Alterations & Additions to North Narrabeen SLSC Building

Statement of Environmental Effects

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Document Control

Ver	Effective Date	Description of Revision	Prepared by:	Reviewed by:
00	December 2023	Final Draft SEE	Rebecca Englund & Tanja Mackenzie	Louise Collier
01	January 2024	Final SEE	Tanja Mackenzie	Louise Collier

Prepared For: Northern Beaches Council

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Executive Summary

This Statement of Environmental Effects (SEE) has been prepared by Rhelm and Northern Beaches Planning to support the lodgement of a development application for alterations and additions to the existing North Narrabeen Surf Life Saving Club (SLSC) building at 225-229 Ocean Street, Narrabeen ('the site').

The SEE has been informed by architectural plans of the proposal and technical documents relevant to the individual circumstances and constraints of the site and provides an independent assessment of the proposal against the relevant state and local environmental planning instruments, plans and policies.

The SEE concludes that the proposed development:

- Is consistent with the provisions of the relevant environmental planning instruments and development control plans, and
- Has adequately addressed the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality, and
- Is a suitable site for the development, and
- Is in the public interest.

Abbreviations

Abbreviation	Description
AHD	Australian Height Datum
AHDDA	Aboriginal Heritage Due Diligence Assessment
AHIMS	Aboriginal Heritage Information Management System
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
Biodiversity and Conservation SEPP	State Environmental Planning Policy (Biodiversity and Conservation) 2021
CEA	Coastal Environment Area
CM Act	*Coastal Management Act 2016*
CPTED	Crime Prevention Through Environmental Design
CUA	Coastal Use Area
CVA	Coastal Vulnerability Area
CZMP	Coastal Zone Management Plan
DP	Deposited Plan
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
FM Act	*Fisheries Management Act 1994*
LALC	Local Aboriginal Land Council
LG Act	*Local Government Act 1993*
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NP&W Act	*National Parks and Wildlife Act 1974*
PCT	Plant Community Type
PoEO Act	*Protection of the Environment Operations Act 1997*
Resilience and Hazards SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
SEE	Statement of Environmental Effects
SEED	Sharing and Enabling Environmental Data
SLSC	Surf Life Saving Club
TEC	Threatened Ecological Community
WDCP 2011	*Warringah Development Control Plan 2011*
WLEP 2011	*Warringah Local Environmental Plan 2011*
ZRFC	Zone of Reduced Foundation Capacity
ZSA	Zone of Slope Adjustment

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Appendices

1 Introduction

This Statement of Environmental Effects (SEE) has been prepared by Rhelm Pty Ltd, in collaboration with Northern Beaches Planning Pty Ltd, on behalf of Northern Beaches Council to accompany the lodgement of a development application seeking consent for alterations and additions to the North Narrabeen Surf Life Saving Club (SLSC) building at the subject site.

This SEE is informed and accompanied by the following documentation:

- Site Survey by CMS Surveyors (dated 18/07/2023);
- Architectural Plans by Building Assets – Planning, Design & Delivery, Northern Beaches Council, revision D (dated November 2023);
- Absolute (2023a) *Accessibility Compliance Assessment Report* (**Appendix C**);
- Absolute (2023b) *BCA Compliance Assessment Report* (**Appendix C**);
- Baird (2023) *Draft Coastal Assessment and Management Report* (**Appendix A**);
- Barker Ryan Stewart (2023a) *Traffic and Parking Impact Assessment Report* (dated 28/09/2023) (**Appendix D**);
- Barker Ryan Stewart (2023b) *Construction Traffic and Pedestrian Management Plan* (dated 14/09/2023) (**Appendix D**);
- Certified Energy (2023) *Section J Energy Efficiency Report* (**Appendix E**);
- Coast (2023) *Aboriginal Heritage Due Diligence Assessment* (AHDDA) (**Appendix B**);
- EP Consulting (2023) *Construction and Demolition Waste Management Plan* (**Appendix F**);
- Waste Management Plan for the operational phase, completed in the Northern Beaches Council template (**Appendix F**);
- GHD (2023) *Acoustic assessment* (**Appendix G**);
- JK Environments (2023) *Preliminary Acid Sulfate Soil Assessment* (dated 14/07/2023) (**Appendix H**);
- JK Geotechnics (2023) *Geotechnical Investigation* (dated 28/07/2023) (**Appendix H**);
- Stormwater Management Plans by NB Consulting Engineers, issue A (dated July 2023).

This SEE is also informed by advice from Northern Beaches Council in the Pre-Lodgement Meeting Notes from the pre-lodgement meeting held on 31 August 2023.

2 Relevant legislation, Plans and Policies

The following State and local legislation, policies and plans are applicable to the proposed development:

- *Environmental Planning and Assessment Act 1979* (EP&A Act);
- *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation);
- *Coastal Management Act 2016* (CM Act) and *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP):
    - Coastal Use Area Map: Coastal Use Area
    - Coastal Environment Area Map: Coastal Environment Area;
- *Local Government Act 1993* (LG Act);
- *Crown Land Management Act 2016*;
- *Biodiversity Conservation Act 2016* (BC Act) and State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP);
- *Fisheries Management Act 1994* (FM Act);
- *Heritage Act 1997;*
- *National Parks and Wildlife Act 1974* (NP&W Act);
- *Protection of the Environment Operations Act 1997* (PoEO Act);
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)*;*
- Warringah Local Environmental Plan 2011 (WLEP 2011):
    - Acid Sulfate Soils Map: Class 4 and 5
    - Land Zoning Map: RE1 Public Recreation
    - Coastline Hazard Map: Area of Wave Impact & Slope Adjustment and Area of Reduced Foundation Capacity
    - Landslide Risk Land Map: Area A – Slope <5;
- Warringah Development Control Plan 2011 (WDCP 2011);
- *Coastal Zone Management Plan for Collaroy-Narrabeen Beach and Fishermans Beach* (Northern Beaches Council, 2016);
- *Coastal Lands Plan of Management* (Warringah Council, 2002) (hereafter the 'Plan of Management').

3 Site Details

3.1 Overview

The North Narrabeen SLSC building is located at 225-229 Ocean Street, Narrabeen ('the site'; refer **Figure 3-1**), which includes the following lots:

- Lots 6 and 8 Section 63 DP5768;
- Lots 1 and 2 DP339162; and
- Lot B DP376822.

The site is slightly irregular in shape (refer **Figure 3-2**) and is bound by North Narrabeen Beach to the east, Ocean Street to the west, Birdwood Park to the north and a public carpark to the south. The North Narrabeen SLSC building is located at the north-western corner of the site, and also comprises a playground, a public reserve and a portion of the public carpark.

Figure 3-1 Subject Site (image source: SIXViewer, https://maps.six.nsw.gov.au/, accessed 18/12/2023)

Figure 3-2 Site Overview (source: Nearmap, accessed 18/12/2023, aerial imagery captured 21/10/2023)

Surrounding development is varied, with shop top housing development, restaurants/cafes, and low and medium density residential development in the immediate vicinity of the site. Images of the site, the existing surf club building and surrounding development are provided in **Figure 3-3 to Figure 3-8**.

Figure 3-3 The existing building, as seen from the reserve to the south (source: NBP)

Figure 3-4 The existing building, as seen from the reserve to the south-east (source: NBP)

Figure 3-5 The existing building, as seen from the reserve to the north-east (source: NBP)

Figure 3-6 The existing building, as seen from the reserve to the west (source: NBP)

Figure 3-7 The children's playground and residential development on the opposite side of Ocean Street (source: NBP)

Figure 3-8 The intersection of Ocean and Malcolm Streets (source: NBP)

3.2 Land Use Zoning

The site is zoned RE1 Public Recreation under the provisions of WLEP 2011, as shown on the extract of the Land Zoning Map of WLEP in **Figure 3-9**.

Figure 3-9 WLEP 2011 Land Use Zoning Map (source: ePlanning Spatial Viewer, accessed 23/10/2023)

3.3 Land Tenure

The five lots that form the site are Council-owned community land and forms part of Birdwood Park. The site is managed by Northern Beaches Council in accordance with the *Warringah Council Coastal Lands Plan of Management* adopted 24 September 2002.

Figure 3-10 Land Tenure of the Site (source: Northern Beaches Council Land Register, accessed 18/12/2023)

3.4 Biodiversity

3.4.1 Environmental Planning Instruments

Portions of the site are identified as 'Biodiversity Values added in the last 90 days' on the Biodiversity Map and Thresholds Tool (BMAT), as shown in **Figure 3-11**. The BMAT identifies land with high biodiversity values under Part 7 of the BC Act. Should any clearing be proposed in the mapped area, a Biodiversity Development Assessment Report (BDAR) may be required.

Portions of the site are also identified on the Wildlife Corridor Map and Threatened and High Conservation Habitat Map of Warringah Development Control Plan 2011 (WDCP 2011), as shown in **Figure 3-12** and **Figure 3-13**.

Figure 3-11 Biodiversity Values Map (source: ePlanning Portal Spatial Viewer, accessed 18/12/2023)

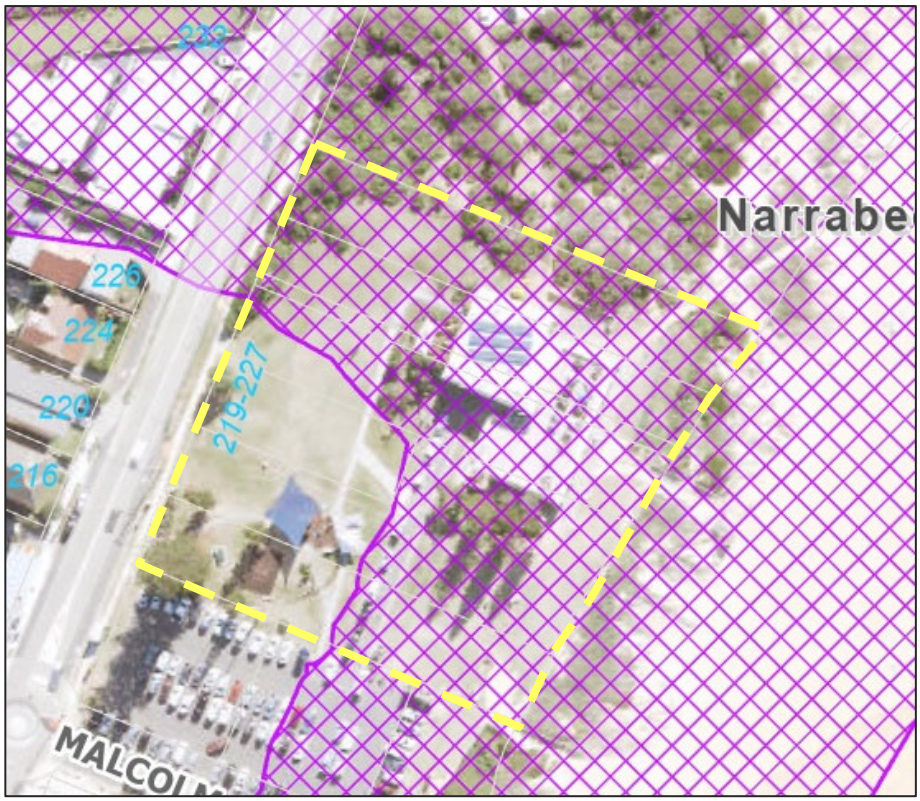


Figure 3-12 WDCP 2011 Wildlife Corridors Map (source: Northern Beaches Council Planning Map, accessed 18/12/2023)

Figure 3-13 WDCP 2011 Threatened and High Conservation Habitat Map (source: Northern Beaches Council Planning Map, accessed 18/12/2023)

3.4.2 Statutory Listings

Searches of the following databases and listings were also undertaken to identify any other biodiversity values, threatened species or communities, or endangered populations relevant to the site:

- Areas of Outstanding Biodiversity Value listed under Part 3 of the BC Act and Part 3 of the Biodiversity Conservation Regulation 2017 – there are none mapped for the subject site;
- Bionet Atlas for threatened species listed under the BC Act;
- Protected Matters Search Tool for Matters of National Environmental Significance (MNES), including threatened species, Threatened Ecological Communities (TECs) and endangered populations listed under the EPBC Act;
- Mapping of Native Vegetation of the Sydney Metropolitan Area – Version 3.1 (OEH, 2016) VIS_ID 4489; and
- The NSW Fisheries Spatial Data Portal for listings of Key Fish Habitat, estuarine macrophyte mapping and NSW Marine Protected Areas listed under the FM Act.

A search of the Bionet Atlas for records of threatened species listed under the BC Act and adopting a 10 km^2 search area returned:

- Three amphibians;
- Four reptiles, three of which were marine turtles;
- 42 species of bird, including shorebirds and marine birds;

- 20 species of mammal, including two whales and two fur-seals;
- 17 species of plant.

The Protected Matters Search Tool returned the following results for EPBC Act listed threatened species and TECs located within 5 km of the site:

- One snail;
- Three species of amphibian;
- Six reptiles, five of which were turtles;
- Four sharks;
- Six species of fish;
- 43 species of bird;
- 13 mammalian species;
- 30 species of plant.

There are no threatened plant species listed under the BC Act mapped in the Bionet Atlas as occurring on the site. A review of the available mapping in the Sharing and Enabling Environmental Data (SEED) Portal shows that there are no Bionet records for threatened species mapped on the site, but there are several for the general vicinity or that might transit the site, including:

- Species of shorebird and marine birds that use adjacent sandy beach and intertidal habitat;
- Birds and species of bat that might use the adjacent dune vegetation for foraging, or in the case of birds, roosting or nesting;
- Turtles, whales, sharks and fur-seals that may transit the adjacent ocean and occasionally enter Narrabeen Lagoon; and
- Some terrestrial mammals such as the Southern Brown Bandicoot (*Isodon obesulus obesulus*) or Grey-headed Flying-fox (*Pteropus poliocephalus*), that may transit the area on occasion.

Due to the lack of vegetation and modified nature of the site and noting also the availability of high quality habitat in the wider locality, it is not anticipated that threatened fauna species regularly use the site and would likely only transit the site on occasion.

A review of the Native Vegetation Mapping for the Sydney Metropolitan Area map as occurring in the dunes around the SLSC (refer **Figure 3-14**) Plant Community Type (PCT) 772 - Coast Banksia - Coast Wattle dune scrub of the Sydney Basin Bioregion and South East Corner Bioregion. According to the Vegetation Identification System, there are no TECs associated with this PCT. None of the vegetation mapped as PCT 772 would be impacted by the proposal.

The Protected Matters Search tool identifies eight TECs that may occur in the locality.

However, the site itself, comprising the grounds of the SLSC and children's playground is largely free of vegetation. The vegetation occurring around the SLSC building that may potentially be impacted by the works comprises landscaping, including three Norfolk Pines and a banksia tree planted near the southern façade of the building. No impacts to TECs are anticipated.

The Fisheries Spatial Data Portal maps Narrabeen Lagoon and the adjacent ocean as Key Fish Habitat. There are *Zostera* seagrasses, which are protected under the FM Act, mapped along the southern shoreline of the Lagoon, west of the Ocean Drive bridge. These areas are located to the north and east of the site.

Figure 3-14 Vegetation Map – Sydney Metro Area 3.1 2016 VIS_ID 4489 (source: SEED Portal, accessed 19/12/2023)

3.5 Heritage

3.5.1 Environmental Planning Instruments

A review of the WLEP 2011 identified two locally significant heritage items located near the site:

- Item I93, a stone wall located on Ocean Street near Malcolm Street; and
- Item I91, a Group of Washington Palms (*Washingtonia robusta*) on Malcolm Street and Lagoon Street.

The nearest item is I93 (refer **Figure 3-15**), which is located adjacent to the site along the western boundary.

Figure 3-15 WLEP 2011 Heritage Map (source: ePlanning Portal Spatial Viewer, accessed 18/12/2023)

3.5.2 Statutory Listings

In addition to listings under the WLEP 2011, heritage sites or places may also be listed under the *Heritage Act 1977*, the EPBC Act, or in the case of Aboriginal cultural heritage, the NP&W Act.

There are no sites listed under the *Heritage Act 1977* located on, or in proximity to, the site.

The Protected Matters Search Tool did not identify any Commonwealth heritage items on, or in proximity to, the site.

An AHDDA was prepared for the proposal in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010) and including a site walkover and engagement with the Metropolitan Local Aboriginal Land Council (LALC) (Coast, 2023). A search of the Aboriginal Heritage Information Management System (AHIMS) identified that, although there are no listed Aboriginal sites on the site itself, there are four within 4 km of the site, including:

- A closed rock shelter featuring artefact, shell;
- Three open sites including:
    - An artefact, shell,
    - Art (pigment or engraved), and
    - A burial site.

No archaeological material was observed on the day of the site visit (Coast, 2023). The AHDDA prepared by Coast (2023) concluded that while it was unlikely any archaeological remains would be encountered or impacted by the proposed works at the site, there remains potential to encounter previously unidentified sites. Hence, it was recommended that construction personnel should be provided with an Aboriginal heritage induction and that a representative of the Metropolitan LALC and a suitably qualified archaeologist/heritage consultant monitor any ground penetrating works. Coast (2023) provides further details of recommendations for managing potential impacts to Aboriginal heritage.

3.6 Coastal Hazards

The key factors of relevance to the evaluation of coastal hazards for the proposal are as follows:

- A review of the drawing set DA01 to DA16 (Revision D, dated November 2023) indicates that:
    - The proposed alterations and additions do not extend the SLSC beyond the current footprint occupied by the building and associated fixtures,
    - The ground elevations immediately seaward of the building are around 9.5-9.7 m AHD, and these would not be altered by the proposed development;
- The investigations undertaken by JK Geotechnics (2023) confirmed that the SLSC is founded on conventional pad footings embedded around 0.4 m below ground level and that the SLSC is founded on marine sands;
- Based on advice from Council regarding their asset management system, the functional life of the SLSC, including after the proposed alterations and additions, is to around 2050. After that time, the age and expected condition of the underlying building structure is likely to necessitate substantial structural modification or replacement of the building. Hence the *Coastal Assessment and Management Report* (Baird, 2023) considered potential coastal hazards to impact the SLSC up to 2050.

The site is subject to coastal hazards, intersecting both the Zone of Reduced Foundation Capacity (ZRFC) and the Zone of Slope Adjustment (ZSA) (refer **Figure 3-16**). These lines are consistent with those presented in the Coastal Zone Management Plan (CZMP) for Collaroy-Narrabeen Beach and Fishermans Beach (NBC, 2016) and correspond to a planning horizon of 2074.

The site is identified within 'Area 1: Collaroy-Narrabeen Beach North of Devitt Street' in the CZMP. Under the CZMP (NBC and Royal Haskoning, 2016) development seaward of the ZRFC is required to have piled foundations. However, these requirements, as detailed under Section 6.2 of the CZMP, are intended to apply to new development.

The earlier hazard mapping provided in the earlier CZMP for Collaroy-Narrabeen Beach and Fishermans Beach (Warringah Council and Royal Haskoning, 2014) adopted a similar erosion hazard assessment methodology as the 2016 CZMP, but derived the ZSA for the immediate (present day), 2050 and 2100 planning horizons. The ZSA and ZRFC lines from the 2014 CZMP are presented in **Figure 3-17** and **Figure 3-18** respectively. Based on that assessment, it is expected that between 2040 and 2050, the SLSC may be in the area where erosion hazard could impact on the capacity of the building foundations (i.e. part of the building is likely to be located within the ZRFC), but the SLSC is not expected to be in the active erosion zone.

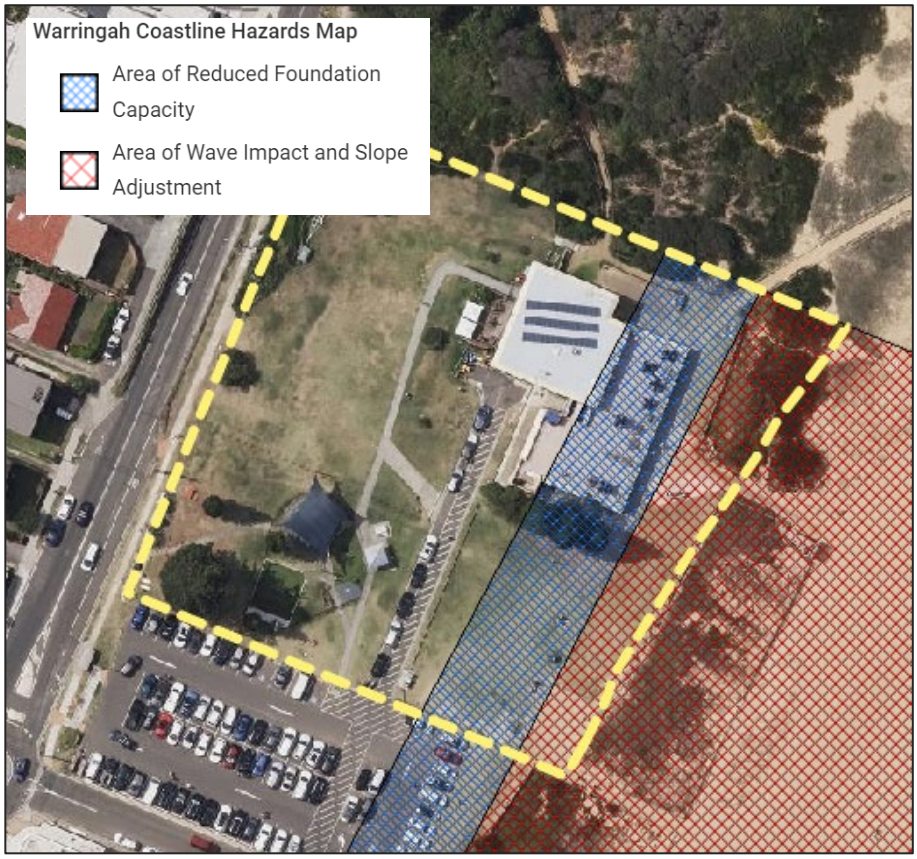


Figure 3-16 WLEP 2011 Coastline Hazards Map (Planning Horizon to 2074) (source: ePlanning Portal Spatial Viewer, accessed 18/12/2023)

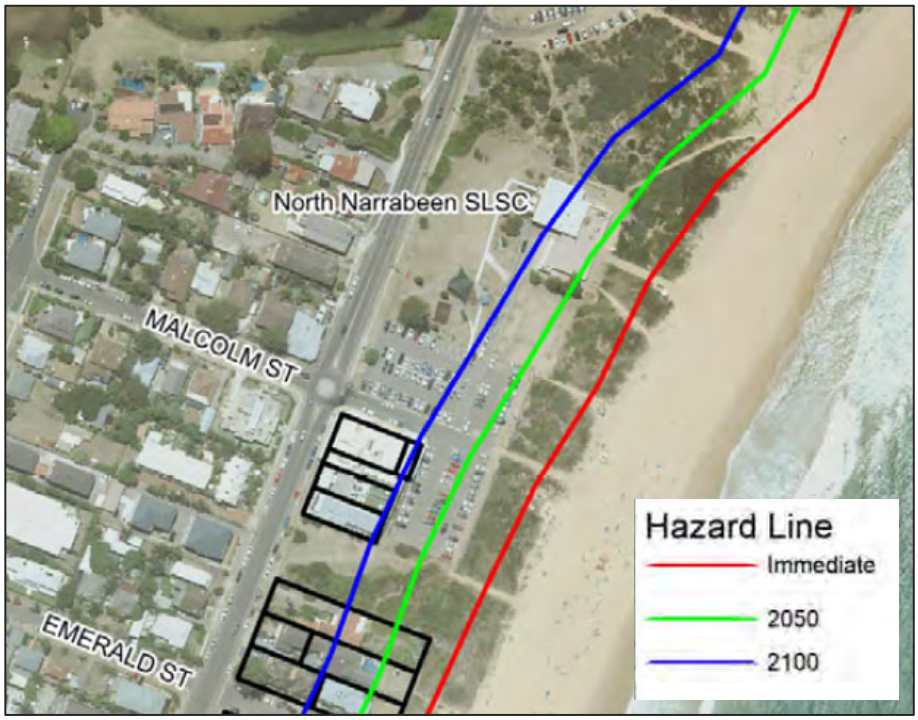


Figure 3-17 Coastal erosion hazard lines (located at the landward edge of the ZSA; after: Warringah Council & Royal Haskoning, 2014)

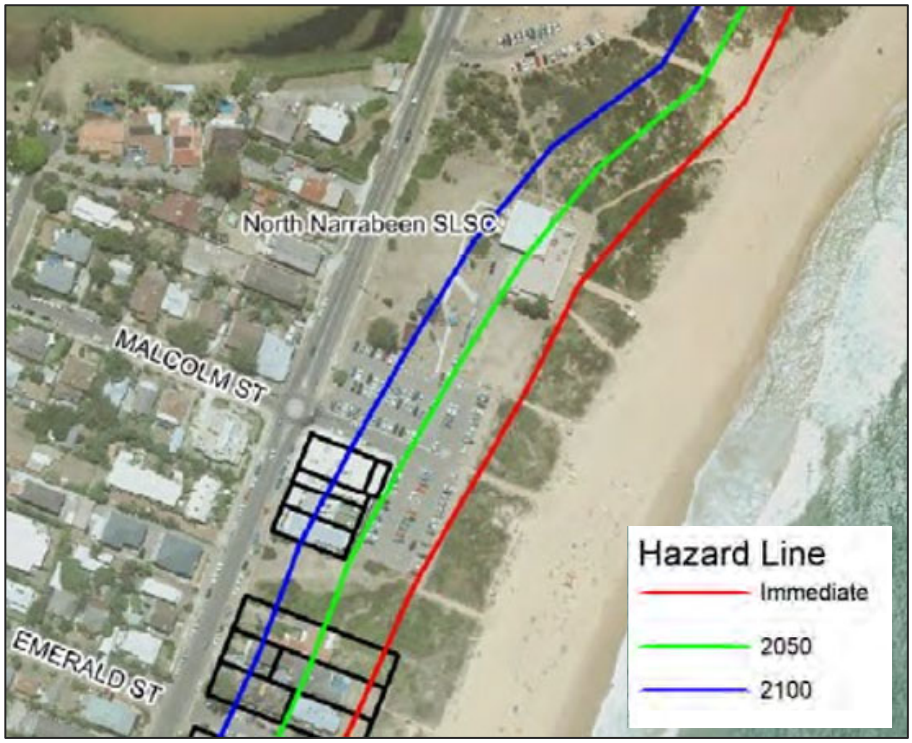


Figure 3-18 Coastal erosion hazard lines (located at the landward edge of the ZRFC; after: Warringah Council & Royal Haskoning, 2014)

The *Coastal Assessment and Management Report* (Baird, 2023) concluded that the probability of the SLSC being located within the ZRFC during or following a severe erosion event by 2050 is around 1% per annum. Considering the essential function of the SLSC and need for it to be located close to the beach for beach surveillance and life-saving purposes, this is considered an acceptably low level of risk. The assessment also concluded that the SLSC is not expected to be subject to coastal inundation.

3.7 Other Hazards

A review of the hazard mapping provided under the WLEP 2011 indicates that the site is:

- Largely Class 4 Acid Sulfate Soils (refer **Figure 3-19**); and
- Low risk of landslide, comprising Class A land with a slope <5 degrees (refer **Figure 3-20**).

The Northern Beaches Bushfire Prone Land Map 2020 does not map any of the site as bushfire prone land. No part of the site is mapped in the Northern Beaches Flood Hazard Map.

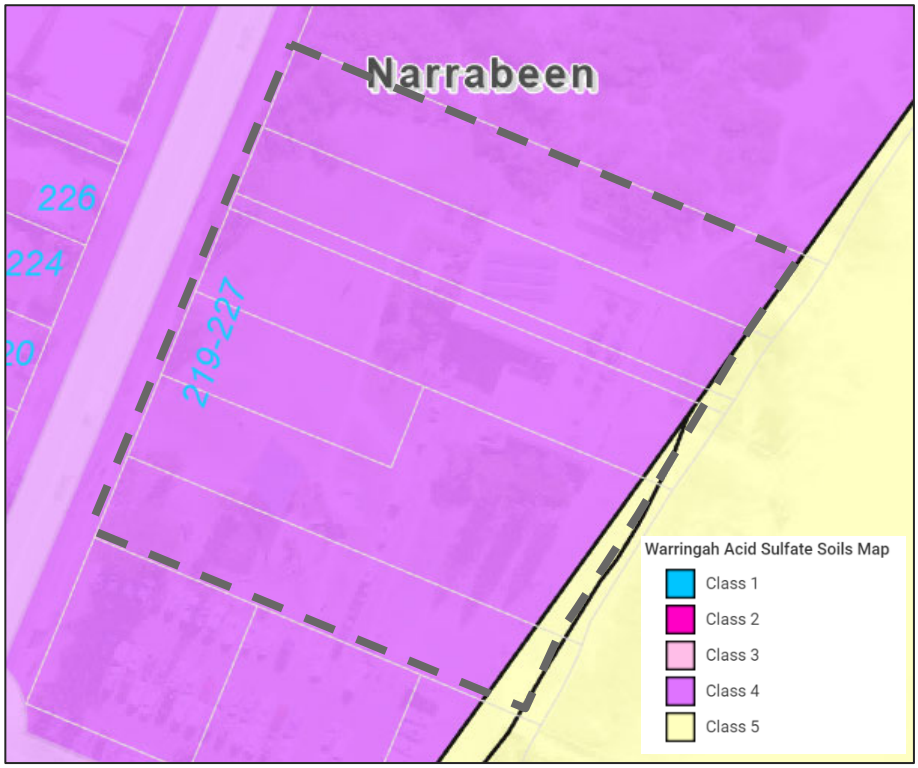


Figure 3-19 WLEP 2011 Acid Sulfate Soils Map (source: Northern Beaches Council Planning Map, accessed 18/12/2023)

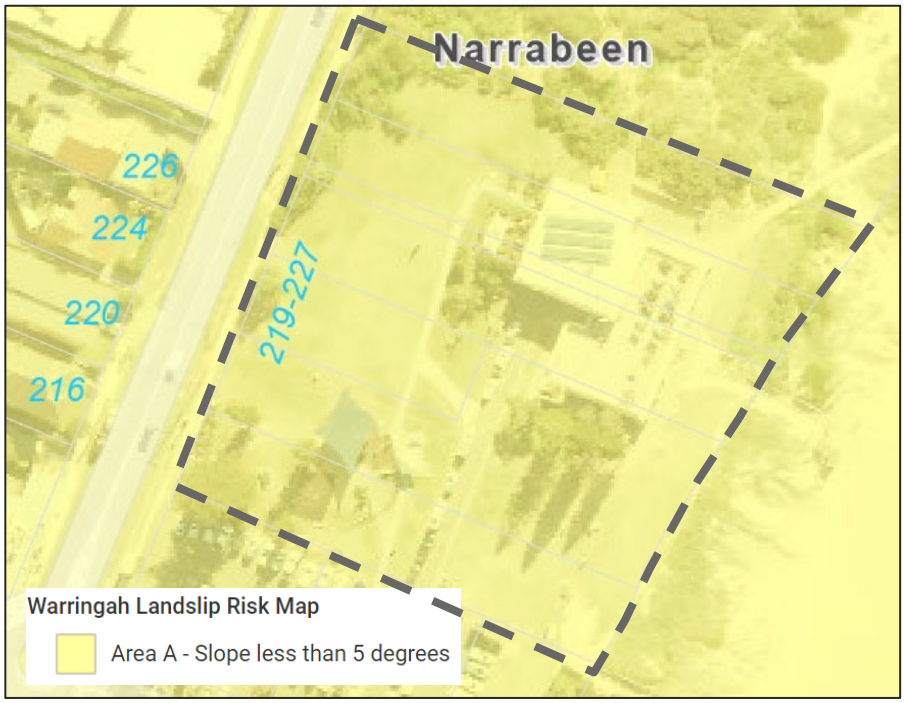


Figure 3-20 WLEP 2011 Landslip Risk Map (source: Northern Beaches Council Planning Map, accessed 18/12/2023)

4 Proposed Development

4.1 Existing Use of the Site

The dominant use of the existing site is for the purpose of a community facility. Additional functions that are ancillary to the dominant use of the site are:

- **Café**
  The café is located at the south-western corner of the first floor, with patrons able to utilise existing internal and external seating areas at the first floor.
  The café trades seven days, between 6:30 am -2:30 pm.
- **Club Bar**
  The club bar is located centrally on the first floor, with patrons able to utilise existing internal and external seating areas at the first floor.
  The club bar trades from Friday – Sunday, as follows:
    - Friday: 4:00 pm – 9:00 pm
    - Saturday: 3:00 pm – 9:00 pm
    - Sunday: 11:00 am – 9:00 pm (peak) or 3:00 pm – 9:00 pm (off-peak).
- **Nippers**
  North Narrabeen SLSC operate Nippers on Sunday mornings between 8:45 am and 12:00 pm from October to March. A BBQ is hosted on the balcony every second Sunday during this time.
- **North Narrabeen Boardriders**
  North Narrabeen Boardriders host monthly competitions from North Narrabeen Beach, with events and meetings held within the existing meeting area and adjacent paved area on the ground floor.
- **Gym**
  The club gym is located at the north-eastern corner of the ground floor.
  The club gym is open daily from 6:30 am to 8:30 pm.

The existing premises has a seated capacity of 142 people, with 54 internal seats and 88 external seats.

4.2 Description of the Proposal

The application seeks consent for alterations and additions to the North Narrabeen SLSC building at the site, as detailed on the Architectural Plans by Building Assets – Planning, Design & Delivery, Northern Beaches Council, revision D dated November 2023 and described, as follows:

- Alterations and additions to the ground floor of the building (**Figure 4-1**, showing colour-coded staging of works), including:
    - an extension to the northern side of the building to facilitate a larger meeting room, with kitchen and store, and a minor increase to the size of the existing gym,
    - an enlarged paved area to the north of the building,
- Alterations and additions to the first floor of the building (**Figure 4-2**, showing colour-coded staging of works), including:
    - an extension to the northern side of the building to provide additional internal and external floor space,
    - enclosure of part of the existing balcony to provide additional internal floor space,
    - a new covered entrance foyer to provide access to the balcony without the need to pass through the existing cafe seating area and bar,

  - minor alterations to internal finishes,
  - new balustrades to balcony,
- New finishes to the external façade of the existing building,
- Construction of a new bin store adjacent to the access driveway,
- Installation of rainwater tanks, and
- Stormwater drainage works.

The proposed works have been designed to:

- Improve accessibility;
- Provide much need upgrades and refurbishment to the aging facility;
- Fix waterproofing issues associated with the first floor deck; and
- Provide more usable and functional meeting facilities for North Narrabeen Boardriders.

Despite the additional internal floor area proposed, the existing seated capacity of the premises would remain unchanged at 142 people, with no change proposed to the existing hours of operation.

Artists impressions of the proposed development viewed from the south-west and north-east are provided in **Figure 4-3** and **Figure 4-4**, respectively.

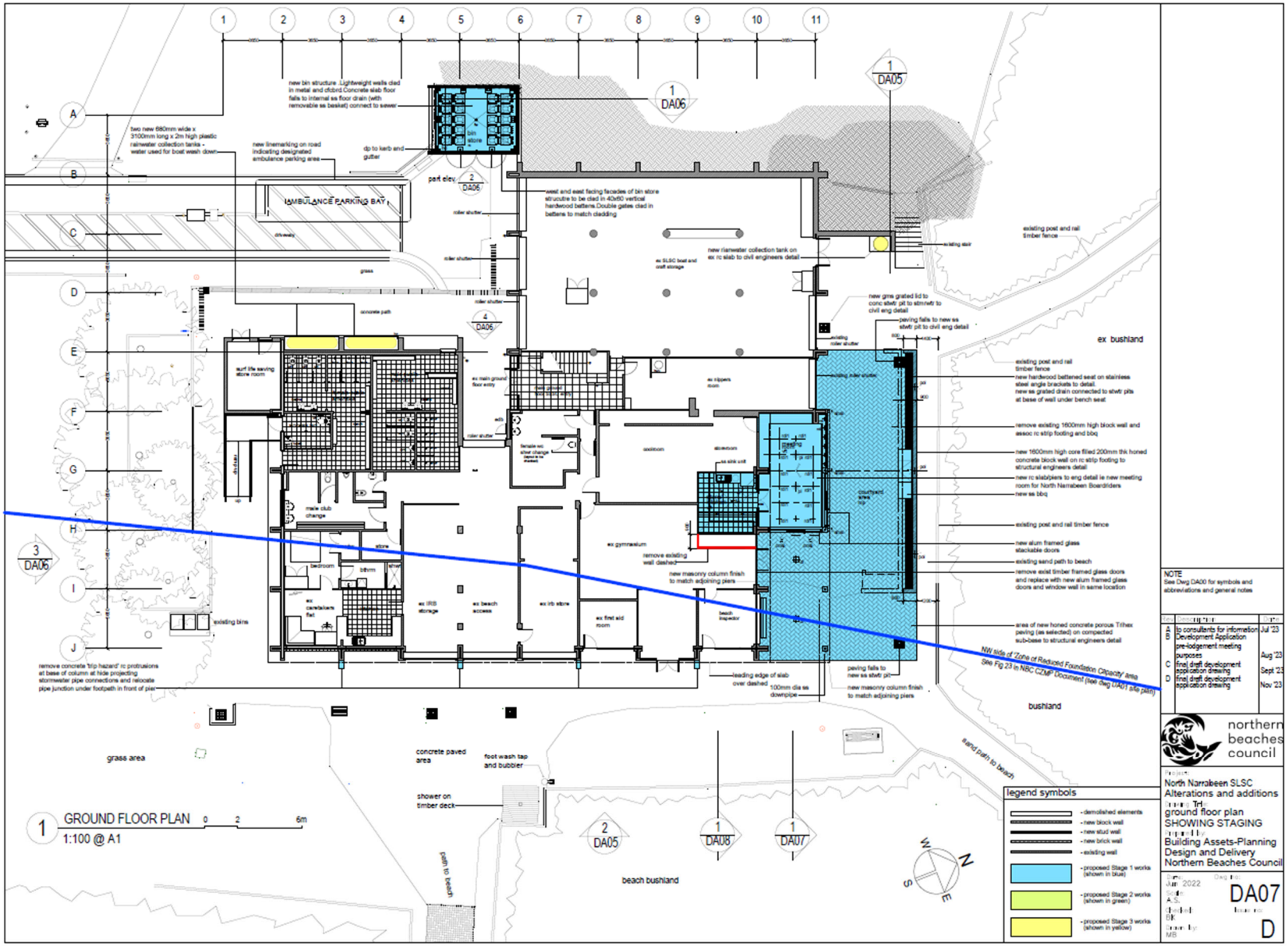


Figure 4-1 Drawing no. DA07 – Alterations and Additions to the Ground Floor, Showing Staging

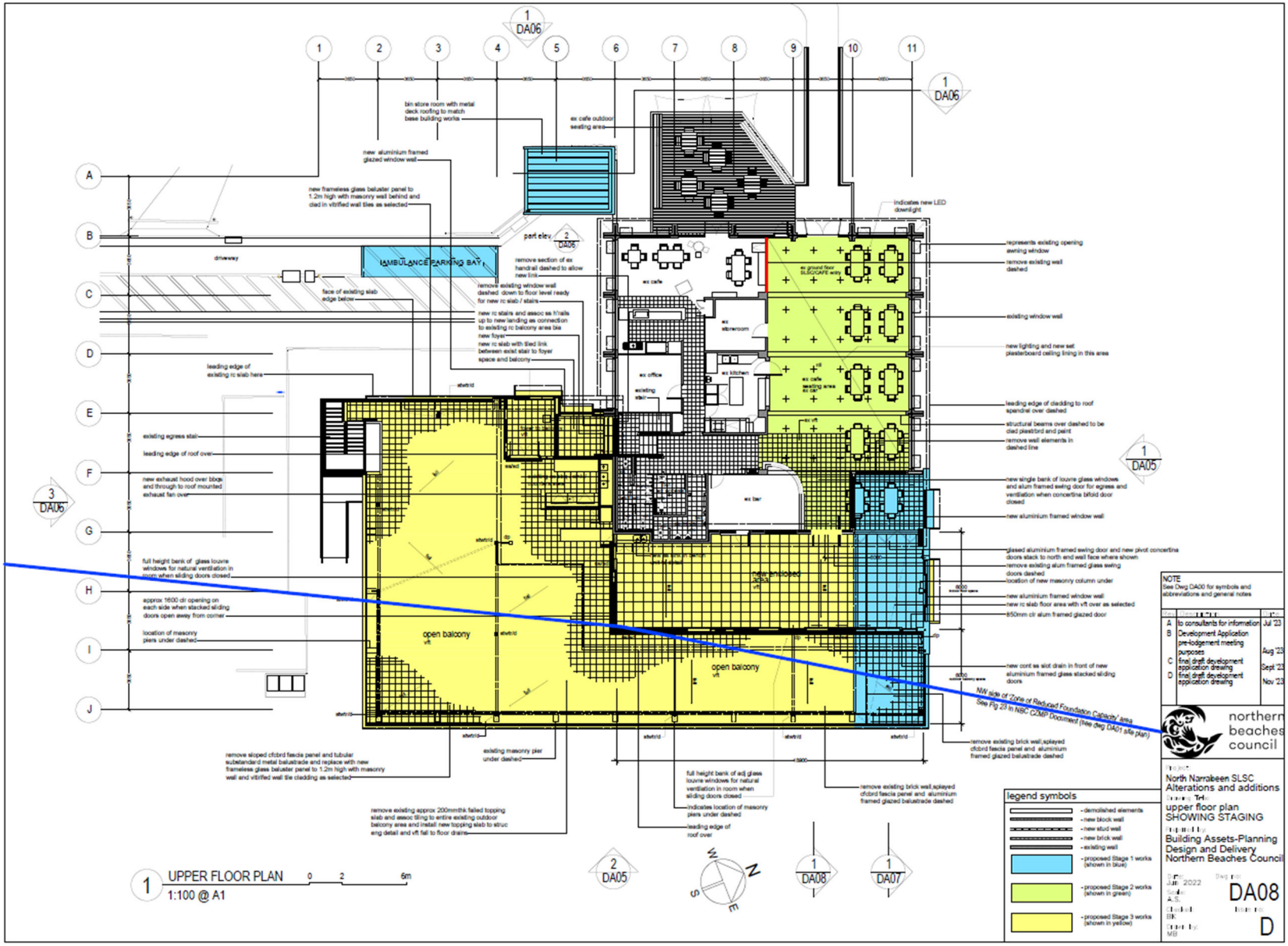


Figure 4-2 Drawing no. DA08 – Alterations and Additions to the First Floor, Showing Staging

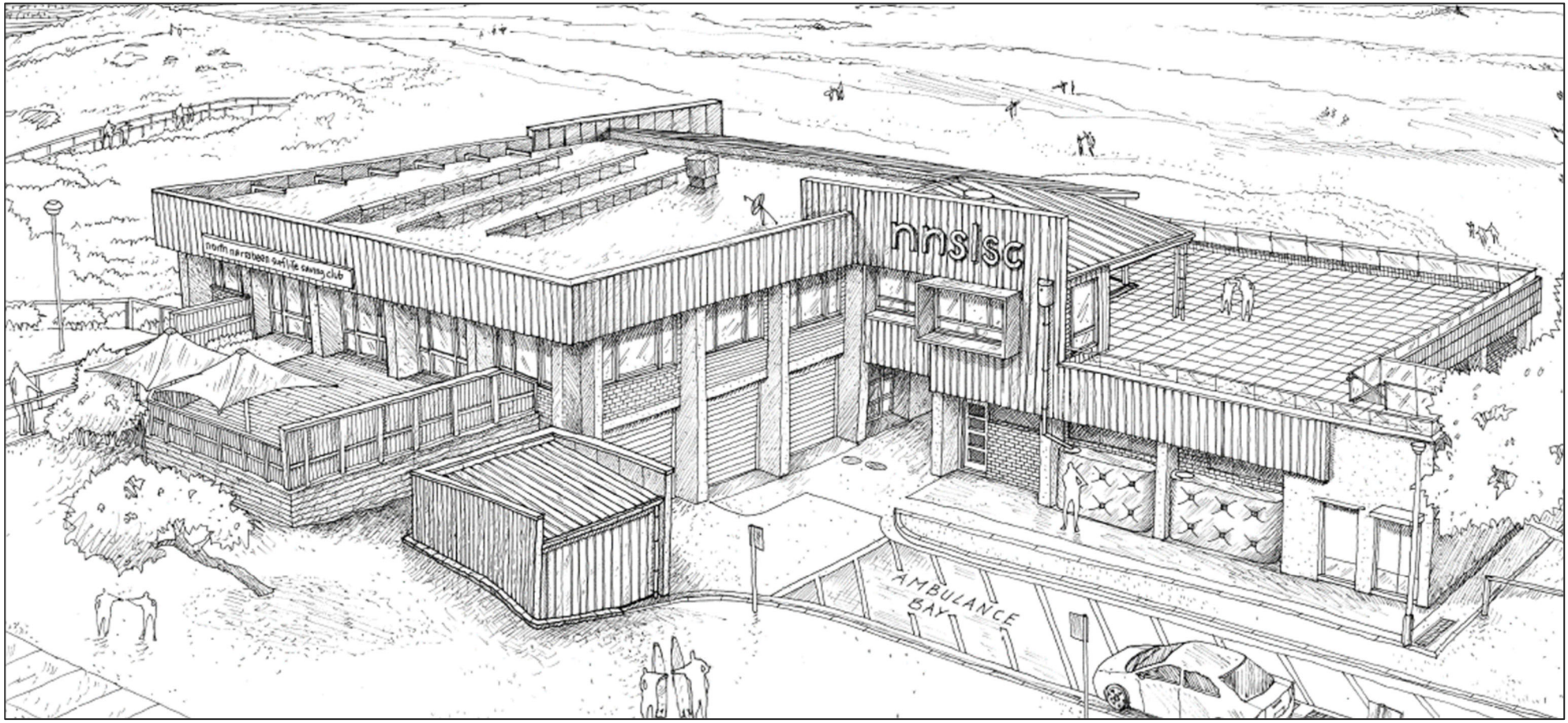


Figure 4-3 Artists impression of the development, as viewed from the south-west (after: drawing no. DA15, revision D, October 2023)

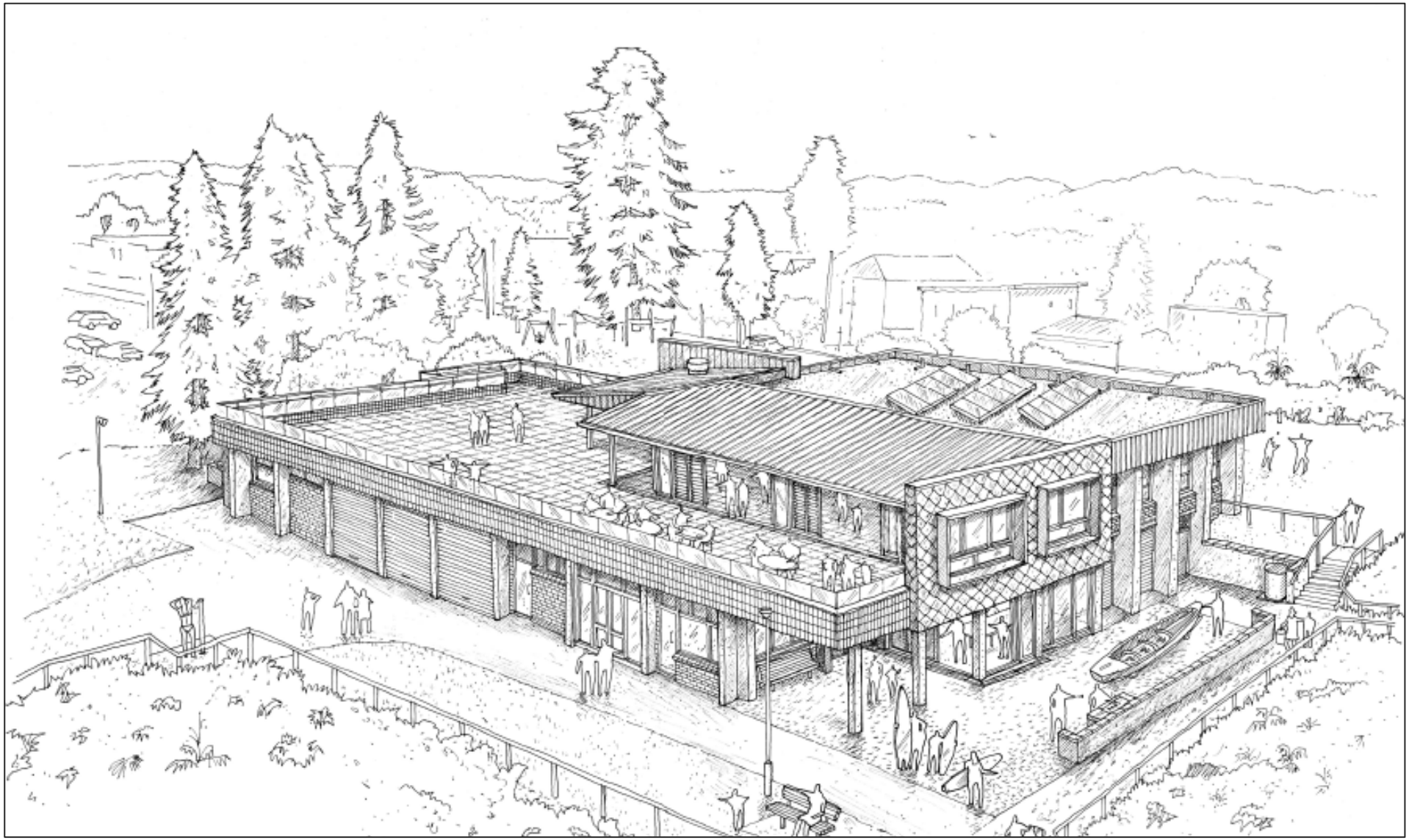


Figure 4-4 Artists impression of the development, as viewed from the north-east (after: drawing no. DA16, revision D, October 2023)

4.3 Background to the Development Application

The proposed alterations and additions to North Narrabeen SLSC building were publicly exhibited between 27 March and 30 April 2023.

In response to the public exhibition process, 77 submissions were received from the community, which are detailed in the Community and Stakeholder Engagement Report prepared by Northern Beaches Council. The key outcomes from the exhibition process are summarised in **Figure 4-5**.

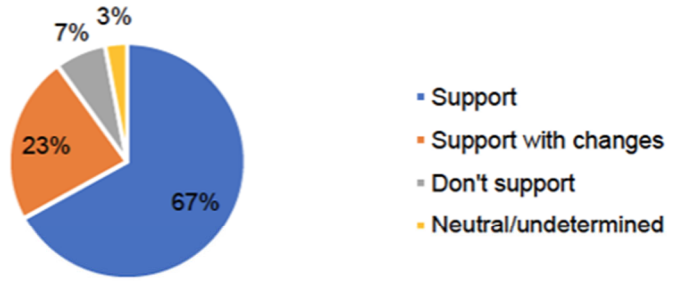
Total unique responses	77	
How responses were received	Submission form Written responses (email)	Completions: 73 Number received: 4
Online sentiment question: Do you support the proposed alterations and extensions?		
Feedback themes	Building upgrades Community Boardriders room	Enclosed space / Outdoor seating BBQ space

Figure 4-5 Key Consultation Outcomes Summary from the Community and Stakeholder Engagement Report (source: NBC, 2023)

The proposed development was amended in response to the exhibition process, with a reduction to the size of the enclosed area on the first floor balcony.

A pre-lodgement meeting was held on 31 August 2023.

The proposed development was further amended in response to advice received during the pre-lodgement process, with the addition of a new bin store adjacent to the access driveway.

5 Relevant Planning Provisions and Development Controls

5.1 Environmental Planning and Assessment Act 1979

The matters prescribed by section 4.15(1) of the EP&A Act are considered in **Table 5-1.**

Table 5-1 Compliance with Clause 4.15(1) Provisions

Clause	Provision	Comment
(a)	*the provisions of—* *i. any environmental planning instrument, and* *ii. any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and* *iii. any development control plan, and* *iv. any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and* *v. the regulations (to the extent that they prescribe matters for the purposes of this paragraph),* *that apply to the land to which the development application relates,*	The relevant provisions of WLEP 2011, all relevant SEPPs, and WDCP 2011 have been considered and addressed in this SEE.
(b)	*the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,*	The likely impacts of the proposed development have been addressed with respect to relevant plans and policies in this statement. The proposed development will not result in any unacceptable or significant impacts upon the natural or built environment, or any social or economic impacts in the locality.
(c)	*the suitability of the site for the development,*	The subject site is suitable for the proposed development. Whilst the site is exposed to Coastal Hazards (refer **Section 3.6**) the proposed development will not increase risk from coastal hazards in the present day or into the future (refer **Sections 5.2 and 5.3**).

Clause	Provision	Comment
(d)	*any submissions made in accordance with this Act or the regulations,*	The application will be notified to all neighbouring properties, with any submissions received to be considered by Council.
(e)	*the public interest.*	The proposed development is in the public interest, in so far as it is consistent with the objectives and outcomes of WLEP 2011 and WDCP 2011 and is responsive to the feedback received from the community during the public consultation process.

5.2 Coastal Management Act 2016

This section considers the relevant provisions of the CM Act. The information provided in this section and the responses provided in relation to the provisions of the legislation have been informed by the *Coastal Assessment and Management Report* (Baird, 2023), where relevant.

The development does not propose any coastal protection works and therefore the provisions of clause 27 of the CM Act do not apply.

5.2.1 Part 2 Coastal zone and management objectives for coastal management areas

The proposal is located in the coastal zone as defined under Clause 5 of the CM Act and mapped under the Resilience and Hazards SEPP. Specifically, the site falls within two coastal management areas (refer **Section 5.2.1**):

- The Coastal Use Area (or CUA); and
- The Coastal Environment Area (or CEA).

Table 5-2 reviews the consistency of the proposal with the management objective for these coastal management areas. Although there is no Coastal Vulnerability Area (CVA) mapped for the Northern Beaches LGA, the site is subject to coastal hazards in future and therefore the objectives for CVAs have also been considered.

Table 5-2 Compliance with Management Objectives for Coastal Management Areas

Clause	Provision	Comment
7(2) The management objectives for the coastal vulnerability area are as follows:		
(a)	*to ensure public safety and prevent risks to human life,*	Given the general footprint and use of the SLSC will not change, there would be no change in the existing level of risk to the public or occupants of the SLSC as a result of the proposed development. The building is located wholly outside the ZRFC in the present day (refer **Figure 3-18**). The *Coastal Assessment and Management Report* (Baird, 2023) concluded that, while the building would likely be located within the ZRFC by the end of its design life (2050), the overall risk to life was low given a 1% probability of such a design coastal erosion event occurring each year and noting also that the majority of the building would be located outside the ZRFC. Hence, retrofitting the existing structure with piled foundations has not been recommended for

Clause	Provision	Comment
		the portion of the building that would be located seaward of the conventional foundations line in the 2016 CZMP (Baird, 2023). The residual risk to life would continue to be managed via the *Coastal Erosion Emergency Action Subplan for Beaches in Warringah* (WorleyParsons, 2015), which provides for warnings for affected landholders in advance of and during a storm event, enabling the SLSC to preclude public access to and evacuate the building.
(b)	*to mitigate current and future risk from coastal hazards by taking into account the effects of coastal processes and climate change,*	The *Coastal Assessment and Management Report* (Baird, 2023) considered the current and future risk of coastal hazards. As discussed above, it is not considered necessary to adopt structural measures to mitigate the risk, with the residual risk to life would continue to be managed via the *Coastal Erosion Emergency Action Subplan for Beaches in Warringah* (WorleyParsons, 2015) in the event of a coastal storm.
(c)	*to maintain the presence of beaches, dunes and the natural features of foreshores, taking into account the beach system operating at the relevant place,*	The proposal would not result in any additional direct or indirect impacts to the beach, dunes or other natural features of the foreshore beyond those associated with the existing SLSC building and surf life-saving operations.
(d)	*to maintain public access, amenity and use of beaches and foreshores,*	The proposal would not alter public access or use of the beach or foreshore. The proposed alterations and additions to the SLSC would provide improved amenity and user experience for members of the public using the SLSC facilities or participating in community activities there.
(e)	*to encourage land use that reduces exposure to risks from coastal hazards, including through siting, design, construction and operational decisions,*	There would be no change in land use, or increased intensity of usage of the SLSC, as a result of the proposal.
(f)	*to adopt coastal management strategies that reduce exposure to coastal hazards—* *(i) in the first instance and wherever possible, by restoring or enhancing natural defences including coastal dunes, vegetation and wetlands, and* *(ii) if that is not sufficient, by taking other action to reduce exposure to those coastal hazards,*	The proposal involves only alterations and additions to an existing SLSC building. The capacity and use of the building would not be materially changed as a result of the development, and the footprint would remain the same. There would be no change to the current coastal hazard management strategy for the site as the level of risk from coastal hazards is considered manageable (see above and also Baird, 2023).
(g)	*if taking that other action to reduce exposure to coastal hazards—* *(i) to avoid significant degradation of biological diversity and ecosystem integrity, and*	There would be no significant degradation of biological diversity or ecosystem integrity of the locality, or any degradation ecological, biophysical, geological or geomporphological coastal processes, beyond that currently occurring due to the operation of the existing SLSC. The proposal includes upgrades to the stormwater drainage system for the SLSC building, as well as adoption of rainwater tanks, thereby reducing the existing level

Clause	Provision	Comment
	(ii) to avoid significant degradation of or disruption to ecological, biophysical, geological and geomorphological coastal processes, and *(iii) to avoid significant degradation of or disruption to beach and foreshore amenity and social and cultural values, and* *(iv) to avoid adverse impacts on adjoining land, resources or assets, and* *(v) to provide for the restoration of a beach, or land adjacent to the beach, if any increased erosion of the beach or adjacent land is caused by actions to reduce exposure to coastal hazards,*	of impact of stormwater runoff on the environment. The proposed drainage works are not expected to adversely impact coastal hazards affecting the SLSC or any surrounding infrastructure or buildings within the adopted planning period of 2050 (Baird, 2023). Degradation of or disruption of the beach and foreshore amenity, social and cultural values, would be minor and would be restricted to the construction phase due to temporary loss or relocation of SLSC facilities, noise and changes to access during the works. In the operational phase there would be improved amenity for SLSC members and community members visiting the SLSC or using the amenities. The alterations and additions to the building would facilitate ongoing community use and enjoyment of the facility. There would be no direct impacts to adjoining land, resources or assets. Given the (seating) capacity and use of the SLSC would not change, no additional indirect operational phase impacts on adjoining land are anticipated. The proposal is not anticipated to contribute to any increased erosion of the beach or adjacent land (refer Baird, 2023).
(h)	*to prioritise actions that support the continued functionality of essential infrastructure during and immediately after a coastal hazard emergency,*	The proposal would support the ongoing use of the North Narrabeen SLSC, noting that the SLSC acts as essential infrastructure in that it supports surf life-saving and other beach safety initiatives both during a coastal hazard emergency and on a day-to-day basis.
(i)	*to improve the resilience of coastal development and communities by improving adaptive capacity and reducing reliance on emergency responses.*	The proposal would support the ongoing use of the North Narrabeen SLSC, thereby supporting the resilience of the community by providing ongoing training on surf life-saving and other beach safety issues.
8(2) The management objectives for the coastal environment area are as follows:		
(a)	*to protect and enhance the coastal environmental values and natural processes of coastal waters, estuaries, coastal lakes and coastal lagoons, and enhance natural character, scenic value, biological diversity and ecosystem integrity,*	The proposed development would not result in any adverse impacts to coastal environmental values or natural processes/character, scenic values or ecosystem integrity beyond those associated with the historic development of the existing SLSC. No removal of native vegetation or modification of the dune system is proposed.
(b)	*to reduce threats to and improve the resilience of coastal waters, estuaries, coastal lakes and coastal lagoons, including in response to climate change,*	The proposed development would not materially alter the existing conditions of the site and is not expected to have implications for threats to and resilience of coastal waters.
(c)	*to maintain and improve water quality and estuary health,*	The proposal would involve construction of improved stormwater management/drainage, including the installation of

Clause	Provision	Comment
		rainwater tanks, thereby reducing the existing level of impact on the receiving environment.
(d)	*to support the social and cultural values of coastal waters, estuaries, coastal lakes and coastal lagoons,*	The proposal directly supports the social and cultural values of coastal waters by providing improved amenity and functionality of the existing SLSC for use by club members and the Boardriders Club, as well as the broader community who benefit from services provided by the SLSC and use the club facilities.
(e)	*to maintain the presence of beaches, dunes and the natural features of foreshores, taking into account the beach system operating at the relevant place,*	The proposal would not adversely impact the beaches, dunes or natural features of the foreshore. As discussed in **Section 3.6** the SLSC is located landward of the ZSA in both the present day and in 2050, by which time the SLSC building will be reaching the end of its useful life. Hence its current location accommodates fluctuations in the beach system.
(f)	*to maintain and, where practicable, improve public access, amenity and use of beaches, foreshores, headlands and rock platforms.*	The proposal would provide improved amenity for SLSC visitors and members, thereby supporting the use of the beach by the community.
9(2) The management objectives for the coastal use area are as follows:		
(a)	*to protect and enhance the scenic, social and cultural values of the coast by ensuring that—* *(i) the type, bulk, scale and size of development is appropriate for the location and natural scenic quality of the coast, and* *(ii) adverse impacts of development on cultural and built environment heritage are avoided or mitigated, and* *(iii) urban design, including water sensitive urban design, is supported and incorporated into development activities, and* *(iv) adequate public open space is provided, including for recreational activities and associated infrastructure, and* *(v) the use of the surf zone is considered,*	The proposal protects the scenic, social and cultural values of the coast by: • Largely maintaining the bulk, scale and size of the existing building by undertaking alterations and additions, rather than re-development; • Avoids direct impacts to the cultural and built environment heritage, including the adjacent heritage site; • Provides for improved management of stormwater runoff from the SLSC building through adoption of rainwater tanks and improved stormwater drainage, thereby reducing the existing level of impact; • The proposed modifications would not adversely impact existing public space, being confined to the existing footprint of the building and fixtures; • The proposal would not impact the use of the surf zone.
(b)	*to accommodate both urbanised and natural stretches of coastline.*	The proposal does not change the existing land use at the site.

5.3 State Environmental Planning Policy (Resilience and Hazards) 2021

5.3.1 Chapter 2 Coastal management

The site is mapped as CUA and CEA under the Resilience and Hazards SEPP (refer **Figure 5-1 and Figure 5-2**). Hence the provisions of Chapter 2 of the SEPP are applicable to the site and this proposal.

Figure 5-1 Coastal Use Area map (source: ePlanning Spatial Viewer, accessed 18/12/2023)

Figure 5-2 Coastal Environment Area map (source: ePlanning Spatial Viewer, accessed 18/12/2023)

Clause 2.9 Development on land within the coastal vulnerability area

Although there is no mapped CVA for the locality, part of the site is identified in the 2016 CZMP as being subject to coastal hazards. Whilst the clause does not strictly apply, a review of compliance with the development controls in clause 2.9 has been included herein.

The consent authority can be satisfied that the proposed development has appropriately considered the risk of coastal hazards for the design life of the building, nominally the 2050 planning horizon.

Development consent must not be granted to development on land that is within the area identified as "coastal vulnerability area" on the Coastal Vulnerability Area Map unless the consent authority is satisfied that—

(a) if the proposed development comprises the erection of a building or works—the building or works are engineered to withstand current and projected coastal hazards for the design life of the building or works, and

(b) the proposed development—

(i) is not likely to alter coastal processes to the detriment of the natural environment or other land, and

(ii) is not likely to reduce the public amenity, access to and use of any beach, foreshore, rock platform or headland adjacent to the proposed development, and

(iii) incorporates appropriate measures to manage risk to life and public safety from coastal hazards, and

(c) measures are in place to ensure that there are appropriate responses to, and management of, anticipated coastal processes and current and future coastal hazards.

As documented in the *Coastal Assessment and Management Report* (Baird, 2023), it is expected that between 2040 and 2050, the SLSC may be in the area where erosion hazard could impact on the capacity of the building foundations (i.e. part of the building is likely to be located within the ZRFC), but the SLSC is not expected to be in the active erosion zone (i.e. seaward of the ZSA).

The *Coastal Assessment and Management Report* (Baird, 2023) concluded that the probability of the SLSC being located within the ZRFC during or following a severe erosion event by 2050 is around 1% per annum. The assessment also concluded that the SLSC is not expected to be subject to coastal inundation.

Given the low level of risk to the building and occupants, it was not considered necessary to incorporate piled foundations or coastal protections into the proposal.

Clause 2.10 Development on land within the coastal environment area

The consent authority can be satisfied that the proposed development has been designed, sited and will be managed to avoid adverse impacts upon the relevant matters identified in section 2.10(1) of this policy.

(1) Development consent must not be granted to development on land that is within the coastal environment area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following—

(a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,
(b) coastal environmental values and natural coastal processes,
(c) the water quality of the marine estate (within the meaning of the Marine Estate Management Act 2014), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1,
(d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,
(e) existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,
(f) Aboriginal cultural heritage, practices and places,
(g) the use of the surf zone.

(2) Development consent must not be granted to development on land to which this section applies unless the consent authority is satisfied that—

(a) the development is designed, sited and will be managed to avoid an adverse impact referred to in subsection (1), or
(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or
(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

The proposed development involves alterations and additions to the existing SLSC building at North Narrabeen and would maintain the current footprint of the building and associated fixtures. The

proposal would not adversely impact the environment, coastal environmental values or natural coastal processes, marine or terrestrial vegetation, biodiversity, headlands or rock platforms.

There would be no impact to existing public open space, or public access to and along the foreshore, or to the use of the surf zone. Provided the mitigation measures recommended in the AHDDA report prepared by Coast (2023) are implemented, and noting also the limited extent of excavations proposed, there is a low likelihood that the works would impact any previously unidentified Aboriginal cultural heritage sites or places. The existing level of impact on cultural activities and use of the coastal zone would not increase over existing.

Clause 2.11 Development on land within the coastal use area

The consent authority can be satisfied that the proposed development has been designed, sited and will be managed to avoid adverse impacts upon the relevant matters identified in section 2.11(1)(a) of this policy, and that the surrounding coastal and built environment has been taken into account with regard to the bulk, scale and size of the proposed development.

(1) Development consent must not be granted to development on land that is within the coastal use area unless the consent authority—

(a) has considered whether the proposed development is likely to cause an adverse impact on the following—

(i) existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,

(ii) overshadowing, wind funnelling and the loss of views from public places to foreshores,

(iii) the visual amenity and scenic qualities of the coast, including coastal headlands,

(iv) Aboriginal cultural heritage, practices and places,

(v) cultural and built environment heritage, and

(b) is satisfied that—

(i) the development is designed, sited and will be managed to avoid an adverse impact referred to in paragraph (a), or

(ii) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or

(iii) if that impact cannot be minimised—the development will be managed to mitigate that impact, and

(c) has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development.

Given the proposal would not materially change the size of the existing SLSC building, overshadowing, wind funnelling and impacts to views to the foreshore are not anticipated. The visual analysis in **Section 5.6.1** concluded that there would not be any significant adverse visual impacts of the proposal.

As discussed above in relation to clause 2.10, no adverse impacts on previously unidentified Aboriginal cultural heritage sites or places are anticipated.

Clause 2.12 Development in the coastal zone generally – development not to increase risk of coastal hazards

Based on the *Coastal Assessment and Management Report* (Baird, 2023) provided in **Appendix A**, the proposed development is not likely to cause increased risk of coastal hazards on the land or other land.

Given the proposed development would be confined within the footprint of the existing building and associated fixtures, and noting also the proposal would not increase the seated capacity of the building, the proposal would not increase the level of risk of coastal hazards beyond that currently occurring at the site. The consent authority can be satisfied with respect to clause 2.12 of this policy.

Clause 2.13 Development in coastal zone generally – coastal management programs to be considered

As discussed in **Section 3.6**, the site is located within 'Area 1: Collaroy-Narrabeen Beach North of Devitt Street' in the 2016 CZMP. Under the CZMP (NBC and Royal Haskoning, 2016) development seaward of the ZRFC is required to have piled foundations. However, these requirements, as detailed under Section 6.2 of the CZMP, are intended to apply to new development.

The earlier hazard mapping provided in the earlier CZMP for Collaroy-Narrabeen Beach and Fishermans Beach (Warringah Council and Royal Haskoning, 2014) adopted a similar erosion hazard assessment methodology as the 2016 CZMP, but derived the ZSA for the immediate (present day), 2050 and 2100 planning horizons. Based on that assessment, it is expected that between 2040 and 2050, the SLSC may be in the area where erosion hazard could impact on the capacity of the building foundations (i.e. part of the building is located within the ZRFC, refer **Figure 3-18**), but the SLSC is not expected to be in the active erosion zone (refer **Figure 3-17**).

The *Coastal Assessment and Management Report* (Baird, 2023) concluded that the probability of the SLSC being located within the ZRFC during or following a severe erosion event by 2050 is around 1% per annum. The assessment also concluded that the SLSC is not expected to be subject to coastal inundation. Based on this assessment, it is considered that the residual risk to life would continue to be managed via the *Coastal Erosion Emergency Action Subplan for Beaches in Warringah* (WorleyParsons, 2015), which provides for warnings for affected landholders in advance of and during a storm event, enabling the SLSC to preclude public access to and evacuate the building.

Overall, the proposed development is consistent with the relevant provisions of Chapter 2 of the Resilience and Hazards SEPP.

5.3.2 Chapter 4 Remediation of land

Chapter 4 of the Resilience and Hazards SEPP applies to all land and aims to provide for a State-wide planning approach to the remediation of contaminated land.

Clause 4.6(1)(a) of this policy requires the consent authority to consider whether land is contaminated. The existing site has been used for the purpose of the surf club building with no known prior land uses. A search of the Environment Protection Authority's Contaminated Land Registers indicates the site does not incorporate contaminated land and is not located in the vicinity of any. Council can be reasonably satisfied that there is no contamination risk, subject to the imposition of suitable conditions relating to the minor demolition works proposed.

Overall, the proposed development is consistent with the relevant provisions of Chapter 4 of the Resilience and Hazards SEPP.

5.4 Local Government Act 1993

The site is community land owned by Council and forms part of a public reserve that is managed by Northern Beaches Council in accordance with the *Coastal Lands Plan of Management* (Warringah Council, 2002).

The North Narrabeen SLSC building is located within the part of the reserve categorised for General Community Use, as shown in yellow on **Figure 5-3**.

Figure 5-3 Excerpt from Map 2a from the Coastal Lands Plan of Management (after: Warringah Council, 2002)

In accordance with Section 35 of the LG Act, community land must be managed in accordance with the plan of management applicable to the land. With respect to the North Narrabeen SLSC building, the Plan of Management specifically anticipates extensions and modifications to North Narrabeen SLSC Building, as stated in the Action Plan at section 6.0 and as demonstrated in the Collaroy/Narrabeen Coastal Management Plan (Master Plan 1).

The proposed alterations and additions to the existing building are therefore consistent with the provisions of the Plan of Management and the LG Act.

5.5 Warringah Local Environmental Plan 2011

The site is identified on the Land Application Map of WLEP 2011, and the provisions of this policy are applicable in relation to the site and the proposed development. The relevant provisions of WLEP 2011 are considered in **Table 5-3.**

Table 5-3 WLEP 2011 Provisions Compliance Table

Clause	Standard	Proposal	Compliance
2.7 Demolition requires development consent	N/A	Minor demolitions works are proposed.	Yes
Zone RE1 Public Recreation		Consistent with RE1 zoning	Yes - see **Section 5.5.1**
4.3 Height of buildings	The height of a building on any land is not to exceed the maximum height shown for the land on the Height of Buildings Map.	The site is not identified on the Height of Buildings Map.	N/A
6.1 Acid sulfate soils	Class 4 and 5 (refer **Section 3.7**)	The application is supported by a *Preliminary Acid Sulfate Soils Assessment Report* (JK Environments, 2023) which concludes that there is a low potential for potential disturbance of acid sulfate soils.	Yes
6.2 Earthworks	Development consent is required for earthworks unless the work is ancillary to other development for which consent has been given	The proposal would involve only minor earthworks to construct upgraded stormwater drainage. These works would be ancillary to the development.	Yes
6.4 Development on Sloping Land	Area A (refer **Section 3.7**)	The application is supported by a geotechnical investigation (JK Geotechnics, 2023) which provides a series of recommendations to ensure an acceptable level of risk.	Yes
6.5 Coastline hazards		The evaluation of coastal hazards prepared by Baird (2023) concluded that the SLSC building is not expected to be within the active coastal erosion zone up to a planning horizon of 2074. It is currently landward of the erosion hazard impact area, including the current ZRFC. By 2050, it is estimated that there is around 1% per annum probability that the SLSC may be	Yes See **Section 5.5.2**

Clause	Standard	Proposal	Compliance
		impacted by the ZRFC during or following a severe erosion event. Considering the essential function of the SLSC and need for it to be located close to the beach for beach surveillance and life-saving purposes, this is considered an acceptably low level of risk.	

5.5.1 RE1 Public Recreation Zone

The land is zoned RE1 Public Recreation, as shown on the Zoning Map of WLEP 2011. The application seeks consent for alterations and additions to the existing North Narrabeen SLSC building, which is appropriately defined as a community facility. Community facilities are permitted with consent within the RE1 Public Recreation Zone.

The proposed development and the continued use of the site for a community facility is consistent with the objectives of the RE1 Public Recreation zone, as follows:

- *To enable land to be used for public open space or recreational purposes.*
  Comment: The North Narrabeen SLSC building is used for recreation purposes, and the proposed works to the building will enable the building to continue to be used for this purpose.
  Furthermore, the proposed works will not prevent the land from being used for public open space or recreational purposes.

- *To provide a range of recreational settings and activities and compatible land uses.*
  Comment: The North Narrabeen SLSC building contributes to the range of recreational activities/uses that occur at the site, and the community facility is a compatible land use within the RE1 zone.

- *To protect and enhance the natural environment for recreational purposes.*
  Comment: The proposal would not result in any adverse impact on the natural environment for recreational purposes. The grounds of the reserve would be reinstated where they are disturbed by the works.

- *To protect, manage and restore public land that is of ecological, scientific, cultural or aesthetic significance*
  Comment: The existing building is not specifically identified to be of special ecological, scientific, cultural or aesthetic significance. However, the proposed works would enable the continued use of the community facility, which could be said to be of cultural significance with respect to its historical association with North Narrabeen SLSC, North Narrabeen Boardriders and the wider community.

- *To prevent development that could destroy, damage or otherwise have an adverse effect on those values.*

Comment: As above, the building is not identified to be of special ecological, scientific, cultural or aesthetic significance. The works are relatively minor and provide for the continued use and enjoyment of the surf club building by its members and the wider community.

5.5.2 Coastline Hazards

As discussed in **Section 3.6**, portions of the North Narrabeen SLSC are located within the ZRFC, , as shown on the Coastline Hazard Map of WLEP 2011.

As required by clause 6.5(3) of the WLRP 2011, the consent authority can be satisfied that the proposed development and the continued use of the SLSC building:

- *(a) will not significantly adversely affect coastal hazards*
  Comment: The proposal is not expected to adversely affect coastal hazards either on the site or on adjacent land, noting there would be no material change to the footprint of the building and that the stormwater drainage upgrades are not expected to contribute to additional erosion (Baird, 2023);

- *(b) Will not result in significant detrimental increases in coastal risks to other development or properties*
  Comment: As discussed above, the assessment by Baird (2023; **Appendix A**) concluded that the proposal would not result in increased coastal risk to other development or properties.

- *(c) Will not significantly alter coastal hazards to the detriment of the environment*
  Comment: The amount of stormwater runoff from the upgraded SLSC building would be reduced over existing due to the incorporation of rainwater tanks in the design. The associated stormwater drainage upgrades would result in stormwater from the development draining to the coastline from the northern and southern extents of the SLSC building. Rip rap would be provided to minimise the risk of scour at the outlets. Baird (2023) concluded the stormwater upgrades are not expected to increase the risk of erosion.
- *(d) Incorporates appropriate measures to manage the risk to life from coastal risks*
  Comment: As detailed in the *Coastal Assessment and Management Report* (Baird, 2023), the SLSC building is not expected to be within the active coastal zone up to a planning horizon of 2074. It is currently landward of the ZSA and ZRFC in the present day. By 2050, which corresponds to the design life of the building, there is around 1% probability of an erosion event occurring that would result in part of the SLSC being impacted by the ZRFC. Given the essential function of the SLSC operations for beach surveillance and surf life-saving, and noting also there would be no increase over the existing level of risk from coastal hazards, this is considered a low level of risk that can be appropriately managed via the *Coastal Erosion Emergency Action Subplan for Beaches in Warringah* (WorleyParsons, 2015), which provides for warnings for affected landholders in advance of and during a storm event, enabling the SLSC to preclude public access to and evacuate the building.

- *(e) avoid or minimises exposure to coastal hazards*
  Comment: The building is not expected to be within the active coastal erosion zone (i.e. the ZSA) up to a planning horizon of 2074 and is not expected to be impacted by coastal inundation over its design life (Baird, 2023). While part of the building would fall within the ZRFC by the end of its design

life (i.e. 2050), this does not increase the level of exposure to hazards of the existing SLSC. It is not possible to avoid exposure to coastal hazards as part of the proposal and, given the low probability of exposure to coastal erosion, it is not considered necessary to adopt additional measures to minimise exposure (Baird, 2023).

- *(f) makes provision for relocation, modification or removal of the development to adapt to coastal hazards and NSW sea level rise planning benchmarks*
  Comment: The proposal would result in retention of the North Narrabeen SLSC in its current location. The design life of the building would not be extended by the proposed works and as evaluated under Council's asset management system, is expected to correspond to the 2050 planning horizon due to the retention of the majority of the existing building. As identified in the *Coastal Assessment and Management Report* prepared by Baird (2023, **Appendix A**), the building is not expected to be in the active coastal zone up to 2074 and would be subject to a 1% chance annually of being impacted by the ZRFC by the end of its design life in 2050. Given this low level of risk from coastal hazards, no modifications of the building (e.g. piling works) are proposed as part of the development. No specific provision has been made for relocation or removal of the building up until this time.
  It is noted that the NSW Coastal Design Guidelines 2023 identify that development on coastal dunes and foreshores should be avoided unless it is for 'essential public purposes, such as surf life-saving club buildings' (DPE, 2023). As the proposal would support the ongoing use of the building as a SLSC up until the end of its design life, this is considered an acceptable level of risk.

Further to the above, Clause 6.5(4) of WLEP 2011 states that '*Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the foundations of the development have been designed to be constructed having regard to coastal risk*.' The existing North Narrabeen SLSC building is on conventional foundations. Under the CZMP (NBC and Royal Haskoning, 2016) development seaward of the ZRFC is required to have piled foundations. However, these requirements, as detailed under Section 6.2 of the CZMP, are intended to apply to new development, whereas the proposed development would involve upgrades to an existing building.

Furthermore, the *Coastal Assessment and Management Report* prepared by Baird (2023) concluded that, although the SLSC building would be impacted by the ZRFC by the end of its design life (2050), piled foundations were not justified based on the low probability of occurrence of a design storm event, noting also that the impact is not expected to occur until sometime between 2040 and 2050, which is the later years of the expected design life of the building.

5.6 Warringah Development Control Plan 2011

WDCP 2011 is applicable to the site and the proposed development. The relevant provisions of WDCP 2011 are considered in **Table 5-4.**

Table 5-4 WDCP 2011 Controls and Compliance

Clause	Control	Proposal	Compliance
B1 Wall Height	N/A	There would be no change to wall heights.	N/A
B2 Number of Storeys	N/A	There would be no change to the number of storeys in the existing building.	N/A
B3 Side Boundary Envelope	N/A	There would be no change to the footprint of the building.	N/A
B4 Site Coverage	N/A	There would be no change to the footprint of the building.	N/A
B5 Side Boundary Setbacks	N/A	There would be no change to the footprint of the building.	N/A
B7 Front Boundary Setbacks	N/A	There would be no change to the footprint of the building.	N/A
B9 Rear Boundary Setbacks	N/A	There would be no change to the footprint of the building.	N/A
C2 Traffic, Access and Safety	Facilities for the loading and unloading of service, delivery and emergency vehicles are to be: - appropriate to the size and nature of the development; - screened from public view; and - designed so that vehicles may enter and leave in a forward direction.	A new designated ambulance parking bay is proposed along the existing access driveway, in close proximity to the SLSC building (see **Figure 4-3**). The existing turning bay facilitates movement in a forward direction. No changes are proposed to existing access arrangements.	Yes
C3 Parking Facilities	Carparking is to be provided in accordance with Appendix 1 which details the rate of car parking for various land uses. Community Facility: Comparisons must be drawn with developments for a similar purpose.	The proposed development will result in an additional 182 m² of gross floor area. However, the capacity of the venue remains unchanged, with the additional enclosed areas proposed in areas already utilised in association with club. The development seeks to continue to rely upon public parking within the adjacent public car park.	Yes

Clause	Control	Proposal	Compliance
		The application is supported by a *Traffic and Parking Impact Assessment Report* (Barker Ryan Stewart, 2023a) which confirms the suitability of this ongoing arrangement.	
C3(A) Bicycle Parking and End of Trip Facilities	Bicycle parking facilities must be provided for new buildings and for alterations or additions to existing buildings.	Bike racks are located within the adjacent public reserve, within the immediate curtilage of the building.	Yes
C4 Stormwater	The stormwater drainage systems for all developments are to be designed, installed and maintained in accordance with Council's Water Management for Development Policy.	The application is supported by Stormwater Management Plans by NB Consulting Engineers to demonstrate consistency with this control.	Yes
C7 Excavation and Landfill	Excavated and landfill areas shall be constructed to ensure the geological stability of the work.	The application is supported by a geotechnical investigation by JK Geotechnics (2023) to confirm the geotechnical stability of the proposed works.	Yes
C8 Demolition and Construction	All development must comply with the appropriate sections of the Waste Management Guidelines and must be accompanied by a Waste Management Plan.	The application is supported by a Demolition and Construction Waste Management Plan prepared by Northern Beaches Council.	Yes
C9 Waste Management	All development must comply with the appropriate sections of the Waste Management Guidelines and must be accompanied by a Waste Management Plan.	The application is supported by an demolition and construction phase Waste Management Plan by EP Consulting (2023; see **Appendix F**). In addition, an operational phase Waste Management Plan prepared in Council's template is provided in **Appendix F**.	Yes
D3 Noise	Noise from combined operation of all mechanical plant and equipment must not generate noise levels that exceed the ambient background noise by more than 5dB(A) when	The Acoustic Report prepared by GHD (2023) concluded that noise levels from the development would not exceed the criteria. A range of noise management measures are proposed to	Yes

Clause	Control	Proposal	Compliance
	measured in accordance with the NSW Industrial Noise Policy at the receiving boundary of residential and other noise sensitive land uses.	effectively manage noise emissions (e.g. closure of balcony doors during the evening and at night to reduce noise emissions).	
D7 Views	Development shall provide for the reasonable sharing of views.	The proposed development has been sited to ensure that any impacts upon views are appropriately minimised.	Yes See **Section 5.6.1**
D9 Building Bulk	Large areas of continuous wall planes are to be avoided by varying building setbacks and using appropriate techniques to provide visual relief. Use colour, materials and surface treatment to reduce building bulk.	The proposal has been designed to enhance the visual aesthetic of the existing building, with new materiality and architectural features to break down the bulk of the development.	Yes
D10 Building Colours and Materials	In highly visible areas, the visual impact of new development (including any structures required to retain land) is to be minimized through the use of appropriate colours and materials and landscaping.	The proposed development comprises a variety of materials and finishes, as detailed on the External Materials and Finishes Schedule (Drawing no. DA09).	Yes
D14 Site Facilities	Waste and recycling bin enclosures are to be durable, integrated with the building design and site landscaping, suitably screened from public places or streets and located for convenient access for collection.	The application proposes a new bin store adjacent to the existing service driveway.	Yes
D18 Accessibility and Adaptability	Access for people with a disability is to be provided at the main entrance to the development. Development is to comply with Australian Standard AS1428.2.	The application is supported by an *Accessibility Compliance Assessment Report* by Absolute BCA & Accessibility Consulting (2023a) which confirms that the development is considered capable of complying with the BCA and in turn AS 1428.2, subject to compliance with the recommendations provided.	Yes

Clause	Control	Proposal	Compliance
D20 Safety and Security	There is to be adequate lighting of entrances and pedestrian areas. Buildings are to overlook streets as well as public and communal places to allow casual surveillance.	The proposed development has been designed with appropriate regard for Crime Prevention Through Environmental Design (CPTED) principles.	Yes
D22 Conservation of Energy and Water	All development must comply with Council's Water Management Policy. Re-use of stormwater on-site is encouraged Buildings are to be designed to minimise energy and water consumption.	The application is supported by Stormwater Management Plans by NB Consulting Engineers to demonstrate consistency with Council's Water Management Policy. The proposal would involve installation of rainwater tanks.	Yes
E1 Preservation of Trees or Bushland Vegetation	Developed is to be sited and designed to minimise impact on remnant native vegetation. Develop must also avoid any impact on trees on public land.	The proposed development is generally maintained within the footprint of the existing building and associated hardstand areas and will not impact upon any existing canopy trees or bushland vegetation.	Yes
E2 Prescribed Vegetation	Development is to be situated and designed to minimise the impact on prescribed vegetation, including remnant canopy trees, understorey vegetation, and ground cover species.	The land to the north of the North Narrabeen SLSC Building is identified as "Biodiversity Values added in the last 90 days" on the Biodiversity Values Map (refer **Section 3.4**). The proposed development does not encroach within this area and will not impact upon existing vegetation. Erosion and sediment barriers are proposed to protect adjacent vegetated areas during construction.	Yes
E3 Threatened Species, Populations, Ecological Communities	The applicant must demonstrate that the objectives have been achieved through a Flora and Fauna Assessment prepared in	The vegetated area of the reserve to the north and east of the existing North Narrabeen SLSC building is identified as "Threatened and High	Yes

Clause	Control	Proposal	Compliance
Listed under State or Commonwealth Legislation, or High Conservation Habitat	accordance with Council guidelines. The applicant must demonstrate that the objectives have been achieved through a Biodiversity Management Plan prepared in accordance with Council guidelines that will protect, manage and where appropriate promote the recovery of threatened species, populations and ecological communities and areas of high conservation habitat on the subject property.	Conservation Habitat" on the Threatened and High Conservation Habitat Map of WLEP 2011. The proposed development does not encroach on this area and will not impact upon existing flora and fauna (refer **Section 3.4.2**), as such the provision of a Flora and Fauna Assessment Report or a Biodiversity Management Plan is not considered to be required in this instance. Note: The Pre-Lodgement Meeting Notes confirm that such reports are not required.	
E4 Wildlife Corridors	For modification of native vegetation where the area of land supporting the vegetation to be modified is greater than 50 m² or the land supporting the vegetation to be modified forms part of an allotment where vegetation has been modified in the last five years: a. The applicant must demonstrate that the objectives have been achieved through a Flora and Fauna Assessment prepared in accordance with Council guidelines; and b. The applicant must demonstrate that the objectives have been achieved through a Biodiversity Management Plan prepared in accordance with Council guidelines that will protect, manage and enhance wildlife corridors, and where appropriate reconstruct wildlife corridor areas on the subject property.	The site is identified as part of a wildlife corridor, as shown on the Wildlife Corridor Map of WLEP 2011. The proposed development is generally maintained within the footprint of the existing building and associated hardstand areas and will not disturb more than 50 m² of vegetated areas of the site.	Yes

Clause	Control	Proposal	Compliance
E7 Development on land adjoining public open space	N/A	The site is not shown on the Land Adjoining Public Open Space Map of WLEP 2011.	N/A
E8 Waterways and Riparian Lands	Developments shall comply with the requirements of Council's Protection of Waterway and Riparian Land Policy and Water Management Policy.	The development is located partially within the Waterways and Riparian Lands Map of the WDCP 2011. The proposed development is generally maintained within the footprint of the existing building and associated hardstand areas and would not result in any change in the existing level of impact on waterways. The application is supported by Stormwater Management Plans by NB Consulting Engineers to demonstrate consistency with Council's Protection of Waterway and Riparian Land Policy. Beneficial outcomes of the proposal include adoption of rainwater tanks for stormwater re-use and drainage upgrades to better manage stormwater runoff from the building. These include rip rap to prevent scour around the outlets.	Yes
E9 Coastline Hazard	For development in the area affected by the certified Coastal Zone Management Plan for Collaroy-Narrabeen Beach and Fishermans Beach (Coastal Zone Management Plan), the applicant must demonstrate compliance with the Northern Beaches Coastal Erosion Policy, the Coastal Zone Management Plan and the Collaroy-Narrabeen Protection Works Design Specifications (as amended from time to time).	The application is supported by a Coastal Risk Assessment by Baird (2023, **Appendix A**) to confirm that the proposed development is consistent with the CZMP. Section 6 of the CZMP states that the requirements apply to new development, whereas the proposed development comprises alterations and additions to an existing building.	Yes

Clause	Control	Proposal	Compliance
E10 Landslip Hazard	Council may decide that a preliminary assessment of site conditions is required.	The application is supported by a geotechnical investigation by JK Geotechnics (2023) to confirm the geotechnical stability of the proposed works.	Yes

5.6.1 Views

Dwellings on the opposite side of Ocean Street appear to enjoy ocean views over and across the subject site. In consideration of the works proposed, any potential impact to these views is limited to the portion of these views currently obtained over the existing first floor balcony. The potentially affected view corridors are indicated in **Figure 5-4**.

