

Report to the DCA

This report is prepared under section 30P of the *Planning Act 1999*, and considers the submissions made in relation to the proposal

DEVELOPMENT CONSENT AUTHORITY DARWIN DIVISION

PROPOSED CONCURRENT APPLICATION PA2023/0327

Amendment proposal to rezone Part Lot 7433 and Part Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin from Zone FD (Future Development) to Zone LR (Low Density Residential) and Zone LMR (Low-Medium Density Residential)

And

A development proposal seeking consent to Part Lot 7433 and Part Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin for subdivision to create 18 lots

Agenda Item Number: **1**

Meeting Date: 09 December 2024

Bookmark A	Site Context
Bookmark B	Application Material
Bookmark C	Public Submission: Bookmarks C1-C14
Bookmark D	Technical Assessment
Bookmark E	Service Authority Submissions: Bookmarks E1-E8

1. GENERAL INFORMATION

ADDRESS:	Part Lot 7433 and Part Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin (Bookmark A1)
CURRENT ZONE:	Zone FD (Future Development)
PROPOSED ZONE:	LR (Low Density Residential) and LMR (Low-Medium Density Residential)
SUMMARY OF APPLICATION:	Subdivision to create 18 lots
APPLICANT:	Earl James and Associates, Kevin Dodd
LAND OWNER:	Dover Investments Pty Ltd, Director Ivan Wong
BENEFICIARY:	Land owner
AREA:	Lot 7433 - 54,300m ² / 5.34ha Lot 5988 is 42,900m ² / 4.29ha

2. LEGISLATIVE REQUIREMENTS

The Minister for the Department of Lands, Planning and Environment is responsible for determining proposals to amend the NT Planning Scheme 2020 (including the amendment component of a concurrent application).

The *Planning Act 1999* establishes requirements relating to the exhibition, consultation and reporting of concurrent applications.

Under section 30N, the consent authority must conduct a hearing if any submissions are received during the exhibition period.

Under section 30P, the consent authority must (following any required hearing and taking account of matters under section 30P(2)) make a preliminary decision that if the Minister were to approve the amendment proposal, the authority would be likely to consent or refuse to consent to the development proposal.

Under section 30Q of the Act, the consent authority must give the Minister a written report that includes the preliminary decision, the submissions received, the issues raised in submissions or during consultation, and any other information that the consent authority believes the Minister should take into account when considering the proposal.

Upon receipt of a notice of approval of the amendment proposal from the Minister, the consent authority must determine, as required by section 30W(1) to either consent, alter and consent or refuse the development proposal.

Third Party Appeal Rights

There is no third party right of appeal in relation to any decision by the Minister for Lands, Planning and Environment in relation to the amendment proposal.

There is no right of appeal by a third party under section 117 of the *Planning Act 1999* in respect of this determination as pursuant to Part 4 of the *Planning Regulations 2000* section 14(2) states *there is no right of review if the determination relates to the subdivision...of land.*

3. ASSESSMENT SYNOPSIS

This report concludes that the Authority should:

- make a preliminary decision that if the Minister were to approve the amendment proposal the consent authority would be likely to consent to the development proposal;
- provide a report to the Minister including the preliminary decision, the submissions and the issues raised in the submissions; and
- delegate to the Chair the determination of the development proposal subject to the Minister's decision on the amendment proposal.

4. PROPOSAL

The pre-lodgement meeting with a planning advisor, as required by Section 30B of the *Planning Act 1999*, was held on 4 July 2023. Regarding the amendment proposal it was noted that Zone LR (using greenfield lot sizes) was considered more appropriate for Areas A and C, Zone LMR for Area B can be considered. Proposed lots 13 and 14 (now lots 11 and 12) in Area A would conflict with the alignment of any future road to connect to the constructed intersection at Tiger Brennan Drive, however the Crown Land Estate division of the Department of Lands, Planning and Environment advised that there are no longer plans to develop land to the east and south of Bayview thereby resolving this conflict.

As part of the pre-lodgement meeting, it was noted that a similar subdivision application was submitted by the applicant in 2022 (application reference PA2022/0474) and it was recommended that the applicant refer to the matters previously raised in the technical assessment for that application, service authority comments and public submissions received. The application was withdrawn by the applicant in April 2023.

On 27 September 2023, Kevin Dodd of Earl James and Associates lodged a concurrent application comprising:

- an amendment proposal to rezone Part Lot 7433 and Part Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin from Zone FD (Future Development) to Zone LR (Low Density Residential) and Zone LMR (Low-Medium Density Residential) and
- a development proposal seeking consent to subdivide Part Lot 7433 and Part Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin to create 19 lots.

The application notes that in order to subdivide the land in accordance with the Darwin Inner Suburbs Area Plan, a planning scheme amendment to change the zone from Zone FD (Future Development) to Zone LR (Low Density Residential) and Zone LMR (Low-Medium Density Residential) is required to support the proposed lot sizes. The concurrent application process is being utilised to allow for a single process for the application, exhibition and receiving of comments for both the planning scheme amendment and development application.

Lots 5988 and 7433, Town of Darwin, are Crown lease parcels that have been progressively developed as the Bayview Marina Estate. The developers were initially granted a Crown lease

over Lot 5988, Town Darwin (CLT 1251) in 1993. Then in 2004, a Crown lease (CLT 2155) was granted over an additional land area (Lot 7433) to enable the subdivision to be expanded. The current application proposes to create 18 lots as below:

Area A – Comprises of a strip of land that is part of Lot 5988 and a portion of Lot 7433. The subdivision proposes to create 12 lots in this area having lots sizes ranging from 454m² to 715m² and will be in zone LR. This area also includes the creation of a 15m wide public road and access to Lot 7433 adjacent to Lot 10.

Area B – Comprises of a strip of land that is part of Lot 5988 and a portion of Lot 7433. The subdivision proposes to create 2 lots in this area measuring 399m² and 392m² and is zoned LMR.

Area C - Comprises of the middle section of Lot 7433 and a small portion of Lot 5988. The subdivision proposes to create 4 lots and a 15m wide public road and access to Lot 7433 adjacent to Lot 1. The 2 lots to the north will be in zone LR and include lot sizes of 1429m² and 670m². The two lots to the south will be in Zone LMR and include lot sizes of 1812m² and 597m².

The balance of Lot 7433 will form the remnant Crown Lease Term (CLT) parcel. The subdivision includes lots that can be used for the purpose of dwelling-single, dwelling-group and dwelling multiple. The Area Plan identifies the site residential and future development, and a discussion relating to provisions of the intended zoning, zone LR and LMR is provided below.

A copy of the exhibition material including the application is at **Bookmark B1**.

Following exhibition of the application, the application was deferred under delegation to allow the applicant to address matters raised in the technical assessment and in comments from service authorities.

The applicant provided two amended subdivision layouts, one with 18 lots (**Bookmark B2**) and the second with minor changes to the (18) lots sizes and an access provided from proposed Area A to Area C (**Bookmark B3**) in response to comments from Council. The amended subdivision plans were circulated to submitters and service authorities for comment. Any development permit issued should reference the revised proposal of “subdivision to create 18 lots”. The applicant’s response to service authority comments is discussed further in section (I).

Planning History

In 2022 a similar subdivision application (for 21 lots) was lodged over the lots located in Zone FD however the proposal was withdrawn and the concurrent application lodged in its place.

The planning history for Lot 5988 and Lot 7433 is provided below.

Development Permit	Purpose	Date of Issue	Lot 5988	Lot 7433
DP13/0635A	Extension of time for 2 years to DP13/0635.	06/10/2015	✓	✓
DP13/0635	Subdivision to create 2 lots	18/09/2013	✓	✓
DP11/0778	Subdivision to create 5 lots	26/10/2011	✓	
DP06/0278	6 x 3 bedroom cluster dwellings in 2 x 2 storey buildings	05/07/2006	✓	✓

Development Permit	Purpose	Date of Issue	Lot 5988	Lot 7433
DP08/0327	Subdivision to create 65 lots	23/04/2008	✓	
DP02/0144A	Extension of time for 1 year to DP02/0144	19/01/2006	✓	✓
DP04/0322	Building set back plans for Stage 10 Bayview Estate	19/11/2004	✓	✓
DP04/0010	Subdivision to create 29 lots	28/07/2004	✓	✓
DP03/0265	Subdivision to create 1 lot	17/10/2003		✓
DP04/0081	5x3 bedroom cluster dwellings in 2 storeys	24/03/2004	✓	
DP03/0288	Subdivision to create 3 lots	12/11/2003	✓	
DP03/0074	33 x 3 Bedroom Flats in 4 Storeys & Restaurant / 10 x 3 Flats in 3 Storeys	28/03/2003	✓	
DP02/0104C	Consolidate proposed Lots 6211 and 6212 at the southern end of Fanning Dive	05/12/2002	✓	
DP02/0104B	Remove marina berths from proposed Lots 1 (6075) & 2 (6076)	05/11/2002	✓	
DP98/0218H	Amend Boundaries of Lot 6943	05/11/2002	✓	
DP98/0218G	Carparking Lot	03/10/2002	✓	
DP02/0104A	Vary the size of Proposed Lots 22, 23 & 24 and include the water adjacent to proposed Lot 3 in the title to that lot	18/06/2002	✓	
DP98/0218F	Include water to lots 6071 to 6074	18/06/2002	✓	
DP98/0218E	Extension of time for 2 years	31/05/2002	✓	
DP02/0144	Foreshore filling	12/06/2002	✓	
DP02/0104	Subdivision to create 45 lots	14/05/2002	✓	
DP02/0244	Building setbacks & design guidelines - Bayview stage 8	30/09/2002	✓	
DP98/0218D	Variation to layout	07/11/2001	✓	
DP98/0218C	Boundary re-alignment and additional 2 lots	22/08/2001	✓	
DP01/0388	Setback & design guidelines stage 7B & 9	08/10/2001	✓	
DP01/0347	Subdivision to create 38 lots - Stage 9	04/10/2001	✓	
DP01/0314	Subdivision to create 15 lots - Stage 7B	10/08/2001	✓	
DP98/0218B	Subdivision to create Lot 6943	09/11/1999	✓	
DP00/0101	8 x 3 Bedroom Cluster Dwellings	21/03/2000	✓	

Development Permit	Purpose	Date of Issue	Lot 5988	Lot 7433
DP98/0389	Sales Office	07/08/1998	✓	
DP98/0218	Subdivision to create 231 lots	25/05/1998	✓	
S 2562	Subdivision to create 2 lots	10/12/1993	✓	

5. SITE AND LOCALITY CONTEXT

The suburb of Bayview is located northeast of the Darwin Central Business District and has been developed for predominately residential purposes with some commercial land uses located in the marina.

Lot 5988 and Lot 7433 Town of Darwin are Crown Lease parcels that have progressively been developed as the Bayview Marina Estate. The land subject to this application (the site) has been identified as the last suitable land for residential development within the original Crown Lease areas of the estate. The applicant advised this will be the final subdivision in the current Crown Lease parcels.

The site is adjacent to lots zoned LMR (Low-Medium Density Residential), LR (Low Density Residential) and FD (Future Development).

Access to the Bayview Estate is provided via a signalised intersection at Stoddart Drive and Tiger Brennan Drive to the west and via a left in – left out access at Stoddart Drive and Tiger Brennan Drive to the east.

Site, Surrounds and Zoning

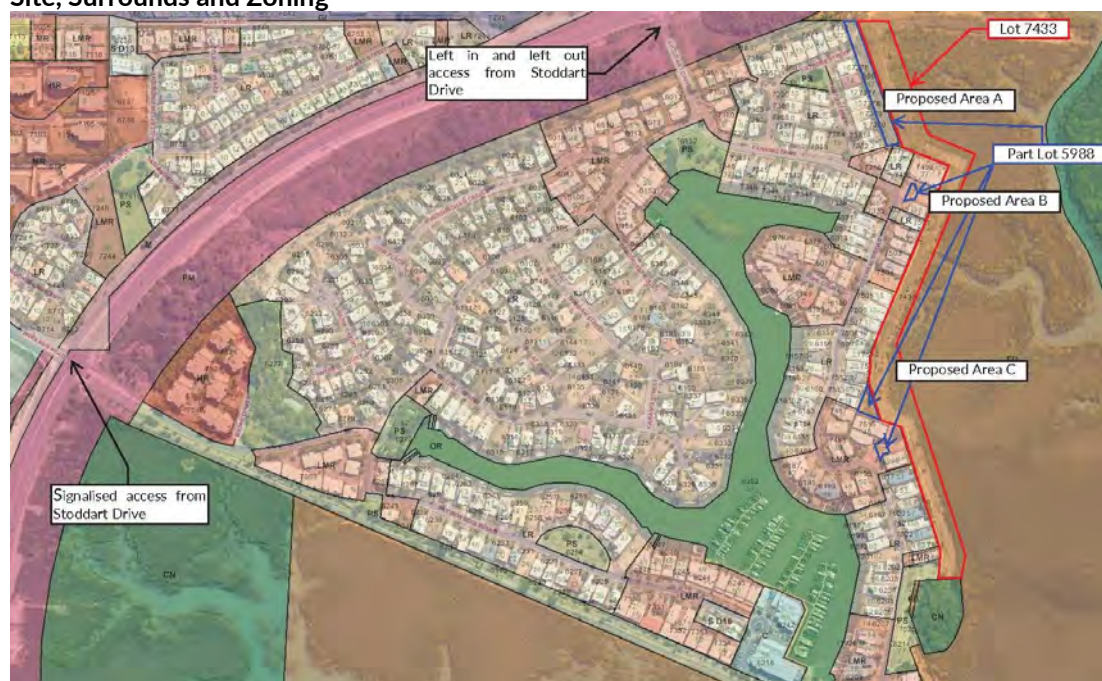


Figure 1: Bayview Locality Plan

6. PUBLIC EXHIBITION

The application was placed on public exhibition for a period of 28 days from 8 March 2024 to 5 April 2024. 13 public submissions were received under section 49(1) of the *Planning Act 1999* and one late submission was received on 8 April 2024. Copies of the submissions received are at **Bookmarks C1 – C14**.

7. PRELIMINARY DECISION ABOUT DEVELOPMENT PROPOSAL (SECTION 30P OF THE PLANNING ACT)

Section 30P(2) of the *Planning Act 1999* establishes matters the consent authority is required to consider in making a preliminary decision in relation to the development proposal.

The matters discussed below are those identified in section 30P(2) that are relevant to this proposal.

(a) the planning scheme that applies to the land to which the application relates (the land);

Northern Territory Planning Scheme 2020 (NTPS 2020)

The NT Planning Scheme 2020 applies to the land and subdivision to create 18 lots requires consent under Clause 1.8 (When development consent is required). It is identified as Impact Assessable under Clause 1.8(1)(c)(ii), therefore the strategic framework (Part 2 of the Scheme, including Darwin Regional Land Use Plan 2015 and Darwin Inner Suburbs Area Plan 2016), overlay Clauses 3.4 (CR - Coastal Reclamation) and 3.7 (LSSS - Land Subject to Storm Surge) zone purpose and outcomes of Clauses 4.2 (Zone LR – Low Density Residential) and Clause 4.3 (Zone LMR – Low-Medium Density Residential) and Clauses 6.2.1 (Lot Size and Configuration for Subdivision in Zones LR, LMR, MR and HR), 6.2.2 (Lots Less Than 600m² for Dwellings-Single), 6.2.3 (Site Characteristics for Subdivision in Zones LR, LMR, MR and HR) and 6.2.4 (Infrastructure and Community Facilities for Subdivision in Zones LR, LMR, MR and HR), need to be considered.

These clauses have been considered and it is found that the proposal complies with the relevant requirements of the Planning Scheme. A copy of the technical assessment is provided at **Bookmark D**.

Part 2 - Strategic Framework

Clause 2.1 (Purpose of the Strategic Framework) requires that interpretation of the Planning Scheme and determinations of a consent authority have regard to the policies and planning concepts expressed in documents appearing in Part 2 or Schedule 5 and ensure that a use or development or proposed use or development is consistent with them.

Darwin Regional Land Use Plan 2015 (DRLUP)

The purpose of the Darwin Regional Land Use Plan 2015 (DRLUP) is to identify the essential characteristics and needs that will shape future development in the region and establish an overarching framework for that development.

The location of the proposed development is in an area identified for Urban/Peri-Urban land use. These areas will accommodate a full range of land uses such as a variety of housing types,

retail and commercial, community facilities and services, sport, recreation and urban open space, and natural and conservation areas.

The proposal aligns with the key Residential objectives of the DRLUP by providing residential lots that integrate new and existing residential development to maintain character and create a cohesive society that meets the diverse needs and aspirations of all sectors of the community.

The high level mapping in the DRLUP does not recognise the nuances in established areas between those smaller sites that have been built upon and those that remain undeveloped. A discussion regarding application of clause 6.2.1 is provided later in the section of this report with the Part 6 – Subdivision Requirements.

Darwin Inner Suburbs Area Plan 2016

The Darwin Inner Suburbs Area Plan 2016 (DISAP) provides a framework to guide progressive growth and development within the Inner Suburbs of Darwin building on the broad regional strategic planning policies established by the Darwin Regional Land Use Plan 2015.

The Land Use Plan identifies the subject land as future development. Land to the west of the subject land is shown in the DISAP as a mixture of low density and low-medium residential, which forms part of the existing Bayview Marina Estate.

Part 3 – Overlays

3.4 CR - Coastal Reclamation

The site is within the level of the highest astronomical tide. The application proposes site preparation earthworks and a sea wall to ensure the site (areas A and C) is suitable for residential development. Area B does not require earthworks as this area has been filled and surcharged as part of a previous stage of Bayview that was completed in 2004.

Sub-clause 3 of Clause 3.4 (CR - Coastal Reclamation) states, *the consent authority in considering an application for coastal landfill must have regard to the advice of the agency responsible for natural resources and the environment.*

The application was circulated to the Department of Lands, Planning and Environment, previously the Department of Environment, Parks and Water Resources and their comments are summarised below in section (I). Conditions and notes relating to acid sulfate soils and erosion and sediment control have been recommended for inclusion on any development permit issued.

3.7 LSSS - Land Subject to Storm Surge

The purpose of Clause 3.7 (LSSS - Land Subject to Storm Surge) is to identify areas with a known risk of inundation from primary or secondary storm surges and ensure that development in these areas demonstrates adequate measures to minimise the associated the risk to people, damage to property and costs to the general community caused by storm surge.

The relevant administration is provided below:

- (5) *Land within the PSSA is to be used or developed only with consent.*
- (6) *The consent authority may consent to a use or development within the PSSA that is not in accordance with sub-clauses 8-10 only if it is satisfied that the application demonstrates that there is no increased risk to people and property, including adjoining property.*

The site is located within the primary and secondary storm surge area (PSSA and SSSA). The application identifies bulk earthworks that will be undertaken to achieve the proposed road design and site levels for lots in preparation for residential development. These works will ensure that the lots are suitable for development as they will be elevated to approximately RL 6.5m AHD, above the storm surge level. In addition, a seawall is proposed will enable the development of the lots for their intended purposes, and with a crest level of RL6.5m AHD, will mitigate risk and damage as a result of any storm surge event.

Part 4 – Zones

4.2 Zone LR – Low Density Residential

The subdivision proposal is separated into 3 areas, area A and part of area C is in zone LR (Low Density Residential). The area A subdivision proposes to create 12 lots in this area having lot sizes ranging from 454m² to 715m². The Area C subdivision proposes to create 4 lots and a 15m wide public road. The 2 lots to the north will be in zone LR and include lot sizes of 1429m² and 670m². The remaining 2 lots to the south will be in Zone LMR.

Access to area A will extend from Latrobe Street and include the creation of a 15m wide public road which will provide access to each of the lots. Access to area C will extend from O’Ferrals Road and include the creation of a 15m wide public road which will provide access to each of the lots. Council access from Area A to Area C to Lot 7433 is provided from an access road adjacent to Lot 10A and Lot 1C. City of Darwin advises they are satisfied with the new access arrangements to the remaining part Lot 7433, to allow vehicle access between area A and area C.

The proposal will add to the residential land supply for low density dwellings (such as dwelling-single, dwelling-independent and ancillary structures etc.) in an area identified for a range of low-rise housing options in accordance with the purpose of the zone.

4.3 Zone LMR – Low-Medium Density Residential

The subdivision proposal is separated into 3 areas, area B and part area C is in zone LMR (Low-Medium Density Residential). The Area B subdivision proposes to create 2 lots in this area measuring 399m² and 392m². The Area C subdivision proposes to create 4 lots and a 15m wide public road. The 2 lots to the north will be in zone LR and 2 lots to the south will be in Zone LMR and include lot sizes of 1812m² and 597m².

Access to area B is provided from Fanning Drive/O’Ferrals Road and access to area C will extend from O’Ferrals Road and include the creation of a 15m wide public road which will provide access to each of the lots. The proposal will add to the residential land supply for low-medium density dwellings (such as dwelling-single, dwelling-group etc.) in an area identified for a range of low-rise housing options in accordance with the purpose of the zone. The land is located in an area with access to existing transport networks, reticulated services, open space and community facilities.

Part 6 – Subdivision Requirements

The assessment of the lot layout and proposed building envelopes comply with Clauses 6.2.1 (Lot Size and Configuration for Subdivision in Zones LR, LMR, MR and HR) and 6.2.2 (Lots Less Than 600m² for Dwellings-Single), on the basis the application is assessed under the following Zone LR greenfield provisions:

- Under clause 6.2.1 the minimum lot size for Zone LR in greenfield areas identified for compact urban growth in the strategic framework is an average of 600m² and no smaller than 450m².

Clause 6.2.1 provisions relating to *minimum lot sizes for Zone LR other than greenfield areas identified for compact urban growth in the strategic framework* of 800m² has not been applied as part of this assessment.

The broader Bayview Marina Estate was developed prior to the introduction of the DRLUP in the Planning Scheme; and comprises a range of smaller lot sizes.

The LR lots adjoining proposed area A (Lots 7374 to 7499) have lots sizes ranging from 524m² (Lot 7378) to 732m² (Lot 7375), where the majority of lots are 600m² or less. This excludes Lot 7486 with a lot size of 887m² and Lot 7499 is 1970m² as these 2 lots are zoned LMR. Adjoining proposed lots 1 and 2 of part area C, the lots sizes are 602m² to 619m².

There is no clear definition of greenfield in the DRLUP or DISAP, however, there is a definition of greenfield in the Compact Urban Growth Policy 2015 which is *the creation of new planned suburbs and communities on previously undeveloped land*.

Historic imagery confirms that prior the development of the Bayview Marina Estate, the land was undeveloped and is therefore appropriately considered as greenfield.

This application applies to the last portion of land within the original estate lease area suitable for residential development. The application also seeks to match the existing zoning along proposed area A and part of area C where the existing zoning pattern is LR.

In addition, the proposal has been assessed as complying with Clauses 6.2.3 (Site Characteristics for Subdivision in Zones LR, LMR, MR and HR) and 6.2.4 (Infrastructure and Community Facilities for Subdivision in Zones LR, LMR, MR and HR).

(b) *the amendment proposal in the application;*

The amendment proposal within this application relates to a proposed change in the zoning of the land, from Zone FD (Future Development) to Zone LR (Low Density Residential) and Zone LMR (Low-Medium Density Residential). The merits of the proposal are discussed in section 7(i) of this report. In summary, the site is potentially suitable for the proposed use because it facilitates housing choice to meet the diverse needs of Darwin's population consistent with the existing pattern of residential development and promotes sustainable development by utilising existing service infrastructure.

(c) *any significant development report given to the consent authority under section 30D(6)(c)(iii);*

The Minister did not request a significant development report.

(d) *any interim development control order in force for the land;*

There are no interim development control orders relevant to the site.

- (e) *any environment protection objective, as defined in section 5 of the Waste Management and Pollution Control Act , that is relevant to the land;*

The application was circulated to DEPWS and have identified a range of statutory obligations under the WMPC Act in their comments which will be referenced as a permit note.

- (f) *any information received as a result of consultations carried out, submissions received, or evidence given at a hearing;*

A total of 13 public submissions were received during the exhibition period and one submission was received after the exhibition period (refer to section (r) below). A list of the submissions received are at **Bookmark C1 to C14**.

The issues raised in the submissions are summarised below:

Nuno De Castro 24 Stoddart Drive, Bayview (Bookmark C1)	<ul style="list-style-type: none"> • Requests the consideration of traffic volumes along Stoddard Drive for existing properties. • Concerns that the section of Stoddart Drive between Broadhurst Court and Laidlaw Court has not been constructed to accommodation traffic volumes for a primary collector or secondary collector road and instead is a minor street/ cul de sac. • Concerns regarding traffic safety to residents reversing onto Stoddart Drive. • Consideration of another entry/exit for the development that reduces current traffic volumes through Stoddard Drive between Broadhurst Court and Laidlaw Court. • Traffic plans that consider safety of children, pedestrians and the elderly.
Brandon van Antwerpen (Bookmark C2)	<ul style="list-style-type: none"> • Objects to the proposed subdivision.
Esther and Justin Jones 21 O'Ferrals Road, Bayview. (Bookmark C3)	<ul style="list-style-type: none"> • Objects to the proposed subdivision. • The removal of native mangroves in Area C as a result of the proposed subdivision on climate change and impacts on the marine environment. • Disputes that the applications involves harbour dredging. • Backflow and leeching into the nearby creek system and mangrove system affecting fish and other vulnerable and endangered species in Darwin Harbour. • Impact on fauna from the proposal as a 2015 environmental report identified 26 vulnerable, 19 endangered and one critically endangered marine, mammal and fauna species living in Darwin's harbour including Bayview. • Parking congestion for Area C cul-de-sac which is directly behind their property. • Concerns regarding privacy and impact on everyday living for existing Bayview residents as a result of the proposal including overlooking

	<p>into backyard and living areas, increased traffic and noise during construction.</p> <ul style="list-style-type: none"> • Decrease in property value as a result of the proposed subdivision. • Loss of views from their property of the mangroves.
<p>Michelle Leonard and Shane Lally 19 O'Ferrals Road, Bayview (Bookmark C4)</p>	<ul style="list-style-type: none"> • Objects to the proposed subdivision for Area C. • The cost of the road construction from Benison Road not being developed should be provided by the developer. • Requests the developer build a construction road from the Benison Road entrance. • Impact on existing infrastructure as a result of the proposed subdivision including traffic safety for children and residents and road damage from heavy vehicles to City of Darwin road infrastructure. • Concerns regarding security and crime from access being provided beside Lot 1 of Area C. • Decrease in property value as a result of the proposed development and concerns regarding multiple dwelling development that may occur. • Loss of privacy, overlooking from new dwellings and limitation on providing landscape screening due to the existing tiling along the boundary. • The removal of vegetation resulting in urban sprawl creating heat stress. The proposal not supporting the Northern Territory Government Climate Change Response: Towards 2050 and City of Darwin's Greening Darwin Strategy. • Concerns regarding light spill and visual bulk as a result of the additional residential development. • Loss of views from their property of the mangroves, noise pollution, • Traffic safety from drivers speeding and existing parking concerns with cars parking along the verge blocking sightlines.
<p>Rosario S Finocchiaro (Bookmark C5)</p>	<ul style="list-style-type: none"> • Provides background on previous issues regarding dumping of excavation spoil on Crown Land Lot 7433 at the end of Latrobe Street and requests a condition on any development permit that earthmoving plant and general construction access must be via the disused branch of the intersection at the Benison Road and Tiger Brennan Drive intersection rather than via Latrobe Street or Perth Street. • Objects to the proposed subdivision in Area B and the area instead be used as the access to a new road for residents of east Bayview to the Benison Road and Tiger Brennan Drive intersection. • Access to Tiger Brennan Drive from Stoddard Drive presents safety issues as the street is narrow and on a hill.
<p>Christina Nicolakis</p>	<ul style="list-style-type: none"> • Objects to the proposed subdivision.

15 O'Ferrals Road, Bayview (Bookmark C6)	<ul style="list-style-type: none"> • The removal of mangroves as a result of the proposed subdivision on climate change and impacts on the marine environment. • Impact on fauna from the proposal as a 2015 environmental report identified 26 vulnerable, 19 endangered and one critically endangered marine, mammal and fauna species living in Darwin's harbour including Bayview. • Concerns regarding the removal of mature mangroves. • Disputes that the applications involves harbour dredging and that there should be no risk to nature, people, community and property as result of the proposal. • Concerns regarding traffic congestion and emergency vehicle access due to multiple dwelling development and use of on-street car parking. • Concerns regarding privacy, property value and impact on way of living for existing Bayview residents as a result of the proposal including overlooking, increased traffic and noise during construction.
Ilias Nicolakis 15 O'Ferrals Road, Bayview (Bookmark C7)	<ul style="list-style-type: none"> • Objects to the proposed subdivision. • The removal of mangroves as a result of the proposed subdivision on climate change and impacts on the marine environment. • Impact on fauna from the proposal as a 2015 environmental report identified 26 vulnerable, 19 endangered and one critically endangered marine, mammal and fauna species living in Darwin's harbour including Bayview. • Concerns regarding the removal of mature mangroves. • Disputes that the applications involves harbour dredging and that there should be no risk to nature, people, community and property as result of the proposal. • Concerns regarding traffic congestion and emergency vehicle access due to multiple dwelling development and use of on-street car parking. • Concerns regarding privacy, property value and impact on way of living for existing Bayview residents as a result of the proposal including overlooking, increased traffic and noise during construction.
Ranjit Darkadakis 55 Ellengowan Drive, Brinkin (Bookmark C8)	<ul style="list-style-type: none"> • Objects to the proposed subdivision. • The removal of mangroves as a result of the proposed subdivision on climate change and impacts on the marine environment. • Impact on fauna from the proposal as a 2015 environmental report identified 26 vulnerable, 19 endangered and one critically endangered marine, mammal and fauna species living in Darwin's harbour including Bayview. • Concerns regarding the removal of mature mangroves. • Disputes that the applications involves harbour dredging and that there should be no risk to nature, people, community and property as result of the proposal.

	<ul style="list-style-type: none"> Concerns regarding traffic congestion and emergency vehicle access due to multiple dwelling development and use of on-street car parking. Concerns regarding privacy, property value and impact on way of living for existing Bayview residents as a result of the proposal including overlooking, increased traffic and noise during construction.
Georgios and Eleni Georgiou 16 Latrobe Street, Bayview (Bookmark C9)	<ul style="list-style-type: none"> Objects to the proposed subdivision. Purchased their lot as the plans showed there was a walkway at the back providing privacy. Concerns regarding privacy, property value and impact on way of living for existing Bayview residents as a result of the proposal including overlooking, increased traffic and noise during construction.
Virginia Close 4 Perth Street, Bayview (Bookmark C10)	<ul style="list-style-type: none"> Objects to the proposed subdivision proposal. Raises concerns regarding impacts on climate change and the marine environment from the removal of mangroves as a result of the proposed subdivision. Concerns regarding the removal of mature mangroves and mangrove mud on ecology and fauna species. Smell/ pollution associated with mangrove removal. Concerns regarding erosion from sea wall construction and not being publicly accessible. Raises concerns regarding traffic congestion and traffic safety from proposed cul de sacs. Raises questions regarding management of the Darwin Harbour and infrastructure, new roads, electricity and sewage.
Margaret Clinch of PLAN, The Planning Action Network Inc. (Bookmark C11)	<ul style="list-style-type: none"> References previous subdivision application in 2023 that was withdrawn. Concerns from home owners in the area that the proposal would not match the character and quality of homes in the area. Concerns regarding views, access, impact on existing residents Land not suitable for the development as it is located in land with mangroves. The Area Plan does not automatically rezone land and rezoning is to be considered by the Minister. The DISAP identifies the zone as Zone FD and does not indicate a potential change to the zoning. Requests the applicant addresses the environmental considerations (including mangroves) by a certified report by a qualified environmental professional.

	<ul style="list-style-type: none"> Concerns regarding safety from the sea wall and cul de sacs proposed in the subdivision. Concerns regarding connecting the proposed subdivision with existing infrastructure. Concerns that some drawings and plans are not to scale. Concerns regarding the cost of the development and that it's not the answer to the current housing problem.
Allison Grierson, Tim Baldwin, Lisa and Phillip Ryder , David and Leanne Pears 46 and 48 O'Ferrals Road, Bayview (Bookmark C12)	<ul style="list-style-type: none"> The Traffic Impact Assessment report (Attachment K) excludes suburban traffic flow and road configurations of impact to O'Ferrals Road for the rezoning and development. Traffic safety issues from increased vehicles along O'Ferrals Road which narrows, limited parking and traffic congestion. Requests the developer install the new road at Tiger Brennan Drive and Benison Road, not installing the road would mean traffic on Perth Street, Fanning Drive and O'Ferrals Road will significantly increase. Requests reconfiguration of parking on O'Ferrals Road with sealing of the verge making it clear where parking can occur.
James Richardson 18 Omero Street, Brinkin (Bookmark C13)	<ul style="list-style-type: none"> Objects to the proposed subdivision. Site is unsuitable for residential housing due to rising sea levels and low-lying habitat in Darwin Harbour is inundated regularly. Areas A and C should be left vegetation to act as a buffer for the existing residential neighbourhood, erosion control and a buffer against biting insects.

In response to the public submissions received, the applicant provided a response to submissions at **Bookmark B2**.

Development Assessment Services's Comments

The concerns raised in the submissions are noted.

The main issues raised in the submissions relate to:	DAS's Comments
<ul style="list-style-type: none"> Decrease in property value as a result of the proposed subdivision. 	Changes in property value as a result of the proposal is not a planning consideration.
<ul style="list-style-type: none"> The application involves harbour dredging however it's not included in the application and there should no risk to nature, people, community and property as result of the proposal. 	Clause 3.9 (Darwin Harbour Dredging) is listed over the site, however this overlay applies for dredging of the seabed. The proposal does not include dredging of the seabed and therefore this clause is not applicable.

The main issues raised in the submissions relate to:	DAS's Comments
<ul style="list-style-type: none"> The Area Plan does not automatically rezone land and rezoning is to be considered by the Minister. The DISAP identifies the zone as Zone FD and does not indicate a potential change to the zoning. 	<p>The concurrent application is for a planning scheme amendment (rezoning) and development proposal for a subdivision. The rezoning component of the concurrent application will be considered by the Minister.</p>
<ul style="list-style-type: none"> Concerns that some drawings and plans are not to scale. 	<p>The DCA may wish to query the applicant regarding the scale of the plans submitted.</p>
<ul style="list-style-type: none"> Concerns regarding the cost of the development and that it's not the answer to the current housing problem. 	<p>The cost of the development is not a planning consideration.</p>
Existing and future traffic congestion and safety concerns	
<ul style="list-style-type: none"> Traffic Impact Assessment should consider traffic volumes along Stoddard Drive for existing properties, suburban traffic flow and road configurations of impact to O'Ferrals Road for the rezoning and development and safety of children, pedestrians and the elderly. The existing section of Stoddard Drive between Broadhurst Court and Laidlaw Court has not been constructed to accommodate current traffic volumes. Traffic safety for residents reversing onto Stoddard Drive. Emergency vehicles access. 	<p>The roads within the proposed subdivision are managed by City of Darwin. City of Darwin has requested a conditions for road design including pedestrian/cycle corridors and compliance with the NT Subdivision Guidelines. The conditions regarding road design as requested by City of Darwin are recommended on any development permit issued.</p>
<ul style="list-style-type: none"> Construction of another entry and exist into Bayview from road established at Benison Road and Tiger Brennan Drive. 	<p>The application was circulated to the relevant referral agencies including Crown Land Estate, Transport Planning and City of Darwin who did not raise any concerns regarding the access proposed to the subdivision.</p>
<ul style="list-style-type: none"> Condition requested on any development permit that earthmoving plant and general construction access must be via the disused branch of the intersection at the Benison Road and Tiger Brennan Drive intersection rather than via Latrobe Street or Perth Street. Road damage that may occur from heavy vehicles to City of Darwin road infrastructure. 	<p>City of Darwin requests a condition that a Site Construction Management Plan be required including haulage routes, use of City of Darwin land and how land will be managed during the construction phased. A condition can be included on any development permit issued.</p>
<ul style="list-style-type: none"> If not constructed, the cost of the previous road construction works at Benison Road not being developed should be provided by the developer. 	<p>The cost of previous road construction works is not a planning consideration.</p>
<ul style="list-style-type: none"> Proposed Area B be used as access for residents to the east of Bayview to Benison Road and Tiger Brennan Drive intersection. 	<p>The application was circulated to the relevant referral agencies including Crown Land Estate, Transport Planning and City of Darwin who did not raise any concerns regarding the access proposed to the subdivision.</p>
<ul style="list-style-type: none"> Existing and future on street parking congestion as a result of the proposed subdivision. Reconfiguration of parking on O'Ferrals Road with sealing of verge making it clear where parking can occur. 	<p>Latrobe Street, Fanning Drive and O'Ferrals Road are roads managed by City of Darwin, therefore matters regarding on street car parking is the responsibility of City of Darwin.</p>

The main issues raised in the submissions relate to:	DAS's Comments
<ul style="list-style-type: none"> • Management of new roads and infrastructure. 	<p>The roads proposed to be created in the subdivision will be managed by City of Darwin.</p>
<p>Removal of Mangroves</p>	
<ul style="list-style-type: none"> • Impacts on climate change and marine environment. • Backflow and leeching into the nearby creek system and mangrove system affecting fish and other vulnerable and endangered species in Darwin Harbour. • Impact on fauna from the proposal as a 2015 environmental report identified 26 vulnerable, 19 endangered and one critically endangered marine, mammal and fauna species living in Darwin's harbour including Bayview. • Smell/ pollution associated with mangrove removal. 	<p>The application was circulated to referral agency responsible for environmental matters the Department of Lands, Planning and Environment (formerly the Department of Environment, Parks and Water Security). In their original comments they advised the applicant should consider whether the development has the potential for a significant environmental impact under the <i>Environment Protection Act 2019</i> by using the pre-referral screening tool. Further comments were provided recommending the application arrange a pre-referral meeting with DEPWS. The additional information provided following the pre-referral meeting was circulated to DEPWS for review and further comments were provided raising matters to be addressed by the applicant in relation how matter regarding buffer zones for biting midges and disturbance of Potential Acid Sulfate Soils will be addressed.</p> <p>The matter raised in the comments from DEPWS can be addressed through conditions and notes on any development permit issued regarding managing and mitigating acid sulfate soils, as requested by DEPWS in their original comments and regarding biting midges, Medical Entomology recommends a warning on land titles advising of the biting midge problem as a condition.</p>
<ul style="list-style-type: none"> • The proposal not supporting the Northern Territory Government Climate Change Response: Towards 2050 and City of Darwin's Greening Darwin Strategy. 	<p>The application has been assessed against the requirements of the <i>NT Planning Act 1999</i> and <i>NT Planning Scheme 2020</i>.</p>
<ul style="list-style-type: none"> • Areas A and C should be left as vegetation to act as a buffer for the existing residential neighbourhood, erosion control and a buffer against biting insects. • Erosion from sea wall construction and not being publicly accessible. 	<p>Public access to the sea wall is not a planning requirement. Erosion and sediment control can be managed through a condition on any development permit issued.</p>
<ul style="list-style-type: none"> • Land is not suitable for the development as it is located in land with mangroves. 	<p>The land is capable of supporting the proposed development. Comments</p>

The main issues raised in the submissions relate to:	DAS's Comments
<ul style="list-style-type: none"> Site is unsuitable for residential housing due to rising sea levels and low-lying habitat in Darwin Harbour is inundated regularly. 	<p>from service authorities have been sought in relation to the capability of the land. The requirements of service authorities are addressed through conditions and notes on the permit.</p>
<ul style="list-style-type: none"> Requests the applicant addresses the environmental considerations (including mangroves) by a certified report by a qualified environmental professional. 	<p>Additionally, the application identifies bulk earthworks that will be undertaken to achieve the proposed road design and site levels for lots in preparation for residential development. These works will ensure that the lots are suitable for development as they will be elevated to approximately RL 6.5 m AHD, above the storm surge level. In addition, a seawall is proposed will enable the development of the lots for their intended purposes, and with a crest level of RL6.5 m AHD, will mitigate risk and damage as a result of any storm surge event.</p> <p>The applicant has submitted a pre-referral screening report as supporting documentation prepared by EcOz Environmental Consultants.</p>

Impact on amenity

<ul style="list-style-type: none"> Concerns regarding privacy and impact on everyday living for existing Bayview residents as a result of the proposal including overlooking into backyard and living areas, increased traffic and noise during construction. Loss of views from their property of the mangroves. Security and crimes from increased dwellings as a results of the proposed subdivision. Concerns regarding light spill and visual bulk as a result of the additional residential development. Development not complying with low and medium density housing when considering the surrounding area which is mainly single dwellings. The proposal would not match the character and quality of homes in the area. 	<p>The concerns raised regarding the impact on amenity mainly relate to future dwelling development and will be addressed during the development of future dwellings.</p>
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- (g) a matter that the Minister has, under section 30ZC(1), directed the consent authority to consider in relation to concurrent applications generally;**

The Minister has made no direction in relation to the application.

- (h) if a public environmental report or an environmental impact statement has been prepared or is required under the Environmental Assessment Act in relation to the application:**
- (i) the report or statement; and**
 - (ii) the results of any assessment of the report or statement under that Act;**

The application has been circulated to Department of Lands, Planning and Environment (formerly the Department of Environment, Parks and Water Security) for comment who advised that there are matters that need to be addressed by the applicant regarding their pre-referral screening. The comments are discussed further in section (l) below.

(i) the merits of the development proposal as demonstrated in the application;

The application submits the following merits:

The Bayview Marina development is a master planned development that has provided a variety of housing options for the Darwin market over many years and also comprised an Estate Development, unit title component that comprised the lots fronting the marina and the associated marina berths. The land currently being proposed for development is part of the balance of Crown lease issued by the NT Government. The purpose of these Crown leases is for residential subdivisional purposes and the subdivisions now being proposed are consistent with the purpose of the leases that the Government has issued. The proposed subdivisions will be the final subdivisions from the Crown leases and will complete the Bayview Marina development. The design and construction of the proposed, new allotments will benefit the NT economy and will provide prime housing options that are sure to be well sought after in the market. The range of lots sizes being proposed will provide an opportunity for people with varying financial capabilities to secure an allotment and develop a home in close proximity to the Darwin CBD.

(j) the capability of the land to support the development proposal and the effect of the proposal on the land, and on other land, the physical characteristics of which may be affected by the proposal;

The land is capable of supporting the proposed development. Comments from service authorities have been sought in relation to the capability of the land. The requirements of service authorities are addressed through conditions and notes on the permit.

(k) the public facilities or public open space available in the area in which the land is situated and any requirement for the facilities, or land suitable for public recreation, to be provided by the applicant;

The application does not actively provide any public facilities or public open space, however the proposal is located in the existing suburb of Bayview which has established public open space areas within walking distance to the site.

(l) the public utilities or infrastructure provided in the area in which the land is situated and any requirement for:

- (i) public facilities and services to be connected to the land; and**
- (ii) facilities, infrastructure or land to be provided by the applicant;**

The application was circulated to the below service authorities and agencies for comment.

Aboriginal Areas Protection Authority (AAPA) - Bookmark E1

AAPA recommends the proponent apply for an Authority Certificate in accordance with section 19B of the Northern Territory Aboriginal Sacred Sites Act 1989 (the Sacred Sites Act) prior to undertaking any development activity or other work on site.

DAS's response – The comments can be addressed through notes on any development permit issued.

City of Darwin (Council) – Bookmark E2

Council advised they do not object to the proposed rezoning.

Council advised in accordance with the NT Subdivision Development Guidelines and City of Darwin requirements, gross pollutant traps to stormwater outlets affected by this subdivision are required to be installed, to the satisfaction of the City of Darwin and at no cost to Council.

Council will be requiring an extended defects liability period for all infrastructure within this subdivision which is to be handed to City of Darwin.

Conditions precedent regarding vehicle access, stormwater management, site construction management plan are requested. Comments are provided regarding street trees, street and public lighting and road design are provided. Council request conditions regarding design and specification for landscaping on the road verges, crossovers and driveways, sight lines, easements, works over Council property, stormwater connections, design and specifications of roads and compliance with the NT Subdivision Development Guidelines.

Council raised concerns regarding the proposed subdivision layout and requested updated plans demonstrating the provision of a heavy vehicle access to Lot 7433, to allow vehicle access between Area A and Area C. The applicant provided amended plans which were circulated to Council who advised they are satisfied with the new access arrangements to the remain part Lot 7433, to allow vehicle access between Area A and Area C and the other issues raised in the letter dated 5 April 2024 can be included in the conditions in any development permit.

DAS's response – The comments can be addressed through conditions and notes on any development permit issued.

Department of Lands, Planning and Environment (formerly Department of Environment, Parks and Water Security) Bookmark E3

The Environment Division of DEPWS advised:

- The applicant should consider whether the development has the potential for a significant environmental impact under the *Environment Protection Act 2019* by using the pre-referral screening tool. Further comments were provided recommending the application arrange a pre-referral meeting with DEPWS. The additional information provided following the pre-referral meeting was circulated to DEPWS for review and further comments were provided raising matters to be addressed by the applicant in relation how matter regarding buffer zones for biting midges and disturbance of Potential Acid Sulfate Soils will be addressed. The applicant provided at response at **Bookmark B4** to the matters raised by DEPWS advising that:
 - *a Caution Notice should be lodged with the parent parcel noting the inherent biting midge problem and that the owner/occupier is responsible for managing biting midge problems that occur on their land.*
 - *appropriate mosquito breeding prevention and control measures be implemented during the construction phase (i.e. preventing the creation of standing or pooling water bodies where mosquitos may breed).*
 - *Recommendation of a condition on any development permit issued to prepare an Acid Sulfate Soil Management Plan (ASSMP) which details the expected volumes to*

be generated, handling and treatment procedures, testing requirements and monitoring.

- Standard comments were provided regarding statutory obligations under the *Waste Management and Pollution Control Act 1998 Act*, dust, noise, stormwater, storage, site contamination and waste management.
- The development has potential to create acid sulfate soils and consideration should be made to manage and mitigate acid sulfate soils during the development. A note has been requested regarding managing and mitigating acid sulfate soils.
- The Land Management Unit notes the application includes an Erosion and Sediment Control Plan and advises the document has not been reviewed and requests conditions and notes on any development permit issued for a Type 2 Erosion and Sediment Control Plan.
- Weed species are present over the subject parcels and are subject to the *Weeds Management Act 2001 (WM Act)*. A note has been requested regarding management of weeds under the WM Act.
- The Flora and Fauna Division notes that there will be some clearing of mangroves that those areas have already been impacted by the existing Bayview development due to edge effects and changes to local hydrology etc.
- The lots are located outside a water control district and are not subject to a water allocation plan.

DAS's response – The pre-referral screening comments from DEPWS requested the applicant address matters regarding buffer zones for biting midges and disturbance of Potential Acid Sulfate Soils. A note regarding managing and mitigating acid sulfate soils was requested by DEPWS in their original comments and the regarding biting midges, Medical Entomology recommends a warning on land titles advising of the biting midge problem. The comments can be addressed through conditions and notes on any development permit issued.

Medical Entomology, Department of Health - Bookmark E4

Medical Entomology advises the proposed lot will be subject to high to very high pest biting midge problems from the adjacent mangrove area. There are currently no insecticide control options to treat mangrove biting midge breeding grounds. Adult biting midge control may be effective to some extent, but would be the responsibility of the landowner to organise such treatments on their private lots via a pest controller. Medical Entomology notes the reduction in the size of the originally approved Bayview and the affluent nature of the suburb suggest the potential for indoor air-conditioned living would reduce biting midge exposure. Medical Entomology notes they receive biting midge complaints from residents, and newcomers to Darwin in particular can experience intense itching, secondary infection and scarring. Medical Entomology recommends a warning on land titles advising of the biting midge problem, and that NT Health and local council is unable to resolve the biting midge issue and recommendations provided to prospective buyers regarding architectural design to reduce biting midge exposure.

Additionally Medical Entomology advises an unlined drain to the north of the proposal holds stagnant water during the dry season and requires regular insecticide treatment by Medical Entomology and recommends the drain is strained to reduce ponding and mosquito breeding in the drain.

Medical Entomology notes an appropriate all weather access easement provided along the eastern boundary of proposed Lot 12, to allow machinery to access the southern bank of the

unlined drain via Latrobe Street. In response to this comment the applicant advised the drain referred to in the submission from Entomology is external to the Crown lease and consequently access should not have to be provided adjacent to proposed Lot 12. Access to the entire drain is already available from Stoddart Drive.

DAS's response – It is not recommended that a condition be placed on the development regarding an access easement or remediate the bend in the drain north of the proposal as the lots fall outside of the applicant's lease and the proposed development area. The sites to the North are managed by Crown Land Estate and the application was circulated to them for comment, however they did not raise any concerns regarding the proposed subdivision layout.

The remaining comments from Medical Entomology regarding biting midge control through the construction phase and a caution notice can be addressed through conditions and notes on any development permit issued.

Power and Water Corporation, Power Networks – **Bookmark E5**

Power Networks advises the proponent is to engage the relevant professionals to carry out power servicing to the requirements of Power and Water Corporation.

DAS's response – The comments can be addressed through conditions and notes on any development permit issued.

Power and Water Corporation, Water Services – **Bookmark E6**

Water Services advised the parent parcels are not currently connected to reticulated water and sewer services. The developer is to engage the relevant professional to provide water and sewer services to the requirements of Power and Water Corporation. There is an existing sewerage easement within Lot 5988 and structures must not be located on or over a water supply or sewerage easement.

DAS's response – The comments can be addressed through conditions and notes on any development permit issued.

Survey Land Records, DIPL – **Bookmark E7**

Survey Land Records advises they have no comment for the proposed rezoning. Regarding the subdivision Survey Land Records advises to ensure any potential encroachment issues are taken into account with regarding to new boundaries, contact Place Names unit for road to be officially names, street addressing will be assigned on data allocation and for the proponent to be aware of survey markers in the area.

DAS's response – The comments can be addressed through notes on any development permit issued.

Transport Planning, DIPL – **Bookmark E8**

Transport Planning advises all proposed work within, or impacting upon the Tiger Brennan Drive road reserve shall be in accordance with the standards and specifications of the Transport Civil Services Division (TCSD). Access from a NTG controlled road is to be sought from TCSD. All new road reserves created within the subdivision shall be vested with the relevant local road authority and shall be noted on the survey plans as such.

DAS's response – The comments can be addressed through notes on any development permit issued.

Crown Land Estate did not raise any concerns regarding the proposed subdivision or rezoning and noted that the development will need to be completed in line with all the relevant NT legislation regarding the installation of firebreaks and the Weeds Management Act.

DAS's response – The comments can be addressed through notes on any development permit issued.

No comments received by NBN Co, Land Development Unit and Environmental Health.

(m) *the potential impact on the existing and future amenity of the area in which the land is situated;*

The proposal complies with the subdivision requirements for Zone LR and LMR and is generally consistent with the surrounding residential development. Conditions and advisory notes on any permit issued can address matters identified by service authorities (erosion and sediment control, stormwater, construction noise, vehicle access, reticulated services etc.).

(n) *the public interest, including (if relevant) how the following matters are provided for in the application:*

- (i) *community safety through crime prevention principles in design;***
- (ii) *water safety;***
- (iii) *access for persons with disabilities;***

It is not considered that the proposed zoning and development would have an adverse impact upon the public interest in terms of community safety, water safety, or access for persons with a disability.

(o) *if the development proposal relates to a subdivision of land on which a building is, or will be, situated – whether the building complies, or will comply, with any requirements prescribed by regulation in relation to the building (including, for example, requirements about the structural integrity and fire safety of the building);*

Not applicable.

(p) *any potential impact on natural, social, cultural or heritage values (including, for example, the heritage significance of a heritage place or heritage object under the Heritage Act);*

The proposal is unlikely to have any potential impact on social, cultural or heritage value within this development area.

(pa) *for a proposed subdivision or consolidation of land in a Restricted Water Extraction Area – whether the subdivision or consolidation complies with the restrictions of sections 14A and 14B of the Water Act 1992 and the requirements of section 14C(1) of that Act;*

The Water Resources Division of DEPWS advises the lots are located outside a water control district and are not subject to a water allocation plan.

(q) any beneficial uses, quality standards, criteria, or objectives, that are declared under the Water Act ;

The following declared beneficial uses apply to the subject land for Darwin Harbour:

- Aquaculture, environment, cultural, rural stock and domestic.

It is the responsibility of the developer and land owner to ensure that land use does not result in a contravention of the *Water Act 1992*.

(r) other matters the consent authority considers relevant.

One late public submission objecting to the application was received on 8 April 2024 by Merran Short of 8 Latrobe Street, Bayview. The main issues in the submission is summarised below. A full copy of the submission is provided in **Bookmark C14**.

The main issues raised in the submission relate to:

- Traffic congestion, specifically during peak hours into Bayview due to there only being intersection that allows entry and exit from the traffic lights to the west and has a waiting time of several minutes.
- Traffic report should also consider existing vacant blocks that will be developed.
- Additional traffic generated by the development negatively impacting Latrobe Street Perth Street causing an increased risk to residents and children.
- Concerns regarding traffic safety impacts from increased in-street parking a Perth Street is narrow and currently difficult to navigate.
- Development not complying with low and medium density housing when considering the surrounding area which is mainly single dwellings.
- Concerns the proposal will place a greater burden on the existing infrastructure.
- The proposal will affect property value.
- Concerns regarding the placement of the exhibition signs and not being consulted about the proposed development.
- Negative impact on existing residents from increased traffic.
- The nearest park to the development is small and the proposal will place additional pressure on the existing limited open space.
- Concerns regarding the removal of mature mangroves, an irreplaceable and essential ecological system.

The roads within the proposed subdivision are managed by City of Darwin. City of Darwin has requested conditions for road design including pedestrian/cycle corridors and compliance with the NT Subdivision Guidelines and are recommended on any development permit issued. The concerns raised regarding the impact on amenity mainly relate to future dwelling development and will be addressed during the development of future dwellings. Changes in property value as a result of the proposal is not a planning consideration.

The application was circulated to referral agency responsible for environmental matters the Department of Lands, Planning and Environment (formerly the Department of Environment, Parks and Water Security). In their original comments they advised the applicant should consider whether the development has the potential for a significant environmental impact under the *Environment Protection Act 2019* by using the pre-referral screening tool. Further comments were provided recommending the application arrange a pre-referral meeting with DEPWS. The additional information provided following the pre-referral meeting was circulated to DEPWS for review and further comments were provided raising matters to be addressed by the applicant in relation how matter regarding buffer zones for biting midges and disturbance

of Potential Acid Sulfate Soils will be addressed. The matter raised in the comments from DEPWS can be addressed through conditions and notes on any development permit issued regarding managing and mitigating acid sulfate soils, as requested by DEPWS in their original comments and regarding biting midges, Medical Entomology recommends a warning on land titles advising of the biting midge problem as a condition. The application was exhibited in accordance with the requirements of the *Planning Act 1999*.

8. RECOMMENDATION SUMMARY

The consent authority is required to make a number of related decisions about a concurrent application. The decisions required in relation to the amendment proposal and development proposal are summarised below.

Recommended 1 relates to the preliminary decision the consent authority is likely to make, as required by section 30P, on the development proposal seeking consent.

A development proposal seeking consent to Part Lot 7433 and Part Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin for subdivision to create 18 lots, in the event the Minister were to approve the amendment proposal.

Note that the preliminary decision does not result in a development permit at this stage in the concurrent application process.

Recommended 2 relates to the report the consent authority is required, under section 30Q to provide to the Minister.

Recommended 3 delegates to the Chair the determination of the development proposal contained in the application after receipt of a notice from the Minister under section 30U(1) Minister's decision on the amendment proposal.

Note that the determination of the development proposal will also give effect to the amendment proposal contained in the concurrent application.

9. RECOMMENDATION 1

Recommendation 1:

As required by section 30P(1)(a), the consent authority must make a preliminary decision that, if the Minister were to approve the amendment proposal to rezone Part Lot 7433 and Part Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin; and provide consent pursuant to 30W(6) that it would be likely to determine to consent to the development under section 30W(1)(a) conditionally for the purpose of a subdivision to create 18 lots subject to the following conditions:

CONDITIONS PRECEDENT

1. Prior to the commencement of works (including site preparation), in principle approval is required for all road infrastructure including, but not limited to; the road reserve widths, road geometries pavement widths and a detailed landscaping plan for all proposed road reserves, with all works meeting the requirements of the Northern Territory Government's

Subdivision Guidelines 2023, to the requirement of City of Darwin to the satisfaction of the consent authority.

2. Prior to commencement of works (including site preparation), crossover design approval is to be obtained from City of Darwin.
3. Prior to the commencement of works (including site preparation), an engineered plan completed by a suitably qualified civil engineer demonstrating the on-site collection of stormwater and its discharge into the local underground stormwater drainage system, shall be submitted to, and approved by the City of Darwin, to the satisfaction of the consent authority. The plan shall include details of site levels, and Council's stormwater drain connection points and connection details. The plan shall include details of the gross pollutant traps, site levels, Council's stormwater drain connection points and connection details.
4. Prior to the commencement of works (including site preparation), the applicant is to prepare a Site Construction Management Plan (SCMP) to the requirements of the City of Darwin, to the satisfaction of the consent authority. The SCMP should specifically address the impact to Council owned public spaces and include a waste management plan for disposal of waste to Shoal Bay, traffic control for affected City of Darwin roads, haulage routes, storm water drainage & sediment control, use of City of Darwin land, and how this land will be managed during the construction phase.
5. Prior to the commencement of works, a Type 2 Erosion and Sediment Control Plan (ESCP) must be developed in accordance with the Department of Environment, Parks and Water Security 15 <https://www.waterquality.gov.au/issues/acid-sulfate-soils> Page 6 of 8 nt.gov.au Erosion and Sediment Control Plan (ESCP) procedures (see Note 1). The ESCP must be developed and certified by a Certified Professional in Erosion and Sediment Control (CPESC). The ESCP must be submitted for acceptance prior to the commencement of any earth disturbing activities (including clearing and early works) to Development Assessment Services via email: das.ntg@nt.gov.au.

GENERAL CONDITIONS

6. The works carried out under this permit shall be in accordance with the drawings endorsed as forming part of this permit.
7. The owner of the land must enter into agreements with the relevant authorities for the provision of water supply, drainage, sewerage, electricity and telecommunication networks to each lot shown on the endorsed plan in accordance with the authorities' requirements and relevant legislation at the time.

Please refer to notations 1, 2 and 3 for further information.

8. Any developments on or adjacent to any easements on site shall be carried out to the requirements of the relevant service authority to the satisfaction of the consent authority.
9. All existing and proposed easements and sites for existing and required utility services must be vested in the relevant authority for which the easement or site is to be created on the plan of subdivision submitted for approval by the Surveyor General.
10. All proposed roads to be created on the plan of subdivision submitted for approval by the Surveyor General must be dedicated to the City of Darwin.

11. The kerb crossovers and driveways to the site approved by this permit are to meet the technical standards of City of Darwin, to the satisfaction of the consent authority.
12. Engineering design and specifications for the proposed and affected roads, including:
 - a. street lighting
 - b. stormwater drainage
 - c. vehicular access
 - d. pedestrian/cycle corridors, and
 - e. street-scaping and landscaping of nature strips.

Shall comply with the Northern Territory Subdivision Development Guidelines 2023. All approved works will be constructed at the applicant's expense, to the requirements of City of Darwin.

13. Stormwater is to be collected and discharged into the drainage network to the technical standards of and at no cost to the City of Darwin, to the satisfaction of the consent authority.
14. The owner shall:
 - a. remove disused vehicle and/ or pedestrian crossovers;
 - b. provide footpaths/cycleways;
 - c. collect stormwater and discharge it to the drainage network; and
 - d. undertake reinstatement works;

all to the technical requirements of and at no cost to the City of Darwin, to the satisfaction of the consent authority

15. No fence, hedge, tree or other obstruction exceeding a height of 0.6m is to be planted or erected so that it would obscure sight lines at the junction of the driveway and the public street to the requirements of the City of Darwin, to the satisfaction of the consent authority.
16. All works relating to this permit must be undertaken in accordance with the endorsed Erosion and Sediment Control Plan (ESCP) to the satisfaction of the consent authority. Should the endorsed ESCP need to be amended, the revised ESCP must be developed and certified by a Certified Professional in Erosion and Sediment Control (CPESC). The revised ESCP must be submitted for acceptance to Development Assessment Services via email: das.ntg@nt.gov.au.
17. All reasonable and practicable measures must be undertaken to prevent: erosion occurring onsite, sediment leaving the site, and runoff from the site causing erosion offsite. Appropriate erosion and sediment control measures must be effectively implemented throughout the construction phase of the development (including clearing and early works) and all disturbed soil surfaces must be satisfactorily stabilised against erosion at completion of works, to the satisfaction of the consent authority on written advice from the CPESC.
18. Before issue of titles and pursuant to section 34 of the Land Title Act, a Caution Notice should be lodged with the Registrar General on the parent parcel to include the following advice on all the proposed lots indicated on the endorsed drawings. The Caution Notice is to state that: 'The land is subject to high biting midge problems, and the owner/occupier is

responsible for managing biting midge problems that occur on this land. This could be via the use of personal insect repellents, avoidance of outdoor areas during periods of pest biting insect problems, use of protective clothing, use of fine mesh insect screening on dwellings and outdoor patios and verandas, and the use of adult biting insect control insecticides around houses and in shrub and grass areas, applied by a qualified pest controller', to the requirements of Department of Health (Medical Entomology), to the satisfaction of the consent authority.

19. The developer should implement necessary measures to ensure mosquito breeding does not occur during the construction phase of the development, to the requirements of the Department of Health (Medical Entomology), to the satisfaction of the consent authority.

NOTES

1. The Power and Water Corporation advises that the Water and Sewer Services Development Section (waterdevelopment@powerwater.com.au) and Power Network Engineering Section (powerdevelopment@powerwater.com.au) should be contacted via email a minimum of 1 month prior to construction works commencing in order to determine the Corporation's servicing requirements, and the need for upgrading of on-site and/or surrounding infrastructure.
2. All developers, including owner-builders, are required to comply with Commonwealth telecommunications requirements. Under Commonwealth law, developers are generally required to provide fibre-ready pit and pipe in their developments at their expense. Developers may be able to access an exemption from these arrangements in some circumstances. For more information visit www.infrastructure.gov.au/tind
3. If you choose nbn to service your development, you will need to enter into a development agreement with nbn. The first step is to register the development via <http://www.nbnco.com.au/develop-or-plan-with-the-nbn/new-developments.html> once registered nbn will be in contact to discuss the specific requirements for the development. Nbn requires you to apply at least 3 months before any civil works commence. All telecommunications infrastructure should be built to nbn guidelines found at <http://www.nbnco.com.au/develop-or-plan-with-the-nbn/new-developments/builders-designers.html>
4. The development must comply with the technical standards of the Northern Territory Subdivision Development Guidelines for the construction of public infrastructure as part of subdivision works to the requirements of the relevant local and service authorities. Prior to any works commencing, it is encouraged that you engage early with the relevant authorities to confirm their requirements, and any variations that may be sought to the Subdivision Development Guidelines, to ensure the works are completed to the relevant authorities' requirements. The Northern Territory Subdivision Development Guidelines can be found at: <https://www.ntlis.nt.gov.au/sdg-online/>
5. Any proposed works on/over City of Darwin property shall be subject to separate application to City of Darwin and shall be carried out to the requirements and satisfaction of City of Darwin.

6. Street and public lighting shall be designed to achieve the minimum lighting levels required as per the AS/NZS 1158.3.1:2020 and the lighting design shall be certified by a member of the Illuminating Engineering Society (The IES). Street and public lighting designs for public spaces/road reserves/pathways within the subdivision shall be compatible with the City of Darwin's smart lighting control system.
7. Designs and specifications for landscaping of the road verges adjacent to the property shall be submitted for approval by City of Darwin and all approved works shall be constructed at the applicant's expense, to the requirements of City of Darwin.
8. The location, design and specifications for proposed and affected crossovers shall be provided at the applicant's expense, to the satisfaction of City of Darwin.
9. As part of any subdivision, the parcel numbers for addressing should comply with the Australian Standard (AS/NZS 4819:2011). For more information contact Survey and Land Records surveylandrecords@nt.gov.au 08 8995 5356. The numbers shown on the plans endorsed as forming part of this permit are indicative only and are not for addressing purposes.
10. The Department of Environment, Parks and Water Security Erosion and Sediment Control Plan (ESCP) procedures as updated available at: <https://depws.nt.gov.au/land-management>.
11. Information regarding erosion and sediment control can be obtained from the IECA Best Practice Erosion and Sediment Control 2008 books available at www.austieca.com.au and the Land Management Factsheets available at www.nt.gov.au/environment/soil-land-vegetation. For further advice, contact the Development Coordination Branch: (08) 8999 4446.
12. All land in the Northern Territory is subject to the Weeds Management Act 2001 (WM Act). The WM Act describes the legal requirements and responsibilities that apply to owners and occupiers of land regarding declared weeds. General duties described in Division 1 of the WM Act include the requirement to take all reasonable measures to prevent land being infested with a declared weed and to prevent a declared weed from spreading. There are additional duties including a prohibition on buying, selling, cultivating, moving or propagating any declared weed and the requirement to notify the Weed Management Branch of a declared weed not previously present on the land within 14 days of detection. Gamba grass is subject to a statutory weed management plan. Management obligations outlined in these plans are legally binding on all owners and occupiers. Management requirements and copies of the statutory weed management plans are available online at <https://nt.gov.au/environment/weeds/weed-management-planning>. Information regarding weed management is available online, <https://nt.gov.au/environment/weeds>, or alternatively contact the Weed Management Branch for further advice on (08) 8999 4567. Further information as to management requirements and the Weed Management Plan for gamba grass is available online (<https://nt.gov.au/environment/weeds>), or alternatively contact the Weed Management Branch for further advice on (08) 8973 8857.
13. The Transport and Civil Services Division (TCSD) of the Department of Infrastructure, Planning and Logistics (DIPL) advises:
 - All proposed work (including the provision or connection of services) within, or impacting upon the Tiger Brennan Drive road reserve shall be in accordance with the standards and specifications of the TCSD, DIPL.

- Note that a development permit issued under the *Planning Act 1999* is not an approval for access upon a Northern Territory Government (NTG) road. Approval for the access to be taken from, or constructed within the NTG controlled road reserve rests solely with the TCSD, DIPL as the approving authority.
 - All new road reserves created within the subdivision shall be vested with the relevant local road authority and shall be noted on the survey plans as such.
14. The Aboriginal Areas Protection Authority recommends that the permit holder obtain an Authority Certificate to indemnify against prosecution under the *Northern Territory Aboriginal Sacred Sites Act 1989*. For advice on how to obtain a certificate please contact the Aboriginal Areas Protection Authority.
 15. Any proposed works which fall within the scope of the *Construction Industry Long Service Leave and Benefits Act 2005* must be notified to NT Build by lodgement of the required Project Notification Form. Payment of any levy must be made prior to the commencement of any construction activity. NT Build should be contacted via email (info@ntbuild.com.au) or by phone on 08 8936 4070 to determine if the proposed works are subject to the Act.
 16. The development has the potential to create Acid Sulfate Soils (ASS) and consideration should be made to manage and mitigate acid sulfate soils during the development. Any proposed works should be undertaken in accordance with the National Acid Sulfate Soils Guidance and further information - <https://www.waterquality.gov.au/issues/acid-sulfate-soils>. Jurisdictional guidelines such as the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines v4.0 (Dear et al. 2014) and the Western Australian Acid Sulfate Soils Guidelines Series (DER 2015) may also be referenced. It should be noted that failure to ensure proper management of ASS could result in implications with your proposed development.

10. REASONS FOR RECOMMENDATION 1

1. Pursuant to sections 30P(2)(a) and (b) of the *Planning Act 1999*, the consent authority must take into account any planning scheme that applies to the land to which the application relates and the amendment proposal contained within the application.

The NT Planning Scheme 2020 applies to the land and subdivision to create 18 lots requires consent under Clause 1.8 (When development consent is required). It is identified as Impact Assessable under Clause 1.8(1)(c)(ii), therefore the strategic framework (Part 2 of the Scheme, including Darwin Regional Land Use Plan 2015 and Darwin Inner Suburbs Area Plan 2016), overlay Clauses 3.4 (CR - Coastal Reclamation) and 3.7 (LSSS - Land Subject to Storm Surge) zone purpose and outcomes of Clauses 4.2 (Zone LR – Low Density Residential) and Clause 4.3 (Zone LMR – Low-Medium Density Residential) and Clauses 6.2.1 (Lot Size and Configuration for Subdivision in Zones LR, LMR, MR and HR), 6.2.2 (Lots Less Than 600m² for Dwellings-Single), 6.2.3 (Site Characteristics for Subdivision in Zones LR, LMR, MR and HR) and 6.2.4 (Infrastructure and Community Facilities for Subdivision in Zones LR, LMR, MR and HR), need to be considered.

These clauses have been considered and it is found that the proposal complies with the relevant requirements of the Planning Scheme.

Part 2 - Strategic Framework

Clause 2.1 (Purpose of the Strategic Framework) requires that interpretation of the Planning Scheme and determinations of a consent authority have regard to the policies and planning concepts expressed in documents appearing in Part 2 or Schedule 5 and ensure that a use or development or proposed use or development is consistent with them.

Darwin Regional Land Use Plan 2015 (DRLUP)

The purpose of the Darwin Regional Land Use Plan 2015 (DRLUP) is to identify the essential characteristics and needs that will shape future development in the region and establish an overarching framework for that development.

The location of the proposed development is in an area identified for Urban/Peri-Urban land use. These areas will accommodate a full range of land uses such as a variety of housing types, retail and commercial, community facilities and services, sport, recreation and urban open space, and natural and conservation areas.

The proposal aligns with the key Residential objectives of the DRLUP by providing residential lots that integrate new and existing residential development to maintain character and create a cohesive society that meets the diverse needs and aspirations of all sectors of the community.

The high level mapping in the DRLUP does not recognise the nuances in established areas between those smaller sites that have been built upon and those that remain undeveloped. A discussion regarding application of clause 6.2.1 is provided later in the section of this report with the Part 6 – Subdivision Requirements.

Darwin Inner Suburbs Area Plan 2016

The Darwin Inner Suburbs Area Plan 2016 (DISAP) provides a framework to guide progressive growth and development within the Inner Suburbs of Darwin building on the broad regional strategic planning policies established by the Darwin Regional Land Use Plan 2015.

The Land Use Plan identifies the subject land as future development. Land to the west of the subject land is shown in the DISAP as a mixture of low density and low-medium residential, which forms part of the existing Bayview Marina Estate.

Part 3 – Overlays

3.4 CR - Coastal Reclamation

The site is within the level of the highest astronomical tide. The application proposes site preparation earthworks and a sea wall to ensure the site (areas A and C) is suitable for residential development. Area B does not require earthworks as this area has been filled and surcharged as part of a previous stage of Bayview that was completed in 2004.

Sub-clause 3 of Clause 3.4 (CR - Coastal Reclamation) states, *the consent authority in considering an application for coastal landfill must have regard to the advice of the agency responsible for natural resources and the environment.*

The application was circulated to the Department of Lands, Planning and Environment, previously the Department of Environment, Parks and Water Resources. Conditions and notes relating to acid sulfate soils and erosion and sediment control have been recommended for inclusion on any development permit issued.

3.7 LSSS - Land Subject to Storm Surge

The purpose of Clause 3.7 (LSSS - Land Subject to Storm Surge) is to identify areas with a known risk of inundation from primary or secondary storm surges and ensure that development in these areas demonstrates adequate measures to minimise the associated risk to people, damage to property and costs to the general community caused by storm surge.

The relevant administration is provided below:

- (7) Land within the PSSA is to be used or developed only with consent.
- (8) The consent authority may consent to a use or development within the PSSA that is not in accordance with sub-clauses 8-10 only if it is satisfied that the application demonstrates that there is no increased risk to people and property, including adjoining property.

The site is located within the primary and secondary storm surge area (PSSA and SSSA). The application identifies bulk earthworks that will be undertaken to achieve the proposed road design and site levels for lots in preparation for residential development. These works will ensure that the lots are suitable for development as they will be elevated to approximately RL 6.5m AHD, above the storm surge level. In addition, a seawall is proposed will enable the development of the lots for their intended purposes, and with a crest level of RL6.5m AHD, will mitigate risk and damage as a result of any storm surge event.

Part 4 – Zones

4.2 Zone LR – Low Density Residential

The subdivision proposal is separated into 3 areas, area A and part of area C is in zone LR (Low Density Residential). The area A subdivision proposes to create 12 lots in this area having lots sizes ranging from 454m² to 715m². The Area C subdivision proposes to create 4 lots and a 15m wide public road. The 2 lots to the north will be in zone LR and include lot sizes of 1429m² and 670m². The remaining 2 lots to the south will be in Zone LMR.

Access to area A will extend from Latrobe Street and include the creation of a 15m wide public road which will provide access to each of the lots. Access to area C will extend from O'Ferrals Road and include the creation of a 15m wide public road which will provide access to each of the lots. Council access from Area A to Area C to Lot 7433 is provided from an access road adjacent to Lot 10A and Lot 1C. City of Darwin advises they are satisfied with the new access arrangements to the remaining part Lot 7433, to allow vehicle access between area A and area C.

The proposal will add to the residential land supply for low density dwellings (such as dwelling-single, dwelling-independent and ancillary structures etc.) in an area identified for a range of low-rise housing options in accordance with the purpose of the zone.

4.3 Zone LMR – Low-Medium Density Residential

The subdivision proposal is separated into 3 areas, area B and part area C is in zone LMR (Low-Medium Density Residential). The Area B subdivision proposes to create 2 lots in this area measuring 399m² and 392m². The Area C subdivision proposes to create 4 lots and a 15m wide public road. The 2 lots to the north will be in zone LR and 2 lots to the south will be in Zone LMR and include lot sizes of 1812m² and 597m².

Access to area B is provided from Fanning Drive/O'Ferrals Road and access to area C will extend from O'Ferrals Road and include the creation of a 15m wide public road which will provide access to each of the lots. The proposal will add to the residential land supply for low-medium density dwellings (such as dwelling-single, dwelling-group etc.) in an area

identified for a range of low-rise housing options in accordance with the purpose of the zone. The land is located in an area with access to existing transport networks, reticulated services, open space and community facilities.

Part 6 – Subdivision Requirements

The assessment of the lot layout and proposed building envelopes comply with Clauses 6.2.1 (Lot Size and Configuration for Subdivision in Zones LR, LMR, MR and HR) and 6.2.2 (Lots Less Than 600m² for Dwellings-Single), on the basis the application is assessed under the following Zone LR greenfield provisions:

- Under clause 6.2.1 the minimum lot size for *Zone LR in greenfield areas identified for compact urban growth in the strategic framework* is an average of 600m² and no smaller than 450m².

Clause 6.2.1 provisions relating to *minimum lot sizes for Zone LR other than greenfield areas identified for compact urban growth in the strategic framework* of 800m² has not been applied as part of this assessment.

The broader Bayview Marina Estate was developed prior to the introduction of the DRLUP in the Planning Scheme; and comprises a range of smaller lot sizes.

The LR lots adjoining proposed area A (Lots 7374 to 7499) have lots sizes ranging from 524m² (Lot 7378) to 732m² (Lot 7375), where the majority of lots are 600m² or less. This excludes Lot 7486 with a lot size of 887m² and Lot 7499 is 1970m² as these 2 lots are zoned LMR. Adjoining proposed lots 1 and 2 of part area C, the lots sizes are 602m² to 619m².

There is no clear definition of greenfield in the DRLUP or DISAP, however, there is a definition of greenfield in the Compact Urban Growth Policy 2015 which is *the creation of new planned suburbs and communities on previously undeveloped land*.

Historic imagery confirms that prior the development of the Bayview Marina Estate, the land was undeveloped and is therefore appropriately considered as greenfield.

This application applies to the last portion of land within the original estate lease area suitable for residential development. The application also seeks to match the existing zoning along proposed area A and part of area C where the existing zoning pattern is LR.

In addition, the proposal has been assessed as complying with Clauses 6.2.3 (Site Characteristics for Subdivision in Zones LR, LMR, MR and HR) and 6.2.4 (Infrastructure and Community Facilities for Subdivision in Zones LR, LMR, MR and HR).

2. Pursuant to sections 30P(f) of the *Planning Act 1999*, the consent authority must take into account any information received as a result of consultations carried out, submissions received, or evidence given at a hearing.

A total of 13 public submissions were received during the exhibition period and one submission was received after the exhibition period which is addressed in section 30(r) below).

The main issues raised in the submissions relate to:

- Decrease in property value as a result of the proposed subdivision.

- The application involves harbour dredging however it's not included in the application and there should no risk to nature, people, community and property as result of the proposal.
- The Area Plan does not automatically rezone land and rezoning is to be considered by the Minister.
- The DISAP identifies the zone as Zone FD and does not indicate a potential change to the zoning.
- Concerns that some drawings and plans are not to scale.
- Concerns regarding the cost of the development and that it's not the answer to the current housing problem.

Existing and future traffic congestion and safety concerns

- Traffic Impact Assessment should consider traffic volumes along Stoddard Drive for existing properties, suburban traffic flow and road configurations of impact to O'Ferrals Road for the rezoning and development and safety of children, pedestrians and the elderly.
- The existing section of Stoddard Drive between Broadhurst Court and Laidlaw Court has not been constructed to accommodation current traffic volumes.
- Traffic safety for residents reversing onto Stoddard Drive.
- Construction of another entry and exist into Bayview from road established at Benison Road and Tiger Brennan Drive.
- Condition requested on any development permit that earthmoving plant and general construction access must be via the disused branch of the intersection at the Benison Road and Tiger Brennan Drive intersection rather than via Latrobe Street or Perth Street.
- If not constructed, the cost of the previous road construction works at Benison Road not being developed should be provided by the developer.
- Proposed Area B be used as access for residents to the east of Bayview to Benison Road and Tiger Brennan Drive intersection.
- Road damage that may occur from heavy vehicles to City of Darwin road infrastructure.
- Existing and future on street parking congestion as a result of the proposed subdivision.
- Emergency vehicles access.
- Management of new roads and infrastructure.
- Reconfiguration of parking on O'Ferrals Road with sealing of verge making it clear where parking can occur.

Removal of Mangroves

- Impacts on climate change and marine environment.
- Backflow and leeching into the nearby creek system and mangrove system affecting fish and other vulnerable and endangered species in Darwin Harbour.
- Impact on fauna from the proposal as a 2015 environmental report identified 26 vulnerable, 19 endangered and one critically endangered marine, mammal and fauna species living in Darwin's harbour including Bayview.
- The proposal not supporting the Northern Territory Government Climate Change Response: Towards 2050 and City of Darwin's Greening Darwin Strategy.
- Smell/ pollution associated with mangrove removal.
- Erosion from sea wall construction and not being publicly accessible.
- Land is not suitable for the development as it is located in land with mangroves.
- Requests the applicant addresses the environmental considerations (including mangroves) by a certified report by a qualified environmental professional.
- Site is unsuitable for residential housing due to rising sea levels and low-lying habitat in Darwin Harbour is inundated regularly.

- Areas A and C should be left vegetation to act as a buffer for the existing residential neighbourhood against high lights, erosion control and a buffer against biting insects.

Impact on amenity

- Concerns regarding privacy and impact on everyday living for existing Bayview residents as a result of the proposal including overlooking into backyard and living areas, increased traffic and noise during construction.
- Loss of views from their property of the mangroves.
- Security and crimes from increased dwellings as a results of the proposed subdivision.
- Concerns regarding light spill and visual bulk as a result of the additional residential development.
- Development not complying with low and medium density housing when considering the surrounding area which is mainly single dwellings.
- The proposal would not match the character and quality of homes in the area.

Development Assessment Services's Comments

The concerns raised in the submissions are noted. Changes in property value as a result of the proposal is not a planning consideration. Clause 3.9 (Darwin Harbour Dredging) is listed over the site, however this overlay applies for dredging of the seabed. The proposal does not include dredging of the seabed and therefore this clause is not applicable. The concurrent application is for a planning scheme amendment (rezoning) and development proposal for a subdivision. The rezoning component of the concurrent application will be considered by the Minister. The cost of the development is not a planning consideration. The roads within the proposed subdivision are managed by City of Darwin.

Existing and future traffic congestion and safety concerns

City of Darwin has requested a conditions for road design including pedestrian/cycle corridors and compliance with the NT Subdivision Guidelines. The conditions regarding road design as requested by City of Darwin are recommended on any development permit issued. The application was circulated to the relevant referral agencies including Crown Land Estate, Transport Planning and City of Darwin who did not raise any concerns regarding the access proposed to the subdivision. City of Darwin requests a condition that a Site Construction Management Plan be required including haulage routes, use of City of Darwin land and how land will be managed during the construction phased. A condition can be included on any development permit issued. The cost of previous road construction works is not a planning consideration. The application was circulated to the relevant referral agencies including Crown Land Estate, Transport Planning and City of Darwin who did not raise any concerns regarding the access proposed to the subdivision. Latrobe Street, Fanning Drive and O'Ferrals Road are roads managed by City of Darwin, therefore matters regarding on street car parking is the responsibility of City of Darwin. The roads proposed to be created in the subdivision will be managed by City of Darwin.

Removal of Mangroves

The application was circulated to referral agency responsible for environmental matters the Department of Lands, Planning and Environment (formerly the Department of Environment, Parks and Water Security). In their original comments they advised the applicant should consider whether the development has the potential for a significant environmental impact under the Environment Protection Act 2019 by using the pre-referral screening tool. Further comments were provided recommending the application arrange a pre-referral meeting with DEPWS. The additional information provided following the pre-referral meeting was circulated to DEPWS for review and further comments were provided raising

matters to be addressed by the applicant in relation how matter regarding buffer zones for biting midges and disturbance of Potential Acid Sulfate Soils will be addressed.

The matter raised in the comments from DEPWS can be addressed through conditions and notes on any development permit issued regarding managing and mitigating acid sulfate soils, as requested by DEPWS in their original comments and regarding biting midges, Medical Entomology recommends a warning on land titles advising of the biting midge problem as a condition. The application has been assessed against the requirements of the NT *Planning Act 1999* and NT Planning Scheme 2020. Public access to the sea wall is not a planning requirement. Erosion and sediment control can be managed through a condition on any development permit issued.

The land is capable of supporting the proposed development. Comments from service authorities have been sought in relation to the capability of the land. The requirements of service authorities are addressed through conditions and notes on the permit.

Additionally, the application identifies bulk earthworks that will be undertaken to achieve the proposed road design and site levels for lots in preparation for residential development. These works will ensure that the lots are suitable for development as they will be elevated to approximately RL 6.5 m AHD, above the storm surge level. In addition, a seawall is proposed will enable the development of the lots for their intended purposes, and with a crest level of RL6.5 m AHD, will mitigate risk and damage as a result of any storm surge event.

The applicant has submitted a pre-referral screening report as supporting documentation prepared by EcOz Environmental Consultants.

Impact on amenity

The concerns raised regarding the impact on amenity mainly relate to future dwelling development and will be addressed during the development of future dwellings.

3. Pursuant to sections 30P(j) of the Planning Act 1999, the consent authority must take into account the capability of the land to support the development proposal and the effect of the proposal on the land, and on other land, the physical characteristics of which may be affected by the proposal.

The land is capable of supporting the proposed development. Comments from service authorities have been sought in relation to the capability of the land. The requirements of service authorities are addressed through conditions and notes on the permit.

4. Pursuant to sections 30P(r) of the Planning Act 1999, the consent authority must take into account other matters the consent authority considers relevant.

One late public submission objecting to the application was received on 8 April 2024. The main issues raised in the submission relate to:

- Traffic congestion, specifically during peak hours into Bayview due to there only being intersection that allows entry and exit from the traffic lights to the west and has a waiting time of several minutes.
- Traffic report should also consider existing vacant blocks that will be developed.
- Additional traffic generated by the development negatively impacting Latrobe Street Perth Street causing an increased risk to residents and children.

- Concerns regarding traffic safety impacts from increased in-street parking a Perth Street is narrow and currently difficult to navigate.
- Development not complying with low and medium density housing when considering the surrounding area which is mainly single dwellings.
- Concerns the proposal will place a greater burden on the existing infrastructure.
- The proposal will affect property value.
- Concerns regarding the placement of the exhibition signs and not being consulted about the proposed development.
- Negative impact on existing residents from increased traffic.
- The nearest park to the development is small and the proposal will place additional pressure on the existing limited open space.
- Concerns regarding the removal of mature mangroves, an irreplaceable and essential ecological system.

The roads within the proposed subdivision are managed by City of Darwin. City of Darwin has requested conditions for road design including pedestrian/cycle corridors and compliance with the NT Subdivision Guidelines and are recommended on any development permit issued. The concerns raised regarding the impact on amenity mainly relate to future dwelling development and will be addressed during the development of future dwellings. Changes in property value as a result of the proposal is not a planning consideration.

The application was circulated to referral agency responsible for environmental matters the Department of Lands, Planning and Environment (formerly the Department of Environment, Parks and Water Security). In their original comments they advised the applicant should consider whether the development has the potential for a significant environmental impact under the *Environment Protection Act 2019* by using the pre-referral screening tool. Further comments were provided recommending the application arrange a pre-referral meeting with DEPWS. The additional information provided following the pre-referral meeting was circulated to DEPWS for review and further comments were provided raising matters to be addressed by the applicant in relation how matter regarding buffer zones for biting midges and disturbance of Potential Acid Sulfate Soils will be addressed. The matter raised in the comments from DEPWS can be addressed through conditions and notes on any development permit issued regarding managing and mitigating acid sulfate soils, as requested by DEPWS in their original comments and regarding biting midges, Medical Entomology recommends a warning on land titles advising of the biting midge problem as a condition. The application was exhibited in accordance with the requirements of the *Planning Act 1999*.

11. RECOMMENDATION 2

That under section 30Q of the *Planning Act 1999*, the consent authority report to the Minister for Lands, Planning and Environment advising of the likely decision in relation to the development proposal, issues raised in the submissions, issues raised at the hearing and any other matters it considers the Minister should take into account when considering the amendment proposal.

12. RECOMMENDATION 3

That, pursuant to section 86(1) of the *Planning Act 1999*, the Development Consent Authority delegates its powers to the Chair or in the absence of the Chair any member of the Darwin Division of the Authority to:

- determine pursuant to Section 30W(1)(a) to consent to the development proposal contained in the concurrent application and consent to the concurrent application after receipt of a notice under Section 30U(1) that the Minister has approved the amendment proposal contained in the application.
- issue a development permit under section 54(1) in relation to the development proposal to develop Lot 7433 and Part Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin for the purpose of subdivision to create 18 lots; and
- issue the relevant notices under Section 30Y.

AUTHORISED

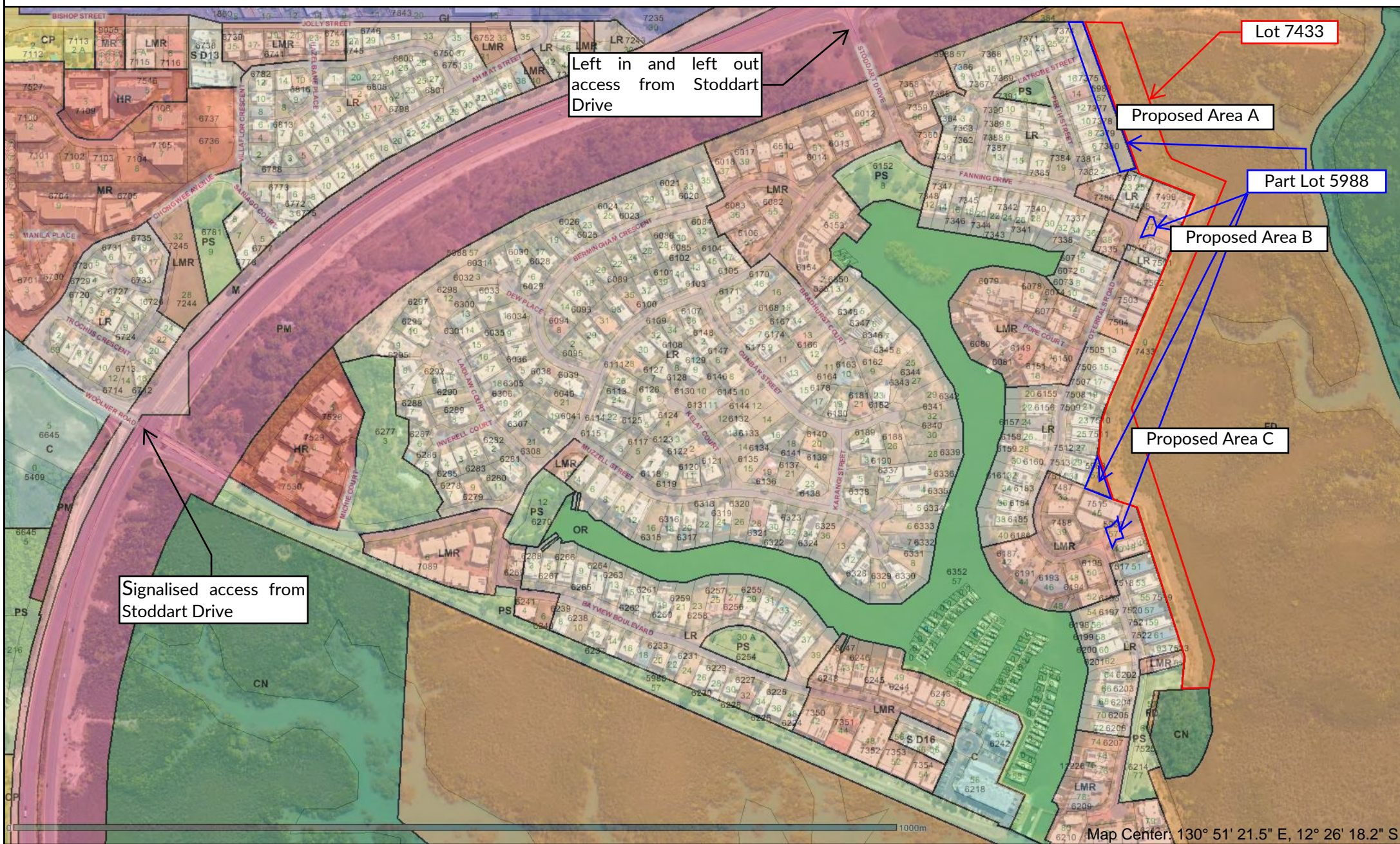


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Senior Planner

Lands Planning & Development Assessment Services

Locality Plan

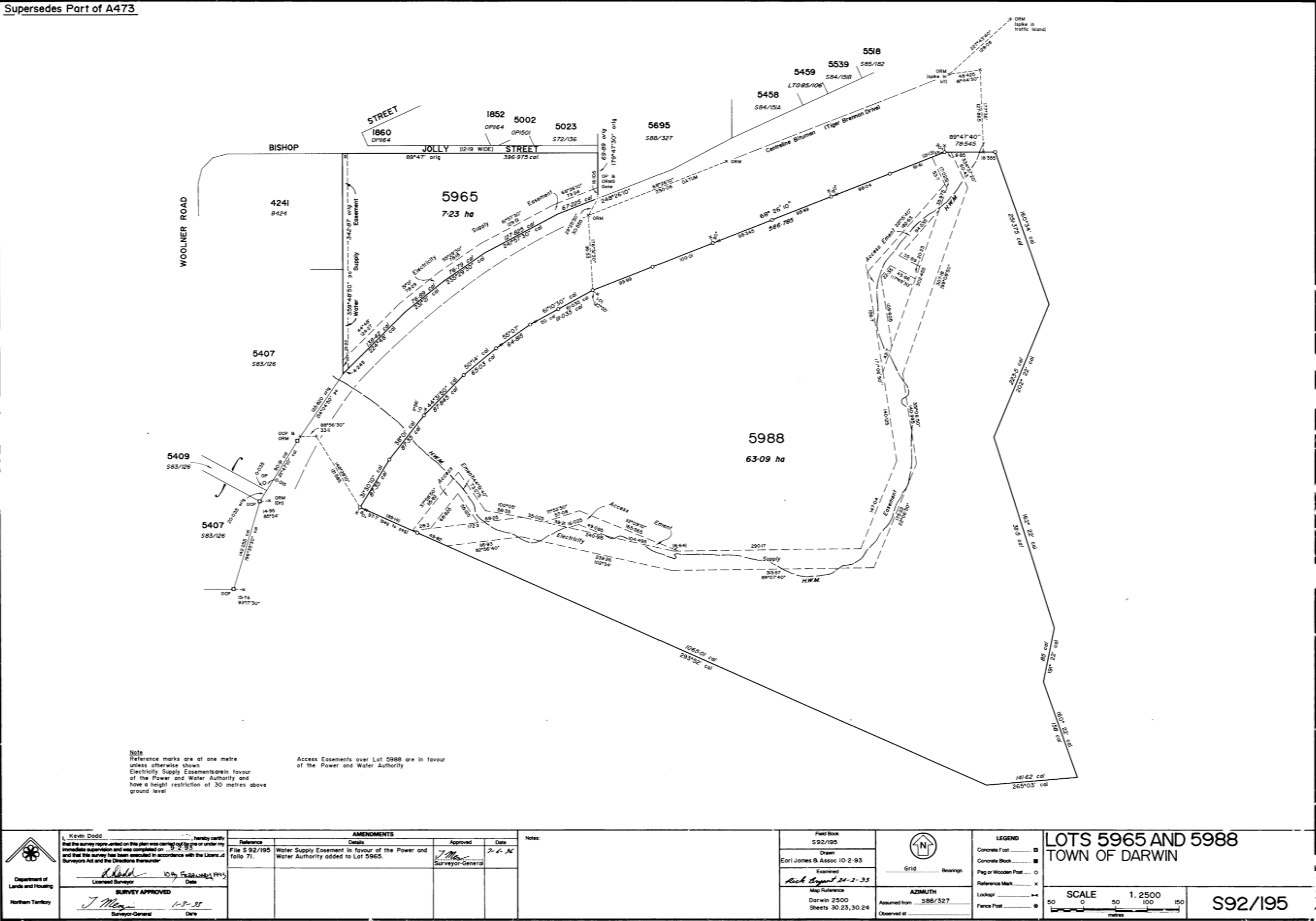


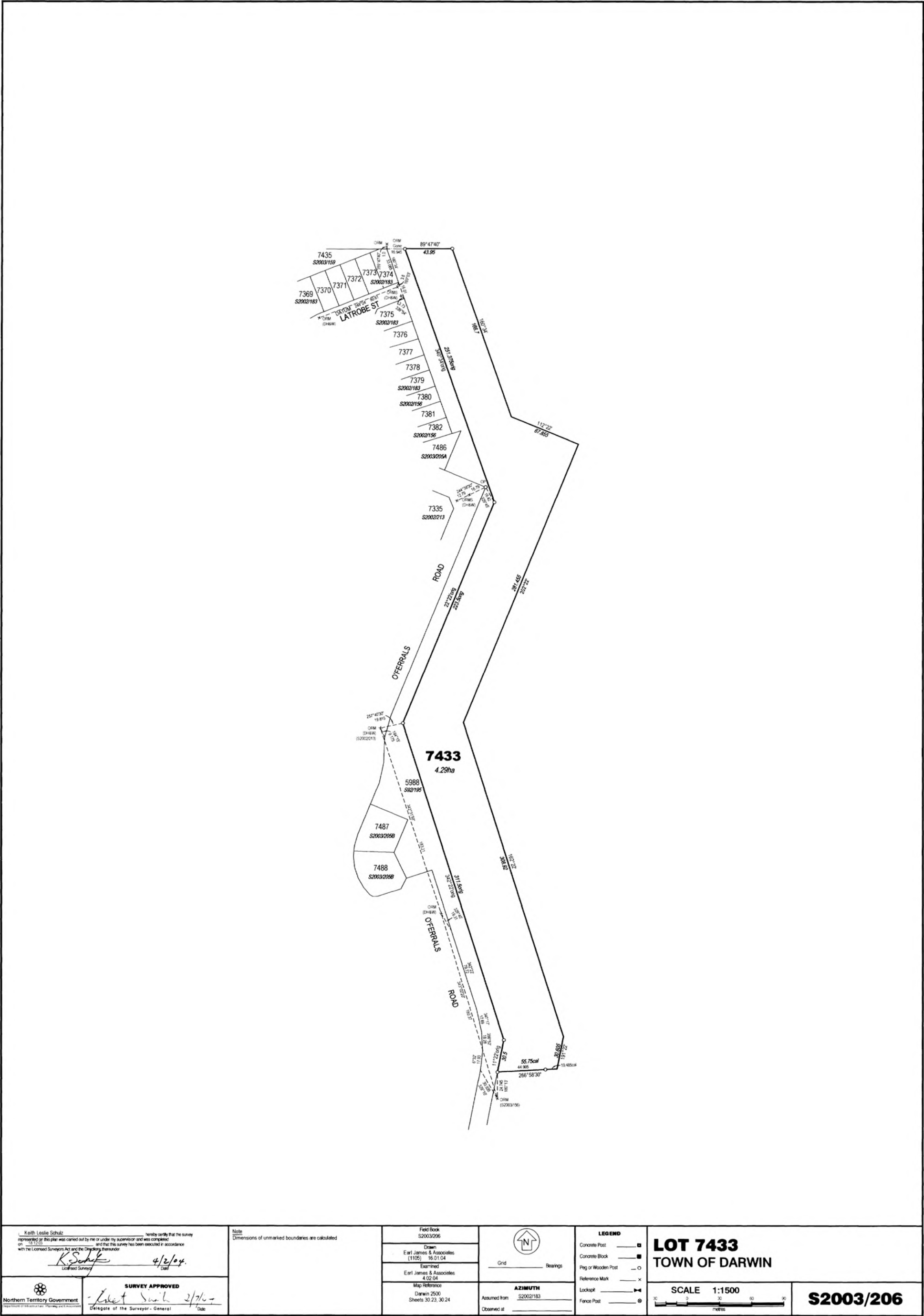
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Data for information purposes only - accuracy not guaranteed

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Exhibition sign along Latrobe Street at proposed Area A.



Exhibition sign along Fanning Drive and O’Ferrals Road at proposed Area B.



-12.43967, 130.86017, 75.8m, 65°
7 Mar 2024 1:33:09 pm

Exhibition sign along O'Ferrals Road at proposed Area C.



Proposed Area A at the end of Latrobe Street



Proposed Area A at the end of Latrobe Street (South)



Proposed Area A at the end of Latrobe Street (North)



Proposed Area A at the end of Latrobe Street (North)



O'Ferrals Road and Fanning Drive



Proposed Area B at O'Ferrals Road and Fanning Drive



View of O'Ferrals Road from Proposed Area B



Rear access track to Proposed Area B



Proposed Area C along O'Ferrals Road



Drain along Stoddart Drive

Proposed Development Report

Lots 5988 and 7433, Town of Darwin

This report forms part of a Concurrent Application seeking approval to change the zoning of part of Lots 5988 and 7433, Town of Darwin from FD (Future Development) to LR (Low Density Residential) and LMR (Low-Medium Density Residential) and then subdivide the subject parts of Lots 5988 and 7433 in order to create 19 lots.

Lots 5988 and 7433, Town of Darwin are Crown lease parcels that have been progressively developed as the Bayview Marina Estate. Bayview Marina Estate is one of Darwin's premier residential subdivisions located a short distance from the Darwin CBD.

The subdivision is recognised for its high standard of development that has resulted from strict design guidelines developed and managed by the developer, Dover Investments.

The developers were initially granted a Crown lease over Lot 5988, Town Darwin (CLT 1251) in 1993 and then in 2004 a Crown lease (CLT 2155) was granted over an additional land area (Lot 7433) to enable the subdivision to be expanded.

The NT Government's strategic planners saw the potential for even further development in the Sadgrove's Creek locality and the Bayview developers were granted an option to purchase an additional area to the east of Lot 7433.



Bayview Marina Estate

Since that time the extension of residential development further to the east into the mangroves has gone off the agenda due to a variety of reasons and there are no longer any plans to develop the land to the east and south of Bayview.

Whilst the development of the option area is not going to happen, there are still certain areas of the existing Crown leases that have been assessed as being suitable for residential development. Areas not suitable for development, such as buffer strips along Tiger Brennan Drive and strips comprising the seawalls are obviously not suitable for residential development and these areas are in the process of being surrendered from the Crown leases.

The three remnant areas that have been determined as being suitable for residential development were the subject Development Application in 2013. These areas are adjacent to the eastern boundary of the Crown leases. The intention was to create three lots and then construct units on the proposed lots.

The Development Consent Authority (DCA) subsequently issued DP13/0635, approving the creation of two new parcels. The third parcel was removed from the proposal in order to provide an access option for the land to the east, however provision for that access is no longer required.

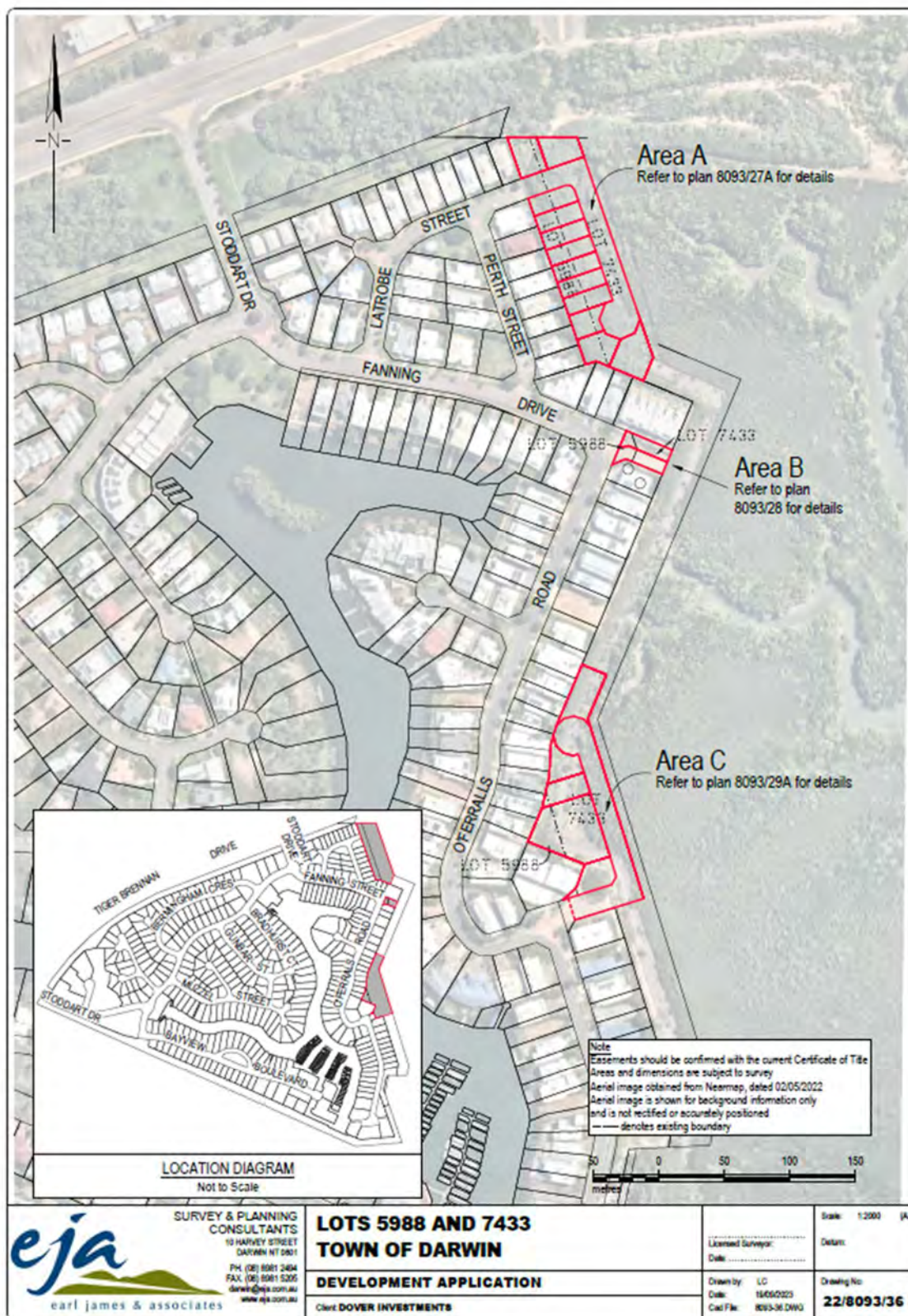
Consideration has been given to the most appropriate form of development for the three subject areas, taking into account the existing Bayview residents and the preferred living options for future residents.

The 2013 proposal, for the land to be developed to its highest potential yield of units was discarded and the option of a subdivision that creates separate freehold lots was adopted.

The current application is seeking the approval of the DCA to subdivide Lots 5988 and 7433, Town of Darwin for the purpose of creating 19 lots, in accordance with plans 22/8093/36, 27A, 28 and 29A.



Public open space abutting the marina



The areas proposed for development



MATTERS TO BE ADDRESSED

46(3)(aa) – Interested parties

Applicant Details

Earl James and Associates

Representative: Kevin Dodd

Address: GPO Box 884, Darwin NT 0801

Email: kdodd@eja.com.au

Phone: 08 89812494

Landowner:

Lot 5988, Town of Darwin

Dover Investments Pty Ltd (ACN 009 637 914)

Address: Level 8, 728 George Street
Sydney NSW 2000

Phone: c/o 08 89812494

Lot 7433, Town of Darwin

Dover Investments Pty Ltd (ACN 009 637 914)

Address: Level 8, 728 George Street
Sydney NSW 2000

Phone: c/o 08 89812494

46(3)(a) – Compliance with the NT Planning Scheme

Property details:

Lot 5988, Town of Darwin

Title details: Volume 857 Folio 147

Crown Lease Term 1251

Survey Plan: S92/195

Address: 57 Bayview Boulevard, Bayview

Easements: Nil

Lot Area: 5.43 hectares

Lot 7433, Town of Darwin

Title details: Volume 857 Folio 148

Crown Lease Term 2155

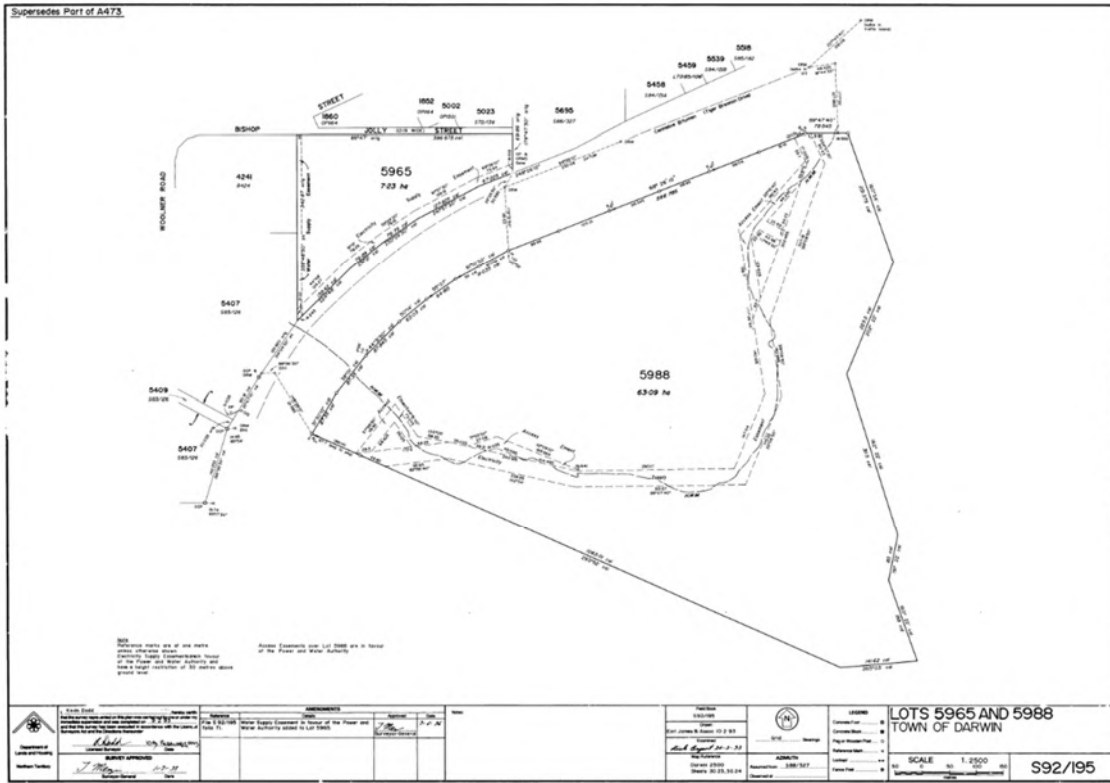
Survey Plan: S2003/206

Address: Bayview

Easements: Nil

Lot Area: 3.2 hectares





Strategic Framework

The Darwin Regional Land Use Plan 2015 (DRLUP) applies to the subject land and identifies the subject land as being suitable for urban/peri-urban development.

The lots being proposed by the current application are ideally suited to urban development and in no way conflict with the intention of the DRLUP.

The Darwin Inner Suburbs Area Plan (DISAP) also applies to the land comprised within the Bayview Crown leases.

The DISAP provides a framework to guide progressive growth and development within the Inner Suburbs of Darwin and the land that is the subject of this application, lying on the eastern edge of the existing Bayview development, is identified for 'Future Development'.



The following figure showing Residential Areas, from the DISAP, also identifies the subject area as a *Future Development Area*.



The Planning Principles associated with *Future Development Area* are set out in the following table from the DISAP:

Future Development Area	
Objectives	Acceptable Responses
1. Identify areas intended for future development.	Development is to accord with either <ul style="list-style-type: none"> An Area Plan and the provisions of Zone FD; or Provisions of a Specific Use Zone.
2. Provide for development in accordance with a site or locality specific planning framework once services are or can be made available to the land.	Both the Area Plan and the Specific Use Zone must address the relevant provisions within the NT Planning Scheme (including concepts within this Area Plan).

Part of the land that is the subject of the current application is zoned LMR whilst the rest is zoned LR and FD.

The intention is for those parts that are currently zoned FD to be rezoned to LR and LMR.

Reticulated services are to be extended to service the proposed lots and details of the servicing are included within this Statement of Effect.

Zoning

As previously mentioned, part of the land that is the subject of the current application is zoned LMR (Low-Medium Density Residential) whilst the rest is zoned LR and FD. The intention is for those parts that are currently zoned FD to be rezoned to LR and LMR prior to titles issuing for the proposed lots.

The intention is to amend the NTPS so the zoning of all the land comprised within Area A is LR. Part of Area A is already zoned LR, whilst the eastern part is zoned FD. Similarly, the intention is to also rezone the area comprising Lots 1, 2 and 3 in Area C to zone LR.

The purpose of zone LR is:

Provide predominantly for low rise urban residential development comprising individual houses and uses compatible with residential amenity, in locations where full reticulated services are available.

The lots being proposed by the current application are consistent with the purpose of the zone and will provide new housing options that will be fully serviced and can utilise existing community services and facilities. The proposed lots will also have a zone that is the same as the zoning of the existing, abutting parcels.

The purpose of zone LMR is to *provide a range of low rise housing options that contribute to the streetscape and residential amenity in locations supported by community services and facilities, and where full reticulated services are available.*

Proposed Lot 4 in Area C, to be rezoned to LMR, is consistent with the purpose of the zone and will provide new housing options that will be fully serviced and can utilise existing community services and facilities. The LMR zone proposed for Lot 4 is consistent with the existing zoning of the land immediately to the south.

The current application is not seeking approval for the use of the land but will result in parcels that will facilitate the development of the desired housing options where reticulated services are available and there are community services available.

Zone Outcomes

The outcome being sought for zone LR is *an efficient pattern of land use with all lots connected to reticulated services, integrated with existing transport networks, and with convenient access to open space and community facilities.*

The LMR zone is looking for lots that are *connected to the reticulated services, integrated with existing transport networks, and with reasonable access to open space and community services.*

The lots being proposed by the current application will be connected to reticulated services and the subdivision will involve the development of new portions of public road that will connect to an integrated road network.

The new lots will be able to utilise the existing open space areas (parks, bicycle and walkways, heritage areas) and given Bayview's proximity to the CBD and other service commercial areas, the new residents will have access to existing community facilities.

Overlays

The Overlays in the NTPS identify areas of land that have specific development requirements.

The Record of Administrative Interests advises the following Overlays apply to Lots 5988 and 7433:

CR Coastal Reclamation

The purpose of this Overlay is to *ensure that landfill of coastal areas does not adversely affect adjacent land or waters, or the quality of adjacent waters, and is suited to its intended purpose.*



The *Administration* section of this overlay advises that the placement of fill below the level of the highest astronomical tide requires consent. The filling works will be part of the works associated with the development of this subdivision and geotechnical consultants Douglas Partners (DP), have previously been engaged to provide an assessment of the proposed site filling and seawalls.

It should be noted that Area B does not require earthworks as this area has been filled and surcharged as part of a previous stage of Bayview that was completed in 2004.

The DP report (attached) advises that the proposed construction for Areas A and C will be as follows:

Area A: Clear and reshape the sloping ground, then construct a building platform at a final level at about RL5.5m AHD by filling over the prepared site surface. Surcharge the lot for a period of up to 5 months with about 2 m of filling to reduce post construction settlements, then remove the surcharge and construct a seawall to RL6.5 m AHD.

Area C: Remove and stockpile the rock armour from the current seawall, reshape the sloping fill batter, then construct a building platform at a final level at about RL5.5 m AHD by filling over the prepared site surface. Surcharge the lot for a period of up to 8 months with about 2 m of filling to reduce post construction settlements, then remove the surcharge and construct a seawall to RL6.5 m AHD.

Also from the DP report:

Geotechnical Issues for Design and Construction

Based on the previous earthworks carried out for construction of similar filling platforms suitable for residential construction in Stages 3 to 10 of the Bayview subdivision, there are four main geotechnical issues to be addressed. These include the following:

- a. stability of the filling and surcharge during placement over soft marine sediments;*
- b. differential settlement between previously placed filling and new filling which may lead to the formation of tension cracks at the interface between the "old" and "new" filling;*
- c. settlement of the filling platform; and*
- d. stability of the seawall after surcharge is removed and rock armour is placed.*

Each of these four issues will be specifically addressed by incorporating the following geotechnical design features and construction strategies into the site filling procedures, and by monitoring the settlement of fill platforms by precise survey.

Issue a: *The current site surfaces will be cleared and benched before an engineered filling platform comprising a woven geotextile layer, a rockfill working platform, engineered filling and surcharge is placed over the mud surface. The earthworks profile proposed for site filling and surcharge is shown on attached Drawing 5. A similar profile has been successfully used for construction of previous stages of Bayview including the adjacent Stage 10 earthworks.*

Issue b: *The new filling will be carefully placed in a controlled manner, and will be keyed into the current filling, to minimise the risk of longitudinal cracking and to ensure stability of the filling platform at all stages. Any tension cracks that form at the interface between "old" and "new" filling will be reinstated before surcharge is removed. Tension cracks that have formed due to differential settlement at Bayview and the nearby Tiger Brennan Drive embankments have been successfully reinstated with minimal detrimental effect to the filling platform using this approach.*

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*Geotechnical Assessment of Proposed Site Filling & Seawalls Project 77861.01
Stage 11 - Lots A and C, Bayview, NT May 2012*

Issue c: *Surcharge will be placed over the engineered filling to heights predetermined by engineering calculations. Examples of surcharge profiles and estimated surcharge times for areas including part of Lot A and all of Lot C are shown on attached Drawings 6 and 7. Settlement of the filling platform under surcharge loads will be monitored by periodic survey and the surcharge will not be removed until approximately 90% of primary consolidation under filling load has been achieved. Settlement monitoring of previous stages of Bayview for periods of up to 5 years after removal of surcharge indicates that post construction settlements of monuments located on filled areas have generally been limited to 20 mm or less.*



Issue d: The seawall section proposed for Lots A and C is shown on attached Drawing 8. This section differs from previous seawall sections at Bayview because shallower average mud depths along the lease boundary on this eastern side allow for a steeper, stable armour rock wall to be constructed on a rockfill base. The seawall construction comprises removing and displacing soft mangrove mud and replacing this soft soil with a rockfill base. The top of the rockfill base will be at or slightly below natural surface level and the rockfill base will be founded on the underlying stiff marine clay. This rockfill base will be placed before the working platform and site filling so that trenching required to remove mud does not cause any instability in the filling.

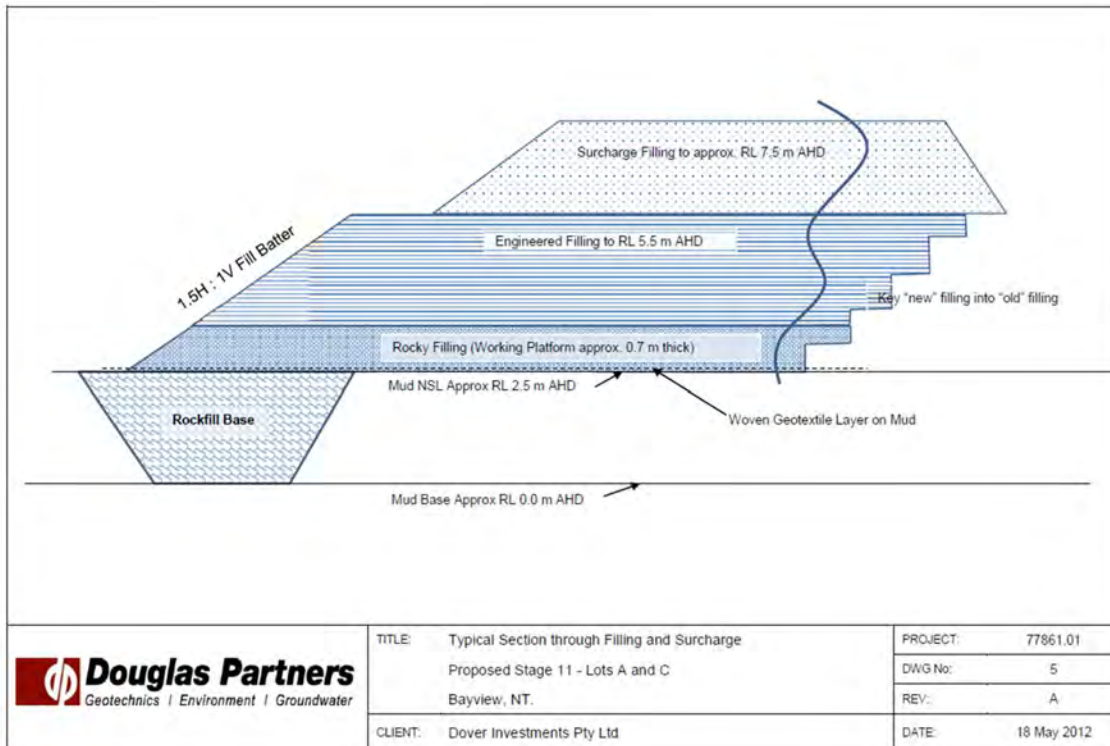
After the surcharge is removed to the design site level of about RL5.5 m AHD, the compacted outer fill batter will be trimmed to a slope of 5H:4V and a 1 m high precast concrete retaining wall will be constructed at the crest of the batter as shown on Drawing 8. A non-woven geotextile will be laid on the batter and secured under the wall, then armour rock (which was previously removed and stockpiled before filling Lots A and C) will be placed on the batter and over the base of the retaining wall.

Suitability for Residential Construction

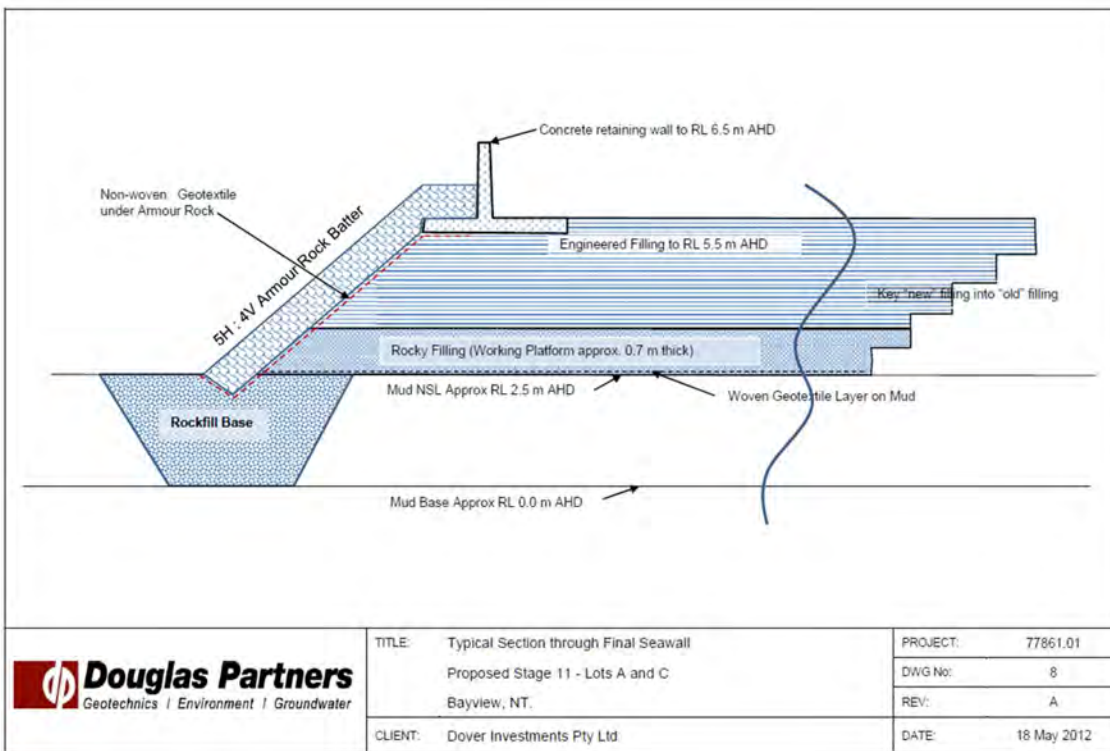
The attached Drawing 4 shows the locations of the proposed Stage 11 - Lots A and C which confirms that the information on mud depths and surcharge calculations contained in previous DP geotechnical reports will adequately cover the proposed Stage 11 lot areas. In addition, the information on Drawings 6 and 7 indicate that previous calculations of surcharge heights and surcharge times could be revised to adequately address the proposed construction schedule of the Stage 11 lots.

The proposed composite wall profile with a rockfill base will be stable, will enable development of the lots for their intended purposes, and with a crest level of RL6.5 m AHD will mitigate risk and damage as a result of any storm surge event.

If the proposed seawall section shown on Drawing 5 is adopted for construction, some additional geo-environmental sampling, testing and reporting will be required to assess the potential for acid sulphate soils (PASS) and to address the issues of handling and disposal of PASS. The management of ASS has been addressed for previous stages of Bayview and the management plans would apply to this additional construction.



Typical section through filling and surcharge



Typical section through final seawall

The future use of the subject area (post surcharging) is yet to be determined however the suitability of the site for the future use will be considered as part of a future DA.

The DP report advises that existing material comprises mostly silty gravelly cobbles and boulders. The cobbles and boulders have been described as medium to high strength and as being well compacted.

The DP report and the Cardno plans advise that outer batter slopes of 1V:2.5H should be maintained in order to ensure against slope instability and associated impact on adjacent waters.

Other measures to minimise impact on the adjacent areas include silt fences and rock sediment traps.

The DP report outlines the surcharge procedures and advises that if all the requirements are followed, then any impact on acid sulphate soils within the marine environment should be avoided.

In addition to the extensive work undertaken by DP, Dover recently engaged environmental consultants EcoOz to assess the proposed development and the likely environmental impacts.

The Ecoz report forms part of this application.

In relation to the impact on coastal processes the EcoOz report makes the following conclusion:

The development is considered unlikely to have a significant impact on coastal processes for the following reasons:

- Currents and tidal movement are limited at the locations that will be reclaimed.
- There is no evidence of erosion occurring along the coastline around the edges of the existing Bayview Development.

CNC *Clearing of Native Vegetation*

From the DP report:

Lot A (Area A) comprises grassed and vegetated vacant land which is partially filled over intertidal mud flats.

The lot is bounded by a filled area to the north, by residential allotments located on a filling platform to the south and west, and by a narrow corridor of cleared mangroves, then mangrove forest to the east. Lot A site surface currently slopes down to the east from about RL5.5 m AHD on the crest of the filling platform to about RL2 to 2.6 m along the eastern lease boundary.

Lot C comprises unvegetated vacant land located in a re-entrant corner of the Bayview rock armoured seawall, as well as low-lying intertidal mud flats. The lot is bounded by residential allotments located on a filling platform to the north, west and south and by a narrow corridor of cleared mangroves, then mangrove forest to the east. Lot C surface is currently level at about RL5.5 m along the western boundary and slopes down across the rock wall to about RL1.8 to 2.4 m over intertidal mudflats along the eastern lease boundary.

In relation to the impact on vegetation, the EcOz report makes the following conclusions:

The development will result in the loss of a small area of mangroves but is considered unlikely to have a significant impact for the following reasons:

- The clearing is small scale and is located on land that is zoned Residential and Future Development.
- The surrounding mangroves that fringe Sadgroves Creek are protected by Conservation zoning.
- Dover Investments has committed to implementing ASS management and ESCP's during construction to minimise the generation of contaminated and turbid stormwater runoff and reduce the likelihood of that water entering the adjacent mangroves that are zoned Conservation.
- Dover Investments has committed to managing weeds to meet the requirements of the *Weeds Management Act*.
- Mangroves have persisted adjacent to the existing development, which indicates that impacts are likely to be limited to within the direct disturbance footprint.
- Due to the small scale and location of the development footprint the loss of habitat is not expected to alter biodiversity, ecological integrity and functioning.

DHD *Darwin Harbour Dredging*

The proposed subdivision does not involve any harbour dredging.

LSSS *Land Subject to Storm Surge*

The purpose of this overlay is to identify areas with a known risk of inundation from primary or secondary storm surges and ensure that development in these areas demonstrates adequate measures to minimise the associated the risk to people, damage to property and costs to the general community caused by storm surge.

The earthworks and construction measures outlined in the DP report will render the land suitable for the proposed use and minimise the risk to people and damage to property.



A view along part of the existing seawall on the eastern side of Bayview

Clause 6.2.1 deals with lot size and configuration for subdivision in zone LR, LMR, MR and HR.

The purpose of the Clause is *ensure that subdivision of land for urban residential purposes creates lots of a size, configuration and orientation suitable for residential development at a density envisaged by the zone.*

Clause 6.2.1 lists the following Requirements for the subdivision of land in zone LR, LMR, MR and HR:

Land is to be subdivided in accordance with Table A to this clause

Table A to Clause 6.2.1: Lot Size and Configuration in Residential Subdivisions	
Zone	Minimum Lot Size
LR in greenfield areas identified for compact urban growth in the strategic framework	Average of 600m ² and no smaller than 450m ²
LR other than greenfield areas identified for compact urban growth in the strategic framework	800m ²
LR, MR, HR and lots for residential buildings in Zone T	800m ²
LMR	300m ²

The areas proposed for the development of Lots zoned LR are not infill areas and consequently can be regarded as greenfield areas. Consequently, the average lot area required in 600m² with a minimum lot area of 450m². The lots being proposed for Area A, and that section of Area C to be zoned LR, conform with the average lot area requirement and all lots have areas greater than 450m².

The prescribed minimum lot size for lots zoned LMR is 300m² and all of the lots proposed to have an LMR zoning have areas in excess of the prescribed minimum.

Lots are to conform with the building envelope requirements in Table B to this clause.

The building envelope requirements are listed in the following Table:

Table B to Clause 6.2.1: Lot Size and Configuration in Residential Subdivisions	
Lot Size	Minimum Building Envelope Requirement
300m ² to less than 450m ²	7m x 15m (exclusive of any boundary setbacks or service authority easements)
450m ² to less than 600m ²	8m x 15m (exclusive of any boundary setbacks or service authority easements).
600m ² and greater	17m x 17m (exclusive of any boundary setbacks or service authority easements)

Plans 22/8093/31A, 32 and 33A indicate that all of the proposed lots can accommodate the required building envelopes.

Lots have sufficient area and appropriate dimensions to provide for the proposed density of developments including dwellings, vehicle access, parking and ancillary buildings.

The lots have been designed to ensure that they can all accommodate the dwellings, access, parking and any ancillary buildings expected for parcels zoned LR and LMR.

There are no battle-axe lots.

No battle-axe parcels are being proposed by the current application.

Lots are oriented to allow dwellings to take advantage of environmental conditions such as prevailing breezes and sunlight.

The design of future dwellings on the proposed lots will be able to take environmental conditions into account.

Lots are connected to reticulated services.

Byrne Consultants has been engaged to consider service reticulation and the servicing of each of the proposed lots.

Servicing reports have been prepared and these form part of the current Development Application.

Servicing details are provided in following sections of this Statement of Effect but each of the proposed Lots will have water, power, sewer and communications connections.

Where there are lots for medium and higher density residential development, those lots are:

(a) distributed in small groups serviced by public transport;

(b) in close proximity to public open space and with adequate access to community facilities and services; and

(c) not located in a cul-de-sac

It is intended that the proposed Lots will be zoned LR and LMR and the purpose of the zone is to provide for a range of low-rise housing options.

