Review of Environmental Factors (REF) Addendum

Proposed Replacement of North Nowra Surcharge Main

Prepared for
Shoalhaven Water

22nd May 2020

DOCUMENT TRACKING

ITEM	DETAIL
Project Name	REF Addendum- Proposed Replacement of North Nowra Surcharge Main
Document Name	20REP006_REFAdd2_NNSM_D2
Project Number	20REP006
Prepared by	Dr Emma McIntyre
Status	Draft for Public Exhibition
Version Number	Draft 2
Last saved on	22nd May 2020
Cover	Location photo, supplied by Anthony Galea.

Contents

1 Introduction

1.1 THE PROPOSED ACTIVITY

Shoalhaven Water, a part of Shoalhaven City Council, is responsible for the collection, treatment and distribution of potable water and wastewater in the Shoalhaven local government area.

Shoalhaven Water proposes to upgrade sections of North Nowra surcharge main (NNSM) which extends from North Nowra to the Nowra Wastewater Treatment Plant (WWTP).

The existing NNSM consists of 300mm asbestos cement (AC) pipeline, which transfers wastewater from the North Nowra catchment area during wet weather to Nowra WWTP to minimise the potential for wet weather surcharges to impact on water quality of Shoalhaven River. Shoalhaven Water has identified the need to replace two sections of the existing pipeline due to the age of the asset and ongoing maintenance and repair requirements, described as follows:

- **NNSM Section 1** – Replacement of the existing pipeline over the length of the Shoalhaven River Bridge (approximately 350m) with a 450mm (internal diameter) steel pipeline. In addition, this Section 1 of the alignment will involve relining of a section of the existing NNSM pipeline to the immediate north of the Shoalhaven River Bridge over a length of approximately 30m.
- **NNSM Section 2** – Replacement of the Section of NNSM extending from the north-eastern side of the Princes Highway and Pleasant Way intersection in Nowra, to Nowra WWTP, an approximate length of 1.6km. Throughout this section of the alignment it is proposed to replace the existing main with a 560mm diameter polyethylene (PE) pipeline.

In addition, whilst there is suitable equipment and expertise associated with the placement and removal of the pipeline under the northbound Shoalhaven River Bridge, Shoalhaven Water proposes to take the opportunity to remove the existing twin redundant 250mm diameter asbestos pipelines adjoined to the underside of the southbound Shoalhaven River Bridge.

Section 1 of the proposed activity, as described above, will be undertaken in partnership with NSW Roads and Maritime Services (RMS). Council and RMS will coordinate these works in conjunction with the Nowra Bridge Project, expected to be undertaken from July 2020. RMS has prepared a separate Review of Environmental Factors (REF) to assess all potential environmental impacts of the Nowra Bridge Project (RMS 2018).

1.2 PURPOSE OF THIS REF ADDENDUM

The proposed activity has been previously assessed in a Review of Environmental Factors (REF) prepared by GHD in September 2015. Whilst there are no changes to the original proposed works, Shoalhaven Water has engaged EMAP Consulting to prepare this REF Addendum to reassess the proposed activity due to the amount of time that has passed since the original assessment, and due to changes in relevant legislation in that time.

Shoalhaven City Council (SCC) is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*. The environmental assessment of the proposed activity has been undertaken in the context of Clause 228 of the Environmental Planning and

Assessment Regulation 2000. In doing so, this Review of Environmental Factors (REF) Addendum helps to fulfil the requirements of Section 111 of the Act that SCC examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the proposed activity.

1.3 LOCATION OF THE STUDY AREA

The proposed activity is located in North Nowra, NSW. The location of the study area, location of the proposed activity and proposed staging of works are illustrated in Figures 1 and 2 respectively, in Appendix A.

The REF Study Area for the purposes of this assessment has been mapped and assessed as a 50 metre buffer of the proposed rising main alignment. Additional features proposed- such as the proposed stockpile sites and sediment control measures- are all located within this area.

Figure 2 also shows the overlay of the REF Study Area for this assessment with the footprint of the REF Study Area assessed by RMS (2018) for the Nowra Bridge Project for context purposes.

1.4 STAGING OF PROPOSED WORKS

The proposed works were described in detail by GHD (2015) as follows:

1.4.1 Pre-Construction Activities

The following pre-construction activities would be required to be completed:

- Notification to relevant authorities and stakeholders, including potentially affected community and nearby residents, of the commencement of work;
- Installing environmental controls in accordance with the construction environmental management plan (CEMP) (to be prepared by the awarded construction contractor for the works and approved by Shoalhaven Water);
- Establishing a compound site suitable for the overland activities associated with pipelaying, including stockpiling of imported materials, laydown of pipes, storage of plant and equipment, and site amenities. The site compound would be fenced and secured;
- Establishment of a suitable compound site for the Shoalhaven River Bridge works. The compound site would need to be located in proximity to the Shoalhaven River with access to a boat ramp or similar for entry and exit to the river. The bridge works compound would facilitate material storage and handling for the bridge crossing works including temporary pipe laydown (both new pipeline and removed redundant asbestos cement pipeline), material and equipment storage and general site amenities for site personnel. The site compound would be fenced and secured;
- Establishment of a floating work platform / barge within the Shoalhaven River for the works associated with the installation of the proposed pipeline and removal of the existing asbestos pipeline on both the northbound and southbound bridges;
- Locating services such as telephone cables, underground power lines and gas and water mains through a dial before you dig search and on-site services searches;
- Relocating any affected services.

1.4.2 Construction Activities

Following the pre-construction phase, the construction sequencing is as follows:

- Excavation of an access pit on the northern side of the Shoalhaven River Bridge, possibly located in the North Nowra Rotary Park. The pit dimensions are likely to be in the order of 3.0m wide, 3.0m long and 2.0m deep to allow access and operation of equipment for the relining of a 30m section of the existing NNSM. Relining of the pipeline typically involves a process whereby an artificial liner is pulled through the pipeline under pressure, causing it to elongate. Following the removal of the pressure, the liner expands and takes the shape of the internal surface of the existing pipeline. The pipeline is then generally flushed with hot water or air to further seal the liner against the internal surface of the existing pipeline;
- Removal and stockpiling of topsoil for later reinstatement along the pipeline alignment;
- Excavation of the pipeline alignment using conventional open-trenching techniques through open paddocks and the road verge and under boring techniques for the crossing of roadways and watercourses;
- Trenching and stockpiling of the excavated trenching material on the up-gradient side of the excavated area where possible;
- Placement of bedding material (clean sand or similar) in the trench to the nominal depth (likely to be approximately 100mm thick);
- Placement of the main pipeline into the excavated area. The main would be laid out 'end to end' adjacent to the excavation to enable easy placement within the trench, and then joined using welding techniques;
- Placements of fill and topsoil material over the main;
- Flushing of the existing NNSM for the section of pipeline no longer in service (i.e. from the Junction of Pleasant Way and the Princes Highway to the Nowra WWTP) and capped at either end, a process known as 'Mothballing';
- Operation of the floating work platform / barge within the Shoalhaven River for the installation of the proposed NNSM and the removal of the existing NNSM asbestos pipeline on the northbound Shoalhaven River Bridge and removal of the twin 250mm diameter asbestos pipelines on the southbound Shoalhaven River Bridge;
- Installation of the 450mm (internal diameter) steel pipeline to the existing service ducts on the Shoalhaven River Bridge;
- At completion of Connection works associated with the connection of the northern end into the existing NNSM and cross-over of the new service, removal of the existing NNSM 300mm AC pipeline from beneath the Shoalhaven River Bridge;
- Removal of the twin 250mm diameter redundant asbestos cement pipelines located on the underside of the southbound Shoalhaven River Bridge.

The new surcharge main would be constructed in sections of approximately 80m to 100m lengths. Typical excavation rates for trenching are approximately 40m per day. Excavations would be

progressively backfilled at the end of each day, leaving an exposed section of pipeline for later connection. Any exposed section of excavation would be covered and secured at the end of the working day for safety purposes.

Typical excavation depths for the installation of the main would be in the order of 1.0m to 2.0m deep below ground level (bgl).

1.4.3 Pressure Testing

For quality control purposes, during the commissioning phase, the pipeline would be pressure tested prior to being put into use. Pressure testing would be undertaken in accordance with the Water Supply code.

1.4.4 Restoration and Rehabilitation

Excavation and construction work storage sites compounds would be rehabilitated using the following principles:

- Stockpiled surface debris, turf and retained vegetation would be returned to the excavated areas (where applicable) immediately following backfilling to minimise the exposure of bare soil;
- Backfilling and compaction of excavated areas (where applicable) using the stored stockpiles so that the soil profile is restored in the correct order;
- Provision of appropriate hydro mulching and other landscaping works (consistent with the character of the surrounding environment) to stabilise exposed ground.

1.5 PLANT AND EQUIPMENT

Plant and equipment for the proposal would be determined during the construction planning phase. An indicative list of plant and equipment likely to be used for the proposal includes:

- Excavators;
- Generator;
- Water pump;
- Crane (Frana or similar);
- Horizontal direction drill rig;
- Small delivery trucks;
- Hand held power tools and equipment;
- Personnel vehicles;
- Floating work platform / barge;
- Small watercraft (dinghy or similar) for transportation of personnel to and from the floating work platform / barge;
- Crane or similar for the handling of materials to and from the Shoalhaven River embankment onto the floating working platform (or onto similar watercraft for transport to the floating working platform).

1.6 WORK COMPOUNDS, ACCESS AND VEHICLE MOVEMENTS

1.6.1 Construction compound

Temporary site compounds would be required at several locations along the alignment. As a minimum, it is likely that a relatively small compound site would be required for the works associated with the relining of a 30 m section of the existing NNSM to the immediate north of the Shoalhaven River Bridge, the works for the crossing of the Shoalhaven River Bridge and a third compound would be required for the undertaking of the trenching works between the north eastern corner of the Princes Highway and Pleasant Way intersection to the Nowra WWTP site. It is envisaged that with several smaller temporary under-boring site compounds being required for the under-boring of roads / watercourses.

Specific locations and layouts are to be determined by the awarded construction contractor. The compound locations and layouts would be detailed on a location plan prepared as part of the construction contractor's CEMP, and would be approved by Shoalhaven Water prior to construction commencement. Where possible, the compound locations would be located to avoid any impact on the environment and would not require any clearance of native vegetation and would not be located in the immediate vicinity of any drainage lines. With regards to the compound associated with the bridge crossing works, the CEMP prepared by the construction contractor would ensure that all necessary mitigation measures, in particular for protection of water quality impacts, are implemented and maintained as required.

The site compound would be used to stockpile inert fill materials, store plant and equipment and to provide for construction staff parking, toilets and amenities. Any chemicals / fuels to be stored at the temporary compound sites would be done so in accordance with the respective CEMPs and in accordance with appropriate material data sheets and manufacturer's specifications. Access points to the temporary site compounds would be stabilised as part of the compound establishment works and would likely require the placement of an aggregate or similar to help prevent sediment tracking etc. onto the local roadways.

1.6.2 Access

The NNSM work areas would be accessed via local streets and via open paddocks (in consultation with property occupiers and in accordance with Shoalhaven Water's community engagement protocols). The proposal would not require the construction of any additional vehicular access roads.

Access to the NNSM and twin 250 mm diameter asbestos pipelines attached to the underside of the Shoalhaven River Bridge (northbound and southbound respectively) would be via a floating working platform / barge. It is understood that the floating work platform / barge would be moored up as required to a fixed location (relocating as required) and accessed by a smaller water craft (dinghy or similar) from either the Wharf Road boat ramp, Nowra (southern side of the Shoalhaven River) or the Fairway Drive (Greys Beach) boat ramp, North Nowra (northern side of the Shoalhaven River).

1.7 WORKFORCE AND TIMEFRAME

The work will be carried out during standard construction working hours (7am – 6pm Monday to Friday, 8am – 1pm Saturday, with no works on Sundays or public holidays). Work outside standard construction working hours due to exceptional circumstances (e.g. traffic restrictions) will only be undertaken following consultation with potentially impacted stakeholders and following approval from Council (except in the case of an emergency).

Work crews associated with the pipeline construction from Pleasant Way to the Nowra WWTP would typically include up to 5-8 contractor personnel, whilst work crews associated with the installation and removal of the pipelines across the Shoalhaven River would typically include up to 4 to 6 contractor personnel. It is envisaged that the work sites would be occasionally inspected by Area Supervisors (or similar) and would also require deliveries to and from the site. The proposed works will commence in late 2020, with a total construction period of approximately 6 months.

1.8 ONGOING OPERATION

Once operational, the new infrastructure would be operated and managed by Council in accordance with the procedures applied to the remainder of the sewerage system. Routine maintenance would consist of works that are already in place.

2 Legislation and planning context

This section describes the planning framework under which the Proposal is assessed and relevant provisions of local, state and commonwealth legislation.

2.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and its associated regulations provide the framework for assessing environmental impacts and determining planning approvals for developments and activities in NSW. The EP&A Act also establishes State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs) which may include provisions relevant to the Proposal.

Under the EP&A Act, Shoalhaven City Council is classified as a proponent and a determining authority (Part 5 of the Act). A proposed activity can be assessed by a determining authority under Part 5 of the Act if it:

- May be carried out without development consent;
- Is not a prohibited development;
- Is carried out, or approved by a determining authority.