Figure 5-4 Aerial image of the site with outline of first floor roof shown in green and potential view corridors shown in red

Potential impacts on each of these view corridors is discussed below.

1. 226 Ocean Street

A two storey dwelling is located at 226 Ocean Street. The dwelling at 226 Ocean Street appears to enjoy views of Narrabeen Lake in a northerly direction, North Narrabeen Headland in a north-easterly direction, the ocean in an easterly direction and Long Reef Headland in a south-easterly direction, as shown in **Figure 5-5**.

Figure 5-5 View from 226 Ocean Street in a north-easterly direction (left) and a south-easterly direction (right) as viewed from upper floor living/dining room (Source: realestate.com.au)

The proposed enclosed lobby at the first floor has potential to impact upon views currently available across the open balcony of the SLSC towards the ocean in an easterly direction from the upper level living/dining room. The potential impact is limited to a minor portion of the expansive views available, in a location that is currently obstructed by a fixed privacy screen, umbrellas and gazebos intermittently erected on the balcony for shade and weather protection.

In light of the extent of views available from 226 Ocean Street and the minor nature of the works proposed, the impact upon views from 226 Ocean Street is considered to be negligible and reasonable.

2. 224 Ocean Street

An existing single storey dwelling is located at 224 Ocean Street. Any potential ocean views from the single storey dwelling are currently obstructed by a large hedge. The proposed development will be not impact upon views from the property.

3. 220 Ocean Street

An existing three storey dwelling is located at 220 Ocean Street. The dwelling at 220 Ocean Street appears to enjoy views of Narrabeen Lake in a north-westerly direction, North Narrabeen Headland in a north-easterly direction and the ocean in an easterly direction.

The proposed enclosed seating area at the first floor has potential to impact upon views currently obtained across the open balcony towards the ocean in an easterly direction from the upper level of the dwelling. The potential impact is limited to a minor portion of the expansive views available, in a location that is currently obstructed by umbrellas and gazebos intermittently erected on the balcony for shade and weather protection.

In light of the extent of views available from 220 Ocean Street and the minor nature of the works proposed, the impact upon views from 220 Ocean Street is considered to be negligible and reasonable.

4. 216 Ocean Street

An existing three storey residential flat building is located at 216 Ocean Street. The dwellings on the upper two levels of the building appear to enjoy ocean views in an easterly direction, as shown in **Figure 5-6**.

Figure 5-6 View from 10/216 Ocean Street in an easterly direction (left) and view from 6/216 Ocean Street (middle floor) in an easterly direction (right) from front bedroom (Source: realestate.com.au)

The proposed enclosed seating area at the first floor has potential to impact upon views currently obtained across the open balcony towards the ocean in a north-easterly direction from the front bedrooms of the upper floor apartments. The potential impact is limited to a minor portion of the views available, in a location that is currently obstructed by umbrellas and gazebos intermittently erected on the balcony for shade and weather protection. The potential impact upon views from the bedroom windows of the front, upper level apartments at 216 Ocean Street is considered to be minor and reasonable.

The existing SLSC building obstructs views to the ocean in a north-easterly direction from the bedroom windows on the middle level of apartments at 216 Ocean Street, with ocean views in an easterly and south-easterly direction unaffected by the proposed development.

5. 212-214 Ocean Street

An existing two/three storey residential flat building is located at 212-214 Ocean Street. The upper levels at the north-eastern corner of the dwelling appear to enjoy ocean views in a north-easterly direction.

The proposed enclosed seating area at the first floor of the SLSC building has potential to impact upon filtered views towards the headland in a north-easterly direction that may be currently obtained across the open balcony from the corner windows of the middle level and from the upper level roof terrace. The potential impact is limited to a minor portion of the views available, in a location that is currently obstructed by the children's playground (including shade sails) and large Norfolk Island Pines, in addition to umbrellas and gazebos intermittently erected on the balcony for shade and weather protection. The potential impact upon views from this dwelling is considered to be negligible (if there is any impact at all) and reasonable.

6. 209-211 Ocean Street

A three storey shop top housing development is located at 209-211 Ocean Street. Dwellings with windows on the northern elevation appear to enjoy views to North Narrabeen Headland in a northerly/north-easterly direction, and views to the ocean in a north-easterly/easterly direction, as shown in **Figure 5-7**.

Figure 5-7 View from 1/209 Ocean Street (first floor) in an easterly direction from living room and balcony (left) and in a north-easterly direction from north facing bedroom (right) (Source: realestate.com.au)

The proposed enclosed seating area at the first floor of the SLSC building has potential to impact upon filtered views towards the headland in a northly direction that may be currently obtained across the open balcony from the windows of the middle level and from the upper level roof terrace. The potential impact is limited to a minor portion of the views available, in a location that is currently obstructed by the large Norfolk Island Pines, in addition to umbrellas and gazebos intermittently erected on the balcony for shade and weather protection. The potential impact upon views from this building is considered to be negligible (if there is any impact at all) and reasonable.

Based on the assessment of views provided above, Council can be satisfied that the potential impact of the proposed development upon views has been appropriately considered and that view sharing is achieved.

6 Conclusion

The application seeks consent for alterations and additions to the existing North Narrabeen SLSC building.

North Narrabeen SLSC serves a pivotal role in the Narrabeen locality. The not-for-profit organisation is largely comprised of volunteers and provides education and training for residents of the area, enhances public safety at the beach, and fosters a sense of community by promoting volunteerism and group/team recreation. The proposal has been designed to provide a much-needed upgrade to the existing facility to the meet the operational demands of the club, the North Narrabeen Boardriders, and to provide improved amenity for the local community.

North Narrabeen has also been re-introduced back into the World Surfing League schedule, with the return of the Sydney Surf Pro Challenger Series Competition to be hosted at the site in May 2024. The proposed development will ensure that the existing building and facilities are upgraded to a standard that is suitable to continue to host this international event.

The proposed development is consistent with the applicable provisions of WLEP 2011, WDCP 2011 and other applicable plans and policies, including the CM Act and Resilience and Hazards SEPP.

7 References

Absolute BCA & Accessibility Pty Ltd [Absolute] (2023a) *Accessibility Compliance Assessment Report North Narrabeen Surf Life Saving Club Alterations and Additions to existing building*, November 2023.

Absolute (2023b) *BCA Compliance Assessment Report North Narrabeen Surf Life Saving Club Alterations and Additions to existing building*, November 2023.

Baird Australia [Baird] (2023) *North Narrabeen SLSC – Coastal Assessment and Management Report for Development Application (Alterations and Additions to Existing Building)*, November 2023.

Barker Ryan Stewart (2023a) Traffic and Parking Impact Assessment Report North Narrabeen Surf Life Saving Club 2 Malcolm Street, Narrabeen, September 2023.

Barker Ryan Stewart (2023b) Construction Traffic and Pedestrian Management Plan North Narrabeen Surf Life Saving Club 2 Malcolm Street, Narrabeen, September 2023.

Certified Energy (2023) *Section J Energy Efficiency Report North Narrabeen SLSC Alterations and additions*, November 2023.

Coast History and Heritage [Coast] (2023) *North Narrabeen Surf Life Saving Club, Narrabeen, Aboriginal Heritage Due Diligence Assessmen*t, December 2023.

Department of Environment, Climate Change and Water [DECCW] (2010) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*, Sydney.

Department of Planning and Environment [DPE] (2023) *NSW Coastal Design Guidelines 2023 For a thriving and resilient coast*, October 2023.

Elephant Foots Consulting Pty Ltd [EP Consulting] (2023) *North Narrabeen Surf Life Saving Club 2 Malcolm St Narrabeen Construction and Demolition Waste Management Plan*, November 2023.

GHD (2023) *North Narrabeen SLSC Acoustic assessment*, November 2023.

JK Environments (2023) Preliminary *Acid Sulfate Soil Assessment Proposed Alterations and Additions North Narrabeen Surf Life Saving Club, Ocean Street, North Narrabeen, NSW*, July 2023.

JK Geotechnics (2023) *Geotechnical Investigation Proposed Alterations and Additions North Narrabeen Surf Life Saving Club, Ocean Street, North Narrabeen, NSW*, July 2023.

Northern Beaches Council [NBC] (2023) *Community and Stakeholder Engagement Report North Narrabeen SLSC Alterations and Extensions (Stage 1 of 1).*

Warringah Council (2002) *Coastal Lands Plan of Management A Generic Plan of Management*, adopted 24 September 2002.

Warringah Council and Royal Haskoning (2014) *Coastal Zone Management Plan for Collaroy-Narrabeen Beach and Fishermans Beach, Supporting Appendix I: Coastal Processes and Hazard Lines*. Prepared for Warringah Council.

WorleyParsons (2015) *Coastal Erosion Emergency Action Subplan for Beaches in Warringah*. Prepared for Warringah Council.

Appendix A

Coastal Assessment & Management Report

Baird Australia Pty Ltd as Trustee for the Baird Australia Unit Trust
ACN 161 683 889 | ABN 92 798 128 010

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Ms. Tanja Mackenzie
Principal Environmental Scientist | Rhelm
50 Yeo Street
Neutral Bay, NSW 2089

via email to tanja.mackenzie@rhelm.com.au

Status: Final
22 December 2023

Dear Tanja,

Reference # 13142.505.L1.Rev0

RE: NORTH NARRABEEN SLSC - COASTAL ASSESSMENT AND MANAGEMENT REPORT FOR DEVELOPEMENT APPLICATION (ALTERATIONS & ADDITIONS TO EXISTING BUILDING)

Baird Australia Pty Ltd (Baird) have been engaged to prepare a Coastal Assessment and Management Report for a Development Application (DA) associated with the North Narrabeen Surf Life Saving Club (SLSC). The DA involves Alterations and Additions to the existing SLSC to improve amenities and building facilities, and to extend the functional life of the SLSC building but this DA does not extend the ultimate life of the SLSC building structure.

The North Narrabeen SLSC is located at the northern end of Narrabeen Beach, to the south of the ocean entrance of Narrabeen Lagoon as outlined in Figure 1. The SLSC is located within the coastal management area of the Coastal Zone Management Plan (CZMP) for Collaroy-Narrabeen Beach and Fisherman's Beach (NBC & Royal Haskoning, 2016). The 2016 CZMP was developed in accordance with the NSW Coastal Protection Act 1979 and NSW Coastal Policy 1997 and is the current management plan applied for the development and management of Collaroy-Narrabeen Beach. This Coastal Assessment and Management Report has utilised data and coastal hazard assessment information presented in CZMP.

This report is structured into the following sections:

- Overview of DA and summary of interaction with coastal hazards.
- Summary of requirements for this Coastal Assessment
- Summary of coastal hazards relevant to the DA.
- Coastal engineering assessment of impacts of coastal erosion and inundation on the SLSC over a relevant planning period up to 2050.
- Design and management recommendations for the DA.

Figure 1: Locality Plan of the North Narrabeen SLSC.

Development Application Details

The proposed alterations and additions to the SLSC is presented in the drawing set numbered DA01 to DA16 Revision D (Issued November 2023). A site plan of the development area, including appliable coastal hazard lines from the CZMP is presented in Figure 2, and Figure 3 presents a plan view of the ground floor development. The proposed alterations and additions do not extend the SLSC beyond the current footprint occupied by the building and associated fixtures. The ground elevations immediately seaward of the building are typically 9.5 to 9.7 m AHD and those would not be altered by the planned development.

In July 2023, JK Geotechnics completed a geotechnical investigation of the site as part of the design and planning for preparation of the DA. The scope of the geotechnical investigation was to examine the subground conditions at the site, and to document and assess the foundations of the SLSC. Two test pits were excavated to 0.5 m depth, and four Dynamic Cone Penetration (DCP) tests were completed and terminated at 4 m depth (below the surface).

The investigations indicated that the SLSC is founded on conventional pad footings that are embedded 0.4 m (approximately) below the ground level. To the depth of the DCP tests, the subsurface was comprised of fine to medium sands ranging in density from very loose to medium density (JK Geotechnics, 2023). The geotechnical assessment confirmed that the SLSC is founded on marine sands, as expected, and that the conventional foundations of the SLSC are dependent on the bearing capacity of the surface and near-surface soil layers.

Northern Beaches Council (NBC) maintains an asset register for all buildings that they are responsible for which includes an assessment of the remaining functional life of the building structure. Based on advice from NBC, the SLSC, including after the planned alterations and additions, is expected to have a functional life up to 2050. After that time, due to the age and expected condition of underlying building structure, a substantial structural renovation or replacement of the building would be expected. This Coastal Assessment and Management Plan has focused on the potential coastal impacts up to the year 2050.

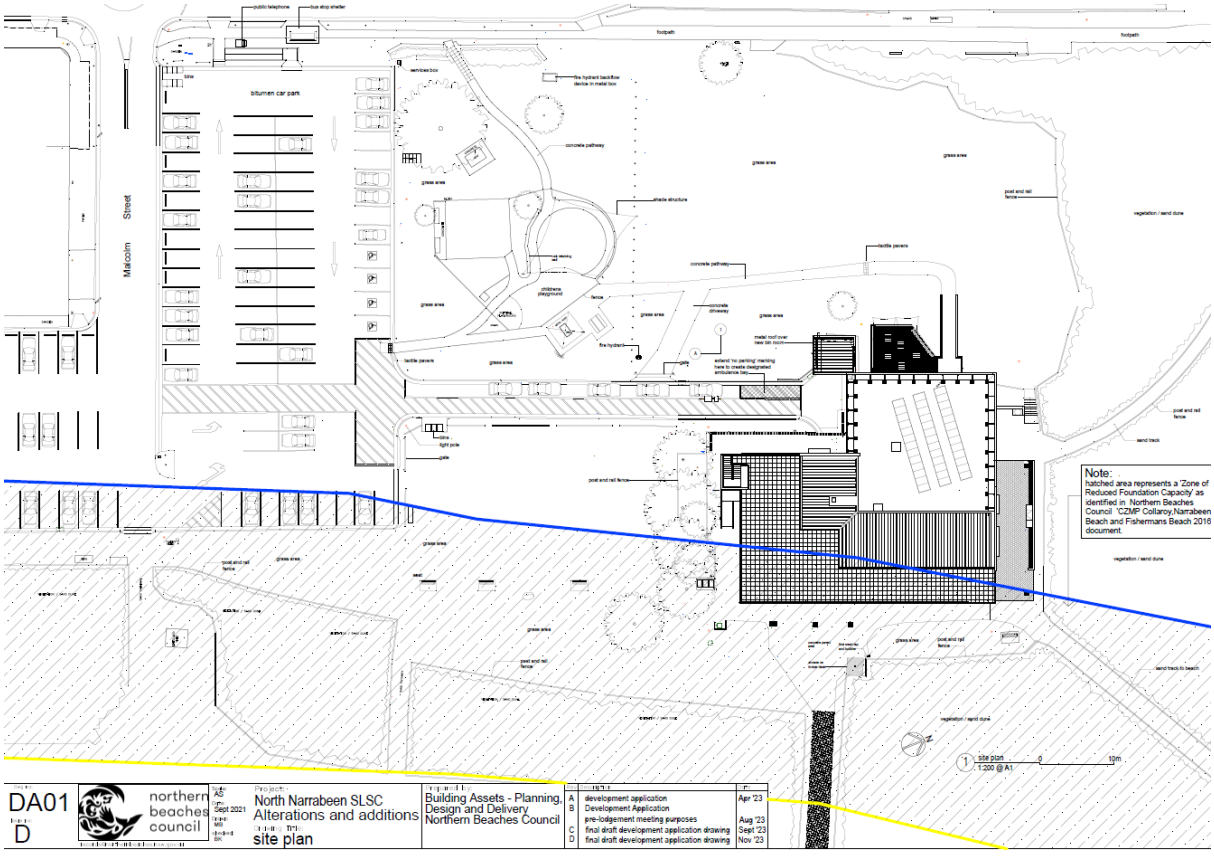

Figure 2: Site Plan for North Narrabeen SLSC Alterations and Additions (DA01-D)

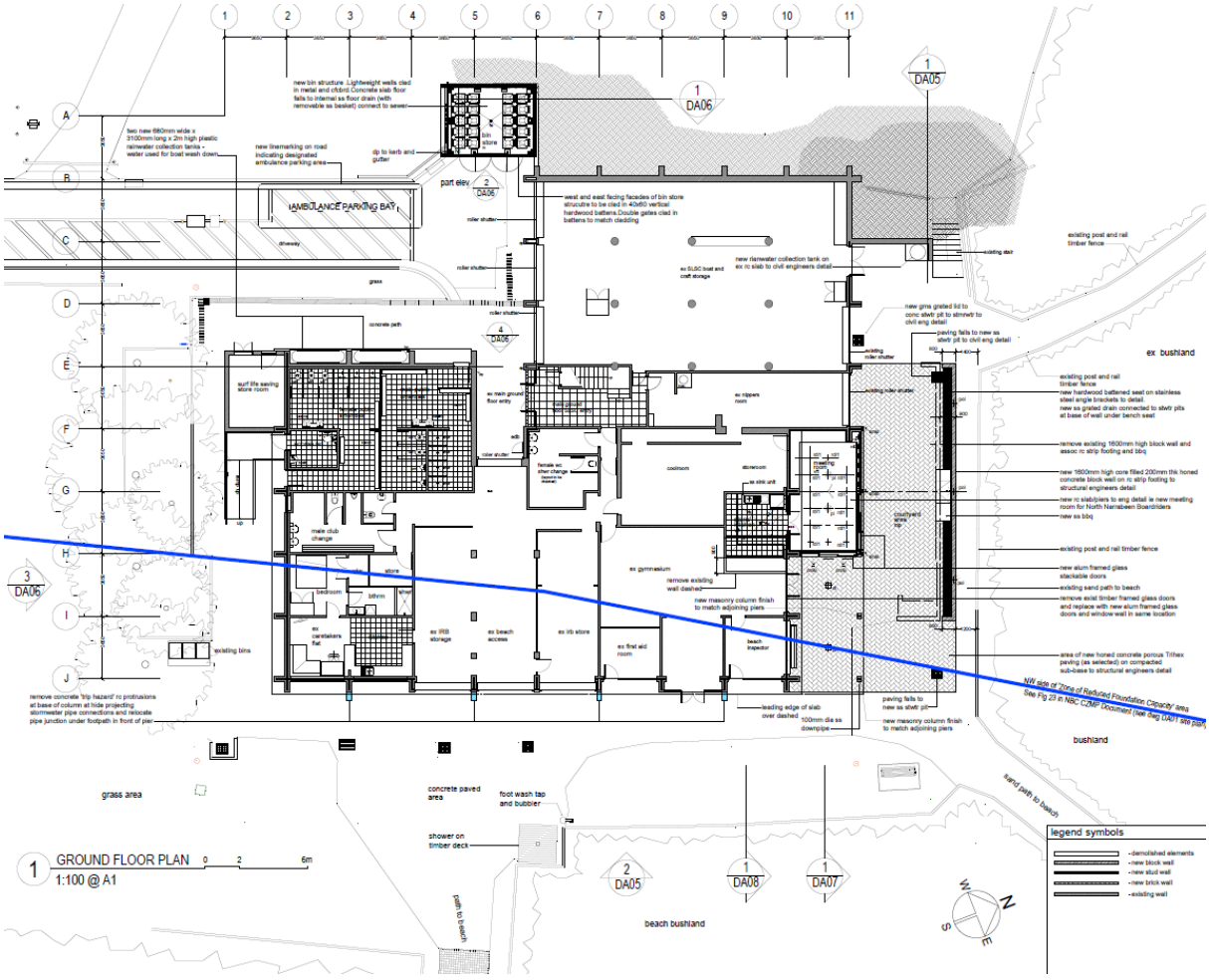

Figure 3: Ground Floor Plan for North Narrabeen SLSC Alterations and Additions (DA02-D)

Requirements for Coastal Assessment

This report has been prepared to meet NBC's planning requirements in accordance with the NSW Coastal Management Act 2016. The Coastal Management Act 2016 requires seven coastal hazards to be considered with respect to their potential impact on planned development, as well as the impact of development on surrounding coastal processes relevant to those hazards. Table 1 summarises the coastal hazards considered in the preparation of this report and a summary of their potential impacts on the SLSC.

Table 1: Coastal hazards considered in this report in accordance with the Coastal Management Act 2016

Coastal Hazard	Applicability to SLSC DA	Description of Hazard Assessment Methodology
Beach Erosion	For future planning horizons, beyond 2050, the SLSC may be impacted by beach erosion in combination with shoreline recession.	Review of 2016 and 2014 CZMP's. Calculation of Zone of Reduced Foundation Capacity (ZRFC) completed for the SLSC.
Shoreline Recession	For future planning horizons, beyond 2050, the SLSC may be impacted by shoreline recession in combination with beach erosion.	Considered in assessment of impact of beach erosion.
Coastal Lake or Watercourse Entrance Instability	The SLSC is located south of the ocean entrance to Narrabeen Lagoon.	Review of relevant documents, including 2022 EMP.
Coastal Inundation	The SLSC is located on relatively high, stable dunes at an elevation of 9.5 m AHD. Over the planning period to 2074 as defined in the CZMP, the CZMP assesses that at an elevation above 8 m AHD are unlikely to be impacted by coastal inundation.	Review of 2016 and 2014 CZMP's and additional analysis presented in Baird (2021). No further assessment completed.
Coastal Cliff or slope instability	Not applicable to the site.	Review of geology and ground conditions at site. No further assessment completed.
Tidal Inundation	The SLSC is located on relatively high, stable dunes at an elevation of 9.5 m AHD. Not applicable to the site for any relevant planning period.	Review of 2016 and 2014 CZMP. No further assessment completed.
Erosion or inundation of foreshores by tidal water and impact of waves and catchment floodwaters	Not applicable to the site.	Review of 2016 and 2014 CZMP. No further assessment completed.

Summary of Coastal Hazards Relevant to the DA

Beach Erosion and Shoreline Recession

Based on the CZMP, the SLSC is calculated as been beyond the present-day impact zone from coastal erosion and coastal inundation based on the 2014 CZMP. The potential for direct erosion impacts on the SLSC was identified as possible in the time frame of 2050 and beyond, depending on the rate of sea level rise. In the 2016 CZMP, the *Acceptable Risk* assessment of coastal erosion and its impact on development controls up to 2074 identified that the direct impact line of coastal erosion from a severe erosion event lies 26 to 33 m seaward of the SLSC (see yellow line on Figure 2), but that within the 2074

planning period, the Zone of Reduced Foundation Capacity (ZRFC) may impact on the SLSC. The ZRFC was included in the 2016 CZMP based on the beach erosion and slope adjustment model of Neilson *et al* (1992) which is schematically presented in Figure 4. The coastal engineering assessment summarised in the following section has focused on the potential impact of the ZRFC on the SLSC, particularly in the context of remaining asset life to 2050.

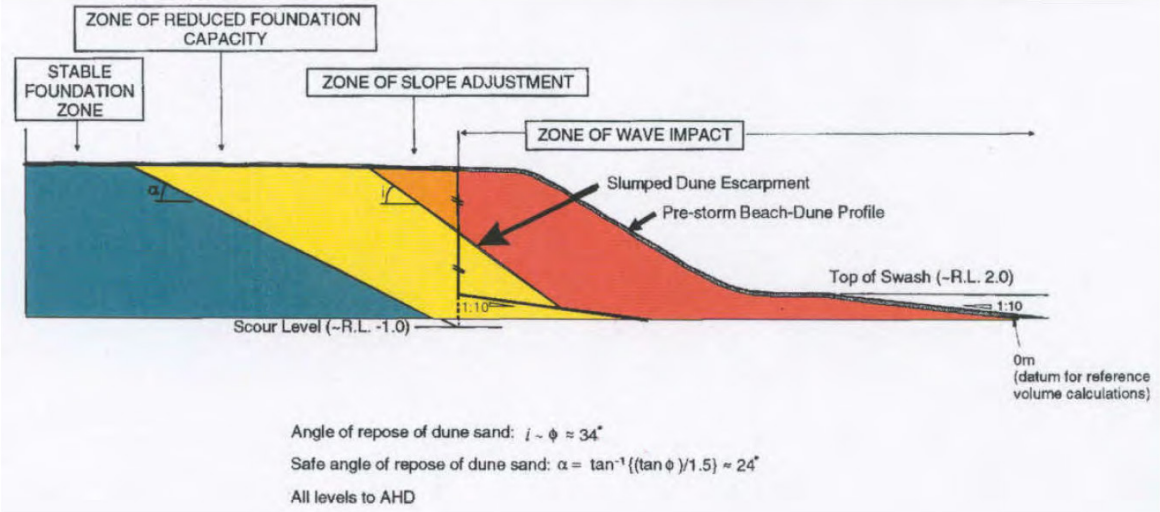

Figure 4: Erosion hazard zones including the Zone of Reduced Foundation Capacity (ZRFC) as defined by Nielsen *et al* (1992).

Whilst the 2016 CZMP defined that the SLSC was potentially impacted by coastal erosion in the 2074 planning period, the 2014 CZMP which adopted a similar erosion hazard assessment as the current 2016 CZMP defined that at present day, and for the planning horizon to 2050, the SLSC was landward of the Zone of Reduced Foundation Capacity (ZRFC) as referred to in Figure 4. Figure 5 presents the immediate (2014), 2050 and 2100 coastal hazard lines from the 2014 CZMP. Based on that assessment, the SLSC is landward of the ZRFC at present (2023) and it is expected that between 2040 and 2050, the SLSC may be in the area where erosion hazard could impact on the capacity of the building foundations, but the SLSC is not expected to be in the active erosion zone.

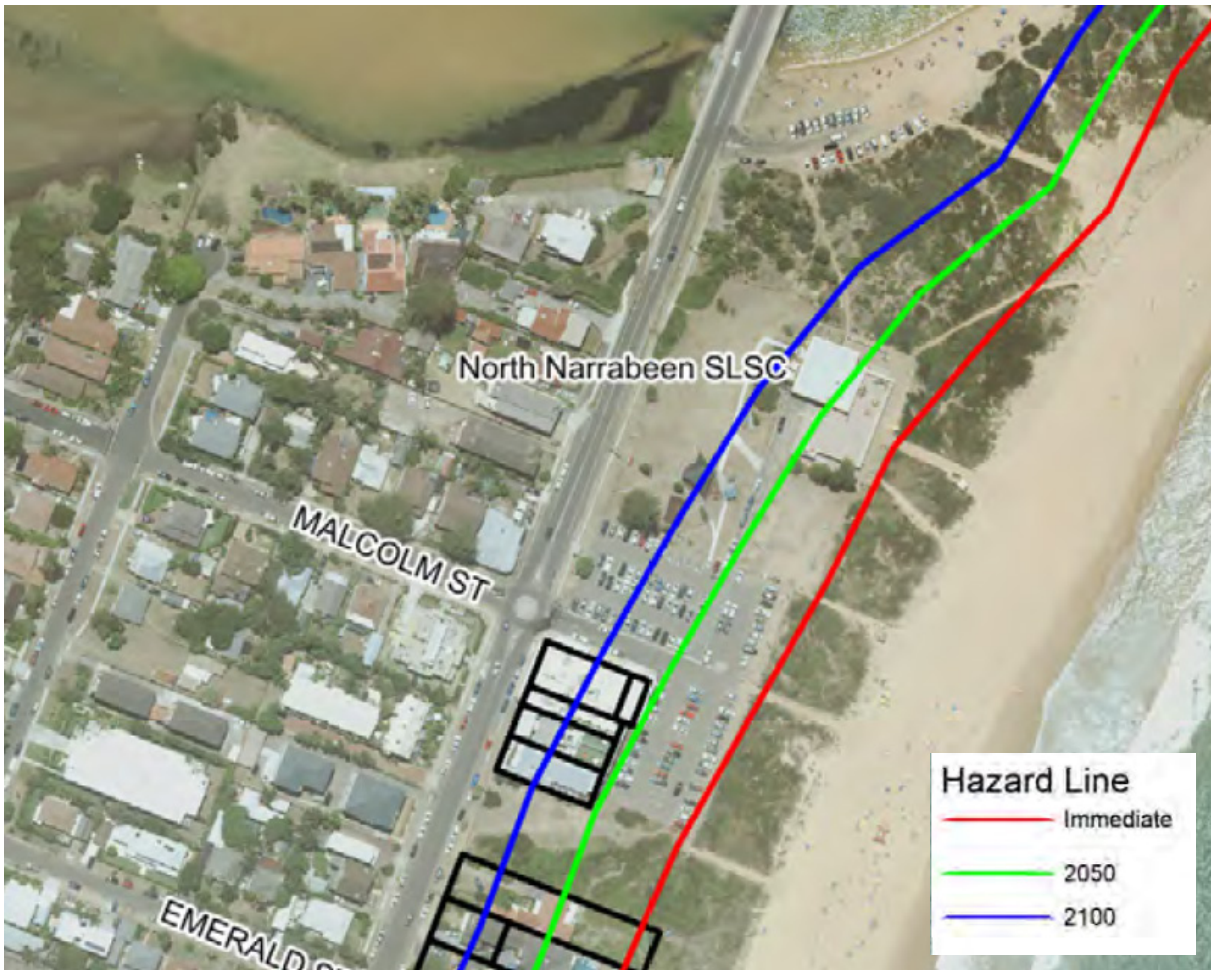

Figure 5: Immediate, 2050 and 2100 Coastline Hazard Lines (located at landward edge of ZRFC) at northern end of Narrabeen Beach (Figure I17, Warringah Council & Royal Haskoning, (2014).

Narrabeen Lagoon Entrance Morphology and Impacts on SLSC

Various assessments of the entrance morphology and channel migration, including the recent Entrance Management Strategy (Royal Haskoning, 2022) have indicated that the entrance has historically been on the northern end of the beach and has not migrated south towards the SLSC over the period of photographic records. The stable, high dunes comprised of marine sand that the SLSC is founded on also indicates that the SLSC has not been impacted by the entrance position over a prolonged period of time. No further assessment of entrance morphology impacts has been considered in this report.

Coastal Engineering Assessment of Coastal Erosion and Inundation

Coastal Erosion

A coastal engineering assessment has been completed for the proposed SLSC alterations and additions based on the 2074 *Acceptable Risk* hazard lines. As indicated previously, based on the CZMP, the SLSC is potentially within the ZRFC for the 2074 planning period but is located well landward of the current erosion hazard risk zone defined in the 2014 CZMP.

An assessment of the lower level of the ZRFC has been completed using LiDAR and site survey data, and the hazard lines presented in the CZMP as indicated in Figure 2. Figure 6 presents two cross-sections that have been analysed to determine the minimum vertical level where soil bearing capacity can be assumed. This is generally referred to as the minimum vertical level where piled foundations can assume soil strength based on Neilson et al (1992). Figure 7 presents the calculated maximum vertical level where soil capacity can be assumed based on the 2074 hazard lines I the CZMP. If erosion resilient foundations were required for the SLSC for the 2074 planning period, the foundations would need to be founded in soil layers below the levels indicated on Figure 7. However, based on the 2014 and 2016 CZMP's, it is estimated that by 2050, there is approximately a 1% per annum probability that the SLSC may be impacted by the ZRFC during or following a severe erosion event.

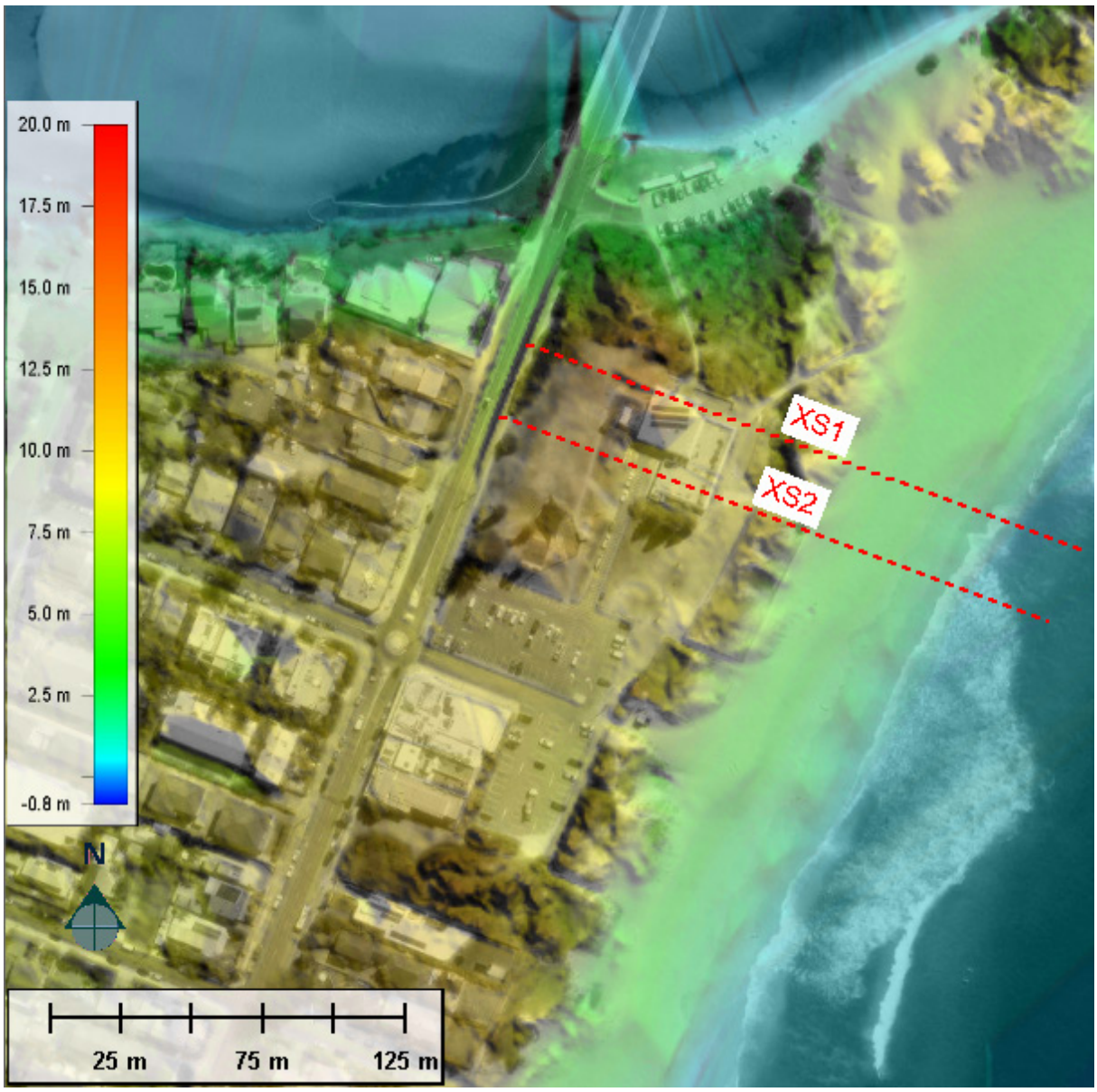

Figure 6: Cross sections analysed for Zone of Reduced Foundation Capacity (ZRFC).

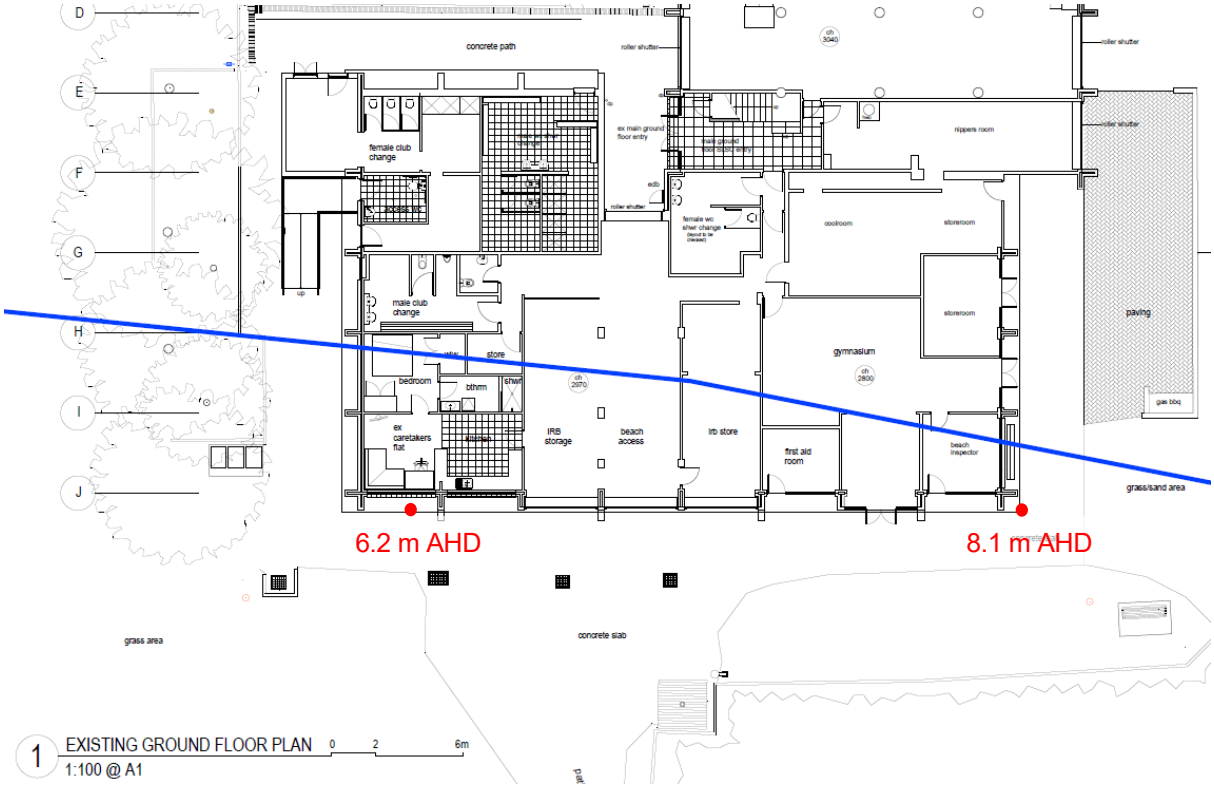

Figure 7: SLSC Existing ground floor: maximum vertical elevation for piled foundations to assume soil capacity based on ZRFC (see Figure 4).

Coastal Inundation

The 2016 CZMP addresses the potential for coastal inundation along Collaroy-Narrabeen in a cursory manner despite the shorelines along the beach potentially being subjected to predicted and observed wave run-up up to levels of 8 m AHD. The most severe wave run-up scenario along the sandy beach areas of Collaroy-Narrabeen occurs following significant erosion of the beach and the formation of a steep beach scarp at the back of the beach. This scenario has frequently occurred in major storms at Collaroy-Narrabeen over the last 80-years, including the June 2016 storm.

Baird completed a detailed case study report on the June 2016 storm and its impact on the Collaroy-Narrabeen, including from wave dominated inundation (Baird, 2021). The assessment included analysis of historical wave run-up and inundation back to the 1970's based on measured and hindcast data. That assessment indicated that extreme wave run-up levels can reach up to 8 m AHD for present sea level conditions and can impact up to the Zone of Slope Adjustment as indicated in Figure 4 when the elevation of the crest of the ZSA is less than 8 m AHD. Within the planning horizon applicable to this development application (i.e. 2050), the ZSA will be seaward of the SLSC and be located at an elevation of around 9 m AHD. It is not expected that the SLSC will be subject to coastal inundation from wave action or elevated coastal water levels.

Design and Management Recommendations for the Development Application

Based on a review of the development details for the planned alterations and additions to the North Narrabeen SLSC, the coastal hazards impacting the site, and the remaining structural life of the SLSC building (which is not expected to exceed 2050), Baird would recommend that no additional consideration of coastal hazards needs to be incorporated into the DA design. The following summarises the basis for this assessment:

- The SLSC is not expected to be within the active coastal erosion zone up to a planning horizon of 2074. It is currently landward of the erosion hazard impact area, including the current ZRFC following a severe erosion event.
- By 2050, it is estimated that with beach recession dominated by expected sea level rise, there is approximately a 1% per annum probability that the SLSC may be impacted by the ZRFC during or following a severe erosion event. For a public use asset such as the SLSC that is essential for the ongoing safe community use of the beach, and provides entertainment and recreational opportunities near the coast for the wider community, this level of risk exposure by 2050 is considered low.
- Additionally, the planned alterations and additions to the SLSC proposed in the DA will not extend the structural life of the SLSC, which is not expected to exceed 2050 before a major structural renovation or replacement of the building will be required.

As part of this coastal assessment, the stormwater drainage and its potential impact on coastal processes, particularly with respect to contributing to additional erosion has been considered. The storm water infrastructure is planned to be upgraded in this DA will drain towards the coastline from the northern and southern extents of the SLSC building. Within a planning period to 2050, it is not expected that stormwater from the SLSC building will have an adverse impact on the coastal hazards impacting the SLSC or any surrounding infrastructure and buildings.

It is recommended that that the ongoing management and consideration of the impact of coastal hazards on the SLSC be reviewed by Northern Beaches Council on a periodic basis. This could occur at each update to the coastal management framework for the beach. This will ensure that if coastal processes or risk exposure of the SLSC to erosion increases in a manner not expected based on the current 2016 CZMP, any increased exposure to coastal hazards will be identified early and adaptive management of erosion risk to the SLSC could be implemented.

As a matter of precaution, Northern Beaches Council should ensure that the SLSC is included within the potential properties subject to emergency response actions during and following a major coastal storm event. Whilst the present risk the SLSC is considered extremely low, in the future as sea level rise increases including the SLSC in the properties potentially subject to emergency response actions will minimise risk to life and property because of possible damage to the SLSC.

Should you have any questions or comments regarding this report, please contact the signing engineer to this report.

With thanks,

David Taylor CPEng, NER (2296992). APAC Engineer, IPEng (Aus) | Principal
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References

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Document Approval and Revision History

Revision	Status	Comments	Prepared	Reviewed	Approved
A	Draft	Sent to Rhelm for Review	RW / DT	DT	DT
0	Final	Issued for DA	RW / DT	DT	DT

Appendix B

Aboriginal Heritage Due Diligence Assessment

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15/112 McEvoy Street
Alexandria NSW 2015

ACN: 625442480

13 December 2023

Bernard Koon
Senior Project Officer
Northern Beaches Council
PO Box 82
Manly NSW 1655

WARNING: Aboriginal & Torres Strait Islander readers should note that this document discusses the ancestral remains of Aboriginal people

Dear Bernard,

RE: North Narrabeen Surf Life Saving Club, Narrabeen
Aboriginal Heritage Due Diligence Assessment

This Aboriginal Heritage Due Diligence Assessment report has been prepared by Coast History & Heritage (Coast) to assess the proposed upgrades to the North Narrabeen Surf Life Saving Club (SLSC) building located in Narrabeen NSW. The assessment is required by Northern Beaches Council to support the lodgement of a Development Application (DA). The assessment aims to determine if any Aboriginal heritage sites ('objects' or 'places' under the *National Parks and Wildlife Act 1974*) will be impacted by the proposal and if any further Aboriginal heritage investigations may be required.

This report was written by Gina Basile (Heritage Consultant) and Julia McLachlan (Senior Heritage Consultant) reviewed by Fenella Atkinson (Senior Heritage Consultant), and meets the requirements of the Heritage NSW *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Due Diligence Code of Practice).[1]

1 What we are assessing

The property and proposal

The area we are assessing (the study area) consists of the North Narrabeen SLSC building and immediate surrounds. It is located in Birdwood Park to the north of Malcolm Street, and east of Ocean Street, Narrabeen NSW (**Figure 1** and **Figure 2**). It is situated within the Northern Beaches Local Government Area (LGA), in the Parish of Manly Cove and County of Cumberland, and within

[1] Department of Environment, Climate Change and Water. 2010. *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. Sydney: Department of Environment, Climate Change and Water NSW.

the boundaries of the Metropolitan Local Aboriginal Land Council (LALC). The study area comprises parts of:

- Lot 6, Lot 8, Section 63 DP5768
- Lot 1, Lot 2 DP339162
- Lot A, Lot B DP376822

The proposed works will comprise alterations and additions to the existing North Narrabeen SLSC building (**Figure 3** and **Figure 4**). The works that will require or have the potential for subsurface impacts will include:

- Extension to the north for new board rider's room and associated features
- Installation of rainwater tanks and associated plumbing
- New stormwater drainage and rainwater tanks

Other works that will not require ground impact include modification to the proposed bin area, internal alterations, external door and window alterations. Except for the stormwater works, no other upgrades to existing subsurface services are proposed (e.g. electrical, sewage). The works will likely be staged depending on funding and logistics. It is expected that any ground penetrating works have the potential to impact Aboriginal sites where present. This report aims to determine the likelihood for the potential presence of Aboriginal sites within the study area and whether further investigation will be required in relation to the proposal.

Figure 1. The general location of the study area

Figure 2. The study area

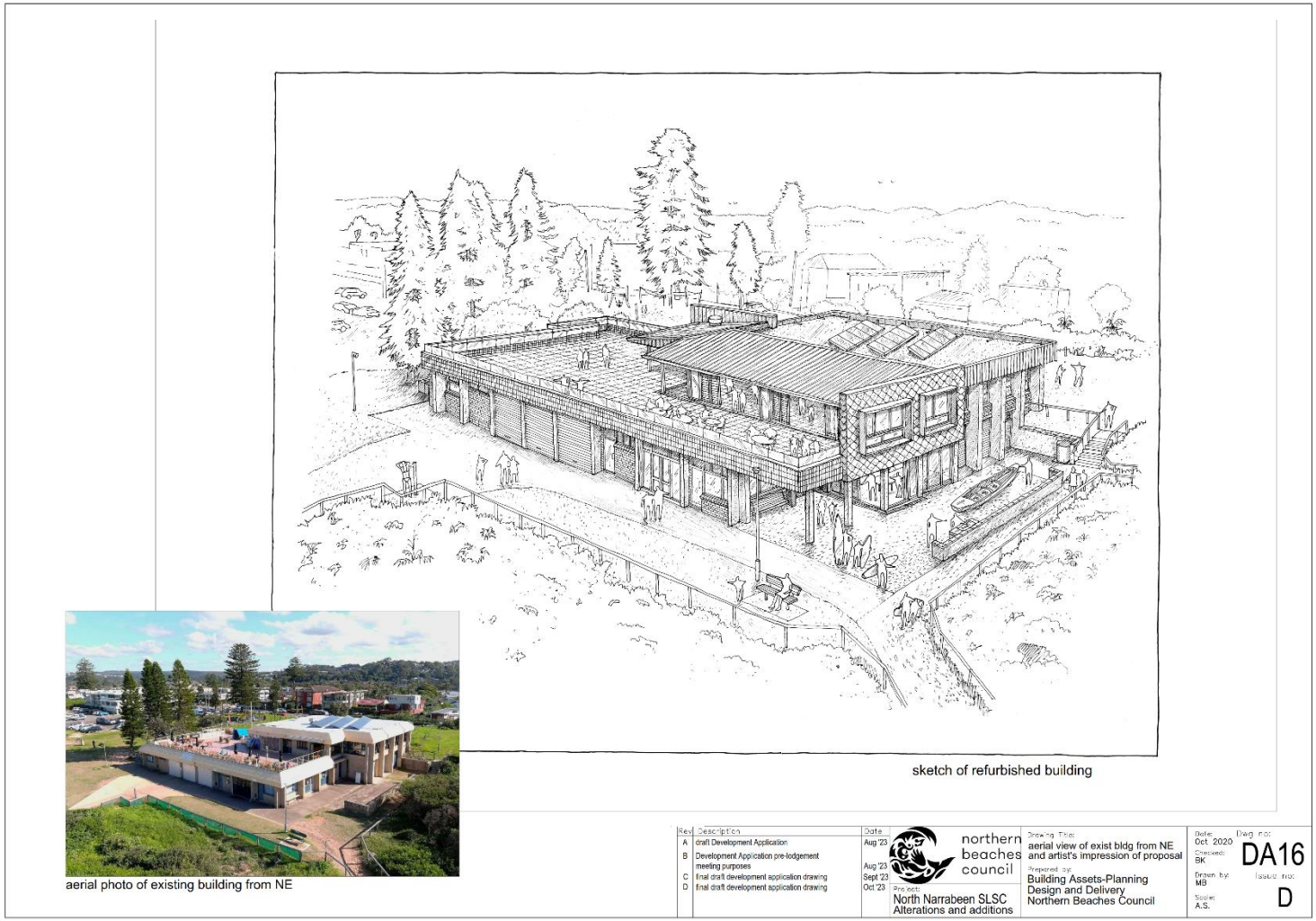

Figure 3. Photograph of existing building and schematic of proposed upgrades

Source: Northern Beaches Council. North Narrabeen SLSC Alterations and additions: aerial view of exist bldg from NE and artist's impression of proposal, DWG DA16, Rev D, Oct 2023.

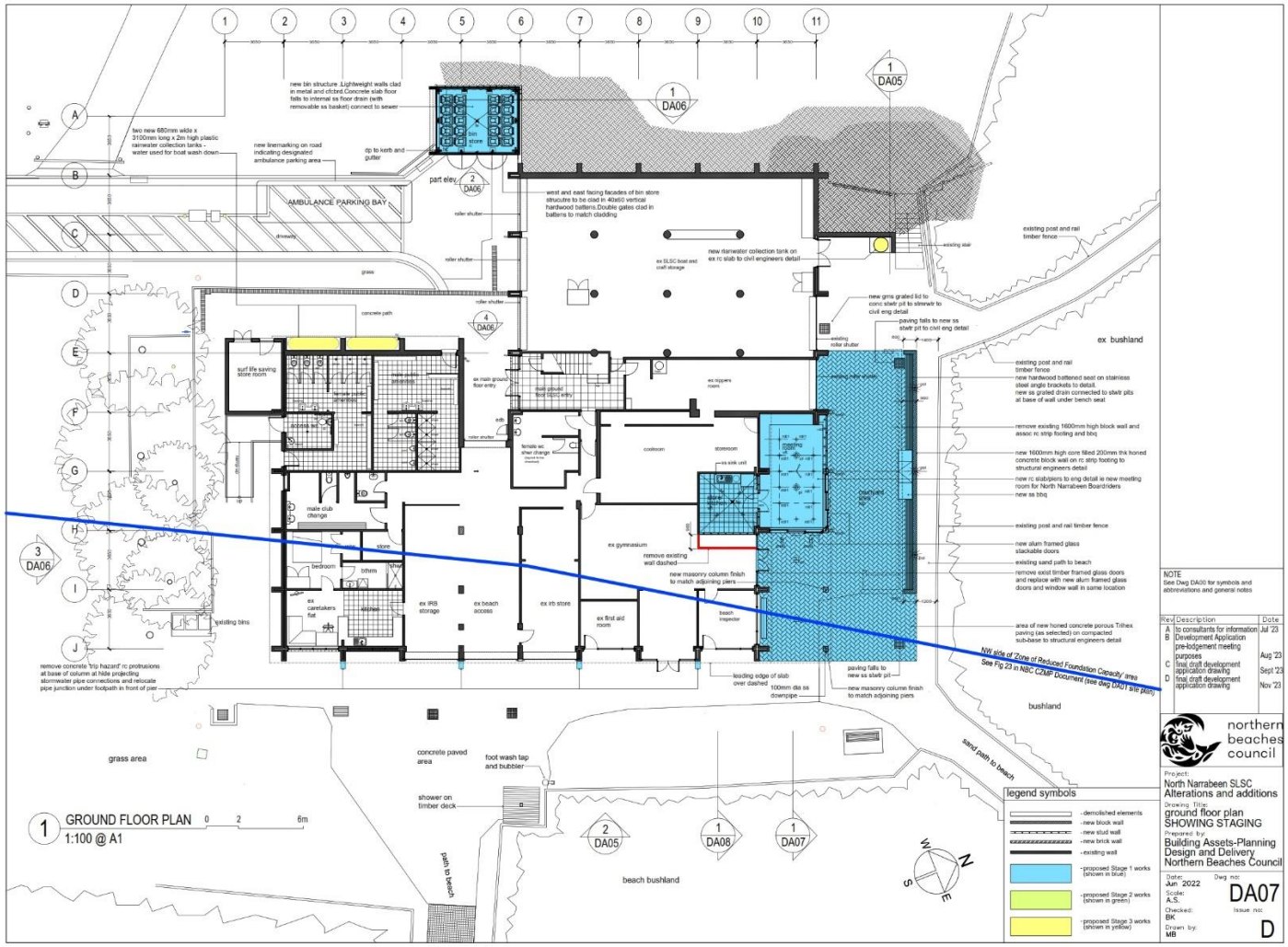

Figure 4. Ground floor plan, showing proposed staging of works

Source: Northern Beaches Council. North Narrabeen SLSC Alterations and additions: ground floor plan showing staging, DWG DA07, Rev D, Nov 2023.

2 Who we have spoken with

Aboriginal community consultation

As part of this Due Diligence Aboriginal Heritage Assessment, we spoke with the Metropolitan LALC to provide an Aboriginal community perspective on the assessment, and to identify any particular Aboriginal cultural or historical associations that might need to be considered in relation to the proposal. Under the *Aboriginal Land Rights Act 1983* the Metropolitan LALC has a responsibility "to promote the protection of Aboriginal culture and the heritage of Aboriginal persons"[2] within its boundaries, which includes the study area.

The project was discussed with the Metropolitan LALC, and Heritage Officers Rowena Welsh-Jarrett and Jacqueline Gibbs who participated in the site inspection on Tuesday, 14 November 2023. During and after the inspection, we discussed what we had seen and the possible implications of the proposed development for Aboriginal heritage. Metropolitan LALC noted that burials are common in these sand dune contexts. While it was acknowledged that disturbances are likely to have impacted the area to some degree, it was requested that any ground penetrating works are monitored by a representative of the Metropolitan LALC together with an archaeologist/heritage consultant.

We provided the Metropolitan LALC with a draft copy of this report and asked them to let us know of any Aboriginal cultural or historical connections or information that they think should be considered in this assessment. We also asked them to consider the recommendations of the draft report. Metropolitan LALC agreed with the recommendations of this report however they also noted that Ancestral burial sites are of the highest level of sacred and cultural heritage significance. Their comments, if provided in writing, will be attached in **Appendix 1.**

3 Information we have considered

Environmental, archaeological and historical context

3.1 Environmental context

If we want to understand how Aboriginal people may have used the local area in the past, and what traces of that use might still physically remain on and below the ground surface, we need to understand the local environment and how it has changed over time.

Prior to around 7,000 years ago, Sydney looked vastly different than its modern form. The coastline would have been around 12-20km further to the east during the Last Glacial Maximum (LGM, roughly 18,000 years ago) and the sea level was lower than today.[3] Slowly, the global climate warmed and the coastline began receding at a pace of approximately 1-2m per year until around 7,000 years ago when the eastern coastline of Greater Sydney, including the study area, reached its modern form. The material culture and surviving evidence of Aboriginal people is likely to have been impacted by this changing climate and landscape.

The study area is located at the northernmost tip of a sandy peninsula that separates the Narrabeen

[2] *Aboriginal Land Rights Act 1983*, s52(1)(m).

[3] Attenbrow, V. 2010. *Sydney's Aboriginal Past - Investigating the archaeological and historical records*. UNSW Press, pp. 37-38.

lagoon and the Tasman Sea. The entire peninsula is a sand dune which begins at Collaroy in the south and extends north to Narrabeen, terminating at the mouth of the Narrabeen lagoon (South Creek). There are several soil landscapes of layering sand dunes that form this peninsula (**Figure 5**).[4] The dune largely comprises the Tuggerah soil landscape which is marine sand, deposited by wind (aeolian dune) in the Pleistocene and Holocene (i.e. within the last 2.58 million years). The low ground on the western side of the peninsula, near the lagoon, comprises the Warriewood soil landscape that is made up of a silty to peaty quartz sand deposited in the Holocene period in the last 11,000 years or so. On the eastern side of the peninsula, on which the study area is situated, is the Narrabeen soil landscape which was also formed in the Holocene period. It comprises deep deposits of coarse sand as well as broken-down shell fragments that form the foredune and beach. The geological mapping also notes that the study area is within coastal deposits that are marine deposited and reworked by wind. This soil landscape is known to occur on barrier beaches such as Narrabeen Beach and is highly susceptible erosion as a result of wind and wave action. The vegetation on these foredunes would have once comprised, low grasses and creepers such as hairy spinifex (*Spinifex hirsutus*), knobby club-rush (*Scripus nodosus*), and beach penny wort (*Hydrocotyle bonariensis*). In the Sydney area, the original vegetation of the dunes has been heavily disturbed resulting in destabilisation, however in most places, these dunes are being revegetated with endemic species.

The presence of these dunes is confirmed by both visual inspection and by geotechnical data for the proposed works within the study area.[5] Through a series of two test pits and four dynamic cone penetrometers (DCPs), the geotechnical engineers encountered natural marine sands to depths of at least 2m. The aim of the test pits was to expose the existing footings and foundations of the SLSC building to inform structural planning. It was found that the western side of the building has been partially cut into the sand dune to a maximum depth of 2.5m below the original ground surface. The existing concrete pavements were noted as being 75mm thick and the existing footings were found to be approximately 0.4m deep (below the level of the cut) and are set into loose sands.

Historical maps from the mid nineteenth century show that the landform, on which the study area is situated, remains largely within the same area as modern footprint, therefore, it is not a more recent washed in sand body (**Figure 6**). Just to the north of the study area forms the opening for the Narrabeen Lagoon which lies further to the west. It is an open/closed lagoon, impacted by the ocean currents that transport material just to the north of the study area, with various sand deposits in-washed during storms that impact the lagoon levels and access to the ocean.

The available information indicates that the location of the study area would have been rich in natural resources. The natural vegetation in the area would have been mainly grassland and herbland[6], which would have provided habitat for animals. The plants and trees would have also been used as a food source themselves, for medicinal purposes, and to make tools, implements and weapons. And the nearby salt waters of the Narrabeen Lagoon and Tasman Sea would have provided fish, shellfish and crustaceans.

[4] Chapman & Murphy, 1989. *Soil Landscapes of the Sydney 1:100 000 Sheet*. Soil Conservation Service NSW, Sydney, p125-129.

[5] JK Geotechnics 2023. *Report to Northern Beaches Council on Geotechnical Investigation for Proposed Alterations and Additions to the North Narrabeen Surf Life Saving Club at Ocean Street, North Narrabeen, NSW*.

[6] Chapman & Murphy 1989.

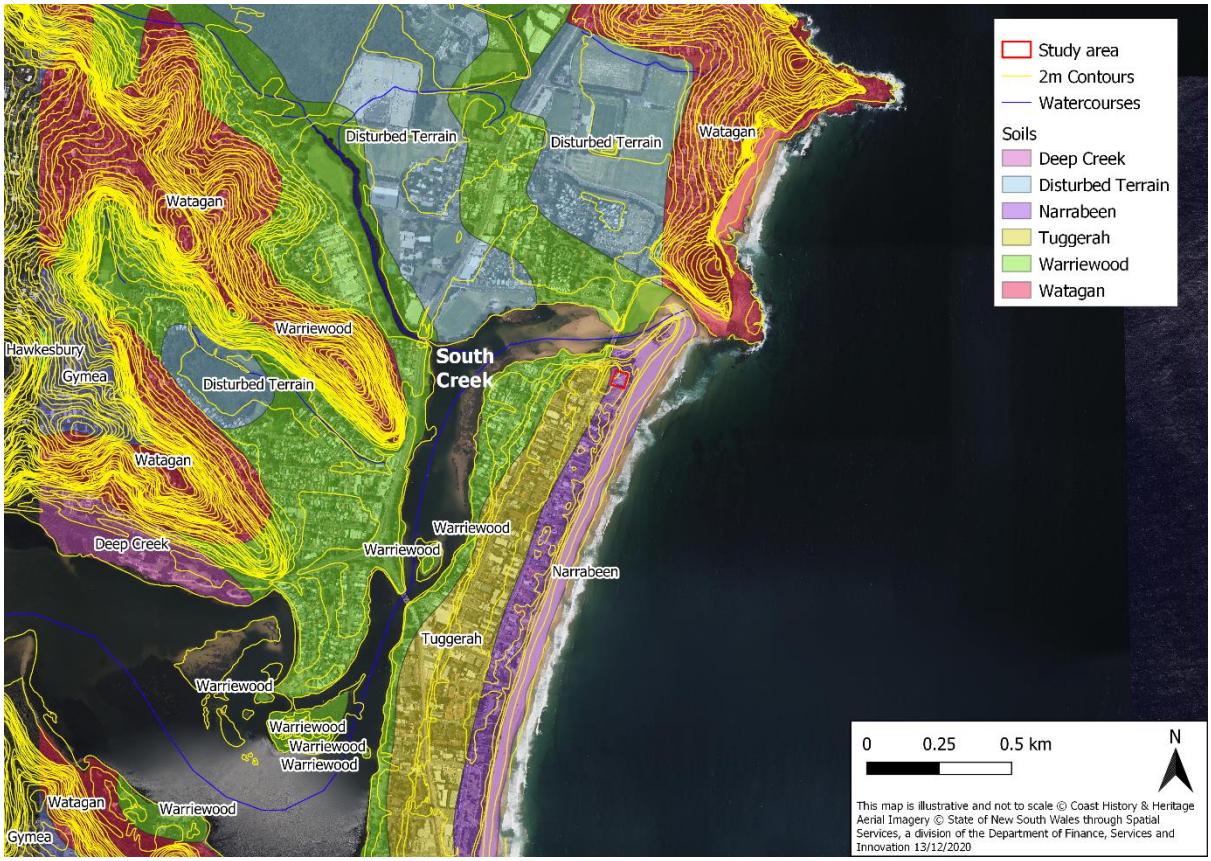

Figure 5. The study area in relation to mapping of soil, watercourses and contours

The Due Diligence Code of Practice specifies several landforms that indicate the likely presence of Aboriginal objects, as they are expected to have been foci of past Aboriginal occupation. Two of these landforms are relevant to the study area: land within 200m of water and land within a sand dune system. As noted above, these landforms indicate the likely presence of rich natural resources. However, the archaeological potential of landscape features may be affected by disturbance that has occurred as a result of natural process, or as a result of historical occupation and development. A review of historical documentation provides more detail on the specific impacts that have occurred in the study area.

Contrary to popular belief, Aboriginal people did not disappear from the coast and areas such as Narrabeen after Europeans arrived in Sydney in 1788. Due to the relatively rugged terrain, the areas north of Sydney Harbour were left relatively undeveloped by the British settlement until the 19th Century. The suburb of Narrabeen is believed to be named after the Aboriginal name of the stream outlet from the Narrabeen Lagoon, referred to as 'Narrowbine' in the journal of Lieutenant James Grant.[7] This was recorded by Lieutenant Grant of the ship the *Lady Nelson* which arrived in Australia in 1800. During his travels he navigated the Pittwater with three Aboriginal guides and describes camping on a beach in the area with Aboriginal men who shared their fish and described parts of

[7] *Lieutenant James Grant's Journey to Manly Warringah Pittwater 1801*. Northern Beaches Council, accessed 29/11/2023, https://northernbeaches.recollect.net.au/nodes/view/12906; James Grant, *Voyage of Discovery to N.S.W. in the Lady Nelson in 1800-1802.* Accessed via Project Gutenberg Australia https://gutenberg.net.au/ebooks13/1300421h.htm

their belief systems. The area surrounding the Narrabeen Lagoon would have offered a diverse range of natural resources and likely to have held spiritual and ceremonial importance utilised by the Aboriginal people of the area.[8] Early references to the Aboriginal people living in the area, from Broken Bay to Port Jackson, are frequently referred to as the Garigal / Carigal people.[9] While Aboriginal people continued to live in the area, the effects of European arrival was devastating, with frontier violence and conflicts, widespread disease with the smallpox epidemic and the continual loss of land.

In 1818, approximately 400 acres of land stretching from the Narrabeen Lagoon to Long Reef was granted to John Ramsay, a First Fleet convict from Ireland, by Governor Macquarie (**Figure 6**). The land was awarded to Ramsay on the condition that 45 acres would be cultivated farmland. This farm would later become known as 'Mount Ramsay'.[10] There is documentary reference to agricultural and pastoral activities through the cultivation of wheat and the presence of cattle.[11] The land then passed through several owners before it fell into the hands of John Weatherall, a Pitt-street draper, in 1877.[12] The land was eventually subdivided in the early 20th century.[13]

The North Narrabeen SLSC was formally established in c.1912 or 1913 however, there was no formal clubhouse until a few years later when Warringah Shire Council provided a building located at the end of Malcom Street (**Figure 7**).[14] At this time, the study area largely comprised undeveloped land on an unvegetated sand dune. The northern and westernmost extent of the study area during this period was within the yards of four residential lots (**Figure 7**). The yards of these residential properties were extended southeast by 1955. These houses were removed by 1971 when the Council acquired the land (**Figure 8**).[15]

By 1975, the residential properties were removed and the current North Narrabeen SLSC building was constructed (**Figure 9**). At this same time, it appears efforts were made to vegetate and stabilise the surrounding sand dune. This first iteration of the current building was single storey, however, by 1982 a second storey addition was added on the northwest side of the building (**Figure 10**). Additionally, the surrounds were landscaped and footpaths were laid in what is now Birdwood Park.

Historically, North Narrabeen beach has been susceptible to large swells resulting from the east coast low weather system. In 2009 and 2013 large swells significantly eroded the sand dune to the east of the SLSC building.[16] While continued efforts have been made to stabilise the surrounding dunes, the erosion to date has caused lasting effects to their structure and stability. It also demonstrates that the study area is within a highly active area that is subject to coastal elements.

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[8] 1932 'PEEPS FROM AN ABORIGINAL GIBBER GUNYAH.', *Dungog Chronicle : Durham and Gloucester Advertiser (NSW : 1894 - 1954)*, 24 May, p. 6. , viewed 27 Nov 2023, http://nla.gov.au/nla.news-article141142328

[9] Attenbrow, V. 2010. *Sydney's Aboriginal Past - Investigating the archaeological and historical records*. UNSW Press.

[10] 1933 'OLD NARRABEEN.', *The Sydney Morning Herald (NSW : 1842 - 1954)*, 16 August, p. 14. , viewed 24 Nov 2023, http://nla.gov.au/nla.news-article16998821

[11] 1823 'Classified Advertising', *The Sydney Gazette and New South Wales Advertiser (NSW : 1803 - 1842)*, 13 February, p. 1. , viewed 24 Nov 2023, http://nla.gov.au/nla.news-article2181639

[12] Primary Application 4536.

[13] State Library NSW 1861-1965 Narrabeen subdivision plans. https://digital.sl.nsw.gov.au/delivery/DeliveryManagerServlet?dps_pid=IE9050834&change_lng=

[14] North Narrabeen SLSC, 'Our History'. Accessed 23 November 2023. https://northnarra.org.au/news/

[15] Pers. Comm. Graeme Jephcote, 14 November 2023.

[16] Northern Beaches Council, Dec 2016. *Coastal Zone Management Plan for Collaroy-Narrabeen Beach and Fishermans Beach.*

The historical background demonstrates that that the study area has been subject to modifications, in particular since construction of the SLSC building in 1975. The various phases of construction have involved excavation into the dune deposits, for levelling and the installation of footings and services associated with the building. These impacts have resulted in the removal of the original surface of the dune.

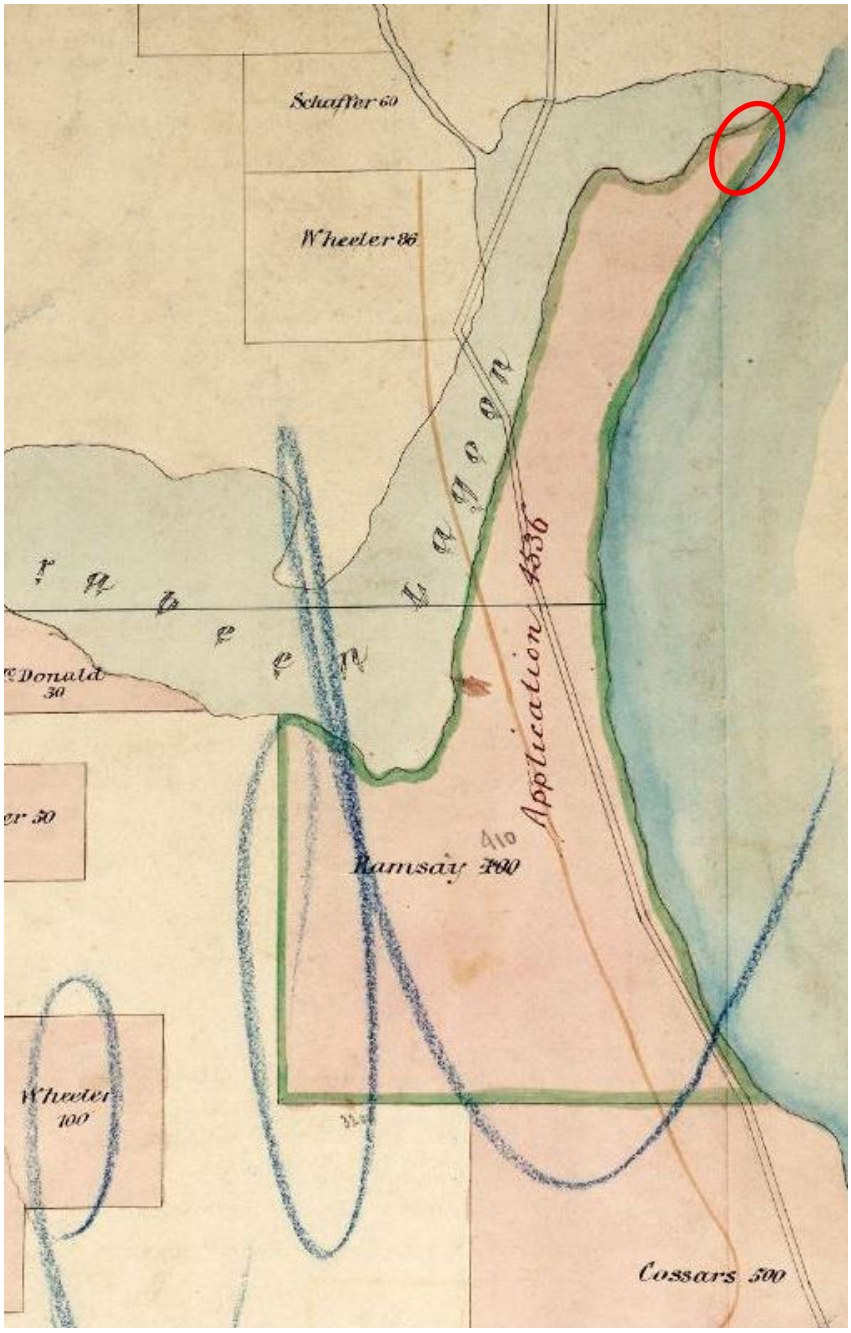


Figure 6. Parish map showing indicative location of study (circled in red).

Source: Extract from Parish map of Manly Cove, Land and Water Conservation 140660 (Ref 14066001). Historical Land a Registry Services, accessed 22/11/2023.

Figure 7. 1943 aerial showing the approximate location of the study area, and current SLSC building. Former SLSC clubhouse circled in blue.
Source: Metro Map, 1943

Figure 8. 1955 aerial showing the approximate location of the study area
Source: Historical Imagery Viewer, 1955

Figure 9. 1975 aerial showing the approximate location of the study area
Source: Historical Imagery Viewer, 1975

Figure 10. 1982 aerial photograph showing the approximate location of the study area
Source: NSW Spatial Services, Historical Imagery Viewer

3.2 Archaeological recordings and research

For this assessment we checked the main Aboriginal heritage database for New South Wales, the NSW Heritage Aboriginal Heritage Information Management System ('the AHIMS Register'). We searched the AHIMS Register over a 4 x 4 km area centred on the study area.[17] While no Aboriginal sites are registered within the study area, there are four sites within the search area (**Figure 11**).

Sites can be recorded as a particular site type: closed, which commonly refers to rock shelters or overhangs; or open, which covers the remainder. The sites within the search area include one closed site, and three open. Sites are also recorded with one or more of a set list of 22 site features. For the four sites in the search area, a total of six instances of four site features has been recorded (**Table 1**). The closed site (AHIMS #45-6-0112), that is, the rock shelter, includes a midden deposit. Of the three open sites, one is a midden deposit (AHIMS #45-6-0738), another is a burial (AHIMS #45-6-2747), and the last is an engraving (AHIMS #45-6-1242). The engraving has been updated as 'not a site' upon reassessment, however, the justification for this reassessment is not included in the AHIMS data. Therefore, for the purpose of this report, the engraving is retained as a possible site.

This AHIMS data indicates that the known archaeology of the local area comprises both sites associated with sandy deposits and nearby waterways; burial and midden, as well as outcropping sandstone; rockshelters and possible rock engravings. Within the search area, there is one site in a similar environmental context to the study area. AHIMS #45-6-2747 (Ocean-Octavia Street Burial) is a burial site located approximately 500m southwest of the study area. It is situated within the same aeolian (wind-blown) dune landform as the study area. More detail on this site is discussed below. In conjunction with the environmental context, that is, within a sand dune context located near the sea and lagoon, the types of sites we would expect to find in the study area include ancestral burials, shell midden deposits, and open campsites.

Table 1. The site features recorded in the AHIMS search area

Site type	Feature	Quantity
Closed (rockshelter)	Artefact, Shell	1
Open	Artefact, Shell	1
	Art (pigment or engraved)	1
	Burial	1

[17] Client Service ID 834405, 30/10/2023, GDA94 / MGA Zone 56 340910-344910 mE, 6267260-6271260 mN

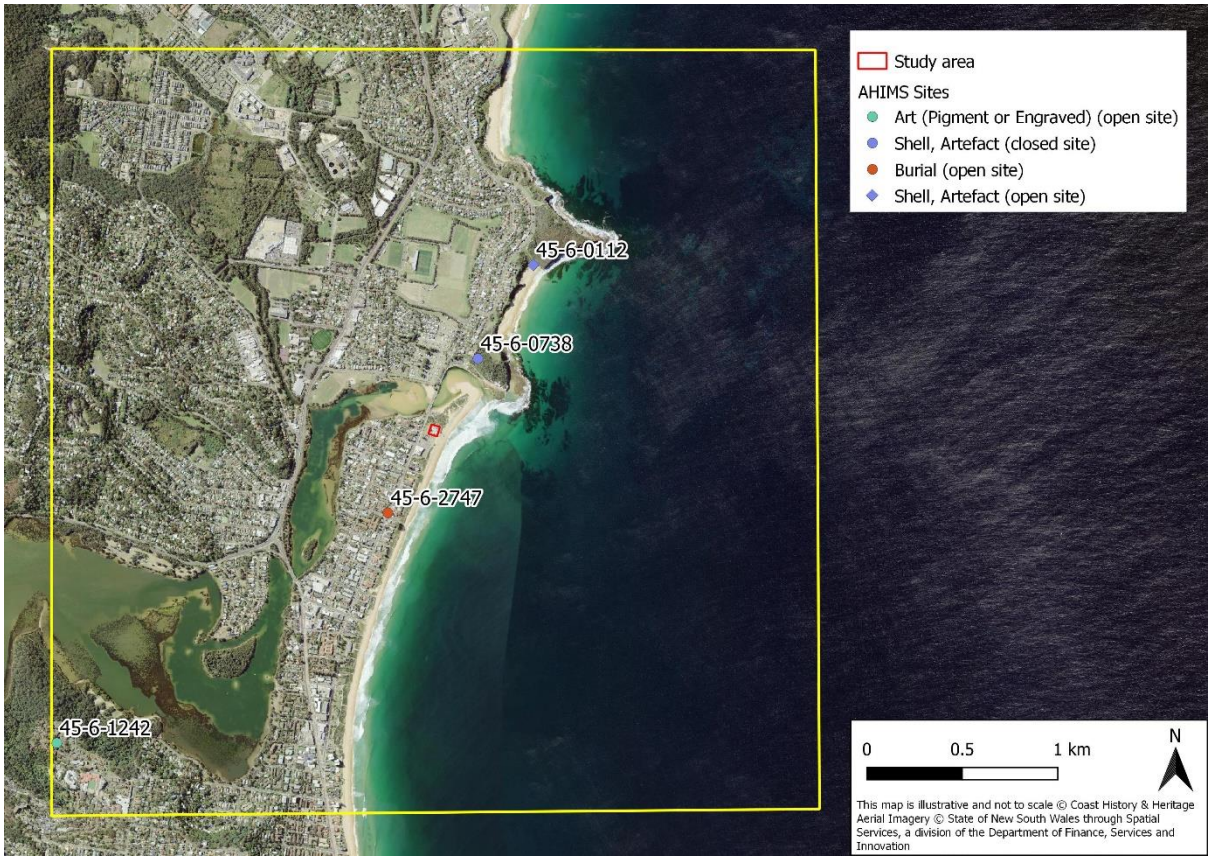


Figure 11. The results of the AHIMS search

As well as the AHIMS Register, we also searched some other heritage registers to see if any other sites or places of Aboriginal cultural or historical significance had been recorded. The Australian Heritage Database (incorporating the former Register of the National Estate) and the NSW State Heritage Inventory (incorporating the NSW State Heritage Register) were both searched on 24 November 2023 for the suburb of 'Narrabeen'. No items were found that contain identified Aboriginal heritage values nor were any nearby Aboriginal Places identified on the Heritage Management System.

Official heritage registers such as AHIMS contain only records of those sites which have been documented. Of particular relevance to the current study area are a number of Aboriginal burials which were found in the decades before AHIMS existed, and were therefore never registered. Burials have been found across the northern beaches of Sydney, typically during earthworks in sandy areas or following erosion from inclement weather events, and they remain very underrepresented on AHIMS despite their high cultural significance.

There have been a number of such reports of Aboriginal human remains being discovered in the early decades of the twentieth century within the sand dune along the Collaroy to Narrabeen peninsula. These burial sites are not registered on AHIMS. (**Figure 12**). At least two notable instances of the discovery of Aboriginal ancestral remains near the study have been found during research for this assessment, and there could be records of more yet undiscovered. The article from 1923 notes

that the Aboriginal person was buries 50 years ago, and if true, it would suggest that traditional burial practices continued in that area into at least the 1870s.

SKELETON FOUND AT NARRABEEN

A human skeleton was found in a sand hill at the rear of Ocean Street, Narrabeen, yesterday, but whether the bones were the remains of an aboriginal will not be known until they are examined by the Government Medical Officer, Dr. Percy, at the City Morgue to-day.

Two boys, Stewart Heland, 15, and James W. Welch, 17, of Lindfield, saw a skull protruding from the sand while they were cycling.

Police believe that it was uncovered by the recent rains. A dentist who examined the teeth said the skeleton was that of an aboriginal, aged 55 to 70 years.

SKELETON ON THE BEACH.

SYDNEY, Monday.—A skeleton, pronounced to be that of an adult aboriginal, who was buried 50 years ago, was found on the beach at North Narrabeen on Saturday. It had been uncovered by last week's gales.

Figure 12. Examples of newspaper reports of Aboriginal burials near the study area.

[Sources: The Sydney Morning Herald, 18 June 1945, p.3 (left) N.B. later news articles confirm the remains were of an Aboriginal person; Tweed Daily, 25 Sep 1923, p.3 (right)]

There have been limited archaeological investigations around Narrabeen. One study is summarised below.

Burial on Octavia Street and Ocean Street 2005[18]

In 2005, skeletal remains were found during the construction of a bus stop at the intersection of Ocean Street and Octavia Street, Narrabeen NSW. The remains were identified to be that of a tall Aboriginal man, between 30-40 years old, who was killed by a spear. The skeletal remains were dated to 3677 cal BP (3480 ± 30 radiocarbon years, CAMS-120202). Stable isotope analysis showed that the individual subsisted largely on marine foods suggesting that he lived around the coastal zone for much of his life. This individual has become commonly known as 'Narrabeen Man'.

Seventeen fragments of flaked stone were found in association with the burial, one of which was lodged between the second and third lumbar vertebrae. Another fragment is thought to have been lodged in one of the thoracic vertebrae. The cranium also showed signs of trauma, likely from spearing. It is considered to be the first archaeological evidence of death by spearing in Australia.

[18] McDonald, Donlon, Field, Fullager, Coltrain, Mitchell, and Rawson. 2007. 'The first archaeological evidence for death by spearing in Australia' in *Antiquity* 81: 877-885; McDonald, J., Donlon, D., Field, J., Fullagar, R., Mitchell, P., Brenner-Coltrain, J., & Rawson, M. (2008). *Salvage Excavation of Human Skeletal Remains at Ocean and Octavia Streets, Narrabeen Site #45-6-2747*. Australian Association of Consulting Archaeologists (N.B. this report not sighted for the present study).

The individual was found within the sand dune about 1.5m below the ground level at that time. Importantly, this may not be the original surface of the dune, as subsequent historical developments would have impacted levels. The date of the burial places it within the Holocene during a period when sea levels were 2-3m higher than they are today. At this time, the dune system would have been much narrower and likely less stable as it was subject to constant coastal erosion and reworking. At the time of death, it is believed that the body would have lain on the upper dune surface, that is, the individual was not buried but rather left on the ground surface. Over time, the active dune would have covered over the remains until they were uncovered again in 2005.

4 What we have observed

Site inspection

On Tuesday 14 November 2023, Rowena Welsh-Jarrett and Jacqueline Gibbs (Metropolitan LALC), along with Julia McLachlan and Fenella Atkinson (Coast) inspected the study area, with assistance from Graeme Jephcote (Narrabeen SLSC).

The study area comprises the location of the current North Narrabeen SLSC building and immediate surrounds. It is located just behind, to the west of, North Narrabeen Beach and at the northern tip of the Narrabeen Peninsula that separates the Narrabeen Lagoon and the Tasman Sea. The building is presently located on top and on the upper slope of the sand dune that sits at the rear of the beach (**Figure 13**). The SLSC is a single-storey brick structure, with a two-storey extension on its northwest side. There are no basement levels, however, the two-storey extension is cut into the ground level to the west. Here, a timber deck extends onto the adjacent grassed area (**Figure 14**). On the northern and southern side of the building, retaining walls have been constructed to support the ground which is approximately 1-1.5m higher than the ground surface on which the SLSC building is situated (**Figure 15** & **Figure 16**).

To the east, the ground slopes down to the beach, forming the dune face which is presently covered by vegetation. With the exception of some minor landscaping, there is little vegetation in the immediate surrounds of the SLSC building. To the west of the building, the ground rises, which on first impression looks to be a natural dune (**Figure 14**). However, it is clear that some of these mounds are artificial and it is possible that excess material excavated as part of the levelling for the construction of the SLSC building was deposited across the general area. This may be supported by the presence of material overlying the original foundations of the houses that were previously situated on the property prior to 1971. However no geotechnical testing has been undertaken and as such, cannot be confirmed without further investigation.

An extension to the SLSC building is proposed on the northeastern side of the current building. At present, this location contains a paved and concrete area, with a low brick wall to the north (**Figure 18**). In the surrounding area, it was apparent that the underlying material was a sandy soil, which is consistent with both the soil landscape mapping and geotechnical results (**Figure 19**).

In general, the landform appears to have been modified and levelled for the construction of the SLSC building and addition. Visual inspection confirmed that there has been some impact to the sand dune as a result of historical development and natural erosion. No Aboriginal objects were identified during the site inspection.