All of the lots within Area A, and proposed Lots 1,2 and 3 in Area C will be for single dwellings. Similarly, the lots in Area B and proposed Lot 5 in Area C will be single dwellings as they all have areas less than 600m².

Proposed Lot 4 in Area C, with an intended LMR zoning, could yield 3 dwellings.

The proposed Lots can all utilise the existing public transport that (buses) that service Bayview as well as the range of open space options within the precinct.

Areas A and C are to be developed as cul-de-sacs however the lots are only for low and medium future uses and the proposed roads are not long cul-de-sacs.

6.2.2 Lots Less Than 600m² for Dwellings-Single

Purpose

Ensure the subdivision of land to lots of less than 600m² will allow residential development that minimises impact on amenity and the functionality of the street infrastructure.

Administration

1. *The consent authority must not consent to a subdivision that is not in accordance with sub-clauses 3 and 4.*
2. *An application must provide plans to demonstrate the requirements of sub-clause 4.*

Requirements

3. *Lots subject to this clause shall not have a boundary to any public road less than specified in the table to this clause.*

All of the proposed lots have frontages that exceed the minimums listed in the table to Clause 6.2.2.

4. *The site layout of lots subject to this clause is able to comply with the purpose of this clause and the development requirements for vehicle parking (5.2.4), building setbacks (5.4.3 and 5.4.3.3) and private open space (5.4.6).*



As required by Clause 5.2.4, every Lot can accommodate 2 on-site parking spaces and every lot has sufficient area to ensure that the required area of private open space can be accommodated in the development of a future dwelling (refer to plans 22/8093/31A, 32 and 33A).

Plans 22/8093/34B, 37A and 37B indicate drive and on-street parking options. Whilst a few of the lots do not have the required 6.5m for on-street parking directly in front of the lots (due to the curved kerblines, the streets do allow for on-street parking in close proximity to the subject lots. This on-street parking option will not be inconvenient for the lot owners and will not unduly reduce the operation or amenity of the street.

Table to Clause 6.2.2: Lots Less than 600m ² for Dwellings-Single	
Range of Lot Size	Minimum length of any Boundary to a Public Road
300m ² to less than 450m ²	10m
450m ² to less than 600m ²	13m

Clause **6.2.3** deals with site characteristics for subdivision in Zones LR

The purpose of this Clause is to *ensure that the subdivision of land provides lots suitable for urban residential purposes that respond appropriately to the physical characteristics of the land and does not detrimentally impact on surrounding land.*

Administration

1. *The consent authority may consent to a subdivision that is not in accordance with sub-clauses 2-6, only if it is satisfied the subdivision design is consistent with the purpose of this clause.*

Requirements

2. *Avoid the development of land of excessive slope, unstable or otherwise unsuitable soils (e.g. seasonally waterlogged) and natural drainage lines.*

The entire Bayview Marina development has involved earthworks and site treatment to ensure that the land is suitable for the purpose for which it was leased – *residential subdivisional purposes*.

The design and implementation of these earthworks has been carried out in conjunction with relevant Government agencies over many years and similarly, all design and construction works for the proposed areas will be undertaken by engineering and environmental consultants in consultation with Government agencies.

3. *Ensure, by site selection or site grading, that areas intended for lots less than 600m² do not slope in excess of 2%, such that the need for on-site stormwater structures, retaining walls and the like is minimised.*

All site design will ensure that the grades of those lots with areas less than 600m² are not greater than 2 %.

4. *Retain and protect significant natural and cultural features.*

O'Ferrals Rock has previously been identified as a significant cultural feature and will not be impacted by the current proposal.



5. Avoid development of land affected by a 1% AEP flood or storm surge event.

As with previous stages of the Bayview development, the subject land will be developed to ensure that the resulting housing lots are free of the 1% AEP storm surge event.

6. Retain and protect natural drainage lines and any distinctive landform features or stands of natural vegetation and incorporate them into public open space.

Previous assessments of the entire Bayview lease areas have identified the distinctive landforms (eg: O'Ferrals Rock) and these have been excluded from development and set aside as public open space.

Clause **6.2.4** deals with infrastructure and community facilities for subdivision in Zones LMR

The purpose of this Clause is to *ensure that subdivision of land for residential purposes is appropriately integrated with infrastructure, community services and facilities.*

Bayview Marina Estate is a centrally located residential precinct that is a short distance from commercial and community facilities located in Darwin CBD, Stuart Park, Parap and Winnellie.

Each of the areas proposed for development by the current application will have direct access onto an established public road network. This network services the Bayview development and then connects to Tiger Brennan Drive that in turn leads to the rest of Darwin and beyond.

There is a Government public bus service that services Bayview and the residents of the proposed lots will be able to utilise this service.

Bayview incorporates a variety of public open space including parks, walking paths and heritage areas and all of the lots being proposed by the current application are less than 400m walking distance from a neighbourhood park.

As previously mentioned, Byrne Consultants has been engaged to consider service reticulation and this application includes the Byrne servicing reports.

The Reports contain all the necessary detail but following are extracts in relation to the various services, including comments from Power and Water Corporation (PWC):

Water and Sewer

PWC comments:

Lot A

- *For water – A new DN150 water main is to connect from the existing DN150 main at the end of Latrobe Street, be looped in the cul-de-sac and connect back into the existing DN100 in Perth Street. It is recommended that the water network is designed to direct flow through the cul-de-sac and reduce risk to water quality*
- *For sewer – connect into existing sewer reticulation main in Latrobe Street via new DN150 sewer reticulation main.*

Lot B

- *For water – Install 2 x service connections on the existing DN150 water main in O'Ferrals Road*
- *For sewer – construct new sewer service connections for both lots and connect into existing vacuum pit BA/P1*

Lot C

- *For water – A new DN150 water main is to connect from the existing DN150 main in O'Ferrals Road, looped in the cul-de-sac and connect back into the existing DN150 in*



O'Ferrals Road. It is recommended that the water network is designed to direct flow through the cul-de-sac and reduce risk to water quality

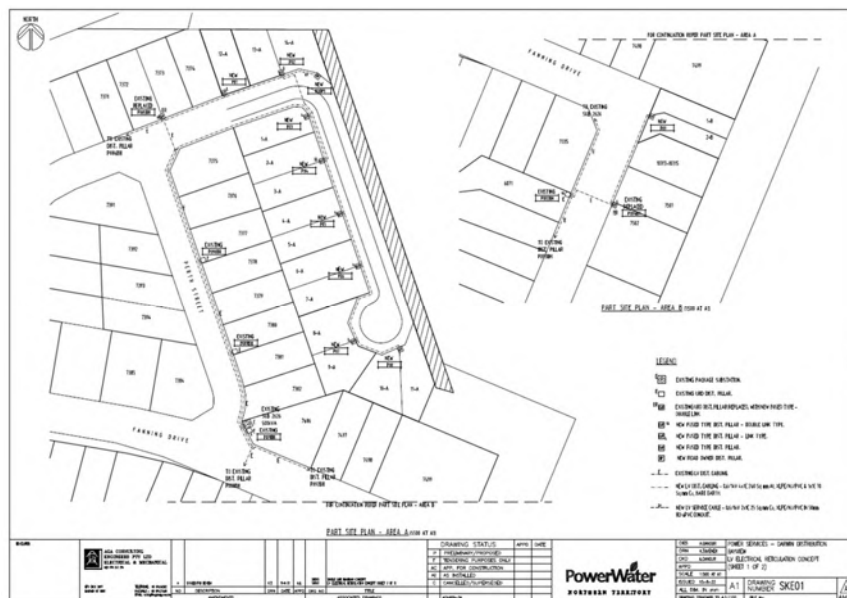
- For sewer – Construct new sewer reticulation main to service the subdivision and connect into existing DN125 vacuum sewer line via a new vacuum pit built as per PWC standard drawing W2-2-10A

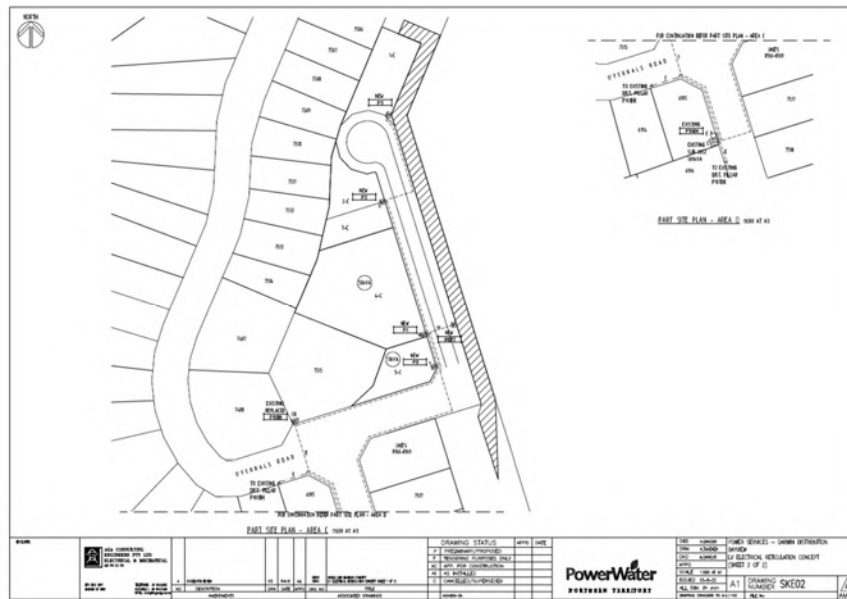
Power

All high and low voltage electrical reticulation will be designed and constructed in accordance with PWC specifications.

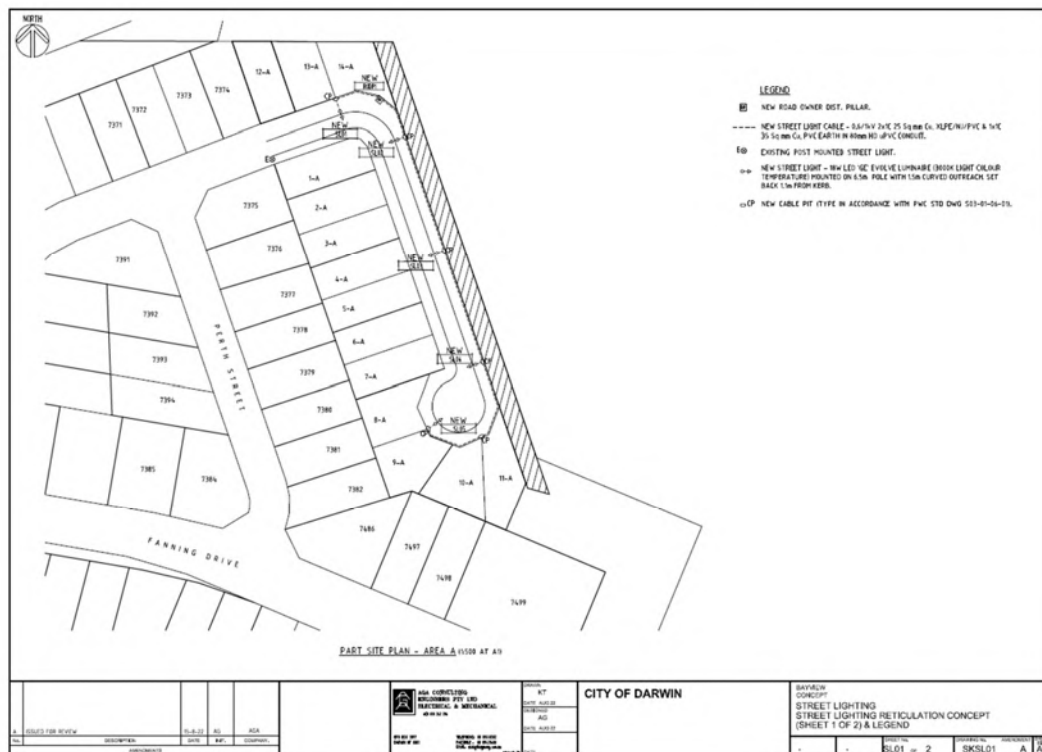
Similarly, streetlight design will be in accordance with City of Darwin (COD) requirements.

Concept electrical plans prepared by electrical consultant AGA Consulting Engineers:





Concept streetlighting plans prepared by AGA Consulting Engineers:







Part of the extensive public walkway network through Bayview

Stormwater

The stormwater drainage design prepared by Byrne has been designed in accordance with COD standards and the Northern Territory Subdivision Development Guidelines.

Internal Stormwater Strategy:

The intent of the internal development stormwater strategy is to direct all stormwater flows from the proposed lots toward the road reserve where it will be collected via kerb and channel along the roadway and captured via stormwater inlet pits into the proposed stormwater pipe network. The sites shall discharge stormwater into the existing mangrove creek in accordance with the current stormwater management philosophy for the development.

Area A

The proposed lawful point of discharge for the development of Lot A is into the mangroves and creek area east of Latrobe Street. An existing 525mm diameter RCP which discharges to the area shall be extended and upsized to account for the additional development catchment area of Lot A.

Area B

All stormwater from Lot B is collected by the existing stormwater network (pit and pipes) on O'Ferrals Road which is directed via the trunk underground drainage network to a drainage easement through Lot 7502 before discharging into the adjacent mangroves area. No upgrades to the existing drainage system are proposed to service Lot B.

Area C

The proposed lawful point of discharge for the development of Lot C shall be via the existing underground stormwater network and 1200mm diameter RCP outlet which discharges to the mangroves area through Lot PT8169. The existing 1200mm RCP discharge pipe shall be extended and upsized to account for the additional development catchment area of Lot C.

External Stormwater Strategy:

It is anticipated that the proposed internal stormwater strategy design will cause no worsening effects of existing upstream conditions due to the proposed stormwater network being sized sufficiently to convey the upstream inflows. No worsening of the downstream flows is expected due to discharge into the existing tidal mangrove creek.

Traffic Assessment

Byrne has carried out a traffic impact assessment with the full results contained in the attached servicing the report.

Following are the conclusions extracted from the report:

- *Intersection 1 (Stoddard Dr / Tiger Brennan Dr / Woolner Rd) exhibited minor changes in the intersection performance due to the development traffic generation (no notable change). The intersection performance with respect to degree of saturation, average delay and queue length lowered during the 2027 and 2032 scenarios due to the applied background growth factors on Tiger Brennan Drive and Woolner Road, not the development traffic. It is beyond the scope of this TIA to suggest any upgrades to this intersection and impact by the proposed development is minimal.*
- *Intersection 2 (Stoddard Dr / Tiger Brennan Dr) exhibited a LoS of B and DoS ≤ 0.6 during the 2032 growth scenario (AM / PM) due to growth rates applied to Tiger Brennan Drive. This intersection performs satisfactorily with the proposed development traffic.*
- *Intersection 3 (Stoddard Dr / Fanning Dr) and Intersection 4 (Stoddard Dr / Bayview Blvd) exhibited a LoS of A and a DoS ≤ 0.2 for all growth scenarios performing satisfactorily with the proposed development traffic.*



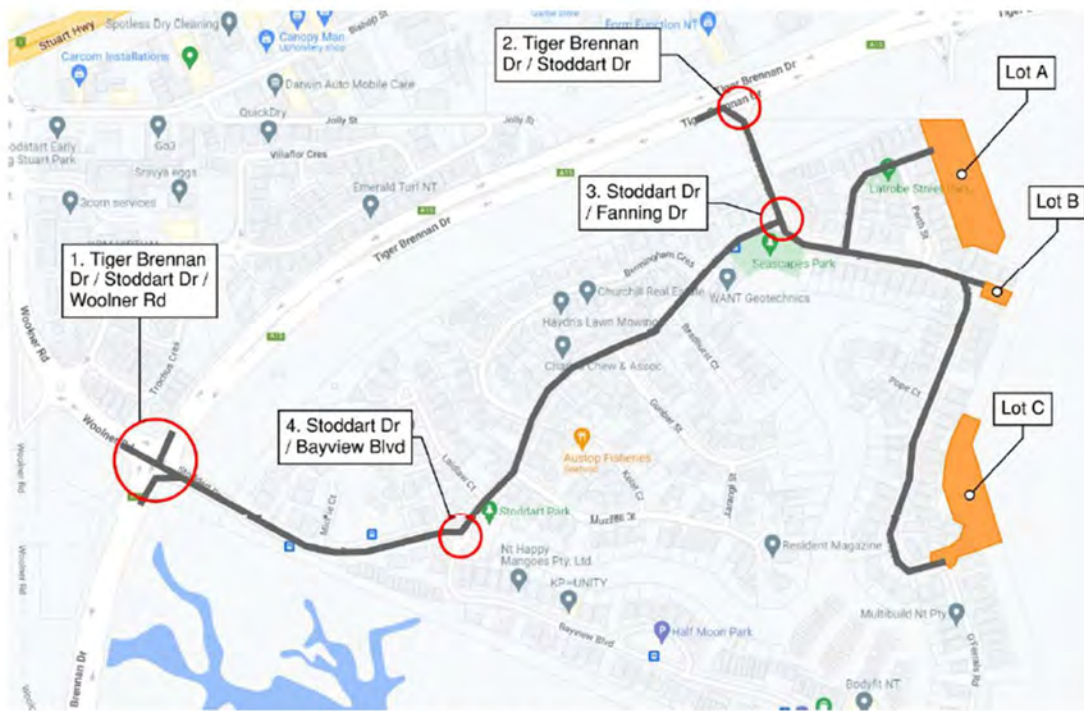


Figure 1.1 – Site Overview (source: Google)

30C(4)(a) – Compliance with an Interim Development Control Order

The subject land is not subject to any Interim Development Control Orders.

30C(4)(b) – Public Environmental Report or Environment Impact Statement

EcOz environmental consultants were engaged to carry out an assessment (screening) in order to determine whether the development has the potential for significant environmental impact under the Environment Protection Act 2019.

The screening indicated that the development is unlikely to have a significant impact and therefore does not need to be referred under the *Environment Protection Act 2019*.

30C(4)(c) – Merits of the proposed development

The Bayview Marina development is a master planned development that has provided a variety of housing options for the Darwin market over many years and also comprised an Estate Development, unit title component that comprised the lots fronting the marina and the associated marina berths.

The land currently being proposed for development is part of the balance of Crown lease issued by the NT Government. The purpose of these Crown leases is for residential subdivisional purposes and the subdivisions now being proposed are consistent with the purpose of the leases that the Government has issued.

The proposed subdivisions will be the final subdivisions from the Crown leases and will complete the Bayview Marina development.

The design and construction of the proposed, new allotments will benefit the NT economy and will provide prime housing options that are sure to be well sought after in the market.

The range of lots sizes being proposed will provide an opportunity for people with varying financial capabilities to secure an allotment and develop a home in close proximity to the Darwin CBD.

30C(4)(d) – The physical characteristics of the land

As previously addressed in this report and the associated attachments, the physical characteristics of the land have been assessed by engineering consultants and siteworks will render the subject areas suitable for the intended use.

30C(4)(e) – Public facilities or open space

The housing lots being proposed by the current application will be able to utilise the existing public facilities and open space within Bayview and the adjoining areas.



An existing neighbourhood park in close proximity to the areas being proposed for development

30C(4)(f) – Public utilities and infrastructure

Significant design and consultation work has already been undertaken to ensure that the proposed lots can be serviced with power, water, sewer and telecommunication.

All lots will have direct access onto a public road network and stormwater management has been considered to ensure that the lots will all have appropriate drainage measures in place.

30C(4)(g) – Potential impact on the existing and future amenity of the area

As with any staged development, each progressive stage of the Bayview Marina development has had some impact on the preceding stages.

The current application deals with the final stage of the development of the existing Crown leases and the lots now being proposed are for residential uses which is consistent with the existing uses in the existing, adjacent stages.

Given that the uses are consistent, the impact on the amenity of the area will be minimal.

30C(4)(h) – Assessment of the benefit or detriment to the public interest of the development

The proposal will have significant economic benefit in not only the design and construction of the subdivisions, but also the ongoing benefits to a wide range of design and trades people during the construction of new dwellings on the lots.

Apart from the clear economic benefits, the creation of new housing options will benefit the wider community by providing the opportunity for more people to reside in this unique residential precinct.

30C(4)(i) – Building regulations

There are no buildings on the subject areas.

30C(4)(j) – Unit Titles Act

Not applicable



Concurrent Application

Lots 5988 and 7433, Town of Darwin

Reason for Concurrent Application

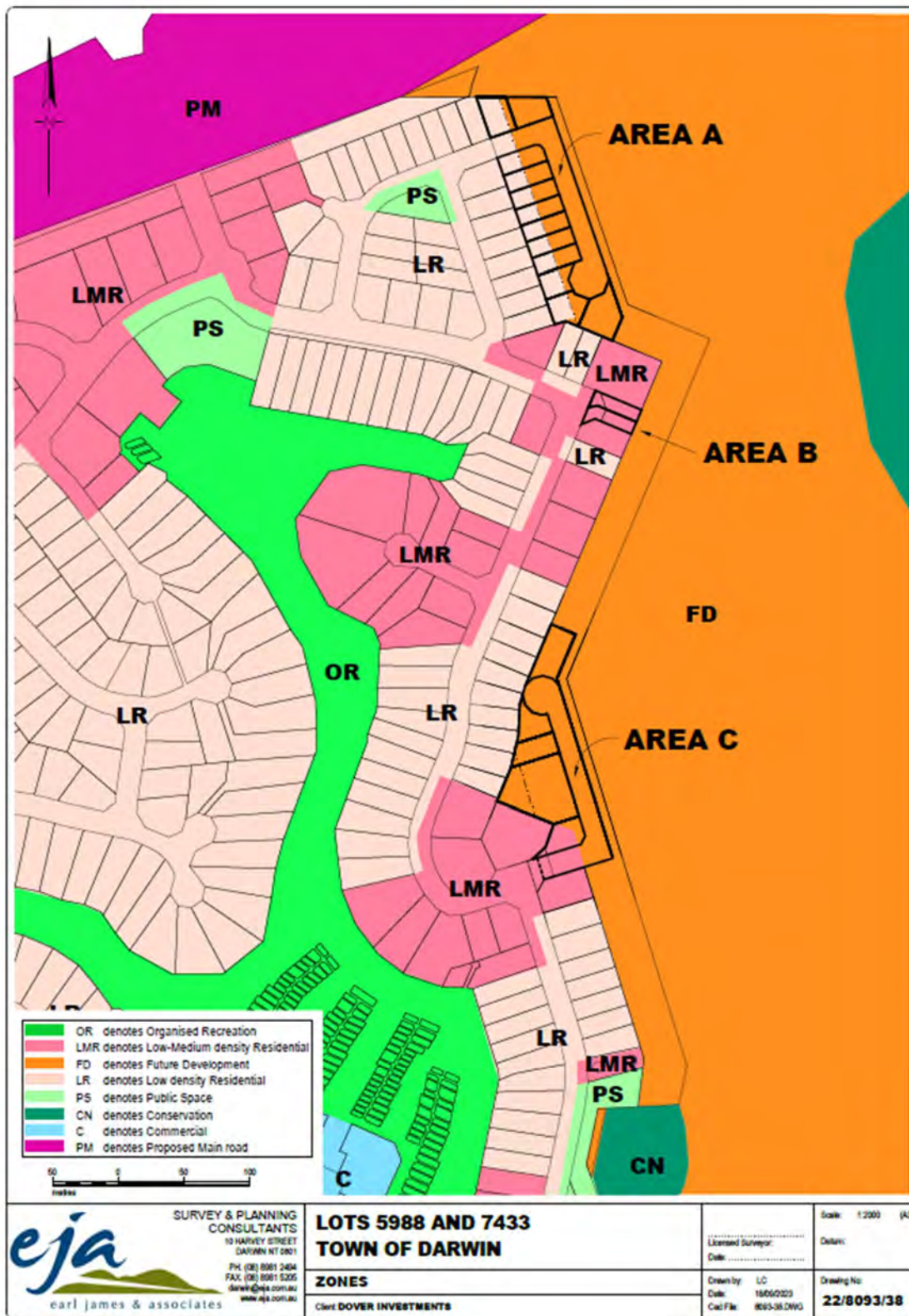
Lots 5988 and 7433, Town of Darwin are Crown lease parcels that have been progressively developed as the Bayview Marina Estate. Bayview Marina Estate is one of Darwin's premier residential subdivisions located a short distance from the Darwin CBD.

The subdivision is recognised for its high standard of development that has resulted from strict design guidelines developed and managed by the developer, Dover Investments (Dover).

There are three remnant areas that have been determined as being suitable for residential development and these areas were the subject of Development Application in 2013. These areas are adjacent to the eastern boundary of the Crown leases and the intention was to create three lots and then construct units on the proposed lots.

The developers did not proceed with the unit development proposal and are now considering less intense development of the Crown lease areas in the form of a majority individual housing lots as well as one larger allotment that may be utilised for multiple dwellings.

The subject areas, as shown in the figure below, comprise a range of zonings under the NT Planning Scheme (NTPS). The current zonings include LR (Low Density Residential), LMR (Low-Medium Residential) and FD (Future Development).



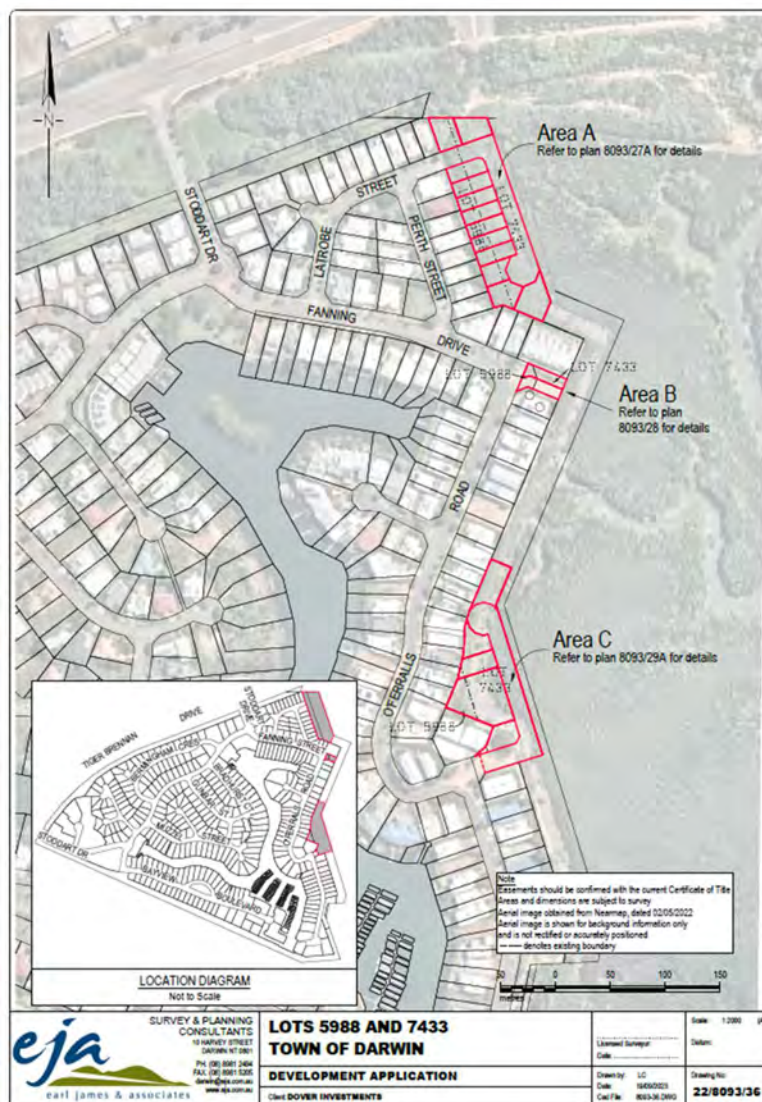
Existing zones

Dover has consulted extensively in order to determine the size of housing lot that is being sought in today's market and as a result of that consultation, as well as detailed site investigation and consideration of available services, has arrived at the designs shown on plans 22/8093/27A, 28 and 29A.

These plans show lot sizes ranging from 392m² up to 2,128m².

In order to facilitate the development of the proposed lots in accordance with requirements of the NTPS, Council and relevant Government agencies, it will be necessary to rezone those areas of the subject land with FD zonings to zone LR and LMR.

The concurrent application process is being utilised as it will allow for a single application, a single exhibition period for the Planning Scheme amendment and development application components of the application and also allow for a single submission/comment from authorities and members of the community.



The proposed subdivision areas

Description of the Proposed Amendment

In 2022 a Development Application was lodged seeking approval to subdivide the subject remnant areas for the purpose of creating 21 urban allotments. Whilst the proposal was consistent with the purpose and intention of the Crown leases (residential subdivision), some of the subject land area was zoned FD (Future Development).

As this FD area is not identified in an Area Plan for the type of housing lots proposed by the 2022 Development Application, it has been determined that those parts of the subject land, currently zoned FD, should be rezoned to LR (Low Density Residential) and LMR (Low-Medium Density Residential) as those zones are consistent with the type of land parcels intended for the subject area.

The objective of this concurrent application is to create 19 urban allotments on the eastern edge of the Bayview Marina Estate Crown leases.

The Darwin Regional Land Use Plan 2015 (DRLUP) applies to the subject land and identifies the subject land as being suitable for urban/peri-urban development.

The lots being proposed by the current application are ideally suited to urban development and in no way conflict with the intention of the DRLUP.

The Darwin Inner Suburbs Area Plan (DISAP) also applies to the land comprised within the Bayview Crown leases.

The DISAP provides a framework to guide progressive growth and development within the Inner Suburbs of Darwin and the land that is the subject of this application, lying on the eastern edge of the existing Bayview development, is identified for 'Future Development'.

Darwin Inner Suburbs Area Plan
District Wide Land Use Plan



The following figure showing Residential Areas, from the DISAP, also identifies the subject area as a *Future Development Area*.



The Planning Principles associated with *Future Development Area* are set out in the following table from the DISAP:

Future Development Area	
Objectives	Acceptable Responses
1. <i>Identify areas intended for future development.</i>	Development is to accord with either <ul style="list-style-type: none"> An Area Plan and the provisions of Zone FD; or Provisions of a Specific Use Zone.
2. <i>Provide for development in accordance with a site or locality specific planning framework once services are or can be made available to the land.</i>	Both the Area Plan and the Specific Use Zone must address the relevant provisions within the NT Planning Scheme (including concepts within this Area Plan).

Part of the land that is the subject of the current application is zoned LMR (Low-Medium Density Residential) whilst the rest is zoned FD (Future Development) and LR (Low Density Residential)

The intention is to amend the NTPS so the zoning of all the land comprised within Area A is LR. Part of Area A is already zoned LR, whilst the eastern part is zoned FD. Similarly, the intention is to also rezone the area comprising Lots 1, 2 and 3 in Area C to zone LR.

The purpose of zone LR is:

Provide predominantly for low rise urban residential development comprising individual houses and uses compatible with residential amenity, in locations where full reticulated services are available.

The lots being proposed by the current application are consistent with the purpose of the zone and will provide new housing options that will be fully serviced and can utilise existing community services and facilities. The proposed lots will also have a zone that is the same as the zoning of the existing, abutting parcels.

This application is also proposing to rezone the land comprised within proposed Lot 4 in Area C to LMR

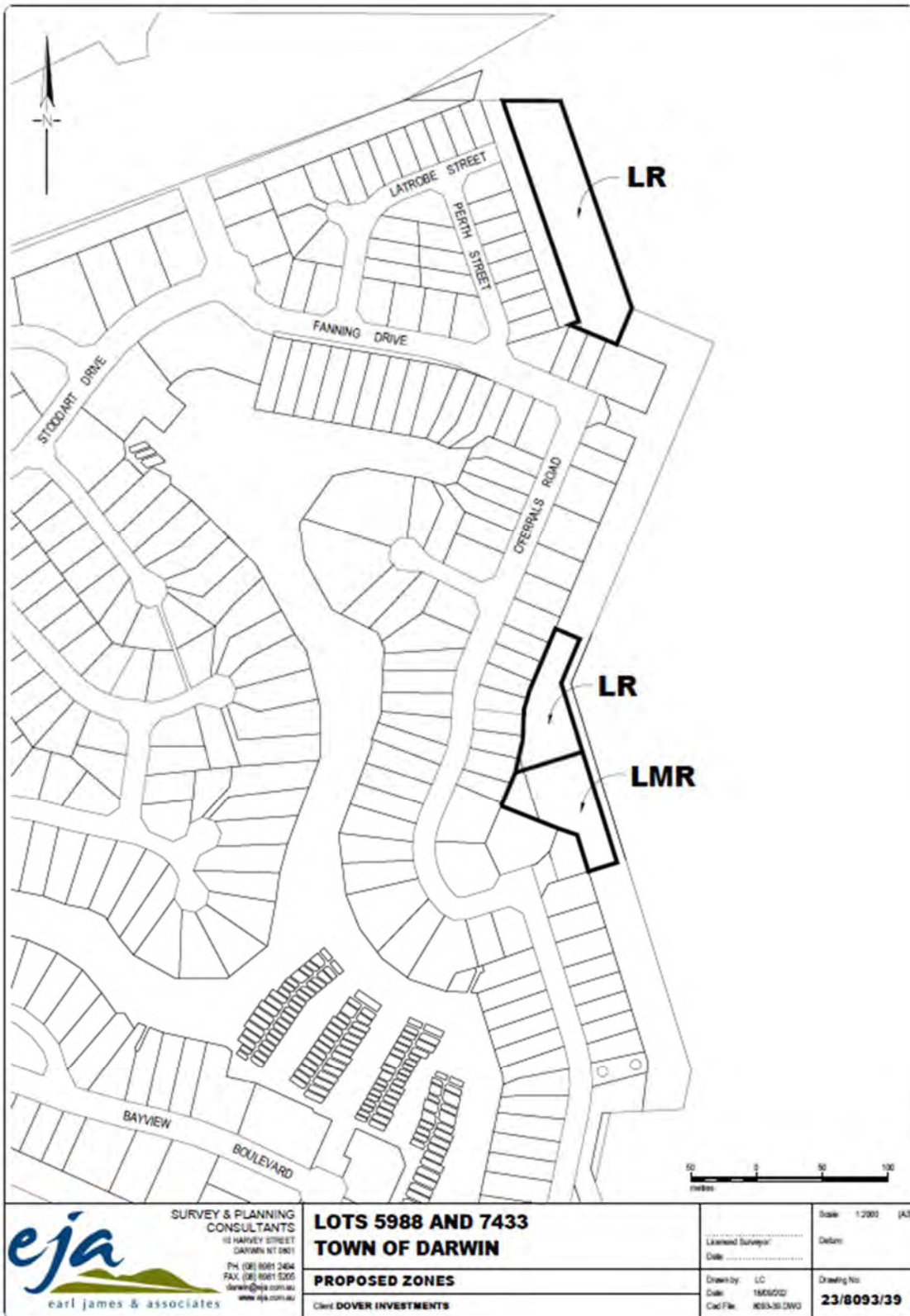
The purpose of zone LMR is:

Provide a range of low rise housing options that contribute to the streetscape and residential amenity in locations supported by community services and facilities, and where full reticulated services are available.

Proposed Lot 4 is consistent with the purpose of the zone and will provide new housing options that will be fully serviced and can utilise existing community services and facilities. The LMR zone proposed for Lot 4 is consistent with the existing zoning of the land immediately to the south.

Plan 22/8093/39 (below and attached) shows the proposed zoning changes.





Below are the Zoning Tables for the LR, LMR and FD Zones.

ASSESSMENT TABLE – ZONE LR – LOW DENSITY RESIDENTIAL					
Defined Use	Assessment Category	Overlays	General Development Requirements	Location Specific Development Requirements	Specific Development Requirements
Caravan Accommodation	Permitted	3.4 CR – Coastal Reclamation 3.6 LSF – Land Subject to Flooding 3.7 LSSS – Land Subject to Storm Surge 3.8 LADR – Land Adjacent to a Designated Road 3.12 RDKE – Residential Development in the Katharine East Locality	5.2.1 General Height control 5.2.4 Car Parking 5.2.6 Landscaping 5.2.7 Setbacks for Development Adjacent to Land in Zones LR, LMR, MR or HR		5.4.11 Caravan Accommodation
Community Centre	Impact assessable				
Demountable Structures	Merit assessable				5.8.7 Demountable Structures
Dwelling-Community Residence	Permitted				5.4.14 Dwelling-Community Residence
Dwelling-Independent	Permitted				5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.6 Private Open Space 5.4.13 Dwelling-Independent
Dwelling-Single	Permitted				5.4.1 Residential Density 5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.6 Private Open Space
Excavation and Fill	Impact assessable				5.8.9 Excavation and Fill
Home Based Business	Permitted				5.4.10 Home Based Businesses
Residential Care Facility	Impact assessable				5.4.1 Residential Density 5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.7 Communal Open Space 5.4.8 Residential Building Design 5.4.15 Residential Care Facility 5.4.17 Building Articulation
Sex Services-Home Based Business	Permitted				5.4.10 Home Based Businesses
Telecommunications Facility	Impact assessable				5.8.10 Telecommunications Facility
All other uses defined in Schedule 2 (Definitions)	Prohibited				
Undefined Uses Any use not defined in Schedule 2 (Definitions)	Prohibited				

ASSESSMENT TABLE – ZONE LMR – LOW-MEDIUM DENSITY RESIDENTIAL					
Defined Use	Assessment Category	Overlays	General Development Requirements	Location Specific Development Requirements	Specific Development Requirements
Dwelling-Multiple	Merit assessable	3.4 CR – Coastal Reclamation 3.6 LSF – Land Subject to Flooding 3.7 LSSS – Land Subject to Storm Surge 3.8 LADR – Land Adjacent to a Designated Road	5.2.1 General Height Control 5.2.4 Car Parking 5.2.6 Landscaping 5.2.7 Setbacks for Development Adjacent to Land in Zones LR, LMR, MR or HR		5.4.1 Residential Density 5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.4 Extensions and Structures Ancillary to a Dwelling-Group or Dwelling-Multiple Development 5.4.6 Private Open Space 5.4.7 Communal Open Space 5.4.8 Residential Building Design 5.4.17 Building Articulation
Dwelling-Single	Permitted	3.10 MRT – Residential Development in Major Remote Towns			5.4.1 Residential Density 5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.6 Private Open Space
Excavation and Fill	Impact assessable				5.8.9 Excavation and Fill
Home Based Business	Permitted				5.4.10 Home Based Businesses
Residential Care Facility	Impact assessable				5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.7 Communal Open Space 5.4.8 Residential Building Design 5.4.15 Residential Care Facility 5.4.17 Building Articulation
Sex Services-Home Based Business	Permitted				5.4.10 Home Based Businesses
Telecommunications Facility	Impact assessable				5.8.10 Telecommunications facility
All other uses defined in Schedule 2 (Definitions)	Prohibited				
Undefined Uses Any use not defined in Schedule 2 (Definitions)	Prohibited				

ASSESSMENT TABLE – ZONE LMR – LOW-MEDIUM DENSITY RESIDENTIAL					
Defined Use	Assessment Category	Overlays	General Development Requirements	Location Specific Development Requirements	Specific Development Requirements
Caravan Accommodation	Permitted	3.4 CR – Coastal Reclamation	5.2.1 General Height Control		5.4.11 Caravan Accommodation
Community Centre	Impact assessable		5.2.4 Car Parking		
Demountable Structures	Merit assessable	3.6 LSF – Land Subject to Flooding	5.2.6 Landscaping		5.8.7 Demountable Structures
Dwelling-Community Residence	Permitted	3.7 LSSS – Land Subject to Storm Surge	5.2.7 Setbacks for Development Adjacent to Land in Zones LR, LMR, MR or HR		5.4.14 Dwelling-Community Residence
Dwelling-Group (2)	Permitted	3.8 LADR – Land Adjacent to a Designated Road			5.4.1 Residential Density 5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.4 Extensions and Structures Ancillary to a Dwelling-Group or Dwelling-Multiple Development 5.4.6 Private Open Space 5.4.8 Residential Building Design 5.4.17 Building Articulation
Dwelling-Group (3+)	Merit assessable	3.10 MRT – Residential Development in Major Remote Towns			5.4.1 Residential Density 5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.4 Extensions and Structures Ancillary to a Dwelling-Group or Dwelling-Multiple Development 5.4.6 Private Open Space 5.4.8 Residential Building Design 5.4.17 Building Articulation
Dwelling-Independent	Permitted	3.11 RCFR – Rapid Creek Flood Response			5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.6 Private Open Space 5.4.13 Dwelling-Independent

ASSESSMENT TABLE – ZONE FD – FUTURE DEVELOPMENT					
Defined Use	Assessment Category	Overlays	General Development Requirements	Location Specific Development Requirements	Specific Development Requirements
Dwelling-Group	Impact assessable	3.4 CR - Coastal Reclamation 3.5 LPA - Land In Proximity to Airports 3.6 LSF - Land Subject to Flooding	5.2.1 General Height Control 5.2.4 Car Parking 5.2.5 Loading Bays 5.2.6 Landscaping		5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.4 Extensions and Structures Ancillary to a Dwelling-Group or Dwelling-Multiple Development 5.4.6 Private Open Space 5.4.8 Residential Building Design 5.4.17 Building Articulation
Dwelling-Independent	Permitted	3.7 LSSS - Land Subject to Storm Surge	5.2.7 Setbacks for Development Adjacent to Land in Zones LR, LMR, MR or HR		5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.6 Private Open Space
Dwelling-Multiple	Impact assessable	3.8 LADR - Land Adjacent to a Designated Road 3.9 DHD - Dredging in Darwin Harbour	5.3.4 Development of Land in Zone FD		5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.4 Extensions and Structures Ancillary to a Dwelling-Group or Dwelling-Multiple Development 5.4.6 Private Open Space 5.4.7 Communal Open Space 5.4.8 Residential Building Design 5.4.17 Building Articulation
Dwelling-Single	Impact assessable				5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.6 Private Open Space
Education Establishment	Impact assessable				5.5.3 General Building and Site Design 5.8.2 Education Establishment
Emergency Services Facility	Impact assessable				5.5.3 General Building and Site Design 5.8.6 Emergency Services Facility
Excavation and Fill	Impact assessable				5.8.9 Excavation and Fill
Food Premises-Cafe/Take Away	Impact assessable				5.5.3 General Building and Site Design 5.5.11 Food Premises
Food Premises-Fast Food Outlet	Impact assessable				5.5.3 General Building and Site Design 5.5.11 Food Premises

ASSESSMENT TABLE – ZONE FD – FUTURE DEVELOPMENT					
Defined Use	Assessment Category	Overlays	General Development Requirements	Location Specific Development Requirements	Specific Development Requirements
Agriculture	Impact assessable	3.4 CR - Coastal Reclamation	5.2.1 General Height Control		5.7.1 Rural Development (Agriculture, Horticulture and Intensive Animal Husbandry)
Animal Boarding	Impact assessable	3.5 LPA – Land In Proximity to Airports	5.2.4 Car Parking		5.7.2 Animal related Use and Development
Bar-Public	Impact assessable	3.6 LSF - Land Subject to Flooding	5.2.5 Loading Bays		5.5.3 General Building and Site Design 5.5.10 Nightclub Entertainment Venue, Bar-Public and Bar-Small
Bar-Small	Impact assessable	3.7 LSSS – Land Subject to Storm Surge	5.2.6 Landscaping		5.5.3 General Building and Site Design 5.5.10 Nightclub Entertainment Venue, Bar-Public and Bar-Small
Caravan Accommodation	Permitted	3.8 LADR – Land Adjacent to a Designated Road	5.2.7 Setbacks for Development Adjacent to Land in Zones LR, LMR, MR or HR		5.4.11 Caravan Accommodation
Caravan Park	Impact assessable		5.3.4 Development of Land in Zone FD		5.5.13 Caravan Park
Car Park	Impact assessable				
Child Care Centre	Impact assessable	3.9 DHD – Dredging in Darwin Harbour			5.5.3 General Building and Site Design 5.5.7 Child Care Centre
Club	Impact assessable				5.5.3 General Building and Site Design 5.8.3 Club
Community Centre	Impact assessable				5.5.3 General Building and Site Design
Demountable Structures	Merit assessable				5.8.7 Demountable Structures
Dwelling-Caretakers	Impact assessable				5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.12 Dwelling-Caretakers
Dwelling-Community Residence	Permitted				5.4.14 Dwelling-Community Residence

ASSESSMENT TABLE – ZONE FD – FUTURE DEVELOPMENT					
Defined Use	Assessment Category	Overlays	General Development Requirements	Location Specific Development Requirements	Specific Development Requirements
Food Premises-Restaurant	Impact assessable	3.4 CR - Coastal Reclamation	5.2.1 General Height Control		5.5.3 General Building and Site Design 5.5.11 Food Premises
Helicopter Landing Site	Impact assessable	3.5 LPA – Land In Proximity to Airports	5.2.4 Car Parking		5.4.16 Helicopter Landing Sites
Home Based Business	Permitted		5.2.5 Loading Bays		5.4.10 Home Based Businesses
Horticulture	Impact assessable	3.6 LSF - Land Subject to Flooding	5.2.6 Landscaping		5.7.1 Rural Development (Agriculture, Horticulture and Intensive Animal Husbandry)
Hospital	Impact assessable	3.7 LSSS – Land Subject to Storm Surge	5.2.7 Setbacks for Development Adjacent to Land in Zones LR, LMR, MR or HR		5.5.3 General Building and Site Design
Hotel/Motel	Impact assessable	3.8 LADR – Land Adjacent to a Designated Road	5.3.4 Development of Land in Zone FD		5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.5.3 General Building and Site Design
Intensive Animal Husbandry	Impact assessable				5.7.1 Rural Development (Agriculture, Horticulture and Intensive Animal Husbandry)
Leisure and Recreation	Impact assessable	3.9 DHD – Dredging in Darwin Harbour			5.5.3 General Building and Site Design 5.8.5 Leisure and Recreation
Medical Clinic	Impact assessable				5.5.3 General Building and Site Design
Office	Impact assessable				5.5.3 General Building and Site Design
Place of Worship	Impact assessable				5.5.3 General Building and Site Design 5.8.4 Exhibition Centre, Place of Assembly and Place of Worship
Plant Nursery	Impact assessable				
Renewable Energy Facility	Impact assessable				5.5.3 General Building and Site Design 5.8.8 Renewable Energy Facility
Residential Care Facility	Impact assessable				5.4.3 Building Setbacks of Residential Buildings and Ancillary Structures 5.4.7 Communal Open Space 5.4.8 Residential Building Design 5.4.17 Building Articulation

ASSESSMENT TABLE – ZONE FD – FUTURE DEVELOPMENT					
Defined Use	Assessment Category	Overlays	General Development Requirements	Location Specific Development Requirements	Specific Development Requirements
Retail Agricultural Stall	Impact assessable	3.4 CR - Coastal Reclamation	5.2.1 General Height Control		5.7.5 Retail Agricultural Stall
Service Station	Impact assessable	3.5 LPA – Land In Proximity to Airports	5.2.4 Car Parking		5.5.3 General Building and Site Design 5.5.8 Service Station
Sex Services-Home Based Business	Permitted		5.2.5 Loading Bays		5.4.10 Home Based Businesses
Shop	Impact assessable	3.6 LSF - Land Subject to Flooding	5.2.6 Landscaping		5.5.3 General Building and Site Design
Shopping Centre	Impact assessable	3.7 LSSS – Land Subject to Storm Surge	5.2.7 Setbacks for Development Adjacent to Land in Zones LR, LMR, MR or HR		5.5.3 General Building and Site Design 5.5.12 Shopping Centre
Telecommunications Facility	Impact assessable				5.8.10 Telecommunications Facility
Veterinary Clinic	Impact assessable	3.8 LADR – Land Adjacent to a Designated Road	5.3.4 Development of Land in Zone FD		5.5.3 General Building and Site Design
All other uses defined in Schedule 2 (Definitions)	Prohibited				
Undefined Uses Any use not defined in Schedule 2 (Definitions)	Impact assessable	3.9 DHD – Dredging in Darwin Harbour			Part 2, Part 3, Part 4, Part 5 of this Planning Scheme

Land Suitability

As with all the preceding Stages of the Bayview Marina Estate, earthworks will be involved in rendering the land suitable for the intended use.

Geotechnical consultants Douglas Partners (DP) have been involved in the past stages and they have previously prepared a report to detail the site filling and seawall construction.

A copy of the DP report is included in this application and is addressed in more detail in the Development Proposal component of this concurrent application.

It is expected that any approval for the subdivision being proposed by the current application will be conditional on the design of all earthworks being approved by the relevant authorities prior to the commencement of any construction.

Infrastructure

Byrne Consultants has been engaged to consider service reticulation and the servicing of each of the proposed lots.

Servicing reports have been prepared and these form part of the current application. These reports have been prepared after consultation with the relevant service authorities.

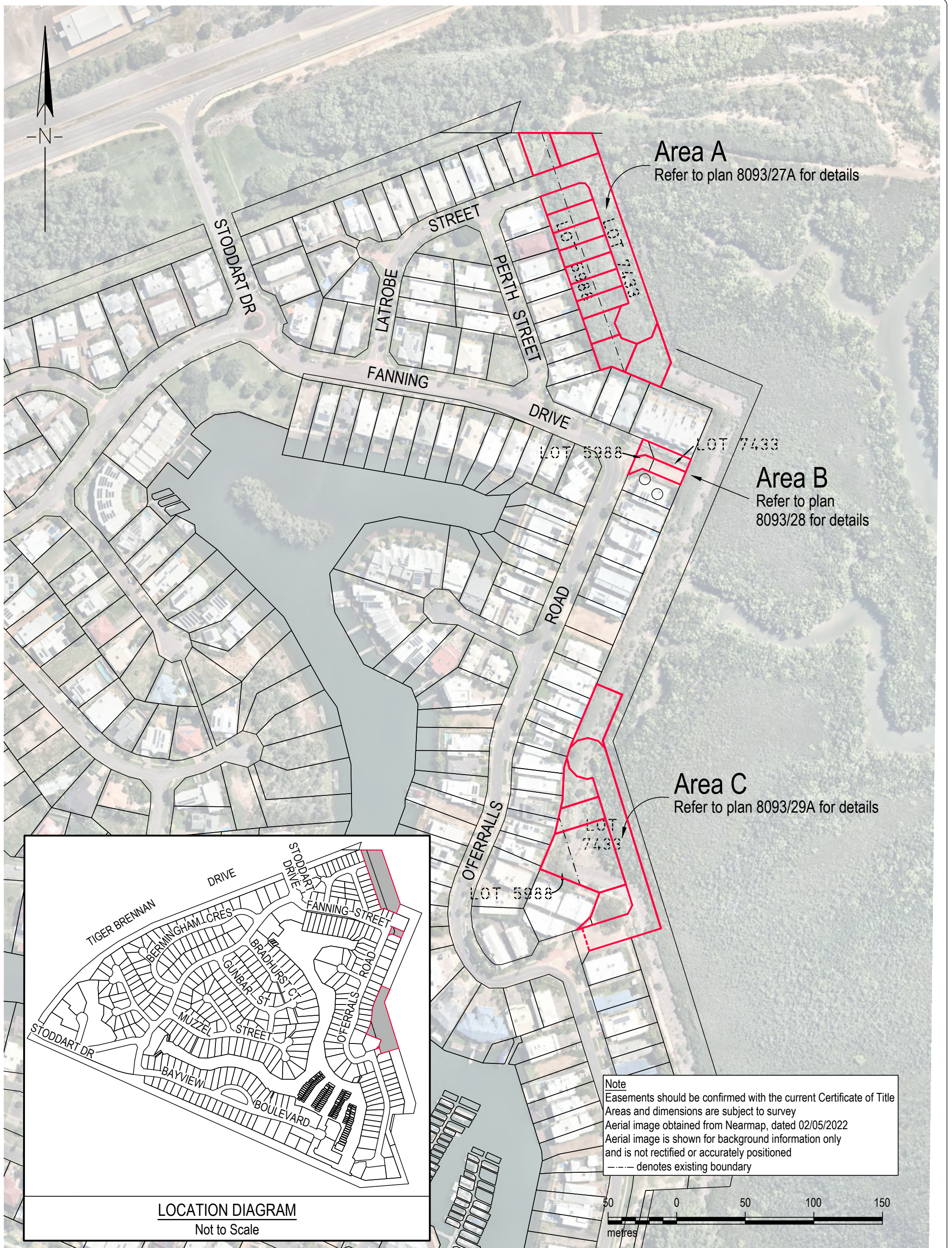
Servicing details are outlined in the Development Proposal but each of the proposed Lots will have water, power, sewer and communications connections.


Conclusion

The proposed Planning Scheme amendment will facilitate the development of lots in the final stages of the Bayview Marina Estate.

The creation of the new lots is consistent with the purpose of the Crown leases and Darwin Regional Land Use Plan.

The new lots will provide valuable new housing options that are close to the Darwin CBD and the future residents will be able to utilise the existing community and commercial facilities in the locality.

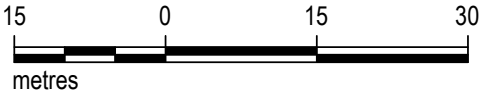


	SURVEY & PLANNING CONSULTANTS 10 HARVEY STREET DARWIN NT 0801 PH. (08) 8981 2494 FAX. (08) 8981 5205 darwin@eja.com.au www.eja.com.au		LOTS 5988 AND 7433 TOWN OF DARWIN		Licensed Surveyor: Date:	Scale: 1:2000 (A3) Datum:
	DEVELOPMENT APPLICATION		Client: DOVER INVESTMENTS		Drawn by: LC Date: 19/09/2023 Cad File: 8093-36.DWG	Drawing No: 22/8093/36



Note
Refer to plan 8093/26 for location plan
Easements should be confirmed with the current Certificate of Title
Areas and dimensions are subject to survey
Aerial image obtained from Nearmap, dated 02/05/2022
Aerial image is shown for background information only
and is not rectified or accurately positioned

denotes Seawall construction



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**AREA A, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DEVELOPMENT APPLICATION

Client: **DOVER INVESTMENTS**

Licensed Surveyor:
Date:

Drawn by: LC
Date: 01/08/2023
Cad File: 8093-27A.DWG

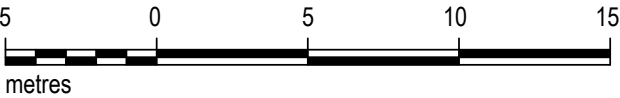
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Drawing No:
22/8093/27A



Note
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Aerial image obtained from Nearmap, dated 02/05/2022
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**AREA B, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DEVELOPMENT APPLICATION

Client: **DOVER INVESTMENTS**

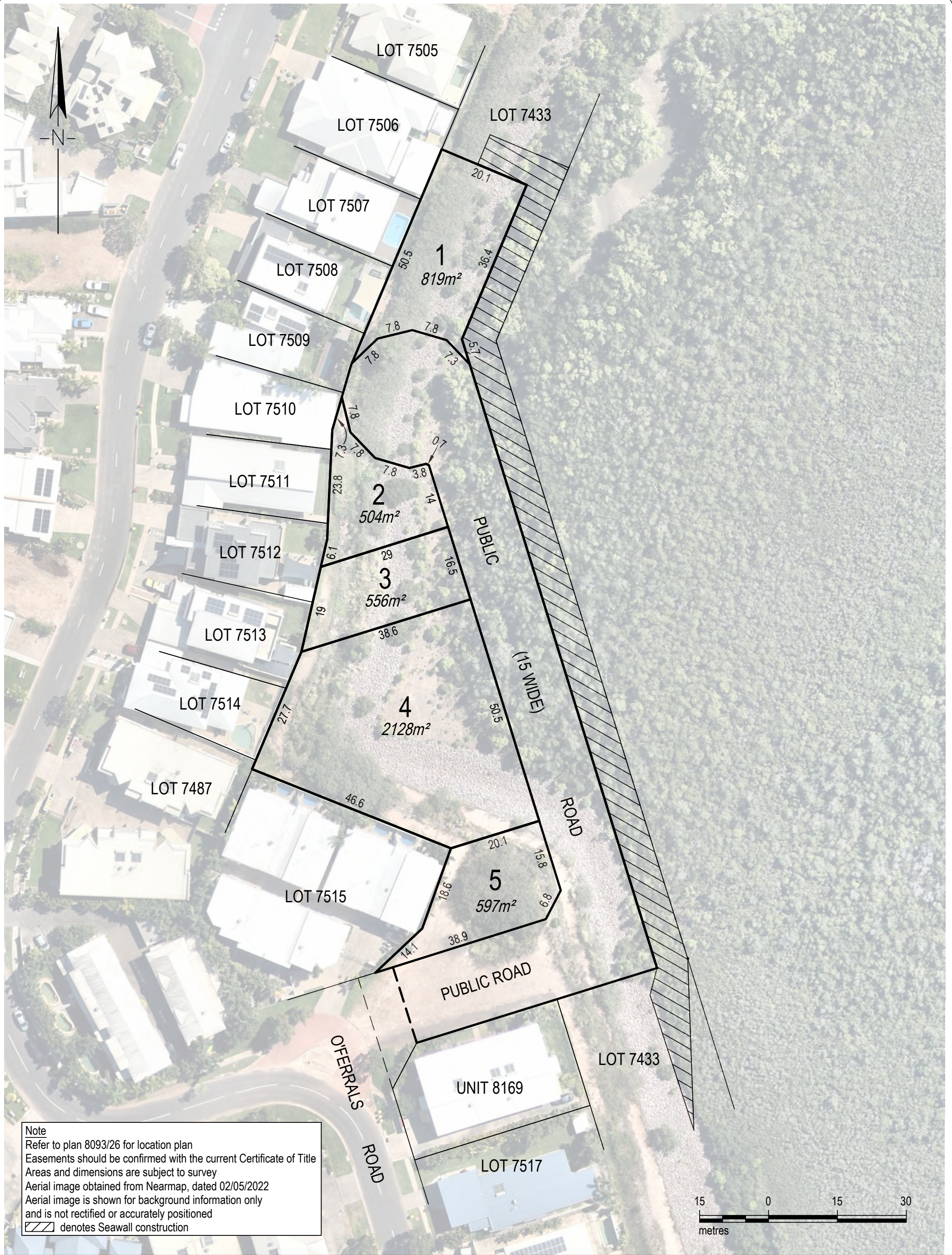
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Licensed Surveyor:
Date:

Drawn by: LC
Date: 29/09/2022
Cad File: 8093-28.DWG

Scale: 1:250 (A3)

Datum:

Drawing No:
22/8093/28



Note
Refer to plan 8093/26 for location plan
Easements should be confirmed with the current Certificate of Title
Areas and dimensions are subject to survey
Aerial image obtained from Nearmap, dated 02/05/2022
Aerial image is shown for background information only
and is not rectified or accurately positioned
/// denotes Seawall construction



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**AREA C, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DEVELOPMENT APPLICATION

Client: **DOVER INVESTMENTS**

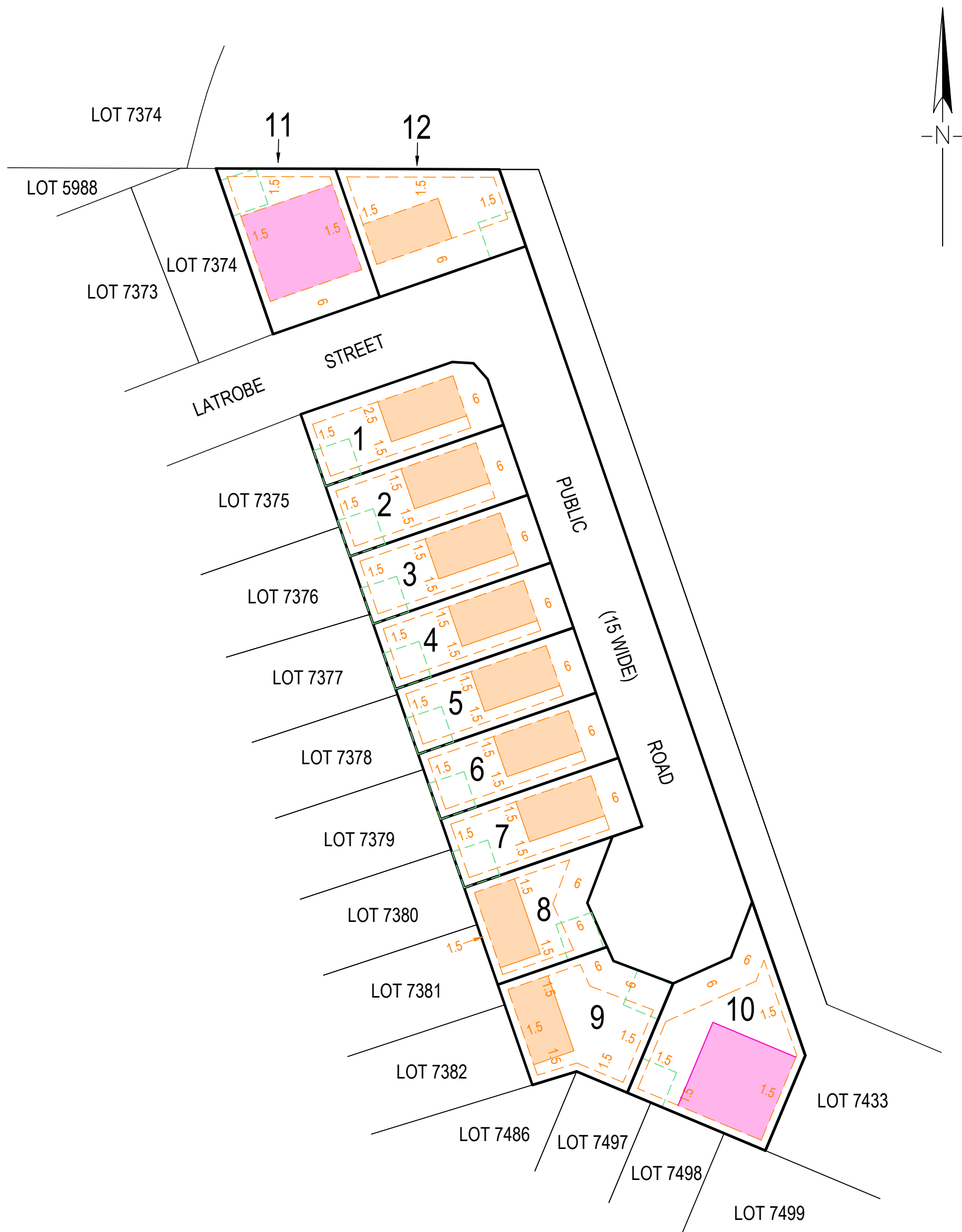
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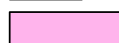



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Datum:

Drawing No:
22/8093/29A



Legend

-  Designated Building Envelope of 17x17m
-  Designated Building Envelope of 8x15m
-  Setback
-  Indicative open space - 50m²

Note
Refer to plan 8093/26 for location plan



**AREA A, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

SETBACK AND BUILDING ENVELOPE

Client: **DOVER INVESTMENTS**

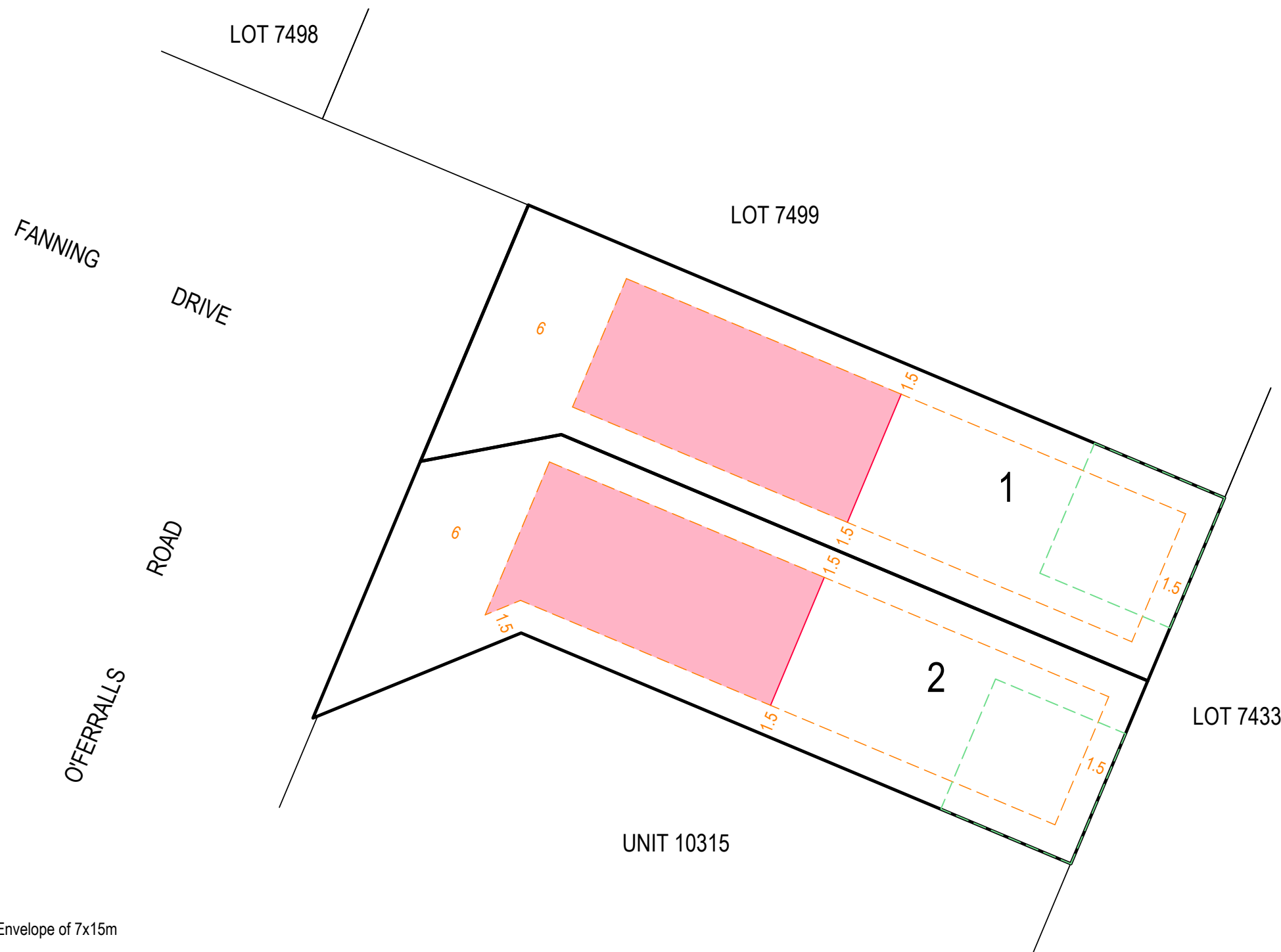
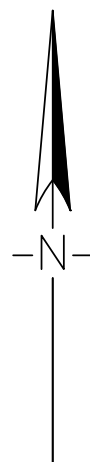
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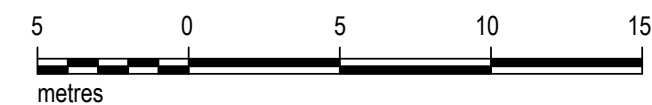


Legend

-  Designated Building Envelope of 7x15m
-  Setback
-  Indicative open space - 50m²

Note

Refer to plan 8093/26 for location plan



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**AREA B, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DEVELOPMENT APPLICATION

Client: **DOVER INVESTMENTS**

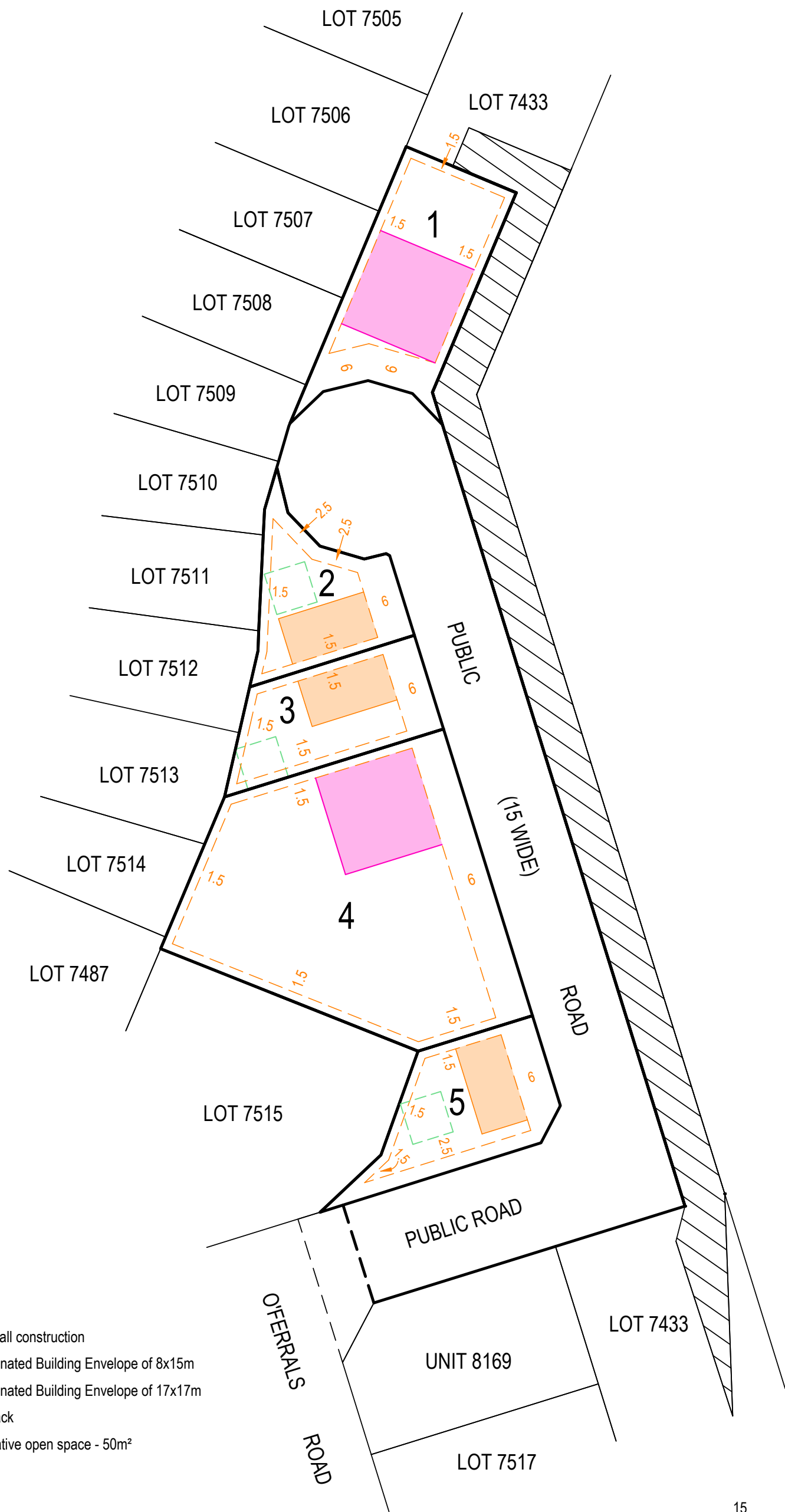
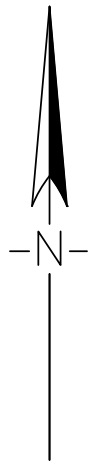
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Date: 17/11/2022
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Scale: 1:250 (A3)

Datum:

Drawing No:
22/8093/32



- Legend**
- Seawall construction
 - Designated Building Envelope of 8x15m
 - Designated Building Envelope of 17x17m
 - Setback
 - Indicative open space - 50m²

Note
Refer to plan 8093/26 for location plan



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**AREA C, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

SETBACK AND BUILDING ENVELOPE

Client: **DOVER INVESTMENTS**

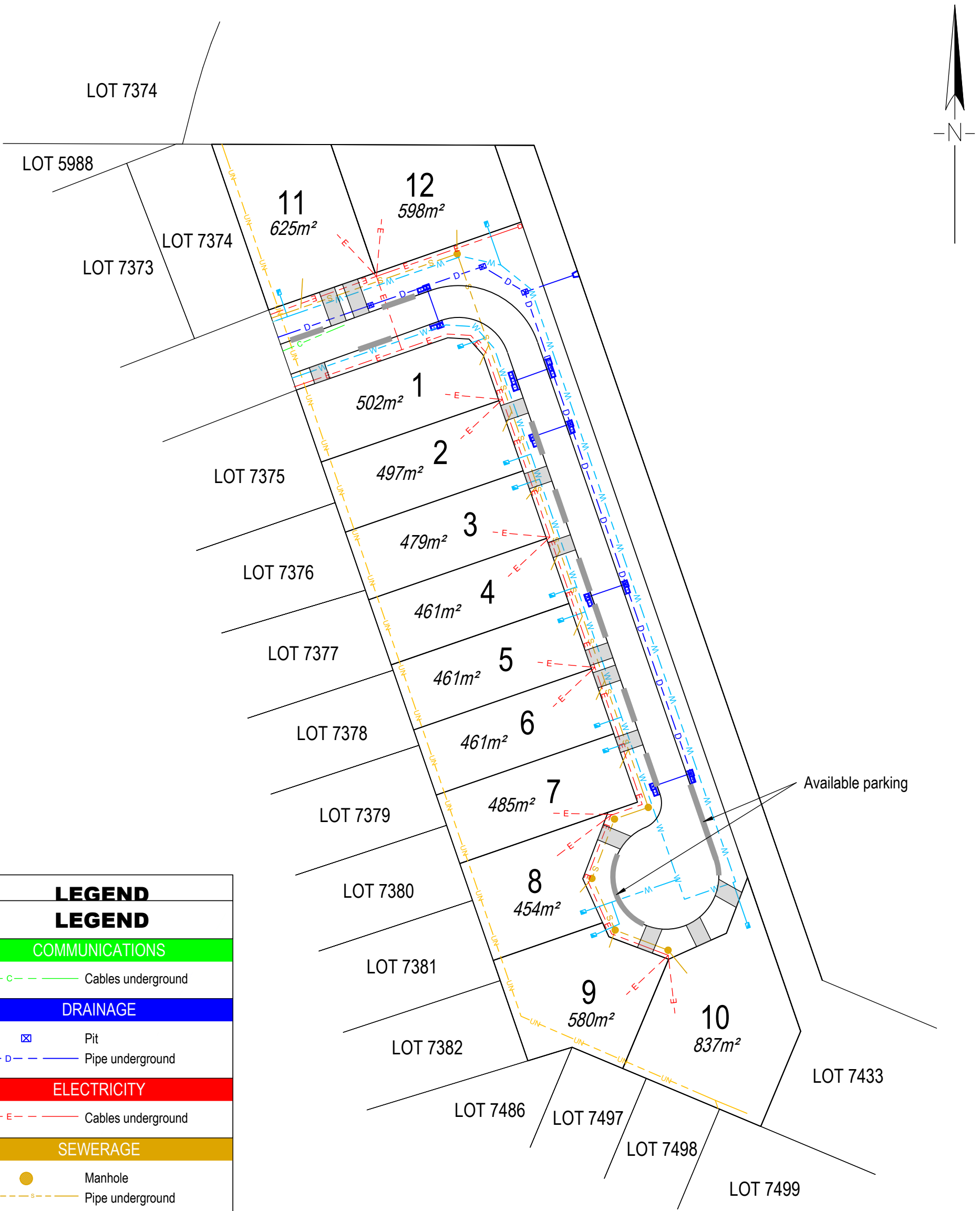
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Cad File: 8093-33A.DWG

Scale: 1:750 (A3)

Datum:

Drawing No:
22/8093/33A



LEGEND	
LEGEND	
COMMUNICATIONS	
	Cables underground
DRAINAGE	
	Pit
	Pipe underground
ELECTRICITY	
	Cables underground
SEWERAGE	
	Manhole
	Pipe underground
	Vacuum pipe
WATER SUPPLY	
	Pipe below ground
ROAD	
	Driveway
	Available carparking



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**AREA A, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DRIVEWAYS

Client: **DOVER INVESTMENTS**

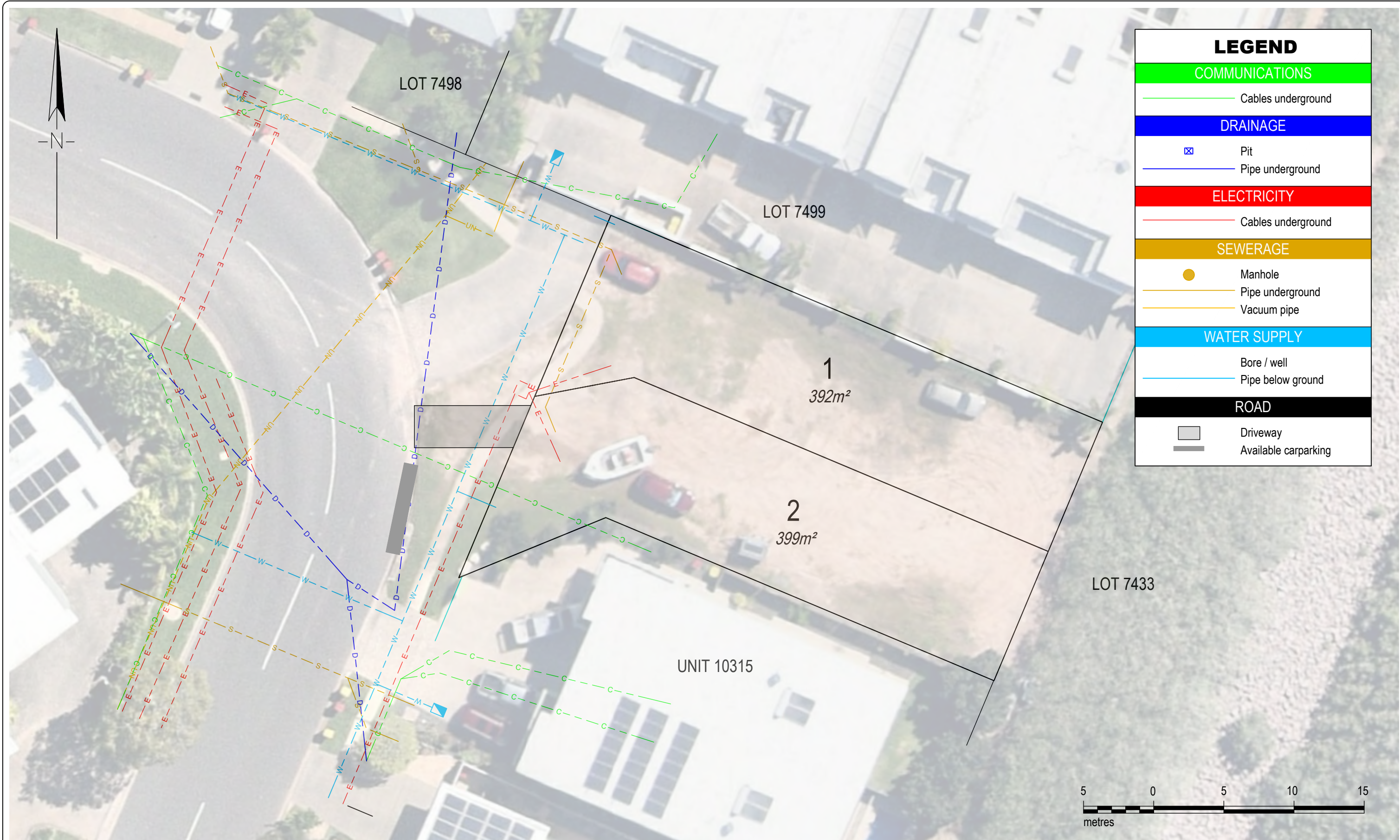
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SHEET 1 OF 2





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**AREA B, PART OF LOTD 5988 AND 7433
TOWN OF DARWIN**

DRIVEWAYS

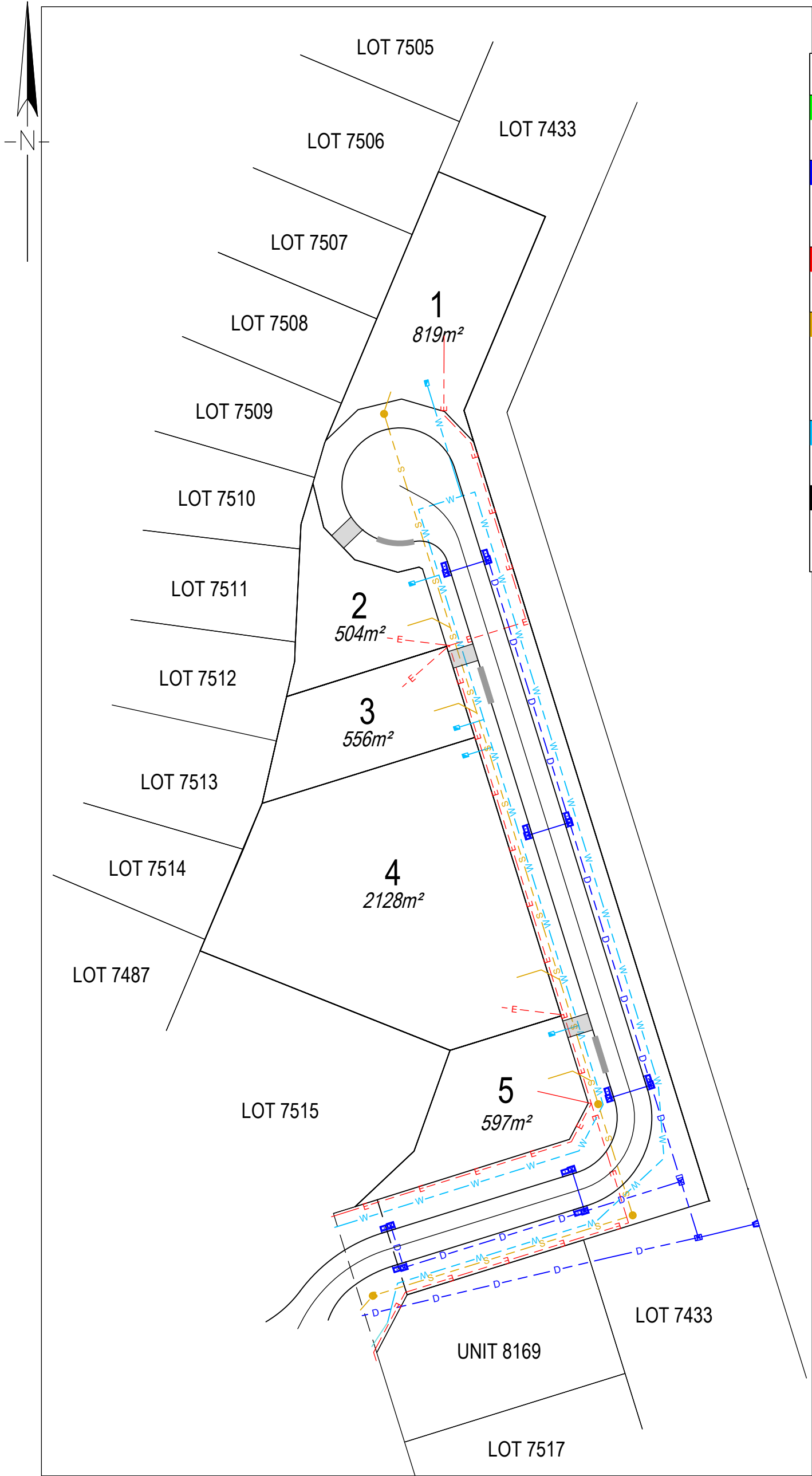
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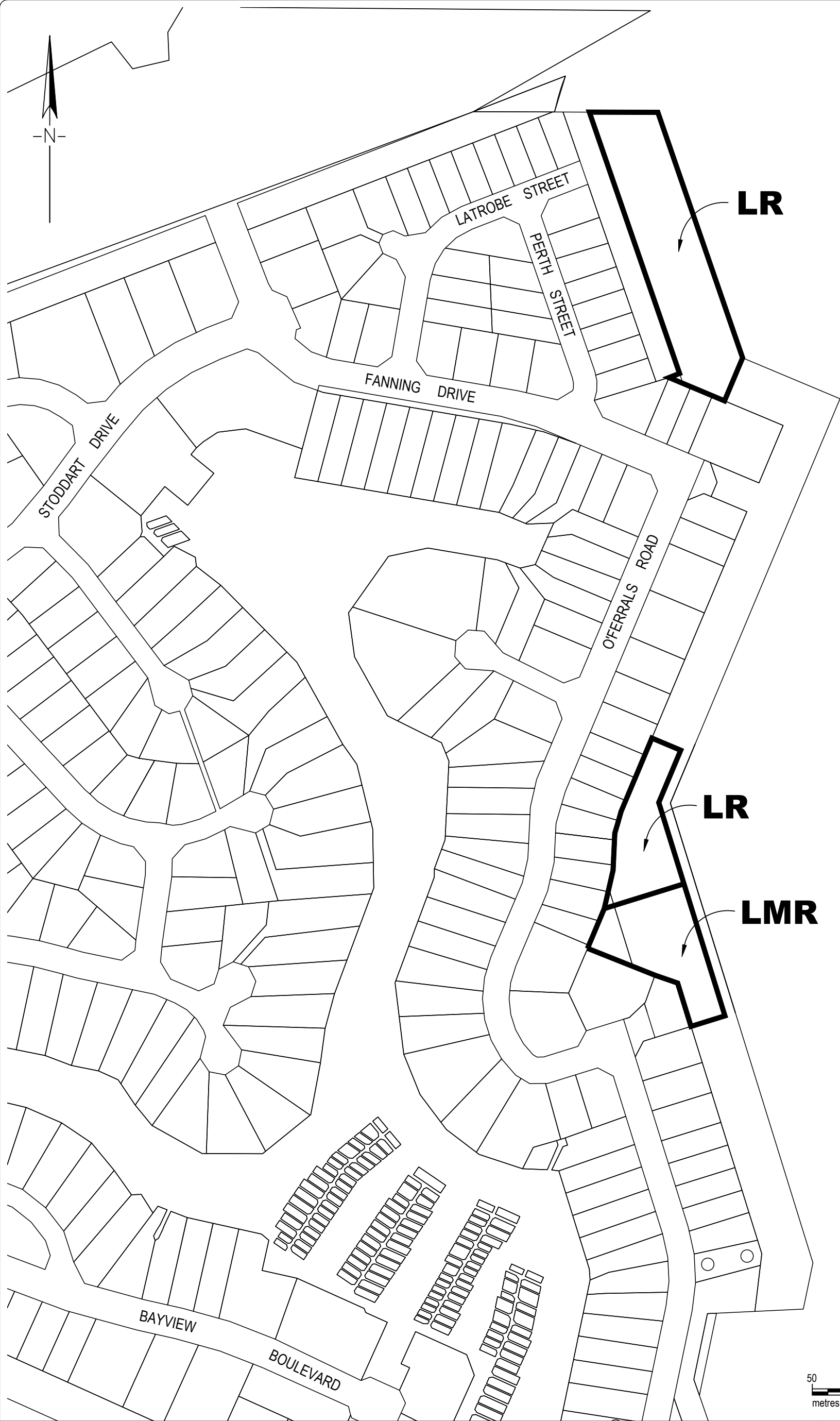
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22/8093/34B
SHEET 2 OF 3



LEGEND	
COMMUNICATIONS	
	Cables underground
DRAINAGE	
	Pit
	Pipe underground
ELECTRICITY	
	Cables underground
SEWERAGE	
	Manhole
	Pipe underground
	Vacuum pipe
WATER SUPPLY	
	Pipe below ground
ROAD	
	Driveway
	Available carparking

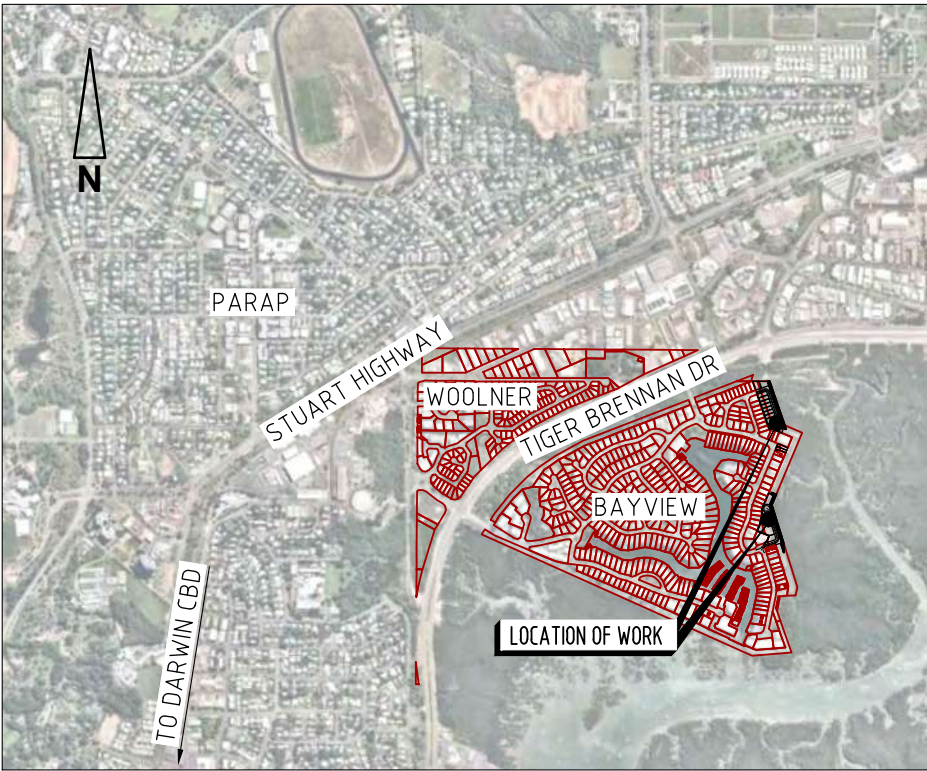
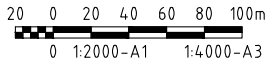





	SURVEY & PLANNING CONSULTANTS 10 HARVEY STREET DARWIN NT 0801 PH. (08) 8981 2494 FAX. (08) 8981 5205 darwin@eja.com.au www.eja.com.au		LOTS 5988 AND 7433 TOWN OF DARWIN		Scale: 1:2000 (A3)
	PROPOSED ZONES		Client: DOVER INVESTMENTS		Datum:
			Drawn by: LC Date: 18/09/202 Cad File: 8093-39.DWG		Drawing No: 23/8093/39



LOCALITY LAYOUT
SCALE 1:2000



LOCALITY MAP
NTS


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	DRAWN	BB							
	DESIGNED	SI	SCALE	AS SHOWN	PROJECT No	22007	DRAWING No	SK009	AMDT

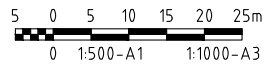



LOT A LAYOUT

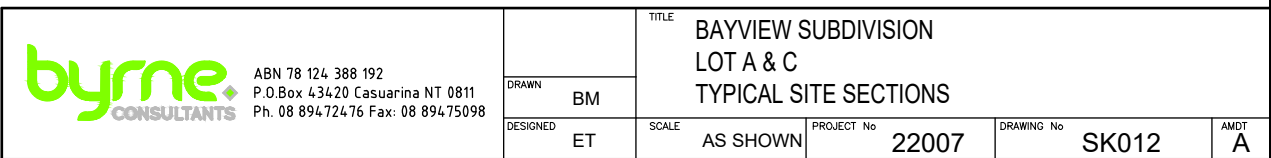
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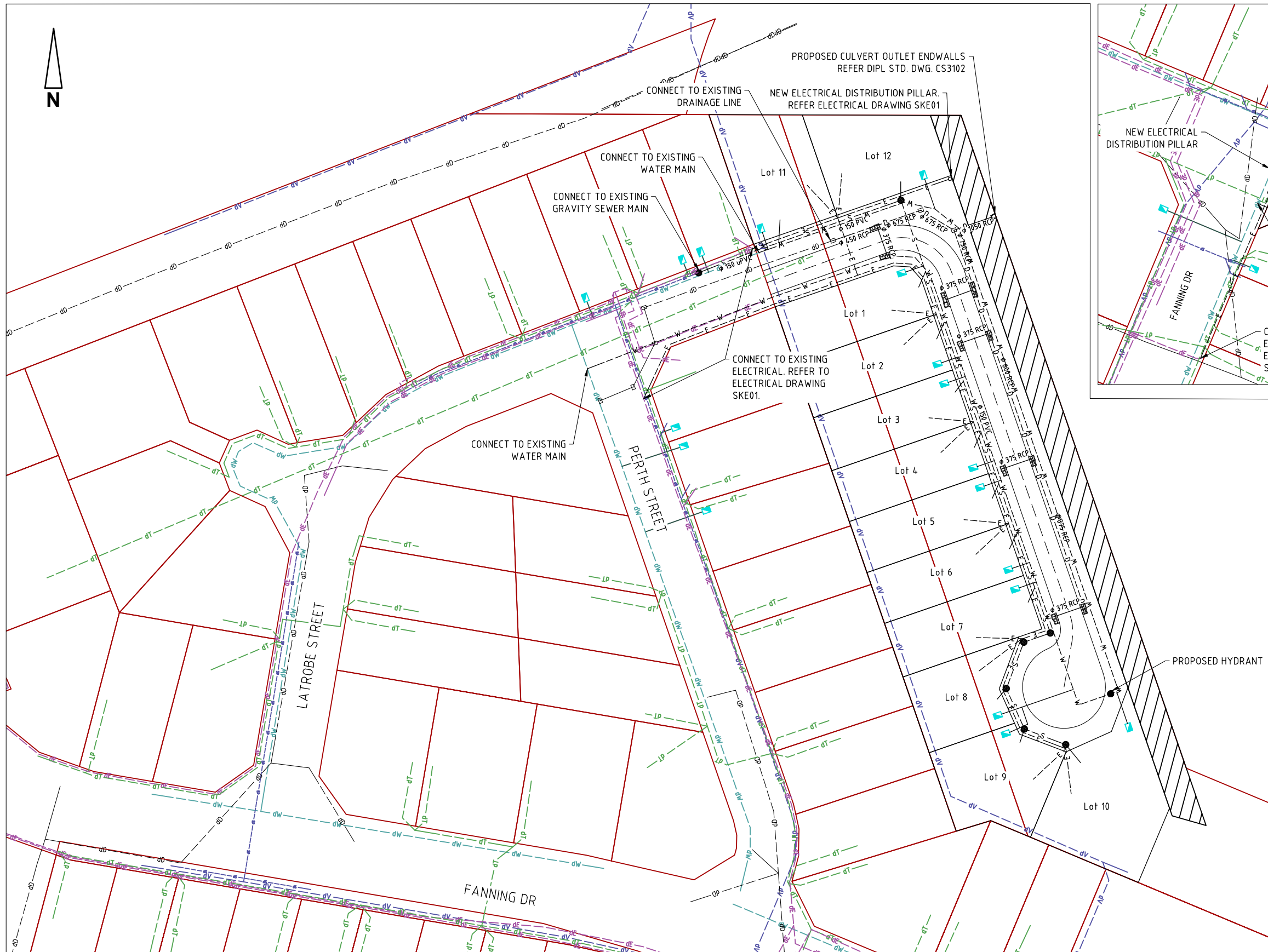
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		DRAWN BB	SCALE AS SHOWN		
DESIGNED SI	PROJECT No 22007	DRAWING No SK001	AMDT B		

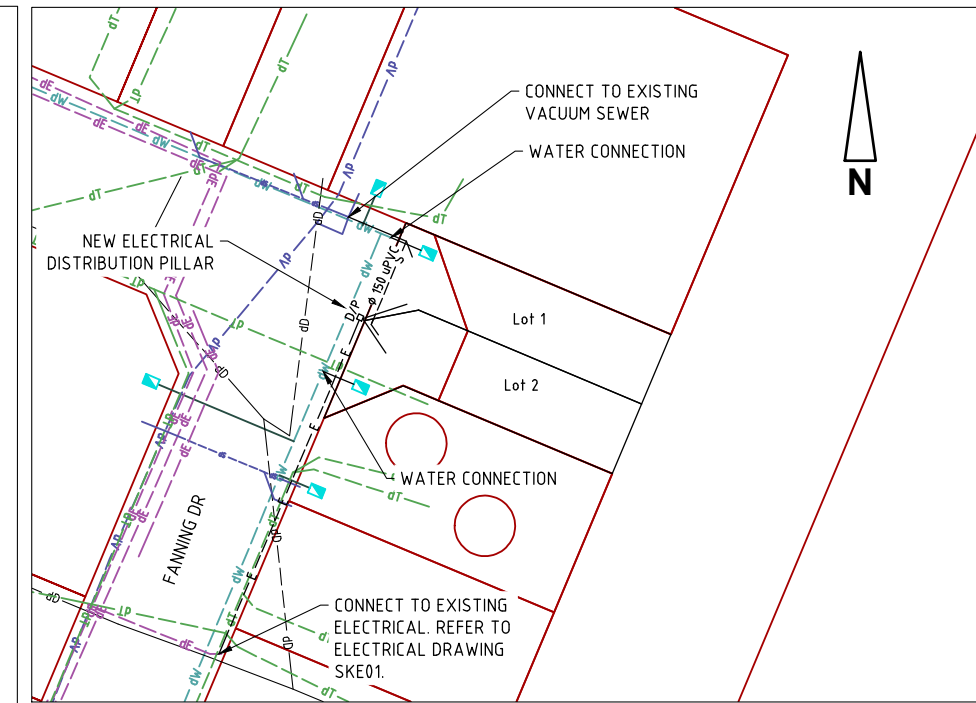


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	DRAWN BB					
	DESIGNED SI	SCALE AS SHOWN	PROJECT No 22007	DRAWING No SK002	AMDT B	





LOT A LAYOUT



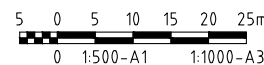
LOT B LAYOUT

LEGEND
PROPOSED

- PROPERTY BOUNDARY
- GRAVITY SEWER MAIN
- ELECTRICAL CONDUIT
- STORMWATER DRAINAGE
- WATER MAIN
- WATER LOT SERVICE
- STORMWATER MANHOLE
- STORMWATER SIDE ENTRY PIT (2 BAY)
- SEWER MANHOLE
- SEWER VACUUM PIT AND ACTUATOR BOX
- WATER HYDRANT
- ELECTRICAL DISTRIBUTION PILLAR

EXISTING

- ELECTRICAL
- WATER
- TELECOMMUNICATIONS
- GRAVITY SEWER
- VACUUM SEWER
- DRAINAGE



No	DATE	INITIAL	AMENDMENT
C	01/09/23	BB	LOT LAYOUT AMENDMENT
B	02/02/23	SI	WATER MAIN UPDATE
A	20/09/22	SI	ISSUED TO CLIENT

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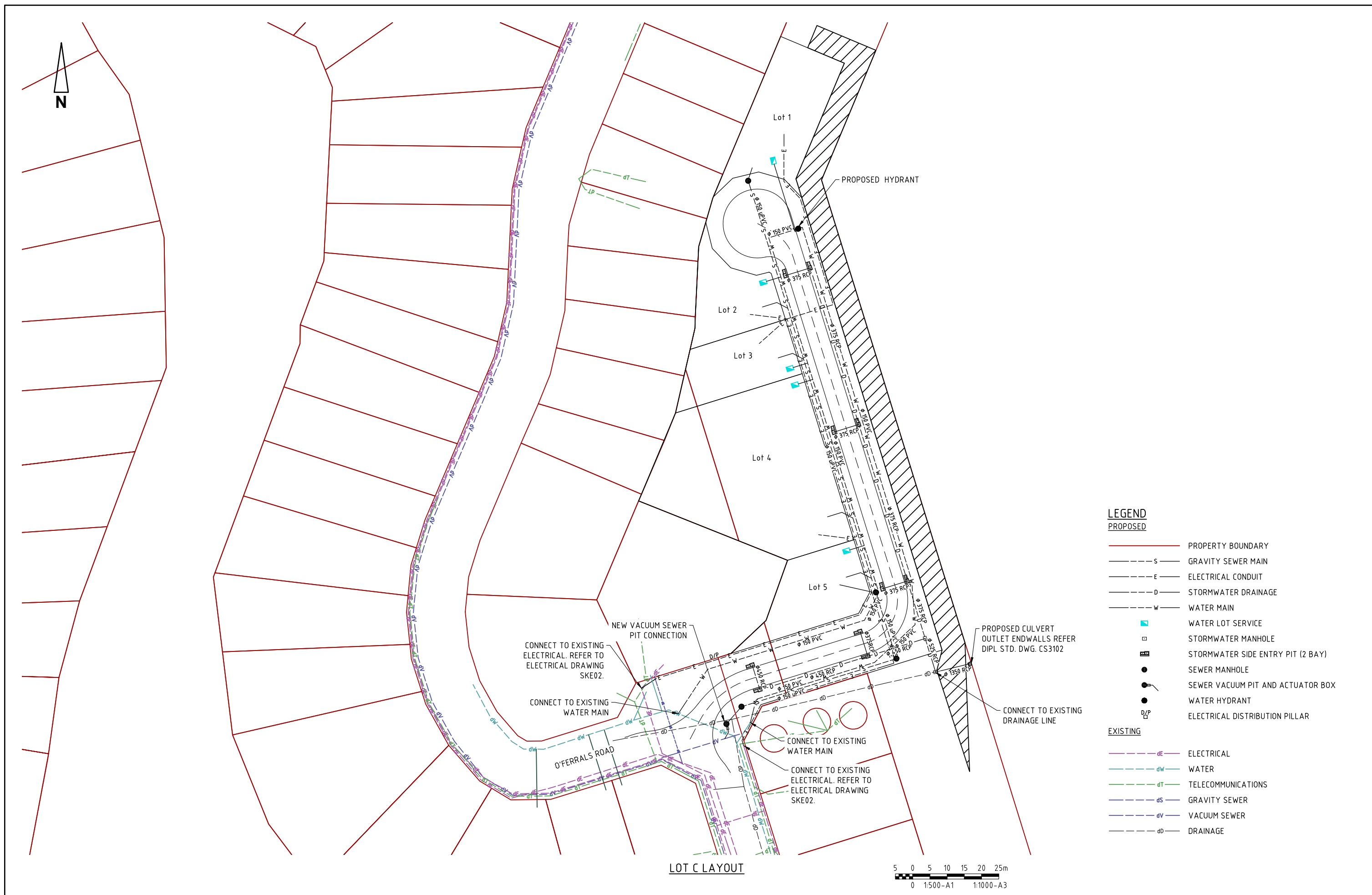
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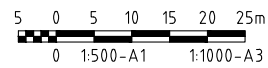
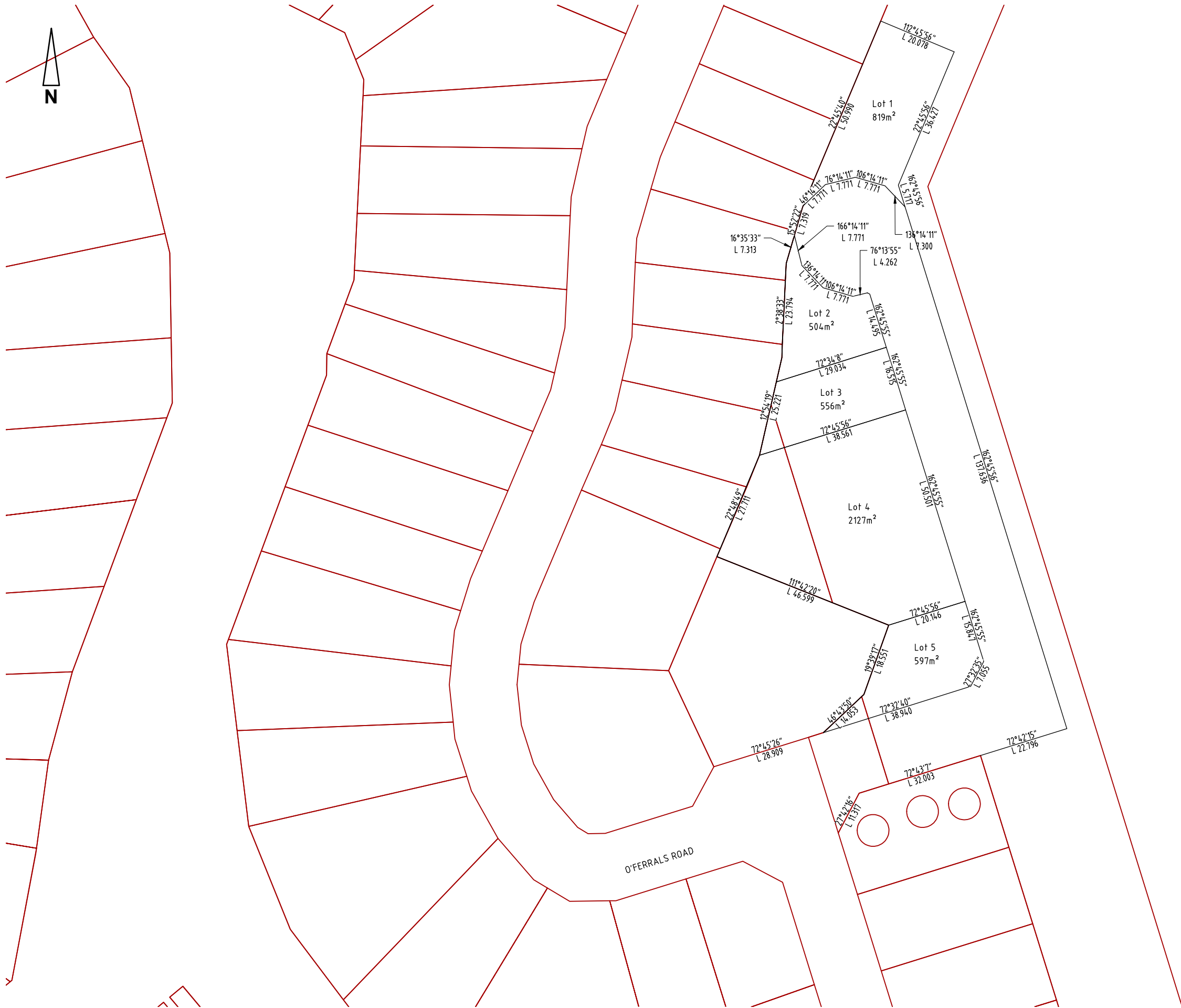
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DRAWN	CHECKED
BB	SC
DESIGNED	CHECKED
SI	SC

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SCALE AS SHOWN	PROJECT No 22007	DRAWING No SK-003	AMDT C

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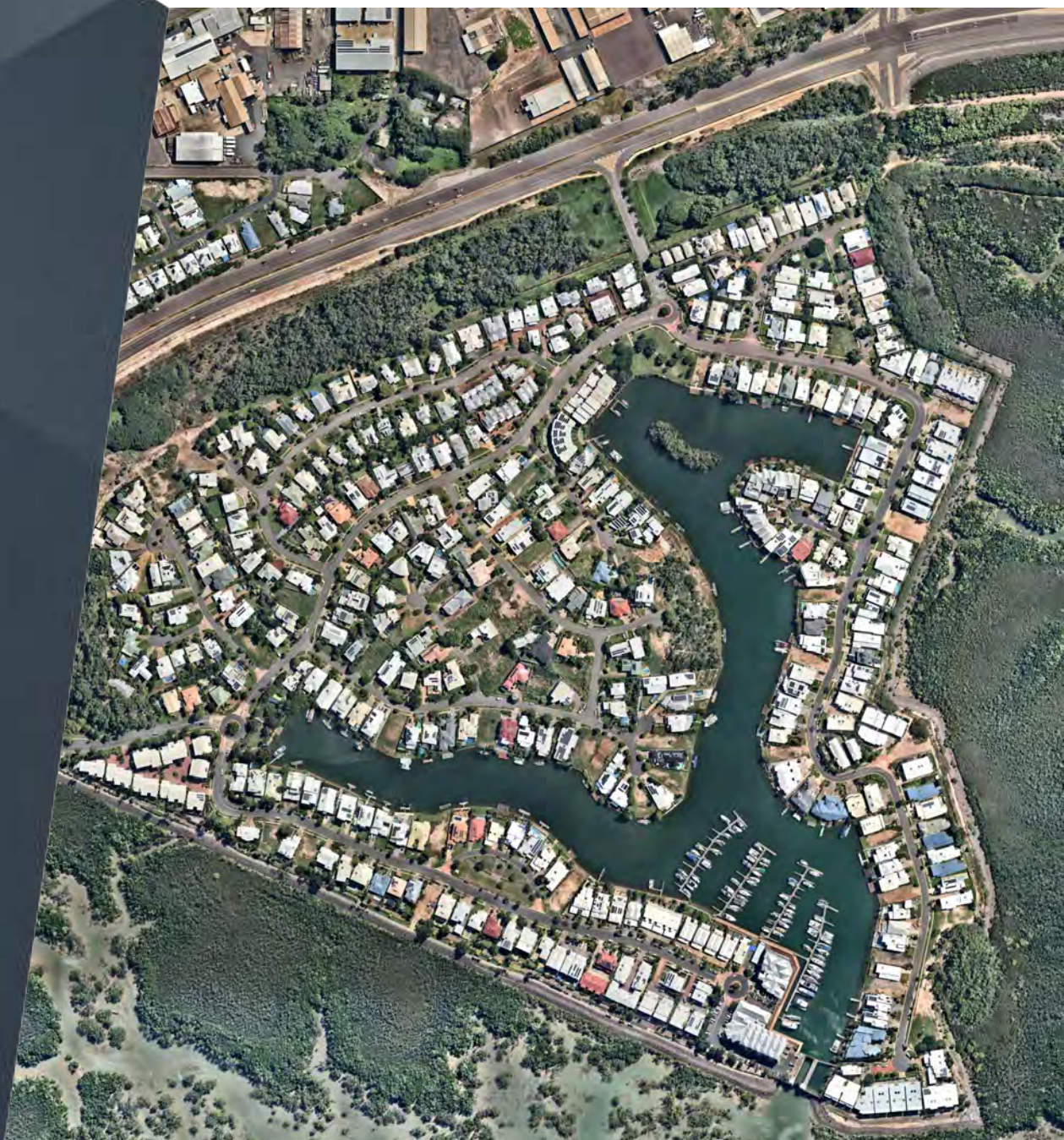
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DESIGNED ET				AMDT B	

Bayview Subdivision Development

Stormwater Management Plan

Dover Investments Pty Ltd

September 2023



byrne.



Document Control

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Date: September 2023

Prepared by Binod Bhujel

Reviewed by Sam Colwell

Rev	Revision Date	Description	Authorised (Position)	Signature
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B	07/09/2022	Issued to Client	Sam Colwell	
C	18/09/2022	Issued for Use	Sam Colwell	
D	01/09/2023	Lot Layout Amendment	Sam Colwell	

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Appendix B	Stormwater Catchment Plan
Appendix C	Q2 Hydrology and Hydraulics Calcs
Appendix D	Q100 Hydrology and Hydraulics Calcs

Definitions

Abbreviation	Definition
AAPA	Aboriginal Areas Protection Authority
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ARI	Average Recurrence Interval
CCTV	Closed Circuit Television
CICL	Cast Iron Cement Lined
CoD	City of Darwin
CPTED	Crime Prevention Through Environmental Design
DBYD	Dial Before You Dig
DDA	Disability and Discrimination Act
DICL	Ductile Iron Cement Lined
DIPL	Department of Infrastructure Planning and Logistics
DN	Nominal Diameter
EP	Equivalent Population
ESCP	Erosion and Sediment Control Plan
GPS	Global Positioning System
HV	High Voltage
IECA	International Erosion Control Association
LED	Light Emitting Diode
LV	Low Voltage
MH	Maintenance Hole
MMDD	Maximum Modified Dry Density
NBNCO	National Broadband Network Company
NT	Northern Territory
NTG	Northern Territory Government
NT SDG	Northern Territory Subdivision Guidelines
PUP	Public Utility Plant
PVC	Poly Vinyl Chloride
PWC	Power and Water Corporation
RCD	Residual Current Device
RCP	Reinforced Concrete Pipe
RHS	Rectangular Hollow Section
RL	Reduced Level

Abbreviation	Definition
RODP	Road Owner Distribution Pillar
SID	Safety in Design
TBC	To Be Confirmed
TCSD	Transport and Civil Services Department
VC	Vertical Curve
VIAC	Vehicle Impact Absorbing Column
WSAA	Water Services Association of Australia
XLPE	Cross Linked Polyethylene

1 Introduction

1.1 Scope

Byrne Consultants has been commissioned by Dover Investments Pty Ltd to develop a Stormwater Management Plan (SMP) for the proposed development of Lots A, B and C forming Stage 11 of Bayview Subdivision. The objective of this report is to document the proposed developments stormwater management strategy including design criteria, catchment area, flow calculations, legal point of discharge, and preliminary stormwater network modelling design.

1.2 Limitations

The limitations of this report include:

- No flood modelling has been undertaken as part of this study.
- No detailed engineering survey of existing lots has been undertaken as part of the assessment.
- Publicly available lidar survey was used for the assessment.
- Plans provided in the Appendices are preliminary only and not for construction purposes.

2 Site Conditions

2.1 Site Description

Dover Investments Pty Ltd is progressing the development of Bayview subdivision to create a low to medium density residential development. The proposed sites are located within the Bayview Subdivision, Darwin, NT and consists of three (3) proposed development sites labelled Lot's A, B & C as shown in Figure 2.1.

Lot's A & B is proposed to feature low density residential (LR) blocks and Lot C is proposed to feature both low density (LR) and medium density residential blocks (LMR) as described under the NT Planning Scheme.

The proposed development areas are:

Lot A - 10,600 m²

Lot B - 800 m² and

Lot C - 11,200 m²

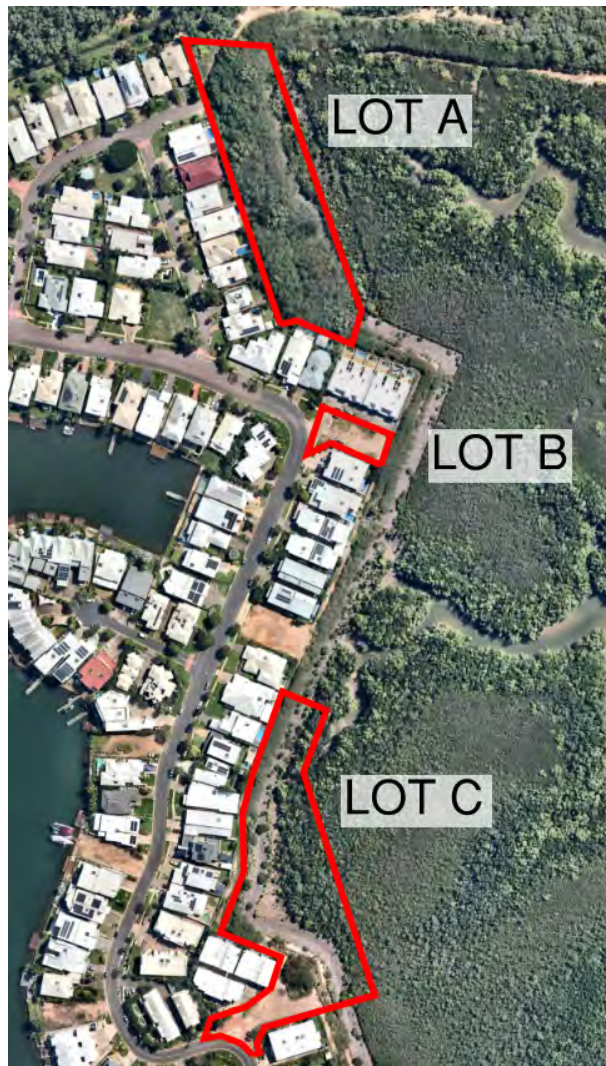


Figure 2.1 – Bayview Subdivision Project Area

2.2 Proposed Development

The proposed development consists of three (3) separate land developments with two (2) new road reserves as detailed in Figure 2.2, 2.3 and 2.4.

The intended use of the lots is as follows:

- Lot A – 12 residential lots (LR).
- Lot B – 2 residential lots (LR).
- Lot C – 3 residential lots (LR).
- Lot C – 2 residential lots (LMR, approx. 9 dwellings)

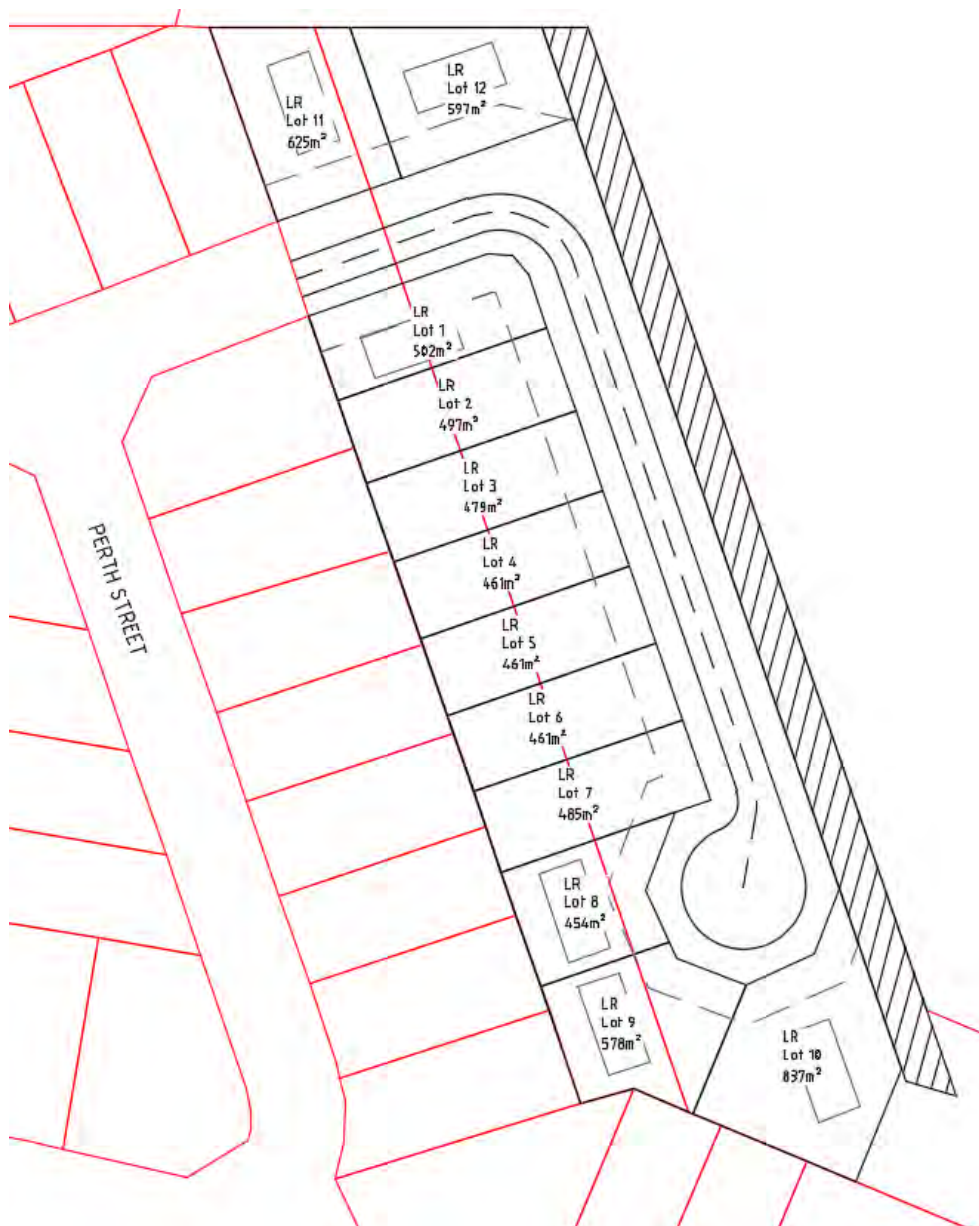


Figure 2.2 – Lot A Bayview Subdivision Development Intent

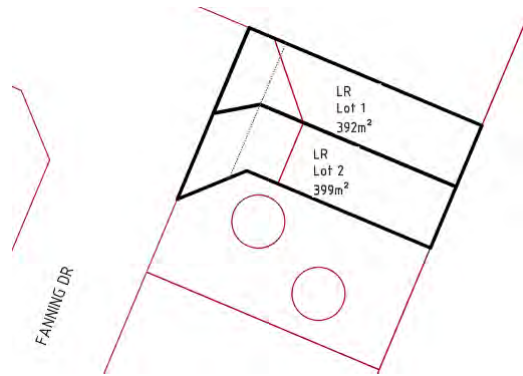


Figure 2.3 – Lot B Bayview Subdivision Development Intent

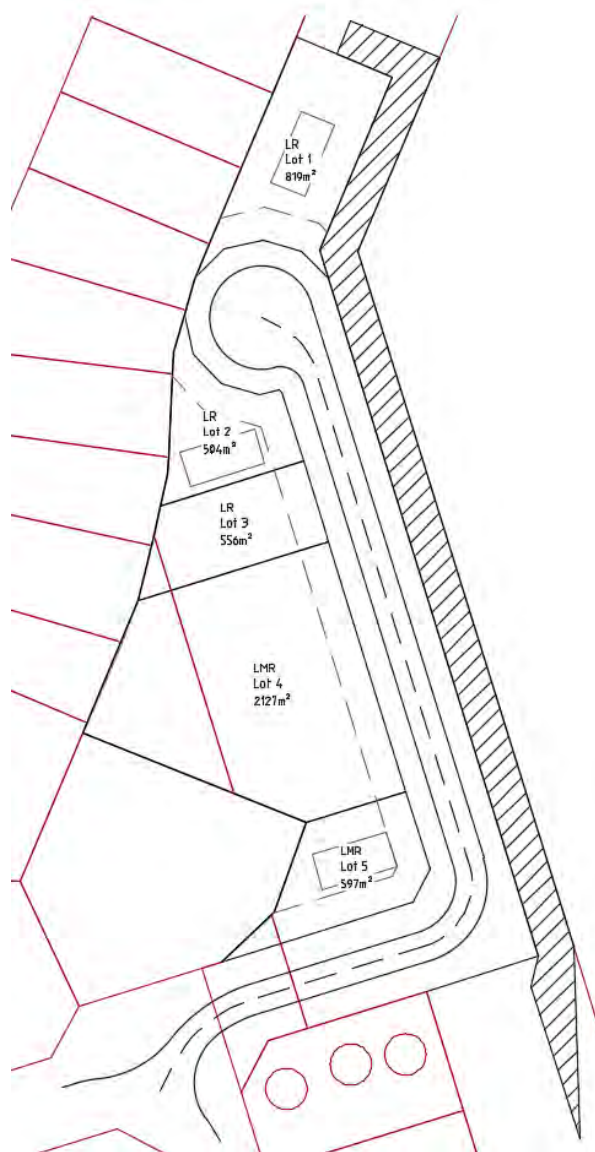


Figure 2.4 – Lot C Bayview Subdivision Development Intent

3 Design Basis

3.1 Requirements

The design has been based on Northern Territory Government (NTG) and other design standards including:

- Northern Territory Subdivision Development Guidelines (NT SDG), (2020)
- Australian Rainfall and Runoff (Geoscience Australia)
- Stormwater Drainage Design in Small Urban Catchments (ARRB Special Report No. 34)
- Austroads Guidelines, including Guide to Road Design – Part 5: Drainage

3.2 Design Criteria

Table 3.1 – Design Criteria

Parameter	Criteria Value	Comments
Design Storms	Minor Storm: Q2 Major Storm: Q100	As per NT SDG Table 19
Flow Widths	≤ 2.5 metres from kerb invert	As per NT SDG Table 21
Flow Depths	Minor Storm: Flows must not overtop kerb Major Storm: Flow contained within the road reserve boundaries	As per NT SDG Table 21 & 22
Freeboard	Min 300mm freeboard to allotment boundaries	As per NT SDG Table 22

3.3 Constraints

The stormwater design constraints include:

- Topography – The site is constrained by existing dwellings to the west and mangroves to the east.
- Stormwater – The existing stormwater network system and existing outlet locations.
- Stormwater – The construction of a revetment wall which prevents overland flow path discharge to the east.

3.4 Assumptions

The design assumptions include:

- The development of the surrounding lots will be in accordance with Darwin's Inner Suburbs Plan (Residential).
- All existing stormwater pipe sizes are as per the diameters identified in available sources including DBYD and City of Darwin Open Hub Data (ArcGIS).
- There are no blocked stormwater pipes on site or within the downstream catchment.

4 Existing Topography and Drainage Patterns

4.1 Existing Conditions

4.1.1 Lot A

The site generally falls from west to east from an existing urban residential environment to a vegetated mangrove creek. From google imagery and CoD Stormwater Network Mapping, the existing site indicates that stormwater is collected in a series of stormwater pits located along Latrobe Street. The existing underground stormwater pipe system discharges into the mangroves at the end of Latrobe Street through a 525mm diameter RCP.

4.1.2 Lot B

The project area consists of a vacant lot which drains towards O'Ferrals Road reserve at an approximate grade of 1%. Stormwater discharge from the lot is collected by the existing stormwater network (pit and pipes) which is directed via the trunk underground drainage network to via a drainage easement through Lot 7502 before discharging into the adjacent mangroves area. No upgrades to the existing drainage system are proposed to service Lot B.

4.1.3 Lot C

The site generally falls from west to east from an existing urban residential environment to a vegetated mangrove creek. From google imagery and CoD Stormwater Network Mapping, stormwater is collected via the truck stormwater network located within O'Ferrals Road reserve. The trunk drainage network then discharges stormwater into the mangrove creek via a 1200mm diameter RCP which runs through Lot PT8169. Do designated easement through PT8169 was identified, so the pipe alignment would need to be confirmed.

4.2 Upstream Network Catchment Assessment

For the purposes of preliminary investigations, a high-level upstream catchment assessment has been conducted. Existing pit and pipe networks have been modelled and catchment boundaries defined for the purpose of preliminary hydrology and hydraulics calculations. It is anticipated that the proposed stormwater design will cause no worsening effects of upstream conditions.

4.3 Flooding Assessment

Department of Environment and Natural Resources storm surge map indicates that the Site is subject to flooding via Extreme Storm Surge (10,000-year ARI) as shown in Figure 4.1. Flood mitigation has been considered during the design process of the development and involves the implementation of raised embankments and revetment walls to RL to 6.5m in line with the current immunity of existing Bayview development. No further flood analysis has been conducted as part of this study.

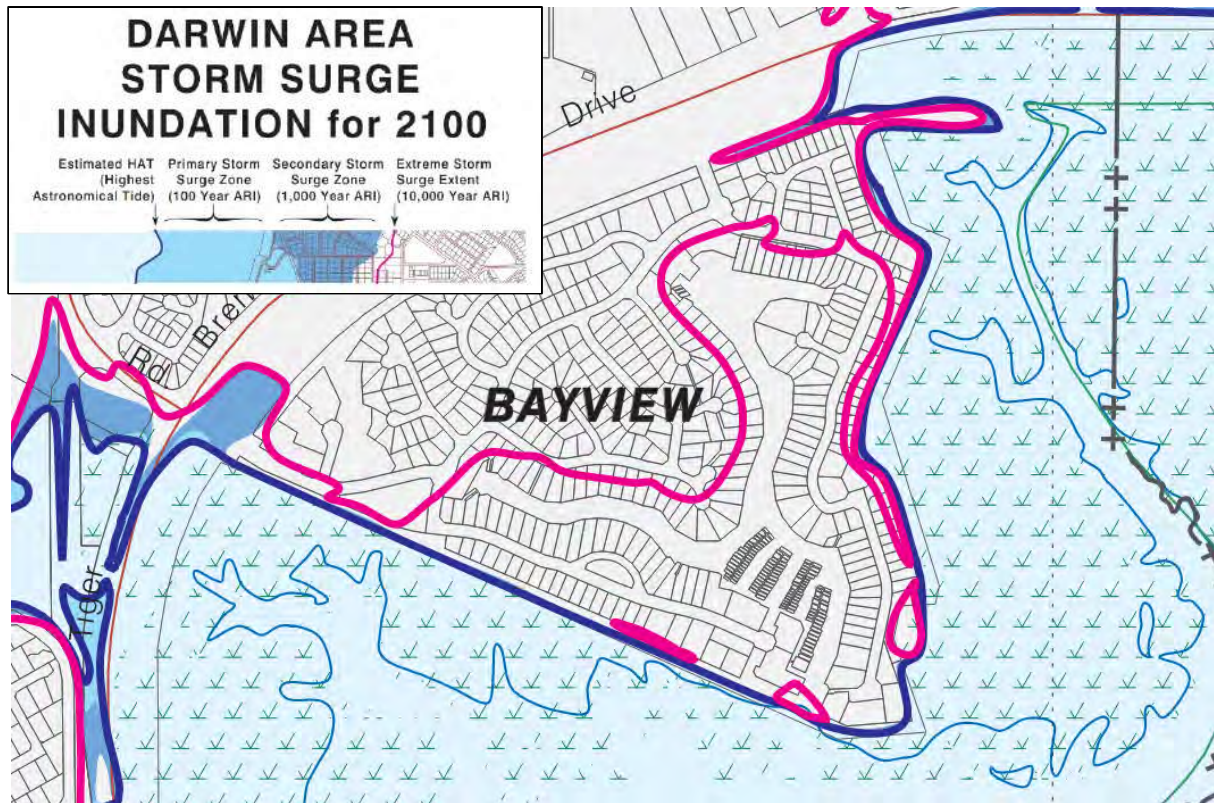


Figure 4.5 – Storm Surge Excerpt

4.4 Lawful Point of Discharge (LPD)

Refer to Appendix B for stormwater drainage plans.