The Proposal does not require development consent under Part 4 of the EP&A Act, and is not classified as state significant infrastructure under 5.1. Therefore, the Proposal has been assessed under Part 5 of the EP&A Act. This REF has been prepared to determine if the Proposal is likely to have a significant impact on the environment. If a determining authority decides an activity is likely to significantly affect the environment, it must prepare an environmental impact statement (EIS). Clause 228 of the EP&A Regulation lists factors that must be taken into account when considering the likely impact of an activity on the environment. Section 5 includes an assessment of these factors for this proposal.

2.2 STATE ENVIRONMENTAL PLANNING POLICIES

State Environmental Planning Policy (Infrastructure) 2007

The aim of the State Environmental Planning Policy (Infrastructure) 2007 is to facilitate the effective delivery of infrastructure across NSW. This SEPP provides for this work to be undertaken without development consent. In circumstances where development consent is not required, the environmental assessment provisions outlined in Part 5 of the Act are required to be complied with. This REF fulfils this requirement.

State Environmental Planning Policy (Coastal Management) 2018

The Coastal Management SEPP gives effect to the objectives of the Coastal Management Act 2016 from a land use planning perspective, by specifying how development is assessed if it is within the coastal zone. The REF Study Area is partly located within the Coastal Environmental Area and the Coastal Use Area to which this SEPP applies.

State Environmental Planning Policy No.44 – Koala Habitat Protection

The development control provisions within this SEPP apply only to development applications made under Part 4 of the EP&A Act. Therefore this SEPP does not apply.

State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011

The subject site is not mapped as an area covered by this policy.

2.3 SHOALHAVEN LOCAL ENVIRONMENT PLAN 2014

Under the Shoalhaven LEP, the REF Study Area traverses areas that are zoned:

- SP2 Infrastructure
- B4 Mixed Use
- R2 Low Density Residential
- RE1 Public Recreation
- RU1 Primary Production

The proposed activity may have required development consent under the SLEP. However, the provisions of the SEPP Infrastructure prevail over the SLEP and consequently development consent is not required.

2.4 OTHER NSW LEGISLATION

Heritage Act 1977

The *Heritage Act 1977* was introduced to conserve the environmental heritage of NSW. It defines environmental heritage as places, buildings, works, relics, moveable objects and precincts that have State or local heritage significance. The Act allows for a variety of orders and permits to protect items of environmental heritage, including the listing of items on the State Heritage Register (SHR). Section 3.4 of this REF considers the impact of the proposed works to heritage and associated items and concludes there will be no significant impact to items of heritage significance.

Protection of the Environment Operations Act 1997 (POEO Act)

The proposed work does not constitute scheduled development work or scheduled activities as listed under Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.

National Parks and Wildlife Act 1974

The Office of Environment and Heritage (OEH) administers the *National Parks and Wildlife Act 1974* (NPW Act). Under section 86 of the Act it is an offence to harm Aboriginal objects or places. Defences against prosecution of this offence include having an Aboriginal Heritage Impact Permit and being able to demonstrate due diligence. All works will be undertaken on existing disturbed sites. Similarly, no known archaeological sites, Aboriginal objects or places would be directly or indirectly impacted by the Proposal. Further discussion of Aboriginal Heritage is included in section 3.3.

The NPW Act also allows for the establishment and management of National Parks and nature reserves and prohibits certain activities within these areas. There are no National Parks or nature reserves at or in the immediate vicinity of the subject site.

NSW Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) establishes a framework for protecting threatened species, populations, ecological communities and their habitats in NSW. Schedules 1 and 2 of the BC Act list terrestrial species, populations and ecological communities threatened in NSW.

Under Section 7.8 of the BC Act, if an activity assed under Part of the EP&A Act is likely to *significantly affect* threatened species – as per Section 7.3 of the BC Act *"Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats"* - a Species Impact Statement (SIS) and licence are required. Section 5 of this REF provides details of threatened species, populations, ecological communities or habitats within or in the vicinity of the work areas.

Fisheries Management Act 1994

The proposed activity:

- Would not affect declared aquatic reserves;
- Does not involve dredging or reclamation works in 'key fish habitat';
- Would not impact mangroves and marine vegetation;
- Would not involve disturbance to gravel beds where salmon or trout spawn;
- Does not involve the release of live fish;
- Does not involve construction of dams and weirs;
- Would not result in blocking of the passage of fish;
- Would not impact declared threatened species of endangered ecological communities;
- Does not constitute a declared key threatening process;
- Would not use explosives in a watercourse.

Therefore a licence is not required.

Noxious Weeds Act 1993

The purpose of the Noxious Weeds Act 1993 is to identify noxious weeds in respect of which particular control measures need to be taken, to specify those control measures, and to specify the duties of both public and private landholders with respect to the control of noxious weeds.

The proposed activity will include mitigation measures to reduce the potential spread of noxious weeds.

Water Management Act 2000

Local councils are exempt from s.91E(1) of the Act in relation to controlled activities that are carried out in waterfront land.

2.5 COMMONWEALTH LEGISLATION

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Under the EPBC Act 1999 activities that are likely to have a significant impact on matters of national environmental significance, actions undertaken on Commonwealth lands, or by the Commonwealth must be assessed and approved. The EPBC Act identifies matters of national environmental significance (MNES) as:

- world heritage properties;
- national heritage properties;
- Ramsar wetlands;
- nationally threatened species and communities;
- migratory species protected under international agreements;
- Commonwealth marine environment;
- Great Barrier Reef Marine Park;
- nuclear actions;
- protection of water resources from coal seam gas development and large coal mining development.

The results of the EPBC Protected Matters search of the study area, conducted on 8th May 2020, revealed the following MNES occur within a 10km radius of the study area:

- 3 listed threatened ecological communities;
- 64 threatened species;
- 53 listed migratory species.

These matters are discussed further in sections 5.2 and 5.3. The proposed activity IS NOT likely to have a significant impact on any matters of national environmental significance. The proposed activity is therefore not a controlled activity and does not require commonwealth referral.

3 Existing Environment

3.1 SOILS AND LANDFORM

The proposal area lies within the southern portion of the Sydney Basin, in a region characterised by Quaternary age sediments overlying Permian age geology. The regional geological domains for the proposal area comprise alluvium sediments associated with flood plains and the Berry Formation of the Shoalhaven Group.

The following soil landscapes descriptions are from GHD (2015), and originally sourced from the Kiama 1:100,000 Soil Landscape sheet and accompanying explanatory report.

Shoalhaven (fluvial)

Landscape: Level to gently undulating present river bed and banks, active floodplain with levees and backwater swamps on alluvium. Flat to undulating terrace surfaces of the Shoalhaven River. Relief less than 5 m and slopes less than 3%. Completely cleared.

Soils: Moderately deep prairie soils occur on levees. Red earths and yellow and red podzolic soils occur on terraces. Alluvial soils and gleyed podzolic (potential Acid Sulphate) soils occur on the floodplain. The Shoalhaven soil landscape includes four soil material unit / horizons (sf1 to sf4).

The limitations associated with the Shoalhaven Landscape group include flood hazards, seasonal waterlogging, permanently high water table, hard setting, Acid Sulphate potential, strongly acidic and moderate shrink-swell.

Nowra (depositional)

Landscape: Moderately to gently undulating rises to low hills on Nowra Sandstone. Relief greater than 40 m, slopes greater than 5%. Broad ridges and crests. Benched sandstone outcrops adjacent to drainage lines. Extensive to moderately cleared tall open-forest.

Soils: Moderately deep brown podzolic soils occur on crests and upper slopes. Soloths and / or yellow earths occur mid-slope. Yellow podzolic soils occur on lower slopes and drainage lines. The Nowra soil landscape includes seven soil material units / horizons (no1 to no7).

The limitations associated with the Nowra landscape group include run-on, rock outcrop (localised), shallow soil (localised), stoniness, hard setting, sodicity, low permeability, low wet bearing strength.

3.2 ACID SULFATE SOILS

There are Potential Acid Sulfate Soils (PASS) mapped along the proposed alignment- see Figure 3 in Appendix A. Left undisturbed, acid sulfate soils do not present any risk, however when they are exposed to air the iron sulphides they contain react with oxygen to create sulfuric acid. The acid makes metals in the soil, such as iron and aluminium more soluble.

The acid and released metals can have the following environmental impacts:

- Water quality impacts due to the release of acid and toxic metals into waterways;

- Killing aquatic life, particularly organisms that are immobile (such as oysters) and that live in sediment; and
- Reduce survival and growth rates of plants and animals and promote disease outbreaks, such as red-spot disease in fish.

As well as potential environmental impacts, acid sulfate soils can have impacts on most industries including recreational and commercial fishing, oyster growing and other aquaculture, cropping, grazing and dairying.

GHD (2015) identified the following sections of pipeline has having the potential to disturb actual or potential acid sulfate soils:

- For the section of the alignment starting at the intersection of Pleasant Way and extending approximately 430m towards the Nowra WWTP, there is a potential to disturb actual or potential acid sulphate soils at a depth of 2m or greater below the ground surface. Given that the depth of excavation for the NNSM construction will be in the order of 1m – 2m bgl, it is unlikely that Class 4 acid sulphate soils will be disturbed, however it must be considered as having the potential to occur;
- For the section of the pipeline alignment between 430 m east-southeast of the Princes Highway and Pleasant Way intersection and the Nowra WWTP (approximately 1.2 km), there is a potential to disturb actual or potential acid sulphate soils between depths of 1 m and 2 m below the ground's surface. Given that the depth of excavation for the NNSM construction will be in the order of 1m – 2m bgl, it is highly likely that acid sulphate soils will be disturbed and will require management and possible on-site neutralisation / treatment prior to re-use or off-site disposal.

3.3 POTENTIAL CONTAMINATION

GHD (2015) identified that the proposed alignment is located within a combination of previously disturbed ground (i.e. adjacent to built-up areas and adjacent to existing roadways) and land within land historically utilised for agricultural purposes (i.e. the land between the Princes Highway and the Nowra WWTP).

The source of fill within the road network is unknown and there is a potential to encounter contaminants which may have been introduced with the road base material during road construction. The section of the NNSM immediately adjacent to or within roadways such as the sections adjacent to Pleasant Way, Hawthorn Avenue, Lyrebird Drive and Moss Street / Terara Road, Nowra would therefore have a risk of encountering contaminants during excavation activities.

It is known that the existing NNSM and the twin 250mm diameter pipelines on the southbound Shoalhaven River Bridge are constructed from asbestos cement. In addition, the construction of the new pipeline will be undertaken in the immediate vicinity of the existing NNSM which is thought to contain asbestos cement pipeline. Furthermore, recently through site inspections along the proposed alignment, it became apparent that a property located to the immediate west of the Nowra WWTP contained stored / stockpiled asbestos waste. As a result, the property owner was order by Council to remove asbestos from the property and obtain an asbestos clearance certificate for the affected area.

Since 2015 when the REF was prepared by GHD, upgrade works undertaken by Shoalhaven Water at Nowra WWTP have required demolition of several assets onsite that contain asbestos materials. These materials are stored in an onsite encapsulation cell on the Nowra WWTP site.

The management and disposal requirements of potential contamination and expected finds of asbestos are detailed further Section 6- Waste Management.

3.4 WATER AND DRAINAGE

The proposal site is located on relatively flat land within the Shoalhaven River floodplain. The surrounding land use is predominantly rural/ agricultural with areas of medium to low density residential, minor commercial and road use.

The Shoalhaven River is a major waterway which rises in the Southern Tablelands of NSW and flows to through the coastal floodplains near Nowra to discharge into the Pacific Ocean near Culburra. In addition, the NNSM alignment intercepts two unnamed watercourses located towards the eastern end of the project, which both drain to Shoalhaven River.

3.5 FLORA AND FAUNA

3.5.1 Method of Assessment

As this is a desktop assessment only, methods for assessment included:

- Database searches:
    - OEH (2013) Compilation Map: Biometric vegetation types and endangered ecological communities of the Shoalhaven, Eurobodalla and Bega Valley local government areas;
    - OEH Threatened Species Profiles Database;
    - OEH NSW Bionet Atlas (10km buffer, accessed 8th May, 2020);
    - The EPBC Protected Matters Search Tool (10km buffer, accessed 8th May, 2020);
- Literature Review:
    - Review of Environmental Factors for North Nowra Surcharge Main Upgrade (GHD 2015);
- An assessment of likelihood of occurrence of threatened species based on previous records and information provided in the literature review;
- Test of Significance (under section 7.3 of the NSW *Biodiversity Conservation Act 2016*) for Green and Golden Bell Frog.

A list of threatened flora and fauna within the locality (10km buffer of the study area- see Figure 5, and Appendix B) was determined from the database searches detailed above. The list of subject species is determined from consideration of this list.

In order to adequately determine the relevant level of assessment to apply to potentially impacted species, analysis of the likelihood of those species occurring within the study area was completed.

Four categories for 'likelihood of occurrence' (Table 1) were attributed to species after consideration of criteria such as proximity of NSW Bionet Atlas records and presence or absence of important habitat features on the subject site (based on literature review). This process was completed on an individual species basis.

Species considered further in formal assessments of significance (BC Act, EPBC Act) legislation are those in the 'Known' or 'Potential' categories and where impacts for the species could reasonably be expected to occur from the proposed activity. Species listed as a 'low' or 'no' likelihood of occurrence are those for which there is limited or no habitat present within the study area.