Figure 13. North Narrabeen SLSC building from the beach (looking west)

Figure 14. Western side of SLSC building showing cut into the adjoining land (looking north)

Figure 15. Retaining wall on northern side of SLSC building (looking west)

Figure 16. Retaining wall on southern side of SLSC building (looking west)

Figure 17. Old foundations with overlying material, along the eastern side of Ocean Street, looking east

Figure 18. Area proposed for extension, on the north side of the building, looking west

Figure 19. Sand in exposures (looking west), to the north of the SLSC building

5 Our conclusions

In this assessment we have considered the environmental setting and historical context of the study area, and what is currently known about past Aboriginal use of the surrounding area, and we have conducted a field inspection with a representative of Metropolitan LALC. Based on all these things, we have been able to determine whether the current development proposal is likely to impact any items of Aboriginal heritage, and whether it may have other impacts to Aboriginal heritage values.

There are no previously recorded Aboriginal archaeological sites within the study area, and none were identified as a result of the research or site inspection for the current assessment. In addition, few archaeological investigations have been undertaken in this area, which may therefore explain why few Aboriginal sites have been registered, compared with other regions in Greater Sydney that have been subject to more rigorous study. The few sites that are registered are consistent with coastal sites, including shell middens, engravings on rock exposures and burials within sand dunes. One burial site, situated within the same sand dune landform as the current study area, is located 500m southwest of the North Narrabeen SLSC building. In addition, ancestral burials have been reported in historical sources along the coastal dune in this area, two of which were found around North Narrabeen. Therefore, where intact profiles are retained, there is potential for Aboriginal objects to be present, the most likely of which would be ancestral burials and shell middens or open campsites.

The area within the footprint of the current building is likely to have resulted in subsurface disturbance within the building footprint. Observations on site indicate the entire study area has been impacted to some degree by the construction of the present building and surrounding landscaping. While the geotechnical results indicate the impact has been at least 2.5m from the original ground level, the exact depth of this disturbance is not presently known. Due to the active nature and evolution of this dune system over time, intact deposits may be present in deeper deposits within the sand dune profile.

A summary of the ground impact of the current proposal are shown in **Figure 20**) and include:

- Northern extension of the building that will require a concrete raft slab with thickened edge beam
- Two pad footings
- Relocation of existing brick wall on northern side of the building
- Replacement of existing paving on the northern side of the building
- Two new stormwater pits
- New stormwater pipes
- Two new rainwater tanks

The northern extension for the boardrider's room and upper floor extension will require the installation of a concrete raft slab and pad footings. The concrete raft slab will be approximately 5 x 8m and extend directly off the northern wall of the building. The slab will be approximately 150mm thick with a thickened edge beam around its perimeter of approximately 500mm width and 500mm depth. The extension of the upper floor will require support through the installation of two pad footing with dimensions of up to 1x1m wide and 500mm depth. The surrounding paving will be

replaced but this is expected to be at the same level of the existing paving. In addition, the existing brick courtyard wall will be relocated approximately 1m north of its current position. The new location will require a strip footing for the length of the wall (12m) and 400mm wide by 400mm deep.

Approximately 120m of new stormwater trenching will be undertaken directly beneath the existing building, and directly adjacent to it. The trenching will be approximately 300mm, and range between 300-500mm depth which will depend on the grading required. In addition two new stormwater pits will be installed at the northern end of the building. These will be approximately 600m wide and 600mm deep. Two slim rainwater tanks will be installed directly adjacent to the western side of the building. The installation will require excavation 300-500mm below the current surface.

The raft slab will need to be raised slightly from the existing ground surface to meet the level of the current building. The excavation for the stormwater and rain tanks will be inclusive of the current hardstands and subgrades. Therefore the depth of impact to the underlying deposit will be reduced as the impact includes existing hardstand and subgrades. In addition, it is likely that the underlying deposit has been impacted to some degree by the construction of the existing building and associated services installed over the years . Therefore, there is considered to be low potential for *in situ* archaeological deposits.

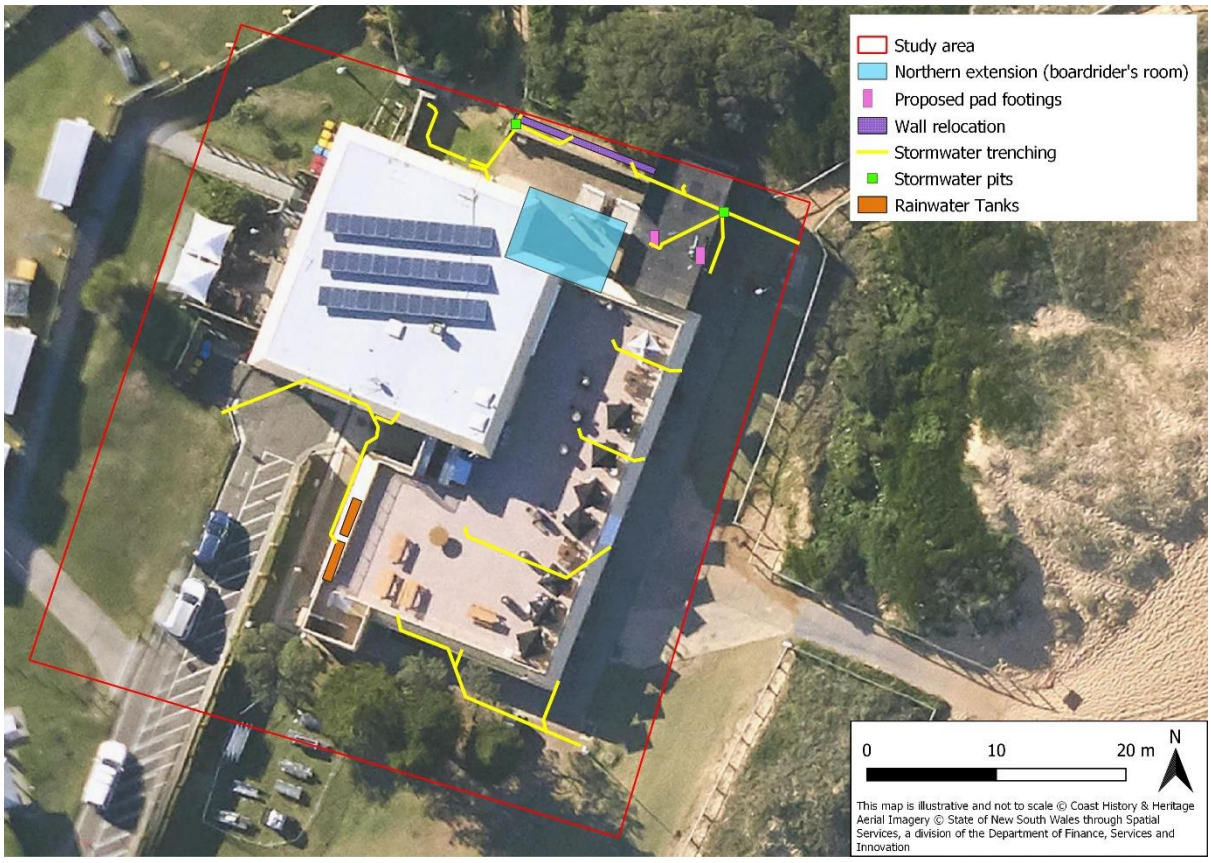


Figure 20. Proposed subsurface impacts – indicative locations

It is unlikely that any intact or *in situ* archaeological remains would be encountered or impacted by the proposal. However, given the high degree of significance of Aboriginal human remains in particular, it would be considered prudent to implement some precautions in relation to the current development proposal. In addition, Metropolitan LALC have noted that due to the possible presence of ancestral burials within the sand dune context, any ground penetrating works should be monitored by a representative of the Metropolitan LALC together with an archaeologist/heritage consultant.

The documented levels of historical disturbance in relation to the SLSC building and limited impact of the proposed development suggest that it is not warranted to undertake Aboriginal archaeological test excavations under an Aboriginal Heritage Impact Permit (under s90 of the *National Parks & Wildlife Act 1974*). However, it is recommended that:

- An Aboriginal heritage induction should be provided for workers involved in excavation works for the new development. This should be developed and delivered by a representative from the Metropolitan LALC and archaeologist/heritage consultant. The induction will address the legal protections afforded to Aboriginal objects under the *National Parks & Wildlife Act 1974*. It will also include procedures for the recommended monitoring, and for 'stop work' protocols for dealing with unexpected finds (such as human or animal bone, shell material or stone artefacts).

- Consideration should be given to minimise any unnecessary impact. For instance, where possible, services should be installed within existing service routes and reducing the length of the northern brick wall to the extent of the BBQ and providing a timber log barrier to the sides that matches the dune fence.

- Monitoring and direction of the excavation by a suitably qualified archaeologist/heritage consultant and a representative from the Metropolitan LALC should be undertaken during any works that exceed the depth of the current ground level. This is largely contained to the northeast side of the current SLSC building.

- It is assumed excavation will be undertaken by machine, however, where determined to be appropriate by the monitoring LALC representative and archaeologist, hand excavation by the contractor may be necessary. This will also be monitored by a suitably qualified archaeologist/heritage consultant and a representative from the Metropolitan LALC.

- If the footprint, depth and or scope of the proposed works is amended, further investigation and assessment should be undertaken to assess the potential Aboriginal heritage impact.

- If any human remains or other Aboriginal archaeological remains are encountered during site works, the 'unexpected finds' procedures set out below must be followed.

- Ground disturbance outside the footprint of the proposed works should be avoided, for instance by using existing hard stand for site compounds and access.

Provided that the recommendations below are followed, there are considered to be no Aboriginal heritage grounds for the current proposal not to proceed as planned, and no further Aboriginal heritage investigations or approvals are considered warranted prior to the granting of development

approval. It should be noted that if any Aboriginal objects are identified during the works, further investigation will likely be required and where impact cannot be avoided, a permit under the *National Parks & Wildlife Act 1974* will be required to proceed.

6 Our recommendations

We have based our recommendations on:

- the research and conclusions of our assessment as outlined in this report
- the views expressed during our consultation with the Metropolitan LALC, including during the field inspection and as outlined in their report attached in **Appendix 1** *(pending)*
- the legal protections provided to Aboriginal 'objects' and 'places' under s.86 of the *National Parks and Wildlife Act 1974*
- current policy and regulatory requirements relating to the assessment of Aboriginal heritage, and in particular the *Due Diligence Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales.*

It was found that:

- There are no registered AHIMS sites within the study area
- Historical sources have documented Aboriginal ancestral remains (burials) in the dune landform at North Narrabeen and nearby area. Aboriginal ancestral remains are considered to have exceptional cultural heritage significance
- The original surface of the dune has been impacted by development, and the immediate surround of the building is likely to have been impacted to some degree. However, *in situ* archaeological deposits may be present wherever intact/ undisturbed dune is present
- Given the proposed depth and extent of impact, the works are likely to be within previously disturbed deposits and therefore it is unlikely *in situ* archaeological deposits will be impacted

We recommend that:

1. If the works are undertaken in accordance with the recommendation of this report, no further Aboriginal heritage investigations are required in relation to the current proposal prior to development consent for the DA.
2. All workers involved in excavation works should be subject to an Aboriginal Heritage Induction to be delivered by an appropriately qualified archaeologist/heritage consultant and a representative of the Metropolitan LALC, to make them aware of the legal protections afforded to Aboriginal objects under the *National Parks & Wildlife Act 1974*. This will include procedures for the recommended monitoring, and for 'stop work' procedures for dealing with unexpected finds (such as human or animal bone, shell material or stone artefacts).
3. Consideration should be given to reduce ground penetrating impacts, where possible.

4. A suitably qualified archaeologist/heritage consultant and a representative of the Metropolitan LALC should be present to monitor and direct type of excavation, including both mechanical and manual.

5. If there are any changes to the proposed design, including amendments to the footprint and/or depth of the proposed works, further investigation and assessment should be undertaken to assess the potential Aboriginal heritage impact.

6. If any Aboriginal objects or bones suspected of being human are identified during construction, site workers must:

    a. Not further disturb or move these remains.

    b. Immediately cease all work at the location.

    c. In the case of suspected human remains only, notify NSW Police. In the case of Aboriginal objects, notify the Heritage NSW Environment Line on 131 555 as soon as practicable and provide available details of the objects or remains and their location. If not already present, the Metropolitan LALC should also be notified to assist in the determination of appropriate management for the objects or remains.

    d. Not recommence any work at the location unless authorised in writing by Heritage NSW.

7. A copy of the final report should be forwarded to Metropolitan LALC and:

    The Registrar
    Aboriginal Heritage Information Management System
    Heritage NSW
    Locked Bag 5020
    Parramatta NSW 2220

If you require any further information, please do not hesitate to contact us.

Yours sincerely,

Julia McLachlan
Senior Heritage Consultant
E: julia@coasthistory.com.au
W: www.coasthistory.com.au

Appendix 1

Correspondence with the Metropolitan LALC

Metropolitan Local Aboriginal Land Council
36-38 George Street Redfern NSW 2016
PO Box 1103 Strawberry Hills NSW 2012
Telephone: (02) 8394 9666 Fax: (02) 8394 9733
Email: bookings@metrolalc.org.au

12/12/2023

To whom it may concern,

Please see below, Metropolitan Local Aboriginal Land Council's response to the **North Narrabeen Surf Life Saving Club, Narrabeen Aboriginal Heritage Due Diligence Assessment** prepared by **Julia McLachlan of Coast History & Heritage**.

Metropolitan Local Aboriginal Land Council confirm that we have had ongoing consultation with Julia McLachlan in relation to the above project.

Metropolitan Local Aboriginal Land Council confirm that we have read and understand the draft report. We agree with all recommendations made in the report. In addition to the recommendations outlined in the report prepared by Coast History & Heritage, Metropolitan Local Aboriginal Land Council request the following additional recommendations:

- A representative of Metropolitan Local Aboriginal Land Council is consulted on the archaeologist/consultancy engaged for the works.

Metropolitan Local Aboriginal Land Council are extremely cautious around sand dune excavations as they have been known to be the location of Ancestral burial sites, particularly in this area. Ancestral burial sites are of the highest level of sacred and cultural significance. We note that there has been an increase in the recording of such sites in these sand dunes as a result of coastal erosion and new developments. We reiterate that any ground penetrating works are archaeologically monitored. The desecration of these burial sites has an emotional, social, and spiritual wellbeing toll on Aboriginal people.

I Jacqueline Gibbs, Cultural Heritage Officer of Metropolitan Local Aboriginal Land Council am in agreeance with recommendations as stipulated in the North Narrabeen Surf Life Saving Club, Narrabeen Aboriginal Heritage Due Diligence Assessment as written by Julia McLachlan of Coast History & Heritage.

Should you require additional information, do not hesitate to contact me via email at culturalheritage@metrolalc.org.au or via phone on 0477 788 883.

Kind Regards,

Jacqueline Gibbs
Metropolitan Local Aboriginal Land Council
Cultural Heritage Officer

Appendix 2

AHIMS Register Search

[The search is of a 4km x 4km area centred on the study area. To help protect the listed Aboriginal sites we have provided only the basic search results without site coordinates and have omitted the search entirely from the public version of this report. If the extensive search results showing site names and coordinates are required, please contact Coast History & Heritage].

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : 2023-35 North Narra SLSC

Client Service ID : 834319

Coast History & Heritage

Date: 30 October 2023

15/112 McEvoy Street
Alexandria New South Wales 2015

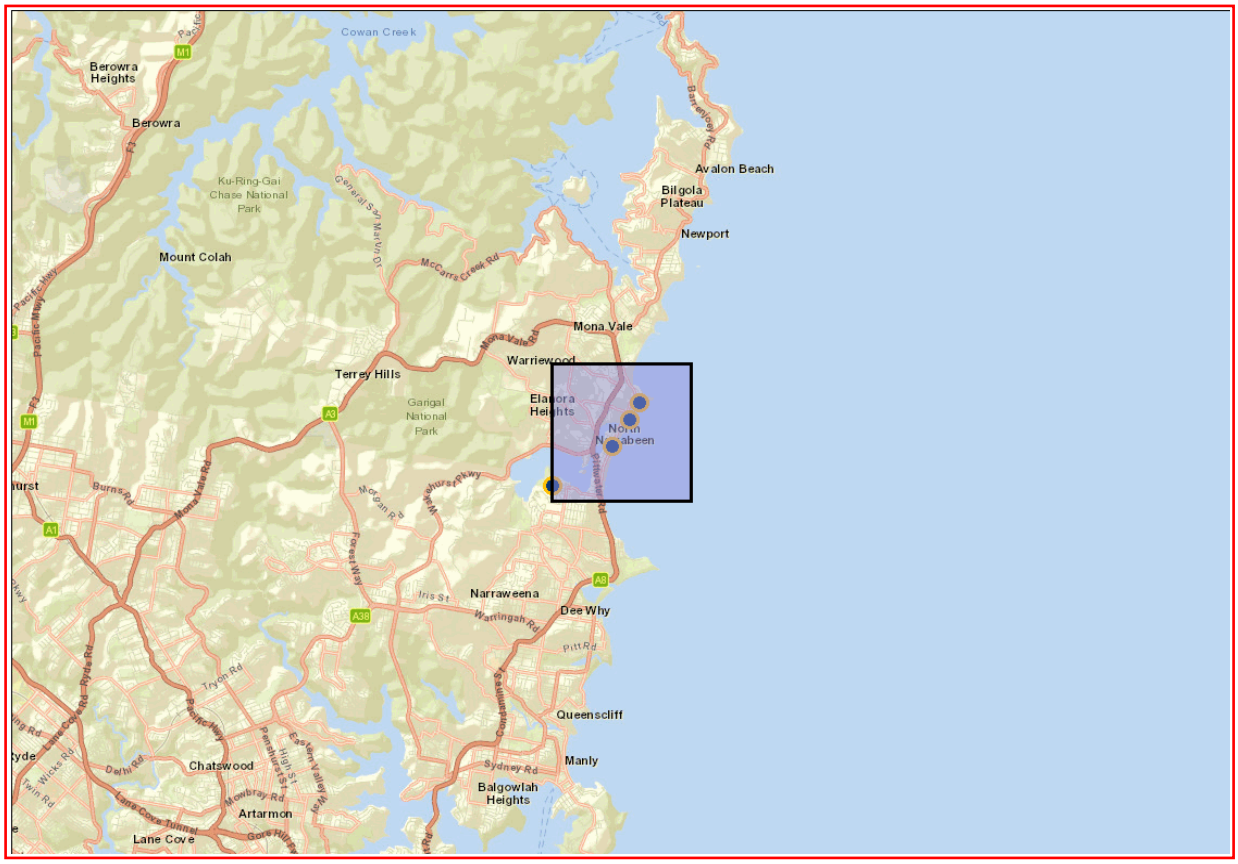
Attention: Gina Basile

Email: gina@coasthistory.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 340910.0 - 344910.0, Northings : 6267260.0 - 6271260.0 with a Buffer of 0 meters, conducted by Gina Basile on 30 October 2023.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

4	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

Appendix C

Accessibility & BCA Compliance Reports

ABSOLUTE
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ACCESSIBILITY COMPLIANCE ASSESSEMENT REPORT

North Narrabeen Surf Life Saving Club

Alterations and Additions to existing building

Report Number	A23_03_ACC
Date of Issue	24.11.2023
Revision	01 – Draft for comment (13.07.2023)
	02 _ Issue for DA

ABSOLUTE BCA & ACCESSIBILITY CONSULTING PTY LTD
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PO BOX 292, MANLY NSW 1655
ABN 11667632644

Contents

1.0 Introduction & Report Basis

Absolute BCA & Accessibility has been engaged by Northern Beaches Council to prepare this Accessibility compliance assessment report for the proposed alterations and additions to the existing North Narrabeen Surf Life Saving Club.

The subject works primarily include:

- The partial enclosure of northern part of the first-floor terrace to extend bar area.
- The extension of western portion of first floor terrace to connect to existing internal stair.
- The creation of a board riders meeting room at ground floor.
- New external cladding and render.

The purpose of this report is to provide:

1. A high level assessment of the proposed design/building against the requirements relating to 'access for people with a disability' (See Section 1.2 below); and
2. Recommendations to address any identified significant design issues. Refer to Section 4.0

1.1 Assessed Information

The following information was specifically relied upon for this assessment:

Document Type	Prepared by	Reference or Revision Number
Architectural Plans	Northern Beaches Council	Issue D dated November 2023

1.2 Accessibility Requirements (Relevant Codes and Legislation)

NCC BCA 2022

The following clauses of the BCA (directly relevant to accessibility)

- Part D4 "Access for People with Disabilities" – this part contains general accessibility requirements for all types of buildings.
- Part E3 "Lift Installations" – this part specifies lift types, sizes and features required in all buildings.
- Part F4 "Sanitary & Other Facilities" – this part includes requirements for sanitary facilities, including numbers vs populations, and accessible and ambulant facilities.

Australian Standards (limited to parts specifically referenced by the BCA)

- AS1428.1-2001/2009 "Design for Access and Mobility – Part 1: General Requirements for Access New Building Works"
- AS1428.4-1992 "Design for Access & Mobility – Part 4 Tactile Ground Surface Indicators for Orientation of People with Visual Impairment"
- AS1428.4.1-2009 "Design for Access & Mobility–Part 4.1 Means to Assist the Orientation of People with Vision Impairment – Tactile Ground Surface Indicators"
- AS1735.12-1999 "Lifts, Escalators & Moving Walkways – Part 12 – Facilities for Persons with Disabilities"
- AS2890.6-2009 "Parking Facilities - Off Street Parking for People with Disabilities"

Disability (Access to Premises Buildings) Standards 2010 – "The Premises Standard"

The Disability (Access to Premises – Buildings) Standards 2010 (Premises Standards) is legislated under the Disability Discrimination Act 1992. This requires new works in applicable premises to comply with the accessibility requirements of the standard (& corresponding BCA requirements).

Note that in existing buildings, the premises standards can require the 'affected part' to comply (in addition to the 'new works' – this may necessitate upgrade works beyond the typical scope of the 'new works'.

Some exemptions are provided for existing lifts and toilets .

The Disability Discrimination Act 1992 ("DDA")

The DDA is a complaints-based piece of legislation that seeks to eliminate discrimination, 'as far as possible', against people with disabilities.

It should be noted that the DDA does not contain prescriptive or specific design requirements (refer to the Premises Standards for this purpose).

1.3 Assumptions, Limitations & Exclusions

- This report is intended to support the Development Application (or similar) stage design and identifies significant design issues only. For the purposes of this report, significant design issues are:
    - Non-compliance with DTS provisions that would likely necessitate significant changes alterations to the current plans (changes which would be expected to necessitate a S4.55 if carried out post Consent).
    - Non-compliance with DTS provisions that would likely necessitate the development of a Performance Solution. It is noted that some Performance Solutions will necessitate design change. It is the applicant's responsibility to confirm the extent of required design changes with the author of any proposed Performance Solution
- The Report only assesses the information specifically referenced in Section 1.1 of this report. This information is accepted in good faith as accurate and correct.
- No assessment has been made of any existing BCA Performance Solution based Reports that may apply to the base building or development, unless otherwise specifically noted.
- In terms of development within existing buildings (or adjacent to existing buildings), it must be ensured that the *subject works* do not:
    - cause on-compliance within the existing building; or
    - aggravate an existing non-compliance within the existing building.
- Subject to consideration of the above comments, this report has not considered the requirement for the upgrade of existing building in terms of Accessibility compliance. Note that the Premises Standard (affected part) will still apply.
- Some requirements of the Access Regulations are recognised as being interpretive in nature. Where these matters are encountered, interpretations are made in accordance with Absolute policy &/or as guided by other standards, guides and industry best practice.
- Detailed assessment of any engineering matters or Australian Standards– e.g: structural, civil, electrical, hydraulic, mechanical, fire, bushfire protection is beyond the scope of this report.
- The Report does not provide for any Performance Solutions.
- Compliance with the recommendations of this report does not assure or guarantee compliance with the provisions of the DDA (as compliance cannot be measured through this assessment).

2.0 BCA Assessment Data

BCA Reference	Subject Building	
A6 Classification	2 (residential)	☐
	3 (residential – short term)	☐
	4 (single dwelling in an otherwise non-residential building)	☒
	5 (commercial – office)	☐
	6 (retail)	☐
	7a (carparking)	☐
	7b (storage)	☒
	8 (factory/industrial)	☐
	9a (hospital/health care)	☐
	9b (assembly/public building)	☒
	9c (aged care)	☐
C2D3 Rise in Stories	2	

3.0 Accessibility Compliance Assessment

The plans identified in Section 1.1 of this report have been assessed against accessibility requirements (See Section 1.2) – which are considered relevant to the current stage of design (Development Application or similar). A summary of these requirements is provided below.

Where the plans show a *non-compliance* or are lacking in critical detail – recommendations have been provided in Section 4.0 to address the issue.

BCA 2022 - Assessment Comments

a) Access is generally maintained to and within the new or 'affected' areas as required by BCA D4D2.

b) Existing accessible entrances are not proposed to be affected by the proposed works.

c) The new stairs (linking western side of first floor terrace to existing stairs) will need to comply with Clause 11 of AS1428.1-2009.

d) Braille and Tactile Signage must be provided to:

   a. Exit doors provided with an exit sign

   b. At a non-accessible building entrance.

e) New doorways will typically need to comply with AS1428.1 in terms of width, door hardware, circulation space and luminance contrast.

f) Tactile Indicators complying with AS1428.4 are required to be provided to the top and base of the new stairs in accordance with BCA D4D9.

g) Glazing On Accessways Glazing on an Accessway must comply with AS1428.1. This requires decals to be provided across full height glazing to reduce the likelihood of full height glazing from being mistaken for a doorway.

h) Accessible Carparking not impacted on by the proposed works.

Access to Premises Code 'Affected Part' upgrade.

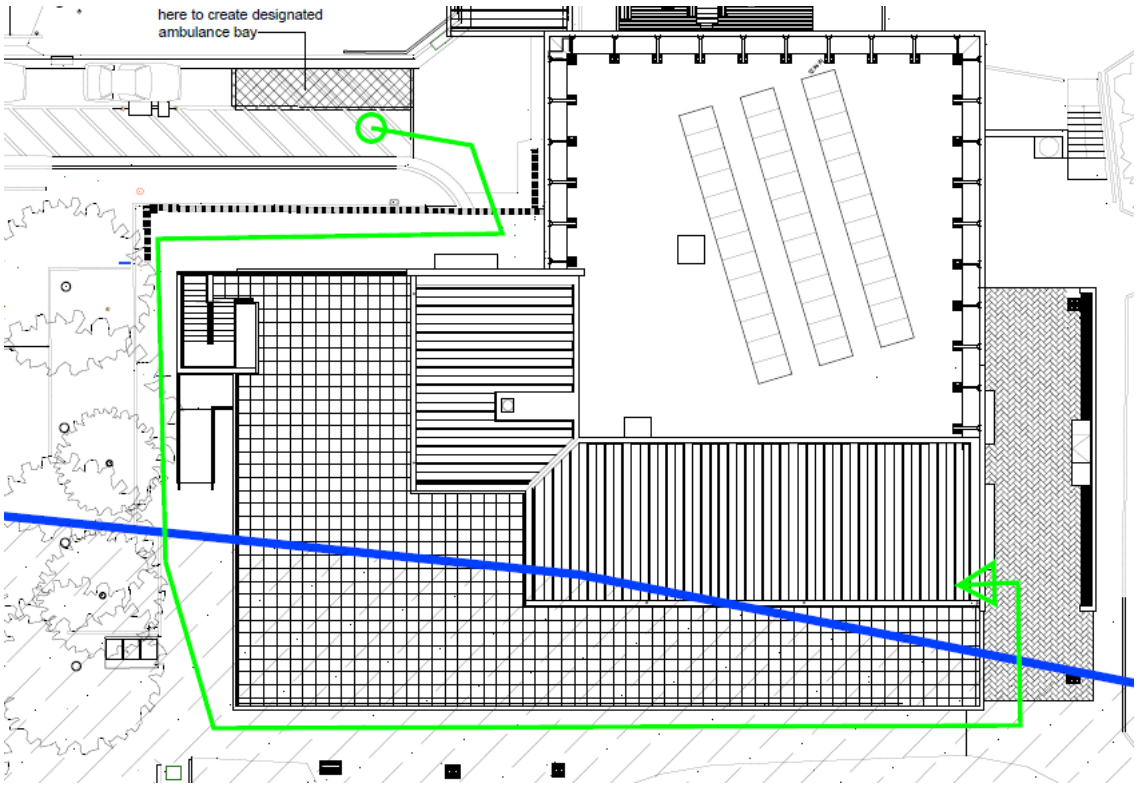
Under the Access to Premises Code – an accessway is required to link the existing building entrance (at western side of first floor) to the new 'board riders meeting room' at ground floor. This would typically require a lift or ramp (which is currently proposed).

As confirmed with the applicants on site, the intended occupants of this room are primarily (surf) board riders – who are expected to be able bodied.

It is considered that a performance solution to address this issue may be warranted at construction approval stage. The solution would support the lack of ramped/lift access to the meeting room, based on the characterises of the primary users & the availability of an accessible path via the eastern side of the building – as shown in green below).

This path will need to be made available to any guests/visitors/members needing to access to the room & the building management plan would need to make provision for this alternative means of access.

Level access between the meeting room and the external paving is recommended.



4.0 Recommendations

4.1 – Performance Solution – Lack of ramped or lift access to ground floor.

A performance solution is considered necessary to address the lack of ramped or lift access to ground floor board riders meeting room. Absolute BCA & Accessibility is of the opinion that such a solution would not necessitate further design change.

5.0 Conclusion

This report has assessed the subject design against the relevant design requirements relating to access for people with a disability (including the requirements of the National Construction Code (NCC) / Building Code of Australia (BCA) 2022. (as relevant to the Development Application stage deign).

Subject to compliance with any recommendations listed in Section 4.0 of this report, the development is considered capable of complying with the BCA, within the constraints of the current design.

Paul O'Shannassy
Director
Absolute BCA & Accessibility Consulting Pty Ltd

Accredited BCA Consultant / Certifier (Highest Level) BDC No. 0825
Qualified DDA Accessibility Consultant with ACAA ACAA No. 0594
Accredited Level 1 Building Surveyor AIBS Accreditation No: 8189
MAAC

BCA COMPLIANCE ASSESSEMENT REPORT

North Narrabeen Surf Life Saving Club

Alterations and Additions to existing building

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- The extension of western portion of first floor terrace to connect to existing internal stair.
- The creation of a board riders meeting room at ground floor.
- New external cladding and render.

The purpose of this report is to provide:

1. A high-level assessment of the proposed design/building against the significant design requirements of the of the BCA; and
2. Recommendations to address any identified significant design issues. Recommendations are provided in Section 4.0.

It is understood that this report will be used to support the Development Application for the subject development.

1.1 Assessed Information

The following information was specifically relied upon for this assessment:

Document Type	Prepared by	Reference or Revision Number
Architectural Plans	Northern Beaches Council	Issue D dated November 2023
Annual Fire Safety Statement	David Pengilly (Northern Beaches Council)	13.07.2023

1.2 Relevant BCA Volume & Sections.

The Building Code of Australia (National Construction Code) 2022 Volume 1

Section	Addressed
A – Governing Requirements	Informational
B – Structure	No - Addressed by structural engineers
C – Fire resistance	Yes - Addressed in this report
D – Access and egress	Yes - Addressed in this report
E – Services and equipment	Yes - Addressed in this report
F – Health and amenity	Yes - Addressed in this report
G – Ancillary provisions	Yes - Addressed in this report
I – Special use buildings	Yes - Addressed in this report
J – Energy efficiency	No - Addressed by energy efficiency consultants

1.3 Assumptions, Limitations & Exclusions

- This report is intended to support the Development Application (or similar) stage design and identifies *significant* design issues only. For the purposes of this report, significant design issues are:
    - Non-compliance with DTS provisions that would likely necessitate significant changes alterations to the current plans (changes which would be expected to necessitate a S4.55 if carried out post Consent).
    - Non-compliance with DTS provisions that would likely necessitate the development of a Performance Solution. It is noted that some Performance Solutions will necessitate design change. It is the applicant's responsibility to confirm the extent of required design changes with the author of any proposed Performance Solution.

  A further detailed assessment would typically be undertaken Construction Certificate Application (CCA) stage.
- The Report only assesses the information specifically referenced in Section 1.1 of this report. This information is accepted in good faith as accurate and correct.
- The report is limited to assessment of the development against the deemed-to-satisfy provisions of the applicable Building Code of Australia.

- No assessment has been made of any existing Fire Engineering or BCA Performance Solution based Reports that may apply to the base building or development, unless otherwise specifically noted.
- In terms of development within existing buildings (or adjacent to existing buildings), it must be ensured that the *subject works* do not:
    - cause a BCA non-compliance within the existing building; or
    - aggravate an existing non-compliance within the existing building.

  Subject to consideration of the above comments, this report has not considered the requirement for the upgrade of existing building in terms of BCA compliance. It should be noted that further upgrade works may be required by Consent Authorities or other stakeholders. Any such requirement should be advised to Absolute BCA as soon as practical.
- Some requirements of the BCA / Access Regulations are recognised as being interpretive in nature. Where these matters are encountered, interpretations are made in accordance with Absolute policy &/or as guided by other standards, guides and industry best practice.
- Absolute BCA does not support the use of combustible cladding or aluminium composite panels as external cladding, lining or ancillary element in any way. Such products are recommended to be avoided and where such products are proposed, Absolute BCA automatically excludes their assessment from any reporting and certification and will not accept liability for their use in any way.
- Detailed assessment of any engineering matters or Australian Standards– e.g: structural, civil, electrical, hydraulic, mechanical, fire, bushfire protection is beyond the scope of this report.
- The Report does not provide any Performance Solutions.

2.0 BCA Assessment Data

BCA Reference	Subject Building	
A6 Classification	2 (residential)	☐
	3 (residential – short term)	☐
	4 (single dwelling in an otherwise non-residential building)	☒
	5 (commercial – office)	☐
	6 (retail)	☐
	7a (carparking)	☐
	7b (storage)	☒
	8 (factory/industrial)	☐
	9a (hospital/health care)	☐
	9b (assembly/public building)	☒
	9c (aged care)	☐
C2D3 Rise in Stories	2	
C2D2 Construction Type	Type A (most fire resisting)	☐
	Type B	☒
	Type C (least fire resistant)	☐
C3D3 Floor areas and Fire Compartment Limitations	Floor area and volume of fire compartments in accordance with Table C3D3	☒
	Large Isolated Building in accordance C3D4	☐
Scd 1 Effective Height	Less than 12m	☒
	More than 12m but less than 25m	☐
	More than 25m	☐

3.0 BCA Compliance Assessment

The plans identified in Section 1.1 of this report have been assessed against the DTS requirements of the BCA – which are considered relevant to the current stage of design (Development Application or similar). A summary of these requirements is provided below.

Where the plans show a *non-compliance* or are lacking in critical detail – recommendations have been provided in Section 4.0 to address the issue.

3.1 Section C Fire Resistance Levels

The subject building straddles multiple allotments (as shown in the extract below).

Under the DTS provisions, the requirement for building elements to be 'fire rated' depends on the distance to 'fire source features' (and this this case the fire source features include the side & rear allotment boundaries).

It is considered that the building may be treated as a 'united building' under the provisions of BCA2022 Part A7. On this basis it is considered that the intermediate boundary lines which run 'through' the building can be disregarded as fire source features for the purposes of this assessment.

Note – if deemed warranted by the project certifier at Construction Approval stage, the above can be supported via performance solution. *Absolute BCA is of the opinion that the performance solution would support the current design 'as-is' and would not require further design change.*

In accordance with BCA C2D2, the building is required to achieve a minimum type B construction & and building elements must comply with BCA Specification 5.

The following elements are typically required to achieve a FRL:

- External walls/columns (depending on distance to fire source features). Where the new external walls/columns supporting the new roof are within 18m of the allotment boundaries (see comments above), they should achieve a FRL in accordance with Table S5C21a of BCA 2022. Again, this could be supported via performance solution if need be, at Construction Certificate stage.
- New floors (between ground and first levels) are required to achieve a min FRL of 30/30/30 – this is achieved by the concrete slab.

a) Non-combustible construction & ancillary elements

As the building is required to be of Type A or B construction, the following elements must be *non-combustible*:

- External walls and common walls, including all components incorporated in them including the facade covering, framing and insulation.
- Ancillary elements (attachments to external walls)

Details to be provided at CC stage (although it appears that the external cladding and attachments will be non-combustible).

b) Fire Hazard Properties

The fire hazard properties of floor linings and floor coverings, wall linings and ceiling linings, air-handling ductwork and lift cars. following internal linings, materials and assemblies within a Class 2 to 9 building must comply with BCA Specification 7.

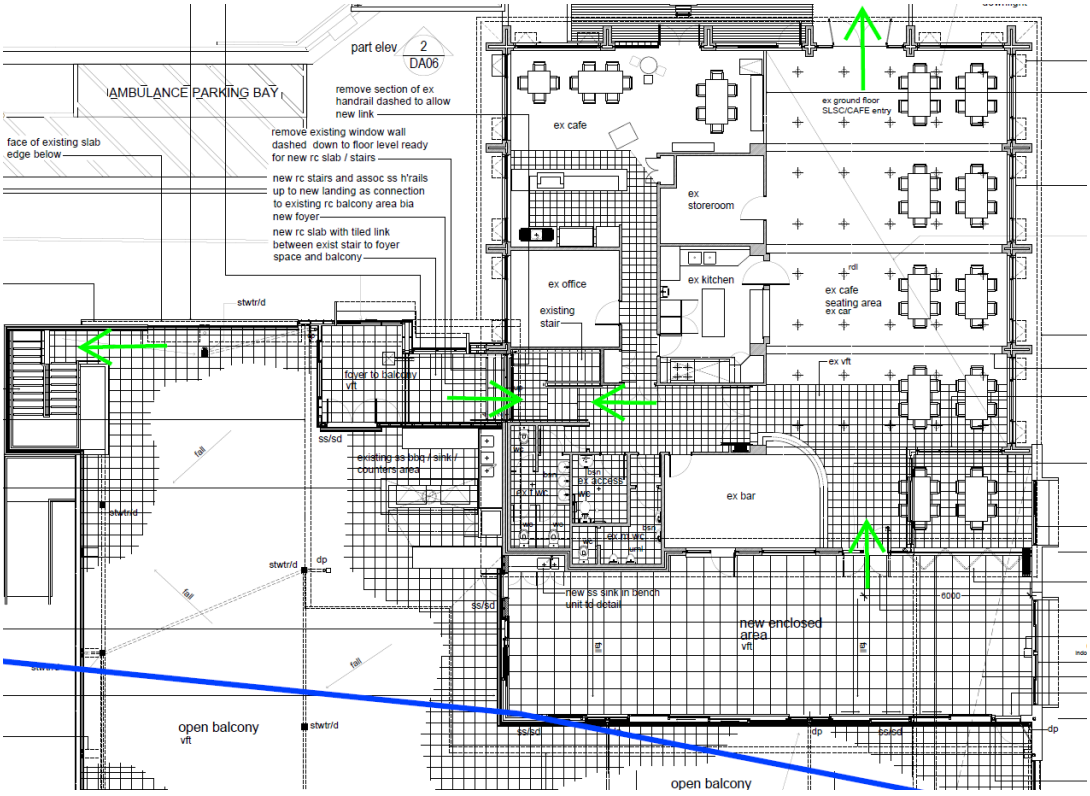
Details to be provided at construction approval stage.

3.2 Section D – Access and Egress

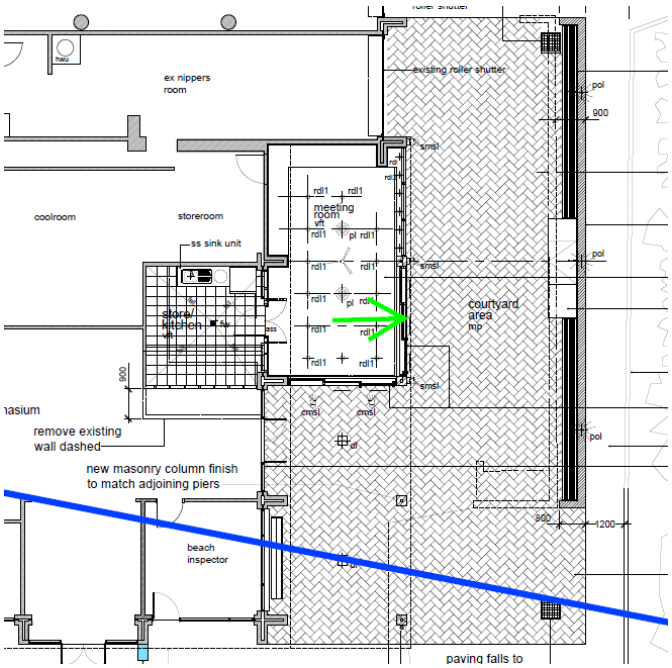
The primary exit points from the affected parts of each storey are shown in green below.

The proposed works are not considered to affect or reduce the existing egress systems.

It is understood that the proposed works are not intended to increase the existing staff or patron numbers.



First floor exit points.



Ground floor exit points.

Details demonstrating compliance with the following will need to be provided at construction approval stage (compliance with these requirements is not expected to impact on the current design):

a) D2D7 – D2D9 – Exit dimensions - New exit doorways will need to provide a min dimension of 850mm x 1980mm.

b) D3D14 Goings and risers - Stair details will need to be provided for assessment

c) D3D16 – Thresholds – ensure level access is provided to external doorways in accessible areas (suitable strip drains likely required to prevent surface water ingress).

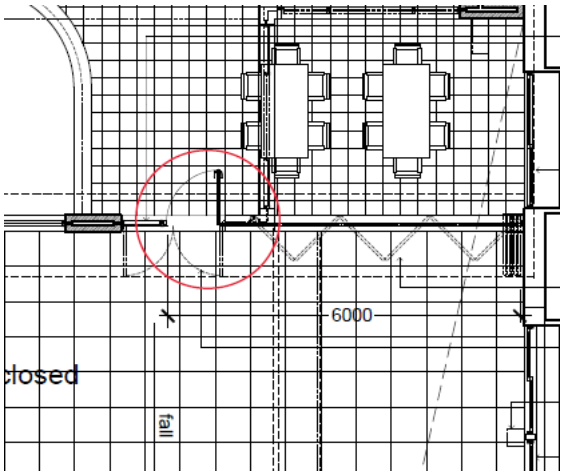
d) D3D17 -D3D21 – Balustrades

e) D3D22 – Handrails

f) D3D24 – Doorways and doors

g) D3D25 – Doors to swing in direction of egress (particular attention to be paid to the doors leading from newly enclosed balcony area to main bar area (as shown below).

h) D3D26 – Door hardware – panic bars generally required to new exit doors.



3.3 Services and Equipment

The following services and equipment are required to be installed in the subject parts. Details to be provided by fire services consultant at construction approval stage.

a) E1D2 – Fire hydrants (existing systems may be utilised subject to pressure, flow and coverage checks).

b) E1D3 – Fire hose reels – to be upgraded as required to suit new works.

c) E1D14 – Portable fire extinguishers – to be provided throughout new works as appropriate.

d) E2D3 – Smoke hazard management – generally NA assuming no ducted mechanical systems are affected/proposed.

e) E4 – Exit and emergency lighting – It is recommended that exit and emergency lighting throughout the first floor be upgraded to suit the new works.

3.4 Section F – Health and Amenity

a) F4 – Sanitary Facilities - Not considered to be affected by proposed works (noting that no additional occupant numbers are anticipated.

b) F5 – Room Heights – appear compliant based on scaled dimensions. Full details to be provided at construction approval stage.

3.5 Section J

a) A separate section J assessment is required to be provided by the energy efficiency consultant.

4.0 Recommendations

4.1 – **C2D2 - FRL of building elements (& protection of openings)**

It should be noted that performance solutions to address issues associated with the multiple allotment boundaries may be required at construction approval stage (to be determined by project certifier- Refer to discussion in Section 3.1 of this report).

5.0 Conclusion

This report has assessed the subject building against the National Construction Code (NCC) / Building Code of Australia (BCA) 2022 (as relevant to the Development Application stage deign).

Subject to compliance with any recommendations listed in Section 4.0 of this report, the development is considered capable of complying with the BCA, within the constraints of the current design.

Paul O'Shannassy
Director
Absolute BCA & Accessibility Consulting Pty Ltd

Accredited BCA Consultant / Certifier (Highest Level) BDC No. 0825
Qualified DDA Accessibility Consultant with ACAA ACAA No. 0594
Accredited Level 1 Building Surveyor AIBS Accreditation No: 8189
MAAC

Attachment A – Fire Safety Schedule

Fire Safety Schedule *The following provides a list of the fire safety measures which are required to be provided (or existing services required to be modified to suit the new works. For any existing fire safety measures – refer to the Annual Fire Safety Statements for the base building. The final fire safety schedule will need to be verified by the Certifier at CC stage.*	
Fire Safety Measure	**Standard of Performance**
Fire seals protecting openings in fire-resisting components of the building (including fire collars & fire stopping/mastic) *Only applies if new penetrations through the separating floor slab(s) are proposed.*	BCA C4D15, BCA Specification 13, AS4072.1-2005 AS1530.4-2014
Fire Hydrants	BCA E1D2 & AS2419.1-2021
Fire Hose Reels	BCA E1D3 & AS2441-2005
Portable Fire Extinguishers	BCA E1D14 & AS2444-2001
Automatic Shutdown of Air Handling Systems *Only applies if new ducted mechanical systems are installed.*	BCA NSW E2D16 & AS1668.1-2015
Emergency Lighting	BCA E4D2, E4D4 & AS2293.1-2018
Exit & Directional Signage	BCA E4D5. E4D6, E4D8 & AS2293.1-2018
Fire Engineering Report	*TBA at CC stage.*

Appendix D

Traffic Reports

BARKER RYAN STEWART

Northern Beaches Council

Traffic and Parking Impact Assessment Report

North Narrabeen Surf Life Saving Club

2 Malcolm Street, Narrabeen

28 September 2023

ENGINEERING
PLANNING
SURVEYING
CERTIFICATION
PROJECT MANAGEMENT

Project No.	230478
Author	JH
Checked	AN
Approved	AN

Rev No.	Status	Date	Comments
1	Draft	31/07/2023	

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Table of Contents

1 Introduction

Barker Ryan Stewart have been engaged by Northern Beaches Council to prepare a Traffic and Parking Impact Assessment in accordance with the requirements of Warringah Development Control Plan 2011 and the NSW Government's '*Guide to Traffic Generating Developments*' to accompany a Development Application for an upgrade of the existing North Narrabeen Surf Lifesaving Club (SLSC).

The purpose of this report is to assess and address traffic, access, car parking and pedestrian impacts generated by the proposed development. This can be briefly outlined as follows:

- The expected traffic generation to/from the proposed development.
- The impact of the proposed development on the road network.
- Intersection analysis based on traffic counts.
- Vehicle parking provisions.
- Provision for pedestrians.
- Availability of public transport.

This Traffic and Parking Impact Assessment Report concludes that the subject site is suitable for the proposed development in relation to traffic impact, car parking provision, vehicle and pedestrian access and safety considerations.

2 Existing Conditions

2.1 Site Location

The North Narrabeen SLSC site is located at 225-229 Ocean Street, Narrabeen and 2 Malcolm Street, North Narrabeen and comprises of the following lots:

- Lot 1, DP122234
- Lot 3 and Lot 6, Section 63 DP5748
- Lot A and B, DP 376822
- Lot 1, DP178553
- Lot 1-2, DP339162
- Lot 4, DP331508

The site has existing vehicular access from Malcolm Street.

It is surrounded by the beach in the north and east and low-density residential developments in the south and west. An aerial of the site location is shown in Figure 2.1.

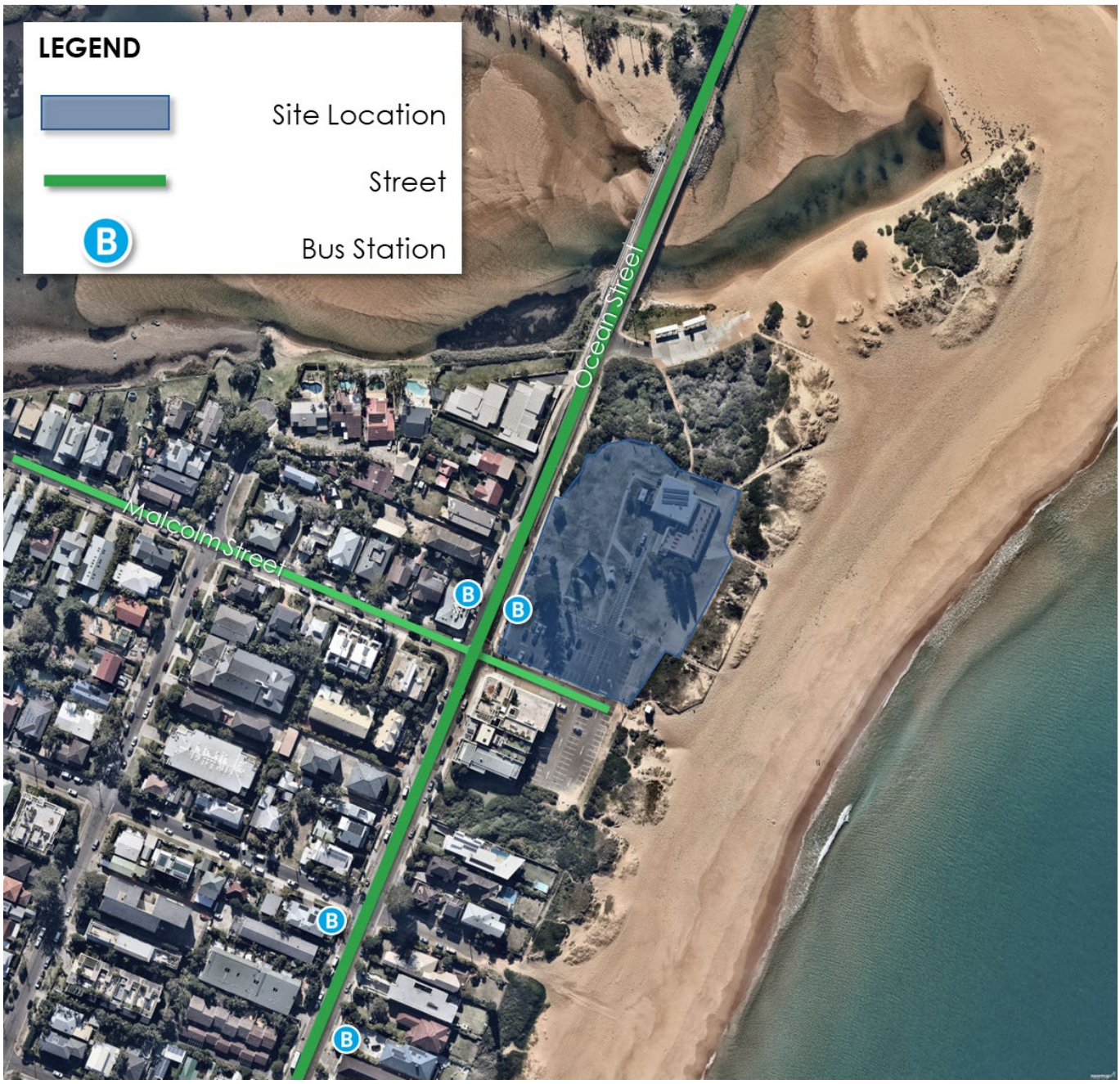


Figure 2.1: Site Location (Source: Nearmap, July 2023)

2.2 Existing Development

The existing development is the operational North Narrabeen SLSC. The existing development is described below:

- Club/ Gym (66.5m^2):
  - Open 6:30AM – 8:30PM daily
- Bar (19m^2):
  - Friday: Open 4:00PM – 9:00PM
  - Saturday: Open 3:00PM – 9:00PM
  - Sunday: Open 3:00PM – 9:00PM (off-peak), 11:00AM – 9:00PM (on-peak)
- Café (154m^2):
  - Open 6:30AM – 2:30PM

- Nippers (Children's Beach Program) (34.5m^2):
  - 8:45AM – 12:00PM
- Balcony Seats: 88 (70% occupancy during busiest period)
- Internal Seats: 54 (60% occupancy during busiest period, including café patrons)

There also exists some programs associated with Boardriders, a surfing association with events held in the premises.

Currently, there are 123 (approximately 8 unlined parallel) regular spaces and 4 accessible parking spaces with paid parking treatment. This is shown in Figure 2.2.

Figure 2.2: Car Park Aerial (Source: Nearmap, July 2023)

2.3 Existing Road Conditions

A schedule of the roads relevant to the site are outlined in Table 2.1.

Table 2.1: Schedule of Roads

Street Name	Classification	Direction	Speed Limit	No. of Lanes	Parking Permission
Ocean Street	Collector Road	N-S	50km/h	2	Not permitted
Malcolm Street	Local Road	E-W	50km/h	2	Permitted

2.3.1 2023 Classified Intersection Count

An intersection count had been commissioned and completed on Friday 21/07/2023 for the AM and PM peak at the intersection of Malcolm Street and Ocean Street.

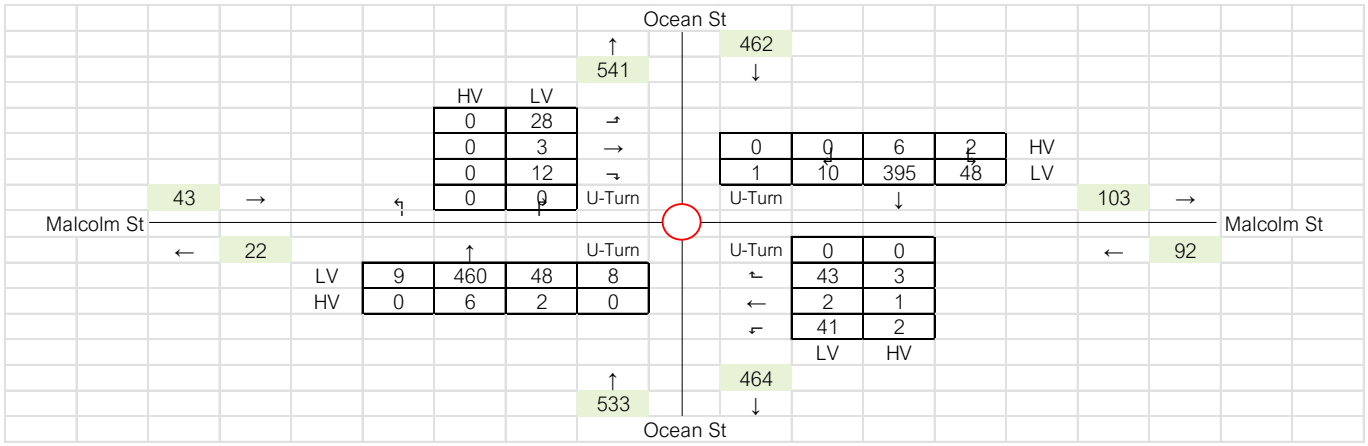


Figure 2.3: 2023 Surveyed Traffic Volumes (AM)

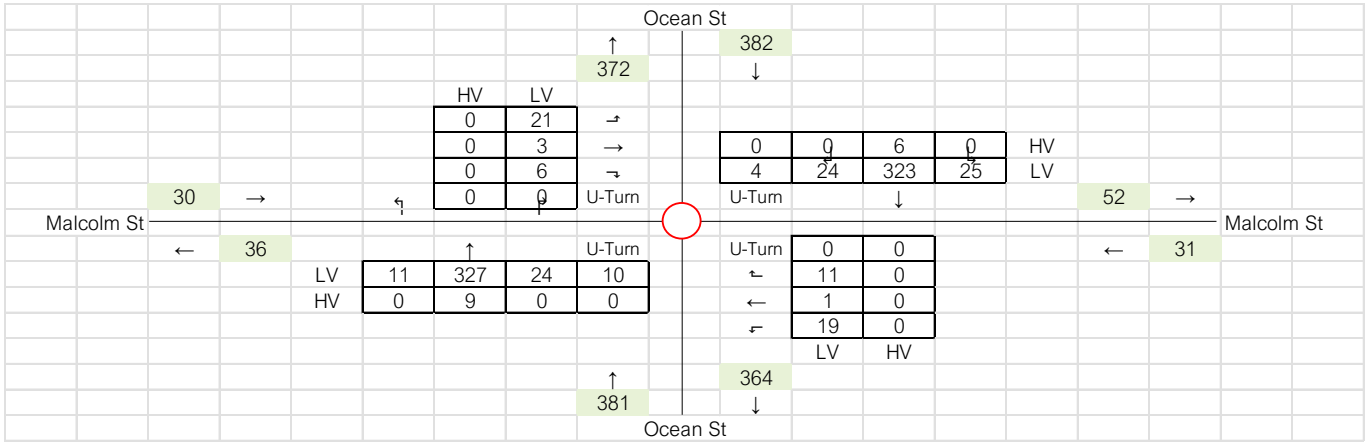


Figure 2.4: 2023 Surveyed Traffic Volumes (PM)

2.3.2 SIDRA Intersection 9.0 Existing Conditions Model

Intersection performance has been assessed using the SIDRA INTERSECTION 9.0 modeling software which uses the level of service (delay) model adopted by the Transport for NSW (TfNSW) in NSW to assess intersection performance. Average delay is used to determine the level of service (LOS) based on Table 2.2, sourced from the TfNSW's *'Guide to Traffic Generating Developments'* (GTGD) 2002.

Table 2.2: Level of Service Criteria for Intersections

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 – 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 – 42	Satisfactory	Satisfactory, but accident study required
D	43 – 56	Operating near capacity	Near capacity & accident study required
E	57 - 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode

The network results have been summarized in Table 2.3.

Table 2.3: 2023 Existing SIDRA Intersection Model

Peak Period	Intersection	Degree of Saturation (v/c)	Average Delay (s)	Level of Service	Average Queue Distance (m)
AM	Ocean St/ Malcolm St	0.390	4.7	A	20.9
PM	Ocean St/ Malcolm St	0.272	4.4	A	11.6

The existing intersection operates very well with negligible delay.

2.4 Public Transport, Pedestrians and Cyclists

The area is serviced with bilateral bus stops outside the site's frontage. These stops service Route 155 – Bayview Garden Village to Narrabeen every 30 minutes.

2.5 Pedestrian and Active Transport

Footpaths are available on both sides of Ocean Street, and on the southern side of Malcolm Street.

Bicycle facilities are provided through the site. This is shown in Figure 2.5.

Figure 2.5: Bicycle Map (Source: Northern Beaches Council, July 2023)

3 Proposed Development

3.1 Development Description

The proposal includes the upgrade of the existing club and includes the expansion of ground and upper floor areas, namely:

- The addition of 44m^2 for board riders use
- The conversion of 151m^2 outdoor area for café/ dining

3.1.1 Parking and Access

The existing car parking will be retained as part of the development. This consists of 123 regular spaces and 4 accessible spaces.

A figure showing the proposed ground floor is shown in Figure 3.1 and Figure 3.2.

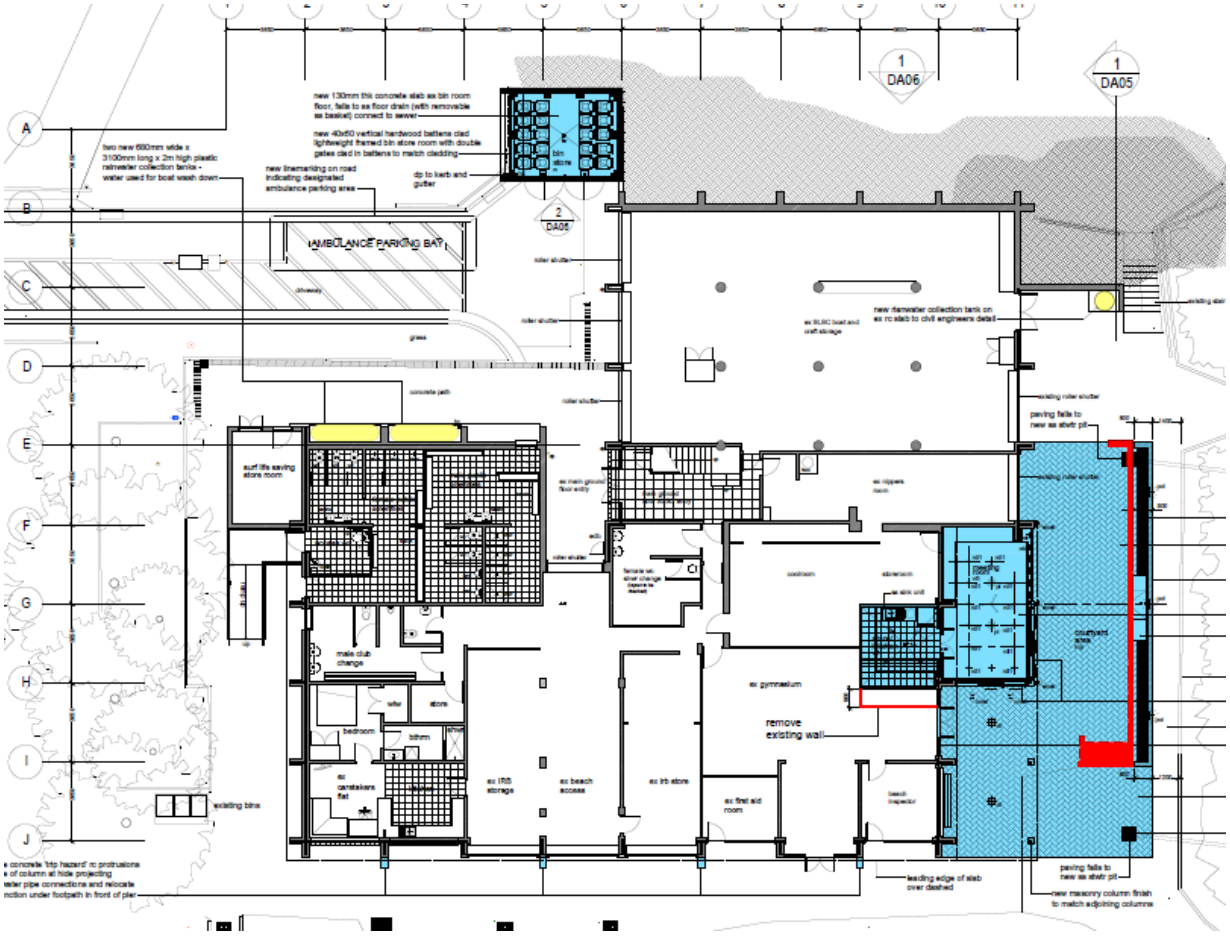


Figure 3.1: Proposed Ground Floor (Northern Beaches Council, September 2023)

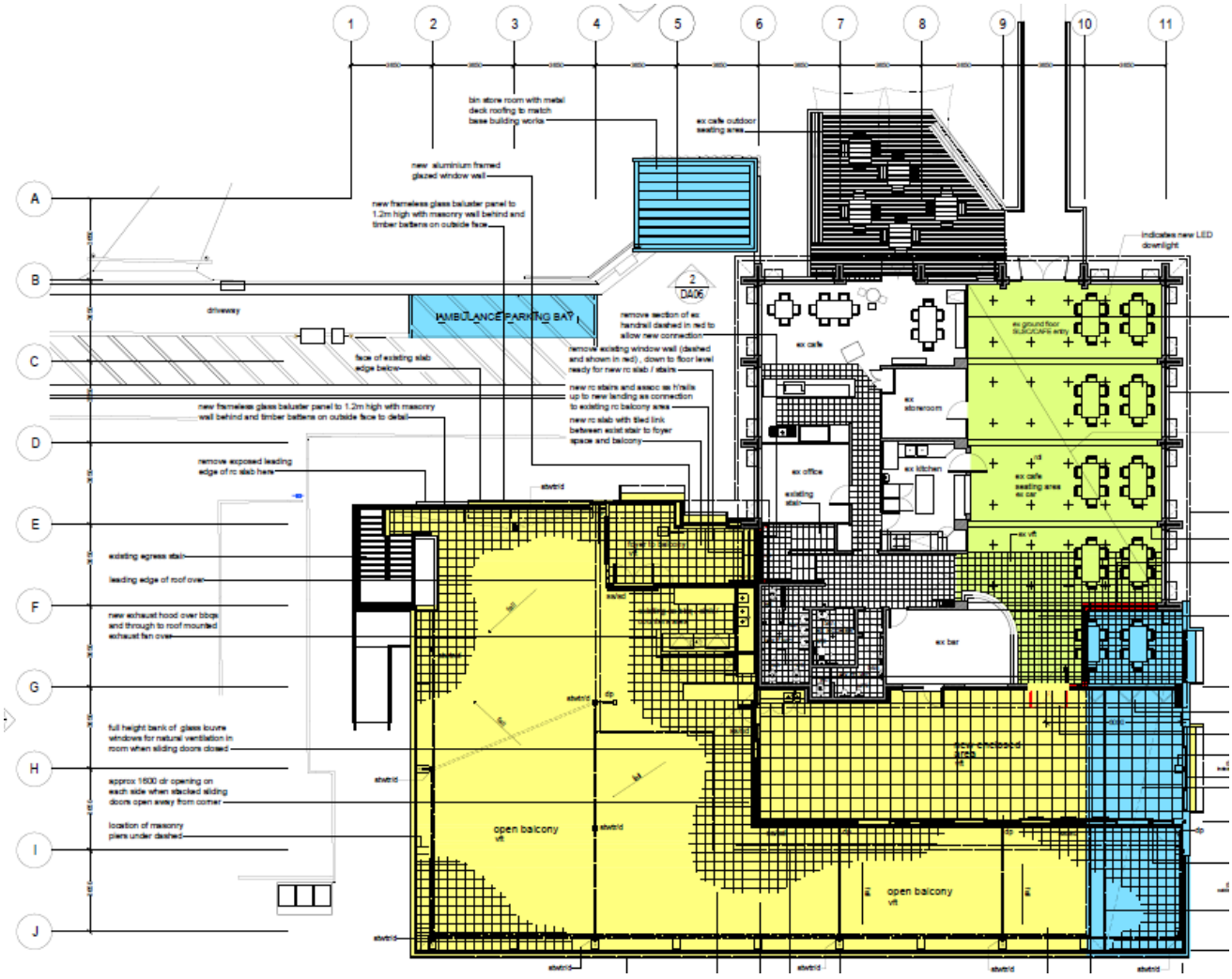


Figure 3.2: Proposed First Floor (Northern Beaches Council, September 2023)

3.1.2 Service Vehicles

The existing service vehicle arrangement will be retained for the site.

4 Car Parking Assessment

4.1 Parking Requirements

The proposed access and car parking provision has been assessed against the requirements of the Warringah DCP 2011. However, it is understood that the land's expected use will significantly deviate from rates outlined in the DCP due to external contexts and general behaviours.

4.1.1 Warringah DCP 2011

The Warringah DCP requires the following parking provisions:

- Gym: 4.5 spaces per 100m^2
- Bar & Café (considered 'Restaurant'): greater of 15 spaces per 100m^2 or 1 space per 3 seats
- Nippers (considered 'Childcare'): 1 space for every 4 children

No rates are provided for general lifeguard uses. The 'boardriders' use also does not have a direct correlative rate.

4.1.2 Site Context Discussion

The site generally services parking close to the beach front, and North Narrabeen beach will be the primary trip attractor during the surf/ beach season. This also correlates to the largest demand and is consistent with all water-front usages such as marinas and other beach-fronts. Additional land use for restaurants would not generate as much traffic as normal restaurants as the restaurant facilities often are ancillary to beach uses. Additionally, increases to the 'boardrider' space would generally generate traffic outside the time-of-day peak, as surfers generally surf early in the morning or late evening, and the peak demands for parking generally start around 10AM on weekends.

4.2 Parking Provision

It is proposed that the existing 123 spaces and 4 accessible spaces are sufficient for the development as the parking's peak demand generation is not the café, and the 'boardriders' club will operate outside of parking peak hours.

Therefore, the proposed development will not increase existing demand.

5 Traffic Assessment

5.1 Trip Generation

5.1.1 Existing Development

The existing development traffic has been captured in the traffic survey for the site dated 21/07/2023.

5.1.2 Proposed Development

As noted in Section 4, the primary trip generator/ attractor will continue to be North Narrabeen beach. Hence, it is expected that trip generation arising from expansion to the café and boardriders' areas will be significantly reduced. However, trip generation for the café has been calculated according to the TfNSW Guide to Traffic-Generating Developments (GTGD) 2002 and the boardriders' group has been assessed on first principles estimates.

The TfNSW GTGD 2002 rate for restaurants is as follows:

- 5 trips per 100m^2 GFA in the PM peak

Considering the opening times of the café, this trip generation has instead been allocated to the AM peak, and the PM would generate no trips. Hence some 8 trips would be added as part of the café development.

As an estimate of the boardriders' usage, 5 trips would be added as part of both AM and PM peak.

Hence the development is conservatively estimated to generate:

- 13 trips in the AM peak and
- 5 trips in the PM peak

5.1.3 Directional Distribution

It has been estimated that 50% of trips will be in, and 50% of trips will be out, and that 50% would be coming from/ heading to the north, and 50% would be coming from/ heading to the south, which is generally in accordance with surveyed behaviours. These distributions are shown in Figure 5.1 and Figure 5.2

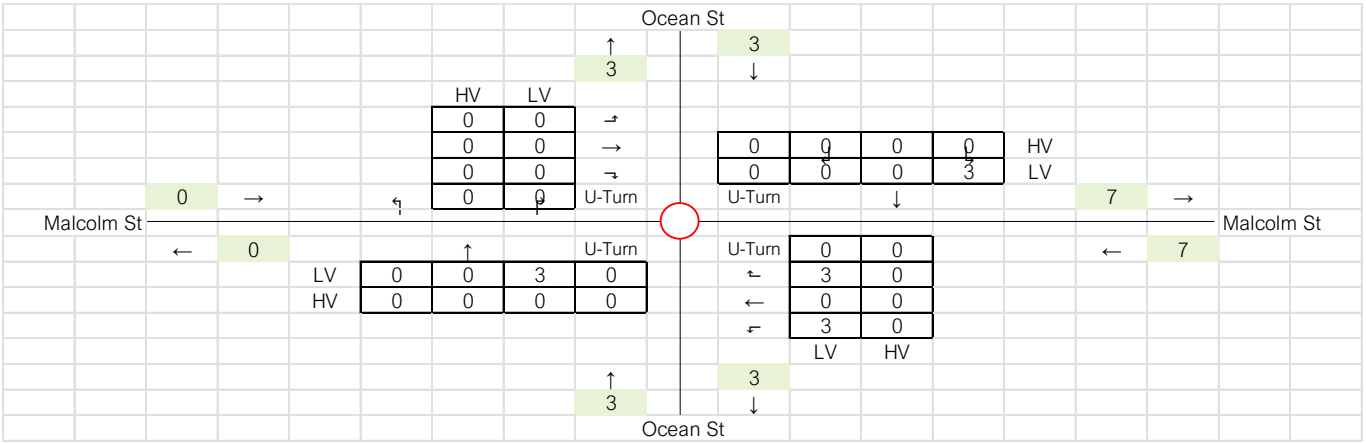


Figure 5.1: Directional Distribution (AM)

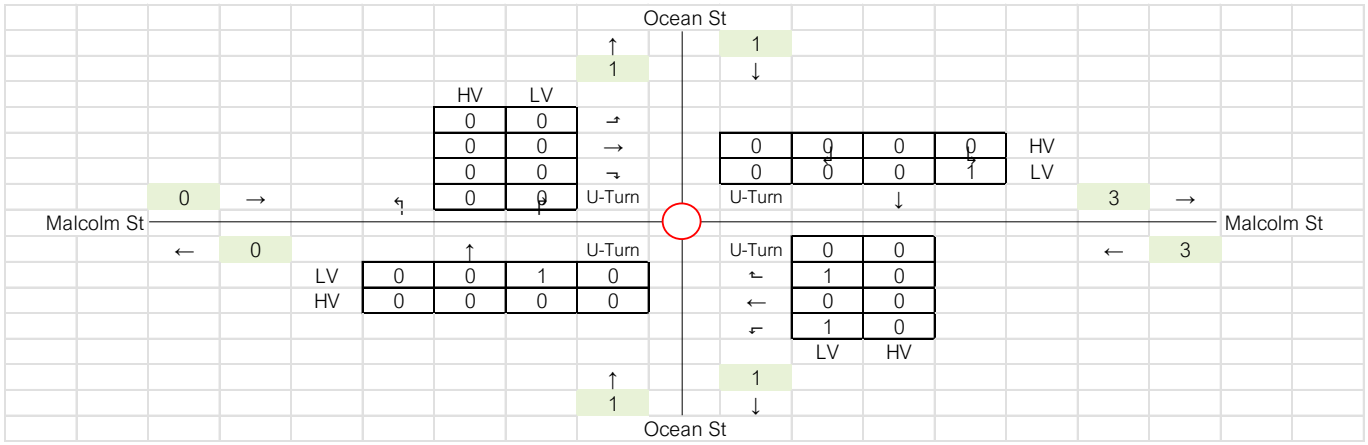


Figure 5.2: Directional Distribution (PM)

5.2 2023 Development SIDRA Intersection Modelling

Base modelling has been shown in Section 2.3.2 SIDRA modelling for the development has been shown in Table 5.1.

Table 5.1: 2023 Development SIDRA Intersection Model

Peak Period	Intersection	Degree of Saturation (v/c)	Average Delay (s)	Level of Service	Average Queue Distance (m)
AM	Ocean St/ Malcolm St	0.394	4.8	A	21.2
PM	Ocean St/ Malcolm St	0.273	4.4	A	11.7

It can be observed that the development will continue to operate very well post-development.

5.3 2033 Base Year and Development SIDRA Intersection Modelling

The existing surveyed volumes have been projected for 2033, with an assumed 1.7% pa. growth. This is shown in Figure 5.3 and Figure 5.4.

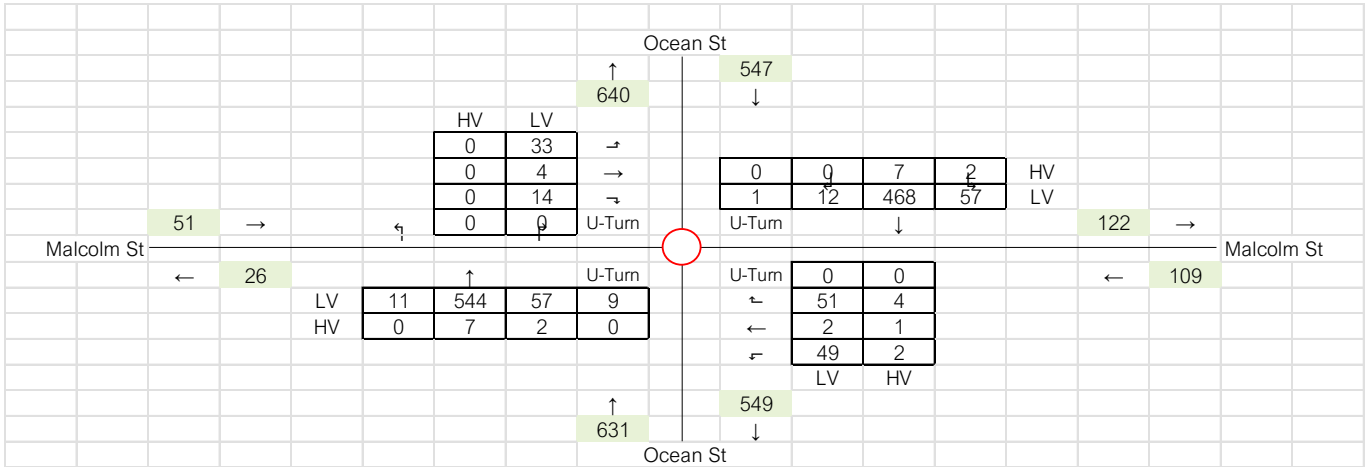


Figure 5.3: 2033 Base Traffic Volumes (AM)

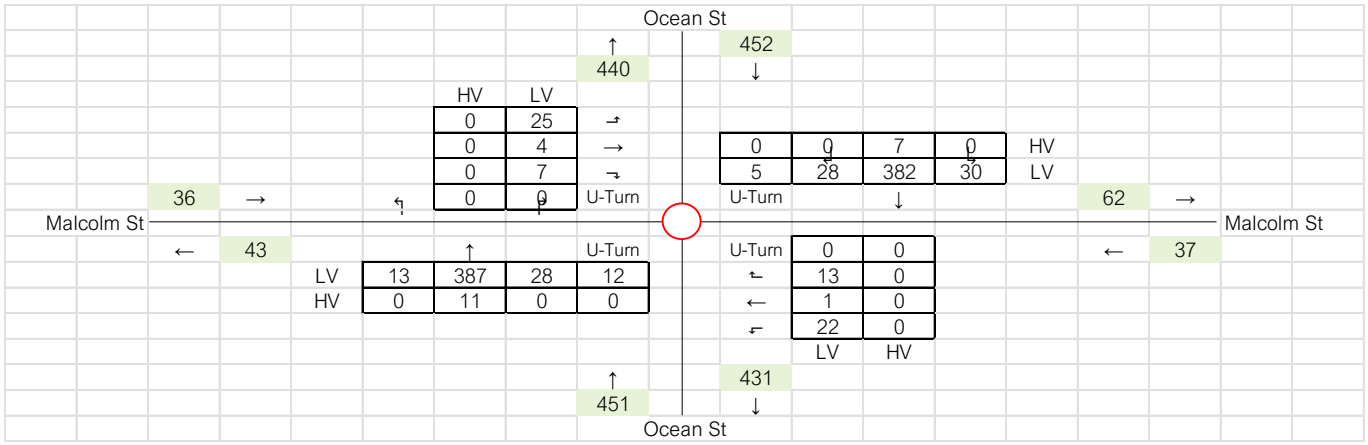


Figure 5.4: 2033 Base Traffic Volumes (PM)

Accordingly, the base and development SIDRA models are shown in Table 5.2.

Table 5.2: 2033 Existing and Development SIDRA Intersection Model

Scenario	Peak Period	Intersection	Degree of Saturation (v/c)	Average Delay (s)	Level of Service	Average Queue Distance (m)
Base	AM	Ocean St/ Malcolm St	0.467	4.9	A	27.8
	PM	Ocean St/ Malcolm St	0.324	4.5	A	14.7
Development	AM	Ocean St/ Malcolm St	0.471	5.0	A	28.2
	PM	Ocean St/ Malcolm St	0325	4.5	A	14.9

The intersection is expected to continue to perform well in the future scenario, and the development does not significantly increase traffic.

6 Conclusion/Recommendations

This Traffic and Parking Impact Assessment has been prepared in accordance with the requirements of Warringah DCP 2011 and the NSW Government's 'Guide to Traffic Generating Developments' to accompany a Development Application for alterations and additions to the North Narrabeen SLSC.

The proposal includes alterations and additions to the existing café and boardriders club facilities to the order of some 151m^2 and 44m^2 respectively.

It is proposed that the existing 123 regular and 4 accessible spaces on-site will be retained. Due to the nature of the specific development, it is understood that small increases in the land size will not significantly impact parking demand, and the provided parking primarily services the North Narrabeen beach.

The proposed additional facilities are not expected to generate significant parking demand, as the primary trip generator for the stie will be the North Narrabeen beach, particularly during the peak season. Conservatively, this assessment has assumed a generation of 13 trips in the AM peak and 5 trips in the PM peak. The estimated generation will not significantly affect the intersection of Ocean Street and Malcolm Street, which operates without significant delay in both the AM and PM peak.

The Traffic and Parking Impact Assessment concludes that the subject site is suitable for the proposed development in relation to the impact of traffic, car parking provision, vehicle and pedestrian access and safety considerations.

7 References

Roads and Maritime Services, *'Guide to Traffic Generating Developments'* Version 2.2 dated October 2002.

Warringah DCP 2011

Attachment A - Site Plan

1 2 3 4 5 6 7 8 9 10 11
3650 3650 3650 3650 3650 3650 3650 3650 3650 3650 3650
A B C D E F G H I J
3650 3650 3650 3650 3650 3650 3650 3650 3650

1 DA06
1 DA05
2 DA06
3 DA06

new 130mm thk concrete slab as bin room floor, falls to ss floor drain (with removable ss basket) connect to sewer
new 40x60 vertical hardwood battens clad lightweight framed bin store room with double gates clad in battens to match cladding
bin store
fw
hc
rc
two new 680mm wide x 3100mm long x 2m high plastic rainwater collection tanks - water used for boat wash down
new linemarking on road indicating designated ambulance parking area
dp to kerb and gutter
AMBULANCE PARKING BAY
driveway
grass
roller shutter
roller shutter
roller shutter
roller shutter
concrete path
existing stair
existing post and rail timber fence
ex SLSC boat and craft storage
new rianwater collection tank on ex rc slab to civil engineers detail
existing roller shutter
paving falls to new ss stwtr pit
800
1400
ex bushland
existing post and rail timber fence
existing roller shutter
pol
900
indicates new hardwood battened seat on stainless steel angle brackets to detail
remove existing 1600mm high block wall and assoc rc strip footing and bbq . All dashed and shown in red
new 1600mm high core filled 200mm thk honed concrete block wall on rc strip footing to structural engineers detail
new rc slab/piers to eng detail ie new meeting room for North Narrabeen Boardriders
new elec ss bbq as selected
existing post and rail timber fence
new alum framed glass stackable doors
existing sand path to beach
remove exist timber framed glass doors and replace with new alum framed glass doors and window wall
area of new honed concrete Trihex paving (as selected) on rc slab on compacted sub-base to structural engineers detail
stormwater pit to hydraulic engineer's design
paving falls to new ss stwtr pit
new masonry column finish to match adjoining columns
leading edge of slab over dashed
bushland
surf life saving store room
male public amenities
female public amenities
access wc
male club change
female wc shwr change (layout to be checked)
ex main ground floor entry
main ground floor SLSC entry
ex nippers room
coolroom
storeroom
ss sink unit
meeting room
store/ kitchen
courtyard area
ex gymnasium
remove existing wall
wiw
store
bedroom
bthrm
shwr
ex caretakers flat
kitchen
ex IRB storage
ex beach access
ex irb store
ex first aid room
beach inspector
ramp up
existing bins
remove concrete 'trip hazard' rc protrusions at base of column at hide projecting stormwater pipe connections and relocate pipe junction under footpath in front of pier
grass area
concrete paved area
foot wash tap and bubbler
shower on timber deck
sand path to beach
path to beach
beach bushland
2 DA05
1 DA08
1 DA07
N

1 GROUND FLOOR PLAN
1:100 @ A1
0 2 6m

NOTE
See Dwg DA00 for symbols and abbreviations and general notes

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23

legend
- demolished elements
- new block wall
- new stud wall
- new brick wall
- existing wall
- proposed Stage 1 works (shown in blue)
- proposed Stage 2 works (shown in green)
- proposed Stage 3 works (shown in yellow)

northern beaches council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
ground floor plan

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB
Dwg no: DA02/1
Issue no: C

1 DA06

bin store room with metal deck roofing to match base building works

ex cafe outdoor seating area

new aluminium framed glazed window wall

new frameless glass baluster panel to 1.2m high with masonry wall behind and timber battens on outside face

indicates new LED downlight

2 DA06

driveway

AMBULANCE PARKING BAY

remove section of ex handrail dashed in red to allow new connection

remove existing window wall (dashed and shown in red) , down to floor level ready for new rc slab / stairs

face of existing slab edge below

new rc stairs and assoc ss h'rails up to new landing as connection to existing rc balcony area

new rc slab with tiled link between exist stair to foyer space and balcony

new frameless glass baluster panel to 1.2m high with masonry wall behind and timber battens on outside face to detail

remove exposed leading edge of rc slab here

existing egress stair

leading edge of roof over

new exhaust hood over bbqs and through to roof mounted exhaust fan over

3 DA06

full height bank of glass louvre windows for natural ventilation in room when sliding doors closed

approx 1600 clr opening on each side when stacked sliding doors open away from corner

location of masonry piers under dashed

ex cafe

ex storeroom

ex office

ex kitchen

existing stair

ex ground floor SLSC/CAFE entry

rdl

ex cafe seating area ex car

ex vft

ex bar

ex access wc

ex f wc

ex m wc

bsn

urnl

wc

stwtr/d

foyer to balcony vft

ss/sd

existing ss bbq / sink / counters area

fall

dp

up

open balcony vft

new enclosed area vft

6000

6000 indoor floor space

6000 outdoor balcony space

18900

remove existing wall shown in red

existing window wall

new lighting and set plasterboard ceiling lining in this area

leading edge of cladding to roof spandrel over dashed

structural beams over dashed to be clad plastrbrd and paint

remove wall elements dashed shown in red

new single bank of louvre glass window for ventilation when concertinad bifold door closed

1 DA05

glased aluminium framed swing door and new pivot concertina doors stack to north end wall face where shown

remove existing alum framed glass doors dashed in red and replace with bank of adj glass louvre window

location of new masonry column under

new aluminium framed window wall

new rc slab floor area with vft over as selected

850mm clr alum framed glazed door for quick access to balcony when sliding doors closed

full height bank of glass louvre windows for natural ventilation in room when sliding doors closed

remove existing brick wall,splayed cfcmbrd fascia panel and aluminium framed glazed balustrade dashed

ss slot drain in front of new aluminium framed glass stacked sliding doors

remove sloped cfcbrd fascia panel and tubular substandard metal balustrade and replace with new frameless glass baluster panel to 1.2m high with masonry wall behind and timber battens on outside face to detail (incorporate LED lighting into balustrade to detail)

remove existing topping slab and tiling to entire existing outdoor and proposed enclosed balcony area and install new topping slab and tiling fall to floor drains

indicates location of masonry piers under dashed

leading edge of roof over

remove existing brick wall,splayed cfcbrd fascia panel and aluminium framed glazed balustrade dashed

2 DA05

1 DA08

1 DA07

1 UPPER FLOOR PLAN

1:100 @ A1

0 2 6m

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23

northern beaches council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
upper floor plan

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB

Dwg no: DA03/1
Issue no: C

legend

- demolished elements
- existing walls
- proposed Stage 1 works (shown in blue)
- proposed Stage 2 works (shown in green)
- proposed Stage 3 works (shown in yellow)

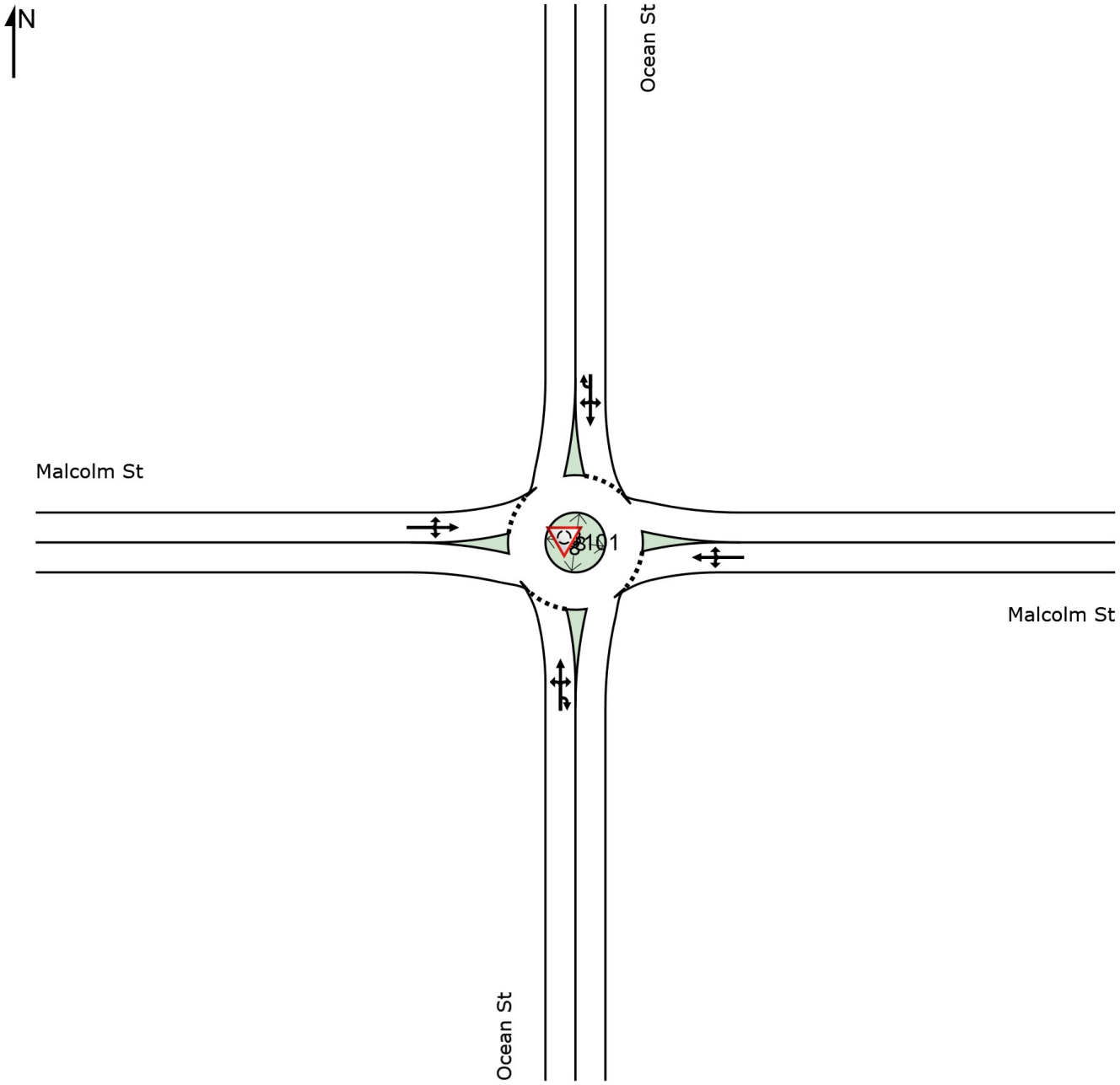
Appendix B – SIDRA Layout and Assessment

SITE LAYOUT

Site: 101 [1. 2023 AM Ex Ocean/ Malcolm (Site Folder: 2023 Ex)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



USER REPORT FOR SITE

All Movement Classes

Project: 230478_SIDRA **Template: Summary**

Site: 101 [1. 2023 AM Ex Ocean/ Malcolm (Site Folder: 2023 Ex)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ocean St														
1	L2	9	0	9	0.0	0.390	4.2	LOS A	2.9	20.9	0.28	0.45	0.28	44.1
2	T1	466	6	491	1.3	0.390	4.1	LOS A	2.9	20.9	0.28	0.45	0.28	46.8
3	R2	50	2	53	4.0	0.390	7.2	LOS A	2.9	20.9	0.28	0.45	0.28	29.2
3u	U	8	0	8	0.0	0.390	9.9	LOS A	2.9	20.9	0.28	0.45	0.28	50.1
Approach		533	8	561	1.5	0.390	4.5	LOS A	2.9	20.9	0.28	0.45	0.28	45.3
East: Malcolm St														
4	L2	43	2	45	4.7	0.106	5.9	LOS A	0.6	4.2	0.56	0.67	0.56	41.4
5	T1	3	1	3	33.3	0.106	6.4	LOS A	0.6	4.2	0.56	0.67	0.56	30.5
6	R2	46	3	48	6.5	0.106	9.0	LOS A	0.6	4.2	0.56	0.67	0.56	42.2
Approach		92	6	97	6.5	0.106	7.5	LOS A	0.6	4.2	0.56	0.67	0.56	41.6
North: Ocean St														
7	L2	50	2	53	4.0	0.346	4.3	LOS A	2.3	16.3	0.28	0.45	0.28	28.3
8	T1	401	6	422	1.5	0.346	4.1	LOS A	2.3	16.3	0.28	0.45	0.28	46.9
9	R2	10	0	11	0.0	0.346	7.2	LOS A	2.3	16.3	0.28	0.45	0.28	45.0
9u	U	1	0	1	0.0	0.346	9.9	LOS A	2.3	16.3	0.28	0.45	0.28	50.2
Approach		462	8	486	1.7	0.346	4.2	LOS A	2.3	16.3	0.28	0.45	0.28	45.0
West: Malcolm St														
10	L2	28	0	29	0.0	0.053	7.0	LOS A	0.3	2.0	0.62	0.66	0.62	42.0
11	T1	3	0	3	0.0	0.053	6.8	LOS A	0.3	2.0	0.62	0.66	0.62	13.8
12	R2	12	0	13	0.0	0.053	9.9	LOS A	0.3	2.0	0.62	0.66	0.62	42.7
Approach		43	0	45	0.0	0.053	7.8	LOS A	0.3	2.0	0.62	0.66	0.62	40.3
All Vehicles		1130	22	1189	1.9	0.390	4.7	LOS A	2.9	20.9	0.31	0.48	0.31	44.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
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.