4.4.1 Lot A

The proposed LPD for the development of Lot A is into the mangroves and creek area east of Latrobe Street. An existing 525mm diameter RCP which discharges to the area shall be extended and upsized to account for the additional development catchment area of Lot A.

4.4.2 Lot B

All stormwater from Lot B is collected by the existing stormwater network (pit and pipes) on O’Ferrals Road which is directed via the trunk underground drainage network to a drainage easement through Lot 7502 before discharging into the adjacent mangroves area. No upgrades to the existing drainage system are proposed to service Lot B.

4.4.3 Lot C

The proposed LPD for the development of Lot C shall be via the existing underground stormwater network and 1200mm diameter RCP outlet which discharges to the mangroves area through Lot PT8169

The existing 1200mm RCP discharge pipe shall be extended and upsized to account for the additional development catchment area of Lot C.

5 Stormwater Hydrology Assessment (Quantity)

5.1 Pre-Development Peak Flow Calculations

Pre-development flows were not assessed as part of this study as there is no impact on the downstream stormwater network. The proposed stormwater design is effectively connecting to the downstream end of the existing networks and therefore adding any additional stormwater flows to the upstream networks.

5.2 Post Development Peak Flow Calculations

All stormwater management infrastructure is designed generally in accordance with *Northern Territory Subdivision Development Guidelines (2020)*.

5.2.1 Design Storms

The annual exceedance probability (AEP) for residential zones is 50% and 1% for the minor and major design storms respectively as per NT SDG, table 19.

5.2.2 Design Rainfall Intensity

Design rainfall intensities for this study were obtained from the 12D default hydrology data for the City of Darwin Region. Refer to Appendix A for the relevant IFD chart adopted in the design.

5.2.3 Time of Concentration

The time of concentration has been calculated utilising the following components:

- 5 min - Standard inlet time within road reserve
- 10 min - Standard inlet time within lot areas

5.2.4 Runoff Coefficients

As per the NT SDG the drainage design has been carried out using a runoff coefficient of 0.73 and 1 for minor and major storms respectively with a coefficient of 0.9 for impervious areas.

5.2.5 Peak Discharges

The stormwater catchment areas and network system for each site is defined in Appendix A and all hydrological and hydraulic calculations can be seen in Appendix B. A summary of post development hydrological calculations can be seen below.

Table 5.2 – Post Development Peak Flow Calculations

Catchment Label (-)	Time T _c (min)	Q100 Runoff C (-)	Q2 Runoff C (-)	Q100 Intensity I (mm/hr)	Q2 Intensity I (mm/hr)	Area A (ha)	Q100 Q _c =CIA (L/s)	Q2 Q _c =CIA (L/s)
1-1								
1-2	10	1	0.73	283	147	0.129	192.6	85.8
	5	0.9	0.9	366	189	0.129		
1-3								
1-4								
1-5								
2-1	10	1	0.73	283	147	0.0723	107.9	48.1
	5	0.9	0.9	366	189	0.0723		
2-2	10	1	0.73	283	147	0.0623	93.1	41.5
	5	0.9	0.9	366	189	0.0623		
2-3	10	1	0.73	283	147	0.0141	21.1	9.4
	5	0.9	0.9	366	189	0.0141		
2-4	10	1	0.73	283	147	0.0124	18.5	8.2
	5	0.9	0.9	366	189	0.0124		
2-5	10	1	0.73	283	147	0.0459	68.6	30.5
	5	0.9	0.9	366	189	0.0459		
3-1	10	1	0.73	283	147	0.0813	121.4	54.1
	5	0.9	0.9	366	189	0.0813		
4-1	10	1	0.73	283	147	0.0515	76.9	34.3
	5	0.9	0.9	366	189	0.0515		
5-1	10	1	0.73	283	147	0.0719	107.4	47.8
	5	0.9	0.9	366	189	0.0719		
6-1	10	1	0.73	283	147	0.0204	30.4	13.6
	5	0.9	0.9	366	189	0.0204		
6-2	10	1	0.73	283	147	0.0608	90.9	40.5
	5	0.9	0.9	366	189	0.0608		
6-3	10	1	0.73	283	147	0.0179	26.7	11.9
	5	0.9	0.9	366	189	0.0179		
6-4	10	1	0.73	283	147	0.0178	26.6	11.8
	5	0.9	0.9	366	189	0.0178		
6-5								
7-1	10	1	0.73	283	147	0.0631	94.2	42
	5	0.9	0.9	366	189	0.0631		
7-2	10	1	0.73	283	147	0.0139	20.8	9.3
	5	0.9	0.9	366	189	0.0139		
7-3	10	1	0.73	283	147	0.016	23.9	10.6
	5	0.9	0.9	366	189	0.016		
8-1	10	1	0.73	283	147	0.0076	11.3	5
	5	0.9	0.9	366	189	0.0076		
9-1	10	1	0.73	283	147	0.0895	133.7	59.6
	5	0.9	0.9	366	189	0.0895		
10-1	10	1	0.73	283	147	0.0825	123.2	54.9
	5	0.9	0.9	366	189	0.0825		
11-1								
11-2								
12-1	10	1	0.73	283	147	0.0684	102.2	45.6
	5	0.9	0.9	366	189	0.0684		

Catchment Label (-)	Time T _c (min)	Q100 Runoff C (-)	Q2 Runoff C (-)	Q100 Intensity I (mm/hr)	Q2 Intensity I (mm/hr)	Area A (ha)	Q100 Q _c =CIA (L/s)	Q2 Q _c =CIA (L/s)
EX 1-1	10	1	0.73	283	147	0.0679	101.5	45.2
	5	0.9	0.9	366	189	0.0679		
EX 1-2	10	1	0.73	283	147	0.0352	52.6	23.4
	5	0.9	0.9	366	189	0.0352		
EX 1-3	10	1	0.73	283	147	0.0109	16.2	7.2
	5	0.9	0.9	366	189	0.0109		
EX 1-4	10	1	0.73	283	147	0.1016	151.8	67.6
	5	0.9	0.9	366	189	0.1016		
EX 2-1								

6 Stormwater Quality Assessment

6.1 Design Basis

The NT SDG require that gross pollutant traps are considered as part of the drainage design.

6.2 Assessment

Given the existing stormwater system within the development and associated discharge points do not have a gross pollutant trap installed on the outlets. It is not proposed to provide GPT's as part of this stormwater design. The intention is to connect or extend the proposed stormwater system to the existing discharge outlets and to discharge stormwater under the current site conditions into the mangrove creek.

7 Road Reserve Drainage

7.1 Lot A & C Road

Lot A and C's proposed road reserve cross-section comprises of a standard urban cross-section with kerb and gutter discharging into an underground pit and pipe network.

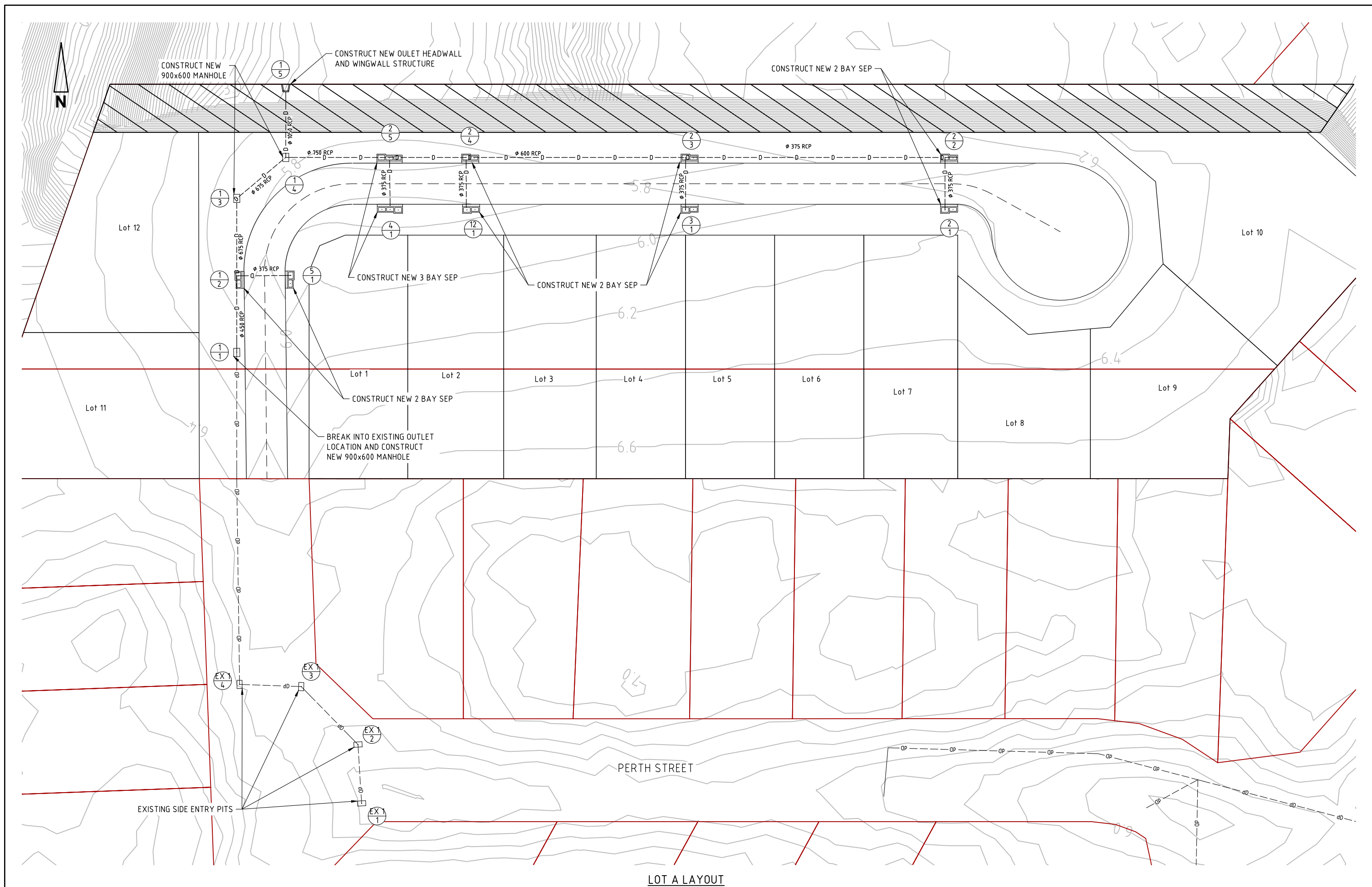
Subsoil drains have been nominated along both sides of the pavement edge, typically following the grade of the roadway and discharging into the underground stormwater network.

7.2 Lot B Road

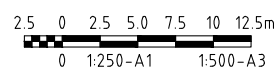
Lot B's road reserve (O'Ferrals Road) will remain unchanged with the exception of an extension on the existing property accesses to the existing kerb line.


The existing road comprises of a standard urban cross-section with kerb and gutter discharging into an underground pit and pipe network.

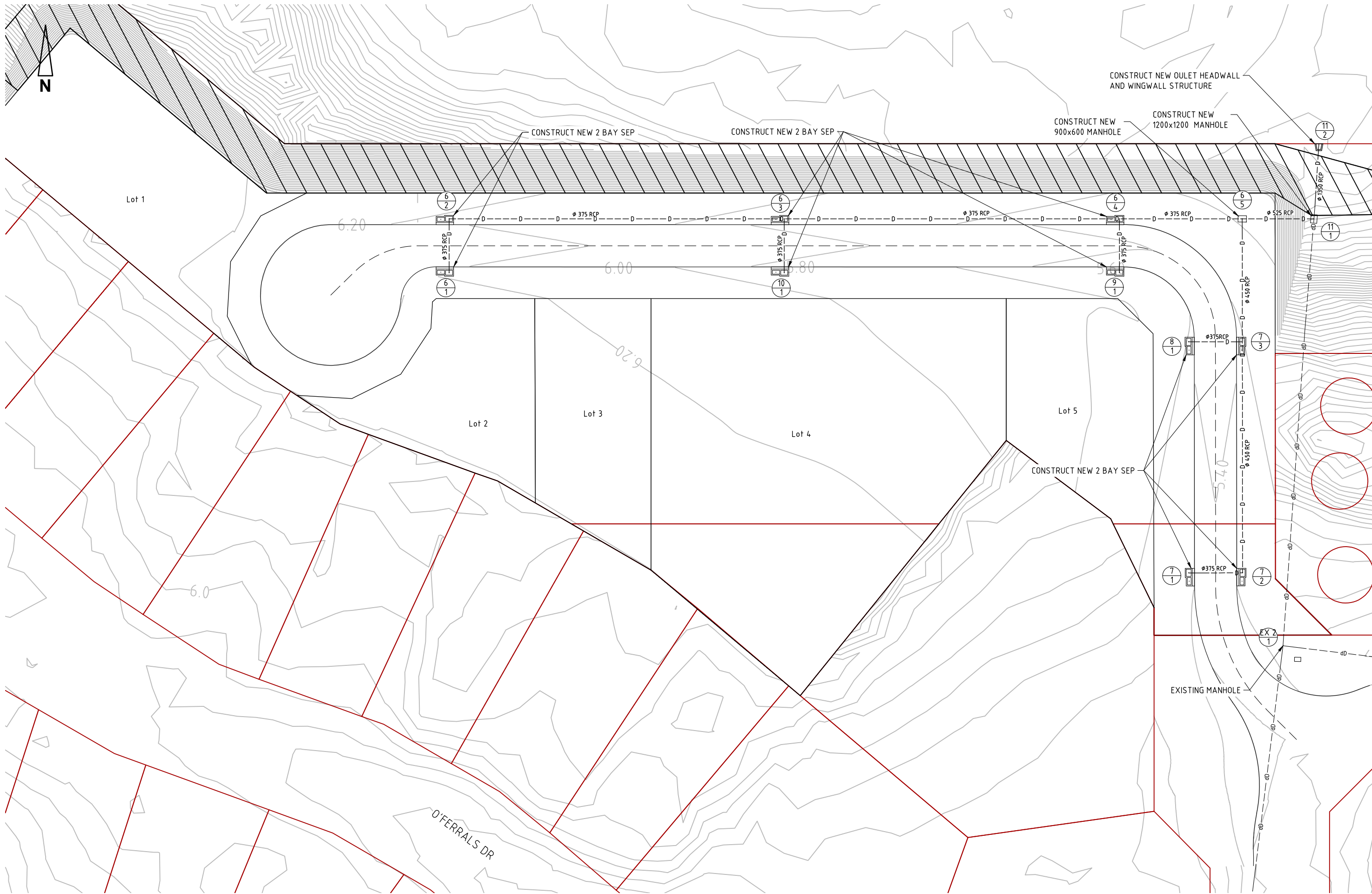
Appendix A Stormwater Drainage Plan




LOT A LAYOUT



 ABN 78 124 388 192 P.O.Box 43420 Casuarina NT 0811 Ph. 08 894 724 76 Fax: 08 894 750 98		TITLE BAYVIEW SUBDIVISION LOT A & B STORMWATER DRAINAGE PLAN			
		DRAWN BB	SCALE AS SHOWN	PROJECT No 22007	DRAWING No SK013
DESIGNED SC				AMDT B	



2.5 0 2.5 5.0 7.5 10 12.5m
0 1:250-A1 1:500-A3

 <div>ABN 78 124 388 192 P.O.Box 43420 Casuarina NT 0811 Ph. 08 89472476 Fax: 08 89475098</div>		TITLE BAYVIEW SUBDIVISION LOT C STORMWATER DRAINAGE PLAN			
		DRAWN BB	SCALE AS SHOWN	PROJECT No 22007	DRAWING No SK014
DESIGNED SC				AMDT B	

LEGEND:

- EXISTING PIPES/PITS
PROPOSED PIPES/PITS
HGL
EXISTING SURFACE
DESIGN SURFACE

NOTE:

1. EXISTING PIPES MODELLED FOR HYDRAULIC PURPOSES.
2. REFER TO DRG. C135 & C136 FOR MANHOLE DETAILS.

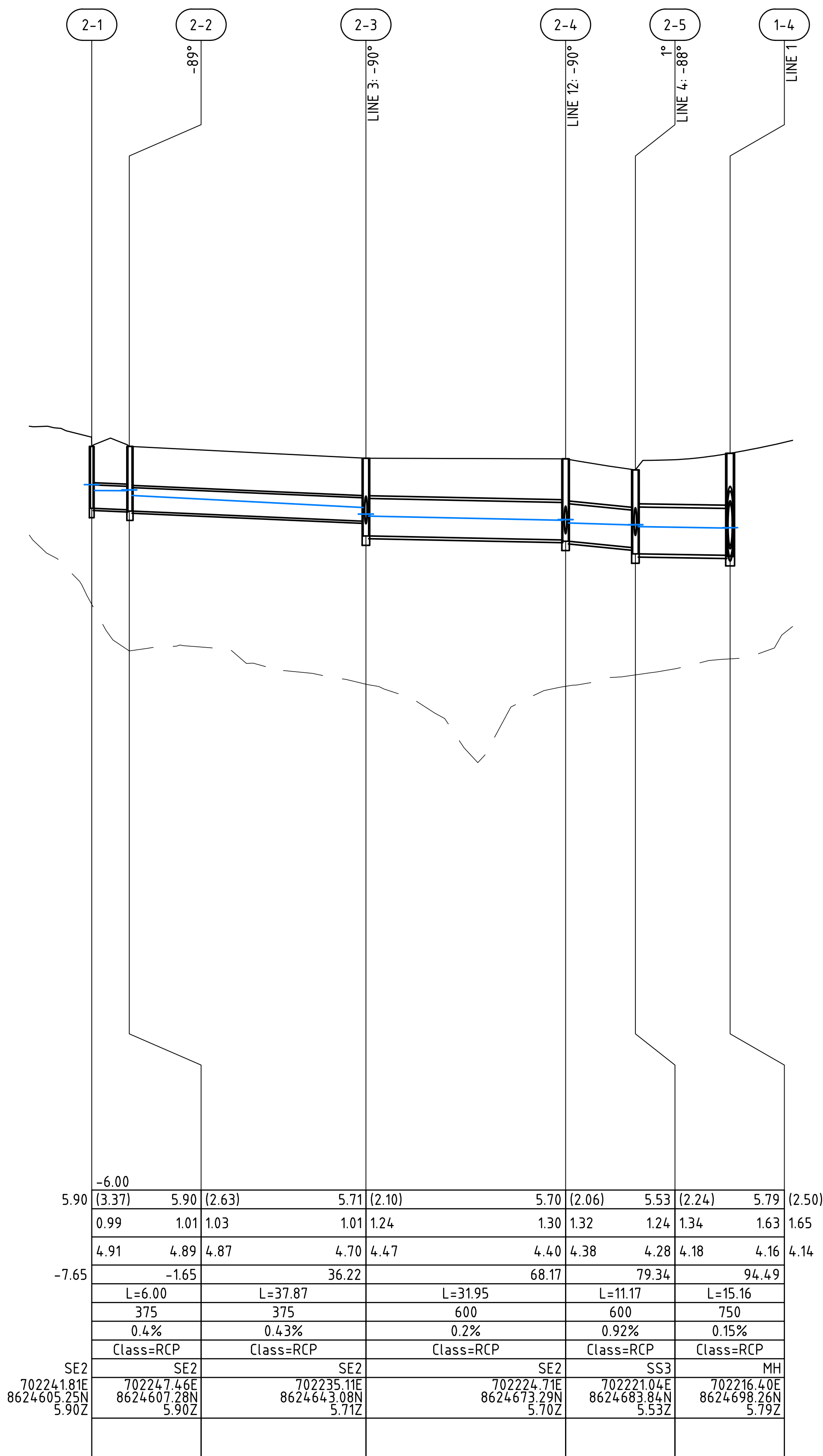
WARNING

BEWARE OF UNDERGROUND SERVICES

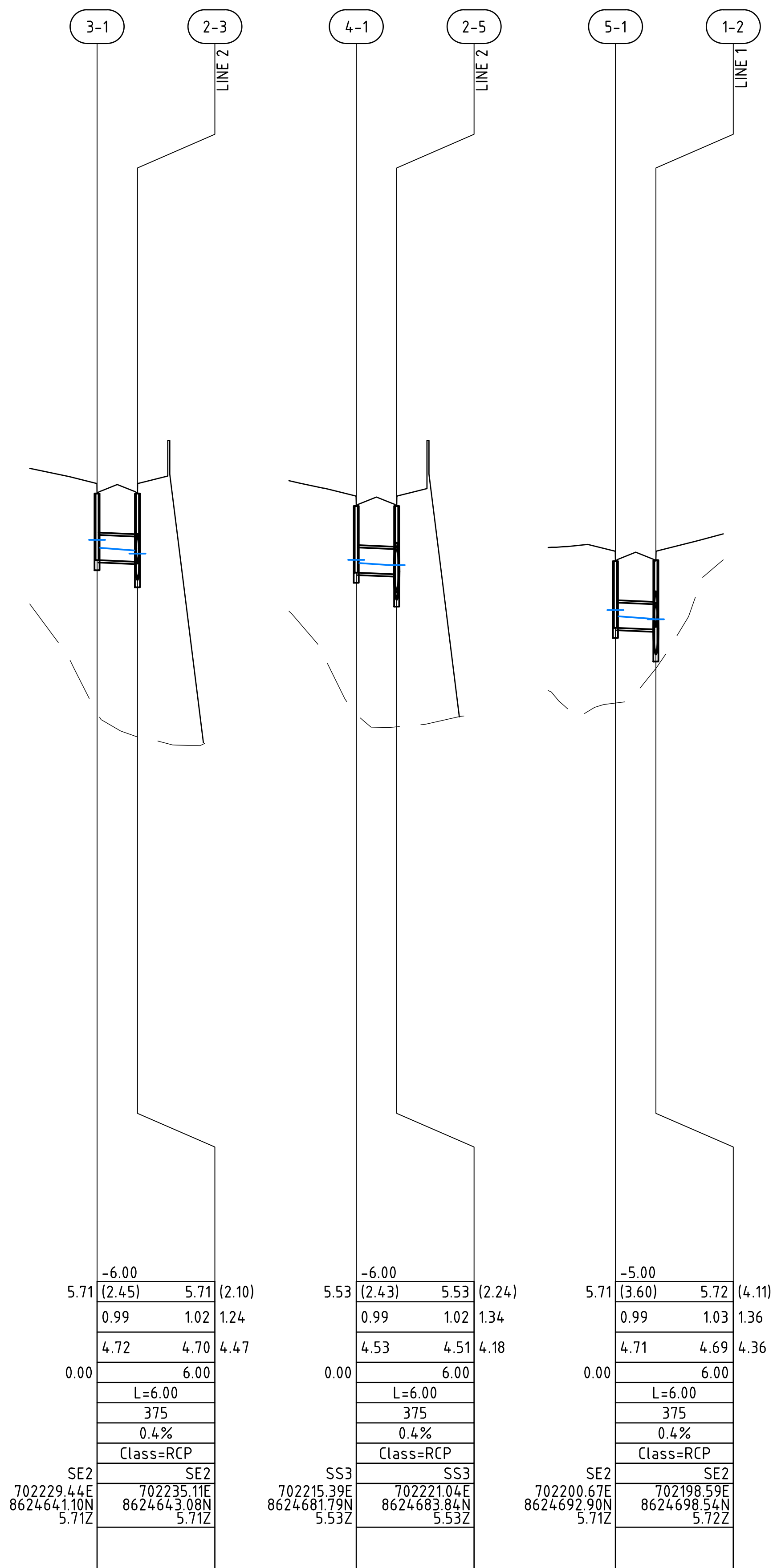
The locations of underground services are approximate only
and their exact position should be proven on site
No guarantee is given that all existing services are shown

DATUM RL	-5.00									
COVER (& NATURAL SURFACE) LEVEL	6.05	(6.10)	5.72	(4.11)	5.84	(2.72)	5.79	(2.50)	5.16	(2.55)
DEPTH TO INVERT	1.18	0.95	1.36	1.50	1.52	1.48	1.65		1.05	
INVERT LEVEL	4.87	4.77	4.36	4.34	4.32	4.31	4.14		4.11	
PIPE CHAINAGE	0.00	11.22	23.53	30.74	38.20					
PIPE LENGTH	L=11.22	L=12.31	L=7.21	L=7.46						
PIPE SIZE (mm)	450	675	675	1050						
PIPE GRADE (%)	0.9%	0.18%	0.18%	0.4%						
PIPE CLASS	Class=RCP	Class=RCP	Class=RCP	Class=RCP						
PIT TYPE	MH	SE2	MH	MH	HW OUT					
PIT SETOUT	702187.69E 8624695.89N 6.05Z	702198.59E 8624698.54N 5.72Z	702210.35E 8624702.19N 5.84Z	702216.40E 8624698.26N 5.79Z	702223.45E 8624700.68N 5.16Z					
ROAD NAME & ROAD CHAINAGE										

LINE 1



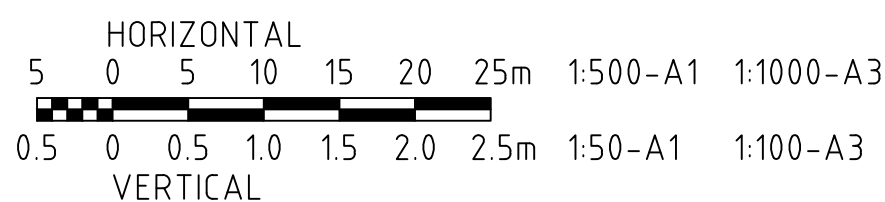
LINE 2



LINE 3

LINE 4

LINE 5



ABN 78 124 388 192
P.O.Box 43420 Casuarina NT 0811
Ph. 08 89472476 Fax: 08 89475098

DRAWN
BM
DESIGNED
SC

TITLE
BAYVIEW SUBDIVISION
STORMWATER LONGITUDINAL SECTIONS

SCALE
AS SHOWN
PROJECT No
22007
DRAWING No
SK015
AMDT
A

LEGEND:

- EXISTING PIPES/PITS
PROPOSED PIPES/PITS
HGL
EXISTING SURFACE
DESIGN SURFACE

NOTE:

1. EXISTING PIPES MODELLED FOR HYDRAULIC PURPOSES.
2. REFER TO DRG. C135 & C136 FOR MANHOLE DETAILS.

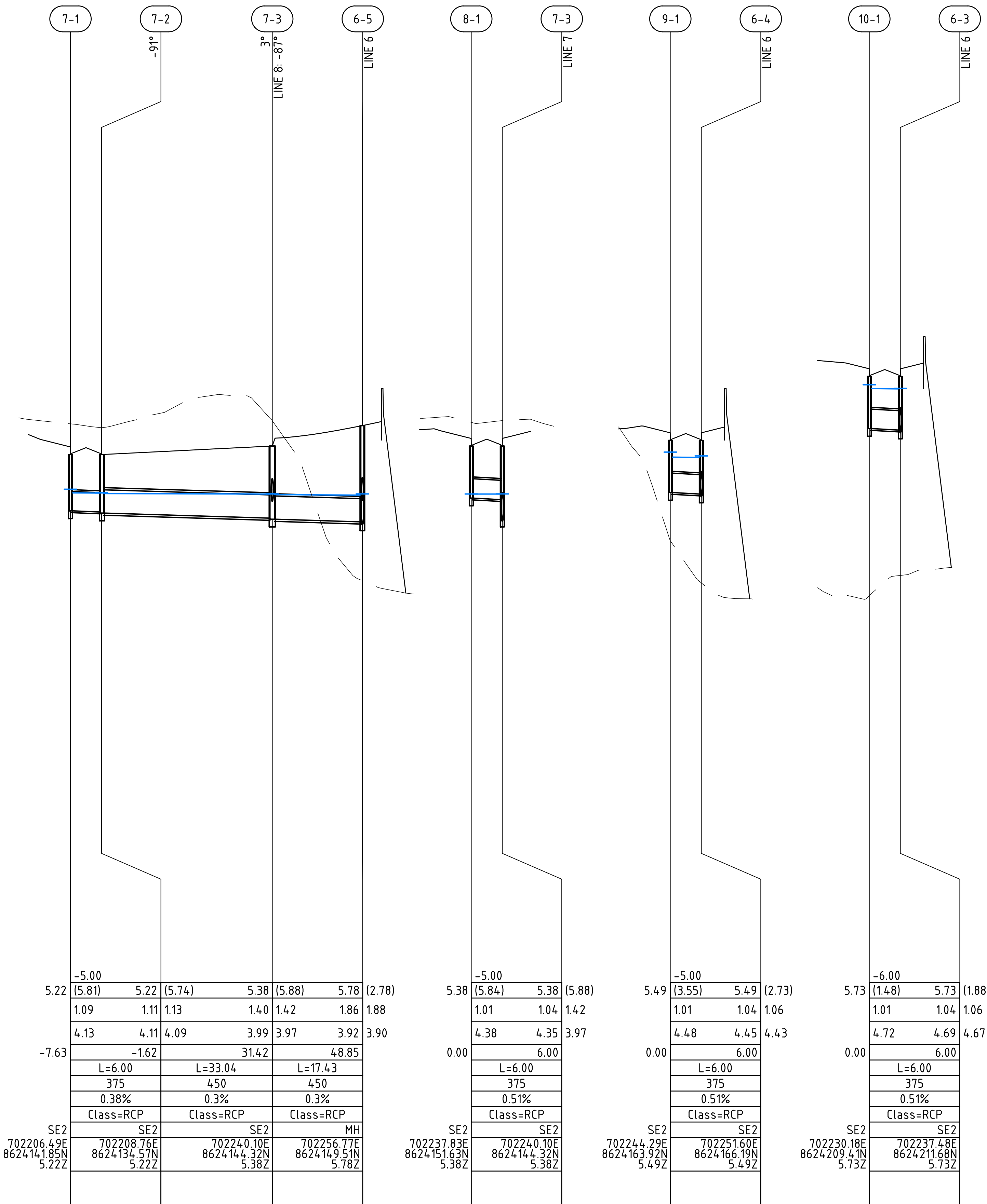
WARNING

BEWARE OF UNDERGROUND SERVICES

The locations of underground services are approximate only
and their exact position should be proven on site
No guarantee is given that all existing services are shown

DATUM RL			-6.00									
COVER (& NATURAL SURFACE) LEVEL	5.97	(2.00)	5.97	(1.54)	5.73	(1.88)	5.49	(2.73)	5.78	(2.78)	4.55	(2.90)
DEPTH TO INVERT	1.01		1.04	1.06	1.01		1.06	1.06	1.42	1.88	0.70	1.35
INVERT LEVEL	4.96		4.93	4.91	4.72		4.67	4.48	4.43	4.36	3.90	3.85
PIPE CHAINAGE	-7.65		-1.65		46.07		93.72		111.24		121.40	
PIPE LENGTH	L=6.00		L=47.72		L=47.64		L=17.52		L=10.17			
PIPE SIZE (mm)	375		375		375		375		525			
PIPE GRADE (%)	0.51%		0.4%		0.4%		0.4%		0.4%			
PIPE CLASS	Class=RCP		Class=RCP		Class=RCP		Class=RCP		Class=RCP		Class=RCP	
PIT TYPE	SE2		SE2		SE2		SE2		MH		MHX	
PIT SETOUT	702216.07E 8624254.91N 5.97Z		702223.37E 8624257.17N 5.97Z		702237.48E 8624211.68N 5.73Z		702251.60E 8624166.19N 5.49Z		702256.77E 8624149.51N 5.78Z		702259.77E 8624139.80N 4.55Z	
ROAD NAME & ROAD CHAINAGE												

LINE 6

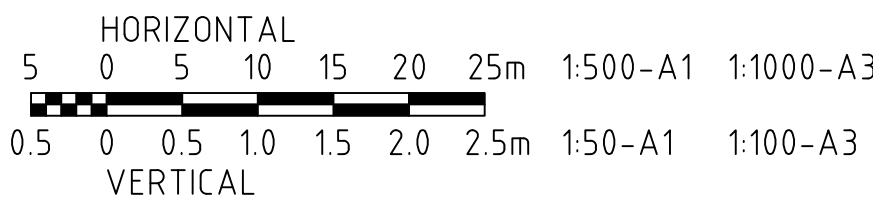



LINE 7

LINE 8

LINE 9

LINE 10



 <div>ABN 78 124 388 192 P.O.Box 43420 Casuarina NT 0811 Ph. 08 89472476 Fax: 08 89475098</div>	DRAWN BM	TITLE BAYVIEW SUBDIVISION STORMWATER LONGITUDINAL SECTIONS			
DESIGNED SC	SCALE AS SHOWN	PROJECT No 22007	DRAWING No SK016	AMDT A	

LEGEND:

- EXISTING PIPES/PITS
- PROPOSED PIPES/PITS
- HGL
- EXISTING SURFACE
- DESIGN SURFACE

NOTE:

1. EXISTING PIPES MODELLED FOR HYDRAULIC PURPOSES.
2. REFER TO DRG. C135 & C136 FOR MANHOLE DETAILS.

WARNING

BEWARE OF UNDERGROUND SERVICES

The locations of underground services are approximate only and their exact position should be proven on site

No guarantee is given that all existing services are shown

DATUM RL	-6.00	
COVER (& NATURAL SURFACE) LEVEL	4.55 (2.90)	4.50 (2.55)
DEPTH TO INVERT	1.35	1.35
INVERT LEVEL	3.20	3.15
PIPE CHAINAGE	0.00	9.72
PIPE LENGTH	L=9.72	
PIPE SIZE (mm)	1350	
PIPE GRADE (%)	0.5%	
PIPE CLASS	Class=RCP	
PIT TYPE	MHX	HW OUT
PIT SETOUT	702259.77E 8624139.80N 4.55Z	702269.23E 8624142.03N 4.50Z
ROAD NAME & ROAD CHAINAGE		

LINE 11

DATUM RL	-6.00	
COVER (& NATURAL SURFACE) LEVEL	5.55 (2.14)	5.70 (2.06)
DEPTH TO INVERT	0.99	1.17
INVERT LEVEL	4.56	4.54
PIPE CHAINAGE	0.00	6.03
PIPE LENGTH	L=6.03	
PIPE SIZE (mm)	375	
PIPE GRADE (%)	0.4%	
PIPE CLASS	Class=RCP	
PIT TYPE	SE2	SE2
PIT SETOUT	702219.01E 8624671.31N 5.55Z	702224.71E 8624673.29N 5.70Z
ROAD NAME & ROAD CHAINAGE		

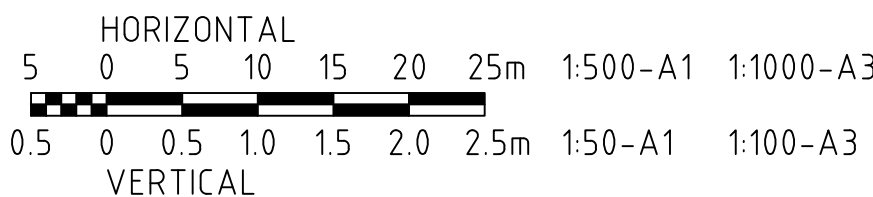
LINE 12

DATUM RL	-4.00	
COVER (& NATURAL SURFACE) LEVEL	6.39	6.44
DEPTH TO INVERT	1.01	1.10
INVERT LEVEL	5.38	5.34
PIPE CHAINAGE	0.00	8.59
PIPE LENGTH	L=8.59	
PIPE SIZE (mm)	375	
PIPE GRADE (%)	0.4%	
PIPE CLASS	Class=RCP	
PIT TYPE	SE2	SE2
PIT SETOUT	702131.49E 8624657.24N 6.39Z	702139.43E 8624660.54N 6.44Z
ROAD NAME & ROAD CHAINAGE		

LINE EX 1

DATUM RL	-5.00	
COVER (& NATURAL SURFACE) LEVEL	5.63	4.55
DEPTH TO INVERT	2.03	1.25
INVERT LEVEL	3.60	3.30
PIPE CHAINAGE	0.00	60.78
PIPE LENGTH	L=60.78	
PIPE SIZE (mm)	1200	
PIPE GRADE (%)	0.5%	
PIPE CLASS	Class=RCP	
PIT TYPE	SE2	MHX
PIT SETOUT	702200.58E 8624126.01N 5.63Z	702259.77E 8624139.80N 4.55Z
ROAD NAME & ROAD CHAINAGE		

LINE EX 2



byrne

CONSULTANTS

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Ph. 08 89472476 Fax: 08 89475098

DRAWN
BM

DESIGNED
SC

TITLE
BAYVIEW SUBDIVISION
STORMWATER LONGITUDINAL SECTIONS

SCALE
AS SHOWN

PROJECT No
22007

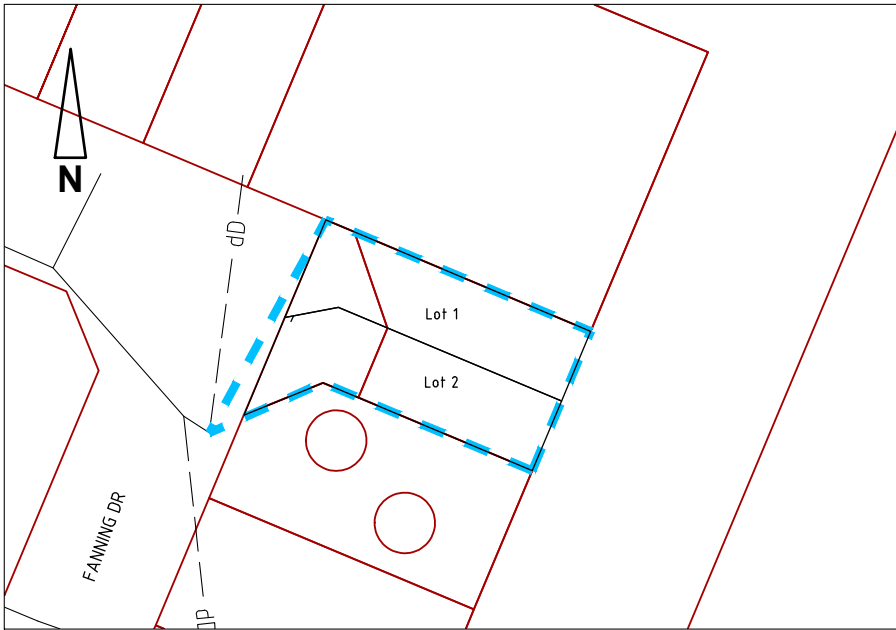
DRAWING No
SK017

AMDT
A

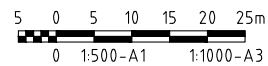
Appendix B Stormwater Catchment Plan




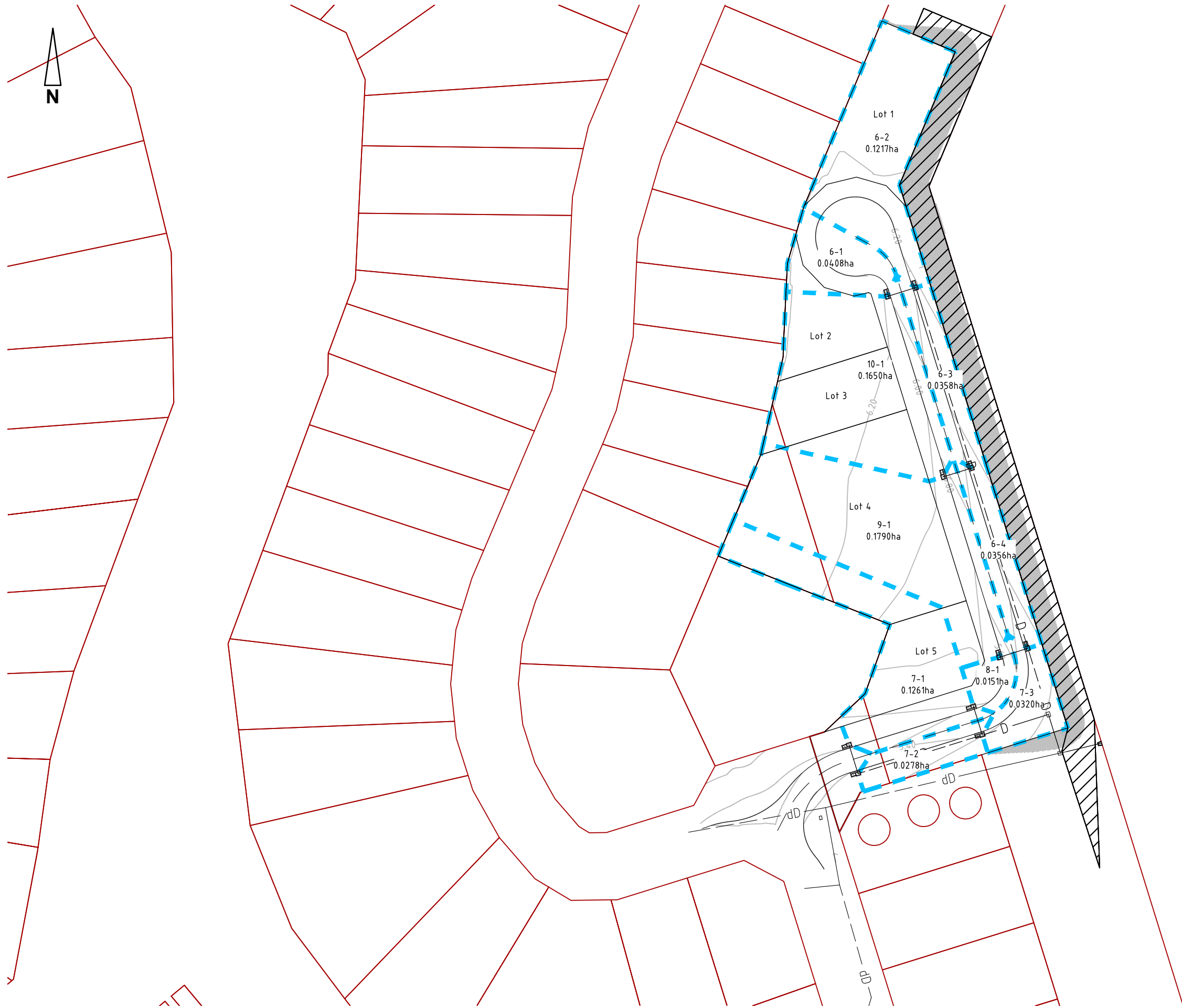
LOT A LAYOUT




LOT B LAYOUT



 <div>ABN 78 124 388 192 P.O.Box 43420 Casuarina NT 0811 Ph. 08 89472476 Fax: 08 89475098</div>		TITLE BAYVIEW SUBDIVISION LOT A & B STORMWATER CATCHMENT PLAN			
		DRAWN BB	SCALE AS SHOWN	PROJECT No 22007	DRAWING No SK018
DESIGNED SC				AMDT B	



5 0 5 10 15 20 25m
0 1:500-A1 1:1000-A3

 ABN 78 124 388 192 P.O.Box 43420 Casuarina NT 0811 Ph. 08 89472476 Fax: 08 89475098		TITLE BAYVIEW SUBDIVISION LOT C STORMWATER CATCHMENT PLAN			
		DRAWN BB	SCALE AS SHOWN	PROJECT No 22007	DRAWING No SK019
DESIGNED SC				AMDT B	

Appendix C Q2 Hydrology and Hydraulics Calcs

12D MODEL - HYDROLOGICAL DESIGN SHEET

Project:	NT22007 CONTOURS
Drainage Model:	DRAINAGE DESIGN
Rainfall File:	SLIB\AUS NT Darwin.12dhydro
Tc Method:	Direct
Rainfall Method:	IFD Table
Runoff C Method:	Direct

Minor 2 Year Storm Event

Node Name	Node Type	Setout Easting	Setout Northing	Setout RL	Catch ID	Time Tc	Intensity I	Runoff C	Area A	Full CA	Full Sum CA	Full Qc=CA	Partial CA	Partial Sum CA	Partial Qc=CA	Catchment Flow Qc	Approach Flow Qa	Road Capacity	Flooded Depth	Flooded Width	Flooded Vel.Dep	Road Grade	Road Xfall	Max Pond Depth	Inlet Curve Name	Inlet Flow Qg	Bypass Flow Qb	Bypass Node
(-)	(-)	(m)	(m)	(m)	(-)	(min)	(mm/hr)	(-)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(m)	(sq.m/s)	(%)	(%)	(m)	(-)	(L/s)	(L/s)	(-)
1-1	MH	702187.69	8624695.89	6.05																								-
1-2	SE2	702198.59	8624698.54	5.72	1P	10	147	0.73	0.129	0.0941	0.2102	85.8	0.0471	0.1631	85.6	85.8	85.8	219	0.097	2.11	0.09	1.4	4		1.0 GRADE	77.3	8.5	2-5
					1I	5	189	0.9	0.129	0.1161			0.1161															
1-3	MH	702210.35	8624702.19	5.84																								-
1-4	MH	702216.4	8624698.26	5.79																								-
1-5	HW OUT	702223.45	8624700.68	5.16																								
2-1	SE2	702241.81	8624605.25	5.9	1P	10	147	0.73	0.0723	0.0528	0.1178	48.1	0.0264	0.0914	48	48.1	48.1	130.2	0.095	2.07	0.05	0.7	4		0.5 GRADE	48.1		3-1
					1I	5	189	0.9	0.0723	0.065			0.065															
2-2	SE2	702247.46	8624607.28	5.9	1P	10	147	0.73	0.0623	0.0455	0.1016	41.5	0.0228	0.0788	41.4	41.5	41.5	129.8	0.09	1.95	0.05	0.4	4		0.5 GRADE	41.5		2-3
					1I	5	189	0.9	0.0623	0.0561			0.0561															
2-3	SE2	702235.11	8624643.08	5.71	1P	10	147	0.73	0.0141	0.0103	0.023	9.4	0.0051	0.0178	9.4	9.4	9.4	130.2	0.056	1.08	0.02	0.5	4		0.5 GRADE	9.4		2-4
					1I	5	189	0.9	0.0141	0.0127			0.0127															
2-4	SE2	702224.71	8624673.29	5.7	1P	10	147	0.73	0.0124	0.009	0.0201	8.2	0.0045	0.0156	8.2	8.2	8.2	130.2	0.054	1.02	0.02	0.5	4		0.5 GRADE	8.2		2-5
					1I	5	189	0.9	0.0124	0.0111			0.0111															
2-5	SS3	702221.04	8624683.84	5.53	1P	10	147	0.73	0.0459	0.0335	0.0748	30.5	0.0168	0.0581	30.5	30.5	39	534	0.022					0.15	SAG	39		-
					1I	5	189	0.9	0.0459	0.0413			0.0413															
3-1	SE2	702229.44	8624641.1	5.71	1P	10	147	0.73	0.0813	0.0593	0.1324	54.1	0.0297	0.1028	54	54.1	54.1	130.2	0.099	2.16	0.06	0.5	4		0.5 GRADE	54	0.1	12-1
					1I	5	189	0.9	0.0813	0.0731			0.0731															
4-1	SS3	702215.39	8624681.79	5.53	1P	10	147	0.73	0.0515	0.0376	0.0839	34.3	0.0188	0.0651	34.2	34.3	34.3	534	0.018					0.15	SAG	34.3		-
					1I	5	189	0.9	0.0515	0.0464			0.0464															
5-1	SE2	702200.67	8624692.9	5.71	1P	10	147	0.73	0.0719	0.0525	0.1172	47.8	0.0262	0.0909	47.7	47.8	47.8	219	0.08	1.68	0.07	1.4	4		1.0 GRADE	47.8		4-1
					1I	5	189	0.9	0.0719	0.0647			0.0647															
6-1	SE2	702216.07	8624254.91	5.97	1P	10	147	0.73	0.0204	0.0149	0.0332	13.6	0.0074	0.0258	13.5	13.6	13.6	130.2	0.063	1.26	0.03	0.5	3		0.5 GRADE	13.6		10-1
					1I	5	189	0.9	0.0204	0.0183			0.0183															
6-2	SE2	702223.37	8624257.17	5.97	1P	10	147	0.73	0.0608	0.0444	0.0991	40.5	0.0222	0.0769	40.4	40.5	40.5	130.1	0.09	1.93	0.05	0.5	3		0.5 GRADE	40.5		6-3
					1I	5	189	0.9	0.0608	0.0547			0.0547															
6-3	SE2	702237.48	8624211.68	5.73	1P	10	147	0.73	0.0179	0.0131	0.0292	11.9	0.0065	0.0227	11.9	11.9	11.9	130.2	0.06	1.19	0.02	0.5	3		0.5 GRADE	11.9		6-4
					1I	5	189	0.9	0.0179	0.0161			0.0161															
6-4	SE2	702251.6	8624166.19	5.49	1P	10	147	0.73	0.0178	0.013	0.029	11.8	0.0065	0.0225	11.8	11.8	11.8	130.2	0.06	1.19	0.02	0.5	3		0.5 GRADE	11.8		7-3
					1I	5	189	0.9	0.0178	0.016			0.016															
6-5	MH	702256.77	8624149.51	5.78																								-
7-1	SE2	702206.49	8624141.85	5.22	1P	10	147	0.73	0.0631	0.046	0.1028	42	0.023	0.0798	41.9	42	42	130.2	0.091	1.96	0.05	0.5	3		0.5 GRADE	42		LOST
					1I	5	189	0.9	0.0631	0.0568			0.0568															
7-2	SE2	702208.76	8624134.57	5.22	1P	10	147	0.73	0.0139	0.0102	0.0227	9.3	0.0051	0.0176	9.2	9.3	9.3	130.1	0.056	1.07	0.02	0.5	3		0.5 GRADE	9.3		LOST
					1I	5	189	0.9	0.0139	0.0125			0.0125															
7-3	SE2	702240.1	8624144.32	5.38	1P	10	147	0.73	0.016	0.0117	0.026	10.6	0.0058	0.0202	10.6	10.6	10.6	130.2	0.058	1.14	0.02	0.5	3		0.5 GRADE	10.6		7-2
					1I	5	189	0.9	0.016	0.0144			0.0144															
8-1	SE2	702237.83	8624151.63	5.38	1P	10	147	0.73	0.0076	0.0055	0.0123	5	0.0028	0.0096	5	5	5.8					0.5	3		0.5 GRADE	5.8		7-1
					1I	5	189	0.9	0.0076	0.0068			0.0068															
9-1	SE2	702244.29	8624163.92	5.49	1P	10	147	0.73	0.0895	0.0653	0.1459	59.6	0.0327	0.1132	59.4	59.6	59.8	130	0.102	2.25	0.06	0.5	3		0.5 GRADE	59	0.8	8-1
					1I	5	189	0.9	0.0895	0.0806			0.0806															
10-1	SE2	702230.18	8624209.41	5.73	1P	10	147	0.73	0.0825	0.0602	0.1345	54.9	0.0301	0.1044	54.8	54.9	54.9	130.2	0.099	2.17	0.06	0.5	3		0.5 GRADE	54.7	0.2	9-1
					1I	5	189	0.9	0.0825	0.0743			0.0743															
11-1	MHX	702259.77	8624139.8	4.55																								-
11-2	HW OUT	702269.23	8624142.03	4.5																								-
12-1	SE2	702219.01	8624671.31	5.55	1P	10	147	0.73	0.0684	0.05	0.1116	45.6	0.025	0.0866	45.5	45.6	45.7	130.2	0.093	2.02	0.05	0.5	3		0.5 GRADE	45.7		4-1
					1I	5	189	0.9	0.0684	0.0616			0.0616															
EX 1-1	SE2	702131.49	8624657.24	6.39	1P	10	147	0.73	0.0679	0.0496	0.1108	45.2	0.0248	0.086	45.1	45.2	45.2									45.2		-
					1I	5	189	0.9	0.0679	0.0612			0.0612															
EX 1-2	SE2	702139.43	8624660.54	6.44	1P	10	147	0.73	0.0352	0.0257	0.0574	23.4	0.0129	0.0446	23.4	23.4	23.4									23.4		-
					1I	5	189	0.9	0.0352	0.0317			0.0317															
EX 1-3	SE2	702144.71	8624671.11	6.53	1P	10	147	0.73	0.0109	0.0079	0.0177	7.2	0.004	0.0138	7.2	7.2	7.2									7.2		-
					1I	5	189	0.9	0.0109	0.0098			0.0098															
EX 1-4	SE2	702142.07	8624679.71	6.59	1P	10	147	0.73	0.1016	0.0742	0.1656	67.6	0.0371	0.1285	67.5	67.6	67.6									67.6		-
					1I	5	189	0.9	0.1016	0.0914			0.0914															
EX 2-1	SE2	702200.58	8624126.01	5.63													0									0		-

12D MODEL - HYDRAULIC DESIGN SHEET

Project:NT22007 CONTOURS

Drainage Model:DRAINAGE DESIGN

Rainfall File:SLIB\AUS NT Darwin.12dhydro

Rainfall Method:IFD Table

Manning n Roughness:0.013

Freeboard Limit:0.15 m

Minor 2 Year Storm Event

Pipe ID	Pipe Type	Pipe Length	Pipe Size	Full Pipe Area Af	Pipe Grade	Pipe Grade	Full-area Tct	Full-area I	Full-area Sum CA	Full-area Qc=CIA	Part-area Tct	Part-area I	Part-area Sum CA	Part-area Qc=CIA	Catchment Flow Qc	Direct Pipe Flow Qdp	Peak Flow Qrat	Net Bypass Flow Qb	Pipe Flow Q	Capacity Flow Qcap	Q/Qcap Ratio	Full Pipe Vel Vf=Q/Af	Norm Depth Vel Vn=Q/An	Crit Depth Vel Vc=Q/Ac	Capacity Vel Vcap=Qcap/Af	US Node Grate RL	Pipe US IL	Pipe DS IL	DS Node Grate RL	Cover Limit	Cover Min	Pipe DS Bend	Pipe DS Drop	US Node Ku	US Node Kw	Pipe V'head	P'head Loss (Ku.V'head)	WSE Loss (Kw.V'head)	Pipe T'head Loss	US Node HGL	Pipe US HGL	Pipe DS HGL	Pipe DS HGL	DS Node HGL	HGL Grade	HGL Grade	F'board US
(-)	(-)	(m)	(mm)	(sq.m)	(%)	(1 in)	(min)	(mm/hr)	(ha)	(L/s)	(min)	(mm/hr)	(ha)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(-)	(m/s)	(m/s)	(m/s)	(m/s)	(m)	(m)	(m)	(m)	(m)	(m)	(deg)	(m)	(-)	(-)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(%)	(1 in)	(m)		
1-1 to 1-2	RCP	11.22	450	0.159	0.9	111.3	10.65	143.11	0.3515	139.7	10.4	144.58	0.3498	140.5	140.5		140.5		140.5	270.3	0.52	0.88	1.72	1.46	1.7	6.05	4.87	4.77	5.72	0.6	0.6	-3.6	0.404	0.6	0.7	0.04	0.02	0.03	0.09	5.16	5.13	5	4.84	1.19	84.4	0.89	
1-2 to 1-3	RCP	12.31	675	0.358	0.18	555.5	10.74	142.55	0.6789	268.8	10	147	0.6691	273.2	273.2		273.2	-8.5	264.7	356.8	0.74	0.74	1.09	1.57	1	5.72	4.36	4.34	5.84	0.6	0.6	50.3	0.02	1.81	2.22	0.03	0.05	0.06	0.03	4.84	4.78	4.75	4.76	0.22	446.7	0.88	
1-3 to 1-4	RCP	7.21	675	0.358	0.18	555.5	10.84	141.93	0.6789	267.7	10.1	146.38	0.6691	272.1	272.1		272.1	-8.5	263.6	356.8	0.74	0.74	1.09	1.56	1	5.84	4.32	4.31	5.79	0.6	0.76	-51.9	0.171	2.18	2.49	0.03	0.06	0.07	0.02	4.76	4.69	4.63	4.6	0.85	117.2	1.08	
1-4 to 1-5	RCP	7.46	1050	0.866	0.4	250	10.9	141.57	1.3442	528.6	10.16	146.02	1.3247	537.3	537.3		537.3		537.3	1734.4	0.31	0.62	1.76	1.73	2	5.79	4.14	4.11	5.16		0.8	0		2.44	2.77	0.02	0.05	0.05	0.03	4.6	4.55	4.51	4.51	0.48	208.2	1.19	
2-1 to 2-2	RCP	6	375	0.11	0.4	250	10	147	0.1178	48.1	5	189	0.0914	48	48.1		48.1		48.1	110.9	0.43	0.44	0.97	1.08	1	5.9	4.91	4.89	5.9	0.6	0.6	-89.3	0.02	9.7		0.01	0.09		0	5.29	5.2	5.19	5.2	0.05	1994.1	0.61	
2-2 to 2-3	RCP	37.87	375	0.11	0.43	233.5	10.05	146.7	0.2194	89.4	10	147	0.2191	89.5	89.5		89.5		89.5	114.8	0.78	0.81	1.15	1.33	1.04	5.9	4.87	4.7	5.71	0.6	0.6	0	0.236	2.29	2.67	0.03	0.08	0.09	0.17	5.2	5.12	4.92	4.82	0.51	197.3	0.7	
2-3 to 2-4	RCP	31.95	600	0.283	0.2	500	10.37	144.81	0.3748	150.8	10.05	146.7	0.372	151.6	151.6		151.6	-0.1	151.4	274.7	0.55	0.54	0.99	1.36	0.97	5.71	4.47	4.4	5.7	0.6	0.6	-0.2	0.02	2.01	2.23	0.01	0.03	0.03	0.07	4.82	4.79	4.72	4.73	0.21	484.3	0.89	
2-4 to 2-5	RCP	11.17	600	0.283	0.92	108.8	10.63	143.21	0.5065	201.5	10.05	146.7	0.4992	203.4	203.4		203.4		203.4	588.8	0.35	0.72	1.89	1.49	2.08	5.7	4.38	4.28	5.53	0.6	0.61	1.3	0.1	1.66	2.03	0.03	0.04	0.05	0.08	4.73	4.68	4.64	4.65	0.29	349.7	0.97	
2-5 to 1-4	RCP	15.16	750	0.442	0.15	666.7	10.72	142.65	0.6653	263.6	10	147	0.6546	267.3	267.3		267.3	8.5	275.8	431.4	0.64	0.62	1.04	1.54	0.98	5.53	4.18	4.16	5.79	0.6	0.6	88.9	0.02	1.34	1.59	0.02	0.03	0.03	0.02	4.65	4.62	4.59	4.6	0.15	669.8	0.88	
3-1 to 2-3	RCP	6	375	0.11	0.4	250	10	147	0.1324	54.1	5	189	0.1028	54	54.1		54.1	-0.1	54	110.9	0.49	0.49	1	1.12	1	5.71	4.72	4.7	5.71	0.6	0.6	-89.7	0.229	9.7		0.01	0.12		0.03	5.02	4.9	4.87	4.82	0.65	152.8	0.69	
4-1 to 2-5	RCP	6	375	0.11	0.4	250	10	147	0.0839	34.3	5	189	0.0651	34.2	34.3		34.3		34.3	110.9	0.31	0.31	0.88	0.98	1	5.53	4.53	4.51	5.53	0.6	0.6	-87.9	0.329	9.7		0	0.05		0.03	4.73	4.68	4.64	4.65	0.57	177	0.8	
5-1 to 1-2	RCP	6	375	0.11	0.4	250	10	147	0.1172	47.8	5	189	0.0909	47.7	47.8		47.8		47.8	110.9	0.43	0.43	0.97	1.08	1	5.71	4.71	4.69	5.72	0.6	0.6	93	0.326	9.7		0.01	0.09		0.03	4.98	4.89	4.85	4.84	0.63	159.6	0.73	
6-1 to 6-2	RCP	6	375	0.11	0.51	196.1	10	147	0.0332	13.6	5	189	0.0258	13.5	13.6		13.6		13.6	125.3	0.11	0.12	0.74	0.75	1.13	5.97	4.96	4.93	5.97	0.6	0.62	88.9	0.02	8.75		0	0.01		0	5.59	5.58	5.58	5.58	0.01	16718	0.38	
6-2 to 6-3	RCP	47.72	375	0.11	0.4	250.5	10.05	146.7	0.1324	53.9	10	147	0.1323	54	54		54		54	110.8	0.49	0.49	1	1.12	1	5.97	4.91	4.72	5.73	0.6	0.6	0	0.048	3.88	4.09	0.01	0.05	0.05	0.05	5.58	5.53	5.49	5.5	0.09	1054.3	0.38	
6-3 to 6-4	RCP	47.64	375	0.11	0.4	250	10.45	144.31	0.296	118.7	10	147	0.2933	119.8	119.8		119.8	-0.2	119.6	110.9	1.08	1.08	1.08	1.5	1	5.73	4.67	4.48	5.49	0.6	0.6	-2.7	0.048	1.78	1.94	0.06	0.11	0.12	0.22	5.5	5.38	5.16	5.19	0.46	215.2	0.23	
6-4 to 6-5	RCP	17.52	375	0.11	0.4	250.8	10.84	141.93	0.4709	185.7	10.05	146.7	0.4636	188.9	188.9		188.9	-0.8	188.2	110.8	1.7	1.7	1.7	1.89	1	5.49	4.43	4.36	5.78	0.6	0.77	2.7	0.469	1.69	1.89	0.15	0.25	0.28	0.2	5.19	4.91	4.68	4.46	1.32	75.6	0.3	
6-5 to 11-1	RCP	10.17	525	0.216	0.4	250	10.99	141.06	0.6348	248.7	10.2	145.83	0.6259	253.5	253.5		253.5		253.5	272.1	0.93	1.17	1.43	1.71	1.26	5.78	3.9	3.85	4.55	-10	-1.55	-86.1	0.654	1.97	2.31	0.07	0.14	0.16	0.04	4.46	4.29	4.25	4.25	0.42	239.7	1.32	
7-1 to 7-2	RCP	6	375	0.11	0.38	262.3	10	147	0.1028	42	5	189	0.0798	41.9	42		42		42	108.3	0.39	0.38	0.92	1.04	0.98	5.22	4.13	4.11	5.22	0.6	0.7	-90.9	0.02	9.7		0.01	0.07		0	4.55	4.48	4.47	4.48	0.04	2341.1	0.67	
7-2 to 7-3	RCP	33.04	450	0.159	0.3	335.6	10.05	146.7	0.1255	51.1	10	147	0.1252	51.1	51.1		51.1		51.1	155.7	0.33	0.32	0.88	1.05	0.98	5.22	4.09	3.99	5.38	0.6	0.64	2.7	0.02	2.18	2.7	0.01	0.01	0.01	0.01	4.48	4.46	4.45	4.46	0.02	4151.6	0.74	
7-3 to 6-5	RCP	17.43	450	0.159	0.3	332.7	10.33	145.05	0.1638	66	10	147	0.162	66.2	66.2		66.2	0.8	66.9	156.4	0.43	0.42	0.94	1.14	0.98	5.38	3.97	3.92	5.78	0.6	1.05	87.4	0.02	1.34	1.57	0.01	0.01	0.01	0.01	4.46	4.44	4.43	4.46	0.06	1816.6	0.93	
8-1 to 7-3	RCP	6	375	0.11	0.51	196.1	10	147	0.0123	5	5	189	0.0096	5	5		5	0.8	5.8	125.3	0.05	0.05	0.58	0.6	1.13	5.38	4.38	4.35	5.38	0.6	0.62	-86.5	0.378	9.7		0	0		0	4.46	4.45	4.45	4.46	0	39296.7	0.93	
9-1 to 6-4	RCP	6	375	0.11	0.51	196.1	10	147	0.1459	59.6	5	189	0.1132	59.4	59.6		59.6	-0.5	59	125.3	0.47	0.53	1.12	1.16	1.13	5.49	4.48	4.45	5.49	0.6	0.62	86.7	0.02	6.65		0.01	0.1		0.01	5.27	5.17	5.16	5.19	0.11	883	0.23	
10-1 to 6-3	RCP	6	375	0.11	0.51	196.1	10	147	0.1345	54.9	5	189	0.1044	54.8	54.9		54.9	-0.2	54.7	125.3	0.44	0.5	1.1	1.13	1.13	5.73	4.72	4.69	5.73	0.6	0.62	88.9	0.02	5.91		0.01	0.07		0.01	5.57	5.5	5.49	5.5	0.1	1028.3	0.16	
11-1 to 11-2	RCP	9.72	1350	1.431	0.5	200	11.08	140.62	0.6348	248	10.28	145.32	0.6259	252.7	252.7	2000	2252.7		2252.7	3790.2	0.59	1.57	2.75	2.55	2.65	4.55	3.2	3.15	4.5			0		2		0.13	0.25		0.04	4.25	4	3.9	3.9	0.99	100.6	0.3	
12-1 to 2-4	RCP	6.03	375	0.11	0.4	250	10	147	0.1116	45.6	5	189	0.0866	45.5	45.6		45.6	0.1	45.7	110.9	0.41	0.41	0.96	1.07	1	5.55	4.56	4.54	5.7	0.6	0.6	-90	0.153	9.7		0.01	0.08		0.02	4.82	4.73	4.72	4.73	0.23	432.2	0.73	
EX 1-1 to EX 1-2	RCP	8.59	375	0.11	0.4	250	10	147	0.1108	45.2	5	189	0.086	45.1	45.2		45.2		45.2	110.9	0.41	0.41	0.95	1.06	1	6.39	5.38	5.34	6.44	0.6	0.63	-40.9	0.02	7		0.01	0.06		0.01	5.68	5.62	5.62	5.63	0.05	1954.8	0.7	
EX 1-2 to EX 1-3	RCP	11.82	375	0.11	0.4	250	10.07	146.57	0.1682	68.5	10	147	0.1678	68.5	68.5		68.5		68.5	110.9	0.62	0.62	1.06	1.21	1	6.44	5.32	5.28	6.53	0.6	0.75	-43.6	0.02	1.88	2.45	0.02	0.04	0.05	0.02	5.63	5.58	5.57	5.58	0.13	775.7	0.81	
EX 1-3 to EX 1-4	RCP	8.99	375	0.11	0.4	250	10.17	145.98	0.1859	75.4	10	147	0.1848	75.5	75.5		75.5		75.5	110.9	0.68	0.68	1.08	1.26	1	6.53	5.26	5.22	6.59	0.6	0.9	87.5	0.02														

Appendix D Q100 Hydrology and Hydraulics Calcs

12D MODEL - HYDROLOGICAL DESIGN SHEET

Project:	NT22007 CONTOURS
Drainage Model:	DRAINAGE DESIGN
Rainfall File:	\$LIB\AUS NT Darwin.12dhydro
Tc Method:	Direct
Rainfall Method:	IFD Table
Runoff C Method:	Direct

Major 100 Year Storm Event

Node Name	Node Type	Setout Easting	Setout Northing	Setout RL	Catch ID	Time Tc	Intensity I	Runoff C	Area A	Full CA	Full Sum CA	Full Qc=CA	Partial CA	Partial Sum CA	Partial Qc=CA	Catchment Flow Qc	Approach Flow Qa	Road Capacity	Flooded Depth	Flooded Width	Flooded Vel.Dep	Road Grade	Road Xfall	Max Pond Depth	Choke Factor	Inlet Curve Name	Inlet Flow Qg	Bypass Flow Qb	Bypass Node
(-)	(-)	(m)	(m)	(m)	(-)	(min)	(mm/hr)	(-)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(m)	(sq.m/s)	(%)	(%)	(m)	(-)	(-)	(L/s)	(L/s)	(-)
1-1	MH	702187.69	8624695.89	6.05																									-
1-2	SE2	702198.59	8624698.54	5.72	1P	10	283	1	0.129	0.129	0.245	192.6	0.0645	0.1806	183.6	192.6	192.6	219	0.127	2.88	0.15	1.4	4		0.8	1.0 GRADE	90.4	102.2	2-5
					1I	5	366	0.9	0.129	0.1161			0.1161																
1-3	MH	702210.35	8624702.19	5.84																									-
1-4	MH	702216.4	8624698.26	5.79																									-
1-5	HW OUT	702223.45	8624700.68	5.16																									-
2-1	SE2	702241.81	8624605.25	5.9	1P	10	283	1	0.0723	0.0723	0.1373	107.9	0.0361	0.1012	102.9	107.9	107.9	130.2	0.125	2.81	0.08	0.7	4		0.37	0.5 GRADE	35.2	72.8	3-1
					1I	5	366	0.9	0.0723	0.065			0.065																
2-2	SE2	702247.46	8624607.28	5.9	1P	10	283	1	0.0623	0.0623	0.1184	93.1	0.0312	0.0873	88.7	93.1	93.1	129.8	0.119	2.66	0.08	0.4	4		0.8	0.5 GRADE	67.1	26	2-3
					1I	5	366	0.9	0.0623	0.0561			0.0561																
2-3	SE2	702235.11	8624643.08	5.71	1P	10	283	1	0.0141	0.0141	0.0268	21.1	0.0071	0.0197	20.1	21.1	47	130.2	0.094	2.05	0.05	0.5	4		0.8	0.5 GRADE	37.6	9.4	2-4
					1I	5	366	0.9	0.0141	0.0127			0.0127																
2-4	SE2	702224.71	8624673.29	5.7	1P	10	283	1	0.0124	0.0124	0.0235	18.5	0.0062	0.0173	17.6	18.5	27.9	130.2	0.079	1.67	0.04	0.5	4		0.8	0.5 GRADE	22.3	5.6	2-5
					1I	5	366	0.9	0.0124	0.0111			0.0111																
2-5	SS3	702221.04	8624683.84	5.53	1P	10	283	1	0.0459	0.0459	0.0872	68.6	0.0229	0.0643	65.3	68.6	176.3	267	0.109					0.15	0.5	SAG	176.3		-
					1I	5	366	0.9	0.0459	0.0413			0.0413																
3-1	SE2	702229.44	8624641.1	5.71	1P	10	283	1	0.0813	0.0813	0.1544	121.4	0.0406	0.1138	115.7	121.4	194.1	130.2	0.15	3.02	0.12	0.5	4		0.63	0.5 GRADE	75.2	118.9	12-1
					1I	5	366	0.9	0.0813	0.0731			0.0731																
4-1	SS3	702215.39	8624681.79	5.53	1P	10	283	1	0.0515	0.0515	0.0979	76.9	0.0258	0.0721	73.3	76.9	271.1	267	0.152					0.15	0.5	SAG	271.1		-
					1I	5	366	0.9	0.0515	0.0464			0.0464																
5-1	SE2	702200.67	8624692.9	5.71	1P	10	283	1	0.0719	0.0719	0.1366	107.4	0.0359	0.1006	102.3	107.4	107.4	219	0.104	2.3	0.1	1.4	4		0.8	1.0 GRADE	73.6	33.8	4-1
					1I	5	366	0.9	0.0719	0.0647			0.0647																
6-1	SE2	702216.07	8624254.91	5.97	1P	10	283	1	0.0204	0.0204	0.0387	30.4	0.0102	0.0285	29	30.4	30.4	130.2	0.082	1.73	0.04	0.5	3		0.8	0.5 GRADE	24.4	6.1	10-1
					1I	5	366	0.9	0.0204	0.0183			0.0183																
6-2	SE2	702223.37	8624257.17	5.97	1P	10	283	1	0.0608	0.0608	0.1156	90.9	0.0304	0.0852	86.6	90.9	90.9	130.1	0.118	2.64	0.08	0.5	3		0.8	0.5 GRADE	65.9	24.9	6-3
					1I	5	366	0.9	0.0608	0.0547			0.0547																
6-3	SE2	702237.48	8624211.68	5.73	1P	10	283	1	0.0179	0.0179	0.034	26.7	0.009	0.0251	25.5	26.7	51.7	130.2	0.097	2.12	0.05	0.5	3		0.13	0.5 GRADE	7	44.7	6-4
					1I	5	366	0.9	0.0179	0.0161			0.0161																
6-4	SE2	702251.6	8624166.19	5.49	1P	10	283	1	0.0178	0.0178	0.0338	26.6	0.0089	0.0249	25.3	26.6	71.3	130.2	0.108	2.4	0.07	0.5	3		0.8	0.5 GRADE	55.2	16	7-3
					1I	5	366	0.9	0.0178	0.016			0.016																
6-5	MH	702256.77	8624149.51	5.78																									-
7-1	SE2	702206.49	8624141.85	5.22	1P	10	283	1	0.0631	0.0631	0.1198	94.2	0.0315	0.0883	89.8	94.2	211.4	130.2	0.157	3.4	0.13	0.5	3		0.21	0.5 GRADE	25.4	186	LOST
					1I	5	366	0.9	0.0631	0.0568			0.0568																
7-2	SE2	702208.76	8624134.57	5.22	1P	10	283	1	0.0139	0.0139	0.0264	20.8	0.007	0.0195	19.8	20.8	28.8	130.1	0.08	1.69	0.04	0.5	3		0.8	0.5 GRADE	23	5.8	LOST
					1I	5	366	0.9	0.0139	0.0125			0.0125																
7-3	SE2	702240.1	8624144.32	5.38	1P	10	283	1	0.016	0.016	0.0304	23.9	0.008	0.0224	22.7	23.9	39.9	130.2	0.089	1.92	0.05	0.5	3		0.8	0.5 GRADE	31.9	8	7-2
					1I	5	366	0.9	0.016	0.0144			0.0144																
8-1	SE2	702237.83	8624151.63	5.38	1P	10	283	1	0.0076	0.0076	0.0144	11.3	0.0038	0.0106	10.8	11.3	212.4					0.5	3		0.8	0.5 GRADE	95.2	117.2	7-1
					1I	5	366	0.9	0.0076	0.0068			0.0068																
9-1	SE2	702244.29	8624163.92	5.49	1P	10	283	1	0.0895	0.0895	0.1701	133.7	0.0448	0.1253	127.4	133.7	242.9	130	0.166	3.77	0.14	0.5	3		0.35	0.5 GRADE	41.8	201.1	8-1
					1I	5	366	0.9	0.0895	0.0806			0.0806																
10-1	SE2	702230.18	8624209.41	5.73	1P	10	283	1	0.0825	0.0825	0.1568	123.2	0.0413	0.1155	117.4	123.2	129.3	130.2	0.133	3.01	0.09	0.5	3		0.19	0.5 GRADE	20.1	109.2	9-1
					1I	5	366	0.9	0.0825	0.0743			0.0743																
11-1	MHX	702259.77	8624139.8	4.55																									-
11-2	HW OUT	702269.23	8624142.03	4.5																									-
12-1	SE2	702219.01	8624671.31	5.55	1P	10	283	1	0.0684	0.0684	0.1301	102.2	0.0342	0.0958	97.4	102.2	221.2	130.2	0.16	3.52	0.13	0.5	3		0.51	0.5 GRADE	60.8	160.4	4-1
					1I	5	366	0.9	0.0684	0.0616			0.0616																
EX 1-1	SE2	702131.49	8624657.24	6.39	1P	10	283	1	0.0679	0.0679	0.1291	101.5	0.034	0.0951	96.7	101.5	101.5										101.5		-
					1I	5	366	0.9	0.0679	0.0612			0.0612																
EX 1-2	SE2	702139.43	8624660.54	6.44	1P	10	283	1	0.0352	0.0352	0.0669	52.6	0.0176	0.0493	50.1	52.6	52.6										52.6		-
					1I	5	366	0.9	0.0352	0.0317			0.0317																
EX 1-3	SE2	702144.71	8624671.11	6.53	1P	10	283	1	0.0109	0.0109	0.0207	16.2	0.0054	0.0152	15.5	16.2	16.2										16.2		-
					1I	5	366	0.9	0.0109	0.0098			0.0098																
EX 1-4	SE2	702142.07	8624679.71	6.59	1P	10	283	1	0.1016	0.1016	0.1931	151.8	0.0508	0.1423	144.6	151.8	151.8										151.8		-
					1I	5	366	0.9	0.1016	0.0914			0.0914																
EX 2-1	SE2	702200.58	8624126.01	5.63													0										0		-

12D MODEL - HYDRAULIC DESIGN SHEET

Project:NT22007 CONTOURS

Drainage Model:DRAINAGE DESIGN

Rainfall File:SLIB\AUS NT Darwin.12dhydro

Rainfall Method:IFD Table

Manning n Roughness:0.013

Freeboard Limit:0.15 m

Major 100 Year Storm Event

Pipe ID	Pipe Type	Pipe Length	Pipe Size	Full Pipe Area Af	Pipe Grade	Pipe Grade	Full-area Tct	Full-area I	Full-area Sum CA	Full-area Qc=CIa	Part-area Tct	Part-area I	Part-area Sum CA	Part-area Qc=CIa	Catchment Flow Qc	Direct Pipe Flow Qdp	Peak Flow Qrat	Net Bypass Flow Qb	Pipe Flow Q	Excess Pipe Flow Qx	Capacity Flow Qcap	Q/Qcap Ratio	Full Pipe Vel Vf=Q/Af	Norm Depth Vel Vn=Q/An	Crit Depth Vel Vc=Q/Ac	Capacity Vel Vcap=Qcap/Af	US Node Grate RL	Pipe US IL	Pipe DS IL	DS Node Grate RL	Cover Limit	Cover Min	Pipe DS Bend	Pipe DS Drop	US Node Ku	US Node Kw	Pipe V'head	P'head Loss (Ku.V'head)	WSE Loss (Kw.V'head)	Pipe T'head Loss	US Node HGL	Pipe US HGL	Pipe DS HGL	DS Node HGL	HGL Grade	
(-)	(-)	(m)	(mm)	(sq.m)	(%)	(1 in)	(min)	(mm/hr)	(ha)	(L/s)	(min)	(mm/hr)	(ha)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(-)	(m/s)	(m/s)	(m/s)	(m/s)	(m)	(m)	(m)	(m)	(m)	(deg)	(m)	(-)	(-)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	
1-1 to 1-2	RCP	11.22	450	0.159	0.9	111.3	10.65	275.87	0.4098	314	10.4	278.56	0.4074	315.2	315.2		315.2		315.2		270.3	1.17	1.98	1.98	2.16	1.7	6.05	4.87	4.77	5.72	0.6	0.6	-3.6	0.404	0.58	0.65	0.2	0.12	0.13	0.14	5.68	5.55	5.41	5.44	1.22	
1-2 to 1-3	RCP	12.31	675	0.358	0.18	555.5	10.74	274.84	0.7914	604.2	10	283	0.778	611.6	611.6		611.6	-136	475.5		356.8	1.33	1.33	1.33	1.93	1	5.72	4.36	4.34	5.84	0.6	0.6	50.3	0.02	1.58	1.9	0.09	0.14	0.17	0.04	5.44	5.27	5.23	5.26	0.32	
1-3 to 1-4	RCP	7.21	675	0.358	0.18	555.5	10.84	273.71	0.7914	601.7	10.1	281.87	0.778	609.1	609.1		609.1	-136	473.1		356.8	1.33	1.32	1.32	1.93	1	5.84	4.32	4.31	5.79	0.6	0.76	-51.9	0.171	2.18	2.49	0.09	0.19	0.22	0.02	5.26	5.04	5.01	5.05	0.32	
1-4 to 1-5	RCP	7.46	1050	0.866	0.4	250	10.9	273.05	1.5669	1188.4	10.18	281.06	1.541	1203.1	1203.1		1203.1		1203.1		1734.4	0.69	1.39	2.16	2.25	2	5.79	4.14	4.11	5.16		0.8	0		2.37	2.75	0.1	0.23	0.27	0.03	5.05	4.78	4.73	4.73	0.67	
2-1 to 2-2	RCP	6	375	0.11	0.4	250	10	283	0.1373	107.9	5	366	0.1012	102.9	107.9		107.9	-72.8	35.2		110.9	0.32	0.32	0.89	0.99	1	5.9	4.91	4.89	5.9	0.6	0.6	-89.3	0.02	5.2		0.01	0.03		0	5.82	5.79	5.79	5.8	0.04	
2-2 to 2-3	RCP	37.87	375	0.11	0.43	233.5	10.05	282.45	0.2557	200.6	10	283	0.2554	200.7	200.7		200.7	-98.8	102		114.8	0.89	0.92	1.17	1.4	1.04	5.9	4.87	4.7	5.71	0.6	0.6	0	0.236	2.33	2.62	0.04	0.1	0.11	0.13	5.8	5.69	5.56	5.57	0.34	
2-3 to 2-4	RCP	31.95	600	0.283	0.2	500	10.37	278.98	0.4369	338.6	10.05	282.45	0.433	339.7	339.7		339.7	-128.4	211.4		274.7	0.77	0.75	1.07	1.51	0.97	5.71	4.47	4.4	5.7	0.6	0.6	-0.2	0.02	1.93	2.08	0.03	0.05	0.06	0.04	5.57	5.51	5.47	5.48	0.12	
2-4 to 2-5	RCP	11.17	600	0.283	0.92	108.8	10.63	276.05	0.5904	452.8	10.27	280.07	0.5854	455.4	455.4		455.4	-165.9	289.5		588.8	0.49	1.02	2.07	1.69	2.08	5.7	4.38	4.28	5.53	0.6	0.61	1.3	0.1	1.54	1.81	0.05	0.08	0.1	0.02	5.48	5.39	5.36	5.4	0.22	
2-5 to 1-4	RCP	15.16	750	0.442	0.15	666.7	10.72	275.03	0.7755	592.4	10.09	281.98	0.764	598.4	598.4		598.4		734.4		431.4	1.7	1.66	1.66	2.19	0.98	5.53	4.18	4.16	5.79	0.6	0.6	88.9	0.02	2	2.3	0.14	0.28	0.32	0.07	5.4	5.08	5.01	5.05	0.43	
3-1 to 2-3	RCP	6	375	0.11	0.4	250	10	283	0.1544	121.4	5	366	0.1138	115.7	121.4		121.4	-46.2	75.2		110.9	0.68	0.68	1.08	1.25	1	5.71	4.72	4.7	5.71	0.6	0.6	-89.7	0.229	4.74		0.02	0.11		0.01	5.69	5.57	5.56	5.57	0.18	
4-1 to 2-5	RCP	6	375	0.11	0.4	250	10	283	0.0979	76.9	5	366	0.0721	73.3	76.9		76.9	194.2	271.1	183		110.9	2.44	2.45	2.45	2.51	1	5.53	4.53	4.51	5.53	0.6	0.6	-87.9	0.329	4.58		0.03	0.15		0.02	5.53	5.38	5.36	5.4	0.25
5-1 to 1-2	RCP	6	375	0.11	0.4	250	10	283	0.1366	107.4	5	366	0.1006	102.3	107.4		107.4	-33.8	73.6		110.9	0.66	0.67	1.07	1.24	1	5.71	4.71	4.69	5.72	0.6	0.6	93	0.326	5.95		0.02	0.13		0.01	5.56	5.42	5.41	5.44	0.18	
6-1 to 6-2	RCP	6	375	0.11	0.51	196.1	10	283	0.0387	30.4	5	366	0.0285	29	30.4		30.4	-6.1	24.4		125.3	0.19	0.22	0.88	0.89	1.13	5.97	4.96	4.93	5.97	0.6	0.62	88.9	0.02	4.89		0	0.01		0	5.9	5.89	5.89	5.89	0.02	
6-2 to 6-3	RCP	47.72	375	0.11	0.4	250.5	10.05	282.45	0.1543	121.1	10	283	0.1542	121.2	121.2		121.2	-31	90.2		110.8	0.81	0.82	1.12	1.34	1	5.97	4.91	4.72	5.73	0.6	0.6	0	0.048	2.55	2.76	0.03	0.09	0.09	0.13	5.89	5.8	5.67	5.68	0.26	
6-3 to 6-4	RCP	47.64	375	0.11	0.4	250	10.45	278.08	0.3451	266.6	10.05	282.45	0.3422	268.4	268.4		268.4	-153.9	114.5		110.9	1.03	1.04	1.14	1.47	1	5.73	4.67	4.48	5.49	0.6	0.6	-2.7	0.048	1.04	1.19	0.05	0.06	0.07	0.2	5.68	5.62	5.41	5.45	0.43	
6-4 to 6-5	RCP	17.52	375	0.11	0.4	250.8	10.84	273.71	0.5489	417.3	10.05	282.45	0.5389	422.8	422.8		422.8	-217.2	205.6		110.8	1.86	1.86	1.86	2.01	1	5.49	4.43	4.36	5.78	0.6	0.77	2.7	0.469	1.43	1.65	0.18	0.25	0.29	0.24	5.45	5.16	4.92	4.95	1.37	
6-5 to 11-1	RCP	10.17	525	0.216	0.4	250	10.99	272.1	0.7399	559.3	10.2	280.84	0.7278	567.8	567.8		567.8	-191.7	376		272.1	1.38	1.74	1.74	2.05	1.26	5.78	3.9	3.85	4.55	-10	-1.55	-86.1	0.654	1.91	2.13	0.15	0.29	0.33	0.08	4.95	4.63	4.55	4.55	0.76	
7-1 to 7-2	RCP	6	375	0.11	0.38	262.3	10	283	0.1198	94.2	5	366	0.0883	89.8	94.2		94.2	-68.8	25.4		108.3	0.23	0.23	0.8	0.9	0.98	5.22	4.13	4.11	5.22	0.6	0.7	-90.9	0.02	4.53		0	0.01		0	5.13	5.12	5.12	5.12	0.02	
7-2 to 7-3	RCP	33.04	450	0.159	0.3	335.6	10.05	282.45	0.1463	114.8	10	283	0.1459	114.7	114.8		114.8	-66.5	48.2		155.7	0.31	0.3	0.86	1.04	0.98	5.22	4.09	3.99	5.38	0.6	0.64	2.7	0.02	2	2.32	0	0.01	0.01	0.01	5.12	5.11	5.1	5.11	0.03	
7-3 to 6-5	RCP	17.43	450	0.159	0.3	332.7	10.33	279.42	0.191	148.2	10.28	279.97	0.1907	148.3	148.3		148.3	25.4	173.7		156.4	1.11	1.09	1.09	1.58	0.98	5.38	3.97	3.92	5.78	0.6	1.05	87.4	0.02	1.82	1.95	0.06	0.11	0.12	0.06	5.11	4.99	4.92	4.95	0.37	
8-1 to 7-3	RCP	6	375	0.11	0.51	196.1	10	283	0.0144	11.3	5	366	0.0106	10.8	11.3		11.3	83.9	95.2		125.3	0.76	0.86	1.25	1.37	1.13	5.38	4.38	4.35	5.38	0.6	0.62	-86.5	0.378	5		0.04	0.19		0.02	5.3	5.11	5.1	5.11	0.29	
9-1 to 6-4	RCP	6	375	0.11	0.51	196.1	10	283	0.1701	133.7	5	366	0.1253	127.4	133.7		133.7	-91.9	41.8		125.3	0.33	0.38	1.02	1.04	1.13	5.49	4.48	4.45	5.49	0.6	0.62	86.7	0.02	4.72		0.01	0.03		0	5.45	5.42	5.41	5.45	0.06	
10-1 to 6-3	RCP	6	375	0.11	0.51	196.1	10	283	0.1568	123.2	5	366	0.1155	117.4	123.2		123.2	-103.1	20.1		125.3	0.16	0.18	0.83	0.84	1.13	5.73	4.72	4.69	5.73	0.6	0.62	88.9	0.02	4.76		0	0.01		0	5.68	5.68	5.67	5.68	0.01	
11-1 to 11-2	RCP	9.72	1350	1.431	0.5	200	11.08	271.25	0.7399	557.5	10.28	279.91	0.7278	565.9	565.9	3000	3565.9	-191.7	3374.2	477		3790.2	0.89	2.36	2.98	3.02	2.65	4.55	3.2	3.15	4.5		0		2	0.21	0.42		0.04	4.55	4.13	4.14	4.14	-0.03		
12-1 to 2-4	RCP	6.03	375	0.11	0.4	250	10	283	0.1301	102.2	5	366	0.0958	97.4	102.2		102.2	-41.4	60.8		110.9	0.55	0.55	1.03	1.17	1	5.55	4.56	4.54	5.7	0.6	0.6	-90	0.153	4.61		0.02	0.07		0.01	5.55	5.48	5.47	5.48	0.12	
EX 1-1 to EX 1-2	RCP	8.59	375	0.11	0.4	250	10	283	0.1291	101.5	5	366	0.0951	96.7	101.5		101.5		101.5		110.9	0.91	0.92	1.14	1.4	1	6.39	5.38	5.34	6.44	0.6	0.63	-40.9	0.02	3.52		0	0		0	6.39	6.39	6.39	6.39	0	

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SITE PLAN
NOT TO SCALE

SCHEDULE OF DRAWINGS

DRAWING No.	DRAWINGS (FOR INFORMATION ONLY)
21020-C140	EROSION AND SEDIMENT CONTROL COVER SHEET
21020-C141	EROSION AND SEDIMENT CONTROL NOTES
21020-C142	EROSION AND SEDIMENT CONTROLS LAYOUT PLAN (WET SEASON)
21020-C143	EROSION AND SEDIMENT CONTROLS FINISHES PLAN
DRAWING No.	STANDARD DRAWINGS
DB-01 RCD-01	<u>IECA STANDARD DRAWINGS – DRAINAGE CONTROLS</u>
	FLOW DIVERSION BANKS CHECK DAMS
GRAVEL-01 R-01	<u>IECA STANDARD DRAWINGS – EROSION CONTROLS</u>
	GRAVELLING REVEGETATION – GENERAL
EXIT-01 EXIT-02	<u>IECA STANDARD DRAWINGS – SEDIMENT CONTROLS</u>
	CONSTRUCTION EXIT – ROCK PAD CONSTRUCTION EXIT – ROCK PAD (NOTES)
SF-01	SEDIMENT FENCE
SF-02	SEDIMENT FENCE (NOTES)
RFD-03	ROCK FILTER DAM
RFD-04	ROCK FILTER DAM (NOTES)
ESC-03	KERB INLET SEDIMENT TRAPS

REF. IECA STANDARD DRAWINGS – <https://www.austieca.com.au/publications/book-6-standard-drawings>

DEVELOPMENT PERMIT	TBC	
CONSTRUCTION PERIOD	TBC	
SUPERINTENDENT CONTACT	TBC	04XX XXX XXX
CONTRACTOR CONTACTS		
• SITE MANAGER	TBC	04XX XXX XXX
• PROJECT MANAGER	TBC	04XX XXX XXX
• ENVIRONMENTAL OFFICER	TBC	04XX XXX XXX
• ESCP DESIGNER	TBC	04XX XXX XXX

GENERIC INSTALLATION SEQUENCE

THE FOLLOWING TABLE INDICATES MINIMUM EROSION AND SEDIMENT CONTROL MEASURES FOR THE WORKS. SITE CONDITIONS, SUCH AS THE PRESENCE OF DISPERSIVE SOILS, MAY WARRANT HIGHER EROSION AND SEDIMENT CONTROL STANDARDS. MARK OUT INITIAL LIMITS OF DISTURBANCE AND IDENTIFY LOCATION OF DISPERSIVE SOIL (IF ANY). IF DISPERSIVE SOIL IS ENCOUNTERED, CONTACT THE SUPERINTENDENT AND ESCP DESIGNER PRIOR TO COMMENCING WORKS.

ITEM	INSTALLED	REMOVED
ENTRY/EXIT ROCK PAD	PRIOR OR IN CONJUNCTION WITH SITE CLEARING.	ONCE SITE IS STABILISED AND ALL TEMPORARY FACILITIES HAVE BEEN REMOVED.
CLEAN WATER DIVERSION CHANNELS/BERMS	PRIOR OR IN CONJUNCTION WITH SITE CLEARING.	ONCE SITE IS STABILISED AND ALL TEMPORARY FACILITIES HAVE BEEN REMOVED.
ROCK FILTER DAMS	PRIOR OR IN CONJUNCTION WITH SITE CLEARING	ONCE SITE IS STABILISED AND ALL TEMPORARY FACILITIES HAVE BEEN REMOVED.
SEDIMENT FENCE	PRIOR OR IN CONJUNCTION WITH SITE CLEARING.	ONCE SITE IS STABILISED AND ALL TEMPORARY FACILITIES HAVE BEEN REMOVED.
GRAVELLING OF TEMP FACILITIES	UPON ESTABLISHMENT OF SITE ACCESS/EGRESS TRACK, SITE OFFICES AND CONTRACTOR CARPARK / LAYDOWN AREA.	ONCE WORKS ARE COMPLETE AND TEMPORARY FACILITIES HAVE BEEN DECOMMISSIONED.
ROCK CHECK DAMS	INSTALLED IN DRAINS IMMEDIATELY AFTER DRAIN CONSTRUCTION	REMOVED ONCE DRAINS ARE DECOMMISSIONED
FIELD AND KERB INLET SEDIMENT TRAPS	INSTALLED UPON COMPLETION OF STORMWATER PITS (GIPS, LBPS AND SEPS)	ONCE SITE IS STABILISED AND ALL TEMPORARY FACILITIES HAVE BEEN REMOVED.
REVEGETATION	IMMEDIATELY FOLLOWING COMPLETION OF WORKS	N/A

STAGING OF WORKS

ITEM OF WORKS	TIMING SCHEDULE
1. SITE MOBILISATION AND ESTABLISHMENT	TBC
2. ACCESS / ENTRY AND EXIT CONTROLS	TBC
3. EARTHWORKS	TBC
4. ROADWORKS	TBC
5. STORMWATER AND DRAINAGE	TBC
6. ELECTRICAL	TBC
7. LANDSCAPING AND REHABILITATION	PROGRESSIVE

EROSION RISK ASSESSMENT (LOT A)

CATCHMENT	AREA (ha)	R	K	LS	P	C	A (t/ha/month)	A (t/month)	CONTROL
BULK EARTHWORKS (MAY TO SEP)	1.56	160	0.040	1.50	1.3	1.0	12.5	19.5	TYPE 1
BULK EARTHWORKS (MAY TO SEP) – STAGED	1.00	160	0.040	1.50	1.3	1.0	12.5	12.5	TYPE 2
ROAD WORKS / LOTS STABILISED (OCT – NOV)	1.56	948	0.040	0.34	1.3	0.34	5.7	8.9	TYPE 3
ROAD PAVEMENT UNDERWAY / COMPLETE (JAN – WORST CASE)	1.56	4496	0.040	0.17	1.3	0.14	6.0	9.0	TYPE 3

WARNING

BEWARE OF UNDERGROUND SERVICES

The locations of underground services are approximate only and their exact position should be proven on site
No guarantee is given that all existing services are shown

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DRAWN BB	TITLE BAYVIEW SUBDIVISION LOT A & B EROSION & SEDIMENT CONTROL			
	DESIGNED ET	SCALE AS SHOWN	PROJECT No 22007	DRAWING No SK005
AMDT B				

GENERAL NOTES

- THIS IS A 'WET SEASON' ESCP FOR A SITE IN THE 'TOP END' OF THE NORTHERN TERRITORY
- ALL WORKS MUST BE UNDERTAKEN IN ACCORDANCE WITH THE APPROVED ESCP AND ASSOCIATED DEVELOPMENT CONDITIONS.
- EROSION AND SEDIMENT CONTROL MEASURES MUST CONFORM TO THE STANDARDS AND SPECIFICATIONS CONTAINED IN:
 - THE APPROVED ESCP AND SUPPORTING DOCUMENTATION; AND
 - THE LATEST VERSION OF INTERNATIONAL EROSION CONTROL ASSOCIATION (IECA) GUIDELINES, IF THE STANDARDS AND SPECIFICATIONS ARE NOT CONTAINED IN THE APPROVED ESCP.
- CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTATION, MONITORING AND MANAGEMENT OF ALL EROSION AND SEDIMENT CONTROL MEASURES TO THE SATISFACTION OF DEPWS.
- CONTRACTOR MUST TAKE ALL REASONABLE AND PRACTICABLE MEASURES TO CONTROL STORM WATER FLOW VELOCITIES; MINIMISE SOIL EROSION AND SEDIMENT RUNOFF, AND MITIGATE ENVIRONMENTAL HARM.
- UNEXPECTED CIRCUMSTANCES OR LARGE STORM EVENTS MAY NECESSITATE AMENDMENT OF THE ESCP. IN THE EVENT THAT SITE CONDITIONS CHANGE SIGNIFICANTLY FROM THOSE CONSIDERED WITHIN THE APPROVED ESCP, A REVISED EROSION AND SEDIMENT CONTROL PLAN (ESCP) MUST BE SUBMITTED FOR APPROVAL TO DEPWS AND ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MUST BE IMPLEMENTED.
- WHERE THERE IS HIGH PROBABILITY OF ENVIRONMENTAL HARM OCCURRING DUE TO SEDIMENT LEAVING THE SITE, CONTRACTOR MUST IMPLEMENT ALL REASONABLE AND PRACTICABLE MEASURES REQUIRED TO MITIGATE SUCH HARM, INCLUDING IMPLEMENTATION OF APPROPRIATE ADDITIONAL CONTROL MEASURES. WITH THE ESCP AMENDED AS SOON AS POSSIBLE, AND RE-SUBMITTED FOR APPROVAL TO DEPWS.
- CONTRACTOR MUST MAINTAIN SUFFICIENT EROSION AND SEDIMENT CONTROL MATERIALS ON SITE FOR SHORT NOTICE REPAIRS.
- CONTRACTOR MUST MONITOR THE WORKS AREA WEEKLY, OR DAILY DURING RAINFALL, AND ADAPT ESC PRACTICES AS REQUIRED TO MAINTAIN THE REQUIRED PERFORMANCE STANDARD.

ERA NOTES

- GREATEST RAINFALL AT THE SITE IS TYPICALLY EXPERIENCED IN JANUARY. R-VALUES ADOPTED FOR THE BULK EARTHWORKS PHASE ARE THE REPORTED MAY VALUES FOR DARWIN AIRPORT.
- BULK EARTHWORKS WILL NEED TO BE STAGED IN AREAS OF LESS THAN 1 HECTARE TO AVOID TRIGGERING A SEDIMENT BASIN, AS LS FACTORS ARE HIGH DUE TO EXISTING STEEP TERRAIN. ONCE THESE STEEP AREAS HAVE BEEN LEVELLED, THE ENTIRE SITE CAN BE WORKED.
- K-VALUE WAS SELECTED BASED ON THE ASSUMPTION THAT SOIL WILL MOSTLY BE COMPRISED OF SILTY CLAY LOAM (SICL). THIS SOIL TYPE IS FAIRLY TYPICAL FOR MANGROVE AREAS. REFER TO IECA BEST PRACTICE GUIDELINES TABLE E4.
- LS FACTORS WERE SELECTED ON THE FOLLOWING BASIS:
BULK EARTHWORKS – 20% GRADE, 10m SLOPE LENGTH
EARLY ROAD WORKS – 3% GRADE, 20m SLOPE LENGTH
PAVEMENT WORKS – 3% GRADE, 5m SLOPE LENGTH

SITE MANAGEMENT

1. CONSTRUCTION ACTIVITIES MUST BE STAGED SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MANAGEABLE SIZE AND THE EXTENT AND DURATION OF SOIL EXPOSURE IS LIMITED. EROSION AND SEDIMENT CONTROL MEASURES MUST BE PROGRESSIVELY IMPLEMENTED TO SUIT.
2. ALL OFFICE AND OPERATIONAL ACTIVITIES MUST BE LOCATED SUCH THAT ALL LIQUID EFFLUENT (E.G. WASH-DOWN WATER) IS TOTALLY CONTAINED AND TREATED WITHIN THE SITE.
3. ALL LIQUIDS AND CHEMICALS MUST BE STORED AND HANDLED ON-SITE IN ACCORDANCE WITH RELEVANT STANDARDS, INCLUDING AS1940 – THE STORAGE AND HANDLING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS.
4. SITE SPOILS MUST BE LAWFULLY DISPOSED OF IN A MANNER THAT DOES NOT RESULT IN ONGOING SOIL EROSION OR ENVIRONMENTAL HARM.
5. EXCAVATION WORKS MUST BE STAGED SO THAT THE DURATION OF EXPOSED OPEN TRENCHES IS LIMITED. TRENCHING MUST ONLY BE OPENED UP WHERE IT IS INTENDED TO BE BACKFILLED IN THE SAME WORKING DAY.
6. NO LIQUID EFFLUENT IS PERMITTED TO BE DISPOSED OF ON SITE.
7. ACCESS TRACKS ARE TO BE GRADED TO A CROWN OR WITH CROSSFALL DRAINAGE.
8. ACCESS TRACKS ARE TO INCORPORATE STABILISED EXIT POINTS.
9. ACCESS TRACKS ARE TO BE MONITORED FOR EXCESSIVE SEDIMENT TRACKING INTO ADJACENT PUBLIC ROADS. A REVIEW OF THE CONTROLS WILL BE UNDERTAKEN AND ADDITIONAL MEASURES MAY BE EMPLOYED WHERE SEDIMENT BUILD-UP OCCURS ON PUBLIC ROADS AT VEHICLE EXIT POINTS.

CLEARING AND GRUBBING

1. MINIMISE DISTURBANCE TO ONLY THOSE AREAS REQUIRED FOR CONSTRUCTION. ALL OTHER AREAS WILL BE FLAGGED AS “NO-GO ZONE”
2. ALL CLEARING MUST BE CONDUCTED IN ACCORDANCE WITH FEDERAL, TERRITORY AND LOCAL GOVERNMENT ENVIRONMENTAL POLICIES.
3. BEFORE CLEARING COMMENCES, AREAS OF VEGETATION NOMINATED FOR PROTECTION MUST BE CLEARLY IDENTIFIED AND MARKED ON SITE (BY FLAGGING OR FENCING) AND INSPECTED BY THE SUPERINTENDENT. CLEARING OF VEGETATION MUST BE RESTRICTED TO THE NOMINATED AREAS. CONTRACTOR MUST TAKE ALL REASONABLE AND PRACTICABLE MEASURES TO MITIGATE RISK OF UNNECESSARY LAND CLEARING AND PREVENT REMOVAL OR DISTURBANCE OF ALL VEGETATION AND GROUND COVERS (ORGANIC OR INORGANIC) INTENDED TO BE RETAINED.
4. WHERE CLEARING IS REQUIRED FOR THE PURPOSE OF INSTALLING EROSION AND SEDIMENT CONTROL MEASURES, EXTENTS OF CLEARING MUST BE KEPT TO A MINIMUM.
5. DISTURBANCE OF THE NATURAL ENVIRONMENT MUST BE LIMITED TO THE MINIMUM IN KEEPING WITH THE SITE CLEARING PLANS.
6. CONTRACTOR MUST TAKE ALL PRACTICABLE AND REASONABLE MEASURES DURING CLEARING OPERATIONS TO PREVENT THE FORMATION OF FLOW PATHS THAT CAN CONCENTRATE SURFACE RUNOFF AND CREATE POTENTIAL FOR EROSION.

TOPSOIL AND STOCKPILE MANAGEMENT

1. SITE OF STOCKPILES, INCLUDING EXTENT AND LIMIT OF CLEARING, TO BE AGREED WITH SUPERINTENDENT.
2. STRIPPED TOPSOIL MUST BE STOCKPILED FOR REUSE. TOPSOIL STOCKPILE HEIGHTS MUST BE 1.5m MAX. ALL OTHER STOCKPILE HEIGHTS MUST BE 3.0m MAX WITH 1 IN 4 BATTERS MAX.
3. TOPSOIL STOCKPILE MUST NOT BE COMPACTED OR WHEEL ROLLED.
4. AVOID PLACEMENT OF STOCKPILES (WHERE PRACTICABLE) WITHIN 50m OF ANY DRAINS, DRAINAGE LINE OR OTHER WATERWAYS. SUITABLE TYPE 2/3 EROSION AND SEDIMENTATION CONTROLS TO BE IMPLEMENTED WHERE NOT PRACTICABLE.
5. THE FOLLOWING CONTROLS MUST BE IMPLEMENTED FOR STOCKPILES OF ERODIBLE MATERIAL:

A.STOCKPILES MUST BE LOCATED AT LEAST 2m FROM ANY RETAINED VEGETATION AND CONCENTRATED DRAINAGE LINES.

B.EARTH DIVERSION BUNDS MUST BE INSTALLED IMMEDIATELY UP-SLOPE OF THE STOCKPILE, WHERE THE CONTRIBUTING CATCHMENT EXCEEDS 1500m2 AND MUST BE MANAGED TO AVOID CONCENTRATING FLOW CAUSING EROSION.

C.SEDIMENT CONTROL MEASURES MUST BE INSTALLED DOWNSTREAM OF THE STOCKPILE (E.G. MULCH BERMS OR SEDIMENT FENCES).

D.TRENCH SPOIL AND BACKFILL MATERIAL MUST GENERALLY BE STOCKPILED A MINIMUM OF 1.0m FROM OPEN TRENCHES.
6. STOCKPILE OF MATERIALS VULNERABLE TO SEDIMENTATION TO BE COVERED IF REQUIRED.
7. LONG-TERM STOCKPILES (10 DAYS OR MORE) MUST BE ADEQUATELY STABILISED (E.G. COVER, VEGETATION, SOIL BINDER, OR OTHER) AS DEEMED APPROPRIATE BY THE SUPERINTENDENT.
8. ALL DISTURBED AREAS OF STOCKPILES MUST BE SUITABLY STABILISED.

SURFACE WATER AND DRAINAGE CONTROL

1. ALL DRAINAGE CONTROL MEASURES MUST BE APPLIED AND MAINTAINED IN ACCORDANCE WITH APPROVED ESCP DRAWINGS.
2. DURING THE CONSTRUCTION PHASE, ALL REASONABLE AND PRACTICABLE MEASURES MUST BE IMPLEMENTED TO:

A.DIVERT CLEAN SURFACE WATERS AWAY FROM THE SITE IN A MANNER THAT MINIMISES EROSION OR CONTAMINATION OF WATER.

B.CONTROL FLOW VELOCITIES AND PREVENT SOIL EROSION ALONG DRAINAGE PATHS, INCLUDING ENTRY/EXIT POINTS; AND ENSURE ALL WATERS ARE DISCHARGED ONTO STABLE LAND, IN A NON-EROSIVE MANNER, AND AT A LEGAL POINT OF DISCHARGE.

C.MANAGEMENT OF DRAINAGE IS TO AVOID CONCENTRATION OF FLOW.

D.OPEN PROFILE TRAPEZOIDAL DRAINS INSTEAD OF “V” DRAINS ARE TO BE USED.
3. CONTROL WATER MOVEMENT THROUGH THE WORKS AREA; FLOW DIVERSION BANKS AND CATCH DRAINS ARE TO BE INSTALLED AS PER DRAWINGS.

EROSION CONTROL AND SURFACE STABILISATION

1. ALL EROSION CONTROL MEASURES MUST BE APPLIED AND MAINTAINED IN ACCORDANCE WITH APPROVED ESCP DRAWINGS.
2. SYNTHETIC EROSION CONTROL TREATMENTS MUST NOT BE USED IF SUCH MATERIALS ARE LIKELY TO CAUSE ENVIRONMENTAL HARM.

DUST CONTROL

1. ALL DUST CONTROL MEASURES MUST BE APPLIED AND MAINTAINED IN ACCORDANCE WITH APPROVED ESCP DRAWINGS.
2. CONTRACTOR MUST BE RESPONSIBLE FOR THE EFFECTIVE CONTROL OF ALL DUST AND WINDBORNE MATERIAL EMANATING FROM THE SITE THROUGHOUT THE PERIOD OF THE CONTRACT.
3. CONTRACTOR MUST IMPLEMENT ALL MEASURES NECESSARY TO MINIMISE WIND EROSION AND PREVENT MATERIAL FROM THE SITE BEING BLOWN OVER OR ONTO PROPERTY OUTSIDE OF THE SITE. MEASURES MUST INCLUDE BUT NOT BE LIMITED TO:

A.MINIMISING TRAFFIC MOVEMENTS ON DISTURBED SURFACES AND LIMITING VEHICLE SPEEDS TO 25KPH;

B.MAINTAINING EXPOSED SURFACES IN A MOIST CONDITION THROUGH FREQUENT WATERING;

C.PROGRAMMING WORKS TO MINIMISE THE LIFE OF SOIL STOCKPILES, OR TEMPORARILY STABILISING LONG TERM STOCKPILES.
4. DURING DRY PERIODS, UTILISE WATER TRUCK TO WATER DOWN WORKS SURFACES TO MINIMISE DUST GENERATION. DUST SUPPRESSION IS TO BE IMPLEMENTED BY SITE SUPERVISOR AS REQUIRED BY VISUAL INSPECTION.

DEWATERING

1. CONTRACTOR MUST MITIGATE SEDIMENT RELATED ENVIRONMENTAL HARM AND/OR IMPACT TO STORMWATER INFRASTRUCTURE RESULTING FROM DEWATERING ACTIVITIES.
2. FLOW DIVERSION BARRIERS, OR OTHER APPROPRIATE SYSTEMS, MUST BE USED TO MINIMISE THE QUANTITY OF WATER ENTERING EXCAVATIONS.
3. DEWATERING CONTROL MAY INCLUDE GEOFABRIC FILTERS AND NON-WOVEN FILTERING FENCING.
4. SEDIMENT LADEN WATER MUST NOT BE DISCHARGED OFF-SITE WITHOUT FIRST BEING TREATED SATISFACTORILY TO REQUIREMENTS OF THE SUPERINTENDENT. DISCHARGED WATER MUST MEET THE FOLLOWING REQUIREMENTS: MAX 75 NTU, pH 6.5 TO 8.0.

REVEGETATION AND REHABILITATION

1. ALL DISTURBED AREAS AND EARTHWORKS MUST BE PROGRESSIVELY REHABILITATED WITH GRASS, OR OTHER COVER.

SEDIMENT CONTROL

1. ALL SEDIMENT CONTROL MEASURES MUST BE APPLIED AND MAINTAINED IN ACCORDANCE WITH APPROVED ESCP DRAWINGS.
2. ALL REASONABLE AND PRACTICABLE MEASURES MUST BE TAKEN TO PREVENT, OR AT LEAST MINIMISE, THE RELEASE OF SEDIMENT FROM THE SITE. SEDIMENT CONTROL DEVICES MUST BE INSTALLED TO TRAP SEDIMENT AS CLOSE TO THE SOURCE AS PRACTICABLE.
3. SEDIMENT CONTROL DEVICES MUST NOT PRESENT A SAFETY HAZARD FOR SITE WORKERS AND/OR THE PUBLIC.
4. SEDIMENT FENCES AND/OR MULCH FILTER BERMS ARE TO BE INSTALLED ALONG THE DOWN SLOPE SIDE OF THE EARTHWORK ACTIVITIES AS PER IECA STANDARD DRAWINGS SF-01, SF-02 AND MB-01. ENSURE RETURNS ARE PROVIDED WHERE APPLICABLE.
5. SEDIMENT CONTROLS ARE TO REMAIN IN PLACE UNTIL THE ACTIVITIES ARE FINISHED AND AREAS ARE STABILISED.
6. TRACKING OF SEDIMENTS ONTO ROADS EXTERNAL OF THE SITE IS NOT PERMITTED. ENTRY/EXIT TO SITE MUST BE RESTRICTED TO DEFINED POINTS, WITH SUPPLEMENTARY ENTRY/EXIT SEDIMENT CONTROLS INSTALLED.
7. SEDIMENT CONTROL DEVICES MUST BE DE-SILTED WHEN CAPACITY IS REDUCED BELOW 80%.
8. SEDIMENT CONTROLS MUST BE INSPECTED WEEKLY DURING CONSTRUCTION AND IMMEDIATELY AFTER EACH RAINFALL EVENT.

MONITORING

1. EROSION AND SEDIMENT CONTROLS ARE DESIGNED IN ACCORDANCE WITH IECA BEST PRACTICE GUIDELINES, USING AN EROSION RISK ASSESSMENT TO CONFIRM THE TYPE OF CONTROLS REQUIRED AROUND EACH SUB-CATCHMENT OF THE SITE.
2. WHERE TYPE 2/3 CONTROLS ARE APPLIED IN THE FORM OF MULCH BERMS, EROSION RISKS IN THESE SUB-CATCHMENTS ARE CONSIDERED TOLERABLE AND RELEASE OF SOME TURBID WATER OFFSITE THROUGH THESE BERMS IS TO BE EXPECTED.
3. WHERE EROSION AND SEDIMENT CONTROLS FAIL, RESULTING IN DISCHARGE OF SEDIMENT OFFSITE, THE CONTRACTOR MUST NOTIFY THE RELEVANT REGULATORY AUTHORITIES TO THE EXTENT REQUIRED UNDER RELEVANT ENVIRONMENTAL LEGISLATION.

MAINTENANCE

1. ALL EROSION AND SEDIMENT CONTROL MEASURES, INCLUDING DRAINAGE CONTROL MEASURES, MUST BE MAINTAINED IN PROPER WORKING ORDER AT ALL TIMES DURING THEIR OPERATIONAL LIVES.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSPECTED:

A.AT LEAST DAILY (WHEN WORK IS OCCURRING ON-SITE);

B.AT LEAST WEEKLY (WHEN WORK IS NOT OCCURRING ON-SITE);

C.WITHIN 24 HOURS PRIOR TO EXPECTED RAINFALL; AND

D.WITHIN 18 HOURS FOLLOWING A RAINFALL EVENT OF SUFFICIENT INTENSITY AND DURATION TO CAUSE RUNOFF ON-SITE.
3. CONTRACTOR MUST REPAIR ANY DAMAGED EROSION AND SEDIMENT CONTROL MEASURES, AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
4. CONTRACTOR MUST ENSURE SEDIMENT CONTROL DEVICES ARE DE-SILTED AND MADE FULLY OPERATIONAL AS SOON AS PRACTICABLE AFTER SEDIMENT-PRODUCING EVENTS, TO ENSURE THE SEDIMENT RETENTION CAPACITY IS MAINTAINED ABOVE 80% OF ITS DESIGN RETENTION CAPACITY.
5. ALL MATERIALS, WHETHER LIQUID OR SOLID, REMOVED FROM SEDIMENT CONTROL DEVICES AND PLACES OF SEDIMENT DEPOSITION, MUST BE DISPOSED OF IN AN APPROVED MANNER THAT DOES NOT CAUSE FURTHER SOIL EROSION OR ENVIRONMENTAL HARM. MATERIALS MUST BE DISPOSED OF IN A LOCATION THAT PREVENTS MATERIALS RE-ENTERING THE SYSTEM.
6. ALL SEDIMENT DEPOSITED OFFSITE AS A DIRECT RESULT OF CONSTRUCTION ACTIVITIES MUST BE REMOVED AND THE AREA APPROPRIATELY CLEANED / REHABILITATED AS SOON AS PRACTICABLE.
7. EROSION AND SEDIMENT CONTROL MEASURES MUST BE MAINTAINED UNTIL AFTER THE STOCKPILE IS REMOVED FROM THE SITE.
8. ALL TEMPORARY CONTROL MEASURES MUST BE REMOVED AFTER ACHIEVING A SATISFACTORY “OFF-MAINTENANCE INSPECTION” BY SUPERINTENDENT’S REPRESENTATIVE.

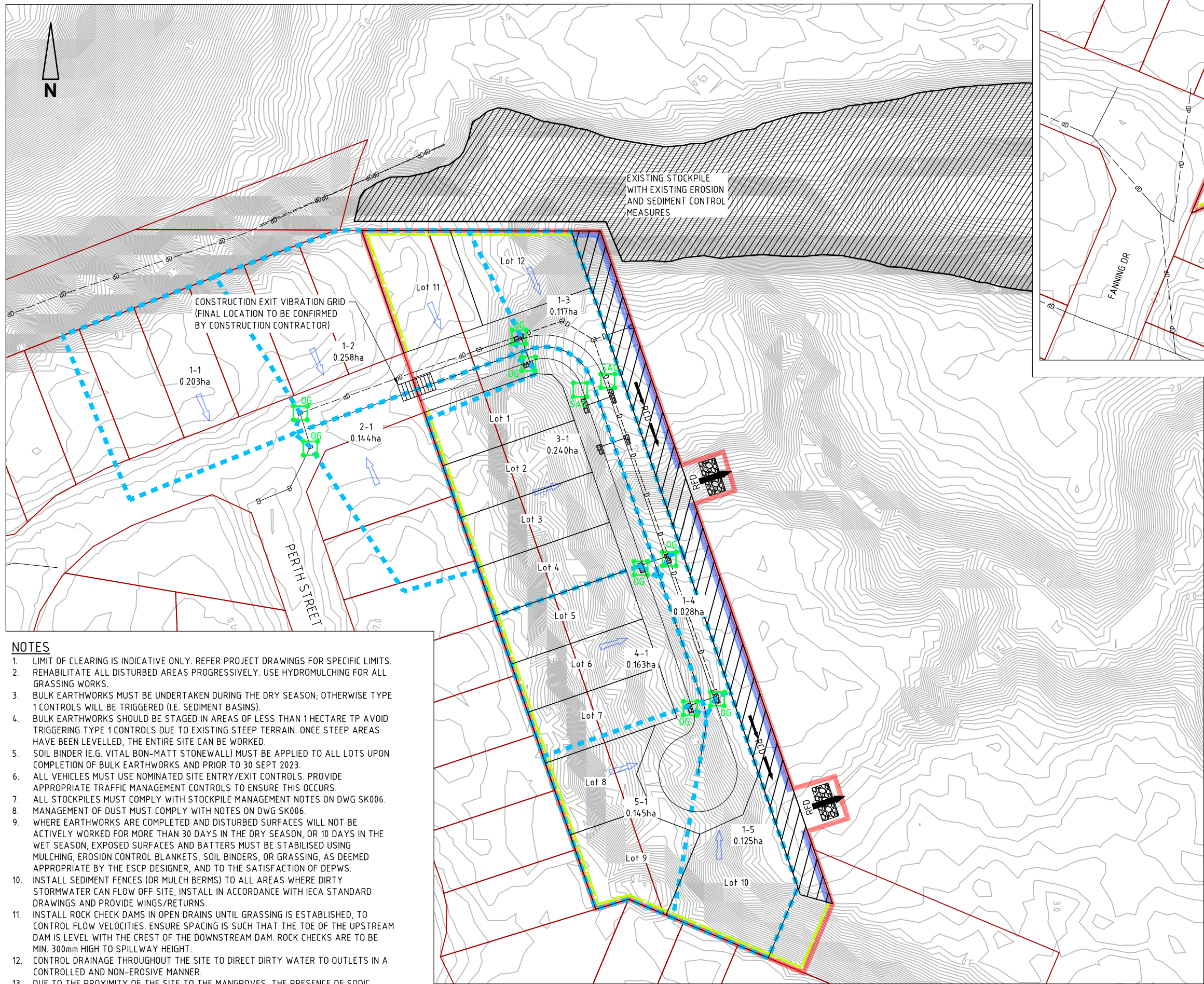
WARNING
BEWARE OF UNDERGROUND SERVICES

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No guarantee is given that all existing services are shown



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DRAWN	BB	TITLE BAYVIEW SUBDIVISION LOT C EROSION & SEDIMENT CONTROL			
		SCALE AS SHOWN	PROJECT No 22007	DRAWING No SK006	AMDT B



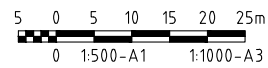
LOT B LAYOUT

- NOTES**
1. LIMIT OF CLEARING IS INDICATIVE ONLY. REFER PROJECT DRAWINGS FOR SPECIFIC LIMITS.
 2. REHABILITATE ALL DISTURBED AREAS PROGRESSIVELY. USE HYDROMULCHING FOR ALL GRASSING WORKS.
 3. BULK EARTHWORKS MUST BE UNDERTAKEN DURING THE DRY SEASON; OTHERWISE TYPE 1 CONTROLS WILL BE TRIGGERED (I.E. SEDIMENT BASINS).
 4. BULK EARTHWORKS SHOULD BE STAGED IN AREAS OF LESS THAN 1 HECTARE TP AVOID TRIGGERING TYPE 1 CONTROLS DUE TO EXISTING STEEP TERRAIN. ONCE STEEP AREAS HAVE BEEN LEVELLED, THE ENTIRE SITE CAN BE WORKED.
 5. SOIL BINDER (E.G. VITAL BON-MATT STONEWALL) MUST BE APPLIED TO ALL LOTS UPON COMPLETION OF BULK EARTHWORKS AND PRIOR TO 30 SEPT 2023.
 6. ALL VEHICLES MUST USE NOMINATED SITE ENTRY/EXIT CONTROLS. PROVIDE APPROPRIATE TRAFFIC MANAGEMENT CONTROLS TO ENSURE THIS OCCURS.
 7. ALL STOCKPILES MUST COMPLY WITH STOCKPILE MANAGEMENT NOTES ON DWG SK006.
 8. MANAGEMENT OF DUST MUST COMPLY WITH NOTES ON DWG SK006.
 9. WHERE EARTHWORKS ARE COMPLETED AND DISTURBED SURFACES WILL NOT BE ACTIVELY WORKED FOR MORE THAN 30 DAYS IN THE DRY SEASON, OR 10 DAYS IN THE WET SEASON, EXPOSED SURFACES AND BATTERS MUST BE STABILISED USING MULCHING, EROSION CONTROL BLANKETS, SOIL BINDERS, OR GRASSING, AS DEEMED APPROPRIATE BY THE ESCP DESIGNER, AND TO THE SATISFACTION OF DEPWS.
 10. INSTALL SEDIMENT FENCES (OR MULCH BERMS) TO ALL AREAS WHERE DIRTY STORMWATER CAN FLOW OFF SITE, INSTALL IN ACCORDANCE WITH IECA STANDARD DRAWINGS AND PROVIDE WINGS/RETURNS.
 11. INSTALL ROCK CHECK DAMS IN OPEN DRAINS UNTIL GRASSING IS ESTABLISHED, TO CONTROL FLOW VELOCITIES. ENSURE SPACING IS SUCH THAT THE TOE OF THE UPSTREAM DAM IS LEVEL WITH THE CREST OF THE DOWNSTREAM DAM. ROCK CHECKS ARE TO BE MIN. 300mm HIGH TO SPILLWAY HEIGHT.
 12. CONTROL DRAINAGE THROUGHOUT THE SITE TO DIRECT DIRTY WATER TO OUTLETS IN A CONTROLLED AND NON-EROSIVE MANNER.
 13. DUE TO THE PROXIMITY OF THE SITE TO THE MANGROVES, THE PRESENCE OF SODIC SOILS IS LIKELY. THESE SOILS MAY NEED TO BE AMELIORATED WITH GYPSUM TO MITIGATE EROSION RISKS. IF SODIC SOILS ARE ENCOUNTERED, CONTACT THE ESCP DESIGNER FOR ADVICE.

LOT A LAYOUT

LEGEND

- EXISTING**
- 415 NATURAL SURFACE CONTOURS
- PROPOSED**
- RFD ROCK FILTER DAM
 - STORMWATER FLOW DIRECTION
 - RCD ROCK CHECK DAM 300mm HIGH. REFER IECA STD DRG RCD-01.
 - OG SEDIMENT TRAP. REFER IECA STD DRG. ESC-03.
 - STORMWATER DIVERSION BUND. 1m HIGH. REFER SK008 FOR BUND DETAILS.
 - LIMIT OF CLEARING
 - SEDIMENT FENCE. REFER IECA STD DRG SF-01.




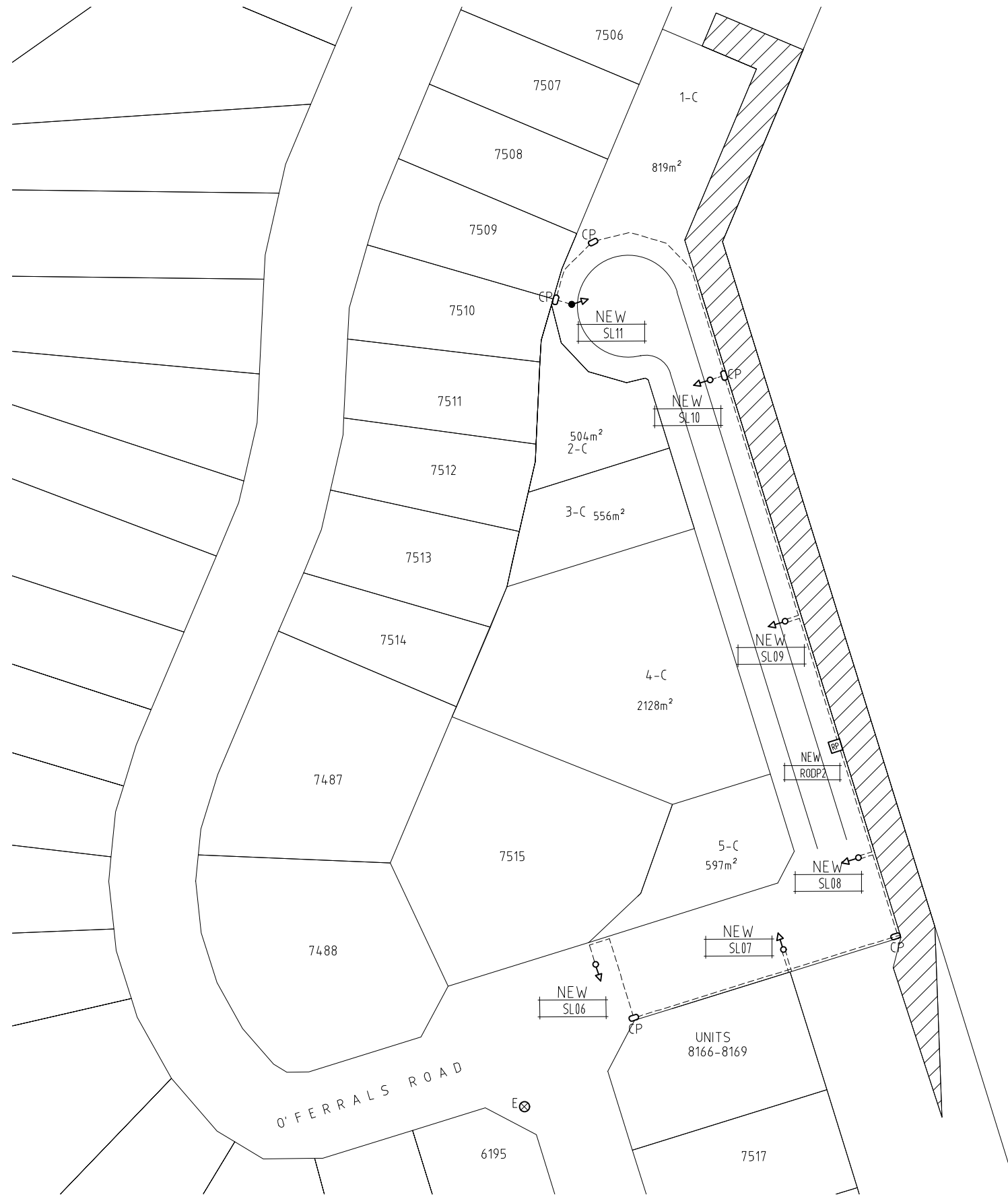
		ABN 78 124 388 192 P.O.Box 43420 Casuarina NT 0811 Ph. 08 89472476 Fax: 08 89475098		TITLE BAYVIEW SUBDIVISION LOT A & B EROSION & SEDIMENT CONTROL	
		DRAWN BB	DESIGNED ET	SCALE AS SHOWN	PROJECT No 22007




RP	NEW ROAD OWNER DIST. PILLAR.
---	NEW STREET LIGHT CABLE - 0.6/1kV 2x1C 25 Sq mm Cu, XLPE/NJ/PVC & 1x1C 35 Sq mm Cu, PVC EARTH IN 80mm HD uPVC CONDUIT.
E ⊗	EXISTING POST MOUNTED STREET LIGHT.
● →	NEW STREET LIGHT - 30W LED 'GE' EVOLVE LUMINAIRE (3000K LIGHT COLOUR TEMPERATURE) MOUNTED ON 6.5m POLE WITH 1.5m CURVED OUTREACH. SET BACK 1.1m FROM KERB.
○ →	NEW STREET LIGHT - 18W LED 'GE' EVOLVE LUMINAIRE (3000K LIGHT COLOUR TEMPERATURE) MOUNTED ON 6.5m POLE WITH 1.5m CURVED OUTREACH. SET BACK 1.1m FROM KERB.
○ CP	NEW CABLE PIT (TYPE IN ACCORDANCE WITH PWC STD DWG S03-01-06-01).

