REVIEW OF ENVIRONMENTAL FACTORS (REF)
STORMWATER DRAINAGE UPGRADE
KINGSLEY AVENUE TO NORTH STREET, ULLADULLA

Contents

Document control

Item	Details
Project	Stormwater drainage upgrade – Kingsley Avenue to North Street, Ulladulla
Client/Proponent	City Services, Shoalhaven City Council
Prepared By	City Services, Shoalhaven City Council

Document status

Version	Author / Reviewer*	Name	Signed	Date
V1.0	Author	Geoff Young		23/08/2022
	Reviewer	Dan Woods		19/09/2022

*Review and endorsement statement:

“I certify that I have reviewed and endorsed the contents of this REF document and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation, and the information it contains is neither false nor misleading”.

Assessment and approvals overview

Item	Details
Assessment type	Division 5.1 (EP&A Act) - Review of Environmental Factors (REF)
Proponent	Shoalhaven City Council
Determining authority / authorities	Shoalhaven City Council
Required approvals (consents, licences and permits)	Nil
Required publication	Yes, for the purpose of public interest. Published on the NSW Planning Portal.

1. PROPOSAL AND LOCATION

1.1 Overview

The proposed activity is the upgrade of stormwater management system between Kingsley Avenue and North Street, Ulladulla (Figure 1 below). The works would involve:

- installation of twin 750mm internal diameter reinforced concrete stormwater pipes in an existing open stormwater channel
- removal of vegetation growing within the open stormwater channel
- replacement of, and supplementing, existing headwalls and pits
- filling of the open drainage channel and the establishment of a grassy surface swale drain
- repair of gabion wall at North Street

Plans are attached as Appendix A. The length of works is approximately 66 metres.

Shoalhaven City Council (SCC) is the proponent and the determining authority under Part 5 of the EP&A Act. The environmental assessment of the proposed activity and associated environmental impacts has been undertaken in the context of Clause 171 of the *Environmental Planning and Assessment Regulation 2021*. In doing so, this Review of Environmental Factors (REF) helps to fulfil the requirements of Section 5.5 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 activity.

1.2 Location

The proposed activity would predominantly be undertaken in the undeveloped Kingsley Avenue road casement north of North Street, Ulladulla (Figure 1, below). Filling and swale development works would also extend onto 71 North Street (Lot 123 DP 1060860) which is private land. a permit to enter has been obtained from the owners of this land.

Figure 1 Location of proposed activity

2. EXISTING ENVIRONMENT

The activity would be undertaken in an existing open drainage channel within an undeveloped public road casement. It is highly disturbed through previous clearing and excavation activities associated with construction of the open drain. Photos are provided below.

The drainage channel is unstable and erosion is occurring particularly at the Kingsley Avenue end.

The site is highly disturbed dominated by exotic species such as kikuyu, *Bidens pilosa*, *Hydrocotyle bonariensis*, Arum Lily *Zantedeschia aethipica*, Vasey grass *Paspalum urvillei*, Ginger Lily *Hedychium gardnerianum*, Lantana *Lantana camara*, Cassia *Senna sp.*, Blackberry *Rubus fruticosus* and Japanese Honeysuckle *Lonicera japonica*. Native vegetation that would be impacted include a single small, Swamp Oak *Casuarina glauca*, five small Turpentines *Syncarpia glomifera*, Blady Grass *Imperata cylindrica*, Dusky Coral Pea *Kenneida rubicunda*, Sweet Pittosporum *Pittosporum undulatum,* Coastal Wattle *Acacia sopharae* and Black Wattle *Acacia mearnsii*. There are no rare or threatened species and it does not comprise an endangered ecological community. No hollow-bearing trees, threatened flora species, rocky outcrops, caves, crevices or water bodies would be removed or otherwise impacted. No food resources critical to the survival of a particular species would be removed.

Of relevance to this assessment, the site:

- is not mapped as being bushfire prone
- has low risk for acid sulfate soils to be present (Class 5)
- is not mapped as Key Fish Habitat and does not meet the description of such https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/key-fish-habitat-maps
- does not contain coastal wetlands or littoral rainforest to which SEPP (Resilience and Hazards) 2021 applies
- is mapped as flood prone
- is not mapped as potentially contaminated
- contains no heritage items
- contains no recorded Aboriginal heritage sites

An assessment of potential environment impacts is provided in Section 3 of this REF.

Photo 1: Existing open drain – photo taken from North Street

Photo 2: Existing open drain – photo taken from Kingsley Avenue

Photo 3: Existing open drain showing example of current erosion

3. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

3.1 Threatened species impact assessment (NSW)

Section 1.7 of the EP&A Act 1979 applies the provisions of Part 7 of the NSW *Biodiversity Conservation Act 2016* and Part 7A of the *NSW Fisheries Management Act 1994* that relate to the operation of the Act in connection with the terrestrial and aquatic environment. Each are addressed below.

3.1.1 Part 7A *Fisheries Management Act 1994*

The proposed activity would not impact key fish habitat as mapped and/or described by the NSW Fisheries of the Department of Primary Industries and would not impact habitat for listed threatened species, ecological communities, and their habitats.

3.1.2 Part 7 *Biodiversity Conservation Act 2016*

Section 7.3 of the Act provides a 'five-part' test to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. Each part is addressed below.

(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.

An assessment of the likelihood of occurrence provided in Appendix B indicates that there are no threatened species likely to occur at the site.

(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.***

The vegetation that would be impacted by the proposed activity does not comprise an endangered ecological community.

(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 proposal is unlikely to adversely affect threatened species or endangered ecological communities (refer to responses to a and b above).

(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).

No “areas of outstanding biodiversity values” have been declared in the City of Shoalhaven.

(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.

There are no key threatening process listed under the Act considered relevant to the proposed activity. A species impact statement is not required for this part.

3.2 Indigenous heritage

Under Section 86 of the NSW *National Parks and Wildlife Act 1974* (NPW Act) it is an offence to disturb, damage, or destroy any Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP). The Act, however, provides that if a person who exercises ‘due diligence’ in determining that their actions will not harm Aboriginal objects has a defence against prosecution if they later unknowingly harm an object without an AHIP (Section 87(2) of the Act). To effect this, the NSW Department of Environment, Climate Change and Water have prepared the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wale*s (hereafter referred to as the ‘Due Diligence Guidelines’) (DECCW 2010) to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for an AHIP.

An on-site search of the proposed work conducted on the 26 July 2022 did not locate any aboriginal objects.

A search on the Aboriginal Heritage Information Management System (AHIMS) on 27 July 2022 indicated that there are no recorded Aboriginal sites or places in the vicinity of the proposal (refer to AHIMS report below in Figure 2 below).

The Due Diligence Guidelines define disturbed land as follows:

> *“Land is disturbed if it has been the subject of a human activity that has changed the land’s surface, being changes that remain clear and observable. Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks.”*

The area of impact would be considered to have high potential for Aboriginal objects as it is within 200 metres of tidal waters. The drainage channel may have also been a natural freshwater watercourse prior to the development of Ulladulla. The proposed activity area is however on ‘disturbed land’ and it has been the subject of human activity that has changed the land’s surface which remain clear and observable, *i.e.,* clearing for residential development and construction of the open drainage channel. It is reasonable to conclude that there are no known Aboriginal objects or a low probability of objects occurring in the area of the proposed activity. In accordance with the Due Diligence Guidelines the proposed activity can proceed with caution without applying for an AHIP (refer to Section 7 of this REF for precautions).

