NORTHERN BEACHES COUNCIL

Warringah Golf Course Stormwater Swale

REVIEW OF ENVIRONMENTAL FACTORS

DRAFT

July 2023

Civille

Project client: Northern Beaches Council

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DECLARATION AND SIGN OFF

This Review of Environmental Factors (REF) assesses potential environmental impacts of the Warringah Golf Course stormwater swale (the Proposal), which is part of Council's capital works program. The REF has been prepared under Division 5.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act), with Northern Beaches Council as both the proponent and determining authority. The State Environmental Planning Policy (Transport and Infrastructure) 2021 allows the Proposal to be carried out without development consent. The Proposal has also been considered against the matters listed in Clause 171 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) (Appendix 1).

The potential adverse environmental impacts of the proposed works are associated with the construction phase and include temporary impacts on noise, visual and public amenity, local traffic, sediment and erosion. No adverse impacts are expected during operation of the Proposal.

A permit from DPI Fisheries will be required for the works connecting the proposed swale to Brookvale Creek, a mapped Key Fish Habitat area. This permit must be obtained prior to commencing works.

The assessment demonstrates that the Proposal is not expected to have a significant environmental impact. Accordingly, an Environmental Impact Statement (EIS) is not required for the works. Mitigation measures have been identified in this REF to minimise the risk of potential adverse impacts of the Proposal, and it is a requirement that these mitigation measures be adopted.

It is the responsibility of Council's Project Manager and the construction contractor to ensure that the Proposal is constructed as described in this REF. If the scope of work or work methods described in this REF change significantly following determination, additional environmental impact assessment may be required.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

The proposed works are for the relocation of a drainage swale from its current discharge point near Pittwater Road to Brookvale Creek within Warringah Golf Course. The proposed new Warringah Golf Club House requires the decommissioning of the existing drainage swale at the site. The proposed swale will convey stormwater from the upstream 3.5 hectare catchment to Brookvale Creek.

The proposed works are to be constructed as part of Council's Capital Works program.

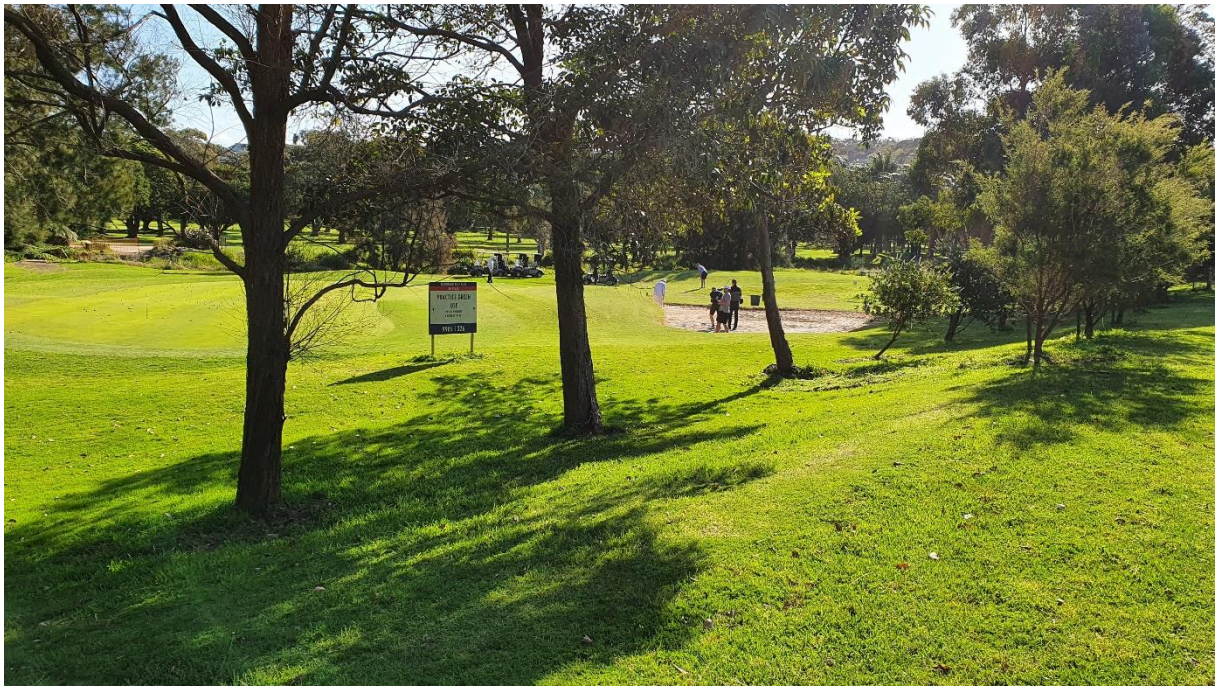

Figure 1 Location of proposed swale facing west

1.2 SCOPE OF THIS REF

The purpose of this REF is to assess the potential impacts of the proposed works on the environment. This report provides a review of the statutory requirements of the Proposal such as licencing or approvals and identifying environmental safeguards and management measures to minimise the potential impacts on the environment.

Northern Beaches Council is classified as a public authority operating under the Local Government Act as defined in Section 1.4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Nothern Beaches Council is also the determining authority for the proposed work under Division 5.1 of the Act.

Under Division 5.1 Subdivision 1 (5.5) of the EP&A Act, Northern Beaches Council is responsible for assessing the environmental impacts of its activities. The Act states that for *protection and enhancement of the environment, a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.* This REF provides the basis for assessing the impact of the proposed works and in deciding whether an Environmental Impact Statement (EIS) is required in accordance with Section 5.7 of the EP&A Act.

These potential impacts have been considered against the matters listed in clause 171 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation), which lists the factors to be taken into account when consideration is being given to the likely impact of an activity on the environment. A summary of these factors is provided in Appendix 1 of this REF.

1.3 PROPOSAL NEED

The existing drainage swale between Pittwater Road and Brookvale Creek (Figure 2) is to be removed as part of the proposed works for the Warringah Golf Clubhouse. This is part of a separate DA for the Club House works that would decommission the existing drainage swale in order to build a new clubhouse building. An overview of the proposed works is shown in Figure 3.

Figure 2 Existing drainage swale facing downstream (looking west from Pittwater Rd)

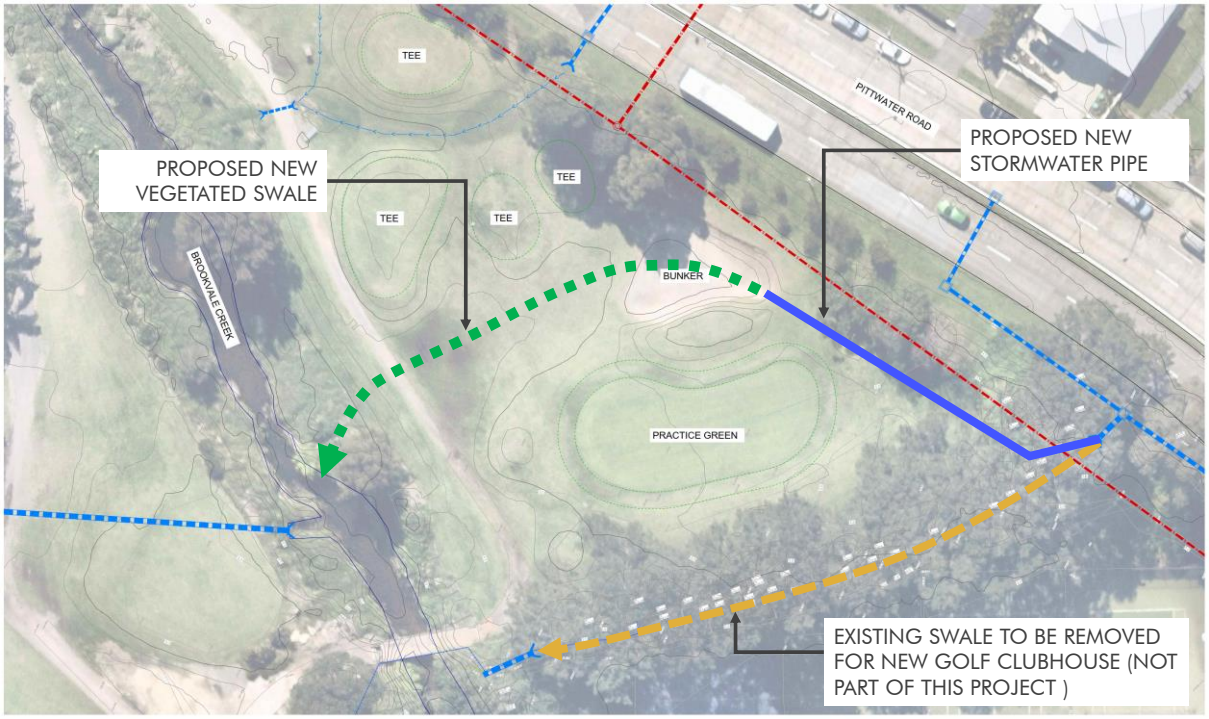

Figure 3 Existing drainage swale to be removed (yellow), and indicative alignment of proposed stormwater pipe and swale

2. ALTERNATIVES AND JUSTIFICATION FOR THE PROPOSAL

2.1 ALTERNATIVES AND THEIR ASSESSMENT

Four options have been assessed for this project:

Option 1 – Do nothing: This option proposes that no works are done to replace the existing drainage swale at Warringah Golf Course.

Option 2 – Convert the swale to a piped connection: This option proposes to convert the existing swale to a piped connection directly to Brookvale Creek.

Option 3 – Reinstate the swale further north, replacing the existing practice green: This option proposes to reinstate the existing swale further north to accommodate new Club House but would require removal of the existing practice green.

Option 4 – Treat stormwater in a bioretention system: This option proposes to divert the existing catchment to a bioretention system for treatment with a piped high flow bypass directly to Brookvale Creek.

Option 5 – Treat stormwater in a wetland: This option proposes to divert the existing catchment to a wetland for treatment with a high flow bypass swale to Brookvale Creek.

Option 6 (preferred option) – Reinstate the swale further north, retaining the existing practice green: This option proposes to reinstate the existing swale further north to accommodate new Club House but retains the existing practice green.

Option 7 – A linear swale alongside Brookvale Creek: This option proposes co-locate swale within Brookvale Creek riparian zone.

The advantages and disadvantages of the alternative options considered are summarised in Table 1.

Table 1: Pros and cons of alternative options considered.

OPTION	ADVANTAGES	DISADVANTAGES
Option 1 – do nothing	• No costs associated with conducting works • No temporary environmental impacts associated with construction	• There would be local flooding issues if the new Club House is built and the swale is not relocated
Option 2	• Low cost option • Flooding issues associated with not replacing the swale are prevented	• Stormwater would not receive any treatment before flowing into Brookvale Creek, with negative environmental impacts.
Option 3	• Drainage issues are avoided by relocating the existing drainage swale • Stormwater is treated in the swale • Low cost option	• Requires the relocation of the existing practice green and associated sand bunker

Option 4	• Drainage issues are avoided by diverting flows • Stormwater is treated in a bioretention system	• Requires a large area for bioretention filter area • Requires the removal of the existing practice green and associated bunker • High costs associated with construction
Option 5	• Drainage issues are avoided by diverting flows • Stormwater is treated in a wetland • Ecology of the site enhance by wetland system	• Requires a large area for wetland • Requires a high flow bypass swale • Requires the relocation of the existing practice green and associated bunker • Highest cost option
Option 6 (preferred option)	• Drainage issues are avoided by relocating the existing drainage swale • Allows the existing practice green to be retained • Allows existing tees to be retained • Treats stormwater in the swale	• Requires the decommissioning of the sand bunker
Option 7	• Drainage issues are avoided by relocating the existing drainage swale • Allows the existing practice green and bunker to be retained	• Works in the riparian corridor are difficult and have a higher potential ecological impact

2.2 SELECTION OF THE PREFERRED OPTION

Option 6 is the preferred option. The option chosen best meets the objectives of the project whilst minimising impacts to the environment and minimising costs associated with construction. Option 6 provides:

- Treatment of stormwater in new swale
- Allows the existing practice green to be retained
- Enhances visual amenity of the golf course

A description of the option is provided in Section 3.

2.3 CONSIDERATION OF PROPOSAL AGAINST PRINCIPLES OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The most common and broadest definition of Ecologically Sustainable Development (ESD) is ‘development that improves the quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends’ (Environment Australia, 1992). The Proposal must be

considered in accordance with the four principles of ESD as outlined in section 6(2) of the *Protection of the Environment Administration Act 1991* and Schedule 2 of the EP&A Regulation.

These principles are described below:

The precautionary principle - if there are threats of serious or irreversible damage to the environment, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Inter-generational equity - the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

Conservation of biological diversity and ecological integrity - these are fundamental considerations to the sustainability of development.

Improved valuation, pricing and incentive mechanisms - that users pay for their products or services including their full life-cycle impacts and cost-effective market mechanisms to attribute externalities should be implemented.

The principles of Ecologically Sustainable Development have been incorporated from the conception of the proposal, through to and as part of, the environmental impact assessment process. The potential environmental risks associated with the Proposal have been identified. Appropriate mitigation measures have been recommended for implementation during the construction and operational phases of the proposal, as described in Section 6 below.