Site: 101 [1. 2023 PM Ex Ocean/ Malcolm (Site Folder: 2023 Ex)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ocean St														
1	L2	11	0	12	0.0	0.271	4.0	LOS A	1.6	11.6	0.17	0.44	0.17	44.5
2	T1	336	9	354	2.7	0.271	3.9	LOS A	1.6	11.6	0.17	0.44	0.17	47.1
3	R2	24	0	25	0.0	0.271	7.0	LOS A	1.6	11.6	0.17	0.44	0.17	29.5
3u	U	10	0	11	0.0	0.271	9.7	LOS A	1.6	11.6	0.17	0.44	0.17	50.5
Approach		381	9	401	2.4	0.271	4.3	LOS A	1.6	11.6	0.17	0.44	0.17	46.1
East: Malcolm St														
4	L2	19	0	20	0.0	0.032	5.3	LOS A	0.2	1.1	0.48	0.59	0.48	42.4
5	T1	1	0	1	0.0	0.032	5.2	LOS A	0.2	1.1	0.48	0.59	0.48	35.3
6	R2	11	0	12	0.0	0.032	8.3	LOS A	0.2	1.1	0.48	0.59	0.48	43.2
Approach		31	0	33	0.0	0.032	6.4	LOS A	0.2	1.1	0.48	0.59	0.48	42.6
North: Ocean St														
7	L2	25	0	26	0.0	0.272	4.0	LOS A	1.6	11.6	0.18	0.44	0.18	28.5
8	T1	329	6	346	1.8	0.272	3.9	LOS A	1.6	11.6	0.18	0.44	0.18	47.1
9	R2	24	0	25	0.0	0.272	7.0	LOS A	1.6	11.6	0.18	0.44	0.18	45.3
9u	U	4	0	4	0.0	0.272	9.7	LOS A	1.6	11.6	0.18	0.44	0.18	50.5
Approach		382	6	402	1.6	0.272	4.2	LOS A	1.6	11.6	0.18	0.44	0.18	45.9
West: Malcolm St														
10	L2	21	0	22	0.0	0.031	5.7	LOS A	0.2	1.1	0.49	0.58	0.49	43.1
11	T1	3	0	3	0.0	0.031	5.6	LOS A	0.2	1.1	0.49	0.58	0.49	14.1
12	R2	6	0	6	0.0	0.031	8.7	LOS A	0.2	1.1	0.49	0.58	0.49	43.9
Approach		30	0	32	0.0	0.031	6.3	LOS A	0.2	1.1	0.49	0.58	0.49	40.5
All Vehicles		824	15	867	1.8	0.272	4.4	LOS A	1.6	11.6	0.20	0.45	0.20	45.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
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.

Site: 101 [1. 2033 AM Ex Ocean/ Malcolm (Site Folder: 2033 Ex)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ocean St														
1	L2	11	0	12	0.0	0.467	4.3	LOS A	3.9	27.8	0.34	0.46	0.34	43.8
2	T1	551	7	580	1.3	0.467	4.2	LOS A	3.9	27.8	0.34	0.46	0.34	46.6
3	R2	59	2	62	3.4	0.467	7.3	LOS A	3.9	27.8	0.34	0.46	0.34	29.1
3u	U	9	0	9	0.0	0.467	10.0	LOS A	3.9	27.8	0.34	0.46	0.34	49.9
Approach		630	9	663	1.4	0.467	4.6	LOS A	3.9	27.8	0.34	0.46	0.34	45.1
East: Malcolm St														
4	L2	51	2	54	3.9	0.135	6.5	LOS A	0.8	5.6	0.62	0.71	0.62	40.9
5	T1	3	1	3	33.3	0.135	7.1	LOS A	0.8	5.6	0.62	0.71	0.62	29.7
6	R2	55	4	58	7.3	0.135	9.6	LOS A	0.8	5.6	0.62	0.71	0.62	41.6
Approach		109	7	115	6.4	0.135	8.1	LOS A	0.8	5.6	0.62	0.71	0.62	41.1
North: Ocean St														
7	L2	59	2	62	3.4	0.415	4.4	LOS A	3.0	21.5	0.33	0.46	0.33	28.2
8	T1	475	7	500	1.5	0.415	4.3	LOS A	3.0	21.5	0.33	0.46	0.33	46.7
9	R2	12	0	13	0.0	0.415	7.3	LOS A	3.0	21.5	0.33	0.46	0.33	44.8
9u	U	1	0	1	0.0	0.415	10.1	LOS A	3.0	21.5	0.33	0.46	0.33	50.1
Approach		547	9	576	1.6	0.415	4.4	LOS A	3.0	21.5	0.33	0.46	0.33	44.8
West: Malcolm St														
10	L2	33	0	35	0.0	0.070	7.9	LOS A	0.4	2.9	0.69	0.71	0.69	41.3
11	T1	4	0	4	0.0	0.070	7.8	LOS A	0.4	2.9	0.69	0.71	0.69	13.6
12	R2	14	0	15	0.0	0.070	10.9	LOS A	0.4	2.9	0.69	0.71	0.69	42.0
Approach		51	0	54	0.0	0.070	8.7	LOS A	0.4	2.9	0.69	0.71	0.69	39.4
All Vehicles		1337	25	1407	1.9	0.467	4.9	LOS A	3.9	27.8	0.37	0.49	0.37	44.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
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.

Site: 101 [1. 2033 PM Ex Ocean/ Malcolm (Site Folder: 2033 Ex)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ocean St														
1	L2	13	0	14	0.0	0.323	4.1	LOS A	2.1	14.7	0.20	0.44	0.20	44.4
2	T1	398	11	419	2.8	0.323	4.0	LOS A	2.1	14.7	0.20	0.44	0.20	47.0
3	R2	28	0	29	0.0	0.323	7.0	LOS A	2.1	14.7	0.20	0.44	0.20	29.5
3u	U	12	0	13	0.0	0.323	9.7	LOS A	2.1	14.7	0.20	0.44	0.20	50.4
Approach		451	11	475	2.4	0.323	4.3	LOS A	2.1	14.7	0.20	0.44	0.20	46.1
East: Malcolm St														
4	L2	22	0	23	0.0	0.039	5.7	LOS A	0.2	1.4	0.53	0.62	0.53	42.0
5	T1	1	0	1	0.0	0.039	5.6	LOS A	0.2	1.4	0.53	0.62	0.53	34.6
6	R2	13	0	14	0.0	0.039	8.7	LOS A	0.2	1.4	0.53	0.62	0.53	42.9
Approach		36	0	38	0.0	0.039	6.8	LOS A	0.2	1.4	0.53	0.62	0.53	42.2
North: Ocean St														
7	L2	30	0	32	0.0	0.324	4.1	LOS A	2.1	14.7	0.21	0.44	0.21	28.4
8	T1	388	6	408	1.5	0.324	4.0	LOS A	2.1	14.7	0.21	0.44	0.21	47.0
9	R2	28	0	29	0.0	0.324	7.1	LOS A	2.1	14.7	0.21	0.44	0.21	45.2
9u	U	5	0	5	0.0	0.324	9.8	LOS A	2.1	14.7	0.21	0.44	0.21	50.4
Approach		451	6	475	1.3	0.324	4.2	LOS A	2.1	14.7	0.21	0.44	0.21	45.8
West: Malcolm St														
10	L2	25	0	26	0.0	0.040	6.1	LOS A	0.2	1.5	0.54	0.61	0.54	42.8
11	T1	4	0	4	0.0	0.040	6.0	LOS A	0.2	1.5	0.54	0.61	0.54	14.0
12	R2	7	0	7	0.0	0.040	9.1	LOS A	0.2	1.5	0.54	0.61	0.54	43.6
Approach		36	0	38	0.0	0.040	6.7	LOS A	0.2	1.5	0.54	0.61	0.54	39.8
All Vehicles		974	17	1025	1.7	0.324	4.5	LOS A	2.1	14.7	0.23	0.45	0.23	45.7

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
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.

BARKER RYAN STEWART

Northern Beaches Council

Construction Traffic and Pedestrian Management Plan

North Narrabeen Surf Life Saving Club

2 Malcolm Street, Narrabeen

14 September 2023

ENGINEERING
PLANNING
SURVEYING
CERTIFICATION
PROJECT MANAGEMENT

www.brs.com.au

Project No.	230478
Author	JH
Checked	AN
Approved	AN

Rev No.	Status	Date	Comments
1	DRAFT	28/8/2023	Issued
2	Final	14/9/2023	

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Table of Contents

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Appendices

Appendix A – Site Management Plan
Appendix B – Vehicle Movement Plan (VMP)
Appendix C – Swept Path Analysis
Appendix D – Traffic Control Plans (TCP)

1 Introduction

Barker Ryan Stewart has been engaged by Northern Beaches Council to prepare a Construction Traffic Management Plan (CTMP) to detail traffic management procedures and systems for the upgrade of the existing North Narrabeen Surf Life Saving Club in accordance with the requirements of:

- Warringah Development Control Plan 2011;
- RMS's "*Traffic Control at Worksites*" document; and
- AS1742.3 2009 "*Manual of uniform traffic control devices*"

The purpose of this plan is to ensure the safe and controlled movement of traffic at the site during the demolition, excavation and building works to address potential traffic, access, car parking and pedestrian issues generated by the works.

In preparing this CTMP the following items have been considered/undertaken:

- An inspection of the site and surrounding road network to determine any constraints that may impact on the safe and controlled movement of traffic during demolition, excavation and building works.
- Determination of appropriate traffic/haul routes,
- Provision of a swept path analysis to ensure safe access/egress from the site,
- Traffic control plan (TCP) and Vehicle Movement Plan (VMP), and
- A brief outline of the demolition, excavation and building works in relation to traffic management.

2 Project Overview

2.1 Proposed Development

The site is occupied by the existing surf lifesaving club and the proposed works include the following:

- Building an extension for a new board-riders meeting room, approximately 30m2.
- Building an enclosed dining space, approx. 110m2, on the existing eastern balcony.

2.2 Project Staging

This CPTMP covers the excavation and construction of the new buildings and can be broken into the following components.

1. Minor extension for a ground floor board-riders room;
2. Internal refurbishment to existing indoor seating space; and
3. Conversion of part of the existing open balcony into an enclosed seating space and associated works.

2.3 Project Program

The project duration for the excavation and building works are outlined below.

Stage	Estimated Duration
Stage 1 – Extension of Ground Floor	4 months
Stage 2 – Internal Refurbishment and Finishing	1 month
Stage 3 – Conversion of Existing Balcony	6 months

2.4 Construction Hours

The proposed construction work hours are between 7:00AM to 5:00PM Monday to Friday and 8:00AM to 1:00PM on Saturdays. Construction work will not generally be undertaken on Sundays or public holidays; however, work may need to be undertaken in some circumstances for operational / construction related reasons. For any demolition works (noting most demolition would be minor in scale), works will take place between 8:00AM and 5:00PM Monday to Friday.

2.5 Existing Conditions

2.5.1 Site Location

The site is formally noted as 2 Malcolm Street, North Narabeen. The site is currently occupied by the existing and operational North Narabeen SLSC.

It is surrounded by the beach in the north and east and low-density residential developments in the south and west. An aerial of the site location is shown in Figure 2.1.

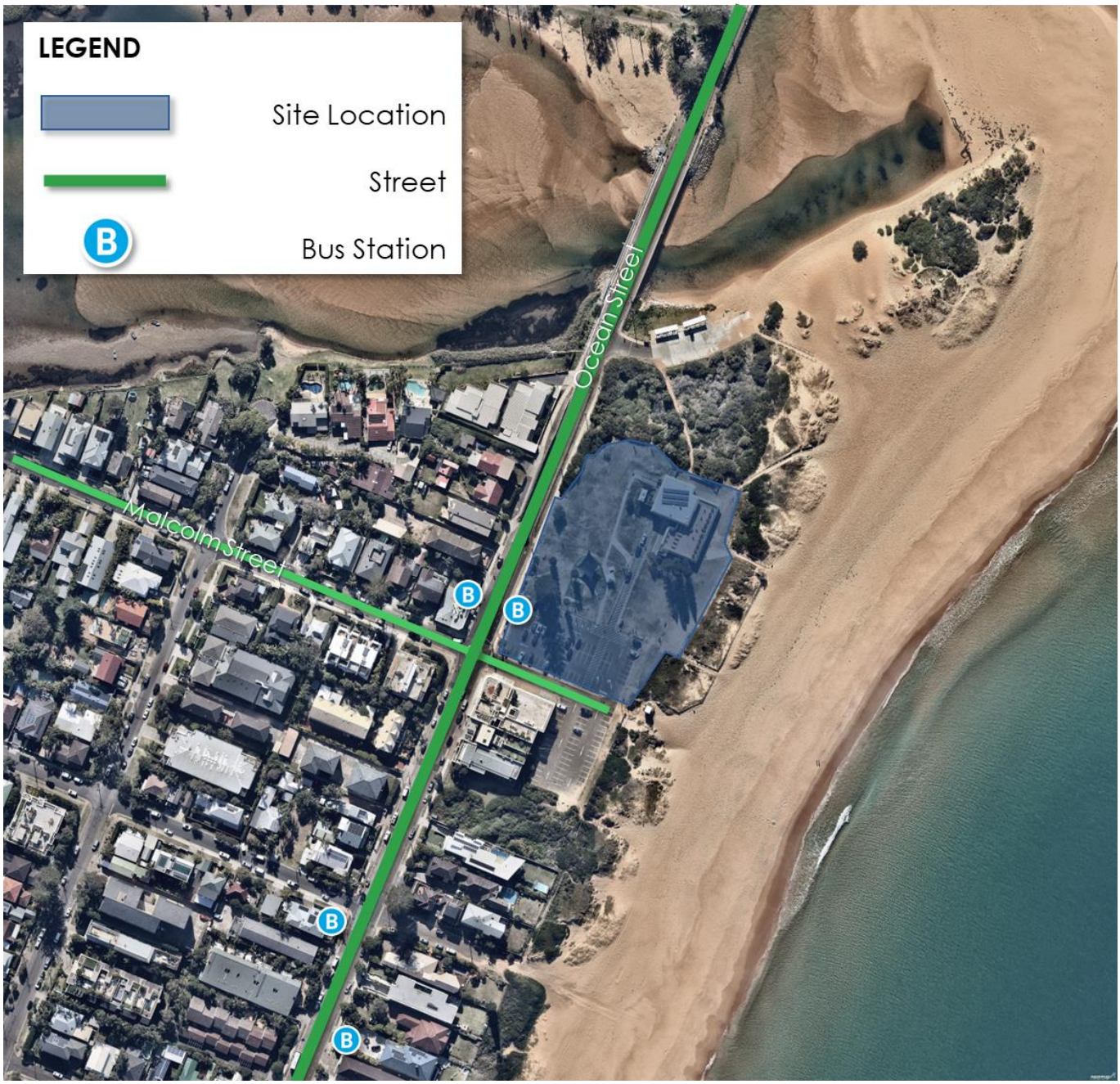

Figure 2.1: Site Location (Source: Nearmap, July 2023)

2.5.2 Existing Road Conditions

A schedule of the roads relevant to the site are outlined in Table 2.1.

Table 2.1: Schedule of Roads

Street Name	Classification	Direction	Speed Limit	No. of Lanes	Parking Permission
Ocean Street	Collector Road	N-S	50km/h	2	Not permitted
Malcolm Street	Local Road	E-W	50km/h	2	Permitted

2.5.3 Public Transport, Pedestrian and Cycling Facilities

The area is serviced with bilateral bus stops outside the site's frontage. These stops service Route 155 – Bayview Garden Village to Narrabeen every 30 minutes.

2.5.4 Pedestrian and Active Transport

Footpaths are available on both sides of Ocean Street, and on the southern side of Malcolm Street.

Bicycle facilities are provided through the site. This is shown in Figure 2.2.

Figure 2.2: Bicycle Map (Source: Northern Beaches Council, July 2023)

3 Construction Traffic Management

3.1 General

Traffic management for the site has been configured to ensure that workers can undertake construction works safely, at all times, by separating workers and public road users. Contractors are responsible for the demolition and excavation work and the building contractor is responsible for construction management and shall establish and maintain the Construction Traffic Management Plan for this project and shall be responsible for its ongoing effectiveness, including the control of all quality, environmental and safety aspects that may apply to traffic control measures.

The Traffic Control Plans (TCPs) produced as part of this CTMP shall be implemented by appropriately qualified and authorised traffic controllers only. Traffic controllers must have completed RMS (formerly RTA) accredited courses for traffic controllers and must wear yellow vest with the words Authorised Traffic Controller. Reflective white overalls with reflective bands must be worn at night.

All signs and devices shall be placed in accordance with the TCP prior to works starting and in clear view of public road users to inform and guide road users to pass the site. All devices and signs shall then be removed upon the completion of the works.

The road reserves bordering the site must not be obstructed by any materials, vehicles, refuse, skips or the like without prior approval of Council.

3.2 Potential Traffic Impacts

A summary of potential traffic impacts for the site are listed below:

- Potential impact on local commercial and residential road users.
- Construction sites within the vicinity of the site,
- Duration of the project,
- Short term activities such as floating machinery to the site,
- Access, egress and parking in and near the worksite by employees and visitors,
- Pedestrian movements,
- Heavy vehicles parking in and around worksite,
- Vehicles depositing spoil on public roads,
- Loading and unloading, including construction work zones,
- Truck/vehicle turning movements,
- Disruption of established traffic movements or patterns,
- Traffic interference in peak times (morning and afternoon),
- Interference to public transport services,
- Traffic volumes including nearby school, industrial, commercial, retail and residential developments.

3.3 Construction Site Plan

The site management plan for different stages of the construction works at **Appendix A** shows the proposed locations of trucks entry/exit, and landing platform within the site, location of other plants and equipment, material storage area and staff parking within the site.

3.4 Construction Vehicles

The vehicles shown in **Table 3.1** are likely to be required for the demolition and construction activities.

Table 3.1: Indicative construction schedule and required plant / vehicles

1. Construction Activity	2. Period	3. Frequency	4. Vehicles
Stage 1 – Extension of Ground Floor	4 - 5 months	*10 times /day maximum*	12.5m long Heavy Rigid Trucks (HRV)
Stage 2 – Internal Refurbishment and Finishing	4- 6 weeks	*10 times /day maximum*	12.5m long Heavy Rigid Trucks (HRV)
Stage 3 – Conversion of Existing Balcony	6 months	*10 times /day maximum*	12.5m long Heavy Rigid Trucks (HRV)

The type and nature of activities involved in the demolition and construction work will only generate limited vehicle movements. All removal and delivery of plant or demolished materials will be timed to occur outside of the peak traffic periods to minimise any delays in the area. No significant heavy vehicles are required for the demolition and construction works. The largest size of the construction vehicle proposed is a 12.5m HRV. However, if larger than articulated vehicles are to be used specific approval for a one-off occasion will be assessed and planned as required.

3.5 Vehicular Access

Access to the construction site for smaller vehicles, floating concrete pumps and HRVs will be via the existing access as per **Appendix C**. During construction, approximately eight car parking spaces would have to be reserved for truck turning.

3.6 Loading and Unloading Locations

Similarly, loading and unloading will occur exclusively on-site.

3.7 Vehicular Access Route

All vehicle access routes have been assessed from NSW Higher Mass Limit (HML) maps, which outlined state roads which are approved for vehicles up to 26.0m B-Doubles.

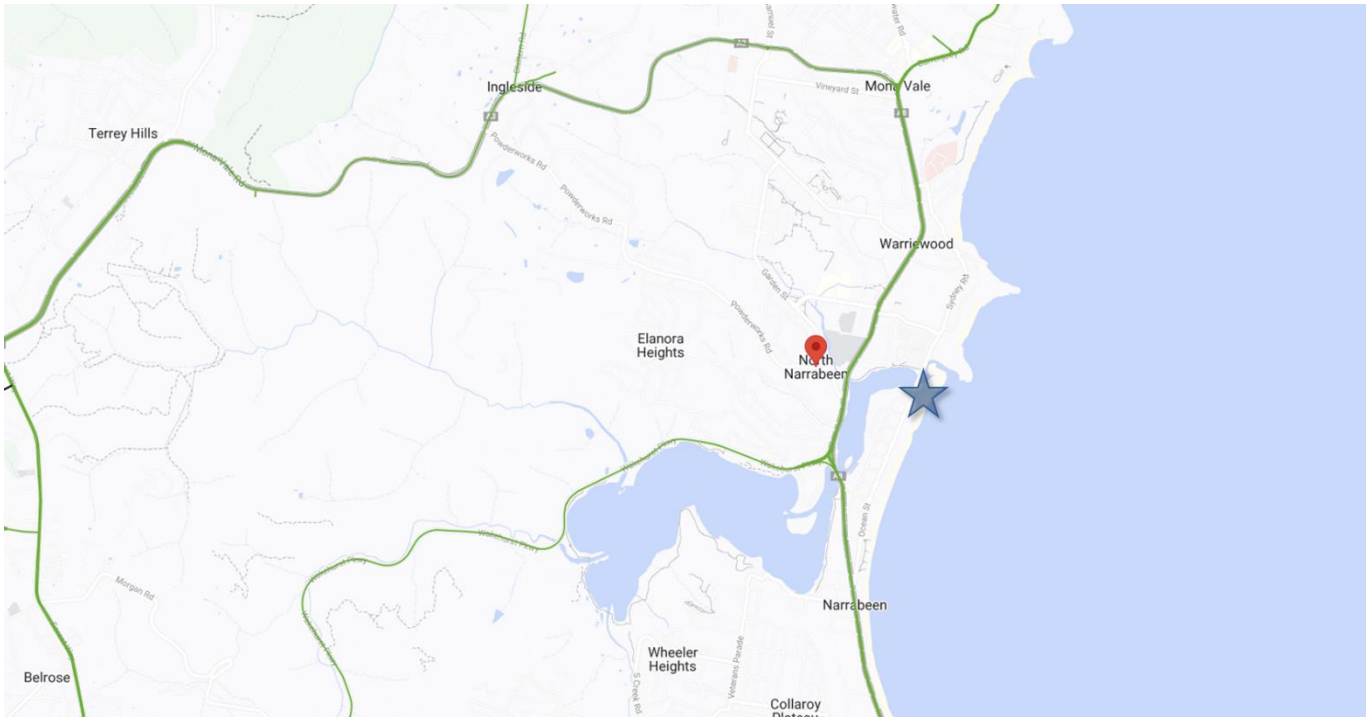

Figure 3.1: NSW HML Roads near site

A Vehicle Movement Plan (VMP) reflecting the proposed haulage routes for a 12.5m HRV is shown below and can be found in **Appendix B.**

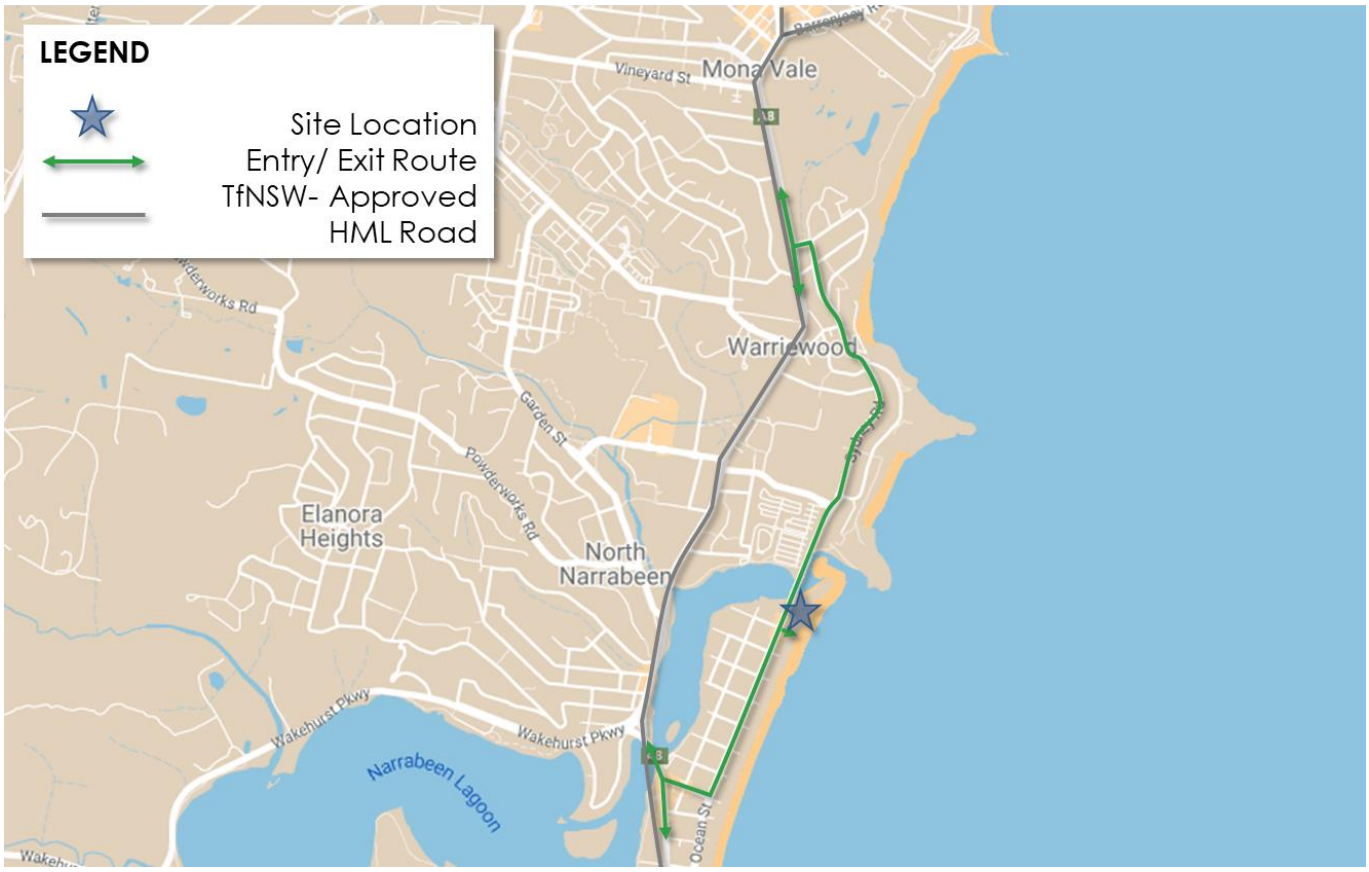

Figure 3.2:Proposed HRV Access Route

This plan shows the proposed construction vehicle routes to and from the site through the road network. The VMP shows that trucks can access the site either from the north or the south, via either Coronation Street or Waterloo Street.

For vehicles entering/ exiting from the north, the following route has been proposed:

- North Entry:
  - Turn left/ right from Pittwater Road onto Coronation Street
  - Turn right onto Melbourne Avenue, Melbourne Avenue becomes Narrabeen Park Parade,
  - Turn right onto Sydney Road, Sydney Road becomes Ocean Street
  - Turn left at the roundabout onto Malcolm Street
- North Exit:
  - Turn right from Malcolm Street onto Ocean Street
  - Ocean Street becomes Sydney Road, turn left from Sydney Road onto Narrabeen Park Parade
  - Narrabeen Park Parade becomes Melbourne Avenue, turn left onto Coronation Street
  - Turn left/ right from Coronation Street onto Pittwater Road

For vehicles entering/ exiting from the south, the following route has been proposed:

- South Entry:
  - Turn left/ right from Pittwater Road onto Waterloo Street
  - Turn left from Waterloo Steet onto Ocean Street
  - Turn right at the roundabout onto Malcolm Street
- South Exit:
  - Turn left from Malcom Street onto Ocean Street
  - Turn right from Ocean Street to Waterloo Street
  - Turn left/ right from Waterloo Street onto Pittwater Road

A swept path analysis was undertaken to check HRV's can use the proposed route. The swept path analysis is contained within **Appendix C** of this report. The swept path diagram demonstrated that HRVs could manoeuvre safely and efficiently along the proposed haulages routes without any constraints.

4 Safeguard and Mitigation Measures

4.1 Construction Work Zone

No construction/demolition activity is proposed within the road reserves surrounding the construction site. No construction works zones are required.

4.2 Traffic Control Plans

Arrangements for warning traffic and guiding traffic around and/or past the worksite are also shown in Traffic Control Plan (TCP) in **Appendix D**.

Qualified traffic controllers will be employed to guide the vehicle egress and stop pedestrians/vehicles if required as per the Traffic Control Plan (TCP) in **Appendix D**.

Pedestrians/cyclists may be held only for very short periods to ensure safety when trucks are leaving or entering BUT must NOT be stopped pedestrians in anticipation i.e. **at all times the pedestrians have right-of-way on the footpath not construction vehicles.**

Traffic Controllers are NOT to stop traffic on the public street(s) to allow trucks to enter or leave the site. They MUST wait until a suitable gap in traffic allows them to assist trucks to enter or exit the site. The Roads Act does not give any special treatment to trucks leaving a construction site - **the vehicles already on the road have right-of-way.**

In the implementation of the TCP the following steps should be undertaken:

1. Place all signs, devices and control measures,
2. Complete a Location Risk Assessment (as per Traffic Control at Work site (TCAW) manual) and identify any modifications that may be required,
3. Drive through and around the site to make sure the TCP is effective,
4. Record implementation, risk assessment and any modifications, and
5. Monitor conditions and record observations.

Where required the TCP may be changed/updated as necessary to reflect changes in traffic flow or work practices by an appropriately qualified traffic control designer only.

Minor modifications to the TCP which have been identified in a Location Risk Assessment can be made by a person with a current "*Prepare Work Zone TMP*" qualification. Should the TCP be changed all relevant permits and details are to be forwarded to the PCA/Council as required.

4.3 Construction Worker Parking Strategy

While working outside of the seasonal peak, construction workers should have no issue using the existing on-site parking. However, parking for the construction workers will be provided onsite as shown in the site management plan in **Appendix A**.

4.4 Pedestrian Separation

The site boundaries will be fenced, and the access will be gated. Noting the building is far away from the site boundary and building works are unlikely to present any disruption or danger on the boundary of the site.

4.5 Traffic Management Strategy

Table 4.1 on the following page summarises the identified potential traffic impacts for this worksite and describes the control measures to be implemented to address each impact.

It is recommended that an Emergency Plan is considered by the project manager of the site in case of emergency, including the response of traffic emergencies such as accidents or unplanned disruptions.

The local community, road users and other stakeholders shall be kept informed of changed traffic conditions where required by Council.

Seven (7) days notification must be provided to adjoining property owners prior to the implementation of any temporary traffic control measures.

Heavy vehicle movements are to be minimised during the commuter peak periods where possible to minimise potential conflicts with commuter traffic and pedestrian movement to and from the commuter car parks.

Table 4.1: Traffic Management Strategy

Potential Impact	Impact Assessment	Control Measure
Potential impact to the commercial, retail and residential developments in the vicinity of the site. **Duration of project.**	Heavy vehicle traffic movements through Ocean Street	Any potential conflicts in Ocean Street are to be minimised through provision of Traffic Controllers providing right of access to local traffic where required. Location Risk Assessments are to be undertaken to enable safe access and from the site.
Floating machinery to the site	In/out of the site.	Swept path analysis showing suitable turning movements (See Appendix C).
Construction Parking Strategy	Possible impact on residents, visitors and commercial/industrial developments in the vicinity of the site.	Parking on-site can easily be accommodated in the off-season. Eight car parking spaces need to be reserved for truck turning, but this should impose no significant effect on operation during the off-season.
Travel Management Strategy	Reduce the impact on construction parking by minimising commuter trips.	Workers will be notified of available local public transport services.
Vehicles leaving the site	Depositing spoil on roadways.	Where sediment is tracked onto the road it is to be swept up immediately.
Pedestrian management	Pedestrians walking around construction zone.	Pedestrian pathways will not be obstructed around the perimeter of the site.
Disruption of established traffic movements or patterns, Traffic interference in peak times (morning and afternoon)	Heavy vehicle traffic through the following local streets, particularly in morning and afternoon peaks with residents entering and exiting: • Coronation Street • Melbourne Avenue • Narrabeen Park Parade • Sydney Road • Ocean Street • Waterloo Street	Where possible construction vehicle movements will be kept to a minimum during local peak traffic AM/PM periods to ensure that existing traffic flows are not disrupted.

5 Impact on Traffic and Transport Operation

This section reports on the impacts of the construction activities on traffic and transport operations in the road network. As no demolition and construction works will be carried out within the road reserve, the impact on traffic flow in the surrounding road network would be minimal.

5.1 Parking

No on-street parking impact is anticipated as part of construction parking nor any works zones.

5.2 Heavy Construction Vehicles

The largest heavy vehicle proposed to be used is a 12.5m Heavy Rigid Vehicle (HRV). It is noted that no significant geometrical constraints were found at any of the proposed access or egress routes which would affect the access of heavy vehicles. Swept paths for HRVs along the proposed haulage routes can be found in **Appendix C**.

The Vehicle Movement Plan (VMP) is attached at **Appendix B** of this report. This plan shows the proposed construction vehicle routes to and from the site through the road network. The VMP shows that HRVs travelling to the site can access the site via Coronation Street, Melbourne Avenue, Narrabeen Park Parade, Sydney Road, Ocean Street and Waterloo St.

5.3 Pedestrians

Pedestrian movements fronting the construction site will not be impacted as no works are to be undertaken within the road reserve.

5.4 Cyclists

No nearby cycle paths will be impacted by the construction activity.

5.5 Emergency Services

The construction activity will have no impact on emergency vehicle routes.

5.6 Cumulative Impact on Surrounding Constriction Sites

Currently there is no other major construction sites in the vicinity of the development site. The cumulative construction activities for different stages of the development have been considered and the CTMP has addressed the worst-case scenario.

6 Monitoring and Performance

6.1 General

Regular monitoring of the performance of the Construction Pedestrian and Traffic Management Plan (CPTMP) to confirm the effectiveness of methods, equipment and controls shall be undertaken. This shall also include review of location and effectiveness of traffic management and TCP signposting. Observations shall be recorded by the supervisor/contractor's and opportunities for improvement recommended to the Project Manager.

6.2 Records

The following records shall be kept as evidence of the design, implementation and performance of the CPTMP:

1. Qualifications
   - RMS accredited Traffic Control Plan designers
   - RMS accredited Traffic Controllers

2. Principal Contractor's meetings minutes with Principal Contractor(s) from adjoining sites

3. TCP approval

4. Temporary speed zone approval (if applicable)

5. Community consultation (where required by Council) including provision of:
   - Letters
   - Handouts
   - Maps and plans

6. Location Risk assessment and any modifications

7. Confirmation of implementation and start of works

8. Monitoring reports

9. Incident reports and corrective action

7 Conclusion

This Construction Pedestrian and Traffic Management Plan (CPTMP) details traffic management procedures and systems for the proposed upgrade of the north Narrabeen Surf Life-Saving Club.

Potential traffic impacts have been identified locally with control measures specified to address these impacts.

Traffic Control Plan (TCP) has been prepared showing appropriate traffic control devices to be implemented for the duration of the proposed works.

A Vehicle Movement Plan (VMP) have been prepared showing the proposed truck haulage and delivery routes to and from the site.

A swept path analysis has been undertaken for the site and shows that Heavy Rigid Vehicles (HRV's) can safely manoeuvre in and out of the site.

This Construction Pedestrian and Traffic Management Plan has been prepared to mitigate the potential negative impacts of the proposed site works on existing properties and local streets during the excavation and construction stages of the proposal.

Appendix A – Site Management Plan

Date: 17/08/2023
Author: Abdun Noor(Safework NSW Card # TCT0000005)
Project: North Narrabeen SLSC
Client: Northern Beaches Council
SITE MANAGEMENT PLAN

SITE MANAGEMENT PLAN

BARKER RYAN STEWART
TOTAL PROJECT SOLUTIONS
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Appendix B – Vehicle Movement Plan

A3

PLAN
SCALE 1:500

5 0 5 10 15 20 25 1:500
METRES

REV	AMENDMENT	ISSUED	DATE
A	SWEPT PATH	JH	14/08/23

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Client:
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NORTH NARRABEEN SLSC
SWEPT PATHS
VEHICLE MOVEMENT PLAN
230478-TR1-06

Designed: JH
Drawn: JH
Checked: AN

Scales: Plan -
Horiz. -
Vert. -
X-Sect. -
Datum: A.H.D.

Plan No.
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Appendix C – Swept Path Analysis

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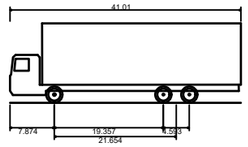
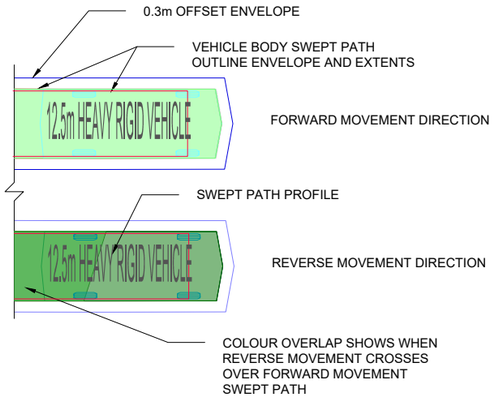


HRV - Heavy Rigid Vehicle	
Overall Length	41.010ft
Overall Width	8.202ft
Overall Body Height	14.106ft
Min Body Ground Clearance	1.369ft
Track Width	8.202ft
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	41.010ft



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REV	AMENDMENT	ISSUED	DATE
A	SWEPT PATH	JH	14/08/23

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Client:
NORTHERN BEACHES COUNCIL

NORTH NARRABEEN SLSC
SWEPT PATHS
PITTWATER RD, CORONATION ST AND MELBOURNE AVE
230478-TR1-01

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SOME MOVEMENTS REQUIRE USING THE OTHER LANE ON MALCOLM STREET, STAFF REQUIRED TO PAUSE OTHER VEHICLES AND SPOT FOR TURNING. NOTE THAT MALCOLM ST (E) IS PRIMARILY A PRIVATE SITE ACCESS

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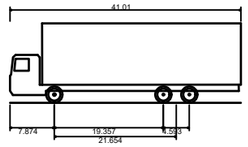

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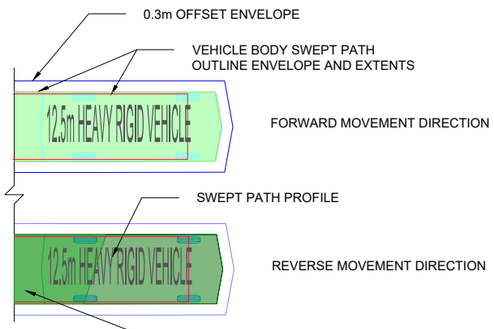

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A	SWEPT PATH	JH	14/08/23

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NORTH NARRABEEN SLSC
SWEPT PATHS
MALCOLM ST AND OCEAN ST
230478-TR1-02

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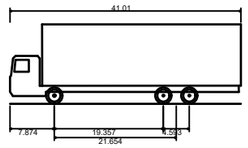

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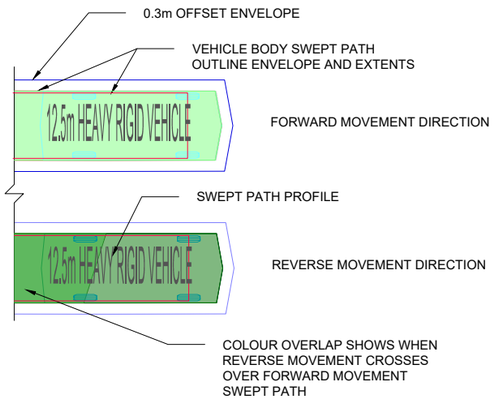

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REV	AMENDMENT	ISSUED	DATE
A	SWEPT PATH	JH	14/08/23

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NORTH NARRABEEN SLSC
SWEPT PATHS
OCEAN ST AND WATERLOO ST
230478-TR1-03

Designed: JH
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Scales: Plan -
Horiz. -
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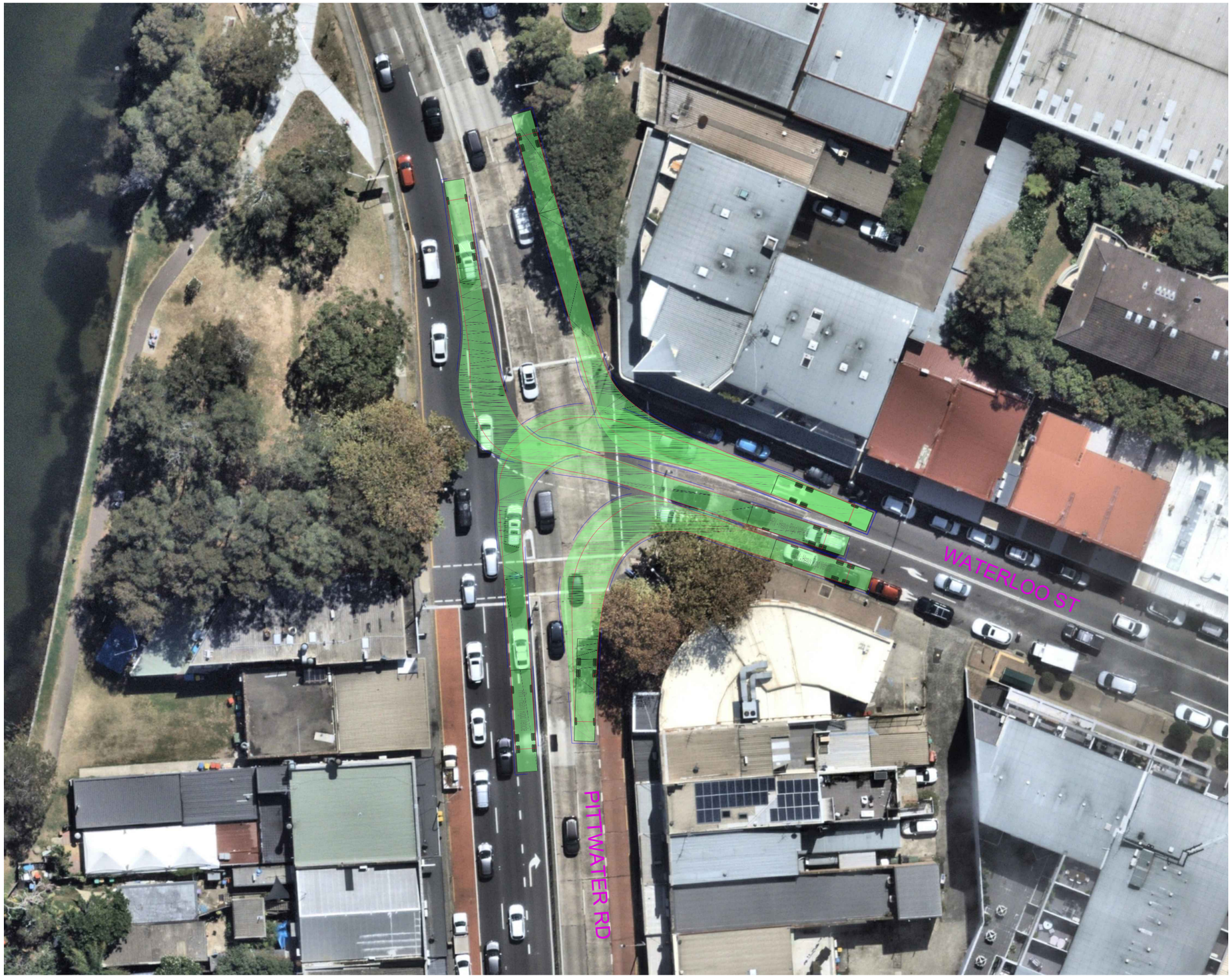

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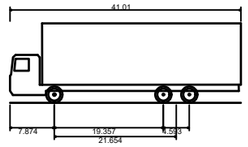

HRV - Heavy Rigid Vehicle	
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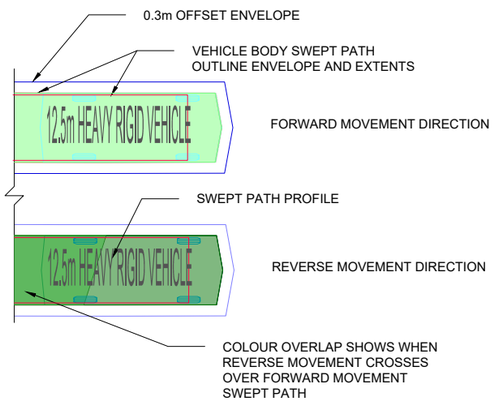

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REV	AMENDMENT	ISSUED	DATE
A	SWEPT PATH	JH	14/08/23

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NORTHERN BEACHES COUNCIL

NORTH NARRABEEN SLSC
SWEPT PATHS
PITTWATER RD AND WATERLOO ST
230478-TR1-04

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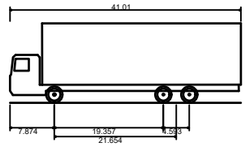
Scales: Plan -
Horiz. -
Vert. -
X-Sect. -
Datum: A.H.D.

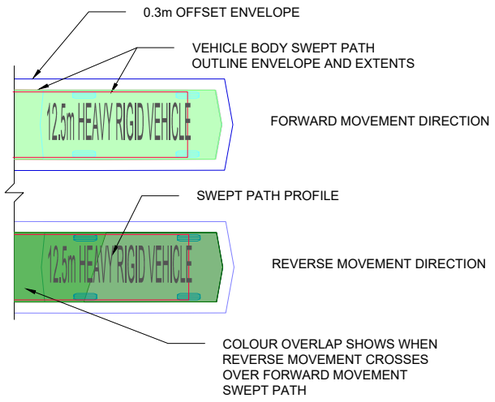
Plan No.
230478-TR1-04
File Ref. 230478
REV. A

A3

LEGEND



HRV - Heavy Rigid Vehicle	
Overall Length	41.010ft
Overall Width	8.202ft
Overall Body Height	14.106ft
Min Body Ground Clearance	1.369ft
Track Width	8.202ft
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	41.010ft



PLAN
SCALE 1:500

5 0 5 10 15 20 25
METRES
1:500

REV	AMENDMENT	ISSUED	DATE
A	SWEPT PATH	JH	14/08/23

BARKER RYAN STEWART
TOTAL PROJECT SOLUTIONS
ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9659 0005
CENTRAL COAST P: 02 4325 5255
HUNTER P: 02 4966 8388
S.E. QLD P: 07 5582 6555

www.brs.com.au
mail@brs.com.au
ABN: 26 134 067 842

Client:
NORTHERN BEACHES COUNCIL

NORTH NARRABEEN SLSC
SWEPT PATHS
SITE TURNING
230478-TR1-05

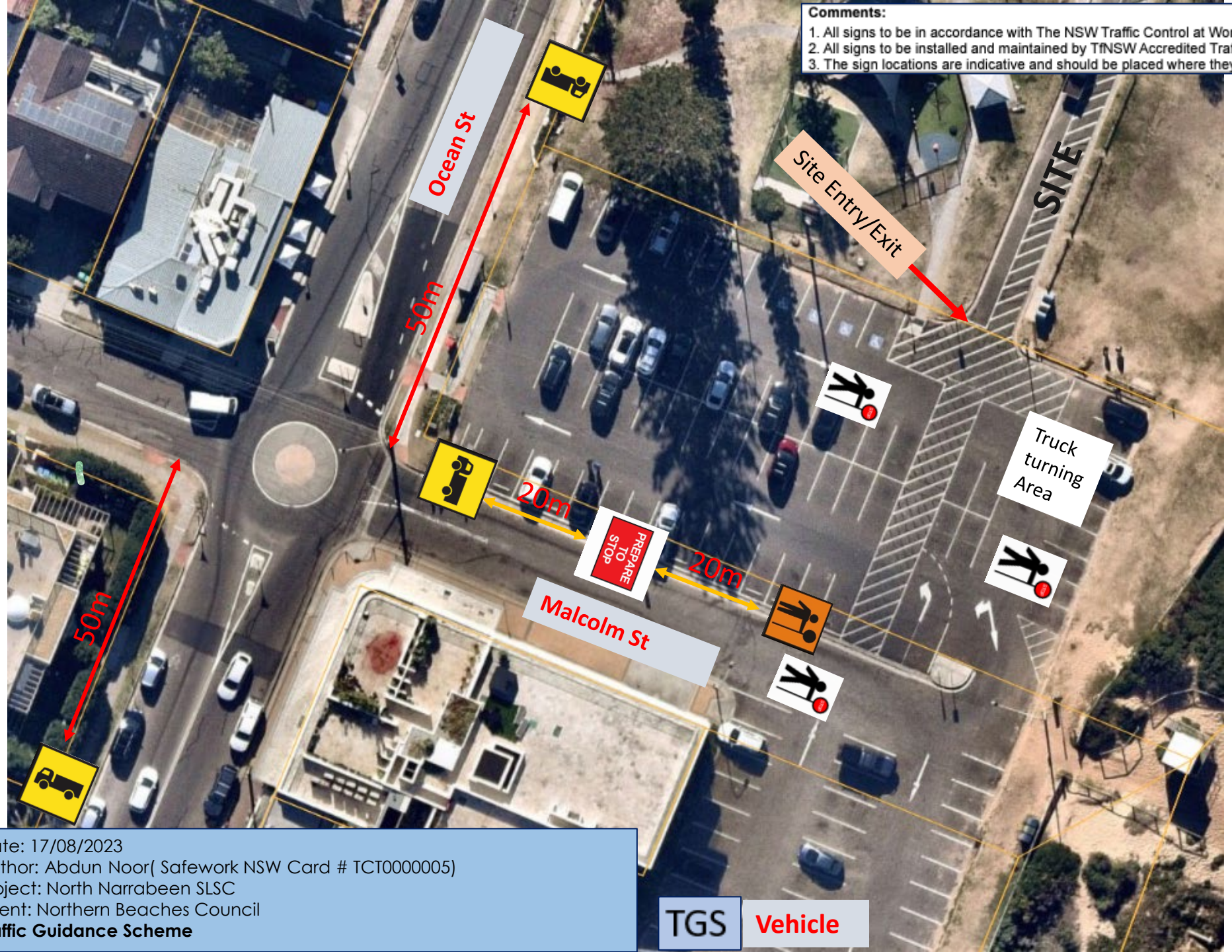
Designed: JH
Drawn: JH
Checked: AN

Scales: Plan -
Horiz. -
Vert. -
X-Sect. -

Datum: A.H.D.

Plan No.
230478-TR1-05
File Ref. 230478
REV. A

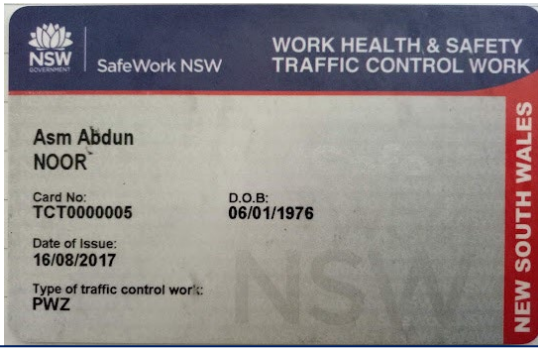
Appendix D – Traffic Control Plans (TCP)



Comments:

1. All signs to be in accordance with The NSW Traffic Control at Worksites Manual 2018 and AS1742.3
2. All signs to be installed and maintained by TfNSW Accredited Traffic Controllers.
3. The sign locations are indicative and should be placed where they are neither obstructed by other signs nor obstructing other signs.

2. TRAFFIC CONTROLLERS ARE REQUIRED TO MANAGE TRUCK MOVEMENTS AND PEDESTRIANS AT THE SITE ENTRY / EXIT



Date: 17/08/2023
Author: Abdun Noor(Safework NSW Card # TCT0000005)
Project: North Narrabeen SLSC
Client: Northern Beaches Council
Traffic Guidance Scheme

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Appendix E

Section J Report

SECTION J ENERGY EFFICIENCY REPORT

PROJECT NAME: North Narrabeen SLSC Alterations and additions

ADDRESS: 225-229 Ocean Street Narrabeen. NSW 2101

CLIENT: Northern Beaches Council

DOCUMENT CONTROL

PREPARED BY:	Tom Chen
CHECKED BY:	Vivian Truong
ISSUE:	FINAL
REVISION:	2
DATE:	14/11/2023

DTS ENERGY EFFICIENCY DECLARATION

Pursuant to NCC A2.2 (vi) this report relies on supplied documentation for assessment with regards to adopting measures contributing to deemed-to-satisfy of designed and built deliverables. This report documents the energy efficiency assessment undertaken on the proposed building work described herein to confirm compliance with the Section J – Energy Efficiency Provisions of the National Construction Code Volume One – Class 2 to Class 9 Buildings. It is our opinion that this project can be constructed to satisfy the requirements of the National Construction Code.

ABN: 95 164 564 210
Association of Building Sustainability Assessors (ABSA) No. 100765

CERTIFIED ENERGY

Table of Contents

1 - Introduction

The term Proposed alteration and additions in this report refers to North Narrabeen SLSC located at 222-229 Ocean Street, Narrabeen, NSW.

This report presents the findings from the design assessment of the Proposed Development against the Deemed-to-Satisfy (DTS) requirements of Section J of the Building Code of Australia 2022 –Volume 1, Energy efficiency.

The purpose of this report is to provide an assessment of the design plans and documentation for the Proposed Development and to satisfy the requirements of Local Government Area of the development for issuance of Construction Certificate for construction operations in the development site.

The scope of this report is limited to the design documentation referenced in Section 2 of this report and only covers Section J of BCA 2022 – V1 provisions.

2 - Referenced Documents

The following documents and design plans have been referenced in compilation of this report:

1. National Construction Code Series, Volume 1, Building Code of Australia 2022 – Class 2 to Class 9 Buildings.

2. Architectural Plans listed below provided by “Building Assets-Planning Design and Delivery Northern Beaches Council” and received by Certified Energy at 14/11/2023.
    - DA00C - Cover, Issue D – 23/Nov
    - DA01C – Site plan, Issue D – 23/Nov
    - DA02C - Ground Floor plan, Issue D – 23/Nov
    - DA03C – First floor plan, Issue D – 23/Nov
    - DA 04C - Roof plan, Issue D – 23/Nov
    - DA05C – Elevations, Issue D – 23/Nov
    - DA06C – Elevations, Issue D – 23/Nov
    - DA07C – Sections, Issue D – 23/Nov
    - DA08C – Sections, Issue D – 23/Nov
    - DAS01C Survey plan, Issue D – 23/Nov

3. Email correspondence and response to information request received from the architects of the Proposed Development.

3 – Proposed Development

The Proposed Development in this report comprise of alteration and Additions to a Class 9b located at 225-229 Ocean Street Narrabeen, NSW. The development is a class 9b building in BCA Climate Zone 5 according to BCA Climate Map for Sydney Surrounds.

The following construction elements are being proposed in the building design according to architectural plans and design documents referenced in this report:

Roof and Ceiling: Concrete slab and suspended ceiling. Metal roofing.

External Walls: Cavity Brick wall and rendered block work.

Internal Walls: Plasterboard on metal stud.

Floors: Suspended concrete slab.

Windows: Standard Aluminium framed windows.

Skylights: No skylights.

Air Conditioning System: No design plans provided.

Lighting System: Lighting layout has been provided in board meeting room (G Floor).

4 - Scope of Report (Building Envelope)

"**Envelope**", for the purposes of Section J, means the parts of the buildings fabric that separate a conditioned space or habitable room from-

- the exterior of the building; or
- a non-conditioned space including-
  - (i) the floor of a rooftop plant room, lift-machine room or the like; and
  - (ii) the floor above a carpark or warehouse; and
  - (iii) the common wall with a carpark, warehouse or the like.

Legend: Building Envelope and scope of this report

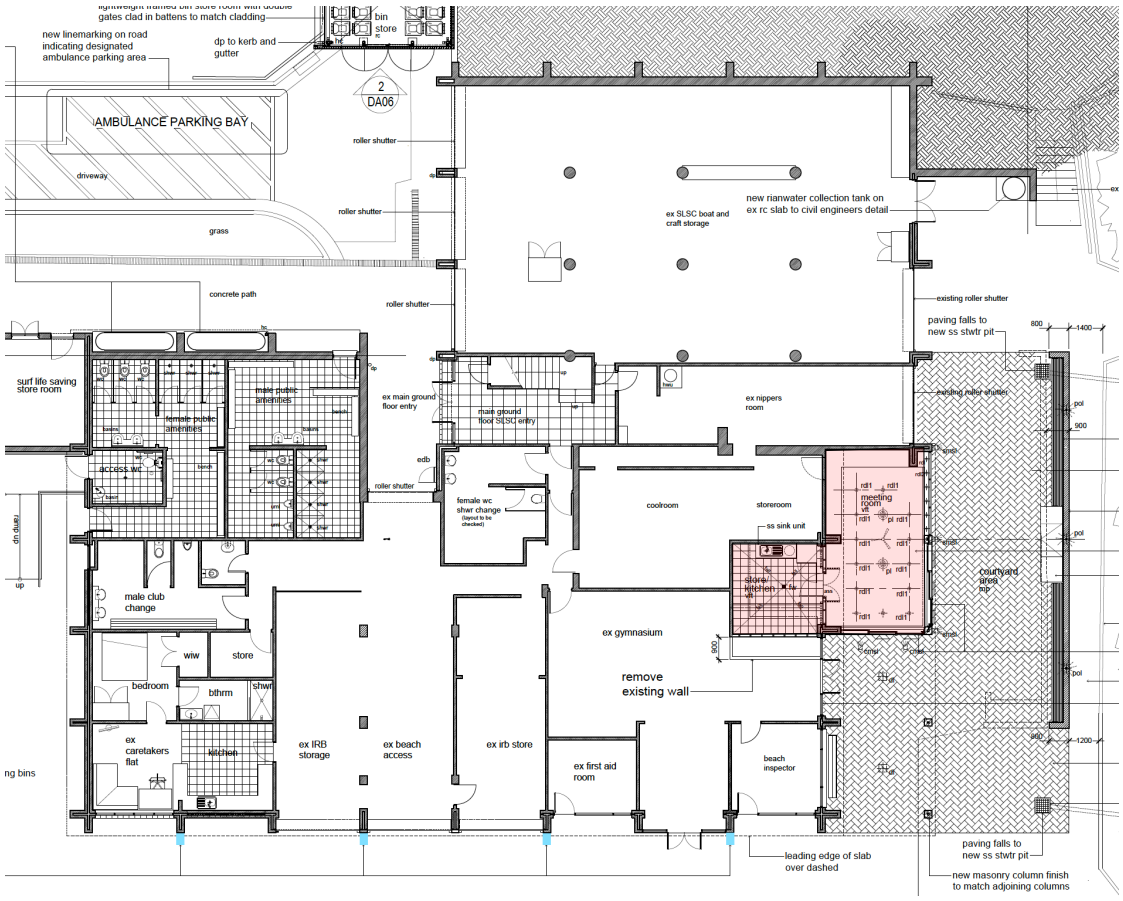


Figure 1 – Building Envelope - Ground Floor

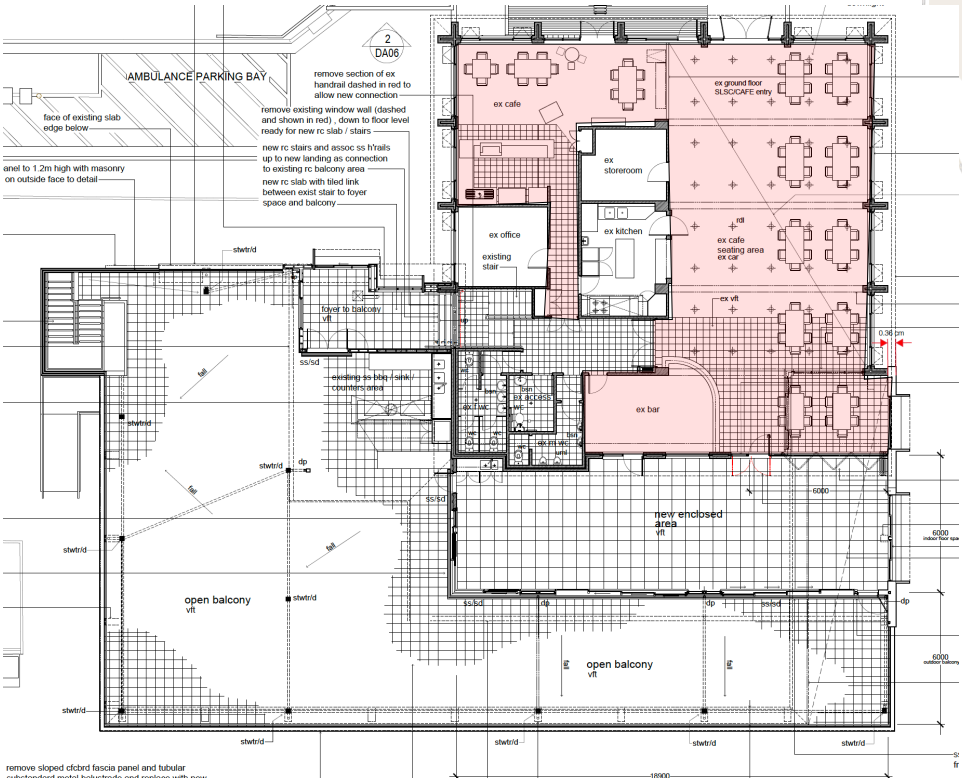


Figure 2 – Building Envelope - First Floor

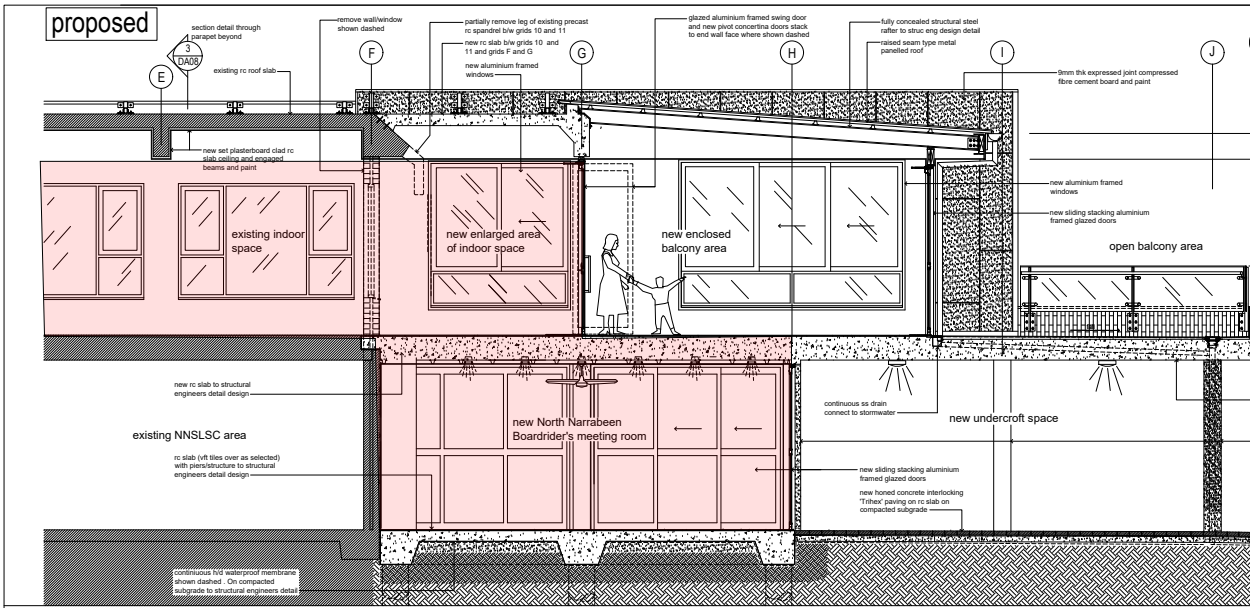
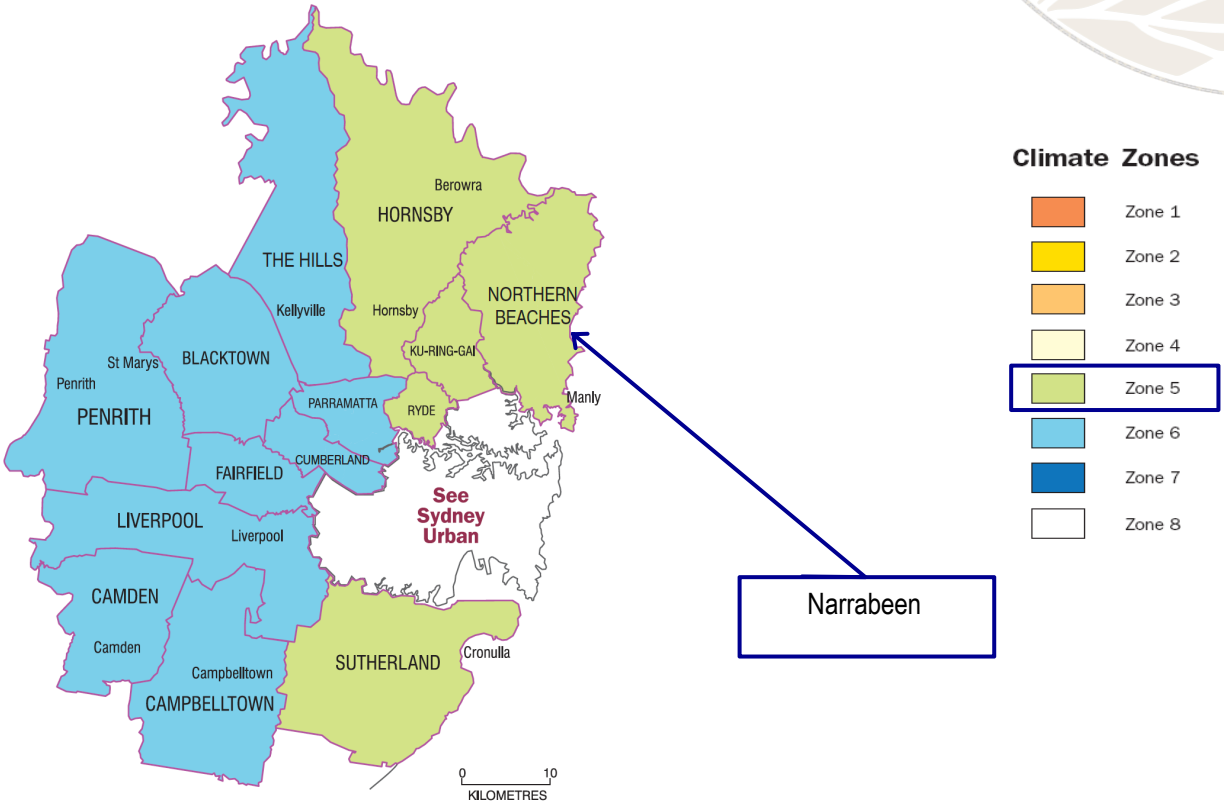


Figure 3 – Building Envelope - Sections

5 - Project Classification and Climate Zone

BUILDING CLASS 9b



CLIMATE	COLOUR	SUBURB
ZONE 5	LIGHT GREEN	NARRABEEN

Climate Characteristics of Zone 5

Warm Temperate

- Moderate diurnal (day-night) temperature range near coast to high diurnal range inland
- Four distinct seasons: summer and winter can exceed human comfort range, spring and autumn are ideal for human comfort
- Mild winters with low humidity
- Hot to very hot summers with low to moderate humidity
- Widely variable solar access and cooling breeze directions and patterns

Key Design Objectives

Minimising heating and cooling energy use should be a primary design objective

6 - NCC Section J Compliance Provisions

This section analyses the current elements of the of Proposed Development design against provisions of Section J of the Building Code of Australia 2022 –Volume 1, Energy Efficiency. In case of a non-complying element, advisory notes are provided to bring the building in compliance with Section J requirements.

A summary note of these provisions is provided in **Section 7-Conclusions** of this report that can be incorporated into specification blocks of architectural plans and, as a result, be deployed during construction. It is however the responsibility of the entity responsible for the submission of the design plans and documents to the council to ascertain each and every element of this report is clearly referenced and reflected on the submitted plans and documents.

6.1 – Part J1 Energy Efficiency Performance Requirements

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	Renewable energy and electric vehicle charging	The proposed building must have features that facilitate the future installation of on-site renewable energy generation and storage and electric vehicle charging equipment.	J1P4

6.2 – Part J4 Building Fabric

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
J4D4 Roof and ceiling construction			
1	Metal cladding roof and plasterboard ceiling of the Proposed Development	Install minimum R2.67 m^2.K/W insulation OR Provide a roof and ceiling system with total performance of R3.7 m^2.K/W	Part J4D4(1) and Material Properties from Specification - J1.2
2		The solar absorptance of the upper surface of the roof should not exceed 0.45	Part J4D4(2)
J4D6 Walls and Glazing			
3	External concrete block wall of the Proposed Development	Install minimum R2.82m^2.K/W insulation and Thermal break tape over metal studs OR Provide a wall-glazing construction system that not exceed the U-value of U2.0 W/ m^2.K	Part J4D6a, Façade Calculator and Material Properties from Specification - J1.2

5	External cavity brick wall of the Proposed Development	Install minimum R2.82m^2.K/W insulation and Thermal break tape over metal studs OR Provide a wall-glazing construction system that not exceed the U-value of U2.0 W/ m^2.K	Part J4D6a, Façade Calculator and Material Properties from Specification - J1.2
6	Plasterboard on metal stud internal walls adjacent to unconditioned spaces	Install minimum R1.3m^2.K/W insulation Thermal break tape over metal studs OR provide an internal wall system with total performance of R1.4 m^2.K/W.	Part J4D6a, Façade Calculator and Material Properties from Specification - J1.2
7	All new windows	Install windows with Total System U-value no more than 4.6 W/m^2.K and SHGC no more than 0.80 check J4D6(7)	Part J4D6a, Façade Calculator
J4D7 Floors			
8	Suspended concrete slab of first floor conditioned areas on top of new undercroft areas.	Install minimum R1.5 m^2.K/W insulation or provide a suspended slab system with total performance of R2.0 m^2.K/W.	Part J4D7(1) and Table J4D7 considering the material properties from specification - J1.2 & J1.6 Figure 2(c)
9	Concrete slab on ground (meeting room)	Install minimum R1.5 m^2.K/W insulation or provide a suspended slab system with total performance of R2.0 m^2.K/W.	Part J1.6(a)(i) and Table J1.6 considering the material properties from specification - J1.2 & J1.6 Figure 2(c)

6.2.1 – Building Fabric Breakdown

	Metal Roof (Enclosed Area)	R value [m^{2}K/W]
1	Outdoor air film (7m/s)	0.03
2	Metal roof	0.00
3	Roof airspace	0.28
4	Bulk insulation	-
5	Plasterboard gypsum (10mm, 880kg/m^3)	0.06
6	Indoor air film	0.15
	Default System R value	**R0.52**
	Total system R value required	R3.7
	Additional insulation required for compliance	**R3.18**

	Suspended Concrete Roof (Seating Area)	R value [m2K/W]
1	Outdoor air film (7m/s)	0.03
2	Concrete	0.23/1.44=1.59
3	Roof airspace	0.28
4	Bulk insulation	-
5	Plasterboard gypsum (10mm, 880kg/m3)	0.06
6	Indoor air film	0.15

	Default System R value	**R2.11**
	Total system R value required	R3.7
	Additional insulation required for compliance	**R1.59**

	Cavity Brick Wall (Meeting Room +First floor N Ele)	R value [m^2K/W]
1	Outdoor air film (7m/s)	0.03
2	Cement render (10 mm)	0.01/0.53=0.01
3	Brick (110 mm)	0.78/0.11=0.14
4	Bulk insulation	-
5	Air gap (40 mm)	0.16
6	Cement render (10 mm)	0.01
7	Indoor air film	0.12
	Default System R value	**R0.47**
	Total system R value required (with factored thermal bridging)	R1.4
	Additional insulation required for compliance (with factored thermal bridging) *	**R0.93 + EPS Thermal break tapes over metal studs**

	Concrete Block Walls (Enclosed Area South Ele)	R value [m^2K/W]
1	Indoor air film (7m/s)	0.12
2	Fibre-cement (6mm)	0.03
3	Airspace (20 to 40mm)	0.17
4	Brick Work (110 mm)	0.14
5	Bulk insulation	-
6	Plasterboard gypsum (10mm, 880kg/m^3)	0.06
7	Indoor air film	0.12
	Default System R value	**R0.64**
	Total system R value required (with factored thermal bridging)	R1.40
	Additional insulation required for compliance (with factored thermal bridging) *	**R0.76 + EPS Thermal break tapes over metal studs**

	Suspended Concrete Slab (Seating Area)	R value [m^2K/W]
1	Indoor air film	0.11
2	Concrete floor slab (470mm)	0.47/1.44=0.32
3	Bulk insulation	-
4	Outdoor air film (3 m/s)	0.04
	Default System R value	**R0.47**
	Total system R value required	R2.0
	Additional insulation required for compliance	**R1.53**

	Concrete Slab on Ground (Seating Area)	R value [m^2K/W]
1	Indoor air film	0.11
2	Concrete floor slab (150mm)	0.08
3	Bulk insulation	-
4	Ground thermal resistance	0.09
	Default System R value	**R1.09**
	Total system R value required	R2.0
	Additional insulation required for compliance	**R0.91**

6.3 – Part J5 Building Sealing

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
3	Each edge of a door, all openable windows, or the like forming part of the envelope of a conditioned space	Provide air seals on all edges or provide doors and windows complying with AS2047 for the Proposed Development except for fire doors, smoke doors, roller shutter doors roller shutter grille or other security door or device installed only for out-of-hours security The bottom seals to doors are to be a draft protection device and all other edges to be of foam or rubber compression strip, fibrous, or similar material.	Part J5D5(1)(2)(3)
4	Entry doors to the building which leads to conditioned spaces greater than $50m^2$	Provide self-closing mechanism, revolving door or similar system other than where a café, restaurant, open front shop or the like has a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and at all other entrances to the café, restaurant, open front shop or the like, self-closing doors	Part J5D5(4)

5	Exhaust fans of the conditioned areas of the Proposed Development if any	Must be equipped with a self-closing damper or similar	Part J5D6
6	Roofs, ceilings, walls, floors, windows frame, door frame and roof light frame of the conditioned areas of the Proposed Development	Must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions OR be sealed by caulking, skirting, architraves, cornices or similar elements unless required for smoke hazard management	Part J5D7
7	Evaporative coolers	All evaporative coolers serving heated space or, habitable room/public area in climate zones 4 to 8, must be fitted with a self-closing damper or the like	Part J5D8

6.4 – Part J6 Air-Conditioning and Ventilation Systems

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
Air Conditioning Systems			
1	Control	All air conditioning systems must be capable of being deactivated when the air-conditioned space is not occupied.	Part J6D3(1)a
2	Zoning	All air conditioning units serve multiple zones, then each zone temperature should be thermostatically controlled. Zone temperature cannot be controlled by mixing actively heated and cooled air. If the zone needs reheating, for a fixed supply air rate, limit the reheating to not more than 7.5K rise in temperature and for a variable supply air rate, limit rise in temperature to not more than 7.5K at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased.	Part J6D3(1)b
3	Economy Cycle	All air conditioning systems with required mechanical ventilation except climate zone 1will be required to have outdoor economy cycle fitted.	Part J6D3(1)c
4	Water Flow Control	If the air-conditioning system has more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating.	Part J6D3(1)d
5	Variable Fan Loads	When the supply air quantity is capable of being varied or with an airflow of more than 1000L/s, must provide a variable speed fan.	Part J6D3(1)e
6	Control systems	The air-conditioning system must have an ability to use direct signals from the control components responsible for the delivery of comfort conditions in the building to regulate the operations of central plant and must have a control dead band of not less than 2 degree C, except where a smaller range is required for specialised applications	Part J6D3(1)gh
7	Dampers & Valves	The air-conditioning system must be provided with balancing dampers and balancing valves that ensure the maximum design air or fluid flow is	Part J6D3(1)i

		achieved but not exceeded by more than 15% above design at each component or group components operating under a common control	
8	Control	Must ensure that each independently operating space of more than 1000 sq.m and every separate floor of the building has provision to terminate airflow independently of the remainder of the system sufficient to allow foe different operating times.	Part J6D3(1)j
9	Control	Must have automatic variable temperature operation of heated and chilled water circuits	Part J6D3(1)k
10	Outside & Return Air Dampers	Motorised outside air and return air dampers should be closed when the air conditioning system is deactivated.	Part J6D3(1)l
11	Control	When two or more air-conditioning systems serve the same space, they must use control sequences that prevent the systems from operating in opposing heating and cooling modes	Part J6D3(2)
12	Time Switches	An air-conditioning system of more than 2 kWr and heater of more than 1kW used for air-conditioning must provide a time switch complying with Part J6D3(3)c.	Part J6D3(3)
13	Fans and Duct Systems	Fans, ductwork and duct components that forms part of an air-conditioning systems or mechanical ventilation system must – i. Separately comply with J6D5(2), (3), (4) and (5); or Achieve a fan motor input power per unit to flowrate lower than the fan motor input power per unit of flowrate achieved when applying J6D5(2), (3), (4) and (5) together.	Part J6D5
14	Pump Systems	All pumps and pipework that form part of an air-conditioning system must either I. Separately comply with (2), (3), (4); or Achieve a pump motor power per unit of flowrate lower than the pump motor power per unit of flowrate achieved when applying (2), (3) and (4) together.	Part J6D8
15	Insulations	Duct work insulation specification to be in accordance with Part J6D6 (1), (2), (3), & (4). Piping, vessels, heat exchangers & tanks that contain cool or heat fluid must meet MEPS rating or insulate in accordance with Part J6D9 (1), (2), (3), (4), & (5).	Part J6D6 & Part J6D9
16	Heat rejection equipment	a. The motor rated power of a fan in a cooling tower, closed circuit cooler or evaporative condenser must not exceed the allowances in Table J6D13 b. The fan in an air-cooled condenser must have a motor rated power of not more than 42 W for each kW of heat rejected from the refrigerant, when determined in accordance with AHRI 460 except for – I. A refrigerant chiller in an air-conditioning system that	Part J6D13

		complies with the EER in Part J6D11; or Packaged air-conditioners, split systems and VRF air-conditioning equipment that complies with the EER in Part J6D12.	
17	Space Heating	Heater of an air-conditioning system must comply with Part J6D10.	Part J6D10
18	Energy Efficiency Ratios	Water or Air cooled refrigerant chiller must comply with MEPS and full load operation EER and part load EER in Table J6D11a or Table J6D11b when determined in accordance with AHRI 551/591 Unitary, Package *air-conditioning, split systems, and VRF systems* with MEPS a capacity of 65 kWr, must have a minimum Cooling COP of • 4.0 for water cooled when tested in accordance with AS/NZS 3823.1.2 at test condition T1. 2.9 for air-cooled when tested in accordance with AS/NZS 3823.1.2 at test condition T1.	Part J6D11 & Part J6D12
Mechanical Ventilation Systems			
18	Controls	The Ventilation Systems are to be capable of being deactivated when the building is not occupied.	Part J6D4(1)
19	Controls	When the air flow rate is more than 1000 L/s, and variable demand, must capable of stopping the motor when the system is not needed and fan to be variable speed.	Part J6D4(2)
20	Carpark exhaust	Must be in accordance with 4.11.2 of AS 1668.2; or 4.11.3 of AS 1668.2	Part J6D4(3)
21	Time switches	Time switch complying must be provided to a mechanical ventilation system with an air flow rate of more than 1000 L/s	Part J6D4(4)

6.5 – Part J7 Artificial Lighting and Power

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	Lighting electrical power of the Proposed Development	Maximum design power allowed is 5677 Watts	Part J7D3(2)
2	Artificial light switch or other lighting control devices of Proposed Development	Artificial lighting of a room or space must be individually operated by a switch or other control device. An artificial lighting switch must be located in a visible position. Light switch or control device must control lighting of no more than 250 m^2 of area.	Part J7D4(3)(b)(ii)
3	Windows display lighting if installed	Must be controlled separately from other display lighting.	Part J7D5(2)
4	External lighting of the Proposed Development if installed	Must be controlled by either a daylight sensor or a time switch which is capable of being pre-programmed for different times of the day on variable days.	Part J7D6(1)a
5	If the total perimeter lighting load of the Proposed Development exceeds 100 Watts	Use LED luminaires for 90% of the total lighting load or control with a motion detector device in accordance with Specification 40 except when providing emergency lighting in accordance with Part E4	Part J7D6(1)b
6	Façade lighting or signage lighting of the Proposed Development if installed	Must be provided with a separate time switch in accordance with Specification 40.	Part J7D6(1)(b)(iii)
7	Lifts	Lifts must be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 mins; and achieve the idle and standby energy performance level in Table J7D8a and achieve the energy efficiency class in Table J7D8b	Part J7D8
8	Escalators and moving walkways	Escalators and moving walkways must have the ability to slow to between 0.2 m/s and 0.5 m/s when unused for more than 15 minutes	Part J7D9

6.6 – Part J8 Heated Water Supply and Swimming Pool and Spa Pool Plant

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	Hot water supply of the Proposed Development	Must be designed and installed in accordance with Part B2 of NCC Volume Three- Plumbing Code of Australia	Part J8D2

6.7 – Part J9 Energy Monitoring and On-site Distributed Energy Resources

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	For the Proposed Development with a floor area of more than 500 m^2	Provide facilities to record gas and electricity consumption	Part J9D3(1)
	Carparks of a Class, 9 buildings	Each storey of the carpark must be provided with electrical distribution boards dedicated to electric vehicle charging in accordance with Table J9D4. These must also be labelled to indicate use for electric vehicle charging.	Part J9D4(1)
	Electric distribution boards serving electric vehicles	Must be fitted with a charging control system that can manage and schedule charging of vehicles in response to total building demand. For Class 5 to 9 buildings: Each circuit should support an electric vehicle charger able to deliver 12 kWh minimum from 9:00am to 5:00pm daily. Must be sized to support future installation of 7 kW (32 A) type 2 electric vehicle charger in 20% of car parking spaces (class 3, 7b, 8, 9)	Part J9D4(2)

	Solar and battery facilities	At least 20% of the building roof area must be left clear for the installation of solar photovoltaic panels.	Part J9D5
	Solar and battery facilities	The above condition is not applicable if: (i) Solar photovoltaic panels are installed on at least 20% of the roof area; or (ii) There is equivalent generation capacity elsewhere on-site; or (iii) 100% of the roof area is shaded for more than 70% of daylight hours; or (iv) Roof area is less than $55m^2$; or (v) More than 50% of roof area is used as a terrace, carpark, roof garden, roof light or similar	Part J9D5(2)

7 - Conclusions

Considering the design elements nominated on the Proposed Development provided by Northern Beaches Council, the following can be concluded for the Proposed Development to meet the Deemed to Satisfy requirements of Section J of the Building Code of Australia 2022 –Volume 1, Energy Efficiency;

Part J1 – Energy Efficiency Performance Requirements

» The proposed building must have features that facilitate the future installation of on-site renewable energy generation and storage and electric vehicle charging equipment.