Figure 2 Results of AHIMS Aboriginal heritage search

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Kingsley to North
Client Service ID : 703639

Shoalhaven City Council - Nowra

Date: 27 July 2022

PO Box 42 Bridge Rd
Nowra New South Wales 2541

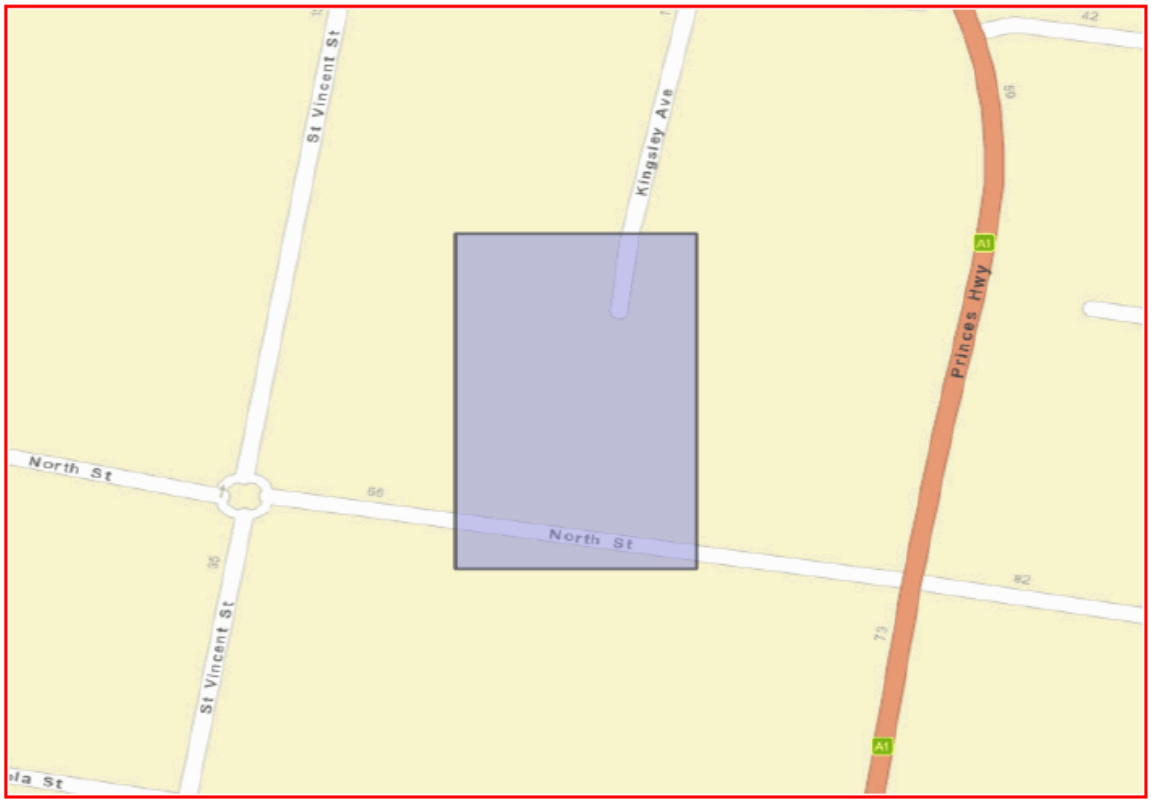
Attention: Geoffrey Young

Email: geoff.young@shoalhaven.nsw.gov.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 270432.0 - 270512.0, Northings : 6084996.0 - 6085129.0 with a Buffer of 0 meters, conducted by Geoffrey Young on 27 July 2022.

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



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

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

3.3 Non-indigenous heritage

There are no heritage items or heritage conservation areas identified in the State Heritage Register or Shoalhaven Local Environmental Plan that would be directly impacted by the proposed demolition works.

3.4 EP&A Regulation – Clause 171 matters of consideration

Clause 171(2) of the *Environmental Planning and Assessment Regulation 2021* lists the factors to be taken into account when consideration is being given to the likely impact of an activity on the environment under Part 5 of the EP&A Act. The following assessment in Table 1 below deals with each of the factors in relation to the proposed activity.

Table 1: Clause 171(2) Factors For Consideration

Does the proposal:	Assessment	Reason
a) Have any environmental impact on a community?	Positive	The proposed activity would benefit the community and the environment as it is anticipated to reduce the impacts of stormwater runoff affecting surrounding properties and reduce erosion of the current open drain that leads to sediment entering Millards Creek and the Harbour, and has potential to impact neighbouring residential land The proposed activity is consistent with the existing land use.
b) Cause any transformation of a locality?	Positive	The proposal will improve the locality's use as a stormwater management system and would allow for better pedestrian access.
c) Have any environmental impact on the ecosystem of the locality?	Negligible	The site is highly disturbed dominated by exotic species. There are no rare or threatened species and it does not comprise an endangered ecological community. No hollow-bearing trees, threatened flora species, rocky outcrops, caves, crevices or water bodies would be removed or otherwise impacted. No food resources critical to the survival of a particular species would be removed. The proposed activity would not have a significant impact upon threatened species or endangered ecological communities. No significant habitat features would be removed or otherwise impacted. No food resources critical to the survival of a particular species would be removed. Aquatic ecosystems are not likely to be affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.

Does the proposal:	Assessment	Reason
d) Cause a diminution of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Positive	the proposal will reduce erosion of the existing drainage channel and subsequent sedimentation into Millards Creek. It may also improve access for pedestrians linking Kingsley Avenue and North Street. The existing site has no recognised aesthetic, recreational, scientific or other quality. The proposal is anticipated to result in improved stormwater drainage to help alleviate current erosion issues and improve safety.
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	The site of the proposed activity has no significant aesthetic, architectural, cultural, historical, scientific or social values. As such, the proposed activity would have no impact on these items. No items in the vicinity of the work site which are listed on the State Heritage Register and the Shoalhaven Local Environmental Plan would be impacted by the proposal. The site is not within an Aboriginal Place declared under the *National Parks and Wildlife Act 1974.* In accordance with the NSW Department of Environment, Climate Change and Water's Due Diligence Code of Practice, the proposed activity does not require an Aboriginal Heritage Impact Permit as the activity is unlikely to harm an Aboriginal object (refer to Section 3.2).
f) Have any impact on the habitat of protected fauna (within the meaning of the Biodiversity Conservation Act 2016)?	negligible	No important habitat will be removed or otherwise impacted. The potential impact is therefore considered to be insignificant or inconsequential. The proposed activity would not have a significant impact upon threatened fauna (refer to Section 3.1 of this REF). The specified environmental mitigation measures (Section 7) would mitigate indirect impacts to fauna and habitat.
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?	Low adverse	No potentially important habitat or food resources for locally occurring fauna species would be removed or otherwise impacted by the proposal. No hollow-bearing trees, threatened flora species, rocky outcrops, caves, crevices or water bodies would be removed or otherwise impacted. No food resources critical to the survival of a particular species would be removed.
h) Have any long-term effects on the environment?	Negligible	Works would be relatively short term and the noise generated will occur during normal working hours. There

Does the proposal:	Assessment	Reason
		are no sensitive receivers in the vicinity of the proposed works. The works would be short term and would stabilise the current erosional processes occurring in the open drain. The proposed activity would not use hazardous substances or use or generate chemicals which may build up residues in the environment.
i) Cause any degradation of the quality of the environment?	Low adverse	Aquatic ecosystems are not likely to be affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. The proposal would not intentionally introduce noxious weeds, vermin, or feral animals into the area or contaminate the soil. Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
j) Cause any risk to the safety of the environment?	Negligible	The proposed activity would not involve hazardous wastes and would not lead to increased bushfire or landslip risks. The activity is not going to adversely affect flood or tidal regimes, or exacerbate flooding risks. The activity is not anticipated to adversely affect flood behaviour or exacerbate flooding risks. The proposal is anticipated to result in improved stormwater drainage to help alleviate current erosion issues that could cause safety issues for the community and to neighbouring residential properties.
k) Cause any reduction in the range of beneficial uses of the environment?	Positive	The proposed activity would improve the current use of the site (stormwater management).
l) Cause any pollution of the environment?	Negligible	The proposal would involve a temporary and local increase in noise during the construction phase due to the use of machinery. However this will not affect any sensitive receivers such as residential areas, schools, childcare centres and hospitals. Sediment and erosion control in accordance with the Blue Book will be implemented to minimise movement of sediment. It is unlikely that the activity (including the environmental impact mitigation measures) would result in water or air pollution, spillages, dust, odours, vibration or radiation. The proposal does not involve the use, storage or transportation of hazardous substances or the generation