Table 1 Likelihood of occurrence criteria

Likelihood Rating	Threatened flora criteria	Threatened fauna criteria
Known	The species was observed within the study area.	The species was observed within the study area during previous field surveys.
Potential	Potential habitat for a species occurs on the site. Adequate field survey would determine if there is a 'high' or 'low' likelihood of occurrence for the species within the study area.	Potential habitat for a species occurs on the site and the species may occasionally utilise that habitat. Species unlikely to be wholly dependent on the habitat present within the study area.
Low	It is unlikely that the species inhabits the study area.	It is unlikely that the species inhabits the study area. If present at the site the species would likely be a transient visitor. The site contains only very common habitat for this species which the species would not rely on for its ongoing local existence.
None/ Unlikely	The habitat within the study area is unsuitable for the species	The habitat within the study area is unsuitable for the species.

One threatened fauna species- the Green and Golden Bell Frog (*Litoria aurea*) which is listed as Endangered under the BC Act and Vulnerable under the EPBC Act, was considered to have a "high" likelihood of occurrence within the REF Study Area and to be potentially impacted by the proposed works. A Test of Significance under section 7.3 of the NSW *Biodiversity Conservation Act 2016* is provided in Appendix E, and concludes that the proposed replacement of the North Nowra Surcharge Main, and associated mitigation measures outlined in this REF, will not result in the removal or fragmentation of any known habitat for this species, and as such a Species Impact Statement is not required.

A Significant Impact Assessment for this species under the EPBC Act is not required as the proposed activity meets the criteria for 'prior authorisation' or 'continuing use' exemptions.

A GGBF Management Plan has been prepared and will be implemented to ensure potential impacts on this species are negligible (Appendix F).

3.5.2 Vegetation Communities

The Shoalhaven Biometric Vegetation Map (OEH 2013) does not identify the presence of any vegetation communities along the alignment of the proposed main- see Figure 4 in Appendix A.

However, a flora and fauna assessment conducted for the nearby REMS 1B project (GHD 2014) identified a single native vegetation type- *P105 Floodplain Swamp Forest* (from Tozer, 2010)- as occurring to the immediate south of the Shoalhaven River Bridge, on both the eastern and western sides of the Princes Highway. This vegetation type is commensurate with *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community*, listed under the BC Act.

No vegetation within the study area is consistent with any threatened ecological communities listed under the EPBC Act.

3.5.3 Threatened Flora

A total of 26 threatened flora species, as listed on the BC and/or EPBC Acts, were considered in this assessment (Appendix B).

As detailed in section 5.3.2, it is considered unlikely that any threatened flora species will be impacted by the proposed activity.

3.5.4 Threatened Fauna

A total of 106 threatened fauna species (73 birds, 22 mammals, 2 frogs, 6 reptiles and 3 Fish) have been recorded (NSW Bionet Atlas) or are predicted to have habitat (EPBC Act) within 10km of the study area (Appendix B). Of these species, one species is considered to have a high likelihood of occurring within the study area, thirteen species are considered to have a moderate likelihood of occurring in the study area, and the remainder were considered to have a low likelihood of occurring in the study area (see Appendix B). This is a conservative approach based on the limitations of a desktop assessment.

3.6 ABORIGINAL HERITAGE

In August 2014 Artefact Heritage Pty Ltd (Artefact Heritage) undertook a due diligence Aboriginal heritage assessment for the REMS 1B Project, including the proposed NNSM alignment (Transfer Main Option 2), meeting the requirements of the OEH 2010 Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (the Code of Practice), including recommendations as to whether further archaeological investigation may be required in relation to the proposal.

The assessment included an inspection of the study area on foot on 30 June and 1 July 2014 by Artefact Heritage representatives (Alexander Timms and Stacey Kenney) and Graham Smith, a representative of the Nowra Local Aboriginal Land Council (NLALC).

To ensure currency of the search results, a search of the Aboriginal Heritage Information Management System (AHIMS) conducted on 8th May 2020 revealed there are 20 Aboriginal sites and no Aboriginal places recorded in the vicinity of the study area. See Appendix C.

The proposed activity constitutes a low impact activity in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. This is because the proposed activity is maintenance of an existing utility on or under land that has been previously disturbed.

The National Parks and Wildlife Regulation 2009 (the Regulation), under Clause 80B describes defences of carrying out certain low impact activities:

(1) It is a defence to a prosecution for an offence under section 86(2) of the Act, if the defendant establishes that the act or omission concerned:

(a) was maintenance work of the following kind on land that has been disturbed: (i) maintenance of existing roads, fire and other trails and tracks, (ii) maintenance of existing utilities and other similar services (such as above or below ground electrical infrastructure, water or sewage pipelines).

The Regulation defines the following as “land that has been disturbed”:

(2) For the purpose of this clause, land is disturbed if it has been the subject of human activity that has changed the land surface, being changes that remain clear and observable.

Note: Examples of activities that may have disturbed land includes the following: (a) soil ploughing; (b) construction of rural infrastructure (such as dams and fences); (c) construction of roads, trails and tracks; (d) clearing of vegetation; (f) construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewage pipeline, storm water drainage, and other similar infrastructure; (h) construction of earth works associated with anything referred to in paragraphs (a)-(g).

As the proposed activity is considered a low impact activity, no further assessment is required.

3.7 NON-ABORIGINAL HERITAGE

GHD (2015) detailed results of multiple heritage database searches within approximately 200m of the proposal.

A search of the State Heritage Register was conducted on 8th May 2020 to ensure currency of the search results.

The following heritage-listed properties were identified:

- Site 1- Graham Lodge and Surrounds
- Site 5- Nowra Bridge over the Shoalhaven River
- Site 6- Inter-war Weatherboard building and timber wharf
- Site 12- Moss Cottage (Former Moss Central Hotel)
- Site 13- Former Numbaa Red Cedar Flood Boat and Captain Cook Bicentennial Memorial.

Construction and operation impacts of the proposed activity on these sites is outlined in section 5.7.

4 Consultation

Consultation requirements with other government authorities are specified by Part 2 Division 1 of the Infrastructure SEPP.

Shoalhaven Water should inform all local residents and businesses of the proposed activity, particularly affected residents and businesses in the immediate vicinity, and include information such as construction timeframe, work hours and any access arrangements.

A template for a community consultation letter is provided in Appendix D.

Other consultation requirements of the Infrastructure SEPP do not apply as the proposed activity:

- Would not impact local heritage items;
- Would not be undertaken adjacent to a marine park declared under the Marine Parks Act 1997;
- Would not be undertaken adjacent to an aquatic reserve declared under the Fisheries Management Act 19994;
- Would not be undertaken in the foreshore area within the meaning of the Sydney Harbour Foreshore Authority Act 1998;
- Does not comprise a fixed or floating structure in or over navigable waters.

5 Assessment of Environmental Impacts

In circumstances where development consent is not required, the environmental assessment provisions outlined in Part 5 (Environmental Assessment) of the EP&A Act are required to be complied with. Part 5 requires Council to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. As a minimum the following must be addressed:

- Section 7.3 of the *Biodiversity Conservation (BC) Act 2016*;
- Section 111 Matters of Consideration
- Clause 228 of the EP&A Regulation;
- Matters of NES under the *EPBC Act*.

5.1 SOILS AND LANDFORM

The following activities will involve ground disturbance:

- Pit excavation to the immediate north of the Shoalhaven River Bridge associated with the relining of an approximate 30 m section of existing NNSM.
- Trenching and excavation associated with the installation of the NNSM.
- Excavation and boring activities associated with the horizontal directional drilling of the NNSM under roads and watercourses, including the excavation of the launch and receival pits on either side of the section to be under-bored.
- General disturbance associated with spoil handling and the movement of heavy machinery.

As such, the potential environmental impacts associated with ground disturbance include:

- Erosion from spoil stockpiles and exposed surfaces and sediment transport from the immediate work area during construction, resulting in sedimentation of local waterways;
- Disturbance of actual and potential acid sulphate soils primarily from the excavation works associated with the installation of the NNSM. By exposing these soils to the air, there is the potential for the oxidation of these acid sulphate soils and the generation of acid soils and acid runoff to local waterways;
- Potential to encounter contaminated land, including asbestos waste;
- Accidental spills of fuels and oils from construction vehicles have the potential to contaminate soils at the construction site. In addition, incorrect wash-down of plant and machinery may result in additional soil contamination.

5.2 WATER AND DRAINAGE

There are several potential mechanisms by which the proposed works could impact on water quality. These include:

- Direct impact of water courses as a result of the construction activities.
- Sediment run-off from extracted soils on the site.
- Spillage of chemicals, oils or fuels from the site.
- Inappropriate wash-down of plant, equipment or concrete trucks/containers.
- Incorrect disposal of the contaminated water following flushing of the section of the existing NNSM to be 'Mothballed'.
- Contamination of groundwater.

GHD (2015) outlined that it is proposed to avoid direct impact on all of the watercourses by way of utilising the existing service ducts on the Shoalhaven River Bridge for the Shoalhaven River crossing, using under-bore techniques for the crossing of the watercourse to the immediate west of the Terara Road and Moss Street intersection, and the use of an aerial crossing for the waterway located immediately west of the Nowra WWTP.

Groundwater is unlikely to be impacted by the proposed works. Any groundwater intercepted during trenching activities would be re-introduced into the open trench at a location that is not going to impact the works.

Other potential impacts are described in Section 5.1.

5.3 FLORA AND FAUNA

5.3.1 Affected Endangered Ecological Communities (EECs)

There will be no impact on the two areas of identified Floodplain Swamp Forest located immediately south of the Shoalhaven River Bridge, as the existing NNSM alignment is to be utilised throughout this section, with associated proposal works being restricted to connection / crossover of the new NNSM to the existing NNSM at a location immediately south of the Shoalhaven River Bridge and also at the north eastern corner of the intersection between the Princes Highway and Pleasant Way.

Therefore the proposal is not considered to have a significant impact upon the Swamp Oak Floodplain Forest EEC.

5.3.2 Affected Threatened Flora

As discussed in Section 3.5.3, twenty six (26) species of threatened flora have been recorded within 10km of the study area. Without conducting field survey of the subject site it can not be determined with any certainty whether these species occur there. However, based on descriptions of available habitat, and lack of any threatened flora species identified in previous flora surveys (GHD 2015), it has therefore been assumed that the likelihood of occurrence for each of these species at the subject site is low (see Appendix B).

The proposal is largely located within existing disturbed areas that have been cleared in the past for agriculture, infrastructure and residential development. There is limited native vegetation within the

majority of the study area. The proposed alignment of the NNSM is to be located within the vicinity of the existing alignment and therefore vegetation clearance requirements are expected to be minimal. To avoid impacts on riparian vegetation, it is proposed to under-bore the section of the alignment at the point where it crosses the ephemeral drainage line immediately west of the Terara Road and Moss Street intersection.

Due to the nature of the proposed activity, and minimal impact to native vegetation at the subject site, the potential of these species to be impacted by the proposal is considered negligible. Therefore, threatened flora are not likely to be impacted by the proposal. As such, Tests of Significance under the BC Act and an address of Significant Impact Criteria (EPBC Act) are not required for threatened flora.

5.3.3 Affected Threatened Fauna

A total of 106 threatened fauna species (73 birds, 22 mammals, 2 frogs, 6 reptiles and 3 Fish) have been recorded within 10km of the REF study area.

Of these species:

- One threatened species, the Green and Golden Bell Frog ("Endangered" in NSW and "Vulnerable" in Commonwealth) is considered to have a HIGH likelihood of occurring in the vicinity of the proposed works. The majority of nearby records occur approximately 2.5km east-south east of the NNSM alignment near Brundee Swamp. Trenching activities near creeklines have the potential to directly impact the Green and Golden Bell Frog if present. Given the low mobility of this species, and the potential for direct impacts, a 'test of significance' is required under the NSW *Biodiversity Conservation Act 2016*, and is provided in Appendix E. The EPBC Act significant impact guidelines for this species consider that significant impact is possible if actions result in the removal or degradation of terrestrial habitat within 200 metres of known habitat. The project is short term and does not propose removal or modification of habitat. It also falls under the 'continuing use' exemption criteria for this assessment and therefore does not need to be referred to the Commonwealth.

- Two species of birds- the Spotted Harrier (*Circus assimilis*) and the Black Bittern (*Ixobrychus flavicollis*)- were previously recorded in the study area by GHD (2015) but were found to have a low potential to be impacted by the proposed activity due to the temporary nature of the works and small portion of potential habitat that is likely to be affected.

- Twelve threatened species (6 birds, 5 mammals and 1 fish) are considered to have a POSSIBLE likelihood of occurring in the vicinity of the proposed works as previous studies have described potential habitat within the study area. The potential for the proposed project to affect these species in any way is considered negligible due to lack of limiting breeding and/or foraging habitat for these species in the vicinity of the proposed works.

- Ninety-one threatened species (65 birds, 17 mammals, 1 frog, 6 reptiles and 2 fish) are considered to have a LOW likelihood of occurring in the vicinity of the proposed works as there is no suitable habitat within the REF study area. The potential for the proposed project to affect these species in any way is considered negligible due to lack of previous records and lack of limiting breeding and/or foraging habitat for these species in the vicinity of the proposed works.

This is a conservative rating due to the absence of field survey, hence the large number of species that have been assessed in Appendix B.