Part J4 – Building Fabric:

Roof & Ceiling:

» Install minimum R1.59 m^2.K/W insulation or provide a ceiling and roof system with total performance of R3.2 m^2.k/w for the suspended concrete roof over new seating area of Proposed Development on top of conditioned areas.

» All the upper surfaces of the roof should not exceed the solar absorptance of 0.45.

Walls:

» Install minimum R0.93 m^2.K/W insulation and thermal break tape over metal studs OR Provide an external cavity brick wall system with total performance of R1.4 m^2.K/W

» Install minimum R0.76 m^2.K/W insulation and thermal break tape over metal studs OR Provide an external concrete block wall system with total performance of R1.4 m^2.K/W

Glazing:

» Provide the following minimum performance requirements for doors & windows of conditioned areas, adjacent to unconditioned spaces.

- All new windows; Install windows with Total System U-value no more than 4.6 W/m2.K and SHGC no more than 0.80

Flooring:

» Install minimum R1.53 m2.K/W insulation OR provide a suspended concrete slab on first floor system with total performance of R2.0 m2.K/W.

» Install minimum R0.91 m2.K/W insulation OR provide a concrete on slab on ground floor system with total performance of R2.0 m2.K/W.

Insulations:

» Installed insulation must comply with AS/NZS 4859.1 and be installed in such a way to meet the following requirements:

- The insulation must abut or overlap adjoining insulation other than at supporting members such as studs, noggins, joists, furring channels and the like where the insulation must be against the member.
- The installed insulation must form a continuous barrier with ceiling, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier while does not affect the safe and effective operation of a service or fitting.

- The bulk insulation must maintain its position and thickness other than when it is compressed between cladding and supporting members, water pipes, electrical cabling or the like.
- Reflective insulation must be installed with the necessary airspace to achieve the required R Value and be adequately supported by framing members. Each adjoining sheet of role membrane must be overlapped by not less than 50mm or tapped together. It must be closely fitted against any penetration, door or window opening.

Part J5 – Building Sealing:

» Provide air seals on all edges or provide windows complying with AS 2047 for all external doors and openable windows of the Proposed Development servicing conditioned areas except fire doors, smoke doors, roller shutter doors roller shutter grille or other security door or device installed only for out-of-hours security.

» Provide self-closing mechanism, revolving door or similar system to conditioned spaces greater than 50m^2 other than where a café, restaurant, open front shop or the like has a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.

» Exhaust fans of the Proposed Development serving conditioned areas must be equipped with a self-closing damper or similar.

» Roofs, ceilings, walls, floors, windows frame, door frame and roof light frame of conditioned areas of the Proposed Development must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions OR be sealed by caulking, skirting, architraves, cornices or similar elements unless required for smoke hazard management.

» Air infiltration seal for bottom edge of external swing doors of the Proposed Development must be a draft protection device and for other edges of an external door or the edges of an openable window or other such openings may be a foam or rubber compression strip, fibrous seal or the like.

» All evaporative coolers serving heated space or, habitable room/public area in climate zones 4 to 8, must be fitted with a self-closing damper or the like.

Part J6 – Air Conditioning & Ventilation:

» All Air Conditioning units and Ventilation Systems are to be capable of being deactivated when the space is not occupied.

» All air conditioning units serves multiple zones, then each zone temperature should be thermostatically controlled. If the zone needs reheating, then limit the reheating to not more than 7.5K to the air conditioning supply air. Zone temperature cannot be controlled by mixing actively heated and cooled air.

» All air conditioning systems which provides required mechanical ventilation will be required to have economy cycle fitted (Climate Zone 2 - 8).

» When the supply air quantity is capable of being varied, must provide a variable speed fan.

» All air-conditioning systems having more than one water heater, chiller or coil must be capable of stopping the flow of water to those not operating.

» Motorised outside air and return air dampers should be closed when the air conditioning system is deactivated.

» Air-conditioning systems must have the ability to use direct signals from the control components responsible for the delivery of comfort conditions in the building to regulate the operation of central plant; and must have a control dead band of not less than 2-degree C.

» Balancing dampers and valves must be provided that ensures the maximum design air or

fluid flow is achieved but not exceeded by more than 15% above design at each component or group of components.

- Must ensure that it independently operates for space more than 1000 sq.m and every separate floor of the building.
- Pump systems must comply with Part J6D8.
- Insulation specification for duct work and fittings in air-conditioning system to be in accordance with J6D6.
- An air-conditioning system of more than 2 kWr and heater of 1kW must provide a time switch. Refer to Part J6D3(3)
- Heater of an air-conditioning system must comply with Part J6D10.
- Minimum Energy Efficiency Ratio or EER must be as per J6D11.
- Mechanical ventilation systems that are to be capable of being deactivated when the building is not occupied.
- Time switch must be provided to control a mechanical ventilation system with an air flow rate of more than 1000 L/s.
- Miscellaneous Exhaust Systems with air flow rate is more than 1000 L/s, and variable demand, must capable of stopping the motor when the system is not needed and fan to be variable speed.

Part J7 – Artificial Lighting & Power:

- Maximum design lighting power allowed for the Proposed Development is 5677 Watts.
- Artificial lighting of a room or space must be individually operated by a switch or other control device. An artificial lighting switch must be located in a visible position. Artificial light switch or other lighting control devices of the Proposed Development must control lighting of no more than 250 m^2 of area.
- Windows display lighting if installed must be controlled separately from other display lighting.
- External lighting of the Proposed Development if installed must be controlled by either a daylight sensor or a time switch which is capable of being pre-programmed for different times of the day on variable days.
- Façade lighting or signage lighting of the Proposed Development if installed must be provided with a separate time switch.
- All lighting and power control devices of the Proposed Development including timers, time switches, motion detectors and daylight control devices must follow the guidelines and specifications outlined in Appendix D Artificial Lighting and Power Notes of this report.

Part J8 – Heater Water Supply & Swimming Pool & Spa Pool Plant:

- Hot water supply of the Proposed Development must be designed and installed in accordance with section 8 of AS/NZS 3500.4

Part J9 – Energy Monitoring and On-site Distributed Energy Resources:

- For the Proposed Development provide facilities to record gas and electricity consumption.
- For the Proposed Development provide facilities to record individually the energy consumption of air conditioning plant, heating plant, cooling plant, air handling fans, artificial lighting, appliance power, central hot water supply, and internal transport devices including lifts, escalators and travelators where there is more than one serving the building and other ancillary plant.

- The energy meters required must be connected to a communication system that collates the time-of-use energy data to a single interface monitoring system where it can be stored, analysed, and reviewed.
- Each storey of carparks in Class 2, 3, 5, 6, 7b, 8, 9 buildings must be provided with electrical distribution boards dedicated to electric vehicle charging in accordance with Table J9D4.
- These must also be labelled to indicate use for electric vehicle charging.
- Electric distribution boards serving electric vehicles must be fitted with a charging control system that can manage and schedule charging of vehicles in response to total building demand.
- For Class 9 buildings: Each circuit should support an electric vehicle charger able to deliver 12 kWh minimum from 9:00am to 5:00pm daily.
- Must be sized to support future installation of 7 kW (32 A) type 2 electric vehicle charger in 20% of car parking spaces (class 9)

- At least 20% of the building roof area must be left clear for the installation of solar photovoltaic panels, except for buildings where-
  (i) Solar photovoltaic panels are installed on at least 20% of the roof area; or
  (ii) There is equivalent generation capacity elsewhere on-site; or
  (iii) 100% of the roof area is shaded for more than 70% of daylight hours; or
  (iv) Roof area is less than 55m2; or
  (v) More than 50% of roof area is used as a terrace, carpark, roof garden, roof light or similar

8 - Appendix

This section of the report demonstrates the results of employing BCA Calculators for Glazing, Lighting Power, and other referenced calculations and plans in this report.

8.1 – Appendix A – Façade Calculator

Façade

Report

Calculator

Project Summary

Date
23/10/2023

Name
Tom Chen

Company
Certified Energy

Position
ESD Consultant

Building Name / Address
225-229 Ocean St, Narrabeen
0

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 9b - public halls, function rooms or the like

Storeys Above Ground
2

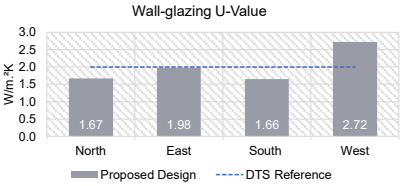
Tool Version
1.1 (April 2020)

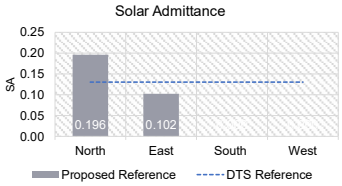
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

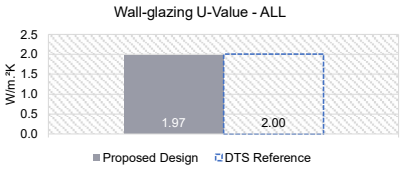
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	1.67	1.98	1.66	2.72	1.97
Solar Admittance	0.20	0.10			
AC Energy V					103

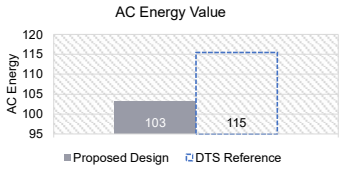
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	45.658	37.544	20.016	54.336
Glazing to Façade Ratio	25%	32%	24%	52%
Glazing References	FF Sliding GF fixed	FF Sliding GF sliding	FF awning	FF awning
Glazing System Types	Sliding Door Casement	Sliding Door Casement	Awning	Awning
Glass Types	0	0	0	0
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Average Glazing U-Value (W/m².K)	4.60	4.60	4.60	4.60
Average Glazing SHGC	0.80	0.80	0.00	0.00
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	139.63	78	62.57	50.92
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	FF External cavity wall FF internal wall	FF internal wall FF External cavity wall	FF External cavity wall FF internal wall	FF External cavity wall FF internal wall
Wall Thickness	300 100	100 300	300 100	300
Average Wall R-value (m².K/W)	1.40	1.40	1.40	1.40
Solar Absorptance	0.6	0.6	0.6	0.6

8.2 – Appendix B – Lighting Calculator

ABCB

Non-residential Lighting
(Beta release)

National Construction Code

Calculator

Building name/description	Classification
Narrabeen SLSC	Class 9b

Number of rows preferred in table below: 4 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design illumination power load	Space	Illuminance: Designed lux level	Illuminance: Recommended lux level	Adjustment factor 1: Adjustment factor 1	Adjustment factor 1: Dimming % area	Adjustment factor 1: Illuminance turndown	Adjustment factor 2: Adjustment factor 2	Adjustment factor 2: Dimming % area	Adjustment factor 2: Illuminance turndown	Light colour adjustment factors: Light colour adjustment factor 1	Light colour adjustment factors: Light colour adjustment factor 2	SATISFIES PART J7D3: System illumination power load allowance	SATISFIES PART J7D3: Lighting system share of % of aggregate allowance used
							These columns do not represent a requirement of the NCC and are suggestions only.		Adjustment factors			Adjustment factors						
1	Meeting room	7.3 m²	11 m	3.0 m	1 W	Board room and conference room											65 W	**25% of 0%**
2	Enclosed verandah	109.0 m²	51 m	3.0 m	1 W	Auditorium, church and public hall											1178 W	**25% of 0%**
3	Kitchen	13.0 m²	15 m	3.0 m	1 W	Kitchen and food preparation area											87 W	**25% of 0%**
4	Seating Area	236.0 m²	99 m	3.0 m	1 W	Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks											4347 W	**25% of 0%**

Total	4 W

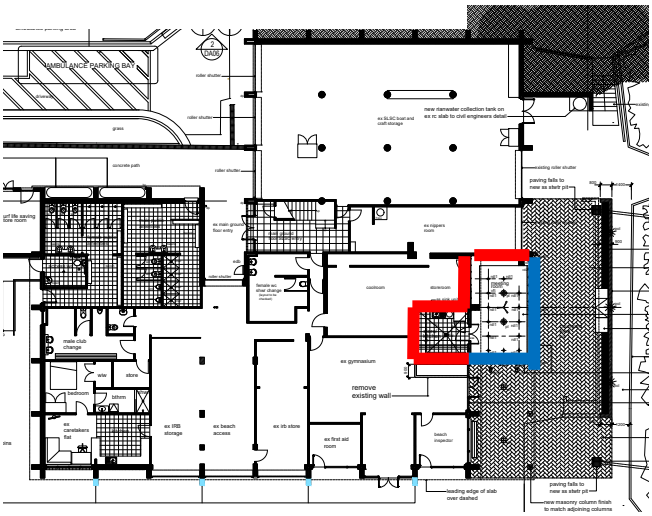
Total	5677 W

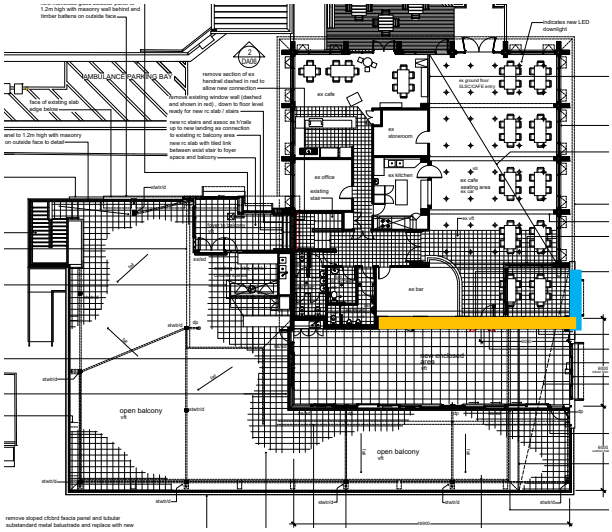
if inputs are valid ✓

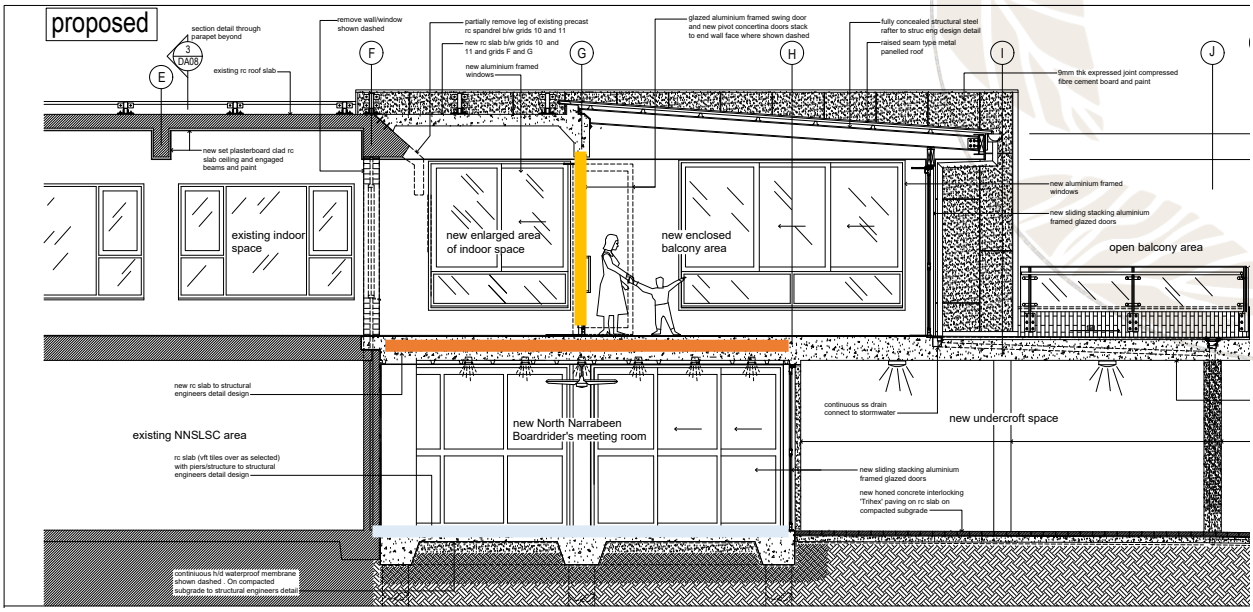
8.3 – Appendix C – Insulation Mark-Up

LEGEND

- R1.4 EXTERNAL CONCRETE PANEL WALLS
- R1.4 EXTERNAL DOUBLE BRICK WALLS
- R1.4 INERNAL PLASTERBOARD WALLS
- R1.4 INERNAL CONCRETE PANEL WALLS
- R3.7 CONCRETE SLAD ROOF
- R2.0 SUSPENDED CONCRETE SLAB
- R2.0 SLAB ON GROUND







8.4 – Appendix D – Artificial Lighting & Power Notes

1- A lighting timer must;
   a. be located within 2 m of every entry door to the space; and
   b. have an indicator light that is illuminated when the artificial lighting is off; and
   c. not control more than
      i. an area of 100 m^2 with a single push button timer; and
      ii. 95% of the lights in spaces of area more than 25 m^2; and
   d. be capable of maintaining the artificial lighting
      i. for not less than 5 minutes and not more than 15 minutes unless it is reset; and
      ii. without interruption if the timer is reset.

2- Time switch;
   a. A time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.
   b. A time switch for internal lighting must be capable of being overridden by
      i. a means of turning the lights on, either by
         1. a manual switch or an occupant sensing device that on sensing a person's presence, overrides the time switch for a period of up to 2 hours, after which there is no further presence detected, the time switch must resume control; or
         2. an occupant sensing device that overrides the time switch upon a person's entry and returns control to the time switch upon the person's exiting, such as a security card reader; and
      ii. a manual "off" switch
   c. A time switch for external lighting must be capable of
      i. limiting the period the system is switched on to between 30 minutes before sunset and 30 minutes after sunrise is determined or detected including any pre-programmed period between these times; and
      ii. being overridden by a manual switch or a security access system for a period of up to 30 minutes, after which the time switch must resume control.
   d. A time switch for boiling water and chilled water storage units must be capable of being overridden by a manual switch or a security access system that senses a person's presence, overrides for a period of up to 2 hours, after which if there is no further presence detected, the time switch must resume control.

3- Motion detectors;
   a. In a Class 9b building, a motion detector must
      i. be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and
      ii. be capable of detecting
         1. a person before they have entered 1 m into the space; and
         2. movement of 500 mm within the useable part of the space; and
      ii. not control more than
         1. in other than a carpark an area of 500 m^2 with a single sensor or group of parallel sensors; and
         2. 75% of the lights in spaces using high intensity discharge; and
      iii. be capable of maintaining the artificial lighting when activated
         1. for a maximum of 30 minutes unless it is reset; and
         2. without interruption if the motion detector is reset by movement; and
      iv. not be overridden by a manual switch to permanently leave the lights on.
   b. When outside a building, a motion detector must

i. be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and
ii. be capable of detecting a person within a distance from the light equal to
    1. twice the mounting height; or
    2. 80% of the ground area covered by the light's beam; and
        ii. not control more than five lights; and
        iii. be operated in series with a photoelectric cell or astronomical time switch so that the light will not operate in daylight hours; and
        iv. be capable of maintaining the artificial lighting when the switch is on for a maximum of 10 minutes unless it is reset; and
        v. have a manual override switch which is reset after a maximum period of 4 hours.

4- Daylight sensor and dynamic lighting control device;

a. A daylight sensor and dynamic control device for artificial lighting must
    i. for switching on and off
        1. be capable of having the switching level set point adjusted between 50 and 1000 Lux; and
        2. have a delay of more than 2 minutes; and a differential of more than 100 Lux for a sensor controlling high pressure discharge lighting, and 50 Lux for a sensor controlling other than high pressure discharge lighting; and
        3. for dimmed or stepped switching, be capable of reducing the power consumed by the controlled lighting in proportion to the incident daylight on the working plane either
            5- continuously down to a power consumption that is less than 50% of full power; or
            6- in no less than 4 steps down to a power consumption that is less than 50% of full power.

a. Where a daylight sensor and dynamic control device has a manual override switch, the manual override switch must not be able to switch the lights permanently on or bypass the lighting controls.

9 - Disclaimer

Recommendations:

Based on the information available on the supplied drawings and data, I am of the opinion that there is nothing that should prevent this project from compliance with the requirements of the Building Code of Australia 2022.

This report is based on details available at the time of writing. Selected contractors and other parties contributing to the scope of the works should confirm that their supplied work will be in compliance with the BCA/NCC. It is advisable that this confirmation be requested prior to the commencement of construction. Final certification of BCA/NCC compliance at completion of works should be obtained to aid final certifier's approval.

Dimensions:

The dimensions used in this report are scaled from the supplied project documents. There may be some minor variation between the scaled dimensions, the dimensions on the window schedule and the actual dimensions on site.

Checked by:

Jamie Ian Bonnefin

BSc (Arch) MArch Cert IV (NatHERS Assessment)
HERA Assessor 10056

CERTIFIED ENERGY
Leading Local Sustainability

Appendix F

Waste Management Plans

northern beaches council

NORTHERN BEACHES COUNCIL

Waste Management Plan

This plan is to be completed

in accordance with Council's

Waste Management Guidelines

Effective Date: 1 November 2016

TABLE OF CONTENTS

Purpose of the Waste Management Plan

This *Waste Management Plan (WMP)* will detail the arrangements for waste management during all stages of development and occupation.

The WMP must be completed in accordance with the Waste Management Guidelines (Guidelines).

A completed WMP is a mandatory requirement for any Development Application (DA) for which Council is the Consent Authority. DAs that are submitted without a completed WMP will be rejected or refused by Council.

Structure of the Waste Management Plan

All applicants are required to complete the 'Applicant and Project Details' part of the WMP and include it with the relevant Sections that apply to their proposed development.

The WMP is divided into Sections and applicants are only required to complete the relevant Sections in accordance with the Guidelines. The table below identifies which Sections are relevant to which development types.

For example, if the proposed development was to include demolition of an existing structure and construction of a single dwelling, the relevant Sections would be Sections 1, 2 and 3.

Section	Development Type^
Section 1 – Demolition	All
Section 2 – Construction	All
Section 3 – On-going waste management for one or two dwellings	One or two dwelling developments Mixed-use developments containing one or two dwellings
Section 4 – On-going waste management for three or more dwellings	Three or more dwelling developments Mixed-use developments containing three or more dwellings
Section 5 – On-going waste management for non-residential and mixed use developments	Commercial developments Industrial developments Mixed-use developments
Section 6 – Private roadway developments	Private roadways

^Note: the definitions of the development types are provided in Section vi of the Introduction to the Guidelines

Property and Project Details

Complete this page and the relevant Sections that apply to your proposed development.

Property Details

Lot No: Deposited Plan (DP) No: or Strata Plan (SP) No:	6 & 8, Section 63 DP5768	1 & 2, DP339162	B DP376822
Unit No: House No: Street: Suburb: Postcode:	 225-229 OCEAN STREET NARRABEEN 2101		

Project Details

Description of proposed development:	Extension to the northern side for a meeting room, enclosure of existing balcony, accessibility improvements, waterproofing renewals and finishes upgrades
Structures to be demolished:	BBQ wall & paving, masonry balustrades, north-east section of wall & windows, balcony concrete screed and waterproof membranes.

Section 1 – Demolition

This section must be completed in accordance with 'Chapter 1 – Demolition' of the Waste Management Guidelines

MATERIALS ON SITE	**DESTINATION** *Evidence such as weighbridge dockets and invoices for waste disposal or recycling must be retained on site for inspection*					
	REUSE AND RECYCLING (MOST FAVOURABLE)				**DISPOSAL (LEAST FAVOURABLE)**	
Types of Waste Material	Estimated Volume (m^3) or Weight (t)	**ONSITE RE-USE** ✓ Specify how material will be reused on site	**OFFSITE RECYCLING** ✓ Recycling Outlet (RO) ✓ Waste Transport Contractor (WTC)		**OFFSITE DISPOSAL** ✓ Specify landfill site (LS) ✓ Specify Waste Transport Contractor (WTC)	
			WTC	RO	WTC	LS
Excavated Material	Please refer to Ef Consulting Construction & Demolition					
Garden Organics	Waste Management Plan, dated 02/11/2023					
Bricks					OPTION NOT AVAILABLE: These materials must be re-used or separated on or off site and sent for recycling.	
Tiles						
Concrete						
Timber						
Plasterboard						
Metals						
Asbestos						
Other waste (please specify)						
Estimated Total % Recovered						

Refer to the estimation tables in 'Chapter 1 – Demolition' of the Guidelines for assistance in completing this table.

The applicant must submit a Site Plan showing the structures to be demolished and storage areas for waste and construction materials (if the development also includes construction).

WMP Checklist

Have you included the following:	Applicant Tick
A site plan showing: • The structures to be demolished. • Storage areas for waste to be reused, recycled, or disposed of. • Materials storage (if the development also includes construction)	☐
The table on the previous page, completed in accordance with 'Chapter 1 – Demolition' in the guidelines.	☐

Section 2 – Construction

This section must be completed in accordance with 'Chapter 2 – Construction' of the Waste Management Guidelines

MATERIALS ON SITE	**DESTINATION** *Evidence such as weighbridge dockets and invoices for waste disposal or recycling must be retained on site for inspection*					
	REUSE AND RECYCLING (MOST FAVOURABLE)				**DISPOSAL (LEAST FAVOURABLE)**	
Types of Waste Material	Estimated Volume (m^3) or Weight (t)	**ONSITE RE-USE** ✓ Specify how material will be reused on site	**OFFSITE RECYCLING** ✓ Specify recycling outlet (RO) ✓ Specify Waste Transport Contractor (WTC)		**OFFSITE DISPOSAL** ✓ Specify landfill site (LS) ✓ Specify Waste Transport Contractor (WTC)	
* Please specify			WTC	RO	WTC	LS
Excavated Material	Please refer to Ef Consulting Construction & Demolition Waste Management Plan, dated 02/11/2023					
Garden Organics						
Bricks					OPTION NOT AVAILABLE: These materials must be re-used or separated on or off site and sent for recycling.	
Tiles						
Concrete						
Timber*						
Plasterboard						
Metals*						
Asbestos						
Other waste*						
Estimated Total % Recovered						

Refer to the estimation tables in 'Chapter 2 – Construction' of the Guidelines for assistance in completing this table.

The applicant must submit a Site Plan showing the structures to be demolished and storage areas for waste and construction materials (if the development also includes construction).

WMP Checklist

Have you included the following:	Applicant Tick
A site plan showing: • The structures to be demolished. • Potential storage areas for waste to be reused, recycled, or disposed of. • Materials storage	☐
The table on the previous page, completed in accordance with 'Chapter 2 – Construction' in the guidelines.	☐

Section 3 – On-going waste management for one or two dwellings

This section is to be completed in accordance with 'Chapter 3 – On-going waste management for one or two dwellings' of the Waste Management Guidelines.

Type of development: _____

Number of dwellings: _____

WMP Checklist

Do your architectural and landscape plans include the following:	Applicant Tick
Waste Storage Area design requirements (Chapter 3.2.)	☐
Waste Storage Area location requirements (Chapter 3.3.)	☐

Section 4 – On-going waste management for three or more dwellings

This section is to be completed in accordance with 'Chapter 4 – On-going waste management for three or more dwellings' of the Waste Management Guidelines.

Type of development: _____

Number of dwellings: _____

WMP Checklist

Do your architectural/landscape plans include the following:	Applicant Tick	N/A
Waste Storage Area design requirements (Chapter 4.2.)	☐	-
Waste Storage Area location requirements (Chapter 4.3.)	☐	-
Pathway, access and door requirements (Chapter 4.4.)	☐	-
Clean-up waste requirements (Chapter 4.5.)	☐	☐
Kerbside (on-street) waste collection requirements (Chapter 4.6.)	☐	☐
On-site (off-street) waste collection requirements (Chapter 4.7.)	☐	☐

Section 5 – On-going waste management for non-residential and mixed use developments

This section is to be completed in accordance with 'Chapter 5 – On-going waste management for non-residential developments' and 'Chapter 6 – On-going waste management for mixed use developments' of the Waste Management Guidelines.

Type of development: Alterations & Additions

Number of commercial premises: 1

Number of Waste Storage Areas: 1

WMP Checklist

Do your architectural/landscape plans include the following:	Applicant Tick	N/A
Waste Storage Area design requirements (Chapter 5.2.)	☑	-
Waste Storage Area location requirements (Chapter 5.3.)	☑	-

Section 6 – Private roadway developments

This section is to be completed in accordance with 'Chapter 7 – Private roadway developments' of the Waste Management Guidelines.

Type of development: _____

Number of dwellings: _____
(Only applicable for sub-divisions)

WMP Checklist

Do your sub-division plans include the following:	Applicant Tick	N/A
Council's waste vehicle design requirements (Chapter 7.2.)	☐	☐
Waste Storage Area requirements (Chapter 7.3.)	☐	☐

Consulting.™
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North Narrabeen Surf Life Saving Club

2 Malcolm St Narrabeen

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

2/11/2023
Revision B

Client

Northen Beaches Council
https://www.northernbeaches.nsw.gov.au/

ELEPHANTS FOOT

ABN: 47 644 736 514
ELEPHANTS FOOT CONSULTING. PTY LTD
1300 456 374 | consulting@elephantsfoot.com.au
www.elephantsfoot.com.au

SCOPE

A Waste Management Plan (WMP) is to be submitted with all development applications for new and change-of-use developments that will generate construction, demolition and operational waste.

This WMP applies only to the **construction** and **demolition** phases of the proposed development. The requirements outlined in this WMP must be implemented on site during construction and demolition and may be subject to review upon any change to the design. Construction and demolition waste management requirements will also be subject to review as part of the Construction Management Plan.

The waste management for the **operational** phase of the development is not addressed in this report.

REVISION REFERENCE

Revision	Date	Prepared by	Description
A	13/10/2023	H Wilkes	Draft
B	2/11/2023	H Wilkes	Final

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1 ACKNOWLEDGEMENT OF COUNTRY

Elephants Foot Consulting acknowledges that every project we work on takes place on First Peoples Land. We recognise Aboriginal and Torres Strait Islander People as Traditional Custodians of this land. We pay respect to ancestors and Elders, past and present.

2 INTRODUCTION

2.1 Background

EFC has been tasked to prepare the following waste management plan for Northen Beaches Council for the management of construction and demolition waste generated by the refurbishment of North Narrabeen Surf Life Saving Club located at 2 Malcolm St Narrabeen.

Waste management strategies and auditing are a requirement on construction sites to promote strong sustainability outcomes. It is EFC's belief that a successful waste management strategy contains three key objectives:

i. ***Promote responsible source separation*** to reduce the amount of waste that goes to landfill, by implementing convenient and efficient waste management systems.

ii. ***Ensure adequate waste provisions and robust procedures*** that will cater for potential changes during the operational phase of the development.

iii. ***Comply*** with all relevant Australian Standards, council codes, policies, and guidelines.

2.2 Site Summary

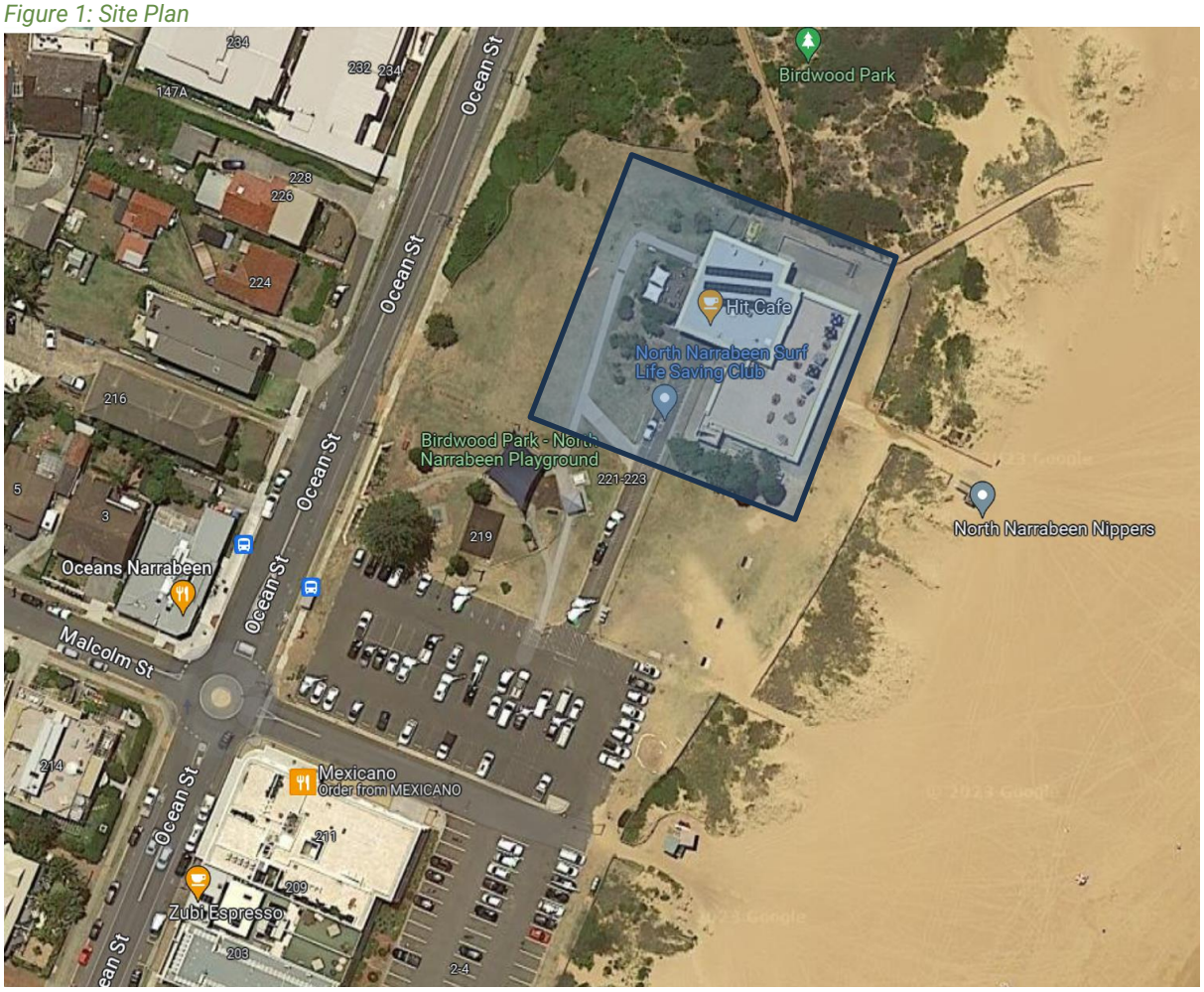
The proposed development falls under the LGA of Northern Beaches Council. The works consist of upgrades to the existing North Narrabeen Surf Life Saving Club building.

All figures and calculations are based on area schedules as advised by our client and shown on architectural drawings.

2.3 Site Location

The site is located at 2 Malcolm St Narrabeen, as shown below. The site vehicle access via the car park from Malcolm St.

Figure 1: Site Plan



Source: Google Maps 2023

2.4 Legislation and Guidance

Information provided in this WMP comes from a wide range of construction and demolition waste management guidance at the local, state, and federal levels. The primary sources of guidance include:

- Warringah Development Control Plan 2011
- Australian Government, Department of Sustainability, Environment, Water, Population and Communities. *Construction and Demolition Waste Guide – Recycling and Re-use Across the Supply Chain*. (2014, November).
- NSW Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021
- NSW Waste Classification Guidelines 2014
- Australia's National Waste Policy 2018

2.5 Waste Diversion Targets

To quantify and measure this sustainable approach to waste management, the NSW WARR Strategy 2014-2021 outlines specific targets in order to clarify the state's long-term goals and priorities. These targets were supported by industry, community, state, and local governments during the Strategy's consultation phase, and include:

- Increasing construction and demolition recycling rates to 80%
- Increasing waste diverted from landfill to 75%
- Reducing litter by 40%
- Reduce illegal dumping incidents by 30%

2.6 Report Objectives

Throughout this report, EFC aims to encourage where practical, having regard to the design, the nature of the material to be demolished and the site constraints, the following waste management practices for the duration of the demolition and construction stages of the development:

- Re-use of excavated material on-site and disposal of any excess to an approved site;
- Green waste mulched and re-used on-site as appropriate, or recycled off-site;
- Bricks, tiles and concrete re-used on-site as appropriate, or recycled off-site;
- Plasterboard waste returned to supplier for recycling;
- Framing timber re-used on site or recycled off-site;
- Windows, doors and joinery recycled off-site;
- All asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with WorkCover Authority and EPA requirements;
- Plumbing, fittings and metal elements recycled off site;
- Ordering accurate quantities of materials and prefabrication of materials where possible;
- Re-use of formwork;
- Careful source separation of off-cuts to facilitate re-use, resale or recycling.

2.7 Limitations

This report has been prepared by EFC for the sole purpose of providing a Construction and Demolition Waste Management Plan (C&D WMP) to support a development application. The report is provided with the following limitations:

- This report is for the sole use of Northen Beaches Council (including their officers, employees and advisers) and should not be used or relied upon by any other party without prior written consent from EFC;
- Drawings, estimates and information contained in this report have been prepared by analysing information, plans and documents supplied by the client, or nominated third parties. Any assumptions based on the information contained in the report are outside the control of EFC;
- The calculations presented in the report are estimates only. The amount of waste generated will be dependent on the approach taken by site management, including the levels of training and education offered to site staff and the actions and attitudes of staff themselves.
- The site manager will make adjustments as required based on actual waste volumes (e.g. if waste volumes are greater than estimated, then waste storage capacity and collection frequencies will increase accordingly) and increase the amount of waste storage and collection frequency accordingly;
- The report has been prepared with all due care and attention; however, no assurance or representation is made that the WMP reflects the actual outcome. EFC will not be liable to for any plans or outcomes that are not suitable for purpose, whether as a result of incorrect or unsuitable information or otherwise;
- EFC offer no warranty or representation of accuracy or reliability of the WMP unless specifically stated;
- Examples of equipment provided in this report should be reviewed by the appropriate equipment supplier who will assess the correct equipment for supply. Reference to any other business or product besides EFC and EFC equipment is for information purposes only, and is not officially endorsed or recommended by EFC.

3 GENERAL WASTE MANAGEMENT PROVISIONS

3.1 Stakeholder Roles and Responsibilities

All stakeholders have a responsibility for their own environmental performance and compliance with all legislation.

The Construction Contractor will be responsible for implementing this WMP, although site staff have a responsibility to ensure their own compliance at all times. Where possible, an Environmental Management Representative (EMR) should also be appointed for the project to help ensure compliance. The following table demonstrates the primary roles and responsibilities of the respective stakeholders:

Table 1: Stakeholder Roles and Responsibilities

Roles	Responsibilities
Site Management	• Organise waste collections as required; • Organise replacement or maintenance requirements for bins; • Investigate and ensure prompt clean-up of illegally dumped waste materials; • Notify the Principal Certifying Authority (Council) of the appointment of waste removal, transport or disposal contractors for waste tracking purposes; • Ensure waste related equipment is well maintained; • Ensue accurate calculations so only the required amount of materials are ordered; • Ensure segregation of materials to maximise reuse and recycling; • Check waste sorting and storage areas routinely for cleanliness, hygiene, contamination and OH&S issues; • Ensure all monitoring and audit results are well documented and are carried out as specified in the WMP; • Ensure effective signage, communication and education is provided to site staff/contractors; • Provide staff/contractors with equipment manuals, training, health and safety procedures, risk assessments, and PPE to control hazards associated with all waste management activities; • Assess any manual handling risks and prepare a manual handling control plan for waste and bin transfers;
Site Staff/Contractors	• Ensure adequate separation and disposal of waste streams in compliance with the WMP; • Abide by all relevant OH&S legislation, regulations, and guidelines; • Attend training and inductions as required; • Clean and transport bins as required; • Carry out daily visual inspections of waste storage areas; • Organise, maintain and clean the waste storage areas;
Environmental Management Representative (EMR)	• Approach and establish the local commercial reuse of materials where reuse on-site is not practical; • Establish separate skips and recycling bins for effective waste segregation and recycling purposes; • Ensure staff and contractors are aware of site requirements; • Provision of training of the requirements of the WMP and specific waste management strategies adopted for the development; • Contaminated waste management and approval of off-site waste transport, disposal locations and check licensing requirements; • Arrange assessment of suspicious potentially contaminated materials, hazardous materials and liquid waste; • Monitor, inspect and report requirements.
Waste Collection Contractors	• Provide a reliable and appropriate waste collection service; • Provide feedback to site management regarding contamination of waste streams; • Work with site management to customise waste systems where possible.

3.2 Monitoring and Reporting

It is recommended that the following measures be taken to improve demolition and construction waste management in future and to provide more reliable waste generation figures:

- Compare projected waste quantities with actual waste quantities produced.
- Conduct waste audits of current projects (where feasible).
- Note waste generated and disposal methods.
- Look at past waste disposal receipts.
- Record this information to help in waste estimations for future waste management plans.

Records of waste volumes recycled, reused or contractor removed are to be maintained. Additionally, dockets/receipts verifying recycling/disposal in accordance with the WMP must be kept and presented to Council or the EPA if and when required.

Daily visual inspections of waste storage areas will be undertaken by site personnel and inspection checklists/logs recorded for reporting to the Site Manager on a weekly basis or as required. These inspections will be used to identify and rectify any resource and waste management issues.

Waste audits are to be carried out by the Building Contractor to gauge the effectiveness and efficiency of waste segregation procedures and recycling/reuse initiatives. Where audits show that the above procedures are not carried out effectively, additional staff training should be undertaken and signage re-examined.

All environmental incidents are to be dealt with promptly to minimise potential impacts. An incident register must be maintained on-site at all times and should include the contact details of the 24-hour EPA Pollution line. Likely incidents to occur during the construction and demolition stage of the development may involve fuel or chemical spills, seepage or mishandling of hazardous waste, or unlicensed discharge of pollutants to environment.

3.3 Opportunities for Reuse and Recycling

There are many opportunities to reduce the volume of waste generated during demolition and construction. Adaptive reuse of building materials should be encouraged, with significant consideration given to methods of reusing or recycling materials onsite as well as sourcing used or recycled materials from elsewhere to be used on site.

The site should facilitate where practical reuse and recycling by 'deconstruction', whereby various materials are carefully dismantled and sorted. Any unwanted reusable materials can be taken to a second-hand building centre, reducing waste disposal costs.

Materials that are individually wrapped should also be avoided where possible, with preference given for materials that can be delivered in returnable packaging such as timber pallets.

The table below gives examples of potential reuse and recycling options for the materials likely to be used/generated in construction and demolition at this development:

Table 2: Potential Reuse/Recycling Options for Construction Materials

Material	Reuse/Recycling Potential
Asphalt	Hot in-place recycling or reprocessed into Reclaimed Asphalt Pavement (RAP).
Bricks	Cleaned and/or rendered for reuse, crushed for fill, sold or provided to a recycled materials yard
Cardboard Packaging	Recycled at a paper/cardboard recycling facility
Carpet	Cleaned and reused for the same purpose, reused in landscaping or garages/sheds, recycled at an appropriate processing facility
Concrete, Masonry, Spoil	Reused on-site as fill, levelling or crushed for road base
Doors, Windows, Fittings	Reused in new or existing buildings or sent to second-hand supplier
Glass	Recycled at a glass recycling facility, aggregate for concrete production, crushed for termite barrier, reused as glazing
Green Waste (Organics)	Mulched, composted for reuse, trees chipped for use in landscaping or removed carefully and reused onsite or sold
Hardwood Beams	Reused as floorboards, fencing, furniture or sent to second-hand timber supplier
Insulation Material	Reprocessed to remove impurities and reused for the same purpose or as off-cuts, compressed for ceiling tile manufacture
Metal, Steel/Copper Pipe	Recycled at a metal recycling facility, melted into secondary materials for structural steel, roofing, piping etc. copper sold for re-use
Other Timber	Reused in formwork, ground into mulch for garden or sent to second-hand timber supplier
Plasterboard	Crushed for reuse in manufacture of new plasterboard, returned to supplier or used in landscaping
Plastics	Reused as secondary materials for playgrounds, park benches etc.
Roof Tiles	Cleaned and reused, crushed for reuse for landscaping and driveways or sold or provided to a recycled materials yard
Soil	Stockpiled onsite for reuse as fill
Synthetic & Recycled Rubber	Reused for the same purpose or reprocessed for use in manufacture/construction of safety barriers, speed humps
Topsoil	Stockpiled onsite for reuse in landscaped areas

3.4 Management of Hazardous Waste Materials

For the purpose of this report, hazardous waste materials include any waste that poses a hazard or potential harm to human health or the environment, particularly asbestos waste and asbestos containing material (ACM). The general advice provided in this report is superseded by any specific hazardous materials or remediation control plans prepared for the project.

During the construction phase of the development, there must be a commitment to engage qualified and certified contractors to remove all contaminated/hazardous materials (e.g. asbestos) and dispose of all contaminated/hazardous waste at an appropriately licenced facility, where applicable.

In the event that any contaminated or hazardous materials are unexpectedly uncovered during demolition or excavation works, the Site Manager is to stop work immediately in that location and contact the relevant hazardous waste contractor prior to further works being undertaken in the area.

The following general mitigation measures will apply:

- Contaminated material stockpiled on site will be minimised as far as possible and should be stored on HDPE liner, in a bunded location which is protected from inclement weather;
- Sediment fences should be installed around the base of stockpiles and the stockpiles should be covered. Where excavated material requires validations, samples should be taken for NATA laboratory testing as per the requirements of the contamination assessment prior to restoration works, backfilling exercises and disposal;
- Any trucks carrying contaminated materials should be securely and completely covered immediately after loading the materials (to prevent windblown emissions and spillage) and must be licensed by the NSW Environmental Protection Authority (EPA);
- Decontamination of all equipment prior to demobilisation from the site is important so that contaminated materials are not spread off-site.

3.5 Management of Excavation Waste

For the purpose of this report, excavation waste consists of any unwanted material generated from excavation activities such as a reduced level dig, site preparation and levelling and the excavation of foundations, basements, tunnels and service trenches. This will typically consist of soil and rock. The general advice provided in this report is superseded by any specific hazardous materials or remediation control plans prepared for the project.

All excavated material generated on this site may be re-used in the landscaping or used on other sites as fill material, provided no contamination is present. If sandstone is found to be present, this may be sold or incorporated into the building design.

The following measures and safeguards will apply to the development for excavated material:

- Wherever practical, excavation material will be reused as part of the development;
- Excavation material that is not natural (virgin) material will be transported to an approved landfill site or off-site recycling depot;
- A waste classification assessment of the fill material should be undertaken prior to it being acceptable for waste disposal purposes;
- Transportation routes for excavation material removed from site will be identified and used.

4 SITE SPECIFIC WASTE MANAGEMENT PROVISIONS

4.1 Demolition Waste Volumes and Management

The demolition stage of the development provides the greatest opportunity for waste minimisation and resource recovery. The first thing that should be considered is whether it is possible to reuse parts of buildings for the proposed use. With careful on-site sorting and storage and by staging work programs it is possible to reuse many materials, either on or off-site.

Where possible, materials will be reused, such as crushing concrete for use as clean fill. However, the majority of the components of the building will either be reused for the same purpose or disposed of offsite.

A demolition contractor will be engaged during this phase of the project. The contractor will be responsible for ensuring all demolition activities are planned and undertaken in accordance with relevant waste minimisation policies and DA requirements.

The table below illustrates the anticipated volumes of materials generated at this development during the demolition stage. Volumes have been advised by our client.

Table 3: Demolition Waste Conversion

Material	Volume (m3)	*Tonnes (t)	**Appx. Percentage Recovered
Excavation Material	45.0	45.0	99.8%
Green waste	5.0	0.8	80%
Bricks	15.0	18.0	100%
Tiles	8.0	8.0	100%
Concrete	7.0	10.5	100%
Timber	5.0	1.0	33%
Metals	2.0	1.0	100%
Totals	**87**	**84.2**	

**The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation <https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20-Approved%20method%20for%20recyclers.pdf>*

***The percentage of recycled demolition waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.*

The table below illustrates how the demolition materials will be managed, and estimates percentage of materials diverted from landfill.

Table 4: Demolition Waste Management

			How Waste will be Managed			
Type of Material	**Less than 10m³**	**Estimated Tonnage**	**Reuse On-Site**	**Recycle**	**Landfill**	**Estimated Tonnage of Material Diverted from Landfill**
Excavation Material	☐	45.0	☐	☒	☒	44.9
Green Waste	☒	0.8	☐	☒	☒	0.6
Bricks	☐	18.0	☐	☒	☐	18.0
Tiles	☒	8.0	☐	☒	☐	8.0
Concrete	☒	10.5	☐	☒	☐	10.5
Timber	☒	1.0	☐	☒	☒	0.3
Metals	☒	1.0	☐	☒	☐	1.0
	Total	**87**		**Total**		**84.2**
					Total Diversion of Waste from Landfill (Minimum 80%)	**98.9%**

4.2 CONSTRUCTION WASTE VOLUMES AND MANAGEMENT

Waste generated during the construction stage of the development will be managed by the principal contractor and sub-contractors, with materials being reused and recycled wherever possible. Where neither reuse nor recycling are possible, waste will be disposed of as general waste at a licensed landfill site.

Recyclable material generated during construction will largely consist of off-cuts and discarded bricks, timber, steel, concrete, tiles, plasterboard, and piping, as well as packaging materials.

It is important to note that source separation of waste on-site may offer cost savings when compared to the disposal of mixed waste at landfill sites. Further cost savings may be achieved through the use of reusable and recycled-content materials and by reusing materials salvaged from the demolition stage of the development.

The table below illustrates the anticipated volumes of materials generated at this development during the construction stage. Volumes have been advised by our client.

Table 5: Construction Waste Conversion

Material	Volume (m3)	*Tonnes (t)	**Approx. Percentage Recovered
Bricks	0.4	0.5	100%
Tiles	0.15	0.2	100%
Concrete	0.2	0.3	100%
Timber	0.28	0.1	33%
Plasterboard	0.4	0.1	50%
Metals	0.2	0.1	100%
Totals	**1.63**	**1.2**	

**The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation <https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20-Approved%20method%20for%20recyclers.pdf>*

***The percentage of recycled waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.*

The table below illustrates how the construction materials will be managed, and estimates percentage of materials diverted from landfill.

Table 6: Construction Waste Management

			How Waste will be Managed			
Type of Material	**Less than 10m³**	**Estimated Tonnage**	**Reuse On-Site**	**Recycle**	**Landfill**	**Estimated Tonnage of Material Diverted from Landfill**
Bricks	☒	0.5	☐	☒	☐	0.5
Tiles	☒	0.2	☐	☒	☐	0.2
Concrete	☒	0.3	☐	☒	☐	0.3
Timber	☒	0.1	☐	☒	☐	0.035
Plasterboard	☒	0.1	☐	☒	☒	0.04
Metals	☒	0.1	☐	☒	☐	0.1
Total		**1.2**	**Total**			**1.1**
Total Diversion of Waste from Landfill (Minimum 80%)						**93.5%**

4.3 Recycling Directory

Construction and demolition materials removed from site will need to be managed in accordance with the provisions of current legislation and may include segregation by material type classification in accordance with NSW EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste* and disposal at facilities appropriately licensed to receive the particular materials.

Please find the below recommendations for recycling drop off locations for all materials likely to be generated at this development. Only the nearest locations are provided. See www.businessrecycling.com.au for additional locations:

Table 7: Recycling Directory

	Business Name	Suburb	Distance (km)
Excavation Material	AE Biggs	Oxford Falls	3.9km
	Kimbriki Resource Recovery Centre	Ingleside	6.2km
	Bingo Recycling Centre	Artarmon	14.1km
Green Waste	Kimbriki Resource Recovery Centre	Ingleside	6.2km
	Bingo Recycling Centre	Artarmon	14.1km
	Bingo Recycling Centre	Alexandria	22.8km
Bricks	AE Biggs	Oxford Falls	3.9km
	Kimbriki Resource Recovery Centre	Ingleside	6.2km
	Bingo Recycling Centre	Artarmon	14.1km
Tiles	AE Biggs	Oxford Falls	3.9km
	Kimbriki Resource Recovery Centre	Ingleside	6.2km
	Bingo Recycling Centre	Artarmon	14.1km
Concrete	AE Biggs	Oxford Falls	3.9km
	Kimbriki Resource Recovery Centre	Ingleside	6.2km
	Bingo Recycling Centre	Artarmon	14.1km
Timber	AE Biggs	Oxford Falls	3.9km
	Kimbriki Resource Recovery Centre	Ingleside	6.2km
	Bingo Recycling Centre	Artarmon	14.1km
Plasterboard	AE Biggs	Oxford Falls	3.9km
	Kimbriki Resource Recovery Centre	Ingleside	6.2km
	Bingo Recycling Centre	Artarmon	14.1km
Metals	AE Biggs	Oxford Falls	3.9km
	Kimbriki Resource Recovery Centre	Ingleside	6.2km
	Bingo Recycling Centre	Artarmon	14.1km

4.4 Site-Specific Operational Measures

Training/Site Inductions

All staff employed during the demolition and construction stages of the development must undertake site-specific induction training regarding the procedures for waste management. Employees of the head contractor will undertake a specific induction outlining their duties and how they are to enforce the waste management procedures.

Induction training will include the following at a minimum:

- Legal obligations;
- Emergency response procedures on site;
- Waste storage locations and separation of waste;
- Litter management in transit and on site;
- The implications of poor waste management practices;
- Correct use of general-purpose spill kits;
- Responsibility and reporting (including identification of personnel responsible for waste management and individual responsibilities).

Materials Selection and Ordering

- Selection of all materials will be undertaken by architectural designers;
- Prefabrication of materials off-site where possible;
- Materials requirements are to be accurately calculated to minimise waste from over-ordering;
- Materials ordering process is to aim at minimisation of materials packaging;
- Material Safety Data Sheets (MSDS) are to accompany all materials delivered to site, where required, to ensure that safe handling and storage procedures are implemented.

Waste Avoidance Opportunities

- Limiting unnecessary excavation;
- Selection of construction materials taking into consideration to their long lifespan and potential for reuse;
- Ordering materials to size and ordering pre-cut and prefabricated materials;
- Reuse of formwork;
- Planned work staging;
- Use of naturally ventilating buildings to reduce ductwork;
- Reducing packaging waste on-site by returning packaging to suppliers where possible, purchasing in bulk and requesting cardboard or metal drums rather than plastics;
- Requesting metal straps rather than shrink wrap and using returnable packaging such as pallets and reels;
- Reduction of PVC use;
- Use of low VOC (volatile organic compounds) paints, floor coverings and adhesives;
- Use of fittings and furnishings that have been recycled or incorporate recycled materials;
- Use of building materials, fittings and furnishings with consideration to their longevity, adaptation, disassembly, reuse and recycling potential.

Site Procedures

- Excavated materials will be used onsite where practical;
- Green waste will be mulched and reused in landscaping either onsite or offsite;
- Concrete, tiles and bricks will be reused or recycled offsite;
- Steel will be recycled offsite; all other metals will be recycled where economically viable;
- Framing timber will be reused on-site or recycled off-site;
- Windows, doors and joinery will be recycled off-site where possible;
- Plumbing, fittings and joinery will be recycled off-site where possible;
- Plasterboard will be re-used in landscaping on-site or returned to the supplier for recycling where possible;
- All used crates will be stored for reuse unless damaged;
- All glass that can be economically recycling will be;
- All solid waste timber, brick, concrete, rock, plasterboard and other materials that cannot be reused or recycled will be taken to an appropriate facility for treatment to recover further resources or for disposal to landfill in an approved manner;
- All asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with WorkCover Authority and EPA requirements;
- Provision for the collection of batteries, fluorescent tubes, smoke detectors and other recyclable resources will be provided on site;
- Beverage container recycling will be provided on-site for employee use;
- All waste and recycling will be disposed of via council approved systems.

4.5 Location and Design of Waste Management Facilities

General Requirements

All waste management facilities onsite should:

- Be conveniently located to enable easy access for on-site movement and collection;
- Be incorporated with other loading/unloading facilities;
- Have sufficient space for the quantity of waste generated and careful source separation of recyclable materials;
- Have sufficient space to contain any on-site treatment facilities, such as compaction equipment;
- Have adequate weather protection and, where required, be enclosed or undercover;
- Be secure and lockable;
- Be well-ventilated and drained to the sewer;
- Be clearly sign-marked to ensure appropriate use.

Waste and Recycling Receptacles

A sufficient quantity of skip bins should be provided for the separate storage of each type of C&D material generated on site. This will assist in maximising source separation and resource recovery, while reducing the costs and quantity of materials disposed of at landfill.

The size of the receptacles should be appropriate to the nature of waste generated and the available storage area. In general, the following options would be acceptable:

Bin Size	Access	Dimensions
2.5m	Top loading	
3m	Drop door walk-in	
4m	Drop door walk-in	
5m	Drop door walk-in	
6m	Double doors walk-in	

Source: Aussie Bins

If the developer chooses to adopt a traditional waste management strategy, whereby waste is deposited into comingled skip bins to be sorted offsite, a single skip bin would be considered sufficient for purpose. However, if the site is to pursue source separation, dedicated skips for the following materials are recommended:

- Timber;
- Plasterboard;
- Concrete;
- Bricks;
- Scrap metal;
- General waste.

Separate receptacles for the safe disposal of hazardous waste types (i.e. light bulbs, batteries, etc) will also be provided where applicable. Where possible, additional bins will be provided in common areas for the collection of commingled recyclables such as beverage containers (glass, plastic, aluminium), paper products, recyclables food containers, etc. Specialised bins for cigarette butts should also be provided.

Safety and Signage

The following safety measures should be considered for the waste storage area:

- Location should not interfere with sight lines of drivers entering or leaving the site;
- Skip bins should be clearly visible and located in well-lit areas;
- Safe paths of travel should be designated using reflective tape, barriers and cones;
- Skip bins must be secured and must not be over-filled to reduce risk of injury through bins moving and falling objects.

Standard signage will be installed in all waste areas, with all skip bins colour coded and labelled appropriately on all sides to allow clear identification of the type of waste to be deposited into each bin.

Refer to the EPA's website for standard construction waste and recycling signs:

www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm

Space and Siting Requirements

The waste storage area will be located adjacent to the entrance to the site to enable access and allow sufficient space for the required skip bins and servicing requirements. The storage area will also be flexible in order to cater for change of use throughout demolition and construction works.

Where space is restricted, dedicated stockpile areas will be allocated onsite, with regular transfers to the dedicated skip bins for sorting and collections.

The position of the designated waste holding area onsite may change according to building works and the progression of the development. Access, visual amenity and WHS will always be integral to the selection of waste storage area locations. Any stockpile locations will take into account slope and drainage factors to avoid contamination of stormwater drains during rain events.

Servicing and Transport

The frequency of waste removal from site will be determined by the volume of materials deposited into the dedicated skip bins. Skip bins will be monitored on a daily basis by the Site Manager to ensure they do not overflow. If skip bins are reaching capacity, removal and replacement should be organised for within 24 hours.

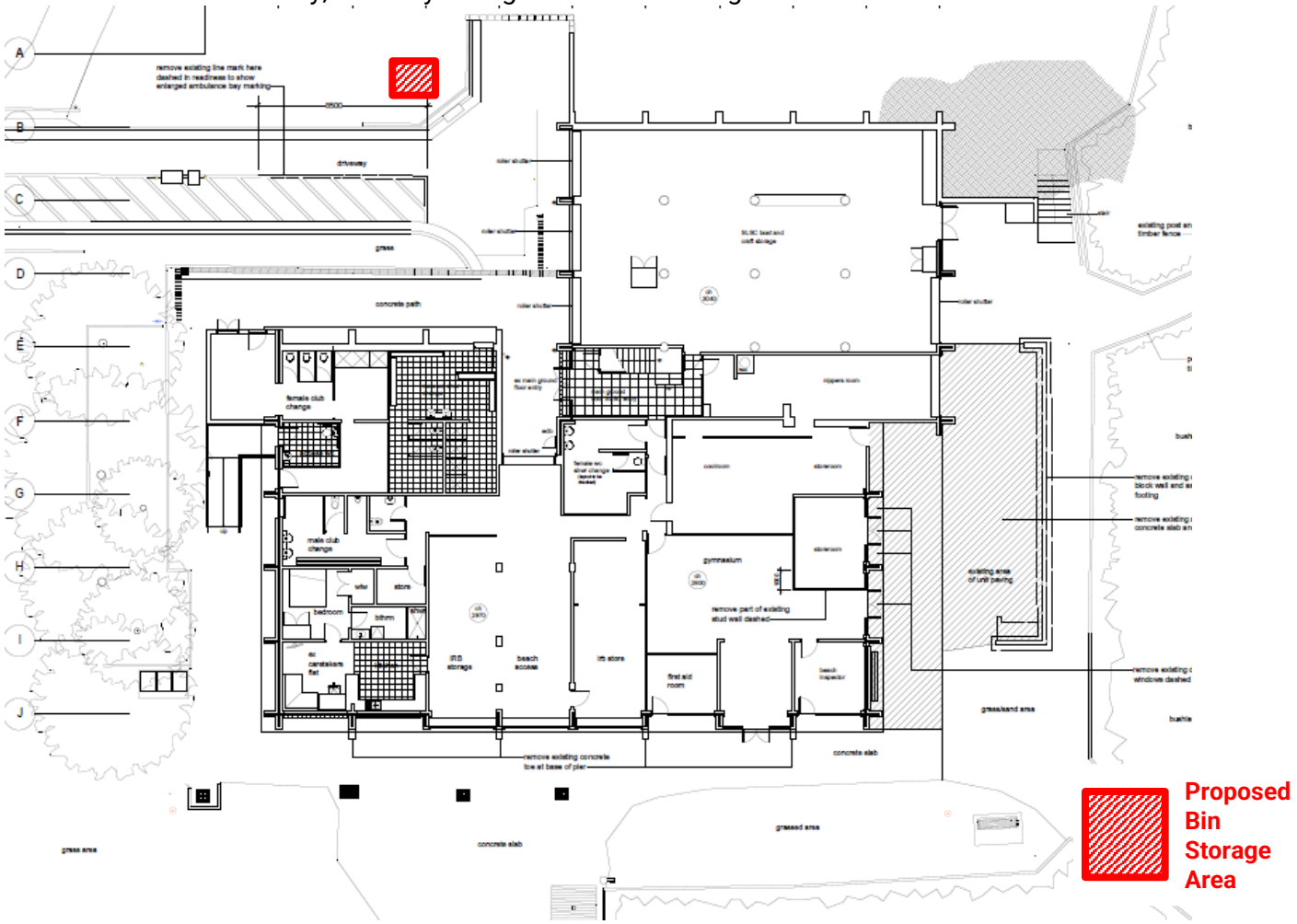
All skip bins leaving the site will be covered with a suitable tarpaulin to reduce spillage of waste while in transit.

All waste collection for construction works will be conducted between approved hours as per Council requirements (typically between 7am and 7pm Monday to Friday, and between 7am and 1pm on Saturdays). All waste generated on site will be transported to an approved and appropriately licensed resource recovery facility and/or landfill site.

4.6 Site Plans

Existing Structures

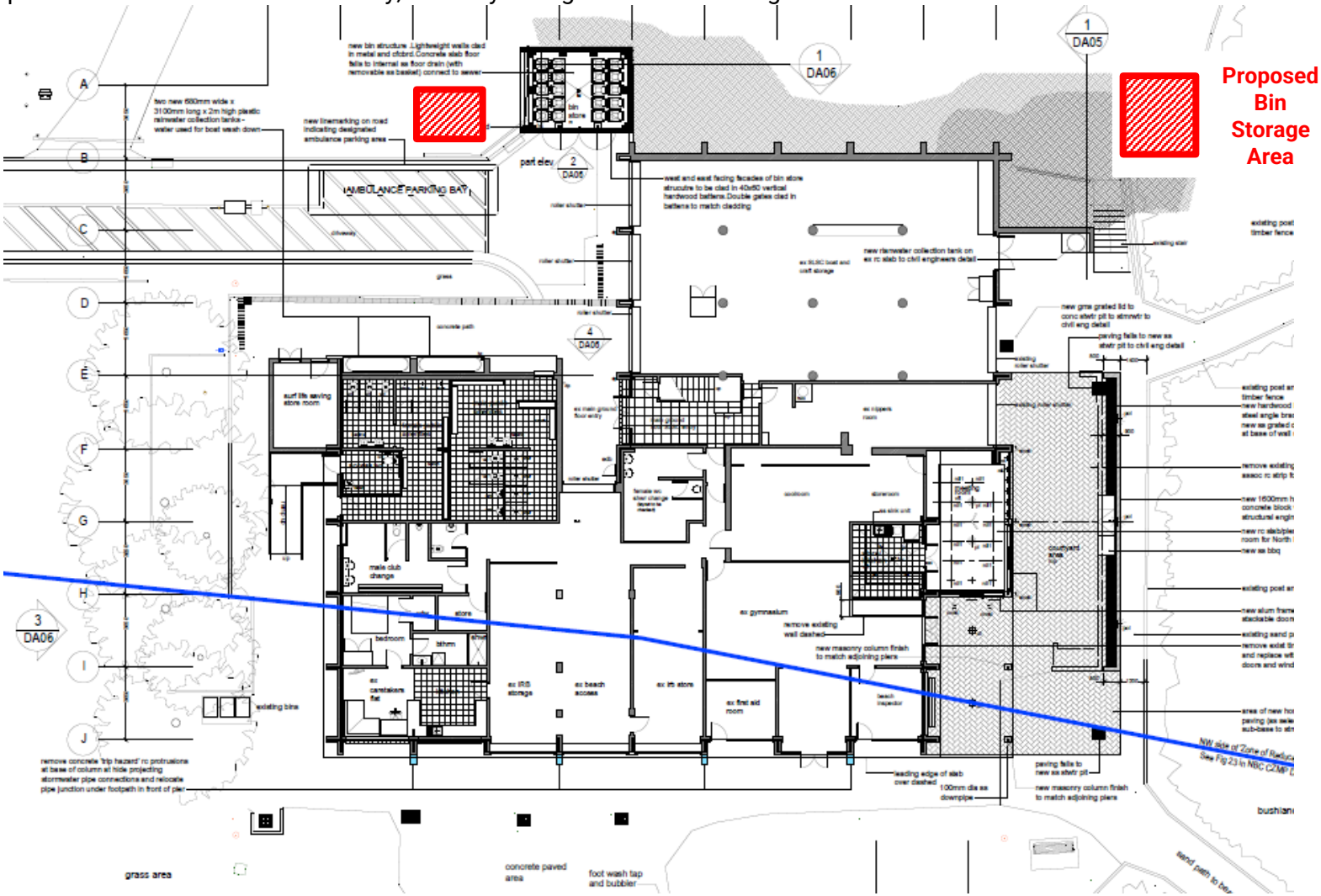
Note: the proposed bin location is indicative only, this may change based on site logistics.



Source: Building Assets – Planning Desing and Delivery Northern Beaches Council, Drawing No DA07, Issue D, Nov 2023 – Existing Ground Floor Plan

Proposal

Note: the proposed bin location is indicative only, this may change based on site logistics.



Source: Building Assets – Planning Desing and Delivery Northern Beaches Council, Drawing No DA02, Issue D, Nov2023 –Ground Floor Plan

Appendix G

Acoustic Report

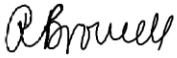
North Narrabeen SLSC

Acoustic assessment

Northern Beaches Council

06 November 2023

→ **The Power of Commitment**

Project name		North Narrabeen SLSC - acoustic assessment					
Document title		North Narrabeen SLSC | Acoustic assessment					
Project number		12618094					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	0	C Doyle 	R Browell		E Milton		06/11/23

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[Compliance statement]

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1. Introduction

1.1 Purpose of this report

The Northern Beaches Council (Council) are seeking approval to conduct building alteration and extension works at the North Narrabeen Surf Life Saving Club (SLSC). GHD Pty Ltd (GHD) has prepared this acoustic assessment report to support the lodgement of the DA application for the works.

The objective of this acoustic assessment is to assess potential noise emissions from the SLSC and where required, provide mitigation measures to achieve the relevant acoustic requirements.

1.2 Scope of works

GHD has completed the following scope of works as part of this acoustic assessment:

– Conducted a review of all relevant information and documentation, including the Northern Beaches Council LEP and DCP, architectural drawings, existing consent conditions, noise and environmental guidelines.
– Travelled to site and deployed a noise logger for a period of 13 days to obtain suitable noise monitoring data.
– Based on the noise monitoring conducted, and the relevant acoustic guidelines and policies, appropriate project noise criteria for the assessment of external noise emissions were determined.
– Conducted noise modelling to determine noise levels at adjacent noise sensitive receivers from all relevant sources of noise including:
    - Noise from mechanical plant and other noise generating equipment (if any)
    - Noise from patrons and music within the function spaces of the SLSC, including the upstairs outdoor balcony area, and upstairs enclosed space.
    - Noise from the café, including patrons.
    - Any other relevant sources of noise.
– Based on the results of the noise modelling, and where noise from the proposed operations exceeds the relevant criteria, recommendations for noise mitigation have been provided in order to reduce noise emissions to compliant levels.

1.3 Limitations

This report: has been prepared by GHD for Northern Beaches Council and may only be used and relied on by Northern Beaches Council for the purpose agreed between GHD and Northern Beaches Council as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Northern Beaches Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

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

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

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

GHD has prepared this report on the basis of information provided by Northern Beaches Council and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the

agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.4 Assumptions

– This report relies on the following information provided by Council to GHD:
  - Architectural Drawing Set Issue D (Nov 2023) provided in Appendix B.
– The results of this assessment are dependent on the operational assumptions defined in Section 2.1 and also the operational noise modelling inputs and parameters defined in Section 4 and Section 5.
– No alterations or additions are proposed for the existing (and already approved) ground floor gym. The gym has not been included in this assessment

2. Existing environment

2.1 Proposal site

The North Narrabeen SLSC features a number of different facilities including a bar (with indoor and outdoor balcony seating), a café (with indoor and outdoor veranda seating), as well as a gym, meeting rooms and facilities for surf lifesaving operations. Also present are various ablutions, amenities, storage spaces, cool rooms and a care-takers flat. Architectural drawings for the site are provided in Appendix B.

Northern Beaches Council are seeking to complete a series of renewal and upgrade works to the club with the primary features of the application including:

– Addition of Boardriders room to the ground floor and renewal of barbeque area and associated landscaping works on the ground floor.
– Internal refurbishments work.
– Renewal of second floor open balcony, including waterproofing works, decking and balustrade works and a new enclosed area.

The new enclosed area on the second-floor balcony will primarily be used as seating for club patrons and will occasionally host functions that have live music within it. Previously, live music functions have been hosted on the eastern balcony with a temporary marquee being erected. After the works are completed, live music is planned to be hosted in the new enclosure.

Operational hours

Table 2.1 outlines the operational hours for the different facilities at the club.

Table 2.1 Operational hours

Facility	Operational hours
Gym / club	– 6:30 am to 8:30 pm (7 days)
Bar	– Friday 4:00 pm to 9:00 pm – Saturday 3:00 pm to 12:00 midnight (typically only during functions) – Sunday 11:00 am to 9:00 pm
Café	– 6:30 am to 2:30 pm (7 days)
Ground floor BBQ courtyard	Between 4:00 pm and 7:00 pm. Periodic/occasional use.

Patronage

The maximum capacity for each of the upper level seating areas is:

– 52 outdoor open balcony seats (eastern balcony)
– 36 enclosed space seats
– 20 outdoor café seats (western veranda)
– 54 internal café / bar seats.

The outdoor balcony and the enclosed space is expected to be primarily used by the bar operations, with the internal seats to be shared between the café and bar operations. The western veranda is expected to be used by café patrons

The club expects to have occasional live music performances on the outdoor balcony or in the main hall.

Mechanical plant

There is to be a mechanical exhaust to the first floor BBQ located on the upper awning.

2.2 Study area

The proposal is located at 2 Malcom Street, Narrabeen on land zoned under the Warringah Local Environmental Plan (LEP) (2011) as RE1: Public Recreation. The nearest residential receivers lie immediately to the west of the SLSC along Ocean Street and are on land zoned as R2: Low Density Residential. A mixed use building with a commercial Food and Beverage premises on the ground floor and residential apartments above is located on Malcolm Street to the south of the site. Due to the citing of the patron areas this receiver is the most impacted receiver to the site. North Narrabeen Beach is located directly to the east, and the Narrabeen lagoon is located to the North.

Identified noise sensitive receivers in the vicinity of the proposal are provided in Table 2.2. Receivers are also shown in Figure 2.1 Achieving compliance at these nearest noise sensitive receivers ensures compliance at all receivers as they are predicted to receiver lower noise levels due to their increased relative distance to the proposal site.

1 Malcolm Street (R06) has been identified as a Commercial receiver. It has conservatively been assumed to be a residential receiver for the purposes of this assessment.

The location of the SLSC, surrounding sensitive receivers, noise monitoring location and land zonings are shown in Figure 2.1.

Table 2.2 Identified noise sensitive receivers

Receiver ID	Address	Land Use	Description
R01	232-234 Ocean Street	Residential	Apartment complex facing the lagoon
R02	226-228 Ocean Street	Residential	Three story residence
R03	224 Ocean Street	Residential	One story residence
R04	220 Ocean Street	Residential	Three story residence – logger deployment address
R05	216 Ocean Street	Residential	Three story apartments
R06	1 Malcolm Street	Commercial	Oceans Narrabeen café/restaurant
R07	211 Ocean Street	Residential/Commercial	Ground floor eateries with second story residential apartments
R08	214 Ocean Street	Residential	Apartment block
R09	3 Malcolm Street	Residential	House
R10	5 Malcolm Street	Residential	House
R11	7 Malcolm Street	Residential	House
R12	9 Malcolm Street	Residential	House
R13	6-8A Malcolm Street	Residential	Adjoined town houses

Paper Size ISO A4

0 25 50 m

Map Projection: Mercator Auxillary Sphere
Horizontal Datum: WGS 1984
Grid: WGS 1984 Web Mercator Auxillary Sphere

GHD

Northern Beaches Council
North Narrabeen SLSC
Acoustic Assessment

Proposal site, noise sensitive receivers, noise monitoring location and land zoning

Project No. 12618094
Revision No. 0
Date. 14/08/2023

FIGURE 2.1

Document Path: \\ghdnet\ghd\AU\Sydney\Projects\21\12618094\Tech\Noise\03_GIS\nslsc.qgz

Print Date:

Data Source:

Created By: Christopher Doyle

2.3 Noise monitoring program

The methodology for the noise monitoring program includes the following:

– Noise monitoring was conducted from Friday 13 July to Tuesday 25 July 2023.

– A calibration check was performed on the noise monitoring equipment using a sound level calibrator with a sound pressure level of 94 dBA at 1 kHz. At completion of the measurements, the meter's calibration was re-checked to ensure the sensitivity of the noise monitoring equipment had not varied. The noise loggers were found to be within the acceptable tolerance of ± 1 dBA.

– Noise monitoring was undertaken using a Svan 977 environmental noise logger. The noise logger was programmed to accumulate LA90, LA10, and LAeq noise descriptors continuously over the entire monitoring period. Details of the noise monitoring equipment are provided in Table 2.3.

– The data collected by the logger was downloaded and analysed, and any invalid data removed. Invalid data refers to periods of time where average wind speeds were greater than 5 m/s (adjusted for ground level) or when rainfall occurred. Meteorological data was sourced from the Terrey Hills AWS (ID 66059) which is located 7.5 km from the site.

– Unattended noise monitoring was conducted by a competent Acoustic Engineer Chris Doyle, who:

  - is a member employee of GHD, a member firm of the Association of Australasian Acoustical Consultants (AAAC)
  - possess the qualification Bachelor of Mechanical Engineering, attained at the University of New South Wales (UNSW) in 2021

– All noise monitoring activities were undertaken and processed in accordance with the Noise Policy for Industry (EPA 201) long-term monitoring methodology. All noise logger settings and descriptors used were based on this method.

Table 2.3 provides noise monitoring equipment details. Table 2.4 provides a summary of daily noise monitoring results. The

Table 2.3 Noise monitoring equipment details

Location	Equipment details	Equipment settings	Logger photo
220 Ocean Street, Narrabeen	Svan 977 Type 1 Sound level meter SN: 36873 IEC 61672-3:2013 Compliant Manufactured prior 2019 1.5 m above ground level Free-field conditions	A-Weighted Fast time response 15-minute intervals Pre and post calibration: 0.30 dB	

Table 2.4 Daily noise monitoring results

Day	Rating background level (RBL) $L_{A90(15min)}$, dBA[1]			Ambient $L_{Aeq(15min)}$ noise level, dBA[1]		
	Day	Evening	Night	Day	Evening	Night
Thursday-13-Jul-23	53	50	42	62	58	54
Friday-14-Jul-23	51	45	40	61	58	53
Saturday-15-Jul-23	49	42	36	60	56	51
Sunday-16-Jul-23	48	44	42	62	56	54
Monday-17-Jul-23	51	50	42	61	60	54
Tuesday-18-Jul-23	49	41	37	60	56	53
Wednesday-19-Jul-23	49	50	47	61	58	54
Thursday-20-Jul-23	52	45	42	62	60	53
Friday-21-Jul-23	50	49	48	61	60	53
Saturday-22-Jul-23	51	51	47	62	57	54
Sunday-23-Jul-23	50	49	49	62	57	59
Monday-24-Jul-23	52	51	46	62	58	54
Tuesday-25-Jul-23	49	-	-	62	-	-
Overall	**50**	**49**	**42**	**61**	**58**	**54**

Note 1:

Day – 7:00 am to 6:00 pm

Evening – 6:00 pm to 10:00 pm

Night – 10:00 pm to 7:00 am

Note 2: Red text indicates that the measurement period had a significant portion of the data excluded from the measurement.

2.4 International Standard ISO 226 : 2003

The ISO 226 :2003 – Normal Equal-Loudness-Level contours presents *Tf* values for the threshold of human hearing in third octave bands. The *Tf* corresponding to each octave band centre frequency is presented in Table 2.5 below.

Table 2.5 Threshold of human hearing (ISO 226:2003 Table 1)

Weighting	dB in octave bands [Hz]								
	31.5	63	125	250	500	1000	2000	4000	8000
Z - weighted	59.5	37.5	22.1	11.4	4.4	2.4	-1.3	-5.4	12.6
A - weighted	20.1	11.3	6	2.8	1.2	2.4	-0.1	-4.4	11.5

Where octave band background noise levels are below the threshold of human hearing, the A-weighted threshold of human hearing will be used.

2.5 Octave band background noise levels

The criteria presented in Section 3.3 below requires the assessment of noise emission in octave bands. Octave band background noise levels are presented in Table 2.6.

Table 2.6 Octave band background noise levels

Time period	RBL L_{A90} in octave bands [Hz], dB(A)								
	31.5	63	125	250	500	1000	2000	4000	8000
External – 7 am to 6 pm	20(13)[1]	24	32	38	42	46	42	32	18
External – 6 pm to 10 pm	20(9)[1]	21	28	34	39	40	35	26	15
External – 10 pm to 12 am	20(7)[1]	17	25	30	35	36	30	22	14

Note 1: Octave band background noise level below threshold of human hearing. A-weighted threshold of human hearing used instead.

3. Noise criteria

3.1 Existing Consent Conditions

A review of existing consent conditions for the SLSC was undertaken and no conditions relevant to the emission of noise from the site was identified.

3.2 Warringah DCP (2011)

A review of the relevant Northern Beaches Council DCP (Warringah DCP) was undertaken and the following guidance in regard to noise emission is provided:

D3 Noise

Requirements:

1. *Noise from combined operation of all mechanical plant and equipment must not generate noise levels that exceed the ambient background noise by more than 5dB(A) when measured in accordance with the NSW Industrial Noise Policy at the receiving boundary of residential and other noise sensitive land uses.*
2. *Development near existing noise generating activities, such as industry and roads, is to be designed to mitigate the effect of that noise.*

5. Where possible, locate noise sources away from the bedroom areas of adjoining dwellings/properties to minimise impact

It is noted that the NSW Industrial Noise Policy has been superseded by the Noise Policy for Industry, which will be referred to when appropriate. Table 3.1 provides the adopted criteria for the assessment of mechanical plant noise from the proposal. Requirement 1 has been used to determine the noise emission criteria for the operation of mechanical plant from the proposal.

Table 3.1 Mechanical plant noise emission criteria, dBA

Time Period	Rating background noise level, $L_{A90,\ 15\ min}$	Mechanical plant noise emission criteria, $L_{Aeq,\ 15\text{-}minute}$
Day	50	55
Evening	49	54
Night	42	47

3.3 LGNSW noise condition

Noise emissions from the proposed development have the potential to be conditioned by the LGNSW under the Liquor Act 2007 (generally in response to a noise complaint), however it is not a mandatory condition at the commencement of operation. This noise condition is considered most appropriate when assessing noise emissions from patrons and from live music operations. The standard wording of the condition being;

> *The LA10 noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz–8kHz inclusive) by more than 5dB between 7:00 am and 12:00 midnight at the boundary of any affected residence.*
>
> *The LA10* noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz–8kHz inclusive) between 12:00 midnight and 7:00 am at the boundary of any affected residence.*
>
> *Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12:00 midnight and 7:00 am.*

Noting that no bar operations are proposed between the hours of 12:00 am midnight and 7:00 am and as such no noise impacts are anticipated during this period and have not been considered further in this report. Based on the octave band background noise levels measured during the noise monitoring program (presented in Section 2.5), Table 3.2 provides the adopted criteria for the assessment of music and patron noise.

Table 3.2 Patron and music noise emission criteria in octave bands [Hz], dBA

Time period	Patron and music noise emission criteria in octave bands [Hz] $L_{A10(15min)}$, dB(A)								
	31.5	63	125	250	500	1000	2000	4000	8000
External – 7 am to 6 pm	25	29	37	43	47	51	47	37	23
External – 6 pm to 10 pm	25	26	33	39	44	45	40	31	20
External – 10 pm to 12 am	25	22	30	35	40	41	35	27	18

4. Patron and live music assessment

4.1 Modelling inputs and parameters

Noise emission modelling was undertaken using CadnaA 2021. CadnaA is a computer program for the calculation and assessment of noise exposure. Environmental noise propagation in CadnaA was calculated using the ISO 9613 algorithm.

The following noise modelling assumptions were made to establish site specific conditions:

– Surrounding land was modelled assuming to be 50% hard ground and 50% soft ground with a ground absorption coefficient of 0.50
– Modelled scenarios consider the shielding effect from surrounding buildings and structures on and adjacent to the site.
– Each residential receiver identified in Table 2.2 has a receiver modelled externally at \the worst affected section of façade.
– Receivers were assessed at the most exposed faced to transmission which are windows or balconies areas

The following meteorological conditions were used in the model:

– Atmospheric air absorption was based on an average temperature of 10 °C and an average humidity of 70 %. These assumptions are considered conservative.

4.2 Modelling scenarios

Table 4.1 provides the modelling scenarios for the assessment of patron and live music noise emissions from the SLSC. All patron and live music operations are assessed against the LGNSW octave band criteria. Modelled scenarios have been selected to represent worst-case noise emissions from the site which would mainly be associated with live music events expected to be held occasionally at the club (a few times a year).

Three live music scenarios have been modelled in the new enclosed area of the SLSC. Each scenario conservatively assumes all seating areas are at full capacity. The first scenario assumes live music operations are occurring during the day period (until 6 pm) and that all sliding doors to the balcony are fully open. The second live music scenario assumes that only the balcony sliding door to the north is open, with all the others closed. This is expected to occur during the evening period (between 6 pm and 10 pm). Figure 4.1 shows the section of the façade that is to be closed in the ‘half closed’ live music scenario. The third live music scenario assumes that all sliding doors on the balcony are fully closed.