Does the proposal:	Assessment	Reason
		of chemicals which may build up residues in the environment. Acid sulfate soils are unlikely at the site.
m) Have any environmental problems associated with the disposal of waste?	Negligible	The waste that would be disposed off-site can be recycled or re-used in accordance with resource recovery exemptions or taken to a licensed waste facility. There would be no trackable waste, hazardous waste, liquid waste, or restricted solid waste as described in the NSW *Protection of the Environment Operations Act 1997*.
n) Cause any increased demands on resources (natural or otherwise) which are, or are likely to become, in short supply?	Low adverse	The amount of resources that would be used are not considered significant and would not increase demands on current resources such that they would become in short supply.
o) Have any cumulative environmental effect with other existing or likely future activities?	Low adverse	The assessed low adverse or negligible impacts of the proposal are not likely to interact. Mitigation measures (Section 7) shall be implemented to minimise the risk of cumulative environmental effects. The current proposal would not significantly affect habitat connectivity or reduce any significant vegetation.
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	Low adverse	The proposed activity would have no effect on coastal processes including those projected under climate change conditions.
q) applicable local strategic planning statements, regional strategic plans or district plans made under the Act, Division 3.1	Positive	The proposed activity is consistent with the *Shoalhaven 2040* Strategic Land-use Planning Statement, including Planning Priority 2 *delivering Infrastructure* https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D20/437277. The activity is not inconsistent with the Illawarra Shoalhaven Regional Plan 2041 https://www.planning.nsw.gov.au/-/media/Files/DPE/Plans-and-policies/Plans-for-your-area/Regional-plans/Illawarra-Shoalhaven-Regional-Plan-05-21.pdf and the vegetation that would be removed is not mapped in the Planning Statement as “high environmental value” or “habitat corridor”.

Does the proposal:	Assessment	Reason
r) other relevant environmental factors	n/a	Environmental factors have been addressed in Section 3 of this REF.

4. PERMISSIBILITY

4.1 Environmental Planning & Assessment Act 1979

Section 4.1 (Development that does not need consent) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) states that:

> *"If an environmental planning instrument provides that specified development may be carried out without the need for development consent, a person may carry the development out, in accordance with the instrument, on land to which the provision applies."*

In this regard, Section 2.136(1) of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP) states that "*development for the purpose of stormwater management systems may be carried out by or on behalf of a public authority without* [development] *consent on any land"*.

As the proposal does not require development consent, and as it constitutes an 'activity' for the purposes of Part 5 of the EP&A Act, being carried out by (or on behalf of) a public authority, environmental assessment under Part 5 of the EP&A Act is required. This REF provides this assessment.

4.2 Other

A summary of other relevant legislation and permissibility is provided in Table 2 below.

Table 2: Summary of other relevant legislation and permissibility

NSW STATE LEGISLATION
***Environmental Planning and Assessment Act 1979* (EP&A Act)**
Permissible √ Not permissible ☐
Justification: The Transport and Infrastructure SEPP provides for the proposed works to be undertaken without development consent (refer Section 4.1 above). 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.
Shoalhaven Local Environmental Plan 2014 (SLEP)
Permissible √ Not permissible ☐
Justification: Under the SLEP the proposed activity may have required development consent. The provisions of the Transport and Infrastructure SEPP, however, prevail over the SLEP where there is an inconsistency by virtue of Section 3.28 of the EP&A Act. Consequently, development consent is not required.
Protection of the Environment Operations Act 1997
Permissible √ Not permissible ☐
Justification:

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

***National Parks and Wildlife Act 1974* (NP&W Act)**

Permissible √ Not permissible ☐

Justification:

- The proposed activity would not encroach into National Park estate.
- The Act provides the basis for the legal protection and management of Aboriginal sites in NSW. Under Sections 86 and 90 of the Act it is an offence to disturb an Aboriginal object or knowlingly destroy or damage, or cause the destruction or damage to, an Aboriginal object or place, except in accordance with a permit of consent under section 87 and 90 of the Act.
- As there are no recorded sites or visible objects and as the site is on 'disturbed land', the Due Diligence Guidelines requires no further assessment as it is reasonable to conclude that there is a low probability of objects occurring in the area of the proposed activity and an AHIP is not required. Refer to Section 3.2 for more information.

Heritage Act 1977

Permissible √ Not permissible ☐

Justification:

- The proposed activity would not disturb an item of state heritage significance.
- The Act also provides statutory protection to relics, archaeological deposits, artefacts or deposits. Section 139 to 146 of the Act require that excavation that is likely to contain, or is believed may contain, archaeological relics is undertaken in accordance with an excavation permit issued by the Heritage Council. The Act defines an archaeological relic as "*any deposit, artefact, object or material evidence that:*

  a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement; or
  b) *is of state and local heritage significance"*

  As the site has little to no archaeological potential, a permit is not required.

Biodiversity Conservation Act 2016

Permissible √ Not permissible ☐

Justification:

- The proposed activity is unlikely to have a significant impact on species and communities listed in the schedules of the Act.
- The proposed development is not within an area declared to be of "outstanding biodiversity value" as defined in the Act.

- The design and mitigation measures (Section 7) would ensure that no *serious and irreversible impacts on biodiversity values* (as defined by the BC Act) occur at the site of the proposed activity.

The proposed activity therefore is not deemed to be *likely to significantly affect threatened species* and an environmental impact statement (EIS) or a Biodiversity Development Assessment Report (BDAR) is not required.

It is also a defence to a prosecution for an offence under Part 2 of the Act (harming animals, picking plants, damaging the habitat of threatened species or ecological communities *etc*) if the work was essential for the carrying out of an activity by a determining authority within the meaning of Part 5 of the Environmental Planning and Assessment Act 1979 after compliance with that Part. The activity will not remove vegetation that is listed under Schedule 1 Threatened Species, Schedule 2 Threatened ecological communities and Schedule 6 Protected Plants. Therefore the activity is considered permissible as this REF has been prepared and determined in accordance with the EP&A Act.

State Environmental Planning Policy (Hazards and Resilience) 2021

Permissible √ Not permissible ☐

Justification:

- The site is mapped as Coastal Use Area and Coastal Environment Area for the purpose of the SEPP. The development controls relevant to these mapped areas do not apply to development that can be carried out without consent.
- There are no areas mapped by this SEPP as coastal wetlands, littoral rainforest and coastal vulnerability areas in the proposed activity area.

COMMONWEALTH LEGISLATION

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EP&BC Act)

Permissible √ Not permissible ☐

Justification:

The proposed activity would not be undertaken on Commonwealth land and no matters of National Environmental Significance are likely to be significantly impacted by the proposed activity. The proposed activity is therefore not a controlled action and does not require Commonwealth referral.

Commonwealth *Native Title Act 1993*

Permissible √ Not permissible ☐

Justification:

Works would occur on private lands and road reserves. Native Title is assumed to have been extinguished as a Past Act as defined in Section 228 of the Act.

5. CONSULTATION WITH GOVERNMENT AGENCIES

5.1 Transport and Infrastructure SEPP

Section 2.10 – Development with impacts on council-related infrastructure or services

No impacts to roads, sewerage, water infrastructure, public places, nor excavation of footpaths, such as described under Section 2.10 (1) would occur.

Section 2.11 – Development with impacts on local heritage

No impacts to any local heritage item would occur. Consultation under Section 2.11 is therefore not required.

Section 2.12 – Development with impacts on flood liable land

and

Section 2.13 – Consultation with State Emergency Service—development with impacts on flood liable land

The proposed activity would be undertaken on flood liable land.

Notification to SES was undertaken through the NSW Planning Portal. A response was received on the 16 August 2022. The response stated:

> *"Based on the Millards Creek Flood Study 2021, the site appears to be affected in relatively frequent flooding (20% AEP flooding). The NSW SES notes that the works are likely to reduce existing flood risk".*

The response in full can be viewed in the Planning Portal. No further consultation is required.