3. DESCRIPTION OF THE PROPOSED WORK AND ACTIVITIES

3.1 LOCATION OF THE PROPOSAL

The site is in the suburb of North Manly on land owned by Northern Beaches Council. The lot impacted by the proposal is zoned RE1 Public Recreation under the Warringah Local Environmental Plan 2011, as the area is part of the former Warringah Council Local Government Area and a combined LEP has not yet been developed. Each lot within the Proposal site boundary is documented in Table 2 and shown in Figure 4. Consideration of consultation and approvals required from the land owner agencies is discussed in Section 4.1.

Table 2: Cadastre lots and landowners impacted by the Proposal

LOT/DP NUMBERS	LAND OWNER	ZONING
Lot 2742//DP752038	Northern Beaches Council	RE1 Public Recreation

Figure 4 Land zoning at the site (Source: NSW Planning Portal Spatial Viewer)

3.2 PROPOSAL DESCRIPTION

The Proposal consists of construction of a new stormwater pipe and swale at Warringah Golf Course. Broadly the works will consist of:

- Construct a new junction pit at the downstream end of the existing 525mm diameter stormwater pipe near to Pittwater Road
- Decommission the sand bunker at the practice green, salvage sand for golf club use
- Install a 600mm diameter stormwater pipe
- Construct a headwall, and reinforced concrete sediment forebay immediately downstream of the headwall
- Construct a maintenance access track for maintenance of the sediment forebay
- Excavate to create the channel bed and banks for swale
- Construct 2 x swale weirs from sandstone boulders and logs
- Construct a bridge to cross the swale (D&C)
- Rock armour the outlet to Brookvale Creek with scour protection boulders
- Construct a new junction pit, pipe and headwall in the area to the north of the swale, to facilitate spoil relocation.
- Lay jute mesh to swale batter slopes
- Lay pebbles to the swale base
- Plant swale out with wetland plants
- Construct spoil mound with excess spoil from the swale excavation works
- Plant out spoil mound with native plants

The proposed works are shown in Figure 5 with detailed design information provided in the drawings in Appendix 2.

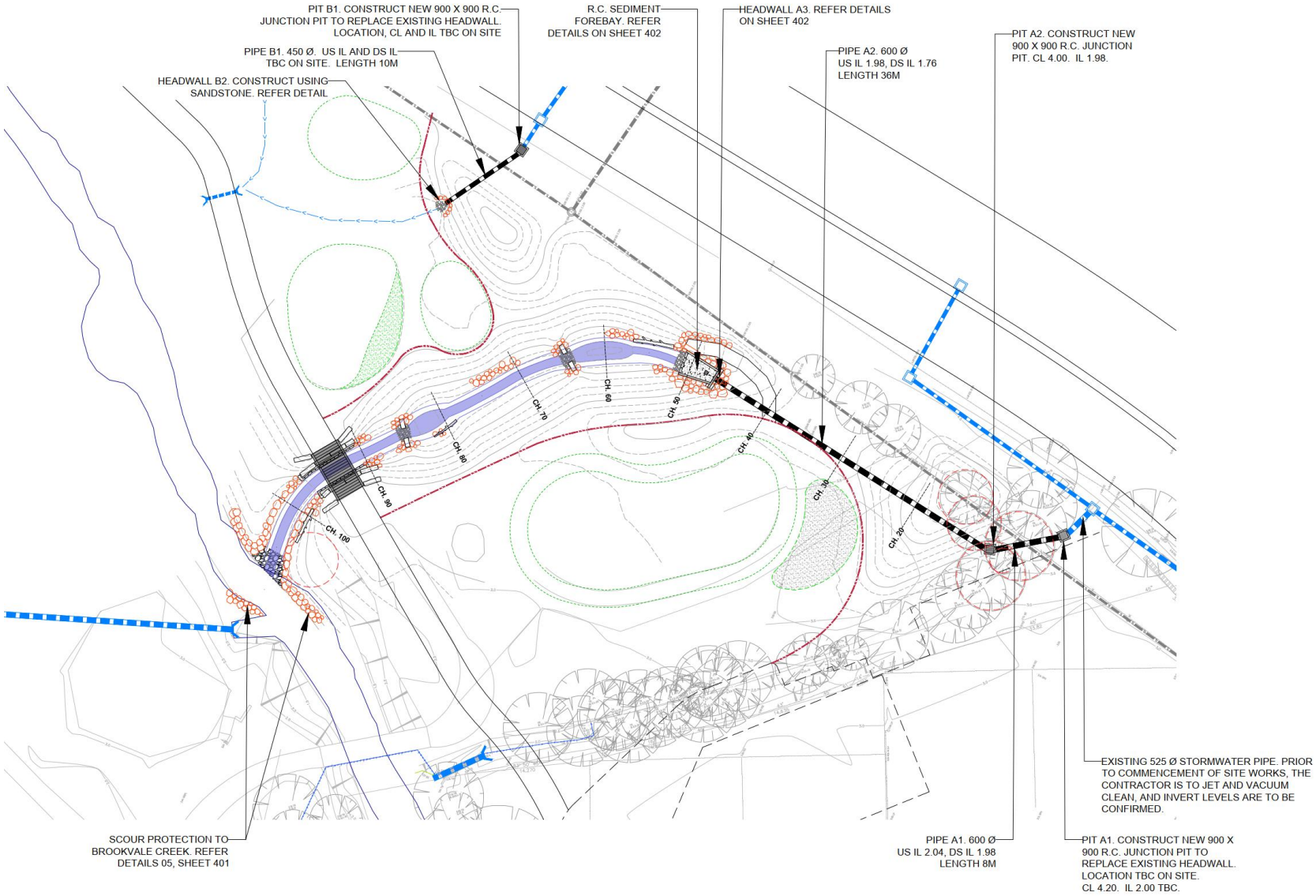

Figure 5 Drainage plan for Warringah Golf Course swale works (Civille 2023)

3.3 PROPOSED ACTIVITIES

The detailed construction methodology and sequence would be the responsibility of the construction contractor. However, a general overview of anticipated construction activities is described in Table 3 below.

Table 3: High level summary of construction activities.

PRE-CONSTRUCTION	
Site setout and preliminaries	• Installing environmental and traffic/pedestrian controls in accordance with the Construction Environment Management Plan • Establishing stockpile and compound sites • Install water and sediment management controls • Erecting site sheds/amenities • Relocating or securing of any affected services • Erecting temporary fences as required • Site set-out The exact location of these elements will be chosen by the Contractor, in consultation with the landowner and approved by Council's Project Manager as described in the safeguards in Section 7.
CONSTRUCTION	
Demolition	• Clearing of turf • Remove six trees as per Figure 17 [Number to be confirmed onsite with Council's superintendent] • Decommission sand bunker, salvage sand for golf club use • Decommission/modify 2 x existing tees • Demolish the existing headwall at existing swale location • Demolish the existing headwall in area to the north of proposed swale

Civil works	• Construct a stormwater pipe diversion from the existing swale inlet to the new proposed swale inlet with
	  ○ 2 x junction pits
	  ○ 600mm diameter diversion pipes
	• Earthworks for swale channel bed and banks, with maximum batter slope of 1:3 and a typical swale base 2m wide
	• Construct a reinforced concrete sediment forebay, headwall and maintenance access track at the inlet to the new swale

	• Construct 2 x swale weirs from sandstone boulders and logs, and install rock toe protection and habitat features. • Construct a bridge to cross swale (D&C) • Rock armour the outlet to Brookvale Creek and locations of the swale with sandstone scour protection boulders • Construct a new junction pit, 450mm diameter stormwater pipe and headwall in the area to the north of the new swale • Construct spoil mounds with excess spoil from swale excavation works
Landscaping	• Pin swale batter slopes with jute matting • Lay swale base with pebble mulch • Plant out swale with wetland plants, and banks with terrestrial/ephemeral plants. • Plant out spoil mound
COMPLETION	
Restoration	• Restoration of disturbed areas including turf or ground cover vegetation to pre-construction condition or better • Removal of compounds and materials from site, ensuring the work site is rehabilitated to pre-construction levels • Removal of all waste and tidying of construction site • Disposal of any unused/contaminated spoil to an appropriate facility
Maintenance	• Maintenance of the proposed soft landscaping works including turf establishment for 12 weeks • Restoration/replacement for any defected built forms

3.4 MATERIALS AND EQUIPMENT

The construction activities would be likely to require the materials and equipment listed in Table 4.

Table 4: High-level summary of materials and equipment likely to be required.

MATERIALS AND EQUIPMENT	
Equipment	• Excavator, • Concrete agitator, and • Trucks • Shovels • Wheelbarrows
Materials	• Concrete • Steel • Sandstone boulders • Sandstone logs (blocks) • Timber logs (hardwood) • Precast/cast-in-situ junction pits • Pebble mulch • Soil • Jute mat • Native plants • Timber (mowing strip)

3.5 WORK SITES, ACCESS AND VEHICLE MOVEMENTS

A high level description of anticipated construction site management considerations is documented in Table 5.

Table 5: High-level description of anticipated construction site management considerations.

WORKSITES, ACCESS AND VEHICLE MOVEMENTS	
Construction sites, access and vehicle movements	A small construction compound would be required for the Proposal to house a site shed (TBC) and provide a materials and equipment laydown area. The exact requirements and location of the compound will be confirmed during tender documentation and/or construction planning, in consultation with Council, but it is anticipated that vehicular access from Pittwater Road will not be possible. Construction would generate a small number of heavy vehicle movements associated with the transportation of construction machinery, equipment and materials to the site. Light vehicle movements would also be increased during the works, associated with employees and smaller deliveries. It is important that the impact of the works on golf course users is minimised. During works, the construction works area will be fenced, possibly in stages, to exclude public access to the works area. This fencing will be decommissioned at the completion of works. Construction access will be granted via a lockable gate at site vehicle entrance.
Traffic Management	The works are located within the golf course lot boundary with only minimal impacts on the local road network. A portion of the existing parking may be temporarily lost during construction (e.g. for deliveries and parking of construction vehicles), however given this is within the golf course site, this is unlikely to have a major impact on the community. A traffic management plan would be prepared by the contractor in accordance with the Traffic Control at Work Sites Manual (RMS, 2018) and RMS Specification D&C G10 – Control of Traffic (RMS, 2015). The traffic management plan would provide details of traffic management to be implemented during construction to ensure that road safety is not compromised, and that traffic flow is maintained where possible. The plan would include details of construction sequences.

WORKFORCE AND TIMEFRAME	
Construction Workforce	It is estimated that approximately 3 personnel would be required on site during the construction period, with minor fluctuations in numbers, depending on the construction activity being undertaken.
Construction Timeframe	The scheduled commencement date for construction of the Proposal is TBC by Council. It is expected that construction will take around 3-6 months, following the completion of the approvals and procurement processes. Considerations for the construction timeframe include: • Where possible the works should be managed to minimise the impact on users of the golf course and to reduce conflicts between golf course users and construction activities
Construction Hours	Construction activities would occur during the standard hours set out in the *Interim Construction Noise Guideline* (DECC, 2009): • Mondays to Fridays between 7 am and 5 pm • Saturdays between 8 am and 1 pm • No work would occur on Sundays or public holidays. • Working hours for noisy activities would comply with any conditions specified by any environment protection licence (refer Section 2.2.1). Construction is not expected to be required outside the standard hours. However, if out of hours work is required, the Contractor must request permission from Council to undertake work outside the standard hours. The Contractor would determine whether any additional mitigation measures would be required. This may include the need to monitor noise, install noise barriers, and notifying surrounding landholders. The Contractor must also notify the EPA and Council if out of hours work is required.

3.6 OPERATION AND MAINTENANCE

The anticipated operation or maintenance requirements for the contractor or Council following completion of the proposed works include:

- Establishment of new vegetation, including irrigation.
- Removal of stormwater pollutants captured in the forebay.
- Removal of weeds from the swale and vegetated areas.

3.7 CHANGES TO THE SCOPE OF WORK

The Proposal site to be impacted shown in this REF is based on the latest design drawings at the time of the preparation of the REF. The final design may change based on design changes during any further design phases or during construction due to latent site conditions. If the scope of work or construction methods described in this document change significantly from those outlined in this REF, it is recommended that supplementary assessment must be prepared for the amended components.

This would generally not be required provided any design changes:

- remains within the proposed extent of works of the REF and has no net additional environmental impact; or
- is outside the proposed extent of works of the REF but reduces the overall environmental impact of the Proposal, as per Clause 110E(a) of the Act.

Changes to the Proposal outside the proposed extent of works can only occur:

- to reduce impacts to biodiversity, heritage or human amenity; or
- to avoid engineering (for example, geological, topographical) constraints; and
- after consultation with any potentially affected landowners and relevant agencies.

The construction contractor will demonstrate in writing how the changes meet these requirements and Council's Project Manager will review the request, in consultation with appropriate Council stakeholders.

4. CONSULTATION

4.1 STAKEHOLDER AND COMMUNITY CONSULTATION

Consultation has been managed by Council's standard planning process.

The Proposal is a Council project that is being undertaken on Council land. The list of the key stakeholders and high-level consultation/approval requirements is summarised in Table 6.

Table 6: List of key stakeholders and consultation requirements.