Developments can impact upon fauna in a number of ways. The significance of an impact would be greatest if any of the following situations occur:

- Death or injury of individuals
- Loss or disturbance of limiting foraging resources
- Loss or disturbance of limiting breeding resources.

Limiting resources are those that are of particular importance for the survival of a species.

All these species may have potential foraging habitat within the study area, however the habitat surrounding the study area is extensive and likely to provide similar habitat. It is therefore unlikely that the proposal will result in a significant loss of habitat or direct impact to any threatened fauna.

A Test of Significance (s7.3 of the BC Act) is provided in Appendix E. This assessment concluded that the proposal is not expected to have a significant impact upon this species, as long as the mitigation measures outlined in this REF are put in place. Therefore a Species Impact Statement is not required.

5.4 AIR AND ENERGY

According to GHD (2015) the major air quality implications associated with NNSM are related to dust generation from haulage and construction activities and vehicle emissions.

Dust emissions result from the disturbance of dry soils, especially fine-grained or heavily trafficked soils. Dust emissions are intermittent in nature and should not cause significant health or nuisance issues due to the limited extent of soil disturbance associated with the proposal.

Vehicle emissions will not contribute appreciably to surrounding pollutant levels as the anticipated vehicle movements typically make up a small proportion of existing movements on the regional road network. Excessive exhaust fumes may impact air quality as generated by poorly maintained plant and equipment.

There may be the potential for isolated odour events as a result of decommissioning of the existing surcharge main.

5.5 NOISE AND VIBRATION

Sensitive receivers were identified by GHD (2015) based on the type of landuse and proximity to the proposed works.

Construction works will be generally short-term, and is likely to be approximately three months in duration. The proposed work will involve the use of plant and equipment with the main ones including excavators, loaders, spoil haulage trucks, delivery trucks, boring machine and associated equipment and various hand-held power tools which will generate noise throughout the construction period. Noise from the work will be temporary along the length of the renewal (e.g. typical excavation rate is 40 m per day) so will only affect individual receivers for short periods of time.

Temporary construction compounds will be operational for the duration of the construction phase (approximately three months). For further details regarding construction compounds, refer to Section 2.3.1 In addition, there will be several smaller temporary compounds associated with the under-boring

activities. At this stage under-boring is expected to be utilised for the crossing of the ephemeral drainage line to the immediate west of the Moss Street and Terara Road intersection, in addition to the water canal located to the west of the Nowra WWTP site. There are also several road crossings (Pleasant Way, Hawthorn Avenue, Lyrebird Drive) that may utilise under-boring construction techniques, to be determined during the detailed design phase. If required, it is anticipated that these under-bore activities would last approximately one week for shorter drives (approximately 20 m – 30 m) and up to two weeks for the longer drives of up to 200 m. Work activities associated with these temporary compounds will be consistent with the remainder of the proposal with regards to noise and vibration generation and will be restricted to the standard construction hours.

It is anticipated that there will be no permanent noise impacts.

Vibration impacts are considered to be negligible for the proposed works.

Provided the appropriate mitigation measures and controls are implemented as per Section 6, it is anticipated that the potential impacts associated with noise and vibration will be negligible.

5.6 ABORIGINAL HERITAGE

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) was conducted by Artefact Heritage on 24 June 2014 for sites registered within a diameter of approximately 10 km from the study area. Within this search field, the nearest Aboriginal heritage site was a registered artefact located approximately 430 m to the east of the northern side of the Shoalhaven River Bridge. Several other registered artefact sites were also identified in the greater vicinity of the proposal, at a distance of greater than 500 m.

GHD (2015) found that no registered sites have the potential to be impacted by the proposed works. Mitigation measures are proposed for management of any unanticipated finds.

5.7 NON-ABORIGINAL HERITAGE

There is the potential for ground disturbance associated with the proposed activities, in particular open trench excavation for installation of the NNSM.

With regards to heritage sites 1 and 12 , including the family cemetery associated with site 1, the works in the vicinity of these heritage items will be restricted to the existing road corridor / road verge and will not encroach on the lot boundaries of the identified heritage items. It is not anticipated that proposed activities will have any long term impacts on the heritage significance of the overall streetscape associated with the heritage value of the residential settings given that any ground disturbance in the vicinity of the identified heritage items will be associated with installation of the NNSM which will be reinstated at the completion of the construction phase. There may be short term / temporary impacts on aesthetics / visual amenity associated with construction activities however these are expected to be minimal and will not impact upon the conservation significance of the listed items.

For heritage site 5, the heritage listed bridge is located to the immediate east of the more recently constructed Princes Highway Bridge, allocated for northbound traffic. The works associated with the NNSM crossing of the Shoalhaven River will utilise existing service ducts under the deck of the northbound bridge structure and will therefore not impact on the heritage listed southbound bridge. The works associated with the removal of the redundant twin 250 mm diameter asbestos pipelines located on the underside of the southbound Shoalhaven River Bridge will involve removal works only and are

not anticipated to impact on the appearance, structural integrity or the heritage significance of the bridge. All works on both the northbound and southbound Shoalhaven River Bridges will be undertaken in consultation with RMS and Shoalhaven City Council.

It is proposed to connect the new NNSM into the existing NNSM at a location immediately south of the Shoalhaven River Bridge, utilising the existing section of the NNSM from this point south to the intersection of the Princes Highway and Pleasant Way, Nowra. Therefore there will be no works in the vicinity of heritage sites 6 and 13 and with no impacts anticipated.

With the implementation of the environmental mitigation measures and controls detailed in Section 6, potential impacts of the proposed activity on items / places of non-Aboriginal heritage significance is expected to be negligible.

5.8 TRAFFIC, ACCESS AND PARKING

The road network providing access to the NNSM includes the Princes Highway, collector roads Moss Street and Terara Road, and local roads Lyrebird Drive, Hawthorn Avenue and Pleasant Way. Temporary access tracks will be used in areas inaccessible by roads.

Sections of the NNSM traverse through established residential areas with local sealed roads primarily used by vehicles to access local residential properties. Relatively low existing traffic movements are associated with Lyrebird Drive, Pleasant Way and Hawthorn Avenue. These local streets would generally have an increase in traffic during public and school holidays partially due to increased visitation to the Willows East Van Park and the Comfort Inn on Pleasant Way. Hawthorn Avenue is a connecting road to Wharf Road, which has access to a boat ramp and restaurant and would noticeably see an increase in traffic during public and school holidays. Moss Street and Terara Road are collector roads that will be used during the installation of the surcharge main and carry more vehicles per day than the local roads. The Princes Highway is a major arterial road carrying high volumes of traffic throughout the year. Sections inaccessible by roads will be accessed by temporary access tracks and would predominantly occur within areas away from residential properties.

For the works associated with the pipe installation from the Pleasant Way / Princes Highway intersection to the Nowra WWTP, these proposed works would result in traffic movements and works within the road reserve which have the potential to impact on operation of the road networks. The works could result in temporary impacts to traffic flow along local roads, loss of kerb side parking, and access restrictions to private properties.

Generally, the proposal site is associated with relatively quiet rural roads which will not be significantly impacted by temporary traffic, parking, and private property access restrictions.

It is anticipated that the construction of the proposal would generate vehicle movements associated with the following activities:

- Construction personnel travelling to and from the construction locations.
- Transportation of pipework, sand, concrete and other construction materials to the construction locations.
- Transportation of construction machinery and vehicles to and from the construction locations.
- Transportation of waste materials from the construction locations.

Works within the road reserves will have a temporary impact on road and pedestrian networks due to loss of kerb-side parking, potential temporary restricted access to private residences, and partial road closure and traffic control when the NNSM is required to cross roads. Where road crossings are needed directional drilling construction techniques will be considered in the detailed design phase, in order to minimise impact on local road networks. Traffic impacts are likely to be minor and temporary, and any short-term increase in traffic movements is unlikely to impact on the safe operation of the local road network.

If partial road closures are required for trenching operations, approval from Shoalhaven Council for local roads and / or RMS as required. Where the pipeline crosses the road, directional drilling will be utilised to minimise disruption to local traffic.

5.9 FLOODING

The long term flood impacts associated with the proposal are expected to be negligible. The proposal involves ground excavation and pipeline installation, with the ground level and disturbed area being returned a condition similar to that prior to construction and therefore not impacting on the current flood regime of the floodplain and river.

Therefore the identified flooding impacts associated with the proposal are those restricted to construction phase only. The proposal has the potential to impact on flooding associated with the Shoalhaven River as a result of temporary alteration to local runoff paths within the immediate vicinity of the trenching and under-boring activities. Associated risks are primarily those associated with the safety of site personnel and also the potential for inadvertent damage to plant and machinery in the event of site inundation.

With the implementation of the environmental mitigation measures and controls detailed in Section 6.9.3, potential impacts associated with flooding is expected to be negligible during both the construction and operational phase of the proposal.

5.10 CLAUSE 228(2) MATTERS OF CONSIDERATION

Clause 228 Matters of Consideration are outlined in Table 2.

Table 2 Consideration of Clause 228

Does the proposal:	Assessment	Reason
(a) Have any environmental impact on a community?	Positive	The proposed activity will replace the existing surcharge main and therefore reduce the potential for the existing main to fail and subsequent flow of wastewater into surrounding environments.
(b) Cause any transformation of a locality?	Negligible	There is expected to be a minor impact on the visual amenity of the site for the duration of construction. Following construction, the locality will benefit from the improved function of the surcharge main.
(c) Have any environmental impact on the ecosystem of the locality?	Negligible	The threatened species assessment provided in Section 5.3 concludes that the proposed activity would not have a significant impact upon endangered ecological communities or threatened fauna or flora.
(d) Cause a dimunition of the aesthetic, recreational, scientific or other environmental	Positive	The proposed activity will replace the existing main and therefore reduce the potential for the existing main to fail and subsequent flow of wastewater into surrounding environments

Does the proposal:	Assessment	Reason
quality or value of a locality?		
(e) Have any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	Negligible	With the implementation of the environmental mitigation measures and controls detailed in Section 6, potential impacts of the proposed activity on items / places of non-Aboriginal heritage significance is expected to be negligible The site is not within an Aboriginal Place declared under the National Parks and Wildlife Act 1974. In accordance with the NSW OEH Due Diligence Code of Practice, as the proposed activity is low impact, it is unlikely to disturb an Aboriginal object or place, and therefore does not require an Aboriginal Heritage Impact Permit.
(f) Have any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974)?	Negligible	The threatened species assessment provided in Section 5.3 concludes that the proposed activity will not have a significant impact on protected fauna or habitats.
(g) Cause any endangering of any species of animal, plant or other form of life whether living on land in water or in the air?	Negligible	The threatened species assessment provided in Section 5.3 concludes that the proposed activity will not have a significant impact on threatened fauna or habitats.
(h) Have any long term effects on the environment?	Negligible	The proposed activity will be short term and environmental mitigation measures will be put in place to prevent any effects on the environment.
(i) Cause any degradation of the quality of the environment?	Negligible	The proposed activity will be short term and environmental mitigation measures will be put in place to prevent any effects on the environment.
(j) Cause any risk to the safety of the environment?	Negligible	The proposed activity will be short term and environmental mitigation measures will be put in place to prevent any effects on the environment.
(k) Cause any reduction in the range of beneficial uses of the environment?	Positive	The proposed activity will improve the aesthetic value of the site.
(l) Cause any pollution of the environment?	Negligible	Mitigation measures outlined in Section 6 will reduce potential impacts to receiving environments.
(m) Have any environmental problems associated with the disposal of waste?	Negligible	Consideration will need to be given to the adequate disposal of acid sulfate soils and contaminated waste including asbestos materials.
(n) Cause any increased demand on resources (natural or otherwise) which are, or are likely to become, in short supply?	Negligible	The proposed activity would not lead to any increase demands on resources to an extent that they become in short supply.
(o) Have any cumulative environmental effect with other existing or likely future activities?	Negligible	There are no cumulative environmental effects associated with the proposed activity.

Does the proposal:	Assessment	Reason
(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	Negligible	The site of the proposed activity is within the coastal zone, however it is unlikely to have any impact on coastal processes.

5.11 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Under the EPBC Act, consideration of matters of national environmental significance (MNES) is required to determine whether the proposed activity should be referred to the Commonwealth Department of the Environment and Energy. Table 6 provides a summary of how MNES have been considered.

Table 3 Consideration of Matters of National Environmental Significance and Commonwealth Land

MNES	Potential Impacts
Any impact on a World Heritage property?	Nil, there are no World Heritage properties located in the vicinity of the proposed activity.
Any impact on a National heritage place?	Nil, there are no National heritage places located in the vicinity of the proposed activity.
Any impact on any wetlands of international importance?	Nil, there are no wetlands of international importance located in the vicinity of the proposed activity.
Any impact on a Commonwealth listed threatened species or ecological communities?	Nil, there are no impacts to Commonwealth listed threatened species or ecological communities.
Any impacts on a Commonwealth listed migratory species?	Nil, there are no impacts to migratory species.
Any impact on a Commonwealth marine area?	Nil, there are no impacts to marine areas.
Any impact on the Great Barrier Reef Marine Park?	Nil, the proposed activity is not within the Great Barrier Marine Park.
Does the proposed activity involve a nuclear action (including uranium mines)?	Nil, the proposed activity does not involve a nuclear action
Does the proposed activity involve a water resource, in relation to coal seam gas development and large coal mining development?	Nil, the proposed activity does not involve a water resource in relation to coal activities.
Is the proposed activity likely to have a significant impact on the environment on Commonwealth land?	Nil, there are no impacts to Commonwealth land.