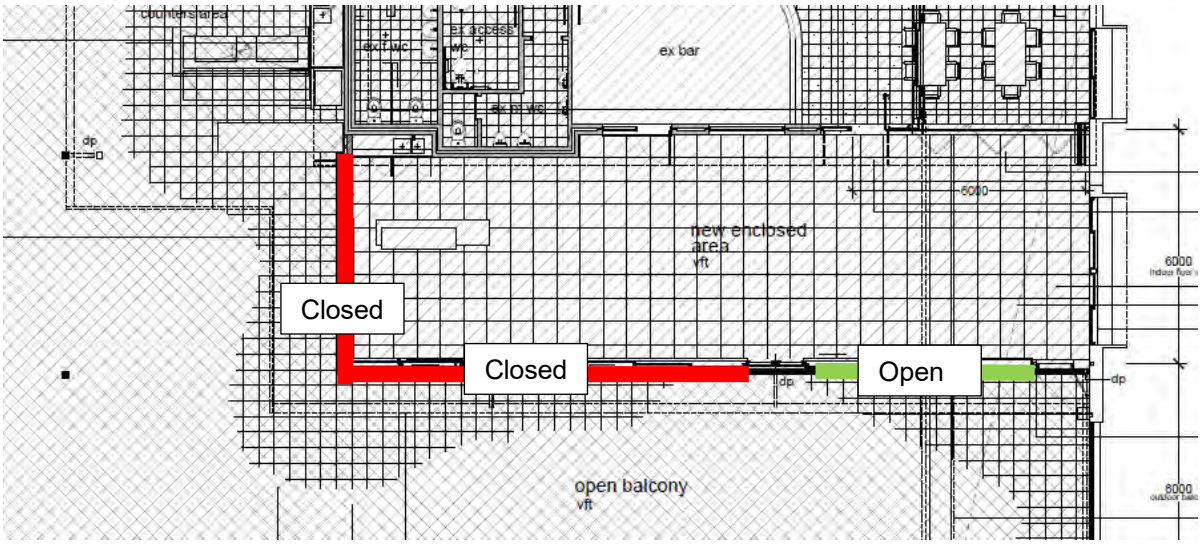


Figure 4.1 Configuration of closed sliding doors for ‘half closed’ scenario

Table 4.1 Noise modelling scenarios

Scenario and applicable time periods	Scenario description	Source parameters	Attenuation
S01 **Patrons Only** 7:00 am to 12:00 midnight	Conservatively assume 100% capacity of each seating area (as provided in Section 2.1), with light background music underneath patrons talking	Assuming half of the people are talking at any given time with: – 50% of those are speaking at a normal level – 30% at a raised level and – 20% at a loud level. Each patron area has: – 26 people speaking on the Eastern balcony with a cumulative SWL of **91 dBA** – 18 people speaking in the enclosed area with a cumulative internal reverberant Sound Pressure Level (SPLi) of **78 dBA**. – 27 people speaking in the internal café / bar area with a SPLi of **81 dBA**. – 10 people speaking on the café / bar western veranda with a cumulative SWL of **83 dBA.**	Glass doors to enclosed area and internal café / bar area assumed to be open
S02 **Enclosed Space – Open** 7:00 am to 6:00 pm	Conservatively assume 100% capacity of each seating area, with break out noise from the enclosed space. All doors between balcony and enclosed space assumed to be fully open.	All patron areas fully occupied as Patron Scenario above, with the Enclosed Space having live music and an SPLi of **90 dBA** (Based on previous measurements of amplified music operations)	Glass doors to enclosed area assumed open
S03 **Enclosed Space – Half Closed** 7:00 am to 10:00 pm	Conservatively assume 100% capacity of each seating area, with break out noise from the enclosed space though 4 mm pane glass. Assumed that the southern half of sliding glass doors between balcony and enclosed area are closed as shown in Figure 4.1.	As above with glass doors to enclosed area half closed. Glazing is expected to be 6 mm or 8 mm laminated glass	Glass doors to enclosed area assumed **closed** Rw 30
S04 **Enclosed Space - Closed** 7:00 am to 12:00 midnight	Conservatively assume 100% capacity of each seating area, with break out noise from the enclosed space though 4 mm pane glass. All sliding glass doors between balcony and enclosed area are closed.	As above with glass doors to enclosed area entirely closed. 4 mm pane glass assumed	Glass doors to enclosed area assumed **closed** Rw 30

4.3 Modelling results

4.3.1 Patron and live music noise levels

Table 4.2 provides the overall predicted noise levels at the receivers for the bar and café operational scenarios. For all scenarios, predicted noise levels are highest at R07 to the south of the site. This receiver is mixed use with residential apartments on the upper levels. Noise levels are next highest at receivers along Ocean Street, the receiver along Ocean Street with the highest noise level is different for each scenario. Results have been presented for R07 and the most impacted receiver along Ocean Street for that scenario. Compliance at these two

receivers for each scenario ensures compliance at all receivers for that scenario. Each scenario has been presented against the most stringent criteria that is applicable for that scenario.

Table 4.2 Overall received noise levels

Receiver	Predicted overall received noise level L_{Aeq}, dBA			
	S01	S02	S03	S04
R01	38	39	38	38
R02	**41**	42	**41**	**41**
R03	40	41	40	40
R04	**41**	43	**41**	**41**
R05	40	**44**	40	40
R06	39	42	39	39
R07	**41**	**46**	**41**	**41**
R08	37	41	37	37
R09	39	42	39	39
R10	26	30	27	26
R11	22	28	24	22
R12	19	26	22	19
R13	36	39	36	36

Table 4.3 Predicted octave band noise levels (S01 – Patrons only scenario – 10 pm to 12 midnight criteria)

Receiver	LGNSW night criteria L_{A10} octave-band, Hz								
	31.5	63	125	250	500	1k	2k	4k	8k
	25	22	30	35	40	41	35	27	18
R07	0	0	6	25	36	38	31	21	1
R02	0	0	7	26	37	38	31	22	4

Table 4.4 Predicted octave band noise levels (S02 – Enclosed space live music – doors open – 7 am to 6 pm criteria)

Receiver	LGNSW day criteria L_{A10} octave-band, Hz								
	31.5	63	125	250	500	1k	2k	4k	8k
	25	29	37	43	47	51	47	37	23
R07	3	29	30	37	40	42	39	34	22
R05	1	27	28	34	38	40	36	31	19

Table 4.5 Predicted octave band noise levels (Enclosed space live music – doors half closed – 6 pm to 10 pm criteria)

Receiver	LGNSW evening criteria L_{A10} octave-band, Hz								
	31.5	63	125	250	500	1k	2k	4k	8k
	25	26	33	39	44	45	40	31	20
R07	0	25	24	31	36	37	31	23	6
R02	0	22	21	28	37	38	31	24	9

Table 4.6 Predicted octave band noise levels (Enclosed space live music – doors closed – 10 pm to 12 midnight criteria)

Receiver	LGNSW night criteria L_{A10} octave-band, Hz								
	31.5	63	125	250	500	1k	2k	4k	8k
	25	22	30	35	40	41	35	27	18
R07	0	15	13	26	36	38	31	22	2
R02	0	13	11	26	37	38	31	22	5

4.4 Discussion

4.4.1 Patron noise

The patron noise assessment is conservative and assumes the bar and café areas are at 100% capacity and that all doors between patron areas and the external environment are open. The scenario is assessed in Table 4.3 against the most stringent LGNSW criteria (the night shoulder criteria) and is compliant. Therefore, no noise impacts are expected to occur during standard patron noise scenarios.

4.4.2 Live music – new enclosed area

During live music operations in the enclosed space and before 6 pm, the sliding doors are expected to be completely open. When assessed against the day time criteria, no noise impacts are predicted to occur.

After 6 pm only the northern most sliding door to the balcony is expected to be open, with the sliding doors to the south being closed. When assessed against the evening criteria (between 6 pm and 10 pm). No exceedances of the LGNSW criteria are predicted.

After 10 pm, the doors are to be fully closed. Noise levels decrease a considerable amount once the enclosed area is fully closed and no exceedances of the night time shoulder criteria (between 10 pm and 12 midnight) are predicted.

5. Mechanical plant assessment

A mechanical exhaust to the first-floor barbecue is proposed as part of the alterations and additions to the SLSC. Exact details of the exhaust are not known at this stage and therefore a conservative SWL has been assumed to provide an indication of compliance with the relevant criteria. The Warringah DCP (2011) provides the appropriate guidance for the assessment of noise from the proposed BBQ mechanical exhaust and it is provided in Section 3.2. The mechanical exhaust is to be mounted to the rooftop awning over the new first floor barbecue area and is to be concealed from the west by the new external cladding. Table 5.1 provides the received noise level at each receiver against the night time mechanical plant noise criteria. Compliance during the most stringent (the night time criteria) ensures compliance during all periods of the day.

The mechanical plant assessment assumes a SWL of **95 dBA.**

Table 5.1 Predicted mechanical plant noise levels, dBA

RID	Criteria	Received level, dBA
R01	$L_{Aeq,\ 15\text{-}minute}$ 47	44
R02		45
R03		45
R04		44
R05		44
R06		43
R07		43
R08		40
R09		42
R10		28

Assuming a SWL of 95 dBA, all noise sensitive receivers are expected to comply with the mechanical plant noise criteria provided in the Warringah DCP (2011).

6. Management and mitigation measures

Mitigation measures and management measured to be incorporated into the plan of management are provided to ensure the acoustic amenity of the surrounding area can be preserved and for compliance with the relevant noise criteria provided in Section 3 be maintained.

- During live music operations within the enclosed area, sliding doors to the balcony are to be partially closed as shown in Figure 4.1 after 6pm.
- During live music operations within the enclosed area, sliding doors to the balcony are to be fully closed after 10pm.
- Live music operations within the enclosed area should not exceed an internal reverberant sound pressure level of 90 dBA and 97 dBC. A sound level meter should be used to confirm the internal noise level.
- Patrons should not congregate in numbers outside the venue, particularly after 10:00 pm.
- The club should ensure that either a member of the club staff or event organisers staff is designated onsite to monitor patron behaviour in, and in the vicinity of, the premises. Practical steps should be taken to ensure the quiet and orderly behaviour of patrons in the venue and also particularly in departing the club after the conclusion of night time events.
- If during operations, a complaint has been lodged from any of the nearby sensitive receivers, the following process should be followed to ensure all complaints are dealt with in an appropriate manner:
  - All complaints should be documented and responded to in a timely, consistent, and sensitive manner.
  - A staff member will be nominated to deal with complaints from the community
  - All complaints will be logged within a complaint register that details the nature of the complaint and the actions taken to address the complaint.
  - The complaint register should be reviewed at regular intervals to identify any common and recurring complaints and measures should be actively taken to reduce the number of complaints.
- In the event of a noise complaint, compliance noise monitoring should be undertaken at the reasonably most affected location of the complainant to determine if the maximum noise levels specified are being adhered to or if further controls are appropriate.

7. Conclusion

GHD has prepared this acoustic assessment to support a development application at North Narrabeen SLSC for additions and alterations to the club. Noise emissions from the premises were assessed against the following criteria:

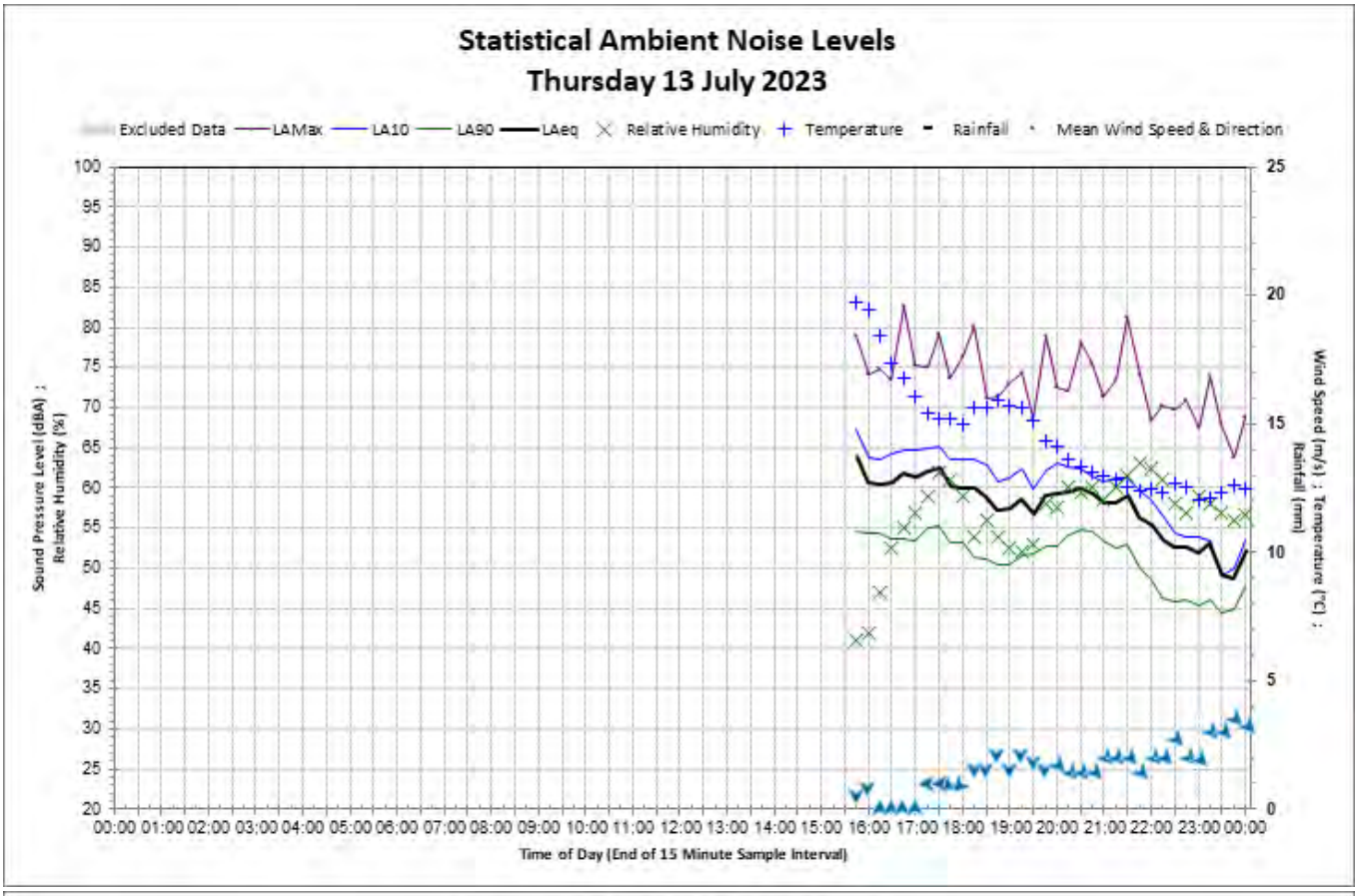
– Liquor and Gaming NSW noise conditions – for the assessment of patron and music noise
– Warringah DCP (2011) – for the assessment of mechanical plant noise

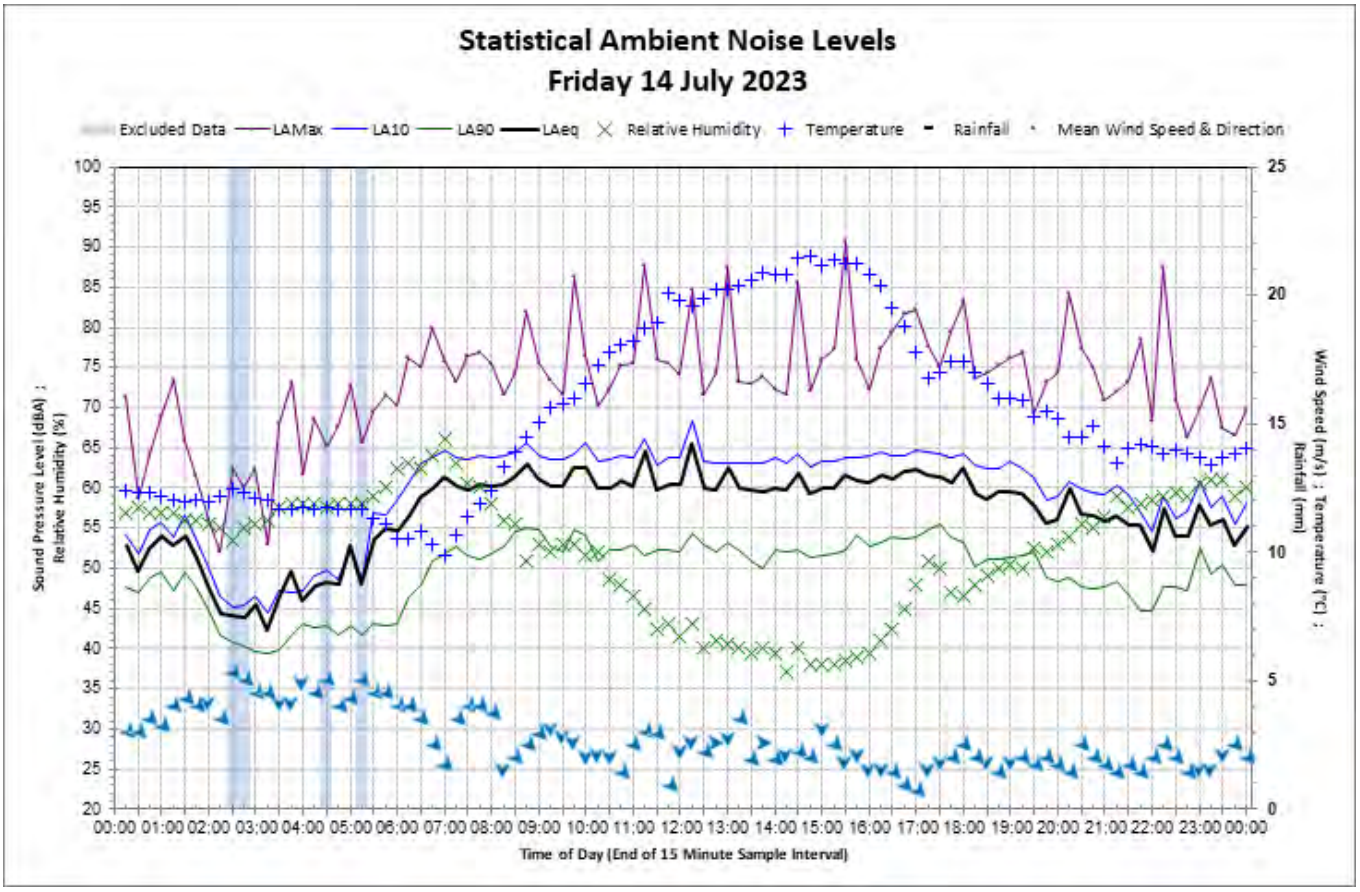
The results of the noise modelling indicates compliance with the assessment criteria for all noise sensitive receivers provided that the mitigation and management measures presented in Section 6 are incorporated into the operational plan of management.

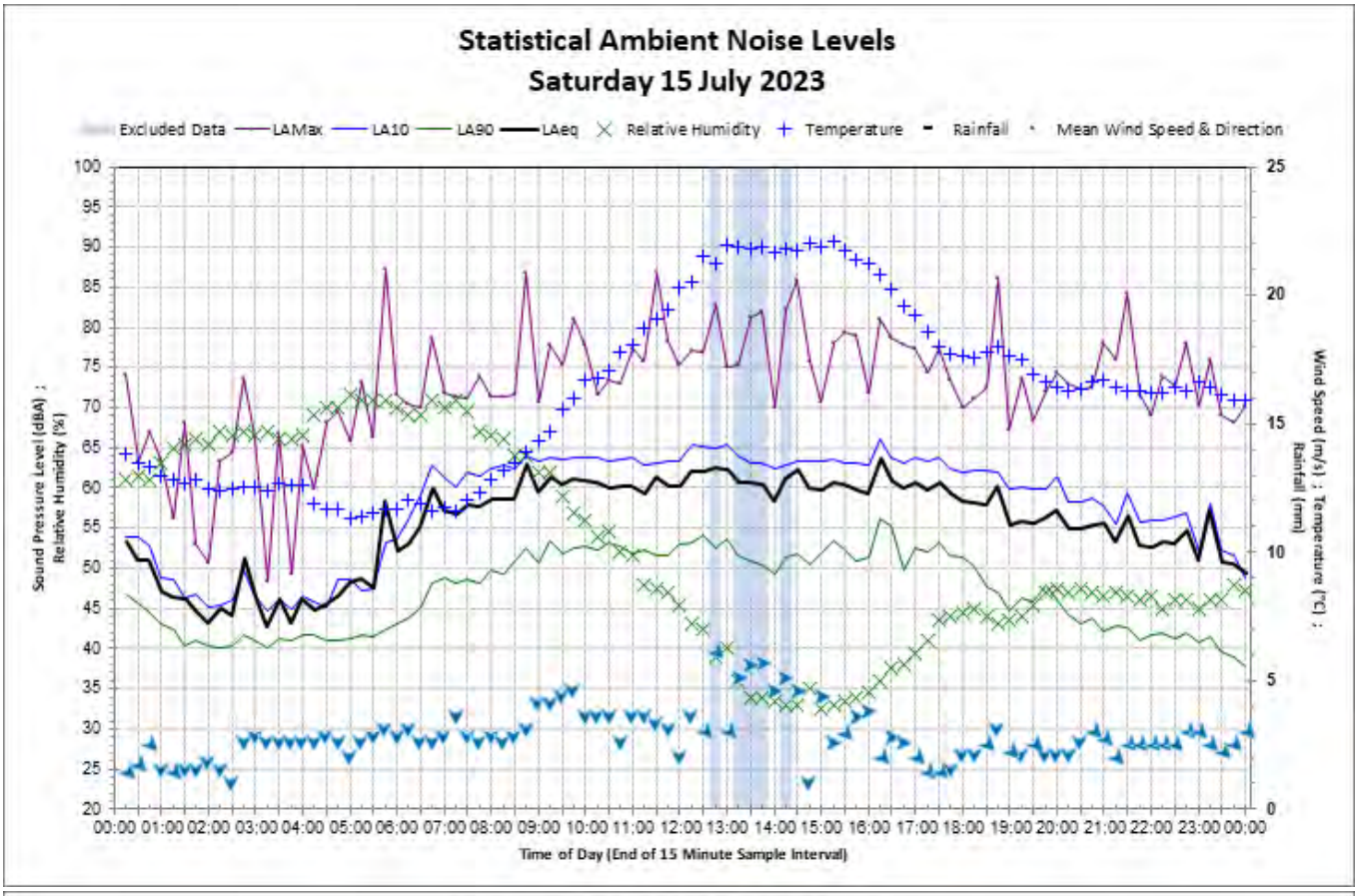
Appendices

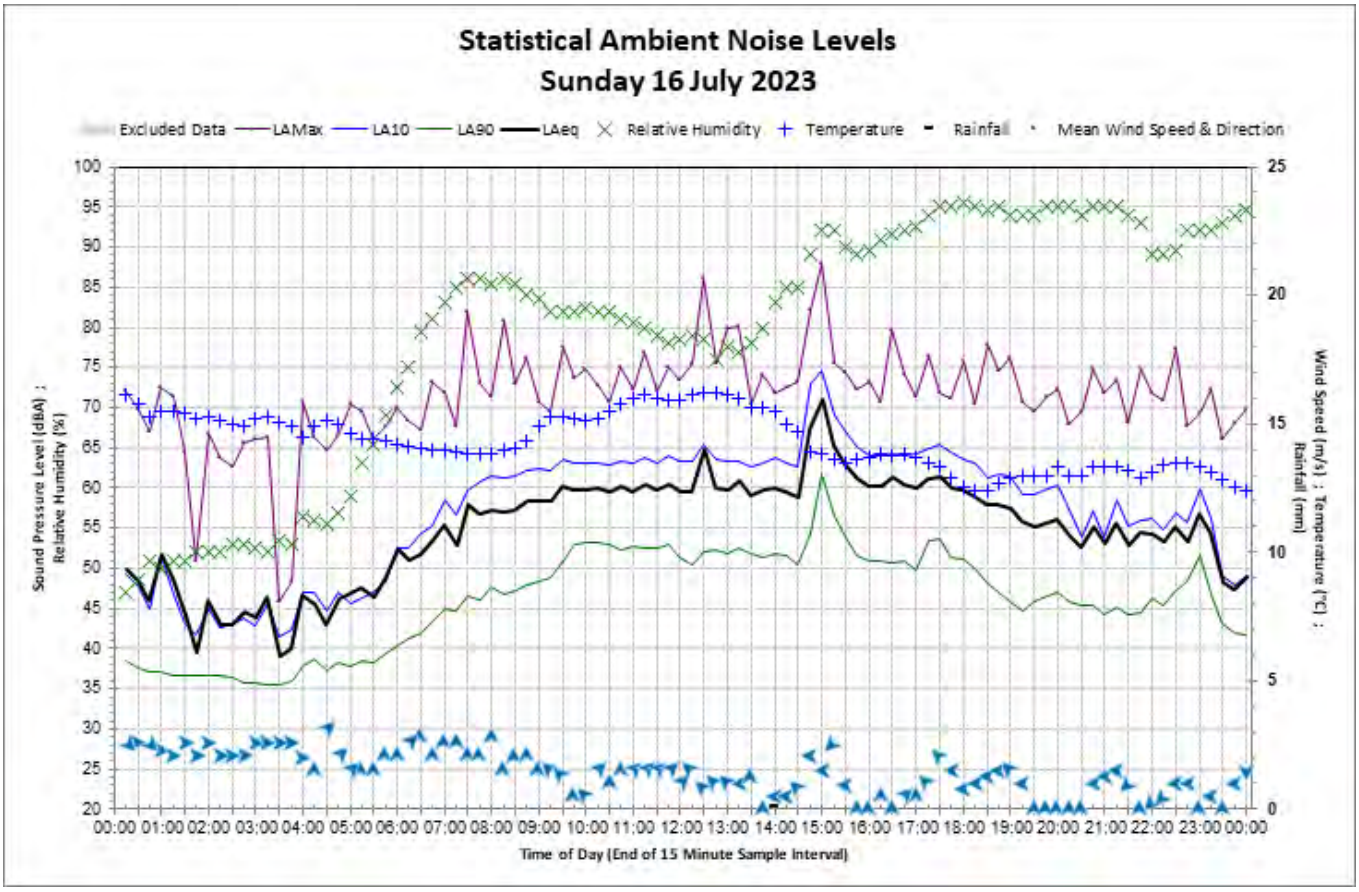
Appendix A

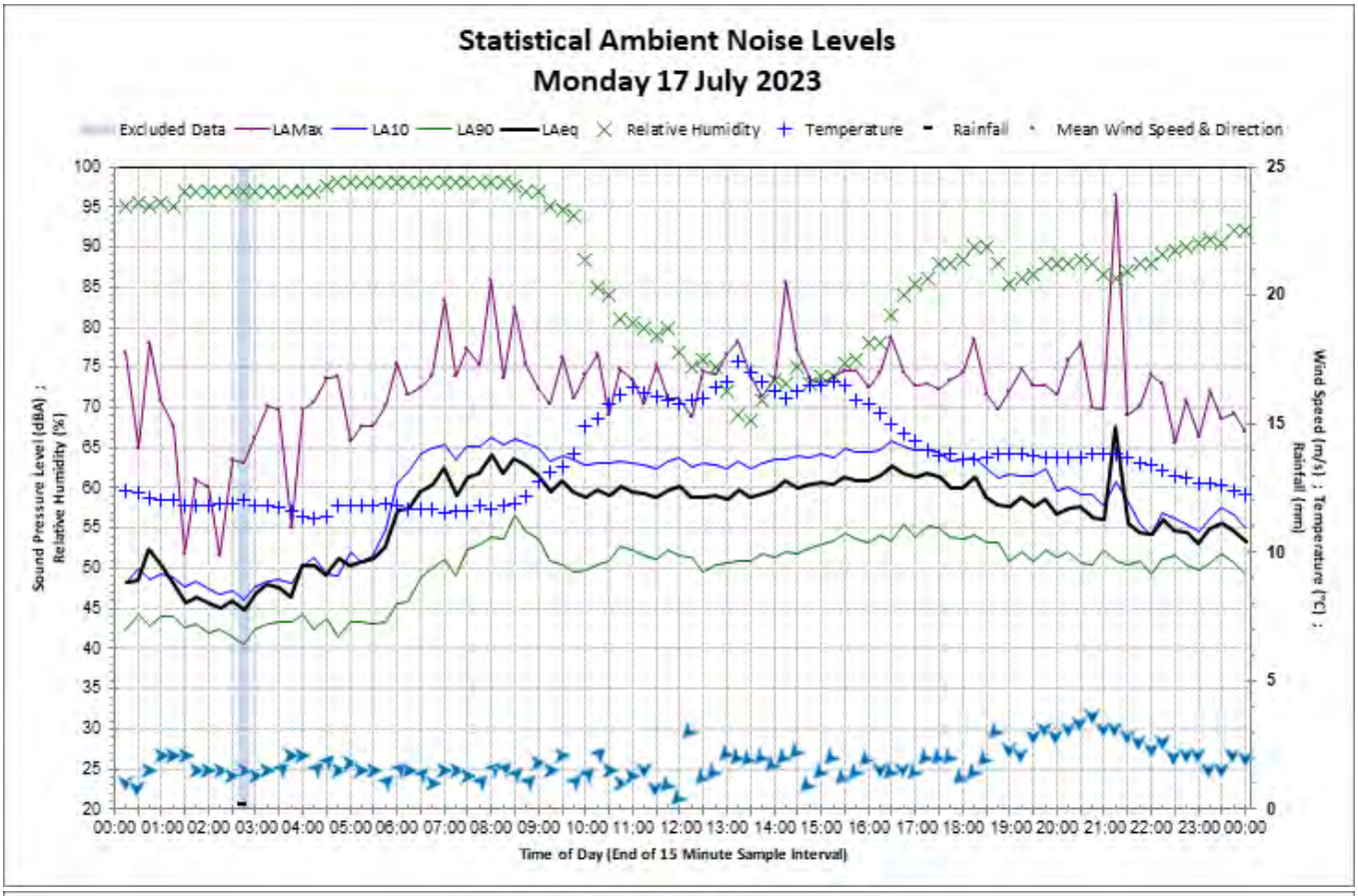
Daily noise monitoring charts

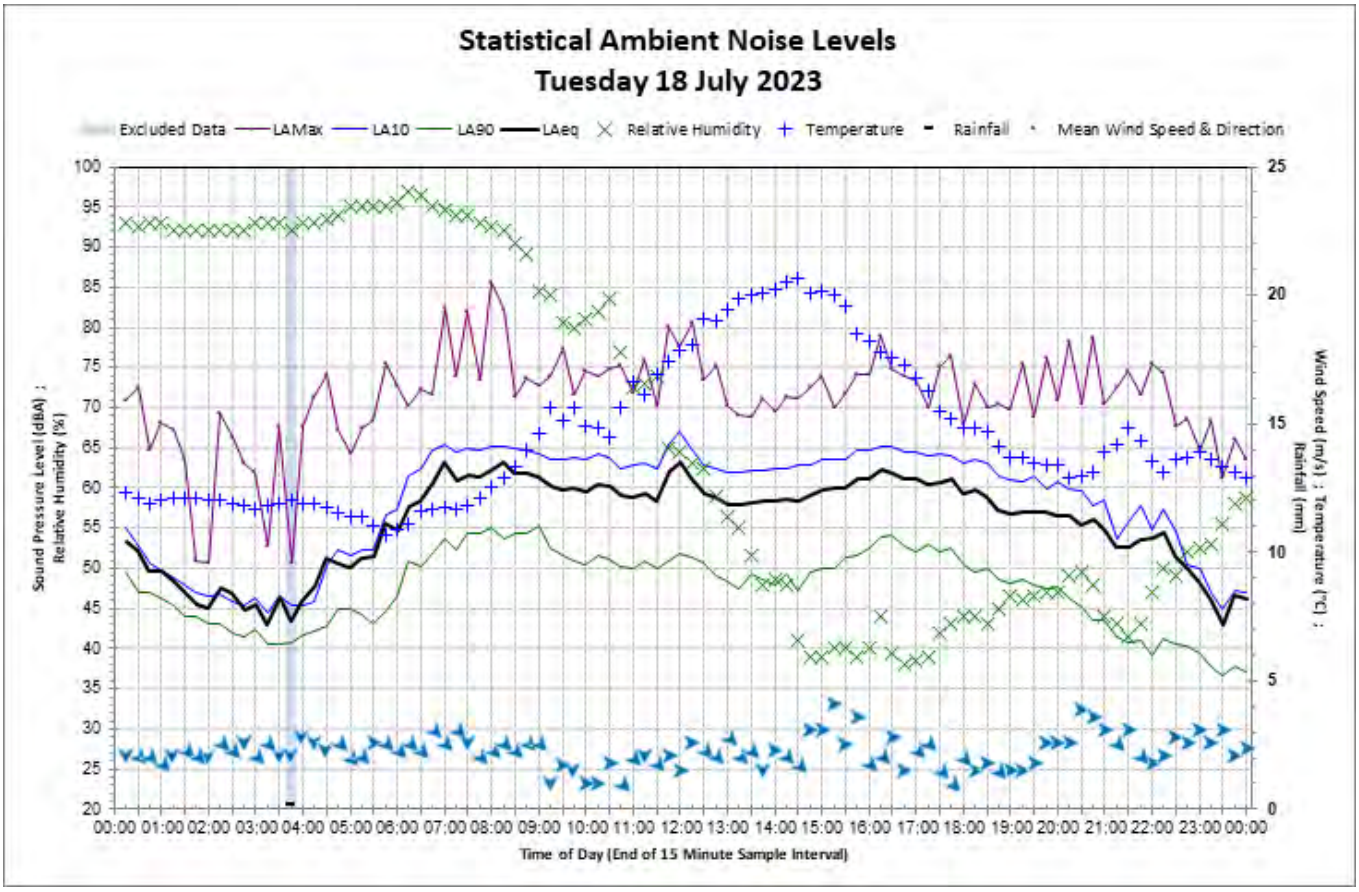


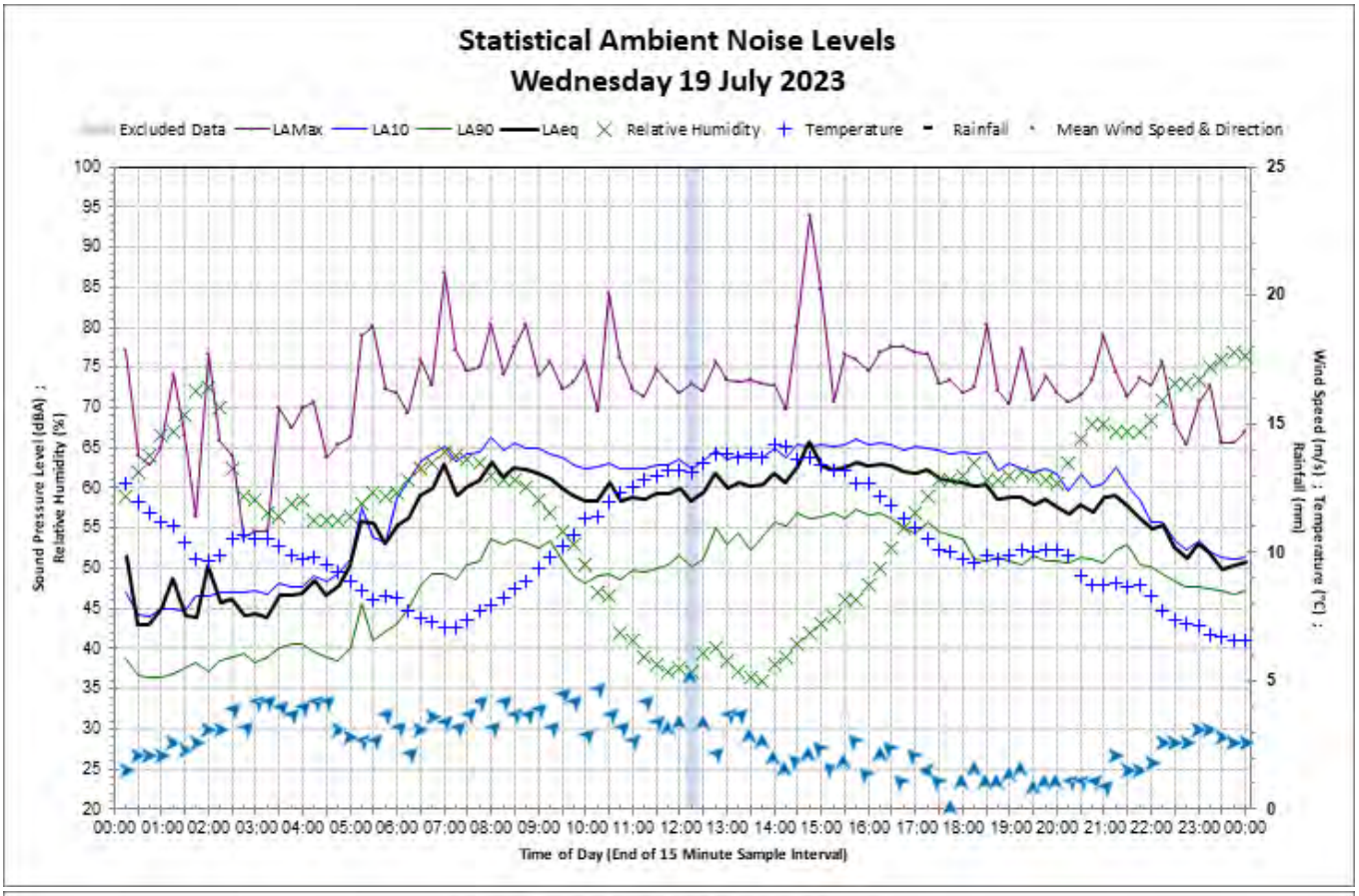


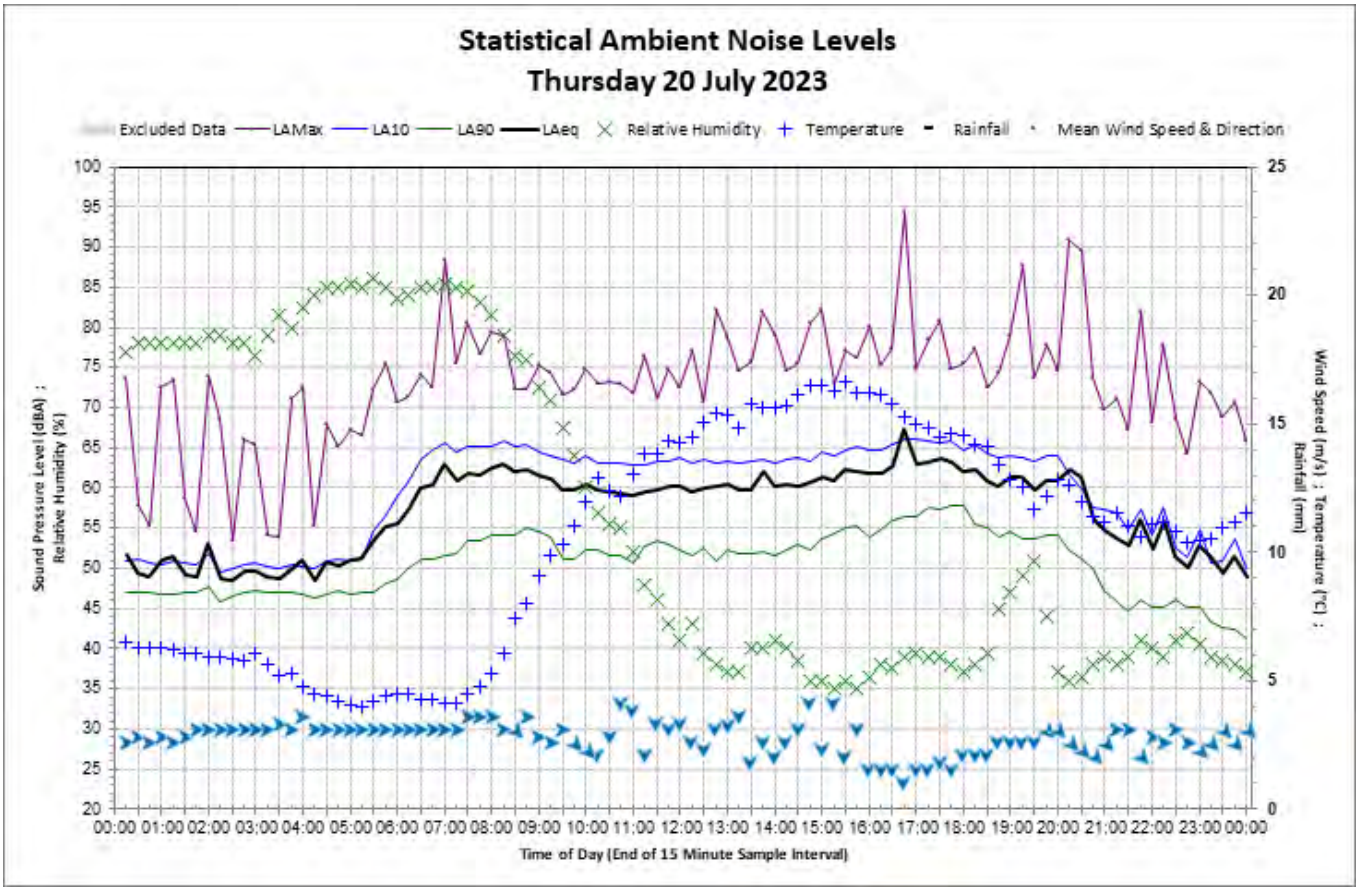


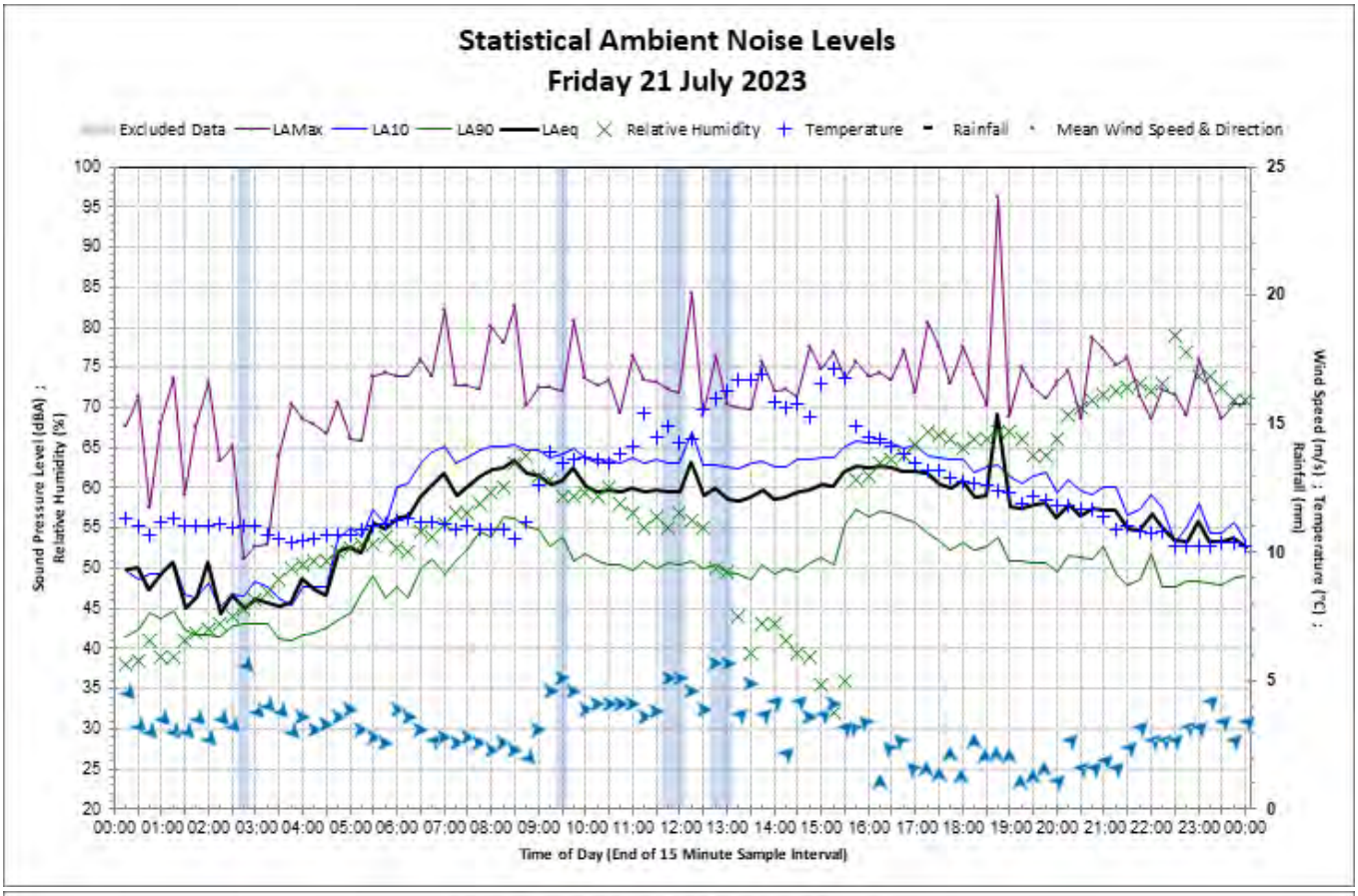


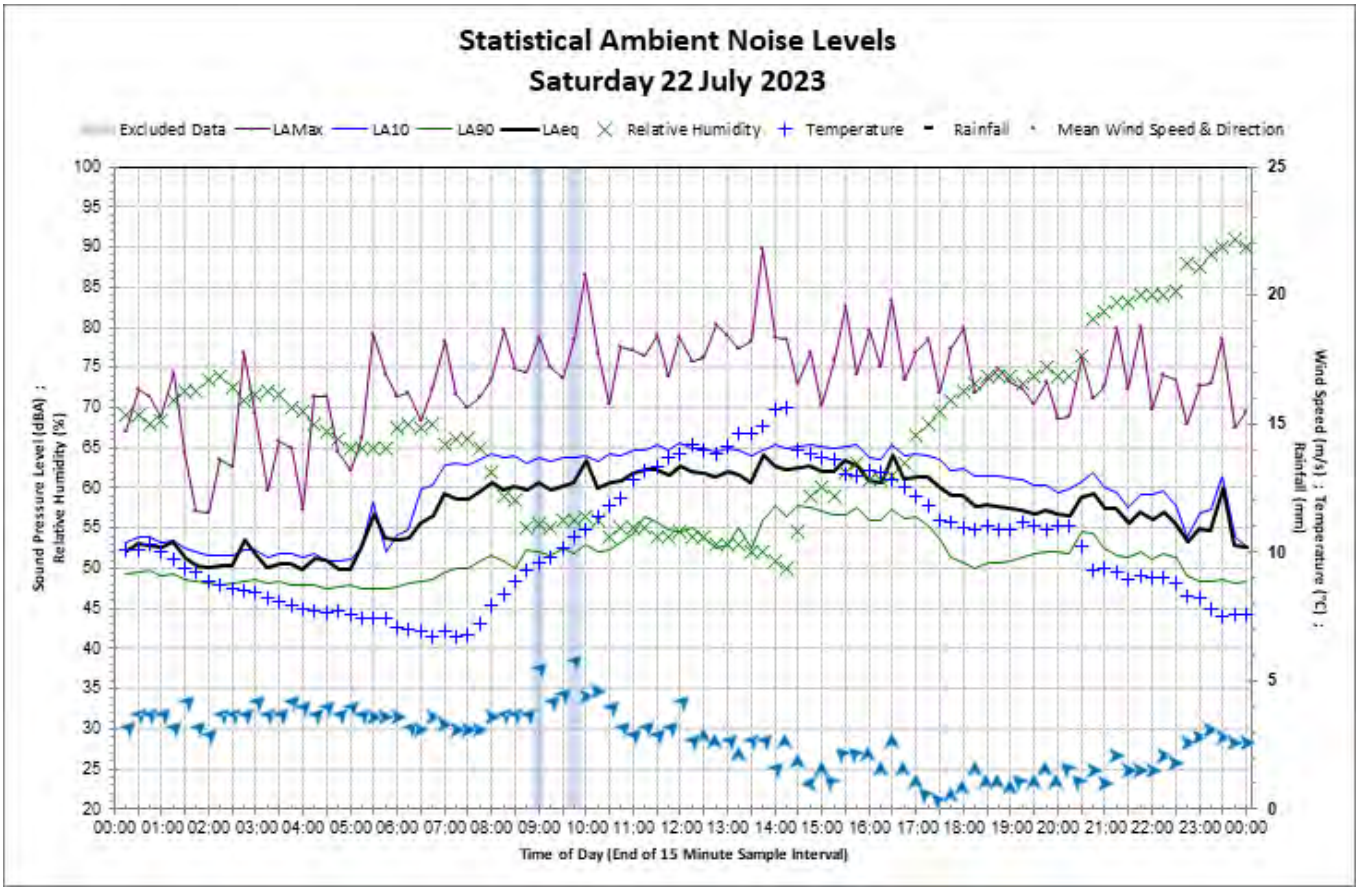


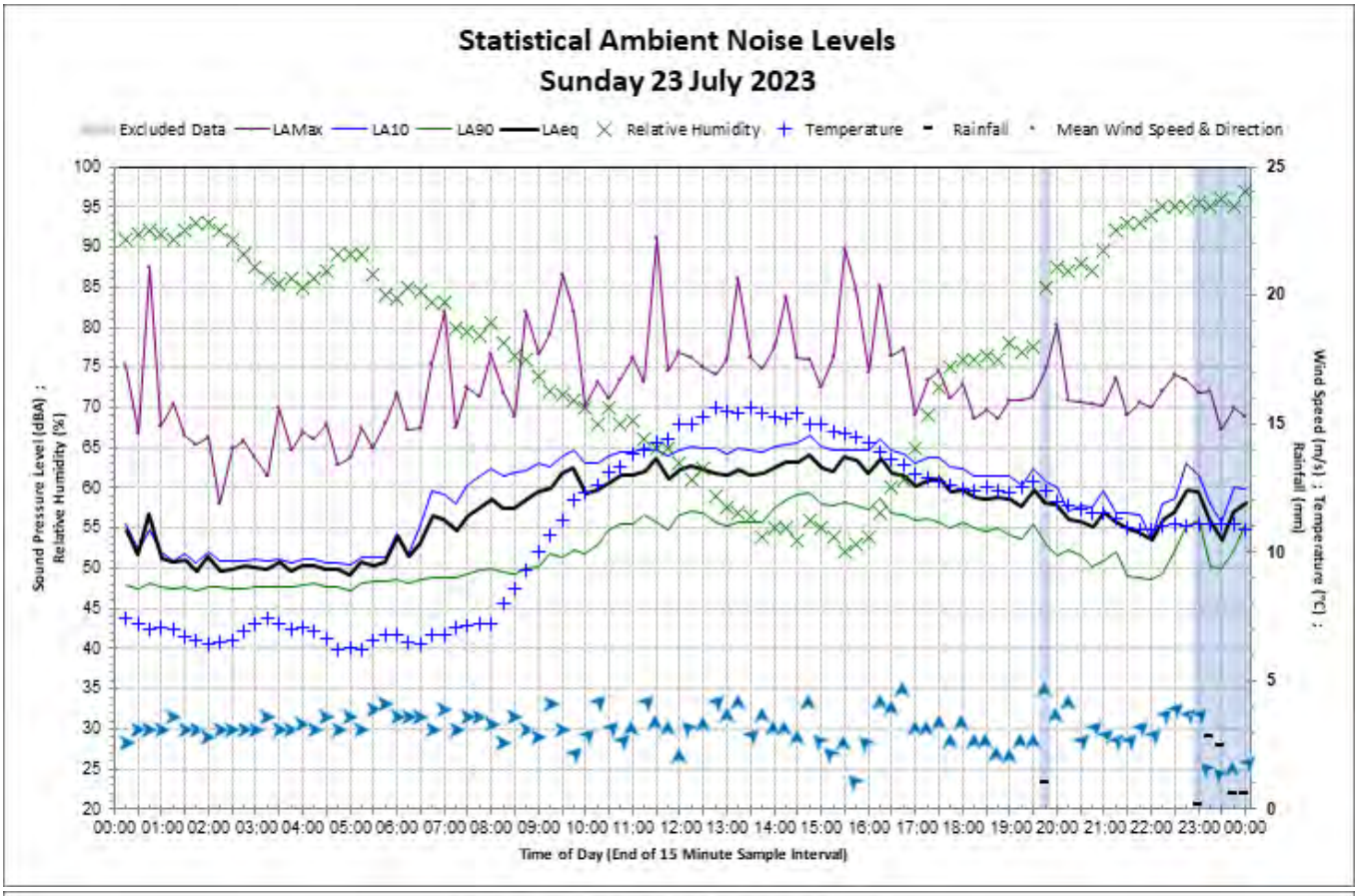


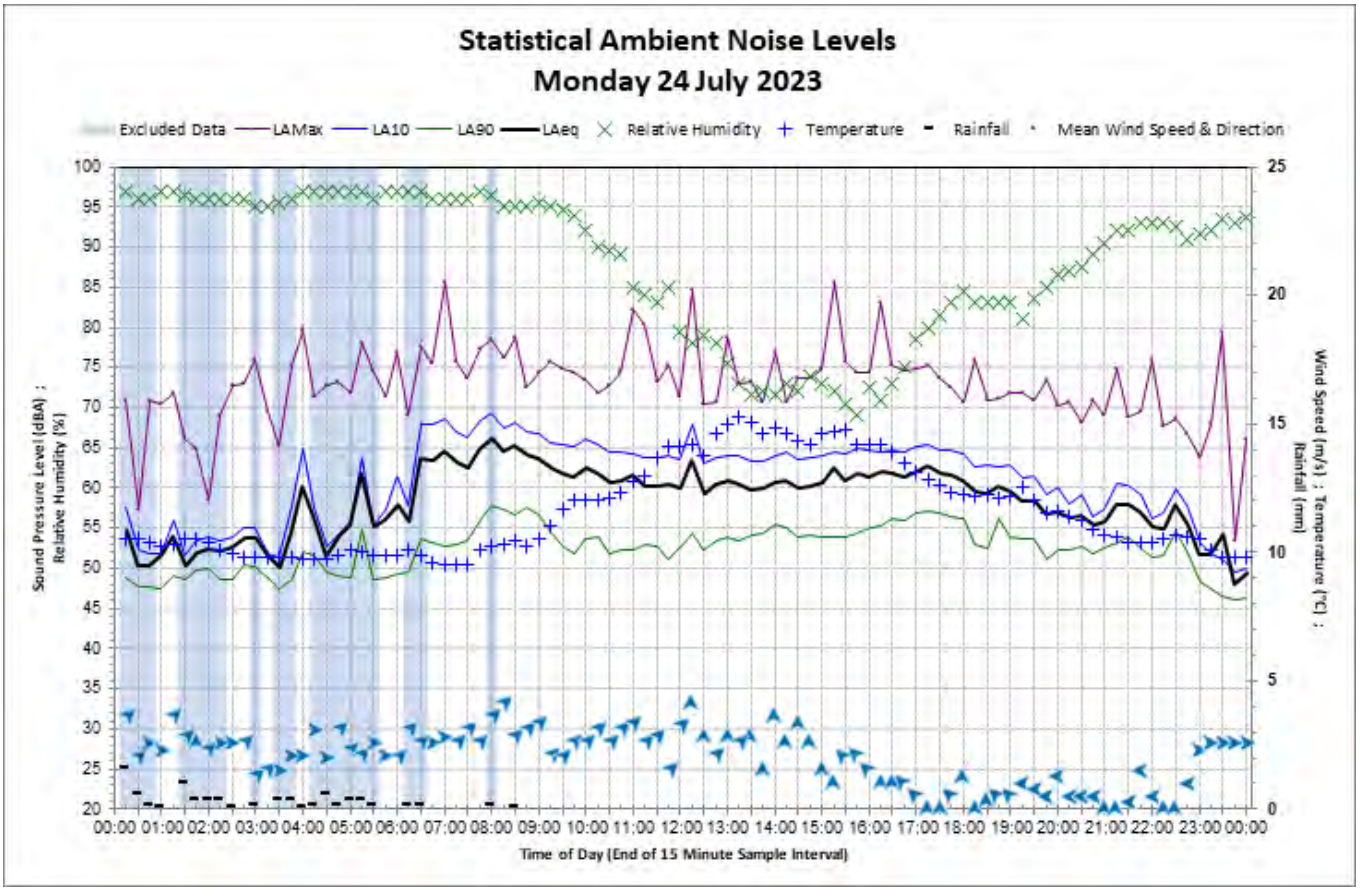


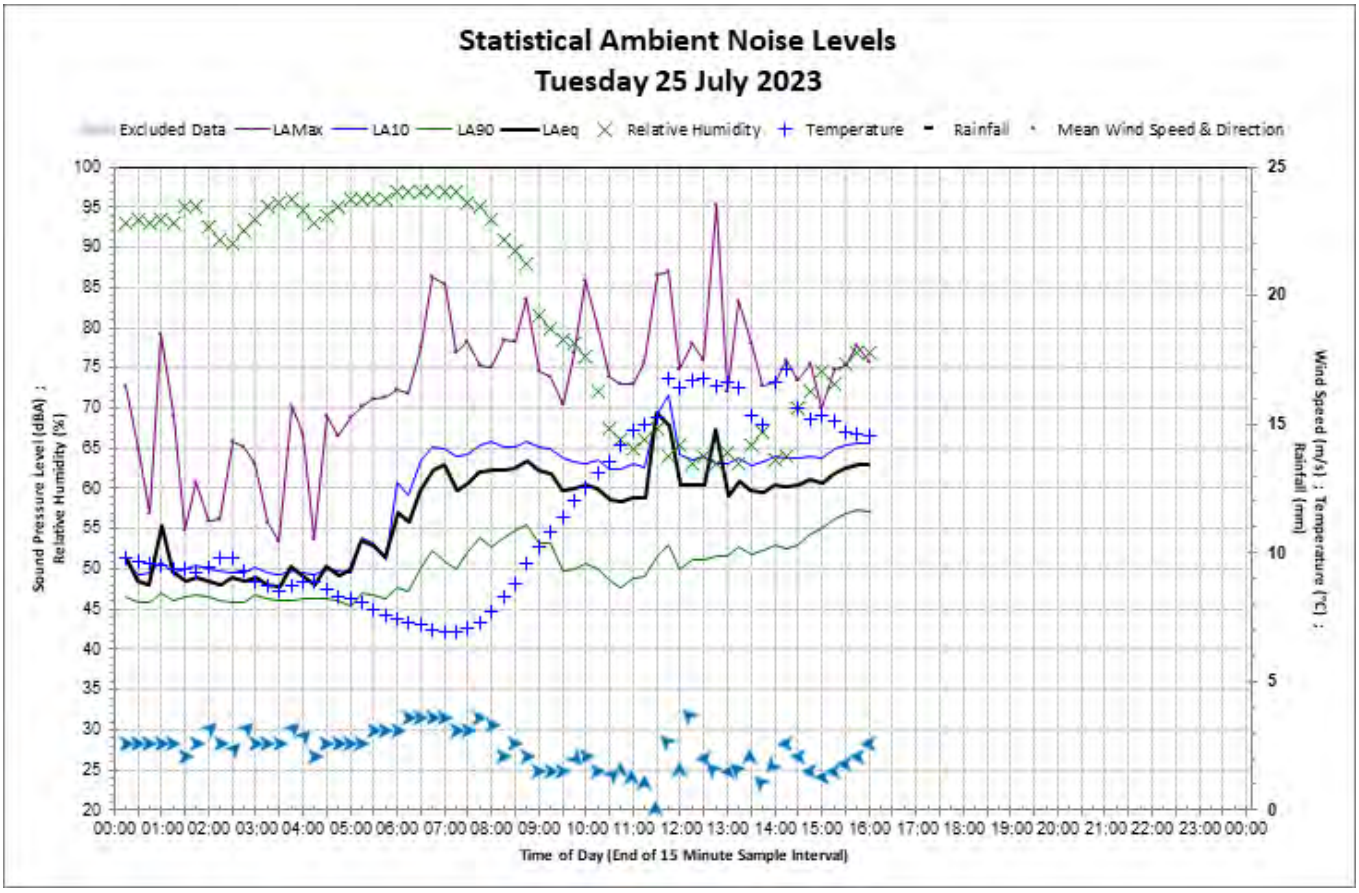












Appendix B

Architectural drawings

North Narrabeen Surf Lifesaving Club alterations and additions project

Development Application - Architectural Drawings register:-

Dwg DAEX01D	- existing ground floor plan (1:100 @ A1)
Dwg DAEX02D	- existing first floor plan (1:100@ A1)
Dwg DAS01D	- survey plan
Dwg DAS02D	- construction sediment control plan (nts use scale bar)
Dwg DA00D	- cover sheet , arch dwgs register , notes and abbreviations
Dwg DA01D	- site plan (1:200 @ A1)
Dwg DEM01D	- demolition works - ground floor plan (1:100 @ A1)
Dwg DEM02D	- demolition works - first floor plan (1:100 @ A1)
Dwg DA02D	- ground floor plan (1:100 @ A1)
Dwg DA03D	- first floor plan (1:100 @ A1)
Dwg DA04D	- roof plan (1:75 @ A1)
Dwg DA05D	- elevations (1:75 @ A1)
Dwg DA06D	- elevations (1:75 @ A1)
Dwg DA07D	- ground floor plan - INC COLOUR SHOWING STAGING (1:100 @ A1)
Dwg DA08D	- first floor plan - (INC COLOUR SHOWING STAGING) (1:100 @ A1)
Dwg DA09D	- roof plan - (INC COLOUR SHOWING STAGING) (1:75 @ A1)
Dwg DA10D	- elevations - (INC COLOUR SHOWING STAGING) (1:75 @ A1)
Dwg DA11D	- elevations - (INC COLOUR SHOWING STAGING) (1:75 @ A1)
Dwg DA12D	- detailed sections (1:50 @ A2)
Dwg DA13D	- detailed sections (1:50 @ A2)
Dwg DA14D	- external materials and finishes board
Dwg DA15D	- aerial view of exist bldg from SW and artist's impression of proposal
Dwg DA16D	- aerial view of exist bldg from NE and artist's impression of proposal

aerial photo location plan


aerial photos of existing building SW and NE views

GENERAL NOTES :-

All works to comply with all relevant Australian Standards , NCC and BCA requirements

- all works as relevant to comply with AS1428-2021
- Demolition works to be carried out in line with NSW Government Code of Pratice Demolition Work August 2019
- All RL's (reduced levels) shown on the drawings are Australian Height Datum.
- works affecting those parts of the existing building identified as asbestos sheet in '*PRM-Destructive Hazardous Building Materials Survey*' for the building are to be carried out in the manner set out in that report.
- As per Safework NSW , all asbestos removal , disposal , air monitoring , provision of clearance inspections and issuing of clearance certificates for removal of friable asbestos must be carried out by a NSW Government licensed asbestos removalist.
- the contractor is to ensure there is no water ponding on tiled floors , and external paved areas providing sufficient falls in this flooring to ensure all water drains to the nearest floor waste, grated drain, stormwater pit and outer edge of concrete walkways and slabs.
- Concrete block wall construction to comply with CMAA Technical Manuals inc CM01 - Concrete Masonry Handbook , CM02 - Concrete Masonry Single Leaf Masonry Design Manual , RW01 - Reinforced Cantilevered Concrete Block Retaining Walls
- For Development Application purposes the architectural drawings take precedence over the specification where there is a conflict in information presented
- The architectural drawings must be read in conjunction with the Project Architectural Specification , the Structural Engineers drawings and specifications, the Landscape Architects drawings and the Hydraulic and Civil Engineers and Electrical Engineers drawings and specifications

legend of symbols

- new brick wall
- existing wall
- proposed Stage 1 works (shown in blue)
- proposed Stage 2 works (shown in green)
- proposed Stage 3 works (shown in yellow)
- new block wall
- new stud wall
- demolished elements

ABBREVIATIONS:-

ag	- agricultural drainage line
ahd	- Australian Height Datum
bif	- bitumen impregnated felt
blkwrk	- blockwork
bsn	- hand basin
b/w	- between
cfcmbrd	- compressed fibre cement board
ch	- clothes hook
chr	- clothes hooks on rail
cm	- corrugated colorbond metal
cmsl	- ceiling mounted spot light
col	- colour
conc	- concrete
cont	- continuous
c.o.s	- confirm on site
cr	- cement render
cwt	- ceramic wall tiles
d	- drain
dl	- down light
dn	- down
dp	- down pipe
eng	- engineer
ec	- epoxy coving
ex	- existing
exist	- existing
exs	- exterior spot light
exwl	- exterior wall light
f	- fridge
fdl	- finished deck level
ffl	- finished floor level
fg	- fixed glass
fpl	- finished paving level
fsl	- finished slab level
fw	- floor waste
gd	- ss grated drain
hd	- heavy duty
hwd	- hardwood
io	- sewer line inspection opening
ksm	- kitchen sink mixer
l	- light
mp	- masonry paver
mr	- mirror
nat	- natural
nts	- not to scale (use scale bar on dwg)
p	- paint
pc	- powder coat paint finish
pl	- pendant light
plstrbrd	- plasterboard
pol	- pole light
prop	- proprietary
rc	- reinforced concrete
rdl	- recessed downlight
req	- required
rev	- reverse
rl	- reduced level
sc	- shower curtain
scd	- solid core door
scr	- shower curtain rail
sd	- slot drain
sel	- selected
shd	- shower head and tap set
shrd	- basin shroud
shwr	- shower
smsl	- surface mounted spotlight
ss	- stainless steel
sss	- stainless steel separation strip
st	- coved skirting tile
struc	- structural
stwtr	- stormwater
tbd	- to be determined
th	- towell hook
tim	- timber
tmv	- thermostatic mixing valve
trh	- toilet roll holder
uno	- unless noted otherwise
vft	- vitrified floor tiles
vlbrd	- 9mm thk set Villaboard
w/p	- water proof
wpm	water proof membrane

Rev	Description	Date
A	draft development application	Jun '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

Project:
North Narrabeen Surf Lifesaving Club alterations and additions

Prepared by:
Building Assets - Planning Design and Delivery,
Northern Beaches Council

Drawing Title:
Cover sheet ie including Architectural drawings register, general notes and abbreviations

northern beaches council
records@northernbeaches.nsw.gov.au

Scale: AS
Date: Apr 2023
Drawn: MB
checked: BK

Dwg no: DA00
Issue no: D

public telephone
bus stop shelter
footpath
footpath
GRASS
KERB
GARDEN
21*
bins
bitumen car park
services box
fire hydrant backflow device in metal box
CONCRETE
MULCH
concrete pathway
grass area
grass area
grass area
shade structure
post and rail fence
vegetation / sand dune
METAL
MULCH
CONCRETE
rock retaining wall
childrens playground
fence
tactile pavers
concrete pathway
SOFTFALL PLAYGROUND
GRASS
METAL BIN
BBQ
grass area
grass area
concrete driveway
grass area
fire hydrant
1
A
gate
metal roof over new bin room
extend 'no parking' marking here to create designated ambulance bay
tactile pavers
grass area
bins
light pole
gate
post and rail fence
sand track
Malcolm Street
PAVED
GARDEN
Note:
hatched area represents a 'Zone of Reduced Foundation Capacity' as identified in Northern Beaches Council 'CZMP Collaroy,Narrabeen Beach and Fishermans Beach 2016' document.
vegetation / sand dune
PARKING METER
BINS
VEGETATION / SAND DUNE
SAND PATHWAY
post and rail fence
grass area
seat
VEGETATION / SAND DUNE
LIFESAVING BOARD
VEGETATION / SAND DUNE
grass area
SAND PATHWAY
post and rail fence
VEGETATION / SAND DUNE
VEGETATION / SAND DUNE
concrete paved area
foot wash tap and bubbler
shower on timber deck
grass area
post and rail fence
sand track to beach
vegetation / sand dune
N
1 site plan
1:200 @ A1
0
10m

Dwg no: DA01
Issue no: D

northern beaches council
records@northernbeaches.nsw.gov.au

Scale: AS
Date: Sept 2021
Drawn: MB
checked: BK

Project:
North Narrabeen SLSC
Alterations and additions
Drawing Title:
site plan

Prepared by:
Building Assets - Planning, Design and Delivery
Northern Beaches Council

Rev	Description	Date
A	development application	Apr '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

1 GROUND FLOOR PLAN 0 2 6m
1:100 @ A1

new bin structure .Lightweight walls clad in metal and cfcbrd.Concrete slab floor falls to internal ss floor drain (with removable ss basket) connect to sewer

two new 680mm wide x 3100mm long x 2m high plastic rainwater collection tanks - water used for boat wash down

new linemarking on road indicating designated ambulance parking area

dp to kerb and gutter

bin store

part elev 2 DA06

1 DA06

1 DA05

AMBULANCE PARKING BAY

driveway

grass

roller shutter

west and east facing facades of bin store strucutre to be clad in 40x60 vertical hardwood battens.Double gates clad in battens to match cladding

ex SLSC boat and craft storage

new rianwater collection tank on ex rc slab to civil engineers detail

existing stair

existing post and rail timber fence

new gms grated lid to conc stwtr pit to stmrwtr to civil eng detail

paving falls to new ss stwtr pit to civil eng detail

existing roller shutter

ex bushland

existing post and rail timber fence

new hardwood battened seat on stainless steel angle brackets to detail.
new ss grated drain connected to stwtr pits at base of wall under bench seat

remove existing 1600mm high block wall and assoc rc strip footing and bbq

new 1600mm high core filled 200mm thk honed concrete block wall on rc strip footing to structural engineers detail

new rc slab/piers to eng detail ie new meeting room for North Narrabeen Boardriders

new ss bbq

existing post and rail timber fence

new alum framed glass stackable doors

existing sand path to beach

remove exist timber framed glass doors and replace with new alum framed glass doors and window wall in same location

area of new honed concrete porous Trihex paving (as selected) on compacted sub-base to structural engineers detail

NW side of 'Zone of Reduced Foundation Capacity' area
See Fig 23 in NBC CZMP Document (see dwg DA01 site plan)

bushland

concrete path

surf life saving store room

male public amenities

female public amenities

access wc

ramp up

up

ex main ground floor entry

main ground floor SLSC entry

ex nippers room

female wc shwr change (layout to be checked)

coolroom

storeroom

ss sink unit

store/ kitchen

meeting room

courtyard area

male club change

store

bedroom

bthrm

shwr

ex caretakers flat

kitchen

ex IRB storage

ex beach access

ex irb store

ex first aid room

ex gymnasium

remove existing wall dashed

new masonry column finish to match adjoining piers

beach inspector

existing bins

remove concrete 'trip hazard' rc protrusions at base of column at hide projecting stormwater pipe connections and relocate pipe junction under footpath in front of pier

leading edge of slab over dashed

100mm dia ss downpipe

paving falls to new ss stwtr pit

new masonry column finish to match adjoining piers

3 DA06

4 DA06

grass area

concrete paved area

foot wash tap and bubbler

shower on timber deck

path to beach

sand path to beach

beach bushland

2 DA05

1 DA08

1 DA07

legend symbols

- demolished elements
- new block wall
- new stud wall
- new brick wall
- existing wall

NOTE
See Dwg DA00 for symbols and abbreviations and general notes

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting	Aug '23
C	purposes final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

northern beaches council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
ground floor plan

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB
Dwg no: DA02
Issue no: D

1 DA06

1 2 3 4 5 6 7 8 9 10 11

3650 3650 3650 3650 3650 3650 3650 3650 3650 3650 3650

1 DA06

A B C D E F G H I J

3650 3650 3650 3650 3650 3650 3650 3650 3650

3 DA06

bin store room with metal deck roofing to match base building works

ex cafe outdoor seating area

new aluminium framed glazed window wall

new frameless glass baluster panel to 1.2m high with masonry wall behind and clad in vitrified wall tiles as selected

indicates new LED downlight

part elev 2 DA06

driveway

AMBULANCE PARKING BAY

face of existing slab edge below

remove section of ex handrail dashed to allow new link

remove existing window wall dashed down to floor level ready for new rc slab / stairs

new rc stairs and assoc ss h'rails up to new landing as connection to existing rc balcony area bia new foyer

new rc slab with tiled link between exist stair to foyer space and balcony

leading edge of existing rc slab here

ex cafe

ex ground floor SLSC/CAFE entry

ex storeroom

ex office

existing stair

ex kitchen

rdl

ex cafe seating area ex car

ex vft

represents existing opening awning window

remove existing wall dashed

existing window wall

new lighting and new set plasterboard ceiling lining in this area

leading edge of cladding to roof spandrel over dashed

structural beams over dashed to be clad plastrbrd and paint

remove wall elements in dashed line

existing egress stair

leading edge of roof over

new exhaust hood over bbqs and through to roof mounted exhaust fan over

full height bank of glass louvre windows for natural ventilation in room when sliding doors closed

approx 1600 clr opening on each side when stacked sliding doors open away from corner

location of masonry piers under dashed

stwtr/d

foyer to balcony vft

ss/sd

existing ss bbq / sink / counters area

fall

dp

wc

bsn

ex access

wc

ex f.wc

ex bar

ex rm wc

urnl

new ss sink in bench unit to detail

new enclosed area vft

6000

6000 indoor floor space

6000 outdoor balcony space

open balcony vft

new single bank of louvre glass windows and alum framed swing door for egress and ventilation when concertina bifold door closed

new aluminium framed window wall

glased aluminium framed swing door and new pivot concertina doors stack to north end wall face where shown

remove existing alum framed glass swing doors dashed

location of new masonry column under

new aluminium framed window wall

new rc slab floor area with vft over as selected

850mm clr alum framed glazed door

new cont ss slot drain in front of new aluminium framed glass stacked sliding doors

NW side of 'Zone of Reduced Foundation Capacity' area
See Fig 23 in NBC CZMP Document (see dwg DA01 site plan)

remove existing brick wall,splayed cfcbrd fascia panel and aluminium framed glazed balustrade dashed

remove sloped cfcbrd fascia panel and tubular substandard metal balustrade and replace with new frameless glass baluster panel to 1.2m high with masonry wall and vitirifed wall tile cladding as selected

existing masonry pier under dashed

18900

full height bank of adj glass louvre windows for natural ventilation in room when sliding doors closed

remove existing brick wall,splayed cfcbrd fascia panel and aluminium framed glazed balustrade dashed

indicates location of masonry piers under dashed

leading edge of roof over

remove existing approx 200mmthk failed topping slab and assoc tiling to entire existing outdoor balcony area and install new topping slab to struc eng detail and vft fall to floor drains

1 UPPER FLOOR PLAN
1:100 @ A1

0 2 6m

2 DA05

1 DA08

1 DA07

1 DA05

NOTE
See Dwg DA00 for symbols and abbreviations and general notes

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

legend symbols

- demolished elements
- new block wall
- new stud wall
- new brick wall
- existing wall

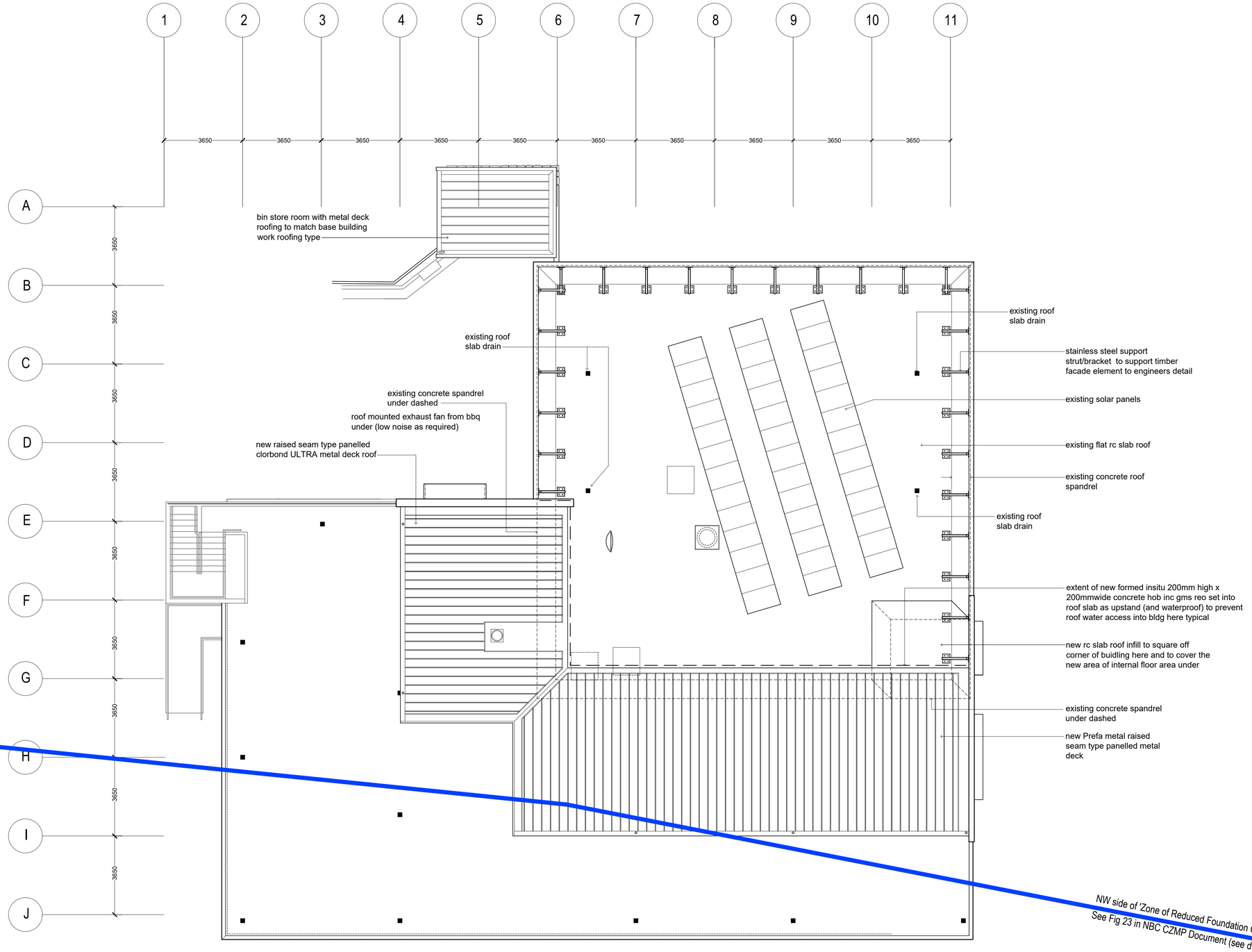
northern beaches council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
upper floor plan

Prepared by:
Building Assets-Planning
Design and Delivery
Northern Beaches Council

Date: Jun 2022
Dwg no: DA03
Scale: A.S.
Checked: BK
Issue no: D
Drawn by: MB



1 ROOF PLAN
1:100 @ A1

0 2 6m

N
E
S
W

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

northern beaches council

Drawing Title:
roof plan

Project:
North Narrabeen SLSC
Alterations and additions

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Date:
Jun 2022

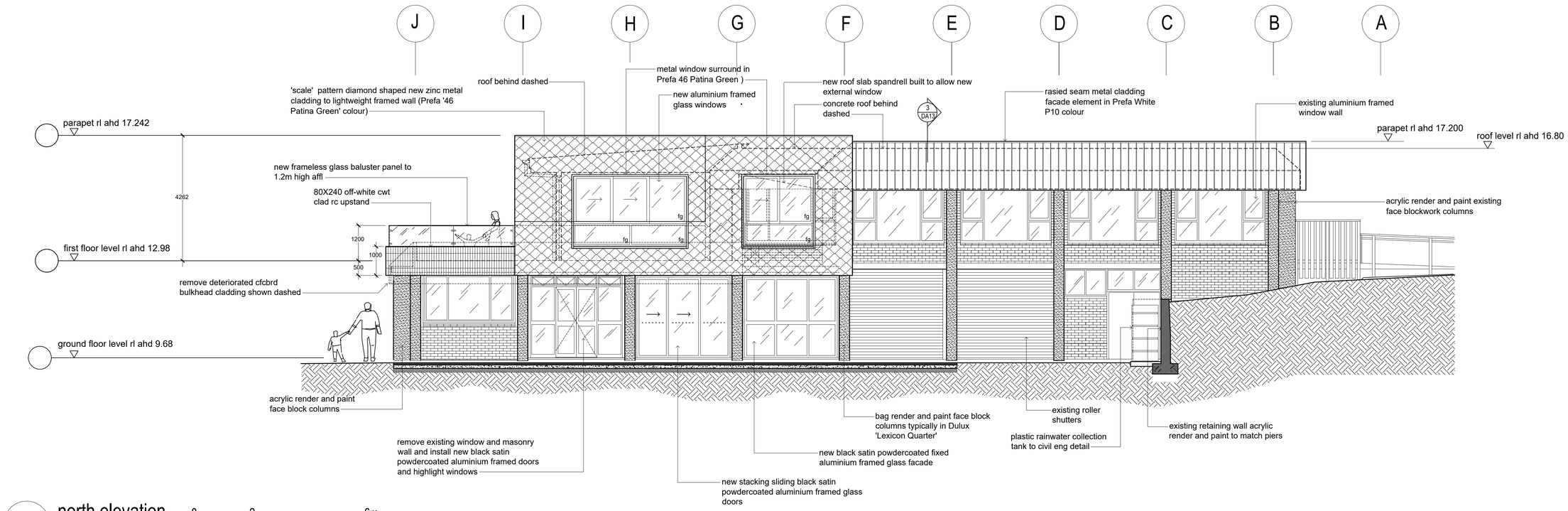
Dwg no:
DA04

Scale:
A.S.