STAKEHOLDER	RELEVANCE	REQUIREMENT
Internal Council stakeholders	Asset owners, maintenance staff, infrastructure managers, sustainability managers	Meet relevant standards of design and construction
Warringah Golf Club	Asset managers	Understand maintenance requirements
TBC by Council		

4.2 CONSULTATION OBJECTIVES

The consultation objectives were as follows:

- Under stakeholder's requirements
- work with stakeholders to deliver the project
- provide all relevant stakeholders with clear, accurate and timely information

4.3 STAKEHOLDER AND COMMUNITY CONSULTATION

Prior to any construction occurring for the Proposal, stakeholders would be consulted with regards to:

- public safety issues
- the placement of any temporary site sheds, compound
- removal of trees
- work hours

Consultation with affected facility providers and service providers is currently being undertaken and involves:

- Approval from Fisheries
- Distribution of relevant documentation for each stakeholder for review, feedback and approval.

Feedback from each of the key stakeholders will be considered in the final design development of the Proposal.

5. LEGISLATION AND PLANNING CONTEXT

The following section documents the relevant environmental planning instruments and legislation that are relevant to the proposal. This REF documents any relevant licences and permits, timing and responsibility for obtaining them.

5.1 GREATER SYDNEY REGIONAL PLAN 2018

The Greater Sydney Regional Plan is a broad strategic planning document developed by the state government that outlines strategies and actions for the Greater Sydney region over the next 40 years (to 2056). There are four broad overarching strategies with themes of 'Infrastructure and collaboration', 'Liveability', 'Productivity', and Sustainability'. The plan is developed to accommodate a growing population and will broadly provide and enhance jobs, services, recreational facilities, and housing. The Greater Sydney Regional Plan is an overarching plan that informs subsequent district planning. The proposed works align most closely with Planning Objective 31 *Public open space is accessible, protected and enhanced.*

5.2 NORTH DISTRICT PLAN 2018

The *North District Plan* (2018) is a broad strategic planning document also developed by the state government that outlines more specific planning actions and strategies for the southern portion of the Greater Sydney region. This document pertains to the local government areas of City of Ryde, Hornsby, Hunters Hill, Ku-ring-gai, Lane Cove, Mosman, North Sydney, Northern Beaches and Willoughby. Like the Greater Sydney Regional Plan, some goals of the district plan that align with the outcomes of the proposed works include:

- Planning Priority N15 *Protecting and improving the health and enjoyment of the District's wateways.*
- Planning Priority N20 *Delivering high quality open space.*
- Planning Priority N22 *Adapting to the impacts of urban and natural hazards and climate change.*

5.3 STATE ENVIRONMENTAL PLANNING POLICIES (SEPPS)

5.3.1 TRANSPORT AND INFRASTRUCTURE (2021)

The aim of the State Environmental Planning Policy (Transport and Infrastructure) 2021 is to facilitate the effective delivery of infrastructure across NSW. The State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP hereafter) allows certain proposed works to be carried out without development consent. The aim of the T&I SEPP is to facilitate the effective delivery of infrastructure across NSW.

Division 12 of the T&I SEPP, *Parks and other public reserves*, states that in Section 2.73 (relevant items in bold by author):

(3) Any of the following development may be carried out by or on behalf of a public authority without consent on land owned or controlled by the public authority—

(a) development for any of the following purposes—

(i) roads, pedestrian pathways, cycleways, single storey car parks, ticketing facilities, viewing platforms and ***pedestrian bridges****,*

Division 20 of the T&I SEPP, *Stormwater management systems*, states that in Section 2.137 (relevant items in bold by author):

(1) Development for the purpose of stormwater management systems may be carried out by or on behalf of a public authority without consent on any land.

Stormwater management systems are defined in this act as (items bold for relevance to the proposal):

(a) works for the collection, detention, harvesting, distribution or ***discharge of stormwater (such as channels****, aqueducts,* ***pipes, drainage works,*** *embankments, detention basins and pumping stations), and*

Given that the site of the proposed works is part of Warringah District Park and considered a public reserve and Council is considered a public authority, the Proposal is permissible without consent under the T&I SEPP.

5.3.2 RESILIENCE AND HAZARDS (2021)

The *Resilience and Hazards State Environmental Planning Policy (2021) (R&H SEPP)* includes:

- Chapter 2 – Coastal management (former SEPP Coastal Management 2018)
- Chapter 4 – Remediation of Land (former SEPP55)

Chapter 2 Coastal management

The former *State Environmental Planning Policy Coastal Management 2018* has been consolidated into the Resilience and Hazards (R&H) SEPP 2021 as Chapter 2 Coastal management. Chapter 2 of R&H SEPP gives effect to the objectives of the Coastal Management Act 2016 from a land use planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal management area.

The proposal site is mapped as a 'Coastal environment area' under the R&H SEPP. Division 3 of the R&H SEPP provides controls for development with the Coastal environment area as Clause 2.10 states:

2.10 Development on land within the coastal environment area

> *(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 works are described in Section 3 and as such will not cause and adverse impact the matters listed above in 2.10 (1), (a)-(f).

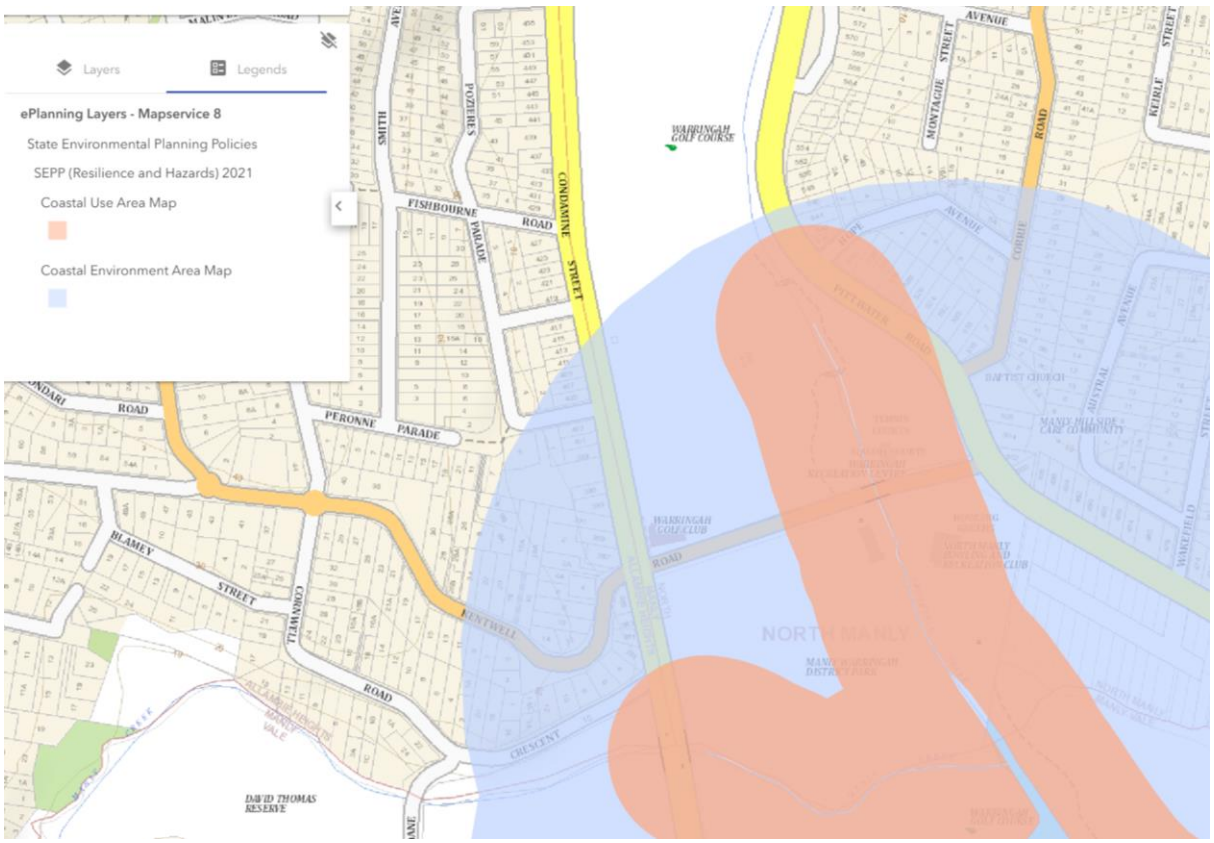

Figure 6 Coastal environment area and Coastal Use Area (Source: Fisheries NSW Data Portal Viewer)

The proposal site is also mapped as a 'Coastal use area' under the R&H SEPP. Division 3 of the R&H SEPP provides controls for development with the Coastal environment area as Clause 2.11 states:

> *(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.*

The proposed works are described in Section 3 and as such will not cause and adverse impact the matters listed above in 2.11 (1), (a)-(f).

Chapter 4 Remediation of Land

Chapter 4 of the R&H SEPP (formerly SEPP 55) promotes the remediation of contaminated land and specifies when development consent is and is not required to carry out remediation work.

The site includes land that is located on fill, and it is considered possible that the site has the potential to contain contaminated fill. For any areas of excavation, it is required to determine the extent of any contamination and classify this against the remediation categories within the SEPP to determine if the works are permissible without consent (Clause 14(b) (2)). These investigations have been undertaken and are summarised in Section 6.

Chapter 4 states that:

> *For the purposes of this Chapter, a category 1 remediation work is a remediation work (not being a work to which section 4.11(b) applies) that is—*
>
> *(a) designated development, or*
>
> *(b) carried out or to be carried out on land declared to be a critical habitat, or*
>
> *(c) likely to have a significant effect on a critical habitat or a threatened species, population or ecological community, or*
>
> *(d) development for which another State environmental planning policy or a regional environmental plan requires development consent, or*
>
> *(e) carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument—*
>
> *(i) coastal protection,*
>
> *(ii) conservation or heritage conservation,*
>
> *(iii) habitat area, habitat protection area, habitat or wildlife corridor,*
>
> *(iv) environment protection,*
>
> *(v) escarpment, escarpment protection or escarpment preservation,*
>
> *(vi) floodway,*
>
> *(vii) littoral rainforest,*
>
> *(viii) nature reserve,*
>
> *(ix) scenic area or scenic protection,*
>
> *(x) wetland, or*
>
> *(f) carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Minister).*

If the works are assessed as Category 1, Section 4.16 of the Resilience and Hazards SEPP states that:

> *If a provision of another State environmental planning policy or of a regional environmental plan, whether made before or after this Chapter, permits a remediation work without development consent, a requirement in this Chapter to obtain development consent to carry out the work does not prevail over that provision.*

The proposed works are on land classed as 'Proximity area for coastal wetlands' under Chapter 2 Coastal management and within the 1 in 100-year flood extents as shown in Figure 14.

5.4 LOCAL ENVIRONMENT PLAN (LEP)

The provisions of the T&I SEPP override the requirements of the LEP, making the project permissible without development consent. However, the LEP has been considered to ensure that the proposal complies with objectives or regulations within the LEP and that appropriate mitigation measures would be taken to ensure this, as required.

Warringah Local Environmental Plan 2011

The Proposal site is located in the Warringah Golf Course in North Manly, part of the former Warringah Local Government Area (LGA) and is governed by the Warringah Local Environmental Plan 2021. The Proposal site is within land zoned RE1 Public Recreation (Figure 4).

The proposed works are considered to align with the objectives of the applicable zoning in the LEP. Objectives of RE1 zoning are as follows:

- To enable land to be used for public open space or recreational purposes.
- To provide a range of recreational settings and activities and compatible land uses.
- To protect and enhance the natural environment for recreational purposes.
- To protect, manage and restore public land that is of ecological, scientific, cultural or aesthetic value.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

Acid sulfate soil (ASS) mapping indicates that the site is mapped as Class 2 and Class 5 ASS. The controls for class 2 acid sulfate soils are outlined in the Warringah LEP 2011 in Part 6 clause 6.1 as follows:

(2) Development consent is required for the carrying out of works described in the table to this subclause on land shown on the Acid Sulfate Soils Map as being of the class specified for those works.

> *Class 2: Works below the natural ground surface. Works by which the watertable is likely to be lowered.*
>
> *Class 5: Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.*

Development consent would be required for proposed works if the T&I SEPP did not override the requirements of the LEP. The T&I SEPP allows works to be completed without development consent. However, given the likely presence of ASS at the site, the contractor must develop an ASS Management Plan to mitigate potential impacts of ASS on human health and the local environment.

Figure 7 Acid sulfate soil map (Source: NSW Planning Portal Spatial Viewer)

5.5 OTHER RELEVANT PLANS AND LEGISLATION

5.5.1 DISTRICT PARK PLAN OF MANAGEMENT 2015

A Plan of Management (POM) has been prepared for Warringah District Park, the extents of which are shown in Figure 8.

The POM includes the objective *To protect, preserve and enhance the natural environment (land and water) in District Park*. Some associated strategies for this objective include:

- *Improve the quality of water in creeks and waterways.*
- *Improve water quality in Brookvale and Manly Creeks suitable for secondary contact recreation.*
- *Control pollutants from upstream areas*

Figure 8 District Park extents (Source: POM, 2015)

5.5.2 FISHERIES MANAGEMENT ACT 1994

Development in areas mapped as 'Key Fish Habitat' (KFH) is regulated under the Fisheries Management Act (FM Act hereafter) 1994. The 'Policy and guidelines for fish habitat conservation and management' state that KFHs include those habitats that are *crucial to the survival of native fish stocks* (DPI 2013).

The proposal site is mapped as KFH (Figure 9), and therefore the FM Act should be considered against the proposed works.