6 Mitigation Measures

Potential Impact	Mitigation Measures
Erosion and Sedimentation	• An erosion and sedimentation (ERSED) control plan would be developed and incorporated into the CEMP for the works and would be prepared and implemented by the nominated contractor. The plan would include control measures outlined in this section and relevant guidelines including Managing urban stormwater: Soils and construction Volume 1 (Blue Book) 4th Edition (Landcom, 2006) and Managing Urban Stormwater – Soils and Construction Volume 2A Installation of Services (DECC, 2008). The plan would identify areas requiring management measures; include inspection frequencies and responsibilities and checklist sheets. • Sediment and erosion controls as per the ERSED control plan would be inspected weekly and after rainfall events (>10 mm in a 24 hour period) to ensure that they are suitably maintained, are in effective working order, and sediment would be cleared from behind barriers as required. In addition, the areas adjacent to the construction works would be inspected to determine if erosion attributed to the proposal is occurring. Records would be kept of these inspections. • Any discharge from the construction sites would comply with Section 120 of the Protection the Environment Operations Act 1997 (POEO Act) – Prohibition of pollution of waters. • During periods of heavy rainfall work should cease when there is a risk of sediment loss off-site or ground disturbance due to water logged conditions. • Where possible, topsoil would be removed and stockpiled for later reinstatement during the restoration phase of the works. • Where stockpiles of excess material awaiting removal from site are inactive for a period of greater than 1 week, they would be seeded or covered to reduce potential for erosion. • Vehicle and equipment movement would be confined to established designated roads. Where possible, vehicle movements are to utilise the footprint of the proposed access road alignments to avoid unnecessary ground disturbance. • Dust suppressant techniques, such as spraying exposed surfaces (stockpiles, dry material for haulage, and general areas) with water, would be undertaken as required to minimise dust generation. If dust suppression methods fail to manage the impacts and the dust generation is creating a safety or unacceptable nuisance hazard, works would be altered or ceased.
Contaminated Land and Spills	• The CEMP for the works is to detail management procedures for any disturbance to contaminated material that is encountered. The CEMP is also to detail the

Potential Impact	Mitigation Measures
	management of any unexpected finds of asbestos or the management of asbestos waste as a result of damage to the existing pipeline. All asbestos must be managed, handled and disposed of in accordance with NSW WorkCover Guidelines. • Any spoil to be removed from site is to be disposed of at an appropriately licensed waste management facility and is to be managed in accordance with the EPA Waste Classification Guidelines (EPA, 2014). • An incident emergency spill plan would be developed and incorporated into the construction environmental management plan. The plan would include measures to avoid and manage spillages of fuels, chemicals, and fluids onto any surfaces and an emergency response procedure. • Should a spill occur during construction, the emergency response plan would be implemented, and the Shoalhaven Water Environmental Officer contacted. The EPA would also be notified as required in accordance with Part 5.7 of the POEO Act. • Vehicle wash downs and/or concrete truck washouts would be undertaken within a designated bunded area of an impervious surface or undertaken off-site. • Machinery would be checked daily to ensure there are no oils, fuels or other liquids leaking from the machinery. • All fuels, chemicals, and liquids would be stored within an impervious bunded area within the compound site. • The refuelling of plant and maintenance of machinery would be undertaken offsite or in impervious bunded areas in the compound area. • The management and disposal requirements of potential contamination and expected finds of asbestos are detailed further Section 6.11 – Waste management.
Acid Sulfate Soils	• Due to the possible presence and likely disturbance required of ASS or potential ASS (PASS) associated with general civil works for the construction of the NNSM, an ASS management plan is to be prepared and included as a sub-plan to the CEMP, and would be implemented to minimise possible environmental impacts from excavation works. • The ASS management plan would be prepared in accordance with the Acid Sulfate Soils Management Advisory Committee (ASSMAC) guidelines and would include the following details as a minimum: - The extent and characteristics of ASS/PASS in areas to be excavated (to be determined prior to the commencement of construction works). This would also include suitable liming application rates required to neutralise the material (if required). - ASS excavated during construction would be managed by neutralisation and disposal/reuse on site. - Excavation would be done in stages, with the excavated material treated and stockpiled in a bunded area. - All material excavated would be transported to the

Potential Impact	Mitigation Measures
	specified remediation area and stockpiled for treatment and containment. - Preparation of the remediation area would involve the construction of bunded treatment pads. To prevent acid leaching to the subsurface, all stockpiles in the remediation area must be placed on treatment pads. - All associated chemicals (e.g. agricultural lime) required for the treatment of ASS would be managed appropriately. - The transportation of untreated ASS/PASS off site would be implemented as a last resort only. Should off-site transportation of untreated ASS/PASS be required, the transporting vehicles would be covered and sealed to prevent the loss of soil or acidic water during transportation. - A monitoring program suitable for the level of environmental risk and the objectives of the mitigation measures would be followed.
Water and Drainage	• The construction contractor appointed for the works associated with the removal and installation of pipelines from under the northbound and southbound Shoalhaven River bridges are to include mitigation measures in their CEMP for the control and management of asbestos and asbestos fragments. In addition, the CEMP is to include water pollution control measures for waterborne craft to ensure fuels and / or oils are not released into the waterway. As a minimum these are to include regular maintenance of the watercraft and daily inspections. • The existing NNSM pipeline to be removed from the underside of the northbound Shoalhaven River Bridge is to be flushed with fresh water prior to removal, to avoid the inadvertent deposition of sewage or sewage debris into the Shoalhaven River. • Standard erosion and sedimentation controls are to be implemented down-gradient of the discharge water to ensure energy dissipation is achieved and erosion / sedimentation is minimised. • Shoalhaven Water and its Contractors are required to comply with environmental legislation and regulations, and in accordance with the POEO Act, would inform the appropriate regulatory authority of any pollution incident that may result in material harm to the environment. • Disposal of all water associated with the flushing of the section of the NNSM to be 'Mothballed' is to be collected (if required) and discharged / treated through the Nowra WWTP as part of normal operations. • All site personnel would undertake a site induction prior to commencement of work on site, and this would include awareness of relevant legislation and associated penalties for water pollution, and an awareness of environmental controls for surface water management and the importance of maintaining and managing the controls. • It is Shoalhaven Water's policy that Shoalhaven Water be notified of any pollution incident that may result in material harm to the environment so that appropriate actions, investigations and preventative measures are

Potential Impact	Mitigation Measures
	implemented. • If minor groundwater ingress occurs during construction it can be managed through pumping to an alternate section of the open excavation, which would be considered to still be a part of the groundwater system. • Any groundwater that cannot be managed within the existing excavation area would be collected and disposed of to a licenced liquid waste facility. There would be no disposal to the stormwater system associated with the proposed works.
Flora and fauna impacts: (i) Aquatic Habitat	• Contractor to prepare and Aquatic Management Subplan as part of the CEMP to outline procedures to minimise impacts upon aquatic habitat within the Shoalhaven River and will include the following measures: - Clearing riparian vegetation would be avoided; - Checking machinery daily to ensure there are no oil, fuel or other liquids leaking; - Developing contingency plans to deal with spills which might occur during works; - Storing chemicals or fuels on site in accordance with relevant Australian Standards and Material Data sheets; - Minimising the need for operating heavy machinery immediately adjacent to waterways where practicable and avoiding disturbance of surrounding banks by machinery and other plant and equipment; - No mooring or anchoring of barge or construction equipment above sea-grass beds on the Shoalhaven River; - If disturbance to sea-grass beds cannot be avoided, consultation with NSW Fisheries would be undertaken prior to the works to determine the need for a Section 205 permit under the Fisheries Management Act.
(ii) Vegetation management	• Measures would be undertaken to control the spread of weed species and ensure appropriate disposal of any removed propagules or weed material. The following measures would be included in the CEMP to mitigate impacts on native vegetation adjoining the easement as far as practical: - Communicating with site personnel to inform them of the conservation value of surrounding habitats (namely EEC vegetation and riparian zones) and their responsibilities with regards to protecting these habitats during all works. - Washing all plant and machinery prior to work in areas of native vegetation to minimise the potential spread of plant diseases. - Retaining large trees (including mature planted street trees) where practicable within design constraints. - Clearly marking or fencing mapped threatened ecological communities as 'no-go' areas. Temporary barriers would be erected around the perimeter of work areas in these

Potential Impact	Mitigation Measures
	locations. The barriers would be erected prior to clearing activities commencing and would be maintained for the duration of works at these locations where practical
(iii) Fauna Management	• The following mitigation measures would be implemented during construction to minimise impacts on fauna where practicable: - Implementing protocols to prevent introduction or spread of diseases. - Developing measures to reduce the potential for fauna to become trapped or injured in trenches. - Protocols would be developed to deal with the removal of injured or dangerous animals (e.g. snakes). Rescue and relocation of any fauna species would be undertaken by a suitably qualified ecologist or Wildlife Information Rescue and Education Service (WIRES).
Air Quality	• An air quality management plan will be prepared as part of the Construction EMP and include the following measures to minimise the impact of emissions during construction: *Dust Management* - Roads will be monitored and cleaned as required by street sweepers. - Stockpiles and handling areas will be maintained in a condition which minimises windblown or traffic generated dust. - Operations will be conducted with regards to prevailing meteorological conditions. - Silt will be removed from behind filter fences and other erosion control structures on a regular basis, so that collected silt did not become a source of dust. - The extent of exposed surface areas through excavation activities and the like would be minimised wherever possible. - All trucks hauling dirt, sand, soil or other loose materials to and from the construction site would be covered when driving on public roads. - Stabilisation of disturbed surfaces within the construction compound site would be undertaken as soon as practicable following the completion of works. Soil surfaces would be covered with mulches or cover crops to stabilise soil. *Emission Management* - All construction vehicles, mobile plant and machinery would be maintained and operated in accordance with the manufacturers' specifications to minimise exhaust emissions. - All equipment for dust control will be kept in good operating condition. Construction equipment will be properly maintained to ensure exhaust emissions comply with the relevant legislation. - Unused equipment would be shut down or the engine load

Potential Impact	Mitigation Measures
	reduced in order to reduce exhaust emissions. - The burning of vegetation on site is prohibited.
Noise and Vibration	• The Interim Construction Noise Guidelines (DECCW, 2009) and the Industrial Noise Policy (EPA, 2000) noise criteria would be adhered to. • Construction activities would be limited to the standard construction hours. • All construction plant on site would be maintained in accordance with manufacturer's requirements and, where applicable, fitted with suitable noise suppressing equipment to limit engine noise emissions. • Plant items would be shut down or at least throttled down where possible when not in use. This would minimise prolonged periods of engine idling. • Vehicle movements and speeds would be minimised to limit noise emissions. • Reversing alarm noise emissions would be minimised, but would achieve occupational health and safety requirements (consideration is to be given to the use of non-tonal reversing alarms). • Potentially affected residents would be contacted prior to the commencement of works and would be informed of the proposed works, working hours, and the period of construction. Residents would also be provided with a contact name and number should they wish to register a complaint or discuss any queries. • Any complaints relating to environmental noise emissions would be investigated and responded to with a suitable approach.
Aboriginal heritage impacts: • Potential disturbance of unforeseen Aboriginal objects or items of Aboriginal heritage significance	• The site induction is to include awareness of the importance of the protection and preservation of items and places of Aboriginal heritage significance. It is an offence under the National Parks and Wildlife Act 1974 (as amended 2010) to disturb or destroy an Aboriginal object without an Aboriginal Heritage Impact Permit. • If unforeseen Aboriginal objects are uncovered during development, or items or places suspected of being of Aboriginal heritage significance, work should cease and Shoalhaven City Council notified. In consultation with Council, an archaeologist, the OEH and the NLALC should also be contacted for further direction prior to recommencement of construction activities. If human remains are found, work should cease, the site should be secured and the NSW Police and the OEH should be notified. • If human remains are found, work would cease, the site would be secured and the NSW Police and Shoalhaven Water would be notified. • If changes are made to the development proposal that may result in impacts to areas not covered by this assessment, further archaeological assessment will be required.