PART SITE PLAN - AREA A (1:500 AT A1)


B A	RE-ISSUED FOR REVIEW ISSUED FOR REVIEW	24-8-23 15-8-22	AG AG	AGA AGA
	DESCRIPTION	DATE	INIT.	COMPANY.
AMENDMENTS				
<div> <div>  <div> AGA CONSULTING ENGINEERS PTY LTD ELECTRICAL & MECHANICAL ACN 070 242 296 </div> </div> <div> GPO BOX 3897 DARWIN NT 0801 </div> <div> TELEPHONE : 08 89416582 FACSIMILE : 08 89421400 EMAIL : aiekig@agoeng.com.au </div> </div>				
<div> <div> DRAWN KT DATE AUG 22 DESIGNED AG DATE AUG 22 </div> <div> CITY OF DARWIN </div> <div> BAYVIEW CONCEPT STREET LIGHTING STREET LIGHTING RETICULATION CONCEPT (SHEET 1 OF 2) & LEGEND </div> </div>				
<div> <div> - </div> <div> - </div> <div> SHEET No. SL01 OF 2 </div> <div> DRAWING No. SKSL01 </div> <div> AMENDMENT B </div> <div> SHEET SIZE A </div> </div>				

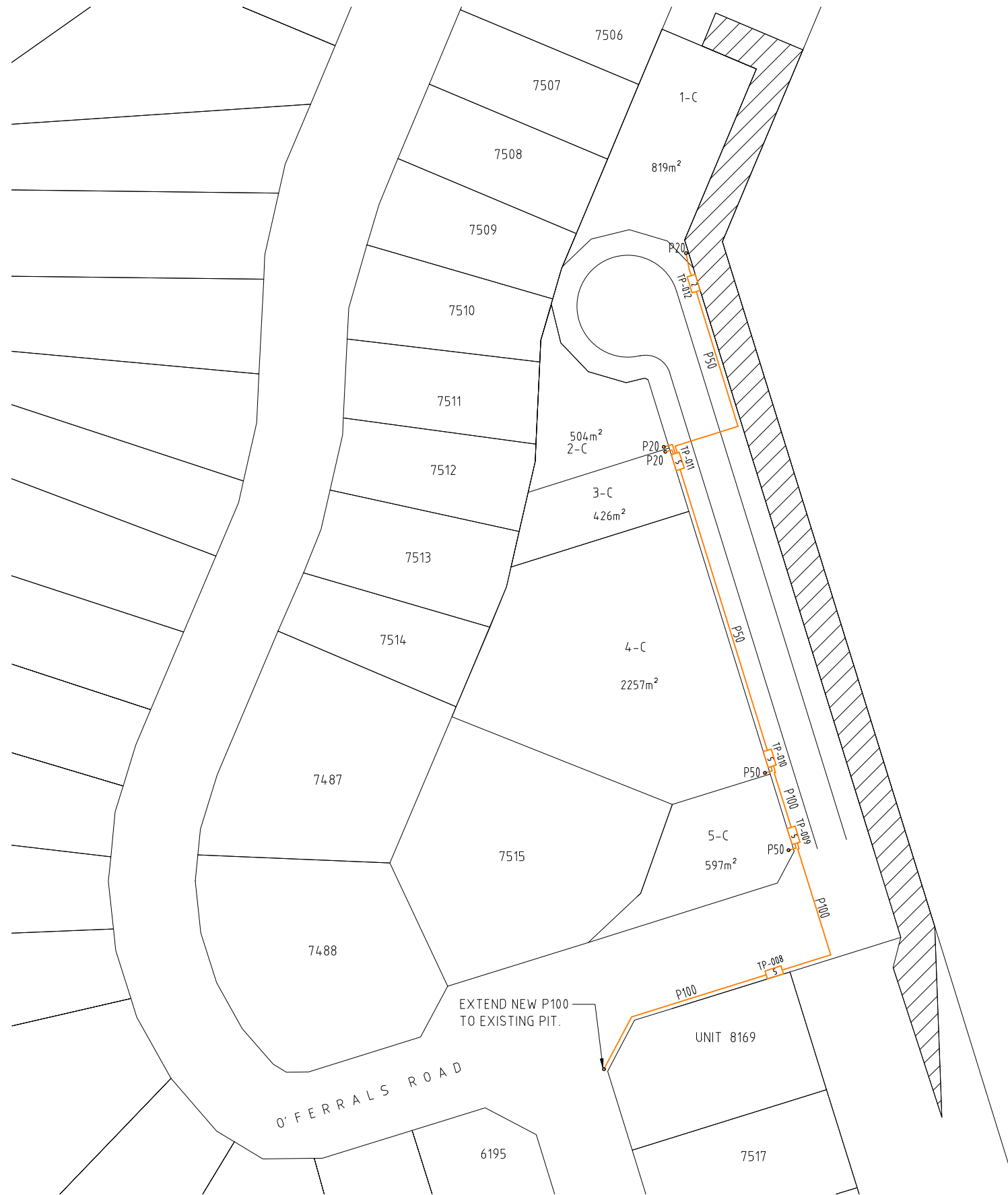


PART SITE PLAN - AREA B (1:500 AT A1)


B A	RE-ISSUED FOR REVIEW ISSUED FOR REVIEW	24-8-23 15-8-22	AG AG	AGA AGA	<div><div></div><div>AGA CONSULTING ENGINEERS PTY LTD ELECTRICAL & MECHANICAL <small>ACN 070 242 296</small></div></div> <div><div>GPO BOX 3097 DARWIN NT 0801</div><div>TELEPHONE: 08 8946582 FACSIMILE: 08 89421400 EMAIL: alekg@agaeng.com.au</div></div> <div>AGA69-28</div>	DRAWN KT	CITY OF DARWIN	BAYVIEW CONCEPT STREET LIGHTING STREET LIGHTING RETICULATION CONCEPT (SHEET 2 OF 2)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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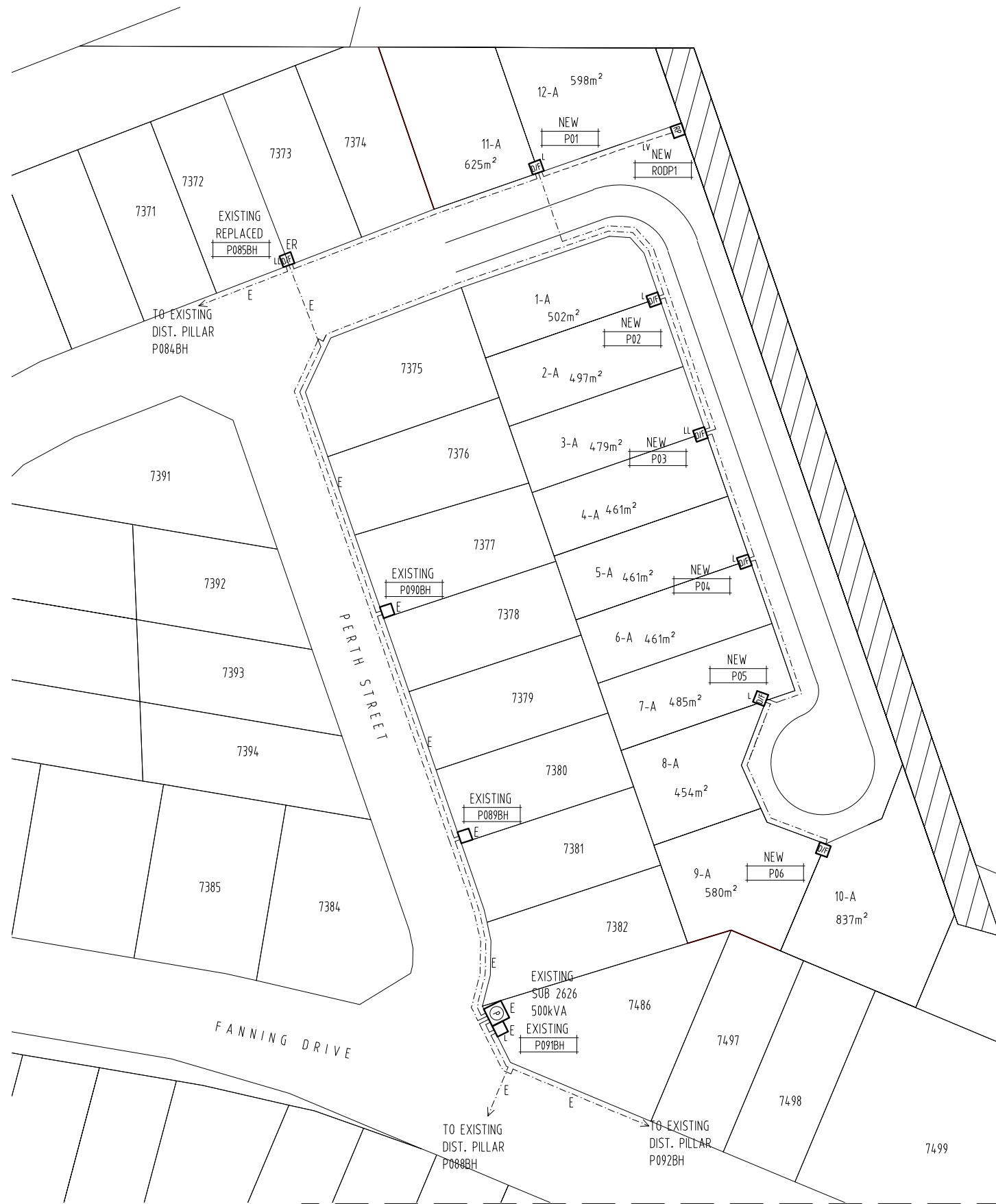












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													DRAWING No. SKNBN01						
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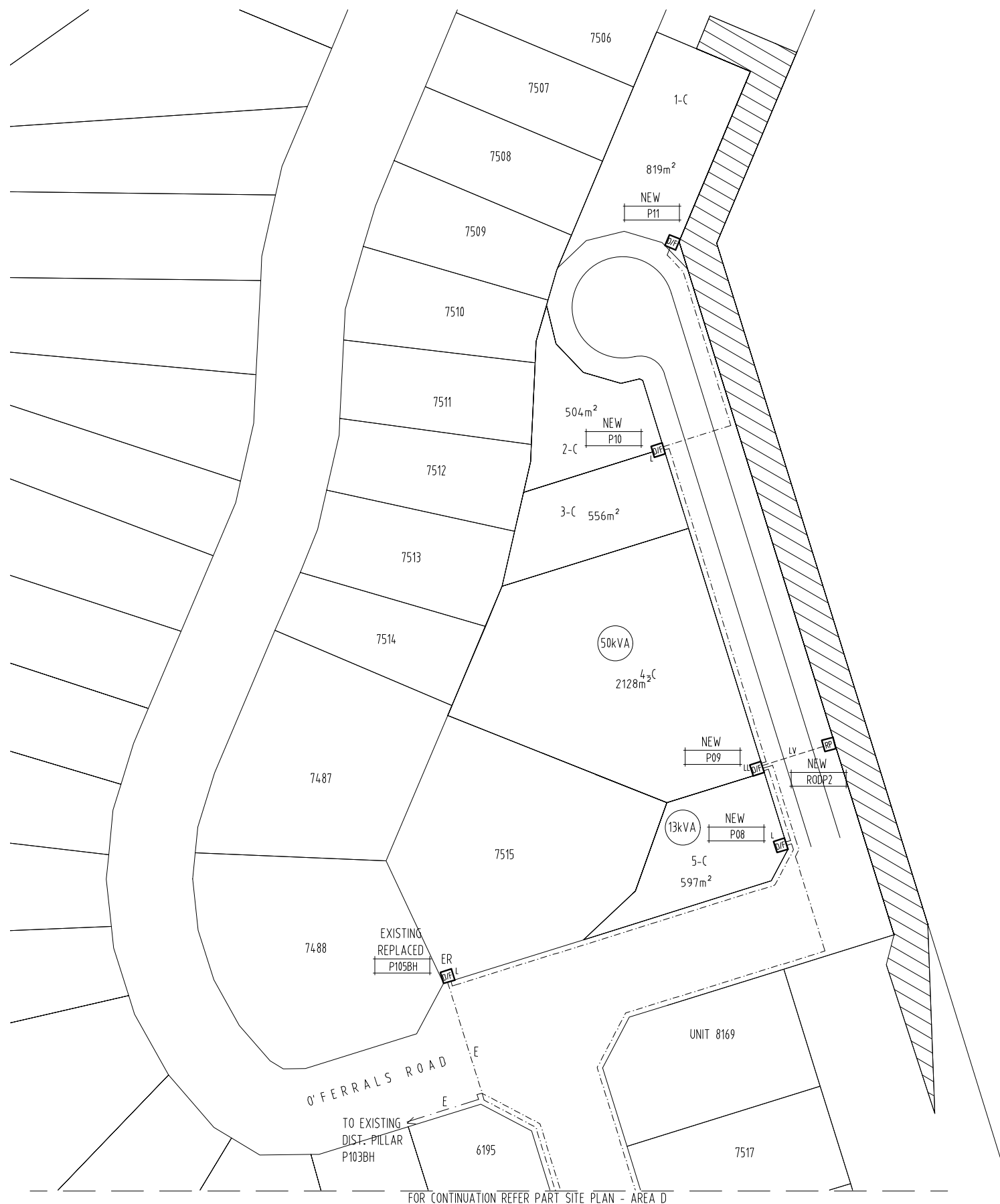
PART SITE PLAN - AREA C (1:500 AT A1)

						<div><div></div><div>AGA CONSULTING ENGINEERS PTY LTD ELECTRICAL & MECHANICAL ACN 070 242 296</div></div>		<div><div>DRAWN KT</div><div>DATE AUG 22</div><div>DESIGNED AG</div><div>DATE AUG 22</div><div></div><div>DATE</div></div>		NBN Co		BAYVIEW CONCEPT NBN CONCEPT (SHEET 2 OF 2)					
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AMENDMENTS																	
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	EXISTING PACKAGE SUBSTATION.
	EXISTING URD DIST. PILLAR.
	EXISTING URD DIST. PILLAR REPLACED. WITH NEW FUSED TYPE - DOUBLE LINK.
	NEW FUSED TYPE DIST. PILLAR - DOUBLE LINK TYPE.
	NEW FUSED TYPE DIST. PILLAR - LINK TYPE.
	NEW FUSED TYPE DIST. PILLAR.
	NEW ROAD OWNER DIST. PILLAR.
	EXISTING LV DIST. CABLING.
	NEW LV DIST. CABLING - 0.6/1kV 4x1C 240 Sq mm Al, XLPE/NJ/PVC & 1x1C 70 Sq mm Cu, BARE EARTH.
	NEW LV SERVICE CABLE - 0.6/1kV 2x1C 25 Sq mm Cu, XLPE/NJ/PVC IN 50mm HD uPVC CONDUIT.

DEVELOPER:	<div>AGA CONSULTING ENGINEERS PTY LTD ELECTRICAL & MECHANICAL ACN 070 242 296</div> <div>GPO BOX 3097 DARWIN NT 0801</div> <div>TELEPHONE: 08 8946582 FACSIMILE : 08 89421400 EMAIL: diekg@gaeng.com.au</div>								DRAWING STATUS	APPD	DATE	<div> PowerWater NORTHERN TERRITORY</div>	DES A.GANGUR		POWER SERVICES – DARWIN DISTRIBUTION BAYVIEW LV ELECTRICAL RETICULATION CONCEPT (SHEET 1 OF 2)		
		P	PRELIMINARY/PROPOSED			DRN K.TAVENER											
		T	TENDERING PURPOSES ONLY			CKD A.GANGUR											
		AC	APP. FOR CONSTRUCTION			APPD											
		AI	AS INSTALLED			SCALE 1:500 AT A1	ISSUED 24–8–23	A1	DRAWING NUMBER SKE01	<div></div>							
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		B A	RE-ISSUED FOR REVIEW ISSUED FOR REVIEW	K.T. K.T.	24-8-23 15-8-22	A.G. A.G.	SKE03 SKE02	SINGLE LINE DIAGRAM CONCEPT LV ELECTRICAL RETICULATION CONCEPT (SHEET 2 OF 2)									
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AMENDMENTS							ASSOCIATED DRAWINGS				AGA469–2A						



FOR CONTINUATION REFER PART SITE PLAN - AREA C

7515

O'FERRALS ROAD

UNIT 8169

TO EXISTING DIST. PILLAR P103BH

6194

6195

EXISTING P104BH

EXISTING SUB 2652 500kVA

6196

7517

7518

TO EXISTING DIST. PILLAR P107BH

[illegible]

**Dover Investments Pty Ltd
GPO Box 5222
BRISBANE QLD 4000**

**Project 77861.01
23 May 2012
DSF:pc**

Attention: Mr Barry Young

Email: barry_young@austcorp.com.au

Dear Sir

**Geotechnical Assessment of Proposed Site Filling and Seawalls
Stage 11 – Lots A & C
Bayview, NT**

1. Introduction

This letter report by Douglas Partners Pty Ltd (DP) provides a geotechnical assessment of proposed site filling and seawalls for Stage 11, Lots A and C at Bayview, Darwin, NT. It is understood that the assessment is required to provide additional information in respect to cross sections to ensure the land is suitably filled to a height to enable development of the lots for their intended purposes, thereby avoiding risk and damage as a result of any storm surge event. The letter report was requested by Mr Barry Young on behalf of Dover Investments Pty Ltd.

2. Site Descriptions

The location of the proposed Stage 11 Lots A and C relative to the currently developed areas of Bayview are shown on the attached Site Locality Plan, Drawing 1 and the individual Lots A and C together with adjacent lots are shown on Drawings 2 and 3 attached. Site photographs showing current surface conditions are attached.

Lot A comprises grassed and vegetated vacant land which is partially filled over intertidal mud flats. The lot is bounded by a filled area to the north, by residential allotments located on a filling platform to the south and west, and by a narrow corridor of cleared mangroves, then mangrove forest to the east. Lot A site surface currently slopes down to the east from about RL5.5 mAHD on the crest of the filling platform to about RL2 to 2.6 m along the eastern lease boundary.

Lot C comprises unvegetated vacant land located in a re-entrant corner of the Bayview rock armoured seawall, as well as low-lying intertidal mud flats. The lot is bounded by residential allotments located on a filling platform to the north, west and south and by a narrow corridor of cleared mangroves, then mangrove forest to the east. Lot C surface is currently level at about RL5.5 m along the western

boundary and slopes down across the rock wall to about RL1.8 to 2.4 m over intertidal mudflats along the eastern lease boundary.

3. Geology

Reference to the Darwin 1:100 000 Geological Map Series sheet indicates the site is underlain by recent marine sediments (mangrove mud) then Quaternary age sediments comprising ferruginous gravelly clayey sand and pisolitic mottled laterite, ferricrete (locally referred to as coffee rock) overlying bedrock comprising low to medium strength metasiltstone (phyllite) of the Burrell Creek Formation.

4. Previous Investigations and Reports

Previous field investigations and engineering analysis have been carried out in the areas of Lots A and C. The results of these investigations were presented in DP reports and letter reports listed as references Ref 1 to Ref 11 in Section 8 of this report. Previous work included mud depth probes, laboratory testing, engineering analysis, development of a construction strategy for filling over soft marine clays, and the results of settlement monitoring.

References 1 to 6 contain the field data and results of engineering analyses carried out to plan the earthworks in an area designated as Stage 10 of the Bayview subdivision. References 7, 8 and 9 contain the results of settlement monitoring for the Stage 10 area and Ref 10 is an earthworks certification report for the Stage 10b area. Reference 11 is the most recent report prepared for Dover Investments Pty Ltd in December 2011 for the rezoning application for Lots A and C.

5. Proposed Construction

It is understood that the proposed construction to develop each of the two lots will be as follows:

Lot A: Clear and reshape the sloping ground, then construct a building platform at a final level at about RL5.5m AHD by filling over the prepared site surface. Surcharge the lot for a period of up to 5 months with about 2 m of filling to reduce post construction settlements, then remove the surcharge and construct a seawall to RL6.5 m AHD.

Lot C: Remove and stockpile the rock armour from the current seawall, reshape the sloping fill batter, then construct a building platform at a final level at about RL RL5.5 m AHD by filling over the prepared site surface. Surcharge the lot for a period of up to 8 months with about 2 m of filling to reduce post construction settlements, then remove the surcharge and construct a seawall to RL6.5 m AHD.

6. Comments

6.1 Surface and Subsurface Conditions

The present surface conditions on Lots A and C are shown in the attached site photographs, Plates 1 and 2, taken in early May 2012. There are no mature mangroves within the lease boundary at either of the sites, and all vegetation on the earth and rockfill slopes is regrowth since the slopes were constructed.

The locations of mud depth probes from Ref 3 are shown on Drawing 4, and the depths of soft mud penetrated at each probe location are listed in Table 1. Based on these results, average mud depth along the lease boundary at Lot A is about 2 m and the average mud depth along the lease boundary at Lot C is about 2.5 m. The soft mud is underlain by a layer of stiff marine clay which averages about 1 m thick at Lot A and about 0.7 m thick at Lot C.

6.2 Geotechnical Issues for Design and Construction

Based on the previous earthworks carried out for construction of similar filling platforms suitable for residential construction in Stages 3 to 10 of the Bayview subdivision, there are four main geotechnical issues to be addressed. These include the following:

- a. stability of the filling and surcharge during placement over soft marine sediments;
- b. differential settlement between previously placed filling and new filling which may lead to the formation of tension cracks at the interface between the “old” and “new” filling;
- c. settlement of the filling platform; and
- d. stability of the seawall after surcharge is removed and rock armour is placed.

Each of these four issues will be specifically addressed by incorporating the following geotechnical design features and construction strategies into the site filling procedures, and by monitoring the settlement of fill platforms by precise survey.

Issue a: The current site surfaces will be cleared and benched before an engineered filling platform comprising a woven geotextile layer, a rockfill working platform, engineered filling and surcharge is placed over the mud surface. The earthworks profile proposed for site filling and surcharge is shown on attached Drawing 5. A similar profile has been successfully used for construction of previous stages of Bayview including the adjacent Stage 10 earthworks.

Issue b: The new filling will be carefully placed in a controlled manner, and will be keyed into the current filling, to minimise the risk of longitudinal cracking and to ensure stability of the filling platform at all stages. Any tension cracks that form at the interface between “old” and “new” filling will be reinstated before surcharge is removed. Tension cracks that have formed due to differential settlement at Bayview and the nearby Tiger Brennan Drive embankments have been successfully reinstated with minimal detrimental effect to the filling platform using this approach.

Issue c: Surcharge will be placed over the engineered filling to heights predetermined by engineering calculations. Examples of surcharge profiles and estimated surcharge times for areas including part of Lot A and all of Lot C are shown on attached Drawings 6 and 7. Settlement of the filling platform under surcharge loads will be monitored by periodic survey and the surcharge will not be removed until approximately 90% of primary consolidation under filling load has been achieved. Settlement monitoring of previous stages of Bayview for periods of up to 5 years after removal of surcharge indicates that post construction settlements of monuments located on filled areas have generally been limited to 20 mm or less.

Issue d: The seawall section proposed for Lots A and C is shown on attached Drawing 8. This section differs from previous seawall sections at Bayview because shallower average mud depths along the lease boundary on this eastern side allow for a steeper, stable armour rock wall to be constructed on a rockfill base. The seawall construction comprises removing and displacing soft mangrove mud and replacing this soft soil with a rockfill base. The top of the rockfill base will be at or slightly below natural surface level and the rockfill base will be founded on the underlying stiff marine clay. This rockfill base will be placed before the working platform and site filling so that trenching required to remove mud does not cause any instability in the filling.

After the surcharge is removed to the design site level of about RL5.5 m AHD, the compacted outer fill batter will be trimmed to a slope of 5H:4V and a 1 m high precast concrete retaining wall will be constructed at the crest of the batter as shown on Drawing 8. A non-woven geotextile will be laid on the batter and secured under the wall, then armour rock (which was previously removed and stockpiled before filling Lots A and C) will be placed on the batter and over the base of the retaining wall.

7. Suitability for Residential Construction

The attached Drawing 4 shows the locations of the proposed Stage 11 - Lots A and C which confirms that the information on mud depths and surcharge calculations contained in previous DP geotechnical reports will adequately cover the proposed Stage 11 lot areas. In addition, the information on Drawings 6 and 7 indicate that previous calculations of surcharge heights and surcharge times could be revised to adequately address the proposed construction schedule of the Stage 11 lots.

The proposed composite wall profile with a rockfill base will be stable, will enable development of the lots for their intended purposes, and with a crest level of RL6.5 m AHD will mitigate risk and damage as a result of any storm surge event.

If the proposed seawall section shown on Drawing 5 is adopted for construction, some additional geo-environmental sampling, testing and reporting will be required to assess the potential for acid sulphate soils (PASS) and to address the issues of handling and disposal of PASS. The management of ASS has been addressed for previous stages of Bayview and the management plans would apply to this additional construction.

Providing construction is carried out in accordance with a strategy developed during the detailed design phase of the project, it is considered that the construction strategy and monitoring proposed above will produce filling platforms for Lots A and C that are suitable for residential construction of single (SU) or multiple (MU) residential buildings up to two storeys high. The geotechnical risk of damage as a result of a storm surge event is considered to be minimal.

8. References

- Ref 1 "Report on Geotechnical Assessment, Filling Surcharging and Mud Disposal, Proposed eastern Extension, Bayview Canal Estate, Darwin" prepared for Bayview Joint Venture, DP Project 23057, February 1999.
- Ref 2 Letter report "Review of Previous Work, Preparation of Sections and Preliminary Analysis of Stability, Settlement and Surcharge Requirements, Proposed Extension of Eastern Boundary – Bayview Project, Darwin, NT", DP Project 23057A, 22 Jan 2000.
- Ref 3 Letter Report "Stability, Settlement and Surcharge Analysis, Proposed Extension of the Eastern Boundary – Bayview Project", DP Project 23057A, 18 February 2002.
- Ref 4 Letter Report "Additional Geotechnical Assessment, Proposed Extension of Eastern Boundary – Bayview Project", DP Project 23057A, 19 March 2002.
- Ref 5 Letter Report "Embankment Design Stage 10 Bayview Canal Estate, Bayview, NT", DP Project 23057A, 16 July 2002.
- Ref 6 "Report on Geotechnical Investigation, Stage 10 Area, Bayview, NT", prepared for Bayview Joint Venture, DP Project 26718, March 2004.
- Ref 7 Letter Report "First Interim Report on Settlement Monitoring for Filling and Surcharge in the Stage 10 Area, Eastern Extension – Bayview", DP Project 23057B, 27 Mar 2003.
- Ref 8 Letter Report "Second Interim Report on Settlement Monitoring for Filling and Surcharge in the Stage 10 Area, Eastern Extension – Bayview", DP Project 23057B, 14 Jan 2004.
- Ref 9 Letter Report "Third Interim Report on Settlement Monitoring for Filling and Surcharge in the Stage 10 Area, Eastern Extension – Bayview", DP Project 23057B, 24 Sept 2004.
- Ref 10 "Report on Certification of Bulk Earthworks, Stages 10b Area, Bayview, Darwin, NT", prepared for Bayview Joint Venture, DP Project 26057C, February 2005.
- Ref 11 Letter report entitled "Bayview Stage 11 – Proposed Lots A, B & C, Bayview, Darwin, NT", prepared for Dover Investments Pty Ltd, DP Project 77861.00, December 2011.

9. Limitations

Douglas Partners (DP) has prepared this report for this project at Stage 11 – Lots A and C, Bayview, NT, in accordance with DP's proposal dated 16 May 2012 and acceptance received from Mr Barry Young. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Dover Investments Pty Ltd and associated Consultants for this project only and for the purposes as described in the report. It should not be used for other projects or by a third party. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during previous investigations. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

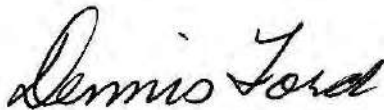
This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Yours faithfully

Douglas Partners Pty Ltd

Reviewed by



Dennis Ford

Senior Geotechnical Engineer

Michael J Thom

Principal

Attachments: Notes About this Report
Plates 1 and 2 - Site Photographs, Lots A and C
Table 1 – Mud Probe Results
Drawings 1 to 8

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



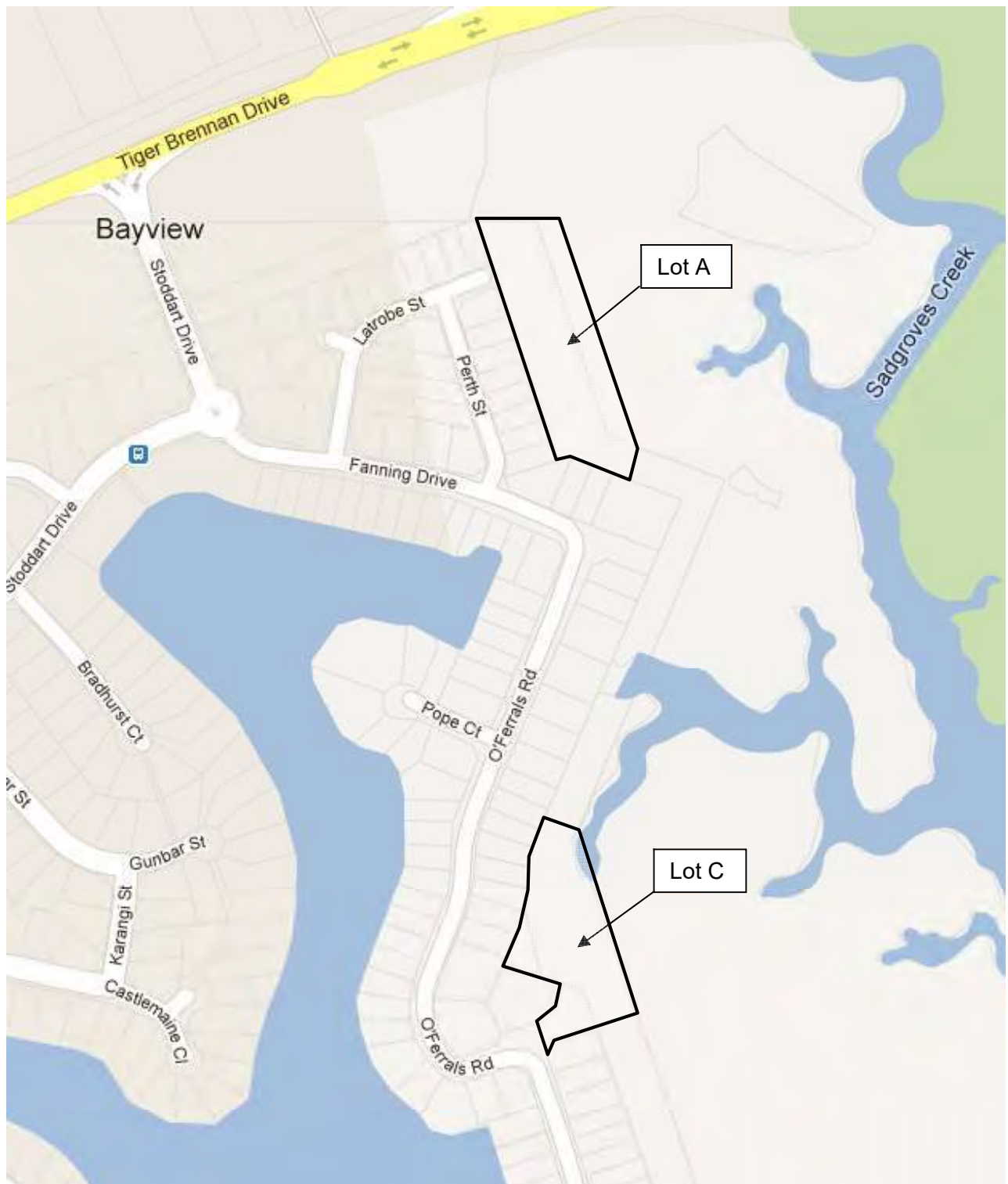
Plate 1: View of existing embankment and site surface at Lot A



Plate 2: View of existing embankment and site surface at Lot C

TABLE 1**MUD PROBE RESULTS**

PROBE No	SECTION No	OFFSET (m)*	SURF RL (m)	MUD DEPTH (m)	BASE OF MUD RL (m)
24	5	0	2.8	2.0	0.8
25	5	30	2.6	3.2	-0.6
26	5	60	2.4	3.0	-0.6
33	6	0	3.0	2.0	1.0
34	6	30	2.5	2.4	0.1
47	10	0	2.5	2.6	-0.1
48	10	30	2.5	2.8	-0.3
49	10	60	2.0	2.2	-0.2
51	11	0	2.5	2.4	0.1
52	11	30	2.5	1.2	1.3
53	11	60	1.5	1.8	-0.3
54	12	30	2.3	1.8	0.5
55	12	60	2.0	2.0	0.0
56	12	90	2.2	1.6	0.6
58	13	0	2.7	0.0	2.7
59	13	30	2.5	1.8	0.7
60	13	60	2.3	2.2	0.1

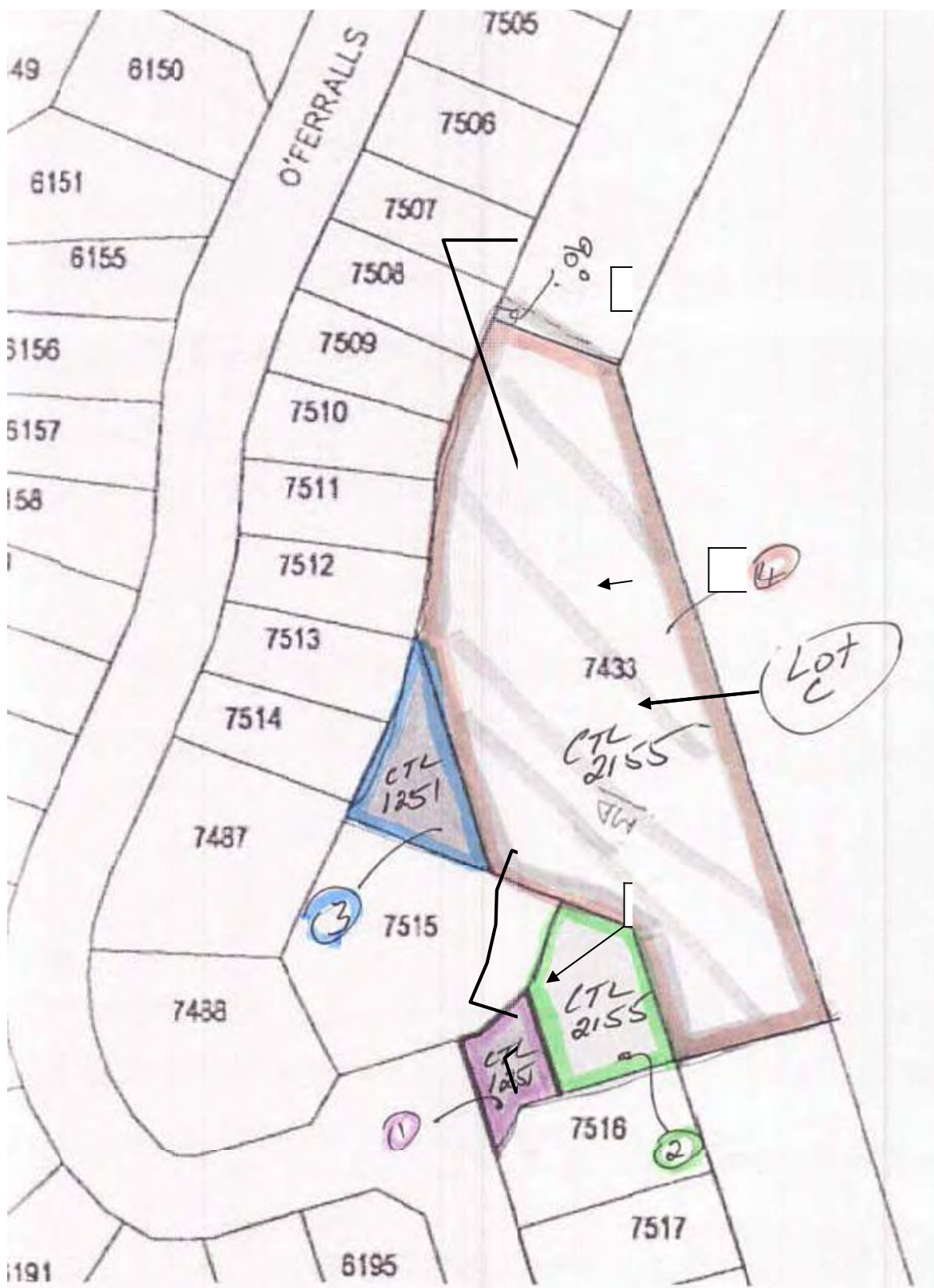


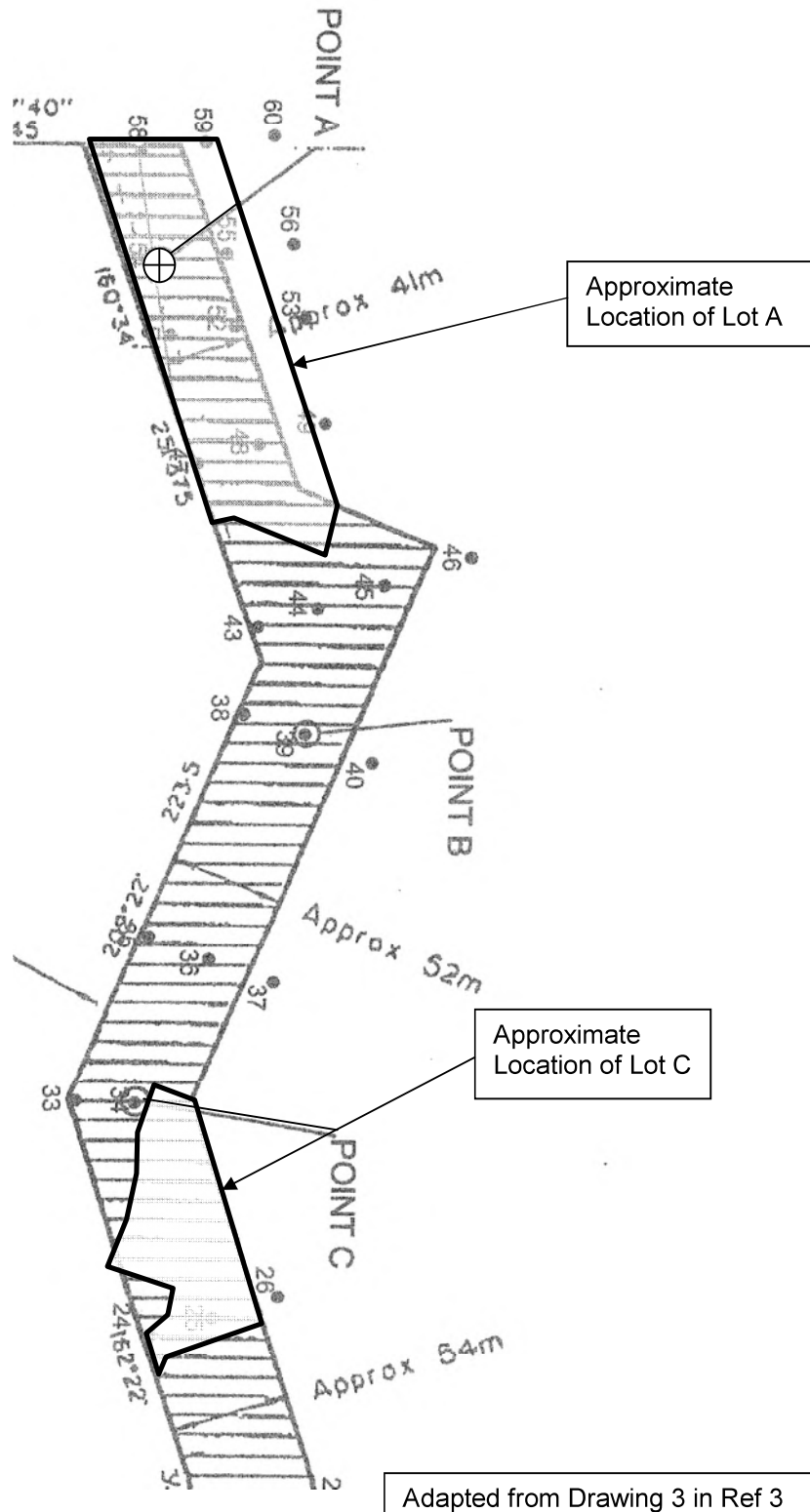
TITLE: Site Locality Plan Stage 11 - Lots A and C Bayview, NT.	PROJECT: 77861.01
	DWG No: 1
	REV: A
	DATE: 16 May 2012
CLIENT: Dover Investments Pty Ltd	



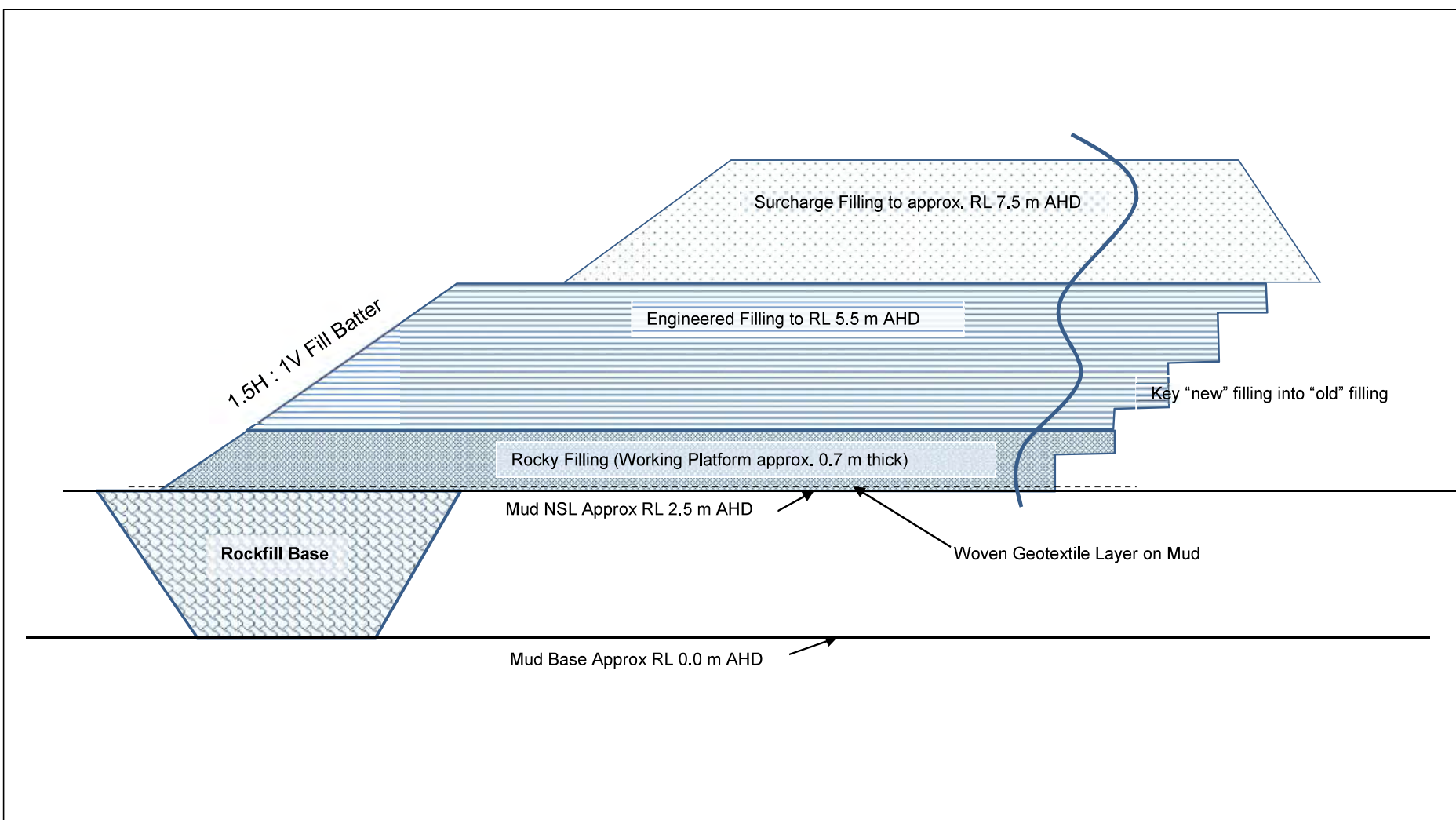
CLIENT: Dover Investments Pty Ltd

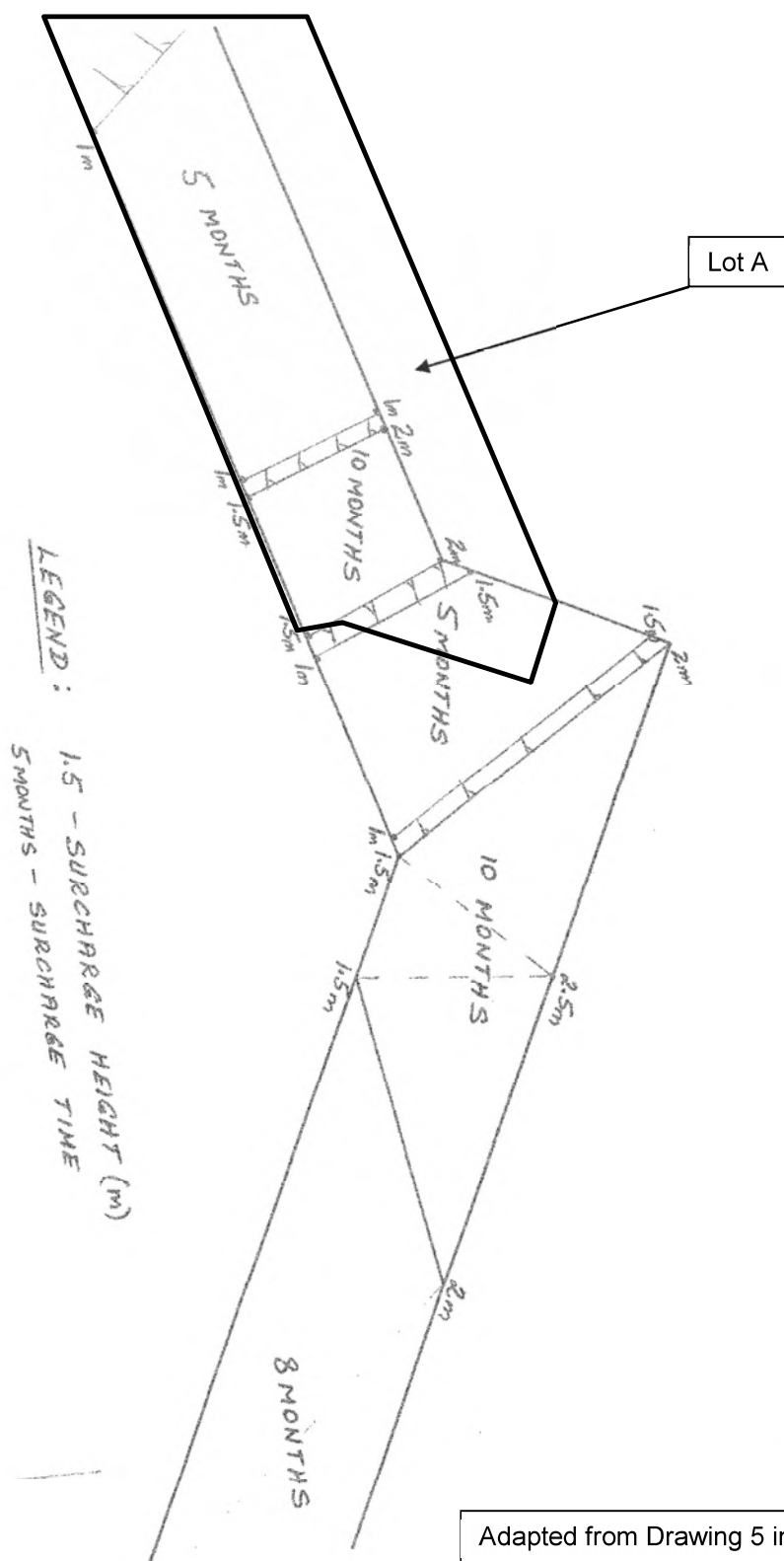
DATE: 16 May 2012

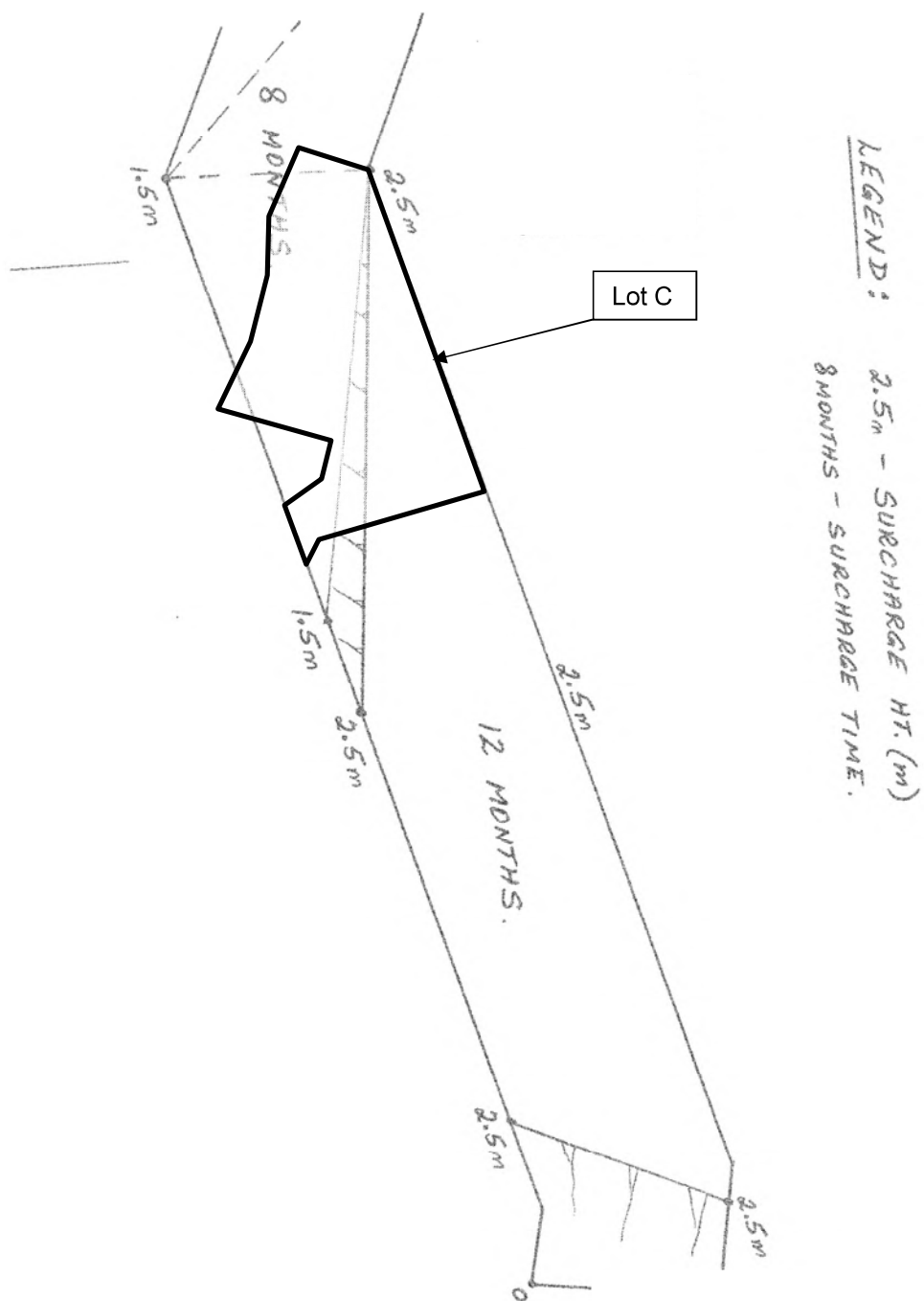




TITLE:	Mud Probe Locations and Surcharge Calculation Points		PROJECT:	77861.01
	Stage 11 - Lots A and C		DWG No:	4
	Bayview, NT.		REV:	A
	CLIENT:	Dover Investments Pty Ltd	DATE:	16 May 12







Adapted from Drawing 6 in Ref 3



TITLE: Typical Surcharge Heights and
Surcharge Times
Proposed Lot C
Stage 11, Bayview, NT.

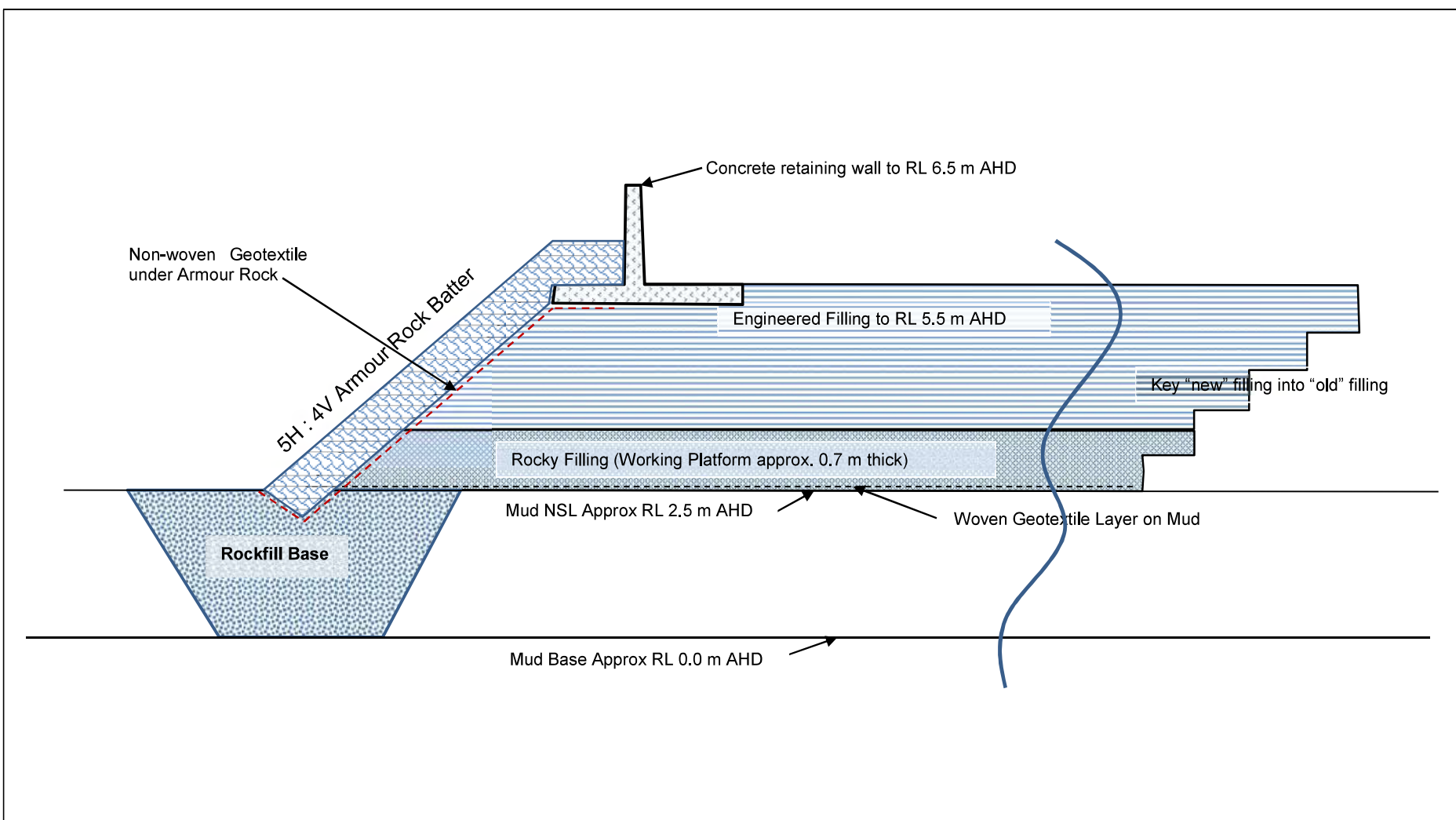
CLIENT: Dover Investments Pty Ltd


PROJECT: 77861.01

DWG No: 7

REV: A

DATE: 17 May 2012



 Douglas Partners Geotechnics Environment Groundwater	TITLE:	Typical Section through Final Seawall	PROJECT:	77861.01
		Proposed Stage 11 - Lots A and C	DWG No:	8
		Bayview, NT.	REV:	A
	CLIENT:	Dover Investments Pty Ltd	DATE:	18 May 2012

Bayview Subdivision – Stage 11

Traffic Impact Assessment

Dover Investments Pty Ltd


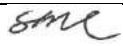
September 2023



byrne.

Document Control

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 Reference: NT22007_Traffic_Impact_Assessment_RevB
 Date: September 2023
 Prepared by Binod Bhujel
 Reviewed by Sam Colwell

Rev	Revision Date	Description	Authorised (Position)	Signature
A	25/08/2022	Issued to Client	Sam Colwell	
B	01/09/2023	Lot Layout Amendment	Sam Colwell	

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Appendix C	CoD Traffic Count Reports
Appendix D	Traffic Count Information
Appendix E	Traffic Volume Calculations Overview
Appendix F	SIDRA Movement Summary Outputs

Definitions

Abbreviation	Definition
AADT	Annual Average Daily Traffic
AGTM	Austroads Guide to Traffic Management
ABS	Australian Bureau of Statistics
Byrne	Byrne Consultants
CoD	City of Darwin
DA	Development Application
DIPL	Department of Infrastructure and Planning
DoS	Degree of Saturation
Dover	Dover Investments Pty Ltd
LMR	Low-Medium Density Residential
LoS	Level of Service
LR	Low Density Residential
PB	Parsons Brinkerhoff
TIA	Traffic Impact Assessment

1 Introduction

1.1 Project Background

Dover Investments Pty Ltd (Dover) has engaged Byrne Consultants (Byrne) to prepare a Traffic Impact Assessment (TIA) for the proposed development of Stage 11 within the Bayview Subdivision located in Darwin, Northern Territory. Dover have previously completed 10 stages to date with Stage 11 consisting of three (3) new development lots, those being:

1. Lot A – 12 x Low Density Residential (LR) lots
2. Lot B – 2 x LR lots (split existing lot)
3. Lot C – 3 x LR lots. 2 x Low-Medium Density Residential (LMR) lots

From the 2021 Census, Australian Bureau of Statistics (ABS), Bayview consists of approximately 672 habited properties containing 1,702 people within the suburb.

The locations of these development lots are identified in Figure 1.1.

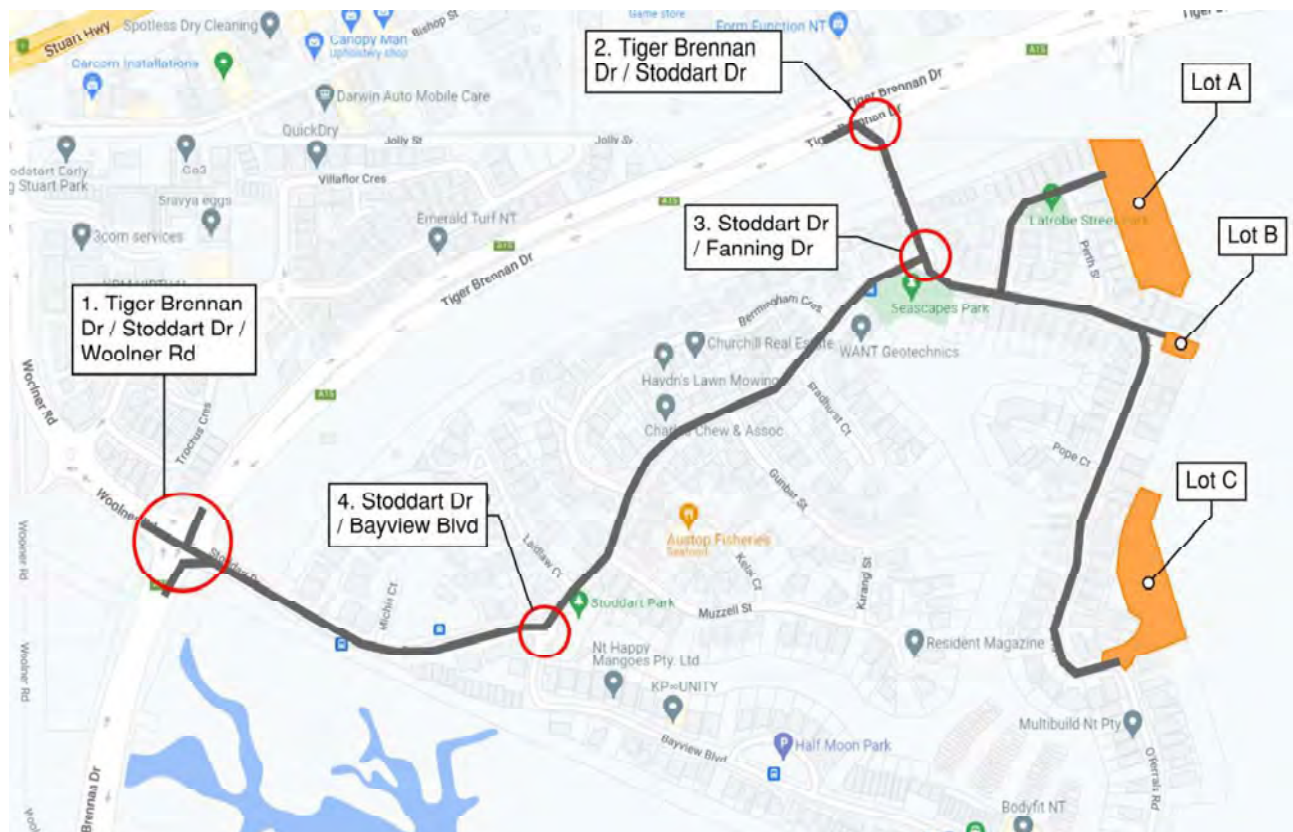


Figure 1.1 – Site Overview (source: Google)

The previous traffic impact study undertaken for the project area include:

1. *Assessment for Traffic Access for Bayview Stage 10*, Parsons Brinkerhoff (PB), June 2003

The information provided in this report has been reviewed for any relevant background information.

1.2 Purpose & Methodology

The purpose of this report is to prepare a TIA report to support the Development Application (DA) submission and identify any traffic generation impacts caused by the proposed development. Comparison between the existing traffic conditions and developed traffic conditions have been undertaken with the assessment scope including the following:

1. Review of background traffic information and previous reporting
2. Carry out peak hour (AM / PM) traffic count surveys at the following intersections
 - i. Stoddard Dr / Tiger Brennan Dr / Woolner Rd
 - ii. Stoddard Dr / Tiger Brennan Dr
 - iii. Stoddard Dr / Fanning Dr
 - iv. Stoddard Dr / Bayview Blvd
3. Calculate future development traffic potential and its impacts to the existing intersections (if any)
4. Calculate peak hour traffic trip generation by the proposed development and directional splits at the existing intersections.
5. Calculate traffic growth rates for the AM/PM peak hour movements at the intersections.
6. Undertake SIDRA intersection analysis for existing case (2022) and development cases (2027 and 2032) cases for the AM /PM peak hours.
7. Identify any upgrade requirements to intersections as a direct result of the development traffic generated by the proposed development (if any).

2 Existing Operations

2.1 Overview

The Bayview residential and development area is connected to Tiger Brennan Drive via Stoddard Drive, as per Figure 1.1 above, in which the 4 highlighted intersections will be the focus of this study including:

1. Stoddard Dr / Tiger Brennan Dr / Woolner Rd
2. Stoddard Dr / Tiger Brennan Dr
3. Stoddard Dr / Fanning Dr
4. Stoddard Dr / Bayview Blvd

2.2 Background Traffic Data

2.2.1 Parsons Brinckerhoff, 2003 Study

An *Assessment of Traffic Access for Bayview Stage 10* report was developed by Parsons Brinckerhoff in 2003. This study assessed the stage 10 expansion of 55 additional dwellings. While this was a similar traffic impact study, the development and information presented in the report is since outdated and was not used for any future assessments as part of this report. Refer to Appendix A for the full report.

2.2.2 Census Growth Data

A review was undertaken of the latest census data to further understand the Bayview subdivision population statistics. A population comparison was made between the 2016 and the 2021 census which outlined a population increase of 1.1% over 5 years. This increase is likely the result of larger occupancies within the existing properties as the Bayview subdivision has not increased in total size (i.e. no new

developments). To account for this potential increased occupancy growth, a 0.2% linear background growth rate was adopted for the Bayview subdivision.

2.2.3 Department of Infrastructure and Planning (DIPL) Traffic Counts

Within the project area, all local roads are controlled by the City of Darwin (CoD) aside from Tiger Brennan Drive which is a Department of Infrastructure Planning, and Logistics (DIPL) controlled asset. DIPL's latest *Annual Traffic Report, 2021* was reviewed for recent traffic volume counts along Tiger Brennan Drive. The closest traffic count sites along Tiger Brennan Drive are outlined in Figure 2.1. Refer to Appendix B for output from the *Annual Traffic Report, 2021*.



Figure 2.1 – Tiger Brennan Traffic Count Sites (source: Google)

This traffic count information is available annually from 2012-2021 and has been assessed to further understand the approximate traffic growths rate for the traffic catchment.

A large fluctuation was identified for the 2012 data and this was excluded from the assessment. This traffic count data was tabulated and a line of best fit was applied to understand the potential future growth. This line of best fit was nominated as linear due to several increases and decreases in traffic counts throughout the years, making an exponential model un-realistic. The three (3) scenarios for different linear growth lines were reviewed and compared as outlined in Figure 2.2 and Figure 2.3 below:

- Scenario 1 - DIPL traffic data linear line of best fit - Purple Line
- Scenario 2 - 1.5% growth (inbound), 2.0% growth (outbound) - Blue Line
- Scenario 3 - 3.0% growth - Grey Line

From this analysis, the blue line growth rates were adopted:

- Inbound – Linear growth rate of 1.5% adopted
- Outbound – Linear growth rate of 2.0% adopted

These adopted growth rates continue from the last available traffic count AADT (2021) and both exceed the existing linear growth rate model (purple line).



Figure 2.2 – Tiger Brennan Drive Inbound Traffic Growth Assessment

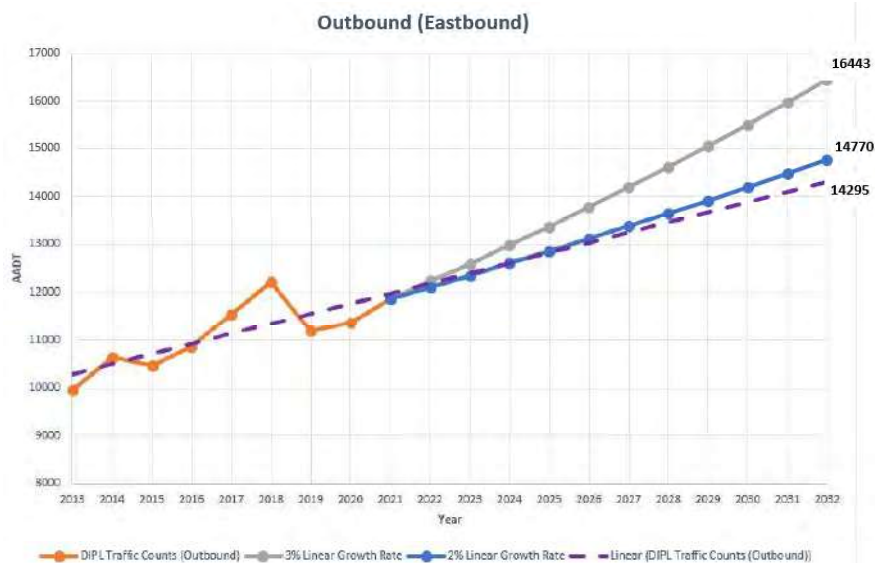


Figure 2.3 – Tiger Brennan Drive Outbound Traffic Growth Assessment

In addition, it should be noted that Tiger Brennan Drive underwent a major capacity upgrade in 2016 with comparison images (before and after) evident in Figure 2.4 below. This is likely to account for some of the traffic fluctuations around these years, particularly for the inbound data.



Figure 2.4 – Tiger Brennan Drive Upgrade Comparison Images (source: Nearmap)

2.2.4 City of Darwin Traffic Counts

Recent traffic count information was received by the City of Darwin within the project area. This included the following counting location, year and AADT:

- Stoddart Drive
 - #47, Aug 2020, 1625 Total Vehicles (7-day average)
 - #24, Sep 2016, 2179 Total Vehicles (7-day average)
- Bayview Boulevard
 - #53, Mar 2016, 684 Total Vehicles (7-day average)
 - #49, Mar 2016, 732 Total Vehicles (7-day average)
- Woolner Road
 - Top of Hill, Nov 2021, 6882 Total Vehicles (7-day average)
 - Bottom of Hill, Nov 2021, 6840 Total Vehicles (7-day average)
 - Bishop Street – Brewery Place, Sep 2015, 3642 Southbound Vehicles (7-day average)
 - Stuart highway - Bishop Street, Sep 2015, 3063 Southbound Vehicles (7-day average)

This information was reviewed however, it was difficult to determine any particular growth patterns or vehicle direction splits based on inconsistent information (i.e. Stoddart Drive decreasing in traffic volumes within a 5-year span, with counts occurring at slightly different locations).

This information was noted but ultimately disregarded in favour of the manual peak hour traffic counts collected. As the DIPL data had a constant and longer collection time, the growth rates along Tiger Brennan Drive have been adopted for Woolner Road for a consistent assessment approach. Refer to Appendix C for CoD traffic count reports.

2.2.5 Adopted Growth Rates

From reviewing the information outlined above, the following linear growth rates in Figure 2.5 have been adopted for this impact assessment.

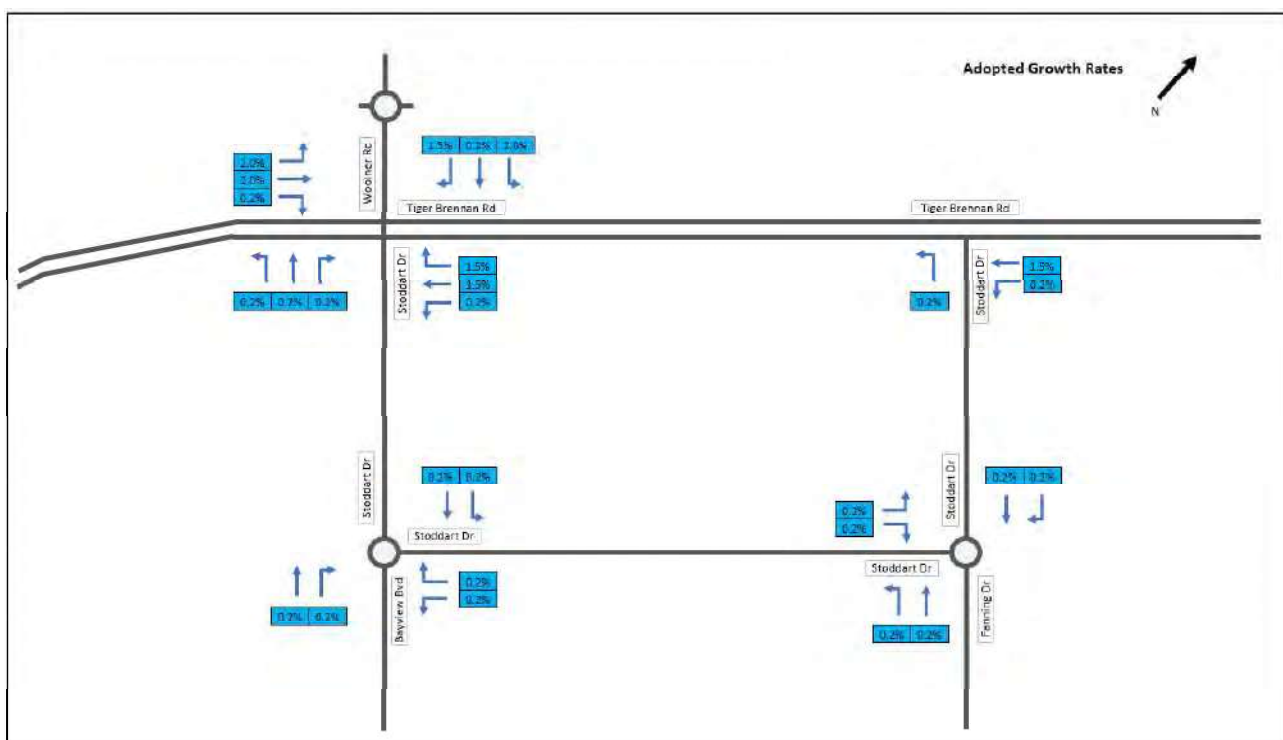


Figure 2.5 – Adopted Project Growth Rates

2.3 Traffic Survey Information

2.3.1 Intersection Traffic Counts

Byrne have conducted intersection traffic surveys for the peak hour traffic volumes (AM and PM) at each of the four (4) key intersections. These counts were undertaken on 1 day for each site, over a 2-hour AM/PM peak period and included counts of heavy vehicles and identified pedestrians / cyclists. The AM peak hour period surveyed was between 7:00AM – 9:00AM and the PM period between 4:00PM – 6:00PM. These volumes for each site are summarised in Figure 2.6 below with the heavy vehicle counts summarised in Figure 2.7.

For the full traffic count survey information, refer to Appendix D of this report.

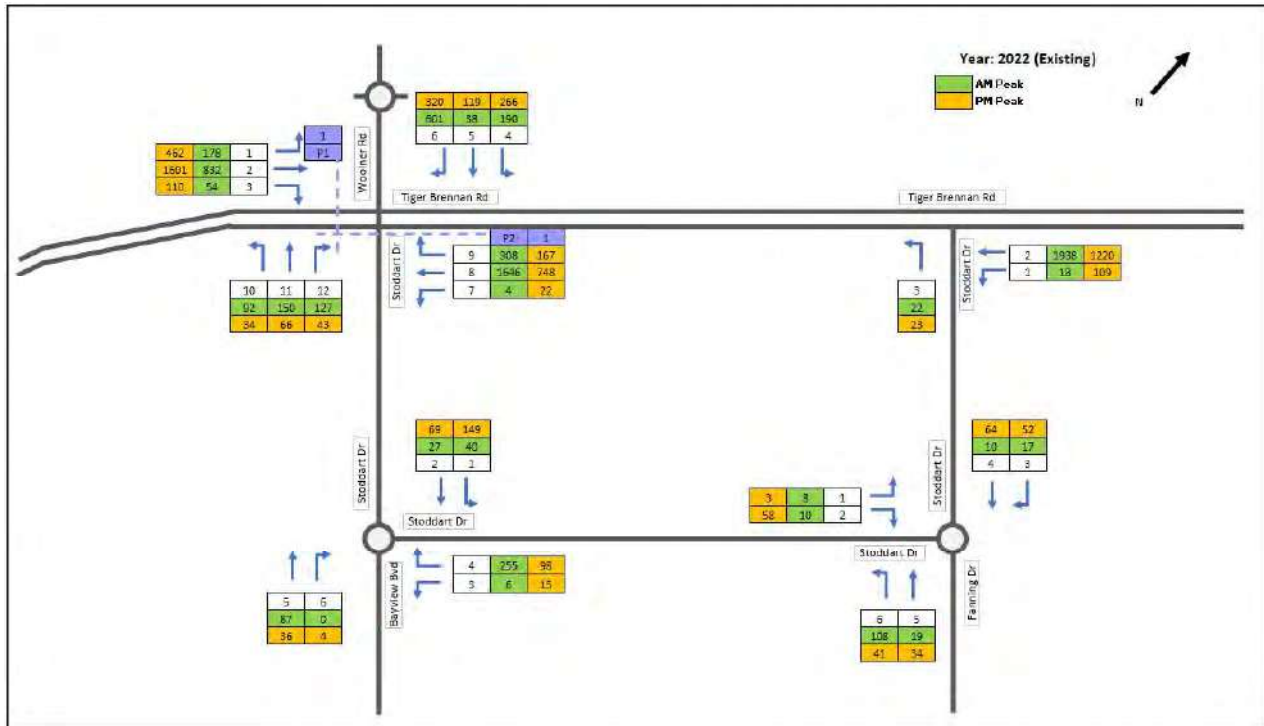


Figure 2.6 – Traffic Count Information Summary

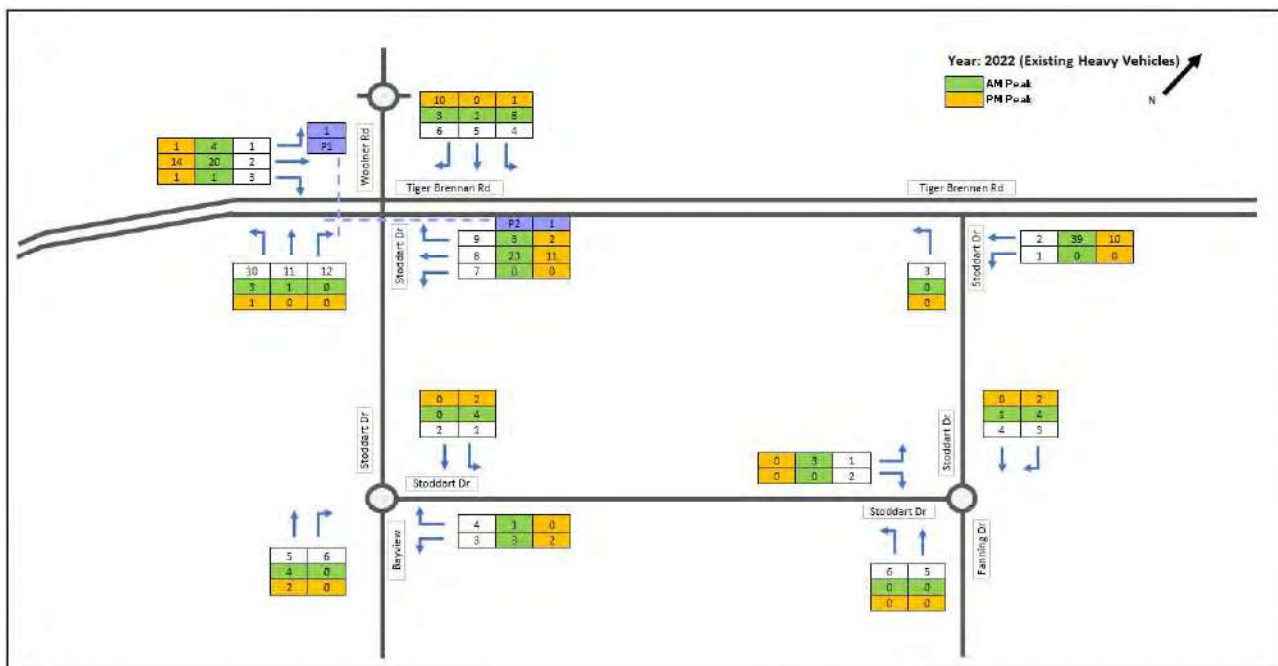


Figure 2.7 – Traffic Count Heavy Vehicle Summary

2.3.2 Traffic Movement Directional Splits

From the traffic count information, directional splits were calculated for any generated development traffic focussing on entering / exiting from Fanning Drive and how those volumes will be dispersed over the four (4) key intersections. These splits are summarised in Figure 2.8.

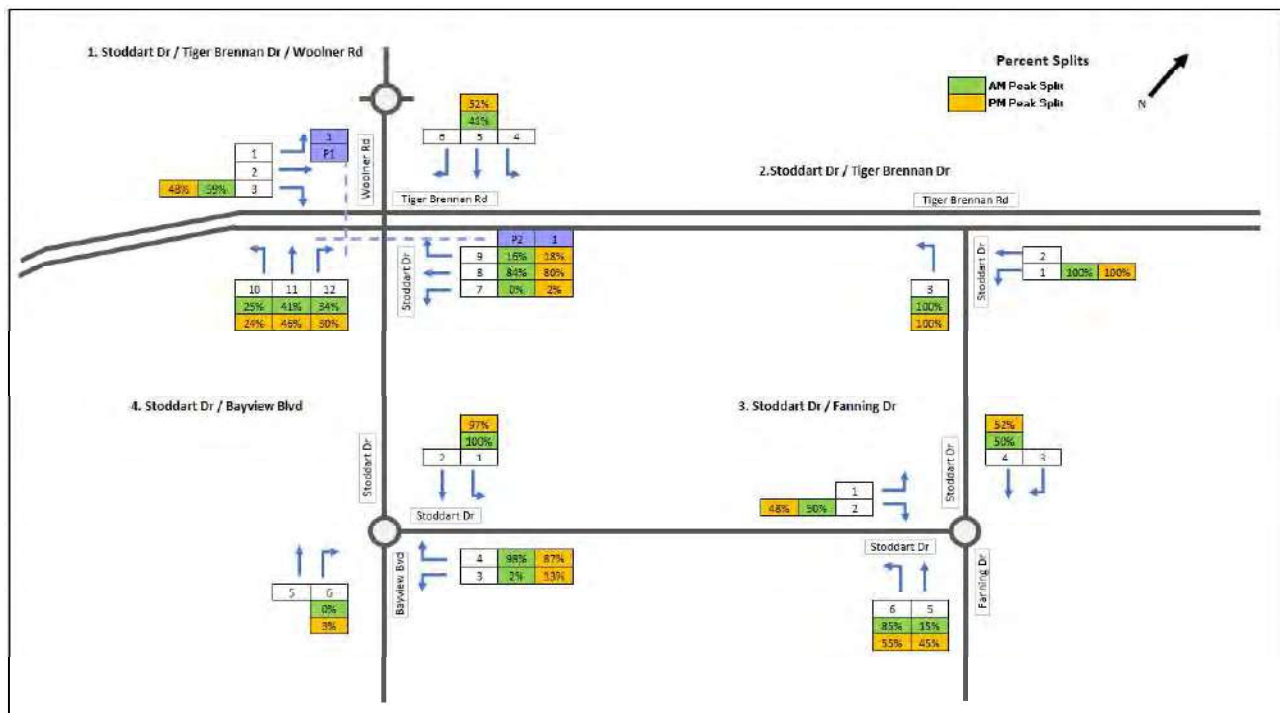


Figure 2.8 – Development Traffic Generation Splits

3 Development Traffic

3.1 Development Traffic Generation

The proposed development consists of 17 LR lots and 2 LMR lots. The LMR lots are assumed to account for approximately 8 individual residences, for a total of 28 residences. A trip generation factor of 10.7 was used per residency in accordance with *Austrroads Guide to Traffic Management* (AGTM P12, 2020, Appendix D.1 Low Density Sydney). This is similar to the previous study conducted by PB who used a trip generation factor of 10 per residency. Using a nominated 10% AADT for peak hour flows, the total trips calculated during a peak hour period for the proposed development is estimated to be 31 vehicles. This is outlined in Table 3.1.

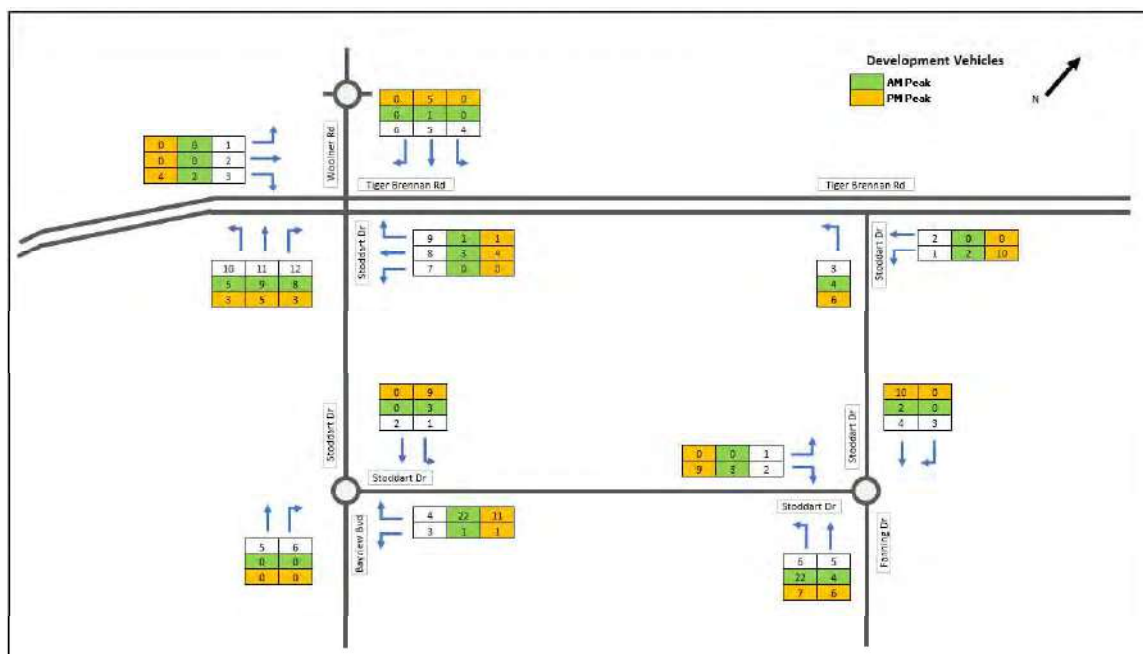
Table 3.1 – Development Trip Generation

Development	Equivalent LR Lots	Development Daily Trip Generation (veh trips)	Development Peak Hour Trip Generation (10%) (veh trips)
Lot A – 12 x LR lots	12	150	15
Lot B – 2 x LR lots	2	22	3
Lot C – 3 x LR lots. 2 x LMR lots (duplex + 7 townhouses)	11	129	13
TOTAL	25	301	31

3.2 Development Traffic Distribution

With the development traffic generation estimated, these peak hour figures were then applied to the 4 intersections throughout the road network assessment area. Starting with Intersection 3 (Fanning Drive / Stoddart Drive), the 31 generated trips were distributed using the traffic movement splits identified in Section 2.3.2. The results are summarised in Figure 3.1.

In addition, Figure 3.2 outlines the percent increase for the generated development traffic for each vehicle movement. All intersections exhibit at least 1 leg with an increase of 5.0% or greater, in which assessment of the intersection is required. The development does not anticipate an increase of heavy vehicle volumes within the subdivision. It is anticipated that an increase in Equivalent Standard Axels (ESA) will be less than 5.0% and as such, no existing pavement assessment has been conducted.

**Figure 3.1 – Development Generated Vehicle Movements (2022)**

4 Traffic Analysis

With the existing traffic counts, selected growth rates and estimated development vehicle generation, the following developed traffic scenarios were analysed:

- These traffic volume values are tabulated in Appendix E including heavy vehicle volumes. The scenarios were then modelled in SIDRA Intersection 9.0 software as separate intersections discussed in the following sections. Movement summary SIDRA modelling results for each intersection is compiled in Appendix F.

The diagram illustrates the proposed intersection layout for the intersection of Tiger Drennan Rd and Stoddart Dr, showing traffic flow and vehicle counts for AM and PM peaks in 2027. The layout includes a roundabout at the intersection of Woolmer Rd and Tiger Drennan Rd, and a signalized intersection at the intersection of Stoddart Dr and Tiger Drennan Rd. The diagram also shows the intersection of Stoddart Dr and Bayview Rd, and the intersection of Stoddart Dr and Fenning Dr.

Year: 2027 (Developed)

Legend:

- AM Peak (Green)
- PM Peak (Orange)

Intersection Data (Vehicle Counts):

- Woolmer Rd / Tiger Drennan Rd (Roundabout):**
 - Approach from Woolmer Rd (Left): 508 (AM), 196 (PM)
 - Approach from Woolmer Rd (Right): 1761 (AM), 915 (PM)
 - Approach from Woolmer Rd (Through): 115 (AM), 56 (PM)
 - Approach from Tiger Drennan Rd (Left): 344 (AM), 125 (PM)
 - Approach from Tiger Drennan Rd (Right): 646 (AM), 40 (PM)
 - Approach from Tiger Drennan Rd (Through): 293 (AM), 209 (PM)
- Stoddart Dr / Tiger Drennan Rd (Signalized):**
 - Approach from Stoddart Dr (Left): 98 (AM), 160 (PM)
 - Approach from Stoddart Dr (Right): 37 (AM), 72 (PM)
 - Approach from Stoddart Dr (Through): 136 (AM), 47 (PM)
 - Approach from Tiger Drennan Rd (Left): 342 (AM), 183 (PM)
 - Approach from Tiger Drennan Rd (Right): 1773 (AM), 809 (PM)
 - Approach from Tiger Drennan Rd (Through): 4 (AM), 22 (PM)
- Stoddart Dr / Bayview Rd (Signalized):**
 - Approach from Stoddart Dr (Left): 70 (AM), 159 (PM)
 - Approach from Stoddart Dr (Right): 27 (AM), 43 (PM)
 - Approach from Stoddart Dr (Through): 280 (AM), 130 (PM)
 - Approach from Bayview Rd (Left): 88 (AM), 0 (PM)
 - Approach from Bayview Rd (Right): 56 (AM), 4 (PM)
- Stoddart Dr / Fenning Dr (Signalized):**
 - Approach from Stoddart Dr (Left): 26 (AM), 29 (PM)
 - Approach from Stoddart Dr (Right): 2083 (AM), 1212 (PM)
 - Approach from Stoddart Dr (Through): 21 (AM), 120 (PM)
 - Approach from Fenning Dr (Left): 74 (AM), 53 (PM)
 - Approach from Fenning Dr (Right): 12 (AM), 17 (PM)
- Stoddart Dr / Bayview Rd (Signalized):**
 - Approach from Stoddart Dr (Left): 3 (AM), 8 (PM)
 - Approach from Stoddart Dr (Right): 88 (AM), 13 (PM)
 - Approach from Stoddart Dr (Through): 132 (AM), 23 (PM)
 - Approach from Bayview Rd (Left): 48 (AM), 40 (PM)

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4.1.1 SIDRA Intersection 1 Stoddard Dr / Tiger Brennan Dr / Woolner Rd

An additional 31 vehicles are estimated to travel through during peak times and the modelling showed no capacity concerns. In comparing the Existing 2022 and the Developed 2022 volumes, the impact on this intersection is relatively minor. The majority of the intersection worsening is identified by the background growth along Tiger Brennan Drive and Woolner Road. Table 4.1, Table 4.2 and Table 4.3 outline the Degree of Saturation, Average Delay and Queue Length for this intersection.

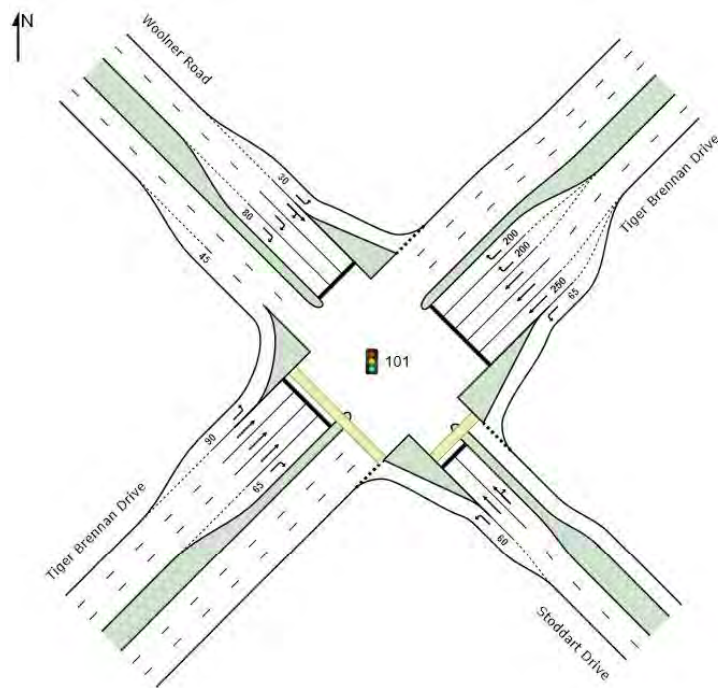


Figure 4.4 – Intersection 1 Modelled SIDRA Layout

Table 4.1 – Intersection 1 Degree of Saturation

AM Peak Degree of Saturation						
Approach	E 2022	B + D 2022	B 2027	B + D 2027	B 2032	B + D 2032
SouthEast: Stoddart Drive	0.767	0.751	0.777	0.821	0.857	0.829
NorthEast: Tiger Brennan Drive	0.753	0.756	0.809	0.812	0.87	0.872
NorthWest: Woolner Road	0.75	0.751	0.813	0.815	0.841	0.842
SouthWest: Tiger Brennan Drive	0.372	0.38	0.41	0.41	0.451	0.46
PM Peak Degree of Saturation						
Approach	E 2022	B + D 2022	B 2027	B + D 2027	B 2032	B + D 2032
SouthEast: Stoddart Drive	0.6	0.644	0.613	0.663	0.619	0.663
NorthEast: Tiger Brennan Drive	0.477	0.443	0.561	0.517	0.661	0.604
NorthWest: Woolner Road	0.613	0.621	0.703	0.712	0.757	0.766
SouthWest: Tiger Brennan Drive	0.628	0.613	0.691	0.684	0.767	0.761

Table 4.2 – Intersection 1 Average Delay

AM Peak Average Delay (s)						
Approach	E 2022	B + D 2022	B 2027	B + D 2027	B 2032	B + D 2032
SouthEast: Stoddart Drive	52.1	51.1	52.9	54.6	57.5	55.8
NorthEast: Tiger Brennan Drive	37.5	38.3	39.5	39.6	44.7	47.5
NorthWest: Woolner Road	46.4	46.4	48.7	49	49.9	50
SouthWest: Tiger Brennan Drive	25.1	25.8	25.3	25.4	25.7	26.3
PM Peak Average Delay (s)						
Approach	E 2022	B + D 2022	B 2027	B + D 2027	B 2032	B + D 2032
SouthEast: Stoddart Drive	53.3	52.9	52.9	53.3	52.9	53.5
NorthEast: Tiger Brennan Drive	25.9	26.2	25.4	25.7	25.6	25.7
NorthWest: Woolner Road	39.9	40	42.3	42.5	44.2	44.6
SouthWest: Tiger Brennan Drive	21	21.6	20.6	21.1	20.8	21.4

Table 4.3 – Intersection 1 Queue Length (m)

AM Peak Queue Length (m)						
Approach	E 2022	B + D 2022	B 2027	B + D 2027	B 2032	B + D 2032
SouthEast: Stoddart Drive	64.3	67.5	65.5	70.8	69.5	71.9
NorthEast: Tiger Brennan Drive	201.1	204.6	227.3	228.4	269.4	282
NorthWest: Woolner Road	99.9	100.2	113.1	113.8	125.6	125.9
SouthWest: Tiger Brennan Drive	84.3	85.5	94.4	94.4	106.1	107.7
PM Peak Queue Length (m)						
Approach	E 2022	B + D 2022	B 2027	B + D 2027	B 2032	B + D 2032
SouthEast: Stoddart Drive	25.4	27.4	26	28.4	26.3	28.4
NorthEast: Tiger Brennan Drive	60.9	62.3	64	65.6	68.4	70.2
NorthWest: Woolner Road	64.2	65.2	72	73.2	79.4	80.8
SouthWest: Tiger Brennan Drive	171.1	174.7	211.3	209	243.5	249.7

4.1.2 SIDRA Intersection 2 Stoddard Dr / Tiger Brennan Dr

Intersection 2 (Stoddard Dr / Tiger Brennan Dr) is an unsignalised left in / left out intersection comprising of left slip lanes as per Figure 4.5. In comparing the Existing 2022 and the Developed 2022 volumes, the impact on this intersection is relatively minor. Table 4.4, Table 4.5 and Table 4.6 outline the Degree of Saturation, Average Delay and Queue Length for this intersection.

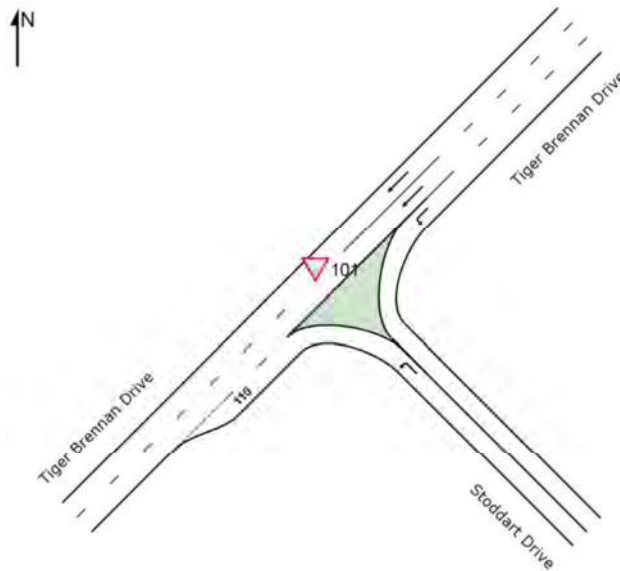


Figure 4.5 – Intersection 2 Modelled SIDRA Layout

Table 4.4 – Intersection 2 Degree of Saturation

Approach	AM Peak Degree of Saturation			PM Peak Degree of Saturation		
	E 2022	B + D 2022	B + D 2032	E 2022	B + D 2022	B + D 2032
SouthEast: Stoddart Drive	0.012	0.015	0.015	0.013	0.016	0.017
NorthEast: Tiger Brennan Drive	0.524	0.524	0.606	0.328	0.328	0.379

Table 4.5 – Intersection 2 Average Delay

Approach	AM Peak Average Delay (s)			PM Peak Average Delay (s)		
	E 2022	B + D 2022	B + D 2032	E 2022	B + D 2022	B + D 2032
SouthEast: Stoddart Drive	8.8	8.9	10.3	7	7	7.4
NorthEast: Tiger Brennan Drive	4.4	4.4	4.4	4.3	4.3	4.4

Table 4.6 – Intersection 2 Queue Length (m)

Approach	AM Peak Queue Length (m)			PM Peak Queue Length (m)		
	E 2022	B + D 2022	B + D 2032	E 2022	B + D 2022	B + D 2032
SouthEast: Stoddart Drive	0	0	0	0	0	0
NorthEast: Tiger Brennan Drive	0	0	0	0	0	0

4.1.3 SIDRA Intersection 3 Stoddard Dr / Fanning Dr

Intersection 3 (Stoddard Dr / Fanning Dr) is three-legged roundabout as per Figure 4.6. In comparing the Existing 2022 and the Developed 2022 volumes, the impact on this intersection is relatively minor. Table 4.7, Table 4.8 and Table 4.9 outline the Degree of Saturation, Average Delay and Queue Length for this intersection.

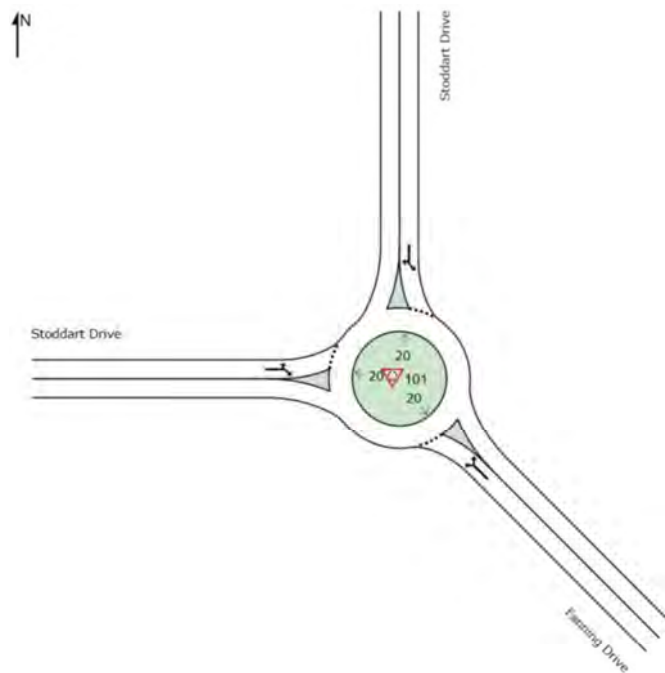


Figure 4.6 – Intersection 3 Modelled SIDRA Layout

Table 4.7 – Intersection 3 Degree of Saturation

Approach	AM Peak Degree of Saturation			PM Peak Degree of Saturation		
	E 2022	D 2022	D 2032	E 2022	D 2022	D 2032
SouthEast: Fanning Drive	0.089	0.106	0.108	0.059	0.068	0.07
North: Stoddart Drive	0.021	0.023	0.024	0.09	0.099	0.101
West: Stoddart Drive	0.015	0.017	0.018	0.046	0.053	0.055

Table 4.8 – Intersection 3 Average Delay

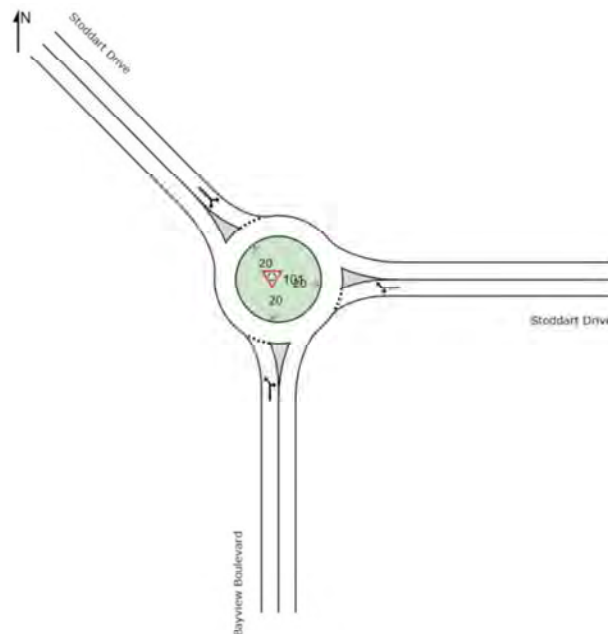
Approach	AM Peak Average Delay (s)			PM Peak Average Delay (s)		
	E 2022	D 2022	D 2032	E 2022	D 2022	D 2032
SouthEast: Fanning Drive	4.4	4.4	4.4	5.7	5.8	5.8
North: Stoddart Drive	7.1	6.9	6.8	6.2	6.1	6.1
West: Stoddart Drive	6.2	6.5	6.5	7.6	7.7	7.7

Table 4.9 – Intersection 3 Queue Length (m)

Approach	AM Peak Queue Length (m)			PM Peak Queue Length (m)		
	E 2022	D 2022	D 2032	E 2022	D 2022	D 2032
SouthEast: Fanning Drive	3	3.7	3.8	2	2.4	2.5
North: Stoddart Drive	0.8	0.9	0.9	3.2	3.5	3.6
West: Stoddart Drive	0.5	0.6	0.7	1.6	1.8	1.9

4.1.4 SIDRA Intersection 4 Stoddard Dr / Bayview Blvd

Intersection 4 (Stoddard Dr / Bayview Blvd) is three-legged roundabout as per Figure 4.7. In comparing the Existing 2022 and the Developed 2022 volumes, the impact on this intersection is relatively minor. Table 4.10, Table 4.11 and Table 4.12 outline the Degree of Saturation, Average Delay and Queue Length for this intersection.

**Figure 4.7 – Intersection 4 Modelled SIDRA Layout****Table 4.10 – Intersection 4 Degree of Saturation**

Approach	AM Peak Degree of Saturation			PM Peak Degree of Saturation		
	E 2022	D 2022	D 2032	E 2022	D 2022	D 2032
South: Bayview Boulevard	0.085	0.086	0.089	0.034	0.034	0.035
East: Stoddart Drive	0.181	0.196	0.2	0.09	0.098	0.099
NorthWest: Stoddart Drive	0.043	0.044	0.047	0.137	0.142	0.143

Table 4.11 – Intersection 4 Average Delay

Approach	AM Peak Average Delay (s)			PM Peak Average Delay (s)		
	E 2022	D 2022	D 2032	E 2022	D 2022	D 2032
South: Bayview Boulevard	5.1	5.2	5.3	4.7	4.8	4.8
East: Stoddart Drive	7.7	7.7	7.7	7.5	7.5	7.5
NorthWest: Stoddart Drive	5.4	5.3	5.3	5	4.9	4.9

Table 4.12 – Intersection 4 Queue Length (m)

Approach	AM Peak Queue Length (m)			PM Peak Queue Length (m)		
	E 2022	D 2022	D 2032	E 2022	D 2022	D 2032
South: Bayview Boulevard	3.1	3.1	3.3	1.2	1.2	1.2
East: Stoddart Drive	6.7	7.4	7.6	3.1	3.4	3.4
NorthWest: Stoddart Drive	1.7	1.7	1.8	5.3	5.5	5.6

5 Conclusions

A summary of the Traffic Impact Assessment modelling results are as follows:

- Intersection 1 (Stoddard Dr / Tiger Brennan Dr / Woolner Rd) exhibited minor changes in the intersection performance due to the development traffic generation (no notable change). The intersection performance with respect to degree of saturation, average delay and queue length lowered during the 2027 and 2032 scenarios due to the applied background growth factors on Tiger Brennan Drive and Woolner Road, not the development traffic. It is beyond the scope of this TIA to suggest any upgrades to this intersection and impact by the proposed development is minimal.
- Intersection 2 (Stoddard Dr / Tiger Brennan Dr) exhibited a LoS of B and DoS ≤ 0.6 during the 2032 growth scenario (AM / PM) due to growth rates applied to Tiger Brennan Drive. This intersection performs satisfactorily with the proposed development traffic.
- Intersection 3 (Stoddard Dr / Fanning Dr) and Intersection 4 (Stoddard Dr / Bayview Blvd) exhibited a LoS of A and a DoS ≤ 0.2 for all growth scenarios performing satisfactorily with the proposed development traffic.

Appendix A Assessment for Traffic Access, PB, June 2003

Assessment of Traffic Access for Bayview Stage 10

12 June 2003

Bayview Haven Joint Venture



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1. Introduction

The existing Bayview development has been designed to accommodate some 750 dwellings in a mix of differing densities, located within 9 discrete residential stages (Figure 1.1). Approved traffic access arrangements to the estate comprise:

- Full movement access via a signalised four way intersection at Tiger Brennan Drive/Woolner Road/Bayview Drive
- A left in-left out arrangement at the intersection of Stoddart Drive with Tiger Brennan Drive, located some 1.25 km to the east of Woolner Road.

During initial development of Bayview, full access was provided via the Stoddart Drive/Tiger Brennan Drive intersection. The design provided for left in/left out access, plus a protected right turn into Stoddart Drive and a left turn deceleration lane from Tiger Brennan Drive into Stoddart Drive. Access at this location was subsequently down graded to the current left in-left out arrangement when access via the intersection at Woolner Road was later constructed. The current access arrangements effectively require:

- All traffic entering Bayview (other than from the east via Tiger Brennan Drive) to use the Woolner Road intersection. In particular, traffic to the eastern precincts of the estate (Stages 7b, 8a, 8b, and 9) must all enter via the Woolner Road intersection, requiring travel via the internal Bayview road network to their destinations. More direct access off Tiger Brennan Drive is not enabled as noted above.
- Traffic exiting Bayview can either travel via the Stoddart Drive/Tiger Brennan Drive (TBD) intersection (left turning vehicles) or via the Woolner Road intersection. The high volume of inbound traffic on TBD in the AM peak period to the CBD constrains the volume of traffic able to exit from Stoddart Drive, with a significant proportion expected to reroute through Bayview to exit via Woolner Road to reduce delay.

This present study was commissioned by the Bayview Joint Venture to undertake an assessment of traffic impacts of a possible extension to the existing Bayview development, in the form of approximately 55 additional dwellings in Stage 10, located in an area abutting the eastern fringe of Bayview, with access via Fanning Drive.

In particular, the study was to:

- Undertake an assessment of access arrangements to Bayview for the existing development, and thence to determine how these might be impacted upon by traffic growth on Tiger Brennan Drive past Bayview.
- Undertake a traffic assessment of the effects of the Stage 10, and thence to determine required changes in access requirements.
- Develop and assess options for upgrading the eastern access to Bayview at the Stoddart Drive/TBD intersection.

Upgrading of the Stoddart Drive/TBD intersection would deliver two main future benefits:

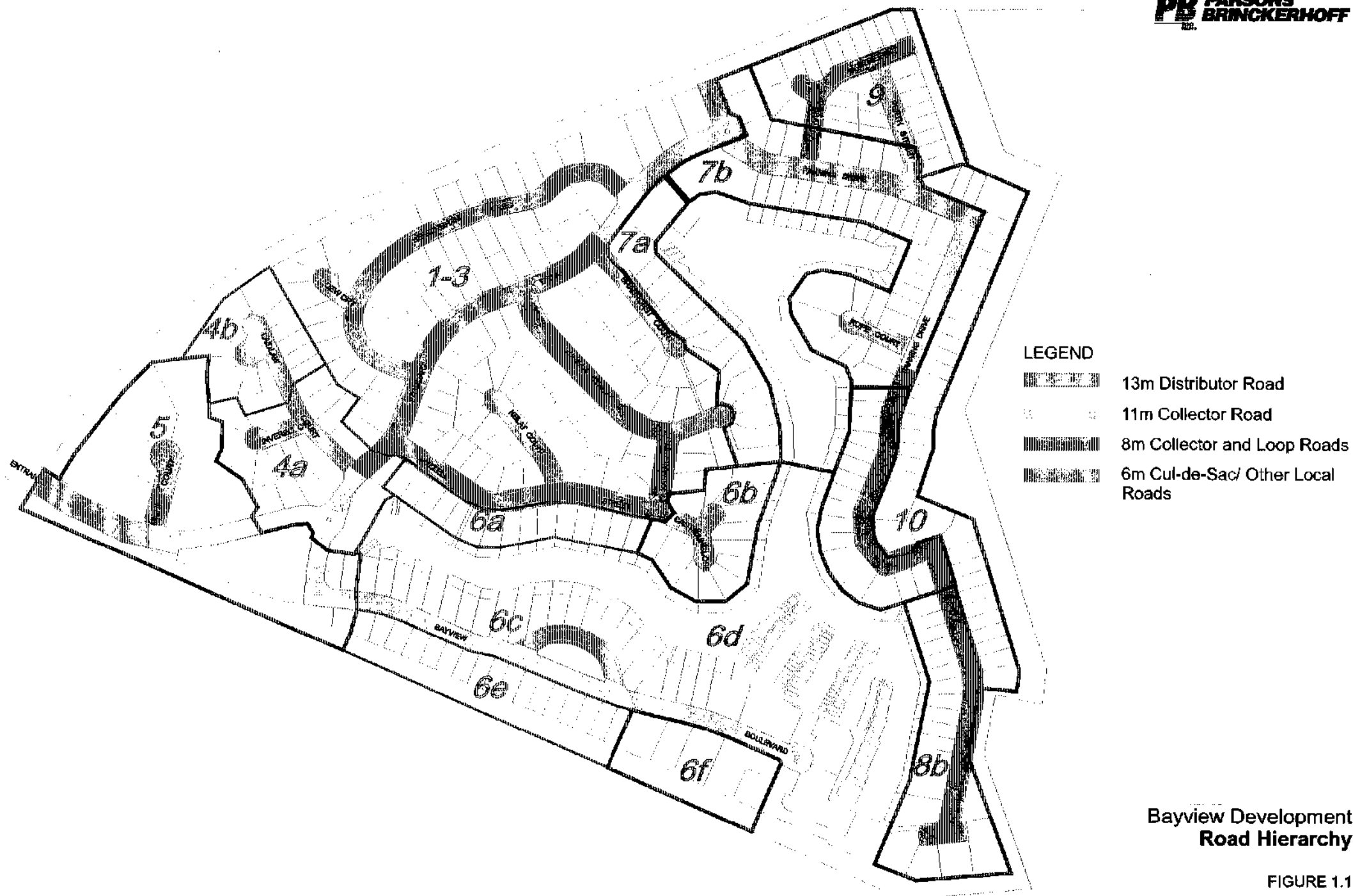
- Reducing the potential scope of and timing for further upgrading of the Woolner Road/TBD/Bayview Drive intersection in response to future development at Bayview.

- Reducing the through traffic impacts of demand generated by existing stages of Bayview to the east (Stages 7b, 8a, 8b, 9), and from the proposed Stage 10 extension, on residents within Bayview, by reducing the volume of through traffic on Stoddart Drive/Bayview Drive. The addition of new traffic from Stage 10 would impinge upon the amenity of existing residents along these existing routes.

1.1 Scope of Work

The tasks to be undertaken under the terms of this traffic study comprise:

- Review traffic forecast assumptions, based on current traffic counts and lot turnoffs.
- Update the traffic forecasting procedure to reflect observed Bayview traffic characteristics.
- Prepare revised traffic forecasts for:
 - ▶ The existing Bayview development
 - ▶ The addition of the proposed Stage 10
- Update peak hour traffic flow forecasts for Tiger Brennan Drive (to coincide with probable development of Stage 10).
- Undertake an assessment of traffic flows into/out of Bayview for the *status quo* case – maintaining the current form of the Stoddart Drive/TBD intersection.
- Develop alternative improvement options for the Stoddart Drive/TBD intersection.
- Assess the traffic performance of the improvement options, and the consequence of these improvements on the need to further upgrade the Woolner Road/TBD/Bayview Drive intersection.
- Recommend preferred staged improvements for the Stoddart Drive/TBD intersection.



Bayview Development
Road Hierarchy

FIGURE 1.1

2. Traffic Forecasts

2.1 Introduction

A forecasting procedure for assessing the traffic impacts of developments within Bayview was previously developed by Parsons Brinckerhoff (PB)¹. This procedure reflected the generation of traffic resulting from the planned distribution of residences throughout the estate, as a function of traffic parameters pertinent to Darwin. They took explicit account of recent AM peak hour traffic modelling work undertaken by PB for the then Department of Transport & Works (DTW) in Darwin². Forecasts of PM peak hour traffic volumes were derived from the AM peak volumes by the application of factors derived from permanent traffic count data sourced from DTW.

The opportunity has been taken as part of this study to update various parameters and assumptions in the forecasting process, based on traffic count data collected in December 2002. The particular updates comprise:

- Revisions to the vehicle trip generation rate for Bayview.
- Minor changes in the assumed distribution of trips between Bayview and other parts of Darwin.
- Updated AM and PM peak hour traffic forecasts for Tiger Brennan Drive.
- Updated forecasts for peak traffic movements to/from Woolner Road.

Section 2.2 describes the updating process, whilst Sections 2.3 to 2.5 report the main elements of the forecasting process and summary traffic forecasts.

2.2 Updating of Traffic Parameters

2.2.1 Trip Generation Rates

Average AM peak hour trip generation rates for Bayview were updated with reference to:

- AM peak entry/exit traffic data collected at Woolner Road (counts undertaken on 12 December 2002).
- Estimates of occupied dwellings within Bayview (provided by the Bayview Joint Venture).
- Allowances for construction related traffic.

An updated average AM peak hour generation rate of 1.0 trips per household was derived from an analysis of entry and exit volumes at Woolner Road, allowing for a proportion of construction traffic, plus allowing for a small exit volume from Stoddart Drive. Coupled with AM peak hour trips comprising 9.0% of daily traffic, this is equivalent to an overall level of 10.0 trips per household per day. The generation rate for PM peak hour trips was retained at a level of 95% of AM peak rates.

¹ *Bayview Haven Estate Traffic Impact Study*, prepared by PPK Environment & Infrastructure for Willing and Partners, October 1998.

² *Darwin – Development of an AM Peak Hour Traffic Forecasting Model*, prepared by PPK Environment & Infrastructure, August 1999 for the Department of Transport & Works.

2.2.2 Trip Destination for Traffic from Bayview

The previous analysis of traffic movements from Bayview to other sectors of Darwin assumed a bias to the CBD and inner Darwin (49% of trips), with 37% of trips to the northern suburbs, and 15% to the east (Winnellie, Palmerston etc). Observations of traffic movements during the AM peak counts on 12 December 2002 suggested a higher proportion of traffic departing from Bayview via Woolner Road to the Parap/Fannie Bay area and to the northern suburbs. The trip distribution pattern was updated to reflect this observation, as noted in section 2.4 below. In particular, the assumed proportion to the northern suburbs was increased from 37% to 47%.

2.2.3 Traffic Growth on Tiger Brennan Drive

Updated estimates of peak hour traffic volumes along Tiger Brennan Drive have been prepared for 2005, the approximate date at which the proposed Stage 10 development could be completed and occupied. The estimation procedure considered two alternative approaches, both relating to the application of growth factors to current 2002 traffic volumes:

- Growth factors reflecting historic traffic growth trends on TBD over the past 5-6 years.
- Growth factors based on an analysis of traffic forecasts prepared by PB for the then Department of Transport and Works^{3,4} (now Department of Infrastructure, Planning and Environment – DIPE).

The procedures for establishing the 2002 counts, and for deriving the respective growth factors, are described in the following paragraphs.

2002 Traffic Counts

Hourly traffic counts were provided by DIPE from permanent traffic counting stations on TBD just north of Gothenburg Crescent at Stuart Park, and just west of Benison Street at Winnellie. These volumes were in the form of directional counts by hour of day for the full month of September 2002. Counts in September can be reasonably taken as representing average annual volumes, not requiring further seasonal adjustment.

Previous analysis of traffic characteristics on TBD (PPK 1999) showed that the AM peak hour was from 7.30-8.30am. (Approximately 60% of the traffic volumes between 7 and 9am occur over this hour.) The 2002 DIPE counts were adjusted to reflect this peaking characteristic using data derived from counts in 1996/97. The final 2002 counts that form the basis for estimating the 2005 volumes are reported in Table 2.1.

A similar peaking analysis was undertaken for the PM peak hour.

Historic Growth Factors

These factors were derived for the period 1996-2002 (north of Gothenburg Crescent) and for 1997-2002 (west of Benison Street). Values adopted from this analysis for estimating AM peak hour demand in 2005 were:

³ Darwin – Development of an AM Peak Hour Traffic Forecasting Model, prepared by PPK Environment & Infrastructure for the Department of Transport & Works, August 1999

⁴ Updated Traffic Forecasts for the 120,000/150,000/200,000 Population Levels in Darwin, prepared by PPK Environment & Infrastructure for Department of Transport & Works, August 2000.

North of Gothenburg Crescent

- IN 2% p.a.
- OUT 3% p.a.

West of Benison Street

- IN 3% p.a.
- OUT 5% p.a.

Values adopted for the PM peak hour were the reverse of the AM peak values. This represented a reasonable approximation.

Table 2.1 Forecast Peak Traffic Flows on Tiger Brennan Drive

Location/Year	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
North of Gothenburg Cres⁽¹⁾				
2002	1,700	570	550	1,520
2005 – Historic Growth Factors	1,800	630	600	1,620
2005 – Modelled Growth Factors	2,180	740	720	2,020
West of Benison Street⁽²⁾				
2002	1,200	520	470	1,160
2005 – Historic Growth Factors	1,320	600	550	1,270
2005 – Modelled Growth Factors	1,420	680	620	1,350

⁽¹⁾ On CBD approach to the Woolner Road/Tiger Brennan Drive/Bayview Drive intersection

⁽²⁾ On eastern approach to Tiger Brennan Drive/Stoddart Drive intersection

Source: Permanent traffic counts, traffic projections, and consultant estimates

Modelled Growth Factors

Growth factors were derived from an analysis of forecast traffic growth between 1996 and the design 120,000 population level. This analysis assumed that the 120,000 population level would be reached in about 2014, with factors from 2002 to 2005 being derived by interpolation. Values of these factors for the AM peak hour were:

North of Gothenburg Crescent

- IN 7.7% p.a.
- OUT 9.1% p.a.

West of Benison Street

- IN 5.8% p.a.
- OUT 9.4% p.a.

PM peak hour factors were assumed to be the reverse of the AM growth factors, as the traffic model only forecasts AM peak hour traffic flows.

Summary TBD Traffic Forecasts

Table 2.1 reports the 2005 traffic forecasts for TBD at the two respective locations.

The forecasts based on the DIPE traffic model are significantly higher than those based on historic growth rates. They reflect the assumed distribution of future growth in population

and employment in Darwin, together with assumptions regarding future road network improvements. For the analyses presented in later chapters of this report, we have adopted the historic growth factor forecasts as the basis for the analysis, with sensitivity tests being undertaken with the higher modelled forecasts. These latter tests reflect wider network interactions which are not possible with simple historic growth factor extrapolations. They represent a **realistic** upper level of traffic growth on the Darwin arterial road network for the purposes of assessing the timing of potential future road upgrading needs.

2.2.4 Traffic Growth on Woolner Road

Turning movement counts taken on Woolner Road in December 2002 indicated that peak traffic demand has not increased to levels previously forecast, particularly for the right turn movement into Tiger Brennan Drive (south). The AM peak hour count in December 2002 totalled some 468 (or 510 seasonally adjusted) right turning vehicles. Allowing for an average 3% per annum growth rate, revised forecasts of key turning movements between Woolner Road and TBD (south) for 2005 are as reported in Table 2.2. Corresponding estimates as incorporated in previous analyses of traffic access requirements for Bayview are also included in the table for comparison.

Table 2.2 Revised Turning Movements at Woolner Road/TBD

Year	AM Peak Hour ⁽¹⁾		PM Peak Hour ⁽²⁾	
	Revised	Previous	Revised	Previous
2002	510	650	150	180
2005 ⁽³⁾	560	820	160	190

(1) For right turn from Woolner Road into Tiger Brennan Drive (south)

(2) For left turn from Tiger Brennan Drive (south) into Woolner Road

(3) Assuming development of Bayview stages 1-9

Source: 12/12/02 Traffic Counts (Bayview Joint Venture) and consultant estimates

2.3 Traffic Generation

Traffic generated by the Bayview development, including stage 10, has been estimated as a function of average trip rates per dwelling (as updated in Section 2.2.1), and the number of dwellings located within each of the discrete subdivision areas.

The following traffic generation parameters have been adopted:

- Residential densities for each zoning category are:
 - 1 dwelling per R0/R1 zoned allotment
 - 1 dwelling per 300 m² for R2
 - 1 dwelling per 100 m² for R4.
- The daily number of trips generated per household is 10.0 trips, with 9% of these taking place in the AM peak hour.
- Trips taking place in the PM peak hour represent approximately 95% of the total AM peak flows, in the reverse direction. (This proportion was derived from an analysis of permanent traffic count data from Tiger Brennan Drive near to Gothenburg Crescent.)
- Commercial floor space is about 40% of the area zoned for commercial purposes.

- Trips attracted to the proposed commercial areas allowed for trips to work by employees and for travel by commercial vehicles.

2.4 Traffic Assignment

This section overviews the relative assignment of trips generated by the Bayview development. It is understood that there will be no schools or significant shopping facilities provided within Bayview, and so all such trips must necessarily travel to other such destinations elsewhere in Darwin. Assumptions upon which the assignment of Bayview traffic has been made comprise:

- Trip purpose during the AM peak hour comprises 50% for work trips, 10% for school, 20% for shopping, and 20% for other purposes. These values were derived from previous travel modelling work undertaken by PB in Darwin.
- Directional purpose movements from Bayview, as updated in accordance with the analysis outlined in section 2.2.2, were assumed as:

▶ Work:	south 50%	north 40%	east 10%
▶ Shopping:	south 25%	north 70%	east 5%
▶ School:	south 40%	north 50%	east 10%
▶ Other:	south 40%	north 50%	east 10%

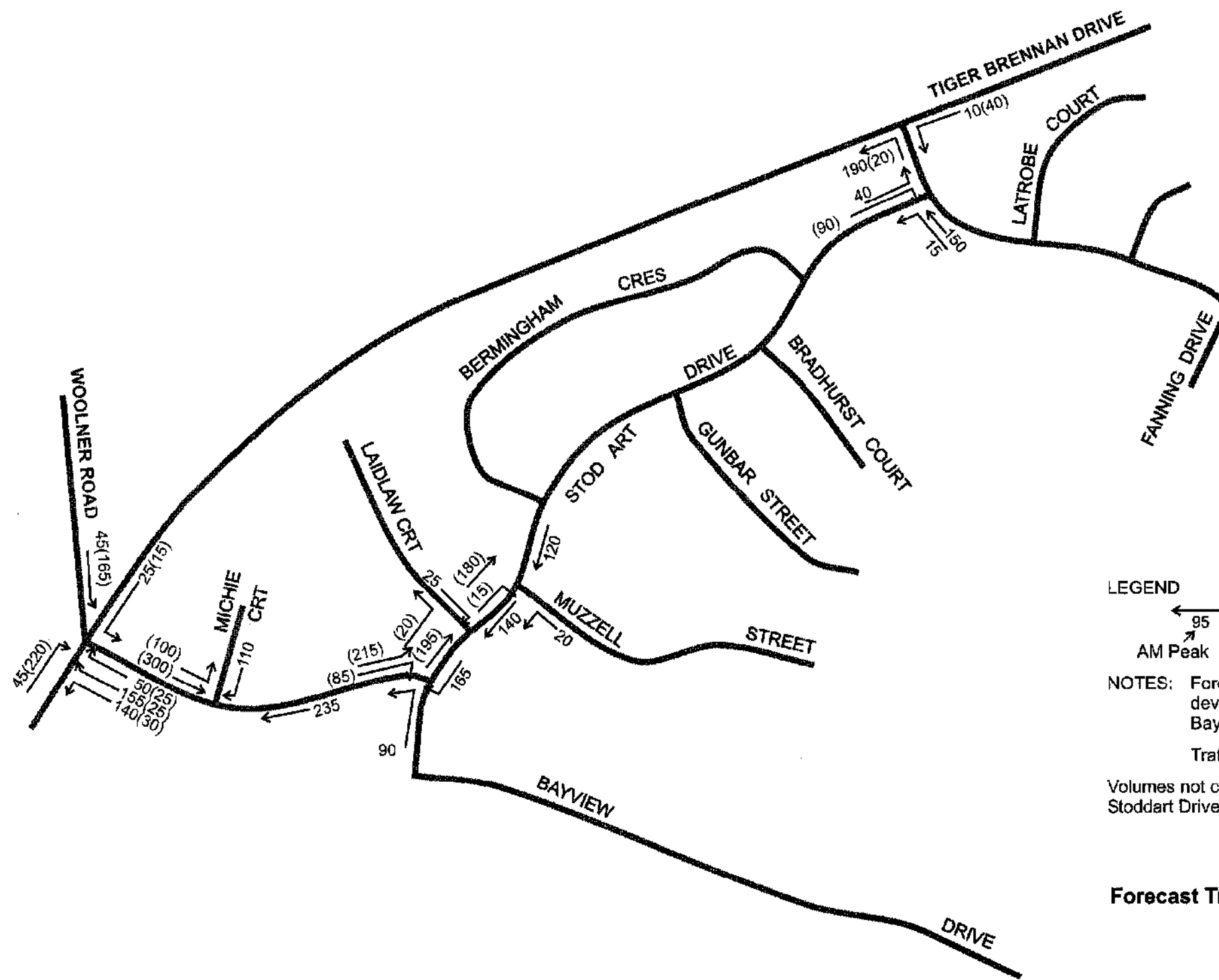
These directional movements imply the following broad trip destinations:

- ▶ South: Travel via Tiger Brennan Drive to the Darwin CBD area
- ▶ North: Travel via Woolner Road to the inner suburbs (Parap and Fannie Bay) and to the northern suburbs (Nightcliff, Casuarina and Sanderson)
- ▶ East: Travel via Tiger Brennan Drive to Winnellie, Berrimah and Palmerston.
- During the AM peak hour, 85% of trips leave Bayview, with 15% returning.
- The relative distribution of trips to the Woolner Road and Stoddart Drive exits varied by precinct, reflecting the proximity of each.

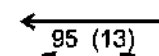
Traffic which would turn right from Stoddart Drive onto Tiger Brennan Drive, or right turn from TBD into Stoddart Drive, was assigned to the Woolner Road entry/exit point for the left in/left access option at Stoddart Drive.

2.5 Traffic Forecast Summary

Figure 2.1 summarises the key forecast AM and PM peak hour traffic volumes at the Stoddart Drive and Woolner Road access points and midblock movements along Stoddart and Bayview Drives. Appendix A contains a listing of the spreadsheet analysis undertaken to derive these estimates for 2005 (stage 10), based on the methodology described above.



LEGEND



AM Peak PM Peak

NOTES: Forecasts assume complete development of all stages of Bayview Haven

Traffic volumes Stages 1 – 10

Volumes not constrained by capacity of Stoddart Drive exit

Forecast Traffic Volumes, 2005

FIGURE 2.1

3. Traffic Impact Assessment (Status Quo)

3.1 Introduction

Access into/out of Bayview Haven is presently provided via:

- The existing left in/left out arrangement at Stoddart Drive/Tiger Brennan Drive
- The full movement four way intersection at Bayview Drive/Tiger Brennan Drive/Woolner Road.

The future performances of these intersections will be influenced by growth in regional traffic movements (Tiger Brennan Drive, Woolner Road), and by growth in traffic demand from Bayview as residential infill continues. It is the growth in traffic flows on Tiger Brennan Drive, however, that will have the most significant impact on future intersection performance.

In reflection of the external traffic impacts on Bayview access, this chapter presents the following analyses of the status quo access arrangements:

- Performance of Stoddart Drive/Tiger Brennan Drive for 2002 and 2005 (Stage 10 complete). This analysis demonstrates that the growth in traffic flows on TBD will constrain the effective volume of traffic that can exit (left turn) onto TBD in the AM peak hour, (with residual traffic expected to reroute through Bayview to use the intersection at Bayview Drive/TBD/Woolner Road).
- Performance of Woolner Road/TBD/Bayview Drive intersection for 2002 and 2005 (Stage 10 complete). This analysis shows the extent to which the performance of this intersection is expected to decline over the period to 2005, as a function of regional traffic growth (primarily) and infill in Bayview stages 1-9 and additional demand from the proposed stage 10. It enables some indicative conclusions to be drawn as to the need for, and timing of, improvements to the intersection whether or not stage 10 of Bayview is developed.
- Assessment of the intersection of Stoddart Drive with Bayview Drive, and a general overview of internal traffic flows with respect to nominal desirable capacities of the road hierarchy expressed in the internal Bayview road network.

This chapter also considers the expected need to increase capacity on Tiger Brennan Drive between Winnellie and Woolner Road, in response to growth in regional traffic demand.

3.2 Performance of Stoddart Drive/Tiger Brennan Drive

The intersection of Stoddart Drive and Tiger Brennan Drive is currently a left in/left out configuration and is unsignalised with give-way control of Stoddart Drive, as shown in Figure 3.1 below.