Notification to SCC's Senior Flood Engineer was made on the 28 July 2022 (D22/314655). A response was received on the 29 July 2022 (D22/318170). The response from the flood engineer questioned the hydraulic performance of the proposed system. It stated:

> *"My key question is whether a hydraulic assessment has been undertaken to demonstrate that the proposed works will not have any adverse flood impacts on existing properties, adjacent to or downstream of the limit of works. Council's Engineering Design Specifications requires there to be zero afflux in urban properties in urban properties in a 1% AEP event. Whilst the twin DN750 pipes have a steep grade and overland flow path above them, it is unknown how the hydraulic capacity of the proposed system compares against the existing vegetated stormwater drain."*

In response, Shin Lee SCC Civil Engineer states (D22/395964):

> *"…I can confirm that the overland swale is designed to 1% AEP and the pipe designed to 5 year.*
>
> *Some assumption has been made, such as downstream control (north street twin 900 culverts) for the 1%AEP event was the nominal road overtopping level at RL11.50m; and for the 20% AEP event at the obvert of the culvert at RL 10.40. Levels wise there are no afflux issues (although assumption were made using GIS contours by the designers MIE of the upstream catchments). Should the flow exceed 1% AEP event – the swale will be overtopped onto the existing low point in the grassed area of the church land. Low point*

discharges across the North St at the sag point in the road, there is an existing culvert at the sag point as well."

No further consultation is required.

Section 2.14 – Development with impacts on certain land within the coastal zone

The proposal would not occur within a coastal vulnerability area. Consultation is therefore not required.

Section 2.15 – Consultation with public authorities other than councils

In consideration of the other consultation requirements specified under Section 2.15 of the Transport and Infrastructure SEPP, the proposed activity:

- would not be undertaken adjacent to land reserved under the *National Parks and Wildlife Act 1974* or land acquired under that Act
- would not be undertaken on land in Zone E1 National Parks and Nature Reserves or in an equivalent land use zone.
- does not comprise a fixed or floating structure in or over navigable waters
- would not increase the amount of artificial light in the night sky and located on land within the dark sky region as identified on the dark sky region map
- would not be undertaken within Defence communications facility buffer (only relevant to the defence communications facility near Morundah)
- would not be undertaken on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*

These prescribed consultation requirements therefore do not apply.

Section 2.16 – Consideration of Planning for Bush Fire Protection (PBP)

The proposed activity is not a development prescribed in this section (health services facilities, correctional centres, residential accommodation). Consideration of PBP is therefore not required.

6. COMMUNITY ENGAGEMENT

In accordance with Council's Community Engagement Policy, the proposal constitutes a *Local Area – Low Impact* activity.

A permit to enter has been obtained from owners of 71 North Street, Ulladulla to which part of the works would be conducted.

Residents of 69 North Street and 8 Kingsley Avenue shall be informed of the works prior to construction. This requirement is reflected in the environmental mitigation measures listed in Section 7 of this REF.

No further consultation is required.

7. ENVIRONMENTAL SAFEGUARDS AND MEASURES TO MINIMISE IMPACTS

Safeguard / Measure	Responsibility
1. This REF shall be published on the NSW Planning Portal in accordance with clause 171(4) EP&A Regulation 2021 (as a matter of "public interest")	Environmental Operations Officer
2. Residents of 69 North Street and 8 Kingsley Avenue shall be notified and informed of the works at least two weeks prior to commencement of works.	SCC Project Manager
3. Owners of 71 North Street shall be notified of the commencement of works.	SCC Project Manager
4. An emergency spill kit on-site at all times with procedures to contain and collect any leakage or spillage of fuels, oils and greases from plant and equipment.	SCC Project Manager and Site Supervisor
5. To avoid the risk of pollution from machinery, refuelling shall be done off-site. However if refuelling is required, due care shall be taken to avoid spilling fuel and a tray shall be used to catch any accidently spilt fuel.	All operators on-site.
6. Erosion and sediment controls in shall be implemented in accordance with the Blue Book (Landcom 2004) to prevent the entry of sediment into waterways. Erosion and sediment controls shall be maintained in good working order for the duration of the works and subsequently until the site has been stabilised and the risk of erosion is minimal.	SCC Project Manager and Site Manager
7. Tree removal shall be minimal and only to the extent necessary to undertake the activity.	SCC Project Manager and Site Manager
8. Pruning of trees, where required, shall be undertaken in accordance with AS4373 – *Pruning of Amenity Trees.*	SCC Project Manager and Site Manager
9. In the event that any wildlife be significantly disturbed or injured during works, Council's Environmental Officers shall be contacted on 44293399, or if unavailable, Wildlife Rescue –	All staff working at the site.

Safeguard / Measure	Responsibility
south Coast should be contacted on 0418 427 214, to rescue and relocate the animal(s).	
10. If engineering fill, derived from waste, is imported to the site, all conditions prescribed in the applicable Resource Recovery Exemptions shall be complied with, including: • ensuring the producer of the waste has complied with the applicable Order such as testing and validation • ensuring the material has met all chemical and other material requirements specified in the applicable Order • keeping a written record of the following for a period of six years: o the quantity of material received o the name and address of the supplier	SCC Project Manager and Site Manager
11. If Virgin Excavated Natural Material (VENM) is taken to the site (*i.e.* without chemical testing and validation): • the material must meet the definition of VENM (http://www.epa.nsw.gov.au/waste/virgin-material.htm) • the supplier must fill out and complete the VENM Certificate • The completed *VENM Certificate* shall be kept for at least six years and provided to the EPA upon any request.	SCC Project Manager and Site Manager
12. Any waste generated on-site shall be reused in accordance with relevant Resource Recovery Orders and Exemptions, or otherwise disposed of at a licenced waste facility	SCC Project Manager and Site Manager
13. Staff working at the site shall be instructed to stop work immediately on identification of any suspected Aboriginal heritage object. If any objects are found, the NSW Department of Planning, Industry and Environment (ph:131555) shall be contacted.	SCC Project Manager and Site Manager
14. The surface swale drain shall be immediately turfed following construction.	SCC Project Manager and Site Manager

Safeguard / Measure	Responsibility
15. An asset form shall be trimmed to file 44574E on commissioning of the assets in Accordance with POL15/8 Asset Accounting Policy section 3.1.4 and POL16/79 Asset Management Policy section 3.3.	SCC Project Manager

8. SIGNIFICANCE EVALUATION & CONCLUSION

This Review of Environmental Factors has assessed the likely environmental impacts, in the context of Part 5 of the *Environmental Planning and Assessment Act 1979*, of a proposal by Shoalhaven City Council upgrade the stormwater management system between Kingsley Avenue and North Street, Ulladulla.

In consideration of the proposal as described in Section 1 and assuming the implementation of all proposed safeguards and mitigation measures (Section 7), it is determined that:

1. It is unlikely that there will be any significant environmental impact as a result of the proposed work and an Environmental Impact Statement is not required for the proposed works.
2. The proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats and a Species Impact Statement / BDAR is not required.
3. No additional statutory approvals, licences, permits and external government consultations are required.
4. Works can proceed.

In accepting and adopting this REF, Shoalhaven City Council commits to ensuring the implementation of the proposed safeguards and mitigation measures identified in this report (Section 7) to minimise and/or prevent detrimental environmental impacts.

Troy Punnett
Unit Manager – District Engineer - South
Shoalhaven City Council Date: 19/9/22

9. REFERENCES

DECCW (Department of Environment, Climate Change and Water, NSW) 2010 Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. Available at: https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/634694/Policy-and-guidelines-for-fish-habitat.pdf

Landcom 2004 *Managing Urban Stormwater: Soils and Construction 4th edition.* NSW Government. ISBN 0-97520030-3-7

SCC (Shoalhaven City Council) 2006 *Plan of Management Crookhaven Headland.* SCC PoM No.1 File no:1840-02

Appendix A: The proposed activity

DO NOT SCALE

MIENGINEERS

SYDNEY OFFICE
Level 1, 83 - 89 Renwick Street, Redfern 2016
Tel (02) 8396 6565

SOUTH COAST OFFICE
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Tel (02) 4423 0566

WOLLONGONG OFFICE
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Tel (02) 4423 0566

www.miengineers.com

PROPOSED STORMWATER DRAINAGE UPGRADE

KINGSLEY AVENUE TO NORTH STREET, ULLADULLA NSW 2539

LOCALITY PLAN
N.T.S.