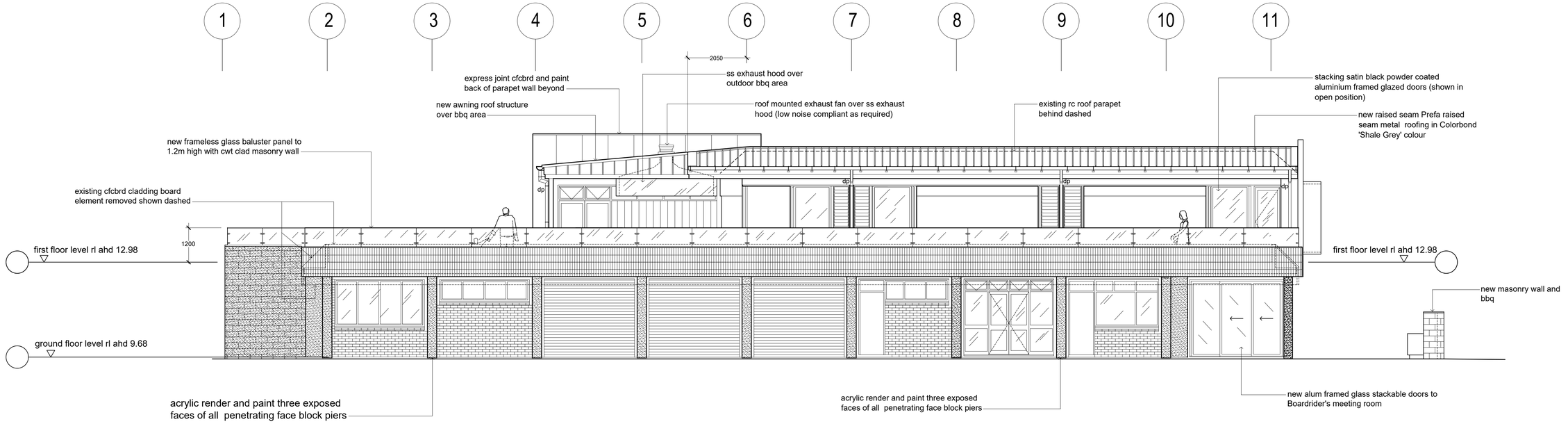
Checked:
BK

Issue no:
D

Drawn by:
MB



1 north elevation 0 2 6m
1:75 @ A1



2 east elevation 0 2 6m
1:75 @ A1

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

Project:
North Narrabeen SLSC
Alterations and additions

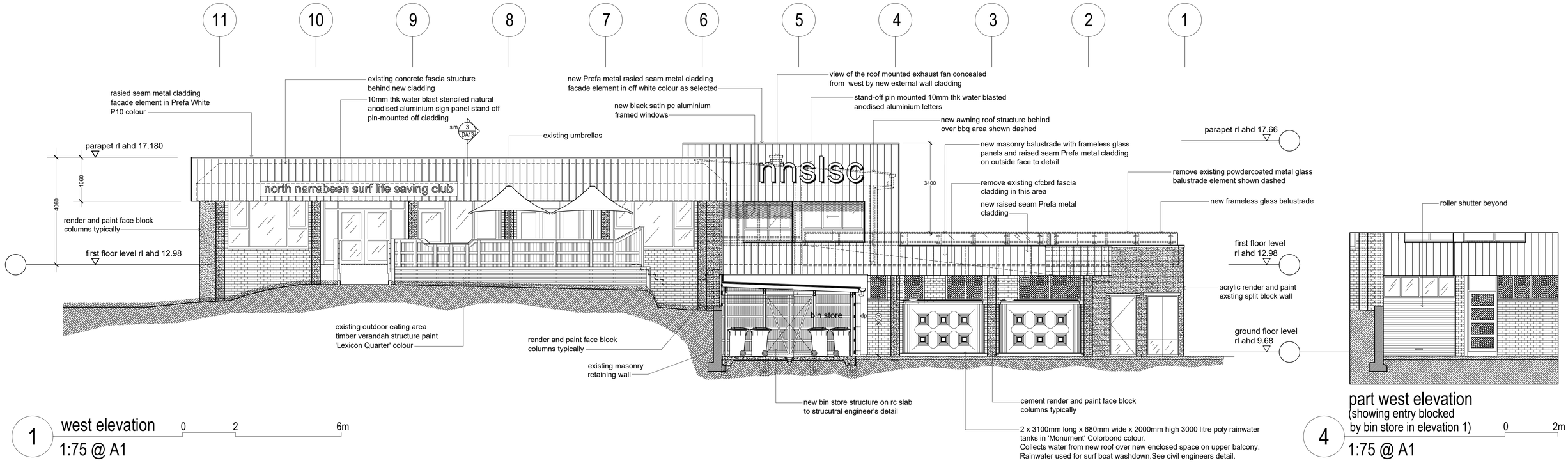
Drawing Title:
elevations
SHOWING STAGING

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

northern beaches council

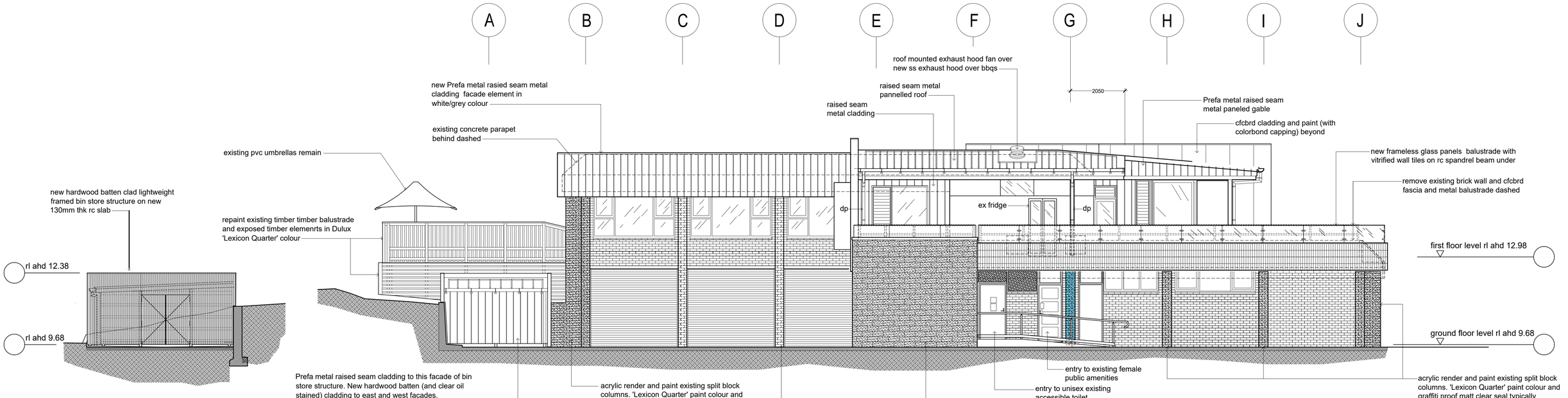
Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB

Dwg no: DA05
Issue no: D



1 west elevation
1:75 @ A1
0 2 6m

4 part west elevation
(showing entry blocked by bin store in elevation 1)
1:75 @ A1
0 2m



2 part elevation
1:75 @ A1

3 south elevation
1:75 @ A1
0 2 6m

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
elevations
SHOWING STAGING

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

northern beaches council

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB

Dwg no: DA06
Issue no: D

new bin structure .Lightweight walls clad in metal and cfcbrd.Concrete slab floor falls to internal ss floor drain (with removable ss basket) connect to sewer

two new 680mm wide x 3100mm long x 2m high plastic rainwater collection tanks - water used for boat wash down

new linemarking on road indicating designated ambulance parking area

dp to kerb and gutter

bin store

part elev 2 DA06

1 DA06

1 DA05

AMBULANCE PARKING BAY

driveway

grass

roller shutter

west and east facing facades of bin store strucutre to be clad in 40x60 vertical hardwood battens.Double gates clad in battens to match cladding

ex SLSC boat and craft storage

new rianwater collection tank on ex rc slab to civil engineers detail

existing stair

existing post and rail timber fence

new gms grated lid to conc stwtr pit to stmrwtr to civil eng detail

paving falls to new ss stwtr pit to civil eng detail

existing roller shutter

ex bushland

existing post and rail timber fence

new hardwood battened seat on stainless steel angle brackets to detail.
new ss grated drain connected to stwtr pits at base of wall under bench seat

remove existing 1600mm high block wall and assoc rc strip footing and bbq

new 1600mm high core filled 200mm thk honed concrete block wall on rc strip footing to structural engineers detail

new rc slab/piers to eng detail ie new meeting room for North Narrabeen Boardriders

new ss bbq

existing post and rail timber fence

new alum framed glass stackable doors

existing sand path to beach

remove exist timber framed glass doors and replace with new alum framed glass doors and window wall in same location

area of new honed concrete porous Trihex paving (as selected) on compacted sub-base to structural engineers detail

NW side of 'Zone of Reduced Foundation Capacity' area
See Fig 23 in NBC CZMP Document (see dwg DA01 site plan)

concrete path

surf life saving store room

male public amenities

female public amenities

access wc

male club change

ex main ground floor entry

main ground floor SLSC entry

ex nippers room

female wc shwr change (layout to be checked)

coolroom

storeroom

ss sink unit

meeting room

store/ kitchen

courtyard area

ex gymnasium

remove existing wall dashed

new masonry column finish to match adjoining piers

store

bedroom

bthrm

shwr

ex caretakers flat

kitchen

ex IRB storage

ex beach access

ex irb store

ex first aid room

beach inspector

existing bins

remove concrete 'trip hazard' rc protrusions at base of column at hide projecting stormwater pipe connections and relocate pipe junction under footpath in front of pier

leading edge of slab over dashed

100mm dia ss downpipe

paving falls to new ss stwtr pit

new masonry column finish to match adjoining piers

bushland

grass area

concrete paved area

foot wash tap and bubbler

shower on timber deck

sand path to beach

path to beach

beach bushland

1 GROUND FLOOR PLAN
1:100 @ A1
0 2 6m

NOTE
See Dwg DA00 for symbols and abbreviations and general notes

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

legend symbols

- demolished elements
- new block wall
- new stud wall
- new brick wall
- existing wall
- proposed Stage 1 works (shown in blue)
- proposed Stage 2 works (shown in green)
- proposed Stage 3 works (shown in yellow)

northern beaches council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
ground floor plan
SHOWING STAGING

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB
Dwg no: DA07
Issue no: D

1 DA06

1 2 3 4 5 6 7 8 9 10 11 — 3650 typ

1 DA06

A B C D E F G H I J — 3650 typ

3 DA06

bin store room with metal deck roofing to match base building works

ex cafe outdoor seating area

new aluminium framed glazed window wall

new frameless glass baluster panel to 1.2m high with masonry wall behind and clad in vitrified wall tiles as selected

indicates new LED downlight

part elev 2 DA06

driveway

AMBULANCE PARKING BAY

remove section of ex handrail dashed to allow new link

face of existing slab edge below

remove existing window wall dashed down to floor level ready for new rc slab / stairs

new rc stairs and assoc ss h'rails up to new landing as connection to existing rc balcony area bia new foyer

new rc slab with tiled link between exist stair to foyer space and balcony

leading edge of existing rc slab here

existing egress stair

leading edge of roof over

new exhaust hood over bbqs and through to roof mounted exhaust fan over

full height bank of glass louvre windows for natural ventilation in room when sliding doors closed

approx 1600 clr opening on each side when stacked sliding doors open away from corner

location of masonry piers under dashed

ex ground floor SLSC/CAFE entry

ex cafe

ex storeroom

ex office

ex kitchen

existing stair

ex cafe seating area ex car

rdl

ex vft

ex bar

ex access wc

ex f.wc

ex m wc

urnl

wc

bsn

stwtr/d

dp

ss/sd

fall

foyer to balcony vft

existing ss bbq / sink / counters area

new ss sink in bench unit to detail

new enclosed area vft

open balcony vft

6000

6000 indoor floor space

6000 outdoor balcony space

represents existing opening awning window

remove existing wall dashed

existing window wall

new lighting and new set plasterboard ceiling lining in this area

leading edge of cladding to roof spandrel over dashed

structural beams over dashed to be clad plastrbrd and paint

remove wall elements in dashed line

1 DA05

new single bank of louvre glass windows and alum framed swing door for egress and ventilation when concertina bifold door closed

new aluminium framed window wall

glased aluminium framed swing door and new pivot concertina doors stack to north end wall face where shown

remove existing alum framed glass swing doors dashed

location of new masonry column under

new aluminium framed window wall

new rc slab floor area with vft over as selected

850mm clr alum framed glazed door

new cont ss slot drain in front of new aluminium framed glass stacked sliding doors

NW side of 'Zone of Reduced Foundation Capacity' area
See Fig 23 in NBC CZMP Document (see dwg DA01 site plan)

remove existing brick wall,splayed cfcbrd fascia panel and aluminium framed glazed balustrade dashed

remove sloped cfcbrd fascia panel and tubular substandard metal balustrade and replace with new frameless glass baluster panel to 1.2m high with masonry wall and vitirifed wall tile cladding as selected

existing masonry pier under dashed

remove existing approx 200mmthk failed topping slab and assoc tiling to entire existing outdoor balcony area and install new topping slab to struc eng detail and vft fall to floor drains

18900

full height bank of adj glass louvre windows for natural ventilation in room when sliding doors closed

indicates location of masonry piers under dashed

leading edge of roof over

remove existing brick wall,splayed cfcbrd fascia panel and aluminium framed glazed balustrade dashed

2 DA05

1 DA08

1 DA07

N W E S

NOTE
See Dwg DA00 for symbols and abbreviations and general notes

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

legend symbols

- demolished elements
- new block wall
- new stud wall
- new brick wall
- existing wall
- proposed Stage 1 works (shown in blue)
- proposed Stage 2 works (shown in green)
- proposed Stage 3 works (shown in yellow)

northern beaches council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
upper floor plan
SHOWING STAGING

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB

Dwg no: DA08
Issue no: D

1 UPPER FLOOR PLAN
1:100 @ A1

0 2 6m

1 2 3 4 5 6 7 8 9 10 11

3650 3650 3650 3650 3650 3650 3650 3650 3650 3650 3650

A B C D E F G H I J

3650 3650 3650 3650 3650 3650 3650 3650 3650

bin store room with metal deck roofing to match base building work roofing type

existing roof slab drain

existing concrete spandrel under dashed

roof mounted exhaust fan from bbq under (low noise as required)

new raised seam type panelled clorbond ULTRA metal deck roof

existing roof slab drain

stainless steel support strut/bracket to support timber facade element to engineers detail

existing solar panels

existing flat rc slab roof

existing concrete roof spandrel

existing roof slab drain

extent of new formed insitu 200mm high x 200mmwide concrete hob inc gms reo set into roof slab as upstand (and waterproof) to prevent roof water access into bldg here typical

new rc slab roof infill to square off corner of buidling here and to cover the new area of internal floor area under

existing concrete spandrel under dashed

new Prefa metal raised seam type panelled metal deck

NW side of 'Zone of Reduced Foundation Capacity' area
See Fig 23 in NBC CZMP Document (see dwg DA01 site plan)

1 ROOF PLAN
1:100 @ A1

0 2 6m

N E S W

legend

- proposed Stage 1 works (shown in blue)
- proposed Stage 2 works (shown in green)
- proposed Stage 3 works (shown in yellow)

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

northern beaches council

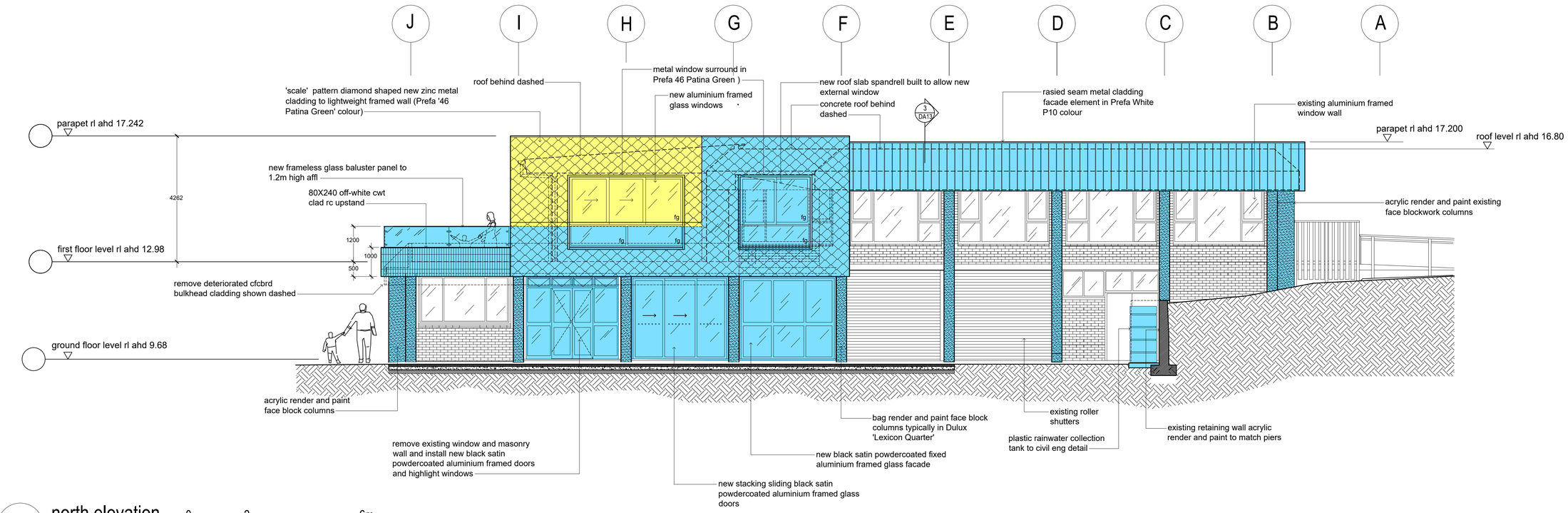
Drawing Title:
roof plan
SHOWING STAGING

Project:
North Narrabeen SLSC
Alterations and additions

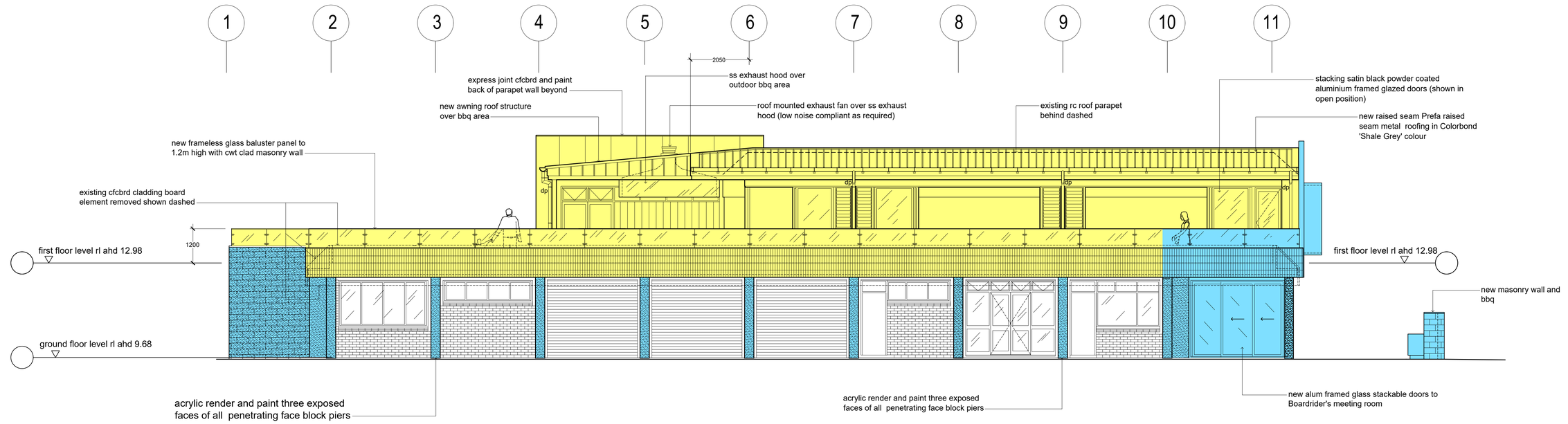
Prepared by:
Building Assets-Planning
Design and Delivery
Northern Beaches Council

Date: Jun '2022
Scale: A.S.
Checked: BK
Drawn by: MB

Dwg no: DA09
Issue no: D



1 north elevation 0 2 6m
1:75 @ A1



2 east elevation 0 2 6m
1:75 @ A1

legend

- proposed Stage 1 works (shown in blue)
- proposed Stage 2 works (shown in green)
- proposed Stage 3 works (shown in yellow)

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

Project:
North Narrabeen SLSC
Alterations and additions

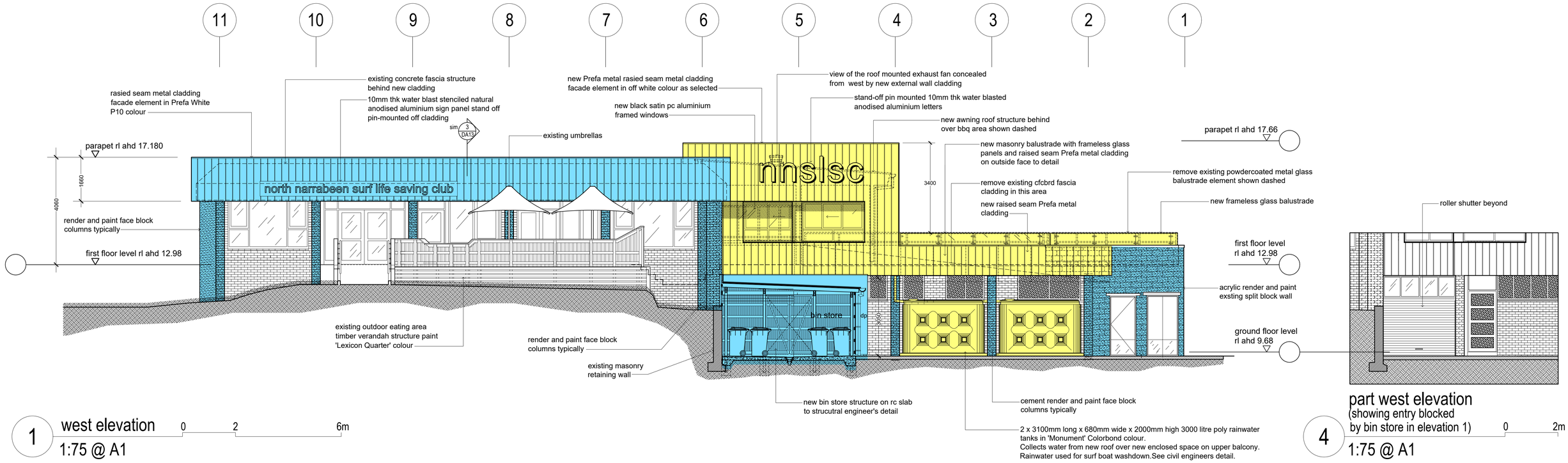
Drawing Title:
elevations
SHOWING STAGING

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

northern beaches council

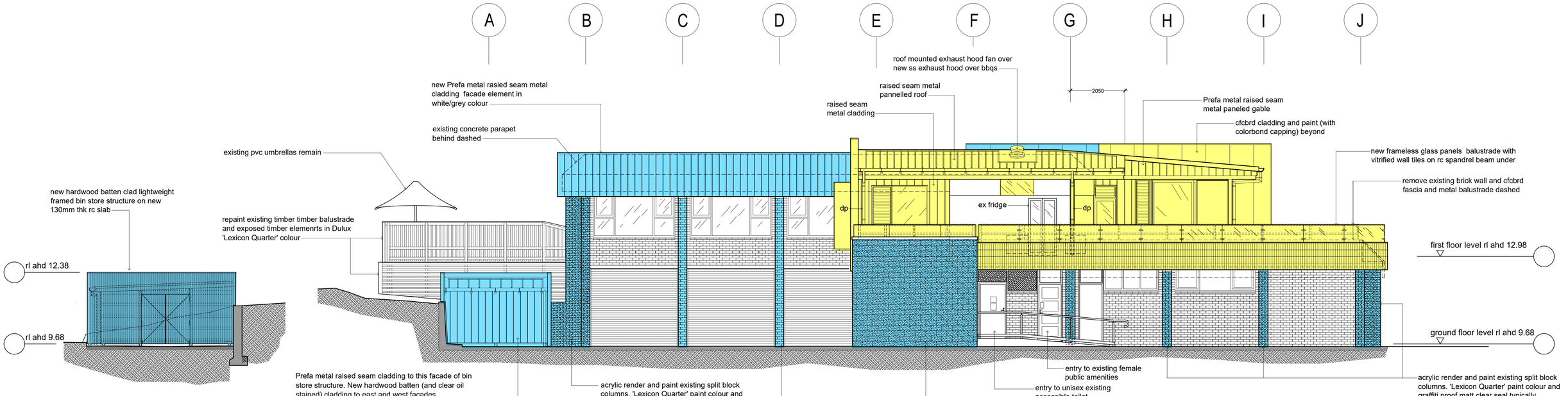
Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB

Dwg no: DA10
Issue no: D



1 west elevation 0 2 6m
1:75 @ A1

4 part west elevation (showing entry blocked by bin store in elevation 1) 0 2m
1:75 @ A1



2 part elevation
1:75 @ A1

3 south elevation 0 2 6m
1:75 @ A1

legend

- proposed Stage 1 works (shown in blue)
- proposed Stage 2 works (shown in green)
- proposed Stage 3 works (shown in yellow)

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
elevations
SHOWING STAGING

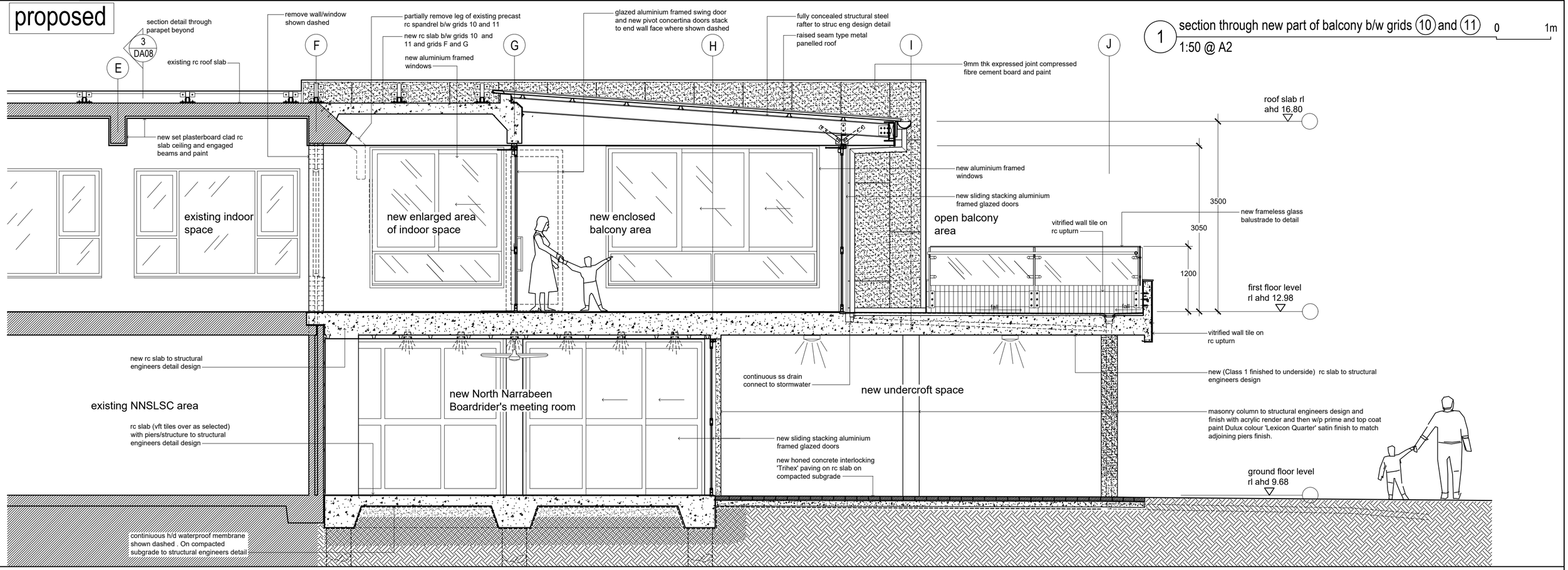
Prepared by:
Building Assets-Planning
Design and Delivery
Northern Beaches Council

northern beaches council

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB

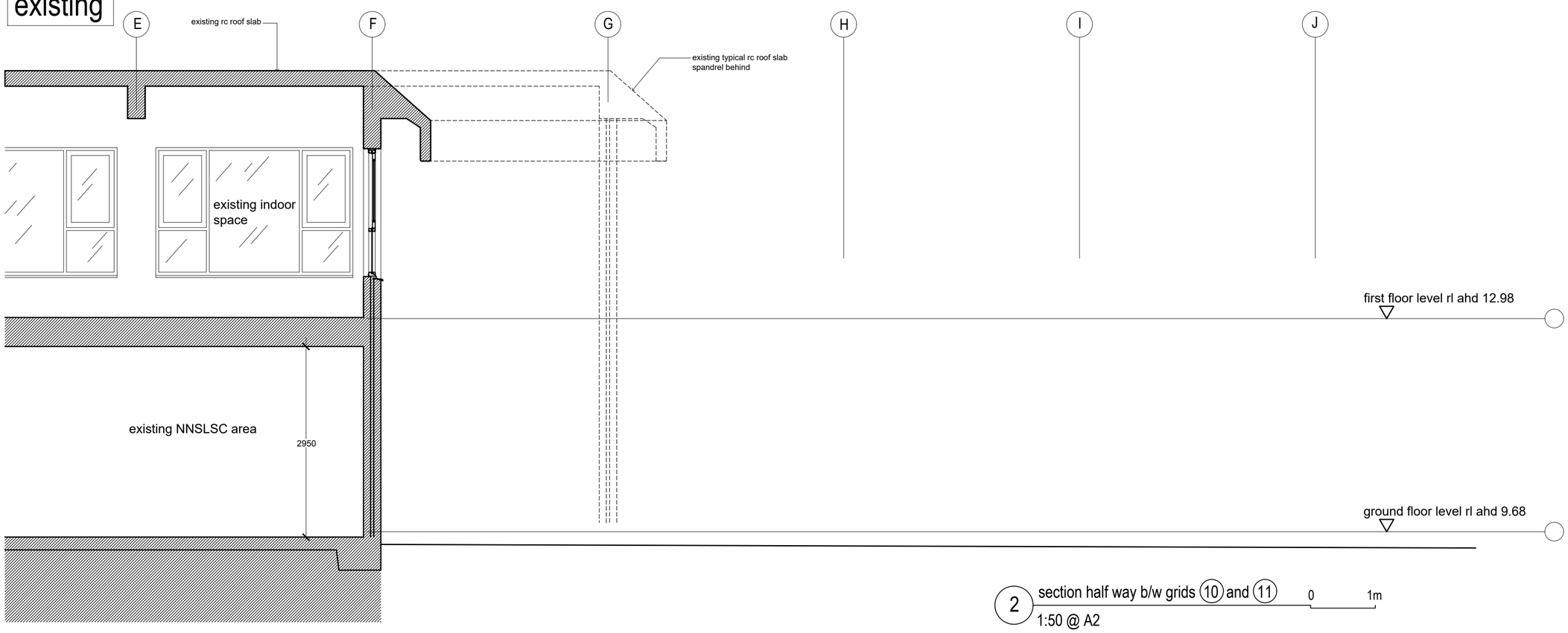
Dwg no: DA11
Issue no: D

proposed



1 section through new part of balcony b/w grids 10 and 11
1:50 @ A2
0 1m

existing



2 section half way b/w grids 10 and 11
1:50 @ A2
0 1m

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development drawing	Sept'23
D	final draft development drawing	Nov '23

northern beaches council

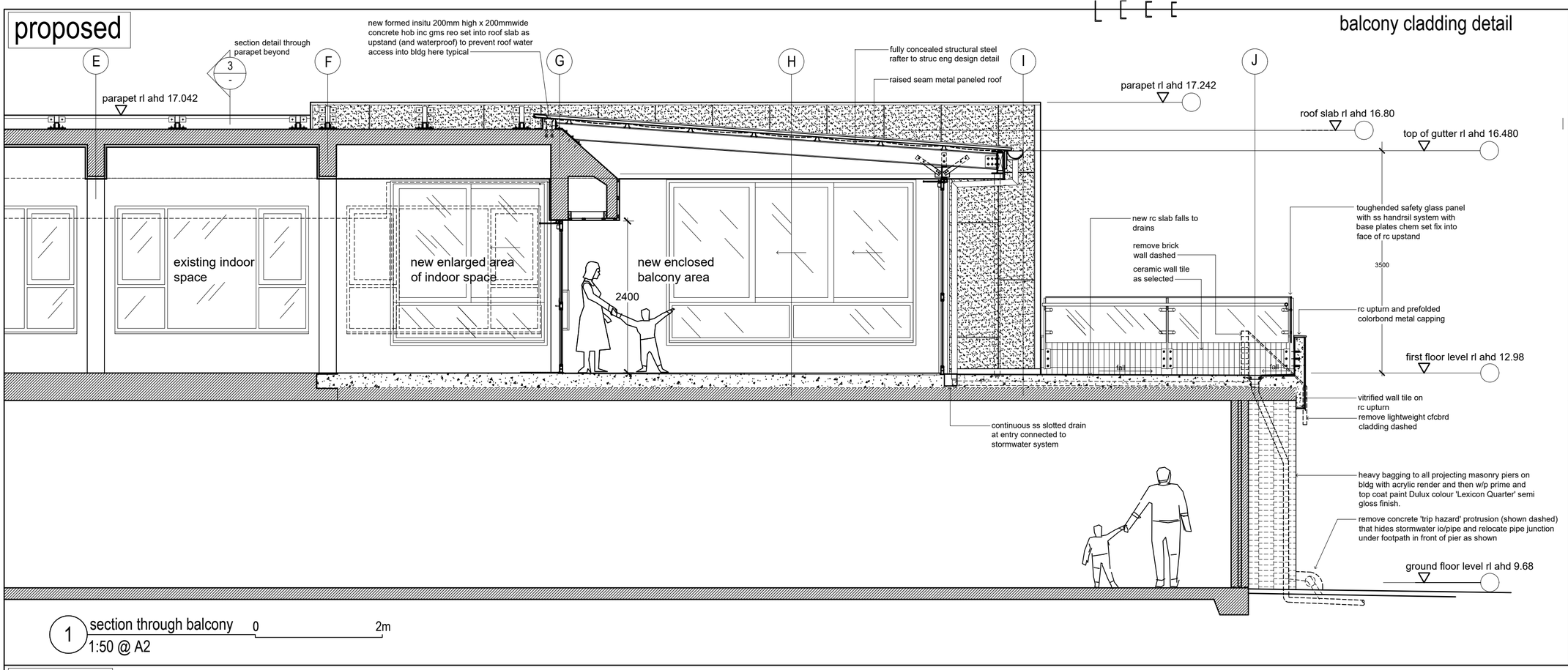
Project:
North Narrabeen SLSC Alterations and additions

Drawing Title:
detailed sections (existing and proposed)

Prepared by:
Building Assets-Planning Design and Delivery Northern Beaches Council

Date: Oct 2020
Dwg no: DA12
Checked: BK
Issue no: D
Drawn by: MB
Scale: A.S.

proposed

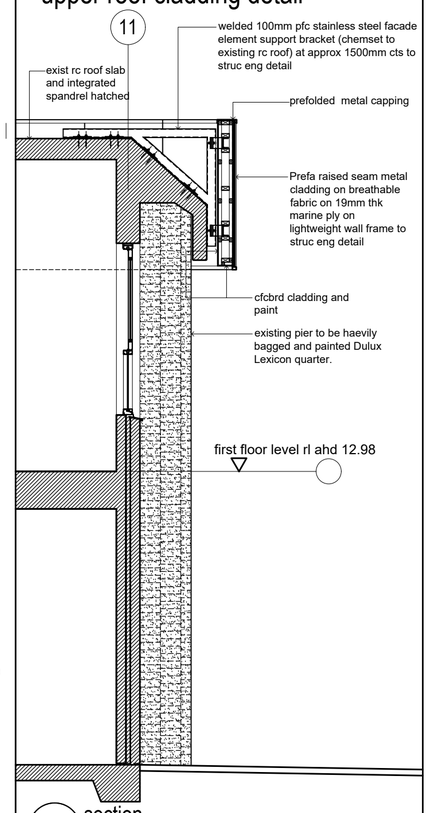


1 section through balcony
1:50 @ A2

0 2m

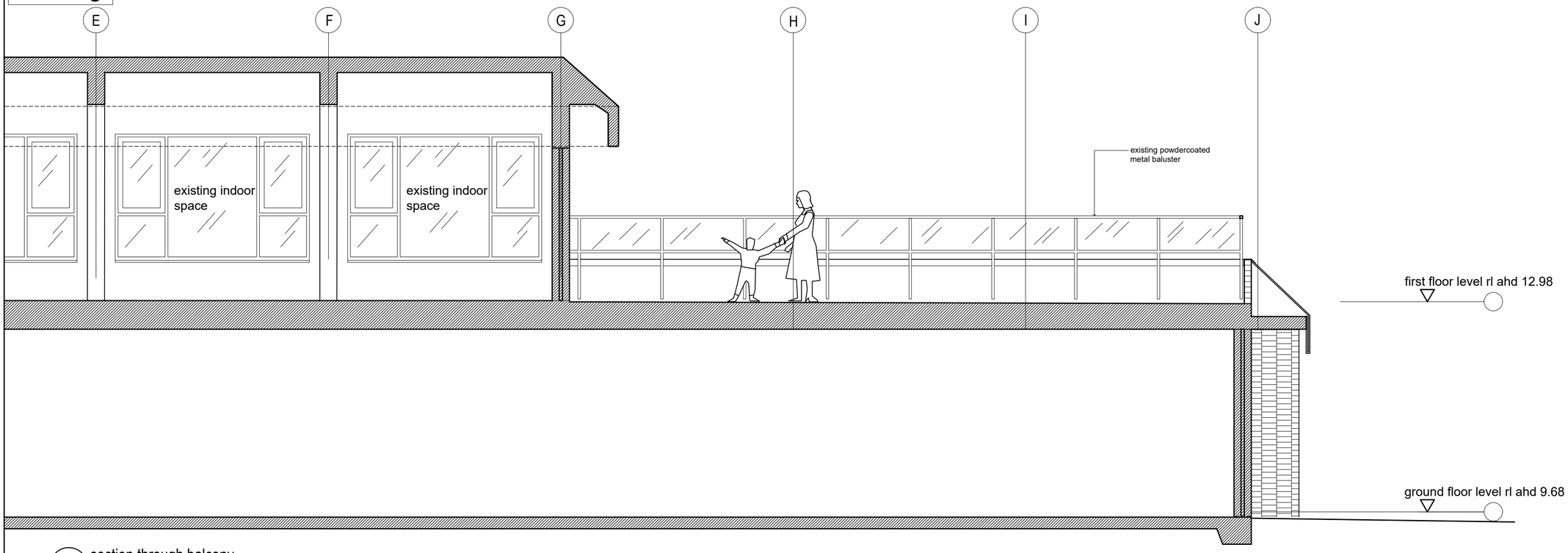
balcony cladding detail

upper roof cladding detail



3 section
1:50 @ A2

existing



2 section through balcony
1:50 @ A2 use scale bar

0 2m

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development drawing	Sept'23
D	final draft development drawing	Nov '23

northern beaches council

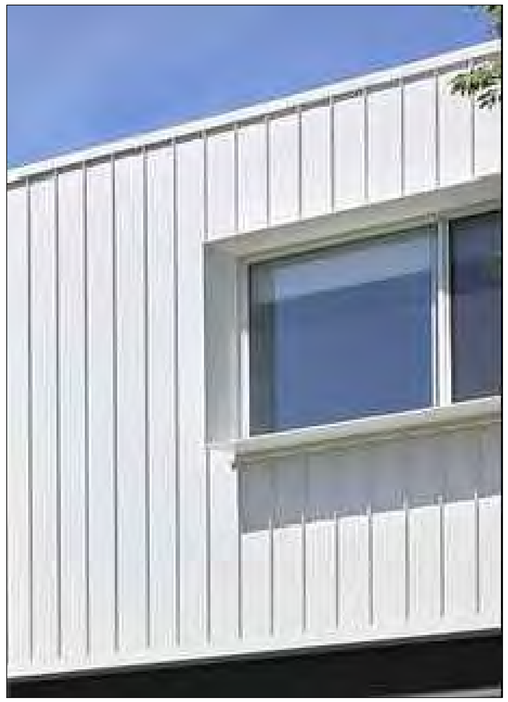
Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
detailed sections
(existing and proposed)

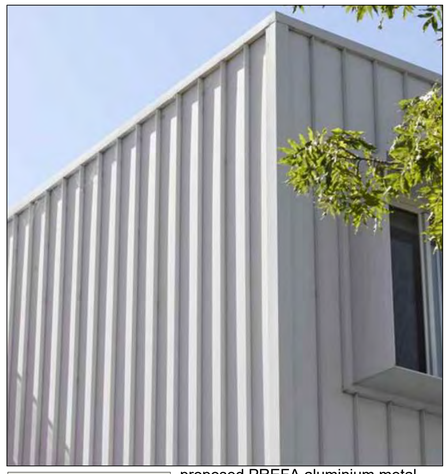
Prepared by:
Building Assets-Planning
Design and Delivery
Northern Beaches Council

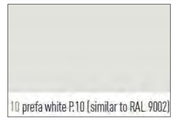
Date: Oct 2020
Dwg no: DA13
Checked: MC
Issue no: D
Drawn by: MB
Scale: A.S.

materials and finishes schedule - North Narrabeen SLSC building alterations and additions

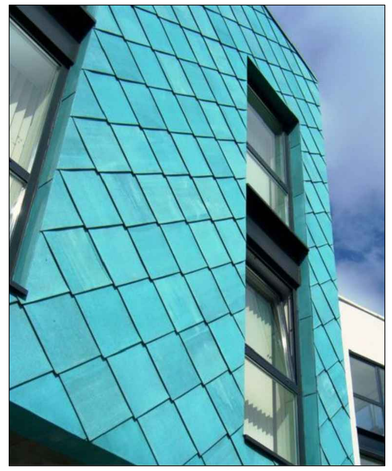


proposed raised seam PREFA aluminium metal cladding in Prefa White P.10 colour





proposed PREFA aluminium metal raised seam cladding in off-white Prefa White P.10 colour

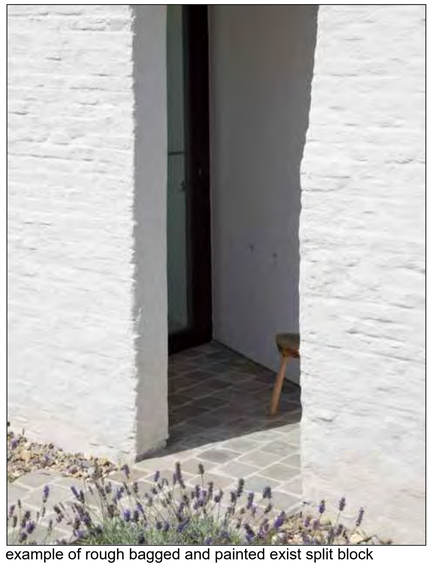


proposed diamond shaped shinlge 'scales' patterned cladding.Colour proposed is Prefa '46 patina green' (natural colour) sample chip here

examples of single pinned-on natural anodised aluminium letter sign and natural anodised aluminium plate building sign

proposed raised seam metal deck roofing in light grey colour sim 'Shale Grey' Colorbond

example of proposed frameless glass balustrade with integrated ss tubular handrail and fixing arrangement (balcony upstand however to be tiled)

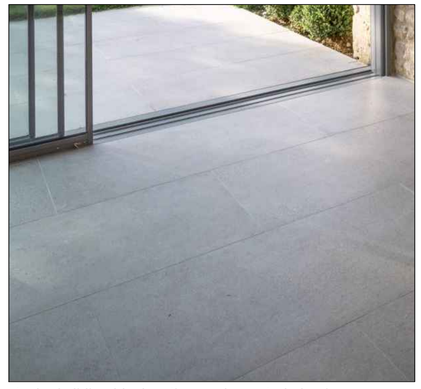


example of rough bagged and painted exist split block piers in 'Lexicon Quarter' paint colour

the proposed vitrified white wall tile (ie 80x240)

vitrified white wall tile (ie 80x240) to inside and outside face of rc up-stand element of balustrade on upper deck - and the proposed stack bond look in context

example of 600x300 vitrifed floor tile for balcony and proposed new enclosed room on existing balcony (non slip finish for external area tile)



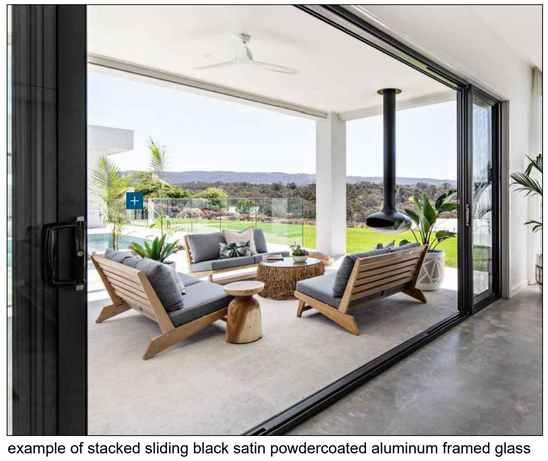
stacked sliding black satin powdercoated aluminum framed glass doors concept ie between new enclosed space on balcony and open balcony space

honed conrete 'Trihex' type pavers to new paved area on north side of building

example of stainless steel slot drain to front of stacking sliders b/w new enlcosed room and open balcony

concertina type black satin powdercoated aluminium doors ie between existing cafe and new enclosed room on balcony

example of stacked sliding black satin powder-coated aluminum framed glass doors concept ie between new enclosed space on balcony and open balcony space. Showing full open corner scenario proposed.



example of stacked sliding black satin powdercoated aluminum framed glass doors concept ie between new enclosed space on balcony and open balcony space. Showing full open corner scenario proposed

example of black satin powder-coated adjustable glass louvre window

Rev	Description	Date
A	Devalopment Application	Aug '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

Project:
North Narrabeen SLSC - Alterations and Additions

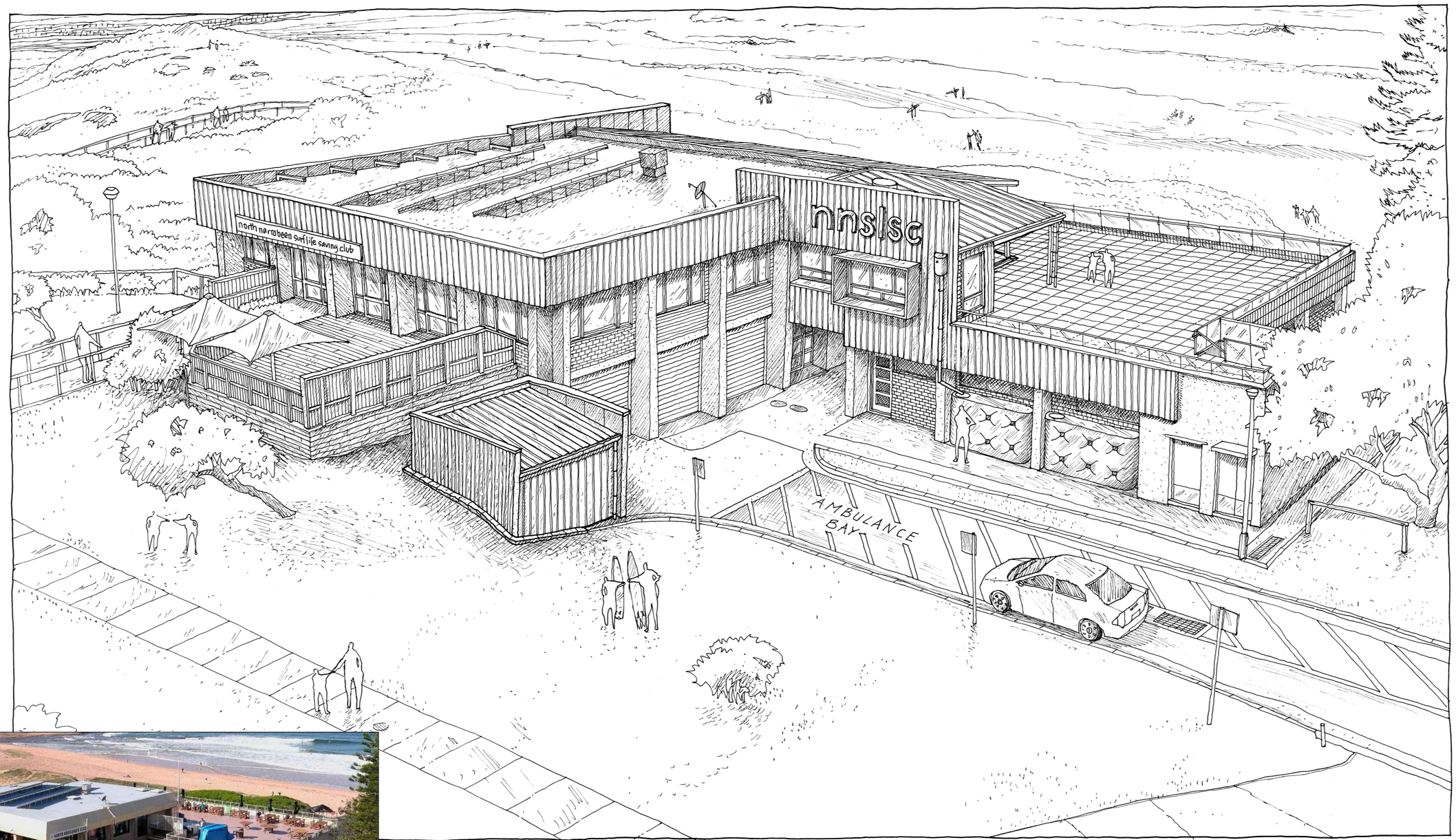
Drawing Title:
external finishes and materials board

Prepared by:
Building Assets - Plannig Design and Delivery
Northern Beaches Council

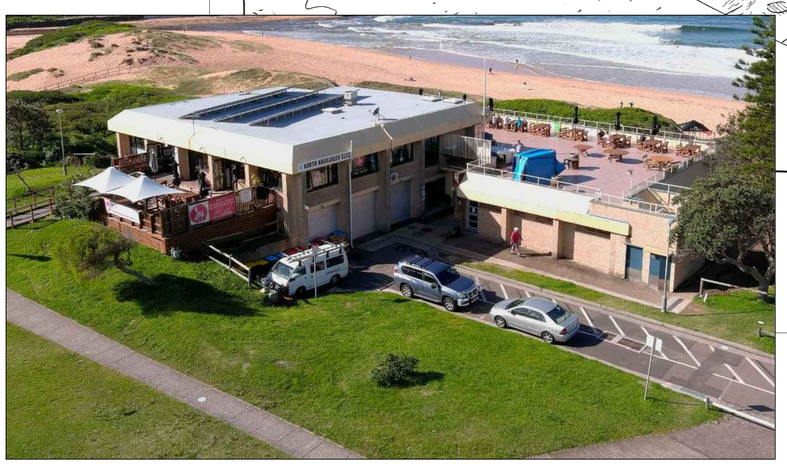
northern beaches council

Date: Oct 2022
Checked: BK
Drawn by: MB
Scale: A.S.

Dwg no: DA14
Issue no: D



sketch of refurbished building



aerial photos of existing building from SW

Rev	Description	Date
A	draft Development Application	Aug '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Oct '23

northern beaches council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
aerial view of exist bldg from SW and artist's impression of proposal

Prepared by:
Building Assets-Planning
Design and Delivery
Northern Beaches Council

Date: Oct 2020
Dwg no: DA15
Checked: BK
Drawn by: MB
Issue no: D
Scale: A.S.

sketch of refurbished building

aerial photo of existing building from NE

Rev	Description	Date
A	draft Development Application	Aug '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Oct '23

northern beaches council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
aerial view of exist bldg from NE and artist's impression of proposal

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Date:
Oct 2020

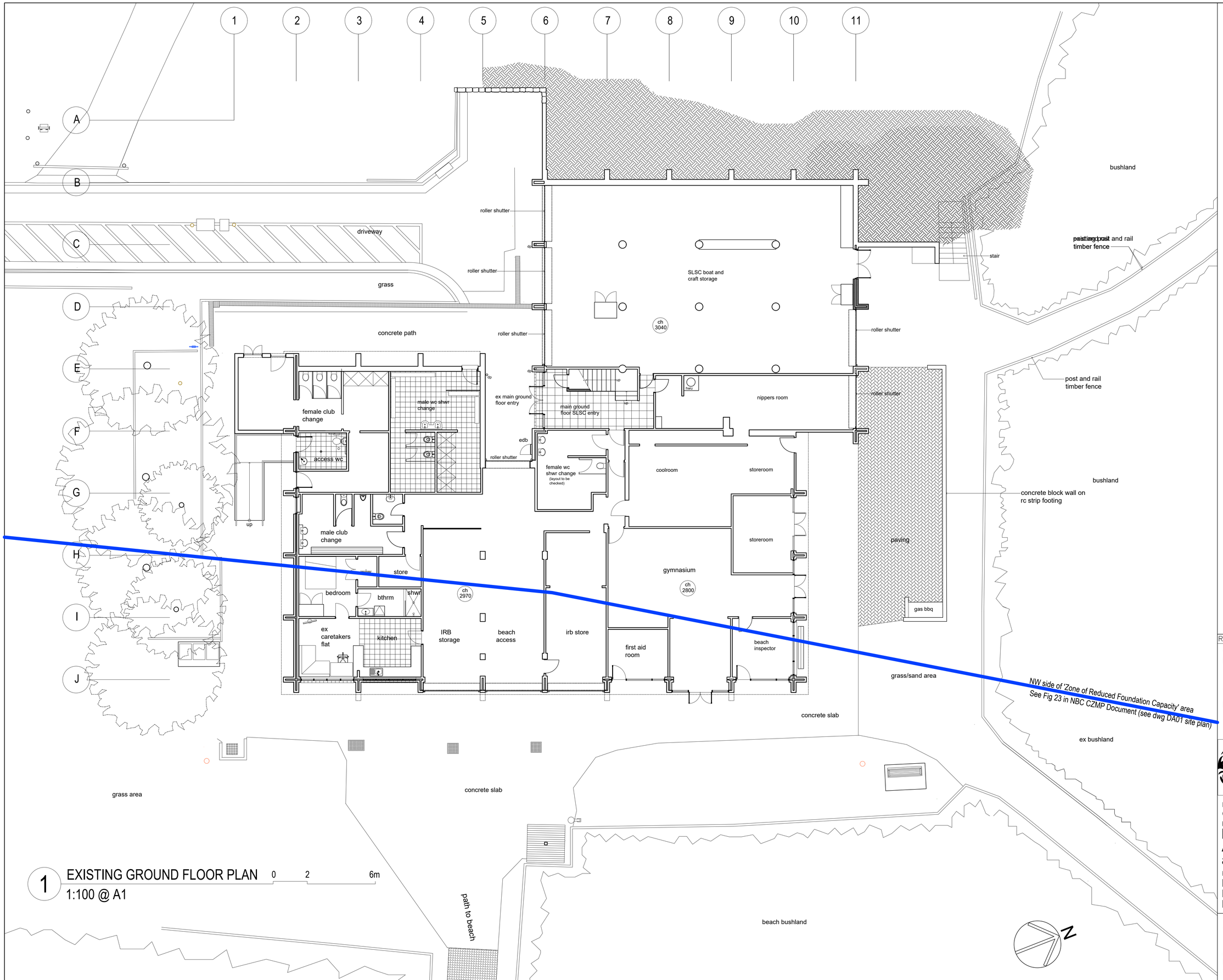
Checked:
BK

Drawn by:
MB

Scale:
A.S.

Dwg no:
DA16

Issue no:
D



1 EXISTING GROUND FLOOR PLAN 0 2 6m
1:100 @ A1

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	draft development application drawing	Sept'23
D	final draft development application drawing	Nov'23

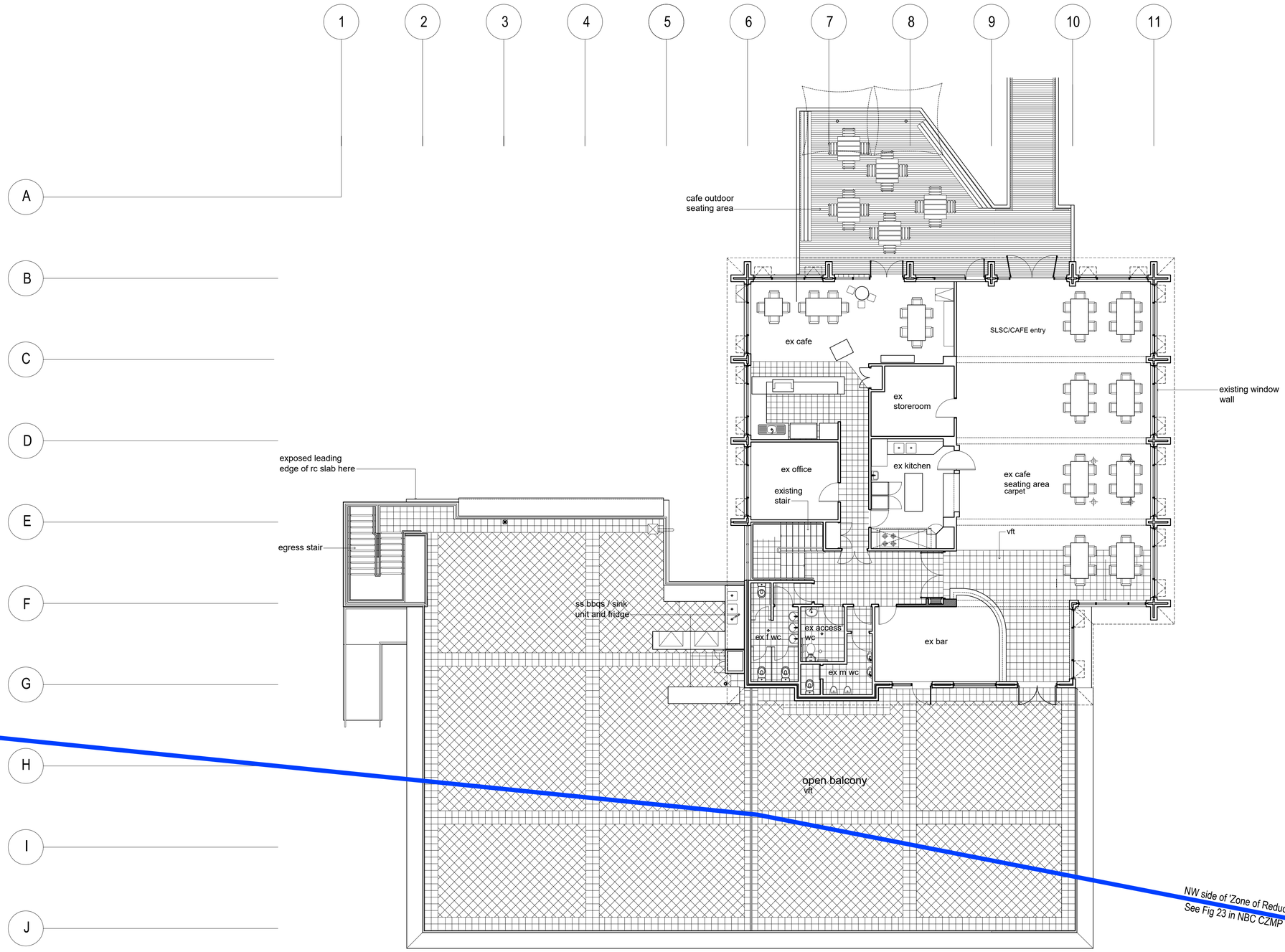
northern beaches council

Drawing Title:
existing ground floor plan

Project:
North Narrabeen SLSC
Alterations and additions

Prepared by:
Building Assets-Planning
Design and Delivery
Northern Beaches Council

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB
Dwg no: DAEX01
Issue no: D



1 EXISTING UPPER FLOOR PLAN
1:100 @ A1

0 2 6m

N

legend of use areas

- existing area of outdoor balcony area for the public (ie 416m2)

Rev	Description	Date
A	to consultants for information	Jul '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	draft development application drawing	Sept'23
D	final draft development application drawing	Nov'23

northern beaches council

Drawing Title:
existing upper floor plan

Project:
North Narrabeen SLSC
Alterations and additions

Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Date: Jun 2022
Dwg no: DAEX02
Scale: A.S.
Checked: BK
Drawn by: MB
Issue no: D

OCEAN STREET

MALCOLM STREET

STREET

S.P.89359

No.209-211 TWO STOREY RESIDENTIAL & COMMERCIAL BUILDING WITH TWO UNITS UNDER (BASEMENT UNDER)

No.225-229 1 & 2 STOREY BRICK BUILDING SURF CLUB

4 D.P.331508

B D.P.376822

A D.P.376822

3 SEC.63 D.P.5768

6 SEC.63 D.P.5768

2 D.P.339162

1 D.P.339162

8 SEC.63 D.P.5768

9 SEC.63 D.P.5768

1 D.P.122234

1 D.P.178553

7301 D.P.1140671

ARTIFICIAL GRASS SWINGS

SHADE CLOTH OVER SOFTFALL PLAYGROUND

ARTIFICIAL GRASS PLAYGROUND

SOFTFALL PLAYGROUND

TIMBER DECK

TERRACE ROOF BUILDING UNDER

METAL & GLASS BALUSTRADE

APPROX. POSITION OF M.H.W.M.

98.325 M.H.W.M.

BENCH MARK NAIL IN CONCRETE RL 9.72 (AHD)

Survey plan 1:200 @ A1

0 10m

Legend

(A) RIGHT OF FOOTWAY 0.915 WIDE VIDE F595822

Rev	Description	Date
A	development application	Apr '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

Project:
North Narrabeen SLSC
Alterations and additions

Prepared by:
Building Assets - Planning Design and Delivery, Northern Beaches Council

Drawing Title:
survey plan

northern beaches council

records@northernbeaches.nsw.gov.au

Scale: AS
Date: Sept 2021
Drawn: MB
checked: BK

Dwg no: DAS01
Issue no: D

1

A

AMBULANCE PARKING BAY

SCS

roller shutter

dp

roller shutter

grass

concrete path

roller shutter

ex SLSC boat and craft storage

existing stair

existing roller shutter

SCS

existing roller shutter

dp

dp

ex main ground floor entry

main ground floor SLSC entry

up

up

hwu

ex nippers room

roller shutter

female wc shwr change (layout to be checked)

coolroom

storeroom

meeting room

store/ kitchen

male public amenities

female public amenities

bench

basins

access wc

bench

wc

shwr

urnl

male club change

up

wiw

store

bedroom

bthrm

shwr

ex caretakers flat

kitchen

ex IRB storage

ex beach access

ex irb store

ex gymnasium

ex first aid room

beach inspector

sand path to beach

existing paving

SCS

SCS

SCS

grass area

sand path to beach

N

W

E

S

1 sediment control plan

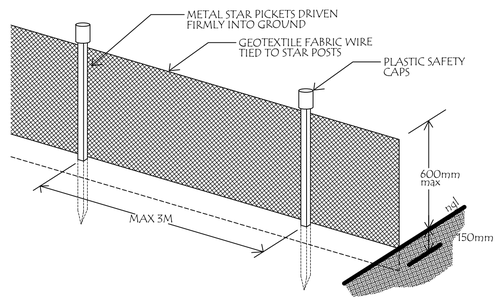
not to scale .Use scale bar

0

6m

draft

Sediment control sock to stwtr drains



SEDIMENT CONTROL FENCING DETAIL

legend

- SEDIMENT CONTROL FENCING (LOCATION ON SITE SHOWN)

SCS – SEDIMENT CONTROL SOCK AT STORMWATER DRAINS (LOCATION ON SITE SHOWN)

GENERAL NOTES:

SEDIMENT AND EROSION CONTROL

1. The contractor shall be solely responsible for the establishment and maintenance of erosion and sedimentation throughout the construction period in accordance with:-
   - Local Authority requirements
   - EPA requirements
   - Protection of the Environment Operations Act 1997
2. The erosion and sediment controls shown on the drawings represent concept only to demonstrate the minimum requirements.
3. The contractor shall maintain the control devices at all times to the satisfaction of the Superintendent , the Private Certifier and the Northern Beaches Council.
4. For all existing stormwater drains and pits and for all stormwater pits and drains constructed and replaced , prevent site run off entering them unless sediment controls are erected around and or over pits and drains.
5. Water shall be prevented from entering the permanent drainage system unless it is relatively sediment free.
6. Dust suppression using water will be used and runoff of that water will be kept localized and be legally and appropriately disposed of.
7. Final site landscaping and ground stabilization will be undertaken as soon as possible following construction activities.
8. The Contractor is to inform the subcontractors and all staff of their responsibilities in minimizing the potential for soil erosion and pollution to downstream lands and waterways.
9. Soil and excavated materials will be stored and taken away from site using skip bins.No stockpiling of such material on site is allowed.
10. Temporary soil and water management structures will be removed only after there is no possibility that future pollution or soil erosion will take place.
11. All demolition materials and soil will be put straight into skips within the sediment and erosion controlled areas and disposed of appropriately.
12. Acceptable containers/receptors will be provided for concrete pump/truck and painter washdown , rubbish and construction waste.
13. Site access will be restricted for vehicles. Roads and footpaths must be kept clean and debris free.

NOTE:
Measures for erosion and sediment control installed will comply with those methods , recommendations and requirements as set out in Northern Beaches Council's - North Area *"Guidelines for Erosion and Sediment Control on Building Sites"* document.

Rev	Description	Date
A	for consultatns purposes	Jun '23
B	Development Application pre-lodgement meeting purposes	Aug '23
C	final draft development application drawing	Sept '23
D	final draft development application drawing	Nov '23

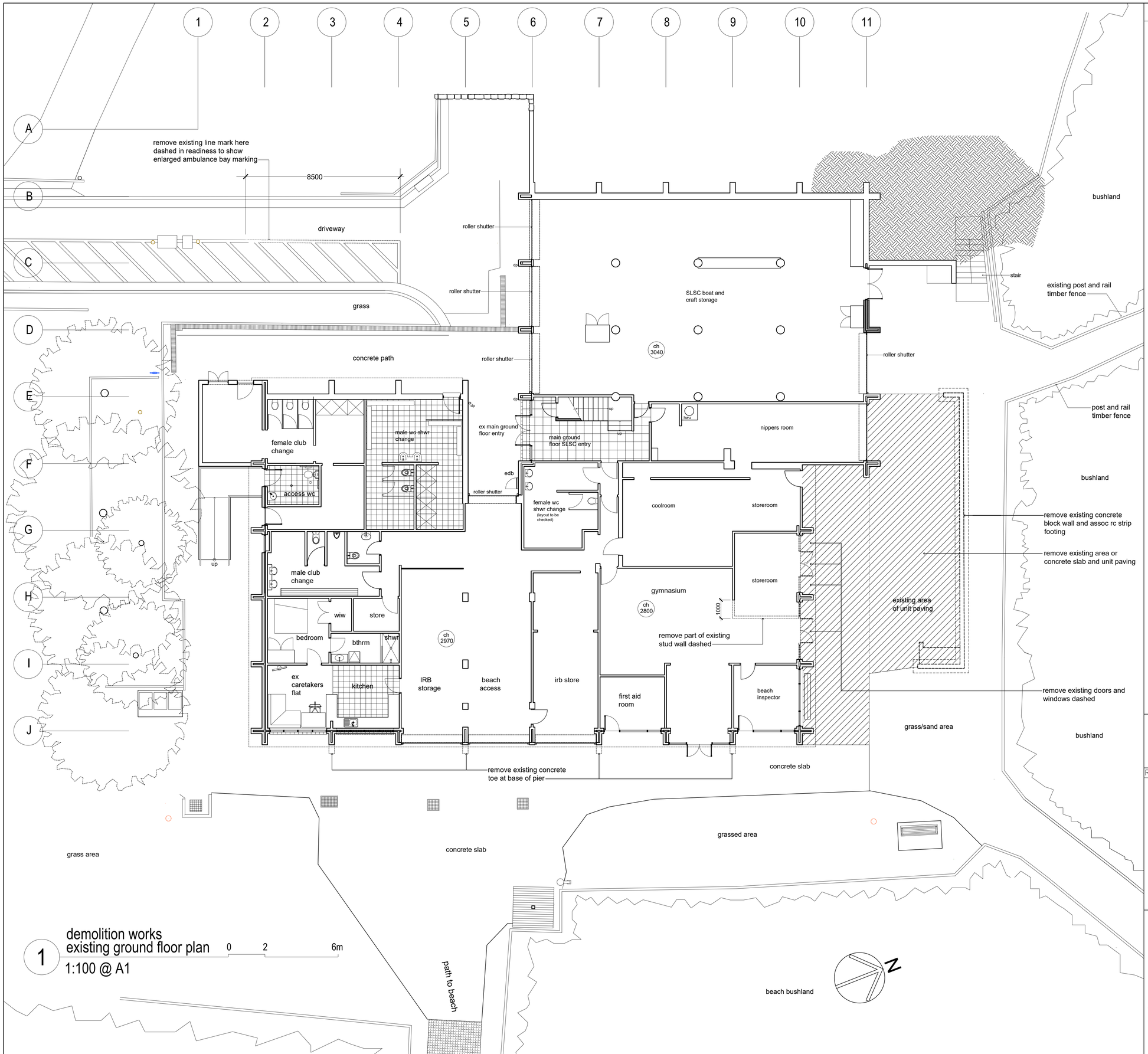
northern beaches council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing title:
construction sediment control plan

Prepared by:
Building Assets-Planning
Design and Delivery
Northern Beaches Council

Date: Apr 2023
Drawn by: MB
Dwg no: DAS02
Checked: BK
Scale: A.S.
Issue no: D



1 demolition works
existing ground floor plan
1:100 @ A1

0 2 6m

general notes:

Demolition works to be carried out in line with NSW Government Code of Pratice Demolition Work August 2019

All works related to this project must be carried out in line with all items as set out in the DA when and if approved , and include but not be limited to the following items items set out here;

- Where there is conflict between notes set out here and in the DA Notice of Determination , contact the project superintendant from NBC for clarification
- Where Aboriginal objects or remains or other arceological deposits and relics are uncovered during the works, the works must cease and the superintendnt from NBC and the Heritage Council must be immediately contacted
- Tree protection measures are to be installed prior to any demolition works and must be maintained for the duration of the works .
- A delapidattion report of the existing building must be prepared prior to commencement of demolition works on site.
- All natural landscape features including rock outcrops , native vegetation and watercourses are to be protected and will remain undisturbed and unaffected by the demolition works.
- An Erosion and Sediment Control Plan shall be prepared by and appropriately qualified person and implemented on site prior to commencement.This plan shall include items set out here below and all other items as setout in the DA Notice of Determination.

1. The contractor shall be solely responsible for the establishment and maintenance of erosion and sedimentation throughout the construction period in accordance with:-
   - Local Authority requirements
   - EPA requirements
   - Protection of the Environment Operations Act 1997, and with the requirements outlined in the Landcom publication "Managing Urban Stormwater : Soils and Construction" - Volume 1 4th Edition (2004)
2. The contractor shall maintain the control devices at all times to the satisfaction of the Superintendent , the Private Certifier and the Northern Beaches Council.
3. prevent site run off from entering all adjoning and on site existing watercourses, stormwater drains and pits and protect below ground storm water assets to NBC superintendent approval.
4. Water shall be prevented from entering the permanent drainage system unless it is relatively sediment free.
5. Dust suppression using water will be used and runoff of that water will be kept localized and be legally and appropriately disposed of.
6. Final site landscaping and ground stabilization will be undertaken as soon as possible following demolition activities.
7. The Contractor is to inform the subcontractors and all staff of their responsibilities in minimizing the potential for soil erosion and pollution to downstream lands and waterways.
8. Temporary soil and water management structures will be removed only after there is no possibility that future pollution or soil erosion will take place.
9. All demolition materials and soil will be put straight into skips within the sediment and erosion controlled areas and disposed of appropriately.No stockpiling of such material on site is allowed.
10. Acceptable containers/recepticals will be provided for rubbish and demolition waste.

note:

Location of all in-ground services within and adjoining the affected site to be verified and marked on site prior to works commencing on site.
Including a DIAL BEFORE YOU DIG investigation

Rev	Description	Date
A	to consultants for information	Oct '23
B	draft DA dwg for information	Oct '23
C	draft DA dwg for information	Oct '23
D	final draft DA dwg for information	Nov '23

northern beaches council

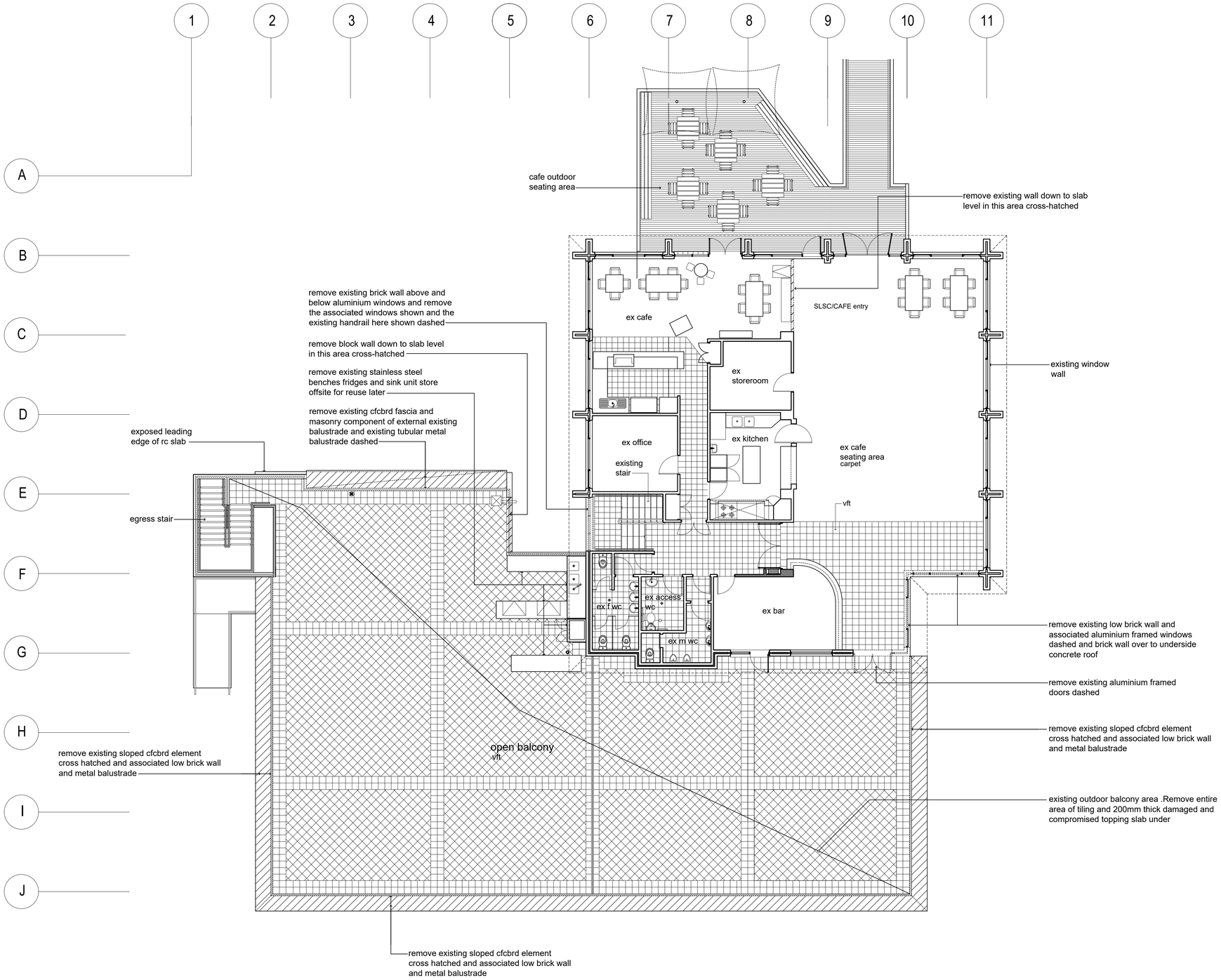
Prepared by:
Building Assets-Planning Design and Delivery
Northern Beaches Council

Project:
North Narrabeen SLSC
Alterations and additions

Drawing Title:
demolition works
existing ground floor plan

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB

Dwg no: DEM01
Issue no: D



1 demolition works existing upper floor plan
1:100 @ A1

0 2 6m

N

note:
See Dwg DEM01 for notes regarding demolition requirements

Rev	Description	Date
A	to consultants for information	Oct '23
B	draft DA dwg for information	Oct '23
C	draft DA dwg for information	Oct '23
D	final draft DA dwg for information	Nov '23

northern beaches council

Drawing Title:
demolition works
existing upper floor plan

Project:
North Narrabeen SLSC
Alterations and additions

Prepared by:
Building Assets-Planning
Design and Delivery
Northern Beaches Council

Date: Jun 2022
Scale: A.S.
Checked: BK
Drawn by: MB

Dwg no: DEM02
Issue no: D

Appendix H

Geotech Investigation & Acid Sulfate Soils Assessment Reports

REPORT TO

NORTHERN BEACHES COUNCIL

ON

GEOTECHNICAL INVESTIGATION

FOR

PROPOSED ALTERATIONS AND ADDITIONS TO THE NORTH NARRABEEN SURF LIFE SAVING CLUB

AT

OCEAN STREET, NORTH NARRABEEN, NSW

Date: 28 July 2023
Ref: 36107PErpt

JKGeotechnics
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JK Geotechnics Pty Ltd
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Report prepared by:

Michael Egan
Senior Geotechnical Engineer

Report reviewed by:

Peter Wright
Principal | Geotechnical Engineer

For and on behalf of
JK GEOTECHNICS
PO BOX 976
NORTH RYDE BC NSW 1670

DOCUMENT REVISION RECORD

Report Reference	Report Status	Report Date
36107PErpt	Final Report	28 July 2023

Table of Contents

ATTACHMENTS

1 INTRODUCTION

This report presents the results of a geotechnical investigation for the proposed alterations and additions at the North Narrabeen Surf Life Saving Club (SLSC), North Narrabeen, NSW. The location of the site is shown in Figure 1. The investigation was commissioned by Bernard Koon of Northern Beaches Council (NBC) by Purchase Order (PO No. T945110) dated 4 July 2023. The commission was on the basis of our fee proposal, 'Ref. P58713PE' dated 30 May 2023.

Based on the supplied concept drawings (Drawings STG1/01 to STG1/04, STG2/01 & STG3/01 to STG3/03, all Issue No A, dated June 2022) and 'Quotation Request Form' dated 18 May 2023 prepared by NBC, we understand the proposed development will be carried out in three stages, comprising the following:

- Stage 1 – Construction of a new ground floor meeting room, paved area and 1.6m high blockwork wall, as well as a new first floor concrete infill slab that will be integrated into the existing first floor balcony at the northern end of the SLSC;
- Stage 2 – Internal alterations and additions throughout the SLSC first-floor level; and
- Stage 3 – Construction of new enclosed entertainment area within the SLSC first floor balcony.

The purpose of the investigation was to obtain geotechnical information on the subsurface conditions, and to use this as a basis for providing our comments and recommendations on site preparation, footings, on-grade floor slabs, external pavements, soil aggression, and additional geotechnical input.

This geotechnical investigation was carried out in conjunction with a preliminary acid sulfate soil assessment by our environmental division, JK Environments (JKE). Reference should be made to the separate report by JKE, Ref: E36107BRlet-ASS, for the results of the environmental site assessment.

2 INVESTIGATION PROCEDURE

The fieldwork for the investigation was carried out on 21 June 2023 and was limited by access constraints to the use of portable manually operated equipment. The fieldwork comprised the following:

- Hand excavation of two test pits (TP1 and TP2) to approximately 0.5m depth below existing surface levels in an attempt to expose the footing details and foundation conditions at the northern and southern ends of the SLSC building. The test pits were initially advanced with a shovel and crowbar and then with a hand auger to a termination depth of 2m.
- Four Dynamic Cone Penetration (DCP) tests (DCP1 to DCP4) were completed adjacent to the test pits and at two additional locations and extended to a termination depth of 4m.

Prior to the commencement of the fieldwork, a specialist sub-consultant reviewed available 'Before you Dig Australia' information and electro-magnetically scanned the test locations for buried services.

The fieldwork for the investigation was carried out in the full-time presence of our geotechnical engineer (Ngoc Anh Phung), who set out the test locations, directed the electro-magnetic scanning, nominated testing and sampling, and prepared the test pit cross-sectional/plan sketches and DCP test results sheets. The test pit sketches and DCP test results sheets are attached to this report, together with a glossary of symbols used.

The test locations, as shown on Figure 2, were set out by taped measurements from existing surface features. An available aerial image sourced from Nearmap forms the basis of Figure 2.

The concrete pavements at the test pit locations were penetrated using a hand held saw (with water flush). The relative density of the underlying sand was assessed from the DCP blow counts. Groundwater observations were made during and for a short time following excavation/drilling. Long-term groundwater level monitoring was outside the agreed scope of the geotechnical investigation. For details of the adopted investigation techniques employed, and their limitations, reference should be made to the attached Report Explanation Notes.

Three soil samples were returned to a NATA accredited analytical laboratory, Envirolab Services Pty Ltd, for soil pH, sulphate, chloride and resistivity testing. The results are presented in the attached Envirolab Services 'Certificate of Analysis 326222'.

3 RESULTS OF INVESTIGATION

3.1 Site Description

The North Narrabeen SLSC is located on a section of the Tasman Sea foreshore at North Narrabeen, approximately 300m to the south of the South Creek entry into Narrabeen Lagoon. The SLSC sits atop a partially vegetated sand dune on the seaward side of Ocean Street, with surrounding surface levels sloping gently down in all directions.

The SLSC consists of an irregular L shaped, one and two storey brick and blockwork building, with a first floor balcony on its seaward (i.e. eastern) side, and a first floor timber deck at the north-western end. The western side of the building has been partially cut (maximum 2.5m depth) into the aforementioned sand dune to form the ground floor level in this area. The building was surrounded by concrete pavements and brick pavers, and an asphaltic concrete access road was located to the south-west.

Several retaining walls of brick and mortared sandstone block construction up to a maximum height of approximately 1.7m further supported the dune on both the northern and southern sides of the building. A number of medium sized trees were also set back approximately 3m beyond the southern end of the SLSC building.

Based on a cursory inspection, the SLSC building, retaining walls and pavements were in a poor to moderate condition with horizontal, vertical and stepped cracking up to approximately 20mm wide noted.

3.2 Subsurface Conditions

The 1:100,000 series geological map of Sydney (Geological Survey of NSW, Geological Series Sheet 9130) indicates the site is underlain by Quaternary age aeolian and marine sands and silts. Below the pavements, the test pits generally encountered natural marine sands which extended to the test pit termination depth of 2m. Groundwater was not encountered within the test pits. Reference should be made to the test pit cross-sectional/plan sketches and DCP test results for specific details at each test locations.

Pavements

Concrete pavements were encountered from surface level in both test pits and were 75mm thick. A thin layer of corroded/rusted metal underlay the concrete slab in TP1.

Marine Sands

Fine to medium grained marine sand was encountered below the concrete slab in TP2 and below the corroded/rusted metal in TP1. From the results of the DCP tests and assuming the soils below the test pit termination depths were sandy (which is expected), and that a similar sandy profile is present at DCP3 and DCP4, the relative densities at each test location are indicated in the table below.

Location / Density	Depth (m)			
	DCP1	DCP2	DCP3	DCP4
Very Loose	0.0 – 0.2	0.0 – 0.2 1.3 - 1.6	-	0.0 – 1.0
Loose	1.1 – 1.6	0.2 – 1.3 1.6 – 1.9	0.0 – 1.4	1.0 – 1.6 2.8 – 3.2
Medium Dense	0.2 – 1.1 1.6 – 4.0	1.9 - 4.0	1.4 – 4.0	1.6 – 2.8 3.2 - 4.0

Groundwater

Groundwater seepage was not noted during, or on completion of, excavation or drilling. No longer term groundwater monitoring was undertaken. Notwithstanding, considering the locality of the site, we would expect groundwater levels to be similar to sea levels and rise and fall with tidal fluctuations.

Footing Details

The exposed footings at TP1 and TP2 were founded at approximately 0.4m depth in natural sands of loose (TP2) and medium dense (TP1) relative density. The dimensions of the concrete footings were fairly consistent being 0.31m (TP1) and 0.35m (TP2) deep, and contained outstands of 0.19m (TP1) and 0.15m (TP2). Assuming symmetry, the footings appear to be rectangular pad footings, with a maximum width and length of 0.73m and 1.45m in TP1, and 0.65m and 1.25m in TP2, respectively. Based on our site observations, it appears as though the brick walls of the SLSC building are supported on the concrete floor slab.

3.3 Laboratory Test Results

The soil pH test results were 9.3 and 9.4 which showed the samples were moderately alkaline. The sulphate and chloride test results were less than 10mg/kg which indicates low sulphate and chloride contents. The resistivity tests were 18,000ohm.cm and 19,000 ohm.cm indicating high resistivity.

4 COMMENTS AND RECOMMENDATIONS

At this stage, we have not been provided with the proposed loads or details of how the structures will be built. Once such details are known, we should be asked to review these details and revise this report, as necessary.

4.1 Site Preparation

Site preparation works are expected to comprise removal of the existing concrete pavements, brick pavers and blockwork wall at the northern end of the site, as well as removal of any root affected soils and/or deleterious or contaminated existing fill which should be separately stockpiled for reuse in landscape areas or appropriately disposed of offsite.

As very loose sands were encountered and may extend below the existing structures, we do not recommend the use of large rock breakers during demolition due to the potential for transmission of vibrations which could cause damage to the existing SLSC building. We therefore recommend that the removal of all concrete pavements and floor slabs, and any sections of masonry walls etc., be completed using a diamond saw followed by removal of the concrete/brick pieces using a bucket attachment to a tracked excavator, or using small hydraulic rock breakers attached to excavators of not more than 5 tonne size. We also note that 'dropping' of large sections of the concrete/brickwork during demolition should also be avoided in order to prevent the generation of potentially damaging vibrations.

4.2 Footings

From the results of the investigation, natural marine sands were encountered/inferred to at least 4m below ground surface. In addition, the SLSC building appears to be supported by rectangular pad footings with minimum dimensions (assuming symmetry) of 1.25m x 0.65m x 0.3m (length x width x depth). The footings are embedded approximately 0.4m below ground surface and founded in loose and medium dense sands. However, a very loose sand band (maximum 0.3m thick) and loose sand band (0.5m thick) were encountered at 1.3m depth in TP2 and 1.1m depth in TP1, respectively.

Based on the above, we consider an allowable bearing pressure (ABP) of 90kPa can be adopted to check the capacity of the existing footings to support the existing development with the additional proposed enclosed entertainment area loads. If the additional loads imposed on the existing footings exceed the ABP outlined above, the footings may need to be enlarged or underpinned, although increasing the size of the footing will increase the expected settlement. Further proving of footings by probe drilling or possibly with slab scanning techniques to obtain further information on the footing sizes will be required prior to the commencement of construction.

At this stage, it is not clear whether the project structural engineer would prefer for all new footings to match the existing footing details and founded on similar foundation materials. Where this is the case, we recommended pad footings founded in loose (or denser) natural sands (width and embedment depth at least 0.5m) may be designed using an ABP of 90kPa, subject to geotechnical inspection. Since the existing structure

would have already settled, it may be preferable to create an articulation joint between the existing and new portions of the structure and support the extension on new piled footings such as steel screw piles.

Piled footings such as cased auger piles, CFA piles or steel screw piles of at least 0.45m diameter which are founded within medium dense sand at a depth of 3.5m could provisionally be designed for an allowable end bearing pressure of 1,000kPa. Further investigation would be required to prove this medium dense sand layer is consistent. Higher pile loads could also be achievable for larger pile diameters founded at deeper depths, provided the relative density does not reduce with depth.

DCP3 and DCP4 indicate very loose and loose sands at (assumed) foundation level for the proposed blockwork wall. Although the structural loads will be relatively small, we recommend the wall be provided with a concrete footing founded in the very loose (or denser) natural sands (width and embedment at least 0.5m) and be designed using an ABP of 50kPa, subject to geotechnical inspection. Footings of 0.5m width designed for 50kPa could undergo settlement of about 10mm.

We note that the bearing pressure of sandy soils is a function of footing geometry in addition to the soil properties. Therefore, once the structural loads have been finalised, additional bearing capacity analysis should be carried out to assess the suitability of the footing options described above.

Due to the presence of very loose sands encountered at the northern end of the site, we recommend additional test pit excavations and DCP testing should be carried out by an experienced geotechnical engineer following removal of the concrete pavements and brick pavers. The purpose of the additional test pits and DCP testing is to further confirm the geometry of the existing footings and presence of any other very loose sand bands. Similarly, DCP testing should also be carried out at all new footing locations to confirm the ABP in these areas. Some footing excavations may need to be deepened to achieve the required bearing capacity.

Excavations for pad/strip footings will extend through sandy soils and should therefore be supported with formwork or battered, as vertical cuts will be potentially unstable. Temporary batters should be formed no steeper than 1 Vertical (V) in 2 Horizonal (H). The bases of footing excavations in sand should be thoroughly moistened and compacted using a hand held vibrating plate compactor or whacker packer.

4.3 Floor Slabs

Whilst slab-on-grade construction is considered feasible for the proposed meeting room, it will be difficult to complete high quality earthworks in such a confined area, particularly close to the existing SLSC building which will preclude the use of vibratory rollers. Where the earthworks are carried out to a poor standard, differential settlements and potential cracking of the floor slab can occur.

For the above reasons, our recommendation is to suspended the floor slab between new high level footings founded within the underling natural marine sands or piled footings founded at depth. For floor slabs suspended over soil subgrade areas, the subgrade preparation would generally comprise the removal of all root affected soils, and any deleterious or contaminated soils, and the nominal tracking of ‘formwork’ fill to

the required subgrade level (if necessary). Care must be taken during any excavation works not to undermine any nearby footings or retaining walls that will remain.

4.4 External Paved Area

The concept design drawings indicate the proposed paved area will be located between the proposed blockwork wall and northern end of the existing SLSC building. Following removal of the concrete and brick pavements, a geotechnical engineer must inspect the subgrade below the new paved area to confirm the subsurface material may remain in place or be excavated and replaced with engineered fill.

Below any areas of new (non-trafficable) pavements, all root affected soils, and deleterious or contaminated soils, should be stripped and stockpiled separately for reuse in landscape areas or appropriately disposed off offsite.

A 100mm thick layer of road base should be placed over the exposed subgrade, adequately moistened, and then proof rolled with at least eight passes of a two tonne minimum deadweight smooth drum static (non vibratory) roller to detect any soft or heaving areas. Confirmatory DCP testing should be carried out on grid arrangement to confirm the sandy subgrade has been suitably compacted. Where access is restricted, say between existing brick columns, proof rolling may require the use of a hand held vibrating plate compactor or whacker packer. Where the pavements are trafficable, the roller should be increased to 5 tonne which may require thickening of the road base to 150mm.

If soft/heaving areas are present, these areas should be locally removed down to a competent base and replaced with engineered fill. We expect the excavated sands may be used as engineered fill and should be compacted in horizonal layers with a maximum 100mm loose layer thickness to achieve a minimum density index of (I_D) of 70%. Density tests should be carried out in accordance with AS3798-2007 'Guidelines on Earthworks for Commercial and Residential Developments' for the volume of fill involved.