Potential Impact	Mitigation Measures
Non-Aboriginal Heritage	• Construction activities, including site access and ancillary activities are to remain within the designated construction footprint only, particularly when working in the vicinity of heritage items 1 and 12 • Any works to be undertaken on the northbound and southbound Shoalhaven River bridges are to be undertaken in consultation with RMS and Shoalhaven City Council. • If any non-Aboriginal items are discovered during the works, or suspected items of non-Aboriginal heritage significance, then works in the immediate area should stop immediately and the Shoalhaven City Council contacted to advise of management measures prior to recommencing works in the vicinity. • The location and significance of any heritage items are to be clearly identified in the construction contractor's CEMP. • Site personnel are to be made aware of the heritage items 1 and 12 (refer to Table 6-7). Access arrangements and any ancillary activities (i.e. stockpiling, amenity locations, laydown etc.) are to remain outside of the boundaries of these items.
Traffic, Access and Parking	• A traffic management plan would be prepared by the construction contractor and approved by Council prior to the commencement of the construction phase. • The construction management plan is to include reference to any required approvals and permits (Council and RMS) required to be obtained prior to works, including any approvals associated with the temporary mooring or navigation of the floating work platform / barge if required. • Establishment and use of the temporary construction compound associated with the Shoalhaven River works is to be located to ensure that access to any boat ramp is not impeded and reduction in available car / trailer parking spaces is minimised. • Residents and other stakeholders would be notified and consulted where appropriate to minimise the temporary impacts on access and amenity. • Appropriate signs would be erected to inform public traffic of the construction activities in the area. • Driveways would be under-bored where feasible, and residents consulted to ensure no loss of right-of-way during construction. • Work vehicles would be confined to established designated roads, and generally would not obstruct the roadway or restrict access to any private driveways. • Public roads would be cleaned of dirt from construction works daily and/or as required.
Flooding	• The site induction is to include awareness of the potential for flooding in the area and the relevant measures and controls to be implemented. • Weather forecasts are to be monitored during construction

Potential Impact	Mitigation Measures
	to provide a look-ahead with regard to predicted rainfall. • Storage of plant and materials away from major drainage lines and ensuring that any existing drainage lines or drains remain open at all times. • In the event of forecast heavy rain, plant and machinery are to be removed from potential flood affected areas and relocated to an area not likely to be impacted by flood water.
Waste Management	• The CEMP for the works is to detail management procedures for any disturbance to contaminated material that is encountered. The CEMP is also to detail the management of any unexpected finds of asbestos or the management of asbestos waste as a result of damage to the existing pipeline. • All asbestos must be managed, handled and disposed of in accordance with NSW WorkCover Guidelines, including the preparation and implementation of an Asbestos Management Plan if required. • As part of the CEMP, the construction contractor is to consult with Shoalhaven Water to ensure that all asbestos management requirements are identified and implemented as part of the construction mitigation measures. • The removal of the asbestos pipelines will need to be undertaken by a licensed asbestos removal contractor (in accordance with NSW WorkCover requirements), ensuring that asbestos management, handling and disposal is undertaken in accordance the NSW WorkCover guidelines. This includes the correct labelling and containment of asbestos waste in accordance with the Globally Harmonised System of Classification and Labelling of Chemicals, Fourth Revised Edition (United Nations, 2011). • Personal protective equipment (PPE) that has been in contact with asbestos must be sealed in a container before being removed and disposed of at an authorised site or laundered at a laundry equipped to deal with asbestos contaminated clothing. • Provide, operate and maintain adequate facilities for the collection, transportation and disposal of liquid wastes including portable toilet wastes, fuels, lubricants, oils and greases. • Construction waste would be recycled and/or reused on site where possible. Any construction waste requiring removal from site would be disposed of at an approved recycling facility or licensed landfill in accordance with the waste classification guidelines (EPA, 2014). • Any suitable clean road base material or similar will be re-used on site where practicable, providing it is reinstated in the same location and horizon from which it originated. If any such material is suspected to be contaminated (through visual or odour detection), the material is to be removed from site and disposed of in accordance with the EPA Waste Classification Guidelines (EPA, 2014). • Reuse of Virgin Excavated Natural Materials (VENM) will

Potential Impact	Mitigation Measures
	be maximised on site and where possible will be used to backfill trenches and pits as required. Any other excavated material, not deemed to be VENM, cannot be reused on site and would be required to be disposed of off site at a suitably licensed waste management facility in accordance with the EPA Waste Classification Guidelines (EPA, 2014). • All work areas would be maintained, kept free of rubbish and cleaned up at the end of each working day. Waste materials would be removed from the site as required, particularly food items and other general waste. • Adequate bins with lids that prevent wind-blown litter and exclude pest and native animal scavenging would be provided on site. • Burning or incineration of waste would not be permitted on site at any time. • All waste residues (concrete slurries etc.) would be washed out at an approved facility (not on site) and disposed of appropriately. • Washout of any concrete trucks would be undertaken in a designated concrete wash-out bay and the accumulated concrete waste (including waste water) would be removed and disposed of off-site at completion of the works in accordance with the waste classification guidelines (EPA, 2014). • All drilling fluids / muds required for the under-boring activities would be recycled where possible. Any excess material or material not suitable for recycling / reuse on site would be disposed of in accordance with the waste classification guidelines.

7 Conclusion

The proposed activity will reduce the risk of failure of key assets that deliver wastewater from North Nowra to Nowra Wastewater Treatment Plant.

The proposed activity is unlikely to have a significant impact on the environment for the following reasons:

- An assessment of the statutory matters of consideration reveals no potential adverse impacts.
- All identified potential impacts are addressed by the proposed mitigation measures;
- The assessments conducted under Section 7.3 of the *NSW Biodiversity Conservation Act 2016* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 2000* indicate that the proposed activity is unlikely to have a significant effect on threatened species, populations or ecological communities.

8 Determination

This Review of Environmental Factors has assessed the likely environmental impacts of a proposal by Shoalhaven City Council (Shoalhaven Water) for the replacement of North Nowra Surcharge Main, as illustrated in Figure 2.

Shoalhaven City Council has considered the potential environmental effects of the proposal and the effectiveness and feasibility of measures for reducing or preventing detrimental effects. It is determined that:

1. The proposed mitigation measures will be adopted and implemented;
2. Implementation of these mitigation measures will reduce the potential environmental impact of the proposed activity;
3. An Environmental Impact Statement is not required for the proposed works if all mitigation measures in this REF are implemented by Shoalhaven City Council.

Robert Horner
Acting Director
Shoalhaven Water - Shoalhaven City Council, Date:

This REF has been prepared by:

Dr Emma McIntyre
Senior Environmental Scientist
Environmental Mapping and Planning (EMAP) Consulting, Date : 22nd May 2020

References

DoEE (2018) Protected Matters Search Tool. Department of the Environment and Energy, Australian Government, Canberra. Accessed April 2020.

EMAP Consulting (2018) Review of Environmental Factors for Proposed Replacement of Surcharge Mains in Nowra.

GHD (2015) Review of Environmental Factors for North Nowra Surcharge Main.

OEH (2018). BioNet Atlas of NSW Wildlife. Office of Environment and Heritage, Sydney. Accessed April 2020.

OEH (2013) Compilation map: Biometric vegetation types and endangered ecological communities of the Shoalhaven, Eurobodalla & Bega Valley local government areas. A living map. Version 2.0. Technical Report. NSW Office of Environment & Heritage, Queanbeyan.

RMS (2018) Nowra Bridge Project Review of Environmental Factors. NSW Roads and Maritime Services, August 2018.

Shoalhaven City Council's State of the Environment Web Mapping. Available from: http://maps2.shoalhaven.nsw.gov.au/soemaps/

Appendix A:

FIGURES

Figure 1

North Nowra Surcharge Main REF Addendum

Location

Proposed Surcharge Main

REF Study Area

Coordinate System: GDA 1994 MGA Zone 56
Created by EMAP Consulting on 8/05/2020 for Shoalhaven Water

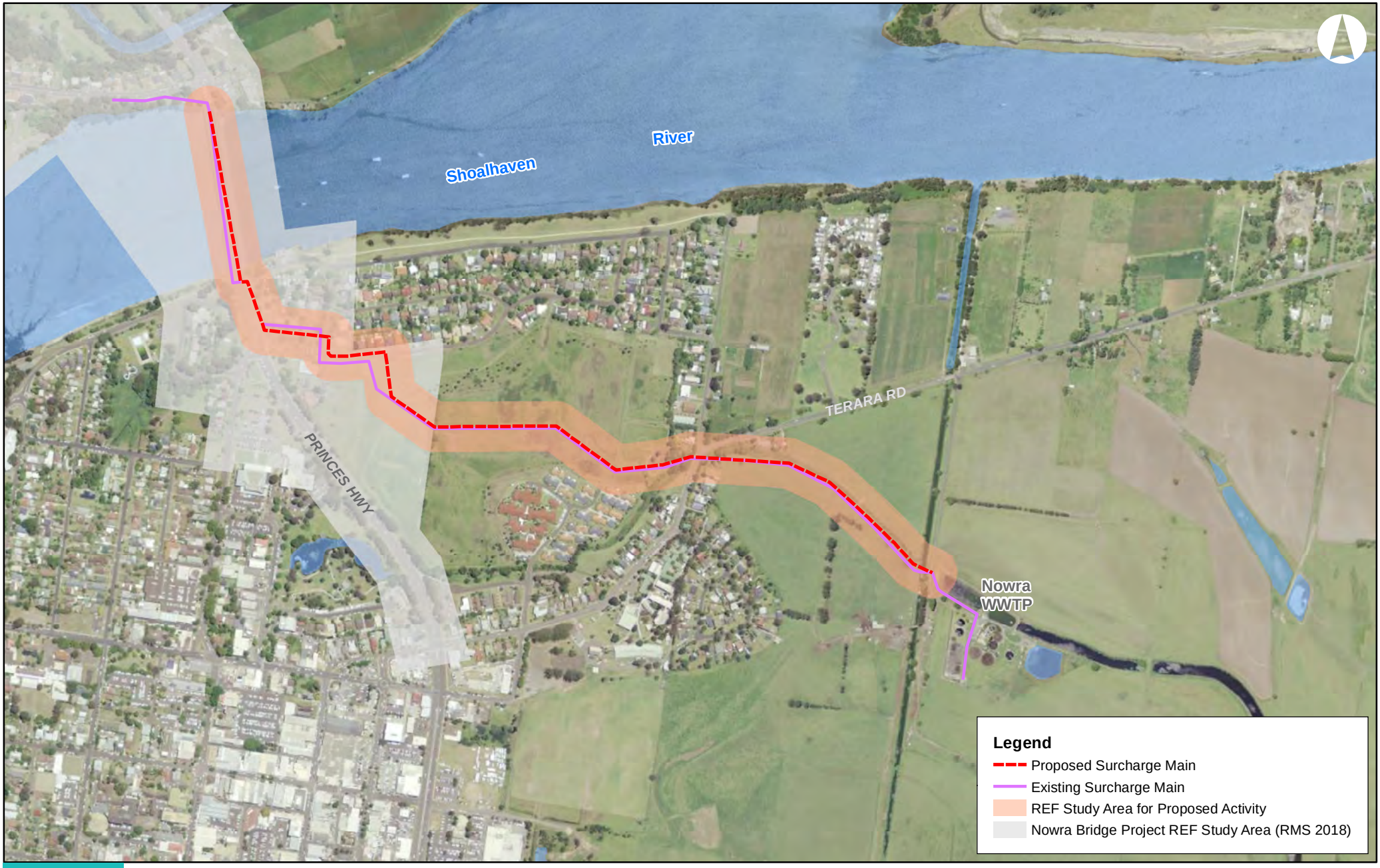


Figure 2

North Nowra Surcharge Main REF Addendum

Study Area

Coordinate System: GDA 1994 MGA Zone 56
Created by EMAP Consulting on 22/05/2020 for Shoalhaven Water

0 250 500
Metres

emapconsulting

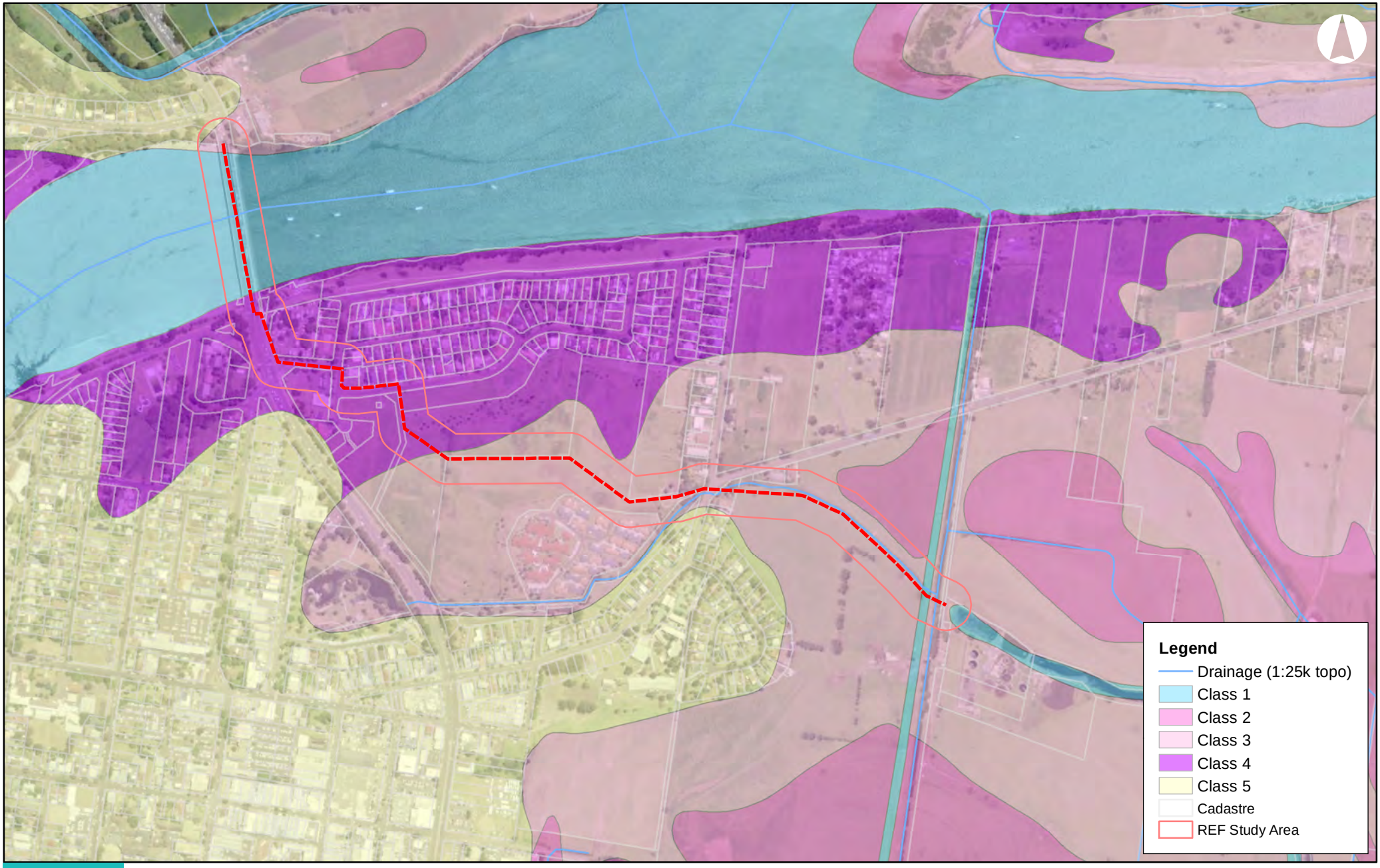


Figure 3

North Nowra Surcharge Main REF Addendum

Potential Acid Sulfate Soils

0 250 500
Metres

Coordinate System: GDA 1994 MGA Zone 56
Created by EMAP Consulting on 8/05/2020 for Shoalhaven Water