DRAWING INDEX

NOT FOR CONSTRUCTION

DIAL BEFORE YOU DIG www.1100.com.au

REVISION	AMENDMENTS	DATE	CKD	APP
A	ISSUED FOR REVIEW	30.06.21	-	AS

SURVEYOR: SHOALHAVEN CITY COUNCIL
DATE OF SURVEY: VARIOUS 2021
ORIGIN: PM27347
HEIGHT OF DATUM: RL 19.556
HORIZONTAL DATUM: -

CLIENT: Shoalhaven City Council

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PROJECT : PROPOSED STORMWATER DRAINAGE UPGRADE
KINGSLEY AVENUE TO NORTH STREET,
ULLADULLA NSW 2539

DRAWING NAME: COVER SHEET

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
RM	JH	-	A1

DRAWING STATUS: PRELIMINARY
DRAWING No.: C001
PROJECT No.: DN210142
REVISION: A

GENERAL NOTES:

1. THE NOTES CONTAINED ON THIS DRAWING ARE TYPICAL STANDARDS ONLY. ANY SPECIFIC DETAILS PROVIDED ELSEWHERE ARE TO TAKE PRECEDENCE.
2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE RELATED SOIL EROSION CONTROL NOTES, RELATED ROAD AND DRAINAGE PLANS, SPECIFICATION AND STANDARD DRAWINGS AS APPLICABLE.
3. ALL WORK IS SUBJECT TO STATUTORY REQUIREMENTS, INCLUDING BUT NOT LIMITED TO WORK HEALTH AND SAFETY REQUIREMENTS, & APPROPRIATE TRAFFIC CONTROL REQUIREMENTS.
4. THE CONTRACTOR IS TO PROVIDE ALL NECESSARY LABOUR, PLANT, MATERIALS AND ANYTHING ELSE REQUIRED TO COMPLETE THE INTENT OF THE DESIGN.
5. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SET OUT IN BOTH LINE AND LEVEL FOR THE WORKS IN ACCORDANCE WITH THE DESIGN.
6. THE CONTRACTOR IS TO ALLOW FOR THE COST OF TESTING. ALL TESTING IS TO BE DONE BY A NATA REGISTERED LABORATORY, TEST RESULTS ARE TO BE SUBMITTED TO THE PRINCIPAL FOR APPROVAL PRIOR TO WORK PROCEEDING.
7. THE CONTRACTOR SHALL ENSURE THAT THE ADJOINING PROPERTY OWNERS ARE NOT DEPRIVED OF ALL WEATHER ACCESS NOR ARE SUBJECTED TO ADDITIONAL STORMWATER RUNOFF.
8. THE CONTRACTOR SHALL ENSURE THAT ALL EROSION AND SEDIMENTATION CONTROL STRUCTURES ARE IN PLACE PRIOR TO COMMENCING.
9. THE CONTRACTOR SHALL NOT ENTER UPON ADJOINING PROPERTY WITHOUT THE PERMISSION OF THE OWNER/OCCUPIER.
10. THE SITE IS TO BE LEFT CLEAN AND TIDY, AND TO THE SATISFACTION OF THE PRINCIPAL.
11. WHERE MIENGINEERS RELIES ON THE INFORMATION SUPPLIED BY OTHERS TO PRODUCE THE DESIGNS, WE ACCEPT NO LIABILITY FOR ERRORS, TO THE EXTENT THAT THE DESIGN HAS MADE RELIANCE ON THIS INFORMATION

CLEARING AND GRUBBING:

1. THE CONTRACTOR SHALL GIVE COUNCIL & THE PRINCIPAL AT LEAST THREE FULL WORKING DAYS NOTICE OF INTENTION TO COMMENCE CLEARING OPERATIONS.
2. THE CONTRACTOR SHALL AVOID UNWARRANTED DAMAGE TO ALL NATURAL FLORA ON SITE AND ON THE ADJACENT LAND.
3. ONLY TREES IDENTIFIED TO BE REMOVED ON THE DRAWINGS ARE TO BE FELLED OR DAMAGED IN ANY WAY. SURPLUS SOIL IS TO BE KEPT WELL CLEAR OF EXISTING TREE TRUNKS. CARE MUST BE TAKEN TO PROTECT THE ROOTS OF TREES TO BE RETAINED.
4. NO TREES SHALL BE CLEARED WITHOUT OBTAINING THE WRITTEN APPROVAL OF THE COUNCIL.
5. ALL MATERIAL CLEARED OR GRUBBED SHALL BE DISPOSED OF BY THE CONTRACTOR TO AN APPROVED SITE. THE CONTRACTOR SHALL PAY ALL FEES. BURNING IS NOT PERMITTED.
6. ANY HOLES OR DEPRESSION CAUSED BY THE CLEARING OR GRUBBING WORK SHALL BE INSPECTED BY THE PRINCIPAL. HOLES ARE TO BE BACKFILLED WITH APPROVED MATERIAL, AND COMPACTED TO AT LEAST 98% OF STANDARD MAXIMUM DRY DENSITY.

TOPSOIL:

1. TOPSOIL INCLUDING ALL GRASS COVER SHALL BE STRIPPED FROM THE WHOLE OF THE AFFECTED AREA TO THE DEPTH SPECIFIED IN THE DRAWINGS OR AS REQUIRED OR, WHERE NO DEPTH IS SPECIFIED, TO A MINIMUM DEPTH OF 100mm.
2. STRIPPED SURFACES WILL NEED TO BE INSPECTED BY THE PRINCIPAL OR A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER PRIOR TO THE COMMENCEMENT OF EARTHWORKS TO ENSURE THE AREAS HAVE BEEN ADEQUATELY STRIPPED.
3. THE STRIPPED TOPSOIL IS TO BE STOCKPILED IN THE LOCATIONS SHOWN ON THE SOIL AND WATER MANAGEMENT PLAN. IF STOCKPILE LOCATIONS ARE NOT INDICATED THEY ARE TO BE PLACED GENERALLY IN ACCORDANCE WITH MUS AND TO THE SATISFACTION OF THE PRINCIPAL. THE SURFACE OF STOCKPILES IS TO BE COVERED WITH GEOFABRIC TO PREVENT SEDIMENT LOSS.
4. THE STOCKPILED TOPSOIL IS TO BE RE-SPREAD OVER THE FINISHED SURFACE (IN THE LOCATIONS INSTRUCTED BY THE PRINCIPAL) IMMEDIATELY FOLLOWING COMPLETION OF EARTHWORKS. DEPTHS OF TOPSOIL SHALL BE A MINIMUM OF 75mm BUT SHALL NOT EXCEED 250mm.
5. SURPLUS TOPSOIL SHALL NOT BE SPREAD OVER THE SITE WITHOUT THE WRITTEN PERMISSION OF THE PRINCIPAL.
6. NEWLY TOPSOILED AREAS ARE TO BE IMMEDIATELY REVEGETATED IN ACCORDANCE WITH THE APPROVED SOIL AND WATER MANAGEMENT PLAN & MUS.

FILL AND COMPACTION:

1. FILL IS TO BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 150mm COMPACTED THICKNESS.
2. FILL IS TO BE COMPACTED TO AT LEAST 100% OF STANDARD MAXIMUM DRY DENSITY AS DETERMINED BY AS1289-5.1.1.
3. COMPACTION TESTING SHALL OCCUR AT THE RATE OF AT LEAST ONE TEST PER 500mm THICKNESS, 300m2 AREA OR 150m3 VOLUME, WHICHEVER GIVES MAXIMUM NUMBER OF TESTS.
4. ALL COMPACTION TESTING IS TO BE PERFORMED BY A NATA REGISTERED LABORATORY UNDER THE CONTROL OF A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER WHO SHALL SUPERVISE THE WORKS TO AT LEAST LEVEL 2 CONTROL AS DEFINED BY AS3798.
5. ALL COMPACTION TEST RESULTS SHALL BE SUBMITTED TO THE PRINCIPAL AS THEY BECOME AVAILABLE, BUT NO LATER THAN 48hrs AFTER TESTING.