The NSW DPI's (2013) *Policy and guidelines for fish habitat conservation and management* provides guidance on development activities that require approval from NSW DPI under the FM Act. Development activities that require approval include (bold by author to indicate relevance to the proposed works):

- Aquaculture operations (including oyster cultivation, yabbie farms, grow-out ponds, 'fish-out' facilities, but not including aquariums for display or pet shops),
- Jetties – where part of the structure includes a rock or concrete structure or revetment (i.e. Reclamation) or where marine vegetation may be harmed during construction (e.g. By establishing piles, dredging an access channel, the deck results in shading of marine vegetation),
- Boat ramps and boat sheds (i.e. Reclamation),
- Bridges, culverts, causeways (both piped and unpiped) or other road-crossings of waterways (temporary or permanent) which require placing material on the bed of the waterway (i.e. Reclamation) and/or which may obstruct the free passage of fish,
- Dams, weirs, floodgates, or levee banks across waterways (i.e. Obstruction of fish passage),
- Marinas (e.g. Dredging for access, reclamation for a wall, harming marine vegetation),
- Dredging navigation channels (whether for maintenance of an existing channel or construction of a new one) or to open an intermittently-opening waterway,
- Dredging for winning sand, gravel or other materials for private or commercial use, channelisation, relocation or realignment of waterways,
- Installation of pipelines across a waterway (involving dredging or reclamation),
- **Installation of stormwater outlets (involving reclamation of the bed or bank of a waterway),**
- Stream bed or bank stabilisation works (involving dredging or reclamation to halt erosion),
- Foreshore stabilisation (e.g. Seawalls, retaining walls) where 'water land' may be filled or marine vegetation may be harmed,
- Boardwalks or walking tracks that cross intertidal areas, coastal wetlands, seaweeds or seagrasses,
- Development that may affect marine vegetation by cutting, removing, destroying, transplanting, shading or damaging it in any way (e.g. Trimming mangroves).

The proposed activities described in this REF involve the relocation of an existing stormwater outlet within an area mapped as Key Fish Habitat (Figure 9). are defined in the above (bold) development activities listed in the NSW DPI's guidelines. Therefore, a Part 7 Fisheries Management Act permit is required to conduct the works proposed in this REF.

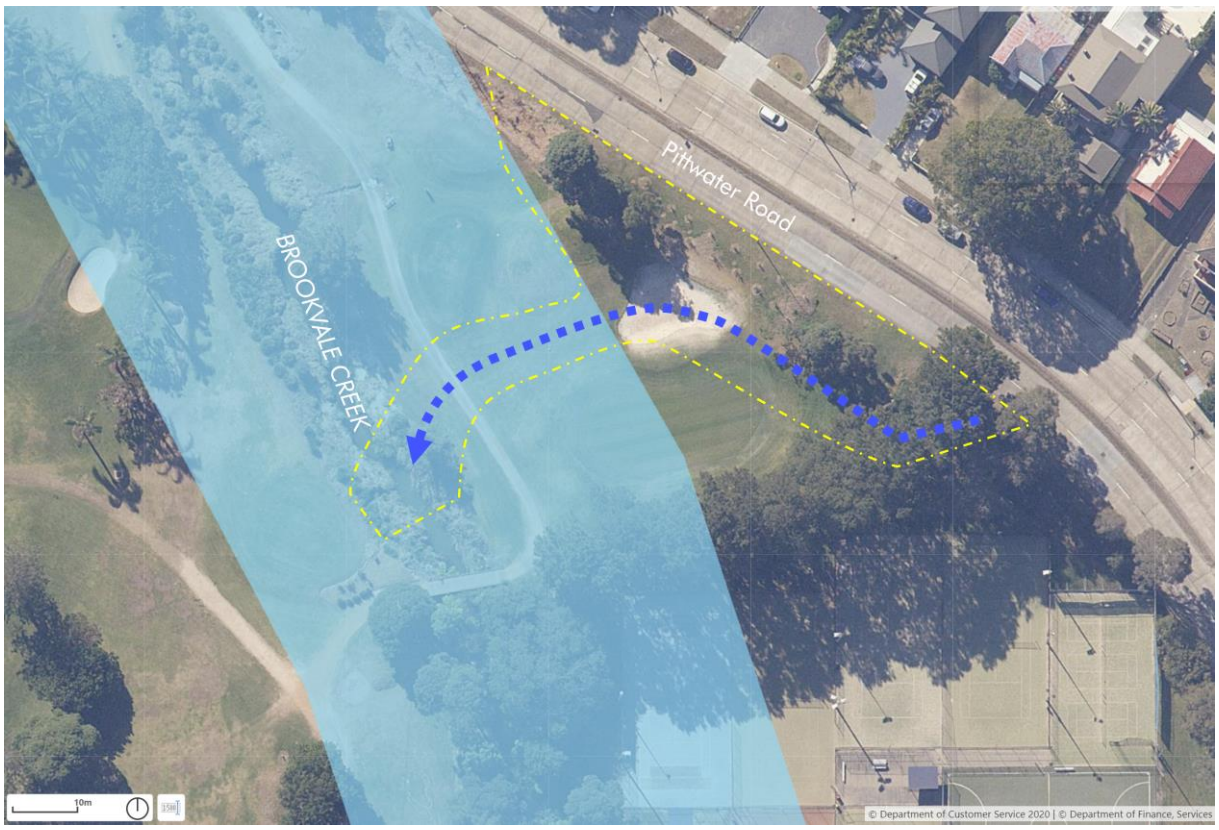

Figure 9 Key Fish Habitat mapping at the proposal site

5.5.3 BIODIVERSITY CONSERVATION ACT 2016

The Biodiversity Conservation Act has the aim of protecting threatened species or ecological communities. The broader site is mapped as having two patches of a threatened ecological community (TEC) (Figure 10):

- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions

The proposed works would not impact upon the mapped Swamp Oak Floodplain Forest as the two patches are located away from the works zone (indicative boundary dot-dash yellow line in Figure 10).

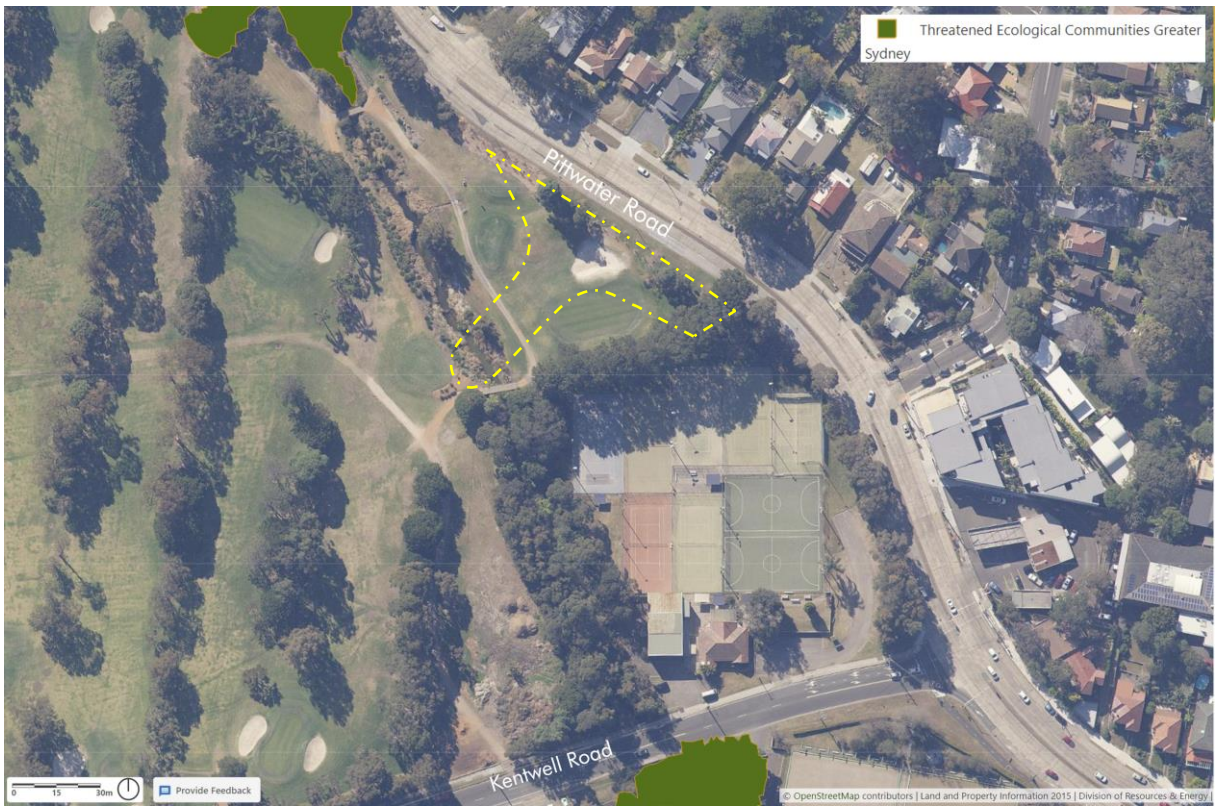

Figure 10 A snapshot of TECs mapping at the site (DPIE 2021)

5.5.4 LOCAL GOVERNMENT ACT 1993

One of the purposes of the *Local Government Act 1993* (LG Act) is to guide Council's on the use and management of community land (Division 2 of this Act). The site is on land defined as community land under the Local Government Act. Section 35 of the LG Act starts that:

Community land is required to be used and managed in accordance with the following—

- *the plan of management applying to the land*
- *any law permitting the use of the land for a specified purpose or otherwise regulating the use of the land*
- *this Division.*

5.5.5 WATER MANAGEMENT ACT 2000

Approvals are required for "controlled activities" on waterways including:

- The erection of a building or the carrying out of a work (within the meaning of the Environmental Planning and Assessment Act 1979), or
- The removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise, or
- The deposition of material (whether or not extractive material) on land, whether by way of landfill operations or otherwise, or
- The carrying out of any other activity that affects the quantity or flow of water in a water source

However, a public authority does not need to obtain a controlled activity approval for any controlled activities that it carries out in, on or under waterfront land. Therefore, Northern Beaches Council does not need a controlled activity approval for the proposed works.

5.5.6 MASTERPLAN AND WARRINGAH GOLF CLUB

Warringah Golf Club is proposing construction of a new clubhouse in close proximity to the Proposal. New car parks are also proposed by Council as shown in Figure 11.

Figure 11 Masterplan with new Warringah Golf clubhouse (separate project)

6. EXISTING ENVIRONMENT AND POTENTIAL IMPACTS

6.1 TOPOGRAPHY, GEOLOGY AND SOILS

6.1.1 EXISTING ENVIRONMENT

A review of the 1:100,000 Geological Series Map of Sydney indicates that the soils at the site belong to the Warriewood soil landscape (9130wa). Soils in this landscape are generally described as Holocene silty to peaty quartz sand and medium to fine marine sand with podzols.

Alliance Geotechnical Pty Ltd (AG) completed a waste classification study in December 2020 that consisted of 5 bore holes near the site (Figure 12). A summary of subsurface conditions is shown in Table 7 below.

Table 7 Summary of subsurface conditions close to the site (Alliance Geotechnical 2020)

Unit	Description	Depth of the encountered unit (metres BGL)				
		BH1	BH2	BH3	BH4	BH5
--	Topsoil	0.0 – 0.3	0.0 – 0.2	0.0 – 0.2 (including pavement)	0.0 – 0.2	0.0 – 0.4
1	Clayey SAND [Natural - Alluvium] (Loose to Medium Dense)	0.3 – 1.2	0.2 – 0.6	0.2 – 0.7	0.2 – 1.0	0.4 – 3.0
2	Organic CLAY, high plasticity (Soft to Firm)	1.2 – 2.0	0.6 – 1.2	--	2.5 – 4.0	--
3	Silty CLAY, medium to high plasticity (Firm to Stiff)	--	--	--	1.0 – 1.5	--
4	SAND, fine to medium grained (loose to medium dense)	--	1.2 – 2.5	0.7 – 5.0	1.5 – 2.5	--
Termination Depth of the Borehole		2.0	2.5	5.0	2.5	3.0

Figure 12 Borehole locations

Soil samples were subjected to pH field screen analysis which indicated that a number of samples had the potential to contain acid sulfate soils (ASS). These samples were then further investigated by Chromium Reducible Sulfur (CRS) analysis as shown in Table 8.

Sampling was not done at the precise site location of proposed works but is anticipated to be very similar due to the close proximity of borehole locations to the site (65-75m south of the site). BH1 and BH4 are the closest to the site.

Table 8 Chromium Reducible Sulfur (CRS) analysis

Sample ID	Net Acidity – Sulfur units (% S)	Net Acidity – Acidity units (mol H+/tonne)	Liming Rate (kg CaCO3/t)
BH1 (2.0M)	0.2	130	9.6
BH3 (2.5M)	0.28	180	13
BH3 (3.0M)	0.23	140	11
BH4 (2.0M)	0.05	31	2.4
BH4 (2.5M)	0.18	120	8.7

The potential for ASS at the site was further investigated by Ideal Geotech (2022) at the borehole locations shown in (Figure 13). These boreholes were completed approximately 15-20m south of the Proposal location. Boreholes were terminated 3.0m below the ground. Soils consisted of silty sand and natural silty sand with traces of clay (Ideal Geotech 2022).