emapconsulting

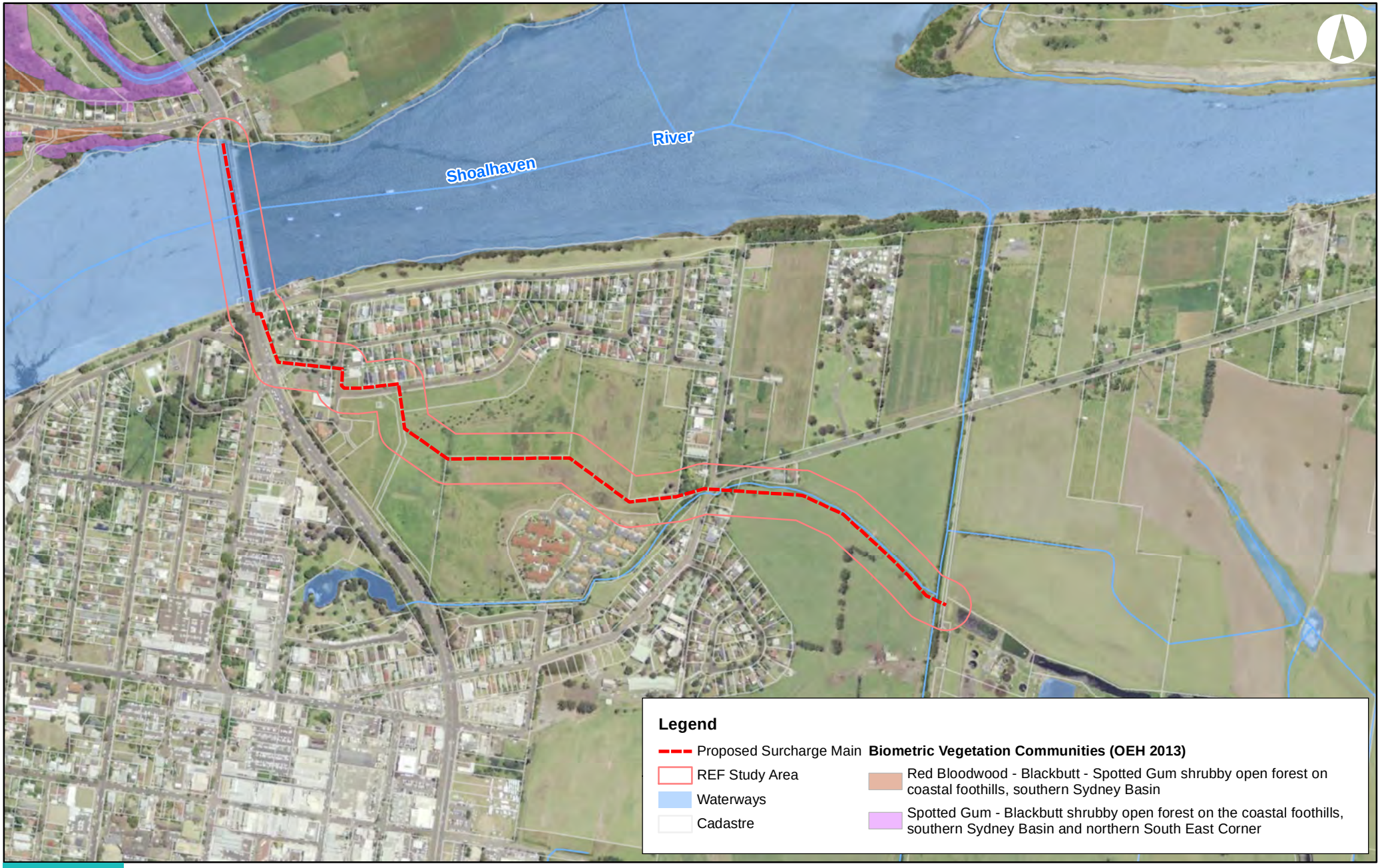


Figure 4

North Nowra Surcharge Main REF Addendum

Vegetation Communities

Coordinate System: GDA 1994 MGA Zone 56
Created by EMAP Consulting on 8/05/2020 for Shoalhaven Water

0 250 500
Metres

emapconsulting

Figure 5

North Nowra Surcharge Main REF Addendum

Threatened Species Records

Coordinate System: GDA 1994 MGA Zone 56
Created by EMAP Consulting on 8/05/2020 for Shoalhaven Water

0 250 500
Metres

emapconsulting

Appendix B:

THREATENED SPECIES TABLES

Impact Assessment of Threatened Flora Species

(CE = Critically Endangered, E = Endangered, V = Vulnerable)

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Potential to be affected by proposal
Acacia bynoeana	Bynoe's Wattle	E	V	Low	Negligible Impacts
Acacia pubescens	Downy Wattle	V	V	Low	Negligible Impacts
Caladenia tessellata	Thick-lipped Spider-orchid	E	V	Low	Negligible Impacts
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Low	Negligible Impacts
Eucalyptus langleyi	Albatross Mallee	E	V	Low	Negligible Impacts
Genoplesium baueri	Bauer's Midge Orchid	E	E	Low	Negligible Impacts
Haloragis exalata subsp. exalata	Wingless Raspwort	V	V	Low	Negligible Impacts
Hibbertia puberula	-	E	-	Low	Negligible Impacts
Hibbertia stricta subsp. furcatula	-	E	-	Low	Negligible Impacts
Lastreopsis hispida	Bristly Shield Fern	E	-	Low	Negligible Impacts
Melaleuca biconvexa	Biconvex Paperbark	V	V	Low	Negligible Impacts
Melaleuca deanei	Deane's Paperbark	V	V	Low	Negligible Impacts
Persicaria elatior	Knotweed	V	V	Low	Negligible Impacts
Pterostylis gibbosa	Illawarra Greenhood	E	E	Low	Negligible Impacts
Pterostylis pulchella	Waterfall Greenhood	V	V	Low	Negligible Impacts
Pterostylis ventricosa		E	-	Low	Negligible Impacts
Pterostylis vernalis	Halbury Rustyhood	E	CE	Low	Negligible Impacts
Rhodamnia rubescens	Scrub Turpentine	E	-	Low	Negligible Impacts
Solanum celatum		E	-	Low	Negligible Impacts
Syzygium paniculatum	Magenta Lilly Pilly	E	V	Low	Negligible Impacts
Thelymitra kngaloonica	Kangaloon Sun Orchid	CE	CE	Low	Negligible Impacts
Thesium australe	Austral Toadflax	V	V	Low	Negligible Impacts
Triplarina nowraensis	Nowra Heath Myrtle	E	E	Low	Negligible Impacts
Xerochrysum palustre	Swamp Everlasting		V	Low	Negligible Impacts
Zieria baeuerlenii	Bomaderry Zieria	E	E	Low	Negligible Impacts
Zieria tuberculata	Warty Zieria	V	V	Low	Negligible Impacts

Impact Assessment of Threatened Fauna Species

(CE = Critically Endangered, E = Endangered, V = Vulnerable, P = Protected, M = Migratory)

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Potential to be affected by proposal
BIRDS					
Anthochaera phrygia	Regent Honeyeater	E	CE	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Apus pacificus	Fork-tailed Swift	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Ardea ibis	Cattle Egret	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Ardenna pacificus	Wedge-tailed Shearwater	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Ardenna tenuirostris	Short-tailed Shearwater	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Botaurus poiciloptilus	Australasian Bittern	E	E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Burhinus grallarius	Bush Stone-curlew	E	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Calidris acuminata	Sharp-tailed Sandpiper	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Calidris ferruginea	Curlew Sandpiper	E	CE,M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Calidris melanotos	Pectoral Sandpiper	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Calidris tenuirostris	Great Knot	V	CE,M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Charadrius leschenaultii	Greater Sand Plover	V	V,M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Charadrius	Lesser Sand	V	E,M	Low	Negligible impacts.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Potential to be affected by proposal
mongolus	Plover				No limiting foraging or breeding habitat within the study area.
Circus assimilis	Spotted Harrier	V	-	Known – one individual recorded by GHD foraging in the study area	Low- proposal would temporarily impact habitat for prey species in very localised areas. Impact would make up a negligible portion of the individual's home range.
Daphoenositta chrysoptera	Varied Sittella	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Dasyornis brachypterus	Eastern Bristlebird	E	E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Diomedea antipodensis	Antipodean Albatross	V	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Diomedea antipodensis gibsoni	Gibson's Albatross	V	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Diomedea epomophora	Southern Royal Albatross	-	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Diomedea exulans	Wandering Albatross	E	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Diomedea sanfordi	Northern Royal Albatross	-	E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Epthianura albifrons	White-fronted Chat	V	-	Possible	Low- temporary impacts of trenching unlikely to impact the foraging habitat of the species.
Esacus magnirostris	Beach Stone-curlew	CE	-	Possible	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Falco subniger	Black Falcon	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Gallinago hardwickii	Latham's Snipe	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Gelochelidon nilotica	Gull-billed Tern	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Glossopsitta pusilla	Little Lorikeet	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Grantiella picta	Painted Honeyeater	V	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Potential to be affected by proposal
Haematopus longirostris	Pied Oystercatcher	E	-	Possible	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Hieraaetus morphnoides	Little Eagle	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Hirundapus caudacutus	White-throated Needletail	P	V,M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Hydroprogne caspia	Caspian Tern	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Ixobrychus flavicollis	Black Bittern	V	-	Known- recorded by GHD at Bomaderry Creek next to the old rail bridge.	Low- no impact on dense riparian vegetation. Indirect impacts on creeks likely to be minimal.
Limnodromus semipalmatus	Asian Dowitcher	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Limosa lapponica baueri	Bar-tailed Godwit	P	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Limosa lapponica menzbieri	Bar-tailed Godwit	P	CE	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Limosa limosa	Black-tailed Godwit	V	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Lophoictinia isura	Square-tailed Kite	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Macronectes giganteus	Southern Giant Petrel	E	E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Macronectes halli	Northern Giant Petrel	V	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Merops ornatus	Rainbow Bee-eater	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Neophema chrysogaster	Orange-bellied Parrot	CE	CE	Possible	Low- temporary impact of trenching unlikely to impact the foraging habitat of the species.
Neophema pulchella	Turquoise Parrot	V	-	Low	Negligible impacts. No limiting foraging or breeding

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Potential to be affected by proposal
					habitat within the study area.
Ninox strenua	Powerful Owl	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Numenius madagascariensis	Eastern Curlew	P	CE,M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Numenius phaeopus	Whimbrel	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Pachycephala olivacea	Olive Whistler	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Pachyptila turtur subantarctica	Fairy Prion (southern)	-	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Pandion cristatus	Eastern Osprey	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Petroica boodang	Scarlet Robin	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Petroica phoenicea	Flame Robin	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Petroica rodinogaster	Pink Robin	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Plegadis falcinellus	Glossy Ibis	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Rostratula australis	Australian Painted Snipe	E	E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Sterna hirundo	Common Tern	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Stictonetta naevosa	Freckled Duck	V	-	Possible	Low- Foraging habitat is not located in core habitat area. Study area represents a negligible portion of potential habitat for the species.
Thalassarche bulleri	Buller's Albatross	-	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Thalassarche bulleri platei	Northern Buller's Albatross	-	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Thalassarche cauta cauta	Shy Albatross	V	V	Low	Negligible impacts. No limiting foraging or breeding