SOIL/WATER MANAGEMENT AND PROTECTION OF THE ENVIRONMENT :

1. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES AND STRUCTURES SHALL BE LOCATED, CONSTRUCTED & MAINTAINED IN ACCORDANCE WITH THE GUIDELINES AND PRINCIPLES AS OUTLINED IN LANDCOM'S "SOILS AND CONSTRUCTION" VOLUME 1 (MANAGING URBAN STORMWATER 4TH EDITION, MARCH 2004),(MUS).
2. THE CONTRACTOR IS RESPONSIBLE FOR CARRYING OUT ALL EARTHWORKS, ROAD AND DRAINAGE CONSTRUCTION GENERALLY IN ACCORDANCE WITH MUS AND TO THE SATISFACTION OF COUNCIL, THE SOIL CONSERVATION SERVICE AND THE PRINCIPAL.
3. CONSTRUCTION SEQUENCE SHALL BE PLANNED SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MANAGEABLE SIZE. STABILISATION MEASURES SHALL BE APPLIED TO THE FIRST DISTURBED SECTION PRIOR TO COMMENCING ON THE NEXT SECTION.
4. BEFORE STRIPPING TOPSOIL ALL AREAS TO BE EXPOSED SHALL BE CLEARED AND GRUBBED OF ALL EXCESSIVE VEGETATION.
5. ALL WORK SHALL BE CARRIED OUT IN SUCH A MANNER AS TO AVOID NUISANCE AND/OR DAMAGE TO THE ENVIRONMENT. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE CONDITIONS OF APPROVAL IMPOSED BY THE COUNCIL, THE ENVIRONMENTAL PROTECTION AUTHORITY, THE CLEAN WATERS ACT, THE CLEAN AIR ACT AND THE NOISE CONTROL ACT. THE CONTRACTOR IS TO ALLOW FOR THIS IN THEIR TENDER.
6. HERBICIDES AND OTHER TOXIC CHEMICALS SHALL NOT BE USED ON THE SITE WITHOUT THE PRIOR WRITTEN APPROVAL OF THE PRINCIPAL.
7. NO NOISE, SMOKE, OR OTHER NUISANCE WHICH IN THE OPINION OF THE PRINCIPAL IS UNNECESSARY OR EXCESSIVE SHALL BE PERMITTED BY THE CONTRACTOR IN THE PERFORMANCE OF THE WORKS UNDER THIS CONTRACT. SHOULD WORK OUTSIDE CUSTOMARY WORKING HOURS BE APPROVED, THE CONTRACTOR SHALL NOT USE, DURING SUCH PERIOD, ANY PLANT, MACHINERY OR EQUIPMENT WHICH IN THE OPINION OF THE PRINCIPAL IS CAUSING OR LIKELY TO CAUSE A NUISANCE TO THE PUBLIC. NO NOISY WORKS AND/OR WORKS LIKELY TO DISTURB NEARBY RESIDENTS SHALL BE UNDERTAKEN DURING THE HOURS PRECLUDING SUCH ACTIVITY AS SPECIFIED BY COUNCIL IN ACCORDANCE WITH THE REQUIREMENTS FOR DEVELOPMENT CONSENT AND BUILDING APPROVAL MADE UNDER THE LOCAL GOVERNMENT ACT AND THE NOISE CONTROL ACT.
8. THE CONTRACTOR SHALL ENSURE THAT FUGITIVE DUST FROM DISTURBED AREAS IS MINIMISED BY A METHOD APPROVED BY THE PRINCIPAL.
9. TOPSOIL REQUIRED TO BE RESPREAD ON SITE SHALL BE STOCKPILED CLEAR OF HAZARDS SUCH AS DRAINAGE AREAS, REMAINING TOPSOIL SHALL BE REMOVED AND STOCKPILED WHERE AGREED. STOCKPILED TOPSOIL IS TO BE RE-SPREAD LATER ON AREAS TO BE REVEGETATED AND STABILISED ONLY (ie. ALL FOOTPATHS, BATTERS, DRAINAGE RESERVE AND CHANNELS). TOPSOIL SHALL NOT BE SPREAD ON ANY OTHER AREAS UNLESS SPECIFICALLY APPROVED BY THE PRINCIPAL. STOCKPILES REMAINING LONGER THAN THREE MONTHS SHALL BE PROTECTED FROM EROSION BY COVERING WITH A MULCH AND HYDROSEEDING AND, IF NECESSARY, BY LOCATING BANKS OR DRAINS UPSLOPE TO DIVERT RUNOFF.
10. THE CONTRACTOR SHALL REGULARLY MAINTAIN ALL SEDIMENT AND EROSION CONTROL DEVICES AND REMOVE ACCUMULATED SILT ETC BEFORE NO MORE THAN 60% OF THEIR CAPACITY IS LOST. ALL SILT REMOVED SHALL BE DISPOSED OF AS DIRECTED BY THE PRINCIPAL. CONTROL DEVICES SHALL BE MAINTAINED UNTIL ALL DISTURBED AREAS ARE REVEGETATED OR FURTHER AS MAY BE DIRECTED BY THE PRINCIPAL IN ACCORDANCE WITH THE CONTRACT.
11. CUT AND FILL BATTERS SHALL BE:
    a. FORMED AT MAXIMUMS OF 2:1 IN CUT AND 3:1 IN FILL U.N.O.
    b. TOPSOILED AS SOON AS PRACTICABLE AFTER FORMATION WITH A:
    i. MINIMUM DEPTH OF 75mm AND MAXIMUM OF 250mm.
    ii. SCARIFIED BEFORE TOPSOILING.
    iii. SEEDED WITHIN 7 DAYS OF TOPSOILING WITH AN APPROVED MIX.
    c. WHERE LENGTH OF CUT BATTER SLOPES EXCEED 3m THE BATTER SHALL BE PROTECTED BY EITHER A CUT-OFF DRAIN 150mm DEEP OR A SOIL CUT-OFF BANK 150mm HIGH LEADING TO A SEDIMENT TRAP SO AS TO CONTROL RUNOFF OVER BATTERS PRIOR TO THEIR REVEGETATION.
12. OUTLETS:
    a. ALL WATER SHALL BE RELEASED IN A NON-SEDIMENT MANNER, GENERALLY IN ACCORDANCE WITH MUS.
    b. ENERGY DISSIPATERS SHALL BE PROVIDED AS APPROVED BY THE PRINCIPAL WHEN DISCHARGE FLOW VELOCITIES ARE NOT IN ACCORDANCE WITH MUS.
    c. SHALL HAVE CAPACITY TO DISCHARGE THE 5 YEAR CRITICAL STORM EVENT WITHOUT CAUSING FAILURE OF THE STRUCTURE.
    d. AGGREGATE FOR OUTLETS SHALL BE CRUSHED BASALT OR EQUIVALENT APPROVED BY THE PRINCIPAL.
13. EARTH OR HAY BALE BANKS:
    a. SHALL BE PROVIDED WHERE REQUIRED.
    i. TO DIVERT SEDIMENT LADEN RUNOFF TO A SEDIMENT TRAP OR BASIN, OR
    ii. INCORPORATED AS PART OF A BARRIER OR DAM USED TO INTERCEPT AND RETARD SEDIMENT LADEN RUNOFF.
    b. FREEBOARD: BANKS SHALL HAVE FIXED 300mm FREEBOARD WHEN USED AS A DIVERSION BANK.
14. SLOPES LONGER THAN 80m ARE TO HAVE CHECK DAMS INSTALLED. REFER TO STANDARD DRAWING 5-4 (MUS) FOR DETAILS.
15. WHERE PRACTICAL, MAINTAIN OR IMPROVE EXISTING CLEAN WATER DRAINS TO DIVERT WATER AROUND THE SITE.
16. PERMANENT DRAINAGE FEATURES ARE TO BE INSTALLED AS EARLY AS POSSIBLE DURING THE CONSTRUCTION PERIOD.
17. DRAINAGE CHANNELS AND CATCH DRAINS ARE TO BE STABILISED WITH MATERIAL SUCH AS JUTE MESH, GEOFABRIC, MEDIUM / HIGH PERFORMANCE TURF REINFORCEMENT MATS (TRMS).