Forecasts of (unconstrained) peak hour traffic movements left turning into TBD in 2005 are:

- Bayview stages 1-9 complete: 155 AM peak, 20 PM peak.
- Bayview stages 1-10 complete: 190 AM peak, 25 PM peak.

Left turn volumes from TBD into Stoddart Drive are forecast to be minor.

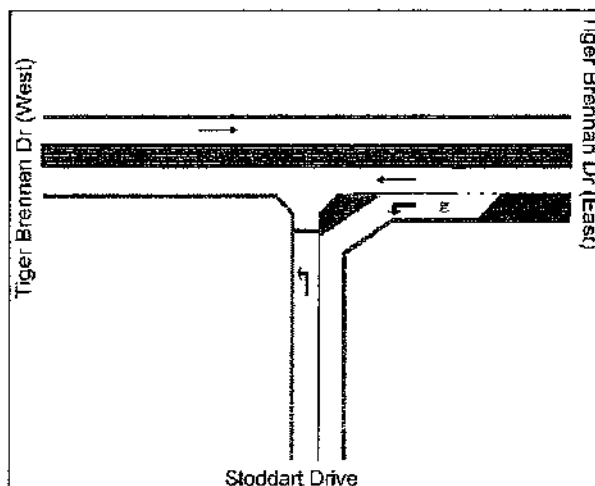


FIGURE 3.1
Intersection Geometry: Stoddart Drive left in/left out

Results from a SIDRA analysis undertaken for 2005 for the AM and PM peak hour periods are respectively summarised in Tables 3.1 and 3.2 below. The tables report the degree of saturation on Stoddart Drive and resultant queue length and delay for vehicles by 2005 for the Bayview stages 1-9 and 1-10 scenarios.

Table 3.1 AM peak performance – Stoddart Drive/Tiger Brennan Drive

Year	Degree of Saturation for Stoddart Drive	Queue Length (m)	Delay (sec)
2005 (stages 1 to 9)	1.292 (L)	224	360.6
2005 (stages 1 to 10)	1.583 (L)	375	605.2

Source: SIDRA Analysis

Table 3.2 PM peak performance – Stoddart Drive/Tiger Brennan Drive

Year	Degree of Saturation for Stoddart Drive	Queue Length (m)	Delay (sec)
2005 (stages 1 to 9)	0.047	2	16.5
2005 (stages 1 to 10)	0.047	2	16.5

Source: SIDRA Analysis

The main conclusions to be drawn from the above tables comprise:

- The high volume of inbound traffic on Tiger Brennan Drive in the AM peak period is expected to constrain the volume of traffic able to exit from Stoddart Drive due to insufficient gaps being available.

- Due to these gap constraints, a significant proportion of vehicles would likely choose to exit Bayview via the Woolner Road intersection to reduce queuing delays, leading to a higher level of internal traffic movements through Bayview on Stoddart Drive.
- The intersection performs satisfactorily during PM peak.

Assuming an acceptable delay of less than 60 seconds during the AM peak, only some 85 left turning vehicles will be able to find acceptable gaps at the Stoddart Drive exit by 2005. Therefore, some 70 (stages 1-9) and 105 (stages 1-10) vehicles would likely reroute to exit via the Woolner Road intersection, leading to increased queue length and delay for other vehicles already using that exit. This traffic shift from Stoddart Drive will also increase delays for traffic on the Woolner Road and Tiger Brennan Drive approaches as a consequence.

Estimates of resultant AM and PM peak hour traffic movements on the Bayview road network, assuming rerouting of surplus exiting traffic from Stoddart Drive to the Woolner Road intersection, are summarised in Figure 3.2 (for Bayview stages 1-10). These flows were subsequently used in the analysis of Woolner/Tiger Brennan Drive/Bayview Drive intersection (section 3.3) and the Stoddart Drive/Bayview Drive roundabout (section 3.5) to determine the consequences of no improvement at the Stoddart Drive exit.

3.3 Assessment of Woolner Road/Tiger Brennan Drive/Bayview Drive

The intersection of Woolner Road, Tiger Brennan Drive and Bayview Drive allows all traffic movements into and out of Bayview as illustrated in Figure 3.3. It is signalised, and for the purpose of this assessment, a 120 second cycle time has been assumed. Analysis of its performance assumed a rerouting of traffic from the Stoddart Drive exit (as described in section 3.2 above) during the AM peak period; details of the traffic volumes for each movement are provided in Appendix C.

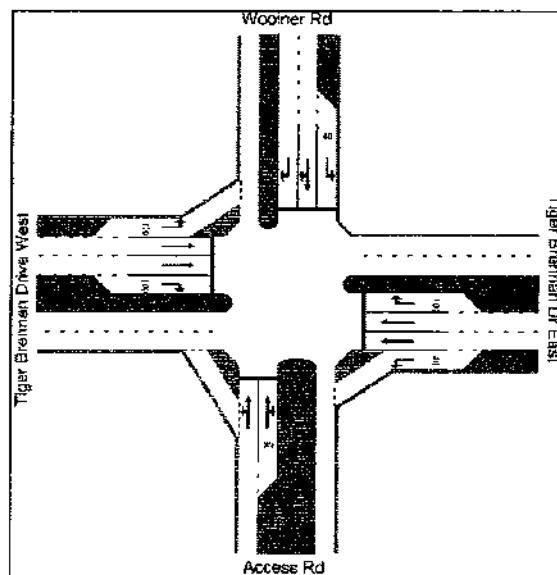
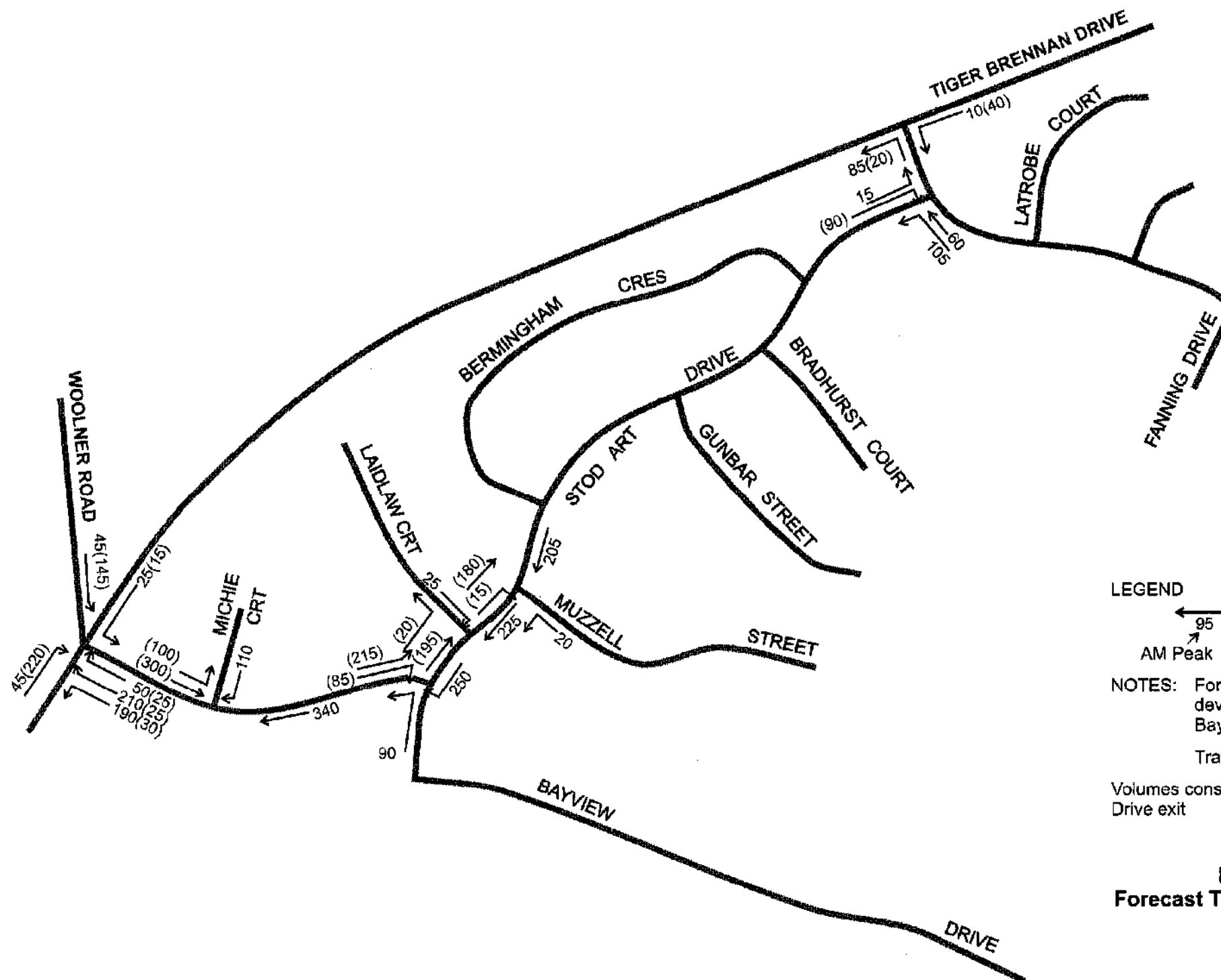
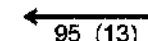


FIGURE 3.3
Intersection Geometry: Woolner Road/Tiger Brennan Drive/Bayview Drive



LEGEND



AM Peak PM Peak

NOTES: Forecasts assume complete development of all stages of Bayview Haven

Traffic volumes Stages 1 – 10

Volumes constrained at Stoddart Drive exit

**Redistributed Traffic
Forecast Traffic Volumes, 2005**

FIGURE 3.2

Results from the SIDRA analysis undertaken for 2005 for the AM and PM peak hours are summarised in Tables 3.3 and 3.4 respectively. The tables report the critical degree of saturation for each intersection approach, and compare the current traffic performance (from traffic counts 12th December 2002), and the currently approved stages 1 to 9 by 2005. Also shown in the tables are the performance results for stages 1-10 and the sensitivity test case, assuming higher regional traffic flows on TBD (refer section 2.2.3). For a summary of queue length and delay, refer to summaries in Appendix C.

Table 3.3 AM Peak Performance - Woolner Road/Tiger Brennan Drive/Bayview Drive

Year	Critical Degree of Saturation x Approach			
	Tiger Brennan Drive (W)	Tiger Brennan Drive (E)	Woolner Road	Bayview Drive
2002	0.301 (T)	0.737 (T)	0.713 (T, R)	0.667 (L, T, R)
2005 (stages 1 to 9)	0.365 (T)	0.901 (T)	0.883 (T, R)	0.894 (L, T, R)
2005 (stages 1-10)	0.371 (T)	0.921 (T)	0.920 (T, R)	0.929 (L, T, R)
2005 Sensitivity ⁽¹⁾	0.454 (T)	0.972 (T)	0.960 (T, R)	0.945 (L, T, R)

⁽¹⁾ Stages 1 to 10

Source: SIDRA Analysis

Table 3.4 PM Peak Performance - Woolner Road/Tiger Brennan Drive/Bayview Drive

Year	Critical Degree of Saturation x Approach			
	Tiger Brennan Drive (W)	Tiger Brennan Drive (E)	Woolner Road	Bayview Drive
2002	0.700 (T)	0.235 (T)	0.287 (T, R)	0.382 (L, T, R)
2005 (stages 1 to 9)	0.753 (T)	0.352 (R)	0.546 (T, R)	0.342 (T, R)
2005 (stages 1-10)	0.753 (T)	0.352 (R)	0.606 (T, R)	0.342 (T, R)
2005 Sensitivity ⁽¹⁾	0.808 (T)	0.389 (R)	0.606 (T, R)	0.342 (T, R)

⁽¹⁾ Stages 1 to 10

Source: SIDRA Analysis

3.3.1 Current Intersection Performance

Tables 3.3 and 3.4 show that the current intersection configuration performs satisfactorily in 2002 for all approaches in terms of degree of saturation for all movements. It is noted, however, that:

- Modelled queue lengths approach 215m on the TBD (east) approach in the AM peak hour. This length blocks both the right turn and left turn lanes. Average delays are approaching 30 seconds.
- Queue lengths on the Woolner Road approach are in the order of 120m, with a corresponding delay of 60 seconds, due to the high right turn volume.

3.3.2 Performance in 2005

In its current layout, the performance of this intersection can be expected to degrade by 2005. The analysis indicates that the Tiger Brennan Drive (east), Woolner Road and Bayview Drive approaches are expected to reach practical capacity (degree of saturation 0.9) by 2005 for full development of stages 1-9 and stage 10 within Bayview. The additional traffic generated by Stage 10 does not have a marked additional impact on the performance of the intersection. The sensitivity test shows high degrees of saturation on all approaches (excepting TBD west).

Key performance measures output from the Sidra analysis for the AM peak hour pertinent to this assessment comprise:

- Queue lengths on TBD (east) around 300m, with an average delay for the through traffic of 50-55 seconds.
- Queue lengths in the order of 160m on Woolner Road approach, with an average delay of over 70 seconds.
- Queues of over 120m and a corresponding average delay of over 60 seconds for traffic exiting from Bayview Drive.

These measures indicate that the intersection will not be performing well in 2005, and will likely need significant improvements to provide an acceptable level of service.

3.3.3 Need for Further Intersection Upgrading

In summary, the foregoing traffic analysis has shown:

- Upgrading of the intersection likely to be required by about 2005. Excessive degrees of saturation, queue lengths and delays are expected on the Tiger Brennan Drive (east), Woolner Road and Bayview Drive approaches.
- Traffic generated by the proposed Bayview Stage 10 development will not lead to a marked further degradation of intersection performance over and above that expected for stages 1-9 and background regional traffic growth.

More detailed analysis is needed to determine the optimum form of improvements, but will desirably include upgrading of the TBD (east) and Woolner Road approaches, and possibly the Bayview Drive approach. Such improvements would be the responsibility of DIPE.

The scope of improvements may, however, be influenced by the nature of potential improvements to Stoddart Drive, as discussed in Section 4.

3.4 Need for Upgrading of Tiger Brennan Drive

Significant growth in traffic demand along Tiger Brennan Drive is expected over the next 10-15 years as urban development in and around Darwin continues. Section 2.2.3 presented an analysis of peak hour growth near Gothenburg Crescent and near Benison Street, (as an input to the intersection analyses). This analysis needs to be taken further, as the extent of growth is expected to require upgrading of Tiger Brennan Drive in the medium term, and this can be expected to have an impact on future access arrangements to Bayview.

Forecast traffic flows on TBD by section are summarised in Table 3.5 for the AM and PM peak hours. This includes volumes for:

- 2002
- 2005 (Bayview stages 1-9)
- 2005 (Bayview stages 1-10)
- 2005 (sensitivity test)
- 2009

Table 3.5 Forecast Growth in Peak Traffic Demand on Tiger Brennan Drive

Year/Scenario	Directional Peak Hour Traffic by Location		
	South of Woolner Road	Woolner Road to Stoddart Drive	East of Stoddart Drive
2002			
AM - In	1,785	1,240	1,200
PM - Out	1,520	1,160	1,160
2005 (Stages 1-9)			
AM - In	1,990	1,395	1,320
PM - Out	1,805	1,270	1,270
2005 (Stages 1-10)			
AM - In	2,010	1,395 ⁽²⁾	1,320
PM - Out	1,940	1,270 ⁽²⁾	1,270
2005 (Sensitivity Test)			
AM - In	2,180	1,495	1,420
PM - Out	2,020	1,350	1,350
2009⁽¹⁾			
AM - In	2,600	1,790	1,700
PM - Out	2,400	1,600	1,600

(1) Based on average growth rates determined from Darwin travel model – see section 2.2.3

(2) Same as stages 1-9, due to AM peak capacity constraints for traffic left turning from Stoddart Drive onto TBD.

Source: Section 2.2.3, consultant estimates

The main conclusions that can be drawn from the table are:

- By 2005, the section of Tiger Brennan Drive between Woolner Road and the CBD is expected to require two outbound lanes to meet projected PM peak hour traffic demand. (The inbound carriageway was previously duplicated.)
- The sensitivity test at 2005 indicates that Tiger Brennan Drive (inbound) will be operating at about 85% of effective service capacity (taken as 1,850 veh/lane/hour) between Stoddart Drive and Woolner Road, and at about 80% of effective service capacity east of Stoddart Drive. These levels will further constrain the effectiveness of the existing left turn from Stoddart Drive onto TBD, with fewer gaps for merging traffic.
- The traffic estimates at 2009, 4 years after the potential completion of stage 10, are shown to be around effective service capacity limits for TBD east of Woolner Road. Duplication of TBD between Woolner Road and Winnellie would probably be warranted by about this time. The timing of such roadworks (the responsibility of DIPE) is important in the context of the type of potential improvements needed for upgrading the Stoddart Drive/TBD intersection (chapter 4).

3.5 Performance of Stoddart Drive/Bayview Drive

The intersection of Stoddart Drive and Bayview Drive is a two way roundabout with 3 approach legs, all 11m collector roads, as shown in Figure 3.4. All returning PM peak traffic (with the exception of traffic from the east) is required to enter via the Woolner Road intersection. This results in high PM peak flows through the roundabout. With the redistribution of traffic internally due to queue length and delay at the Stoddart Drive exit, AM peak movements will also be high.

With development of stage 10, the highest peak hourly traffic volumes which are likely to occur at the roundabout by 2005 are forecast as follows:

- AM Peak: Some 250 vehicles turning from Stoddart Drive to Bayview Drive (W) and 90 vehicles from Bayview Drive (S) to Bayview Drive (W).
- PM Peak: Some 300 vehicles entering via the Bayview Drive (W) approach with 85 continuing through to Bayview Drive (S) and the remaining 215 vehicles turning left onto Stoddart Drive.

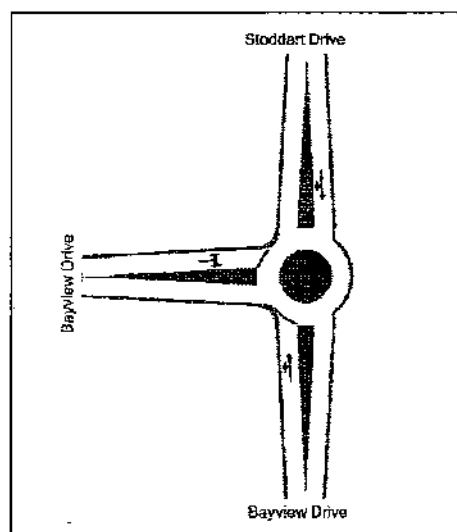


FIGURE 3.4
Intersection Geometry: Stoddart Drive/Bayview Drive

Results from a SIDRA analysis of this intersection are shown in Table 3.6. Additional queue length and delay statistics are provided in Appendix D.

Table 3.6 AM and PM Peak Performance – Stoddart Drive/Bayview Drive

Year	Period	Critical Degree of Saturation x Approach		
		Bayview Drive (W)	Bayview Drive (S)	Stoddart Drive
2005	AM	0.049	0.094	0.128
2005	PM	0.152	0.009	0.063

Source: SIDRA Analysis

The analysis demonstrates that congestion at this intersection will be low, even with full development of stage 10.

3.6 Road Network Assessment

Stoddart Drive and Bayview Drive have varying cross sections as illustrated in Figure 1.1 with pavement widths of:

- 8 m on Stoddart Drive between Laidlaw Court and Bradhurst Court.
- 11 m on Stoddart Drive between Bradhurst Court and Bermingham Crescent (east).
- 11 m Stoddart Drive between Laidlaw Court and Bayview Drive roundabout.
- 11 m along Bayview Drive between Michie Court and the roundabout with Stoddart Drive.
- 13 m on sections of both roads abutting Tiger Brennan Drive.

The estimated maximum PM peak hour traffic flow along Stoddart Drive by 2005 is 195 vehicles between Bayview Drive and Laidlaw Court. This volume decreases east of Laidlaw Court to 180 vehicles and continues to decrease to the east (Figures 2.1 and 3.2). The estimated total AM peak traffic flow by 2005 within the same section of Stoddart Drive is around 165 vehicles (Figure 2.1) but may increase to 250 vehicles (Figure 3.2) if vehicle flows from the Stoddart Drive exit are restricted.

It is important to put these volumes into context: the typical midblock capacity of one lane with an occasional parked vehicle is an estimated 600 vehicles per hour⁵. The volumes are therefore within estimated capacity limits. Given the pavement width of Stoddart Drive between Laidlaw Court and Bradhurst Court being only 8m, there is potential for parked vehicles along this section of Stoddart Drive to restrict the flow of vehicles. In this respect it is noted that previous recommendations⁶ for the construction of off-street parking bays have been accepted by the Bayview Joint Venture. In conjunction with appropriate parking controls, such bays will remove the potential for parked vehicles to impede through traffic movements.

⁵ *Roadway Capacity, Guide to Traffic Engineering Practice Part 2 (Page 28)*, AustRoads.

⁶ *Bayview Development Traffic Impact Study: Proposed Lease Extension*, prepared by PPK Environment & Infrastructure for Austcorp, August 2000.

4. Upgrading of Stoddart Drive/Tiger Brennan Drive

4.1 Introduction

This section investigates the potential to implement improvements to the Stoddart Drive / Tiger Brennan Drive intersection in such a way as to:

- Increase the capacity of the existing left in/left out arrangement
- Allow for right turn in/out access, thereby improving overall accessibility to the Bayview estate.

Improvements at Stoddart Drive would have a secondary benefit to the operation of the Woolner Road intersection, which is expected to need significant improvements within the next 3 years as indicated in chapter 3.

The approach taken in identifying and assessing potential improvements considered:

- The potential to implement improvements in a cost effective staged process
- The potential 'life' of improvements before further improvements become necessary due to regional traffic growth on Tiger Brennan Drive
- The need for (unsignalised) improvements to operate safely, given the high existing traffic volumes on Tiger Brennan Drive, and the high speed regime.

Development of the alternative options (Section 4.2) reflects this approach, and takes explicit account of the previous intersection configuration at Stoddart Drive/TBD, wherein a protected right turn lane from TBD into Stoddart Drive was provided, together with a left turn deceleration lane from TBD. We have sought to utilise this pavement as far as possible to reduce the costs of intersection upgrading, but bearing in mind the expected need for upgrading of Tiger Brennan Drive past Bayview as outlined in section 3.4.

4.2 Development of Improvement Options

This section describes a potential staged series of options to upgrade the capacity of the Stoddart Drive/TBD intersection. The process is aimed at enabling a trade-off in upgrading costs as a function of the effective life of the intersection being achieved at each stage of the process. The options comprise:

1. Upgrading of the existing left in/left out arrangement, without signalisation, with a 200 m long acceleration lane for traffic left turning from Stoddart Drive.
2. As for option 1, but restoring the right turn lane for traffic to right turn from TBD via a filter manoeuvre.
3. Signalise the intersection, to allow full movements into/out of Stoddart Drive. This would require an additional approach lane and exit lane (both about 150m in length) on Tiger Brennan Drive for the inbound and outbound directions.

4.3 Assessment of Improvement Options

4.3.1 Option 1

Option 1 comprises an acceleration lane out of Stoddart Drive into Tiger Brennan Drive with a 200 m minimum length⁷, as illustrated in Figure 4.1. The purpose of the acceleration lane is to allow turning traffic to accelerate up to speeds consistent with through traffic on TBD (in an 80 km/h speed zone), thereby enabling a safe zip merge procedure. This option does not include signalisation.

The analysis assumes that the upgraded intersection will not act as a constraint on left turning exit traffic i.e. there will be no rerouting of traffic to exit Bayview via the Woolner Road intersection, as described in chapter 3. (This assumption is consistent across all three improvement options.) Performance of this option in 2005 (stages 1 to 10) for the AM peak hour is reported in Table 4.1 and Appendix E. (Performance of the intersection in the PM peak is unaffected by this option.)

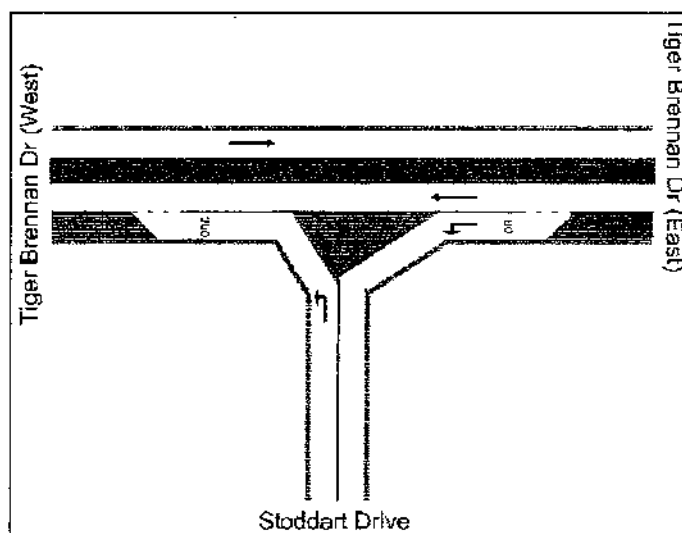


FIGURE 4.1
Intersection Geometry: Option 1

Table 4.1 Performance of Option 1 (2005)

Period	Critical Degree of Saturation x Approach		
	Tiger Brennan Drive (W) ⁽¹⁾	Tiger Brennan Drive (E)	Stoddart Drive
AM Peak	0.305	0.732	0.103

⁽¹⁾ TBD (W) traffic is free flowing and therefore ultimately unaffected by this improvement option. The DoS for TBD (east) reflects the through volume as a proportion of the effective service capacity.

Source: SIDRA Analysis

The results presented in Table 4.1 show that the Stoddart Drive approach performs satisfactorily at 2005, though there may be some safety concerns with the merging of exiting traffic onto the high speed regime on Tiger Brennan Drive. The effective life of this option will, nevertheless, be influenced by the future rate of growth in traffic on the Tiger Brennan Drive (east) approach. Disruptions to traffic movements inbound on TBD are likely

⁷ Intersections At Grade, Guide to Traffic Engineering Practice Part 5 (Table 5.8), AustRoads

to become prevalent after traffic volumes exceed approximately 1,500 vehicles per hour. The analysis reported in section 3.4 indicates that this could occur shortly after 2005. Section 3.4 further suggests that upgrading of TBD (duplication) could be needed by about 2009.

4.3.2 Option 2

Option 2 (Figure 4.2) is similar to option 1, but allows traffic to turn right from Tiger Brennan Drive into Stoddart Drive. This will allow a decrease in the number of vehicles entering at Bayview Drive and lessen the amount of internal through traffic along Stoddart Drive. Most of the right turning will take place in the PM peak hour, when inbound volumes on TBD are forecast to be in the order of 550 vehicles per hour by 2005. The option would utilise the road pavement previously in place for the right turn manoeuvre. The left turn acceleration lane (option 1) has been included as part of this option, so that the overall benefits of a staged improvement can be assessed.

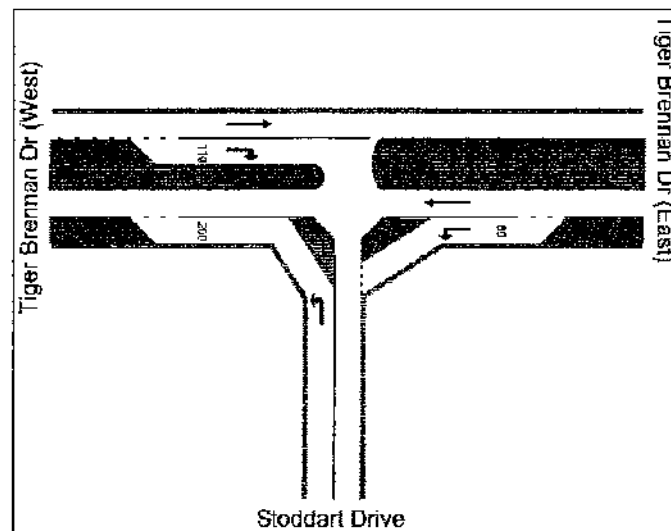


FIGURE 4.2
Intersection Geometry: Option 2

Summary peak hour performance of this option (stages 1-10 at Bayview) is reported in Table 4.2 and Appendix F.

Table 4.2 AM Peak Performance - Option 2 (2005)

Period	Critical Degree of Saturation x Approach		
	Tiger Brennan Drive (W)	Tiger Brennan Drive (E)	Stoddart Drive
AM Peak	0.308 (T)	0.732 (T)	0.103 (L)
PM Peak	0.702 (T)	0.289 (T)	0.011 (L)

Source: SIDRA Analysis

The results in Table 4.2 confirm that the combined improvements would provide an effective option for improving left turn exits from Stoddart Drive (mainly in the AM peak) and right turn

entry (into Stoddart Drive (mainly PM peak). Main issues and concerns with the option, however, are:

- **Safety.** There is some concern with the safe right turning of vehicles in the AM peak hour. Whilst the number of vehicles expected to turn is low, there may be some difficulties for drivers to safely pick suitable gaps in the inbound traffic flow on TBD, given the high volume and the 80 km/h speed regime. (There is not expected to be the same concern in the PM peak when inbound volumes are much lower.) The turn manoeuvres can probably be undertaken safely in the short term, but as traffic demand on TBD increases (Table 3.5) then safety concerns will arise.
- **TBD development.** Operation of the unsignalised arrangement would be unsafe when Tiger Brennan Drive is duplicated in due course, when right turning traffic would need to cross two lanes of heavy, high speed traffic. The timing of duplication of Tiger Brennan Drive will therefore impact upon how long an unsignalised arrangement could safely function.

In summary, this option offers a workable short term solution, but one which will have increasing safety concerns as traffic on TBD continues to increase.

4.3.3 Option 3

This option incorporates signalisation of the intersection, with the following main features:

- Full turn movements to be provided.
- The Tiger Brennan Drive approaches (east and west) would need to be upgraded to provide an additional 200m approach and exit lane. These additional lanes would be required to provide sufficient capacity for the through traffic movements on TBD.
- A right turn lane into Stoddart Drive would be needed, plus a deceleration/left turn lane into Stoddart Drive.

The concept is illustrated in Figure 4.3.

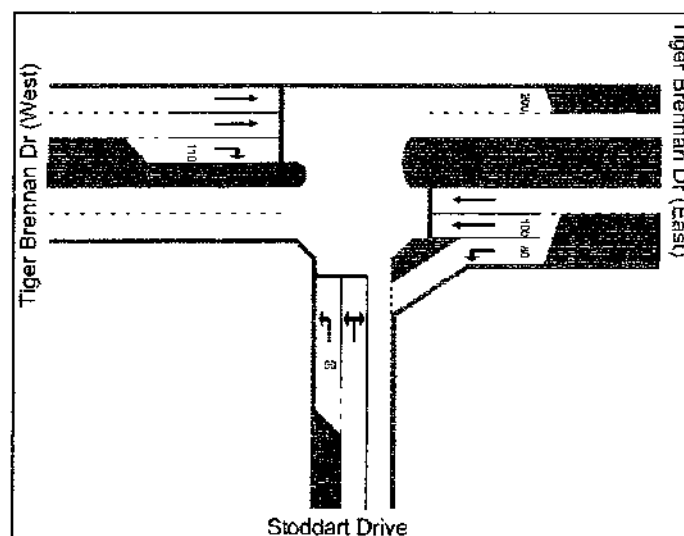


FIGURE 4.3
Intersection Geometry: Option 3

Performance of this option arrangement has been analysed using Sidra for Bayview stages 1-10, with the results presented in Table 4.3.

Table 4.3 AM Peak Performance – Option 3

Period	Critical Degree of Saturation x Approach		
	Tiger Brennan Drive (W)	Tiger Brennan Drive (E)	Stoddart Drive
AM Peak	0.360 (R)	0.646 (T)	0.590 (L, R)
PM Peak	0.519 (T)	0.379 (T)	0.180 (R)

Source: SIDRA Analysis

The results presented in Table 4.3 show that this option will operate efficiently at 2005 (and beyond). Modelled delays and queue lengths (Appendix F) are low on Tiger Brennan Drive. This option therefore represents a safe and efficient arrangement for at least the short to medium term. A separate analysis for this option (stages 1-9 in Appendix F) has also demonstrated that the addition of stage 10 at Bayview would lead to little net impact on intersection performance.

What needs to be considered with this option is the timing of future duplication of Tiger Brennan Drive by DIPE. Duplication would involve the construction of a second carriageway, with a substantial median (indicatively in the order of 5m or more). The Option 3 layout will become redundant when duplication takes place, with the intersection then needing to be reconstructed to reflect the dual carriageways and median. If the need for duplication is warranted by say 2008/09 as suggested in section 3.4, then the expenditure on this option may become redundant within a very short timeframe.

4.4 Implications for Woolner Road Intersection

Section 3.3 presented the results of an analysis of the performance of this intersection, assuming no upgrading of the Stoddart Drive/TBD intersection. It concluded that significant upgrading might be needed by around 2005, depending on the future growth in traffic on Tiger Brennan Drive. Such improvements would likely be needed irrespective of whether or not stage 10 is constructed at Bayview. In summary, conclusions reached were:

- Upgrading of the intersection would likely be required by about 2005, for most approaches.
- The incremental addition of traffic from the proposed stage 10 in Bayview is not likely to have any marked impact on upgrading requirements.

A reassessment of how the upgrading of the Stoddart Drive exit would impact on the need for further improvements to the Woolner Road intersection has been undertaken. This reanalysis (see detailed Sidra results in Appendix H) has shown that the need for improvements could be deferred for in the order of 3-4 years, due to the shifting of traffic movements to Stoddart Drive/TBD. This timing would be consistent with the expected need to upgrade Tiger Brennan Drive by about 2009 (section 3.4).

5. Summary

The performance of the Woolner Road and Stoddart Drive intersections have been documented respectively in Sections 3 and 4. A summary of the findings are presented in this section for further consideration, together with a proposed staged upgrading strategy for the Stoddart Drive/TBD intersection.

The analysis has clearly demonstrated that the addition of stage 10 at Bayview will not have any significant impact on the need for, or timing of, intersection upgrading requirements either at Stoddart Drive or at the Woolner Road intersection. This is discussed further below.

5.1 Summary

5.1.1 Woolner Road/Tiger Brennan Drive/Bayview Drive Intersection

Analysis undertaken assuming no upgrading of the Stoddart Drive/Tiger Brennan Drive intersection (Section 3) has demonstrated the following impacts at the intersection of Woolner Road with Tiger Brennan Drive and Bayview Drive:

- Upgrading of most approaches is likely to be required by about 2005. The forecast growth in AM peak hour regional traffic, plus increased traffic from Bayview as infill in the current 9 stages continues, will lead to increasingly poor levels of service on the Woolner Road, Tiger Brennan Drive (east) and Bayview Drive approaches. Intersection degrees of saturation (DoS) will exceed 0.90, and queue lengths and average delays will start to become excessive.
- Approval of Bayview stage 10 will not change the need for or scope of required improvements at the intersection. Traffic generated by the Stage 10 development would represent only a marginal increase in traffic flows.

Section 3.4 has also shown that the expected growth in traffic demand on Tiger Brennan Drive will require several sections to be duplicated, comprising:

- The outbound lane between the CBD and Woolner Road (from the current single lane to two lanes) – required to meet projected PM peak hour demand by about 2005.
- The carriageway between Woolner Road and Winnellie to a full 2+2 lane cross section, by about 2009. (The extent of duplication, probably to Amy Johnson Avenue, would need to be determined through a more detailed investigation.)

5.1.2 Improvements to Stoddart Drive/Tiger Brennan Drive

The intersection analyses reported in Section 4 considered a range of potential staged improvements to this intersection. In particular the analyses showed that improvements are desirable, whether or not stage 10 of Bayview proceeds.

- The left in/left out configuration of Stoddart Drive will not provide a satisfactory AM peak hour performance in 2005 due to gap constraints in the high volume inbound traffic flow on Tiger Brennan Drive. This constraint is expected to effectively lead to rerouting of a significant proportion of traffic through Bayview to exit via the Woolner Road intersection. The configuration was shown to be deficient for traffic from the currently approved stages 1 to 9.
- An acceleration lane for left turning traffic from Stoddart Drive into Tiger Brennan Drive (Option 1) would provide an acceptable level of service to enable unconstrained movements of traffic from Bayview (including stage 10) until about 2005. At this time the merging of traffic from Stoddart Drive is expected to begin to impact on inbound traffic flows on TBD (when AM peak hour traffic volumes are expected to reach about 1,500 veh/lane/hour). Disruptions to TBD traffic flows will start to become significant.
- The further provision of a right turn lane into Stoddart Drive (Option 2) would provide for more direct entry of traffic to the northern and eastern stages of Bayview (stages 7b, 8a/8b, 9, 10), bypassing entry at Woolner Road. This would benefit operations of the Woolner Road intersection, and also result in reduced internal traffic movements within Bayview. The main concerns with this option relate to safety, and the potential for crashes if right turning vehicles are not able to properly judge gaps in the high speed inbound peak traffic flows on TBD, particularly in the AM peak hour.
- A full access intersection at Stoddart Drive (Options 3) would need to be signalised for safety reasons. The intersection performance analysis showed that this option would provide an acceptable level of service beyond 2005, though its "life" would be constrained by the growth in traffic on TBD and the need for this road to be duplicated past Stoddart Drive (indicatively by around 2009 as noted in section 5.1.1).

The options analysed represent a potential staged sequence of improvements, utilising the previous pavement as far as possible as a means of containing construction costs.

5.2 Staged Improvements to Stoddart Drive/Tiger Brennan Drive Intersection

Developing a recommended staged program of improvements for this intersection is strongly influenced by the growth in regional traffic demand on Tiger Brennan Drive, and the consequential need to duplicate the section between Woolner Road and Winnellie in the medium term (by about 2009). The objective is to define improvements that will improve accessibility to Bayview at Stoddart Drive, that will be operationally and cost effective, but which will also provide an effective life before DIPE needs to upgrade TBD. In reflection of these objectives, the following alternative upgrading approaches could be considered:

- Construct a left turn acceleration lane for traffic exiting Bayview at the Stoddart Drive exit by say 2004. This would allow unconstrained left turning of traffic from Bayview up to about 2006, before these movements begin to cause significant impacts on inbound AM peak hour traffic flows on TBD. The effectiveness of this option would then begin to decline.
- The median be reopened to enable outbound traffic to turn right into Stoddart Drive from Tiger Brennan Drive, also by 2004. This would be a minimal cost option, but raises some safety concerns in the AM peak hour.

OR

- Signalise the intersection by 2005. This would avoid constructing the left turn acceleration lane, but would incur significant cost to widen the TBD approaches and exits to provide two lanes on each. This option is not regarded as cost effective, if the timetable for the duplication of this section of TBD is accepted as being about 2009.

A preferred and more realistic approach to improving traffic efficiency would be for DIPE to commence planning for upgrading Tiger Brennan Drive, with the objectives of:

- Duplicating TBD between Stoddart Drive and Woolner Road by approximately 2005/06.
- Signalising the Stoddart Drive intersection when duplication takes place.
- Upgrading the Woolner Road intersection as part of the works.

Duplication of the outbound lane on TBD between the CBD and Woolner Road would be also warranted by about 2005.

Upgrading of the Stoddart Drive exit by the Bayview Haven Joint Venture does not seem warranted, given the relatively short time frame prior to the more extensive regional road improvements being needed. Construction of the left turn acceleration lane will likely only provide limited efficient life before traffic conditions on TBD reduce its effectiveness.

Appendix B DIPL Annual Traffic Report Outputs

Urban Primary Count Stations
Year: 2021
Table: 1.1 AADT For Primary Stations - 10 Year Period
Region: Darwin

Road Name / Location	ADT Station	Direction	Units	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Tiger Brennan Drive													
Outbound ramp to Roystonea Avenue	UDVDP032	Outbound	Veh						2697	2892	2905	2791	2922
SITE INSTALLED - 2017 - OUTBOUND ONLY													
Tiger Brennan Drive	UDVDP022	Inbound	Veh	8519	9243	9989	8708	7371	10335	10490	10295	9868	10794
800m West of Berrimah Road		Outbound	Veh	7087	7864	8676	8227	7704	9134	9390	9581	8965	10087
		Both	Veh	15606	17107	18665	16935	15075	19469	19880	19876	18833	20881
Tiger Brennan Drive	UDVDP016	Inbound	Veh	6465	10153	10341	9961	8672	10618	10919	10696	10687	11756
500m West of Hook Road		Outbound	Veh	9075	9477	9644	9616	8241	9949	10245	10006	10035	11003
		Both	Veh	15540	19630	19985	19577	16913	20567	21164	20702	20722	22759
Tiger Brennan Drive	UDVDP006	Inbound	Veh	10464	9752	9908	10673	10283	10940	11280	10583	10667	11575
200m North of Gothenberg Crescent		Outbound	Veh	10244	9957	10636	10473	10851	11544	12231	11189	11362	11879
		Both	Veh	20708	19709	20544	21146	21134	22484	23511	21772	22029	23454
Trower Road	UDVDP009	Inbound	Veh	12928	13105	12948	13513	14552	14295	13919	13393	13550	14408
50m West of Ryland Road		Outbound	Veh	11463	10532	13671	13455	14142	12492	13889	13616	13451	13734
		Both	Veh	24391	23637	26619	26968	28694	26787	27808	27009	27001	28142
Vanderlin Drive	UDVDP013	Inbound	Veh	10307	10403	10807	10692	10794	10420	10078	9909	9807	10194
100m West of Lee Point Road		Outbound	Veh	11158	10478	10890	10678	10663	10175	9821	9617	9486	9830
		Both	Veh	21465	20881	21697	21370	21457	20595	19899	19526	19293	20024
Vanderlin Drive	UDVDP012	Inbound	Veh	7533	8042	8394	8614	8906	8252	8400	8296	8135	8678
100m North of Manunda Terrace		Outbound	Veh	7473	7975	8284	8480	8753	8023	8485	8357	8230	8608
		Both	Veh	15006	16017	16678	17094	17659	16275	16885	16653	16365	17286

Darwin Total = 31

Appendix C CoD Traffic Count Reports



Traffic Summary

Bayview - Stoddart Drive @ Number 47

0:00 Tuesday, 11 August 2020 to 0:00 Tuesday, 18 August 2020 (7.00 days)

Volume

	All Days	Weekdays	Weekend	
Both directions	11374	8359	3015	
East (bound)	4575	3257	1318	
West (bound)	6799	5102	1697	

Speed

	All Days	Weekdays	Weekend	
Mean speed	44.3	44.5	43.6	km/h
Median speed	44.6	45.0	43.9	km/h
85% speed	51.8	52.2	51.1	km/h
Peak speed	77.7 (04:00)	-	-	km/h
Mean Exceeding	54.2	54.2	54.0	km/h
Number speeding	2717	2096	621	
Percent speeding	23.9	25.1	20.6	

Posted speed limit = 50 km/h

Class

Class	All Days	Weekdays	Weekend	
1 - SV	10684	7774	2910	
2 - SVT	106	90	16	
3 - TB2	564	475	89	
4 - TB3	7	7	0	
5 - T4	7	7	0	
6 - ART3	1	1	0	
7 - ART4	4	4	0	
8 - ART5	0	0	0	
9 - ART6	1	1	0	
10 - BD	0	0	0	
11 - DRT	0	0	0	
12 - TRT	0	0	0	



Traffic Summary

Stoddart Drive @ No.24 Bayview

0:00 Tuesday, 13 September 2016 to 0:00 Tuesday, 20 September 2016 (7.00 days)

Volume

	All Days	Weekdays	Weekend	
Both directions	15250	10997	4253	
West (bound)	8288	6051	2237	
East (bound)	6962	4946	2016	

Speed

	All Days	Weekdays	Weekend	
Mean speed	47.0	47.3	46.3	km/h
Median speed	47.9	47.9	47.2	km/h
85% speed	55.1	55.4	54.7	km/h
Peak speed	93.7 (12:00)	-	-	km/h
Mean Exceeding	55.0	55.1	54.9	km/h
Number speeding	6040	4493	1547	
Percent speeding	39.6	40.9	36.4	

Posted speed limit = 50 km/h

Class

Class	All Days	Weekdays	Weekend	
1 - SV	14238	10203	4035	
2 - SVT	152	104	48	
3 - TB2	804	642	162	
4 - TB3	30	24	6	
5 - T4	12	11	1	
6 - ART3	6	6	0	
7 - ART4	6	6	0	
8 - ART5	0	0	0	
9 - ART6	1	0	1	
10 - BD	0	0	0	
11 - DRT	1	1	0	
12 - TRT	0	0	0	



Traffic Summary

Bayview Boulevard Bayview @ number 53

0:00 Tuesday, 15 March 2016 to 0:00 Tuesday, 22 March 2016 (7.00 days)

Volume

	All Days	Weekdays	Weekend	
Both directions	4786	3485	1301	
West (bound)	2369	1726	643	
East (bound)	2417	1759	658	

Speed

	All Days	Weekdays	Weekend	
Mean speed	36.3	36.4	35.9	km/h
Median speed	36.7	36.7	36.4	km/h
85% speed	45.0	45.0	45.0	km/h
Peak speed	85.5 (22:00)	-	-	km/h
Mean Exceeding	53.4	53.6	53.0	km/h
Number speeding	235	174	61	
Percent speeding	4.9	5.0	4.7	

Posted speed limit = 50 km/h

Class

Class	All Days	Weekdays	Weekend	
1 - SV	4320	3114	1206	
2 - SVT	19	7	12	
3 - TB2	415	337	78	
4 - TB3	25	20	5	
5 - T4	2	2	0	
6 - ART3	2	2	0	
7 - ART4	3	3	0	
8 - ART5	0	0	0	
9 - ART6	0	0	0	
10 - BD	0	0	0	
11 - DRT	0	0	0	
12 - TRT	0	0	0	



Traffic Summary

Bayview Boulevard Bayview @ number 49

0:00 Tuesday, 15 March 2016 to 0:00 Tuesday, 22 March 2016 (7.00 days)

Volume

	All Days	Weekdays	Weekend	
Both directions	5124	3752	1372	
West (bound)	2559	1880	679	
East (bound)	2565	1872	693	

Speed

	All Days	Weekdays	Weekend	
Mean speed	39.7	39.7	39.6	km/h
Median speed	40.3	40.3	40.0	km/h
85% speed	48.2	48.2	48.2	km/h
Peak speed	87.5 (22:00)	-	-	km/h
Mean Exceeding	53.7	53.8	53.6	km/h
Number speeding	526	383	143	
Percent speeding	10.3	10.2	10.4	

Posted speed limit = 50 km/h

Class

Class	All Days	Weekdays	Weekend	
1 - SV	4638	3362	1276	
2 - SVT	26	13	13	
3 - TB2	414	344	70	
4 - TB3	42	29	13	
5 - T4	1	1	0	
6 - ART3	2	2	0	
7 - ART4	1	1	0	
8 - ART5	0	0	0	
9 - ART6	0	0	0	
10 - BD	0	0	0	
11 - DRT	0	0	0	
12 - TRT	0	0	0	



TERRITORY TRAFFIC SURVEYS

DATA ACQUISITION SPECIALISTS

Traffic Summary

Woolner Rd @ top of hill, Woolner

0:00 Saturday, 30 October 2021 to 0:00 Saturday, 6 November 2021 (7 days)

Volume

	All Days	Weekdays	Weekend	
Both directions	48173	34543	13630	
North	24919	17602	7317	
South	23254	16941	6313	

Speed

	All Days	Weekdays	Weekend	
Mean speed	46.0	45.7	46.7	km/h
Median speed	46.6	46.4	46.8	km/h
85% speed	52.7	52.6	52.9	km/h
Peak speed	130.9 (13)	-	-	km/h
Mean Exceeding	63.9	63.9	63.8	km/h
Number speeding	867	596	271	
Percent speeding	1.800	1.725	1.988	

Posted speed limit = 60 km/h

Class

Class	All Days	Weekdays	Weekend	
1 - SV	44867	31941	12926	
2 - SVT	512	317	195	
3 - TB2	2367	1912	455	
4 - TB3	226	212	14	
5 - T4	61	48	13	
6 - ART3	47	43	4	
7 - ART4	38	26	12	
8 - ART5	8	8	0	
9 - ART6	41	32	9	
10 - BD	2	1	1	
11 - DRT	3	2	1	
12 - TRT	1	1	0	



TERRITORY TRAFFIC SURVEYS

DATA ACQUISITION SPECIALISTS

Traffic Summary

Woolner Rd @ bottom of hill, Woolner

0:00 Saturday, 30 October 2021 to 0:00 Saturday, 6 November 2021 (7 days)

Volume

	All Days	Weekdays	Weekend	
Both directions	47877	34321	13556	
North	24340	17176	7164	
South	23537	17145	6392	

Speed

	All Days	Weekdays	Weekend	
Mean speed	54.1	53.9	54.7	km/h
Median speed	54.4	54.2	54.5	km/h
85% speed	60.3	60.1	60.5	km/h
Peak speed	107.7 (22)	-	-	km/h
Mean Exceeding	63.7	63.7	63.9	km/h
Number speeding	7696	5357	2339	
Percent speeding	16.07	15.61	17.25	

Posted speed limit = 60 km/h

Class

Class	All Days	Weekdays	Weekend	
1 - SV	42613	30234	12379	
2 - SVT	425	240	185	
3 - TB2	4466	3547	919	
4 - TB3	147	139	8	
5 - T4	40	30	10	
6 - ART3	66	43	23	
7 - ART4	69	44	25	
8 - ART5	10	9	1	
9 - ART6	35	29	6	
10 - BD	5	5	0	
11 - DRT	0	0	0	
12 - TRT	1	1	0	



Traffic Summary

Woolner Road Outbound between Bishop Street and Brewery Place
0:00 Friday, 18 September 2015 to 0:00 Friday, 25 September 2015 (7 days)

Volume

	All Days	Weekdays	Weekend	
Both directions	25495	19106	6389	
South	25495	19106	6389	
North	0	0	0	

Speed

	All Days	Weekdays	Weekend	
Mean speed	38.6	38.1	39.8	km/h
Median speed	38.9	38.5	40.0	km/h
85% speed	43.9	43.9	45.0	km/h
Peak speed	77.4 (18:00)	-	-	km/h
Mean Exceeding	63.7	64.7	62.4	km/h
Number speeding	19	11	8	
Percent speeding	0.1	0.1	0.1	

Posted speed limit = 60 km/h

Class

Class	All Days	Weekdays	Weekend	
1 - SV	23351	17340	6011	
2 - SVT	279	202	77	
3 - TB2	1563	1309	254	
4 - TB3	172	150	22	
5 - T4	54	45	9	
6 - ART3	18	13	5	
7 - ART4	20	13	7	
8 - ART5	6	6	0	
9 - ART6	32	28	4	
10 - BD	0	0	0	
11 - DRT	0	0	0	
12 - TRT	0	0	0	



Traffic Summary

Woolner Road Outbound between Stuart Highway and Bishop Street
0:00 Friday, 18 September 2015 to 0:00 Friday, 25 September 2015 (7 days)

Volume

	All Days	Weekdays	Weekend	
Both directions	21442	15719	5723	
South	21441	15718	5723	
North	0	0	0	

Speed

	All Days	Weekdays	Weekend	
Mean speed	38.6	38.4	39.3	km/h
Median speed	38.5	38.5	39.2	km/h
85% speed	43.6	43.2	43.9	km/h
Peak speed	72.8 (23:00)	-	-	km/h
Mean Exceeding	64.0	63.3	64.8	km/h
Number speeding	24	13	11	
Percent speeding	0.1	0.1	0.2	

Posted speed limit = 60 km/h

Class

Class	All Days	Weekdays	Weekend	
1 - SV	19744	14326	5418	
2 - SVT	218	154	64	
3 - TB2	1089	919	170	
4 - TB3	258	210	48	
5 - T4	37	27	10	
6 - ART3	25	20	5	
7 - ART4	27	22	5	
8 - ART5	11	11	0	
9 - ART6	29	26	3	
10 - BD	4	4	0	
11 - DRT	0	0	0	
12 - TRT	0	0	0	

Appendix D Traffic Count Information

1. Stoddart Dr / Tiger Brennan Dr / Woolner Rd

Date: Wednesday, 3 August 2022

AM Period Between 7-9am

Time Start 7:00 Time Finish 9:00

Time Block (15mins)	Tiger Brennan Drive Eastbound												Woolner Drive Southbound											
	Direction 1 (Left)				Direction 2 (Through)				Direction 3 (Right)				Direction 4 (Left)				Direction 5 (Through)				Direction 6 (Right)			
	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds
A - 7:00-7:15	28				144	1			3				30	2			4				56	5	1	
B - 7:15-7:30	35				149	3			6	1			41	1			2	1		1	109	3		
C - 7:30-7:45	37				188				10				50	1	1		5	1			132	2		
D - 7:45-8:00	49	1			256	7			13				48	1			12				151	1		
E - 8:00-8:15	43	3			182	10			23				52	5			10				178			
F - 8:15-8:30	45				186	3	1		7	1			32	1			10				134	3		
G - 8:30-8:45	59				126	9			4	1			42	1			10				101	2		
H - 8:45-9:00	42				123	5			12	2			31				10	2			100	4		

Peak Hour Calc	
A-D	3579
B-E	4010
C-F	4150
D-G	3882
E-H	3275

Time Block (15mins)	Tiger Brennan Drive Westbound												Stoddart Drive Northbound											
	Direction 7 (Left)				Direction 8 (Through)				Direction 9 (Right)				Direction 10 (Left)				Direction 11 (Through)				Direction 12 (Right)			
	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds
A - 7:00-7:15	1				220	3		2	19		1		7	1			13				39		1	
B - 7:15-7:30	1				340	10	2		38	1			11	2			33	1	4		27			
C - 7:30-7:45	1				441	5			97	1			17	2			43	1	1		33			
D - 7:45-8:00	1				433	5			92	2			35				41				38			
E - 8:00-8:15	0				354	4			71				17				38				27			
F - 8:15-8:30	2				395	9			45				20	1			27			2	29			
G - 8:30-8:45	1				317	5			79	2			10				18	1			19			
H - 8:45-9:00	2				184	8			28	2			10				16	1	1		4	2		

Pedestrian Movements - Times crossing activated

Time Block (15mins)	PD1	PD2
A - 7:00-7:15		
B - 7:15-7:30	1	
C - 7:30-7:45		
D - 7:45-8:00		
E - 8:00-8:15		
F - 8:15-8:30		1
G - 8:30-8:45		
H - 8:45-9:00		

1. Stoddart Dr / Tiger Brennan Dr / Woolner Rd

Date: Tuesday, 2 August 2022

PM Period Between 4-6pm

Time Start	16:00	Time Finish	18:00
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Time Block (15mins)	Tiger Brennan Drive Eastbound												Woolner Drive Southbound											
	Direction 1 (Left)				Direction 2 (Through)				Direction 3 (Right)				Direction 4 (Left)				Direction 5 (Through)				Direction 6 (Right)			
	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds
A - 16:00-16:15	80	1			325	3			15				60	2			20				90	1		
B - 16:15-16:30	90				277	3			12				58	1			28				61	1		
C - 16:30-16:45	110	1			425	3	1		24				72				23		1		79	3	1	
D - 16:45-17:00	125				475	3			35	1			55				31				103	3	2	
E - 17:00-17:15	136				410	5			38				80				37				67	3	1	
F - 17:15-17:30	85				120	2			40				60				36				98	2	1	
G - 17:30-17:45	86				451	2	1		16				41				24				77	1		
H - 17:45-18:00	75	1			142	3			21	1			39				18				105	1	2	

Peak Hour Calc	
A-D	3789
B-E	3917
C-F	3828
D-G	3731
E-H	3198

Time Block (15mins)	Tiger Brennan Drive Westbound												Stoddart Drive Northbound											
	Direction 7 (Left)				Direction 8 (Through)				Direction 9 (Right)				Direction 10 (Left)				Direction 11 (Through)				Direction 12 (Right)			
	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds
A - 16:00-16:15	7	1			203	1			50	1			14	1			10	2			18		1	
B - 16:15-16:30	5				173	3	3		15	1			15				12				20			
C - 16:30-16:45	7				208	2	1		43				8				16				5			
D - 16:45-17:00	8				193	1	5		57	1			8				15				6			
E - 17:00-17:15	2		1		163	5	1		50				2	1			23				12			
F - 17:15-17:30	3				158	3	1		41				6				22		1		8			
G - 17:30-17:45	3				150				37		2		7				20				11			
H - 17:45-18:00	0				119	3	1		17				7	1			23				12		1	

Pedestrian Movements - Times crossing activated

Time Block (15mins)	PD1	PD2
A - 16:00-16:15		
B - 16:15-16:30		
C - 16:30-16:45	1	1
D - 16:45-17:00		
E - 17:00-17:15		
F - 17:15-17:30		
G - 17:30-17:45		1
H - 17:45-18:00		

2.Stoddart Dr / Tiger Brennan Dr

Date: Thursday, 4 August 2022

AM Period Between 7-9am

Time Start	7:30	Time Finish	8:30
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	Tiger Brennan Drive Westbound								Stoddart Drive			
	Direction 1 (Left)				Direction 2 (Through)				Direction 3 (Left)			
Time Block (15mins)	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds
A - 7:00-7:15	1	1		1	271	6	1		4		1	
B - 7:15-7:30	3	1		1	339	3	1	1	0		1	3
C - 7:30-7:45	2			1	490	10			6			1
D - 7:45-8:00	7			1	521	11			2			
E - 8:00-8:15	5			1	464	11			7			
F - 8:15-8:30	4				424	7		1	7			
G - 8:30-8:45	9	1			353	12			7			
H - 8:45-9:00	5				228	10		1	5			

Peak Hour Calc	
A-D	1646
B-E	1846
C-F	1939
D-G	1810
E-H	1518

Date: Wednesday, 3 August 2022

PM Period Between 4-6pm

Time Start	16:30	Time Finish	17:30
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	Tiger Brennan Drive Westbound								Stoddart Drive			
	Direction 1 (Left)				Direction 2 (Through)				Direction 3 (Left)			
Time Block (15mins)	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds
A - 16:00-16:15	17				187	2	1		7			
B - 16:15-16:30	27				422	5	1		3			
C - 16:30-16:45	27		1		292	1	1		3			
D - 16:45-17:00	25		1		266	1	1		8			
E - 17:00-17:15	30				230	3			9			
F - 17:15-17:30	33				250	4	2		4			
G - 17:30-17:45	23				195		3		9			
H - 17:45-18:00	17				228	4	2		5			

Peak Hour Calc	
A-D	1284
B-E	1342
C-F	1177
D-G	1082
E-H	1033

3. Stoddart Dr / Fanning Dr

Date: Friday, 5 August 2022

AM Period Between 7-9am

Time Start	7:00	Time Finish	9:00
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Time Block (15mins)	Stoddart Drive Eastbound								Stoddart Drive Southbound								Fanning Drive Northbound							
	Direction 1 (Left)				Direction 2 (Right)				Direction 3 (Right)				Direction 4 (Through)				Direction 5 (Through)				Direction 6 (Left)			
	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds
A - 7:00-7:15	0	1			2			1	2	1			2				2			1	19			2
B - 7:15-7:30	0	2			4			6	3	3		1	3	1		1	5			5	29			1
C - 7:30-7:45	2	1	1		2		1	2	2	1			1				5			2	22			
D - 7:45-8:00	3				2		1		6				2			1	5		1		30			
E - 8:00-8:15	0				2				2				3				4		1	1	27		1	
F - 8:15-8:30	0	1			3			1	7	1			2				6				10			
G - 8:30-8:45	1				6				7	1			2				3				9			
H - 8:45-9:00	1			1	9				5				5				10				18			1

Peak Hour Calc	
A-D	153
B-E	164
C-F	148
D-G	142
E-H	142

Date: Thursday, 4 August 2022

PM Period Between 4-6pm

Time Start	16:00	Time Finish	18:00
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Time Block (15mins)	Stoddart Drive Eastbound								Stoddart Drive Southbound								Fanning Drive Northbound							
	Direction 1 (Left)				Direction 2 (Right)				Direction 3 (Right)				Direction 4 (Through)				Direction 5 (Through)				Direction 6 (Left)			
	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds
A - 16:00-16:15	1				14				4				9				6				9			
B - 16:15-16:30	3				13				7				14				7				9			
C - 16:30-16:45	0				12				2			1	25				9				6			
D - 16:45-17:00	1				10			1	13			2	19				5				4			
E - 17:00-17:15	1				11			1	9	1	1		17				6				6			1
F - 17:15-17:30	1				16				16				21		1		6			1	13			
G - 17:30-17:45	1				20		1	1	13				13		1		16		1	4	8			2
H - 17:45-18:00	0			1	11			2	12	1		2	13				6		2		14			

Peak Hour Calc	
A-D	202
B-E	209
C-F	229
D-G	246
E-H	250

4. Stoddart Dr / Bayview Blvd

Date: Friday, 5 August 2022

AM Period Between 7-9am

Time Start	7:00	Time Finish	9:00
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Time Block (15mins)	Stoddart Drive Southbound								Stoddart Drive Westbound								Bayview Boulevard Northbound							
	Direction 1 (Left)				Direction 2 (Through)				Direction 3 (Right)				Direction 4 (Through)				Direction 5 (Through)				Direction 6 (Right)			
	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds
A - 7:00-7:15	7				0							1	42	1			16				0			3
B - 7:15-7:30	4	2			2				1	2			52		1		21	2	1		0		1	1
C - 7:30-7:45	2	1			3			1	1	1		1	70	1	5	1	20	2			0			
D - 7:45-8:00	17				8				1				75				25		1		0			
E - 8:00-8:15	14			1	14				0			1	57				17				0			2
F - 8:15-8:30	14	1			2	1			0	1			40			2	15	1			0			
G - 8:30-8:45	18				9				0				28				10	1			0			
H - 8:45-9:00	12				3				3				36				12		1		0			1

Peak Hour Calc	
A-D	367
B-E	404
C-F	395
D-G	364
E-H	304

Date: Thursday, 4 August 2022

PM Period Between 4-6pm

Time Start	16:00	Time Finish	18:00
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Time Block (15mins)	Stoddart Drive Southbound								Stoddart Drive Westbound								Bayview Boulevard Northbound							
	Direction 1 (Left)				Direction 2 (Through)				Direction 3 (Right)				Direction 4 (Through)				Direction 5 (Through)				Direction 6 (Right)			
	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds	LV	HV	Cycle	Peds
A - 16:00-16:15	26				2				2				20				2				2			
B - 16:15-16:30	19	1			14				3				21				6				3			
C - 16:30-16:45	39				8				4				20	1			6				0			
D - 16:45-17:00	27				13				1				12				6				1			1
E - 17:00-17:15	39	1			13				1	1			18				9	1			0			
F - 17:15-17:30	35		2		17				5			1	20				6				3			1
G - 17:30-17:45	52				18				4				33		1	1	15				0			
H - 17:45-18:00	21	1			21				3	1			27				4	1			1			

Peak Hour Calc	
A-D	257
B-E	283
C-F	303
D-G	348
E-H	365

Appendix E Traffic Volume Calculations Overview

AM Peaks

1. Stoddart Dr / Tiger Brennan Dr / Woolner Rd

Approaching Road	Direction	Traffic Development (AADT)									Heavy Vehicles				
		2022 Existing	2027 Background	2032 Background	Development Traffic	2022 Developed	Adopted Annual Growth %	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2027 Developed	2032 Developed		
Tiger Brennan Road Southwest	Left	178	196	215	0	178	2.0%	196	215	4	4	4	5		
	Through	832	915	1007	0	832	2.0%	915	1007	20	20	22	24		
	Right	54	55	55	2	56	0.2%	56	57	1	1	1	1		
Woolner Road Northwest	Left	190	209	230	0	190	2.0%	209	230	8	8	9	10		
	Through	38	38	39	1	39	0.2%	40	40	1	1	1	1		
	Right	601	646	695	0	601	1.5%	646	695	3	3	3	3		
Tiger Brennan Road Northeast	Left	4	4	4	0	4	0.2%	4	4	0	0	1	1		
	Through	1646	1769	1902	3	1649	1.5%	1773	1906	23	23	25	27		
	Right	308	331	356	1	309	1.5%	332	357	3	3	3	3		
Stoddart Drive Southeast	Left	92	93	94	5	97	0.2%	98	99	3	3	3	3		
	Through	150	152	153	9	159	0.2%	160	162	1	1	1	1		
	Right	127	128	130	8	135	0.2%	136	137	0	0	1	1		

2.Stoddart Dr / Tiger Brennan Dr

Approaching Road	Direction	Traffic Development (AADT)								Heavy Vehicles			
		2022 Existing	2027 Background	2032 Background	Development Traffic	2022 Developed	Adopted Annual Growth %	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2027 Developed	2032 Developed
Tiger Brennan Road Northeast	Left	18	18	18	2	20	0.2%	21	21	0	0	1	1
	Through	1938	2083	2240	0	1938	1.5%	2083	2240	39	39	42	45
Stoddart Drive Southeast	Left	22	22	22	4	26	0.2%	26	26	0	0	1	1

3. Stoddart Dr / Fanning Dr

Approaching Road	Direction	Traffic Development (AADT)								Heavy Vehicles			
		2022 Existing	2027 Background	2032 Background	Development Traffic	2022 Developed	Adopted Annual Growth %	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2027 Developed	2032 Developed
Stoddart Drive West	Left	8	8	8	0	8	0.2%	8	8	3	3	3	3
	Right	10	10	10	3	13	0.2%	13	13	0	0	1	1
Stoddart Drive North	Right	17	17	17	0	17	0.2%	17	17	4	4	4	4
	Through	10	10	10	2	12	0.2%	12	13	1	1	1	1
Fanning Drive Southwest	Through	19	19	19	4	23	0.2%	23	23	0	0	1	1
	Left	108	109	110	22	130	0.2%	132	133	0	0	1	1

4. Stoddart Dr / Bayview Blvd

Approaching Road	Direction	Traffic Development (AADT)								Heavy Vehicles			
		2022 Existing	2027 Background	2032 Background	Development Traffic	2022 Developed	Adopted Annual Growth %	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2027 Developed	2032 Developed
Stoddart Drive Northwest	Left	40	40	41	3	43	0.2%	43	44	4	4	4	4
	Right	27	27	28	0	27	0.2%	27	28	0	0	1	1
Stoddart Drive East	Through	6	6	6	1	7	0.2%	7	7	3	3	3	3
	Right	255	258	260	22	277	0.2%	280	282	1	1	1	1
Bayview Blvd South	Through	87	88	89	0	87	0.2%	88	89	4	4	4	4
	Right	0	0	0	0	0	0.2%	0	0	0	0	1	1

PM Peaks

1. Stoddart Dr / Tiger Brennan Dr / Woolner Rd																
Approaching Road	Direction	Traffic Development (AADT)								Heavy Vehicles						
		2022 Existing	2027 Background	2032 Background	Development Traffic	2022 Developed	Adopted Annual Growth %	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2032 Developed
Tiger Brennan Road Southwest	Left	462	508	559	0	462	2.0%	508	559	1	1	1	1	1	1	1
	Through	1601	1761	1937	0	1601	2.0%	1761	1937	14	14	15	17	14	14	17
	Right	110	111	112	4	114	0.2%	115	116	1	1	1	1	1	1	1
Woolner Road Northwest	Left	266	293	322	0	266	2.0%	293	322	1	1	1	1	1	1	1
	Through	119	120	121	5	124	0.2%	125	126	0	0	1	1	0	0	1
	Right	320	344	370	0	320	1.5%	344	370	10	10	11	12	10	10	12
Tiger Brennan Road Northeast	Left	22	22	22	0	22	0.2%	22	23	0	0	1	1	0	0	1
	Through	748	804	864	4	752	1.5%	809	870	11	11	12	13	11	11	13
	Right	167	180	193	1	168	1.5%	181	194	2	2	2	2	2	2	2
Stoddart Drive Southeast	Left	34	34	35	3	37	0.2%	37	37	1	1	1	1	1	1	1
	Through	66	67	67	5	71	0.2%	72	72	0	0	1	1	0	0	1
	Right	43	43	44	3	46	0.2%	47	47	0	0	1	1	0	0	1

2.Stoddart Dr / Tiger Brennan Dr																
Approaching Road	Direction	Traffic Development (AADT)								Heavy Vehicles						
		2022 Existing	2027 Background	2032 Background	Development Traffic	2022 Developed	Adopted Annual Growth %	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2032 Developed
Tiger Brennan Road Northeast	Left	109	110	111	10	119	0.2%	120	121	0	0	1	1	0	0	1
	Through	1220	1312	1410	0	1220	1.5%	1312	1410	10	10	11	12	10	10	12
Stoddart Drive Southeast	Left	23	23	23	6	29	0.2%	29	29	0	0	1	1	0	0	1

3. Stoddart Dr / Fanning Dr																
Approaching Road	Direction	Traffic Development (AADT)								Heavy Vehicles						
		2022 Existing	2027 Background	2032 Background	Development Traffic	2022 Developed	Adopted Annual Growth %	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2032 Developed
Stoddart Drive West	Left	3	3	3	0	3	0.2%	3	3	0	0	1	1	0	0	1
	Right	58	59	59	9	67	0.2%	68	68	0	0	1	1	0	0	1
Stoddart Drive North	Right	52	53	53	0	52	0.2%	53	53	2	2	2	2	2	2	2
	Through	64	65	65	10	74	0.2%	74	75	0	0	1	1	0	0	1
Fanning Drive Southwest	Through	34	34	35	6	40	0.2%	40	40	0	0	1	1	0	0	1
	Left	41	41	42	7	48	0.2%	48	49	0	0	1	1	0	0	1

4. Stoddart Dr / Bayview Blvd																
Approaching Road	Direction	Traffic Development (AADT)								Heavy Vehicles						
		2022 Existing	2027 Background	2032 Background	Development Traffic	2022 Developed	Adopted Annual Growth %	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2027 Developed	2032 Developed	2022 Existing	2022 Developed	2032 Developed
Stoddart Drive Northwest	Left	149	150	152	9	158	0.2%	159	161	2	2	2	2	2	2	2
	Right	69	70	70	0	69	0.2%	70	70	0	0	1	1	0	0	1
Stoddart Drive East	Through	15	15	15	1	16	0.2%	16	16	2	2	2	2	2	2	2
	Right	98	99	100	11	109	0.2%	110	111	0	0	1	1	0	0	1
Bayview Blvd South	Through	36	36	37	0	36	0.2%	36	37	2	2	2	2	2	2	2
	Right	4	4	4	0	4	0.2%	4	4	0	0	1	1	0	0	1

Appendix F SIDRA Movement Summary Outputs

Intersection 1 AM 2022 Existing

MOVEMENT SUMMARY

 Site: 101 [1. AM 2022 Background (Existing) (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Stoddart Drive														
21	L2	92	3	97	3.3	0.109	17.2	LOS B	2.6	18.6	0.53	0.66	0.53	45.4
22	T1	150	1	158	0.7	* 0.767	61.5	LOS E	9.1	64.3	1.00	0.90	1.16	27.3
23	R2	127	0	134	0.0	0.767	66.2	LOS E	8.8	61.6	1.00	0.90	1.17	28.7
Approach		369	4	388	1.1	0.767	52.1	LOS D	9.1	64.3	0.88	0.84	1.01	30.9
NorthEast: Tiger Brennan Drive														
24	L2	4	0	4	0.0	0.003	8.0	LOS A	0.0	0.2	0.15	0.62	0.15	54.7
25	T1	1646	23	1733	1.4	* 0.733	32.0	LOS C	28.4	201.1	0.91	0.81	0.91	47.2
26	R2	308	3	324	1.0	* 0.753	66.9	LOS E	9.8	69.4	1.00	0.86	1.14	29.2
Approach		1958	26	2061	1.3	0.753	37.5	LOS D	28.4	201.1	0.92	0.82	0.94	43.1
NorthWest: Woolner Road														
27	L2	190	8	200	4.2	0.202	8.6	LOS A	3.1	22.7	0.35	0.62	0.35	50.7
28	T1	38	1	40	2.6	* 0.750	52.6	LOS D	10.6	75.1	0.97	0.88	1.09	28.4
29	R2	601	3	633	0.5	0.750	57.9	LOS E	14.2	99.9	0.99	0.88	1.09	30.6
Approach		829	12	873	1.4	0.750	46.4	LOS D	14.2	99.9	0.84	0.82	0.92	33.5
SouthWest: Tiger Brennan Drive														
30	L2	178	4	187	2.2	0.103	8.2	LOS A	0.0	0.0	0.00	0.60	0.00	65.5
31	T1	832	20	876	2.4	0.372	26.4	LOS C	11.8	84.3	0.74	0.64	0.74	50.9
32	R2	54	1	57	1.9	0.266	60.6	LOS E	3.1	22.2	0.95	0.75	0.95	30.6
Approach		1064	25	1120	2.3	0.372	25.1	LOS C	11.8	84.3	0.63	0.64	0.63	51.1
All Vehicles		4220	67	4442	1.6	0.767	37.4	LOS D	28.4	201.1	0.83	0.78	0.86	41.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 AM 2022 Existing

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: C:\12dSWS\data\BYRNE-TMS\NT22007 - Dover_Bayview Subdivision lot A_B_C_903\03 Engineering\5. Traffic Impact Assessment
\Working\Bayview SIDRA Modelling.sip9

Intersection 1 AM 2022 Developed

MOVEMENT SUMMARY

 Site: 101 [1. AM 2022 Background + Development (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total HV] veh/h veh/h		DEMAND FLOWS [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist] veh m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Stoddart Drive														
21	L2	97	3	102	3.1	0.115	17.3	LOS B	2.7	19.7	0.53	0.66	0.53	45.4
22	T1	159	1	167	0.6	* 0.751	60.1	LOS E	9.6	67.5	1.00	0.89	1.14	27.6
23	R2	135	0	142	0.0	0.751	64.8	LOS E	9.2	64.6	1.00	0.89	1.14	29.0
Approach		391	4	412	1.0	0.751	51.1	LOS D	9.6	67.5	0.88	0.83	0.99	31.1
NorthEast: Tiger Brennan Drive														
24	L2	4	0	4	0.0	0.003	8.0	LOS A	0.0	0.2	0.15	0.62	0.15	54.7
25	T1	1649	23	1736	1.4	* 0.749	33.0	LOS C	28.9	204.6	0.92	0.82	0.92	46.7
26	R2	309	3	325	1.0	* 0.756	67.0	LOS E	9.9	69.7	1.00	0.86	1.14	29.2
Approach		1962	26	2065	1.3	0.756	38.3	LOS D	28.9	204.6	0.93	0.83	0.95	42.7
NorthWest: Woolner Road														
27	L2	190	8	200	4.2	0.202	8.6	LOS A	3.1	22.7	0.35	0.62	0.35	50.7
28	T1	39	1	41	2.6	* 0.751	52.6	LOS D	10.7	75.3	0.97	0.88	1.09	28.4
29	R2	601	3	633	0.5	0.751	58.0	LOS E	14.3	100.2	0.99	0.88	1.09	30.6
Approach		830	12	874	1.4	0.751	46.4	LOS D	14.3	100.2	0.84	0.82	0.92	33.5
SouthWest: Tiger Brennan Drive														
30	L2	178	4	187	2.2	0.103	8.3	LOS A	0.0	0.0	0.00	0.60	0.00	65.5
31	T1	832	20	876	2.4	0.380	27.1	LOS C	12.0	85.5	0.75	0.65	0.75	50.4
32	R2	56	1	59	1.8	0.276	60.7	LOS E	3.2	23.0	0.95	0.75	0.95	30.6
Approach		1066	25	1122	2.3	0.380	25.8	LOS C	12.0	85.5	0.64	0.65	0.64	50.6
All Vehicles		4249	67	4473	1.6	0.756	37.9	LOS D	28.9	204.6	0.84	0.78	0.87	40.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 AM 2022 Developed

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 1 AM 2027 Background

MOVEMENT SUMMARY

 Site: 101 [1. AM 2027 Background (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Stoddart Drive														
21	L2	93	3	98	3.2	0.117	19.3	LOS B	2.8	20.4	0.57	0.67	0.57	44.3
22	T1	152	1	160	0.7	* 0.777	61.9	LOS E	9.3	65.5	1.00	0.91	1.18	27.2
23	R2	128	1	135	0.8	0.777	66.6	LOS E	8.9	62.8	1.00	0.91	1.19	28.6
Approach		373	5	393	1.3	0.777	52.9	LOS D	9.3	65.5	0.89	0.85	1.03	30.7
NorthEast: Tiger Brennan Drive														
24	L2	4	1	4	25.0	0.003	8.4	LOS A	0.0	0.2	0.15	0.62	0.15	54.2
25	T1	1769	27	1862	1.5	* 0.788	34.0	LOS C	32.1	227.3	0.94	0.85	0.95	46.1
26	R2	331	3	348	0.9	* 0.809	69.3	LOS E	10.9	76.8	1.00	0.89	1.21	28.6
Approach		2104	31	2215	1.5	0.809	39.5	LOS D	32.1	227.3	0.95	0.86	0.99	42.1
NorthWest: Woolner Road														
27	L2	209	9	220	4.3	0.228	9.0	LOS A	3.7	26.6	0.37	0.63	0.37	50.3
28	T1	38	1	40	2.6	* 0.813	55.9	LOS E	11.5	81.1	0.97	0.94	1.19	27.7
29	R2	646	3	680	0.5	0.813	61.2	LOS E	16.1	113.1	0.99	0.93	1.17	29.8
Approach		893	13	940	1.5	0.813	48.7	LOS D	16.1	113.1	0.85	0.86	0.98	32.8
SouthWest: Tiger Brennan Drive														
30	L2	196	4	206	2.0	0.113	8.3	LOS A	0.0	0.0	0.00	0.60	0.00	65.6
31	T1	915	22	963	2.4	0.410	26.9	LOS C	13.2	94.4	0.76	0.65	0.76	50.6
32	R2	55	1	58	1.8	0.271	60.7	LOS E	3.2	22.6	0.95	0.75	0.95	30.6
Approach		1166	27	1227	2.3	0.410	25.3	LOS C	13.2	94.4	0.64	0.65	0.64	51.0
All Vehicles		4536	76	4775	1.7	0.813	38.8	LOS D	32.1	227.3	0.84	0.80	0.90	40.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 AM 2027 Background

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 1 AM 2027 Developed

MOVEMENT SUMMARY

 **Site: 101 [1. AM 2027 Background + Development (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total HV] veh/h veh/h		DEMAND FLOWS [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist] veh m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Stoddart Drive														
21	L2	98	3	103	3.1	0.124	19.9	LOS B	3.0	21.9	0.58	0.67	0.58	44.0
22	T1	160	1	168	0.6	* 0.821	63.9	LOS E	10.1	70.8	1.00	0.95	1.25	26.9
23	R2	136	1	143	0.7	0.821	68.6	LOS E	9.6	67.8	1.00	0.95	1.25	28.1
Approach		394	5	415	1.3	0.821	54.6	LOS D	10.1	70.8	0.90	0.88	1.08	30.2
NorthEast: Tiger Brennan Drive														
24	L2	4	1	4	25.0	0.003	8.4	LOS A	0.0	0.2	0.15	0.62	0.15	54.2
25	T1	1773	27	1866	1.5	* 0.790	34.1	LOS C	32.2	228.4	0.94	0.86	0.96	46.0
26	R2	332	3	349	0.9	* 0.812	69.4	LOS E	10.9	77.1	1.00	0.89	1.22	28.6
Approach		2109	31	2220	1.5	0.812	39.6	LOS D	32.2	228.4	0.95	0.86	1.00	42.0
NorthWest: Woolner Road														
27	L2	209	9	220	4.3	0.230	9.3	LOS A	3.8	27.6	0.38	0.63	0.38	50.1
28	T1	40	1	42	2.5	* 0.815	56.1	LOS E	11.5	81.4	0.97	0.94	1.19	27.7
29	R2	646	3	680	0.5	0.815	61.4	LOS E	16.2	113.8	0.99	0.93	1.17	29.8
Approach		895	13	942	1.5	0.815	49.0	LOS D	16.2	113.8	0.85	0.86	0.99	32.8
SouthWest: Tiger Brennan Drive														
30	L2	196	4	206	2.0	0.113	8.3	LOS A	0.0	0.0	0.00	0.60	0.00	65.6
31	T1	915	22	963	2.4	0.410	26.9	LOS C	13.2	94.4	0.76	0.65	0.76	50.6
32	R2	56	1	59	1.8	0.276	60.7	LOS E	3.2	23.0	0.95	0.75	0.95	30.6
Approach		1167	27	1228	2.3	0.410	25.4	LOS C	13.2	94.4	0.64	0.65	0.64	50.9
All Vehicles		4565	76	4805	1.7	0.821	39.1	LOS D	32.2	228.4	0.85	0.81	0.91	40.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 AM 2027 Developed

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 1 AM 2032 Background

MOVEMENT SUMMARY

 **Site: 101 [1. AM 2032 Background (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Stoddart Drive														
21	L2	94	3	99	3.2	0.129	22.8	LOS C	3.2	22.9	0.62	0.68	0.62	42.5
22	T1	153	1	161	0.7	* 0.857	66.9	LOS E	9.9	69.5	1.00	0.99	1.33	26.3
23	R2	130	1	137	0.8	0.857	71.7	LOS E	9.5	66.6	1.00	0.99	1.34	27.5
Approach		377	5	397	1.3	0.857	57.5	LOS E	9.9	69.5	0.91	0.91	1.15	29.5
NorthEast: Tiger Brennan Drive														
24	L2	4	1	4	25.0	0.003	8.4	LOS A	0.0	0.2	0.15	0.62	0.15	54.2
25	T1	1902	27	2002	1.4	* 0.847	39.3	LOS D	38.0	269.4	0.97	0.93	1.05	43.2
26	R2	356	3	375	0.8	* 0.870	73.7	LOS E	12.3	86.4	1.00	0.94	1.33	27.7
Approach		2262	31	2381	1.4	0.870	44.7	LOS D	38.0	269.4	0.98	0.93	1.09	39.7
NorthWest: Woolner Road														
27	L2	230	10	242	4.3	0.258	9.8	LOS A	4.5	32.4	0.40	0.64	0.40	49.8
28	T1	39	1	41	2.6	* 0.841	57.6	LOS E	12.2	86.2	0.97	0.97	1.23	27.4
29	R2	695	3	732	0.4	0.841	62.7	LOS E	17.9	125.6	0.99	0.96	1.21	29.4
Approach		964	14	1015	1.5	0.841	49.9	LOS D	17.9	125.6	0.85	0.88	1.01	32.5
SouthWest: Tiger Brennan Drive														
30	L2	215	5	226	2.3	0.124	8.3	LOS A	0.0	0.0	0.00	0.60	0.00	65.5
31	T1	1007	24	1060	2.4	0.451	27.4	LOS C	14.9	106.1	0.78	0.67	0.78	50.2
32	R2	55	1	58	1.8	0.271	60.7	LOS E	3.2	22.6	0.95	0.75	0.95	30.6
Approach		1277	30	1344	2.3	0.451	25.7	LOS C	14.9	106.1	0.65	0.66	0.65	50.8
All Vehicles		4880	80	5137	1.6	0.870	41.7	LOS D	38.0	269.4	0.86	0.85	0.97	39.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 AM 2032 Background

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 1 AM 2032 Developed

MOVEMENT SUMMARY

 **Site: 101 [1. AM 2032 Background + Development (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Stoddart Drive														
21	L2	99	3	104	3.0	0.137	23.5	LOS C	3.4	24.7	0.63	0.69	0.63	42.2
22	T1	162	1	171	0.6	* 0.829	64.3	LOS E	10.2	71.9	1.00	0.96	1.26	26.8
23	R2	137	1	144	0.7	0.829	69.1	LOS E	9.8	68.9	1.00	0.96	1.27	28.0
Approach		398	5	419	1.3	0.829	55.8	LOS E	10.2	71.9	0.91	0.89	1.11	29.9
NorthEast: Tiger Brennan Drive														
24	L2	4	1	4	25.0	0.003	8.4	LOS A	0.0	0.2	0.15	0.62	0.15	54.2
25	T1	1906	27	2006	1.4	* 0.867	42.6	LOS D	39.8	282.0	0.99	0.97	1.10	41.6
26	R2	357	3	376	0.8	* 0.872	74.0	LOS E	12.3	86.9	1.00	0.94	1.33	27.6
Approach		2267	31	2386	1.4	0.872	47.5	LOS D	39.8	282.0	0.99	0.96	1.13	38.6
NorthWest: Woolner Road														
27	L2	230	10	242	4.3	0.257	10.1	LOS B	4.6	33.3	0.41	0.64	0.41	49.6
28	T1	40	1	42	2.5	* 0.842	57.7	LOS E	12.3	86.4	0.97	0.97	1.24	27.4
29	R2	695	3	732	0.4	0.842	62.8	LOS E	17.9	125.9	0.99	0.96	1.21	29.4
Approach		965	14	1016	1.5	0.842	50.0	LOS D	17.9	125.9	0.85	0.88	1.02	32.5
SouthWest: Tiger Brennan Drive														
30	L2	215	5	226	2.3	0.124	8.3	LOS A	0.0	0.0	0.00	0.60	0.00	65.5
31	T1	1007	24	1060	2.4	0.460	28.2	LOS C	15.1	107.7	0.79	0.68	0.79	49.6
32	R2	57	1	60	1.8	0.280	60.8	LOS E	3.3	23.4	0.95	0.76	0.95	30.5
Approach		1279	30	1346	2.3	0.460	26.3	LOS C	15.1	107.7	0.66	0.67	0.66	50.3
All Vehicles		4909	80	5167	1.6	0.872	43.2	LOS D	39.8	282.0	0.87	0.87	0.98	38.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 AM 2032 Developed

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 1 PM 2022 Existing

MOVEMENT SUMMARY

 Site: 101 [1. PM 2022 Background (Existing) (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Stoddart Drive														
21	L2	32	1	34	3.1	0.028	7.5	LOS A	0.4	3.0	0.28	0.57	0.28	51.7
22	T1	66	0	69	0.0	* 0.600	64.9	LOS E	3.6	25.4	1.00	0.78	1.07	26.6
23	R2	43	0	45	0.0	0.600	69.5	LOS E	3.5	24.4	1.00	0.78	1.08	28.1
Approach		141	1	148	0.7	0.600	53.3	LOS D	3.6	25.4	0.84	0.73	0.89	30.4
NorthEast: Tiger Brennan Drive														
24	L2	22	0	23	0.0	0.016	9.3	LOS A	0.2	1.6	0.23	0.64	0.23	53.6
25	T1	748	11	787	1.5	0.267	17.7	LOS B	8.6	60.9	0.61	0.52	0.61	57.8
26	R2	167	2	176	1.2	0.477	64.4	LOS E	5.1	35.8	0.99	0.78	0.99	29.8
Approach		937	13	986	1.4	0.477	25.9	LOS C	8.6	60.9	0.67	0.57	0.67	49.4
NorthWest: Woolner Road														
27	L2	266	1	280	0.4	0.353	12.3	LOS B	6.6	46.4	0.49	0.68	0.49	48.9
28	T1	119	0	125	0.0	* 0.613	52.8	LOS D	8.2	57.5	0.98	0.79	0.98	29.1
29	R2	320	10	337	3.1	0.613	58.0	LOS E	8.9	64.2	0.99	0.81	0.99	30.4
Approach		705	11	742	1.6	0.613	39.9	LOS D	8.9	64.2	0.80	0.76	0.80	35.1
SouthWest: Tiger Brennan Drive														
30	L2	462	1	486	0.2	0.262	7.9	LOS A	0.0	0.0	0.00	0.60	0.00	66.1
31	T1	1601	14	1685	0.9	* 0.602	21.7	LOS C	24.3	171.1	0.75	0.67	0.75	54.4
32	R2	110	1	116	0.9	* 0.628	65.8	LOS E	6.8	48.2	1.00	0.80	1.04	29.3
Approach		2173	16	2287	0.7	0.628	21.0	LOS C	24.3	171.1	0.60	0.66	0.60	54.1
All Vehicles		3956	41	4164	1.0	0.628	26.7	LOS C	24.3	171.1	0.66	0.66	0.66	47.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 PM 2022 Existing

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 1 PM 2022 Developed

MOVEMENT SUMMARY

 Site: 101 [1. PM 2022 Background + Development (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Stoddart Drive														
21	L2	37	1	39	2.7	0.033	7.5	LOS A	0.5	3.4	0.28	0.57	0.28	51.7
22	T1	71	0	75	0.0	* 0.644	65.4	LOS E	3.9	27.4	1.00	0.80	1.11	26.5
23	R2	46	0	48	0.0	0.644	70.0	LOS E	3.8	26.4	1.00	0.80	1.12	28.0
Approach		154	1	162	0.6	0.644	52.9	LOS D	3.9	27.4	0.83	0.74	0.91	30.5
NorthEast: Tiger Brennan Drive														
24	L2	22	0	23	0.0	0.016	9.3	LOS A	0.2	1.6	0.23	0.64	0.23	53.6
25	T1	752	11	792	1.5	0.273	18.4	LOS B	8.8	62.3	0.62	0.53	0.62	57.2
26	R2	168	2	177	1.2	0.443	63.2	LOS E	5.0	35.5	0.98	0.78	0.98	30.1
Approach		942	13	992	1.4	0.443	26.2	LOS C	8.8	62.3	0.67	0.58	0.67	49.2
NorthWest: Woolner Road														
27	L2	266	1	280	0.4	0.349	12.2	LOS B	6.6	46.1	0.49	0.68	0.49	48.9
28	T1	124	0	131	0.0	* 0.621	52.9	LOS D	8.2	57.9	0.98	0.79	0.99	29.1
29	R2	320	10	337	3.1	0.621	58.2	LOS E	9.1	65.2	0.99	0.81	1.00	30.4
Approach		710	11	747	1.5	0.621	40.0	LOS D	9.1	65.2	0.80	0.76	0.80	35.1
SouthWest: Tiger Brennan Drive														
30	L2	462	1	486	0.2	0.262	8.0	LOS A	0.0	0.0	0.00	0.60	0.00	66.1
31	T1	1601	14	1685	0.9	* 0.613	22.5	LOS C	24.8	174.7	0.76	0.68	0.76	53.8
32	R2	114	1	120	0.9	* 0.600	64.3	LOS E	7.0	49.2	1.00	0.80	1.01	29.7
Approach		2177	16	2292	0.7	0.613	21.6	LOS C	24.8	174.7	0.61	0.67	0.61	53.7
All Vehicles		3983	41	4193	1.0	0.644	27.2	LOS C	24.8	174.7	0.67	0.67	0.67	46.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 PM 2022 Developed

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 1 PM 2027 Background

MOVEMENT SUMMARY

 Site: 101 [1. PM 2027 Background (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Stoddart Drive														
21	L2	34	1	36	2.9	0.030	7.7	LOS A	0.5	3.3	0.29	0.57	0.29	51.5
22	T1	67	1	71	1.5	* 0.613	65.1	LOS E	3.7	26.0	1.00	0.78	1.08	26.5
23	R2	43	1	45	2.3	0.613	69.8	LOS E	3.5	25.1	1.00	0.78	1.09	27.9
Approach		144	3	152	2.1	0.613	52.9	LOS D	3.7	26.0	0.83	0.73	0.90	30.5
NorthEast: Tiger Brennan Drive														
24	L2	22	1	23	4.5	0.017	9.3	LOS A	0.2	1.7	0.23	0.64	0.23	53.6
25	T1	804	12	846	1.5	0.278	16.8	LOS B	9.0	64.0	0.59	0.51	0.59	58.7
26	R2	180	2	189	1.1	0.561	66.0	LOS E	5.6	39.2	1.00	0.78	1.00	29.4
Approach		1006	15	1059	1.5	0.561	25.4	LOS C	9.0	64.0	0.66	0.56	0.66	49.7
NorthWest: Woolner Road														
27	L2	293	1	308	0.3	0.461	15.1	LOS B	8.7	61.1	0.58	0.72	0.58	47.1
28	T1	120	1	126	0.8	* 0.703	55.4	LOS E	8.5	60.4	0.99	0.85	1.08	28.5
29	R2	344	11	362	3.2	0.703	60.9	LOS E	10.0	72.0	1.00	0.85	1.07	29.7
Approach		757	13	797	1.7	0.703	42.3	LOS D	10.0	72.0	0.83	0.80	0.88	34.4
SouthWest: Tiger Brennan Drive														
30	L2	508	1	535	0.2	0.288	8.0	LOS A	0.0	0.0	0.00	0.60	0.00	66.1
31	T1	1761	15	1854	0.9	* 0.686	21.2	LOS C	30.0	211.3	0.76	0.68	0.76	54.8
32	R2	111	1	117	0.9	* 0.691	67.9	LOS E	7.1	49.8	1.00	0.82	1.10	28.8
Approach		2380	17	2505	0.7	0.691	20.6	LOS C	30.0	211.3	0.61	0.67	0.61	54.5
All Vehicles		4287	48	4513	1.1	0.703	26.6	LOS C	30.0	211.3	0.67	0.67	0.68	47.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 PM 2027 Background

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 1 PM 2027 Developed

MOVEMENT SUMMARY

 **Site: 101 [1. PM 2027 Background + Development (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Stoddart Drive														
21	L2	37	1	39	2.7	0.033	7.7	LOS A	0.5	3.6	0.29	0.57	0.29	51.6
22	T1	72	1	76	1.4	* 0.663	65.7	LOS E	4.0	28.4	1.00	0.81	1.13	26.4
23	R2	47	1	49	2.1	0.663	70.3	LOS E	3.8	27.4	1.00	0.81	1.14	27.8
Approach		156	3	164	1.9	0.663	53.3	LOS D	4.0	28.4	0.83	0.75	0.93	30.4
NorthEast: Tiger Brennan Drive														
24	L2	22	1	23	4.5	0.017	9.5	LOS A	0.2	1.7	0.24	0.64	0.24	53.4
25	T1	809	12	852	1.5	0.284	17.4	LOS B	9.3	65.6	0.60	0.52	0.60	58.1
26	R2	181	2	191	1.1	0.517	64.7	LOS E	5.5	38.9	0.99	0.78	0.99	29.7
Approach		1012	15	1065	1.5	0.517	25.7	LOS C	9.3	65.6	0.67	0.57	0.67	49.6
NorthWest: Woolner Road														
27	L2	293	1	308	0.3	0.458	15.0	LOS B	8.6	60.5	0.57	0.71	0.57	47.2
28	T1	125	1	132	0.8	* 0.712	55.6	LOS E	8.6	60.9	0.99	0.85	1.09	28.5
29	R2	344	11	362	3.2	0.712	61.1	LOS E	10.2	73.2	1.00	0.86	1.08	29.6
Approach		762	13	802	1.7	0.712	42.5	LOS D	10.2	73.2	0.83	0.80	0.89	34.3
SouthWest: Tiger Brennan Drive														
30	L2	508	1	535	0.2	0.288	8.0	LOS A	0.0	0.0	0.00	0.60	0.00	66.1
31	T1	1761	15	1854	0.9	* 0.684	21.9	LOS C	29.6	209.0	0.77	0.69	0.77	54.2
32	R2	115	1	121	0.9	* 0.656	66.2	LOS E	7.2	50.7	1.00	0.81	1.06	29.2
Approach		2384	17	2509	0.7	0.684	21.1	LOS C	29.6	209.0	0.62	0.68	0.62	54.1
All Vehicles		4314	48	4541	1.1	0.712	27.1	LOS C	29.6	209.0	0.67	0.68	0.69	47.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 PM 2027 Developed

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 1 PM 2032 Background

MOVEMENT SUMMARY

 Site: 101 [1. PM 2032 Background (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Stoddart Drive														
21	L2	35	1	37	2.9	0.032	8.2	LOS A	0.5	3.6	0.30	0.58	0.30	51.2
22	T1	67	1	71	1.5	* 0.619	65.2	LOS E	3.7	26.3	1.00	0.79	1.09	26.5
23	R2	44	1	46	2.3	0.619	69.8	LOS E	3.6	25.4	1.00	0.79	1.09	27.9
Approach		146	3	154	2.1	0.619	52.9	LOS D	3.7	26.3	0.83	0.74	0.90	30.5
NorthEast: Tiger Brennan Drive														
24	L2	22	1	23	4.5	0.017	9.3	LOS A	0.2	1.7	0.23	0.64	0.23	53.6
25	T1	864	13	909	1.5	0.294	16.4	LOS B	9.6	68.4	0.59	0.51	0.59	59.1
26	R2	193	2	203	1.0	0.661	68.5	LOS E	6.1	43.3	1.00	0.81	1.08	28.8
Approach		1079	16	1136	1.5	0.661	25.6	LOS C	9.6	68.4	0.66	0.57	0.67	49.7
NorthWest: Woolner Road														
27	L2	322	1	339	0.3	0.527	18.3	LOS B	11.2	78.4	0.66	0.75	0.66	45.3
28	T1	121	1	127	0.8	* 0.757	57.0	LOS E	8.9	62.7	0.99	0.89	1.15	28.1
29	R2	370	12	389	3.2	0.757	62.6	LOS E	11.0	79.4	1.00	0.89	1.13	29.3
Approach		813	14	856	1.7	0.757	44.2	LOS D	11.2	79.4	0.86	0.83	0.95	33.8
SouthWest: Tiger Brennan Drive														
30	L2	559	1	588	0.2	0.317	8.0	LOS A	0.0	0.0	0.00	0.60	0.00	66.1
31	T1	1937	17	2039	0.9	* 0.746	21.6	LOS C	34.5	243.5	0.78	0.71	0.78	54.5
32	R2	112	1	118	0.9	* 0.767	70.8	LOS E	7.3	51.8	1.00	0.86	1.20	28.2
Approach		2608	19	2745	0.7	0.767	20.8	LOS C	34.5	243.5	0.63	0.69	0.63	54.4
All Vehicles		4646	52	4891	1.1	0.767	27.0	LOS C	34.5	243.5	0.68	0.69	0.71	47.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 PM 2032 Background

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 1 PM 2032 Developed

MOVEMENT SUMMARY

 Site: 101 [1. PM 2032 Background + Development (Site Folder: 1. Tiger Brennan Dr / Woolner Rd / Stoddart Dr AM)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Stoddart Drive														
21	L2	37	1	39	2.7	0.034	8.2	LOS A	0.5	3.8	0.30	0.58	0.30	51.2
22	T1	72	1	76	1.4	* 0.663	65.7	LOS E	4.0	28.4	1.00	0.81	1.13	26.4
23	R2	47	1	49	2.1	0.663	70.3	LOS E	3.8	27.4	1.00	0.81	1.14	27.8
Approach		156	3	164	1.9	0.663	53.5	LOS D	4.0	28.4	0.83	0.75	0.94	30.4
NorthEast: Tiger Brennan Drive														
24	L2	23	1	24	4.3	0.017	9.5	LOS A	0.2	1.8	0.24	0.64	0.24	53.4
25	T1	870	13	916	1.5	0.301	17.0	LOS B	9.9	70.2	0.60	0.52	0.60	58.5
26	R2	194	2	204	1.0	0.604	66.6	LOS E	6.0	42.6	1.00	0.79	1.03	29.3
Approach		1087	16	1144	1.5	0.604	25.7	LOS C	9.9	70.2	0.67	0.57	0.67	49.6
NorthWest: Woolner Road														
27	L2	322	1	339	0.3	0.522	18.7	LOS B	11.2	78.6	0.66	0.75	0.66	45.1
28	T1	126	1	133	0.8	* 0.766	57.3	LOS E	8.9	63.2	0.99	0.90	1.16	28.1
29	R2	370	12	389	3.2	0.766	62.9	LOS E	11.2	80.8	1.00	0.90	1.14	29.2
Approach		818	14	861	1.7	0.766	44.6	LOS D	11.2	80.8	0.87	0.84	0.95	33.7
SouthWest: Tiger Brennan Drive														
30	L2	559	1	588	0.2	0.317	8.0	LOS A	0.0	0.0	0.00	0.60	0.00	66.1
31	T1	1937	17	2039	0.9	* 0.761	22.4	LOS C	35.4	249.7	0.80	0.72	0.80	53.9
32	R2	116	1	122	0.9	* 0.722	68.6	LOS E	7.4	52.5	1.00	0.84	1.13	28.7
Approach		2612	19	2749	0.7	0.761	21.4	LOS C	35.4	249.7	0.64	0.70	0.64	53.9
All Vehicles		4673	52	4919	1.1	0.766	27.5	LOS C	35.4	249.7	0.69	0.70	0.71	46.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
SouthEast: Stoddart Drive												
P5	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	218.7	213.9	0.98
SouthWest: Tiger Brennan Drive												
P8	Full	1	1	54.2	LOS E	0.0	0.0	0.95	0.95	228.8	227.1	0.99
All		2	2	54.2	LOS E	0.0	0.0	0.95	0.95	223.8	220.5	0.99

Intersection 1 PM 2032 Developed

Pedestrians

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Intersection 2 AM 2022 Existing

MOVEMENT SUMMARY

 Site: 101 [2. AM 2022 Existing (Site Folder: Tiger Brennan Dr / Stoddart Dr)]

New Site

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Stoddart Drive														
21	L2	22	0	23	0.0	0.012	8.8	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
Approach		22	0	23	0.0	0.012	8.8	NA	0.0	0.0	0.00	0.53	0.00	54.9
NorthEast: Tiger Brennan Drive														
24	L2	18	0	19	0.0	0.010	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
25	T1	1938	39	2040	2.0	0.524	4.3	LOS A	0.0	0.0	0.00	0.53	0.00	54.5
Approach		1956	39	2059	2.0	0.524	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.5
All Vehicles		1978	39	2082	2.0	0.524	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Working\Bayview SIDRA Modelling.sip9

Intersection 2 AM 2022 Developed

MOVEMENT SUMMARY

 Site: 101 [2. AM 2022 Developed (Site Folder: Tiger Brennan Dr / Stoddart Dr)]

New Site

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Stoddart Drive														
21	L2	26	0	27	0.0	0.015	8.9	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
Approach		26	0	27	0.0	0.015	8.9	NA	0.0	0.0	0.00	0.53	0.00	54.9
NorthEast: Tiger Brennan Drive														
24	L2	20	0	21	0.0	0.011	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
25	T1	1938	39	2040	2.0	0.524	4.3	LOS A	0.0	0.0	0.00	0.53	0.00	54.5
Approach		1958	39	2061	2.0	0.524	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.5
All Vehicles		1984	39	2088	2.0	0.524	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 2 AM 2027 Developed

MOVEMENT SUMMARY

 Site: 101 [2. AM 2027 Developed (Site Folder: Tiger Brennan Dr / Stoddart Dr)]

New Site

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Stoddart Drive														
21	L2	26	1	27	3.8	0.015	9.5	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
Approach		26	1	27	3.8	0.015	9.5	NA	0.0	0.0	0.00	0.53	0.00	54.8
NorthEast: Tiger Brennan Drive														
24	L2	21	1	22	4.8	0.012	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
25	T1	2083	42	2193	2.0	0.564	4.4	LOS A	0.0	0.0	0.00	0.53	0.00	54.5
Approach		2104	43	2215	2.0	0.564	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.5
All Vehicles		2130	44	2242	2.1	0.564	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 2 AM 2032 Developed

MOVEMENT SUMMARY

 Site: 101 [2. AM 2032 Developed (Site Folder: Tiger Brennan Dr / Stoddart Dr)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Stoddart Drive														
21	L2	26	1	27	3.8	0.015	10.3	LOS B	0.0	0.0	0.00	0.53	0.00	54.8
Approach		26	1	27	3.8	0.015	10.3	NA	0.0	0.0	0.00	0.53	0.00	54.8
NorthEast: Tiger Brennan Drive														
24	L2	21	1	22	4.8	0.012	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
25	T1	2240	45	2358	2.0	0.606	4.4	LOS A	0.0	0.0	0.00	0.53	0.00	54.4
Approach		2261	46	2380	2.0	0.606	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.4
All Vehicles		2287	47	2407	2.1	0.606	4.5	NA	0.0	0.0	0.00	0.53	0.00	54.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 2 PM 2022 Existing

MOVEMENT SUMMARY

 Site: 101 [2. PM 2022 Existing (Site Folder: Tiger Brennan Dr / Stoddart Dr)]

New Site

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Stoddart Drive														
21	L2	23	0	24	0.0	0.013	7.0	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
Approach		23	0	24	0.0	0.013	7.0	NA	0.0	0.0	0.00	0.53	0.00	54.9
NorthEast: Tiger Brennan Drive														
24	L2	109	0	115	0.0	0.061	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
25	T1	1220	10	1284	0.8	0.328	4.2	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
Approach		1329	10	1399	0.8	0.328	4.3	NA	0.0	0.0	0.00	0.53	0.00	54.8
All Vehicles		1352	10	1423	0.7	0.328	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 2 PM 2022 Developed

MOVEMENT SUMMARY

 Site: 101 [2. PM 2022 Developed (Site Folder: Tiger Brennan Dr / Stoddart Dr)]

New Site

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Stoddart Drive														
21	L2	29	0	31	0.0	0.016	7.0	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
Approach		29	0	31	0.0	0.016	7.0	NA	0.0	0.0	0.00	0.53	0.00	54.9
NorthEast: Tiger Brennan Drive														
24	L2	119	0	125	0.0	0.067	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
25	T1	1220	10	1284	0.8	0.328	4.2	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
Approach		1339	10	1409	0.7	0.328	4.3	NA	0.0	0.0	0.00	0.53	0.00	54.8
All Vehicles		1368	10	1440	0.7	0.328	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 2 PM 2027 Developed

MOVEMENT SUMMARY

 Site: 101 [2. PM 2027 Developed (Site Folder: Tiger Brennan Dr / Stoddart Dr)]

New Site

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Stoddart Drive														
21	L2	29	1	31	3.4	0.017	7.2	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
Approach		29	1	31	3.4	0.017	7.2	NA	0.0	0.0	0.00	0.53	0.00	54.8
NorthEast: Tiger Brennan Drive														
24	L2	120	1	126	0.8	0.068	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
25	T1	1312	11	1381	0.8	0.352	4.2	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
Approach		1432	12	1507	0.8	0.352	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.7
All Vehicles		1461	13	1538	0.9	0.352	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Working\Bayview SIDRA Modelling.sip9

Intersection 2 PM 2032 Developed

MOVEMENT SUMMARY

 Site: 101 [2. PM 2032 Developed (Site Folder: Tiger Brennan Dr / Stoddart Dr)]

New Site

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Stoddart Drive														
21	L2	29	1	31	3.4	0.017	7.4	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
Approach		29	1	31	3.4	0.017	7.4	NA	0.0	0.0	0.00	0.53	0.00	54.8
NorthEast: Tiger Brennan Drive														
24	L2	121	1	127	0.8	0.068	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
25	T1	1410	12	1484	0.9	0.379	4.2	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
Approach		1531	13	1612	0.8	0.379	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.7
All Vehicles		1560	14	1642	0.9	0.379	4.4	NA	0.0	0.0	0.00	0.53	0.00	54.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 3 AM 2022 Existing

MOVEMENT SUMMARY

 **Site: 101 [3. AM 2022 Existing (Site Folder: Stoddart Dr / Fanning Dr)]**

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Fanning Drive														
21a	L1	108	0	114	0.0	0.089	3.8	LOS A	0.4	3.0	0.09	0.44	0.09	55.9
23a	R1	19	0	20	0.0	0.089	7.8	LOS A	0.4	3.0	0.09	0.44	0.09	55.8
Approach		127	0	134	0.0	0.089	4.4	LOS A	0.4	3.0	0.09	0.44	0.09	55.9
North: Stoddart Drive														
7a	L1	10	1	11	10.0	0.021	3.8	LOS A	0.1	0.8	0.06	0.56	0.06	54.0
9	R2	17	4	18	23.5	0.021	9.0	LOS A	0.1	0.8	0.06	0.56	0.06	53.6
Approach		27	5	28	18.5	0.021	7.1	LOS A	0.1	0.8	0.06	0.56	0.06	53.8
West: Stoddart Drive														
10	L2	8	3	8	37.5	0.015	4.3	LOS A	0.1	0.5	0.10	0.55	0.10	52.3
12a	R1	10	0	11	0.0	0.015	7.8	LOS A	0.1	0.5	0.10	0.55	0.10	54.2
Approach		18	3	19	16.7	0.015	6.2	LOS A	0.1	0.5	0.10	0.55	0.10	53.3
All Vehicles		172	8	181	4.7	0.089	5.0	LOS A	0.4	3.0	0.09	0.47	0.09	55.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Working\Bayview SIDRA Modelling.sip9

Intersection 3 AM 2022 Developed

MOVEMENT SUMMARY

 Site: 101 [3. AM 2022 Developed (Site Folder: Stoddart Dr / Fanning Dr)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Fanning Drive														
21a	L1	130	0	137	0.0	0.106	3.8	LOS A	0.5	3.7	0.09	0.44	0.09	55.9
23a	R1	23	0	24	0.0	0.106	7.8	LOS A	0.5	3.7	0.09	0.44	0.09	55.8
Approach		153	0	161	0.0	0.106	4.4	LOS A	0.5	3.7	0.09	0.44	0.09	55.9
North: Stoddart Drive														
7a	L1	12	1	13	8.3	0.023	3.8	LOS A	0.1	0.9	0.08	0.55	0.08	54.2
9	R2	17	4	18	23.5	0.023	9.0	LOS A	0.1	0.9	0.08	0.55	0.08	53.8
Approach		29	5	31	17.2	0.023	6.9	LOS A	0.1	0.9	0.08	0.55	0.08	53.9
West: Stoddart Drive														
10	L2	8	3	8	37.5	0.017	4.4	LOS A	0.1	0.6	0.11	0.55	0.11	52.1
12a	R1	13	0	14	0.0	0.017	7.8	LOS A	0.1	0.6	0.11	0.55	0.11	54.0
Approach		21	3	22	14.3	0.017	6.5	LOS A	0.1	0.6	0.11	0.55	0.11	53.2
All Vehicles		203	8	214	3.9	0.106	5.0	LOS A	0.5	3.7	0.09	0.47	0.09	55.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Working\Bayview SIDRA Modelling.sip9

Intersection 3 AM 2027 Developed

MOVEMENT SUMMARY

 Site: 101 [3. AM 2027 Developed (Site Folder: Stoddart Dr / Fanning Dr)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Fanning Drive														
21a	L1	132	1	139	0.8	0.108	3.8	LOS A	0.5	3.8	0.09	0.44	0.09	55.9
23a	R1	23	1	24	4.3	0.108	7.8	LOS A	0.5	3.8	0.09	0.44	0.09	55.6
Approach		155	2	163	1.3	0.108	4.4	LOS A	0.5	3.8	0.09	0.44	0.09	55.9
North: Stoddart Drive														
7a	L1	12	1	13	8.3	0.023	3.8	LOS A	0.1	0.9	0.08	0.55	0.08	54.2
9	R2	17	4	18	23.5	0.023	9.0	LOS A	0.1	0.9	0.08	0.55	0.08	53.8
Approach		29	5	31	17.2	0.023	6.9	LOS A	0.1	0.9	0.08	0.55	0.08	53.9
West: Stoddart Drive														
10	L2	8	3	8	37.5	0.018	4.4	LOS A	0.1	0.7	0.11	0.55	0.11	52.1
12a	R1	13	1	14	7.7	0.018	7.9	LOS A	0.1	0.7	0.11	0.55	0.11	53.7
Approach		21	4	22	19.0	0.018	6.5	LOS A	0.1	0.7	0.11	0.55	0.11	53.1
All Vehicles		205	11	216	5.4	0.108	5.0	LOS A	0.5	3.8	0.09	0.46	0.09	55.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 3 AM 2032 Developed

MOVEMENT SUMMARY

 **Site: 101 [3. AM 2032 Developed (Site Folder: Stoddart Dr / Fanning Dr)]**

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Fanning Drive														
21a	L1	133	1	140	0.8	0.108	3.8	LOS A	0.5	3.8	0.09	0.44	0.09	55.9
23a	R1	23	1	24	4.3	0.108	7.8	LOS A	0.5	3.8	0.09	0.44	0.09	55.6
Approach		156	2	164	1.3	0.108	4.4	LOS A	0.5	3.8	0.09	0.44	0.09	55.9
North: Stoddart Drive														
7a	L1	13	1	14	7.7	0.024	3.8	LOS A	0.1	0.9	0.08	0.54	0.08	54.3
9	R2	17	4	18	23.5	0.024	9.0	LOS A	0.1	0.9	0.08	0.54	0.08	53.8
Approach		30	5	32	16.7	0.024	6.8	LOS A	0.1	0.9	0.08	0.54	0.08	54.0
West: Stoddart Drive														
10	L2	8	3	8	37.5	0.018	4.4	LOS A	0.1	0.7	0.11	0.55	0.11	52.1
12a	R1	13	1	14	7.7	0.018	7.9	LOS A	0.1	0.7	0.11	0.55	0.11	53.7
Approach		21	4	22	19.0	0.018	6.5	LOS A	0.1	0.7	0.11	0.55	0.11	53.1
All Vehicles		207	11	218	5.3	0.108	4.9	LOS A	0.5	3.8	0.09	0.46	0.09	55.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 3 PM 2022 Existing

MOVEMENT SUMMARY

 Site: 101 [3. PM 2022 Existing (Site Folder: Stoddart Dr / Fanning Dr)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Fanning Drive														
21a	L1	41	0	43	0.0	0.059	3.9	LOS A	0.3	2.0	0.18	0.50	0.18	54.7
23a	R1	34	0	36	0.0	0.059	7.9	LOS A	0.3	2.0	0.18	0.50	0.18	54.6
Approach		75	0	79	0.0	0.059	5.7	LOS A	0.3	2.0	0.18	0.50	0.18	54.6
North: Stoddart Drive														
7a	L1	64	0	67	0.0	0.090	4.0	LOS A	0.4	3.2	0.19	0.52	0.19	54.4
9	R2	52	2	55	3.8	0.090	9.0	LOS A	0.4	3.2	0.19	0.52	0.19	54.6
Approach		116	2	122	1.7	0.090	6.2	LOS A	0.4	3.2	0.19	0.52	0.19	54.5
West: Stoddart Drive														
10	L2	3	0	3	0.0	0.046	4.0	LOS A	0.2	1.6	0.13	0.58	0.13	52.5
12a	R1	58	0	61	0.0	0.046	7.8	LOS A	0.2	1.6	0.13	0.58	0.13	53.2
Approach		61	0	64	0.0	0.046	7.6	LOS A	0.2	1.6	0.13	0.58	0.13	53.2
All Vehicles		252	2	265	0.8	0.090	6.4	LOS A	0.4	3.2	0.17	0.53	0.17	54.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 3 PM 2022 Developed

MOVEMENT SUMMARY

 Site: 101 [3. PM 2022 Developed (Site Folder: Stoddart Dr / Fanning Dr)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Fanning Drive														
21a	L1	48	0	51	0.0	0.068	3.9	LOS A	0.3	2.4	0.18	0.51	0.18	54.7
23a	R1	40	0	42	0.0	0.068	7.9	LOS A	0.3	2.4	0.18	0.51	0.18	54.5
Approach		88	0	93	0.0	0.068	5.8	LOS A	0.3	2.4	0.18	0.51	0.18	54.6
North: Stoddart Drive														
7a	L1	74	0	78	0.0	0.099	4.0	LOS A	0.5	3.5	0.21	0.52	0.21	54.4
9	R2	52	2	55	3.8	0.099	9.1	LOS A	0.5	3.5	0.21	0.52	0.21	54.6
Approach		126	2	133	1.6	0.099	6.1	LOS A	0.5	3.5	0.21	0.52	0.21	54.5
West: Stoddart Drive														
10	L2	3	0	3	0.0	0.053	4.0	LOS A	0.3	1.8	0.15	0.58	0.15	52.4
12a	R1	67	0	71	0.0	0.053	7.9	LOS A	0.3	1.8	0.15	0.58	0.15	53.1
Approach		70	0	74	0.0	0.053	7.7	LOS A	0.3	1.8	0.15	0.58	0.15	53.1
All Vehicles		284	2	299	0.7	0.099	6.4	LOS A	0.5	3.5	0.18	0.53	0.18	54.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 3 PM 2027 Developed

MOVEMENT SUMMARY

 Site: 101 [3. PM 2027 Developed (Site Folder: Stoddart Dr / Fanning Dr)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Fanning Drive														
21a	L1	48	1	51	2.1	0.069	4.0	LOS A	0.3	2.4	0.18	0.50	0.18	54.6
23a	R1	40	1	42	2.5	0.069	8.0	LOS A	0.3	2.4	0.18	0.50	0.18	54.4
Approach		88	2	93	2.3	0.069	5.8	LOS A	0.3	2.4	0.18	0.50	0.18	54.5
North: Stoddart Drive														
7a	L1	74	1	78	1.4	0.100	4.0	LOS A	0.5	3.6	0.21	0.52	0.21	54.4
9	R2	53	2	56	3.8	0.100	9.1	LOS A	0.5	3.6	0.21	0.52	0.21	54.6
Approach		127	3	134	2.4	0.100	6.1	LOS A	0.5	3.6	0.21	0.52	0.21	54.5
West: Stoddart Drive														
10	L2	3	1	3	33.3	0.055	4.4	LOS A	0.3	1.9	0.15	0.58	0.15	51.4
12a	R1	68	1	72	1.5	0.055	7.9	LOS A	0.3	1.9	0.15	0.58	0.15	53.0
Approach		71	2	75	2.8	0.055	7.7	LOS A	0.3	1.9	0.15	0.58	0.15	53.0
All Vehicles		286	7	301	2.4	0.100	6.4	LOS A	0.5	3.6	0.19	0.53	0.19	54.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 3 PM 2032 Developed

MOVEMENT SUMMARY

 Site: 101 [3. PM 2032 Developed (Site Folder: Stoddart Dr / Fanning Dr)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Fanning Drive														
21a	L1	49	1	52	2.0	0.070	4.0	LOS A	0.3	2.5	0.18	0.50	0.18	54.6
23a	R1	40	1	42	2.5	0.070	8.0	LOS A	0.3	2.5	0.18	0.50	0.18	54.4
Approach		89	2	94	2.2	0.070	5.8	LOS A	0.3	2.5	0.18	0.50	0.18	54.5
North: Stoddart Drive														
7a	L1	75	1	79	1.3	0.101	4.0	LOS A	0.5	3.6	0.21	0.52	0.21	54.4
9	R2	53	2	56	3.8	0.101	9.1	LOS A	0.5	3.6	0.21	0.52	0.21	54.6
Approach		128	3	135	2.3	0.101	6.1	LOS A	0.5	3.6	0.21	0.52	0.21	54.5
West: Stoddart Drive														
10	L2	3	1	3	33.3	0.055	4.4	LOS A	0.3	1.9	0.15	0.58	0.15	51.4
12a	R1	68	1	72	1.5	0.055	7.9	LOS A	0.3	1.9	0.15	0.58	0.15	53.0
Approach		71	2	75	2.8	0.055	7.7	LOS A	0.3	1.9	0.15	0.58	0.15	53.0
All Vehicles		288	7	303	2.4	0.101	6.4	LOS A	0.5	3.6	0.19	0.53	0.19	54.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 4 AM 2022 Existing

MOVEMENT SUMMARY

 Site: 101 [4. AM 2022 Existing (Site Folder: Stoddart Dr / Bayview Bvd)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Bayview Boulevard														
1a	L1	87	4	92	4.6	0.085	5.0	LOS A	0.4	3.1	0.41	0.50	0.41	54.8
3	R2	1	0	1	0.0	0.085	10.0	LOS A	0.4	3.1	0.41	0.50	0.41	55.3
Approach		88	4	93	4.5	0.085	5.1	LOS A	0.4	3.1	0.41	0.50	0.41	54.9
East: Stoddart Drive														
4	L2	6	3	6	50.0	0.181	4.5	LOS A	0.9	6.7	0.12	0.59	0.12	51.0
6a	R1	255	1	268	0.4	0.181	7.8	LOS A	0.9	6.7	0.12	0.59	0.12	53.1
Approach		261	4	275	1.5	0.181	7.7	LOS A	0.9	6.7	0.12	0.59	0.12	53.1
NorthWest: Stoddart Drive														
27a	L1	40	4	42	10.0	0.043	3.8	LOS A	0.2	1.7	0.02	0.52	0.02	55.1
29a	R1	27	0	28	0.0	0.043	7.7	LOS A	0.2	1.7	0.02	0.52	0.02	55.2
Approach		67	4	71	6.0	0.043	5.4	LOS A	0.2	1.7	0.02	0.52	0.02	55.1
All Vehicles		416	12	438	2.9	0.181	6.8	LOS A	0.9	6.7	0.17	0.56	0.17	53.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Working\Bayview SIDRA Modelling.sip9

Intersection 4 AM 2022 Developed

MOVEMENT SUMMARY

 Site: 101 [4. AM 2022 Developed (Site Folder: Stoddart Dr / Bayview Bvd)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Bayview Boulevard														
1a	L1	87	4	92	4.6	0.086	5.2	LOS A	0.4	3.1	0.43	0.51	0.43	54.8
3	R2	1	0	1	0.0	0.086	10.1	LOS B	0.4	3.1	0.43	0.51	0.43	55.3
Approach		88	4	93	4.5	0.086	5.2	LOS A	0.4	3.1	0.43	0.51	0.43	54.8
East: Stoddart Drive														
4	L2	7	3	7	42.9	0.196	4.5	LOS A	1.0	7.4	0.12	0.59	0.12	51.2
6a	R1	277	1	292	0.4	0.196	7.8	LOS A	1.0	7.4	0.12	0.59	0.12	53.1
Approach		284	4	299	1.4	0.196	7.7	LOS A	1.0	7.4	0.12	0.59	0.12	53.1
NorthWest: Stoddart Drive														
27a	L1	43	4	45	9.3	0.044	3.8	LOS A	0.2	1.7	0.02	0.51	0.02	55.2
29a	R1	27	0	28	0.0	0.044	7.7	LOS A	0.2	1.7	0.02	0.51	0.02	55.3
Approach		70	4	74	5.7	0.044	5.3	LOS A	0.2	1.7	0.02	0.51	0.02	55.2
All Vehicles		442	12	465	2.7	0.196	6.8	LOS A	1.0	7.4	0.17	0.56	0.17	53.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 4 AM 2027 Developed

MOVEMENT SUMMARY

 Site: 101 [4. AM 2027 Developed (Site Folder: Stoddart Dr / Bayview Bvd)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Bayview Boulevard														
1a	L1	88	4	93	4.5	0.088	5.2	LOS A	0.4	3.2	0.43	0.52	0.43	54.7
3	R2	1	1	1	100.0	0.088	12.8	LOS B	0.4	3.2	0.43	0.52	0.43	51.3
Approach		89	5	94	5.6	0.088	5.3	LOS A	0.4	3.2	0.43	0.52	0.43	54.7
East: Stoddart Drive														
4	L2	7	3	7	42.9	0.198	4.5	LOS A	1.1	7.5	0.12	0.59	0.12	51.2
6a	R1	280	1	295	0.4	0.198	7.8	LOS A	1.1	7.5	0.12	0.59	0.12	53.1
Approach		287	4	302	1.4	0.198	7.7	LOS A	1.1	7.5	0.12	0.59	0.12	53.1
NorthWest: Stoddart Drive														
27a	L1	43	4	45	9.3	0.045	3.8	LOS A	0.2	1.8	0.02	0.51	0.02	55.2
29a	R1	27	1	28	3.7	0.045	7.7	LOS A	0.2	1.8	0.02	0.51	0.02	55.1
Approach		70	5	74	7.1	0.045	5.3	LOS A	0.2	1.8	0.02	0.51	0.02	55.2
All Vehicles		446	14	469	3.1	0.198	6.9	LOS A	1.1	7.5	0.17	0.56	0.17	53.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 4 AM 2032 Developed

MOVEMENT SUMMARY

 **Site: 101 [4. AM 2032 Developed (Site Folder: Stoddart Dr / Bayview Bvd)]**

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Bayview Boulevard														
1a	L1	89	4	94	4.5	0.089	5.2	LOS A	0.4	3.3	0.44	0.52	0.44	54.7
3	R2	1	1	1	100.0	0.089	12.8	LOS B	0.4	3.3	0.44	0.52	0.44	51.3
Approach		90	5	95	5.6	0.089	5.3	LOS A	0.4	3.3	0.44	0.52	0.44	54.7
East: Stoddart Drive														
4	L2	7	3	7	42.9	0.200	4.5	LOS A	1.1	7.6	0.13	0.59	0.13	51.2
6a	R1	282	1	297	0.4	0.200	7.8	LOS A	1.1	7.6	0.13	0.59	0.13	53.1
Approach		289	4	304	1.4	0.200	7.7	LOS A	1.1	7.6	0.13	0.59	0.13	53.1
NorthWest: Stoddart Drive														
27a	L1	44	4	46	9.1	0.047	3.8	LOS A	0.2	1.8	0.02	0.51	0.02	55.2
29a	R1	28	1	29	3.6	0.047	7.7	LOS A	0.2	1.8	0.02	0.51	0.02	55.1
Approach		72	5	76	6.9	0.047	5.3	LOS A	0.2	1.8	0.02	0.51	0.02	55.2
All Vehicles		451	14	475	3.1	0.200	6.9	LOS A	1.1	7.6	0.17	0.56	0.17	53.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 4 PM 2022 Existing

MOVEMENT SUMMARY

 Site: 101 [4. PM 2022 Existing (Site Folder: Stoddart Dr / Bayview Bvd)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Bayview Boulevard														
1a	L1	36	2	38	5.6	0.034	4.2	LOSA	0.2	1.2	0.25	0.44	0.25	55.2
3	R2	4	0	4	0.0	0.034	9.2	LOSA	0.2	1.2	0.25	0.44	0.25	55.7
Approach		40	2	42	5.0	0.034	4.7	LOSA	0.2	1.2	0.25	0.44	0.25	55.3
East: Stoddart Drive														
4	L2	15	2	16	13.3	0.090	4.4	LOSA	0.4	3.1	0.20	0.58	0.20	52.1
6a	R1	98	0	103	0.0	0.090	8.0	LOSA	0.4	3.1	0.20	0.58	0.20	53.2
Approach		113	2	119	1.8	0.090	7.5	LOSA	0.4	3.1	0.20	0.58	0.20	53.0
NorthWest: Stoddart Drive														
27a	L1	149	2	157	1.3	0.137	3.7	LOSA	0.7	5.3	0.04	0.49	0.04	55.6
29a	R1	69	0	73	0.0	0.137	7.7	LOSA	0.7	5.3	0.04	0.49	0.04	55.5
Approach		218	2	229	0.9	0.137	5.0	LOSA	0.7	5.3	0.04	0.49	0.04	55.5
All Vehicles		371	6	391	1.6	0.137	5.7	LOSA	0.7	5.3	0.11	0.51	0.11	54.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 4 PM 2022 Developed

MOVEMENT SUMMARY

 Site: 101 [4. PM 2022 Developed (Site Folder: Stoddart Dr / Bayview Bvd)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Bayview Boulevard														
1a	L1	36	2	38	5.6	0.034	4.3	LOS A	0.2	1.2	0.26	0.45	0.26	55.1
3	R2	4	0	4	0.0	0.034	9.2	LOS A	0.2	1.2	0.26	0.45	0.26	55.7
Approach		40	2	42	5.0	0.034	4.8	LOS A	0.2	1.2	0.26	0.45	0.26	55.2
East: Stoddart Drive														
4	L2	16	2	17	12.5	0.098	4.4	LOS A	0.5	3.4	0.20	0.58	0.20	52.1
6a	R1	109	0	115	0.0	0.098	8.0	LOS A	0.5	3.4	0.20	0.58	0.20	53.2
Approach		125	2	132	1.6	0.098	7.5	LOS A	0.5	3.4	0.20	0.58	0.20	53.0
NorthWest: Stoddart Drive														
27a	L1	158	2	166	1.3	0.142	3.7	LOS A	0.8	5.5	0.04	0.49	0.04	55.6
29a	R1	69	0	73	0.0	0.142	7.7	LOS A	0.8	5.5	0.04	0.49	0.04	55.5
Approach		227	2	239	0.9	0.142	4.9	LOS A	0.8	5.5	0.04	0.49	0.04	55.6
All Vehicles		392	6	413	1.5	0.142	5.7	LOS A	0.8	5.5	0.11	0.51	0.11	54.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 4 PM 2027 Developed

MOVEMENT SUMMARY

 Site: 101 [4. PM 2027 Developed (Site Folder: Stoddart Dr / Bayview Bvd)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Bayview Boulevard														
1a	L1	36	2	38	5.6	0.035	4.3	LOS A	0.2	1.2	0.26	0.44	0.26	55.2
3	R2	4	1	4	25.0	0.035	9.6	LOS A	0.2	1.2	0.26	0.44	0.26	54.7
Approach		40	3	42	7.5	0.035	4.8	LOS A	0.2	1.2	0.26	0.44	0.26	55.2
East: Stoddart Drive														
4	L2	16	2	17	12.5	0.099	4.4	LOS A	0.5	3.4	0.20	0.58	0.20	52.1
6a	R1	109	1	115	0.9	0.099	8.0	LOS A	0.5	3.4	0.20	0.58	0.20	53.1
Approach		125	3	132	2.4	0.099	7.5	LOS A	0.5	3.4	0.20	0.58	0.20	53.0
NorthWest: Stoddart Drive														
27a	L1	158	2	166	1.3	0.143	3.7	LOS A	0.8	5.6	0.04	0.49	0.04	55.6
29a	R1	69	1	73	1.4	0.143	7.7	LOS A	0.8	5.6	0.04	0.49	0.04	55.4
Approach		227	3	239	1.3	0.143	4.9	LOS A	0.8	5.6	0.04	0.49	0.04	55.6
All Vehicles		392	9	413	2.3	0.143	5.8	LOS A	0.8	5.6	0.12	0.51	0.12	54.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection 4 PM 2032 Developed

MOVEMENT SUMMARY

 **Site: 101 [4. PM 2032 Developed (Site Folder: Stoddart Dr / Bayview Bvd)]**

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Bayview Boulevard														
1a	L1	37	2	39	5.4	0.036	4.3	LOS A	0.2	1.3	0.27	0.44	0.27	55.2
3	R2	4	1	4	25.0	0.036	9.6	LOS A	0.2	1.3	0.27	0.44	0.27	54.7
Approach		41	3	43	7.3	0.036	4.8	LOS A	0.2	1.3	0.27	0.44	0.27	55.2
East: Stoddart Drive														
4	L2	16	2	17	12.5	0.101	4.4	LOS A	0.5	3.5	0.21	0.58	0.21	52.1
6a	R1	111	1	117	0.9	0.101	8.0	LOS A	0.5	3.5	0.21	0.58	0.21	53.1
Approach		127	3	134	2.4	0.101	7.6	LOS A	0.5	3.5	0.21	0.58	0.21	53.0
NorthWest: Stoddart Drive														
27a	L1	161	2	169	1.2	0.146	3.7	LOS A	0.8	5.7	0.04	0.48	0.04	55.6
29a	R1	70	1	74	1.4	0.146	7.7	LOS A	0.8	5.7	0.04	0.48	0.04	55.4
Approach		231	3	243	1.3	0.146	4.9	LOS A	0.8	5.7	0.04	0.48	0.04	55.6
All Vehicles		399	9	420	2.3	0.146	5.8	LOS A	0.8	5.7	0.12	0.51	0.12	54.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\12dSWS\data\BYRNE-TMS\T22007 - Dover_Bayview Subdivision lot A_B_C_903\03 Engineering\5. Traffic Impact Assessment
Working\Bayview SIDRA Modelling.sip9

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Supplementary Report – Concurrent Application

Lots 5988 and 7433, Town of Darwin

A Concurrent Application has been lodged seeking approval to change the zoning of part of Lots 5988 and 7433, Town of Darwin from FD (Future Development) to LR (Low Density Residential) and LMR (Low-Medium Density Residential) and then subdivide the subject parts of Lots 5988 and 7433 in order to create 18 lots.