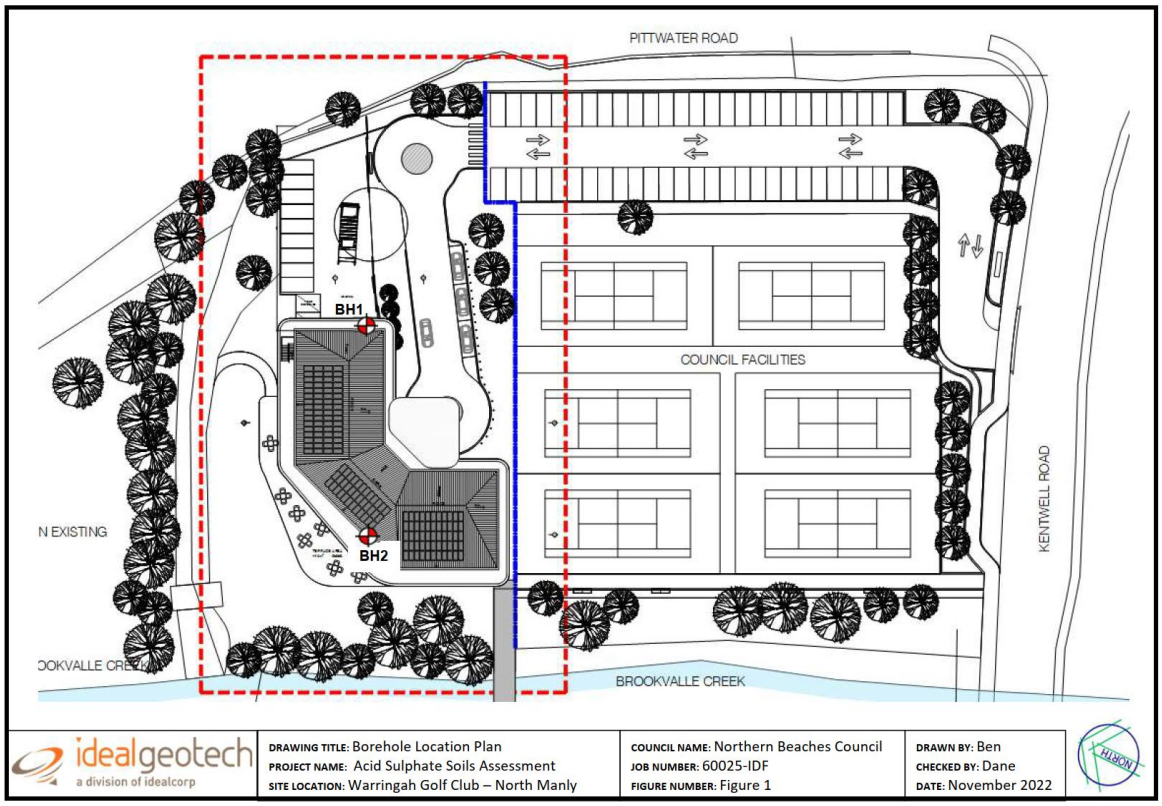

Figure 13 Ideal Geotech (2022) boreholes for ASS assessment

Field screening tests done by Ideal (2022) indicate that there was potential ASS at the borehole locations shown in Figure 13 via strong reactions to 30% h_2O_2. Soil samples were then sent away for quantitative analysis of ASS for Suspension Peroxide Oxidation Combined Acidity & Sulphate (SPOCAS).

Table 9 Suspension Peroxide Oxidation Combined Acidity & Sulphate (SPOCAS) results (Ideal Geotech 2022)

Sample	pH_{ox}	TAA pH 6.5 moles H+/tonne	TPA pH 6.5 moles H+/tonne	TSA pH 6.5 moles H+/tonne	Spos %w/w
BH2/1.0m	3.0	**34**	**214**	**179**	**0.069**
BH2/2.0m	3.9	**27**	**80**	**52**	<0.020

6.1.2 POTENTIAL IMPACTS

Ground disturbance for the project will include:

- Clearing of turf and removal of trees
- Excavation for proposed swale and diversion pipes and associated junction pits
    - Maximum excavation depth is 1.5-2.0m BEGL (below existing ground level)
- Constructing two spoil mounds

ASS

The NSW ASSMAC Assessment Guidelines (1998) require an Acid Sulfate Soil Management Plan must be prepared in all circumstances when the action criteria are met or exceeded. The action criteria for ASS in sandy soil is 0.03 %S (as S_{POS} %w/w) or 18 mol H^+/tonne (Table 10).

Table 10 NSW ASSMAC (1998) action criteria values for different soil types

Type of Material		*Action Criteria 1-1000 tonnes disturbed*		*Action Criteria if more than 1000 tonnes disturbed*	
Texture range.McDonald et al. (1990)	*Approx. clay content (%<0.002 mm)*	*Sulfur trail % S oxidisable (oven-dry basis) eg STOS or SPOS*	*Acid trail mol H^+/tonne (oven-dry basis) eg, TPA or TSA*	*Sulfur trail % S oxidisable (oven-dry basis) eg STOS or SPOS*	*Acid trail mol H^+/tonne (oven-dry basis) eg, TPA or TSA*
Coarse Texture Sands to loamy sands	≤5	0.03	18	0.03	18
Medium Texture Sandy loams to light clays	5 - 40	0.06	36	0.03	18
Fine Texture Medium to heavy clays and silty clays	≥40	0.1	62	0.03	18

AG's (2020) results for BH1 and BH4 (closest to the proposed site) found net acidity – sulfur units (%S) to be above the NSW ASSMAC (1998) action criteria with:

- BH1 (2.0m) = 0.2
- BH4 (2.0m) = 0.05
- BH4 (2.5m) = 0.18

Ideal Geotech's (2022) boreholes close to the site found the action criteria is exceeded in BH2 (0.069 SPOS %w/w) at 1.0m BEGL (Table 9). Given the presence of ASS at borehole locations close to the site, there is a high likelihood that soils at the proposed works location will also contain ASS. As such, it is a requirement that **the contractor must develop an Acid Sulfate Soil Management Plan** for the proposed works.

Refer to Section 7 for mitigation measures and safeguards 2.0 – Topography, Geology and Soils

6.2 WATER AND DRAINAGE

6.2.1 EXISTING ENVIRONMENT

The golf course itself is almost entirely pervious surfaces (turfed fairways/greens/tees, and other vegetated areas) with a small amount of impervious area consisting of local access roads and footpaths, carparks, and the clubhouse. At present a 3.5 hectare catchment consisting of low density residential land drains through the golf course along a *casuarina* lined swale to Brookvale Creek. Brookvale Creek then drains to Manly Lagoon approximately 2km downstream. An approved DA for a new clubhouse at Warringah Golf Course requires the relocation of the existing swale.

Hydrology and Flooding

Council's flood planning maps show land as low, medium or high risk precincts (Figure 14). The proposal site is mapped as a medium risk precinct. Council defines a medium risk site as:

> *The Medium Flood Risk Precinct is equivalent to the Flood Planning Area, and covers all flood prone land which is affected by the 1% Annual Exceedance Probability (AEP) flood (equivalent to the 1 in 100 year flood) with a freeboard added.*

Therefore, the proposal site would be inundated during the 1% AEP flood.

Where the proposed swale connects into Brookvale Creek is mapped as a high risk precinct. Council defines high risk precincts as:

The High Flood Risk Precinct lies within the Medium Flood Risk Precinct, and covers flood prone land which is subject to a high hydraulic hazard.

High hydraulic hazard typically means deep and/or high velocity floodwaters moving through this zone.

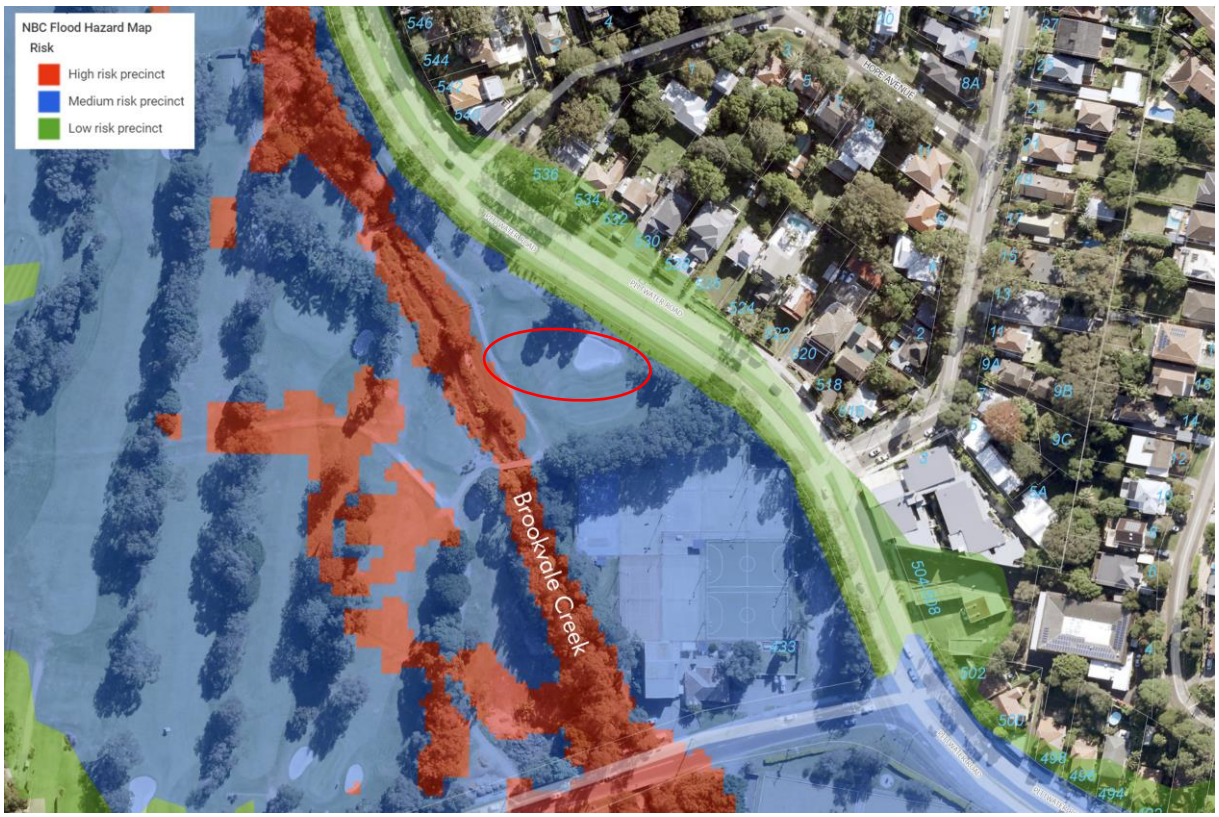

Figure 14 A snapshot of 100yr ARI flood extent at the site (Northern Beaches Mapping). Approximate site boundary shown in dashed red.

Groundwater

Ideal Geotech's (2022) and AG's (2020) boreholes did not encounter groundwater between 0-3m (termination depth) below ground. Despite this it is considered likely that groundwater will be encountered during the works.

6.2.2 POTENTIAL IMPACTS

Water quality

The earthworks associated with the Proposal present the potential for negative impacts to the water quality of Brookvale Creek during construction. The contractor is to development a sediment and erosion control plan to prevent sediment laden runoff from entering the creek and mitigating water quality impacts.

Hydrology and Flooding

Flooding information indicates that the proposal site would be inundated during the 1 in 100-year flood event (Figure 14). The cut and fill plan (See Appendix 2) shows that for areas within the 1 in 100-year flood extent the works are in cut and proposed spoil mounds are located outside the 1 in 100-year flood extent.

Groundwater

Groundwater is unlikely to be significantly impacted by the proposal. Localised dewatering may be required during construction works. This is to be carried out in accordance with environmental regulations.

Refer to Section 7 for mitigation measures and safeguards 3.0 – Water and Drainage

6.3 FLORA AND FAUNA

6.3.1 EXISTING ENVIRONMENT

A search of matters protected under the EPBC Act was undertaken on 17th July 2023 over a 2-kilometre radius of the site. The search identified 7 listed threatened ecological communities, 97 listed threatened species and 59 listed migratory species. The identified species were assessed for their likely presence at or in the immediate vicinity of the Proposal site through a search of the NSW Wildlife Atlas (www.bionet.nsw.gov.au/) accessed 17th July 2023. It was determined that one threatened flora species had the potential to occur on the site, however it was not observed within the site boundary during site investigations.

Figure 15 NSW BioNet Species Sighting map (NSW Government 2022).

Flora

Some of the vegetation at the golf course is mapped as an endangered ecological community (EEC) (See Section 5.5.3). According to the NSW Sydney Metro Vegetation maps (Figure 16), the EEC to the north and south of the proposed works area is mapped as:

- Swamp Oak Floodplain Forest (SOFF) of the NSW North Coast, Sydney Basin and South East Corner bioregions (light blue polygon in Figure 16)

One species of critically endangered flora has been recorded at Warringah Golf Course, Seaforth Mintbush (*Prostanthera marifolia*). The likelihood of this plant's occurrence onsite has been assessed in section 6.3.2.