SMOOTH JUNCTIONS:

1. CONSTRUCTION WORK CARRIED OUT UNDER THIS CONTRACT ADJACENT TO ADJOINING WORKS, SHALL MAKE SMOOTH JUNCTIONS WITH EXISTING WORK, AS APPROPRIATE.

MATERIALS:

1. MATERIALS AND WORKMANSHIP SHALL BE THE BEST OF THEIR KIND AND UNLESS OTHERWISE SPECIFIED, SHALL CONFORM TO RELEVANT AUSTRALIAN STANDARDS.

SUBSURFACE DRAINAGE:

1. SUBSURFACE DRAINAGE IS TO BE INSTALLED ALONG THE EDGE OF ALL PAVEMENT AS DETAILED, OR AS DIRECTED BY THE PRINCIPAL.
2. SUBSURFACE LINE PIPES AND FITTINGS SHALL BE PERFORATED PLASTIC TO AS2439 PART 1. LAY PIPES ON 100mm OF FILTER MATERIAL GRADED AT MINIMUM 1% AND OVERLAY WITH FILTER MATERIAL EXTENDING TO UNDERSIDE OF PAVEMENT SUB-BASE. PROVIDE FILTER FABRIC AROUND TRENCH AS DETAILED.
3. TRENCHES SHALL BE MINIMUM 300mm IN WIDTH AND EXCAVATED TO AT LEAST 500mm BELOW SUBGRADE LEVEL.
4. BACKFILL FILTER MATERIAL SHALL MEET THE GRADING REQUIREMENTS AS SET OUT IN MR538. HOWEVER COARSER MATERIAL WILL BE PERMISSIBLE IF THE ENTIRE BACKFILL IS WRAPPED IN A GEOTEXTILE FABRIC (BIDIM A14 OR TERRAM 1000, OR EQUIVALENT).
5. "NYLEX STRIP DRAIN" OR EQUIVALENT MAY BE CONSIDERED AN ALTERNATIVE TO CONVENTIONAL SUBSURFACE DRAINS BUT WILL REQUIRE THE SPECIFIC PERMISSION OF THE PRINCIPAL IN EACH CASE.
6. ALL SUBSURFACE DRAINAGE IS TO DISCHARGE DIRECTLY TO A DESIGNATED STORMWATER SYSTEM.

EXISTING SERVICES:

1. THE CONTRACTOR IS TO INFORM THEMSELVES OF ALL EXISTING SERVICES. ATTEND TO EXISTING SERVICES AS FOLLOWS:
   (a) IF THE SERVICE(S) IS/ARE TO BE CONTINUED, PROTECT, REPAIR, DIRECT OR RELOCATE AS REQUIRED. IF SUCH A SERVICE(S) CROSSES THE LINE OF A TRENCH, OR WILL LOSE SUPPORT WHEN THE TRENCH IS EXCAVATED, PROVIDE PERMANENT SUPPORT FOR THE EXISTING SERVICES.
   (b) IF THE SERVICE IS TO BE ABANDONED, CUT AND SEAL OR DISCONNECT, AND MAKE SAFE.
2. THE CONTRACTOR'S PRICE IS TO ALLOW FOR HAND EXCAVATION AND BACKFILL NEAR ALL EXISTING SERVICES OR IN AREAS WHERE THERE MAY BE EXISTING SERVICES.
3. THE COST OF DEALING WITH ALL EXISTING SERVICES AS ABOVE, AND THE TIME ASSOCIATED WITH THE WORK, IS TO BE INCLUDED IN THE TENDER.
4. THE PRINCIPAL AND THE DESIGN CONSULTANT WILL NOT BE RESPONSIBLE FOR DAMAGES TO EXISTING SERVICES. THE CONTRACTOR IS TO TAKE ALL ACTION NECESSARY TO AVOID DAMAGE TO EXISTING SERVICES.

STANDARDS AND TEST METHODS:

1. UNLESS OTHERWISE SPECIFIED IN THE CONTRACT, AND WHERE APPLICABLE, MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT STANDARD OF THE STANDARDS ASSOCIATION OF AUSTRALIA.
2. A STANDARD APPLICABLE TO THE WORKS SHALL BE THE EDITION LAST PUBLISHED 14 DAYS PRIOR TO THE CLOSING DATE FOR TENDERS UNLESS OTHERWISE SPECIFIED.
3. OVERSEAS STANDARDS AND OTHER STANDARD DOCUMENTS NAMED IN THE SPECIFICATION SHALL BE APPLICABLE IN THE SAME MANNER AS AUSTRALIAN STANDARDS TO RELEVANT MATERIALS AND WORKMANSHIP.
4. COPIES OF ANY STANDARDS QUOTED OR REFERRED TO IN THE SPECIFICATION SHALL BE KEPT ON THE SITE IF SO SPECIFIED.
5. WHERE NO SUITABLE TEST METHODS ARE AVAILABLE, THOSE OF THE RMS OR PWD (AS APPROPRIATE) SHALL BE USED.

PROVISION FOR TRAFFIC:

1. THE CONTRACTOR SHALL ENSURE THE SAFE PASSAGE OF VEHICLES AND/OR PEDESTRIANS AROUND THE WORK SITE AT ALL TIMES TO STATUTORY REQUIREMENTS.
2. THE CONTROLS FOR VEHICULAR TRAFFIC MUST CONFORM TO THE RMS "TRAFFIC CONTROL AT WORK SITES MANUAL".
3. SIGNS OR BARRIERS USED FOR TRAFFIC CONTROL SHALL COMPLY WITH AS1742 "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" AND WITH RMS "GUIDELINES TO SIGNS AND MARKINGS MANUAL".
4. THE CONTRACTOR IS TO PROVIDE PROPER PROVISION FOR TRAFFIC ON ADJACENT ROADS, AND MAINTAIN EXISTING VEHICULAR ACCESS TO PROPERTIES IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD AND STATUTORY REQUIREMENTS.

STORMWATER DRAINAGE NOTES

1. STORMWATER DRAINAGE SHALL BE GENERALLY IN ACCORDANCE WITH AS3500.3
2. PIPES OF 225mm DIA. AND UNDER SHALL BE uPVC TO AS1254.
3. PIPES OF 300mm DIA. AND LARGER SHALL BE CONCRETE CLASS 4 TO AS4058, RUBBER RING JOINTED UNO.
4. PIPES UP TO 150mm DIA. SHALL BE LAID AT A MINIMUM GRADE OF 1.0 %. PIPES 225mm DIA. AND OVER TO BE LAID AT A MINIMUM GRADE OF 0.5% U.N.O. BEDDING MATERIAL TO AS2032 OR AS3725 AS APPROPRIATE.
5. MINIMUM COVER TO PIPES 300mm DIA. AND OVER GENERALLY SHALL BE 450mm IN CARPARK & ROADWAY AREAS UNO.
6. BACKFILL TRENCHES WITH APPROVED FILL, SUCH AS SANDY LOAM, COMPACTED IN 200mm LAYERS TO 98% OF STANDARD DENSITY TO AS1289.5.1.1.
7. ANY PIPES OVER 15% GRADE SHALL HAVE CONCRETE BULKHEADS AT ALL JOINTS.
8. PITS SHALL BE OF REINFORCED CONCRETE CONSTRUCTION AS DETAILED U.N.O. METAL GRATES AT LEVELS INDICATED. ALL PITS DEEPER THAN 1200mm TO HAVE CLIMB IRONS.
9. BUILD INTO UPSTREAM FACE OF ALL PITS A 3.0m SUBSURFACE LINE FALLING TO PITS TO MATCH PIT INVERT.
10. DRAINAGE PITS MAY ONLY BE SUBSTITUTED WITH ALTERNATIVE PRECAST PITS WITH THE PRIOR APPROVAL OF THE PRINCIPAL OR AS INDICATED ON THE DRAWINGS.