4.5 Soil Aggression

The soil aggression test results have indicated the soils are moderately alkaline and contain low sulphate and chloride contents. In accordance with Table 6.4.2 of AS2159-2009 'Piling – Design and Installation' and Table 4.8.1 of AS3600:2018 'Concrete Structures', the exposure classification to concrete slabs/footings is 'mild' and 'A2', respectively. For steel piles, the exposure classification is 'non-aggressive'.

4.6 Further Geotechnical Input

The following is a summary of the further geotechnical input which is required and which has been detailed in the preceding sections of this report:

- Additional geotechnical inspection of test pits exposing existing footings and DCP testing of the foundation material.
- Geotechnical inspection and DCP testing of all new footings.

- Proof rolling of the exposed soil subgrade and DCP testing.
- Density testing of engineered fill.

5 GENERAL COMMENTS

The recommendations presented in this report include specific issues to be addressed during the design and construction phase of the project. As an example, special treatment of soft spots may be required as a result of their discovery during proof-rolling, etc. In the event that any of the advice presented in this report is not implemented, the general recommendations may become inapplicable and JK Geotechnics accept no responsibility whatsoever for the performance of the structure where recommendations are not implemented in full and properly tested, inspected and documented.

The long term successful performance of floor slabs and pavements is dependent on the satisfactory completion of the earthworks. In order to achieve this, the quality assurance program should not be limited to routine compaction density testing only. Other critical factors associated with the earthworks may include subgrade preparation, selection of fill materials, control of moisture content and drainage, etc. The satisfactory control and assessment of these items may require judgment from an experienced engineer. Such judgment often cannot be made by a technician who may not have formal engineering qualifications and experience. In order to identify potential problems, we recommend that a pre-construction meeting be held so that all parties involved understand the earthworks requirements and potential difficulties. This meeting should clearly define the lines of communication and responsibility.

Occasionally, the subsurface conditions between the completed boreholes may be found to be different (or may be interpreted to be different) from those expected. Variation can also occur with groundwater conditions, especially after climatic changes. If such differences appear to exist, we recommend that you immediately contact this office.

This report provides advice on geotechnical aspects for the proposed civil and structural design. As part of the documentation stage of this project, Contract Documents and Specifications may be prepared based on our report. However, there may be design features we are not aware of or have not commented on for a variety of reasons. The designers should satisfy themselves that all the necessary advice has been obtained. If required, we could be commissioned to review the geotechnical aspects of contract documents to confirm the intent of our recommendations has been correctly implemented.

A waste classification is required for any soil and/or bedrock excavated from the site prior to offsite disposal. Subject to the appropriate testing, material can be classified as Virgin Excavated Natural Material (VENM), Excavated Natural Material (ENM), General Solid, Restricted Solid or Hazardous Waste. Analysis can take up to seven to ten working days to complete, therefore, an adequate allowance should be included in the construction program unless testing is completed prior to construction. If contamination is encountered, then substantial further testing (and associated delays) could be expected. We strongly recommend that this requirement is addressed prior to the commencement of excavation on site.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 326222

Client Details

Client	JK Geotechnics
Attention	N Phung
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**36107PE**
Number of Samples	3 Soil
Date samples received	22/06/2023
Date completed instructions received	22/06/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	29/06/2023
Date of Issue	29/06/2023

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Priya Samarawickrama, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

Misc Inorg - Soil				
Our Reference		326222-1	326222-2	326222-3
Your Reference	UNITS	BH2	BH2	BH2
Depth		0.1-0.2	0.7-0.8	1.6-1.7
Date Sampled		22/06/2023	22/06/2023	22/06/2023
Type of sample		Soil	Soil	Soil
Date prepared	-	26/06/2023	26/06/2023	26/06/2023
Date analysed	-	26/06/2023	26/06/2023	26/06/2023
pH 1:5 soil:water	pH Units	9.3	9.4	9.4
Chloride, Cl 1:5 soil:water	mg/kg	<10	<10	<10
Sulphate, SO4 1:5 soil:water	mg/kg	<10	<10	<10
Resistivity in soil*	ohm m	190	190	180

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA 22nd ED 2510 and Rayment & Lyons. Resistivity is calculated from Conductivity (non NATA). Resistivity (calculated) may not correlate with results otherwise obtained using Resistivity-Current method, depending on the nature of the soil being analysed.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			26/06/2023	[NT]	[NT]	[NT]	[NT]	26/06/2023	[NT]
Date analysed	-			26/06/2023	[NT]	[NT]	[NT]	[NT]	26/06/2023	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	104	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	102	[NT]
Resistivity in soil*	ohm m	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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DYNAMIC CONE PENETRATION TEST RESULTS

Client:	NORTHERN BEACHES COUNCIL						
Project:	PROPOSED ALTERATIONS AND ADDITONS						
Location:	NORTH NARRABEEN SLSC, NORTH NARRABEEN, NSW						
Job No.	36107PE			Hammer Weight & Drop: 9kg/510mm			
Date:	21-6-23			Rod Diameter: 16mm			
Tested By:	N.A.P.			Point Diameter: 20mm			
Test Location	**1**	**2**	**3**	Test Location	**1**	**2**	**3**
Surface RL	N/A	N/A	N/A	Surface RL	N/A	N/A	N/A
Depth (mm)	Blows per 100mm Penetration			Depth (mm)	Blows per 100mm Penetration		
0 - 100	EXCAVATED	SUNK	1	3000-3100	6	7	5
100 - 200	SUNK	1	5	3100-3200	5	8	6
200 - 300	4	2	4	3200-3300	5	9	6
300 - 400	5	3	5	3300-3400	5	9	6
400 - 500	5	3	3	3400-3500	6	8	5
500 - 600	6	5	2	3500-3600	8	6	6
600 - 700	5	5	2	3600-3700	6	6	7
700 - 800	4	3	3	3700-3800	9	6	8
800 - 900	4	5	3	3800-3900	9	7	9
900 - 1000	4	4	3	3900-4000	9	8	9
1000 - 1100	4	2	3	4000-4100	END	END	END
1100 - 1200	3	2	1	4100-4200			
1200 - 1300	3	2	3	4200-4300			
1300 - 1400	4	1	3	4300-4400			
1400 - 1500	4	1	4	4400-4500			
1500 - 1600	3	1	4	4500-4600			
1600 - 1700	5	2	4	4600-4700			
1700 - 1800	6	3	4	4700-4800			
1800 - 1900	4	4	4	4800-4900			
1900 - 2000	4	5	5	4900-5000			
2000 - 2100	4	5	4	5000-5100			
2100 - 2200	4	5	3	5100-5200			
2200 - 2300	4	5	5	5200-5300			
2300 - 2400	6	6	6	5300-5400			
2400 - 2500	6	5	5	5400-5500			
2500 - 2600	6	5	6	5500-5600			
2600 - 2700	6	5	5	5600-5700			
2700 - 2800	6	6	5	5700-5800			
2800 - 2900	7	5	4	5800-5900			
2900 - 3000	6	5	5	5900-6000			

Remarks: 1. The procedure used for this test is described in AS1289.6.3.2-1997 (R2013)
2. Usually 8 blows per 20mm is taken as refusal

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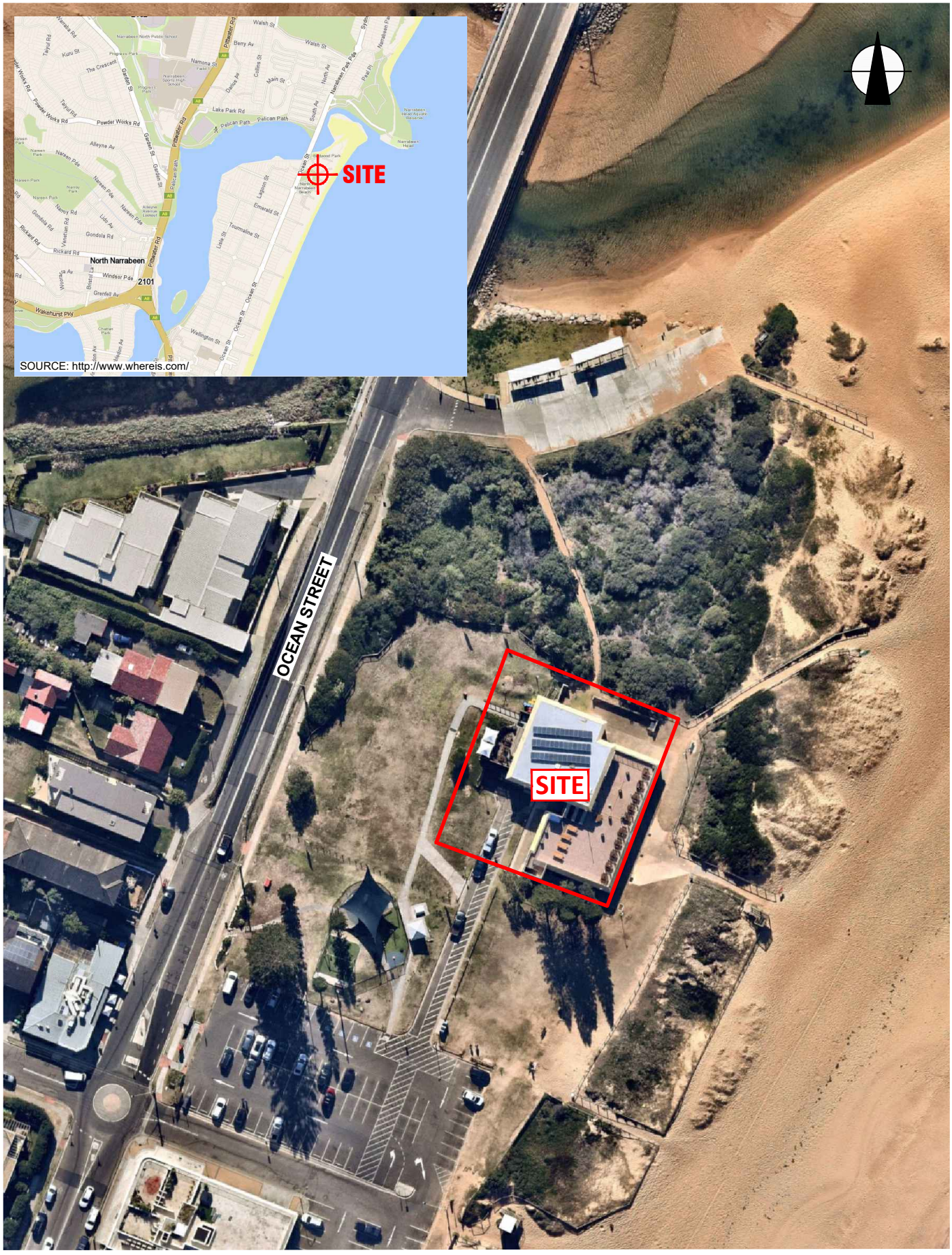
DYNAMIC CONE PENETRATION TEST RESULTS

Client:	NORTHERN BEACHES COUNCIL
Project:	PROPOSED ALTERATIONS AND ADDITONS
Location:	NORTH NARRABEEN SLSC, NORTH NARRABEEN, NSW

Job No.	36107PE	Hammer Weight & Drop:	9kg/510mm
Date:	21-6-23	Rod Diameter:	16mm
Tested By:	N.A.P.	Point Diameter:	20mm

Test Location	**4**			Test Location	**4**		
Surface RL	N/A			Surface RL	N/A		
Depth (mm)	Blows per 100mm Penetration			Depth (mm)	Blows per 100mm Penetration		
0 - 100	2			3000-3100	3		
100 - 200	4			3100-3200	3		
200 - 300	2			3200-3300	4		
300 - 400	1			3300-3400	6		
400 - 500	2			3400-3500	6		
500 - 600	1			3500-3600	6		
600 - 700				3600-3700	5		
700 - 800				3700-3800	6		
800 - 900	↓			3800-3900	6		
900 - 1000	1			3900-4000	8		
1000 - 1100	2			4000-4100	END		
1100 - 1200	2			4100-4200			
1200 - 1300	2			4200-4300			
1300 - 1400	3			4300-4400			
1400 - 1500	4			4400-4500			
1500 - 1600	3			4500-4600			
1600 - 1700	6			4600-4700			
1700 - 1800	5			4700-4800			
1800 - 1900	5			4800-4900			
1900 - 2000	4			4900-5000			
2000 - 2100	5			5000-5100			
2100 - 2200	6			5100-5200			
2200 - 2300	5			5200-5300			
2300 - 2400	4			5300-5400			
2400 - 2500	3			5400-5500			
2500 - 2600	5			5500-5600			
2600 - 2700	5			5600-5700			
2700 - 2800	4			5700-5800			
2800 - 2900	2			5800-5900			
2900 - 3000	3			5900-6000			

Remarks: 1. The procedure used for this test is described in AS1289.6.3.2-1997 (R2013)
2. Usually 8 blows per 20mm is taken as refusal



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

This plan should be read in conjunction with the JK Geotechnics report.

Title: **SITE LOCATION PLAN**

Location: NORTH NARRABEEN SURF LIFE SAVING CLUB, OCEAN STREET, NORTH NARRABEEN, NSW

Report No: 36107PE

Figure No: 1

JKGeotechnics

PLOT DATE: 21/07/2023 11:22:41 AM DWG FILE: J:\6F GEOTECHNICAL JOBS\36000'S\36107PE NORTH NARRABEEN\CAD\36107PE.DWG

LEGEND

- DCP TEST
- TEST PIT, BOREHOLE AND DCP TEST

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 2.5 5 7.5 10 12.5

SCALE 1:250 @A3 METRES

This plan should be read in conjunction with the JK Geotechnics report.

Title: **INVESTIGATION LOCATION PLAN**

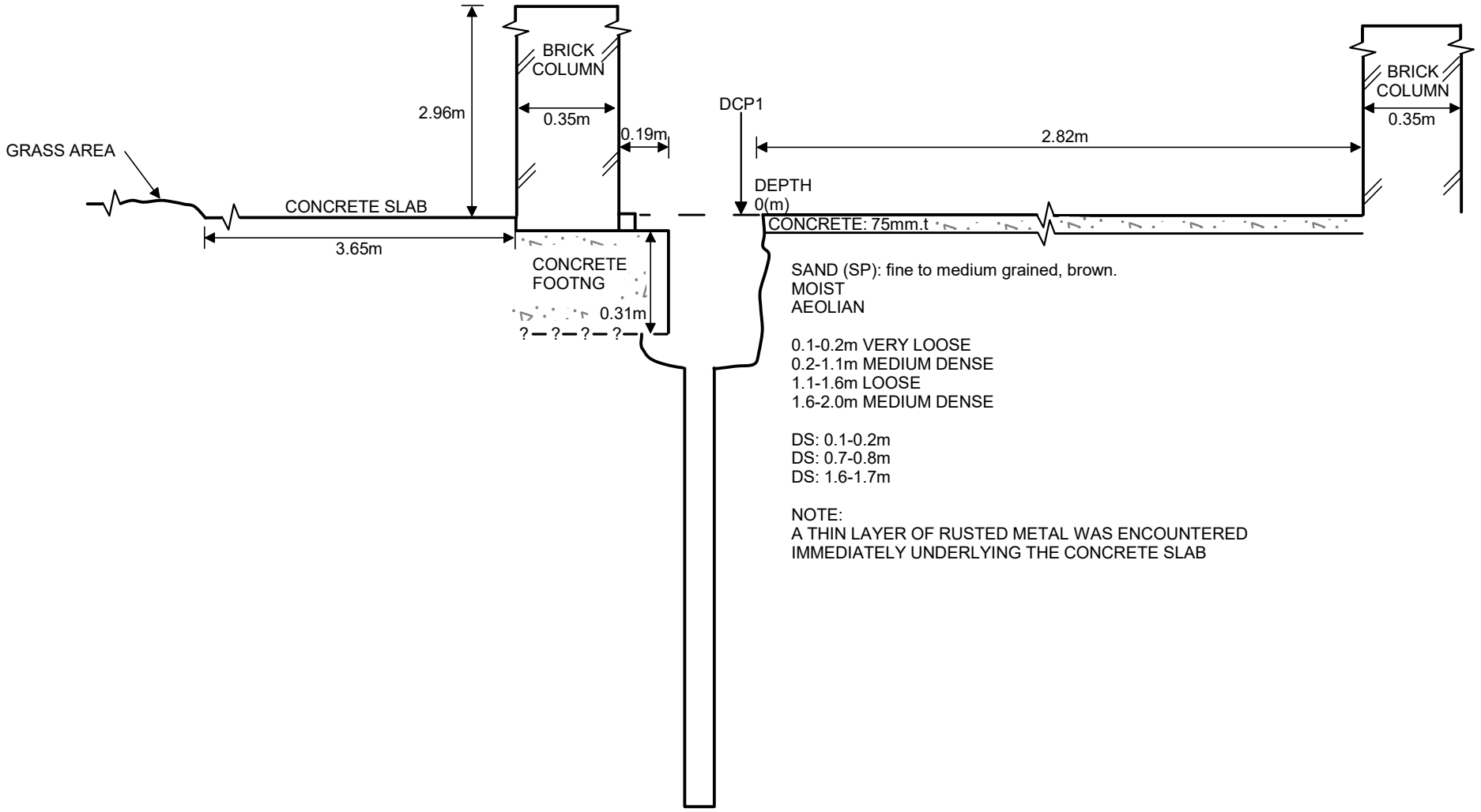
Location: NORTH NARRABEEN SURF LIFE SAVING CLUB, OCEAN STREET, NORTH NARRABEEN, NSW

Report No: 36107PE

Figure No: 2

JKGeotechnics

PLOT DATE: 21/07/2023 11:22:56 AM DWG FILE: J:\6F GEOTECHNICAL JOBS\36000S\36107PE NORTH NARRABEEN\CAD\36107PE.DWG



SAND (SP): fine to medium grained, brown.
MOIST
AEOLIAN

0.1-0.2m VERY LOOSE
0.2-1.1m MEDIUM DENSE
1.1-1.6m LOOSE
1.6-2.0m MEDIUM DENSE

DS: 0.1-0.2m
DS: 0.7-0.8m
DS: 1.6-1.7m

NOTE:
A THIN LAYER OF RUSTED METAL WAS ENCOUNTERED IMMEDIATELY UNDERLYING THE CONCRETE SLAB

BASE OF FOOTING 0.39m DEPTH
BASE OF TESTPIT AT 2.0m DEPTH
'DRY' ON COMPLETION
REFER TO DCP TEST RESULTS SHEET
REFER TO FIGURE 4 FOR PLAN SKETCH

TEST PIT 1
CROSS SECTIONAL SKETCH
LOOKING SOUTH

0 1.0
Scale 1:20 @A4 Metres

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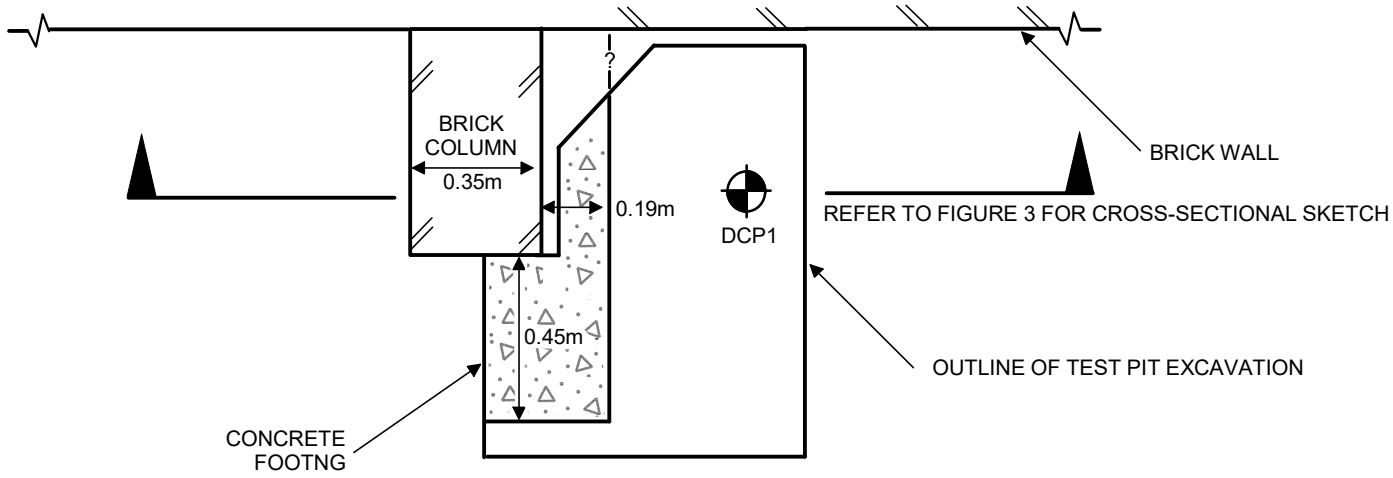
Report No. 36107PE Figure No. 3



PLAN SKETCH
TEST PIT 1

0 1.0
Scale 1:20 @A4 Metres

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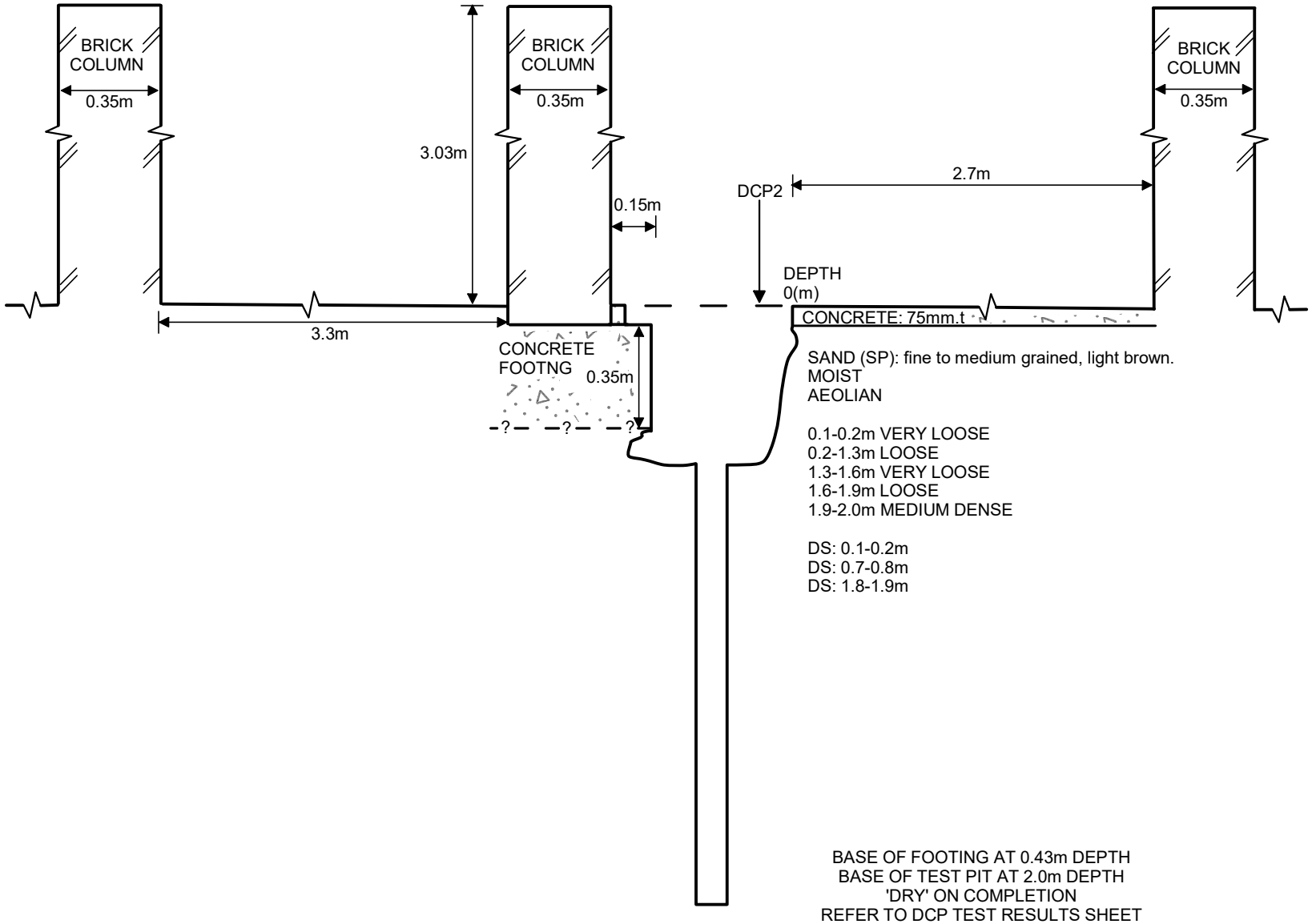
Report No. 36107PE Figure No. 4



0 1.0
Scale 1:20 @A4 Metres

TEST PIT 2
CROSS SECTIONAL SKETCH
LOOKING NORTH

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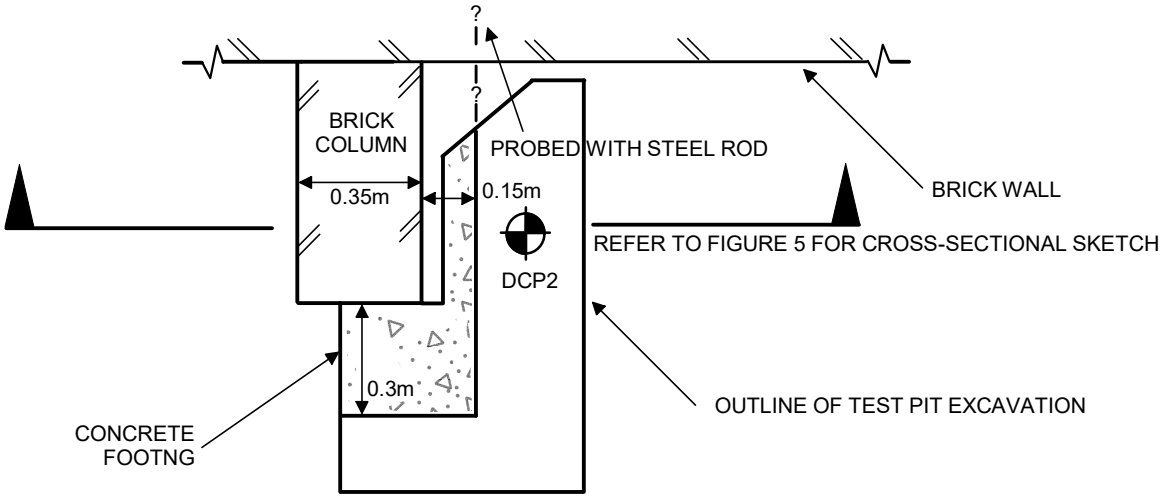
Report No. 36107PE Figure No. 5



PLAN SKETCH
TEST PIT 2

0 1.0
Scale 1:20 @A4 Metres

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Report No. 36107PE Figure No. 6

REPORT EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the geotechnical report in regard to classification methods, field procedures and certain matters relating to the Comments and Recommendations section. Not all notes are necessarily relevant to all reports.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Geotechnical engineering involves gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) is referred to as 'laminite'.

SAMPLING

Sampling is carried out during drilling or from other excavations to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content, minor constituents and, depending upon the degree of disturbance, some information on strength and structure. Bulk samples are similar but of greater volume required for some test procedures.

Undisturbed samples are taken by pushing a thin-walled sample tube, usually 50mm diameter (known as a U50), into the soil and withdrawing it with a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shrink-swell behaviour, strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N > 30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

Cone Penetrometer Testing (CPT) and Interpretation: The cone penetrometer is sometimes referred to as a Dutch Cone. The test is described in Australian Standard 1289.6.5.1–1999 (R2013) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Static Cone Penetration Resistance of a Soil – Field Test using a Mechanical and Electrical Cone or Friction-Cone Penetrometer'*.

In the tests, a 35mm or 44mm diameter rod with a conical tip is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with a hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the frictional resistance on a separate 134mm or 165mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are electrically connected by wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck. The CPT does not provide soil sample recovery.

As penetration occurs (at a rate of approximately 20mm per second), the information is output as incremental digital records every 10mm. The results given in this report have been plotted from the digital data.

The information provided on the charts comprise:

- Cone resistance – the actual end bearing force divided by the cross sectional area of the cone – expressed in MPa. There are two scales presented for the cone resistance. The lower scale has a range of 0 to 5MPa and the main scale has a range of 0 to 50MPa. For cone resistance values less than 5MPa, the plot will appear on both scales.
- Sleeve friction – the frictional force on the sleeve divided by the surface area – expressed in kPa.
- Friction ratio – the ratio of sleeve friction to cone resistance, expressed as a percentage.

  The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and occasionally very soft clays, rising to 4% to 10% in stiff clays and peats. Soil descriptions based on cone resistance and friction ratios are only inferred and must not be considered as exact.

Correlations between CPT and SPT values can be developed for both sands and clays but may be site specific.

Interpretation of CPT values can be made to empirically derive modulus or compressibility values to allow calculation of foundation settlements.

Stratification can be inferred from the cone and friction traces and from experience and information from nearby boreholes etc. Where shown, this information is presented for general guidance, but must be regarded as interpretive. The test method provides a continuous profile of engineering properties but, where precise information on soil classification is required, direct drilling and sampling may be preferable.

There are limitations when using the CPT in that it may not penetrate obstructions within any fill, thick layers of hard clay and very dense sand, gravel and weathered bedrock. Normally a 'dummy' cone is pushed through fill to protect the equipment. No information is recorded by the 'dummy' probe.

Flat Dilatometer Test: The flat dilatometer (DMT), also known as the Marchetti Dilometer comprises a stainless steel blade having a flat, circular steel membrane mounted flush on one side.

The blade is connected to a control unit at ground surface by a pneumatic-electrical tube running through the insertion rods. A gas tank, connected to the control unit by a pneumatic cable, supplies the gas pressure required to expand the membrane. The control unit is equipped with a pressure regulator, pressure gauges, an audio-visual signal and vent valves.

The blade is advanced into the ground using our CPT rig or one of our drilling rigs, and can be driven into the ground using an SPT hammer. As soon as the blade is in place, the membrane is inflated, and the pressure required to lift the membrane (approximately 0.1mm) is recorded. The pressure then required to lift the centre of the membrane by an additional 1mm is recorded. The membrane is then deflated before pushing to the next depth increment, usually 200mm down. The pressure readings are corrected for membrane stiffness.

The DMT is used to measure material index (I_D), horizontal stress index (K_D), and dilatometer modulus (E_D). Using established correlations, the DMT results can also be used to assess the 'at rest' earth pressure coefficient (K_o), over-consolidation ratio (OCR), undrained shear strength (C_u), friction angle (ϕ), coefficient of consolidation (C_h), coefficient of permeability (K_h), unit weight (γ), and vertical drained constrained modulus (M).

The seismic dilatometer (SDMT) is the combination of the DMT with an add-on seismic module for the measurement of shear wave velocity (V_s). Using established correlations, the SDMT results can also be used to assess the small strain modulus (G_o).

Portable Dynamic Cone Penetrometers: Portable Dynamic Cone Penetrometer (DCP) tests are carried out by driving a 16mm diameter rod with a 20mm diameter cone end with a 9kg hammer dropping 510mm. The test is described in Australian Standard 1289.6.3.2–1997 (R2013) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – 9kg Dynamic Cone Penetrometer Test'*.

The results are used to assess the relative compaction of fill, the relative density of granular soils, and the strength of cohesive soils. Using established correlations, the DCP test results can also be used to assess California Bearing Ratio (CBR).

Refusal of the DCP can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Vane Shear Test: The vane shear test is used to measure the undrained shear strength (C_u) of typically very soft to firm fine grained cohesive soils. The vane shear is normally performed in the bottom of a borehole, but can be completed from surface level, the bottom and sides of test pits, and on recovered undisturbed tube samples (when using a hand vane).

The vane comprises four rectangular blades arranged in the form of a cross on the end of a thin rod, which is coupled to the bottom of a drill rod string when used in a borehole. The size of the vane is dependent on the strength of the fine grained cohesive soils; that is, larger vanes are normally used for very low strength soils. For borehole testing, the size of the vane can be limited by the size of the casing that is used.

For testing inside a borehole, a device is used at the top of the casing, which suspends the vane and rods so that they do not sink under self-weight into the 'soft' soils beyond the depth at which the test is to be carried out. A calibrated torque head is used to rotate the rods and vane and to measure the resistance of the vane to rotation.

With the vane in position, torque is applied to cause rotation of the vane at a constant rate. A rate of 6° per minute is the common rotation rate. Rotation is continued until the soil is sheared and the maximum torque has been recorded. This value is then used to calculate the undrained shear strength. The vane is then rotated rapidly a number of times and the operation repeated until a constant torque reading is obtained. This torque value is used to calculate the remoulded shear strength. Where appropriate, friction on the vane rods is measured and taken into account in the shear strength calculation.

LOGS

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

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

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

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it 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 and may not be the same at the time of construction.
- 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 be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to 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 perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse engineering characteristics or behaviour. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing is normally carried out in accordance with Australian Standard 1289 *'Methods of Testing Soils for Engineering Purposes'* or appropriate NSW Government Roads & Maritime Services (RMS) test methods. Details of the test procedure used are given on the individual report forms.

ENGINEERING REPORTS

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building) the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the Company will be pleased to review the report and the sufficiency of the investigation work.

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

- Unexpected variations in ground conditions – the potential for this will be partially dependent on borehole spacing and sampling frequency as well as investigation technique.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of persons or contractors responding to commercial pressures.
- Details of the development that the Company could not reasonably be expected to anticipate.

If these occur, the Company will be pleased to assist with investigation or advice to resolve any problems occurring.

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, the Company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

Where information obtained from this investigation 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. The Company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

REVIEW OF DESIGN

Where major civil or structural developments are proposed or where only a limited investigation has been completed or where the geotechnical conditions/constraints are quite complex, it is prudent to have a joint design review which involves an experienced geotechnical engineer/engineering geologist.

SITE INSPECTION

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related.

Requirements could range from:

i) a site visit to confirm that conditions exposed are no worse than those interpreted, to

ii) a visit to assist the contractor or other site personnel in identifying various soil/rock types and appropriate footing or pile founding depths, or

iii) full time engineering presence on site.

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm)	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
ine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $Cu > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

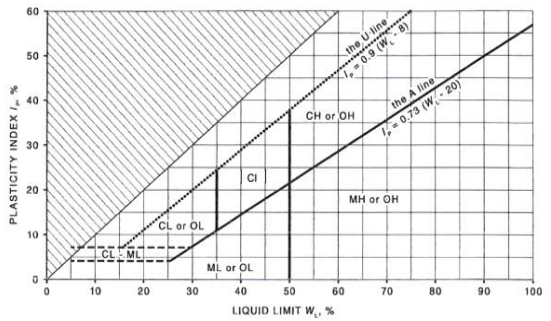
$$C_U = \frac{D_{60}}{D_{10}} \qquad and \qquad C_C = \frac{(D_{30})^2}{D_{10}\, D_{60}}$$

Where D_{10}, D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

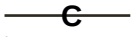
NOTES:

1. For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.
2. Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.
3. Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.
4. The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25	Vane shear reading in kPa of undrained shear strength.
	PID = 100	Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	*w* > PL	Moisture content estimated to be greater than plastic limit.
	w ≈ PL	Moisture content estimated to be approximately equal to plastic limit.
	w < PL	Moisture content estimated to be less than plastic limit.
	w ≈ LL	Moisture content estimated to be near liquid limit.
	w > LL	Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D	DRY – runs freely through fingers.
	M	MOIST – does not run freely but no free water visible on soil surface.
	W	WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – unconfined compressive strength ≤ 25kPa.
	S	SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa.
	F	FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa.
	St	STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa.
	VSt	VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa.
	Hd	HARD – unconfined compressive strength > 400kPa.
	Fr	FRIABLE – strength not attainable, soil crumbles.
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)		**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)**
	VL	VERY LOOSE – ≤ 15 – 0 – 4
	L	LOOSE – > 15 and ≤ 35 – 4 – 10
	MD	MEDIUM DENSE – > 35 and ≤ 65 – 10 – 30
	D	DENSE – > 65 and ≤ 85 – 30 – 50
	VD	VERY DENSE – > 85 – > 50
	( )	Bracketed symbol indicates estimated density based on ease of drilling or other assessment.
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.

Log Column	Symbol	Definition
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'*. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Abbreviations Used in Defect Description

Cored Borehole Log Column		Symbol Abbreviation	Description
Point Load Strength Index		• 0.6	Axial point load strength index test result (MPa)
		x 0.6	Diametral point load strength index test result (MPa)
Defect Details	– Type	Be	Parting – bedding or cleavage
		CS	Clay seam
		Cr	Crushed/sheared seam or zone
		J	Joint
		Jh	Healed joint
		Ji	Incipient joint
		XWS	Extremely weathered seam
	– Orientation	Degrees	Defect orientation is measured relative to normal to the core axis (ie. relative to the horizontal for a vertical borehole)
	– Shape	P	Planar
		C	Curved
		Un	Undulating
		St	Stepped
		Ir	Irregular
	– Roughness	Vr	Very rough
		R	Rough
		S	Smooth
		Po	Polished
		Sl	Slickensided
	– Infill Material	Ca	Calcite
		Cb	Carbonaceous
		Clay	Clay
		Fe	Iron
		Qz	Quartz
		Py	Pyrite
	– Coatings	Cn	Clean
		Sn	Stained – no visible coating, surface is discoloured
		Vn	Veneer – visible, too thin to measure, may be patchy
		Ct	Coating ≤ 1mm thick
		Filled	Coating > 1mm thick
	– Thickness	mm.t	Defect thickness measured in millimetres

14 July 2023
Ref: E36107BRlet-ASS

Northern Beaches Council
1 Boondah Road
WARRIEWOOD NSW 2106

Attention: Bernard Koon
Email: Bernard.Koon@northernbeaches.nsw.gov.au

PRELIMINARY ACID SULFATE SOIL ASSESSMENT
PROPOSED ALTERATIONS AND ADDITIONS
NORTH NARRABEEN SURF LIFE SAVING CLUB, OCEAN STREET, NORTH NARRABEEN, NSW

1 INTRODUCTION

Northern Beaches Council ('the client') commissioned JK Environments (JKE) to undertake a preliminary acid sulfate soil (ASS) assessment for the proposed alterations and additions at North Narrabeen Surf Life Saving Club, Ocean Street, North Narrabeen, NSW. For this assessment, the development area is referred to as 'the site' and the North Narrabeen Surf Life Saving Club property is referred to as 'the wider property'. The site location is shown on Figure 1 and the investigation was limited to the approximate extent of the ground floor alterations as shown on Figure 2 attached in the appendices.

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP58713BR) of 31 May 2023 and written acceptance from Northern Beaches Council by email of 7 June 2023. A geotechnical investigation was undertaken in conjunction with the ASS assessment by JK Geotechnics and the results are presented in a separate report (Ref: 36107PErpt).

The aims of the assessment were to establish whether ASS may be disturbed during the proposed development works, and to assess whether an ASS management plan (ASSMP) is required.

1.1 Assessment Guidelines and Background

The ASS assessment and preparation of this report were undertaken with reference to the National Acid Sulfate Soil Guidance (2018) documents and the Acid Sulfate Soil Management Advisory Committee (ASSMAC) Acid Sulfate Soil Manual (1998)[1].

[1] Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). *Acid Sulfate Soils Manual* (ASS Manual 1998)

ASS materials include potential acid sulfate soils (PASS or sulfidic soil materials) and actual acid sulfate soils (AASS or sulfuric soil materials). These are often found in the same profile, with AASS overlying PASS. AASS and PASS are defined further as follows:

- PASS are soil materials which contain Reduced Inorganic Sulfur (RIS) such as pyrite. The field pH of these soils in their undisturbed state is usually more than pH 4 and is commonly neutral to alkaline (pH 7–9). These soil materials are invariably saturated with water in their natural state. Their texture may be peat, clay, loam, silt or sand and is often dark grey in colour and soft in consistence, but these materials may also exhibit colours that are dark brown, or medium to pale grey to white; and
- AASS are soil materials which contained RIS such as pyrite that have undergone oxidation. This oxidation results in low pH (that is pH less than 4) and often a yellow (jarosite) and/or orange to red mottling (ferric iron oxides) in the soil profile. Actual ASS contains Actual Acidity, and commonly also contains RIS (the source of Potential Sulfuric Acidity) as well as Retained Acidity.

Further background information on ASS and the assessment process is provided in the appendices.

1.2 Proposed Development Details

Based on the details provided, it is understood that the proposed development includes alterations and additions, including a ground-level extension, BBQ renewal, associated landscaping words, internal refurbishments and first floor additions. Soil disturbance is expected to be limited to the extent necessary for foundation works. Bulk excavation is not proposed as part of the proposed development.

2 SITE INFORMATION

2.1 Site Information and Description

Table 2-1: Site Identification

Site Address:	North Narrabeen Surf Life Saving Club, Ocean Street, North Narrabeen, NSW
Lot & Deposited Plan:	Lots 3, 6 and 8, Section 63 in DP5768, Lots 1 and 2 in DP339162 and Lots A and B in DP376822
Current Land Use:	Surf Life Saving Club
Site Area (m^2):	8,100
Site Elevation (metres Australian Height Datum – mAHD approx.)	10-12
Geographical Location (approx.) (approx. centre of club building):	Latitude: -33.704965 Longitude: 151.304953

The wider property is located in a predominantly residential and commercial area of Narrabeen and is bound by Ocean Street to the west and North Narrabeen Beach to the east. South Creek, an estuarine waterway, is located approximately 90m to the north of the site. The investigation area was confined to the approximate extent of the ground floor alterations proposed for the development as shown on Figure 2 attached in the appendices.

The regional topography is characterised by an east facing hillside that falls towards Narrabeen Beach. The wider property is located at the toe of the hillside and slopes down to the east at approximately 1-2°. The site itself is generally level. Parts of the site and the wider property appeared to have been levelled to accommodate the existing development.

At the time of the inspection, the wider property included a 1-2 storey building of predominantly brick and metal construction (the surf life saving club), grassed areas, children's play equipment and footpaths and driveways. Brick retaining walls (approximately 1.6m high) were observed in the north and west of the wider property. Bushland shrubs and low vegetation over sand dunes were observed to the north of the wider property.

The site was located in the north-east of the wider property, adjacent to the north of the existing club building (refer to Figure 2 attached in the appendices). The site was predominantly sealed with brick pavers and concrete pavement, with a 'u'-shaped brick wall (approximately 1.6m high) in the northern portion. An unsealed sand pathway extended along the northern boundary of the site and provided access to the beach to the north-east of the site.

2.2 Regional Geology

The geological map of Sydney (1983)[2] indicates the site and surrounds to be underlain by various Quaternary aged deposits, including medium to fine marine sand overlying quartz sand, minor shell content and interdune swale, silty and fine sand. Silty to peaty quartz sand, silt and clay with common shell layers is anticipated to the west of the site and coarse quartz sand with varying amounts of shell fragments is anticipated to the north and east of the site.

2.3 Acid Sulfate Soil Risk Map

A review of the ASS risk maps prepared by Department of Land and Water Conservation (1997)[3] indicates that the site is mapped as an Aeolian sandplain is located in an area classed as having low probability of ASS occurrence at depths greater than 3m below the ground surface.

[2] Department of Mineral Resources, (1983). *1:100,000 Geological Map of Sydney (Series 9130)*

[3] Department of Land and Water Conservation, (1997). *1:25,000 Acid Sulfate Soil Risk Map (Series 9130S1, Ed 2)*

2.4 Warringah Council Local Environmental Plan (LEP) 2011

A review of the Warringah council LEP indicates that the site is located in a Class 4 ASS risk area. JKE note that South Creek, an estuarine waterway located approximately 90m north of the site, is located in a Class 1 ASS risk area (refer to appendices for further details on each risk class).

3 INVESTIGATION REQUIREMENTS AND ASSESSMENT CRITERIA

3.1 Investigation Requirements

The National Acid Sulfate Soil Guidance (2018) requires sampling to a depth of 1m beyond the depth of disturbance (including the depth of any groundwater disturbance). A summary of the sampling densities and analysis requirements outlined in the *National Acid Sulfate Soil Guidance: National acid sulfate soils sampling and identification methods manual* (2018) is provided in the following tables:

Table 3-1: Minimum Soil Sampling Densities for ASS Investigations

Type of disturbance	Extent of site	Sample point frequency
Small volumes (≤ 1000 m^3) – prior to disturbance	Volume of disturbance (m^3) < 250 251–500 501–1000	Number of boreholes 2 3 4
Large volumes (> 1000 m^3) – prior to disturbance	Project area (ha) <1 1-2 2-3 3-4 >4	Number of boreholes 4 6 8 10 10 plus 2 per additional hectare
Linear	Width and volume Minor[1] Major[2]	Intervals (m) 100 50
Existing stockpiles & verification testing	Volume (m^3) <250 251-500 1,000 >1,000	Number of samples 2 3 4 4 plus 1 per additional 500m^3

[1] Minor Linear Disturbance – for example underground services, narrow shallow drains (less than 1 m below ground level).

[2] Major Linear Disturbance – for example roads, railways, canals, deep sewer, wide drains, deep drains and dredging projects[#].

[#] Further guidance is provided in the Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management (Simpson et al. 2017).

Table 3-2: Minimum Number of Soil Samples to be Submitted for Laboratory Analysis (small-scale disturbance)

Volume of disturbed soils	Maximum disturbance depth			
	< 1 m	1–2 m	2-3 m	3-4 m
≤ 250m^3	3	4	5	6
251–500m^3	4	5	6	7
500–1,000m^3	5	6	7	8

Note: Small scale is considered less than or equal to 1,000 m^3 and does not involve dewatering or groundwater pumping (excluding linear disturbances). Number of samples to be analysed per total volume of soil to be disturbed, not per borehole. Depth of disturbance to be measured from ground surface. Borehole depth must be at least 1 m below maximum proposed depth of disturbance.

The investigation component of this assessment was designed to address the minimum sampling density and analysis frequency. The sampling density and analysis frequency were considered to be adequate given the localised extent and shallow depths of soil disturbance proposed.

3.2 Action Criteria

The action criteria presented in the *National Acid Sulfate Soil Guidance: National acid sulfate soils sampling and identification methods manual* (2018) are summarised in the following table:

Table 3-3: ASS Action Criteria Based on Soil Texture and Volume of Material Being Disturbed

Type of material		Net Acidity			
Texture range* (NCST 2009)	Approximate clay content (%)	1–1000 t materials disturbed		> 1000 t materials disturbed	
		% S-equiv. (oven-dried basis)	mol H^+/t (oven-dried basis)	% S-equiv. (oven-dried basis)	mol H^+/t (oven-dried basis)
Fine - light medium to heavy clays	>40	≥0.10	≥62	≥0.03	≥18
Medium - clayey sand to light clays	5–40	≥0.06	≥36	≥0.03	≥18
Coarse and Peats - sands to loamy sands	<5	≥0.03	≥18	≥0.03	≥18

* If bulk density values are not available for the conversion of cubic meters to tonnes of soil, then default bulk densities, based on the soil texture, may be used.

The action criteria for coarse texture soils were used for this assessment.

3.3 Field Tests

The soil field tests commonly used for investigations for ASS materials include field pH (pH_F) and field pH peroxide (pH_{FOX}) tests. The pH_F test can help identify Actual ASS. While a pH_F of less than or equal to pH 4 is indicative of the presence of Actual ASS, it is not conclusive of the presence of ASS on its own, as naturally occurring, non ASS soils such as many organic soils (for example peats) and heavily leached soils may also have pH_F less than or equal to pH 4. To identify an Actual ASS other evidence must be presented that indicates the low pH_F has been mainly caused by the oxidation of reduced inorganic sulfur. Such information includes the

presence of jarosite in the soil layer/horizon, or the location of other Actual ASS or PASS materials within the sampling location or in the nearby vicinity.

The difference between the pH_F and the pH_{FOX} is helpful in the preliminary identification of PASS. Combined, the pH_F and pH_{FOX} results can be a useful aid with soil sample selection for laboratory analysis. Additional Information in relation to interpretation of the pH field tests is provided in the appendices.

4 INVESTIGATION PROCEDURE

4.1 Subsurface Investigation and Soil Sampling Methods

Field work was undertaken on 21 June 2023. Soil samples were collected from one location (TP/BH2) excavated for the concurrent JK Geotechnics investigation and three additional locations (BH5 to BH7 inclusive) drilled for the ASS assessment. The sampling locations were drilled to a maximum borehole depth of approximately 2.1m below ground level (BGL). The sampling locations are shown on the attached Figure 2.

The sample locations were drilled using hand equipment. JKE note that TP/BH2 was excavated as a test pit to a depth of approximately 0.5mBGL. A borehole was subsequently drilled at the base of the test pit and extended to a depth of approximately 2mBGL.

Soil samples were obtained at various depths, based on observations made during the field investigation. All samples were placed in plastic bags and sealed with plastic ties with minimal headspace. Each sample was labelled with a unique job number, the sampling location, sampling depth and date. All samples were recorded on the borehole logs and test pit cross-section attached in the appendices.

The samples were preserved by immediate storage in an insulated sample container with ice and returned to the JKE office. Samples were subsequently delivered in the insulated sample container (on ice) to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

4.2 Laboratory Analysis

Samples for this assessment were analysed for ASS field tests (including pH_F and pH_{FOX}) and using the chromium reducible sulfur (S_{CR}) acid base accounting analytical methods. All tests/analysis were performed at the laboratory and JKE did not carry out the testing in the field due to time constraints. Samples were Analysed by Envirolab Services (NATA Accreditation Number – 2901). Reference should be made to the laboratory reports (Ref: 326110 and 326110-A) attached in the appendices for further information regarding the laboratory methods used.

5 RESULTS OF THE INVESTIGATION

5.1 Subsurface Conditions

A summary of the subsurface soil conditions encountered during the investigation is presented in the table below. Reference should be made to the borehole logs test pit cross-section attached in the appendices for further details.

Table 5-1: Summary of subsurface conditions

Profile	Description
Pavement	Pavement was encountered at the surface in TP/BH2 and BH5 and ranged in thickness from approximately 75mm to 100mm.
Fill	Fill soil was encountered in BH6 and BH7 and extended to depths of approximately 0.3m to 0.6mBGL. The fill typically comprised sand and contained inclusions of gravel, shells, slag, and glass and ceramic fragments. No odorous fill soil was encountered.
Natural Soil	Aeolian sand was encountered beneath the pavement in TP/BH2 and BH5, and beneath the fill in BH6 and BH7. The natural sand extended to the terminal depth of the boreholes at a maximum depth of approximately 2.1mBGL. Trace concentrations of shell were encountered in BH7. No organic or peaty odours were encountered.
Bedrock	Bedrock was not encountered in the boreholes drilled for the assessment.
Groundwater	Seepage was not encountered in the boreholes drilled for assessment.

5.2 Laboratory Results

The soil laboratory results were assessed against the action criteria adopted for the assessment. The results are presented in the attached report tables and are summarised below.

Table 5-2: Summary of Results

Analysis	N	Comments
pH_F and pH_{FOX}	20	The pH_F results ranged from pH 8.5 to pH 10.8. The pH_{FOX} results ranged from pH 6.2 to pH 6.8. The maximum difference from pH_F to pH_{FOX} was 4 pH units.
pH_{FOX} reaction rates	20	All samples recorded reaction rates classed as 'low'. Five samples were selected for analysis of ASS characteristics using acid base accounting methods. The samples were selected based on a combination of the pH_F and pH_{FOX} results, and to provide spatial coverage and vertical distribution through the soil profiles.
Net Acidity % S-equiv.	5	Net acidity results were all below the laboratory PQL of 0.005 %w/w S and well below the action criterion of 0.03%w/w S.

Analysis	N	Comments
Net Acidity mol H^+/t	5	Net acidity results were all below the laboratory PQL of 5molH^+/t and well below the action criterion of 18molH^+/t.
S_{CR}%	5	The S_{CR}% results were all below the laboratory PQL of 0.005%. These results indicated that the soils did not contain significant oxidisable sulfur concentrations.
Liming Rate	5	The liming rate required for neutralisation was <0.75kg$CaCO_3$/tonne.

N: Total number (primary samples)

6 CONCLUSION

Based on the weight of evidence collected and evaluated for this assessment, there is considered to be a low potential for ASS materials (AASS or PASS) to be disturbed to a depth of approximately 2mBGL during the proposed development described in Section 1.2 of this report. On this basis, an ASSMP is not considered necessary for the proposed development.

7 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified AASS or PASS issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKE have not and will not make any determination regarding finances associated with the site;

- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose;
- Copyright in this report is the property of JKE. JKE has used a degree of care, skill and diligence normally exercised by consulting professionals in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report;
- If the client, or any person, provides a copy of this report to any third party, such third party must not rely on this report except with the express written consent of JKE; and
- Any third party who seeks to rely on this report without the express written consent of JKE does so entirely at their own risk and to the fullest extent permitted by law, JKE accepts no liability whatsoever, in respect of any loss or damage suffered by any such third party.

If you have any questions concerning the contents of this letter please do not hesitate to contact us.

Kind Regards

Craig Ridley
Associate | Environmental Scientist

Vittal Boggaram
Principal Associate | Environmental Scientist

Appendices:

Appendix A: Report Figures
Appendix B: Laboratory Results Summary Table
Appendix C: Information on Acid Sulfate Soils
Appendix D: Borehole & Test Pit Logs
Appendix E: Laboratory Reports & COC Documents

Appendix A: Report Figures

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

This plan should be read in conjunction with the Environmental report.

Title: **SITE LOCATION PLAN**

Location: NORTH NARRABEEN SURF LIFE SAVING CLUB, OCEAN STREET, NORTH NARRABEEN, NSW

Project No: E36107BR

Figure No: 1

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PLOT DATE: 27/06/2023 12:21:32 PM DWG FILE: K:\SC EIS JOBS\36000'S\E36107BR NORTH NARRABEEN\CAD\E36107BR.DWG

BH7 (0.6)

BH6 (0.3)

BH5 (NA)

TP/BH2 (NA)

LEGEND

APPROXIMATE INVESTIGATION AREA

BH(Fill Depth) BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 1 2 3 4 5

SCALE 1:100 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAMPLE LOCATION PLAN**

Location: NORTH NARRABEEN SURF LIFE SAVING CLUB, OCEAN STREET, NORTH NARRABEEN, NSW

Project No: E36107BR

Figure No: 2

JKEnvironments

PLOT DATE: 27/06/2023 12:21:47 PM DWG FILE: K:\5C EIS JOBS\36000\SIE36107BR NORTH NARRABEEN\CADIE36107BR.DWG

Appendix B: Laboratory Results Summary Table

ABBREVIATIONS AND EXPLANATIONS FOR ACID SULFATE SOIL TABLE

Abbreviations used in the Tables:

ANC_{BT}	Acid Neutralising Capacity - Back Titration
ANCE	Excess Acid Neutralising Capacity
$CaCO_3$	Calcium Carbonate
kg	kilogram
mol H^+/t	moles hydrogen per tonne
pHF	Field pH
pHFOX	Field peroxide pH
pH_{KCl}	Pottasium chloride pH
S	Sulfur
SCr	The symbol given to the result from the Chromium Reducible Sulfur method
S_{NAS}	Net Acid Soluble Sulfur
% w/w	Percentage by mass

Results have been assessed against the criteria specified in Table 1.1 of National Acid sulfate Soil Guidance - National acid sulfate soil identification and laboratory method manual. Water Quality Australia. June 2018

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TABLE A
SUMMARY OF LABORATORY RESULTS - ACID SULFATE SOIL ANALYSIS

Soil Texture: Coarse		Analysis	pH_F and pH_{FOX}				pH_{KCL}	Actual Acidity (Titratable Actual Acidity - TAA)	Potential Sulfidic Acidity		Retained Acidity	Acid Neutralising Capacity (ANC_{BT})	a-Net Acidity without ANCE	s-Net Acidity without ANCE	Liming Rate - without ANCE
			pH_F	pH_{FOX}	Reaction	pH_F - pH_{FOX}		(mol H^+/t)	(% SCr)	(mol H^+/t)	(%S_{NAS})	(% $CaCO_3$)	(mol H^+/t)	(%w/w S)	(kg $CaCO_3$/tonne)
National Acid Sulfate Soils Guidance (2018)			-	-	-	-	-	-	-	-	-	-	18	0.03	-
Sample Reference	**Sample Depth (m)**	**Sample Description**													
BH2	0.08-0.2	Sand	9.9	6.4	Low reaction	3.5	9.1	<5	<0.005	<3	[NT]	6.6	<5	<0.005	<0.75
BH2 [LAB_DUP]	0.08-0.2	Laboratory Duplicate	-	-	-	-	9.2	<5	<0.005	<3	[NT]	6.4	<5	<0.005	<0.75
BH2	0.4-0.5	Sand	9.9	6.5	Low reaction	3.4	-	-	-	-	-	-	-	-	-
BH2	0.9-1.0	Sand	9.6	6.7	Low reaction	2.9	-	-	-	-	-	-	-	-	-
BH2	1.5-1.6	Sand	9.7	6.7	Low reaction	3	9.4	<5	<0.005	<3	[NT]	6.7	<5	<0.005	<0.75
BH2	1.9-2.0	Sand	9.7	6.7	Low reaction	3	-	-	-	-	-	-	-	-	-
BH5	0.1-0.2	Sand	10.8	6.8	Low reaction	4	-	-	-	-	-	-	-	-	-
BH5	0.5-0.6	Sand	9.8	6.5	Low reaction	3.3	9.2	<5	<0.005	<3	[NT]	7	<5	<0.005	<0.75
BH5	1.0-1.1	Sand	9.8	6.7	Low reaction	3.1	-	-	-	-	-	-	-	-	-
BH5	1.5-1.6	Sand	9.7	6.5	Low reaction	3.2	-	-	-	-	-	-	-	-	-
BH5	1.9-2.0	Sand	9.5	6.7	Low reaction	2.8	-	-	-	-	-	-	-	-	-
BH6	0-0.1	F: Sand	8.5	6.2	Low reaction	2.3	-	-	-	-	-	-	-	-	-
BH6	0.5-0.6	Sand	9.1	6.5	Low reaction	2.6	-	-	-	-	-	-	-	-	-
BH6	1.0-1.1	Sand	9.4	6.4	Low reaction	3	9.6	<5	<0.005	<3	[NT]	5	<5	<0.005	<0.75
BH6	1.5-1.6	Sand	9.5	6.5	Low reaction	3	-	-	-	-	-	-	-	-	-
BH6	1.9-2.0	Sand	9.5	6.5	Low reaction	3	-	-	-	-	-	-	-	-	-
BH7	0-0.1	F: Sand	9	6.3	Low reaction	2.7	-	-	-	-	-	-	-	-	-
BH7	0.5-0.6	F: Sand	9	6.5	Low reaction	2.5	-	-	-	-	-	-	-	-	-
BH7	1.0-1.1	Sand	9.3	6.4	Low reaction	2.9	-	-	-	-	-	-	-	-	-
BH7	1.5-1.6	Sand	9.3	6.6	Low reaction	2.7	-	-	-	-	-	-	-	-	-
BH7	2.0-2.1	Sand	9.3	6.6	Low reaction	2.7	9	<5	<0.005	<3	[NT]	5.2	<5	<0.005	<0.75
Total Number of Samples			20	20	20	20	6	6	6	6	-	6	6	6	6
Minimum Value			8.5	6.2	-	2.3	9	<5	<0.005	<3	-	5	<5	<0.005	<0.75
Maximum Value			10.8	6.8	-	4	9.6	<5	<0.005	<3	-	7	<5	<0.005	<0.75

Values Exceeding Action Criteria

Appendix C: Information on Acid Sulfate Soils

A. Background

Acid Sulfate Soil (ASS) is formed from iron rich alluvial sediments and sulfate (found in seawater) in the presence of sulfate reducing bacteria and plentiful organic matter. These conditions are generally found in mangroves, salt marsh vegetation or tidal areas and at the bottom of coastal rivers and lakes. ASS materials are distinguished from other soil or sediment materials (referred to as 'soil materials' throughout the National Acid Sulfate Soils Guidance) by having properties and behaviour that have either:

1) Been affected considerably by the oxidation of Reduced Inorganic Sulfur (RIS), or
2) The capacity to be affected considerably by the oxidation of their RIS constituents.

Acid sulfate soil materials include potential acid sulfate soils (PASS or sulfidic soil materials) and actual acid sulfate soils (AASS or sulfuric soil materials). These are often found in the same profile, with AASS overlying PASS. PASS and AASS are defined further below:

- PASS are soil materials which contain RIS such as pyrite. The field pH of these soils in their undisturbed state is usually more than pH 4 and is commonly neutral to alkaline (pH 7–9). These soil materials are invariably saturated with water in their natural state. Their texture may be peat, clay, loam, silt or sand and is often dark grey in colour and soft in consistence, but these materials may also exhibit colours that are dark brown, or medium to pale grey to white; and
- AASS are soil materials which contained RIS such as pyrite that have undergone oxidation. This oxidation results in low pH (that is pH less than 4) and often a yellow (jarosite) and/or orange to red mottling (ferric iron oxides) in the soil profile. Actual ASS contains Actual Acidity, and commonly also contains RIS (the source of Potential Sulfuric Acidity) as well as Retained Acidity.

B. The ASS Planning Maps

The ASS planning maps provide an indication of the relative potential for disturbance of ASS to occur at locations within the council area. These maps do not provide an indication of the actual occurrence of ASS at a site or the likely severity of the conditions.

The maps are divided into five classes dependent upon the type of activities/works that if undertaken, may represent an environmental risk through the development of acidic conditions associated with ASS:

Table 1: Risk Classes

Risk Class	Description
Class 1	All works.
Class 2	All works below existing ground level and works by which the water table is likely to be lowered.
Class 3	Works at depths beyond 1m below existing ground level or works by which the water table is likely to be lowered beyond 1m below existing ground level.
Class 4	Works at depths beyond 2m below existing ground level or works by which the water table is likely to be lowered beyond 2m below existing ground level.
Class 5	Works within 500m of adjacent Class 1, 2, 3, 4 land which are likely to lower the water table below 1m AHD on the adjacent land.

C. The ASS Risk Maps

The ASS risk maps provide an indication of the probability of occurrence of ASS materials at a particular location based on interpretation from geological and soil landscape maps. The maps provide classes based on high probability, low probability, no known occurrence and areas of disturbed terrain (site specific assessment necessary) and the likely depth at which ASS materials are likely to be encountered.

D. Interpretation of ASS Field Tests

Tables A1 and A2 below provide some guidance on the interpretation of pH_F and pH_{FOX} test results, as detailed in the *National Acid Sulfate Soil Guidance: National acid sulfate soils sampling and identification methods manual* (2018):

Table A1: Interpretation of some pH_F test ranges

pH value	Result	Comments
$pH_F \leq 4$, jarosite not observed in the soil layer/horizon	May indicate an AASS indicating previous oxidation of RIS or may indicate naturally occurring, non ASS soils.	Generally not conclusive as naturally occurring, non ASS soils, such as many organic soils (for example peats) and heavily leached soils, often also return $pH_F \leq 4$.
$pH_F \leq 4$, jarosite observed in the soil layer/horizon	The soil material is an AASS.	Jarosite and other iron precipitate minerals in ASS such as schwertmannite require a pH < 4 to form and indicate prior oxidation of RIS.
$pH_F > 7$	Expected in waterlogged, unoxidised, or poorly drained soils.	Marine muds commonly have a pH > 7 which reflects a seawater (pH 8.2) influence. Oxidation of samples with H_2O_2 can help indicate if the soil materials contain RIS.

Source: Adapted from DER (2015a).

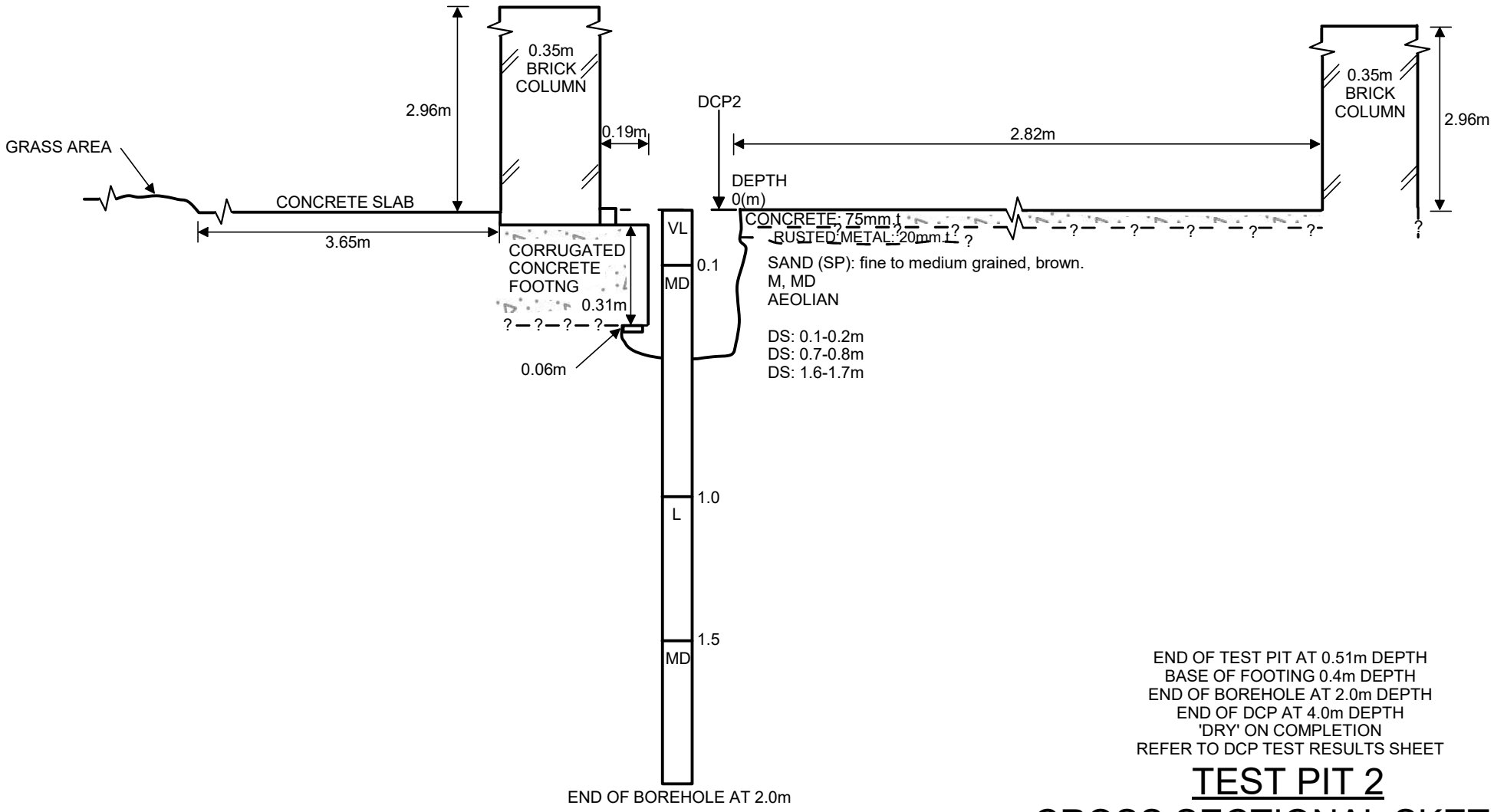
Table A2: Interpretation of pH_{FOX} test results

pH value and reaction	Result	Comments
Strong reaction of soil with H_2O_2 (that is X or V)	Useful indicator of the presence of RIS but cannot be used alone	Organic rich substrates such as peat and coffee rock, and soil constituents like manganese oxides, can also cause a reaction. Care must be exercised in interpreting these results. Laboratory analyses are required to confirm if appreciable RIS is present.
pH_{FOX} value at least one unit below field pH_F and strong reaction with H_2O_2 (that is X or V)	May indicate PASS	The difference between pH_F and pH_{FOX} is termed the ΔpH. Generally the larger the ΔpH the more indicative of PASS. The lower the final pH_{FOX} the better the likelihood of an appreciable RIS content. For example, a change from pH_F of 8 to pH_{FOX} of 7 (that is a ΔpH of 1) would not indicate PASS, however, a unit change from pH_F of 3.5 to pH_{FOX} of 2.5 would be indicative of PASS. Laboratory analyses are required to confirm if appreciable RIS is present.
$pH_{FOX} < 3$, large ΔpH and a strong reaction with H_2O_2 (that is X or V)	Strongly indicates PASS	The lower the pH_{FOX} below 3, the greater the likelihood that appreciable RIS is present. A combination of all three parameters – pH_{FOX}, ΔpH and reaction strength – gives the

pH value and reaction	Result	Comments
		best indication of PASS. Laboratory analyses are required to confirm that appreciable RIS is present.
A pH_{FOX} 3–4 and Low, Medium or Strong reaction with H_2O_2	Inconclusive	RIS may be present; however, organic matter may also be responsible for the decrease in pH. Laboratory analyses are required to confirm the presence of RIS.
pH_{FOX} 4–5	Inconclusive	RIS may be present in small quantities, or poorly reactive under rapid oxidation, or the sample may contain shell/ carbonate which neutralises some or all acid produced on oxidation. Equally, the pH_{FOX} value may be due to the production of organic acids with no RIS present. Laboratory analyses are required to confirm if appreciable RIS is present.
pH_{FOX} > 5, small or no ΔpH, but Low, Medium or Strong reaction with H_2O_2	Inconclusive	For neutral to alkaline pHF with shell or white concretions, the fizz test with 1 M HCl can be used to identify the presence of carbonates. Laboratory analyses are required to confirm if appreciable RIS is present and further testing is required to confirm that effective self-neutralising materials are present.

Source: Adapted from DER (2015a).

Appendix D: Borehole & Test Pit Logs



END OF TEST PIT AT 0.51m DEPTH
BASE OF FOOTING 0.4m DEPTH
END OF BOREHOLE AT 2.0m DEPTH
END OF DCP AT 4.0m DEPTH
'DRY' ON COMPLETION
REFER TO DCP TEST RESULTS SHEET

TEST PIT 2
CROSS SECTIONAL SKETCH
LOOKING SOUTH

0 1.0
Scale 1:20 @A4 Metres

JKGeotechnics

Report No. 36107PE Figure No. 5

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH5** **1/1**

Client: NORTHERN BEACHES COUNCIL

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: NORTH NARRABEEN SLSC, NORTH NARRABEEN, NSW

Job No.: E36107BR **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 21/6/23 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			CONCRETE: 100mm.t				
									SP	SAND: fine to coarse grained, yellow brown.	M			AEOLIAN
							0.5							
							1							
							1.5							
							2			END OF BOREHOLE AT 2.0m				
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH6** **1/1**

Client: NORTHERN BEACHES COUNCIL

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: NORTH NARRABEEN SLSC, NORTH NARRABEEN, NSW

Job No.: E36107BR **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 21/6/23 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION		■					0			FILL: Sand, fine to medium grained, brown, trace of igneous gravel, slag, glass, ceramic fragments, and root fibres.	D			GRASS COVER
									SP	SAND: fine to coarse grained, yellow brown.	M			AEOLIAN
							0.5							
							1							
							1.5							
		■					2			END OF BOREHOLE AT 2.0m				
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH7** **1/1**

Client: NORTHERN BEACHES COUNCIL

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: NORTH NARRABEEN SLSC, NORTH NARRABEEN, NSW

Job No.: E36107BR **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 21/6/23 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Sand, fine to medium grained, brown, trace of igneous gravel, shells and root fibres.	D			GRASS COVER
							0.5		SP	SAND: fine to coarse grained, yellow brown, trace of shells.	M			AEOLIAN
							1							
							1.5							
							2			END OF BOREHOLE AT 2.1m				
							2.5							
							3							
							3.5							

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N > 30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

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

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

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

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it 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 and may not be the same at the time of construction.
- 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 be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to 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 perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
ine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $Cu > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_U = \frac{D_{60}}{D_{10}} \qquad and \qquad C_C = \frac{(D_{30})^2}{D_{10}\, D_{60}}$$

Where D_{10}, D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

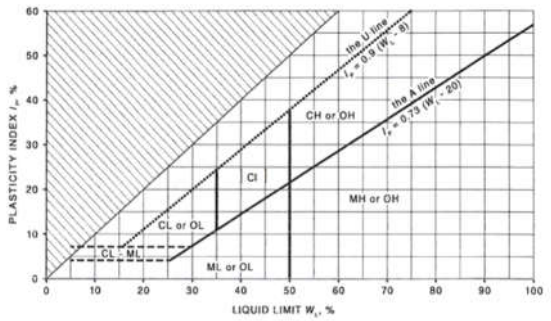
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.

3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
	PFAS	Soil sample taken over depth indicated, for analysis of Per- and Polyfluoroalkyl Substances.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25	Vane shear reading in kPa of undrained shear strength.
	PID = 100	Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL	Moisture content estimated to be greater than plastic limit.
	$w \approx$ PL	Moisture content estimated to be approximately equal to plastic limit.
	w < PL	Moisture content estimated to be less than plastic limit.
	$w \approx$ LL	Moisture content estimated to be near liquid limit.
	w > LL	Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D	DRY – runs freely through fingers.
	M	MOIST – does not run freely but no free water visible on soil surface.
	W	WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – unconfined compressive strength ≤ 25kPa.
	S	SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa.
	F	FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa.
	St	STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa.
	VSt	VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa.
	Hd	HARD – unconfined compressive strength > 400kPa.
	Fr	FRIABLE – strength not attainable, soil crumbles.
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL	VERY LOOSE – Density Index (I_D) Range (%) ≤ 15 – SPT 'N' Value Range (Blows/300mm) 0 – 4
	L	LOOSE – > 15 and ≤ 35 – 4 – 10
	MD	MEDIUM DENSE – > 35 and ≤ 65 – 10 – 30
	D	DENSE – > 65 and ≤ 85 – 30 – 50
	VD	VERY DENSE – > 85 – > 50
	( )	Bracketed symbol indicates estimated density based on ease of drilling or other assessment.

Log Column	Symbol	Definition
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'*. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Appendix E: Laboratory Reports & COC Documents

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CERTIFICATE OF ANALYSIS 326110

Client Details

Client	JK Environments
Attention	C Ridley
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E36107BR, North Narrabeen**
Number of Samples	20 Soil
Date samples received	21/06/2023
Date completed instructions received	21/06/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	28/06/2023
Date of Issue	28/06/2023

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Results Approved By
Diego Bigolin, Inorganics Supervisor

Authorised By
Nancy Zhang, Laboratory Manager

sPOCAS field test						
Our Reference		326110-1	326110-2	326110-3	326110-4	326110-5
Your Reference	UNITS	BH2	BH2	BH2	BH2	BH2
Depth		0.08-0.2	0.4-0.5	0.9-1.0	1.5-1.6	1.9-2.0
Date Sampled		21/06/2023	21/06/2023	21/06/2023	21/06/2023	21/06/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
Date analysed	-	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
pH_F (field pH test)	pH Units	9.9	9.9	9.6	9.7	9.7
pH_{FOX} (field peroxide test)	pH Units	6.4	6.5	6.7	6.7	6.7
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test						
Our Reference		326110-6	326110-7	326110-8	326110-9	326110-10
Your Reference	UNITS	BH5	BH5	BH5	BH5	BH5
Depth		0.1-0.2	0.5-0.6	1.0-1.1	1.5-1.6	1.9-2.0
Date Sampled		21/06/2023	21/06/2023	21/06/2023	21/06/2023	21/06/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
Date analysed	-	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
pH_F (field pH test)	pH Units	10.8	9.8	9.8	9.7	9.5
pH_{FOX} (field peroxide test)	pH Units	6.8	6.5	6.7	6.5	6.7
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test						
Our Reference		326110-11	326110-12	326110-13	326110-14	326110-15
Your Reference	UNITS	BH6	BH6	BH6	BH6	BH6
Depth		0-0.1	0.5-0.6	1.0-1.1	1.5-1.6	1.9-2.0
Date Sampled		21/06/2023	21/06/2023	21/06/2023	21/06/2023	21/06/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
Date analysed	-	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
pH_F (field pH test)	pH Units	8.5	9.1	9.4	9.5	9.5
pH_{FOX} (field peroxide test)	pH Units	6.2	6.5	6.4	6.5	6.5
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test						
Our Reference		326110-16	326110-17	326110-18	326110-19	326110-20
Your Reference	UNITS	BH7	BH7	BH7	BH7	BH7
Depth		0-0.1	0.5-0.6	1.0-1.1	1.5-1.6	2.0-2.1
Date Sampled		21/06/2023	21/06/2023	21/06/2023	21/06/2023	21/06/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
Date analysed	-	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
pH_F (field pH test)	pH Units	9.0	9.0	9.3	9.3	9.3
pH_{FOX} (field peroxide test)	pH Units	6.3	6.5	6.4	6.6	6.6
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

Method ID	Methodology Summary
Inorg-063	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.

QUALITY CONTROL: sPOCAS field test						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			[NT]	[NT]	[NT]	[NT]	[NT]	22/06/2023	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	22/06/2023	[NT]
pH_F (field pH test)	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	99	[NT]
pH_{FOX} (field peroxide test)	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	99	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	C Ridley

Sample Login Details

Your reference	E36107BR, North Narrabeen
Envirolab Reference	326110
Date Sample Received	21/06/2023
Date Instructions Received	21/06/2023
Date Results Expected to be Reported	28/06/2023

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	20 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	11
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	sPOCAS field test
BH2-0.08-0.2	✓
BH2-0.4-0.5	✓
BH2-0.9-1.0	✓
BH2-1.5-1.6	✓
BH2-1.9-2.0	✓
BH5-0.1-0.2	✓
BH5-0.5-0.6	✓
BH5-1.0-1.1	✓
BH5-1.5-1.6	✓
BH5-1.9-2.0	✓
BH6-0-0.1	✓
BH6-0.5-0.6	✓
BH6-1.0-1.1	✓
BH6-1.5-1.6	✓
BH6-1.9-2.0	✓
BH7-0-0.1	✓
BH7-0.5-0.6	✓
BH7-1.0-1.1	✓
BH7-1.5-1.6	✓
BH7-2.0-2.1	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:	JKE Job Number: E36107BR	FROM: JKEnvironments
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	Date Results Required: STANDARD Page: 1 of 1	REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Craig Ridley cridley@jkenvironments.com.au

Location:	North Narrabeen	Sample Preserved In Esky on Ice
Sampler:	AD/CB	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	SCr extended	pH field test (pHF apHFOX)										
21/06/2023	1	BH2	0.08-0.2	P	Sand		X										
21/06/2023	2	BH2	0.4-0.5	P	Sand		X										
21/06/2023	3	BH2	0.9-1.0	P	Sand		X										
21/06/2023	4	BH2	1.5-1.6	P	Sand		X										
21/06/2023	5	BH2	1.9-2.0	P	Sand		X										
21/06/2023	6	BH5	0.1-0.2	P	Sand		X										
21/06/2023	7	BH5	0.5-0.6	P	Sand		X										
21/06/2023	8	BH5	1.0-1.1	P	Sand		X										
21/06/2023	9	BH5	1.5-1.6	P	Sand		X										
21/06/2023	10	BH5	1.9-2.0	P	Sand		X										
21/06/2023	11	BH6	0-0.1	P	F: Sand		X										
21/06/2023	12	BH6	0.5-0.6	P	Sand		X										
21/06/2023	13	BH6	1.0-1.1	P	Sand		X										
21/06/2023	14	BH6	1.5-1.6	P	Sand		X										
21/06/2023	15	BH6	1.9-2.0	P	Sand		X										
21/06/2023	16	BH7	0-0.1	P	F: Sand		X										
21/06/2023	17	BH7	0.5-0.6	P	F: Sand		X										
21/06/2023	18	BH7	1.0-1.1	P	Sand		X										
21/06/2023	19	BH7	1.5-1.6	P	Sand		X										
21/06/2023	20	BH7	2.0-2.1	P	Sand		X										

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 326110
Date Received: 21/6/23
Time Received: 1445
Received By: CH
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
AD	21/06/23	~~12:45~~ 1445	ELS Christine Ho	21/6/23

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CERTIFICATE OF ANALYSIS 326110-A

Client Details

Client	JK Environments
Attention	Alexis Diodati
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E36107BR, North Narrabeen**
Number of Samples	additional analysis
Date samples received	21/06/2023
Date completed instructions received	30/06/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	07/07/2023
Date of Issue	07/07/2023

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Nick Sarlamis, Assistant Operation Manager

Authorised By
Nancy Zhang, Laboratory Manager

Chromium Suite						
Our Reference		326110-A-1	326110-A-4	326110-A-7	326110-A-13	326110-A-20
Your Reference	UNITS	BH2	BH2	BH5	BH6	BH7
Depth		0.08-0.2	1.5-1.6	0.5-0.6	1.0-1.1	2.0-2.1
Date Sampled		21/06/2023	21/06/2023	21/06/2023	21/06/2023	21/06/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/07/2023	06/07/2023	06/07/2023	06/07/2023	06/07/2023
Date analysed	-	06/07/2023	06/07/2023	06/07/2023	06/07/2023	06/07/2023
pH $_{kcl}$	pH units	9.1	9.4	9.2	9.6	9.0
s-TAA pH 6.5	%w/w S	<0.01	<0.01	<0.01	<0.01	<0.01
TAA pH 6.5	moles H^+ /t	<5	<5	<5	<5	<5
Chromium Reducible Sulfur	%w/w	<0.005	<0.005	<0.005	<0.005	<0.005
a-Chromium Reducible Sulfur	moles H^+ /t	<3	<3	<3	<3	<3
S_{HCl}	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
S_{KCl}	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
S_{NAS}	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
ANC_{BT}	% $CaCO_3$	6.6	6.7	7.0	5.0	5.2
s-ANC_{BT}	%w/w S	2.1	2.1	2.2	1.6	1.7
s-Net Acidity	%w/w S	<0.005	<0.005	<0.005	<0.005	<0.005
a-Net Acidity	moles H^+ /t	<5	<5	<5	<5	<5
Liming rate	kg $CaCO_3$ /t	<0.75	<0.75	<0.75	<0.75	<0.75
a-Net Acidity without ANCE	moles H^+ /t	<5	<5	<5	<5	<5
Liming rate without ANCE	kg $CaCO_3$ /t	<0.75	<0.75	<0.75	<0.75	<0.75
s-Net Acidity without ANCE	%w/w S	<0.005	<0.005	<0.005	<0.005	0.0050

Method ID	Methodology Summary
Inorg-068	Chromium Reducible Sulfur - Hydrogen Sulfide is quantified by iodometric titration after distillation to determine potential acidity. Net acidity including ANC has a safety factor of 1.5 applied. Neutralising value (NV) of 100% is assumed for liming rate. The recommendation that the SHCL concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCL result. However, it has been applied in the SNAS calculation: SNAS % = (SHCL-SKCL)x2

QUALITY CONTROL: Chromium Suite						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			06/07/2023	1	06/07/2023	06/07/2023		06/07/2023	[NT]
Date analysed	-			06/07/2023	1	06/07/2023	06/07/2023		06/07/2023	[NT]
pH $_{kcl}$	pH units		Inorg-068	[NT]	1	9.1	9.2	1	98	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-068	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
TAA pH 6.5	moles H^+ /t	5	Inorg-068	<5	1	<5	<5	0	99	[NT]
Chromium Reducible Sulfur	%w/w	0.005	Inorg-068	<0.005	1	<0.005	<0.005	0	101	[NT]
a-Chromium Reducible Sulfur	moles H^+ /t	3	Inorg-068	<3	1	<3	<3	0	[NT]	[NT]
S_{HCl}	%w/w S	0.005	Inorg-068	<0.005	1	[NT]	[NT]		[NT]	[NT]
S_{KCl}	%w/w S	0.005	Inorg-068	<0.005	1	[NT]	[NT]		[NT]	[NT]
S_{NAS}	%w/w S	0.005	Inorg-068	<0.005	1	[NT]	[NT]		[NT]	[NT]
ANC_{BT}	% $CaCO_3$	0.05	Inorg-068	<0.05	1	6.6	6.4	3	101	[NT]
s-ANC_{BT}	%w/w S	0.05	Inorg-068	<0.05	1	2.1	2.1	0	[NT]	[NT]
s-Net Acidity	%w/w S	0.005	Inorg-068	<0.005	1	<0.005	<0.005	0	[NT]	[NT]
a-Net Acidity	moles H^+ /t	5	Inorg-068	<5	1	<5	<5	0	[NT]	[NT]
Liming rate	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	1	<0.75	<0.75	0	[NT]	[NT]
a-Net Acidity without ANCE	moles H^+ /t	5	Inorg-068	<5	1	<5	<5	0	[NT]	[NT]
Liming rate without ANCE	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	1	<0.75	<0.75	0	[NT]	[NT]
s-Net Acidity without ANCE	%w/w S	0.005	Inorg-068	<0.005	1	<0.005	<0.005	0	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
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RPD	Relative Percent Difference
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Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

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Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

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Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Alexis Diodati

Sample Login Details

Your reference	E36107BR, North Narrabeen
Envirolab Reference	326110-A
Date Sample Received	21/06/2023
Date Instructions Received	30/06/2023
Date Results Expected to be Reported	07/07/2023

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	additional analysis
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	11
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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12 Ashley St Chatswood NSW 2067
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customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	Chromium Suite	On Hold
BH2-0.08-0.2	✓	
BH2-0.4-0.5		✓
BH2-0.9-1.0		✓
BH2-1.5-1.6	✓	
BH2-1.9-2.0		✓
BH5-0.1-0.2		✓
BH5-0.5-0.6	✓	
BH5-1.0-1.1		✓
BH5-1.5-1.6		✓
BH5-1.9-2.0		✓
BH6-0-0.1		✓
BH6-0.5-0.6		✓
BH6-1.0-1.1	✓	
BH6-1.5-1.6		✓
BH6-1.9-2.0		✓
BH7-0-0.1		✓
BH7-0.5-0.6		✓
BH7-1.0-1.1		✓
BH7-1.5-1.6		✓
BH7-2.0-2.1	✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Ming To

From: Alexis Diodati <ADiodati@jkenvironments.com.au>
Sent: Friday, 30 June 2023 1:17 PM
To: Samplereceipt
Subject: Additional Analysis for Registration 326110 (JKE Ref: E36107BR North Narrabeen)

Categories: Additional

Ref: 326110-A
TAT: Standard
Due: 07/07/2023
MT

Hi team,

Could we please order the SCr (extended) suite analysis on the samples below (standard TAT)

BH2	0.08-0.2	(1)
BH2	1.5-1.6	(4)
BH5	0.5-0.6	(7)
BH6	1.0-1.1	(13)
BH7	2.0-2.1	(20)

Thank you

Regards
Alexis Diodati
Environmental Scientist

T: +612 9888 5000
D: 0424 578 006
E: ADiodati@jkenvironments.com.au
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