Figure 16 NSW Sydney Metro Vegetation map snapshot

Fauna

Three species of vulnerable fauna have been recorded at the Warringah Golf Course on the Bionet species sightings map (NSW Government 2022, Figure 15):

- Eastern Osprey – *Pandion cristatus* (Vulnerable in NSW)
- Grey-headed Flying-fox – *Pteropus poliocephalus* (Vulnerable in NSW)
- Large Bent-winged Bat – *Miniopterus orianae oceanensis* (Vulnerable in NSW)

The likelihood of occurrence and potential impacts to the above vulnerable species is discussed in section 6.3.2.

6.3.2 POTENTIAL IMPACTS

Flora

The TEC recorded at the Warringah Golf course is greater than 100m from the site of proposed works. Proposed works do not require entry into or removal of any vegetation from the mapped areas of SOFF EEC.

Seaforth Mintbush

Conservation status in NSW: Critically endangered

Commonwealth status: Critically endangered

This species is known to only occur in the northern Sydney suburb of Seaforth and has a very highly restricted distribution within the Sydney Basin Bioregion. There are only three small patches known to exist in the Northern Beaches LGA none of which are greater than 4 sq m.

Given that this species is incredibly rare and occurs in low abundance it is considered highly unlikely that this species would occur at the site. This species was not seen on site during site visits to date.

Fauna

Eastern Osprey

Conservation status in NSW: Vulnerable

Commonwealth status: Not listed

The Eastern Osprey occurs across most of the Australian coastline, except for Victoria and Tasmania. This species is common on rocky shorelines, islands and reefs and particularly favours the mouths of large rivers, lagoons and lakes.

This species is a water-dependent bird of prey that feeds on fish over clear open water.

Typically, the Eastern Osprey builds nests high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea or ocean.

Despite having records close to the site, it is considered unlikely that the Eastern Osprey would frequently use the proposed site of works but may occasionally pass through the site. The proposed site is not consistent with the species foraging habitat or roosting habitat as there is no clear open water at the site and the site more than 3km from the sea. Therefore, the proposal would not an adverse effect on the life cycle of the species to the extent that a viable local population of the species is likely to be placed at risk of extinction.

Grey-headed Flying Fox

Conservation status in NSW: Vulnerable

Commonwealth status: Not listed

Generally, the Grey-headed Flying Fox (*Pteropus poliocephalus*) is found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia in a range of habitats including subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. This species roosts in colonies or camps which can consist of up to tens of thousands of animals and are used for mating, giving birth and rearing young. Roosting camps for this species are generally within ~20 km of a sustainable food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. The Grey-headed flying-fox feeds on the nectar and pollen of native trees, in particular *Eucalyptus*, *Melaleuca* and *Banksia* spp., as well as fruits of rainforest trees and vines.

Within the site there is some suitable foraging habitat for this species such as stands of Eucalypts and Melaleuca species. However, the proposed works will not remove trees from either of these genera. Therefore, it is considered that the proposed activity would not have an adverse effect on the life cycle of the species to the extent that a viable local population of the species is likely to be placed at risk of extinction.

Large Bent-winged Bat

Conservation status in NSW: Vulnerable

Commonwealth status: Not listed

Typically, the Large Bent-winged Bat (*Miniopterus orianae oceanensis*) is found along the east and north-west coasts of Australia. Primarily this species roosts in caves but has been known to roost in derelict mines, stormwater tunnels, buildings and other man-made structures where it forms discrete populations for the birth and rearing of young in spring and summer.

This species forages in forested areas, catching moths and other flying insects by flying high above the canopy.

Given that vegetation is highly fragmented at the site (not fitting the description of a forested area) and that there is no potential roosting habitat, it is considered unlikely that the proposed works would have a negative impact upon on the life cycle of the species to the extent that a viable local population of the species is likely to be placed at risk of extinction.

The proposed works will remove five trees in order to construct the diversion from the existing stormwater network at Pittwater Road and one tree to construct the swale outlet to Brookvale Creek.

Figure 17 Tree removal proposed for works (Civille 2023)

Trees proposed for removal include:

- 2 x Palms
- 4 x Swamp Oaks (*Casuarina glauca*)

Trees are to be flagged for removal and removed with Council's superintendent present to ensure no more trees than necessary are removed.

Refer to Section 7 for mitigation measures and safeguards 4.0 – Flora and Fauna

6.4 AIR AND GREENHOUSE GAS

6.4.1 EXISTING ENVIRONMENT

The Proposal site has a R2 Low-density Residential land use area north and east of the site (Figure 4). Potentially sensitive receivers include local residents on Pittwater Road as well as any Warringah Golf Course users.

The existing air quality at the Proposal site is typical of suburban Sydney.

There is no existing energy usage at the site.

6.4.2 POTENTIAL IMPACTS

There is potential for short term impacts on local air quality from emissions including odours and dust during construction associated with use of machinery, excavation, and travelling on unsealed tracks within the fenced construction zone.

Energy would be required during construction of the proposed works to power vehicles (construction, delivery and staff vehicles). The energy requirements would be in the form of fuel. Indirect and third-party emissions would be generated as a result of energy to produce materials (embodied energy).

Long-term no anticipated negative air quality impacts associated with the Proposal are anticipated, post-construction.

Refer to Section 7 for mitigation measures and safeguards 5.0 – Air and Greenhouse Gas

6.5 WASTE MANAGEMENT

6.5.1 EXISTING ENVIRONMENT

The Proposal site does not currently generate waste. However, there is potential for fill to be encountered below ground during construction.

6.5.2 POTENTIAL IMPACTS

Construction

Wastes likely to be generated during construction include:

- Green waste – removal of trees and turf
- General construction wastes

All spoil from excavating the swale will be retained on site through the construction of two mounds at the proposed site. See cut and fill plan in design drawing package (Appendix 2).

Operation

Resource demands or waste impacts associated with the operation of the site following proposed works are not anticipated.

Refer to Section 7 for mitigation measures and safeguards 6.0 – Waste Management

6.6 HERITAGE – ABORIGINAL AND NON-ABORIGINAL

6.6.1 EXISTING ENVIRONMENT

The following registers were checked for local, state and national heritage items or areas on 9th March 2023:

- Warringah LEP 2011 Schedule 5 Environmental Heritage
- State Heritage Inventory of NSW (Office of Environment and Heritage)
- Australia's National Heritage List (Department of the Environment and Energy).

There were no recorded items of local or State heritage significance at the site, according to the above sources. Figure 18 shows local heritage items in the area surrounding Warringah Golf Course. Note, no locally listed heritage items occur at the site and the closest item is more than 700m from the proposal site boundary.

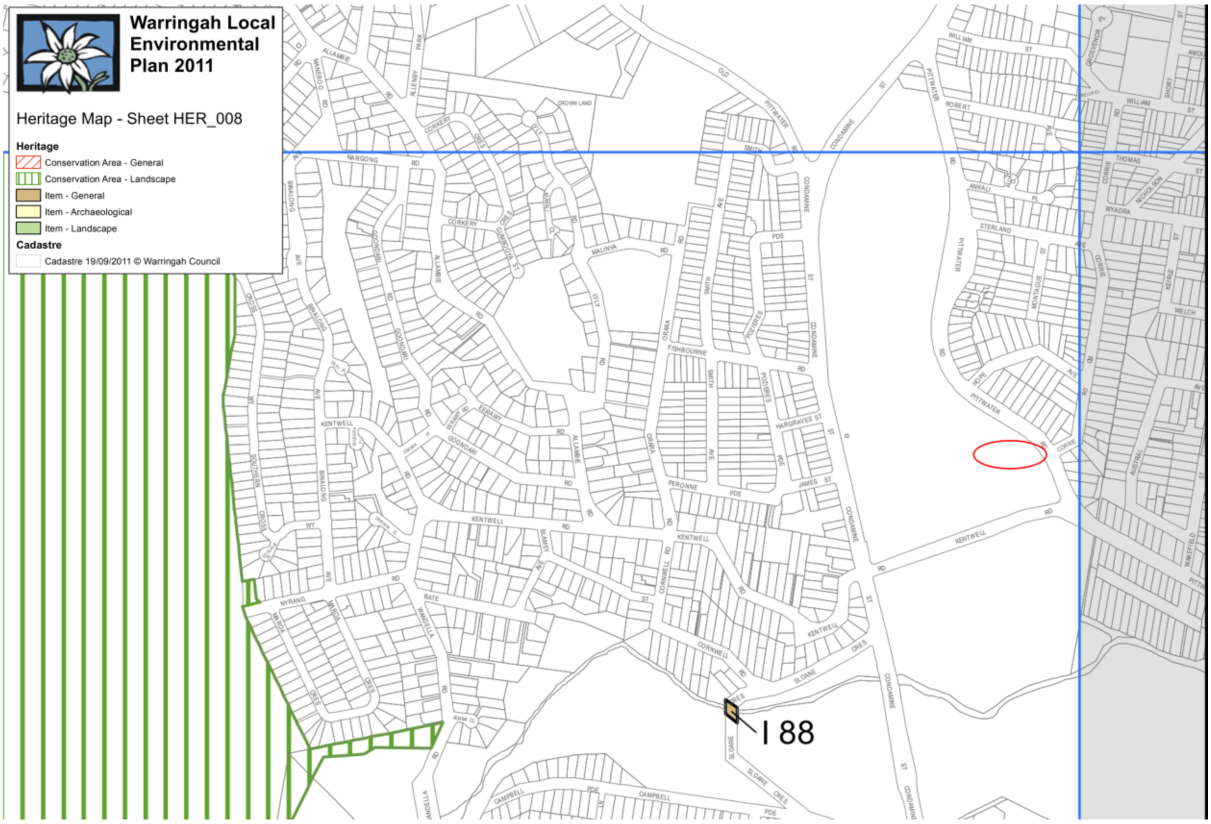

Figure 18 Heritage map (Source: Warringah LEP 2021)

A search of the Aboriginal Heritage Information Management System (AHIMS) on 19th July 2023 showed there one Aboriginal heritage site approximately 650m from the location of the proposed works (Figure 19).

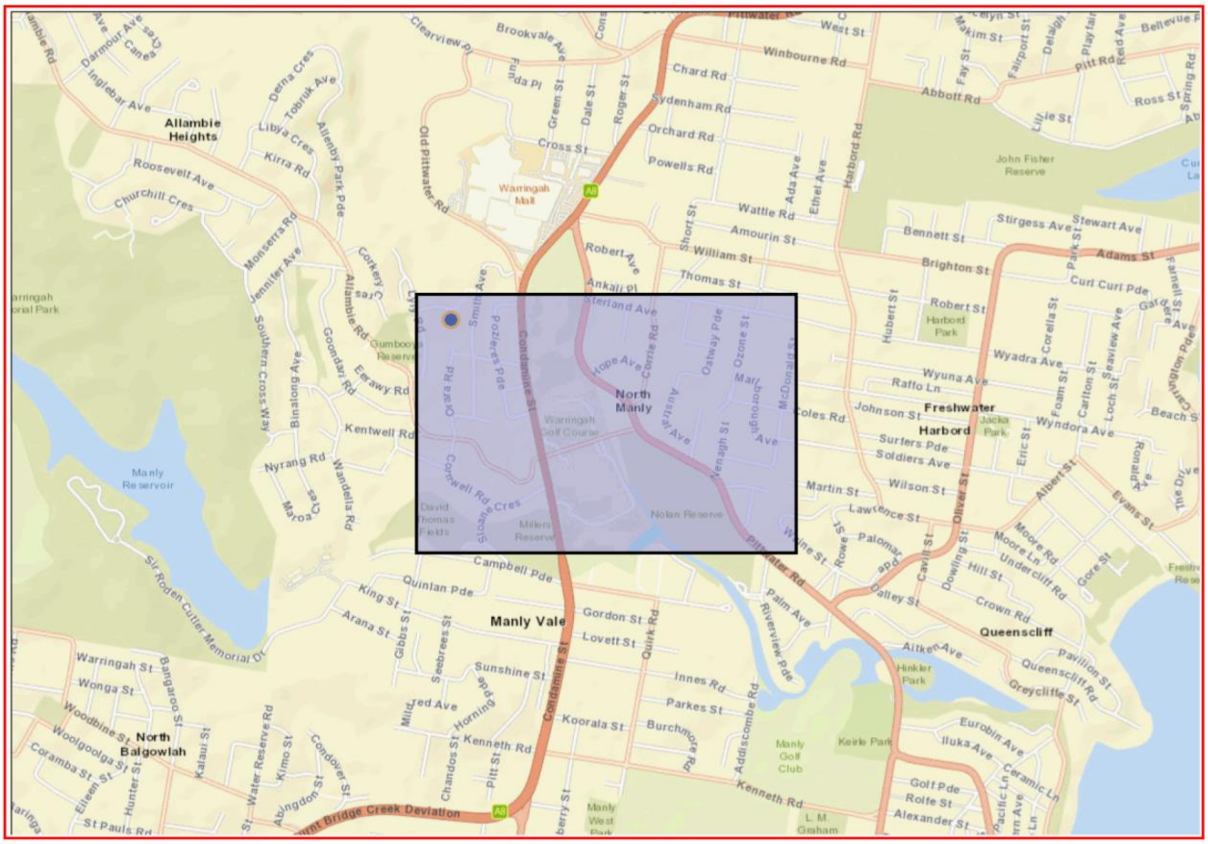

Figure 19 AHIMS search result for Warringah Golf Course, 19th July 2023

6.6.2 POTENTIAL IMPACTS

The extent of proposed works zone does not include any recorded heritage items. Hence impacts to heritage items is not expected.