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Potential to be affected by proposal
					habitat within the study area.
Thalassarche cauta steadi	White-capped Albatross	-	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Thalassarche eremita	Chatham Albatross	-	E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Thalassarche impavida	Campbell Albatross	-	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Thalassarche melanophris	Black-browed Albatross	-	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Thalassarche salvini	Salvin's Albatross	-	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Thinornis rubricollis	Hooded Plover	E	V	Possible	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Tringa nebularia	Common Greenshank	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Tringa stagnatilis	Marsh Sandpiper	P	M	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Tyto novaehollandiae	Masked Owl	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Tyto tenebricosa	Sooty Owl	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Common Name	**Scientific Name**	**BC Act Status**	**EPBC Act Status**	**Likelihood of Occurrence**	**Potential to be affected by proposal**
MAMMALS					
Arctocephalus pusillus doriferus	Australian Fur-seal	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Cercartetus nanus	Eastern Pygmy-possum	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Dugong dugon	Dugong	E	-	Low	Negligible impacts. No limiting foraging or breeding

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Potential to be affected by proposal
					habitat within the study area.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Possible	Low- proposal would remove a negligible area of foraging habitat for this species.
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E	E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Macropus parma	Parma Wallaby	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Miniopterus australis	Little Bent-winged Bat	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Myotis macropus	Southern Myotis	V	-	Possible	Low- proposal would remove a negligible area of foraging habitat for this species.
Petauroides volans	Greater Glider	P	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Petaurus australis	Yellow-bellied Glider	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Petaurus norfolcensis	Squirrel Glider	V	-	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Phascolarctos cinereus	Koala	V	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Potorous tridactylus	Long-nosed Potoroo	V	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Pseudomys novaehollandiae	New Holland Mouse		V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Possible	Low- proposal would remove a negligible area of foraging habitat for this species.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Possible	Low- proposal would remove a negligible area of foraging habitat for this species.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Potential to be affected by proposal
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Possible	Low- proposal would remove a negligible area of foraging habitat for this species.
REPTILES					
Caretta caretta	Loggerhead Turtle	E	E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Chelonia mydas	Green Turtle	V	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Dermochelys coriacea	Leatherback Turtle	E	E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Eretmochelys imbricata	Hawksbill Turtle		V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Hoplocephalus bungaroides	Broad-headed Snake	E	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Natator depressus	Flatback Turtle		V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
AMPHIBIANS					
Heleioporus australiacus	Giant Burrowing Frog	V	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Litoria aurea	Green and Golden Bell Frog	E	V	High- species has been recorded in the area previously. A key population is located near Brundee Swamp.	Possible – proposal may indirectly impact habitat temporarily as a result of trenching. Potential for individual frogs to become trapped in the trench.
FISH					
Epinephelus daemelii	Black Rockcod	V	V	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Macquaria australasica	Macquarie Perch		E	Low	Negligible impacts. No limiting foraging or breeding habitat within the study area.
Prototroctes maraena	Australian Grayling		V	Possible	Negligible impacts. No limiting foraging or breeding habitat within the study area.

Appendix C:

AHIMS

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : NNSM1

Client Service ID : 503372

Date: 08 May 2020

Emma Mcintyre

24 Hunter Street
BALGOWNIE New South Wales 2519

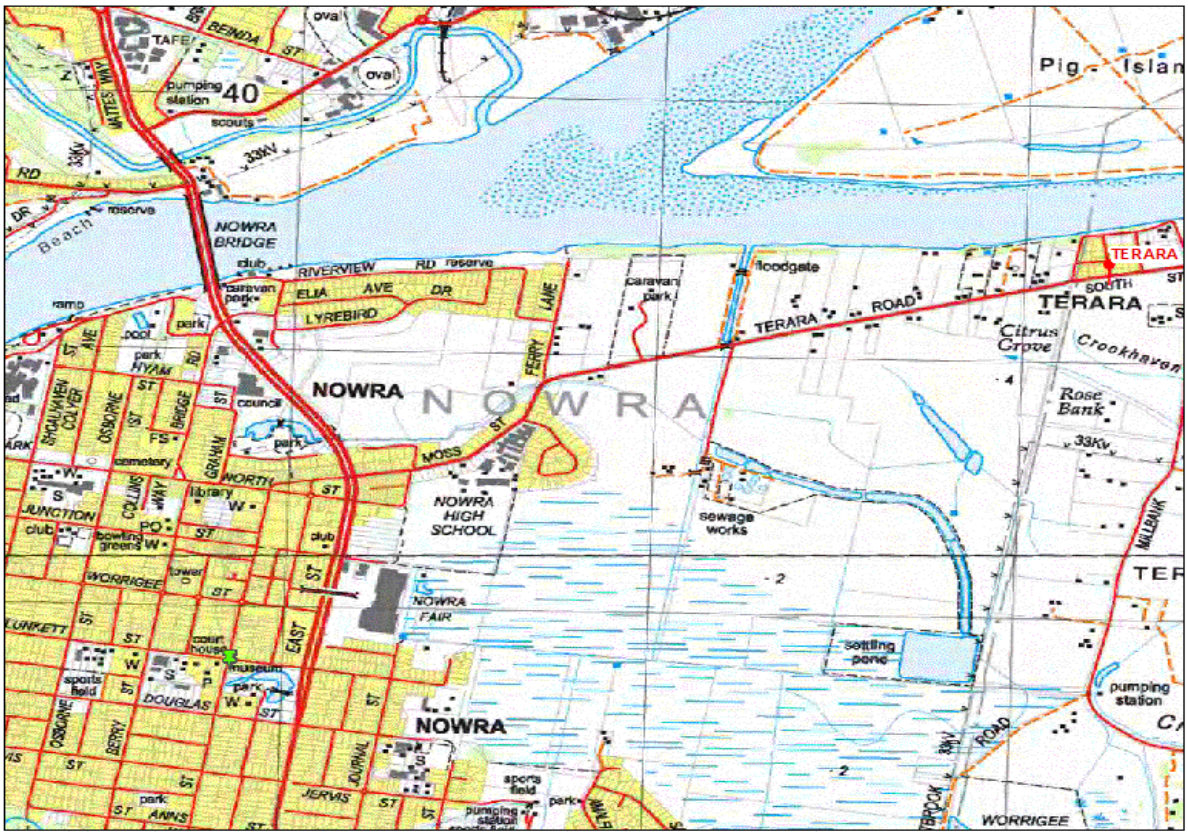
Attention: Emma Mcintyre

Email: emma@emapconsulting.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -34.881, 150.596 - Lat, Long To : -34.8593, 150.6303 with a Buffer of 50 meters, conducted by Emma Mcintyre on 08 May 2020.

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



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

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

Appendix D:

LETTER TEMPLATE FOR COMMUNITY CONSULTATION

STAKEHOLDER AND COMMUNITY CONSULTATION LETTER - Template

Dear <CONTACT NAME>

RE: Review of Environmental Factors Addendum – Proposed Replacement of North Nowra Surcharge Main

Shoalhaven City Council, through Shoalhaven Water, manages the collection, treatment and distribution of water, along with the collection, treatment and disposal of wastewater back into the environment.

As part of the infrastructure utilised in undertaking these functions, Shoalhaven City Council maintain and operate a series of surcharge mains to transfer sewage waste to a wastewater treatment plant. These assets need to be replaced and maintained in order to minimise risk associated with mains breakages and asset failure.

Shoalhaven City Council are planning to replace the North Nowra Surcharge Main from North Nowra to the Nowra Wastewater Treatment Plant.

Shoalhaven City Council is both the proponent and the determining authority for the proposed activity under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). As such, a Review of Environmental Factors (REF) is required to fulfil Council's obligations for environmental assessment of the proposed activity. A previous REF has assessed the proposed activity, however due to the period of time that has lapsed since this assessment was conducted, and due to changes in relevant legislation in that time, an REF Addendum has been prepared to assess potential environmental impacts of the new alignment.

As part of Council's measures to reduce impacts of this project on the local community, we invite <ORGANISATION_NAME>/<LANDHOLDER_NAME> to review the Review of Environmental Factors Addendum on our website at <URL> during the exhibition period, which will be <NUMBER> weeks from <DATE>.

Please provide comment on the REF document to Council's Project Manager, <PROJECT_MANAGER> by <END_DATE> using contact details below:

<PROJECT_MANAGER_NAME>
<POSTAL ADDRESS>
<EMAIL>
<PHONE>

Yours faithfully

NAME and SIGN

Appendix E:

TESTS OF SIGNIFICANCE (NSW BC ACT)

Tests of Significance as per Section 7.3 of the *NSW Biodiversity Conservation Act (2016)* have been conducted for the following:

Frogs:	Green and Golden Bell Frog	*Litoria aurea*

Test of Significance (s7.3 of the NSW BC Act 2016)	
Threatened Fauna: **Frogs**	Green and Golden Bell Frog - *Litoria aurea*
a. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,	The proposed activity includes potential habitat disturbance for the Green and Golden Bell Frog. Mitigation measures outlined in Section 6 will assist to avoid and minimise any potential impacts on this species. The proposed activity is not likely to have an adverse effect on the life cycle of these species such that a viable population of these species is likely to be placed at risk of extinction.
b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	N/A – not an EEC
c. in relation to the habitat of a threatened species or ecological community: i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,	The proposed activity is linear infrastructure which has the potential to fragment sections of potential habitat for this species. However, due to the restricted width of the proposed activity and the associated disturbance area, and implementation of a Vegetation Management Plan following construction, it is unlikely to become fragmented or isolated from other areas of habitat. It is unlikely that the habitat to be removed or disturbed as part of the proposed activity is important to the long-term survival of these species in the locality, due to extent of other available habitat in nearby areas.
d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),	The proposed activity is unlikely to have any adverse impacts on any declared areas of outstanding biodiversity value. This has been confirmed by accessing and analysing the “Area of Outstanding Biodiversity register” on the DPIE website, accessed January 2020.
e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The proposed activity may constitute “Clearing of native vegetation” which is identified as a Key Threatening process in Schedule 4 of the BC Act. Mitigation measures outlined in Section 6 will minimise the area of fauna habitat that is to be cleared or modified as part of the proposed activity. Further, it is anticipated that

Test of Significance (s7.3 of the NSW BC Act 2016)	
Threatened Fauna: **Frogs**	Green and Golden Bell Frog - *Litoria aurea*
	following construction, any habitat that has been either directly or indirectly impacted by the proposed activity will be regenerated as per the Vegetation Management Plan.
Conclusion	In light of the consideration of the above factors, the proposed activity is unlikely to have a "significant impact" on Green and Golden Bell Frog as a result of the proposed activity. A Significant Impact Statement is not required.

Appendix F:

GREEN AND GOLDEN BELL FROG MANAGEMENT PLAN

Green and Golden Bell Frog

Status: The Green and Golden Bell Frog is listed as 'Endangered' under the NSW BC Act and as 'Vulnerable' under the Commonwealth EPBC Act.

Description:
The Green and Golden Bell Frog is a relatively large dull olive to bright emerald green frog that can range in size from around 45 millimetres to 100 millimetres. Its distinctive characteristics are a gold or creamish white stripe running along the side, extending from the upper eyelids almost to the groin, with a narrow dark brown stripe beneath it, from nostril to eye. It is active by day and usually breeds in summer when conditions are warm.

Habitat:

Green and Golden Bell Frogs can occupy a broad range of habitats, including natural, artificial and disturbed habitats, and breed in ephemeral ponds (Pyke & White 1996, DEC 2005). They have been recorded associated with coastal swamps, marshes, dune swales, lagoons, lakes and other estuarine wetlands as well as riverine floodplain wetlands and billabongs and constructed water bodies such as storm water detention basins, farm dams, bunded areas, drains and ditches (DEC 2005).

Best Practice Management

Site Induction	Distribution of this Management Plan to all contractors for implementation during all stages of works
Stop Work Procedure	Implement a stop work or unanticipated find procedure for when Green and Golden Bell Frogs are observed within the construction area. The procedure will include a process to notify the Site Representative, follow the relocation procedure and confirm when it is okay to re-commence works.
Sediment and erosion control	Establish appropriate sediment and erosion control to prevent silt, sediments, spills and other contaminants from reducing water quality in frog habitat. These controls should be regularly inspected, particularly after heavy rain events.
Acid sulfate soils management	Develop appropriate procedures to manage acid sulphate soils during construction and operation. Management of acid sulphate soils should be carried out in accordance with the Acid Sulfate Soils Management Plan prepared for this project.
Hygiene Protocol for disease control (Chytrid – *Batrachochytrium dendrobatidis*)	• Vehicles initially entering the Project area must not be tracking soil/mud and/or vegetative material. If soil/mud and/or vegetative material are found on these vehicles, they must be cleaned in a hard stand area within the site compound area. • Any organic waste collecting during the washdown process would be removed from site. • Restrict vehicles to parking within project boundary and site compound parking areas • Provide parking and turn-around points on hard, well-drained surfaces. • Disinfect boots with cleaning products containing benzalkonium chloride (eg 'Toilet Duck') or methylated spirits diluted in town water (70:30 ratio)) for ALL personnel. • Disinfect hands or change gloves between the handling of individual frogs and between each site. - Only handle frogs when necessary. Use the 'one bag-one frog' approach.
Relocation procedures	• If live GGBF individuals are located during construction works, they can be relocated to a nearby area of suitable habitat (eg drainage line). • If diseased GGBFs are found, they are to be placed in a small plastic container with a small amount of water (one per frog). Contact Taronga Zoo to organise transport for diagnosis and treatment.

If any frogs are found during works, please contact Department of Environment, Energy and Science Threatened Species Unit (Nowra):

Name: Lachlan Wilmott

Email: Lachlan.Wilmott@environment.nsw.gov.au

Phone: (02) 4422 2335