The application has been on public exhibition and this Report addresses issues that have been raised in submission received during the exhibition period.

City of Darwin (COD)

COD has advised that it has no objection to the proposed rezoning.

COD requested provision of heavy vehicle access to the adjacent, balance portions of Lot 7433 to allow vehicle access between Areas A and C to allow for continued maintenance by COD.

Representatives from Byrne Consultants, the developer's engineering consultants, subsequently met with COD to clarify the request.

Following those discussions the proposed lot layout for Areas A and C was amended to provide the access requested by Council.

The amendment of the lot layout resulted the reduction in the area of proposed Lot 10 in Area A (refer to plan 22/8093/27.4).

In Area C, the amendments resulted in the shortening of the proposed road reserve and minor changes to the lot boundaries. The area proposed for rezoning to LMR has also been reduced.

The amended design for Area C is shown on plan 22/8093/29.4.

In its submission, COD has requested updated plans showing access to the two lots proposed for Area B. Byrne has agreed with council that the final engineering plans will indicate access in accordance with COD standards.

COD confirms that gross pollutant traps (GPT's) are not installed on the existing stormwater outlets within the Bayview subdivision and for that reason the Stormwater management Plan prepared by Byrne did not propose GPT's as existing outlets are to be utilised.

COD is now requiring the GPT's so they will be installed on the relevant outlets.

Power and Water Corporation (PWC)

Water and Sewer

PWC advises that a hydraulic consultant should be engaged to assist with water and sewer servicing for the proposed subdivision.

Byrne Consultants has already been engaged and they have had extensive discussions with PWC prior to the lodgement of the subdivision proposal.

Concept designs for servicing have been prepared by along with a comprehensive Site Services Report.

Power

Electrical consultants AGA Consulting has investigated the power requirements and prepared concept servicing and reticulation plans.

PWC has confirmed that it agrees with the AGA design principles.

Department of Environment, Parks and Water Security (DEPWS)

Prior to the submission of the original application, EcOz Environmental Consultants (EcOz) was engaged to carry out a Pre-referral screening assessment in accordance with the tool provided in *Guideline – Referring a Proposal to the NT EPA* <https://ntepa.nt.gov.au/publications-and-advice/environmental-management>.

The assessment indicated that development is unlikely to have a significant impact and therefore does not need to be referred under the EP Act. However, the screening did identify that there are sensitive receptors proximate to the development, namely existing residences and mangroves, and specific controls are required to ensure that impacts to these are avoided and minimised to the greatest extent practicable.

The submission lodged by DEPWS in relation to the current application recommended that the proponent meet with the Environment Assessment team to discuss the matter further.

Kevn Dodd from EJA and EcOz Senior Environmental Consultant, Brittany Crescentino, met with the Environment Assessments Team on 09 July 2024 to discuss the project, and it was confirmed that the proposal *does not address the question about whether there is potential for significant impact* and therefore the team could not confirm whether or not referral was required.

EcOz subsequently carried out a review of its previous prereferral screening and determined that the project proposal is not considered to pose a potential impact to any of the NT EPA environmental factors.

Attached to the Supplementary Report are a covering letter from EcOz and the review of the Pre-referral screening assessment

Issues Raised in Public Submissions

Traffic

The intersection that has been constructed opposite Benison Road, off Tiger Brennan Drive, was constructed by NT Government with a view to service a potential, broader extension of the Bayview subdivision.

That potential extension, incorporating a thoroughfare referred to as Bayview Boulevard, is no longer going to go ahead and the NT Government's offer of additional land has been withdrawn.



The subdivision now being proposed is significantly smaller scale than the extension proposal and consequently the associated traffic generation does not require an additional access point onto Tiger Brennan Drive.

Past and current traffic studies have demonstrated the suitability of the Bayview Road network to accommodate the proposed subdivision and neither of the road authorities, City of Darwin and NT Government, have indicated any concerns with the road network.

Mention has been made in some of the submissions regarding construction traffic. It is understood that any approval that may result from the current application will require a Construction Management Plan and this will include measures to minimise the impact of any construction traffic.

A potential traffic increase in Latrobe Street has been raised in one of the submissions however Latrobe Street has always been identified as a potential connection point to a continuation of the Bayview development. Once again, the impact will be significantly less than what may have eventuated if the broader extension proposal or the 2013 approval had preceeded.

Mangroves and natural environment

EcOz Environmental Consultants have carried out an extensive assessment of the development proposal and they have determined that the project proposal is not considered to pose a potential impact to any of the NT EPA environmental factors.

Privacy

The current proposal is seeking to develop land in a manner that is consistent with the purpose of the Crown lease in the same manner that the rest of the Bayview subdivision has been developed.

Any development has some impact on surrounding residents, but the proposal is consistent with what has been identified.

The impact of the current proposal is certainly less than what would have resulted if the extension proposal had gone ahead and definitely less than if multiple units had been constructed on the lots approved by the Development Consent Authority in 2013.

The latest amendment to the subdivision proposal, following discussions with Council, had reduced the scope of the development in Area C (less road and one less Lot) so this development will abut a lesser number of the existing lots fronting O'Ferrals Road.

Parking

It is not necessarily the case that parking will increase in O'Ferrals Road, as has been suggested in some of the submissions.

The vast majority of the lots being proposed by the current application are for single dwellings and any future development on the lots proposed to have an LMR zoning will have to include on-site parking in accordance with the NT Planning Scheme.





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06 August 2024

Our ref.: EZ23063

Kevin Dodd
Senior Surveyor
Earl James & Associates
kdodd@eja.com.au

Re: Request pre-referral screening review and Regulator engagement support – Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin, and Lot 7433, Town of Darwin.

Dear Kevin,

EcOz Environmental Consultations (EcOz) were engaged to review a Pre-referral screening assessment prepared in accordance with the tool provided in *Guideline – Referring a Proposal to the NT EPA* <https://ntepa.nt.gov.au/publications-and-advice/environmental-management>, and provide support to engage with the Department of Environment, Parks and Water Security (DEPWS) Environment Assessments team.

Purpose of this letter is to provide a summary of the Pre-referral screening assessment review and provide recommendations, in consideration of the *Environment Protection Act 2019 (EP Act)*, based on feedback provided by DEPWS on the Development Application.

The subsection below provides a brief overview of the background to the project.

Background

The proposed development of Lot 5988 and Lot 7433 Town of Darwin for residential purposes (the project), is contained within a larger, formerly proposed, Bayview Boulevard Project. In 2015, a referral under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (Assessment no. EPBC 2015/7466) was submitted. The assessment never commenced; however, it is still listed as active in the EPBC Portal. In addition to this, a Notice of Intent (NOI) under the then Northern Territory *Environment Assessments Act (EA Act)* (superseded by the *EP Act*) was submitted, and the assessment was terminated due to inactivity of the assessment when the *EA Act* was superseded by the *EP Act*.

In 2023, EcOz was engaged to prepare a pre-referral screening assessment under the *EP Act* for a significantly refined project area containing Lot 5988 and Lot 7433 Town of Darwin only. The assessment was undertaken by the EcOz Approvals Team Lead and Certified Environmental Practitioner. The assessment indicated *that development is unlikely to have a significant impact and therefore does not need to be referred under the EP Act. However, the screening did identify that there are sensitive receptors proximate to the development, namely existing residences and mangroves, and specific controls are required to ensure that impacts to these are avoided and minimised to the greatest extent practicable.*

The pre-referral screening assessment was attached with other applicable documentation to support a Development Permit Application for the project. As part of the assessment process, DEPWS Rangelands Environment Division reviewed the application and provided feedback that whilst the pre-referral screening states that the proposal is *unlikely* to have a significant impact, however, does not address the question about whether there is *potential* for significant impact. The Environment Division recommended the proponent meet with the Environment Assessments team to discuss the proposal further.

Kevin Dodd, from Earl James and Associates and EcOz Senior Environmental Consultant, Brittany Crescentino, met with the Environment Assessments Team on 09 July 2024 to discuss the project, and it was confirmed that the proposal *does not address the question about whether there is potential for significant impact* and therefore the team could not confirm whether or not referral was required.

Pre-referral screening review

Based on the assumption that the extent and scope of the project within Lot 5988 and Lot 7433 Town of Darwin had not been altered, a EcOz undertook a review of the pre-referral screening assessment and its original findings. The review determined that the findings and conclusions of the assessment were sound, just and still applicable. In conducting the review, EcOz reviewed mangrove mapping undertaken by Brocklehurst et al. (2019). The mapping indicates that the mangrove communities present at the project site include:

- *Rhizophora stylosa/Camptostemon schultzei* low to mid closed-forest/open-forest (tidal creek forest) (group 2a); and
- *Ceriops tagal* low closed-forest/low open-forest (tidal flats) (group 4a)

The mapped species were also confirmed during a site visit undertaken by an EcOz Ecology Consultant on 21 April 2023. These two mangrove communities are considered regionally common and (along with group 9a Salt flats) account for approximately 60% of the total mangrove distribution (in area) across the Darwin region (DENR, 2020). The cleared extent constitutes less than 0.004% of the regional mapped area for these species. This, combined with the other findings in the original pre-referral screening assessment and the small-scale scope and location of the project means that the development is not considered to have a potential for significant impact to Terrestrial Ecosystems.

The review has found that the project proposal is not considered to pose a potential significant impact to any of the NT EPA environmental factors. The pre-referral screening assessment report has been amended to remove the word *unlikely* and clarify that there is no potential for significant impact. This amendment has been attached to this memo as Attachment A.

Yours sincerely,



Brittany Crescentino
Senior Environmental Consultant
EcOz Environmental Consultants
Brittany.crescentino@eco.com.au

References

Brocklehurst P, Edmeades B (2018) Development of an integrated long-term mangrove monitoring program for Darwin Harbour. Sub-project A: Mangrove community mapping: Charles Point to Gunn Point 2016 Technical Report 19/2018D, Department of Environment and Natural Resources, Northern Territory Government, Darwin, NT.

Department of Environment and Natural Resources (DENR) (2020). Middle Arm Regional Environmental Assessment Stage 2 Final Report [unpublished].

Attachment A

Pre-Referral Screening Report

Project: Bayview subdivision



EcOz Environmental Consultants was engaged by Dover Investments to undertake pre-referral screening of their proposal to subdivide Lots 5988 and 7433, Town of Darwin (Bayview Haven). The proposed subdivision location and layout is shown on Figure 1.

The purpose of the screening is to determine whether the development has the potential for significant environmental impact under the *Environment Protection Act 2019*. A significant environmental impact is defined by Section 11 of the *Environment Protection Act 2019* as:

An impact of major consequence having regard to:

- *the context and intensity of the impact; and*
- *the sensitivity, value and quality of the environment impacted on, and the duration, magnitude and geographic extent of the impact.*

Pre-referral screening was undertaken using the tool provided in the *Guideline – Referring a Proposal to the NT EPA* <https://ntepa.nt.gov.au/publications-and-advice/environmental-management>. The screening records answers to the questions shown in Figure 2.

The following key information sources were referenced to conduct the screening:

- Attachment 1 Statement of Reasons submitted with the Development Application.
- Attachment 2 Site inspection notes
- Attachment 3 Commitments made by the Proponent to avoid and mitigate impacts.

The pre-referral screening results are documented in Table 1 below. The screening indicates that the development is unlikely to have a significant impact and therefore does not need to be referred under the *Environment Protection Act 2019*. However, the screening did identify that there are sensitive receptors proximate to the development, namely existing residences and mangroves, and specific controls are required to ensure that impacts to these are avoided and minimised to the greatest extent practicable. The Proponent has committed to implementing the controls detailed in Attachment 3 and for the purpose of the screening it is assumed that these will be conditioned and regulated through the Development Permit as per the recommendations made by DEPWS. Assuming effective implementation of the controls, most impacts will be limited to the construction phase and will affect a small geographic area and small number of neighbouring residences.

Review of pre-referral screening assessment

EcOz were engaged in July 2024 to review this pre-referral screening assessment, after a letter was received from the Department of Environment, Parks and Water Security (DEPWS) Environment Division in response to the request to provide comment whether a referral submission under the *EP Act* was required. DEPWS advised *that the decision about whether a referral is required is a decision for the proponent. Environment Division staff are unable to confirm that the proposal does not require referral to the Northern Territory Environment Protection Authority (NT EPA) under the EP Act. The statutory decision-maker for the Planning Act 1999 may also refer the action to the NT EPA.* Further commenting that it was encouraged that a pre-referral meeting with the Environmental Division be undertaken by the proponent to discuss the project. As the team raised concerns that *the pre-referral screening report states that the proposal is unlikely to have a significant impact, however, notes the presence of nearby sensitive receptors and the need for controls that are assumed to be regulated through a development permit. The report outlines the reasons why significant impacts on the environment are unlikely, but it does not address the question about whether there is potential for significant impact.*

In light of the above, the review determined that the development is not considered to have a potential for significant impact to Terrestrial Ecosystems or any of the remaining 13 environmental factors assessed under

Pre-Referral Screening Report

Project: Bayview subdivision



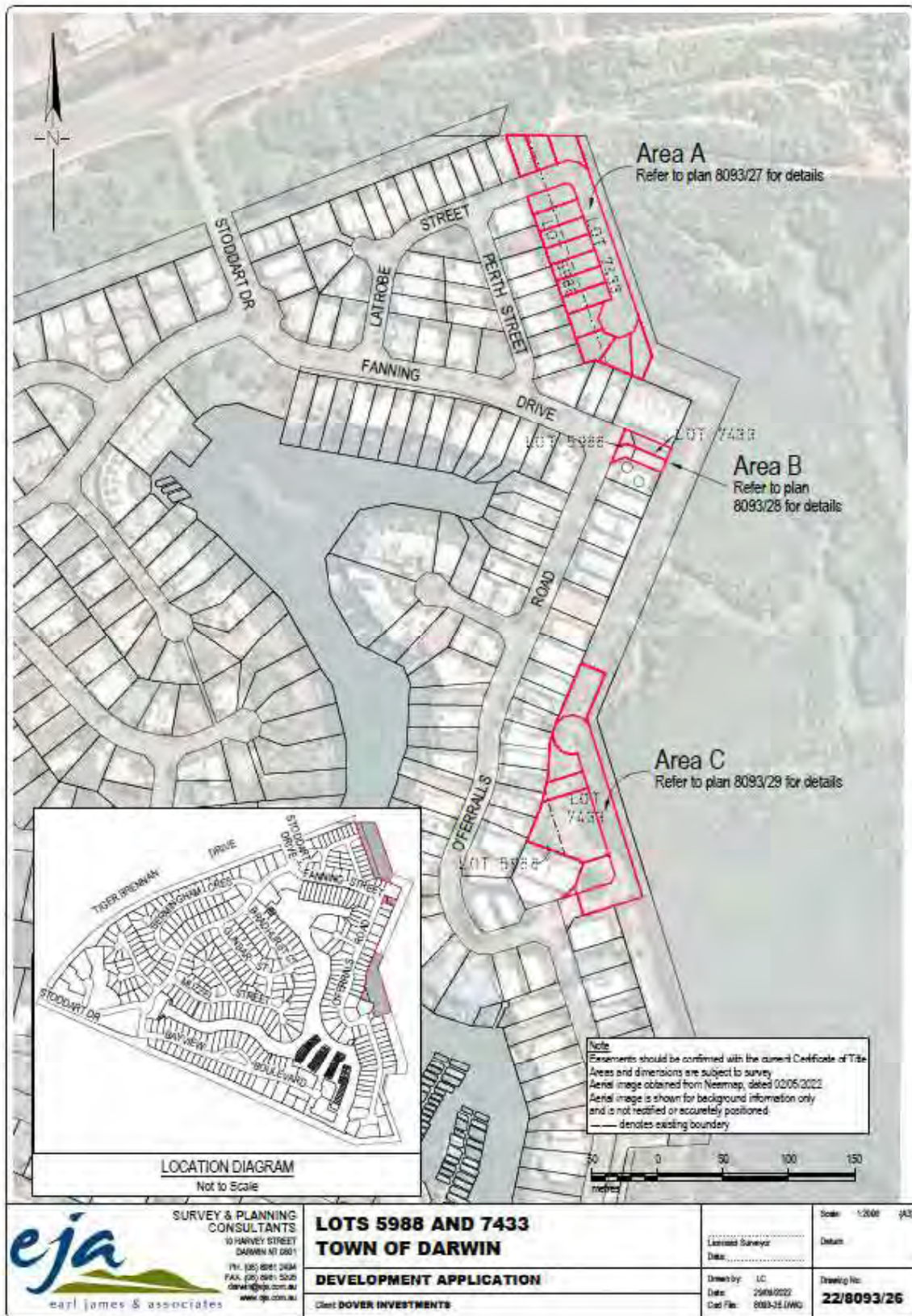
the *EP Act*. As a result this assessment report has been amended to state that the development is not considered to have a potential for a significant impact on any of the environmental factors assessed.

Pre-Referral Screening Report

Project: Bayview subdivision



Figure 1. Subdivision location and layout

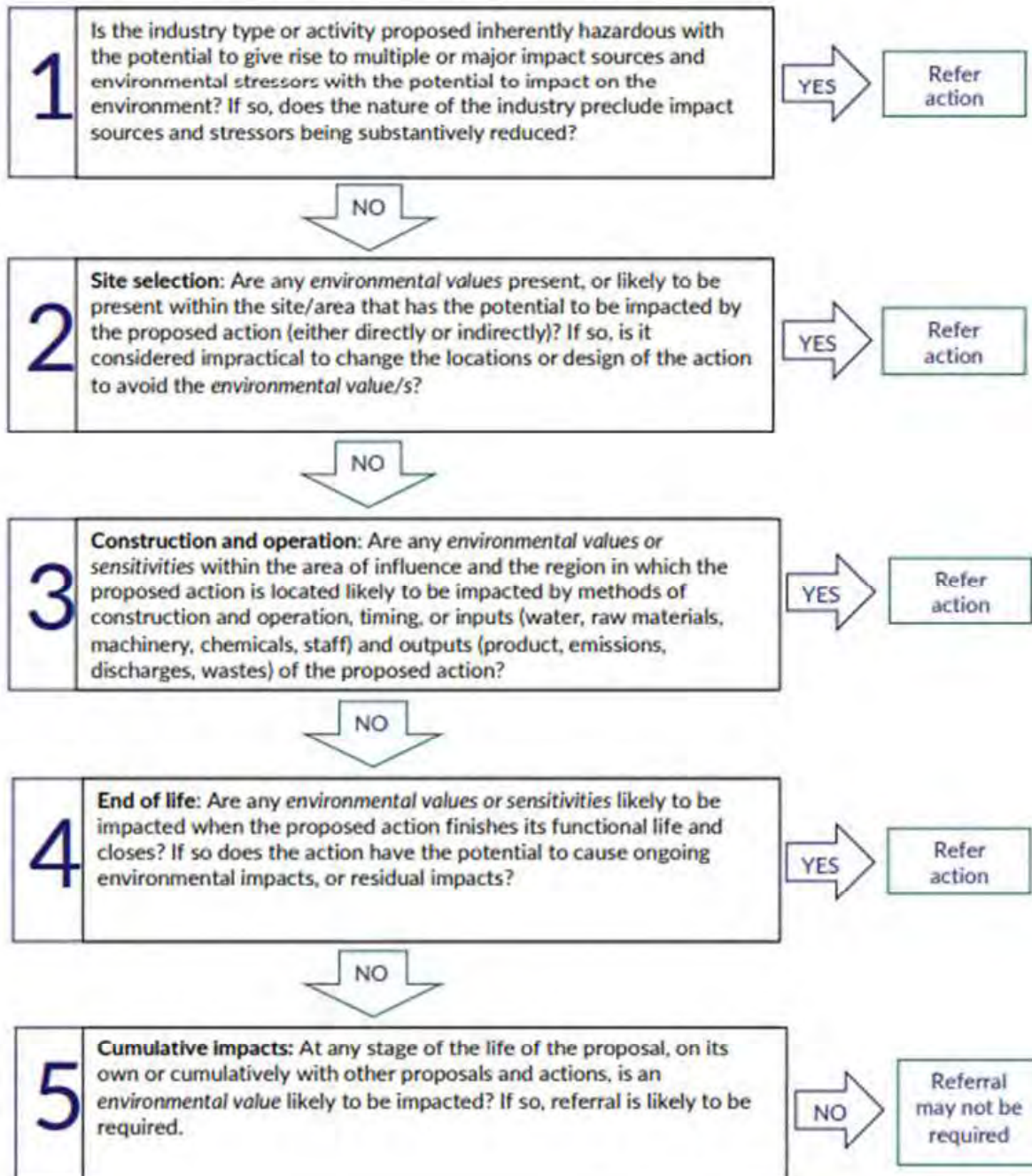


Pre-Referral Screening Report

Project: Bayview subdivision

Figure 2. Pre-screening tool screening questions (Source: NT EPA 2021)

The questions from the pre-referral screening tool are provided here for ease of reference.



Note: The questions in the tool are used as a guide to assess whether a referral may be required. Answering 'yes' to a particular question for an environmental factor does not automatically mean that the proposal will have a significant impact on the environment. Where a 'yes' answer was recorded, further assessment was then undertaken to determine whether a referral is required.

Pre-Referral Screening Report

Project: Bayview subdivision

Table 1. Pre-referral screening tool checklist prepared for Bayview subdivision.

Theme	Factor and Objective	Background information (about the project)	Environmental values, sensitivities (based on desktop and/or surveys)	Pre-referral screening questions						Assessment of potential for significant impact
					Q1	Q2	Q3	Q4	Q5	
				Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>					
Land	Landforms <u>Objective:</u> Conserve the variety and integrity of distinctive physical landforms.	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> No distinct natural landforms. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	The development will not have a significant impact on landforms because there are no distinct natural landforms present in the development footprint.
	Terrestrial Environmental Quality <u>Objective:</u> Protect the quality and integrity of land and soils so that environmental values are supported and maintained.	<ul style="list-style-type: none"> To create land that is suitable for development, approximately 2 ha of land in Area A and Area C will be reclaimed and seawalls constructed to protect the land from storm surge. Area B does not require earthworks as this area has been filled and surcharged as part of a previous stage of Bayview. Seawall construction in Area A and Area C will require removal of mangrove muds that are Potential Acid Sulfate Soils (PASS) Site preparation in Area A will require clearing and reshaping of sloping ground before fill placement. Site preparation in Area C will require removal of the existing rockwall before fill placement. Large volumes of contaminating materials such as fuels are not required to be stored on site due to the proximity of the site to Darwin allowing for daily resupply, and the nature of the project. 	<ul style="list-style-type: none"> PASS may be present where the seawalls are planned to be constructed. The geotechnical report prepared by Douglas Partners states that additional geo-environmental sampling, testing and reporting will be to assess and to address the issues of handling and disposal of PASS. Area A and Area C contain dumped fill and waste materials. The origin and timing of this dumping is unknown; however, visual inspection suggests that in Area A there is potential for occurrence of asbestos (although none was observed on the ground surface). Exposure of soils will create potential for erosion and generation of turbid stormwater runoff that would flow into the adjacent mangrove forests that line the upper reaches of Sadgroves Creek. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	The development will disturb land and soils but is not considered to have the potential to significantly impact on terrestrial environmental quality for the following reasons: <ul style="list-style-type: none"> To avoid and mitigate impacts from ASS, Dover Investments has committed to undertaking testing for ASS and managing ASS in accordance with the national guidelines, and Qld and WA guidelines were relevant. The management of ASS has been addressed for previous stages of Bayview and there was no evidence of ASS impacts along the development boundary inspected by EcOz. To avoid and mitigate impacts from contaminated soils Dover Investments has committed to further site assessment in Area A and Area C in accordance with the ASC NEPM, NSW Contaminated Land Guideline, and relevant geotechnical guidelines. If materials are found to be contaminated, and require removal from site, a licenced contractor will be engaged. Dover Investments will ensure all fill (whether from onsite or offsite sources) is tested and certified suitable for use. Any material that is not suitable due to contamination, or geotechnical instability, will be removed from site by a licenced contractor. To avoid and mitigate impacts from erosion and generation of turbid stormwater runoff Dover Investments has committed to engage a Certified Practitioner to prepare Erosion and Sediment Control Plans (ESCP) that meet the IECA Guidelines and specifications. Contaminating materials such as fuels will only be stored in small volumes and in accordance with VIC EPA Publication 1698: Liquid storage and handling guidelines, June 2018, as amended. Any accidental spill of such materials will be remediated, and materials transported to an appropriate facility by a licensed waste handler. The above measures are accepted practice on construction projects and are expected to be effective in protecting the environment when implemented.

Pre-Referral Screening Report

Project: Bayview subdivision

Theme	Factor and Objective	Background information (about the project)	Environmental values, sensitivities (based on desktop and/or surveys)	Pre-referral screening questions						Assessment of potential for significant impact
					Q1	Q2	Q3	Q4	Q5	
				Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>					
	Terrestrial Ecosystems <u>Objective:</u> Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	<ul style="list-style-type: none">Reclamation of land in Area A and Area C will require clearing and filling of approximately 2 ha of land within the development footprint.Area B is already cleared of vegetation.	<ul style="list-style-type: none">The development footprint comprises 0.6 ha of intact mangroves with the remaining areas being previously disturbed and now infested with weeds.Mangroves are a significant vegetation type under the <i>NT Land Clearing Guidelines</i>. The guidelines recommend that mangroves are excluded from any proposed clearing footprint and native vegetation buffers retained to protect them.The mangroves surrounding the development footprint are protected by Conservation zoning, but the mangroves in the development footprint are not, they are zoned Residential and Future Development.Mangrove mapping by Brocklehurst et al. (2019), indicates that the mangrove communities present at the project site include:<ul style="list-style-type: none"><i>Rhizophora stylosa/Camptostemon schultzei</i> low to mid closed-forest/open-forest (tidal creek forest) (group 2a); and<i>Ceriops tagal</i>/low closed-forest/low open-forest (tidal flats) (group 4a)The mangroves that are present in the development footprint are regionally common and are unlikely to be critical habitat given the location adjacent to existing development. Refer Attachment 2.Weeds are abundant across Area A and were also observed by EcOz in Area C. Refer Attachment 2 for details of weed species.	Yes No Uncertain N/A	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development will result in the loss of a small area of mangroves but is not considered to have the potential to significantly impact on terrestrial ecosystems for the following reasons:</p> <ul style="list-style-type: none">The clearing is small scale and is located on land that is zoned Residential and Future Development.The surrounding mangroves that fringe Sadgroves Creek are protected by Conservation zoning. Dover Investments has committed to implementing ASS management and ESCP's during construction to minimise the generation of contaminated and turbid stormwater runoff and reduce the likelihood of that water entering the adjacent mangroves that are zoned Conservation.Dover Investments has committed to managing weeds to meet the requirements of the <i>Weeds Management Act</i>.Mangroves have persisted adjacent to the existing development, which indicates that impacts are likely to be limited to within the direct disturbance footprint.Due to the small scale and location of the development footprint the loss of habitat is not expected to alter biodiversity, ecological integrity and functioning.The proposed cleared extent of mangroves equates to a loss of less than 0.003% of the regional distribution (area) of the species present.	
Water	Hydrological Processes <u>Objective:</u> Protect the hydrological regimes of groundwater and surface water so that environmental including ecological health, land uses and the welfare and amenity of people are maintained.	<ul style="list-style-type: none">Surface water flows and groundwater recharge are significantly altered from natural conditions by the existing Bayview development.The increase in impervious surfaces associated with the subdivision represents a small fraction of the catchment area.The Bayview stormwater drainage system will be extended through the new development.There is no groundwater extraction proposed.	<ul style="list-style-type: none">Stormwater from Bayview discharges towards Sadgroves Creek.Darwin Harbour natural waterways in the catchment, including Sadgroves Creek, have declared beneficial uses for protection of the environment, cultural (aesthetic, recreational and cultural), and aquaculture.	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development is not considered to have the potential to significantly impact on the hydrological regimes of groundwater and surface water or declared beneficial uses for the following reasons:</p> <ul style="list-style-type: none">The development is considered unlikely to alter the surface water or groundwater hydrological regimes substantially beyond the existing conditions.Despite the altered nature of the hydrological processes in the area, mangroves have persisted around the edges of the existing development boundary, which indicates that environmental beneficial uses are being maintained.	

Pre-Referral Screening Report

Project: Bayview subdivision

Theme	Factor and Objective	Background information (about the project)	Environmental values, sensitivities (based on desktop and/or surveys)	Pre-referral screening questions						Assessment of potential for significant impact
					Q1	Q2	Q3	Q4	Q5	
				Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>					
	Inland Water Environmental Quality <u>Objective:</u> Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.	<ul style="list-style-type: none"> The development has potential to impact the quality of surface water runoff that discharges towards Sadgroves Creek. During construction, surface water quality could be impacted by erosion and turbid runoff, disturbance of PASS and contaminated soils, spills and leaks of hazardous chemicals from construction equipment and machinery. Residential land use could impact water quality through the introduction of nutrients from parks and gardens and inappropriate disposal of chemicals to the stormwater system. 	<ul style="list-style-type: none"> Stormwater quality plays a role in maintaining the ecological health of the surrounding mangroves and marine ecosystem within Sadgroves Creek. Darwin Harbour natural waterways in the catchment, including Sadgroves Creek, have declared beneficial uses for protection of the environment, cultural (aesthetic, recreational and cultural), and aquaculture. Marine environmental values are discussed under the Sea theme below. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	The development could release contaminated or turbid runoff but is not considered to have the potential to significantly impact on inland water quality or declared beneficial uses for the following reasons: <ul style="list-style-type: none"> Dover Investments has committed to conducting further investigation for PASS and contaminated soils, and to implementing contamination and ASS management and ESCP's during construction to minimise the generation of contaminated or turbid stormwater runoff. Contaminating materials such as fuels will only be stored in small volumes and in accordance with VIC EPA Publication 1698: Liquid storage and handling guidelines, June 2018, as amended. Stormwater management system design will comply with City of Darwin standards. Darwin Harbour monitoring program indicates that stormwater discharges do not have a significant impact on water quality in the East Arm zone of the harbour.
	Aquatic Ecosystems <u>Objective:</u> Protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> There are no freshwater ecosystems present within or surrounding the development footprint. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Not applicable
Sea	Coastal Processes <u>Objective:</u> Protect the geophysical and hydrological processes that shape coastal morphology so that the environmental values of the coast are maintained.	<ul style="list-style-type: none"> Reclamation and construction of seawalls in Area A and Area C will alter the natural coastline. The development footprint is currently subject to tidal inundation but will be raised above storm surge levels to create land that is suitable for development. 	<ul style="list-style-type: none"> The coastline within the development footprint and adjacent areas is characterised by dense mangrove forest. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	The development is not considered to have the potential to significantly impact coastal processes for the following reasons: <ul style="list-style-type: none"> Currents and tidal movement are limited at the locations that will be reclaimed. There is no evidence of erosion occurring along the coastline around the edges of the existing Bayview Development.
	Marine Environmental Quality <u>Objective:</u> Protect the quality and productivity of water, sediment and biota so that environmental values are maintained.	<ul style="list-style-type: none"> Any contaminated stormwater runoff from the development will be discharged into the mangrove forests that fringe Sadgroves Creek. The areas that will receive stormwater runoff are subject to tidal inundation that could distribute contaminants out into Sadgroves Creek. During construction, water quality could be impacted by erosion and turbid runoff, disturbance of PASS and contaminated soils, spills and leaks of hazardous chemicals from construction equipment and machinery. Residential land use could impact water quality through the introduction of nutrients from parks and gardens and inappropriate disposal of chemicals to the stormwater system. 	<ul style="list-style-type: none"> Darwin Harbour marine waters and natural waterways in the catchment, including Sadgroves Creek, have declared beneficial uses for protection of the environment, cultural (aesthetic, recreational and cultural), and aquaculture. Water and sediment quality plays a role in maintaining the ecological health of the surrounding mangroves and marine ecosystem within Sadgroves Creek. Sadgroves Creek is also utilised for recreational boating and fishing. The Darwin Harbour water quality report 2021 indicates that water quality in the East Arm zone of the Harbour where Sadgroves Creek is located, is very good. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	The development could release contaminated or turbid runoff but is not considered to have the potential to significantly impact marine water or sediment quality or declared beneficial uses for the following reasons: <ul style="list-style-type: none"> Dover Investments has committed to implementing contamination and ASS management and ESCP's during construction to minimise the generation of contaminated or turbid stormwater runoff. Stormwater management system design will comply with City of Darwin standards. These measures are expected to be effective in ensuring that any impact to water and sediment quality are localised and short term. Darwin Harbour monitoring program indicates that the current land use in the East Arm catchment does not have a significant impact on water quality. The development will not substantially alter existing conditions.

Pre-Referral Screening Report

Project: Bayview subdivision

Theme	Factor and Objective	Background information (about the project)	Environmental values, sensitivities (based on desktop and/or surveys)	Pre-referral screening questions						Assessment of potential for significant impact
					Q1	Q2	Q3	Q4	Q5	
				Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>					
	Marine Ecosystems <u>Objective:</u> Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	<ul style="list-style-type: none"> Marine ecosystems surrounding the development footprint could be affected by any contaminated stormwater runoff or discharges. 	<ul style="list-style-type: none"> The coastline within the development footprint and adjacent areas is characterised by dense mangrove forest. Mangrove forests in Darwin Harbour are recognised as important marine habitats. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development is not considered to have the potential to significantly impact marine ecosystems because:</p> <ul style="list-style-type: none"> Impacts to water quality and sediment quality are predicted to be localised and short term.
	Air Quality <u>Objective:</u> Protect air quality and minimise emissions and their impact so that environmental values are maintained.	<ul style="list-style-type: none"> Construction activities will create dust and exhaust emissions from construction plant and equipment. 	<ul style="list-style-type: none"> There are existing residential properties immediately adjacent to the development footprint. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development will cause dust emissions but is not considered to have the potential to significantly impact on air quality because:</p> <ul style="list-style-type: none"> Dover Investments has committed to implement all measures in the <i>Guideline for preventing pollution on buildings sites</i> (NT EPA 2015) to control dust and limit nuisance. Refer Attachment 3 for details of specific commitments. DEPWS have advised that the proponent must ensure that nuisance dust and/or nuisance airborne particles are not discharged or emitted beyond the boundaries of the premises.
Air	Atmospheric Processes <u>Objective:</u> Minimise greenhouse gas emissions so as to contribute to the NT Government's aspirational target of achieving net zero greenhouse gas emissions by 2050.	<ul style="list-style-type: none"> Construction activities will create GHG emissions from construction plant and equipment, and clearing of mangroves. 		Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development is not considered to have the potential to significantly impact atmospheric processes because:</p> <ul style="list-style-type: none"> It does not involve any activities that release large volumes of GHG emissions.
People	Communities and Economy <u>Objective:</u> Enhance communities and the economy and foster resilience to a changing climate, for the welfare, amenity and benefit of current and future generations of Territorians.	<ul style="list-style-type: none"> Noise and dust emissions from construction activities will reduce amenity for neighbouring residences over periods of months when earthworks are being undertaken. The creation of new residences may impact amenity and privacy for those residences that currently do not have any neighbours along the back boundary of their properties. Additional traffic during construction and residential traffic could be a nuisance for existing residents. 	<ul style="list-style-type: none"> There are existing residential properties immediately adjacent to the proposed subdivision. There was opposition to the subdivision raised in some submissions made through the Development Application processes. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development will affect the amenity of existing residential properties but is not considered to have the potential to significantly impact communities and economy because:</p> <ul style="list-style-type: none"> Dover Investments has committed to managing noise and dust. Refer Attachment 3 for details of specific commitments. Traffic management requirements will be conditioned in a future Development Permit. Impacts to amenity will be greatest during earthworks which will be limited to months in duration. Impacts will be limited to a small geographic extent. Nearby residents will be impacted but impacts are not expected to be experienced by the broader community at Bayview.

Pre-Referral Screening Report

Project: Bayview subdivision

Theme	Factor and Objective	Background information (about the project)	Environmental values, sensitivities (based on desktop and/or surveys)	Pre-referral screening questions						Assessment of potential for significant impact
					Q1	Q2	Q3	Q4	Q5	
				Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>					
	Culture and Heritage <u>Objective:</u> Protect sacred sites, culture and heritage	<ul style="list-style-type: none"> The development footprint encompasses previously disturbed land and mangrove forests. 	<ul style="list-style-type: none"> There are no nominated or declared heritage places within or proximate to the development. The site is substantially disturbed from natural conditions and the undisturbed areas are subject to tidal inundation. It is likely that Aboriginal archaeological sites would have existed in the area prior to the Bayview development occurring; however, the likelihood of sites being present in the development footprint or surrounds now is low based on the previous disturbance and development. An AAPA Authority Certificate (C2013/229) was issued to Dover in December 2013. This certificate indicates there are no sacred sites in the development footprint. 	Yes No Uncertain N/A		<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	The development is not considered to have the potential to significantly impact culture and heritage because: <ul style="list-style-type: none"> There are no known cultural or heritage sites present, and sites are unlikely to occur given the previous disturbance and location of the development.
	Human Health <u>Objective:</u> Protect the health of Northern Territory population.	<ul style="list-style-type: none"> Dust emissions from construction activities may impact the health of sensitive residents in neighbouring properties. There is potential for asbestos to be present in materials dumped in Area A. The proximity of the subdivision to mangroves poses biting insect risk. 	<ul style="list-style-type: none"> There are existing residential properties immediately adjacent to the proposed subdivision. 	Yes No Uncertain N/A		<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	The development will affect the amenity of existing residential properties but is not considered to have the potential to significantly impact human health because: <ul style="list-style-type: none"> Dover Investments has committed to managing noise and dust. Refer Attachment 3 for details of specific commitments. Dover Investments has committed to undertaking contamination assessments in Area A and if materials are found to be contaminated, and require removal from site, a licenced contractor will be engaged to ensure that is done safely. The area is zoned for residential development and so it is assumed that the health risks associated with the proximity of biting insect habitats have been deemed acceptable.

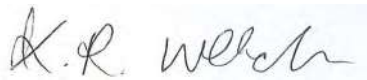
This pre-referral screening checklist was prepared by a suitably qualified professional who is appropriately accredited and experience in impact assessment

Name: Kylie Welch

Qualifications: Master of Social Science (Environment and Planning); Bachelor of Science (Hons)

Certification: Certified Environment Practitioner (CEnvP 975)

Signature:




Pre-Referral Screening Report

Project: Bayview subdivision



A review of this pre-referral screening checklist was undertaken on 30 July 2024, by a suitably qualified professional who is experienced in impact assessment

Name: Britanny Crescentino

Qualifications: Bachelor of Environmental Science

Signature:

A handwritten signature in black ink, appearing to read 'BC', is written over a horizontal line.

Attachment 1 Statement of Reasons

Lots 5988 and 7433, Town of Darwin Development Application

PROPOSAL

Lots 5988 and 7433, Town of Darwin are Crown lease parcels that have been progressively developed as the Bayview Marina Estate. Bayview Marina Estate is one of Darwin's premier residential subdivisions located a short distance from the Darwin CBD.

The subdivision is recognised for its high standard of development that has resulted from strict design guidelines developed and managed by the developer, Dover Investments.

The developers were initially granted a Crown lease over Lot 5988, Town Darwin (CLT 1251) in 1993 and then in 2004 a Crown lease (CLT 2155) was granted over an additional land area (Lot 7433) to enable the subdivision to be expanded.

The NT Government's strategic planners saw the potential for even further development in the Sadgrove's Creek locality and the Bayview developers were granted an option to purchase an additional area to the east of Lot 7433.



Bayview Marina Estate

Since that time the extension of residential development further to the east into the mangroves has gone off the agenda due to a variety of reasons and is unlikely to happen in the foreseeable future.

Whilst the option area is unlikely to happen in the short term, there are still certain areas of the existing Crown leases that have been assessed as being suitable for residential development. Areas not suitable for development, such as buffer strips along Tiger Brennan Drive and strips comprising the seawalls are obviously not suitable for residential development and these areas are in the process of being surrendered from the Crown leases.

The three remnant areas that have been determined as being suitable for residential development were the subject Development Application in 2013. These areas are adjacent to the eastern boundary of the Crown leases. The intention was to create three lots and then construct units on the proposed lots.

The Development Consent Authority (DCA) subsequently issued DP13/0635, approving the creation of two new parcels. The third parcel was removed from the proposal in order to provide an access option for the land to the east, however provision for that access is no longer required.

Consideration has been given to the most appropriate form of development for the three subject areas, taking into account the existing Bayview residents and the preferred living options for future residents.

The 2013 proposal, for the land to be developed to its highest potential yield of units was discarded and the option of a subdivision that creates separate freehold lots was adopted.

The current application is seeking the approval of the DCA to subdivide Lots 5988 and 7433, Town of Darwin for the purpose of creating 21 lots, in accordance with plans 22/8093/26, 27, 28 and 29.



Public open space abutting the marina

MATTERS TO BE ADDRESSED

46(3)(aa) – Interested parties

Applicant Details

Earl James and Associates

Representative: Kevin Dodd

Address: GPO Box 884, Darwin NT 0801

Email: kdodd@eja.com.au

Phone: 08 89812494

Landowner:

Lot 5988, Town of Darwin

Dover Investments Pty Ltd (ACN 009 637 914)

Address: Level 8, 728 George Street
Sydney NSW 2000

Phone: c/o 08 89812494

Lot 7433, Town of Darwin

Dover Investments Pty Ltd (ACN 009 637 914)

Address: Level 8, 728 George Street
Sydney NSW 2000

Phone: c/o 08 89812494

46(3)(a) – Compliance with the NT Planning Scheme

Property details:

Lot 5988, Town of Darwin

Title details: Volume 857 Folio 147

Crown Lease Term 1251

Survey Plan: S92/195

Address: 57 Bayview Boulevard, Bayview

Easements: Nil

Lot Area: 5.43 hectares

Lot 7433, Town of Darwin

Title details: Volume 857 Folio 148

Crown Lease Term 2155

Survey Plan: S2003/206

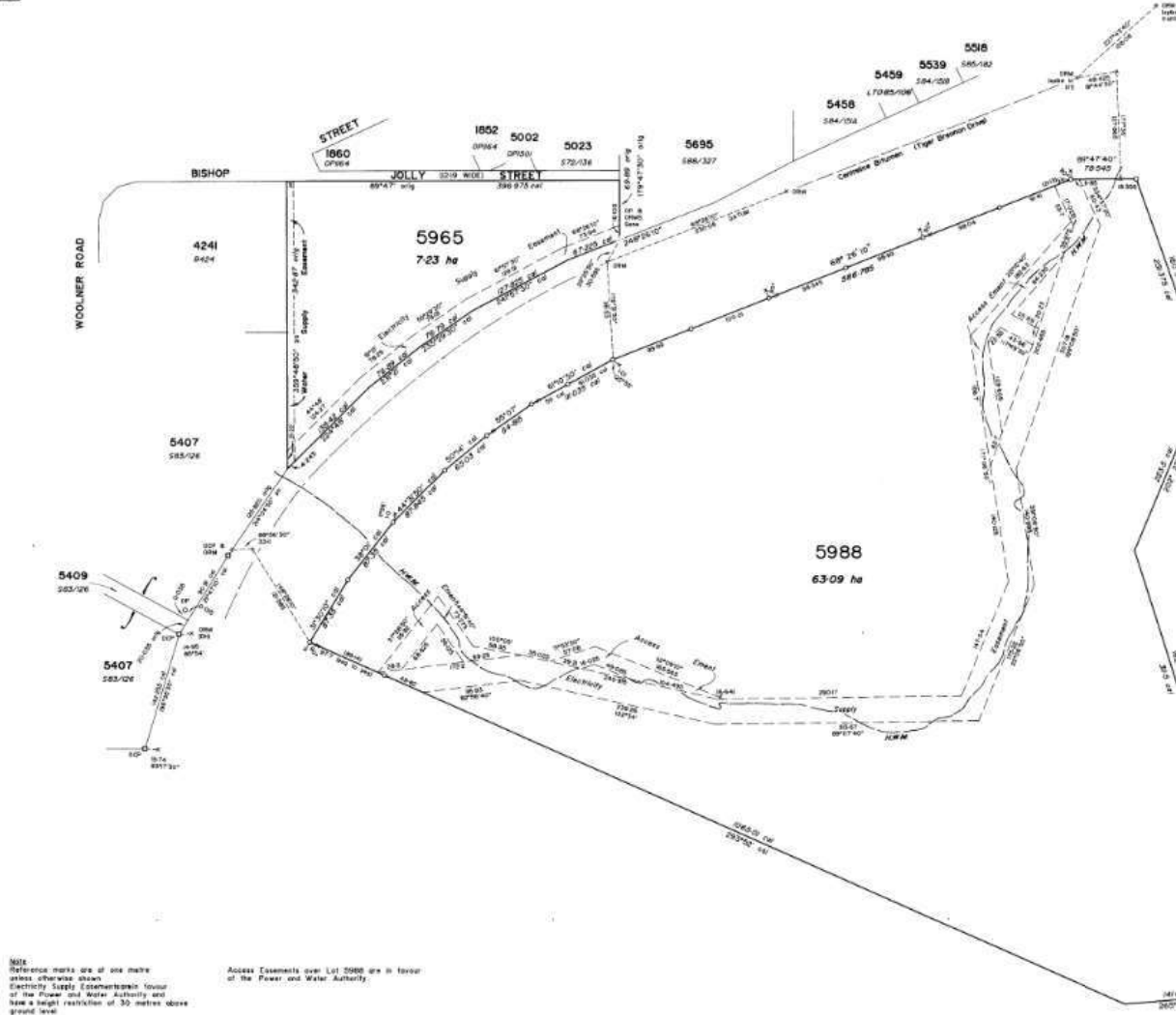
Address: Bayview

Easements: Nil

Lot Area: 3.2 hectares





Supersedes Part of A473



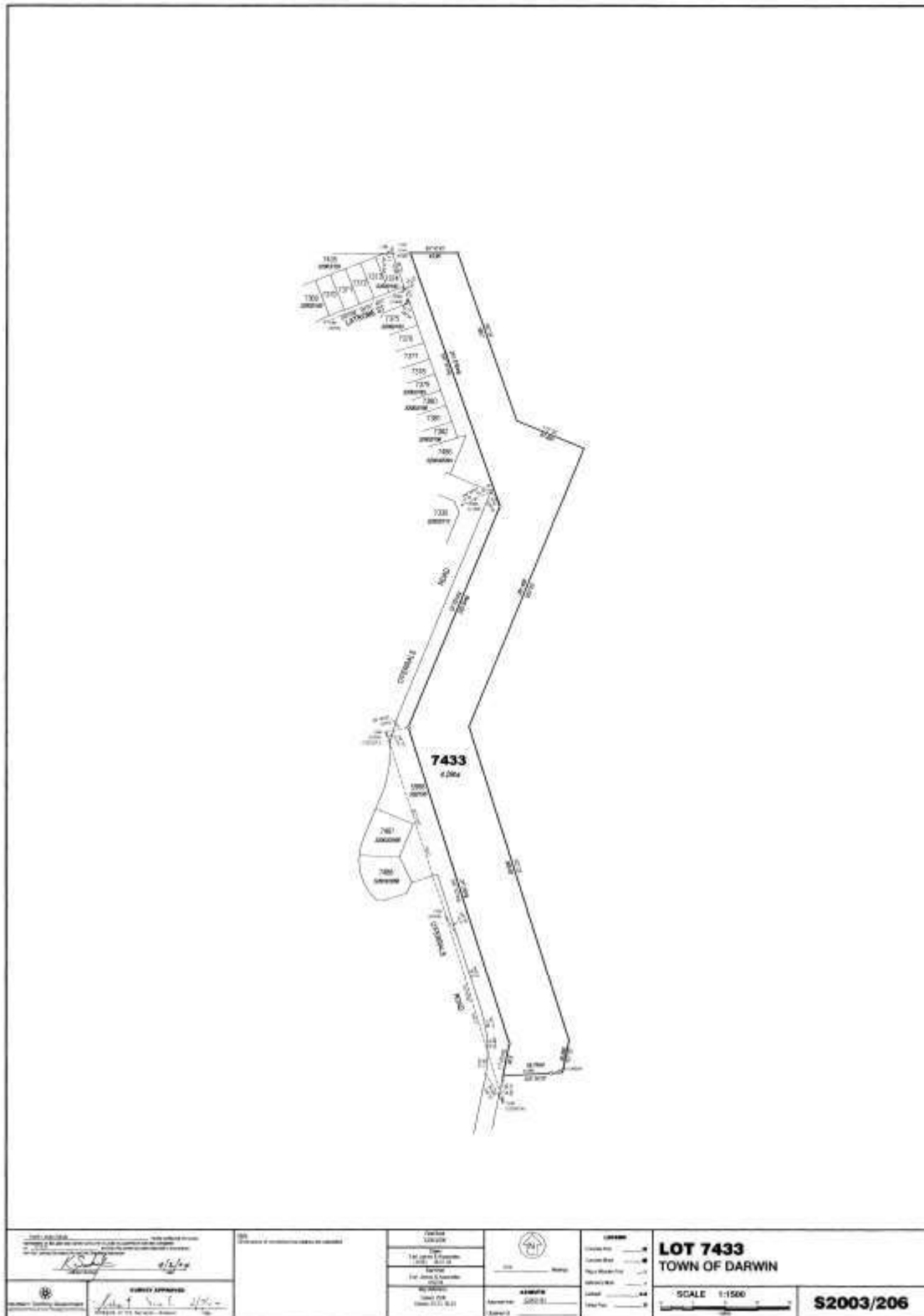
Note:
Reference marks are of one metre
unless otherwise shown.
Electricity Supply Corporation in favour
of the Power and Water Authority and
have a height restriction of 30 metres above
ground level.

Access Easements over Lot 2580 are in favour of the Power and Water Authority.

 Department of Lands and Housing Northern Territory	Kinds: Edd This survey report relates to the plan as marked on the title under the immediate supervision and was completed on 15-1-95 and that the survey has been conducted in accordance with the Land and Survey Act and the Conditions thereunder <u>Robert</u> City Surveyor Licensed Surveyor Date	AMENDMENTS <table border="1"> <thead> <tr> <th>Reference</th> <th>Description</th> <th>Appointed</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>File 5 92/995</td> <td>Water Supply Easement in favour of the Power and Water Authority Act for Lot 5905</td> <td><u>J. M. S.</u> Surveys Director</td> <td>2-6-95</td> </tr> </tbody> </table>		Reference	Description	Appointed	Date	File 5 92/995	Water Supply Easement in favour of the Power and Water Authority Act for Lot 5905	<u>J. M. S.</u> Surveys Director	2-6-95	Notes:	Field Book 590/995 Drawn East James R. Scahill ID 2 93 <u>Robert</u> 24-1-95 Map Reference District 2500 Sheets 30 23, 30 24 Locality Assumed from 388/527 Observed at	 Grid Bearings AZIMUTH 388/527 From Post	LEGEND Concrete Foot Concrete Block Flag or Wooden Post Reference Mark Locality From Post
	Reference	Description	Appointed	Date											
File 5 92/995	Water Supply Easement in favour of the Power and Water Authority Act for Lot 5905	<u>J. M. S.</u> Surveys Director	2-6-95												
SURVEY APPROVED <u>J. M. S.</u> 15-1-95 Surveyor General Date															

WARNING --- Damaged or creased pan will be rejected!

Survey plan S92/195



Survey plan S2003/206

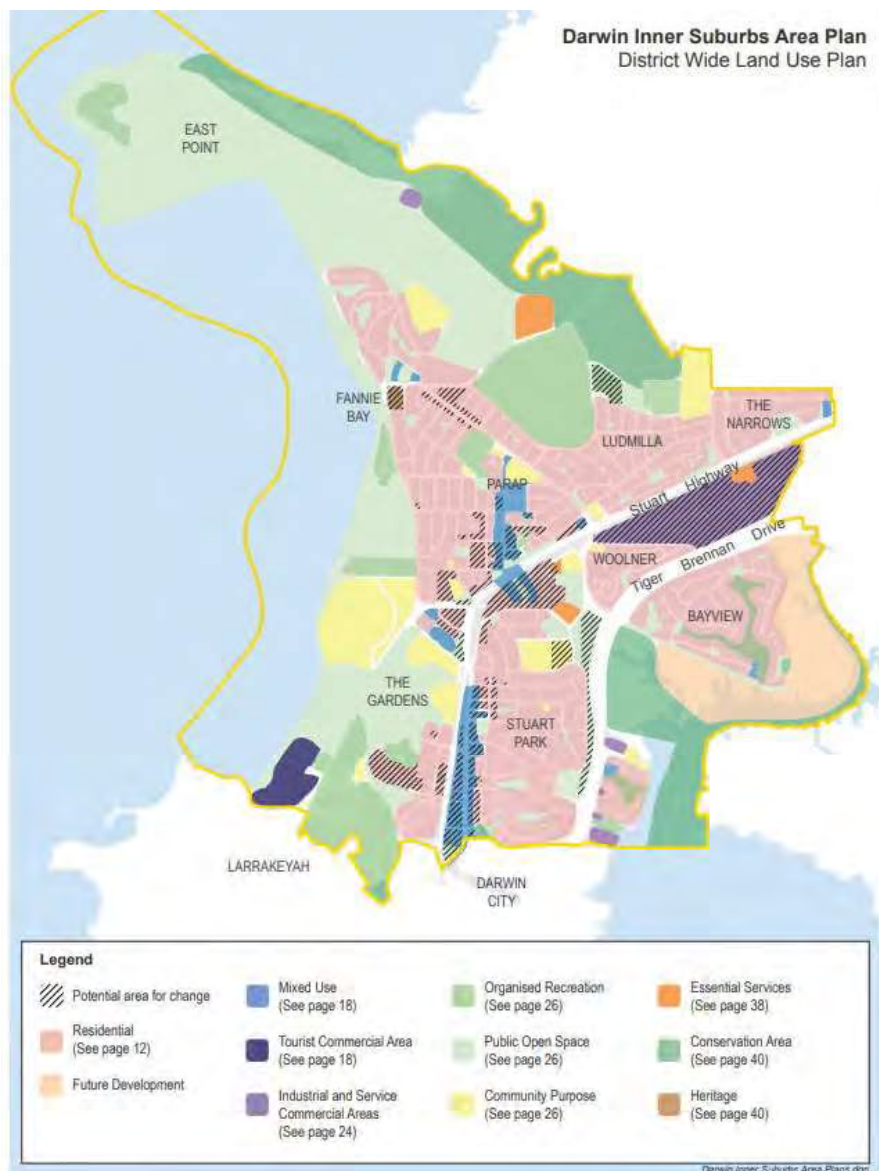
Strategic Framework

The Darwin Regional Land Use Plan 2015 (DRLUP) applies to the subject land and identifies the subject land as being suitable for urban/peri-urban development.

The lots being proposed by the current application are ideally suited to urban development and in no way conflict with the intention of the DRLUP.

The Darwin Inner Suburbs Area Plan (DISAP) also applies to the land comprised within the Bayview Crown leases.

The DISAP provides a framework to guide progressive growth and development within the Inner Suburbs of Darwin and the land that is the subject of this application, lying on the eastern edge of the existing Bayview development, is identified for 'Future Development'.



The following figure showing Residential Areas, from the DISAP, also identifies the subject area as a *Future Development Area*.



The Planning Principles associated with *Future Development Area* are set out in the following table from the DISAP:

Future Development Area	
Objectives	Acceptable Responses
1. Identify areas intended for future development.	Development is to accord with either <ul style="list-style-type: none"> An Area Plan and the provisions of Zone FD; or Provisions of a Specific Use Zone.
2. Provide for development in accordance with a site or locality specific planning framework once services are or can be made available to the land.	Both the Area Plan and the Specific Use Zone must address the relevant provisions within the NT Planning Scheme (including concepts within this Area Plan).

Part of the land that is the subject of the current application is zoned LMR (Low-Medium Density Residential) whilst the rest is zoned FD (Future Development).

The intention is for those parts that are currently zoned FD to be rezoned to LMR prior to titles issuing for the proposed lots. Reticulated services are to be extended to service the proposed lots and details of the servicing are included within this Statement of Effect.

Zoning

As previously mentioned, part of the land that is the subject of the current application is zoned LMR (Low-Medium Density Residential) whilst the rest is zoned FD (Future Development). The intention is for those parts that are currently zoned FD to be rezoned to LMR prior to titles issuing for the proposed lots.

The purpose of zone LMR is to *provide a range of low rise housing options that contribute to the streetscape and residential amenity in locations supported by community services and facilities, and where full reticulated services are available.*

The current application is not seeking approval for the use of the land but will result in parcels that will facilitate the development of the desired housing options where reticulated services are available and there are community services available.

Zone Outcomes

The LMR zone is looking for lots that are *connected to the reticulated services, integrated with existing transport networks, and with reasonable access to open space and community services.*

The lots being proposed by the current application will be connected to reticulated services and the subdivision will involve the development of new portions of public road that will connect to an integrated road network.

The new lots will be able to utilise the existing open space areas (parks, bicycle and walkways, heritage areas) and given Bayview's proximity to the CBD and other service commercial areas, the new residents will have access to existing community facilities.

Overlays

The Overlays in the NTPS identify areas of land that have specific development requirements.

The Record of Administrative Interests advises the following Overlays apply to Lots 5988 and 7433:

CR Coastal Reclamation

The purpose of this Overlay is to *ensure that landfill of coastal areas does not adversely affect adjacent land or waters, or the quality of adjacent waters, and is suited to its intended purpose.*

The *Administration* section of this overlay advises that the placement of fill below the level of the highest astronomical tide requires consent. The filling works will be part of the works associated with the development of this subdivision and geotechnical consultants Douglas Partners (DP), have previously been engaged to provide an assessment of the proposed site filling and seawalls.

It should be noted that Area B does not require earthworks as this area has been filled and surcharged as part of a previous stage of Bayview that was completed in 200.

The DP report (attached) advises that the proposed construction for Areas A and C will be as follows:

Area A: Clear and reshape the sloping ground, then construct a building platform at a final level at about RL5.5m AHD by filling over the prepared site surface. Surcharge the lot for a period of up to 5 months with about 2 m of filling to reduce post construction settlements, then remove the surcharge and construct a seawall to RL6.5 m AHD.

Area C: Remove and stockpile the rock armour from the current seawall, reshape the sloping fill batter, then construct a building platform at a final level at about RL 5.5 m AHD by filling over the prepared site surface. Surcharge the lot for a period of up to 8 months with about 2 m of filling to reduce post construction settlements, then remove the surcharge and construct a seawall to RL6.5 m AHD.



Also from the DP report:

Geotechnical Issues for Design and Construction

Based on the previous earthworks carried out for construction of similar filling platforms suitable for residential construction in Stages 3 to 10 of the Bayview subdivision, there are four main geotechnical issues to be addressed. These include the following:

- a. stability of the filling and surcharge during placement over soft marine sediments;*
- b. differential settlement between previously placed filling and new filling which may lead to the formation of tension cracks at the interface between the “old” and “new” filling;*
- c. settlement of the filling platform; and*
- d. stability of the seawall after surcharge is removed and rock armour is placed.*

Each of these four issues will be specifically addressed by incorporating the following geotechnical design features and construction strategies into the site filling procedures, and by monitoring the settlement of fill platforms by precise survey.

Issue a: *The current site surfaces will be cleared and benched before an engineered filling platform comprising a woven geotextile layer, a rockfill working platform, engineered filling and surcharge is placed over the mud surface. The earthworks profile proposed for site filling and surcharge is shown on attached Drawing 5. A similar profile has been successfully used for construction of previous stages of Bayview including the adjacent Stage 10 earthworks.*

Issue b: *The new filling will be carefully placed in a controlled manner, and will be keyed into the current filling, to minimise the risk of longitudinal cracking and to ensure stability of the filling platform at all stages. Any tension cracks that form at the interface between “old” and “new” filling will be reinstated before surcharge is removed. Tension cracks that have formed due to differential settlement at Bayview and the nearby Tiger Brennan Drive embankments have been successfully reinstated with minimal detrimental effect to the filling platform using this approach.*

Page 4 of 6

*Geotechnical Assessment of Proposed Site Filling & Seawalls Project 77861.01
Stage 11 - Lots A and C, Bayview, NT May 2012*

Issue c: *Surcharge will be placed over the engineered filling to heights predetermined by engineering calculations. Examples of surcharge profiles and estimated surcharge times for areas including part of Lot A and all of Lot C are shown on attached Drawings 6 and 7. Settlement of the filling platform under surcharge loads will be monitored by periodic survey and the surcharge will not be removed until approximately 90% of primary consolidation under filling load has been achieved. Settlement monitoring of previous stages of Bayview for periods of up to 5 years after removal of surcharge indicates that post construction settlements of monuments located on filled areas have generally been limited to 20 mm or less.*

Issue d: *The seawall section proposed for Lots A and C is shown on attached Drawing 8. This section differs from previous seawall sections at Bayview because shallower average mud depths along the lease boundary on this eastern side allow for a steeper, stable armour rock wall to be constructed on a rockfill base. The seawall construction comprises removing and displacing soft mangrove mud and replacing this soft soil with a rockfill base. The top of the rockfill base will be at or slightly below natural surface level and the rockfill base will be founded on the underlying stiff marine clay. This rockfill base will be placed before the working platform and site filling so that trenching required to remove mud does not cause any instability in the filling.*

After the surcharge is removed to the design site level of about RL5.5 m AHD, the compacted outer fill batter will be trimmed to a slope of 5H:4V and a 1 m high precast concrete retaining wall will be constructed at the crest of the batter as shown on Drawing 8. A non-woven geotextile will be laid on the batter and secured under the wall, then armour rock (which was previously removed and stockpiled before filling Lots A and C) will be placed on the batter and over the base of the retaining wall.

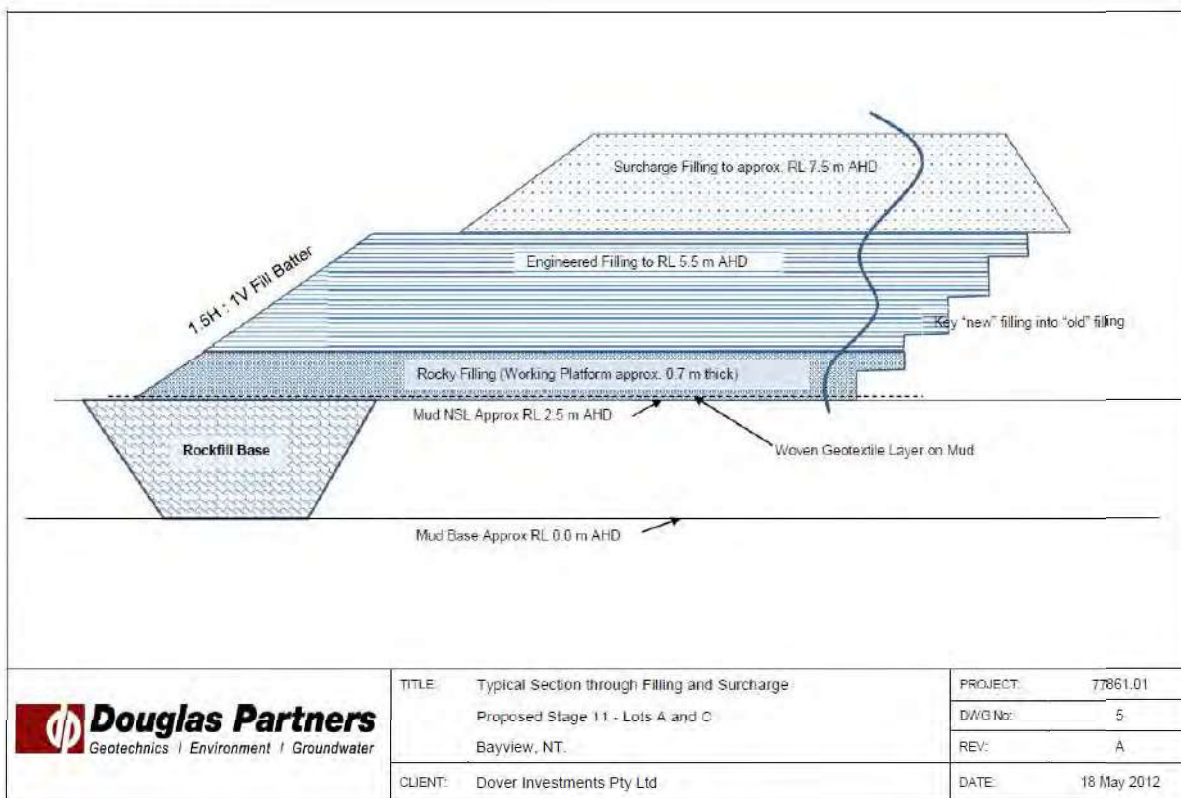


Suitability for Residential Construction

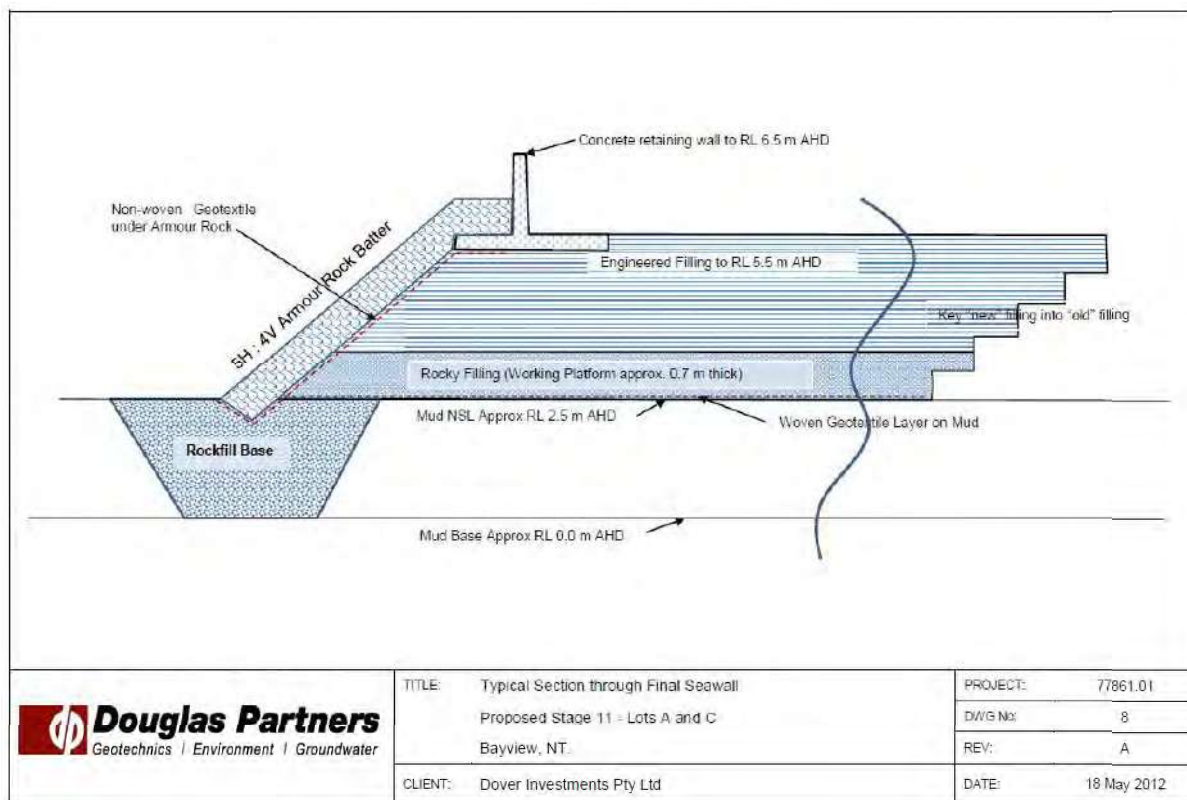
The attached Drawing 4 shows the locations of the proposed Stage 11 - Lots A and C which confirms that the information on mud depths and surcharge calculations contained in previous DP geotechnical reports will adequately cover the proposed Stage 11 lot areas. In addition, the information on Drawings 6 and 7 indicate that previous calculations of surcharge heights and surcharge times could be revised to adequately address the proposed construction schedule of the Stage 11 lots.

The proposed composite wall profile with a rockfill base will be stable, will enable development of the lots for their intended purposes, and with a crest level of RL6.5 m AHD will mitigate risk and damage as a result of any storm surge event.

If the proposed seawall section shown on Drawing 5 is adopted for construction, some additional geo-environmental sampling, testing and reporting will be required to assess the potential for acid sulphate soils (PASS) and to address the issues of handling and disposal of PASS. The management of ASS has been addressed for previous stages of Bayview and the management plans would apply to this additional construction.



Typical section through filling and surcharge



Typical section through final seawall

The future use of the subject area (post surcharging) is yet to be determined however the suitability of the site for the future use will be considered as part of a future DA.

The DP report advises that existing material comprises mostly silty gravelly cobbles and boulders. The cobbles and boulders have been described as medium to high strength and as being well compacted.

The DP report and the Cardno plans advise that outer batter slopes of 1V:2.5H should be maintained in order to ensure against slope instability and associated impact on adjacent waters.

Other measures to minimise impact on the adjacent areas include silt fences and rock sediment traps.

The DP report outlines the surcharge procedures and advises that if all the requirements are followed, then any impact on acid sulphate soils within the marine environment should be avoided.

CNC Clearing of Native Vegetation

From the DP report:

Lot A (Area A) comprises grassed and vegetated vacant land which is partially filled over intertidal mud flats.

The lot is bounded by a filled area to the north, by residential allotments located on a filling platform to the south and west, and by a narrow corridor of cleared mangroves, then mangrove forest to the east. Lot A site surface currently slopes down to the east from about RL5.5 m AHD on the crest of the filling platform to about RL2 to 2.6 m along the eastern lease boundary.

Lot C comprises unvegetated vacant land located in a re-entrant corner of the Bayview rock armoured seawall, as well as low-lying intertidal mud flats. The lot is bounded by residential allotments located on a filling platform to the north, west and south and by a narrow corridor of cleared mangroves, then mangrove forest to the east. Lot C surface is currently level at about RL5.5 m along the western boundary and slopes down across the rock wall to about RL1.8 to 2.4 m over intertidal mudflats along the eastern lease boundary.

There are no mature mangroves within the lease boundary at either of the sites (Areas A and C), and all vegetation on the earth and rockfill slopes is regrowth since the slopes were constructed.

DHD Darwin Harbour Dredging

The proposed subdivision does not involve any harbour dredging.

LSSS Land Subject to Storm Surge

The purpose of this overlay is to identify areas with a known risk of inundation from primary or secondary storm surges and ensure that development in these areas demonstrates adequate measures to minimise the associated the risk to people, damage to property and costs to the general community caused by storm surge.

The earthworks and construction measures outlined in the DP report will render the land suitable for the proposed use and minimise the risk to people and damage to property.



A view along part of the existing seawall on the eastern side of Bayview

Clause **6.2.1** deals with lot size and configuration for subdivision in zone LMR.

The purpose of the Clause is *ensure that subdivision of land for urban residential purposes creates lots of a size, configuration and orientation suitable for residential development at a density envisaged by the zone.*

Clause 6.2.1 lists the following Requirements for the subdivision of land in zone LMR:

Land is to be subdivided in accordance with Table A to this clause

Table A to Clause 6.2.1: Lot Size and Configuration in Residential Subdivisions	
Zone	Minimum Lot Size
LR in greenfield areas identified for compact urban growth in the strategic framework	Average of 600m ² and no smaller than 450m ²
LR other than greenfield areas identified for compact urban growth in the strategic framework	800m ²
LR, MR, HR and lots for residential buildings in Zone T	800m ²
LMR	300m ²

The prescribed minimum lot size for lots zoned LMR is 300m² and all of the proposed lots have areas in excess of the prescribed minimum.

Lots are to conform with the building envelope requirements in Table B to this clause.

The building envelope requirements are listed in the following Table:

Table B to Clause 6.2.1: Lot Size and Configuration in Residential Subdivisions	
Lot Size	Minimum Building Envelope Requirement
300m ² to less than 450m ²	7m x 15m (exclusive of any boundary setbacks or service authority easements)
450m ² to less than 600m ²	8m x 15m (exclusive of any boundary setbacks or service authority easements).
600m ² and greater	17m x 17m (exclusive of any boundary setbacks or service authority easements)

Plans 22/8093/31 to 33 indicate that all of the proposed lots can accommodate the required building envelopes.

Lots have sufficient area and appropriate dimensions to provide for the proposed density of developments including dwellings, vehicle access, parking and ancillary buildings.

The lots have been designed to ensure that they can all accommodate the dwellings, access, parking and any ancillary buildings expected for a parcel zoned LMR.

There are no battle-axe lots.

No battle-axe parcels are being proposed by the current application.

Lots are oriented to allow dwellings to take advantage of environmental conditions such as prevailing breezes and sunlight.

The design of future dwellings on the proposed lots will be able to take environmental conditions into account.

Lots are connected to reticulated services.

Byrne Consultants has been engaged to consider service reticulation and the servicing of each of the proposed lots.

Servicing reports have been prepared and these form part of the current Development Application.

Servicing details are provided in following sections of this Statement of Effect but each of the proposed Lots will have water, power, sewer and communications connections.

Where there are lots for medium and higher density residential development, those lots are:

(a) distributed in small groups serviced by public transport;

(b) in close proximity to public open space and with adequate access to community facilities and services; and

(c) not located in a cul-de-sac

It is intended that the proposed Lots will be zoned LMR and the purpose of the zone is to provide for a range of low-rise housing options.

All of the lots within Areas A and B will be for single dwellings as the areas of the proposed lots are less than 600m².

Similarly, proposed Lots 2,3 and 5 within Area C will be for single dwellings whilst proposed Lot 1 could potentially be developed for Dwelling-Group (2) and Lot 4 could be developed for 3 or more dwellings.

The proposed Lots can all utilise the existing public transport that (buses) that service Bayview as well as the range of open space options within the precinct.

Areas A and C are to be developed as cul-de-sacs however the lots are only for low and medium future uses and the proposed roads are not long cul-de-sacs.

6.2.2 Lots Less Than 600m² for Dwellings-Single

Purpose

Ensure the subdivision of land to lots of less than 600m² will allow residential development that minimises impact on amenity and the functionality of the street infrastructure.

Administration

1. *The consent authority must not consent to a subdivision that is not in accordance with sub-clauses 3 and 4.*
2. *An application must provide plans to demonstrate the requirements of sub-clause 4.*

Requirements

3. *Lots subject to this clause shall not have a boundary to any public road less than specified in the table to this clause.*

All of the proposed lots have frontages that exceed the minimums listed in the table to Clause 6.2.2.



4. *The site layout of lots subject to this clause is able to comply with the purpose of this clause and the development requirements for vehicle parking (5.2.4), building setbacks (5.4.3 and 5.4.3.3) and private open space (5.4.6).*

As required by Clause 5.2.4, every Lot can accommodate 2 on-site parking spaces and every lot has sufficient area to ensure that the required area of private open space can be accommodated in the development of a future dwelling (refer to plans 22/8093/31, 32 and 33).

Plans 22/8093/34, 35 and 36 indicate drive and on-street parking options. Whilst a few of the lots do not have the required 6.5m for on-street parking directly in front of the lots (due to the curved kerblines, the streets do allow for on-street parking in close proximity to the subject lots. This on-street parking option will not be inconvenient for the lot owners and will not unduly reduce the operation or amenity of the street.

Table to Clause 6.2.2: Lots Less than 600m ² for Dwellings-Single	
Range of Lot Size	Minimum length of any Boundary to a Public Road
300m ² to less than 450m ²	10m
450m ² to less than 600m ²	13m

Clause **6.2.3** deals with site characteristics for subdivision in Zones LR

The purpose of this Clause is to *ensure that the subdivision of land provides lots suitable for urban residential purposes that respond appropriately to the physical characteristics of the land and does not detrimentally impact on surrounding land.*

Administration

1. *The consent authority may consent to a subdivision that is not in accordance with sub-clauses 2-6, only if it is satisfied the subdivision design is consistent with the purpose of this clause.*

Requirements

2. *Avoid the development of land of excessive slope, unstable or otherwise unsuitable soils (e.g. seasonally waterlogged) and natural drainage lines.*

The entire Bayview Marian development has involved earthworks and site treatment to ensure that the land is suitable for the purpose for which it was leased – *residential subdivisional purposes*.

The design and implementation of these earthworks has been carried out in conjunction with relevant Government agencies over many years and similarly, all design and construction works for the proposed areas will be undertaken by engineering and environmental consultants in consultation with Government agencies.

3. *Ensure, by site selection or site grading, that areas intended for lots less than 600m² do not slope in excess of 2%, such that the need for on-site stormwater structures, retaining walls and the like is minimised.*

All site design will ensure that the grades of those lots with areas less than 600m² are not greater than 2 %.

4. *Retain and protect significant natural and cultural features.*

O'Ferrals Rock has previously been identified as a significant cultural feature and will not be impacted by the current proposal.

5. *Avoid development of land affected by a 1% AEP flood or storm surge event.*

As with previous stages of the Bayview development, the subject land will be developed to ensure that the resulting housing lots are free of the 1% AEP storm surge event.

6. *Retain and protect natural drainage lines and any distinctive landform features or stands of natural vegetation and incorporate them into public open space.*

Previous assessments of the entire Bayview lease areas has identified the distinctive landforms (eg: O'Ferrals Rock) and these have been excluded from development and set aside as public open space.

Clause 6.2.4 deals with infrastructure and community facilities for subdivision in Zones LMR

The purpose of this Clause is to *ensure that subdivision of land for residential purposes is appropriately integrated with infrastructure, community services and facilities.*

Bayview Marina Estate is a centrally located residential precinct that is a short distance from commercial and community facilities located in Darwin CBD, Stuart Park, Parap and Winnellie.

Each of the areas proposed for development by the current application will have direct access onto an established public road network. This network services the Bayview development and then connects to Tiger Brennan Drive that in turn leads to the rest of Darwin and beyond.

There is a Government public bus service that services Bayview and the residents of the proposed lots will be able to utilise this service.

Bayview incorporates a variety of public open space including parks, walking paths and heritage areas and all of the lots being proposed by the current application are less than 400m walking distance from a neighbourhood park.

As previously mentioned, Byrne Consultants has been engaged to consider service reticulation and this application includes the Byrne servicing reports.

The Reports contain all the necessary detail but following are extracts in relation to the various services, including comments from Power and Water Corporation (PWC):

Water and Sewer

PWC comments:

Lot A

- *For water – A new DN150 water main is to connect from the existing DN150 main at the end of Latrobe Street, be looped in the cul-de-sac and connect back into the existing DN100 in Perth Street. It is recommended that the water network is designed to direct flow through the cul-de-sac and reduce risk to water quality*
- *For sewer – connect into existing sewer reticulation main in Latrobe Street via new DN150 sewer reticulation main.*

Lot B

- *For water – Install 2 x service connections on the existing DN150 water main in O'Ferrals Road*
- *For sewer – construct new sewer service connections for both lots and connect into existing vacuum pit BA/P1*



Lot C

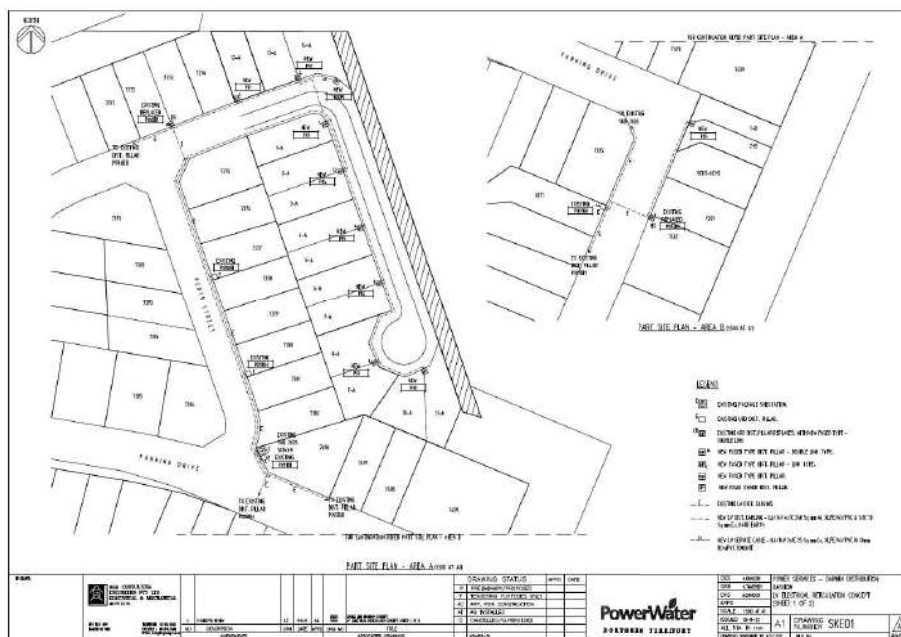
- *For water – A new DN150 water main is to connect from the existing DN150 main in O’Ferralls Road, looped in the cul-de-sac and connect back into the existing DN150 in O’Ferralls Road. It is recommended that the water network is designed to direct flow through the cul-de-sac and reduce risk to water quality*
- *For sewer – Construct new sewer reticulation main to service the subdivision and connect into existing DN125 vacuum sewer line via a new vacuum pit built as per PWC standard drawing W2-2-10A*

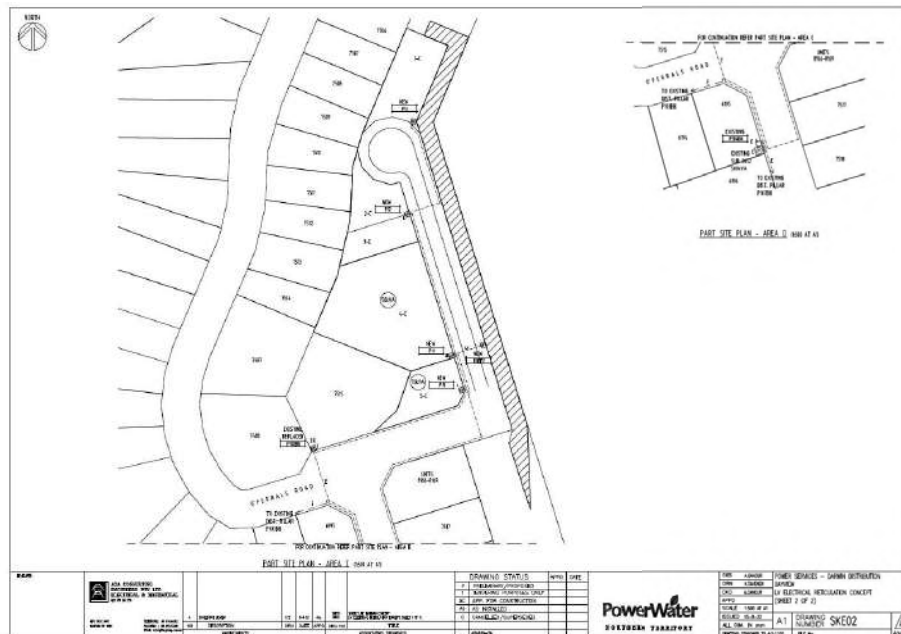
Power

All high and low voltage electrical reticulation will be designed and constructed in accordance with PWC specifications.

Similarly, streetlight design will be in accordance with City of Darwin (COD) requirements.

Concept electrical plans prepared by electrical consultant AGA Consulting Engineers:





Concept streetlighting plans prepared by AGA Consulting Engineers:







Part of the extensive public walkway network through Bayview

Stormwater

The stormwater drainage design prepared by Byrne has been designed in accordance with COD standards and the Northern Territory Subdivision Development Guidelines.

Internal Stormwater Strategy:

The intent of the internal development stormwater strategy is to direct all stormwater flows from the proposed lots toward the road reserve where it will be collected via kerb and channel along the roadway and captured via stormwater inlet pits into the proposed stormwater pipe network. The sites shall discharge stormwater into the existing mangrove creek in accordance with the current stormwater management philosophy for the development.

Area A

The proposed lawful point of discharge for the development of Lot A is into the mangroves and creek area east of Latrobe Street. An existing 525mm diameter RCP which discharges to the area shall be extended and upsized to account for the additional development catchment area of Lot A.

Area B

All stormwater from Lot B is collected by the existing stormwater network (pit and pipes) on O'Ferrals Road which is directed via the trunk underground drainage network to a drainage easement through Lot 7502 before discharging into the adjacent mangroves area. No upgrades to the existing drainage system are proposed to service Lot B.

Area C

The proposed lawful point of discharge for the development of Lot C shall be via the existing underground stormwater network and 1200mm diameter RCP outlet which discharges to the mangroves area through Lot PT8169. The existing 1200mm RCP discharge pipe shall be extended and upsized to account for the additional development catchment area of Lot C.

External Stormwater Strategy:

It is anticipated that the proposed internal stormwater strategy design will cause no worsening effects of existing upstream conditions due to the proposed stormwater network being sized sufficiently to convey the upstream inflows. No worsening of the downstream flows is expected due to discharge into the existing tidal mangrove creek.

Traffic Assessment

Byrne has carried out a traffic impact assessment with the full results contained in the attached servicing the report.

Following are the conclusions extracted from the report:

- *Intersection 1 (Stoddard Dr / Tiger Brennan Dr / Woolner Rd) exhibited minor changes in the intersection performance due to the development traffic generation (no notable change). The intersection performance with respect to degree of saturation, average delay and queue length lowered during the 2027 and 2032 scenarios due to the applied background growth factors on Tiger Brennan Drive and Woolner Road, not the development traffic. It is beyond the scope of this TIA to suggest any upgrades to this intersection and impact by the proposed development is minimal.*
- *Intersection 2 (Stoddard Dr / Tiger Brennan Dr) exhibited a LoS of B and DoS ≤ 0.6 during the 2032 growth scenario (AM / PM) due to growth rates applied to Tiger Brennan Drive. This intersection performs satisfactorily with the proposed development traffic.*
- *Intersection 3 (Stoddard Dr / Fanning Dr) and Intersection 4 (Stoddard Dr / Bayview Blvd) exhibited a LoS of A and a DoS ≤ 0.2 for all growth scenarios performing satisfactorily with the proposed development traffic.*



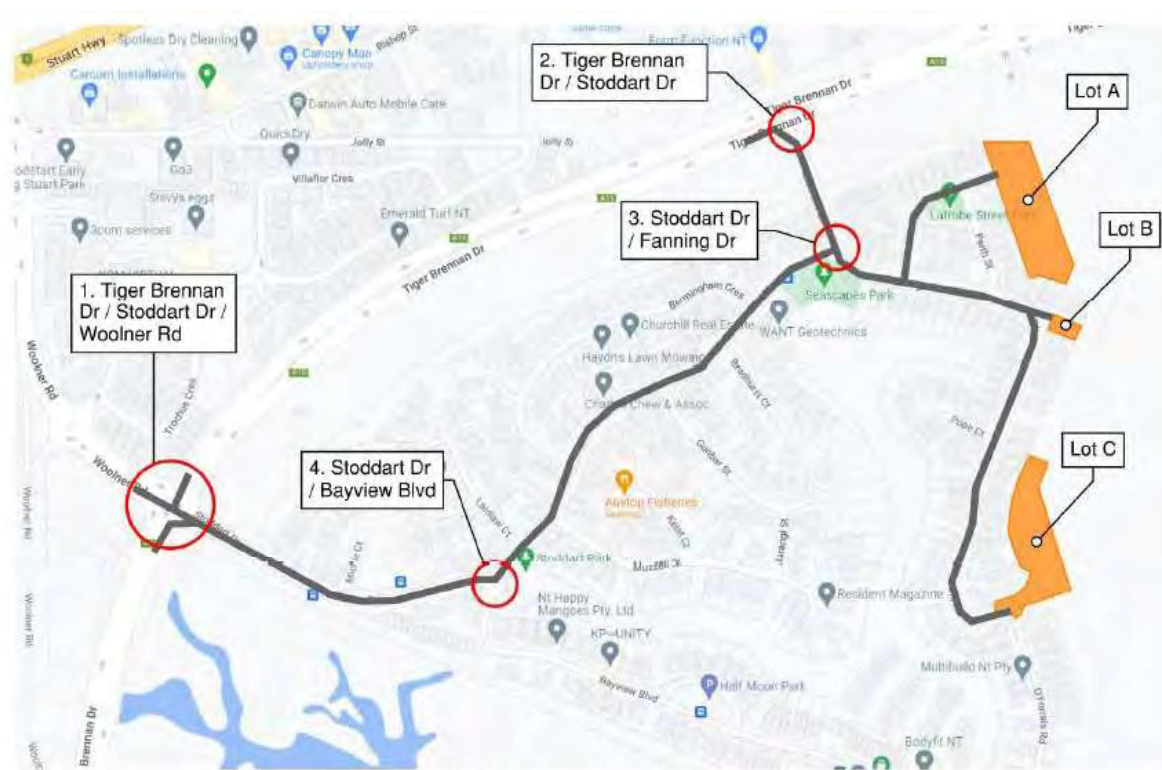


Figure 1.1 – Site Overview (source: Google)

46(3)(b) – Compliance with an Interim Development Control Order

The Applicant is not aware of any Interim Development Control Orders applying to the subject land.

46(3)(c) – Referral to the NT EPA

The developer appreciates that prior to the commencement of any site works, detail earthworks plan will be required and these will be prepared by Douglas Partners in conjunction with Byrne Consultants and an environmental consultant.

These plans will detail all the various stages of the works including any initial site clearing, materials to be used, surcharge program and monitoring, final surface preparation and the associated erosion and sediment control measures.

All design plans and the ESCP (to be prepared by a certified Professional in Erosion and Sediment Control – CPESC) will be presented for assessment and approval prior to the commencement of any works.

46(3)(d) – Merits of the proposed development

The Bayview Marina development is a master planned development that has provided a variety of housing options for the Darwin market over many years and also comprised an Estate Development, unit title component that comprised the lots fronting the marina and the associated marina berths.

The land currently being proposed for development is part of the balance of Crown lease issued by the NT Government. The purpose of these Crown leases is for residential subdivisional purposes and the subdivisions now being proposed are consistent with the purpose of the leases that the Government has issued.

The proposed subdivisions will be the final subdivisions from the Crown leases and will complete the Bayview Marina development.

The design and construction of the proposed, new allotments will benefit the NT economy and will provide prime housing options that are sure to be well sought after in the market.

The range of lots sizes being proposed will provide an opportunity for people with varying financial capabilities to secure an allotment and develop a home in close proximity to the Darwin CBD.

46(3)(e) – The physical characteristics of the land

As previously addressed in this report and the associated attachments, the physical characteristics of the land have been assessed by engineering consultants and siteworks will render the subject areas suitable for the intended use.

46(3)(f) – Public facilities or open space

The housing lots being proposed by the current application will be able to utilise the existing public facilities and open space within Bayview and the adjoining areas.



An existing neighbourhood park in close proximity to the areas being proposed for development

46(3)(g) – Public utilities and infrastructure

Significant design and consultation work has already been undertaken to ensure that the proposed lots can be serviced with power, water, sewer and telecommunication.

All lots will have direct access onto a public road network and stormwater management has been considered to ensure that the lots will all have appropriate drainage measures in place.

46(3)(h) – Potential impact on the existing and future amenity of the area

As with any staged development, each progressive stage of the Bayview Marina development has had some impact on the preceding stages.

The current application deals with the final stage of the development of the existing Crown leases and the lots now being proposed are for residential uses which is consistent with the existing uses in the existing, adjacent stages.

Given that the uses are consistent, the impact on the amenity of the area will be minimal.

46(3)(j) – Benefit or detriment to the public interest

The proposal will have significant economic benefit in not only the design and construction of the subdivisions, but also the ongoing benefits to a wide range of design and trades people during the construction of new dwellings on the lots.




Apart from the clear economic benefits, the creation of new housing options will benefit the wider community by providing the opportunity for more people to reside in this unique residential precinct.



46(3)(k) – Compliance with the Building Act




There are no buildings on the subject areas.



Attachment 2 Site inspection notes

Area: A	Site coordinates: 130.8603276, -12.4349492	Landform: Estuarine fringes	
Site description	Area A is located on the seaward side of existing residential properties (corner of Latrobe St and Perth St). The western side is characterised by weeds and dumped waste transitioning to mixed mangrove spp. on the eastern side.		
Vegetation community description	Low Closed Forest of a mixed Mangrove species community. Coffee Bush (<i>Leucaena leucocephala</i>) common; Isolated instances of White Paperbark (<i>Melaleuca leucadendra</i>). Moderate leaf litter (40 %). Dominant native species: <i>Avicennia marina</i> subsp. <i>eucalyptifolia</i> , <i>Bruguiera parviflora</i> , <i>Ceriops</i> sp., Black Wattle (<i>Acacia auriculiformis</i>)		
Disturbance	Weeds: Mission Grass (<i>Cenchrus pedicellatus</i>), Gamba Grass (<i>Andropogon gayanus</i>), Sensitive Plant (<i>Mimosa pudica</i>), Coffee Bush (<i>Leucaena leucocephala</i>).	Dumped waste: Various building materials throughout Area A, e.g. concrete slabs, rusting large metal pipes; glass bottles and plastic waste	
Soil Type and Colour	Light grey-brown muddy soils, red surface gravels, and rocks.		
Additional site information	Site investigation discovered water discharging to a narrow drainage channel at (130.86047, -12.43482) – pictured top RHS. Review of the stormwater drainage network maps indicates this is likely to be stormwater discharge.		
(L) Dumped waste and Gamba Grass, and (R) Extensive patch of multiple weed species along the northern and western boundary of Area A.			

Area: B	Site coordinates: 130.86079590, -12.43635557		Landform: Estuarine fringes	
Site description	Vacant lots; sited between two residential properties (corner of Fanning Dr & O'Ferrals Rd). Area B does not encroach into mangrove vegetation.			
Vegetation community description	Isolated Black Wattle (<i>Acacia auriculiformis</i>); vegetation primarily consists of weeds over native grasses.			
Disturbance	Weeds:	Dumped waste:		
	Coffee Bush (<i>Leucaena leucocephala</i>) over Annual Mission Grass (<i>Cenchrus pedicellatus</i>) – pictured.	Scattered paper and plastic waste.		
Soil Type and Colour	Orange/Ochre – sandy			
Additional site information	Tyre tracks indicate Area B is used for off-street parking; a small boat was parked at the time of investigation.			

Area: C	Site coordinates: 130.8602932, -12.4388138		Landform: Estuarine fringes	
Site description	Western side of Area C is characterised by weed invasion and dumped waste. The midsection features a downslope rock wall transitioning into mangrove recruits (occurring beyond mangrove mapping extent) then mature individuals along the eastern side. Area C experiences tidal inundation.			
Vegetation community description	Low Closed Forest of mixed Mangrove species ranging from 0.5 – 5 m in height. Mangroves occur along the eastern side of Area C including juvenile recruits within a revegetation section. Dominant native species: <i>Rhizophora stylosa</i> , <i>Avicennia marina</i> subsp. <i>eucalyptifolia</i> , <i>Lumnitzera racemosa</i> ; Isolated Black Wattle (<i>Acacia auriculiformis</i>).			
Disturbance	Weeds: Annual Mission Grass (<i>Cenchrus pedicellatus</i>), Coffee Bush (<i>Leucaena leucocephala</i>).	Dumped waste: Scattered general and large hard rubbish items e.g., lawnmower, washing machine, underwear, revegetation meshing		
Soil Type and Colour	Red gravel and surface pebbles (western side). Intertidal hydrosols: Surface rocks and light-brown clay soils (eastern side)			
Additional site information	Crabs and cone shells throughout mangrove area (eastern side). Chestnut-breasted mannikin (6 individuals) present amongst shrubs.			
(L) Mangrove spp. revegetation adjacent to Low Closed Mangrove Forest, and (R) Rock wall fringing Low Closed Mangrove Forest				

(L) Dumped waste:
Lawnmower amongst
Mission Grass weed,
and

(R) Mangrove crab
burrows in mangrove
sediment



Attachment 3 Commitments made to avoid and mitigate impacts

Attachment 3 Commitments to avoid and mitigate impacts made in response to DEWPS comments received on Development Application

DEPWS Comments	Dover Investments response and commitments
The applicant should consider whether the development has the potential for a significant environmental impact under the <i>Environment Protection Act 2019</i> by using the pre-referral screening tool.	A pre-screening assessment has been completed by EcOz Environmental Consultants. The assessment identifies several key areas of environmental risk that require management to avoid and mitigate environmental impacts, and nuisance impacts to neighbours, to as low as reasonably practicable. The assessment concludes that the subdivision is unlikely to have a significant environmental impact as defined by the <i>Environment Protection Act 2019</i> .
Should the proponent collect, transport, store, recycle or treat listed wastes on a commercial or fee for service basis as part of the premises development, then an Environment Protection Approval or Licence will be required to authorise the activity under the WMPC Act.	The subdivision proposal does not involve these activities.
Any listed wastes generated during the construction or operation of the facility must be transported by an appropriately licenced waste handler to an appropriately licenced facility for treatment, recycling and/or disposal.	Noted. Dover Investments has reviewed the schedule of listed wastes in the WPMPC Act. The wastes that could be generated are: <ul style="list-style-type: none"> • soils contaminated with a listed waste (asbestos) • waste mixtures, or waste emulsions, of oil and water or hydrocarbon and water (only in the event of a spill). If these wastes are generated on site, a licenced waste handler will be engaged to transport the waste to an appropriately licenced facility.
Dust - The proposed activities have the potential to generate dust, particularly during the dry season. The proponent must ensure that nuisance dust and/or nuisance airborne particles are not discharged or emitted beyond the boundaries of the premises.	Dover Investments acknowledges that the proximity of the subdivision to residences poses a high risk of nuisance dust impacts. We will implement all measures detailed in the <i>Guideline for preventing pollution on buildings sites</i> (NT EPA 2015) to control dust and limit nuisance. We will inform neighbours of the proposed works, timing and duration, and contact details for the site supervisor will be provided to neighbours for handling of complaints. We will monitor dust emissions and apply adaptive management if visible dust is observed leaving the site boundaries.
Noise - The proponent is to ensure that the noise levels from the proposed premises comply with the latest version of the <i>Northern</i>	Dover Investments will implement all measures detailed in the <i>Guideline for preventing pollution on buildings sites</i> (NT EPA 2015).

Attachment 3 Commitments to avoid and mitigate impacts made in response to DEWPS comments received on Development Application

DEPWS Comments	Dover Investments response and commitments
<i>Territory Environment Protection Authority Northern Territory Noise Management Framework Guideline.</i>	Construction activity will be restricted to between 7am-7pm Monday to Saturday, and 9am-6pm on Sundays and public holidays. Neighbours will be informed of the proposed works, timing and duration, and contact details for the site supervisor will be provided to neighbours for handling of complaints.
The proponent must ensure that pollution and/or environment harm do not result from soil erosion. ESC measures should be employed prior to and throughout the construction stage of the development. Due to the location of the proposed development and the proximity to surrounding mangroves, should the application be approved it is recommended that preparation and implementation of an Erosion and Sediment Control Plan (ESCP) be developed and endorsed by a Certified Professional Erosion Sediment Control (CPESC).	Noted. Dover Investments will engage a Certified Practitioner to prepare Erosion and Sediment Control Plans (ESCP) that meet the IECA Guidelines and specifications. These plans will be implemented to minimise the generation of turbid stormwater runoff and reduce the likelihood of that water entering the adjacent mangroves.
Note, The NT EPA guidance for on-site dewatering is that water quality should not exceed 20 Turbidity (NTU) or 50mg/L Total Suspended Solids. The proponent must ensure that there is no discharge of contaminants or wastes from the premises into either the groundwater or any surface waters.	Noted. Management of dewatering will be addressed in ESCP's.
The proponent should store liquids only in secure bunded areas in accordance with VIC EPA Publication 1698: Liquid storage and handling guidelines, June 2018, as amended. Where these guidelines are not relevant, the storage should be at least 110% of the total capacity of the largest vessel in the area.	Noted. Only minor volumes will be required on site due to the location being in Darwin where resupply can occur daily.
Historical activities (including impacts from Cyclone Tracy) may have resulted in contamination at the premises. An assessment in accordance with the National Environment Protection (Assessment for Site Contamination) Measure (ASC NEPM) is required to determine whether the land is suitable for the intended land use. The proponent	Noted. Area A and Area C contain dumped fill and waste materials. The origin and timing of this dumping is unknown; however, visual inspection suggests that in Area A there is potential for occurrence of asbestos (although none was observed on the ground surface). Further assessment is required to determine whether the materials can be left in-situ or would need to be cleared from the site prior to the

Attachment 3 Commitments to avoid and mitigate impacts made in response to DEWPS comments received on Development Application

DEPWS Comments	Dover Investments response and commitments
<p>is encouraged to refer to the information provided on the NT EPA website and the <i>NT Contaminated Land Guideline</i>.</p>	<p>surcharging works. Dover Investments will undertake further site assessment in Area A and Area C in accordance with the <i>ASC NEPM</i>, <i>NSW Contaminated Land Guideline</i>, and relevant geotechnical guidelines. If materials are found to be contaminated, and require removal from site, a licenced contractor will be engaged.</p>
<p>The proposed activities have the potential to generate fill and/or involve the importation of fill for use on-site. Untested fill material may already be present on the site. All untested fill and all fill imported or generated and exported as part of the development, must either be certified virgin excavated natural material (VENM) or be sampled and tested in line with the <i>NSW Contaminated Land Guideline</i> and be shown to meet at least one of the applicable standards below:</p> <ul style="list-style-type: none"> • NSW EPA Excavated Natural Material (ENM) Order 2014 • NSW EPA Recovered Aggregate Order 2014 • The definition of Waste fill in the South Australian EPA Current criteria for the classification of waste-including <i>Industrial and Commercial Waste (Listed) and Waste Soil 2009</i> <p>All imported fill material must be accompanied by details of its nature, origin, volume, testing and transportation details. All records must be retained and made available to authorised officers, upon request.</p>	<p>Noted. Dover Investments will ensure all fill (whether from onsite or offsite sources) is tested and certified suitable for use. Any material that is not suitable due to contamination, or geotechnical instability, will be removed from site by a licenced contractor. Records of testing and disposal will be retained.</p>

Attachment 3 Commitments to avoid and mitigate impacts made in response to DEWPS comments received on Development Application

DEPWS Comments	Dover Investments response and commitments
<p>The development has the potential to create acid sulfate soils and consideration should be made to manage and mitigate acid sulfate soils during the development. Any proposed works should be undertaken in accordance with the National Acid Sulfate Soils. Jurisdictional guidelines such as the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines v4.0 (Dear et al. 2014) and the Western Australian Acid Sulfate Soils Guidelines Series (DER 2015) may also be referenced. Essential to an investigation is the requirement for Chromium Reducible Sulfur (CRS) soil testing at an appropriate site density and to a soil depth immediately below the proposed disturbance. If acid sulfate soils are detected through CRS testing, and exposure of these soils is unavoidable then an acid sulfate soil management plan is required.</p>	<p>Noted. As per the statement of effect provided with our development application, some additional geo-environmental sampling, testing and reporting will be required to assess the potential for acid sulfate soils (PASS) and to address the issues of handling and disposal. CRS testing will be undertaken within the disturbance footprint in accordance with the accepted guidelines and standards. The management of ASS has been addressed for previous stages of Bayview and the management plans would apply to this additional construction. All works will be undertaken in accordance with the national guidelines, and Qld and WA guidelines were relevant.</p>
<p>All land in the Northern Territory is subject to the Weeds Management Act 2001 (WM Act). The WM Act describes the legal requirements and responsibilities that apply to owners and occupiers of land regarding declared weeds. Section 9 general duties include the requirement to take all reasonable measures to prevent land being infested with a declared weed and to prevent a declared weed from spreading. There are additional duties including a prohibition on buying, selling, cultivating, moving or propagating any declared weed and the requirement to notify the Weed Management Branch of a declared weed not previously present on the land within 14 days of detection.</p>	<p>Noted. Various weeds were recorded on the site by EcOz Environmental Consultants, with the most prevalent being Coffee Bush, which dominates Area A. There were two declared weeds recorded in Area A, Gamba Grass (<i>Andropogon gayanus</i>) and Sensitive Plant (<i>Mimosa pudica</i>). These weeds will be treated prior to undertaking the works to minimise the chances of spread.</p>

Pre-Referral Screening Report

Project: Bayview subdivision



EcOz Environmental Consultants was engaged by Dover Investments to undertake pre-referral screening of their proposal to subdivide Lots 5988 and 7433, Town of Darwin (Bayview Haven). The proposed subdivision location and layout is shown on Figure 1.

The purpose of the screening is to determine whether the development has the potential for significant environmental impact under the *Environment Protection Act 2019*. A significant environmental impact is defined by Section 11 of the *Environment Protection Act 2019* as:

An impact of major consequence having regard to:

- *the context and intensity of the impact; and*
- *the sensitivity, value and quality of the environment impacted on, and the duration, magnitude and geographic extent of the impact.*

Pre-referral screening was undertaken using the tool provided in the *Guideline – Referring a Proposal to the NT EPA* <https://ntepa.nt.gov.au/publications-and-advice/environmental-management>. The screening records answers to the questions shown in Figure 2.

The following key information sources were referenced to conduct the screening:

- Attachment 1 Statement of Reasons submitted with the Development Application.
- Attachment 2 Site inspection notes
- Attachment 3 Commitments made by the Proponent to avoid and mitigate impacts.

The pre-referral screening results are documented in Table 1 below. The screening indicates that the development is unlikely to have a significant impact and therefore does not need to be referred under the *Environment Protection Act 2019*. However, the screening did identify that there are sensitive receptors proximate to the development, namely existing residences and mangroves, and specific controls are required to ensure that impacts to these are avoided and minimised to the greatest extent practicable. The Proponent has committed to implementing the controls detailed in Attachment 3 and for the purpose of the screening it is assumed that these will be conditioned and regulated through the Development Permit as per the recommendations made by DEPWS. Assuming effective implementation of the controls, most impacts will be limited to the construction phase and will affect a small geographic area and small number of neighbouring residences.

Review of pre-referral screening assessment

EcOz were engaged in July 2024 to review this pre-referral screening assessment, after a letter was received from the Department of Environment, Parks and Water Security (DEPWS) Environment Division in response to the request to provide comment whether a referral submission under the *EP Act* was required. DEPWS advised *that the decision about whether a referral is required is a decision for the proponent. Environment Division staff are unable to confirm that the proposal does not require referral to the Northern Territory Environment Protection Authority (NT EPA) under the EP Act. The statutory decision-maker for the Planning Act 1999 may also refer the action to the NT EPA.* Further commenting that it was encouraged that a pre-referral meeting with the Environmental Division be undertaken by the proponent to discuss the project. As the team raised concerns that *the pre-referral screening report states that the proposal is unlikely to have a significant impact, however, notes the presence of nearby sensitive receptors and the need for controls that are assumed to be regulated through a development permit. The report outlines the reasons why significant impacts on the environment are unlikely, but it does not address the question about whether there is potential for significant impact.*

In light of the above, the review determined that the development is not considered to have a potential for significant impact to Terrestrial Ecosystems or any of the remaining 13 environmental factors assessed under

Pre-Referral Screening Report

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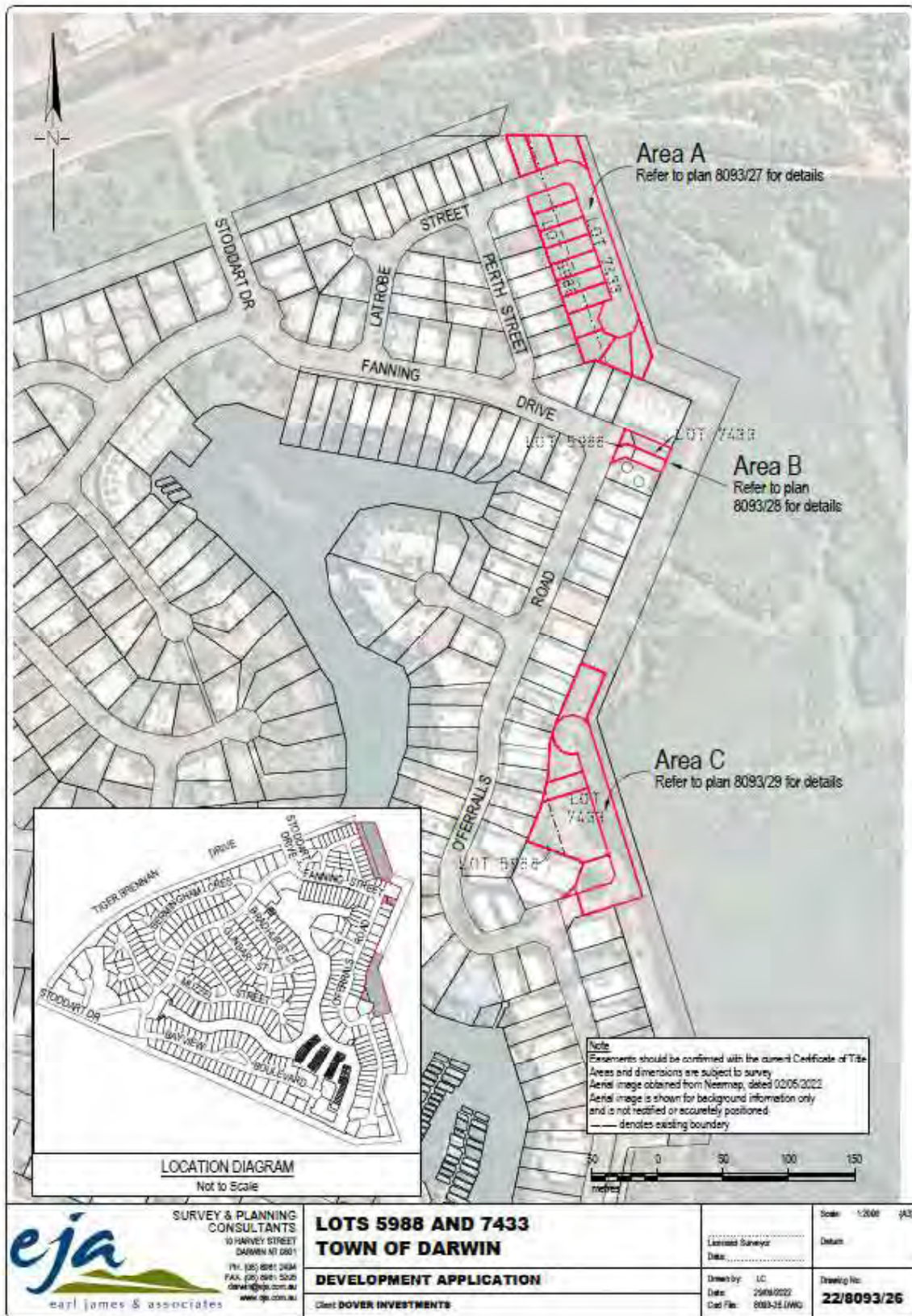
the *EP Act*. As a result this assessment report has been amended to state that the development is not considered to have a potential for a significant impact on any of the environmental factors assessed.

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Figure 1. Subdivision location and layout

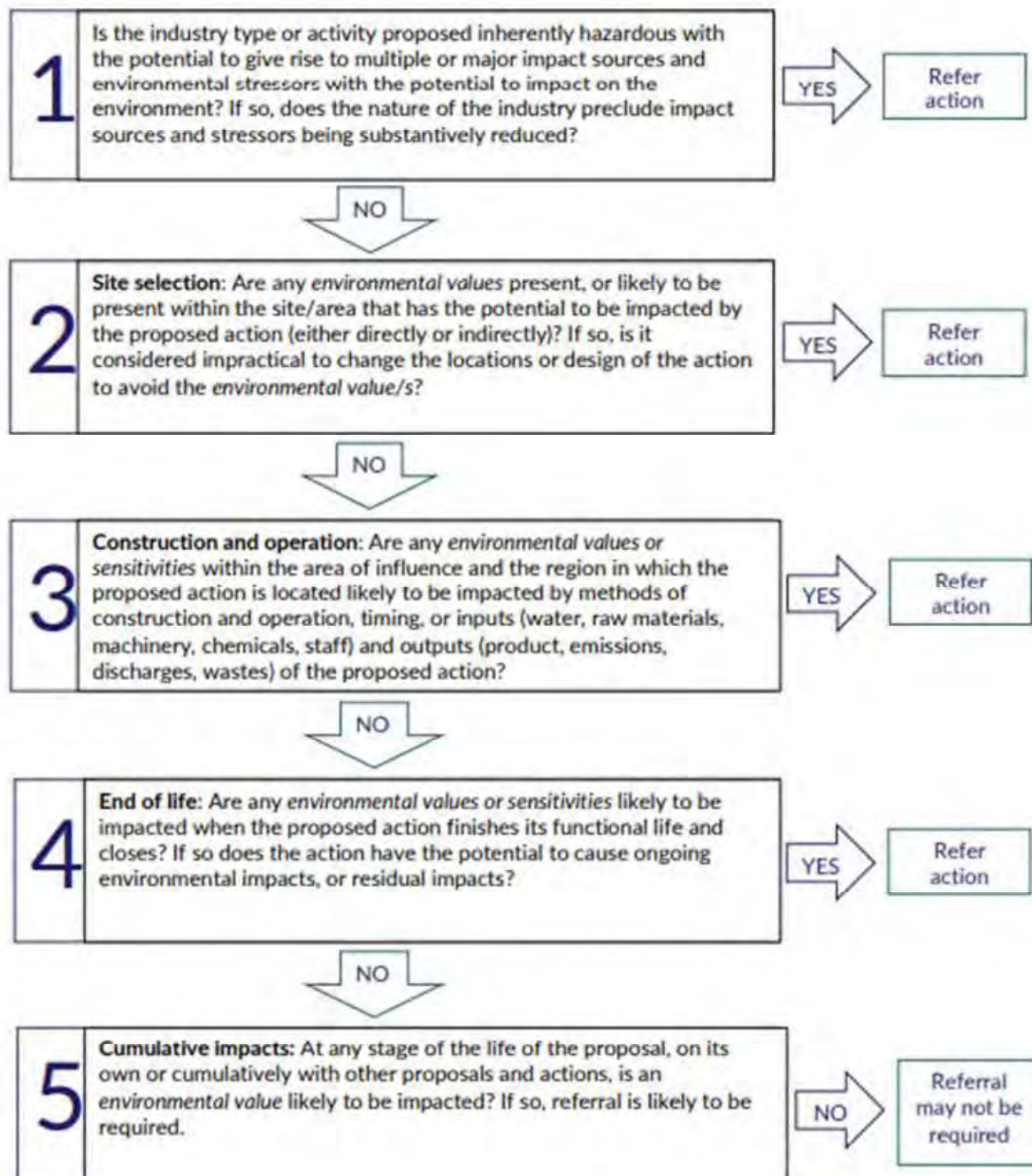


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Figure 2. Pre-screening tool screening questions (Source: NT EPA 2021)

The questions from the pre-referral screening tool are provided here for ease of reference.



Note: The questions in the tool are used as a guide to assess whether a referral may be required. Answering 'yes' to a particular question for an environmental factor does not automatically mean that the proposal will have a significant impact on the environment. Where a 'yes' answer was recorded, further assessment was then undertaken to determine whether a referral is required.

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Table 1. Pre-referral screening tool checklist prepared for Bayview subdivision.

Theme	Factor and Objective	Background information (about the project)	Environmental values, sensitivities (based on desktop and/or surveys)	Pre-referral screening questions						Assessment of potential for significant impact
					Q1	Q2	Q3	Q4	Q5	
				Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>					
Land	Landforms <u>Objective:</u> Conserve the variety and integrity of distinctive physical landforms.	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> No distinct natural landforms. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	The development will not have a significant impact on landforms because there are no distinct natural landforms present in the development footprint.
	Terrestrial Environmental Quality <u>Objective:</u> Protect the quality and integrity of land and soils so that environmental values are supported and maintained.	<ul style="list-style-type: none"> To create land that is suitable for development, approximately 2 ha of land in Area A and Area C will be reclaimed and seawalls constructed to protect the land from storm surge. Area B does not require earthworks as this area has been filled and surcharged as part of a previous stage of Bayview. Seawall construction in Area A and Area C will require removal of mangrove muds that are Potential Acid Sulfate Soils (PASS) Site preparation in Area A will require clearing and reshaping of sloping ground before fill placement. Site preparation in Area C will require removal of the existing rockwall before fill placement. Large volumes of contaminating materials such as fuels are not required to be stored on site due to the proximity of the site to Darwin allowing for daily resupply, and the nature of the project. 	<ul style="list-style-type: none"> PASS may be present where the seawalls are planned to be constructed. The geotechnical report prepared by Douglas Partners states that additional geo-environmental sampling, testing and reporting will be to assess and to address the issues of handling and disposal of PASS. Area A and Area C contain dumped fill and waste materials. The origin and timing of this dumping is unknown; however, visual inspection suggests that in Area A there is potential for occurrence of asbestos (although none was observed on the ground surface). Exposure of soils will create potential for erosion and generation of turbid stormwater runoff that would flow into the adjacent mangrove forests that line the upper reaches of Sadgroves Creek. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development will disturb land and soils but is not considered to have the potential to significantly impact on terrestrial environmental quality for the following reasons:</p> <ul style="list-style-type: none"> To avoid and mitigate impacts from ASS, Dover Investments has committed to undertaking testing for ASS and managing ASS in accordance with the national guidelines, and Qld and WA guidelines were relevant. The management of ASS has been addressed for previous stages of Bayview and there was no evidence of ASS impacts along the development boundary inspected by EcOz. To avoid and mitigate impacts from contaminated soils Dover Investments has committed to further site assessment in Area A and Area C in accordance with the ASC NEPM, NSW Contaminated Land Guideline, and relevant geotechnical guidelines. If materials are found to be contaminated, and require removal from site, a licenced contractor will be engaged. Dover Investments will ensure all fill (whether from onsite or offsite sources) is tested and certified suitable for use. Any material that is not suitable due to contamination, or geotechnical instability, will be removed from site by a licenced contractor. To avoid and mitigate impacts from erosion and generation of turbid stormwater runoff Dover Investments has committed to engage a Certified Practitioner to prepare Erosion and Sediment Control Plans (ESCP) that meet the IECA Guidelines and specifications. Contaminating materials such as fuels will only be stored in small volumes and in accordance with VIC EPA Publication 1698: Liquid storage and handling guidelines, June 2018, as amended. Any accidental spill of such materials will be remediated, and materials transported to an appropriate facility by a licensed waste handler. The above measures are accepted practice on construction projects and are expected to be effective in protecting the environment when implemented.

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Project: Bayview subdivision



Theme	Factor and Objective	Background information (about the project)	Environmental values, sensitivities (based on desktop and/or surveys)	Pre-referral screening questions						Assessment of potential for significant impact
					Q1	Q2	Q3	Q4	Q5	
				Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>					
Terrestrial Ecosystems	Objective: Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	<ul style="list-style-type: none"> Reclamation of land in Area A and Area C will require clearing and filling of approximately 2 ha of land within the development footprint. Area B is already cleared of vegetation. 	<ul style="list-style-type: none"> The development footprint comprises 0.6 ha of intact mangroves with the remaining areas being previously disturbed and now infested with weeds. Mangroves are a significant vegetation type under the <i>NT Land Clearing Guidelines</i>. The guidelines recommend that mangroves are excluded from any proposed clearing footprint and native vegetation buffers retained to protect them. The mangroves surrounding the development footprint are protected by Conservation zoning, but the mangroves in the development footprint are not, they are zoned Residential and Future Development. Mangrove mapping by Brocklehurst et al. (2019), indicates that the mangrove communities present at the project site include: <ul style="list-style-type: none"> <i>Rhizophora stylosa</i>/Campostemon schultzei low to mid closed-forest/open-forest (tidal creek forest) (group 2a); and <i>Ceriops tagal</i> low closed-forest/low open-forest (tidal flats) (group 4a) The mangroves that are present in the development footprint are regionally common and are unlikely to be critical habitat given the location adjacent to existing development, Refer Attachment 2. Weeds are abundant across Area A and were also observed by EcOz in Area C, Refer Attachment 2 for details of weed species. 	Yes No Uncertain N/A	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development will result in the loss of a small area of mangroves but is not considered to have the potential to significantly impact on terrestrial ecosystems for the following reasons:</p> <ul style="list-style-type: none"> The clearing is small scale and is located on land that is zoned Residential and Future Development. The surrounding mangroves that fringe Sadgroves Creek are protected by Conservation zoning. Dover Investments has committed to implementing ASS management and ESCP's during construction to minimise the generation of contaminated and turbid stormwater runoff and reduce the likelihood of that water entering the adjacent mangroves that are zoned Conservation. Dover Investments has committed to managing weeds to meet the requirements of the <i>Weeds Management Act</i>. Mangroves have persisted adjacent to the existing development, which indicates that impacts are likely to be limited to within the direct disturbance footprint. Due to the small scale and location of the development footprint the loss of habitat is not expected to alter biodiversity, ecological integrity and functioning. The proposed cleared extent of mangroves equates to a loss of less than 0.003% of the regional distribution (area) of the species present.
Water	Objective: Protect the hydrological regimes of groundwater and surface water so that environmental including ecological health, land uses and the welfare and amenity of people are maintained.	<ul style="list-style-type: none"> Surface water flows and groundwater recharge are significantly altered from natural conditions by the existing Bayview development. The increase in impervious surfaces associated with the subdivision represents a small fraction of the catchment area. The Bayview stormwater drainage system will be extended through the new development. There is no groundwater extraction proposed. 	<ul style="list-style-type: none"> Stormwater from Bayview discharges towards Sadgroves Creek. Darwin Harbour natural waterways in the catchment, including Sadgroves Creek, have declared beneficial uses for protection of the environment, cultural (aesthetic, recreational and cultural), and aquaculture. 	Yes No Uncertain N/A	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development is not considered to have the potential to significantly impact on the hydrological regimes of groundwater and surface water or declared beneficial uses for the following reasons:</p> <ul style="list-style-type: none"> The development is considered unlikely to alter the surface water or groundwater hydrological regimes substantially beyond the existing conditions. Despite the altered nature of the hydrological processes in the area, mangroves have persisted around the edges of the existing development boundary, which indicates that environmental beneficial uses are being maintained.

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Theme	Factor and Objective	Background information (about the project)	Environmental values, sensitivities (based on desktop and/or surveys)	Pre-referral screening questions						Assessment of potential for significant impact
					Q1	Q2	Q3	Q4	Q5	
				Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>					
	Inland Water Environmental Quality <u>Objective:</u> Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.	<ul style="list-style-type: none"> The development has potential to impact the quality of surface water runoff that discharges towards Sadgroves Creek. During construction, surface water quality could be impacted by erosion and turbid runoff, disturbance of PASS and contaminated soils, spills and leaks of hazardous chemicals from construction equipment and machinery. Residential land use could impact water quality through the introduction of nutrients from parks and gardens and inappropriate disposal of chemicals to the stormwater system. 	<ul style="list-style-type: none"> Stormwater quality plays a role in maintaining the ecological health of the surrounding mangroves and marine ecosystem within Sadgroves Creek. Darwin Harbour natural waterways in the catchment, including Sadgroves Creek, have declared beneficial uses for protection of the environment, cultural (aesthetic, recreational and cultural), and aquaculture. Marine environmental values are discussed under the Sea theme below. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development could release contaminated or turbid runoff but is not considered to have the potential to significantly impact on inland water quality or declared beneficial uses for the following reasons:</p> <ul style="list-style-type: none"> Dover Investments has committed to conducting further investigation for PASS and contaminated soils, and to implementing contamination and ASS management and ESCP's during construction to minimise the generation of contaminated or turbid stormwater runoff. Contaminating materials such as fuels will only be stored in small volumes and in accordance with VIC EPA Publication 1698: Liquid storage and handling guidelines, June 2018, as amended. Stormwater management system design will comply with City of Darwin standards. Darwin Harbour monitoring program indicates that stormwater discharges do not have a significant impact on water quality in the East Arm zone of the harbour.
	Aquatic Ecosystems <u>Objective:</u> Protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> There are no freshwater ecosystems present within or surrounding the development footprint. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Not applicable
Sea	Coastal Processes <u>Objective:</u> Protect the geophysical and hydrological processes that shape coastal morphology so that the environmental values of the coast are maintained.	<ul style="list-style-type: none"> Reclamation and construction of seawalls in Area A and Area C will alter the natural coastline. The development footprint is currently subject to tidal inundation but will be raised above storm surge levels to create land that is suitable for development. 	<ul style="list-style-type: none"> The coastline within the development footprint and adjacent areas is characterised by dense mangrove forest. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development is not considered to have the potential to significantly impact coastal processes for the following reasons:</p> <ul style="list-style-type: none"> Currents and tidal movement are limited at the locations that will be reclaimed. There is no evidence of erosion occurring along the coastline around the edges of the existing Bayview Development.
	Marine Environmental Quality <u>Objective:</u> Protect the quality and productivity of water, sediment and biota so that environmental values are maintained.	<ul style="list-style-type: none"> Any contaminated stormwater runoff from the development will be discharged into the mangrove forests that fringe Sadgroves Creek. The areas that will receive stormwater runoff are subject to tidal inundation that could distribute contaminants out into Sadgroves Creek. During construction, water quality could be impacted by erosion and turbid runoff, disturbance of PASS and contaminated soils, spills and leaks of hazardous chemicals from construction equipment and machinery. Residential land use could impact water quality through the introduction of nutrients from parks and gardens and inappropriate disposal of chemicals to the stormwater system. 	<ul style="list-style-type: none"> Darwin Harbour marine waters and natural waterways in the catchment, including Sadgroves Creek, have declared beneficial uses for protection of the environment, cultural (aesthetic, recreational and cultural), and aquaculture. Water and sediment quality plays a role in maintaining the ecological health of the surrounding mangroves and marine ecosystem within Sadgroves Creek. Sadgroves Creek is also utilised for recreational boating and fishing. The Darwin Harbour water quality report 2021 indicates that water quality in the East Arm zone of the Harbour where Sadgroves Creek is located, is very good. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development could release contaminated or turbid runoff but is not considered to have the potential to significantly impact marine water or sediment quality or declared beneficial uses for the following reasons:</p> <ul style="list-style-type: none"> Dover Investments has committed to implementing contamination and ASS management and ESCP's during construction to minimise the generation of contaminated or turbid stormwater runoff. Stormwater management system design will comply with City of Darwin standards. These measures are expected to be effective in ensuring that any impact to water and sediment quality are localised and short term. Darwin Harbour monitoring program indicates that the current land use in the East Arm catchment does not have a significant impact on water quality. The development will not substantially alter existing conditions.