It should be noted that typically there is a higher likelihood that Aboriginal heritage items are uncovered at sites close to waterways. However, the Proposal sits on highly disturbed soils and given the proposed limited extent of excavation it is considered unlikely that Aboriginal artefacts would be disturbed as part of proposed works. Regardless, the contractor should develop an unexpected finds protocol to appropriately manage the possibility of uncovering Aboriginal artefacts at the site.

Refer to Section 7 for mitigation measures and safeguards 7.0 – Heritage

6.7 NOISE AND VIBRATION

6.7.1 EXISTING ENVIRONMENT

The Proposal site is surrounded by recreational land (Warringah Golf Course) to the west and south and low-density residential properties to the north and east.

Existing noise at the site is anticipated to be typical of suburban Sydney and would include traffic noise (particularly from the four lane Pittwater Road) and occasional construction noise.

6.7.2 POTENTIAL IMPACTS

There would be short term noise impacts for users the golf course during construction. Local residents would also experience some noise during the construction period. Works should be conducted from 8am to 5pm on weekdays to reduce noise impacts to times when most residents would be at work.

Excavation into rock is not anticipated based on the proposed shallow excavation depths.

There is no anticipated on-going operational noise impact from the proposed works.

Refer to Section 7 for mitigation measures and safeguards 8.0 – Noise and Vibration

6.8 TRAFFIC AND ACCESS

6.8.1 EXISTING ENVIRONMENT

The proposal site is accessible for pedestrians via the footpath on Pittwater Road and via the golf course's internal paths.

Warringah Golf Course is accessible by car via the carpark at Boatwright Avenue and the bowling club parking in the northern end of the park.

6.8.2 POTENTIAL IMPACTS

The proposed works will cause a minor increase in vehicle traffic in the local area during construction that may increase safety risks associated with road traffic. The main access route will be via Kentwell Road. Traffic associated with construction will increase but is anticipated to be less than 10 vehicle movements per day, mostly associated with the movement of construction workers and deliveries of supplies.

Impacts to golf course users would include temporary loss of parking due to construction vehicles and machinery accessing the site. These impacts would be highly localised and confined to the nearby the works area. Wherever possible works should be undertaken on weekdays and outside of high use times.

Refer to Section 7 for mitigation measures and safeguards 9.0 – Traffic and Access

6.9 SOCIAL AND VISUAL

6.9.1 EXISTING ENVIRONMENT

The site is used year-round by Warringah Golf Club members. The site is used for active recreation associated with playing golf. This includes walking and the driving of golf carts.

6.9.2 POTENTIAL IMPACTS

During construction the local site area would be temporarily unusable.

The overall and long-term socio-economic and visual impact is anticipated to be positive for the following reasons:

- Improved visual amenity associated with the proposed new swale and bridge crossing
- Improved ecology through provision of freshwater aquatic habitat.

6.10 CUMULATIVE IMPACT

Work currently proposed for the site	The proposed drainage swale and associated works described in this REF.
Other known work currently proposed to be undertaken in the surrounding area	Warringah Golf Club, Clubhouse Building
Any ways the environment may be affected by the cumulative impact of all of the proposed work	Proposed works should aim to complete works in parallel with the clubhouse building works to limit disturbance to a shorter works period than if works were to occur in isolation.

7. ENVIRONMENTAL MEASURES AND MANAGEMENT

7.1 ENVIRONMENTAL MEASURES

1.0 General Management Measures	
1.1	Council's Project Manager can approve temporary construction facilities (such as compounds and access tracks), without additional environmental assessment or approval if the facilities meet the following principles: • Preferably located on any existing hard stand areas (e.g. Paved areas) • Limit proximity to existing site facilities and local residents • No disruption to property access including facilities at the site • No clearing of vegetation and use of existing cleared areas and existing access tracks • No disturbance to waterways • Potential environmental impacts are managed using the safeguards in the REF • No disturbance of contaminated land or acid sulfate soils • Rehabilitation of the compound area at the end of construction. • Assessed and approved by council staff as required Council's nominated construction contractor must demonstrate that the proposed ancillary facilities meet these principles. Any facilities that do not meet these principles will require additional environmental impact assessment. The agreed location of these facilities must be shown on the CEMP site plan and appropriate environmental controls installed.
1.2	Should the works change locations from those assessed in this REF, no further environmental assessment is required provided the changed positions: • Remains within the study area for the REF and has no net additional environmental impact; or • Is outside the study area for the REF but reduces the overall environmental impact of the project
1.3	Changes to the Proposal outside the study area will only occur: • To reduce impacts to biodiversity, heritage or human amenity; or • To avoid engineering (for example, geological, topographical) constraints; and • After consultation with any potentially affected landowners and relevant agencies. Council's Contractor must demonstrate in writing how the changes meet these requirements, for approval by Council's Project Manager.

1.4	Council's nominated contractor is to Prepare a Construction Environmental Management Plan (CEMP) addressing the requirements of this REF. The CEMP should specify licence, approval and notification requirements. Prior to the start of work, all project staff and contractors will be inducted in the CEMP. The CEMP should be readily available on site and include a site plan which shows: • Any identified no go areas and proposed works boundary • Location of environmental controls (such as erosion and sediment controls, fences or other measures to protect vegetation or fauna, spill kits) • Location and full extent of any vegetation disturbance • Stockpile locations and general spoil management approach • Identified areas where an arborist is required • Unexpected finds protocol
1.5	Prepare an Incident Management Plan (IMP) outlining actions and responsibilities during: • Onset of heavy rain during works • Spills • Unexpected heritage finds • Other potential incidents relevant to the scope of works All site personnel should be inducted into the IMP.
1.6	Immediately notify Council's Project Manager of any complaints.
1.7	Clearly delineate approved disturbance boundary for approval by Council's project manager before construction.
1.8	Conduct a dilapidation survey / asset condition assessment prior to works.
2.0 Topography, geology and soils	
2.1	Prevent sediment moving offsite in accordance with Managing Urban Stormwater, Soils and Construction, Volume 1 and 2A (Landcom 2004 and DECC 2008b), including: • Avoid introducing stormwater into the swale until all works are completed and vegetation has established. • Divert surface runoff away from disturbed soil and stockpiles • Install sediment and erosion controls before construction starts • Reuse topsoil where possible and stockpile separately • Inspect controls at least weekly and immediately after rainfall • Rectify damaged controls immediately • Remove controls once surfaces have been stabilised, including removing trapped sediment in drainage lines
2.2	An approved sediment and erosion control plan is to be followed for the duration of the works. The plan is to meet the councils requirements and as outlined in the technical specification and Landcom's managing urban stormwater (blue book).
2.3	Minimise ground disturbance and stabilise disturbed areas progressively. Stabilise and restore all areas as soon as possible after completion of any works
2.4	Council's Contractor to ensure imported material is certified for intended use.
2.5	Stop work in the immediate vicinity of suspected contamination. Indicators of contamination include discoloured soil, strong chemical or petrol odours and leachate. Contain disturbed material on an impermeable surface and cordon areas off. Notify Council's Project Manager.
2.6	Stop work during heavy rainfall or in waterlogged conditions when there is a risk of sediment loss off site.

2.7	Sweep up any sediment/soil transferred off site at least daily, and before forecast rainfall.
2.8	Eliminate ponding and erosion by restoring natural landforms to the pre-works condition.
2.9	Contractor to prepare an Acid Sulfate Soils Management Plan in accordance with the NSW ASSMAC (1998) *Acid Sulfate Soils Assessment Guidelines.* The Acid Sulfate Soils Management Plan is to be followed throughout the works.
3.0 Water and Drainage	
3.1	Use appropriate controls to avoid potential sedimentation to receiving water.
3.2	Store any potential contaminants on robust waterproof membrane away from drainage lines.
3.3	Keep functioning spill kit on site for clean-up of accidental chemical/fuel spills. Keep the spill kits stocked and located for easy access.
3.4	Locate portable site amenities away from any drainage lines.
3.5	Discharge all water in accordance with Landcom's Blue Book, including erosion controls, discharge rate, monitoring.
3.6	Store all chemicals and fuels in accordance with relevant Australian Standards and Safety Data Sheets. Record stored chemicals on site register. Bunded areas to have 110% capacity of stored liquid volume. Chemicals and fuels in vehicles must be tightly secured.
3.7	Conduct refuelling, fuel decanting and vehicle maintenance prior to entering the site where possible and where this is not possible, in site compounds. If field refuelling is necessary, designate an area away from waterways and drainage lines with functioning spill kits close by.
3.8	Conduct any equipment wash down within a designated washout area.
3.9	Ensure equipment is leak free. Repair oil/fuel leaks immediately or remove from site and replace with a leak-free item.
3.10	Locate stockpiles outside the 20-year ARI flood extents.
4.0 Flora and fauna	
4.1	Provided it is essential for delivering the project, Council's Project Manager (after consultation with Council's tree protection officer or equivalent) can approve the following vegetation removal and tree trimming, without additional environmental assessment. It is considered that vegetation removal in these circumstances has minimal environmental impact. Any minor: • Vegetation trimming or • Pruning of trees (subject to approval by Council's tree protection officer) • Removal of turf
4.2	Physically delineate vegetation to be protected on site and install appropriate signage prior to works commencing.
4.3	Adjust methodology where relevant (e.g. avoid area, hand excavate, implement exclusion fencing) to protect any sensitive areas (such as mature trees).
4.4	Any turf or vegetation to be cleared under the base of a tree shall be done by hand operated equipment. Large equipment shall NOT enter under the drip line of any tree to be retained.

4.5	Ground protection will be required for, • Any area of TPZ which can't be surrounded by fencing, • Any vehicle or plant access, • Any works area, such as concrete mixing, • Materials/waste storage are to be located within the TPZ areas. Ground protection to be in the form of steel plates, rumbleboards, trackmats or similar over 100mm depth of mulch (or over existing turf if present).
4.6	If native fauna is encountered on site, stop work and allow the fauna to move away unharassed. Engage an ecologist if assistance is required to move fauna.
4.7	If any threatened species (flora or fauna) is discovered during the works, stop work immediately and notify Council's project manager. Work will only recommence once the impact on the species has been assessed and appropriate control measures provided.
4.8	If any damage occurs to vegetation outside of the identified work zones (as shown in the design drawings), notify Council's Project Manager or Project Arborist so that appropriate remediation strategies can be developed.
4.9	Manage biosecurity in accordance with: • *Biosecurity Act 2015* (see NSW Weedwise) • Contemporary bush regeneration practices, including disposal of sealed bagged weeds to a licenced waste disposal facility For example, weed removal will be selected to protect non-target species, prevent pollution of waterways, and minimise the risk of soil erosion. Weed management may include: • Manual weed removal in preference to herbicides • Replacing non-target species removed/killed because of weed control activities • Protecting non-target species from spray drift • Not applying herbicide if it is raining or if rain is expected • Mixing and loading herbicides, and cleaning equipment away from waterways and drains Biosecurity events e.g., new weed infestations or invasive pests, will be reported.
4.10	To prevent spread of weeds, clean all equipment including PPE prior to entering or leaving the work sites. Wrap straw bales in geofabric prior to use.
4.11	Bag all plant parts and excavated topsoil that may be infested with weed propagules and dispose at a licensed waste disposal facility.
4.12	Implement appropriate site and soil hygiene activities e.g. washing down boots and machinery prior to entering site.
4.13	Obtain permit from DPI Fisheries to construct the outlet to Brookvale Creek prior to commencing construction.
4.14	The removal of six trees is anticipated for proposed works. Remove trees with Council's superintendent present to ensure correct number of trees are removed.
5.0 Air and greenhouse gas	
5.1	Use alternatives to fossil fuels where practical and cost-effective.
5.2	Maintain equipment in good working order, comply with the clean air regulations of the *Protection of the Environment Operations Act 1997*, have appropriate exhaust pollution controls, and meet Australian Standards for exhaust emissions.
5.3	Switch off vehicles/machinery when not in use.

5.4	Implement measures to prevent offsite dust impacts, including but not limited to: • Water exposed areas (using non-potable water source where possible such as water from excavation pits) • Cover exposed areas with tarpaulins or geotextile fabric • Modify or cease work in windy conditions • Modify site layout (place stockpiles away from sensitive receivers) • Vegetate exposed areas using appropriate seeding.
5.5	Cover all transported waste.
6.0 Waste Generation	
6.1	Manage waste in accordance with relevant legislation and maintain records to show compliance e.g. waste register, transport and disposal records.
6.2	Undertake additional site investigation and soil testing of any spoil to be disposed of off site to verify suitability of appropriately classified spoil.
6.3	Provide adequate bins for general waste, hazardous waste and recyclable materials. Remove bins when 80% full.
6.4	Minimise the generation of waste, sort waste streams to maximise reuse/recycling in accordance with the *Waste Avoidance and Resource Recovery Act 2001*.
6.5	Conduct testing of spoil prior to disposal to determine waste classification.
6.6	Dispose wastes at an appropriately licenced facility and in accordance with the NSW EPA Waste Classification Guidelines.
6.7	Securely store all wastes to prevent pollutants from escaping.
6.8	Dispose vegetation such as turf and trees (proposed for removal) at an appropriate green waste disposal facility.
6.9	No spoil from the site is proposed for disposal offsite. However, if any waste is to be disposed of offsite it must be classified prior to disposal at a licenced waste facility.
7.0 Heritage	
7.1	Repeat the basic AHIMS search if it is older than 12 months. Conduct additional assessment if new sites are registered and could be impacted by the works.
7.2	If any Aboriginal object or non-Aboriginal relic is found, cease all excavation or disturbance in the area and notify Council's project manager.
7.3	Contractor to develop and follow an unexpected finds protocol for the unlikely event that an aboriginal artefact/s is uncovered.
8.0 Noise and vibration	
8.1	Schedule work and deliveries during standard daytime working hours of 7am to 6pm Monday to Friday and 8am to 1pm Saturday. No work to be scheduled on Sundays or public holidays (DECC Interim Construction Noise Guideline, 2009). Works will be carried out in accordance with: • Noise Policy for Industry (EPA, 2017).