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					Q1	Q2	Q3	Q4	Q5	
				Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>					
	Marine Ecosystems <u>Objective:</u> Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	<ul style="list-style-type: none"> Marine ecosystems surrounding the development footprint could be affected by any contaminated stormwater runoff or discharges. 	<ul style="list-style-type: none"> The coastline within the development footprint and adjacent areas is characterised by dense mangrove forest. Mangrove forests in Darwin Harbour are recognised as important marine habitats. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development is not considered to have the potential to significantly impact marine ecosystems because:</p> <ul style="list-style-type: none"> Impacts to water quality and sediment quality are predicted to be localised and short term.
	Air Quality <u>Objective:</u> Protect air quality and minimise emissions and their impact so that environmental values are maintained.	<ul style="list-style-type: none"> Construction activities will create dust and exhaust emissions from construction plant and equipment. 	<ul style="list-style-type: none"> There are existing residential properties immediately adjacent to the development footprint. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development will cause dust emissions but is not considered to have the potential to significantly impact on air quality because:</p> <ul style="list-style-type: none"> Dover Investments has committed to implement all measures in the <i>Guideline for preventing pollution on buildings sites</i> (NT EPA 2015) to control dust and limit nuisance. Refer Attachment 3 for details of specific commitments. DEPWS have advised that the proponent must ensure that nuisance dust and/or nuisance airborne particles are not discharged or emitted beyond the boundaries of the premises.
Air	Atmospheric Processes <u>Objective:</u> Minimise greenhouse gas emissions so as to contribute to the NT Government's aspirational target of achieving net zero greenhouse gas emissions by 2050.	<ul style="list-style-type: none"> Construction activities will create GHG emissions from construction plant and equipment, and clearing of mangroves. 		Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development is not considered to have the potential to significantly impact atmospheric processes because:</p> <ul style="list-style-type: none"> It does not involve any activities that release large volumes of GHG emissions.
People	Communities and Economy <u>Objective:</u> Enhance communities and the economy and foster resilience to a changing climate, for the welfare, amenity and benefit of current and future generations of Territorians.	<ul style="list-style-type: none"> Noise and dust emissions from construction activities will reduce amenity for neighbouring residences over periods of months when earthworks are being undertaken. The creation of new residences may impact amenity and privacy for those residences that currently do not have any neighbours along the back boundary of their properties. Additional traffic during construction and residential traffic could be a nuisance for existing residents. 	<ul style="list-style-type: none"> There are existing residential properties immediately adjacent to the proposed subdivision. There was opposition to the subdivision raised in some submissions made through the Development Application processes. 	Yes No Uncertain N/A	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>The development will affect the amenity of existing residential properties but is not considered to have the potential to significantly impact communities and economy because:</p> <ul style="list-style-type: none"> Dover Investments has committed to managing noise and dust. Refer Attachment 3 for details of specific commitments. Traffic management requirements will be conditioned in a future Development Permit. Impacts to amenity will be greatest during earthworks which will be limited to months in duration. Impacts will be limited to a small geographic extent. Nearby residents will be impacted but impacts are not expected to be experienced by the broader community at Bayview.

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					Q1	Q2	Q3	Q4	Q5	
				Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>					
	Culture and Heritage <u>Objective:</u> Protect sacred sites, culture and heritage	<ul style="list-style-type: none"> The development footprint encompasses previously disturbed land and mangrove forests. 	<ul style="list-style-type: none"> There are no nominated or declared heritage places within or proximate to the development. The site is substantially disturbed from natural conditions and the undisturbed areas are subject to tidal inundation. It is likely that Aboriginal archaeological sites would have existed in the area prior to the Bayview development occurring; however, the likelihood of sites being present in the development footprint or surrounds now is low based on the previous disturbance and development. An AAPA Authority Certificate (C2013/229) was issued to Dover in December 2013. This certificate indicates there are no sacred sites in the development footprint. 	Yes No Uncertain N/A		<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	The development is not considered to have the potential to significantly impact culture and heritage because: <ul style="list-style-type: none"> There are no known cultural or heritage sites present, and sites are unlikely to occur given the previous disturbance and location of the development.
	Human Health <u>Objective:</u> Protect the health of Northern Territory population.	<ul style="list-style-type: none"> Dust emissions from construction activities may impact the health of sensitive residents in neighbouring properties. There is potential for asbestos to be present in materials dumped in Area A. The proximity of the subdivision to mangroves poses biting insect risk. 	<ul style="list-style-type: none"> There are existing residential properties immediately adjacent to the proposed subdivision. 	Yes No Uncertain N/A		<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	The development will affect the amenity of existing residential properties but is not considered to have the potential to significantly impact human health because: <ul style="list-style-type: none"> Dover Investments has committed to managing noise and dust. Refer Attachment 3 for details of specific commitments. Dover Investments has committed to undertaking contamination assessments in Area A and if materials are found to be contaminated, and require removal from site, a licenced contractor will be engaged to ensure that is done safely. The area is zoned for residential development and so it is assumed that the health risks associated with the proximity of biting insect habitats have been deemed acceptable.

This pre-referral screening checklist was prepared by a suitably qualified professional who is appropriately accredited and experience in impact assessment

Name: Kylie Welch

Qualifications: Master of Social Science (Environment and Planning); Bachelor of Science (Hons)

Certification: Certified Environment Practitioner (CEnvP 975)

Signature:

K. R. Welch



Pre-Referral Screening Report

Project: Bayview subdivision



A review of this pre-referral screening checklist was undertaken on 30 July 2024, by a suitably qualified professional who is experienced in impact assessment

Name: Britanny Crescentino

Qualifications: Bachelor of Environmental Science

Signature:

A handwritten signature in black ink, appearing to read 'BC', is written over a horizontal line.

Attachment 1 Statement of Reasons

Lots 5988 and 7433, Town of Darwin Development Application

PROPOSAL

Lots 5988 and 7433, Town of Darwin are Crown lease parcels that have been progressively developed as the Bayview Marina Estate. Bayview Marina Estate is one of Darwin's premier residential subdivisions located a short distance from the Darwin CBD.

The subdivision is recognised for its high standard of development that has resulted from strict design guidelines developed and managed by the developer, Dover Investments.

The developers were initially granted a Crown lease over Lot 5988, Town Darwin (CLT 1251) in 1993 and then in 2004 a Crown lease (CLT 2155) was granted over an additional land area (Lot 7433) to enable the subdivision to be expanded.

The NT Government's strategic planners saw the potential for even further development in the Sadgrove's Creek locality and the Bayview developers were granted an option to purchase an additional area to the east of Lot 7433.



Bayview Marina Estate

Since that time the extension of residential development further to the east into the mangroves has gone off the agenda due to a variety of reasons and is unlikely to happen in the foreseeable future.

Whilst the option area is unlikely to happen in the short term, there are still certain areas of the existing Crown leases that have been assessed as being suitable for residential development. Areas not suitable for development, such as buffer strips along Tiger Brennan Drive and strips comprising the seawalls are obviously not suitable for residential development and these areas are in the process of being surrendered from the Crown leases.

The three remnant areas that have been determined as being suitable for residential development were the subject Development Application in 2013. These areas are adjacent to the eastern boundary of the Crown leases. The intention was to create three lots and then construct units on the proposed lots.

The Development Consent Authority (DCA) subsequently issued DP13/0635, approving the creation of two new parcels. The third parcel was removed from the proposal in order to provide an access option for the land to the east, however provision for that access is no longer required.

Consideration has been given to the most appropriate form of development for the three subject areas, taking into account the existing Bayview residents and the preferred living options for future residents.

The 2013 proposal, for the land to be developed to its highest potential yield of units was discarded and the option of a subdivision that creates separate freehold lots was adopted.

The current application is seeking the approval of the DCA to subdivide Lots 5988 and 7433, Town of Darwin for the purpose of creating 21 lots, in accordance with plans 22/8093/26, 27, 28 and 29.



Public open space abutting the marina

MATTERS TO BE ADDRESSED

46(3)(aa) – Interested parties

Applicant Details

Earl James and Associates

Representative: Kevin Dodd

Address: GPO Box 884, Darwin NT 0801

Email: kdodd@eja.com.au

Phone: 08 89812494

Landowner:

Lot 5988, Town of Darwin

Dover Investments Pty Ltd (ACN 009 637 914)

Address: Level 8, 728 George Street
Sydney NSW 2000

Phone: c/o 08 89812494

Lot 7433, Town of Darwin

Dover Investments Pty Ltd (ACN 009 637 914)

Address: Level 8, 728 George Street
Sydney NSW 2000

Phone: c/o 08 89812494

46(3)(a) – Compliance with the NT Planning Scheme

Property details:

Lot 5988, Town of Darwin

Title details: Volume 857 Folio 147

Crown Lease Term 1251

Survey Plan: S92/195

Address: 57 Bayview Boulevard, Bayview

Easements: Nil

Lot Area: 5.43 hectares

Lot 7433, Town of Darwin

Title details: Volume 857 Folio 148

Crown Lease Term 2155

Survey Plan: S2003/206

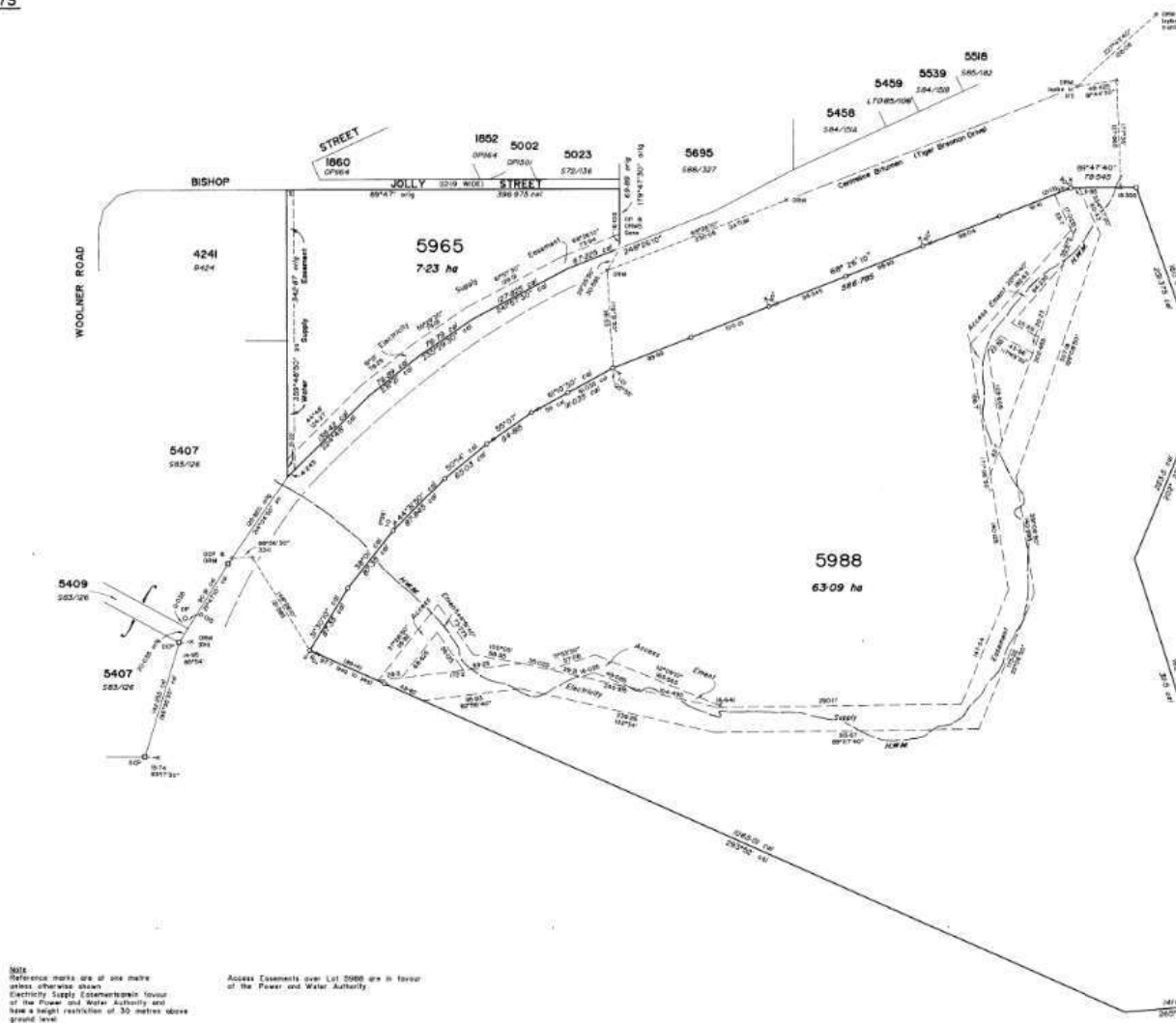
Address: Bayview

Easements: Nil

Lot Area: 3.2 hectares





Supersedes Part of A473



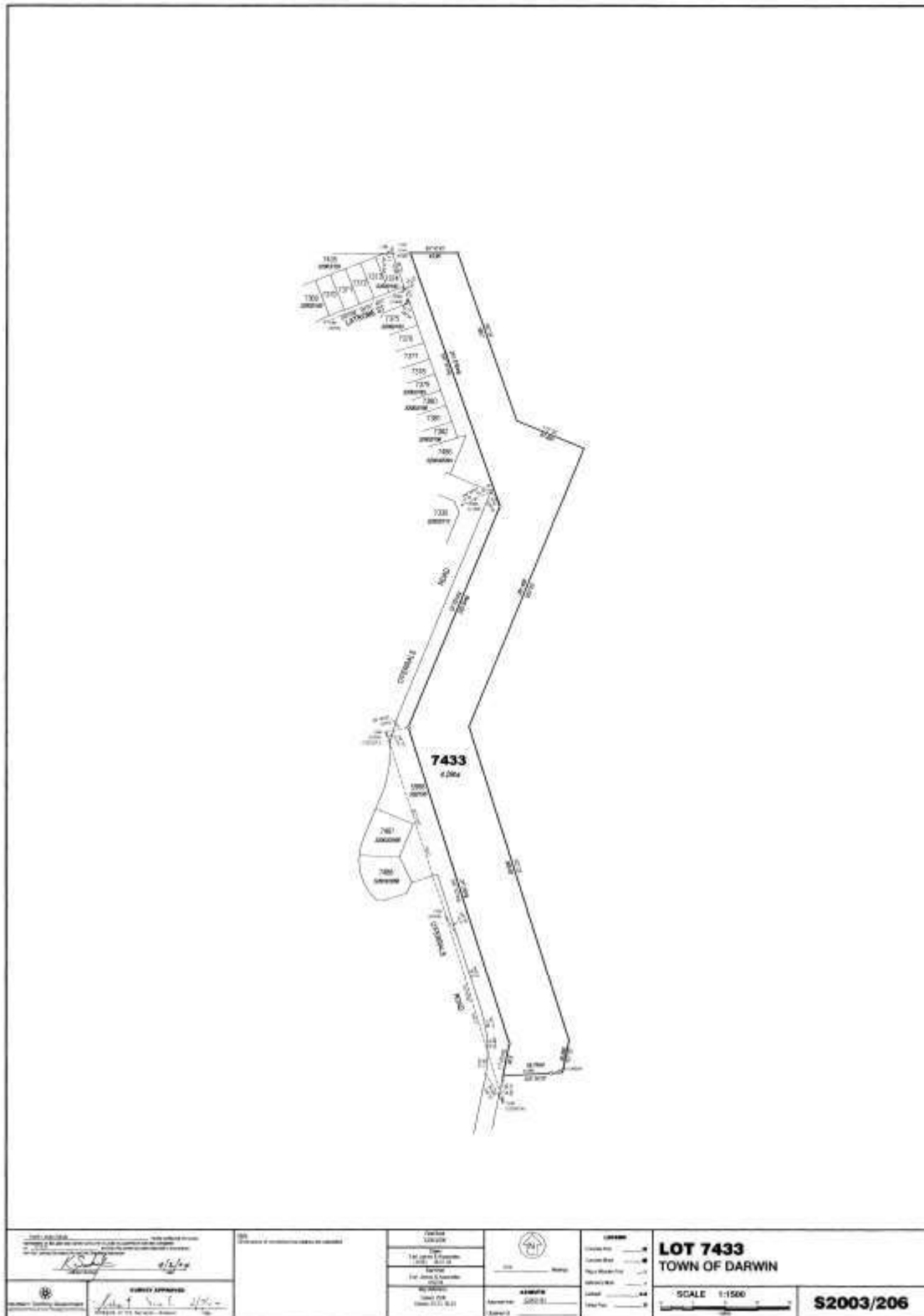
Note:
Reference marks are of one metre
unless otherwise shown.
Electricity Supply Corporation in favour
of the Power and Water Authority and
have a height restriction of 30 metres above
ground level.

Access Easements over Lot 2580 are in favour of the Power and Water Authority.

 Department of Lands and Housing Northern Territory	Kinds: Edd This survey report relates to the plan as marked on the title under the immediate supervision and was completed on 15-2-95 and that the survey has been conducted in accordance with the Land and Survey Act and the Conditions thereunder <u>Robert</u> City Surveyor Licensed Surveyor Date	AMENDMENTS <table border="1"> <thead> <tr> <th>Reference</th> <th>Version</th> <th>Appointed</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>File 5 92/95</td> <td>Water Supply Easement in favour of the Power and Water Authority Act for Lot 5905</td> <td><u>J. M. S. S.</u></td> <td><u>2-6-95</u></td> </tr> <tr> <td>File 71</td> <td></td> <td><u>Sir Robert</u></td> <td></td> </tr> </tbody> </table>		Reference	Version	Appointed	Date	File 5 92/95	Water Supply Easement in favour of the Power and Water Authority Act for Lot 5905	<u>J. M. S. S.</u>	<u>2-6-95</u>	File 71		<u>Sir Robert</u>		Notes:	Field Book 590/95 Drawn East James R. Section D 2 93 <u>Robert</u> 24-2-95 Map Reference District 2500 Sheets 30 23, 30 24 Locality Assumed from 388/527 Observed at	 Grid Bearings AZIMUTH 388/527 From Post	LEGEND Concrete Foot Concrete Block Flag or Wooden Post Reference Mark Locality From Post
	Reference	Version	Appointed	Date															
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File 71		<u>Sir Robert</u>																	
SURVEY APPROVED <u>J. M. S. S.</u> 15-2-95 Surveyor General Date																			

WARNING --- Damaged or creased plan will be rejected!

Survey plan S92/195



Survey plan S2003/206

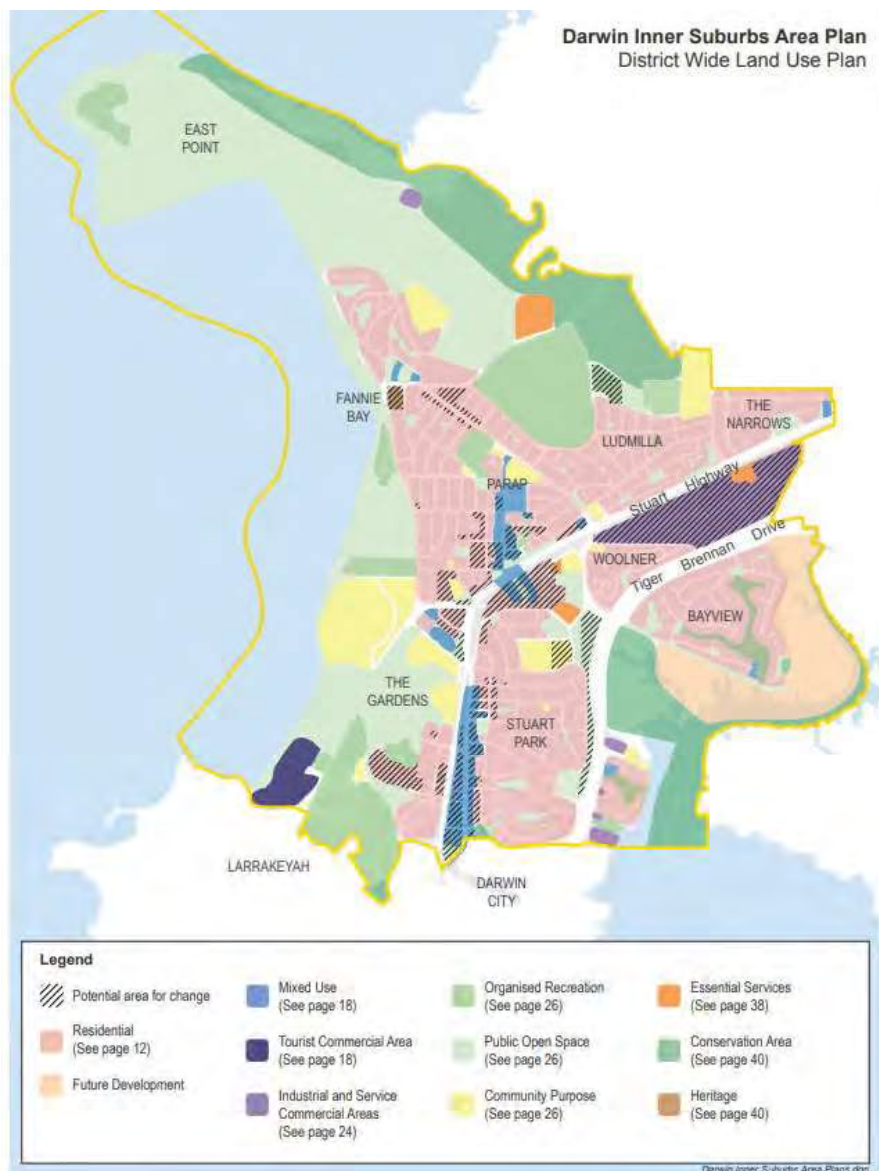
Strategic Framework

The Darwin Regional Land Use Plan 2015 (DRLUP) applies to the subject land and identifies the subject land as being suitable for urban/peri-urban development.

The lots being proposed by the current application are ideally suited to urban development and in no way conflict with the intention of the DRLUP.

The Darwin Inner Suburbs Area Plan (DISAP) also applies to the land comprised within the Bayview Crown leases.

The DISAP provides a framework to guide progressive growth and development within the Inner Suburbs of Darwin and the land that is the subject of this application, lying on the eastern edge of the existing Bayview development, is identified for 'Future Development'.



The following figure showing Residential Areas, from the DISAP, also identifies the subject area as a *Future Development Area*.



The Planning Principles associated with *Future Development Area* are set out in the following table from the DISAP:

Future Development Area	
Objectives	Acceptable Responses
1. Identify areas intended for future development.	Development is to accord with either <ul style="list-style-type: none"> An Area Plan and the provisions of Zone FD; or Provisions of a Specific Use Zone.
2. Provide for development in accordance with a site or locality specific planning framework once services are or can be made available to the land.	Both the Area Plan and the Specific Use Zone must address the relevant provisions within the NT Planning Scheme (including concepts within this Area Plan).

Part of the land that is the subject of the current application is zoned LMR (Low-Medium Density Residential) whilst the rest is zoned FD (Future Development).

The intention is for those parts that are currently zoned FD to be rezoned to LMR prior to titles issuing for the proposed lots. Reticulated services are to be extended to service the proposed lots and details of the servicing are included within this Statement of Effect.

Zoning

As previously mentioned, part of the land that is the subject of the current application is zoned LMR (Low-Medium Density Residential) whilst the rest is zoned FD (Future Development). The intention is for those parts that are currently zoned FD to be rezoned to LMR prior to titles issuing for the proposed lots.

The purpose of zone LMR is to *provide a range of low rise housing options that contribute to the streetscape and residential amenity in locations supported by community services and facilities, and where full reticulated services are available.*

The current application is not seeking approval for the use of the land but will result in parcels that will facilitate the development of the desired housing options where reticulated services are available and there are community services available.

Zone Outcomes

The LMR zone is looking for lots that are *connected to the reticulated services, integrated with existing transport networks, and with reasonable access to open space and community services.*

The lots being proposed by the current application will be connected to reticulated services and the subdivision will involve the development of new portions of public road that will connect to an integrated road network.

The new lots will be able to utilise the existing open space areas (parks, bicycle and walkways, heritage areas) and given Bayview's proximity to the CBD and other service commercial areas, the new residents will have access to existing community facilities.

Overlays

The Overlays in the NTPS identify areas of land that have specific development requirements.

The Record of Administrative Interests advises the following Overlays apply to Lots 5988 and 7433:

CR Coastal Reclamation

The purpose of this Overlay is to *ensure that landfill of coastal areas does not adversely affect adjacent land or waters, or the quality of adjacent waters, and is suited to its intended purpose.*

The *Administration* section of this overlay advises that the placement of fill below the level of the highest astronomical tide requires consent. The filling works will be part of the works associated with the development of this subdivision and geotechnical consultants Douglas Partners (DP), have previously been engaged to provide an assessment of the proposed site filling and seawalls.

It should be noted that Area B does not require earthworks as this area has been filled and surcharged as part of a previous stage of Bayview that was completed in 200.

The DP report (attached) advises that the proposed construction for Areas A and C will be as follows:

Area A: Clear and reshape the sloping ground, then construct a building platform at a final level at about RL5.5m AHD by filling over the prepared site surface. Surcharge the lot for a period of up to 5 months with about 2 m of filling to reduce post construction settlements, then remove the surcharge and construct a seawall to RL6.5 m AHD.

Area C: Remove and stockpile the rock armour from the current seawall, reshape the sloping fill batter, then construct a building platform at a final level at about RL RL5.5 m AHD by filling over the prepared site surface. Surcharge the lot for a period of up to 8 months with about 2 m of filling to reduce post construction settlements, then remove the surcharge and construct a seawall to RL6.5 m AHD.



Also from the DP report:

Geotechnical Issues for Design and Construction

Based on the previous earthworks carried out for construction of similar filling platforms suitable for residential construction in Stages 3 to 10 of the Bayview subdivision, there are four main geotechnical issues to be addressed. These include the following:

- a. stability of the filling and surcharge during placement over soft marine sediments;*
- b. differential settlement between previously placed filling and new filling which may lead to the formation of tension cracks at the interface between the “old” and “new” filling;*
- c. settlement of the filling platform; and*
- d. stability of the seawall after surcharge is removed and rock armour is placed.*

Each of these four issues will be specifically addressed by incorporating the following geotechnical design features and construction strategies into the site filling procedures, and by monitoring the settlement of fill platforms by precise survey.

Issue a: *The current site surfaces will be cleared and benched before an engineered filling platform comprising a woven geotextile layer, a rockfill working platform, engineered filling and surcharge is placed over the mud surface. The earthworks profile proposed for site filling and surcharge is shown on attached Drawing 5. A similar profile has been successfully used for construction of previous stages of Bayview including the adjacent Stage 10 earthworks.*

Issue b: *The new filling will be carefully placed in a controlled manner, and will be keyed into the current filling, to minimise the risk of longitudinal cracking and to ensure stability of the filling platform at all stages. Any tension cracks that form at the interface between “old” and “new” filling will be reinstated before surcharge is removed. Tension cracks that have formed due to differential settlement at Bayview and the nearby Tiger Brennan Drive embankments have been successfully reinstated with minimal detrimental effect to the filling platform using this approach.*

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*Geotechnical Assessment of Proposed Site Filling & Seawalls Project 77861.01
Stage 11 - Lots A and C, Bayview, NT May 2012*

Issue c: *Surcharge will be placed over the engineered filling to heights predetermined by engineering calculations. Examples of surcharge profiles and estimated surcharge times for areas including part of Lot A and all of Lot C are shown on attached Drawings 6 and 7. Settlement of the filling platform under surcharge loads will be monitored by periodic survey and the surcharge will not be removed until approximately 90% of primary consolidation under filling load has been achieved. Settlement monitoring of previous stages of Bayview for periods of up to 5 years after removal of surcharge indicates that post construction settlements of monuments located on filled areas have generally been limited to 20 mm or less.*

Issue d: *The seawall section proposed for Lots A and C is shown on attached Drawing 8. This section differs from previous seawall sections at Bayview because shallower average mud depths along the lease boundary on this eastern side allow for a steeper, stable armour rock wall to be constructed on a rockfill base. The seawall construction comprises removing and displacing soft mangrove mud and replacing this soft soil with a rockfill base. The top of the rockfill base will be at or slightly below natural surface level and the rockfill base will be founded on the underlying stiff marine clay. This rockfill base will be placed before the working platform and site filling so that trenching required to remove mud does not cause any instability in the filling.*

After the surcharge is removed to the design site level of about RL5.5 m AHD, the compacted outer fill batter will be trimmed to a slope of 5H:4V and a 1 m high precast concrete retaining wall will be constructed at the crest of the batter as shown on Drawing 8. A non-woven geotextile will be laid on the batter and secured under the wall, then armour rock (which was previously removed and stockpiled before filling Lots A and C) will be placed on the batter and over the base of the retaining wall.

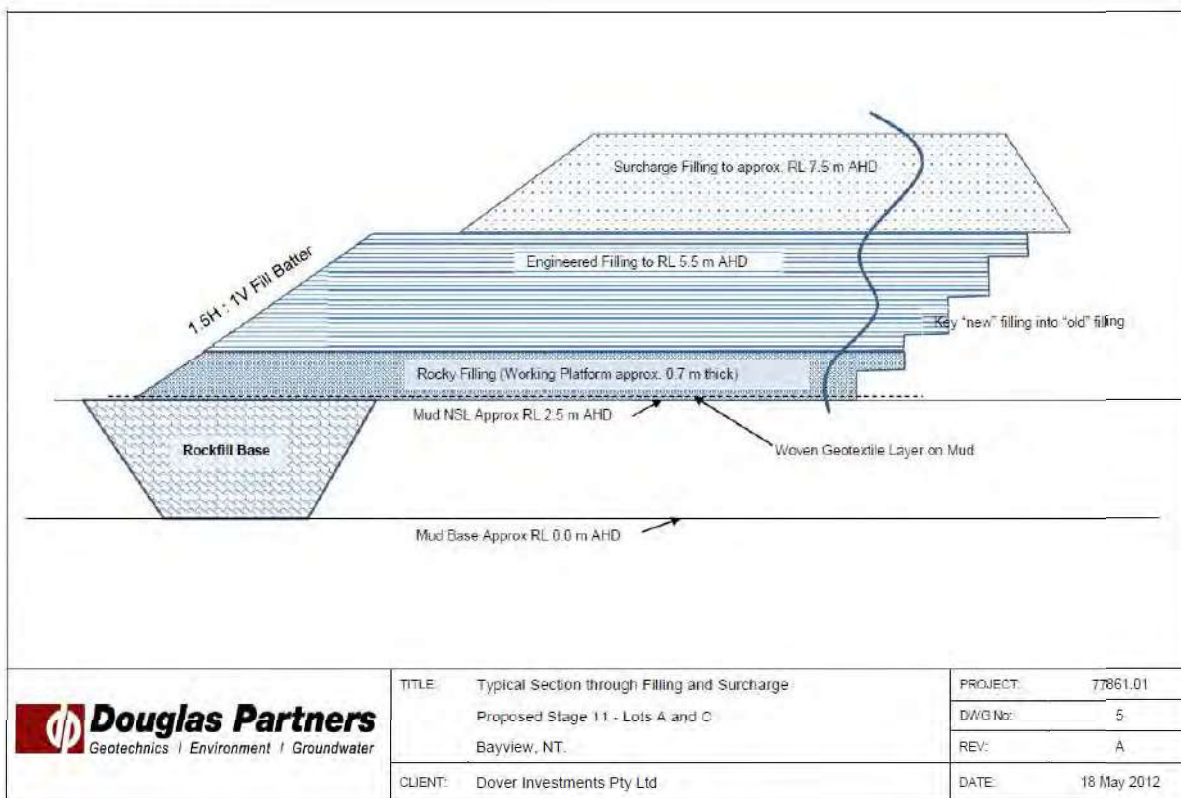


Suitability for Residential Construction

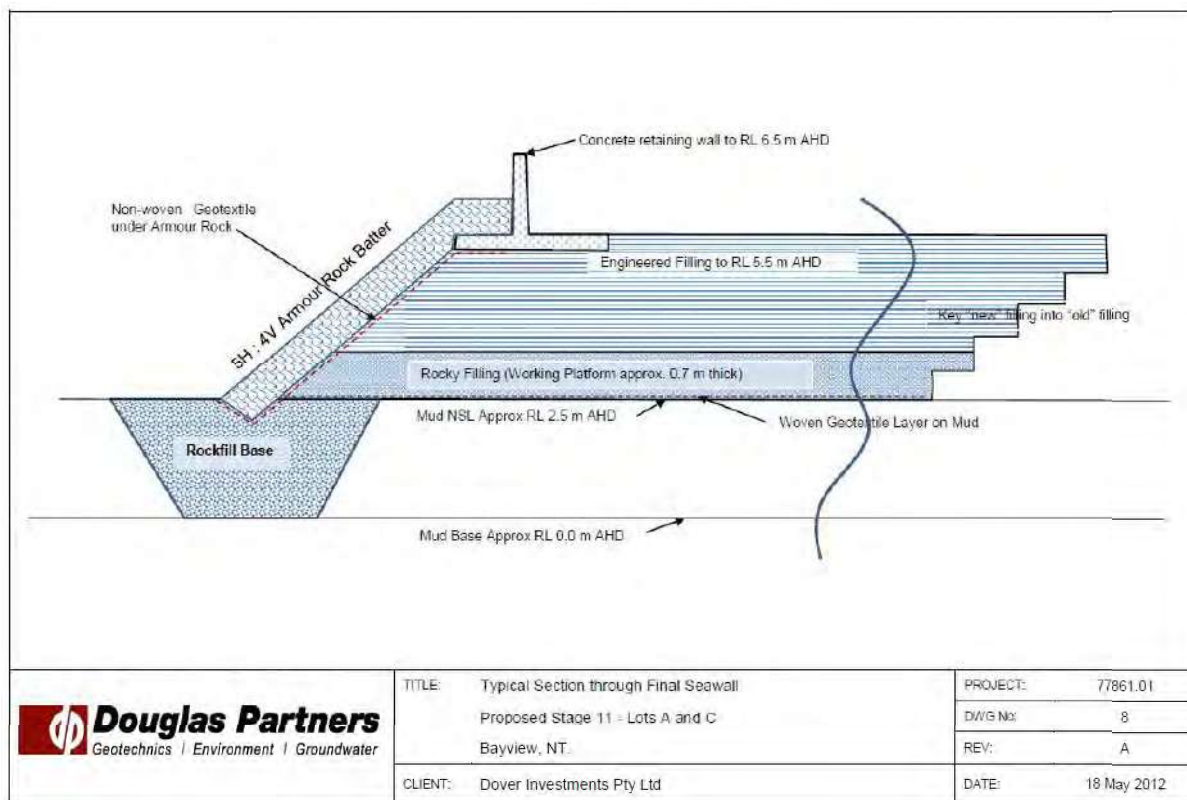
The attached Drawing 4 shows the locations of the proposed Stage 11 - Lots A and C which confirms that the information on mud depths and surcharge calculations contained in previous DP geotechnical reports will adequately cover the proposed Stage 11 lot areas. In addition, the information on Drawings 6 and 7 indicate that previous calculations of surcharge heights and surcharge times could be revised to adequately address the proposed construction schedule of the Stage 11 lots.

The proposed composite wall profile with a rockfill base will be stable, will enable development of the lots for their intended purposes, and with a crest level of RL6.5 m AHD will mitigate risk and damage as a result of any storm surge event.

If the proposed seawall section shown on Drawing 5 is adopted for construction, some additional geo-environmental sampling, testing and reporting will be required to assess the potential for acid sulphate soils (PASS) and to address the issues of handling and disposal of PASS. The management of ASS has been addressed for previous stages of Bayview and the management plans would apply to this additional construction.



Typical section through filling and surcharge



Typical section through final seawall

The future use of the subject area (post surcharging) is yet to be determined however the suitability of the site for the future use will be considered as part of a future DA.

The DP report advises that existing material comprises mostly silty gravelly cobbles and boulders. The cobbles and boulders have been described as medium to high strength and as being well compacted.

The DP report and the Cardno plans advise that outer batter slopes of 1V:2.5H should be maintained in order to ensure against slope instability and associated impact on adjacent waters.

Other measures to minimise impact on the adjacent areas include silt fences and rock sediment traps.

The DP report outlines the surcharge procedures and advises that if all the requirements are followed, then any impact on acid sulphate soils within the marine environment should be avoided.

CNC Clearing of Native Vegetation

From the DP report:

Lot A (Area A) comprises grassed and vegetated vacant land which is partially filled over intertidal mud flats.

The lot is bounded by a filled area to the north, by residential allotments located on a filling platform to the south and west, and by a narrow corridor of cleared mangroves, then mangrove forest to the east. Lot A site surface currently slopes down to the east from about RL5.5 m AHD on the crest of the filling platform to about RL2 to 2.6 m along the eastern lease boundary.

Lot C comprises unvegetated vacant land located in a re-entrant corner of the Bayview rock armoured seawall, as well as low-lying intertidal mud flats. The lot is bounded by residential allotments located on a filling platform to the north, west and south and by a narrow corridor of cleared mangroves, then mangrove forest to the east. Lot C surface is currently level at about RL5.5 m along the western boundary and slopes down across the rock wall to about RL1.8 to 2.4 m over intertidal mudflats along the eastern lease boundary.

There are no mature mangroves within the lease boundary at either of the sites (Areas A and C), and all vegetation on the earth and rockfill slopes is regrowth since the slopes were constructed.

DHD Darwin Harbour Dredging

The proposed subdivision does not involve any harbour dredging.

LSSS Land Subject to Storm Surge

The purpose of this overlay is to identify areas with a known risk of inundation from primary or secondary storm surges and ensure that development in these areas demonstrates adequate measures to minimise the associated the risk to people, damage to property and costs to the general community caused by storm surge.

The earthworks and construction measures outlined in the DP report will render the land suitable for the proposed use and minimise the risk to people and damage to property.



Existing zones



A view along part of the existing seawall on the eastern side of Bayview

Clause **6.2.1** deals with lot size and configuration for subdivision in zone LMR.

The purpose of the Clause is *ensure that subdivision of land for urban residential purposes creates lots of a size, configuration and orientation suitable for residential development at a density envisaged by the zone.*

Clause 6.2.1 lists the following Requirements for the subdivision of land in zone LMR:

Land is to be subdivided in accordance with Table A to this clause

Table A to Clause 6.2.1: Lot Size and Configuration in Residential Subdivisions	
Zone	Minimum Lot Size
LR in greenfield areas identified for compact urban growth in the strategic framework	Average of 600m ² and no smaller than 450m ²
LR other than greenfield areas identified for compact urban growth in the strategic framework	800m ²
LR, MR, HR and lots for residential buildings in Zone T	800m ²
LMR	300m ²

The prescribed minimum lot size for lots zoned LMR is 300m² and all of the proposed lots have areas in excess of the prescribed minimum.

Lots are to conform with the building envelope requirements in Table B to this clause.

The building envelope requirements are listed in the following Table:

Table B to Clause 6.2.1: Lot Size and Configuration in Residential Subdivisions	
Lot Size	Minimum Building Envelope Requirement
300m ² to less than 450m ²	7m x 15m (exclusive of any boundary setbacks or service authority easements)
450m ² to less than 600m ²	8m x 15m (exclusive of any boundary setbacks or service authority easements).
600m ² and greater	17m x 17m (exclusive of any boundary setbacks or service authority easements)

Plans 22/8093/31 to 33 indicate that all of the proposed lots can accommodate the required building envelopes.

Lots have sufficient area and appropriate dimensions to provide for the proposed density of developments including dwellings, vehicle access, parking and ancillary buildings.

The lots have been designed to ensure that they can all accommodate the dwellings, access, parking and any ancillary buildings expected for a parcel zoned LMR.

There are no battle-axe lots.

No battle-axe parcels are being proposed by the current application.

Lots are oriented to allow dwellings to take advantage of environmental conditions such as prevailing breezes and sunlight.

The design of future dwellings on the proposed lots will be able to take environmental conditions into account.

Lots are connected to reticulated services.

Byrne Consultants has been engaged to consider service reticulation and the servicing of each of the proposed lots.

Servicing reports have been prepared and these form part of the current Development Application.

Servicing details are provided in following sections of this Statement of Effect but each of the proposed Lots will have water, power, sewer and communications connections.

Where there are lots for medium and higher density residential development, those lots are:

(a) distributed in small groups serviced by public transport;

(b) in close proximity to public open space and with adequate access to community facilities and services; and

(c) not located in a cul-de-sac

It is intended that the proposed Lots will be zoned LMR and the purpose of the zone is to provide for a range of low-rise housing options.

All of the lots within Areas A and B will be for single dwellings as the areas of the proposed lots are less than 600m².

Similarly, proposed Lots 2,3 and 5 within Area C will be for single dwellings whilst proposed Lot 1 could potentially be developed for Dwelling-Group (2) and Lot 4 could be developed for 3 or more dwellings.

The proposed Lots can all utilise the existing public transport that (buses) that service Bayview as well as the range of open space options within the precinct.

Areas A and C are to be developed as cul-de-sacs however the lots are only for low and medium future uses and the proposed roads are not long cul-de-sacs.

6.2.2 Lots Less Than 600m² for Dwellings-Single

Purpose

Ensure the subdivision of land to lots of less than 600m² will allow residential development that minimises impact on amenity and the functionality of the street infrastructure.

Administration

1. *The consent authority must not consent to a subdivision that is not in accordance with sub-clauses 3 and 4.*
2. *An application must provide plans to demonstrate the requirements of sub-clause 4.*

Requirements

3. *Lots subject to this clause shall not have a boundary to any public road less than specified in the table to this clause.*

All of the proposed lots have frontages that exceed the minimums listed in the table to Clause 6.2.2.



4. *The site layout of lots subject to this clause is able to comply with the purpose of this clause and the development requirements for vehicle parking (5.2.4), building setbacks (5.4.3 and 5.4.3.3) and private open space (5.4.6).*

As required by Clause 5.2.4, every Lot can accommodate 2 on-site parking spaces and every lot has sufficient area to ensure that the required area of private open space can be accommodated in the development of a future dwelling (refer to plans 22/8093/31, 32 and 33).

Plans 22/8093/34, 35 and 36 indicate drive and on-street parking options. Whilst a few of the lots do not have the required 6.5m for on-street parking directly in front of the lots (due to the curved kerblines, the streets do allow for on-street parking in close proximity to the subject lots. This on-street parking option will not be inconvenient for the lot owners and will not unduly reduce the operation or amenity of the street.

Table to Clause 6.2.2: Lots Less than 600m ² for Dwellings-Single	
Range of Lot Size	Minimum length of any Boundary to a Public Road
300m ² to less than 450m ²	10m
450m ² to less than 600m ²	13m

Clause **6.2.3** deals with site characteristics for subdivision in Zones LR

The purpose of this Clause is to *ensure that the subdivision of land provides lots suitable for urban residential purposes that respond appropriately to the physical characteristics of the land and does not detrimentally impact on surrounding land.*

Administration

1. *The consent authority may consent to a subdivision that is not in accordance with sub-clauses 2-6, only if it is satisfied the subdivision design is consistent with the purpose of this clause.*

Requirements

2. *Avoid the development of land of excessive slope, unstable or otherwise unsuitable soils (e.g. seasonally waterlogged) and natural drainage lines.*

The entire Bayview Marian development has involved earthworks and site treatment to ensure that the land is suitable for the purpose for which it was leased – *residential subdivisional purposes*.

The design and implementation of these earthworks has been carried out in conjunction with relevant Government agencies over many years and similarly, all design and construction works for the proposed areas will be undertaken by engineering and environmental consultants in consultation with Government agencies.

3. *Ensure, by site selection or site grading, that areas intended for lots less than 600m² do not slope in excess of 2%, such that the need for on-site stormwater structures, retaining walls and the like is minimised.*

All site design will ensure that the grades of those lots with areas less than 600m² are not greater than 2 %.

4. *Retain and protect significant natural and cultural features.*

O'Ferrals Rock has previously been identified as a significant cultural feature and will not be impacted by the current proposal.

5. *Avoid development of land affected by a 1% AEP flood or storm surge event.*

As with previous stages of the Bayview development, the subject land will be developed to ensure that the resulting housing lots are free of the 1% AEP storm surge event.

6. *Retain and protect natural drainage lines and any distinctive landform features or stands of natural vegetation and incorporate them into public open space.*

Previous assessments of the entire Bayview lease areas has identified the distinctive landforms (eg: O'Ferrals Rock) and these have been excluded from development and set aside as public open space.

Clause 6.2.4 deals with infrastructure and community facilities for subdivision in Zones LMR

The purpose of this Clause is to *ensure that subdivision of land for residential purposes is appropriately integrated with infrastructure, community services and facilities.*

Bayview Marina Estate is a centrally located residential precinct that is a short distance from commercial and community facilities located in Darwin CBD, Stuart Park, Parap and Winnellie.

Each of the areas proposed for development by the current application will have direct access onto an established public road network. This network services the Bayview development and then connects to Tiger Brennan Drive that in turn leads to the rest of Darwin and beyond.

There is a Government public bus service that services Bayview and the residents of the proposed lots will be able to utilise this service.

Bayview incorporates a variety of public open space including parks, walking paths and heritage areas and all of the lots being proposed by the current application are less than 400m walking distance from a neighbourhood park.

As previously mentioned, Byrne Consultants has been engaged to consider service reticulation and this application includes the Byrne servicing reports.

The Reports contain all the necessary detail but following are extracts in relation to the various services, including comments from Power and Water Corporation (PWC):

Water and Sewer

PWC comments:

Lot A

- *For water – A new DN150 water main is to connect from the existing DN150 main at the end of Latrobe Street, be looped in the cul-de-sac and connect back into the existing DN100 in Perth Street. It is recommended that the water network is designed to direct flow through the cul-de-sac and reduce risk to water quality*
- *For sewer – connect into existing sewer reticulation main in Latrobe Street via new DN150 sewer reticulation main.*

Lot B

- *For water – Install 2 x service connections on the existing DN150 water main in O'Ferrals Road*
- *For sewer – construct new sewer service connections for both lots and connect into existing vacuum pit BA/P1*



Lot C

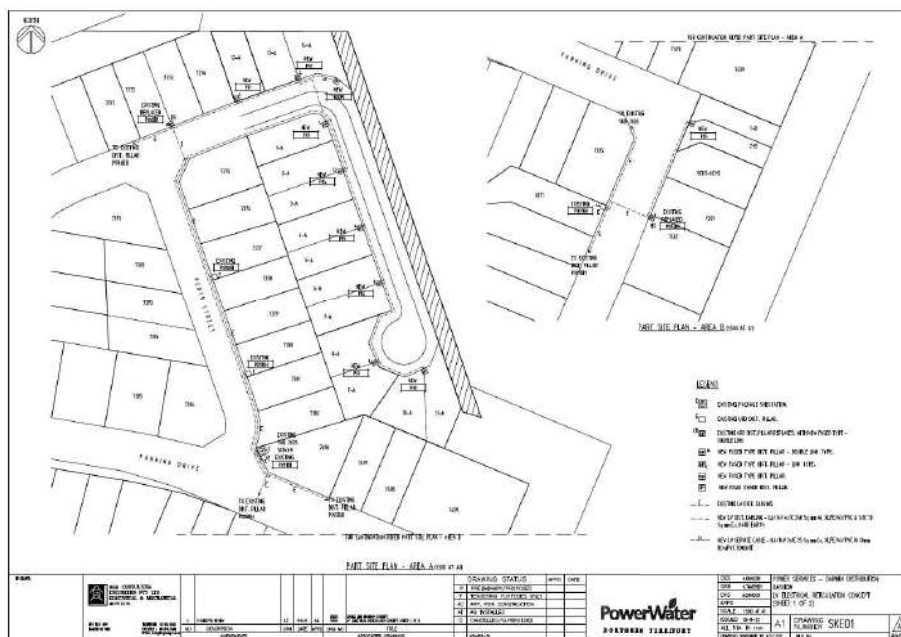
- *For water – A new DN150 water main is to connect from the existing DN150 main in O’Ferrals Road, looped in the cul-de-sac and connect back into the existing DN150 in O’Ferrals Road. It is recommended that the water network is designed to direct flow through the cul-de-sac and reduce risk to water quality*
- *For sewer – Construct new sewer reticulation main to service the subdivision and connect into existing DN125 vacuum sewer line via a new vacuum pit built as per PWC standard drawing W2-2-10A*

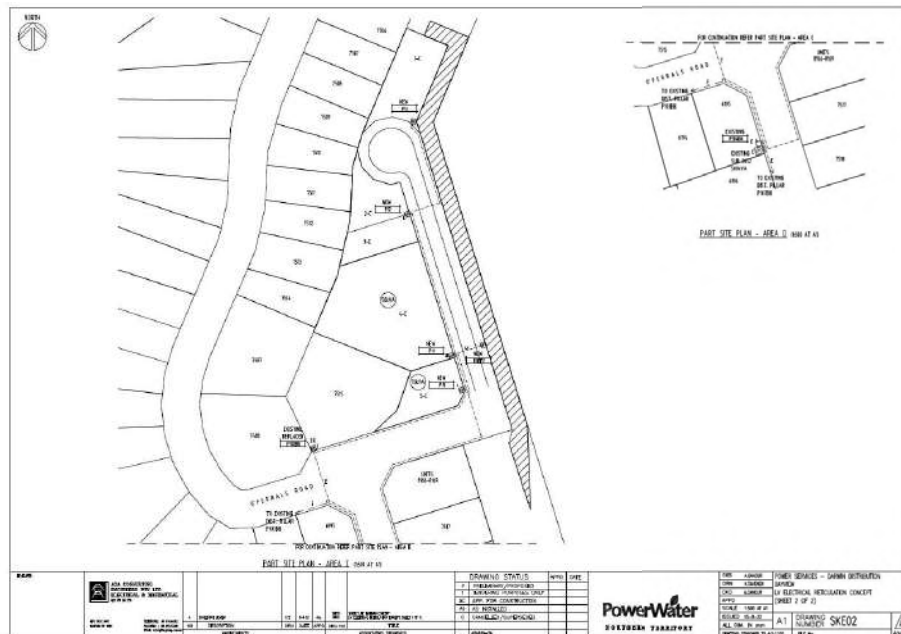
Power

All high and low voltage electrical reticulation will be designed and constructed in accordance with PWC specifications.

Similarly, streetlight design will be in accordance with City of Darwin (COD) requirements.

Concept electrical plans prepared by electrical consultant AGA Consulting Engineers:





Concept streetlighting plans prepared by AGA Consulting Engineers:







Part of the extensive public walkway network through Bayview

Stormwater

The stormwater drainage design prepared by Byrne has been designed in accordance with COD standards and the Northern Territory Subdivision Development Guidelines.

Internal Stormwater Strategy:

The intent of the internal development stormwater strategy is to direct all stormwater flows from the proposed lots toward the road reserve where it will be collected via kerb and channel along the roadway and captured via stormwater inlet pits into the proposed stormwater pipe network. The sites shall discharge stormwater into the existing mangrove creek in accordance with the current stormwater management philosophy for the development.

Area A

The proposed lawful point of discharge for the development of Lot A is into the mangroves and creek area east of Latrobe Street. An existing 525mm diameter RCP which discharges to the area shall be extended and upsized to account for the additional development catchment area of Lot A.

Area B

All stormwater from Lot B is collected by the existing stormwater network (pit and pipes) on O'Ferrals Road which is directed via the trunk underground drainage network to a drainage easement through Lot 7502 before discharging into the adjacent mangroves area. No upgrades to the existing drainage system are proposed to service Lot B.

Area C

The proposed lawful point of discharge for the development of Lot C shall be via the existing underground stormwater network and 1200mm diameter RCP outlet which discharges to the mangroves area through Lot PT8169. The existing 1200mm RCP discharge pipe shall be extended and upsized to account for the additional development catchment area of Lot C.

External Stormwater Strategy:

It is anticipated that the proposed internal stormwater strategy design will cause no worsening effects of existing upstream conditions due to the proposed stormwater network being sized sufficiently to convey the upstream inflows. No worsening of the downstream flows is expected due to discharge into the existing tidal mangrove creek.

Traffic Assessment

Byrne has carried out a traffic impact assessment with the full results contained in the attached servicing the report.

Following are the conclusions extracted from the report:

- *Intersection 1 (Stoddard Dr / Tiger Brennan Dr / Woolner Rd) exhibited minor changes in the intersection performance due to the development traffic generation (no notable change). The intersection performance with respect to degree of saturation, average delay and queue length lowered during the 2027 and 2032 scenarios due to the applied background growth factors on Tiger Brennan Drive and Woolner Road, not the development traffic. It is beyond the scope of this TIA to suggest any upgrades to this intersection and impact by the proposed development is minimal.*
- *Intersection 2 (Stoddard Dr / Tiger Brennan Dr) exhibited a LoS of B and DoS ≤ 0.6 during the 2032 growth scenario (AM / PM) due to growth rates applied to Tiger Brennan Drive. This intersection performs satisfactorily with the proposed development traffic.*
- *Intersection 3 (Stoddard Dr / Fanning Dr) and Intersection 4 (Stoddard Dr / Bayview Blvd) exhibited a LoS of A and a DoS ≤ 0.2 for all growth scenarios performing satisfactorily with the proposed development traffic.*



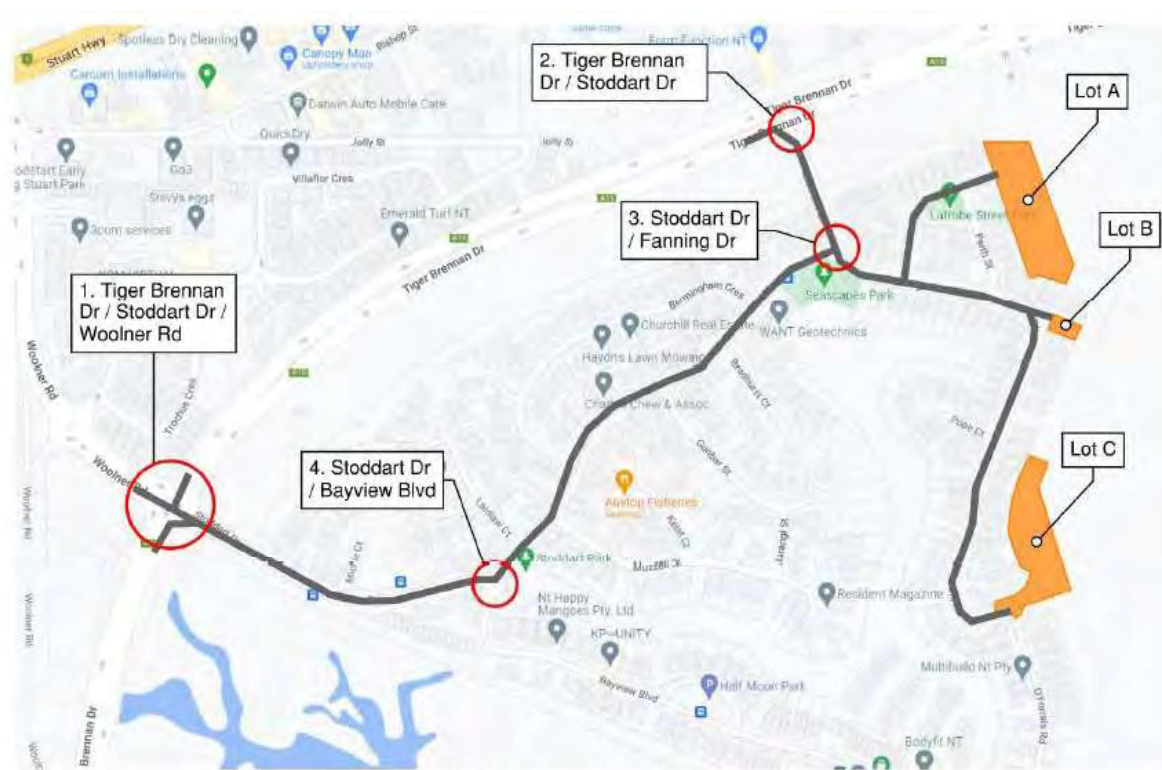


Figure 1.1 – Site Overview (source: Google)

46(3)(b) – Compliance with an Interim Development Control Order

The Applicant is not aware of any Interim Development Control Orders applying to the subject land.

46(3)(c) – Referral to the NT EPA

The developer appreciates that prior to the commencement of any site works, detail earthworks plan will be required and these will be prepared by Douglas Partners in conjunction with Byrne Consultants and an environmental consultant.

These plans will detail all the various stages of the works including any initial site clearing, materials to be used, surcharge program and monitoring, final surface preparation and the associated erosion and sediment control measures.

All design plans and the ESCP (to be prepared by a certified Professional in Erosion and Sediment Control – CPESC) will be presented for assessment and approval prior to the commencement of any works.

46(3)(d) – Merits of the proposed development

The Bayview Marina development is a master planned development that has provided a variety of housing options for the Darwin market over many years and also comprised an Estate Development, unit title component that comprised the lots fronting the marina and the associated marina berths.

The land currently being proposed for development is part of the balance of Crown lease issued by the NT Government. The purpose of these Crown leases is for residential subdivisional purposes and the subdivisions now being proposed are consistent with the purpose of the leases that the Government has issued.

The proposed subdivisions will be the final subdivisions from the Crown leases and will complete the Bayview Marina development.

The design and construction of the proposed, new allotments will benefit the NT economy and will provide prime housing options that are sure to be well sought after in the market.

The range of lots sizes being proposed will provide an opportunity for people with varying financial capabilities to secure an allotment and develop a home in close proximity to the Darwin CBD.

46(3)(e) – The physical characteristics of the land

As previously addressed in this report and the associated attachments, the physical characteristics of the land have been assessed by engineering consultants and siteworks will render the subject areas suitable for the intended use.

46(3)(f) – Public facilities or open space

The housing lots being proposed by the current application will be able to utilise the existing public facilities and open space within Bayview and the adjoining areas.



An existing neighbourhood park in close proximity to the areas being proposed for development

46(3)(g) – Public utilities and infrastructure

Significant design and consultation work has already been undertaken to ensure that the proposed lots can be serviced with power, water, sewer and telecommunication.

All lots will have direct access onto a public road network and stormwater management has been considered to ensure that the lots will all have appropriate drainage measures in place.

46(3)(h) – Potential impact on the existing and future amenity of the area

As with any staged development, each progressive stage of the Bayview Marina development has had some impact on the preceding stages.

The current application deals with the final stage of the development of the existing Crown leases and the lots now being proposed are for residential uses which is consistent with the existing uses in the existing, adjacent stages.

Given that the uses are consistent, the impact on the amenity of the area will be minimal.

46(3)(j) – Benefit or detriment to the public interest

The proposal will have significant economic benefit in not only the design and construction of the subdivisions, but also the ongoing benefits to a wide range of design and trades people during the construction of new dwellings on the lots.




Apart from the clear economic benefits, the creation of new housing options will benefit the wider community by providing the opportunity for more people to reside in this unique residential precinct.



46(3)(k) – Compliance with the Building Act




There are no buildings on the subject areas.



Attachment 2 Site inspection notes

Area: A	Site coordinates: 130.8603276, -12.4349492	Landform: Estuarine fringes	
Site description	Area A is located on the seaward side of existing residential properties (corner of Latrobe St and Perth St). The western side is characterised by weeds and dumped waste transitioning to mixed mangrove spp. on the eastern side.		
Vegetation community description	Low Closed Forest of a mixed Mangrove species community. Coffee Bush (<i>Leucaena leucocephala</i>) common; Isolated instances of White Paperbark (<i>Melaleuca leucadendra</i>). Moderate leaf litter (40 %). Dominant native species: <i>Avicennia marina</i> subsp. <i>eucalyptifolia</i> , <i>Bruguiera parviflora</i> , <i>Ceriops</i> sp., Black Wattle (<i>Acacia auriculiformis</i>)		
Disturbance	Weeds: Mission Grass (<i>Cenchrus pedicellatus</i>), Gamba Grass (<i>Andropogon gayanus</i>), Sensitive Plant (<i>Mimosa pudica</i>), Coffee Bush (<i>Leucaena leucocephala</i>).	Dumped waste: Various building materials throughout Area A, e.g. concrete slabs, rusting large metal pipes; glass bottles and plastic waste	
Soil Type and Colour	Light grey-brown muddy soils, red surface gravels, and rocks.		
Additional site information	Site investigation discovered water discharging to a narrow drainage channel at (130.86047, -12.43482) – pictured top RHS. Review of the stormwater drainage network maps indicates this is likely to be stormwater discharge.		
(L) Dumped waste and Gamba Grass, and (R) Extensive patch of multiple weed species along the northern and western boundary of Area A.			

Area: B	Site coordinates: 130.86079590, -12.43635557		Landform: Estuarine fringes	
Site description	Vacant lots; sited between two residential properties (corner of Fanning Dr & O'Ferrals Rd). Area B does not encroach into mangrove vegetation.			
Vegetation community description	Isolated Black Wattle (<i>Acacia auriculiformis</i>); vegetation primarily consists of weeds over native grasses.			
Disturbance	Weeds: Coffee Bush (<i>Leucaena leucocephala</i>) over Annual Mission Grass (<i>Cenchrus pedicellatus</i>) – pictured.	Dumped waste: Scattered paper and plastic waste.		
Soil Type and Colour	Orange/Ochre – sandy			
Additional site information	Tyre tracks indicate Area B is used for off-street parking; a small boat was parked at the time of investigation.			

Area: C	Site coordinates: 130.8602932, -12.4388138		Landform: Estuarine fringes	
Site description	Western side of Area C is characterised by weed invasion and dumped waste. The midsection features a downslope rock wall transitioning into mangrove recruits (occurring beyond mangrove mapping extent) then mature individuals along the eastern side. Area C experiences tidal inundation.			
Vegetation community description	Low Closed Forest of mixed Mangrove species ranging from 0.5 – 5 m in height. Mangroves occur along the eastern side of Area C including juvenile recruits within a revegetation section. Dominant native species: <i>Rhizophora stylosa</i> , <i>Avicennia marina</i> subsp. <i>eucalyptifolia</i> , <i>Lumnitzera racemosa</i> ; Isolated Black Wattle (<i>Acacia auriculiformis</i>).			
Disturbance	Weeds: Annual Mission Grass (<i>Cenchrus pedicellatus</i>), Coffee Bush (<i>Leucaena leucocephala</i>).	Dumped waste: Scattered general and large hard rubbish items e.g., lawnmower, washing machine, underwear, revegetation meshing		
Soil Type and Colour	Red gravel and surface pebbles (western side). Intertidal hydrosols: Surface rocks and light-brown clay soils (eastern side)			
Additional site information	Crabs and cone shells throughout mangrove area (eastern side). Chestnut-breasted mannikin (6 individuals) present amongst shrubs.			
(L) Mangrove spp. revegetation adjacent to Low Closed Mangrove Forest, and (R) Rock wall fringing Low Closed Mangrove Forest				

(L) Dumped waste:
Lawnmower amongst
Mission Grass weed,
and

(R) Mangrove crab
burrows in mangrove
sediment



Attachment 3 Commitments made to avoid and mitigate impacts

Attachment 3 Commitments to avoid and mitigate impacts made in response to DEWPS comments received on Development Application

DEPWS Comments	Dover Investments response and commitments
The applicant should consider whether the development has the potential for a significant environmental impact under the <i>Environment Protection Act 2019</i> by using the pre-referral screening tool.	A pre-screening assessment has been completed by EcOz Environmental Consultants. The assessment identifies several key areas of environmental risk that require management to avoid and mitigate environmental impacts, and nuisance impacts to neighbours, to as low as reasonably practicable. The assessment concludes that the subdivision is unlikely to have a significant environmental impact as defined by the <i>Environment Protection Act 2019</i> .
Should the proponent collect, transport, store, recycle or treat listed wastes on a commercial or fee for service basis as part of the premises development, then an Environment Protection Approval or Licence will be required to authorise the activity under the WMPC Act.	The subdivision proposal does not involve these activities.
Any listed wastes generated during the construction or operation of the facility must be transported by an appropriately licenced waste handler to an appropriately licenced facility for treatment, recycling and/or disposal.	Noted. Dover Investments has reviewed the schedule of listed wastes in the WPMPC Act. The wastes that could be generated are: <ul style="list-style-type: none"> • soils contaminated with a listed waste (asbestos) • waste mixtures, or waste emulsions, of oil and water or hydrocarbon and water (only in the event of a spill). If these wastes are generated on site, a licenced waste handler will be engaged to transport the waste to an appropriately licenced facility.
Dust - The proposed activities have the potential to generate dust, particularly during the dry season. The proponent must ensure that nuisance dust and/or nuisance airborne particles are not discharged or emitted beyond the boundaries of the premises.	Dover Investments acknowledges that the proximity of the subdivision to residences poses a high risk of nuisance dust impacts. We will implement all measures detailed in the <i>Guideline for preventing pollution on buildings sites</i> (NT EPA 2015) to control dust and limit nuisance. We will inform neighbours of the proposed works, timing and duration, and contact details for the site supervisor will be provided to neighbours for handling of complaints. We will monitor dust emissions and apply adaptive management if visible dust is observed leaving the site boundaries.
Noise - The proponent is to ensure that the noise levels from the proposed premises comply with the latest version of the <i>Northern</i>	Dover Investments will implement all measures detailed in the <i>Guideline for preventing pollution on buildings sites</i> (NT EPA 2015).

Attachment 3 Commitments to avoid and mitigate impacts made in response to DEWPS comments received on Development Application

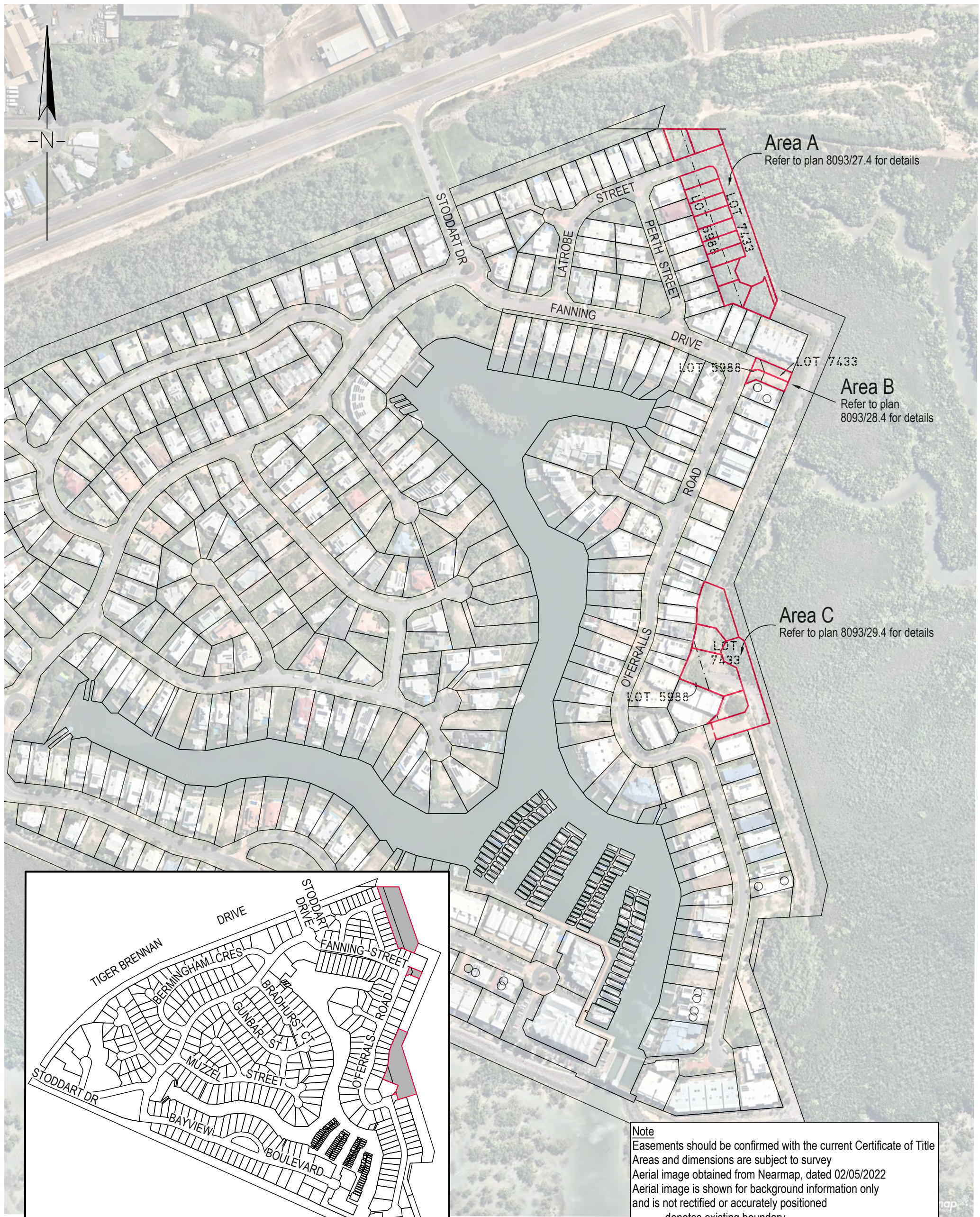
DEPWS Comments	Dover Investments response and commitments
<i>Territory Environment Protection Authority Northern Territory Noise Management Framework Guideline.</i>	Construction activity will be restricted to between 7am-7pm Monday to Saturday, and 9am-6pm on Sundays and public holidays. Neighbours will be informed of the proposed works, timing and duration, and contact details for the site supervisor will be provided to neighbours for handling of complaints.
The proponent must ensure that pollution and/or environment harm do not result from soil erosion. ESC measures should be employed prior to and throughout the construction stage of the development. Due to the location of the proposed development and the proximity to surrounding mangroves, should the application be approved it is recommended that preparation and implementation of an Erosion and Sediment Control Plan (ESCP) be developed and endorsed by a Certified Professional Erosion Sediment Control (CPESC).	Noted. Dover Investments will engage a Certified Practitioner to prepare Erosion and Sediment Control Plans (ESCP) that meet the IECA Guidelines and specifications. These plans will be implemented to minimise the generation of turbid stormwater runoff and reduce the likelihood of that water entering the adjacent mangroves.
Note, The NT EPA guidance for on-site dewatering is that water quality should not exceed 20 Turbidity (NTU) or 50mg/L Total Suspended Solids. The proponent must ensure that there is no discharge of contaminants or wastes from the premises into either the groundwater or any surface waters.	Noted. Management of dewatering will be addressed in ESCP's.
The proponent should store liquids only in secure bunded areas in accordance with VIC EPA Publication 1698: Liquid storage and handling guidelines, June 2018, as amended. Where these guidelines are not relevant, the storage should be at least 110% of the total capacity of the largest vessel in the area.	Noted. Only minor volumes will be required on site due to the location being in Darwin where resupply can occur daily.
Historical activities (including impacts from Cyclone Tracy) may have resulted in contamination at the premises. An assessment in accordance with the National Environment Protection (Assessment for Site Contamination) Measure (ASC NEPM) is required to determine whether the land is suitable for the intended land use. The proponent	Noted. Area A and Area C contain dumped fill and waste materials. The origin and timing of this dumping is unknown; however, visual inspection suggests that in Area A there is potential for occurrence of asbestos (although none was observed on the ground surface). Further assessment is required to determine whether the materials can be left in-situ or would need to be cleared from the site prior to the

Attachment 3 Commitments to avoid and mitigate impacts made in response to DEWPS comments received on Development Application

DEPWS Comments	Dover Investments response and commitments
<p>is encouraged to refer to the information provided on the NT EPA website and the <i>NT Contaminated Land Guideline</i>.</p>	<p>surcharging works. Dover Investments will undertake further site assessment in Area A and Area C in accordance with the <i>ASC NEPM</i>, <i>NSW Contaminated Land Guideline</i>, and relevant geotechnical guidelines. If materials are found to be contaminated, and require removal from site, a licenced contractor will be engaged.</p>
<p>The proposed activities have the potential to generate fill and/or involve the importation of fill for use on-site. Untested fill material may already be present on the site. All untested fill and all fill imported or generated and exported as part of the development, must either be certified virgin excavated natural material (VENM) or be sampled and tested in line with the <i>NSW Contaminated Land Guideline</i> and be shown to meet at least one of the applicable standards below:</p> <ul style="list-style-type: none"> • NSW EPA Excavated Natural Material (ENM) Order 2014 • NSW EPA Recovered Aggregate Order 2014 • The definition of Waste fill in the South Australian EPA Current criteria for the classification of waste-including <i>Industrial and Commercial Waste (Listed) and Waste Soil 2009</i> <p>All imported fill material must be accompanied by details of its nature, origin, volume, testing and transportation details. All records must be retained and made available to authorised officers, upon request.</p>	<p>Noted. Dover Investments will ensure all fill (whether from onsite or offsite sources) is tested and certified suitable for use. Any material that is not suitable due to contamination, or geotechnical instability, will be removed from site by a licenced contractor. Records of testing and disposal will be retained.</p>

Attachment 3 Commitments to avoid and mitigate impacts made in response to DEWPS comments received on Development Application

DEPWS Comments	Dover Investments response and commitments
<p>The development has the potential to create acid sulfate soils and consideration should be made to manage and mitigate acid sulfate soils during the development. Any proposed works should be undertaken in accordance with the National Acid Sulfate Soils. Jurisdictional guidelines such as the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines v4.0 (Dear et al. 2014) and the Western Australian Acid Sulfate Soils Guidelines Series (DER 2015) may also be referenced. Essential to an investigation is the requirement for Chromium Reducible Sulfur (CRS) soil testing at an appropriate site density and to a soil depth immediately below the proposed disturbance. If acid sulfate soils are detected through CRS testing, and exposure of these soils is unavoidable then an acid sulfate soil management plan is required.</p>	<p>Noted. As per the statement of effect provided with our development application, some additional geo-environmental sampling, testing and reporting will be required to assess the potential for acid sulfate soils (PASS) and to address the issues of handling and disposal. CRS testing will be undertaken within the disturbance footprint in accordance with the accepted guidelines and standards. The management of ASS has been addressed for previous stages of Bayview and the management plans would apply to this additional construction. All works will be undertaken in accordance with the national guidelines, and Qld and WA guidelines were relevant.</p>
<p>All land in the Northern Territory is subject to the Weeds Management Act 2001 (WM Act). The WM Act describes the legal requirements and responsibilities that apply to owners and occupiers of land regarding declared weeds. Section 9 general duties include the requirement to take all reasonable measures to prevent land being infested with a declared weed and to prevent a declared weed from spreading. There are additional duties including a prohibition on buying, selling, cultivating, moving or propagating any declared weed and the requirement to notify the Weed Management Branch of a declared weed not previously present on the land within 14 days of detection.</p>	<p>Noted. Various weeds were recorded on the site by EcOz Environmental Consultants, with the most prevalent being Coffee Bush, which dominates Area A. There were two declared weeds recorded in Area A, Gamba Grass (<i>Andropogon gayanus</i>) and Sensitive Plant (<i>Mimosa pudica</i>). These weeds will be treated prior to undertaking the works to minimise the chances of spread.</p>



LOCATION DIAGRAM
Not to Scale



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**LOTS 5988 AND 7433
TOWN OF DARWIN**

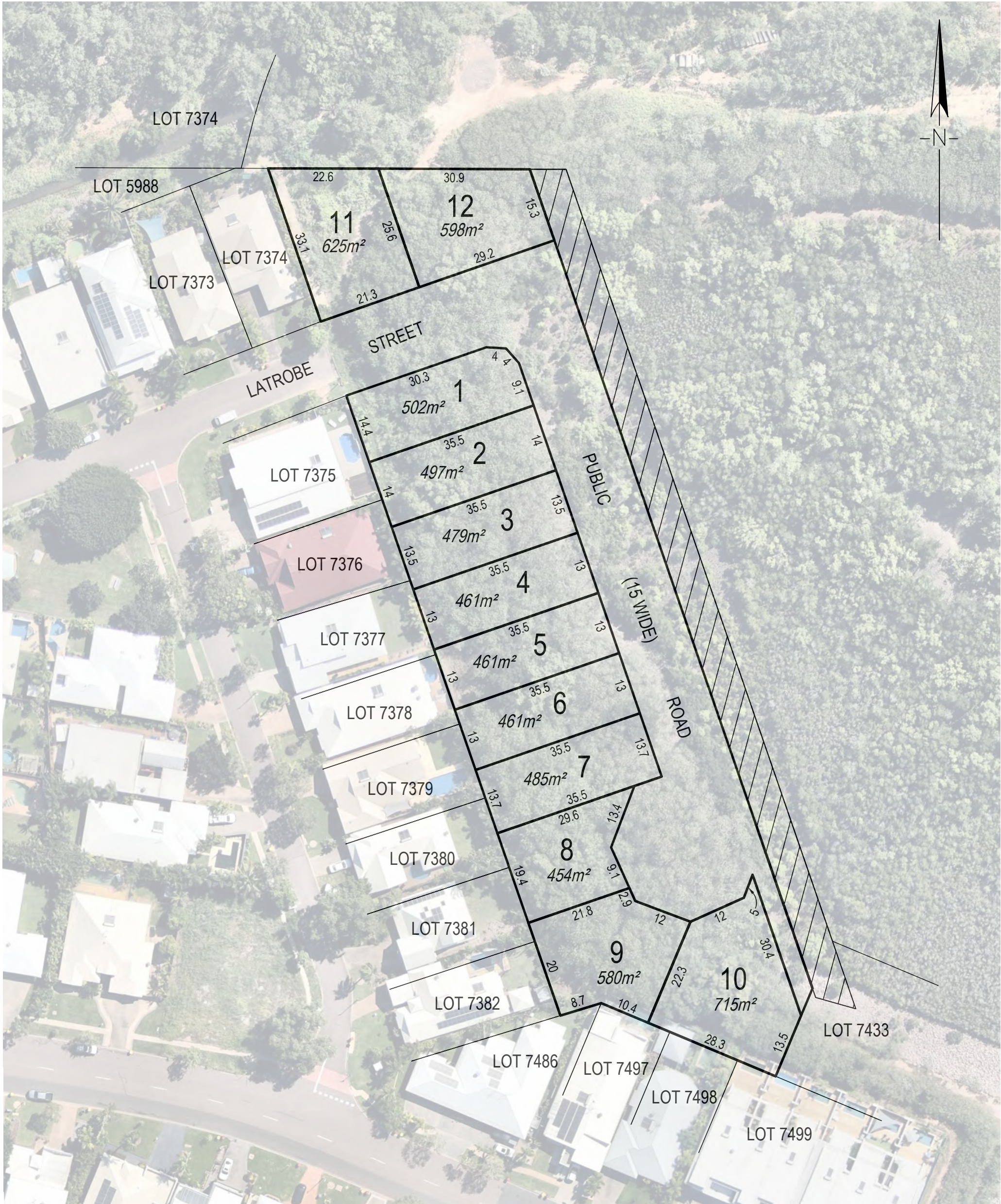
DEVELOPMENT APPLICATION

Client: **DOVER INVESTMENTS**

Licensed Surveyor:
Date:

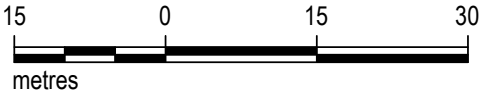
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Note
Refer to plan 8093/26 for location plan
Easements should be confirmed with the current Certificate of Title
Areas and dimensions are subject to survey
Aerial image obtained from Nearmap, dated 02/05/2022
Aerial image is shown for background information only
and is not rectified or accurately positioned

denotes Seawall construction



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**AREA A, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DEVELOPMENT APPLICATION

Client: **DOVER INVESTMENTS**

Licensed Surveyor:
Date:

Drawn by: LC
Date: 11/07/2024
Cad File: 8093-27.4.DWG

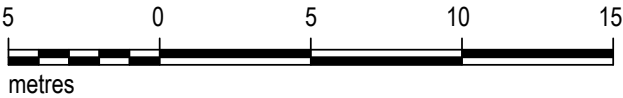
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Drawing No:
22/8093/27.4



Note
Refer to plan 8093/26 for location plan
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Areas and dimensions are subject to survey
Aerial image obtained from Nearmap, dated 02/05/2022
Aerial image is shown for background information only
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**AREA B, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DEVELOPMENT APPLICATION

Client: **DOVER INVESTMENTS**

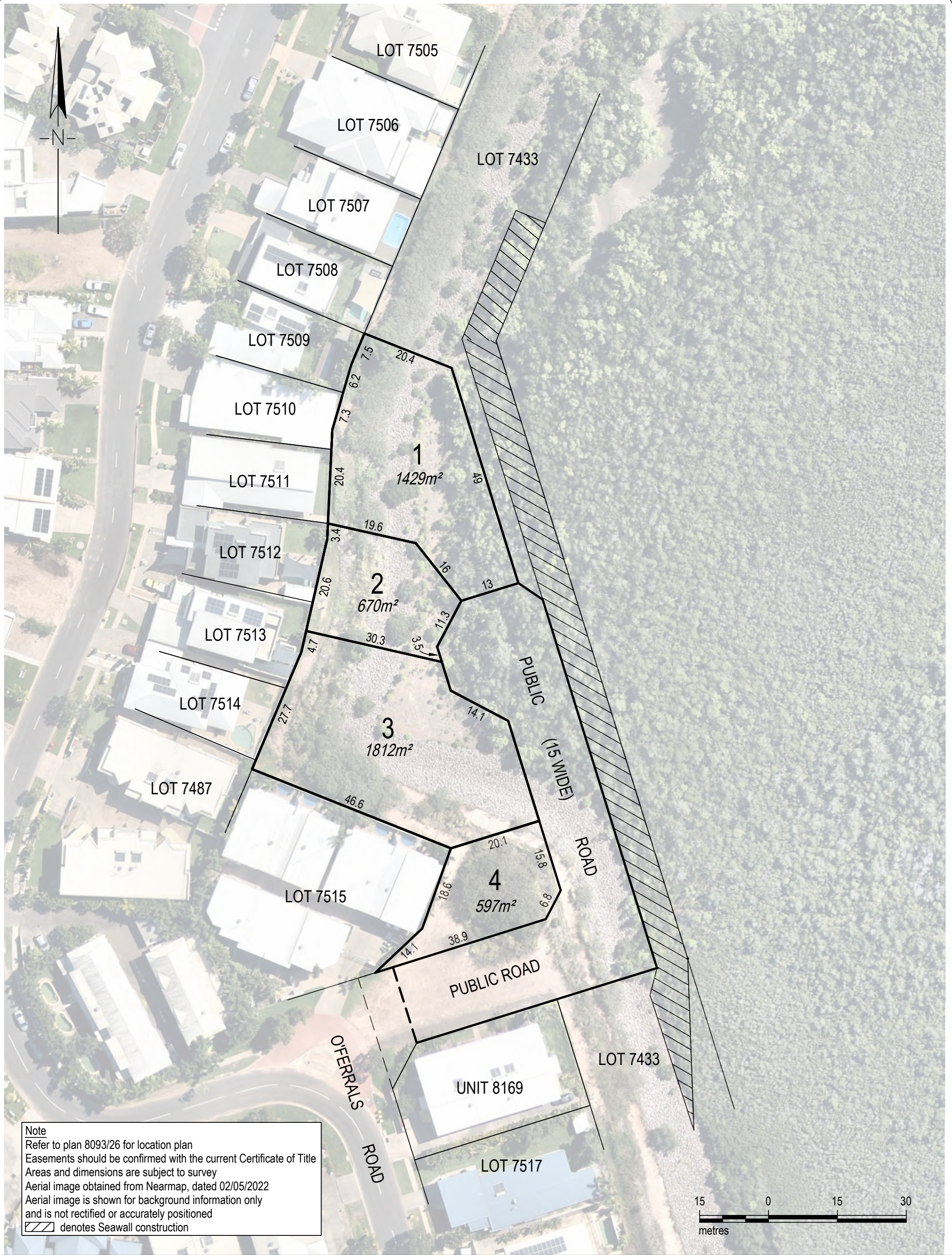
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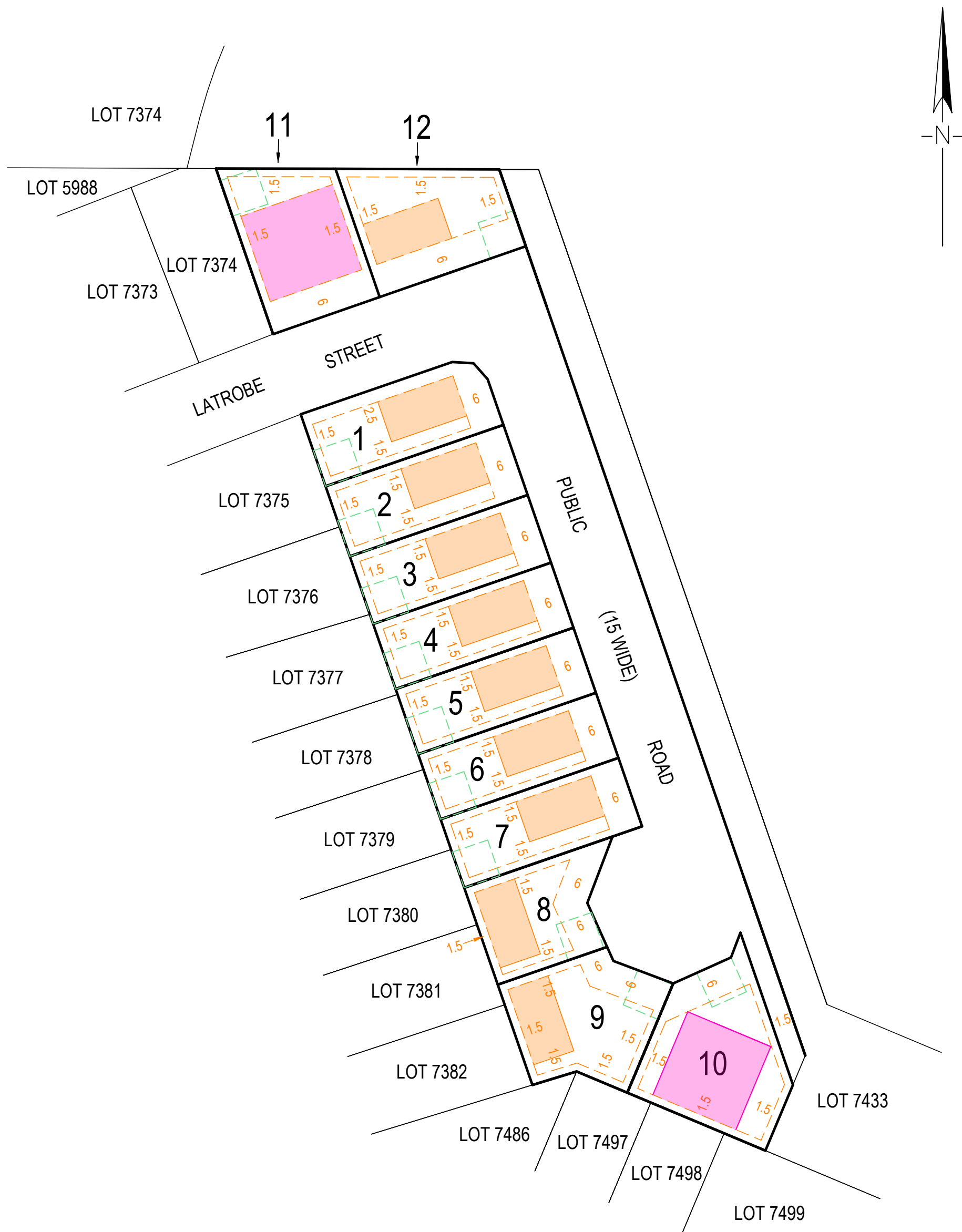
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 <div>SURVEY & PLANNING CONSULTANTS 10 HARVEY STREET DARWIN NT 0801 PH. (08) 8981 2494 FAX. (08) 8981 5205 darwin@eja.com.au www.eja.com.au</div>	AREA C, PART OF LOTS 5988 AND 7433 TOWN OF DARWIN		Scale: 1:750 (A3)
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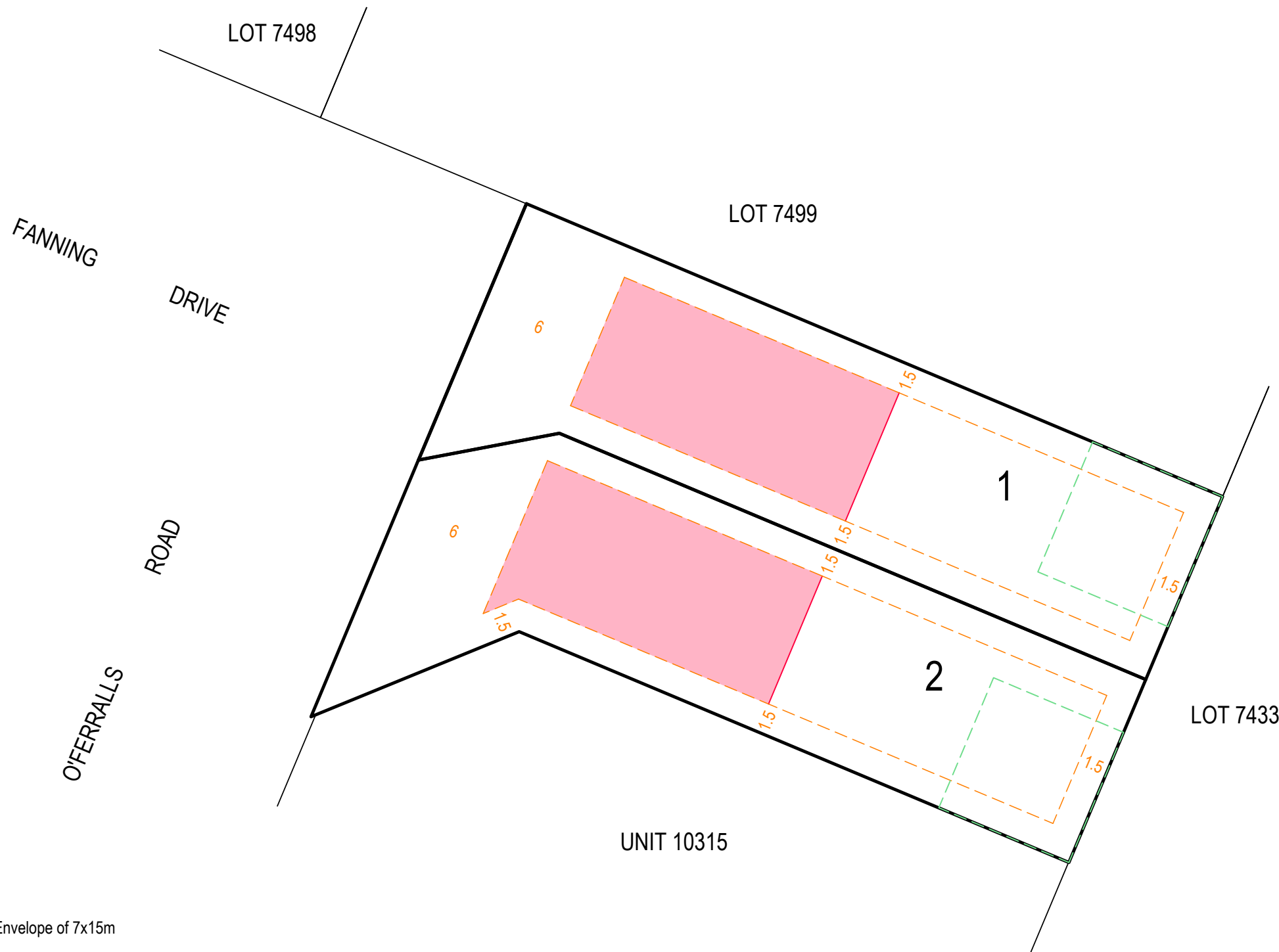
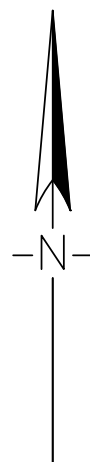


Legend




- Designated Building Envelope of 17x17m
- Designated Building Envelope of 8x15m
- Setback
- Indicative open space - 50m²

Note
Refer to plan 8093/36.3 for location plan



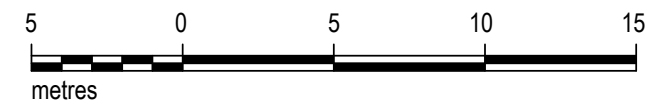


Legend

-  Designated Building Envelope of 7x15m
-  Setback
-  Indicative open space - 50m²

Note

Refer to plan 8093/36.3 for location plan



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**AREA B, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DEVELOPMENT APPLICATION

Client: **DOVER INVESTMENTS**

Licensed Surveyor:
Date:

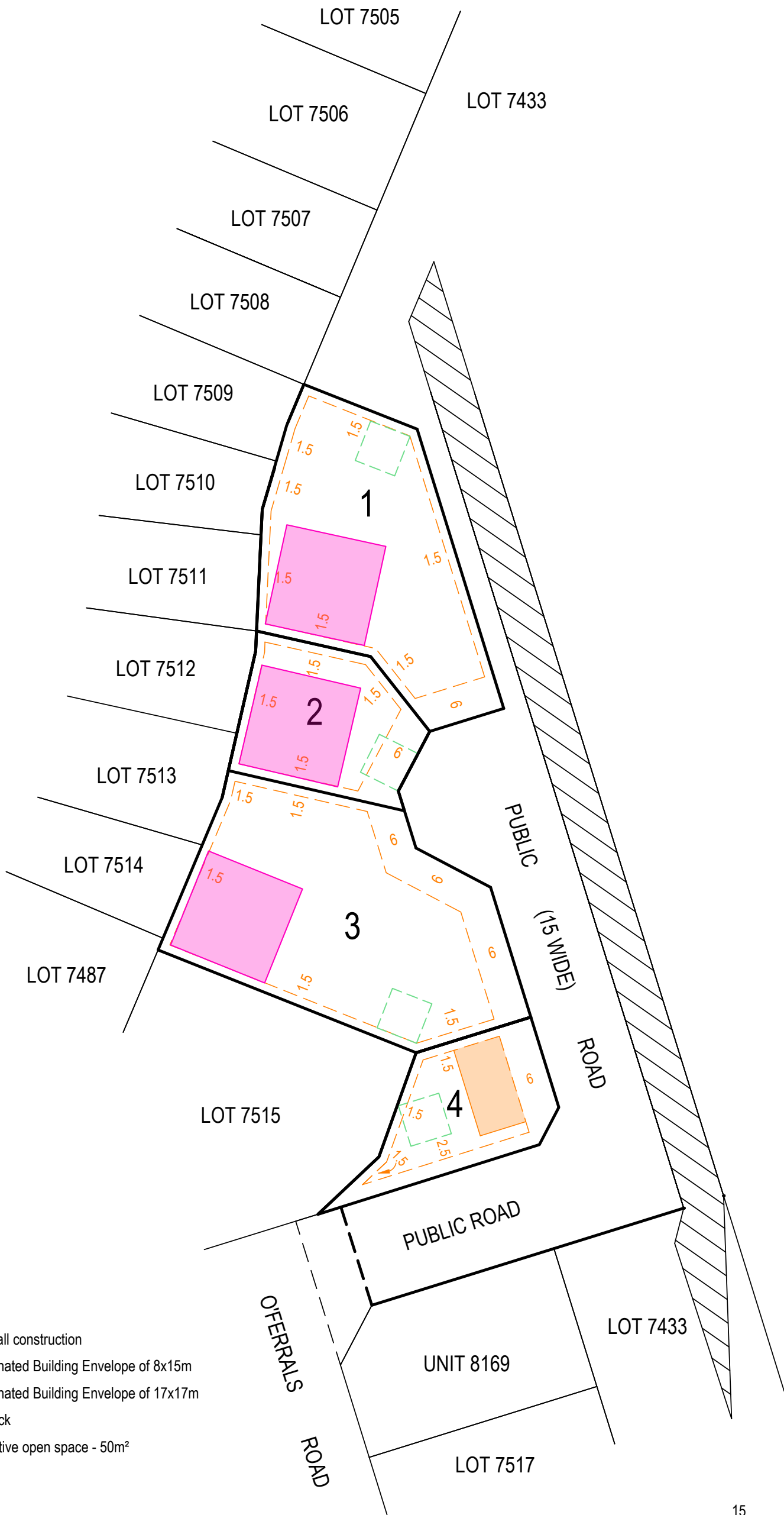
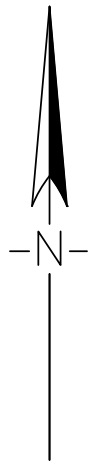
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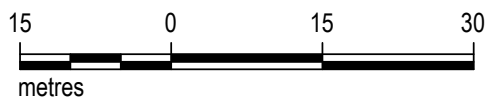
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22/8093/32.4



- Legend**
- Seawall construction
 - Designated Building Envelope of 8x15m
 - Designated Building Envelope of 17x17m
 - Setback
 - Indicative open space - 50m²

Note
Refer to plan 8093/36.3 for location plan



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**AREA C, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

SETBACK AND BUILDING ENVELOPE

Client: **DOVER INVESTMENTS**

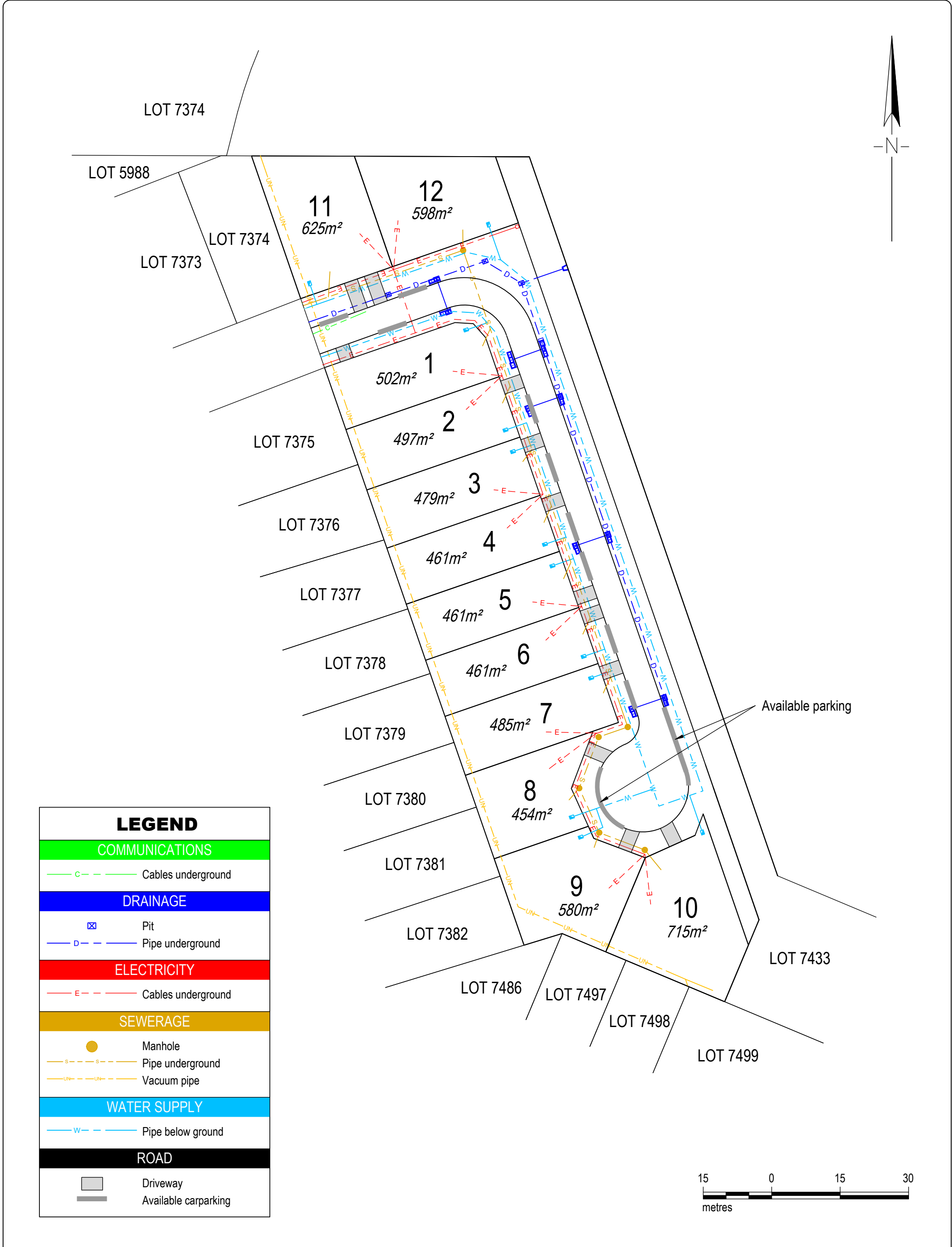
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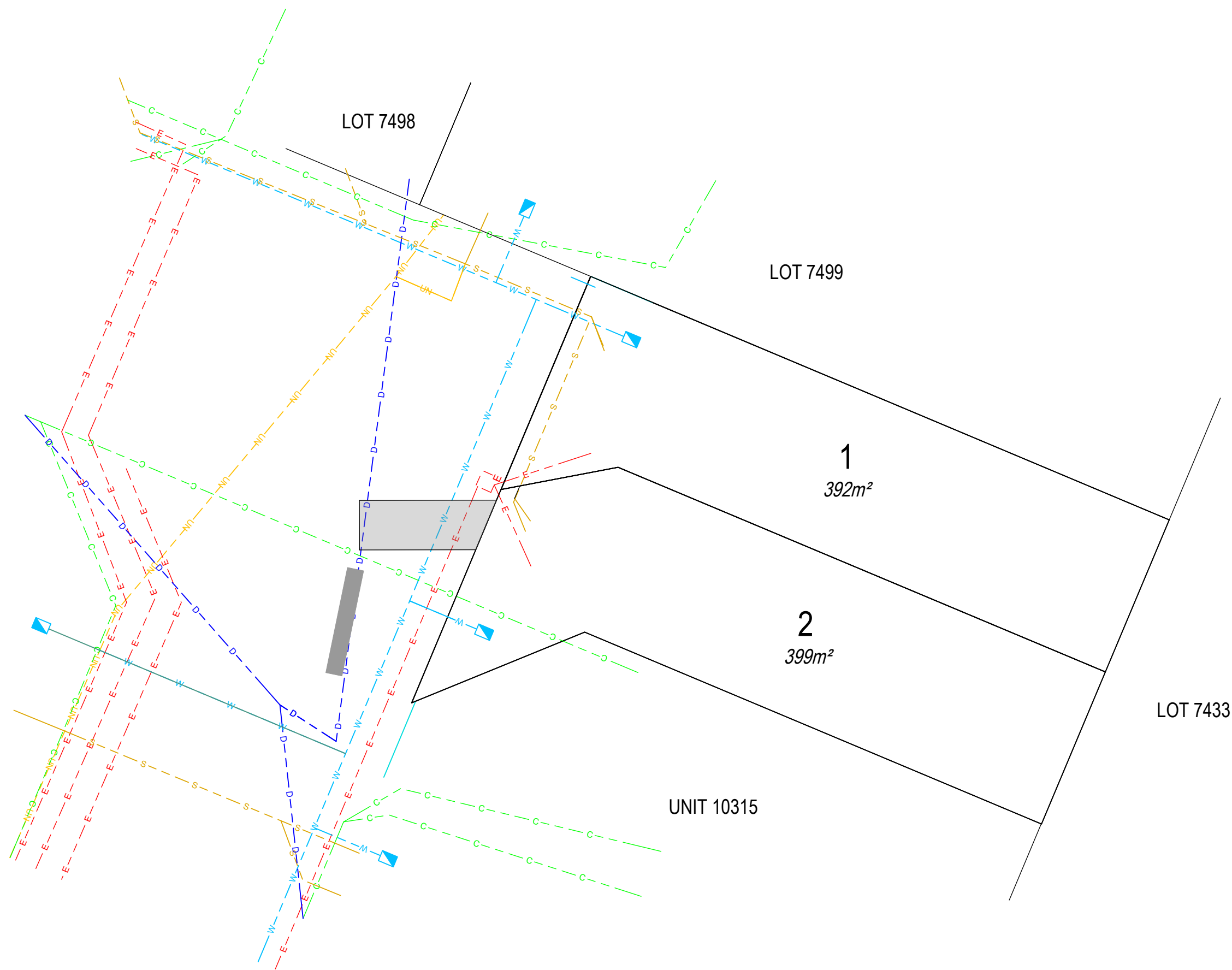
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Datum:

Drawing No:
22/8093/33.4





LEGEND	
COMMUNICATIONS	
— C —	Cables underground
DRAINAGE	
⊠	Pit
— D —	Pipe underground
ELECTRICITY	
— E —	Cables underground
SEWERAGE	
●	Manhole
— S —	Pipe underground
— UN —	Vacuum pipe
WATER SUPPLY	
— W —	Pipe below ground
ROAD	
	Driveway
	Available carparking

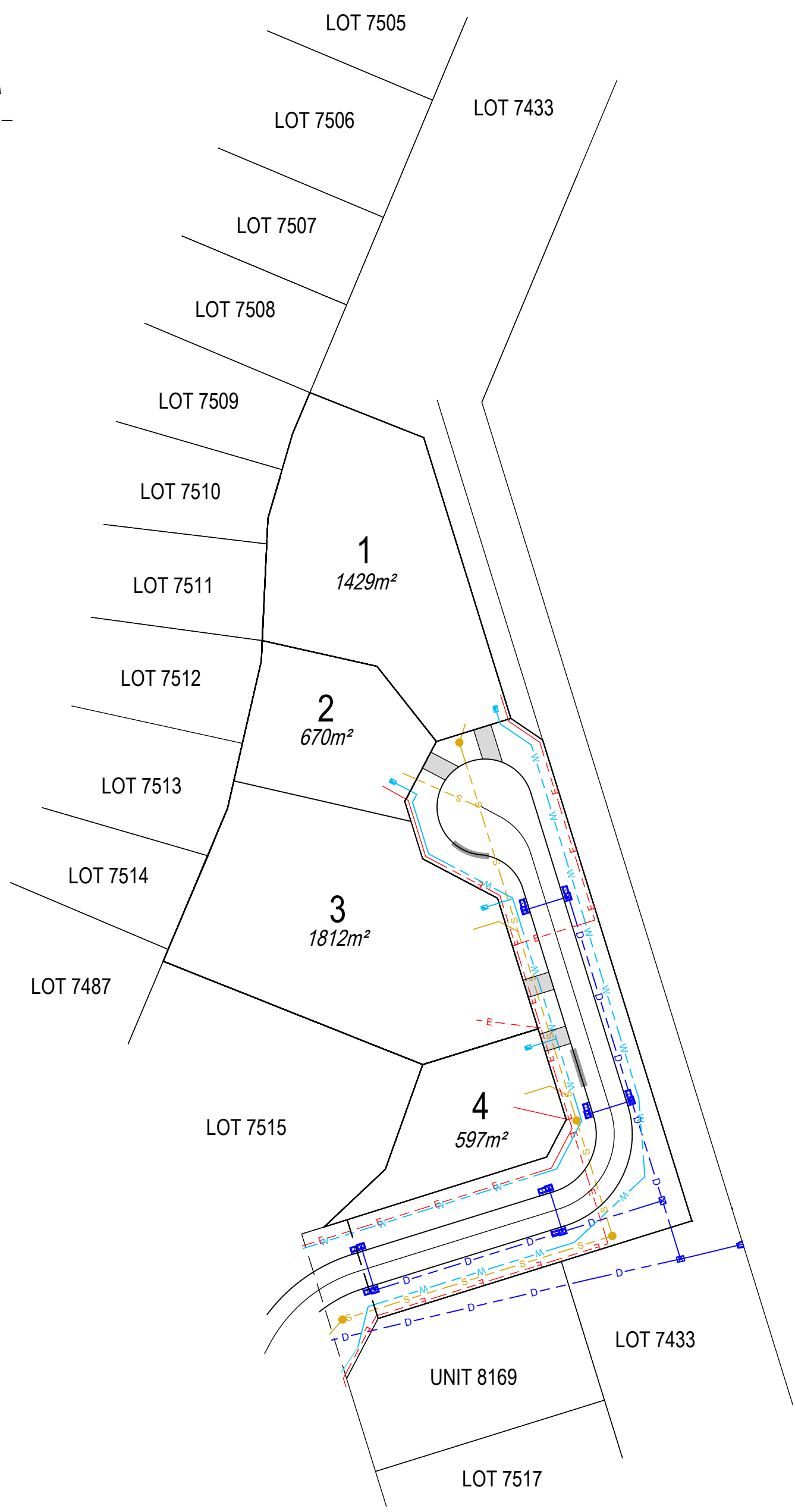
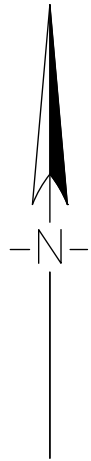


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**AREA B, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DRIVEWAYS
Client: **DOVER INVESTMENT**

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Drawn by: LC Date: 11/07/2024 Cad File: 8093-37.4.DWG	Drawing No: 22/8093/37.4B SHEET 2 OF 3



LEGEND	
COMMUNICATIONS	
C	Cables underground
DRAINAGE	
D	Pit
D	Pipe underground
ELECTRICITY	
E	Cables underground
SEWERAGE	
	Manhole
S	Pipe underground
UN	Vacuum pipe
WATER SUPPLY	
W	Pipe below ground
ROAD	
	Driveway
	Available carparking



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**AREA C, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DRIVEWAYS

Client: **DOVER INVESTMENTS**

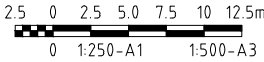
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22/8093/37.4C
SHEET 3 OF 3



A	20/08/24	AD	ISSUED FOR INFORMATION
No	DATE	INITIAL	AMENDMENT

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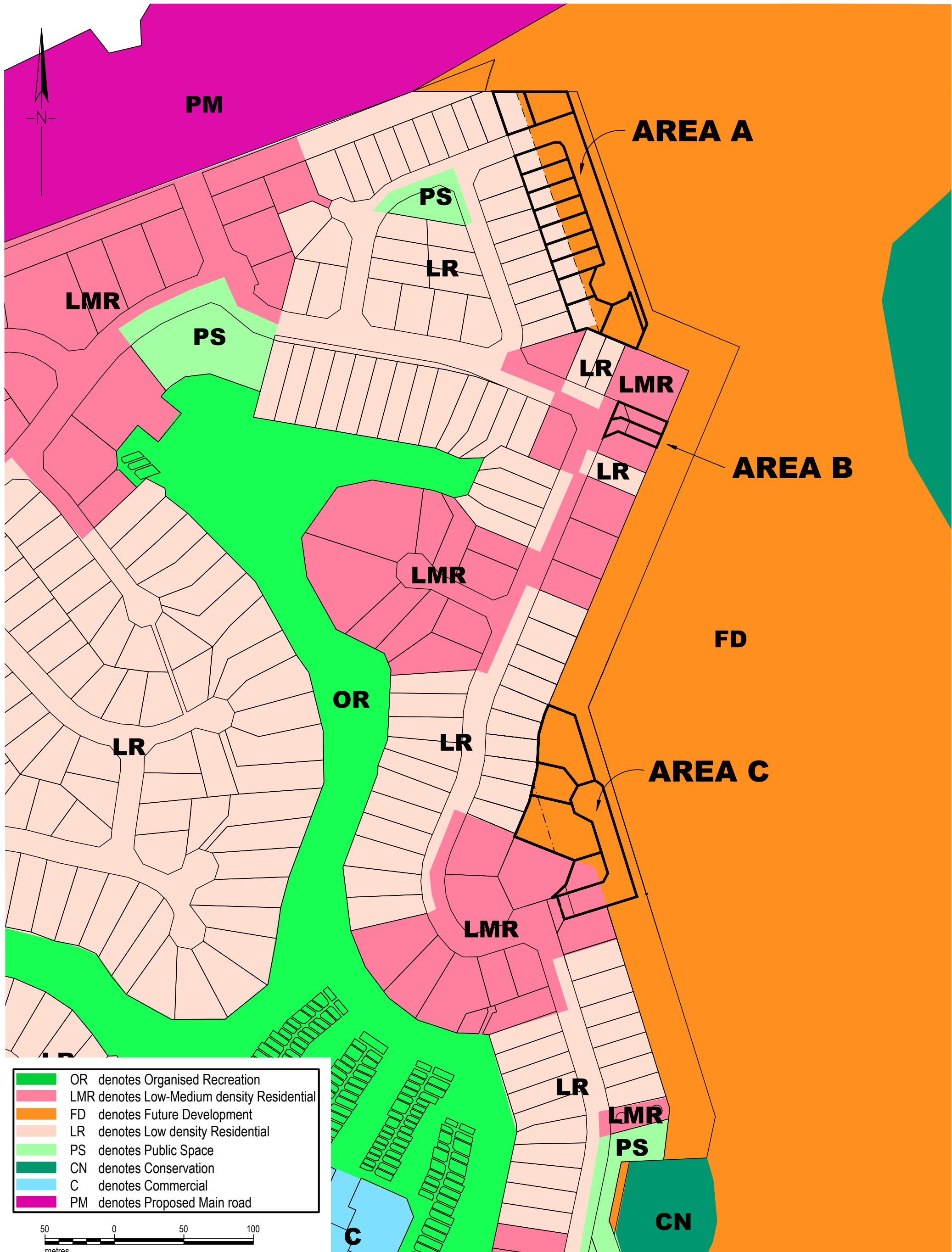
CLIENT



ABN 78 124 388 192
P.O.Box 43420 Casuarina NT 0811
Ph. 08 89472476 Fax: 08 89475098

APPROVED SPB	CHECKED
DRAWN AD	SPB
DESIGNED SPB	CHECKED SPB

TITLE CITY OF DARWIN REGION BAYVIEW SUBDIVISION AREA B DRIVEWAY ACCESS			
SCALE	PROJECT No NT22007	DRAWING No SK-101	AMDT A



SURVEY & PLANNING
CONSULTANTS
10 HARVEY STREET
DARWIN NT 0801
PH. (08) 8981 2494
FAX. (08) 8981 5205
darwin@eja.com.au
www.eja.com.au

LOTS 5988 AND 7433
TOWN OF DARWIN

ZONES

Client: **DOVER INVESTMENTS**

Licensed Surveyor:
Date:


Drawn by: LC
Date: 11/07/2024
Cad File: 8093-38.4.DWG

Scale: 1:2000 (A3)

Datum:

Drawing No:
22/8093/38.4



	SURVEY & PLANNING CONSULTANTS 10 HARVEY STREET DARWIN NT 0801 PH. (08) 8981 2494 FAX. (08) 8981 5205 darwin@eja.com.au www.eja.com.au		LOTS 5988 AND 7433 TOWN OF DARWIN		Scale: 1:2000 (A3)
	PROPOSED ZONES	 Licensed Surveyor: Date:	Datum:	
	Client: DOVER INVESTMENTS		Drawn by: LC Date: 11/07/2024 Cad File: 8093-39.4.DWG	Drawing No: 22/8093/39.4	



Note
Refer to plan 8093/26 for location plan
Easements should be confirmed with the current Certificate of Title
Areas and dimensions are subject to survey
Aerial image obtained from Nearmap, dated 02/05/2022
Aerial image is shown for background information only
and is not rectified or accurately positioned

denotes Seawall construction



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**AREA A, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

DEVELOPMENT APPLICATION

Client: **DOVER INVESTMENTS**

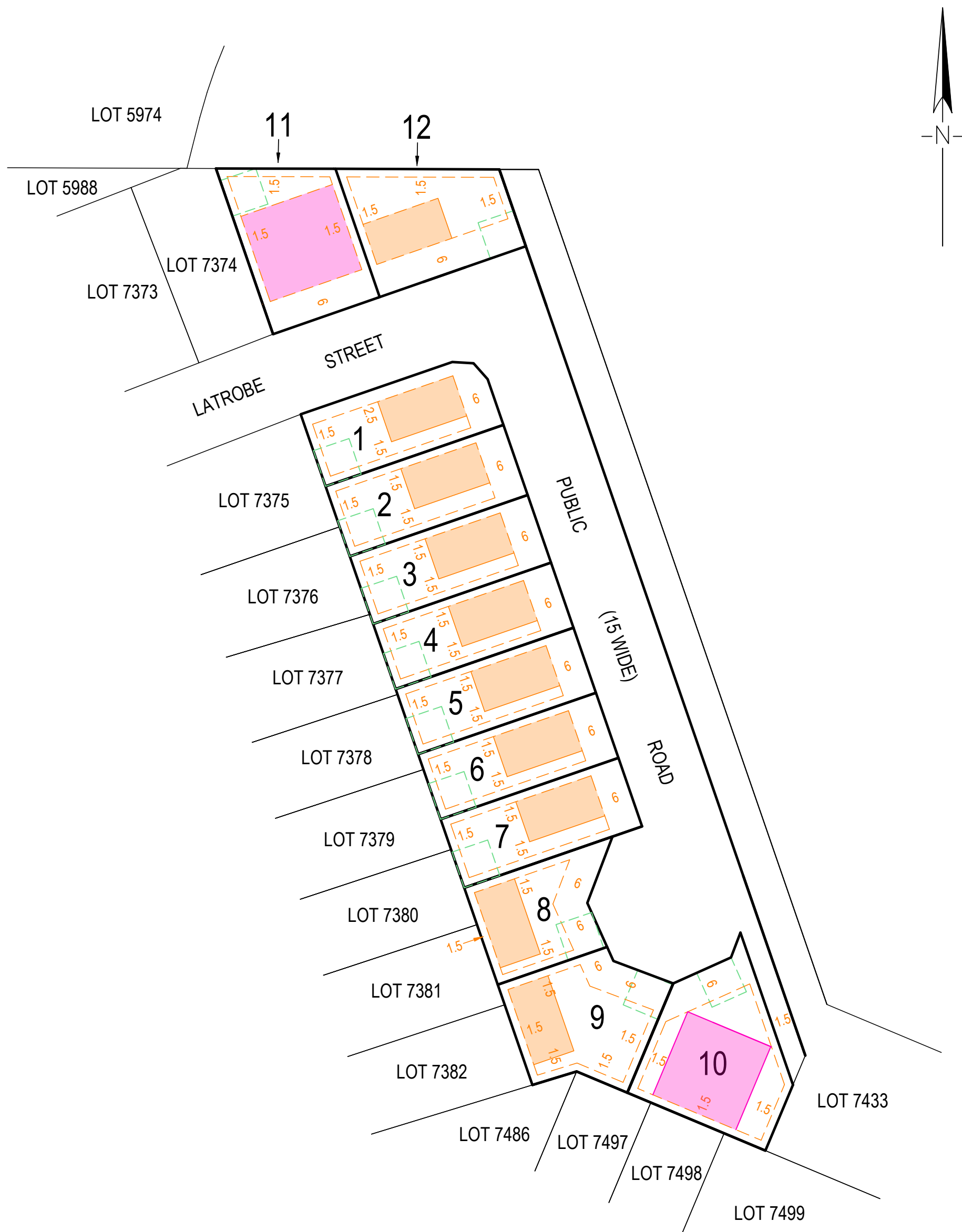
Licensed Surveyor:
Date:

Drawn by: LC
Date: 11/07/2024
Cad File: 8093-27.4.DWG





Scale: 1:750 (A3)

Datum:

Drawing No:
22/8093/27.4



Legend

-  Designated Building Envelope of 17x17m
-  Designated Building Envelope of 8x15m
-  Setback
-  Indicative open space - 50m²

Note
Refer to plan 8093/36.3 for location plan



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**AREA A, PART OF LOTS 5988 AND 7433
TOWN OF DARWIN**

SETBACK AND BUILDING ENVELOPE

Client: **DOVER INVESTMENTS**

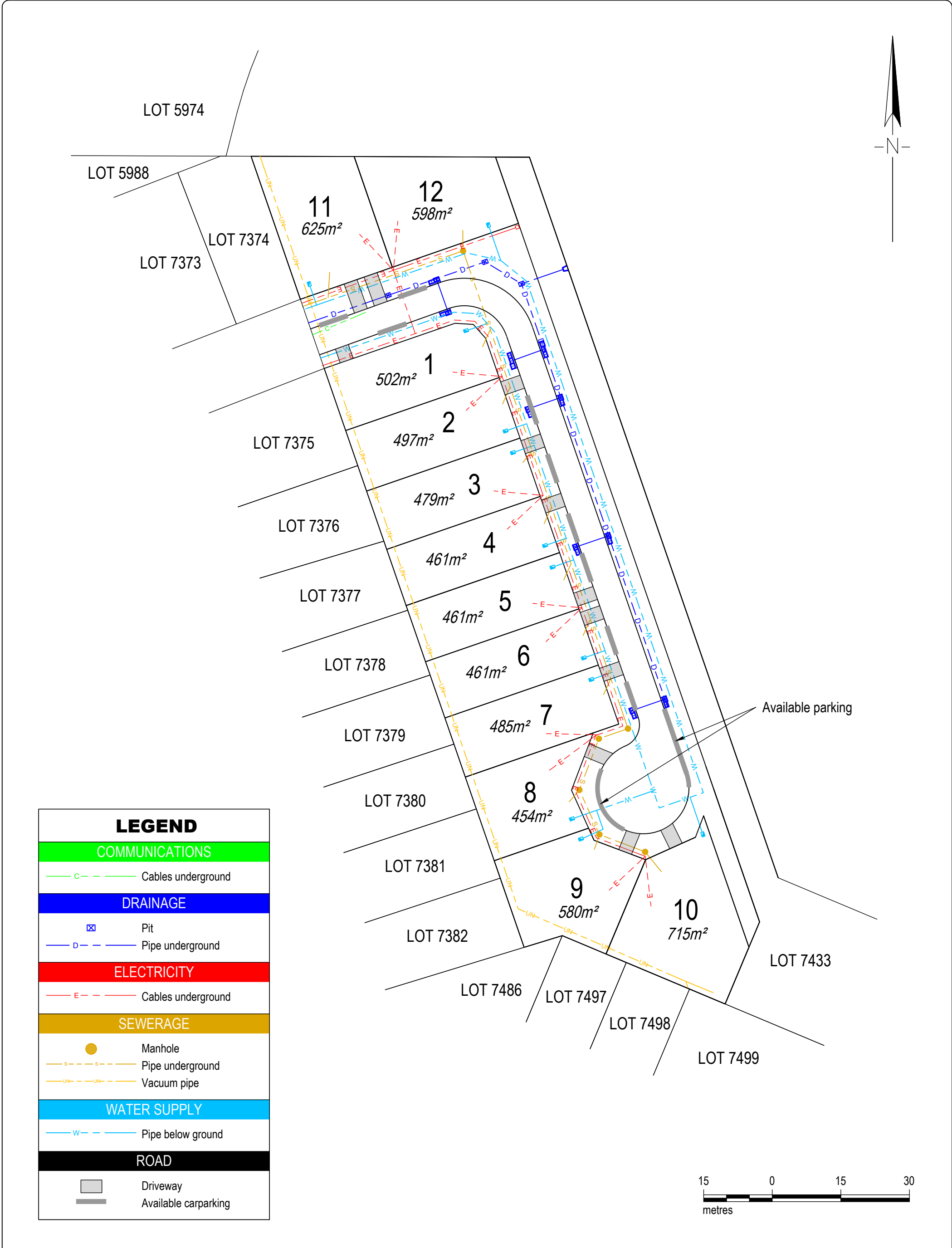
Licensed Surveyor:
Date:

Drawn by: LC
Date: 11/07/2024
Cad File: 8093-31.4.DWG

Scale: 1:750 (A3)

Datum:

Drawing No:
22/8093/31.4





EcOz Environmental Consultants

T: (08) 8981 1100
E: ecoz@ecoz.com.au
W: www.ecoz.com.au

Darwin, Northern Territory
Level 1, 70 Cavenagh St,
GPO Box 381, Darwin, NT 0801

30 October 2024

Our ref.: EZ23063

Kevin Dodd
Senior Surveyor
Earl James & Associates
kdodd@eja.com.au

Re: PA2023/0327 – Proposed development of Lots 5988 & 7433, Bayview

Dear Kevin,

In response to comments made by the Department of Environment, Parks and Water Security (DEPWS), Environment Division on development application PA2023/0327 through correspondence dated 3 September 2024, EcOz have reviewed the pre-referral screening assumptions in relation to biting midges and potential acid sulfate soils.

Biting midges

The pre-referral screening identified the risk of biting insects based on the proximity of the proposed development to mangroves. The screening also noted that the proposed development is directly adjacent to an existing residential area, and the development area is already zoned for future suburb expansion. Whilst the biting insect risk is still present, the proposed development does not change the risk profile of the area with regards to biting insects impacting on human health. EcOz have also reviewed the comments made by the Department of Health, Medical Entomology Unit on the development application (dated 5 April 2024) which recommended the following conditions be placed on the development permit:

- a Caution Notice should be lodged with the parent parcel noting the inherent biting midge problem and that the owner/occupier is responsible for managing biting midge problems that occur on their land.
- appropriate mosquito breeding prevention and control measures be implemented during the construction phase (i.e. preventing the creation of standing or pooling water bodies where mosquitos may breed).

Potential acid sulfate soils

The risk of exposure or disturbance of potential acid sulfate soils (PASS) posed by the proposed development, is a factor for consideration during the construction phase of the project. Land reclamation and the construction of seawalls is required over approximately 2 ha of mangroves within the proposed development area. Reclamation works involve the placement of fill over the unsuitable material, which may not require any excavation or exposure of PASS. The potential exposure footprint is considerably smaller than the original proposal referred to the NT EPA ('Bayview – The Boulevard' project), which the correspondence from the Environment Division refers to in relation to PASS risk. Therefore, while the risk is still present it cannot be considered in the same way as the original proposed because of the difference in scale.

The proponent has committed to undertaking additional geotechnical testing to assess the potential for, and address the issue of, handling and treating PASS. This geotechnical work is also required to inform the reclamation design.

It is recommended that the development permit also includes a condition to prepare an Acid Sulfate Soil Management Plan (ASSMP) which details the expected volumes to be generated, handling and treatment procedures, testing requirements and monitoring. The ASSMP should be prepared in accordance with the *National Acid Sulfate Soils Guidance* (Commonwealth Gov, 2018) and the Queensland or Western Australian guidance materials for acid sulfate soils, as appropriate. It is also noted that the Rangelands division of DEPWS commented on the development application and provided the same advice and recommended permit note.

The adoption and implementation of the guidance materials cited above are considered effective and appropriate in managing the acid sulfate soil risk during construction. The pre-referral screening also noted that there was no evidence that previous developments in Bayview resulted in any significant impacts to the surrounding receptors, suggesting that mitigations have been proven effective in the past.

Based on the information reviewed and the above summaries, EcOz are of the opinion that the environmental risks posed by the proposed development can be managed appropriately through the conditions of the development application administered under the NT *Planning Act 1999*. The outcomes of the pre-referral screening have not changed, and the project activities are not considered to have a potential for significant impact on the environment.

Yours sincerely,

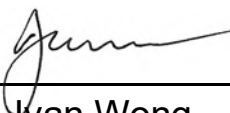


Emma Lewis
Team Leader – Impact Assessment & Approvals
EcOz Environmental Consultants
Emma.lewis@ecoz.com.au

LAND OWNER/S AUTHORISATION TO LODGE A DEVELOPMENT APPLICATION UNDER THE PLANNING ACT 1999

****signatures from ALL landowners registered on the land title must be provided****

The owners and/or persons duly authorised as signatory on behalf of the landowner**, hereby authorise:		
NAME (please print)	<i>Earl James and Associates</i>	
Contact number:	Ph: 89812494	Mob: 0409 269 815
to lodge a development application under the <i>Planning Act 1999</i> over the property described as:		
LOT/ NT PORTION:	<i>Lots 5988 and 7433</i>	
LOCATION/TOWN	<i>Town of Darwin</i>	
STREET ADDRESS:	<i>57 Bayview Boulevard, Bayview</i>	
PROPOSED DEVELOPMENT:	<i>Concurrent Application – Rezoning and Subdivision to create 19 lots</i>	

OWNERS SIGNATURE :		
NAME: (please print)	Ivan Wong	
TITLE: (ie. company director/secretary)	For: Dover Investments Pty Ltd Director	
Contact number:	Ph: 89812494	Mob:
DATE:	27 / 09/ 2023	

OWNERS SIGNATURE :		
NAME (please print)		
TITLE: (ie. company director/secretary)		
Contact number:	Ph:	Mob:
DATE:	/ /	

I would like the Department to consider the traffic volumes passing Stoddard Drive for the existing number of properties it currently experiences.

Approximate measurements taken at 24 Stoddart Drive were as follows:

- Road Reserve = 17 metres (distance between property boundaries).
- Road width = 7.5 - 8.0 metres
- Verge width = 4.0 – 4.5 metres

MINOR STREET / CUL-DE-SAC
NOT TO SCALE

ACCESS STREET
NOT TO SCALE

SECONDARY COLLECTOR
NOT TO SCALE

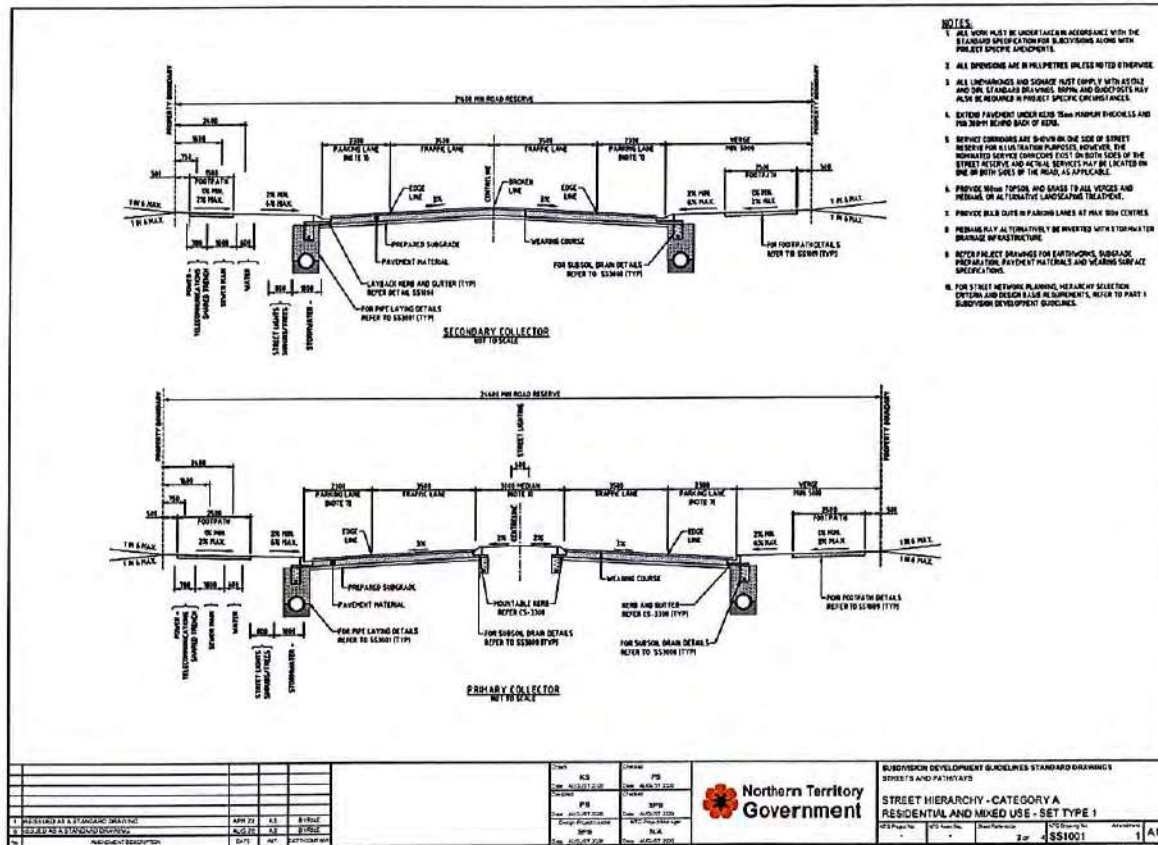
PRIMARY COLLECTOR
NOT TO SCALE

NOTES:


- ALL WORK MUST BE UNDERTAKEN IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR SUBDIVISIONS ALONG WITH PROJECT SPECIFIC AMENDMENTS.
- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- ALL LINE MARKINGS AND SIGNAGE MUST COMPLY WITH AUST NZ AND DIM. STANDARD DRAWINGS. RAPPIN AND SUBDIVISIONS MAY ALSO BE REQUIRED IN PROJECT SPECIFIC CIRCUMSTANCES.
- EXTEND PAVEMENT MATERIAL UNDER KERB MINIMUM 75mm THICKNESS AND MINIMUM 300mm BEHIND BACK OF KERB.
- SERVICE CONDUITS ARE SHOWN ON ONE SIDE OF STREET RESERVE FOR ILLUSTRATION PURPOSES, HOWEVER, THE IMPROVED SERVICE CONDUITS EXIST ON BOTH SIDES OF THE STREET RESERVE AND ACTUAL SERVICES MAY BE LOCATED ON ONE OR BOTH SIDES OF THE ROAD, AS APPLICABLE.
- PROVIDE BROWN TOPSOIL AND GRASS TO ALL VERGES AND PERSHALL, OR ALTERNATIVE LANDSCAPING TREATMENT.
- REFER PROJECT DRAWINGS FOR EARTHWORKS, SUBGRADE PREPARATION, PAVEMENT MATERIALS AND WEARING SURFACE SPECIFICATIONS.
- FOR STREET NETWORK PLANNING, HIERARCHY SELECTION CRITERIA AND DESIGN BASIS REQUIREMENTS, REFER TO PART 1 SUBDIVISION DEVELOPMENT GUIDELINES.

Given the traffic volume, I would expect the minimum road reserve to be 21.6 metres with Parking Lane on both sides of the street.

I have attached the standard drawing for a typical 'Primary and/or Secondary Collection' road profile below for your information (Standard Drawing no. SS1001).



I would recommend a 'traffic Plan' that considers 'safety as a priority' for families with children, pedestrians and the elderly at Bayview.



18 March 2024

Joshua Allbeury

From: Daniel Herlihy on behalf of Das NTG
Sent: Monday, 18 March 2024 11:03 AM
To: Monica Pham; Joshua Allbeury
Subject: FW: Bayview subdivision ref#PA2023/0327

Hi guys,

Please see submission for PA2023/0327.

Cheers,

Daniel Herlihy
Planning and Development Officer
Development Assessment Services
Department of Infrastructure, Planning and Logistics

Level 1, Energy House, 18-20 Cavenagh Street, Darwin GPO Box 1680, Darwin, NT 0800

t. 08 8999 6084

My working hours are 7:30am to 3:21pm. For any urgent matters please contact Development Assessment Services on 8999 6046.

www.nt.gov.au

Please consider the environment before printing this e-mail.

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-----Original Message-----

From: Brandon van Antwerpen <vanantwerpenbc@gmail.com>
Sent: Saturday, 16 March 2024 6:48 PM
To: Das NTG <Das.NTG@nt.gov.au>
Subject: Bayview subdivision ref#PA2023/0327

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hi team,

I Brandon van Antwerpen of unit 2/1 O'ferrals road Bayview oppose the proposed subdivision mentioned in the subject line.

Thank you
Brandon van Antwerpen
0436029768

Sent from my iPhone

25th March 2024
21 O'Ferrals Road
(Lot 7509)
Bayview
NT 0820

To whom it may concern,

Re: Reference No. PA2023/0327
Proposal 19 Lot Subdivision Bayview NT

We, Justin and Esther Jones, of 21 O'Ferrals Road (Lot 7509), Bayview NT 0820 object to the application reference PA2023/0327 from Dover Investments Pty Ltd. We oppose the subdivision proposal to create 19 subdivided lots at the rear of houses on Perth Street and O'Ferrals Road, Bayview, on the following grounds.

A section of the proposed area to be developed (Area C) is native mangroves which require removal. The significance of mangroves has an outstanding contribution to the prevention of climate change and any removal of mangroves significantly impacts the marine environment. The Bayview suburb has been constructed for almost two decades and the mangroves have been there since before then, therefore, the mangroves are of a mature age. Regardless of whether they are young or old, there should not be any more removal of mangroves in Darwin Harbour.

Page 14 states "the development will result in the loss of a small area of mangroves but is considered unlikely to have a significant impact". I disagree with this statement as there is to be a completely new road constructed directly behind O'Ferrals Road with the current seawall being rebuilt further out into the mangroves. Page 14 also states "the proposed subdivision does not involve any harbour dredging". I am also disputing this claim as it is quite clear in the proposal drawings and on the Google earth images supplied that the development will extend well into the mangroves.

Also, the recent new moon springtides earlier this month exceeded eight metres in height on consecutive days, with heights reaching halfway up the break wall on the back of O'Ferrals Road. With the proposed removal and rebuild of this break wall, during new moon and full moon springtides, it will create significant backflow and leeching into the nearby creek system and super sensitive mangrove system, which is a nursery for a large number of fish species, not to mention other vulnerable and endangered species in Darwin Harbour. We do not see how this development cannot affect the ecosystem and endangered species of the creek with construction during the springtide tidal movements.

In the 2015 Environmental report compiled for a previous proposal, it was identified that there were at least 26 vulnerable, 19 endangered and one critically endangered marine, mammal and fauna species living in Darwin's harbour which includes Bayview. Surely, this should be reason alone for no further development of Darwin's harbour.

Page 18 states "Areas A and C are to be developed as cul-de-sacs however the lots are only for low and medium future uses and the proposed roads are not long cul-de-sacs". This is not acceptable. The fact that the proposed cul-de-sac (Area C), which has its turn around bay directly behind our property, is not long will ensure the road to be heavily congested with street carparking. Most of Bayview's lots with multi-dwellings are located in cul-de-sacs which have made these areas of Bayview heavily congested and pedestrian footpaths blocked due to heavy street carparking with existing multi-dwellings not having sufficient on-site carparks.

This proposal has not taken into any consideration into how this development will affect the privacy and everyday living for existing Bayview residents. It does not consider the effect on existing property owners with the pristine mangrove ecosystem views being blocked, elevated houses looking into backyards and living areas, and increased traffic and noise for an extended period of time due to construction once the development begins. Page 28 Section 30C(4)(h) states "providing the opportunity for more people to reside in this unique residential precinct" but surely more people and houses will lower sale prices and property value, and Bayview will no longer be "unique".

We purchased our home only 8 months ago and we are very disappointed to think we may have to consider selling already due to this proposed development and possibly even more future development as shown as the large orange area on the map on Page 15. Moving from a 5ha rural property in NZ, we purchased this particular property because we absolutely loved and value the privacy aspect, and with having beautiful, unblocked views of the mangroves behind us.

In the past, the Bayview community has been very vocal and active in opposing further development of Bayview and Darwin's harbour. I urge the Development Consent Authority to reject this proposal and to remove any more stages of future development from the Bayview area and Darwin's harbour.



Regards,

Justin and Esther Jones

Esther – accounts@nashadequins.co

Esther – 0475719311

19' O Ferrals Road
Bayview
NT 0820
31 March 2024

Dear Planning Authority

Re: PA2023/0327 – Sub division, Proposal to create 19 lots. Town of Darwin, Bayview.

We have read the proposal documents and we write to strongly object to the proposal to create additional lots, as outlined in Area C, proposed for development.

We own Lot 7508, which is adjoining the proposed creation of five new low to medium density lots and a new access road including a cul-de-sac.

We are aware of the zoning for future development; however, believe the proposal should not be approved on the basis of:

- Road construction. The Northern Territory Government paid for the construction costs for the entrance to Bayview (across from Benison Road) in 2016 which has not been developed for use. We question has the developer repaid the Northern Territory Government for this cost to tax payers? This should be a clear requirement for the developer prior to approving any development application, which will result in a commercial financial gain for the developer.
- Use of existing infrastructure. The development will result in 1000s of heavy vehicles utilising the existing road infrastructure. The developer should be requested to build the construction road to be used which would continue the road from the entrance across from Benison Road. The use of existing infrastructure will have severe impacts to Bayview residents including:
 - the roads are currently used for residential purposes, this includes being a school bus route, with children walking to the bus stops in the morning and evening. The volume of heavy vehicles and construction vehicles required to build the Lots will create safety risks to Bayview residents.
 - road damage to City of Darwin Council road infrastructure. The roads are not designed to withstand an enormous increase in heavy vehicle transport carrying materials. This will result in road damage which may result in damage to resident's vehicles while driving on roads which are in disrepair. Repairs carried out by the City of Darwin Council will result in the costs being borne by rate payers.
- Security. As is well evidenced, crime rates across the Greater Darwin Region have increased, Bayview has not been immune to this. Currently the back perimeter of our home is surrounded by mangroves. Currently a determined criminal could walk along the back perimeter (entry point five lots away) and scale the fence to our property; however, this would require significant effort. The proposal for Area C, would result in our back fence boundary adjoining directly onto the cul-de-sac turning point and walkway to a new Lot (Lot 1, Area C). This would create a very accessible access point for criminals to enter our property.
- Financial impact. We have invested significantly in purchasing land for our home and building our home. The proposed development will negatively impact the market value of our home based on the creation of smaller lot sizes (under 600sqm) creating an entry for lower cost homes. As well as having additional homes surrounding our Lot which will impact

the market value of our home. Refer to the next below point for an additional negative financial impact regarding fencing.

- Loss of privacy. Currently the back perimeter of our home is surrounded by mangroves providing environmentally friendly natural privacy. The proposal for Area C would expose our property to walking and road traffic, and new dwellings. We have young children and want to protect our privacy. Our back fence perimeter is fully tiled with a pool adjacent to the boundary, there is no opportunity for us to plant trees/shrubs to provide screening. Our fence is four years old and we do not have financial capacity to replace the existing fence with full screening.
- Loss of vegetation. Residents of O'Ferrals Road can enjoy being surrounded by mangroves at the back perimeter of their property. This proposal for Area C would result in a large loss of vegetation, and be replaced by urban sprawl creating heat stress. This proposal does not support the Northern Territory Government Climate Change Response: Towards 2050 which aims to improve our urban design through liveability and sustainability. The proposal does also not align with the City of Darwin's Greening Darwin Strategy, which aims to create and maintain a cool, clean and green city.
- Loss of privacy from proposed windows and yards of new dwellings.
- Lights. New street lights and dwellings lights would impact the liveability of our home.
- Visual impact through a large, bulky and close building/s. The current outlook from our property is visually appealing with mangroves surrounding the back perimeter. The proposal for Area C, would impact visually as the mangroves would be replaced by residential dwellings, road, roundabout/cul-de-sac and a new rock wall.
- Noise pollution. O'Ferrals Road tries to enjoy being a quiet suburban location. The addition of low to medium residential dwellings will increase noise surrounding our property.
- Hooning. Increased low to medium density dwelling will increase the traffic in Bayview. There are already challenges with speeding throughout the suburbs. The proposal creates a cul-de-sac which can lead to hooning.
- Parking. Acknowledging the developer has attempted to address parking concerns within the proposal, there are already multiple areas along O'Ferrals Road where parking is insufficient to meet demand. This results in cars parking along the verge, causing road hazards due to blocking line of sight. It also impacts the growth of the verge grass and impacts resident's ability to walk along the footpaths as crossing points are often blocked off with parked vehicles. The proposal will increase the need for parking. Any new Lot development in Bayview should be permitted for single dwellings only.
- Area C adjacent to single dwellings. Proposed Lots 1,2 and 3 are adjacent to existing single dwelling homes. It is not advantageous for single dwelling homes to be adjacent to multiple dwelling homes.

To summarise, this proposed development would impact the financial, health and wellbeing of myself and my family, and surrounding neighbours.

We recommend you do not approve the proposal as included in Area C.

Kind regards


Michelle Leonard
0437 689 398


Shane Lally
0447 914 427

Rosario S Finocchiaro
PO Box 38262
Winnellie NT 0821

29 March 2024

The Chair
Development Consent Authority
GPO Box 1680
Darwin NT 0801

Attention: Ms Suzanne Philip

Dear Ms Philip,

RE: Development Application PA2023/0327 – Bayview Expansion

I write generally in support of the application but I wish to express the following requests.

Construction Access

I reside with my family at Latrobe Street in Bayview, which would be connected to the “Area A” in the proposed development.

The residents of Latrobe Street who have been in residence for the past 20 years, as I have, would know that when there is a development in the Darwin CB involving excavation, contractors make attempts, often illegally, to dump excavated spoil on the Crown Land at the end of Latrobe Street, which was to be part of the ill-fated expansion of Bayview towards Charles Darwin National Park.

On one such occasion that the trucks succeeded in getting through, it resulted in our street constantly thundering with trucks for weeks, and they left copious quantities of their soil cargo on the street. The soil spoil became, at times, a muddy quagmire that the residents would be forced to drive through, bringing dirt and filth up our driveways, into our garages and into our homes. Our roofs were also turned into a dusty shade of red.

I, and other residents, successfully prevented another contractor from putting us through the same ordeal just a few years ago.

I request that a condition be placed on any development permit that earthmoving plant and general construction access must be via the disused branch of the intersection at the Benison Road and Tiger Brennan Drive intersection rather than via Latrobe Street or Perth Street or the streets of Bayview generally. This was intended to be the entrance to the ill-fated expansion of Bayview. This can readily be activated and it provides ready access to “Area A” and “Area C” beyond for earthmoving plant and general construction access.

Planning for the future

I disagree with “Area B” being developed. It is an obvious street-in-waiting. I had suggested the following in a submission for the ill-fated expansion of Bayview.

“Area B” must be used as the access via a new road for resident of east Bayview to a right-turn-in and right-turn-out to and from Tiger Brennan Drive via the disused branch at the intersection at Benison Road and Tiger Brennan Drive. I had proposed this instead of the same access being provided via the much narrower Latrobe Street that was proposed in the earlier development at the time. It would not have been appropriate for Latrobe Street to be used for such access. It is a quiet residential street with a park and children’s playground.

Allowing "Area B" to be developed would preclude for decades any possible improved access to Tiger Brennan Drive for residents of east Bayview, who now have to travel all the way to the Woolner Road intersection via the narrowed parts of Stoddart Drive to be able to travel outbound on Tiger Brennan Drive.

Access to Tiger Brennan Drive via Stoddart Drive is imperilled by the narrow part at the hill that is divided by a near-solid thick white line, shared with other traffic, on street parking, wayward exercising pedestrians, Lycra clad cyclists groups, school children, and buses. It is an accident waiting to happen, and I have indeed witnessed accidents over the years.

The disused branch of the Benison Road and Tiger Brennan Drive intersection should be activated in the near future. It could still be used when, in say 20 years, Bagot Road is connected to Tiger Brennan Drive via Snell Street and overpasses, when Tiger Brennan Drive becomes a true freeway.

I commend to you my above stated requests.

Yours sincerely,

A handwritten signature in blue ink, consisting of a stylized 'R' followed by a long, sweeping horizontal line.

Rosario S Finocchiaro

Att. Map

2nd April 2024
15 O'Ferrals Road, Bayview
NT 0820

To whom it may concern,

Re: Reference **No. PA2023/0327**
 Proposal of 19 lot Subdivision Bayview NT

I Christina Nicolakis of 15 O'Ferrals Road, Bayview NT 0820 object to the application reference PA2023/0327 from Dover Investments Pty Ltd. I oppose the subdivision proposal to create subdivided lots at the back of the houses on Perth Street and O'Ferrals Rd Bayview, on the following grounds.

1. Part of the proposed area to be developed is mangroves which require removal. The significance of mangroves has an outstanding contribution to the prevention of climate change and any removal of mangroves significantly impacts the marine environment.
2. There is currently as identified in the 2015 Environmental report done for the previous proposal at least 26 vulnerable, 19 endangered and 1 critically endangered marine, mammal and fauna species living in Darwin's harbour which includes Bayview. There should be no further development of Darwin's harbour.
3. All mangroves, including mature mangroves within the lease boundary at either of the sites will be detrimentally affected. Bayview has been constructed for nearly twenty years. The mangroves have been there since before Bayview. Therefore, the mangroves are mature and capable of flowering. The mangroves flower at three to four years of age. Regardless, whether they are young or old, there should not be any more removal of the mangroves in the Darwin Harbour.
4. I am also disputing the proposal as the subdivision will involve harbour dredging. It is clear in the proposal drawings and supported by the google earth images that the development will extend well into the native mangroves. The risks to nature, people, community and property have been minimised in the proposal, however are in fact significant and need to be researched thoroughly. There should be no risk to anyone or anything, minimising the risk is not acceptable.

5. Most of Bayview's LMR lots with multi-dwellings are located in cul-de-sacs which have made these areas of Bayview heavily congested making emergency access very difficult due to heavy street car parking with existing multi-dwellings not having sufficient on-site car parks. Adding more dwellings as per the proposal further enhances this difficulty and becomes a hazard.

The proposal has not taken into any consideration into how this development may effect privacy, property value and way of life for existing Bayview residents. It claims it will benefit the economy but does not consider the effect on existing property owners with ocean views being blocked, elevated houses peering into backyards and pools, increased traffic (with not all existing vacant lots developed as of yet) and years of construction once the development begins. Loss of tenants for investment properties and lower sale prices during years of construction and upon completion must be considered as well.

I urge the Development Consent Authority (DCA) to reject this proposal and to remove any more stages of future development from the Bayview area and Darwin's harbour. The community has been very vocal and active in opposing further development of Bayview and Darwin's harbour in the past with great success which should send a strong message that it should not be destroyed any further.

Regards,

Christina Nicolakis
Christina.darkadakis@gmail.com
0423417101

2nd April 2024
15 O'Ferrals Road, Bayview
NT 0820

To whom it may concern,

Re: Reference **No. PA2023/0327**
Proposal of 19 lot Subdivision Bayview NT

I Ilias Nicolakis of 15 O'Ferrals Road, Bayview NT 0820 object to the application reference PA2023/0327 from Dover Investments Pty Ltd. I oppose the subdivision proposal to create subdivided lots at the back of the houses on Perth Street and O'Ferrals Rd Bayview, on the following grounds.

1. Part of the proposed area to be developed is mangroves which require removal. The significance of mangroves has an outstanding contribution to the prevention of climate change and any removal of mangroves significantly impacts the marine environment.
2. There is currently as identified in the 2015 Environmental report done for the previous proposal at least 26 vulnerable, 19 endangered and 1 critically endangered marine, mammal and fauna species living in Darwin's harbour which includes Bayview. There should be no further development of Darwin's harbour.
3. All mangroves, including mature mangroves within the lease boundary at either of the sites will be detrimentally affected. Bayview has been constructed for nearly twenty years. The mangroves have been there since before Bayview. Therefore, the mangroves are mature and capable of flowering. The mangroves flower at three to four years of age. Regardless, whether they are young or old, there should not be any more removal of the mangroves in the Darwin Harbour.
4. I am also disputing the proposal as the subdivision will involve harbour dredging. It is clear in the proposal drawings and supported by the google earth images that the development will extend well into the native mangroves. The risks to nature, people, community and property have been minimised in the proposal, however are in fact significant and need to be researched thoroughly. There should be no risk to anyone or anything, minimising the risk is not acceptable.

5. Most of Bayview's LMR lots with multi-dwellings are located in cul-de-sacs which have made these areas of Bayview heavily congested making emergency access very difficult due to heavy street car parking with existing multi-dwellings not having sufficient on-site car parks. Adding more dwellings as per the proposal further enhances this difficulty and becomes a hazard.

The proposal has not taken into any consideration into how this development may effect privacy, property value and way of life for existing Bayview residents. It claims it will benefit the economy but does not consider the effect on existing property owners with ocean views being blocked, elevated houses peering into backyards and pools, increased traffic (with not all existing vacant lots developed as of yet) and years of construction once the development begins. Loss of tenants for investment properties and lower sale prices during years of construction and upon completion must be considered as well.

I urge the Development Consent Authority (DCA) to reject this proposal and to remove any more stages of future development from the Bayview area and Darwin's harbour. The community has been very vocal and active in opposing further development of Bayview and Darwin's harbour in the past with great success which should send a strong message that it should not be destroyed any further.

Regards,

Ilias Nicolakis
Ilias.nicolakis@yahoo.com
0403476871

2nd April 2024
55 Ellengowan Drive, Brinkin
NT 0810

To whom it may concern,

Re: Reference **No. PA2023/0327**
Proposal of 19 lot Subdivision Bayview NT

I Ranjit Darkadakis of 55 Ellengowan Drive, Brinkin NT 0810 object to the application reference PA2023/0327 from Dover Investments Pty Ltd. I oppose the subdivision proposal to create subdivided lots at the back of the houses on Perth Street and O'ferrals Rd Bayview, on the following grounds.

1. Part of the proposed area to be developed is mangroves which require removal. The significance of mangroves has an outstanding contribution to the prevention of climate change and any removal of mangroves significantly impacts the marine environment.
2. There is currently as identified in the 2015 Environmental report done for the previous proposal at least 26 vulnerable, 19 endangered and 1 critically endangered marine, mammal and fauna species living in Darwin's harbour which includes Bayview. There should be no further development of Darwin's harbour.
3. All mangroves, including mature mangroves within the lease boundary at either of the sites will be detrimentally affected. Bayview has been constructed for nearly twenty years. The mangroves have been there since before Bayview. Therefore, the mangroves are mature and capable of flowering. The mangroves flower at three to four years of age. Regardless, whether they are young or old, there should not be any more removal of the mangroves in the Darwin Harbour.
4. I am also disputing the proposal as the subdivision will involve harbour dredging. It is clear in the proposal drawings and supported by the google earth images that the development will extend well into the native mangroves. The risks to nature, people, community and property have been minimised in the proposal, however are in fact significant and need to be researched thoroughly. There should be no risk to anyone or anything, minimising the risk is not acceptable.

5. Most of Bayview's LMR lots with multi-dwellings are located in cul-de-sacs which have made these areas of Bayview heavily congested making emergency access very difficult due to heavy street car parking with existing multi-dwellings not having sufficient on-site car parks. Adding more dwellings as per the proposal further enhances this difficulty and becomes a hazard.

The proposal has not taken into any consideration into how this development may effect privacy, property value and way of life for existing Bayview residents. It claims it will benefit the economy but does not consider the effect on existing property owners with ocean views being blocked, elevated houses peering into backyards and pools, increased traffic (with not all existing vacant lots developed as of yet) and years of construction once the development begins. Loss of tenants for investment properties and lower sale prices during years of construction and upon completion must be considered as well.

I urge the Development Consent Authority (DCA) to reject this proposal and to remove any more stages of future development from the Bayview area and Darwin's harbour. The community has been very vocal and active in opposing further development of Bayview and Darwin's harbour in the past with great success which should send a strong message that it should not be destroyed any further.

Regards,

Ranjit Darkadakis
mclighting@bigpond.com
0407892751

29 March 2024
16 Latrobe Street Bayview

NT 0820

To whom it may concern,

Re: Reference No. PA2023/0327
Proposal 19 Lot Subdivision Bayview NT

I Georgios Georgiou and Eleni Georgiou of 16 Latrobe Street NT 0820 object to the application reference PA2023/0327 from Earl James and Associates. We oppose the subdivision proposal to create nineteen subdivided lots at the back of the houses on Perth Street and O'ferrals Rd Bayview, on the following grounds

1. When we bought our block the plans showed that there was to be a walkway at the back of our blocks ensuring our privacy and we bought with that in mind.

2. The proposal has not taken into any consideration into how this development may effect privacy, property value and way of life for existing Bayview residents. It claims it will benefit the economy but does not consider the effect on existing property owners with ocean views being blocked, elevated houses peering into backyards and pools, increased traffic (with not all existing vacant lots developed as of yet) and years of construction once the development begins. Loss of tenants for investment properties and lower sale prices during years of construction and upon completion must be considered as well.

We urge the Development Consent Authority (DCA) to reject this proposal and to remove any more stages of future development from the Bayview area and Darwin's harbour. The community has been very vocal and active in opposing further development of Bayview and Darwin's harbour in the past with great success which should send a strong message that it should not be destroyed any further.

Regards,

Georgios & Eleni Georgiou

Email: ggeorgiou159@gmail.com

Ph: 0401074660

From: [Virginia Close](#)
To: [Das NTG](#)
Subject: PA2023/0327 - Objection
Date: Thursday, 4 April 2024 12:17:29 AM

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Dear sir/madam
Re: Reference No. PA2023/0327
Proposal 19 Lot Subdivision Bayview NT

Virginia Close, as a co-owner of 4 Perth Street, Bayview, NT 0820, objects to application reference PA2023/0327 on behalf of Earl James and Associates. I oppose the subdivision proposal to create nineteen subdivided lots at the back of the houses on Perth Street, Bayview, on the following grounds.

1. The proposed area to be developed is mangroves which require removal.
2. The significance of mangroves has an outstanding contribution to the prevention of climate change, and any removal of mangroves significantly impacts the marine environment.
3. The Darwin Harbour mangroves have vital roles locally and globally. It reduces climate change. According to the Report Number 25/2003D, Mangroves in Darwin Harbour. Edited and produced by Geraldine Lee, Published by Department of Infrastructure, Planning and Environment (DIPE), Website: <http://www.ipe.nt.gov.au/> 'The mangrove communities in Darwin Harbour are significant natural resource both locally and globally. The mangroves in the harbour are amongst the most diverse in Australia. Approximately 50 species are regarded as 'mangroves' worldwide, 36 of these occur naturally in Darwin Harbour. '
4. Many species in my backyard, including blue-helmeted honey eaters, other mangrove- dwelling birds, green frogs, golden tree snakes, bandicoots, native rats, and mice, frequently come. The development will take away the habitat of these native species.
5. The development will adversely impact the ecology of the nearby mangroves.
6. The development will involve the loss of habitat of local fauna and flora.
7. Although Bayview had been constructed more than twenty-years ago, the mangroves are always there, mature and capable of flowering. The mangroves flower at three to four years of their age. And regardless, whether they are young or old, there should not have anymore removal of mangroves in the Darwin Harbour.
8. The developer is not only removing the mangroves but also the mangrove muds.
9. The mangrove mud which is home to many species will lose their habitat. The ecology between the mangroves and the mangrove mud will stop completely.
10. The removal of mangroves will also give a foul smell in the neighbouring areas. The foul smell is a form of pollution and will gravely affect the health of human beings.
11. The removal of mangroves will severely affect the environment if there are calamities like cyclones and tsunamis. The mangroves control soil erosion.
12. Aside from the development, there is no need for a new seawall in Bayview.
13. The application does not refer to public access along the new seawall. And I suspect it is slope and will be dangerous.
14. Cul-de-sac is utterly dangerous in a place like Bayview, there is no possible way in getting out if there is fire.
15. Building a new seawall will have an adverse impact on the land in the neighbouring areas and beaches, increasing the danger of soil erosion.
16. Is there any new management regarding the Darwin Harbour? And where is it?
17. It is hard to imagine the traffic jam that will impact the tiny subdivision like Bayview which is at present bad enough.
18. Any new infrastructure such as new roads, electricity and sewage will require new management. Is there any taking place?

Respectfully Yours,

Virginia Close

close.virginia@yahoo.com

+61411348095

From: [Margaret Clinch](#)
To: [Das NTG](#)
Cc: [Nicholas Kirlew](#)
Subject: PA2023/0327 Lot 5988 and Lot 07433 /Concurrent Application/57 Bayview Boulevard Bayview.
Date: Thursday, 4 April 2024 11:08:29 PM

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

4.4.2024

The Manager,
Development Assessment Services,
Submission on the above Development Proposal

Dear Sir/Madam,

The above application has been documented by Earl James and Associates for Dover Investments.
Dover Investments developed the residential Bayview Marine Estate on crown lease land along Sadgrove Creek,
and its mangroves, about twenty-five years ago.

A similar previous application was made in 2023. It was withdrawn before it went to the DCA (Development Consent Authority).
The applicant seemed realise there was a shortage of land to complete the development as it was being proposed.

Nevertheless, that earlier application caused a strong reaction on existing home owners in the area.
At that time objected strongly to the proposal, because their large investment, and settled homes would be devalued.
They felt the proposal would not match their homes them in character and quality.

Views, access and living situations would be affected, and neighbourhoods newly crowded.
This side of the estate joins with the mangroves stretching across to Charles Darwin National Park.

Although there is an unpaved walking path here along the edge of top which should have been paved
as it was on the side looking over to the CBD, there is already a secure armoured wall.
One would expect that
the estate at this edge was completely finished.

This is where the proposed extra development is proposed to take place.

Here the applicant wants to use up a few pieces of land on this eastern corner of the estate, to which would be added
rezoned FD Land (Land zoned Future Development) to make of a total of nineteen lots to develop.

The Bayview Estate was a development with strict guidelines, with a covenant for building, including heights.

Two early guidelines are from 1993 (CLT1251) and 2004 (CLT2155).

The FD (Land Zoned for future development) has a special meaning, ie. this land should not be used for development now because it is not suitable). In this case, the FD is intended to be mangrove land, and not residential land- that is land to be zoned for residential and infrastructure purposes. The Survey business Earl James and Associates would be fully aware of this.

The applicant refers to the appropriate Area Plan as the DISAP (Darwin Inner Suburbs Area Plan). In the two relevant relevant maps provided for Bayview, the map does not indicate any expected change by FD zoning.

In addition, on page 5 of the DISAP it states:

'The Rezoning of Land

The Area Plan Indicates that the use of land on specific sites may change in the future. A number of sites may require rezoning before the land use and development potential envisaged by this Area Plan can be realised. However, this Area Plan

. does not automatically rezone land

. does not remove the need to apply to the Minister responsible for administering the Planning Act to rezone land.'

THIS MEANS THAT IT CANNOT BE FAST TRACKED AND REZONED WITHOUT THE PUBLIC'S KNOWLEDGE.

In any case, dealing with mangroves is a situation quite different from dealing with various types of residential zoning.

Dealing with mangroves is a matter of the natural environment. It appears the applicant has not addressed this in the application.

This application requires a certified report by an authorised, qualified ENVIRONMENT PROFESSIONAL to analyse the impact of this application, including by any FD rezoning, movement of the existing armoured wall, or any restructuring of the physical edge on the residential zones..

We cannot support this proposal that in this situation, if any FD land be rezoned to make for these developments possible, in any circumstances.

The proposed access roads each proposed new residential lots are very close to the edge of where the armoured wall, and the drop would be.

It looks dangerous for use by delivery vans, rubbish trucks, boat trailers, and caravans, and for use at night, in blinding tropical rain, and vehicles parked or passing.

We are concerned about the work constructing these lots, and the provision of the linking extended functional infrastructure to each new lot as done retrospectively. A desk top exercise is not be the same.

Some of the drawings and maps drawings presented as serious documentation in this application are marked, 'NOT TO SCALE'.

We are convinced that this application, if approved, would not be the answer to the current housing problem.

The costings of such a development would be very high.

Please note that this is a planning application submission, and please promptly acknowledge it as such.

Regards,

M A CLINCH

PLan: the Planning Action Network, Inc

Margaret.Clinch@bigpond.com

PA 2023 0327
Lot 07433 Town of Darwin

BAYVIEW
Lot 05988 Town of Darwin
57 BAYVIEW BVD
BAYVIEW

Rezone from Zone FD (Future Development) to Zone LR (Low Density Residential) and Zone LMR (Low-Medium Density Residential)

Thank you for the opportunity to provide feedback for consideration regarding the proposed Bayview Development.

We have reviewed the proposal and specifically Attachment K Traffic Impact, Assessment (the Report) regarding the traffic flows and usage. The Report focusses on traffic impact on Tiger Brennan Drive, Stoddart Road and Fanning Drive. The scope of the report excludes the suburban traffic flow and road configurations of O’Ferrals Road which will be impacted by the proposed rezoning and developments.

Our concerns relate to the traffic issues resulting from increased vehicle traffic in O’Ferrals Road and the increased utilisation of a narrow road with limited parking and traffic congestion. The high utilisation of O’Ferrals Road is of significant concern.

1. O’Ferrals Road

Currently, O’Ferrals Road coming from Fanning Drive is a wide road which narrows approaching from the sharp bend from approximately Lot No 40 -50 O’Ferrals Road. On review of the plans the road width is approximately thirteen metres wide as it comes towards the bend, and then narrows to approximately eight metres on the bend in this section before broadening again before the cul de sac at the lock. This area has a history of traffic congestion, safety concerns for vehicles and extremely poor parking provision. There was discussion with the Darwin City Council historically and a yellow non parking line was put in place on one side of the road. This still enables limited on street parking for nearby residences. If the non-parking area extended to both sides of the road, this would require parking a considerable distance from our residences and is not deemed acceptable by owners.

The additional residential traffic flowing with low medium density blocks will put further pressure on this narrow and unsafe section of the road. Whilst the speed of vehicles has reduced now the area is more built up, there remains regular near misses of children, bicycles and vehicles converging on this blind corner and narrow section of the bend.

It is unclear why this road configuration was supported in its current form given the safety concerns, let alone additional traffic that will increase risk and safety of families.

2. Stage 2 Alternative Entry/Exit into Bayview

The increased low medium density development will increase the residential population as well as approximately three vehicles per household into Bayview.

The developers will argue that this road was designed to service Stage 2, but it was always going to give good access alternatives to Stage 1 as well and the Developers should be compelled to install the road now to complete the overall development of the Suburb of Bayview, given that they have more than likely been compensated for the Government veto of Stage 2.

The costly infrastructure of traffic lights and the major intersection works are all in place and the lengths of additional road required are not excessive. Obviously if this road access is not installed to Tiger Brennan, the traffic on Perth, Fanning and O'Ferrals will increase significantly.

There is significant pedestrian, bicycle, dog walking traffic existing. Additional road vehicle traffic will make this environment more unsafe and not support the amenity in Bayview that has attracted and retained long term Darwin residents in a lovely suburb.


We request that for this proposal to proceed, that the Development Consent Authority should make it subject to the final construction of the third and always planned entry/exit road into Bayview.

In addition, reconfiguration of parking on O'Ferrals Road, with sealing of the verge where people are currently required to park would assist.

We are hopeful that the development and traffic flows can be made safe and in keeping with the wonderful and quiet residential lifestyle we enjoy in Bayview.

Yours sincerely

Tim Baldwin
Unit 2 48 O'Ferrals
Road Bayview

Allison Grierson 
3/46 O'Ferrals Road
Bayview NT 0820

Tim Baldwin

Allison Grierson

Liza and Phillip Ryder – confirmation via email (can be provided)

Unit 2 / 46 O'Ferrals Road, Bayview

David and Leanne Pears – confirmation via email (can be provided)

Unit 1/46 O'Ferrals Road, Bayview

5 April 2024

To Whom It May Concern:

I am writing to express my opposition to the proposed development at Lot 05988 in Bayview, PA2023/0327.

As sea levels in Darwin are already rising, the site of the proposal is utterly unsuitable for housing. Within the next thirty years, the area, along with many other regions of low-lying mangrove habitat in Darwin Harbour will be inundated regularly. In no more than fifty years, any houses built now in this area will be abandoned.

The proposed development areas, particularly Area A and Area C, are far better left vegetated. That way, they can act as a buffer to the existing residential neighbourhood against high tides, as well as providing erosion control and a buffer against the biting insects that are common in Bayview.

Thank you for taking my objections into account.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'James Richardson', written in a cursive style.

James Richardson
18 Omeo St, Brinkin
0492865346

Merran Short
8 Latrobe Street
Bayview NT 0820

Email: merran.short@gmail.com

das.ntg@nt.gov.au

Development Consent Authority (Darwin Division)
GPO Box 1680
DARWIN NT 0801

Attention: Chairman

RE: Application number PA2023/0327

Dear Sir,

I am an owner/occupier of 8 Latrobe Street, Bayview and have been Since October 2002. At the time, I purchased 8 Latrobe Street there were very few surrounding houses and during the last 22 years I have watched the growth of Bayview particularly in the adjacent area. I have considered the development application lodged by Earl James & Associates ("EJA") on behalf of the developer and now seek to lodge an objection in relation to same.

I have lived in Bayview for the entire 22 years and I have directly observed the impact that the increased development in the Bayview area has placed on traffic, in particular during peak hour. The traffic has greatly increased at the entry and exit during peak hour periods this has been strained by the failure to provide more than one exit to the right for Bayview. The intersection with lights simply does not cope with entry and exit during peak hours and has necessitated a waiting time for up to several minutes for residents attempting to exit or enter Bayview.

In respect of the proposed Application PA2023/0327 (Application), I object to the proposal based on the following grounds:

i. Section 46(3)(a) – Compliance with NT Planning Scheme and the 1999 NT Government *Proposed Central Darwin Planning Scheme Amendments* identified land use objectives and precincts in and around central Darwin one of which was Bayview to develop "*predominantly for low and medium density housing, with associated marina and commercial developments*". The proposed Application Town of Darwin arguably does not comply with the definition of '*low and medium density housing*' when consideration is given to the surrounding area. The Application is surrounded predominantly by houses rather than units and these houses are occupied by families with children. Accordingly, the proposed development does not comply with the land use objectives for that area of Bayview.

ii. *EJA claim - The lots being proposed by the current application are consistent with the purpose of the zone and will provide new housing options that will be fully*

serviced and can utilise existing community services and facilities. The proposed lots will also have a zone that is the same as the zoning of the existing, abutting parcels. The purpose of zone LMR is to provide a range of low rise housing options that contribute to the streetscape and residential amenity in locations supported by community services and facilities, and where full reticulated services are available. Proposed Lot 4 in Area C, to be rezoned to LMR, is consistent with the purpose of the zone and will provide new housing options that will be fully serviced and can utilise existing community services and facilities.

Latrobe and Perth Street are residential houses, the additional traffic that would be generated by the development of the new dwellings in the proposed development would negatively impact on the traffic flow of Latrobe and Perth Street and would increase the risk to local residents in particular children and families. Residents, including children, tend to use the road as a footpath and there would be an increase risk to them by the increased traffic generated by the proposed development.

Perth Street is a very narrow street that already suffers from the impact of more than one car per house and there is parking on the street making it difficult to navigate at night.

iii. EJA claim - *The lots being proposed by the current application will be connected to reticulated services and the subdivision will involve the development of new portions of public road that will connect to an integrated road network. The new lots will be able to utilise the existing open space areas (parks, bicycle and walkways, heritage areas) and given Bayview's proximity to the CBD and other service commercial areas, the new residents will have access to existing community facilities.*

This proposal will in fact place a greater burden on the existing infrastructure.

iv. The Overlays in the NTPS identify areas of land that have specific development requirements. The Record of Administrative Interests advises the following Overlays apply to the Application. Respectfully, this statement is not supported by the evidence. On the evidence the existing road network is suitable for the residential homes that currently exist but to add the new dwellings as proposed, without additional access is not sustainable. Assuming that each dwelling has at least two cars increases the number of motor vehicles accessing the proposed development via Perth or Latrobe Street significantly and the existing road network will be overwhelmed by the increased traffic. As to the pedestrian links referred in the EJA Report, there are limited footpaths in Perth and Latrobe Street for this reason, residents tend to walk on the road. The impact on the existing residents will be significant and may affect house prices.

Consideration also needs to be given regarding the building of the development as it will no doubt include heavy truck traffic that will negatively impact upon the existing residents.

v. The EJA Report states that, *"Existing residents who adjoin the proposed lots would be aware of the possibility and consequently would have expected that at some time in the future the land abutting their properties may have been developed"*.

It is now some thirty years plus, since Dover developed Bayview and in my submission the current residential owners and tenants have a legitimate expectation that

development proposals that will negatively impact their enjoyment, outlook and surroundings ought not to be allowed. There has been no community consultation, the pink notices notifying of the development were at best poorly placed, and at worst hidden from the community.

The Applicants suggestion that there will be little impact by this development is to understate the fact that the proposal will increase the traffic to what is in effect a very narrow cul-de-sac and closed in area and will deny the residents the enjoyment of the mangroves. The area proposed to be developed is more appropriately part of the Charles Darwin National Park and should be re-zoned to that effect.

If this proposed development is anything like other developments there will not be sufficient parking and no doubt, parking will take place on the street interfering with the existing resident's access to their homes and increasing the traffic and risk to local residents. I do not agree that the impact on existing residents will be minimal.

vi. Merits of the Proposed Development. The effect of the EJA report is that, the Bayview sub division has demonstrated that it is well planned and effective residential community and the proposal to now make use of the remaining suitable land will complete the development.

Respectfully that is only an opinion and what is usage of remaining suitable land and the outcomes is dependent upon your point of view. The residents of the houses in Perth and Latrobe Street are not advantaged by the increased traffic if the application is granted. It will place an increased burden on the services to the area and this may well have a negative impact upon the local residents. The existing residents are not going to have their lives enhanced or improved by the development. With all of the consequent impact that it will have both socially, in terms of noise, by the very nature of having that many people living in a confined space and the increase in traffic, which must follow given the lack of access to the proposed development other than through Perth or Latrobe Street.

This proposal feels rushed and not well thought out with the developers hoping to fast-track approval, without regard for the existing residential community in Bayview.

vii. Public Facilities or Open Space. Whilst it is true to say that Bayview does have areas of public open space and the marina there is only a small park directly near the proposed development, and whilst there is an open atmosphere currently for residents, allowing the development will place additional pressure on the limited open areas.

This application appears to be a last ditch effort by the developers to make money from a suburb that has now been well established for in excess of thirty years.

viii. Whilst I am not an environmental expert, I am aware of the positive biological impact mangroves have on the environment. Mangroves are a limited resource, and any negative impact upon them ought to be justified. I could not find any environmental impact statement regarding this application. An environmental impact report is essential to this development and should be obtained by the developer. When development outweighs the environment, it is to the detriment of all.

I would invite the Consent Authority to actually visit the site the proposed development area is not just made up of 'mud flats' the mangroves encroach on the proposed

development area. The mangroves have existed for in excess of twenty-five years and could not, in all fairness, be said to be young. In any event, they are irreplaceable and play an essential role in the ecological system.

ix. There are still many existing vacant blocks in Bayview still to be developed and any traffic or other reports need to consider this. Further, Bayview is one of Darwin's premier residential subdivisions and will arguably not remain so if this development proposal is granted.

I am also concerned about the following:

Additional exertion to be placed on existing infrastructure.

"Water and Sewer

PWC comments:

Lot A

• For water – A new DN150 water main is to connect from the existing DN150 main at the end of Latrobe Street, be looped in the cul-de-sac and connect back into the existing DN100 in Perth Street. It is recommended that the water network is designed to direct flow through the cul-de-sac and reduce risk to water quality

• For sewer – connect into existing sewer reticulation main in Latrobe Street via new DN150 sewer reticulation main. Lot B • For water – Install 2 x service connections on the existing DN150 water main in O'Ferral" (page 20 of Proposal)

I thank you for considering this submission and I can be contacted at the above address if required.

Yours faithfully



Merran Short 4 April 2024

Technical Assessment PA2023/0327

TECHNICAL ASSESSMENT OF PROPOSED DEVELOPMENT AGAINST RELEVANT PROVISIONS OF THE NORTHERN TERRITORY PLANNING SCHEME 2020

Application No:	PA2023/0327
Lot number:	Lot 7433 and Part Lot 5988 (57) Bayview Boulevard, Bayview
Town/Hundred:	Town of Darwin
Zone:	LR (Low Density Residential) and LMR (Low-Medium Density Residential)
Site Area:	Lot 7433 is 54,300m ² / 5.34ha and Lot 5988 is 42,900m ² /4.29ha
Proposal:	Subdivision to create 18 lots
Plans used for assessment:	Amended drawings prepared by Earl James & Associates dated 11/07/2024.
Date assessment finalised:	25 November 2024

The concurrent application is for a:

- Proposed Planning Scheme Amendment: Rezone from Zone FD (Future Development) to Zone LR (Low Density Residential) and Zone LMR (Low-Medium Density Residential) and
- Proposed Development: Subdivision to create 18 lots.

The subdivision component is assessed by Development Assessment Services (DAS) under the proposed zoning, therefore the proposal is assessed against the subdivision requirements that apply to Zone LR (Low Density Residential) and Zone LMR (Low-Medium Density Residential).

The proposed development requires consent under the Northern Territory Planning Scheme 2020 as described in the below table:

Zone LR (Low Density Residential) and LMR (Low-Medium Density Residential)			
Use	Assessment Category	Overlays	Part 6 Subdivision Requirements
Subdivision	Impact Assessable	3.2 CNV - Clearing of Native Vegetation 3.4 CR - Coastal Reclamation 3.7 LSSS - Land Subject to Storm Surge 3.9 DHD - Darwin Harbour Dredging	6.2.1 (Lot Size and Configuration for Subdivision in Zones LR, LMR, MR and HR) 6.2.2 (Lots Less Than 600m ² for Dwellings-Single) 6.2.3 (Site Characteristics for Subdivision in Zones LR, LMR, MR and HR) 6.2.4 (Infrastructure and Community Facilities for Subdivision in Zones LR, LMR, MR and HR)

Clause 1.8(1)(c)(ii)

(c) Impact Assessable – use and development that requires the exercise of discretion by the consent authority to determine if it is appropriate given the location of the site and the potential impacts on surrounding uses, and if it accords with the Strategic Framework.

Use and development of land requires consent and is Impact Assessable when any of the following apply:

- ii. it is for the subdivision of land other than that included at Clause 1.8(1)(b)(iii)

Clause 1.10 Exercise of Discretion by the Consent Authority

4. In considering an application for a use or development identified as Impact Assessable the consent authority must take into account all of the following:
 1. any relevant requirements, including the purpose of the requirements, as set out in Parts 5 or 6;
 2. any Overlays and associated requirements in Part 3 that apply to the land;
 3. the guidance provided by the relevant zone purpose and outcomes in Part 4, or Schedule 4.1 Specific Use Zones; and
 4. any component of the Strategic Framework relevant to the land as set out in Part 2.

This is a technical assessment of the proposal against the requirements of the Northern Territory Planning Scheme 2020 (NTPS2020) and is no indication of whether or not approval will be given by the consent authority.

2. Strategic Framework

The following is relevant to the subject site.

Darwin Regional Land Use Plan (DRLUP) 2015

The purpose of the Darwin Regional Land Use Plan 2015 (DRLUP) is to identify the essential characteristics and needs that will shape future development in the region and establish an overarching framework for that development.

The location of the proposed development is in an area identified for Urban/Peri-Urban land use. These areas will accommodate a full range of land uses such as a variety of housing types, retail and commercial, community facilities and services, sport, recreation and urban open space, and natural and conservation areas.

The proposal aligns with the key Residential objectives of the DRLUP by providing residential lots that integrate new and existing residential development to maintain character and create a cohesive society that meets the diverse needs and aspirations of all sectors of the community.

The high level mapping in the DRLUP does not recognise the nuances in established areas between those smaller sites that have been built upon and those that remain undeveloped. A discussion regarding application of clause 6.2.1 is provided later in the section of this report with the Part 6 – Subdivision Requirements.

Darwin Inner Suburbs Area Plan 2016

The Darwin Inner Suburbs Area Plan 2016 (DISAP) provides a framework to guide progressive growth and development within the Inner Suburbs of Darwin building on the broad regional strategic planning policies established by the Darwin Regional Land Use Plan 2015.

The Land Use Plan identifies the subject land as future development. Land to the west of the subject land is shown in the DISAP as a mixture of low density and low-medium residential, which forms part of the existing Bayview Marina Estate.

Lots 5988 and 7433, Town of Darwin, are Crown lease parcels that have been progressively developed as the Bayview Marina Estate. The developers were initially granted a Crown lease over Lot 5988, Town Darwin

(CLT 1251) in 1993. Then in 2004, a Crown lease (CLT 2155) was granted over an additional land area (Lot 7433) to enable the subdivision to be expanded. The current application proposes to create 18 lots as below:

Area A – Comprises of a strip of land that is part of Lot 5988 and a portion of Lot 7433. The subdivision proposes to create 12 lots in this area having lots sizes ranging from 454m² to 715m² and will be in zone LR. This area also includes the creation of a 15m wide public road and access to Lot 7433 adjacent to Lot 10.

Area B – Comprises of a strip of land that is part of Lot 5988 and a portion of Lot 7433. The subdivision proposes to create 2 lots in this area measuring 399m² and 392m² and is zoned LMR.

Area C - Comprises of the middle section of Lot 7433 and a small portion of Lot 5988. The subdivision proposes to create 4 lots and a 15m wide public road and access to Lot 7433 adjacent to Lot 1. The 2 lots to the north will be in zone LR and include lot sizes of 1429m² and 670m². The two lots to the south will be in Zone LMR and include lot sizes of 1812m² and 597m².

The balance of Lot 7433 will form the remnant Crown Lease Term (CLT) parcel.

The subdivision includes lots that can be used for the purpose of dwelling-single, dwelling-group and dwelling multiple. The Area Plan identifies the site residential and future development, and a discussion relating to provisions of the intended zoning, zone LR and LMR is provided below.

NOTED

3.4 CR - Coastal Reclamation

Purpose

Ensure that landfill of coastal areas does not adversely affect adjacent land or waters, or the quality of adjacent waters, and is suited to its intended purpose.

Administration

1. *The placement of fill material below the level of the highest astronomical tide requires **consent**.*
2. *This overlay does not apply to unzoned land.*
3. *The consent authority in considering an application for coastal landfill must have regard to the advice of the agency responsible for natural resources and the environment.*

Requirements

4. *An application for the placement of fill material is to demonstrate how the fill material will:*
 - (a) *suit the future use of the reclaimed land;*
 - (b) *minimise the impact of fill works on adjoining land and waters;*
 - (c) *provide appropriate edge treatment of the fill in order to prevent future erosion and siltation of adjacent waters; and*
 - (d) *prevent the formation of acid sulphate leachates.*

DAS's Assessment

The site is within the level of the highest astronomical tide (see Image 1 below). The application proposes site preparation earthworks and a sea wall to ensure the site (areas A and C) is suitable for residential development.

The proposed construction for Areas A and C will be as follows:

Area A: Clear and reshape the sloping ground, then construct a building platform at a final level at about RL5.5m AHD by filling over the prepared site surface. Surcharge the lot for a period of up to 5 months with about 2 m of filling to reduce post construction settlements, then remove the surcharge and construct a seawall to RL6.5 m AHD.

Area C: Remove and stockpile the rock armour from the current seawall, reshape the sloping fill batter, then construct a building platform at a final level at about RL5.5 m AHD by filling over the prepared site surface. Surcharge the lot for a period of up to 8 months with about 2 m of filling to reduce post construction settlements, then remove the surcharge and construct a seawall to RL6.5 m AHD.

The application notes that **Area B** does not require earthworks as this area has been filled and surcharged as part of a previous stage of Bayview that was completed in 2004.

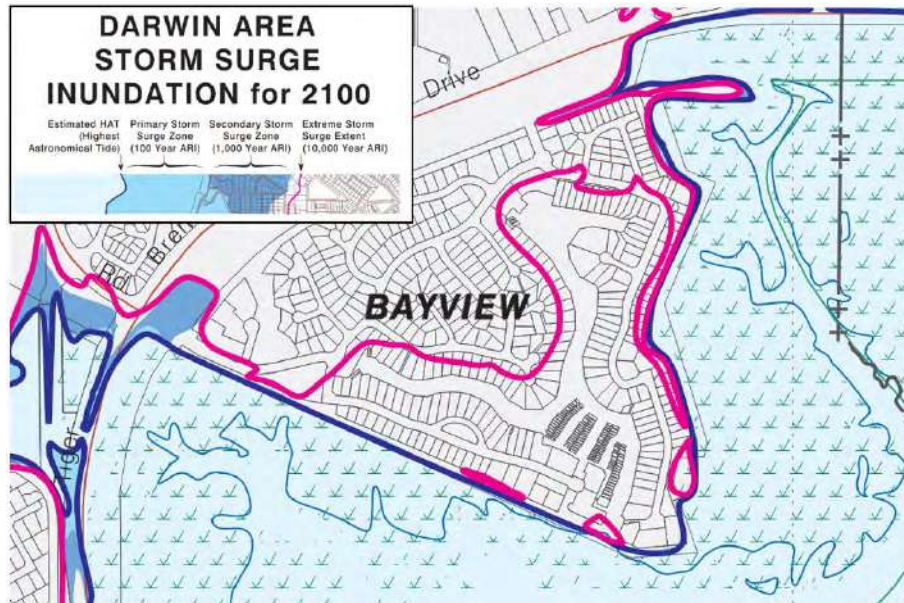


Figure 1: Storm surge mapping (Darwin)

The application provides the following response to the requirements of sub-clause 3:

- (a) The current site surfaces will be cleared and benched before an engineered filling platform comprising a woven geotextile layer, a rockfill working platform, engineered filling and surcharge is placed over the mud surface. The earthworks profile proposed for site filling and surcharge is shown on attached Drawing 5. A similar profile has been successfully used for construction of previous stages of Bayview including the adjacent Stage 10 earthworks.
- (b) The new filling will be carefully placed in a controlled manner, and will be keyed into the current filling, to minimise the risk of longitudinal cracking and to ensure stability of the filling platform at all stages. Any tension cracks that form at the interface between “old” and “new” filling will be reinstated before surcharge is removed. Tension cracks that have formed due to differential settlement at Bayview and the nearby Tiger Brennan Drive embankments have been successfully reinstated with minimal detrimental effect to the filling platform using this approach. Page 4 of 6 Geotechnical Assessment of Proposed Site Filling & Seawalls Project 77861.01 Stage 11 - Lots A and C, Bayview, NT May 2012
- (c) Surcharge will be placed over the engineered filling to heights predetermined by engineering calculations. Examples of surcharge profiles and estimated surcharge times for areas including part of Lot A and all of Lot C are shown on attached Drawings 6 and 7. Settlement of the filling platform under surcharge loads will be monitored by periodic survey and the surcharge will not be removed until approximately 90% of primary consolidation under filling load has been achieved. Settlement monitoring of previous stages of Bayview for

periods of up to 5 years after removal of surcharge indicates that post construction settlements of monuments located on filled areas have generally been limited to 20 mm or less.

- (d) The seawall section proposed for Lots A and C is shown on attached Drawing 8. This section differs from previous seawall sections at Bayview because shallower average mud depths along the lease boundary on this eastern side allow for a steeper, stable armour rock wall to be constructed on a rockfill base. The seawall construction comprises removing and displacing soft mangrove mud and replacing this soft soil with a rockfill base. The top of the rockfill base will be at or slightly below natural surface level and the rockfill base will be founded on the underlying stiff marine clay. This rockfill base will be placed before the working platform and site filling so that trenching required to remove mud does not cause any instability in the filling. After the surcharge is removed to the design site level of about RL5.5 m AHD, the compacted outer fill batter will be trimmed to a slope of 5H:4V and a 1 m high precast concrete retaining wall will be constructed at the crest of the batter as shown on Drawing 8. A non-woven geotextile will be laid on the batter and secured under the wall, then armour rock (which was previously removed and stockpiled before filling Lots A and C) will be placed on the batter and over the base of the retaining wall.

The application was circulated to the Department of Lands, Planning and Environment (previously Department of Environment, Parks and Water Security), which request conditions and notes in relation to acid sulfate soils and erosion and sediment control.

TO BE CONDITIONED

3.7 LSSS - Land Subject to Storm Surge

Purpose

Identify areas with a known risk of inundation from primary or secondary storm surges and ensure that development in these areas demonstrates adequate measures to minimise the associated the risk to people, damage to property and costs to the general community caused by storm surge.

Administration

1. This Overlay applies to land subject to the PSSA and/or the SSSA.
 2. This Overlay does not apply to:
 - (a) outbuildings and extensions to existing dwellings;
 - (b) extensions to existing commercial or industrial buildings;
 - (c) a use or development within the SSSA that would otherwise be Permitted, and complies with the requirements of Part 5;
 - (d) unzoned land; or
 - (e) any use or development within a PSSA or SSSA that complies with Clause 5.5.1 (Interchangeable Use and Development in Specific Zones) which but for this Overlay, would not require consent.
 3. This overlay does not apply to the use and development of land for dwellings-group or dwellings-multiple when the land is subject to Overlay 3.11 RCFR (Rapid Creek Flood Response).
 4. In this Overlay:
 - (a) "AEP" means Annual Exceedance Probability, which is the likelihood, in percentage terms, of inundation by storm surge;
 - (b) "PSSA" means Primary Storm Surge Areas, which are those coastal areas within a 1% AEP of inundation by storm surge as defined on mapping produced by the NT Government;
 - (c) "SSSA" means Secondary Storm Surge Areas, which are those coastal areas adjacent to the PSSA with a 0.1% AEP of inundation by storm surge as defined on mapping produced by the NT Government; and
 - (d) "storm surge" means the elevation in sea level which accompanies the movement of a cyclone particularly near, or over, a coastline, attributed to a cyclone's intensity and wind stress build-up.
-

5. Land within the PSSA is to be used or developed only with consent.
6. The consent authority may consent to a use or development within the PSSA that is not in accordance with sub-clauses 8-10 only if it is satisfied that the application demonstrates that there is no increased risk to people and property, including adjoining property.
7. The use or development of land within the SSSA should have regard to sub-clauses 9 and 10.

Requirements

8. Development in the PSSA should be limited to uses such as open space, recreation, non-essential public facilities (wastewater treatment works excepted) and short-stay tourist camping/ caravan areas.
9. Development within the SSSA should be confined to those uses permitted in the PSSA as well as industrial and commercial land uses.
10. Residential uses, strategic and community services (such as power generation, defence installations, schools, hospitals, public shelters and major transport links) should be avoided in the PSSA and the SSSA.

Assessment

The site is located within the primary and secondary storm surge area (PSSA and SSSA). The application identifies bulk earthworks that will be undertaken to achieve the proposed road design and site levels for lots in preparation for residential development. These works will ensure that the lots are suitable for development as they will be elevated to approximately RL 6.5m AHD, above the storm surge level. In addition, a seawall is proposed will enable the development of the lots for their intended purposes, and with a crest level of RL6.5m AHD, will mitigate risk and damage as a result of any storm surge event.

COMPLIES

3.9 DHD - Darwin Harbour Dredging

Purpose

Ensure dredging within Darwin Harbour does not degrade the environmental value of the harbour waters.

Administration

1. The Darwin Harbour Dredging Overlay applies to the seabed within Darwin Harbour, being the waters south of a straight line between Charles Point and Gunn Point.
2. Dredging of the seabed within the Darwin Harbour Dredging Overlay requires consent.
3. The consent authority in considering an application for dredging must have regard to the advice of the agency responsible for natural resources and the environment.

Requirements

4. An application for dredging is to demonstrate consideration of the Guidelines for the Environmental Assessment of Marine Dredging in the Northern Territory (as amended from time to time) produced by the NT Environmental Protection Authority.

Assessment

The application does not propose dredging of the Darwin Harbour, therefore this clause does not apply.

NOT APPLICABLE

4.2 Zone LR – Low Density Residential

Zone Purpose

Provide predominantly for low rise urban residential development comprising individual houses and uses compatible with residential amenity, in locations where full reticulated services are available.

Zone Outcomes

1. *Dwellings-single and associated dwellings-independent predominantly two storeys or less, on individual lots on a range of lot sizes that respond to changing community needs.*
2. *Home based businesses and dwellings-community residence are conducted in a manner consistent with residential amenity.*
3. *Residential care facilities are of a scale and conducted in a way that maintains the residential character and amenity of the zone.*
4. *Dwellings and outbuildings are set back in a manner sympathetic to neighbours, the streetscape and scale and character of surrounding development.*
5. *Non-residential activities are limited to community centres that:*
 - (a) support the needs of the immediate residential community;*
 - (b) are of a scale and intensity compatible with the residential character and amenity of the area;*
 - (c) wherever possible, are co-located with other non-residential activities in the locality;*
 - (d) avoid adverse impacts on the local road network; and*
 - (e) are managed to minimise unreasonable impacts to the amenity of surrounding residents.*
6. *Building design, site layout and landscaping provide a sympathetic interface to the adjoining public spaces and between neighbours, provides privacy and attractive outdoor spaces.*
7. *An efficient pattern of land use with all lots connected to reticulated services, integrated with existing transport networks, and with convenient access to open space and community facilities.*

Assessment

The subdivision proposal is separated into 3 areas, area A and part of area C is in zone LR (Low Density Residential).

- Area A –The subdivision proposes to create 12 lots in this area having lots sizes ranging from 454m² to 715m².
- Area C - The subdivision proposes to create 4 lots and a 15m wide public road. The 2 lots to the north will be in zone LR and include lot sizes of 1429m² and 670m². The remaining 2 lots to the south will be in Zone LMR.

Access to area A will extend from Latrobe Street and include the creation of a 15m wide public road which will provide access to each of the lots. Access to area C will extend from O'Ferrals Road and include the creation of a 15m wide public road which will provide access to each of the lots. Council access from Area A to Area C to Lot 7433 is provided from an access road adjacent to Lot 10A and Lot 1C. City of Darwin advises they are satisfied with the new access arrangements to the remaining part Lot 7433, to allow vehicle access between area A and area C.

The proposal will add to the residential land supply for low density dwellings (such as dwelling-single, dwelling-independent and ancillary structures etc.) in an area identified for a range of low-rise housing options in accordance with the purpose of the zone.

The assessment of the lot layout and proposed building envelopes comply with Clauses 6.2.1 (Lot Size and Configuration for Subdivision in Zones LR, LMR, MR and HR) and 6.2.2 (Lots Less Than 600m² for Dwellings-Single).

The land is located in an area with access to existing transport networks, reticulated services, open space and community facilities.

COMPLIES**4.3 Zone LMR – Low-Medium Density Residential**Zone Purpose

Provide a range of low rise housing options that contribute to the streetscape and residential amenity in locations supported by community services and facilities, and where full reticulated services are available.

Zone Outcomes

1. *A blend of dwellings-single, associated dwellings-independent, dwellings-group and dwellings-multiple predominantly of two storeys or less, on a range of lot sizes that respond to changing community needs.*
2. *Home based businesses and dwellings-community residence are conducted in a manner consistent with residential amenity.*
3. *Residential care facilities are of a scale and conducted in a way that maintains the residential character and amenity of the zone.*
4. *Non-residential activities are limited to community centres that:*
 - (a) *support the needs of the immediate residential community;*
 - (b) *are of a scale and intensity compatible with the residential character and amenity of the area;*
 - (c) *wherever possible, are co-located with other non-residential activities in the locality;*
 - (d) *avoid adverse impacts on the local road network; and*
 - (e) *are managed to minimise unreasonable impacts to the amenity of surrounding residents.*
5. *Building design, site layout and landscaping provide a sympathetic interface to the adjoining public spaces and between neighbours, provides privacy and attractive outdoor spaces.*
6. *An efficient pattern of land use with all lots connected to reticulated services, integrated with existing transport networks, and with reasonable access to open space and community facilities.*

Assessment

The subdivision proposal is separated into 3 areas, area B and part area C is in zone LMR (Low-Medium Density Residential).

- Area B – The subdivision proposes to create 2 lots in this area measuring 399m² and 392m².
- Area C - The subdivision proposes to create 4 lots and a 15m wide public road. The 2 lots to the north will be in zone LR and 2 lots to the south will be in Zone LMR and include lot sizes of 1812m² and 597m².

Access to area B is provided from Fanning Drive/O'Ferrals Road and access to area C will extend from O'Ferrals Road and include the creation of a 15m wide public road which will provide access to each of the lots. City of Darwin advises they are satisfied with the new access arrangements to the remaining part Lot 7433, to allow vehicle access between area A and area C.

The proposal will add to the residential land supply for low-medium density dwellings (such as dwelling-single, dwelling-group etc.) in an area identified for a range of low-rise housing options in accordance with the purpose of the zone.

The assessment of the lot layout and proposed building envelopes comply with Clauses 6.2.1 (Lot Size and Configuration for Subdivision in Zones LR, LMR, MR and HR) and 6.2.2 (Lots Less Than 600m² for Dwellings-Single).

The land is located in an area with access to existing transport networks, reticulated services, open space and community facilities.

COMPLIES

6.2.1 Lot Size and Configuration for Subdivision in Zones LR, LMR, MR and HR

Purpose

Ensure that subdivision of land for urban residential purposes creates lots of a size, configuration and orientation suitable for residential development at a density envisaged by the zone.

Administration

1. The consent authority must not consent to a subdivision that reduces a lot size by an area greater than 5% of the minimum specified in Table A to this clause:
 - (a) in Zone LR; or
 - (b) in Zones LR and MR in Alice Springs and adjacent zoned areas.
2. The consent authority must not consent to a subdivision in Zone LMR that is not in accordance with Table A to this clause.
3. The consent authority may consent to a subdivision in Zone LR, MR or HR that is not in accordance with Table A to this clause only if it is satisfied that all lots created are consistent with the purpose of this clause and the zone purpose and outcomes.
4. The consent authority may consent to a subdivision that is not in accordance with sub-clauses 5-12, only if it is satisfied the subdivision is consistent with the purpose of this clause and the zone purpose and outcomes.

<u>Requirements</u>	Assessment
5. Land is to be subdivided in accordance with Table A to this clause.	<p>LR – The lot sizes proposed through Area A and Part Area C are listed below in Figure 2. For LR in greenfield areas the proposal results in an average lot size of 601.21m² and complies with the minimum lot size requirement of Average of 600m² and no smaller than 450m².</p> <p>LMR – The lots sizes proposed through Area B (399m² and 392m²) and Part Area C (1812m² and 597m²) comply with the minimum lots size requirement of 300m².</p>
6. Lots are to conform with the building envelope requirements in Table B to this clause.	The proposal complies with the minimum building envelopment requirements as assessed in Figure 3 table below.
7. Lots have sufficient area and appropriate dimensions to provide for the proposed density of developments including dwellings, vehicle access, parking and ancillary buildings.	The assessment of the building envelope plan indicates that all lots can comply with the building envelope requirements. The lot sizes and configuration are suitable for dwellings, vehicle access, parking and ancillary buildings.
8. There are no battle-axe lots.	No battle axe lots are proposed.
9. Lots are oriented to allow dwellings to take advantage of environmental conditions such as prevailing breezes and sunlight.	The lot orientation varies throughout the subdivision however the application indicates that a range of lot which is suitable to capture prevailing

<u>Requirements</u>	Assessment
	breezes. Lots along the western boundary are configured to enable exposure to solar heat gain to be minimised.
10. Lots are connected to reticulated services.	The application confirms that all lots will be connected to reticulated services.
11. Potential land use conflicts are minimised by taking account of the visual and acoustic privacy of residents.	No land use conflict or privacy impacts are expected as a result and the design.
12. Where there are lots for medium and higher density residential development, those lots are: (a) distributed in small groups serviced by public transport; (b) in close proximity to public open space and with adequate access to community facilities and services; and (c) not located in a cul-de-sac.	There are no lots for medium or higher density.

Table A to Clause 6.2.1: Lot Size and Configuration in Residential Subdivisions	
Zone	Minimum Lot Size
LR in greenfield areas identified for compact urban growth in the strategic framework	Average of 600m² and no smaller than 450m²
LR other than greenfield areas identified for compact urban growth in the strategic framework	800m ²
LR, MR, HR and lots for residential buildings in Zone T	800m ²
LMR	300m²

Assessment

Figure 2: Average lot size calculation for Zone LR (Areas A and Part C)

Lot #	Lot Size (m²)
1A	502
2A	497
3A	479
4A	461
5A	461
6A	461
7A	485
8A	454
9A	580
10A	715
11A	625
12A	598
1C	1429
2C	670
Total Area	8417
Average lot size	601.21

Table B to Clause 6.2.1: Lot Size and Configuration in Residential Subdivisions	
Lot Size	Minimum Building Envelope Requirement
300m ² to less than 450m ²	7m x 15m (exclusive of any boundary setbacks or service authority easements)
450m ² to less than 600m ²	8m x 15m (exclusive of any boundary setbacks or service authority easements)
600m ² and greater	17m x 17m (exclusive of any boundary setbacks or service authority easements)

Figure 3: Assessment against sub-clause 6 against building envelopment plans provided.

Lot #	Lot Size (m²)	Minimum building envelopment required (Xm by Xm)*	Compliance as shown on building envelopment plans
1A	502	8 x 15	Complies
2A	497	8 x 15	Complies
3A	479	8 x 15	Complies
4A	461	8 x 15	Complies
5A	461	8 x 15	Complies
6A	461	8 x 15	Complies
7A	485	8 x 15	Complies
8A	454	8 x 15	Complies
9A	580	8 x 15	Complies
10A	715	17 x 17	Complies
11A	625	17 x 17	Complies
12A	598	8 x 15	Complies
1B	392	7 x 15	Complies
2B	399	7 x 15	Complies
1C	1429	17 x 17	Complies
2C	670	17 x 17	Complies
3C	1812	17 x 17	Complies
4C	597	8 x 15	Complies

*(exclusive of any boundary setbacks or service authority easements)

COMPLIES

6.2.2 Lots Less Than 600m² for Dwellings-Single

Purpose

Ensure the subdivision of land to lots of less than 600m² will allow residential development that minimises impact on amenity and the functionality of the street infrastructure.

Administration

1. The consent authority must not consent to a subdivision that is not in accordance with sub-clauses 3 and 4.
2. An application must provide plans to demonstrate the requirements of sub-clause 4.

Requirements

3. Lots subject to this clause shall not have a boundary to any public road less than specified in the table to this clause.
4. The site layout of lots subject to this clause is able to comply with the purpose of this clause and the development requirements for vehicle parking (5.2.4), building setbacks (5.4.3 and 5.4.3.3) and private open space (5.4.6).

Table to Clause 6.2.2: Lots Less than 600m² for Dwellings-Single

Range of Lot Size	Minimum length of any Boundary to a Public Road
300m ² to less than 450m ²	10m
450m ² to less than 600m ²	13m

Assessment

Assessment against sub-clause 3 for minimum length of any boundary to a public road.

Lot #	Lot Size (m ²)	Length of boundary to a public road		Compliance
		Proposed (m)	Required (m)	
1A	502	30.3, 4, 4 and 9.1 (47.4 total)	13	Complies
2A	497	14	13	Complies
3A	479	13.5	13	Complies
4A	461	13	13	Complies
5A	461	13	13	Complies
6A	461	13	13	Complies
7A	485	13.7	13	Complies
8A	454	13.4 and 9.1 (22.4 total)	13	Complies
9A	580	2.9 and 12 (14.9 total)	13	Complies
10A	715	12, 5 and 30.4 (47.4 total)	13	Complies
11A	625	21.3	13	Complies
12A	598	29.2	13	Complies
1B	392	14	10	Complies
2B	399	14	10	Complies
1C	1429	13 and 49 (62 total)	13	Complies
2C	670	11.3 and 3.5 (14.8 total)	13	Complies
3C	1812	Approximately 42	13	Complies
4C	597	15.8, 6.8 and 38.9 (61.5 total)	13	Complies

As assessed above, the subdivision proposal complies with the minimum boundary to any public road.

Compliance with the requirements of clauses 5.2.4, 5.4.3 and 5.4.6 will require individual assessment depending on the design and layout and siting of the proposed dwellings.

COMPLIES**6.2.3 Site Characteristics for Subdivision in Zones LR, LMR, MR and HR**Purpose

Ensure that the subdivision of land provides lots suitable for urban residential purposes that respond appropriately to the physical characteristics of the land and does not detrimentally impact on surrounding land.

Administration

1. The consent authority may consent to a subdivision that is not in accordance with sub-clauses 2-6, only if it is satisfied the subdivision design is consistent with the purpose of this clause.

Requirement	Assessment
2. Avoid the development of land of excessive slope, unstable or otherwise unsuitable soils (e.g. seasonally waterlogged) and natural drainage lines.	The land has been included in the DISAP and is identified for future development, through the proposed concurrent application the proposed rezoning will facilitate residential development. Lot A comprises grassed and vegetated vacant land, which is partially filled over intertidal mud flats. The

<u>Requirement</u>	Assessment
	<p>lot is bounded by a filled area to the north, by residential allotments located on a filling platform to the south and west, a narrow corridor of cleared mangroves, and then a mangrove forest to the east. Lot A site surface currently slopes down to the east from about RL5.5 m AHD on the crest of the filling platform to about RL2 to 2.6 m along the eastern lease boundary.</p> <p>Lot C comprises un-vegetated vacant land located in a re-entrant corner of the Bayview rock armoured seawall, as well as low-lying intertidal mud flats. The lot is bounded by residential allotments located on a filling platform to the north, west and south and by a narrow corridor of cleared mangroves, then mangrove forest to the east. Lot C surface is currently level at about RL5.5 m along the western boundary and slopes down across the rock wall to about RL1.8 to 2.4 m over intertidal mudflats along the eastern lease boundary.</p> <p>Furthermore, the land unit mapping identifies that the soils are subject to seasonal inundation. The application proposes a sea wall along the eastern boundary and bulk earthworks to ensure the land is suitably filled to a height to enable the development of the lots for their intended purposes, thereby avoiding risk and damage due to any storm surge event.</p>
<p>3. <i>Ensure, by site selection or site grading, that areas intended for lots less than 600m² do not slope in excess of 2%, such that the need for on-site stormwater structures, retaining walls and the like is minimised.</i></p>	<p>The application proposes bulk earthworks to ensure the land is suitably filled to a height to enable development of the lots for their intended purposes. The applicant has requested a condition precedent to demonstrate site grade of less than 2% as this will be address in the detailed design.</p>
<p>4. <i>Retain and protect significant natural and cultural features.</i></p>	<p>Mangroves exist within parts of Areas A and C, which will be removed as part of the filling of the land.</p> <p>The application was referred to the Department of Lands, Planning and Environment who advised of matters to be addressed by the applicant in relation to addressing buffer zones for biting midges and disturbance of Potential Acid Sulfate Soils. The applicant provided at response to the matters raised advising that the matters can be addressed through conditions on any development permit issued.</p> <p>The application was referred to the Aboriginal Areas Protection Authority (AAPA). A note advising the</p>

<u>Requirement</u>	Assessment
	developer to obtain a certificate from the AAPA can be recommended on any permit issued for the proposed subdivision.
5. <i>Avoid development of land affected by a 1% AEP flood or storm surge event.</i>	Refer to discussion provided under sub-clause 1 above.
6. <i>Retain and protect natural drainage lines and any distinctive landform features or stands of natural vegetation and incorporate them into public open space.</i>	Refer to the discussion provided under sub-clause 4 above.

COMPLIES

6.2.4 Infrastructure and Community Facilities for Subdivision in Zones LR, LMR, MR and HR

Purpose

Ensure that subdivision of land for residential purposes is appropriately integrated with infrastructure, community services and facilities.

Administration

1. The consent authority may consent to a subdivision that is not in accordance with sub-clauses 2-7, only if it is satisfied the subdivision is consistent with the purpose of this clause.

<u>Requirements</u>	Assessment
2. <i>Provide a high level of internal accessibility and external connections for pedestrian, cycle and vehicle movements.</i>	<p>Area A shall be accessed via a proposed road extension of Latrobe Street.</p> <p>Area B shall be accessed via O'Ferrals Road.</p> <p>Area C shall be accessed via a proposed road extension and a minor intersection off O'Ferrals Road.</p> <p>The assessment notes that the proposed road network will restrict the opportunity to link the existing Bayview subdivision to the future subdivision of Lot 7433 (Zone FD).</p>
3. <i>Provide links to schools, commercial facilities and public transport services.</i>	There are no links to these facilities other than via existing roads.
4. <i>Provide traffic management to restrain vehicle speed, deter through traffic and create safe conditions for all road users.</i>	The road reserve widths proposed in the subdivision is 15m. Council access from Area A to Area C to Lot 7433 is provided from an access road adjacent to Lot 10A and Lot 1C. City of Darwin advises they are satisfied with the new access arrangements to the remaining part Lot 7433, to allow vehicle access between area A and area C.

<u>Requirements</u>	Assessment
5. <i>Incorporate street networks capable of accommodating safe and convenient bus routes with stops within a 400m radius of a majority of dwellings.</i>	The existing bus shelter located on Fanning Drive is 300m-400m from Area A and B, and 600m from Area C. The majority of dwellings are within 400m of existing bus stop.
6. <i>Provide for connection to reticulated services.</i>	The subdivision is intended to be serviced by electricity, water and sewer and the application has been circulated to Power and Water Corporation for comment.
7. <i>Provide a minimum of 10% of the subdivision area as public open space which:</i> <i>(a) ensures the majority of dwellings are within 400m walking distance of a neighbourhood park;</i> <i>(b) incorporates recreational open space in larger units available for active leisure pursuits;</i> <i>(c) is unencumbered by drains and has sufficient flat area for informal recreation; and</i> <i>(d) is designed to provide a safe environment for users by allowing clear views of the open space from surrounding dwellings or passing vehicles.</i>	No public open spaces are proposed as part of this proposal. All lots are within 400m of existing public open space.

COMPLIES

Lands Planning
Planning.ntg@nt.gov.au



**Aboriginal Areas
Protection Authority**
protecting sacred sites across the territory

Dear Lands Planning

Re: Lot 05988 and Lot 07433, Town of Darwin – Application to Rezone from Zone FD (Future Development) to Zone LR (Low Density Residential) and Zone LMR (Low-Medium Density Residential)

Thank you for the opportunity to comment on this proposed concurrent application.

The Aboriginal Areas Protection Authority (AAPA) **recommends that Mr Kevin Dodd apply for an Authority Certificate** in accordance with section 19B of the *Northern Territory Aboriginal Sacred Sites Act 1989* (the Sacred Sites Act) prior to undertaking any development activity or other work in Lot 05988 and Lot 07433, Town of Darwin. There is information on the AAPA homepage on how to apply for an [Authority Certificate](#).

There are recorded sacred sites located approximately 250m from the south of the subject land which could potentially be damaged by development activities.

In the absence of an Authority Certificate, a body corporate or an individual who undertakes work on a sacred site will be committing an offence against the Sacred Sites Act and may be subject to penalties of up to 400 penalty units or imprisonment for 2 years (or 2000 penalty units in the case of a body corporate). Additional offences under the Sacred Sites Act may also apply.

Background Information

AAPA is a statutory authority responsible for overseeing the protection of Aboriginal sacred sites on land and sea across the Northern Territory.

The protection of sacred sites is recognised by the Northern Territory Government and the broader Territory community as an important element in the preservation of the Territory's cultural heritage, for the benefit of all Territorians. AAPA seeks to strike a balance between the protection of sacred sites and development in the Northern Territory.

Yours sincerely,

Jayde Manning
Ministerial/Policy Officer
11 March 2024

cc: Mr Kevin Dodd – E – kdodd@eja.com.au

To:

Please Quote: PA2023/0327

Mrs Sally Graetz

Manager Urban Planning
Department of Infrastructure, Planning & Logistics
GPO Box 1680
DARWIN NT 0801

5 April 2024

Dear Mrs Graetz

Parcel Description: **Lots 5988 & 7433 (57 & 0) Bayview Boulevard Bayview**

Proposed Development: **Rezone from Zone FD (Future Development) to Zone LR (Low Density Residential) and Zone LMR (Low-Medium Density Residential) and a Subdivision to create 19 Lots**

Thank you for the concurrent planning application referred to this office 8 March 2024, regarding the above.

The following issues are raised for consideration by the Development Consent Authority (Authority):

Proposed Planning Scheme Amendment

City of Darwin notes that the proposed rezoning is in accordance with the Darwin Inner Suburbs Area Plan which applies to the subject site, and as such, City of Darwin does not object to the rezoning.

City of Darwin Vehicle access to Lot 7433

City of Darwin requests that the Authority obtain updated plans demonstrating the provision of a heavy vehicle access to Lot 7433, to allow vehicle access between Area A and Area C. This vehicle access is essential for the continued maintenance to the remaining section of lot 7433 by City of Darwin.



The plans should clearly illustrate the location, width and how heavy vehicles will access lot 7433 without any obstructions.

Area B Vehicle Access

City of Darwin requests that the Authority obtains updated plans demonstrating that the vehicle access to both the residential lots within Area B comply with City of Darwin standards.

The proposed driveway design does not meet City of Darwin standards.

Stormwater

Despite the current absence of gross pollutant traps (GPTs) on the stormwater outlets within the development, it is noted that the Northern Territory Subdivision Development Guidelines (NT SDG) July 2023, requires developers to incorporate stormwater quality objectives and mitigation measures in their Stormwater Management Plans.

In accordance with the NT SDG and City of Darwin requirements, gross pollutant traps to stormwater outlets affected by this subdivision are required to be installed, to the satisfaction of the City of Darwin and at no cost to Council.

Infrastructure

Due to the specialised nature of the works required to install the infrastructure, City of Darwin will be requiring an extended defects liability period for all infrastructure within this subdivision which is to be handed to City of Darwin. The duration of this extended defects liability will be discussed and agreed upon during the application process.

Street Trees

City of Darwin's recently completed suite of 2030 strategies, including the Climate Emergency Strategy, Movement Strategy, Greening Darwin Strategy, and the joint NTG, City of Darwin and CSIRO Feeling Cooler in Darwin: Heat Mitigation Strategy, all promote shaded walkable suburbs.

To encourage walking, cycling and other active modes of transport, City of Darwin requires a landscaping plan for the road reserves that considers:

- appropriately located street trees that consider driveways and other infrastructure, to reduce the need for future removal
- tree spacings that provide optimal shade coverage and promote healthy growth
- a suitable mix of tree species that considers:
 - vulnerability to climate change
 - shade coverage
 - a growth rate that provides shade within a reasonable timeframe
 - resistance to cyclones, termites and other pests
 - biodiversity (eg. birds & butterfly attractants, etc)
 - a preference for native species, particularly those that are hardy and require less maintenance.



i). **City of Darwin requests that should a development permit be issued, that the following be provided as conditions precedent:**

- a). A heavy vehicle access shall be provided to the remaining section of Lot 7433 (between area A and area B) to allow the continued maintenance of this area.
- b). A vehicle access shall be provided to each residential lot, to City of Darwin standards.
- c). **Stormwater**

City of Darwin requests that the Authority require a revised engineered stormwater plan completed by a suitably qualified civil engineer. The plan is to demonstrate the on-site collection of stormwater, surface levels and its discharge into the local underground stormwater drainage system be submitted to, and be approved by City of Darwin, prior to the stormwater condition precedent being cleared.

The plan shall include details of the gross pollutant traps, site levels, City of Darwin's stormwater drain connection point/s and connection details.

d). **Site Construction Management Plan**

City of Darwin requests that a Site Construction Management Plan (SCMP) be required.

The SCMP should specifically address the impact to City of Darwin owned land and infrastructure, including the following:

- waste management plan for disposal of waste to Shoal Bay
- traffic control for affected City of Darwin roads
- haulage routes
- storm water drainage & sediment control
- use of City of Darwin land, and
- how this land will be managed during the construction phase.

all to the satisfaction of City of Darwin.

Note: Sediment control measures are to be established and maintained, to prevent silt and sediment escaping the site or causing erosion.

Building rubbish or debris must not be placed, or be permitted to be placed, on any adjoining public reserve, footpath or road, without first obtaining approval from City of Darwin.



ii). **Should the above issues be adequately addressed, City of Darwin offers the following comments:**

City of Darwin comments on issues for which it is the sole responsible authority, under the *Local Government Act* and associated By-Laws:

a). **Street Trees**

Street trees planting within City of Darwin road reserves is to be undertaken to City of Darwin's satisfaction.

As street trees will become an asset of City of Darwin, the developer shall provide City of Darwin the specifications of quality tree stock prior to planting.

The developer shall provide City of Darwin a Plant Schedule for street trees indicating:

- root-ball container volume (litres)
- height of species (metres)
- calliper (millimetres)
- details identifying the nursery supplying the tree stock, and
- confirmation that the developer will enter a one year maintenance period with City of Darwin, as detailed in the NT SDG.

Prior to the establishment of street trees within the road reserve, contact shall be made with City of Darwin to ensure appropriate species and planting locations are defined.

b). **Street and Public Lighting**

Street and public lighting shall be designed to achieve the minimum lighting levels required as per the AS/NZS 1158.3.1:2020 and the lighting design shall be certified by a member of the Illuminating Engineering Society (The IES). Street and public lighting designs for public spaces/road reserves/pathways within the subdivision shall be compatible with the City of Darwin's smart lighting control system.

c). **Road Design**

Prior to construction, plans must be submitted, demonstrating all road infrastructure including, but not limited to; the road reserve widths, road geometries pavement widths and a detailed landscaping plan for all proposed road reserves, with all works meeting the requirements of the Northern Territory Government's Subdivision Guidelines 2023.



Should this application be approved, the following conditions pursuant to the *Planning Act* and City of Darwin's responsibilities under the *Local Government Act* are also recommended for inclusion in the development permit issued by the Development Consent Authority.

- Designs and specifications for landscaping of the road verges adjacent to the property shall be submitted for approval by City of Darwin and all approved works shall be constructed at the applicant's expense, to the requirements of City of Darwin.
- The location, design and specifications for proposed and affected crossovers shall be provided at the applicant's expense, to the satisfaction of City of Darwin.
- Kerb crossovers and driveways to the site shall be provided and disused crossovers removed, public footpath and shared paths shall be provided, stormwater shall be collected and discharged into City of Darwin's drainage network, all of which is to be provided at the applicant's expense, to the requirements and satisfaction of City of Darwin.
- Sight lines shall be provided at crossovers to public streets, to the satisfaction of, City of Darwin. No fence or tree exceeding 0.6 metres in height shall be planted in front of the sight line.
- All developments on/or adjacent to any easements on-site, in favour of City of Darwin shall be carried out to the requirements and satisfaction of City of Darwin.
- All works on/over City of Darwin property shall be subject to separate application to City of Darwin and shall be carried out to the requirements and satisfaction of City of Darwin.
- All stormwater connections to City of Darwin stormwater system shall be subject to separate application to City of Darwin and shall be carried out to the requirements and satisfaction of City of Darwin.
- Engineering design and specifications for the proposed and affected roads, including:
 - street lighting
 - stormwater drainage
 - vehicular access
 - pedestrian/cycle corridors, and
 - street-scaping and landscaping of nature strips.
- Shall comply with the Northern Territory Subdivision Development Guidelines 2023. All approved works will be constructed at the applicant's expense, to the requirements of City of Darwin.
- Any easements or reserves required for the purposes of stormwater drainage, roads, access or for any other purpose, shall be made available free of cost to City of Darwin, and/or neighbouring property owners.



If you require any further information in relation to this application, please feel free to contact City of Darwin's Innovation Team on 8930 0300 or darwin@darwin.nt.gov.au

Yours faithfully

Signed by:

87CE57347FEB682

ALICE PERCY
GENERAL MANAGER INNOVATION



From: [Brian Sellers](#)
To: [Monica Pham](#)
Cc: [Connell L. Brown](#)
Subject: RE: PA2023/0327 - Request for referral agency comments - Lots 5988 and 7433, Town of Darwin
Date: Thursday, 5 September 2024 2:57:54 PM
Attachments: [image003.png](#)

Hi Monica,

Thank you for sending through the updated information for the above development application.

City of Darwin has assessed the revised plans and is satisfied with the new access arrangements to the remain part Lot 7433, to allow vehicle access between Area A and Area C.

The other issues raised in the letter dated 5 April 2024 can be included in the conditions in any development permit issued.

Thanks

Brian

BRIAN SELLERS
PLANNING COORDINATOR



Civic Centre | 17 Harry Chan Avenue | GPO Box 84 Darwin NT 0801
P: +61 8 8930 0683
www.darwin.nt.gov.au

Please consider the environment before printing this email.

City of Darwin is proud to operate on Larrakia country. We acknowledge the Larrakia people as the Traditional Owners of the Darwin region and pay our respects to Larrakia elders past and present. We are committed to working with all Larrakia people to care for our community and this land and sea for our shared future.

From: Monica Pham <Monica.Pham@nt.gov.au>
Sent: Friday, August 23, 2024 4:47 PM
Cc: Das NTG <Das.NTG@nt.gov.au>; Amit Magotra <Amit.Magotra@nt.gov.au>; Andres Calvo <Andres.Calvo@nt.gov.au>
Subject: PA2023/0327 - Request for referral agency comments - Lots 5988 and 7433, Town of Darwin

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good afternoon

I refer to the above planning concurrent application PA2023/0327, lodged over Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin, and Lot 7433, Town of Darwin for:

- Proposed Planning Scheme Amendment: Rezone from Zone FD (Future Development) to Zone LR (Low Density Residential) and Zone LMR (Low-Medium Density Residential) and
- Proposed Development: Subdivision to create 19 lots.

Please find attached additional information received from the applicant in relation to the proposal:

- *EIA 8093 - Supplementary Report* - includes a response to submissions (public and referral agencies) received during the exhibition period

Attachment A - 2024 - Review Pre-referral screening assessment – Bayview

- Letter - Review Pre-referral screening assessment
- Amended plans titled 8093-37.4-A (2023-10-30), 8093-37.4-B (2023-10-30), 8093-37.4-C (2023-11-20), 8093-38.4-(2024-07-11), 8093-29.4-(2024-08-09), 8093-27.4-(2024-07-11), 8093-28.4-(2024-07-11), 8093-31.4 (setback)-(2024-07-11), 8093-32.4 (setback)-(2024-07-11), 8093-33.4 (setback)-(2024-07-11), 8093-36.4-(2024-07-11) and 8093-39.4-(2024-07-11).
- NT22007_SK101_AREA B DRIVEWAY ACCESS

The proposed subdivision layout changes include:

- changes to the layout and lot sizes in areas A (Lot 10) and C (Lots 1 to 3)
- addition of council access between Areas A and C.

If you would like to provide additional comments please email me or Das.NTG@nt.gov.au **by COB on Friday 6 September 2024**. If you require more time to provide a response, please let me know.

If you have any queries regarding the application, please contact me.

Thank you

Monica Pham

Senior Planner – Strategic Projects
Development Assessment Services
Department of Infrastructure, Planning and Logistics

Level 1, Energy House, 18-20 Cavenagh Street, Darwin
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www.nt.gov.au



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Mr Joshua Allbeury
Department of Infrastructure, Planning and Logistics
GPO Box 1680
DARWIN NT 0801

Dear Mr Allbeury

**Re: PA2023/0327 - Rezone from FD to LR & LMR - Lot 5988 Town of Darwin, and
Subdivision to create 19 lots**

The Department of Environment, Parks and Water Security (DEPWS) has assessed the information contained in the above application and provides the following comments:

Environment Division

The applicant should consider whether the development has the potential for a significant environmental impact under the *Environment Protection Act 2019* by using the pre-referral screening tool referenced below.

The Northern Territory Environment Protection Authority (NT EPA) is an independent statutory authority made up of six members and a chairperson. They are supported to undertake their functions by staff in the Department of Environment, Parks and Water Security (DEPWS). Their role includes making decisions about significant environmental impacts and conducting environmental impact assessments under the *Environment Protection Act 2019* (EP Act) and Environment Protection Regulations 2020.

What is environmental impact assessment and when is a referral to the NT EPA required?

- Environmental impact assessment is a process for assessing significant environmental impacts.
 - General information can be found on the NT EPA website¹.
 - The environment is defined as all aspects of the surroundings of humans including physical, biological, economic, cultural and social aspects. The NT EPA has developed environmental factors and objectives as a system for organising information for these aspects, 'The guide to the NT EPA environmental factors and objectives'².

¹ <https://ntepa.nt.gov.au/your-business/environment-impact-assessment>

² https://ntepa.nt.gov.au/_data/assets/pdf_file/0020/804602/guide-ntepa-environmental-factors-objectives.pdf

- A proposal that has the potential to have a significant impact on the environment must be referred by a proponent to the NT EPA. If a proponent fails to refer a proposal, the NT EPA can 'call in' the proposal.
- The NT EPA has developed guidance for proponents on referring a proposal³. The guidance includes a pre-referral screening tool at Appendix 1 (p.21). This will assist a proponent's suitably qualified environmental professional (either from within your organisation or an external environmental consultant) to identify the matters that should be addressed in the referral.
 - If check box records a 'no' response, there needs to be scientific reasoning/evidence for this.
 - If a check box records 'uncertain' or 'yes', a referral is likely to be required, and the referral should outline the measures that will avoid, minimise or manage impacts to these matters as much as possible.
 - If a checkbox records 'uncertain', the referral may identify the gaps in knowledge and studies that the proponent plans to undertake to increase certainty about the extent of impact.

What happens if my proposal needs to be referred to the NT EPA?

- If a referral under the EP Act is required:
 - Stakeholder engagement is an important component of environmental impact assessment. Your referral should include details of stakeholder engagement (relevant to the stage of your development). The NT EPA's guidance on stakeholder engagement is available online⁴.
 - There are maximum time limits on all steps in the impact assessment process, however good quality information in the referral is likely to result in shorter timeframes than those advertised. A flow chart of the environmental assessment process is available online⁵.
 - Once a referral is accepted it will be made available for public comment for 20 business days, after which the NT EPA will make its decision about whether the potential impacts are significant. The maximum timeframe for the NT EPA to make this decision is 50 business days from the date that the NT EPA accepts the referral.
- The quality of the information presented in the referral is critically important to the assessment decision and timeframes. A good quality referral will result in the most efficient assessment process.

What happens if the NT EPA decides my proposal has the potential to have a significant impact?

- If the NT EPA decides that there is potential for significant impacts, further assessment and environmental approval is required before any secondary approval can be issued. There are three options for assessment:
 - Tier 1 - Assessment by referral information (the fastest method at max 60 days);

³ https://ntepa.nt.gov.au/_data/assets/pdf_file/0009/805167/referring-a-proposal-to-the-nt-epa.pdf

⁴ https://ntepa.nt.gov.au/_data/assets/pdf_file/0005/884696/guidance-proponents-stakeholder-engagement-and-consultation.pdf

⁵ https://depws.nt.gov.au/_data/assets/pdf_file/0006/816909/info3-flow-chart-eia-assessment-approval-process.pdf

- Tier 2 - Assessment by supplementary environmental report (SER); and
- Tier 3 - Assessment by environmental impact statement (EIS).
- If the NT EPA decides that an environmental impact assessment is required, the proposal may not commence until the environmental impact assessment process is complete and an environmental approval has been issued by the Minister for Environment.

The information provided regarding the proposal does not appear to trigger licensing requirements of an Environment Protection Approval under the *Waste Management and Pollution Control Act 1998* (WMPC Act).

Should the proponent collect, transport, store, recycle or treat listed wastes on a commercial or fee for service basis as part of the premises development, then an Environment Protection Approval or Licence will be required to authorise the activity under the WMPC Act.

Any listed wastes generated during the construction or operation of the facility must be transported by an appropriately licenced waste handler to an appropriately licenced facility for treatment, recycling and/or disposal.

There are statutory obligations under the WMPC Act that require all persons to take all measures that are reasonable and practicable to prevent or minimise pollution or environmental harm and reduce the amount of waste. The proponent is required to comply at all times with the WMPC Act, including the General Environmental Duty under section 12. There is also requirement to obtain an authorisation prior to conducting any of the activities listed in Schedule 2 of the WMPC Act.

Guidelines to assist proponents to avoid environmental impacts are available on the Northern Territory Environment Protection Authority (NT EPA) website⁶.

To help satisfy the General Environmental Duty, the proponent is advised to take notice of the list of environmental considerations below. The list is not exhaustive, and the proponent is responsible for ensuring their activities do not result in non-compliance with the WMPC Act.

The WMPC Act, administered by the NT EPA, is separate to and not reduced or affected in any way by other legislation administered by other departments or authorities. The NT EPA may take enforcement action or issue statutory instruments should there be non-compliance with the WMPC Act.

A non-exhaustive list of environmental issues that should be considered to help satisfy the environmental duty are listed below:

1. **Dust:** The proposed activities have the potential to generate dust, particularly during the dry season. The proponent must ensure that nuisance dust and/or nuisance airborne particles are not discharged or emitted beyond the boundaries of the premises.
2. **Noise:** The proponent is to ensure that the noise levels from the proposed premises comply with the latest version of the NT EPA Northern Territory Noise Management Framework Guideline available online⁷.
3. **Erosion and Sediment Control (ESC):** The proponent must ensure that pollution and/or environment harm do not result from soil erosion.

⁶ <https://ntepa.nt.gov.au/publications-and-advice/environmental-management>

⁷ https://ntepa.nt.gov.au/_data/assets/pdf_file/0004/566356/noise_management_framework_guideline.pdf

The ESC measures should be employed prior to and throughout the construction stage of the development. Larger projects should plan, install and maintain ESC measures in accordance with the current International Erosion and Sediment Control Association (IECA) Australia guidelines and specifications.

Where sediment basins are required by the development, the NT EPA recommends the use of at least Type B basins, unless prevented by site specific topography or other physical constraints.

Basic advice for small development projects is provided by the NT EPA document: Guidelines to Prevent Pollution from Building Sites⁸ and Keeping Our Stormwater Clean⁹.

4. **Stormwater:** The proponent must ensure that there is no discharge of contaminants or wastes from the premises into either the groundwater or any surface waters.
5. **Storage:** If an Environment Protection Approval or Environment Protection Licence is not required, the proponent should store liquids only in secure bunded areas in accordance with VIC EPA Publication 1698: Liquid storage and handling guidelines, June 2018, as amended. Where these guidelines are not relevant, the storage should be at least 110% of the total capacity of the largest vessel in the area.

Where an Environment Protection Approval or Environment Protection Licence is required, the proponent must only accept, handle or store at the premises listed waste, including asbestos, as defined by the WMPC Act, in accordance with that authorisation.

6. **Site Contamination:** Historical activities (including impacts from Cyclone Tracy) may have resulted in contamination at the premises. An assessment in accordance with the National Environment Protection (Assessment for Site Contamination) Measure (ASC NEPM) is required to determine whether the land is suitable for the intended land use. The proponent is encouraged to refer to the information provided on the NT EPA website¹⁰ and the NT Contaminated Land Guideline¹¹.
7. **Waste Management - Import and Export of Fill:** The proposed activities have the potential to generate fill and/or involve the importation of fill for use on-site. Untested fill material may already be present on the site. All fill imported or generated and exported as part of the activity must either be certified virgin excavated natural material (VENM) or be sampled and tested in line with the NSW EPA Guidelines¹².

All imported fill material must be accompanied by details of its nature, origin, volume, testing and transportation details. All records must be retained and made available to authorised officers, upon request. The proponent should also consider the following NT EPA fact sheets: How to avoid the dangers of accepting illegal fill onto your land¹³, and Illegal Dumping - What You Need to Know¹⁴.

⁸ https://ntepa.nt.gov.au/_data/assets/pdf_file/0010/284680/guideline_prevent_pollution_building_sites.pdf

⁹ https://ntepa.nt.gov.au/_data/assets/pdf_file/0006/284676/guideline_keeping_stormwater_clean_builders_guide.pdf

¹⁰ <https://ntepa.nt.gov.au/your-environment/contaminated-land>

¹¹ <https://ntepa.nt.gov.au/your-environment/contaminated-land/contaminated-land-databases-and-resources>

¹² <https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material>

¹³ https://ntepa.nt.gov.au/_data/assets/pdf_file/0005/285728/factsheet_avoid_danger_accepting_illegal_fill_to_your_land.pdf

¹⁴ https://ntepa.nt.gov.au/_data/assets/pdf_file/0008/285740/factsheet_illegal_dumping_what_you_need_know.pdf

Rangelands Division

Land Assessment Branch

The development has the potential to create acid sulfate soils and consideration should be made to manage and mitigate acid sulfate soils during the development. Any proposed works should be undertaken in accordance with the National Acid Sulfate Soils Guidance and further information¹⁵. Jurisdictional guidelines such as the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines v4.0 (Dear et al. 2014) and the Western Australian Acid Sulfate Soils Guidelines Series (DER 2015) may also be referenced.

Essential to an investigation is the requirement for Chromium Reducible Sulfur (CRS) soil testing at an appropriate site density and to a soil depth immediately below the proposed disturbance. If acid sulfate soils are detected through CRS testing, and exposure of these soils is unavoidable then an acid sulfate soil management plan is required. Depending on the scale of the project, the acid sulfate soil management plan should include the following:

- exact location of the proposed disturbance;
- depth and volume of soil to be disturbed (m³);
- clearly presented CRS results;
- acid base accounting results which clearly indicate an accurate liming rate;
- appropriately designed treatment pads; lime/soil mixing regimes; and
- an appropriate monitoring program.

Should the development application be approved, the Land Assessment Branch recommends the inclusion of the following permit note.

Permit Note

The development has the potential to create Acid Sulfate Soils (ASS) and consideration should be made to manage and mitigate acid sulfate soils during the development. Any proposed works should be undertaken in accordance with the National Acid Sulfate Soils Guidance and further information - <https://www.waterquality.gov.au/issues/acid-sulfate-soils>. Jurisdictional guidelines such as the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines v4.0 (Dear et al. 2014) and the Western Australian Acid Sulfate Soils Guidelines Series (DER 2015) may also be referenced. It should be noted that failure to ensure proper management of ASS could result in implications with your proposed development.

Land Management Unit

It is noted that an Erosion and Sediment Control Plan is included in the application documents. The Land Management Unit has not reviewed this document.

Due to the location and nature of the works involved with the proposed subdivision, should the application be approved the Land Management Unit recommends the inclusion of the following conditions and notes on the development permit:

Condition Precedent

1. Prior to the commencement of works, a Type 2 Erosion and Sediment Control Plan (ESCP) must be developed in accordance with the Department of Environment, Parks and Water Security

¹⁵ <https://www.waterquality.gov.au/issues/acid-sulfate-soils>

Erosion and Sediment Control Plan (ESCP) procedures (see Note 1). The ESCP must be developed and certified by a Certified Professional in Erosion and Sediment Control (CPESC). The ESCP must be submitted for acceptance prior to the commencement of any earth disturbing activities (including clearing and early works) to Development Assessment Services via email: das.ntg@nt.gov.au.

General Conditions:

1. All works relating to this permit must be undertaken in accordance with the endorsed Erosion and Sediment Control Plan (ESCP) to the satisfaction of the consent authority.
Should the endorsed ESCP need to be amended, the revised ESCP must be developed and certified by a Certified Professional in Erosion and Sediment Control (CPESC). The revised ESCP must be submitted for acceptance to Development Assessment Services via email: das.ntg@nt.gov.au.
2. All reasonable and practicable measures must be undertaken to prevent: erosion occurring onsite, sediment leaving the site, and runoff from the site causing erosion offsite.
Appropriate erosion and sediment control measures must be effectively implemented throughout the construction phase of the development (including clearing and early works) and all disturbed soil surfaces must be satisfactorily stabilised against erosion at completion of works, to the satisfaction of the consent authority on written advice from the CPESC.

Permit Notes:

1. The Department of Environment, Parks and Water Security Erosion and Sediment Control Plan (ESCP) procedures as updated available at: <https://depws.nt.gov.au/land-management>.
2. Information regarding erosion and sediment control can be obtained from the IECA Best Practice Erosion and Sediment Control 2008 books available at www.austieca.com.au and the Land Management Factsheets available at www.nt.gov.au/environment/soil-land-vegetation. For further advice, contact the Development Coordination Branch: (08) 8999 4446.

Weed Management Branch

A desktop assessment of the NT Weeds Database for the application area, surrounding parcels and roads has revealed the following weed species:

Common Name	Botanical Name	Declared
Gamba grass	Andropogon gayanus	Class B
Perennial mission grass	Cenchrus polystachios	Class B
Hyptis	Hyptis suaveolens	Class B
Snake weed	Stachytarpheta sp	Class B

All land in the Northern Territory is subject to the *Weeds Management Act 2001* (WM Act). The WM Act describes the legal requirements and responsibilities that apply to all persons, owners and occupiers of land regarding declared and potential weeds. General duties described in Division 1 of the WM Act include the requirement for owners or occupiers of land to take all reasonable measures to prevent land being infested with a declared weed, and to prevent a declared weed from spreading.

There are four types of classifications for a declared or potential weed under the WM Act: Class A (to be eradicated); Class B (growth and spread to be controlled); Class C (not to be introduced into the Territory or part of the Territory); and Class D (prevent the spread by actions of persons).

Gamba grass is subject to a Statutory Weed Management Plan under the WM Act. Management obligations outlined in these plans must be adhered to by all landholders.

Gamba grass is known to be present on many undeveloped properties in the Bayview area.

As described in the Weed Management Plan for Gamba Grass 2020-2030, gamba management must be implemented for the current and proposed parcels, to meet the minimum requirements in the Class B Zone area. It should be noted that there are specific gamba requirements outlined in the weed management plan for blocks that are less than 3ha in size.

Should the development application be approved the Weed Management Branch recommends to following permit note.

Permit Note:

All land in the Northern Territory is subject to the *Weeds Management Act 2001* (WM Act). The WM Act describes the legal requirements and responsibilities that apply to owners and occupiers of land regarding declared weeds. General duties described in Division 1 of the WM Act include the requirement to take all reasonable measures to prevent land being infested with a declared weed and to prevent a declared weed from spreading. There are additional duties including a prohibition on buying, selling, cultivating, moving or propagating any declared weed and the requirement to notify the Weed Management Branch of a declared weed not previously present on the land within 14 days of detection.

Gamba grass is subject to a statutory weed management plan. Management obligations outlined in these plans are legally binding on all owners and occupiers. Management requirements and copies of the statutory weed management plans are available online at <https://nt.gov.au/environment/weeds/weed-management-planning>.

Information regarding weed management is available online, <https://nt.gov.au/environment/weeds>, or alternatively contact the Weed Management Branch for further advice on (08) 8999 4567.

Further information as to management requirements and the Weed Management Plan for gamba grass is available online¹⁶, or alternatively contact the Weed Management Branch for further advice on (08) 8973 8857.

Flora and Fauna Division

The Flora and Fauna Division has reviewed the application and notes that there will be some clearing of mangroves but notes that those areas have already been impacted by the existing Bayview development due to edge effects and changes to local hydrology etc.

¹⁶ <https://nt.gov.au/environment/weeds>

Water Resources Division

The lots are located outside a water control district and are not subject to a water allocation plan.

Information about water resource management can be obtained from the DEPWS website¹⁷.

Should you have any further queries regarding these comments, please contact the Development Coordination Branch by email DevelopmentAssessment.DEPWS@nt.gov.au or phone (08) 8999 4446.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'M Wauchope'.

Maria Wauchope
Executive Director Rangelands
12 April 2024

¹⁷ <https://depws.nt.gov.au/about/water-resources-division>

Mr Amit Magotra
Department of Infrastructure, Planning and Logistics
GPO Box 1680
DARWIN NT 0801

Dear Mr Magotra

Re: PA2023/0327 – Pre-Referral Screening Report over Lot 5988 (57) Bayview Boulevard, Bayview, Town of Darwin, and Lot 7433, Town of Darwin

Thank you for your request, seeking confirmation that the above proposal does not require referral under the *Environment Protection Act 2019* (EP Act). The decision about whether a referral is required is a decision for the proponent. Environment Division staff are unable to confirm that the proposal does not require referral to the Northern Territory Environment Protection Authority (NT EPA) under the EP Act. The statutory decision-maker for the *Planning Act 1999* may also refer the action to the NT EPA.

If a proponent decides not to refer a proposal to the NT EPA, the NT EPA may 'call-in' a proposal, if the NT EPA forms a view that a referral is required. Where there is uncertainty about the potential for significant impact, proponents are advised to make a referral to the NT EPA to minimise their risk of a call-in by the NT EPA late in the application process.

Environment Division

The Environment Division provides the following further comments:

The current application is part of a site that was previously subject to an NT EPA decision (Bayview Boulevard). The NT EPA decided in 2013 that it required environmental impact assessment by the method of environmental impact statement (EIS), under the former *Environmental Assessment Act 1982*. This assessment was terminated after enactment of the EP Act, due to inaction on the EIS.

The Bayview Boulevard proposal is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) EPBC 2015/7466.

The pre-referral screening report states that the proposal is unlikely to have a significant impact, however notes the presence of nearby sensitive receptors and the need for controls that are assumed to be regulated through a development permit. The report outlines the reasons why significant impacts on the environment are unlikely, but it does not address the question about whether there is potential for significant impact.

If the proposal is referred under the EP Act, the NT EPA would decide whether environmental impact assessment is required, based on the potential for the proposal to have a significant impact on the environment. In making this decision NT EPA would consider the proposed measures for avoiding or mitigating the potential for significant environmental impacts, and may also consider other statutory decision-making processes (including under the *Planning Act 1999*) that may mitigate the potential for significant environmental impacts.

We suggest that Development Assessment Services encourages the proponent to contact the Environmental Assessment team on 8994 4216 for a pre-referral meeting.

Should you have any further queries regarding these comments, please contact the Development Coordination Branch by email DevelopmentAssessment.DEPWS@nt.gov.au or phone (08) 8999 4446.

Yours sincerely



Maria Wauchope
Executive Director Rangelands
14 June 2024

Ms Monica Pham
Department of Infrastructure, Planning and Logistics
GPO Box 1680
DARWIN NT 0801

Dear Ms Pham

Re: PA2023/0327 Request for referral agency comments-Lots 5988 & 7433 Town of Darwin

The Department of Environment, Parks and Water Security (DEPWS) has assessed the information contained in the above application and provides the following comments:

Environment Division

The Environment Division have reviewed the additional information, and provides the following comments:

The applicant advised it has undertaken screening in accordance with the Northern Territory Environment Protection Authority's (NT EPA) pre-referral screening tool (Appendix 1 of the guidance for proponents on referring a proposal) and does not consider that the project has to potential to have a significant environmental impact.

However, it is noted that the NT EPA decided a previous proposal, 'Bayview – The Boulevard' project, which incorporated the current proposed development area, required environmental impact assessment. The reasons for the assessment included:

- The location of the project is within the NT Department of Health guideline 1.6km buffer distance from areas of extensive tidal mangroves, as areas of intensive natural breeding of pest biting midges. Development within the recommended buffer zone risks exposure of future residents to regular nuisance from biting midges.
- The proposed footprint presents a high risk of disturbance of Potential Acid Sulfate Soils, and associated ecological impacts if the disturbance is not appropriately managed.

It is not clear how these matters have been resolved in the current proposal.

We note that the NT EPA has the power to 'call in' a proposal that has the potential to have a significant impact on the environment that has not been referred by the proponent.

Should you have any further queries regarding these comments, please contact the Development Coordination Branch by email DevelopmentAssessment.DEPWS@nt.gov.au or phone (08) 8999 4446.

Yours sincerely



Maria Wauchope
Executive Director Rangelands

3 September 2024

5 April 2024

Monica Pham
Senior Project Officer
Development Assessment Services
Department of Infrastructure, Planning and Logistics
Floor 1, Energy House, 18-20 Cavenagh Street,
Darwin GPO Box 1680, Darwin, NT 0801

Dear Monica

Re: PA2023/0327 Concurrent application to change the zoning of part of Lots 5988 and 7433, Town of Darwin from FD (Future Development) to LR (Low Density Residential) and LMR (Low-Medium Density Residential) and then subdivide the subject parts of Lots 5988 and 7433 in order to create 19 lots. Bayview.

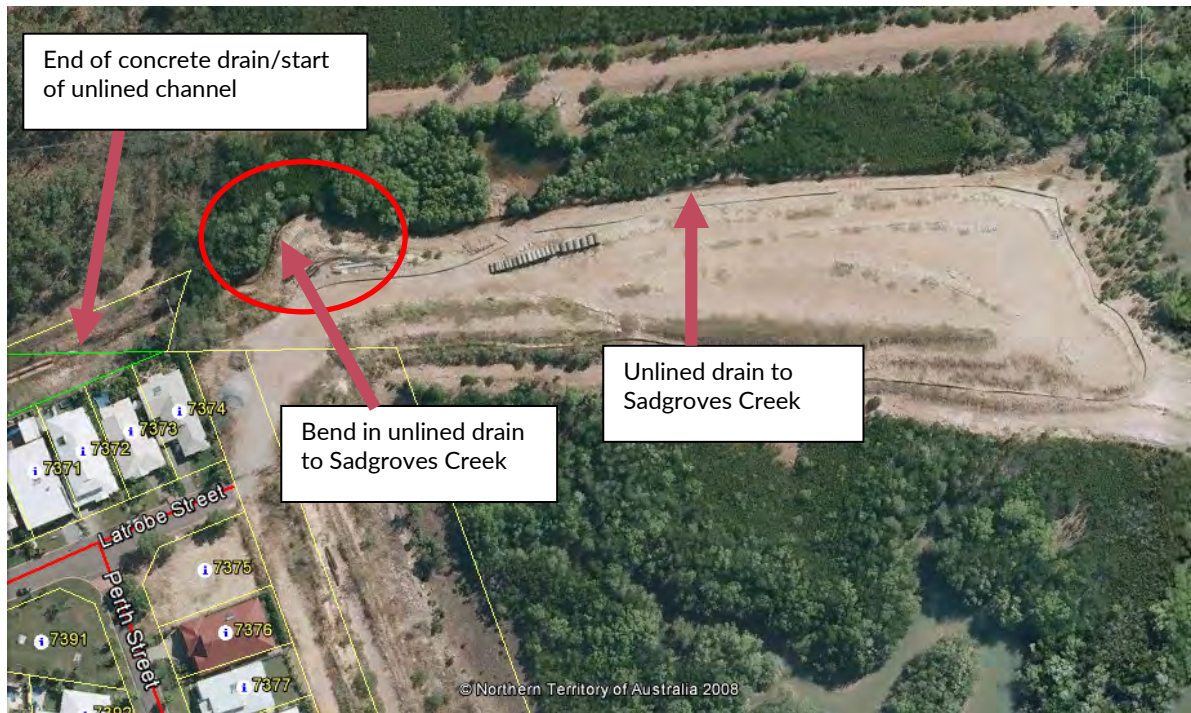
Thank you for the opportunity to comment on the above Development Application. Medical Entomology comments are as follows.

1. The proposed lots will be subject to high to very high pest biting midge problems, similar to the existing lots in Bayview. The biting midges will originate from the adjacent extensive mangrove area. There are currently no insecticide control options to treat mangrove biting midge breeding grounds. Adult biting midge control may be effective to some extent, but would be the responsibility of the landowner to organise such treatments on their private lots via a pest controller. The only currently proven method to reduce mangrove biting midge breeding is via reclamation or permanent flooding of the mangrove habitat within 1.5km of residents, which is unlikely to occur near Bayview.

Ordinarily, the biting midge problems at Bayview would be deemed to high to recommend urban density development, unless major mangrove reclaiming/flooding is carried out. However, there appears to have been a reduction in the size of the originally approved Bayview, and the affluent nature of the suburb suggests the potential for indoor airconditioned living to reduce biting midge exposure. Notwithstanding, Medical Entomology does receive biting midge complaints from residents, and newcomers to Darwin in particular can experience intense itching, secondary infection and scarring. Subsequently, there should be a warning on land titles advising of the biting midge problem, and that NT Health and local council is unable to resolve the biting midge issue. There should also be recommendations provided to prospective buyers regarding architectural design to reduce biting midge exposure. Photos have been provided in Appendix 1 of biting insect housing designs from Florida, US, which might be appropriate for Bayview.

2. The large stormwater drain along the northern boundary of Bayview residents appears incomplete. There is a bend in the drain immediately to the north of proposed Lot 12, caused by the placement of the fill stockpile. The below aerial photo from 2008 shows the bend in the drain, and the narrow outlet channel to Sadgroves Creek. The unlined drain is currently

overgrown with mangroves and heavily silted in the area where the bend occurs, whilst the downstream section alongside the fill stockpile to Sadgroves Creek also appears to be overgrown with mangroves.



The sedimentation and mangrove growth in the unlined section of the drain appears to be exacerbating upstream ponding in the concrete drain to the north of the existing houses on Latrobe St. This drain holds stagnant water during the dry season (see image below), with the resulting productive mosquito breeding requiring regular insecticide treatment by Medical Entomology.



It is therefore recommended that the drain be straightened where indicated on the first image, and the downstream channel to Sadgroves Creek desilted (if required). It should be noted that

whilst Medical Entomology is not an owner of stormwater drains, we are required to control mosquito breeding in urban drains, hence the recommendations to reduce ponding and mosquito breeding in this drain. It is also possible for mosquito breeding events to be missed, with a subsequent potential public health nuisance, therefore source reduction is recommended to prevent the potential for missed breeding events.

3. There should be an appropriate all weather access easement provided along the eastern boundary of proposed Lot 12, to allow machinery to access the southern bank of the unlined drain via Latrobe Street. The access embankment should be of an appropriate width for a backhoe or excavator to fit. Currently, Drawing No. 22/8093/27A suggests there will be no access provided to the southern side of the unlined drain for future maintenance.
4. There is the potential for land reclaiming and site works to create temporary mosquito breeding habitats, for example in shallow surface depressions, sediment ponds and wheel ruts. Any areas of ponding should be treated with a residual mosquito larvicide such as methoprene, until the development has been completed.

Recommended development permit conditions

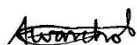
- a) Before issue of titles and pursuant to section 34 of the Land Title Act, a Caution Notice should be lodged with the Registrar General on the parent parcel to include the following advice on all the proposed lots indicated on the endorsed drawings. The Caution Notice is to state that: 'The land is subject to high biting midge problems, and the owner/occupier is responsible for managing biting midge problems that occur on this land. This could be via the use of personal insect repellents, avoidance of outdoor areas during periods of pest biting insect problems, use of protective clothing, use of fine mesh insect screening on dwellings and outdoor patios and verandas, and the use of adult biting insect control insecticides around houses and in shrub and grass areas, applied by a qualified pest controller'.
- b) A general condition regarding mosquito breeding prevention/control is applicable to the proposed development during the construction phase. The condition should read 'The developer should implement necessary measures to ensure mosquito breeding does not occur during the construction phase of the development, to the requirements of NT Health, to the satisfaction of the consent authority and in accordance with the *NT Public and Environmental Health Act 2011*'.

With regards to this condition, the developer can contact Medical Entomology for further advice. This condition would only apply if the development is not completed before the wet season.

- c) Whilst Medical Entomology is not a handover authority for stormwater assets, it is recommended that there is a condition to remediate the bend in the drain north of proposed Lot 12, to the satisfaction of the landowner/relevant government agency or local council that owns the drain. There should also be a general condition that mentions an appropriate all weather access easement is to be provided along the eastern boundary of proposed Lot 12 via Latrobe Street, to the satisfaction of the landowner.

Thank you for considering the points raised in this letter. Please contact me if there are any queries.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Allan Warchot', with a stylized flourish at the end.

Allan Warchot
Advice and Control Officer

Appendix 1 – Potential outdoor biting midge screening options



Photo 1. Florida, US. Biting insect screening on unit balconies.



Photo 2. Outdoor patio and pool mosquito and biting midge screening, Florida, US. Photo source <https://suncoastoutdoorliving.com.au/our-products/swimming-pool-enclosures/>

Phone 1800 245 092

Web powerwater.com.au

Record No: D2024/325175

Container No: NE200/5988

Your Ref: PA2023/0327 (additional information and amended plan)

Monica Pham
Development Assessment Services
GPO Box 1680
Darwin NT 0810

Dear Monica

Re: Lots 5988 & 7433 Bayview Boulevard Bayview Town of Darwin

In response to your additional information letter with amended plans of the above revised proposal for Concurrent Application:

- Rezone part of Lot 7433 from Zone FD to Zone LR and LMR to facilitate residential development; and
- Subdivision to create 18 residential lots and the balance Lots 5988 & 7433.

Power and Water Corporation (PWC) advises the following with reference to electricity enquiries:

1. PWC has no objection to the above revised proposal.
2. The Proponent's (Dover Investments) engaged AGA electrical consultant shall review the current subdivision layout and submit detailed electrical design drawings and verification of spare capacity from existing Substations 2626 and 2652 to PWC for construction approvals.
3. Dover Investments shall carry out other power servicing requirements as stated in the power response letter record D2024/98311 dated 14 March 2024.

If you have any further queries, please contact the undersigned on 8924 5729 or email:

PowerDevelopment@powerwater.com.au

Yours sincerely



Thanh Tang
Manager Distribution Development

28 August 2024

Phone 1800 245 092

Web powerwater.com.au

Record No: D2024/98311

Container No: NE200/5988

Your Ref: PA2023/0327

Joshua Allbeury / Monica Pham
Development Assessment Services
GPO Box 1680
Darwin NT 0801

Dear Joshua / Monica

Re: Lots 5988 & 7433 Bayview Boulevard Bayview Town of Darwin

In response to your letter of the above proposal for the purpose of Concurrent Application:

- Rezone part of Lot 7433 from Zone FD to Zone LR and LMR to facilitate residential development; and
- Subdivision to create 19 lots.

Power and Water Corporation (PWC) advises the following with reference to electricity enquiries:

1. The Developer shall be responsible for the costs to design and to install adequate underground electricity reticulation to the newly created lots in accordance with PWC's NP020 - Guidelines for Developers of Subdivision and Electricity Infrastructure.
2. PWC agrees in design principle with the Attachment I "Electrical Reticulation Plan" prepared by the engaged AGA Consulting Engineering dated 24/04/2023.
3. AGA electrical consultant shall submit A1 and A3 copies of detailed electrical design drawings and verification of spare capacity from existing Substations 2626 and 2652 to PWC for construction approvals.
4. PWC shall check and approve the electrical design drawings for construction by the Developer and carry out final connection work at applicable cost under current Australian Energy Regulator (AER) process.
5. The Developer shall engage an accredited electrical contractor (only with relevant fields of experience from the attached accreditation list) to construct the underground power extension works as per the approved electrical design drawings.
6. Appropriate electricity easements for new distribution pillars shall be surveyed and registered to Land Titles Office at no cost to PWC.

If you have any further queries, please contact the undersigned on 8924 5729 or email:

PowerDevelopment@powerwater.com.au

Yours sincerely



Thanh Tang
Manager Distribution Development

14 March 2024



Container No: LD200/5988

DIPL - Development Assessment Services
GPO Box 1680
Darwin NT 0801

Dear Monica,

RE: Request for Additional Agency Comments - PA2023/0327 - Lot 5988 Town of Darwin - 57 Bayview Boulevard - Bayview - concurrent application: Rezone from Zone FD to Zone LR & LMR and subdivision to create 19 lots

In response to your letter of the above proposal for development application purpose, Power and Water Corporation advises the following with reference to water and sewer enquiries:

1. The parent parcels are not currently connected to reticulated water and sewer services.
2. The developer is advised to engage a hydraulic consultant to assist with water and sewer servicing for the 19 lot subdivision. The developer is required to provide water and sewer services as follows:

Lot A

- For water – A new DN150 water main is to connect from the existing DN150 main at the end of Latrobe Street, be looped in the cul-de-sac and connect back into the existing DN100 in Perth Street. It is recommended that the water network is designed to direct flow through the cul-de-sac and reduce risk to water quality.
- For sewer – connect into existing sewer reticulation main in Latrobe Street via new DN150 sewer reticulation main.

Lot B

- For water – Install 2 x service connections on the existing DN150 water main in O'Ferrals Road
- For sewer – construct new sewer service connections for both lots and connect into existing vacuum pit BA/P1

Lot C

- For water – A new DN150 water main is to connect from the existing DN150 main in O'Ferrals Road, looped in the cul-de-sac and connect back into the existing DN150 in O'Ferrals Road. It is recommended that the water network is designed to direct flow through the cul-de-sac and reduce risk to water quality.
- For sewer – Construct new sewer reticulation main to service the subdivision and connect into existing DN125 vacuum sewer line via a new vacuum pit built as per PWC standard drawing W2-2-10A.

3. Only a single water and sewer service is permitted for each proposed individual lot. All new services are constructed by the developer, at no cost to Power and Water. Water and sewer mains shall be in public land.
4. If construction water is required please contact our Customer Services Centre on 1800 245092 or to apply for access to one of our filling stations please follow the link below:
<https://www.powerwater.com.au/customers/water-and-wastewater/water-filling-stations>
5. PWC are working towards a water efficient future, through the implementation of water saving practices that provide potential financial savings to our customers. PWC invites you to visit the Living Water Smart website <https://www.livingwatersmart.com.au/> to find out more on how to improve your developments, landscaping and irrigation.
6. The existing sewerage easement within Lot 5988 is still required. Structures must not be located on or over a water supply or sewerage easement, or where no easement exists (such as within a road), within 1.5 metres of the centreline of water and/or sewer main infrastructure.
7. All required works mentioned above must all be at according to Power and Water's Connection Code and at the developer's expense. A letter has been sent to the applicant outlining the fees and charges applicable for this development. All standard and quoted charges, as well as contribution charges will be valid for a period of 6 months from date of letter issue. As required, Power and Water will reassess the charges for the development.
8. Power and Water advises that the Water and Sewer Services Development Section (waterdevelopment@powerwater.com.au) and Power Network Engineering Section (powerdevelopment@powerwater.com.au) must be contacted via email a minimum of 1 month prior to construction works commencing.

If you have any further queries, please email waterdevelopment@powerwater.com.au

Yours sincerely



Sarah Hemopo

Services Development Officer

5th September 2024

cc: Kevin Dodd – Earl James and Associates

email: kdodd@eja.com.au

Level 1 Energy House
18-20 Cavenagh Street
Darwin NT 0820

Postal Address
GPO Box 1680
DARWIN NT 0801

T 08 8995 5319
E surveylandrecords@nt.gov.au

File Ref: LI2024/0005-0015

Dear Sir/Madam,

PA2023/0327

DATE : 10 April 2024

Survey Land Records has nil survey comments on the proposed Zoning changes in the Planning Application PA2023/0327.

Kind Regards
Survey Land Records

Dear Sir/Madam,

PA2023/0327

DATE : 18 September 2024

Survey Land Records has the following comments regarding the Planning Application PA2023/0327.

Please ensure that any potential encroachment issues are taken into account with regards to the new boundaries.

The subdivision also contains several proposed roads. For these roads to be officially named please contact Place Names Unit. Once the roads have been named and opened as road, Survey Land records will be able to assign street addressing to the development on data allocation according to the Australian/New Zealand Standard

Please be aware that there may be survey marks within the area, if any of these become disturbed please advise Survey Land Records.

Kind Regards
Survey Land Records

Monica Pham
Development Assessment Services
GPO Box 1680
Darwin NT 0801

File reference
DDL2011/0644-03
TCSD Project No: 2023-0010-P2

Dear Monica

**Re: DARWIN – LOT 5988 AND 7422 TOWN OF DARWIN – 57 BAYVIEW BOULEVARD, BAYVIEW –
SUBDIVISION TO CREATE NINETEEN (19) LOTS – DOVER INVESTMENTS PTY LTD – EARL
JAMES & ASSOCIATES**

I refer to the Development Assessment Services' correspondence of 5 June 20234 regarding Planning Application PA2023/0327.

I am pleased to advise that the Transport and Civil Services Division (TCSD), Department of Infrastructure, Planning and Logistics (DIPL) has no objections in principle to the above mentioned Subdivision, subject to the following comments and requirements:

1. All proposed work (including the provision or connection of services) within, or impacting upon the Tiger Brennan Drive road reserve shall be in accordance with the standards and specifications of the TCSD, DIPL.

Note that a development permit issued under the *Planning Act* is not an approval for access upon a Northern Territory Government (NTG) road. Approval for the access to be taken from, or constructed within the NTG controlled road reserve rests solely with the TCSD, DIPL as the approving authority.

2. All new road reserves created within the subdivision shall be vested with the relevant local road authority and shall be noted on the survey plans as such.

Should you wish to discuss the above mentioned further, please contact the TCSD on telephone 8999 4412.

Please quote the TCSD Project No 2023-0010 in all correspondence.

Yours sincerely



Chandan Kalase
Executive Director, Transport Planning

24/06/2024