8.2	Incorporate standard daytime hours noise management safeguards into the CEMP: • Identify and if required consult with the potentially affected businesses and residents prior to the commencement: • Implement a complaints handling procedure for dealing with noise complaints • Plant or machinery will not be permitted to warm-up near residential dwellings before the nominated working hours. • Appropriate plant will be selected for each task, to minimise the noise impact • Regularly inspect and maintain equipment in good working order • Arrange work sites where possible to minimise noise (e.g. generators or pumps away from sensitive receivers, minimise use of vehicle reversing alarms). • Schedule noisy activities around times of surrounding high background noise (local road traffic or when other noise sources are active).
8.3	Conduct a dilapidation survey / asset condition assessment prior to works which have potential to damage existing structures
8.4	Excavation into rock is not anticipated. If excavation into rock or other similar materials in proximity to existing structures monitor compliance with the recommended vibration levels in DIN 4150-3 1999: Structural Vibration – Part 3; Effects of vibration on structures.
9.0 Traffic and access	
9.1	Minimise traffic impacts near park facilities, residential properties, and local businesses by consulting with them as required (e.g. no major materials deliveries at peak sports user times for facilities).
9.2	Manage sites to allow people to move safely past the works, including alternative pedestrian, bicycles, pram and wheelchair access.
9.3	For works on council roads consult with Council's project managers
9.4	Erect signs to inform road users of the proposed works and any temporary road closures.
9.5	Ensure work vehicles do not obstruct vehicular or pedestrian traffic, or private driveway, public facility or business access unless necessary and only if appropriate notification has been provided.
9.6	The contractor will be required to develop a traffic management plan for the site.
10.0 Social and Visual	
10.1	Undertake works to minimise impacts on park users including: • Work with Council's project manager to notify any impacted user groups and facility managers • Erect signs to inform the public on nature of work • Treat community enquiries appropriately and notify Council's project manager of all community enquiries
10.2	Minimise visual impacts (e.g. erect appropriate exclusion fencing around works site).
10.3	Maintain work areas in a clean and tidy condition.
11.0 Cumulative impacts	
11.1	Proposed works should aim to complete works in parallel with the clubhouse building works to limit disturbance to a shorter works period than if works were to occur in isolation.

7.2 OPERATIONAL ENVIRONMENTAL MANAGEMENT

The establishment period would mostly limited to the facilitating the successful establishment of proposed new native planting and weeding to remove unwanted exotic plant species.

Long term maintenance requirements would include weeding and mowing of turfed areas, consistent with the golf club's existing maintenance requirements of the golf course as well as periodically emptying the sediment forebay.

8. CONCLUSION

This REF has been prepared to assess the potential environmental impacts of a new drainage swale to replace an existing swale that is to be decommissioned. Potential negative impacts of the Proposal are mostly associated with the construction phase. Construction impacts would include temporary generation of noise, dust, construction waste, visual impacts, and loss of parking for staff and golf club members.

The swale works are permissible under Division 20 Stormwater management as they are considered works for the discharge of stormwater (such as channels, aqueducts, pipes, drainage works, embankments, detention basins and pumping stations). The pedestrian bridge is permissible without consent under the provisions listed in Division 12 Parks and other public reserves.

The works to connect the proposed swale into Brookvale Creek are within an area mapped as Key Fish Habitat. This means that the requirements of the Fisheries Management Act 1994 must be considered. The NSW DPI's (2013) *Policy and guidelines for fish habitat conservation and management* provides guidance on development activities that require approval from NSW DPI under the FM Act. The proposed works require approval from DPI Fisheries as they are in line with works described as: *Installation of stormwater outlets (involving reclamation of the bed or bank of a waterway).* A permit to construct the outlet to Brookvale Creek is required from DPI Fisheries prior to commencing construction.

Additionally, soil analysis and ASS mapping indicates that there is a high likelihood of ASS within the proposed works zone to depths of 2.5-3.0m BEGL. The two existing geotechnical investigations found levels of sulfur above the NSW ASSMAC Assessment Guidelines (1998) action criteria. As such, an Acid Sulfate Soil Management Plan must be developed prior to commencing construction to prevent harm to human health and the environment.

Mitigation measures and safeguards have been identified to minimise any potential impacts during construction as outlined in Section 7. Provided the measures are implemented, impacts to the local environment would be negligible.

It is considered that, given the nature, scale and extent of the Proposal, with implementation of the environmental safeguard measures documented in this REF, the Proposal would result in positive environmental impacts and any negative impacts sustained during the construction phase would be minimal, short-term and would not pose significant risk to the environment.

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10. GLOSSARY AND ABBREVIATIONS

Biodiversity	Variety and number of different species living in an ecosystem or a defined geographic area
BC Act	Biodiversity Conservation Act
Catchment	The area of land draining to a waterway. May also refer to areas served by a wastewater or stormwater system
CMP	Conservation Management Plan
Conservation	Use, management and protection of resources so they are not degraded, depleted or wasted and are available on a sustainable basis for present and future generations
dB(A)	A-weighted decibels
DBH	Diameter of a tree trunk at breast height (typically 1.4m from the ground).
Ecologically sustainable development (ESD)	Development that improves the quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends
Ecosystem	A community of organisms, interacting with one another, and the environment in which they live. Processes occurring within an ecosystem are the flow of energy by food chains and food webs and nutrient cycling. An ecosystem may be a pond that is dry for half the year, a lake or even a planet
EEC	Endangered Ecological Community
REF	Review of Environmental Factors
Emission	Anything given off as a result of a process, for example, gases, heat and odours.
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management System, the framework for the management of environmental issues
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products and services
Environmental indicators	Physical, chemical or biological features that can be monitored and used to measure changes in the environment
EPA	Environmental Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence, issued by the Environment Protection Authority (EPA)
Greenhouse gas emissions	Gases such as carbon dioxide and other forms of emissions to the atmosphere, resulting from the burning of fossil fuels (such as coal, natural gas or oil) and land clearing, which contribute to global warming
Groundwater	Water found below the surface, usually in porous rock or soil or in underground aquifers (natural underground formations that contains sufficient saturated, permeable material to yield significant quantities of water)
LEP	Local Environment Plan – a statutory environmental planning instrument under the EP&A Act
LGA	Local Government Area

Nutrients	Substances required for growth by plants and other organisms. Major plant nutrients are phosphorus and nitrogen
NPWS	National Parks and Wildlife Service
OEH	Office of the Environment and Heritage
POEO Act	Protection of the Environment Operations Act
Pollutants	Contaminants in water, soil or air that, when in sufficient quantity, may cause environmental degradation
Pollution	Any harmful or undesirable change in the physical, chemical or biological quality of air, water or soil as a result of the release of chemicals, radioactivity, heat and large amounts of organic matter
Receiving water	A stream, river, pond, lake or ocean that receives stormwater or wastewater discharges
Runoff	Water that flows across the land surface and does not soak into the ground
Sediment	Soil or other particles that settle to the bottom of lakes, rivers, oceans and other waters
SEPP	State Environmental Planning Policy – a statutory environmental planning instrument under the EP&A Act
Sewage	The wastewater from homes, offices, shops, factories and other premises discharged to the sewer. Approximately 99 per cent of sewage is water
Sewerage system	The network of pipes, pumping stations and treatment plants used to collect, transport, treat and discharge sewage (wastewater)
SIS	Species Impact Statement
Stakeholder	A stakeholder is any individual or group, which can affect or is affected by an organisation's activities
Stormwater system	The system of pipes, canals and other channels used to carry stormwater to bodies of water, such as rivers or oceans. The system does not usually involve any treatment
Stormwater	Rainwater that runs off the land, frequently carrying various forms of pollution such as litter and detritus, animal droppings and dissolved chemicals
Suspended solids	Particles in water that can be removed by sedimentation or filtration
Sustainable development	Activities that can be maintained over the long term while achieving a balance between the environment, the economy and society
SRZ	Structural Root Zone
TPZ	Tree Protection Zone
UST	Underground storage tank
Water Sensitive Urban Design (WSUD)	Incorporates a range of initiatives designed to reduce the impact of urban stormwater
Waterways	All streams, creeks, rivers, estuaries, inlets and harbours
Wetland	A wetland is a low-lying area of land often inundated or permanently covered by shallow water. They play a major role in the water cycle by storing and filtering water and replenishing underground water supplies. Wetlands can also be effective in cleaning polluted water by reducing aquatic plant nutrients, suspended solids and oxygen demands

APPENDIX 1: CLAUSE 171 SUMMARY

In the context of clause 171 of the *Environmental Planning and Assessment Regulation 2021*, consideration of the likely impact on the environment of the proposed work is summarised below.

CLAUSE 171 FACTOR	REF FINDING
Any environmental impact on a community	The Proposal may result in traffic and noise impacts during construction works. However, these will be minor and short-term. By implementing the safeguards identified in the REF and preparing a CEMP and traffic management plan, the environmental impacts on the community will be minimised. On balance, there will be an improvement in the value of the community space and no significant operational impacts as a result of the Proposal.
A transformation of a locality	The Proposal will replace an existing drainage swale which will result in a minor positive transformation in the locality through improved visual amenity and ecological value.
Any environmental impact on the ecosystem of the locality	Implementing the safeguards outlined in the REF will ensure that impacts on local ecosystems and downstream ecosystems are minimised. The proposal works are not expected to have a significant environmental impact.
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	There will be temporary reductions in the aesthetic, recreation and environmental quality of the locality during the construction phase of the project. Implementing the safeguards outlined in this REF will minimise impacts to the aesthetic, environmental and recreational quality of the locality during construction. The long term aesthetic, environmental and recreational quality of the locality will be enhance through provision of a new drainage swale with fish habitat features integrated into the design.
Any effect upon a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or any other special value for present or future generations	There are no impacts on any locality, place or building having anthropological, archaeological, architectural, cultural, historical, scientific significance or other special value for present or future generations. The aesthetic and social value of the site will be temporarily impacted during the construction phase of the project. Post-construction the aesthetic and social significance of the site will be enhanced.
Any impact on the habitat of any protected fauna (within the meaning of Section 98 of the *National Parks and Wildlife Act 1974*)	For the proposed works there is no significant habitat of protected fauna present at the proposed area of works that will be affected by the Proposal.
Any endangering of any species of animal or plant or other form of life, whether living on land, in water or in the air	The proposed works will not endanger the general population of species of animal, plant or other life form,

	whether living on land, in water or in the air.
Any long-term effects on the environment	The proposed works will not cause any long-term effects on the environment.
Any degradation of the quality of the environment	There is risk of short term degradation to the quality of the environment during the construction phase of the Proposal. Implementation of the environmental mitigation measures outlined in this REF are integral to minimising the potential adverse impacts on the environment. The contractor's CEMP will also incorporate further safeguards to minimise any site-specific environmental impacts of the project.
Any risk to the safety of the environment	There are short term safety risks associated with the construction phase of the Proposal. Compliance with regulatory requirements stipulated in this REF and other relevant Australian Standards will minimise these risks. There are no potential operational safety risks of the Proposal.
Any reduction in the range of beneficial uses of the environment	There will be a temporary reduction in the range of beneficial uses of the environment during construction. The range of beneficial uses of the environment following works will not be reduced.
Any pollution of the environment	Generation of pollution during construction phase of the Proposal will be minimised through implementation of the mitigation measures outlined in this REF, development of a CEMP and acquisition of appropriate licences and permits as required, will minimise pollution generated and the impact of this pollution. Long-term, the Proposal will have no impact on pollution, air quality and litter.
Any environmental problems associated with the disposal of waste	All waste will be recycled where possible or disposed of at an appropriate licensed waste management facility. Waste materials will be classified in accordance with *NSW DECCW (2009) Waste Classification Guidelines* prior to reuse or disposal.
Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	The project will not increase the demands on resources that are or are likely to become in short supply.
Any cumulative environmental effect with other existing or likely future activities	There is an existing approved DA for the building a new clubhouse by Warringah Golf Club immediately south of the site. The proposed works should be scheduled in parallel with the clubhouse works to limit the construction period
Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	The Proposal will not have any impacts on coastal hazards, including on projected climate change conditions.

Any applicable local strategic planning statement, regional strategic plan or district strategic plan made under Division 3.1 of the Act	**Greater Sydney Regional Plan** *Planning Objective 31: Public open space is accessible, protected and enhanced.* **North District Plan** *Planning Priority N22: Adapting to the impacts of urban and natural hazards and climate change*
Any other relevant environmental factors	None that are not already considered.

APPENDIX 2: DESIGN DRAWINGS