HAULAGE:

1. ROUTES FOR HAULAGE ROADS SHOULD BE CHOSEN TO MINIMISE THE IMPACT OF CONSTRUCTION WORKS ON EXISTING RESIDENTIAL AREAS.
2. THE CONTRACTOR SHALL ENSURE THAT NO SITE MATERIAL IS TRACKED ONTO ANY ADJOINING PUBLIC ROADS. ALL PUBLIC ROADS ARE TO BE KEPT CLEAN AT ALL TIMES.

GENERAL STRUCTURAL NOTES

1. THE ENGINEER SHALL VIEW AND APPROVE ALL CONCRETE WORK PRIOR TO THE POURING OF ANY CONCRETE.
2. ALL WORKS CONDUCTED SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE RELEVANT AUSTRALIAN STANDARDS (INCLUDING ALL AMENDMENTS) AND THE CURRENT EDITION OF THE BUILDING CODE OF AUSTRALIA.
3. THE CONTRACTOR IS TO ENSURE THAT ALL WORK IS DONE IN A SAFE MANNER AND IN ACCORDANCE WITH ALL APPLICABLE SAFEWORK NSW REGULATIONS AND ANY OTHER APPLICABLE STATUTORY AUTHORITY REGULATIONS.
4. WHERE MIENGINEERS RELIES ON THE INFORMATION SUPPLIED BY OTHERS TO PRODUCE THE DESIGNS, WE ACCEPT NO LIABILITY FOR ERRORS, TO THE EXTENT THAT THE DESIGN HAS MADE RELIANCE ON THIS INFORMATION.

CONCRETE NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL COMPLY WITH THE CURRENT EDITION OF AS3600.
2. CONCRETE STRENGTH SHALL BE AS FOLLOWS U.N.O.:

ELEMENT	SLAB ON GROUND (EXTERNAL)
STRENGTH	N32
SLUMP	100mm
MAX. AGG. SIZE	20mm

3. CLEAR CONCRETE COVER TO REINFORCEMENT SHALL BE AS FOLLOWS U.N.O.:

ELEMENT	TOP	BOTTOM	SIDE
SLAB ON GROUND (EXTERNAL)	40	40	40

4. ALL CONCRETE SHALL BE COMPACTED ADEQUATELY IN ACCORDANCE WITH AS3600 BY THE USE OF A MECHANICAL VIBRATOR.
5. ALL CONCRETE SHALL BE CURED IN ACCORDANCE WITH AS3600.
6. REINFORCEMENT SYMBOLS:
   N - DENOTES GRADE 500 DEFORMED BARS TO AS4671
   R - DENOTES GRADE 250 N PLAIN BARS TO AS4671
   SL - DENOTES WELDED GRADE 500 REINFORCING FABRIC TO AS4671
7. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
8. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN OR OTHERWISE APPROVED IN WRITING BY THE ENGINEER. LAPS SHALL BE IN ACCORDANCE WITH AS3600 AND NOT LESS THAN THE DEVELOPMENT LENGTH FOR EACH BAR.

REINFORCEMENT LAP LENGTHS (LESS THEN 300mm OF CONCRETE BELOW THE BAR)			
BAR SIZE			
N12	N16	N20	N24
500	740	1000	1240

REINFORCEMENT LAP LENGTHS (MORE THEN 300mm OF CONCRETE BELOW THE BAR)			
BAR SIZE			
N12	N16	N20	N24
650	960	1300	1600

9. MINIMUM OVERALL DIMENSIONS OF 180° HOOKS AND 90° COGS MAY BE NO SMALLER THEN THE FOLLOWING TABLE:

180° HOOKS OVERALL DIMENSION (X)				
PIN DIA.	BAR NOMINAL SIZE (D)			
	12	16	20	24
3D	60	-	-	-
4D	70	100	120	140

90° COGS OVERALL DIMENSION (Y)				
PIN DIA.	BAR NOMINAL SIZE (D)			
	12	16	20	24
3D	160	-	-	-
4D	170	200	240	280

STAINLESS STEEL NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL COMPLY WITH THE CURRENT EDITION OF AS4673.
2. ALL STAINLESS STEEL TO BE GRADE 316L UNO.
3. ALL WELDING SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF AS1554.6
4. ALL WELDS TO BE 6mm CFW UNO

WORK-AS-EXECUTED DRAWINGS:

1. THE CONTRACTOR SHALL SUPPLY THE PRINCIPAL WITH FULL MARKED-UP AND CERTIFIED WORK-AS-EXECUTED DRAWINGS FOR THE WHOLE OF THE CONTRACT PRIOR TO THE FINAL CERTIFICATE. PRINTS OR REPRODUCIBLES OF THE CONTRACT DRAWINGS WILL BE SUPPLIED BY THE PRINCIPAL FREE OF CHARGE FOR THIS PURPOSE.
2. WORK-AS-EXECUTED DRAWINGS FOR ROADWORKS OR CARPARKS SHALL SHOW IN RED INK, ALL CHANGES TO THE CONTRACT DRAWINGS AND ACTUAL VALUES OF ALL LEVELS SHOWN ON THE DRAWINGS. THE DRAWINGS SHALL BE SIGNED BY A REGISTERED SURVEYOR AND CERTIFIED BY THE CONTRACTOR.
3. WORK-AS-EXECUTED DRAWINGS FOR DRAINAGE AND SEWER WORKS WHERE APPLICABLE SHALL SHOW IN RED INK ALL CHANGES TO THE CONTRACT DRAWINGS, INCLUDING VARIATIONS TO LEVELS, DIMENSIONS, CONCRETE, REINFORCEMENT AND OTHER MATERIALS. THE DRAWINGS SHALL BE CERTIFIED BY THE CONTRACTOR.

WORKING AREA:

1. THE PRINCIPAL WILL NOT BE RESPONSIBLE FOR THE SAFE KEEPING OF ANY OF THE CONTRACTOR'S PLANT, EQUIPMENT, TOOLS, MATERIALS OR OTHER PROPERTY. THE CONTRACTOR MAY PROVIDE, AT THEIR OWN COST, ANY SECURITY FENCING CONSIDERED NECESSARY AROUND THE SITE OFFICE, WORKSHOPS OR STORAGE AREAS, SUBJECT TO THE PRINCIPAL'S PRIOR APPROVAL.
2. IF EXISTING FENCING IS CUT OR ALTERED BY THE CONTRACTOR, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN TEMPORARY FENCING TO THE SATISFACTION OF THE PRINCIPAL DURING THE CONTRACT TO PREVENT UNAUTHORISED ENTRY INTO THE PROPERTY, AND SHALL REINSTATE THE FENCING AND REMOVE TEMPORARY FENCING ON COMPLETION OF THE WORK.

LEGEND

S — S	EXISTING SEWER LINE
SR — SR	EXISTING SEWER RISING MAIN
T — T	EXISTING TELSTRA LINE
G — G	EXISTING GAS LINE
E — E	EXISTING ELECTRICITY LINE
W — W	EXISTING WATER MAIN
C — C	EXISTING COMMUNICATIONS LINE
OP — OP	EXISTING OVERHEAD POWER LINE
OF — OF	EXISTING OPTIC FIBER
SW — SW	EXISTING STORMWATER LINE
	BOUNDARY LINE
	EASEMENT
PP ○	EXISTING POWER POLE
EX. WM ⊗	EXISTING WATER METER
EX. HYD ○	EXISTING HYDRANT
EX. SV ✕	EXISTING STOP VALVE
Ex.SMH ○	EXISTING SEWER MANHOLE
	EXISTING SEALED ROAD

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REVISION	AMENDMENTS	DATE	CKD	APP
A	ISSUED FOR REVIEW	30.06.21	-	AS

SURVEYOR: SHOALHAVEN CITY COUNCIL
DATE OF SURVEY: VARIOUS 2021
ORIGIN: PM27347
HEIGHT OF DATUM: RL 19.556
HORIZONTAL DATUM: -

CLIENT: Shoalhaven City Council

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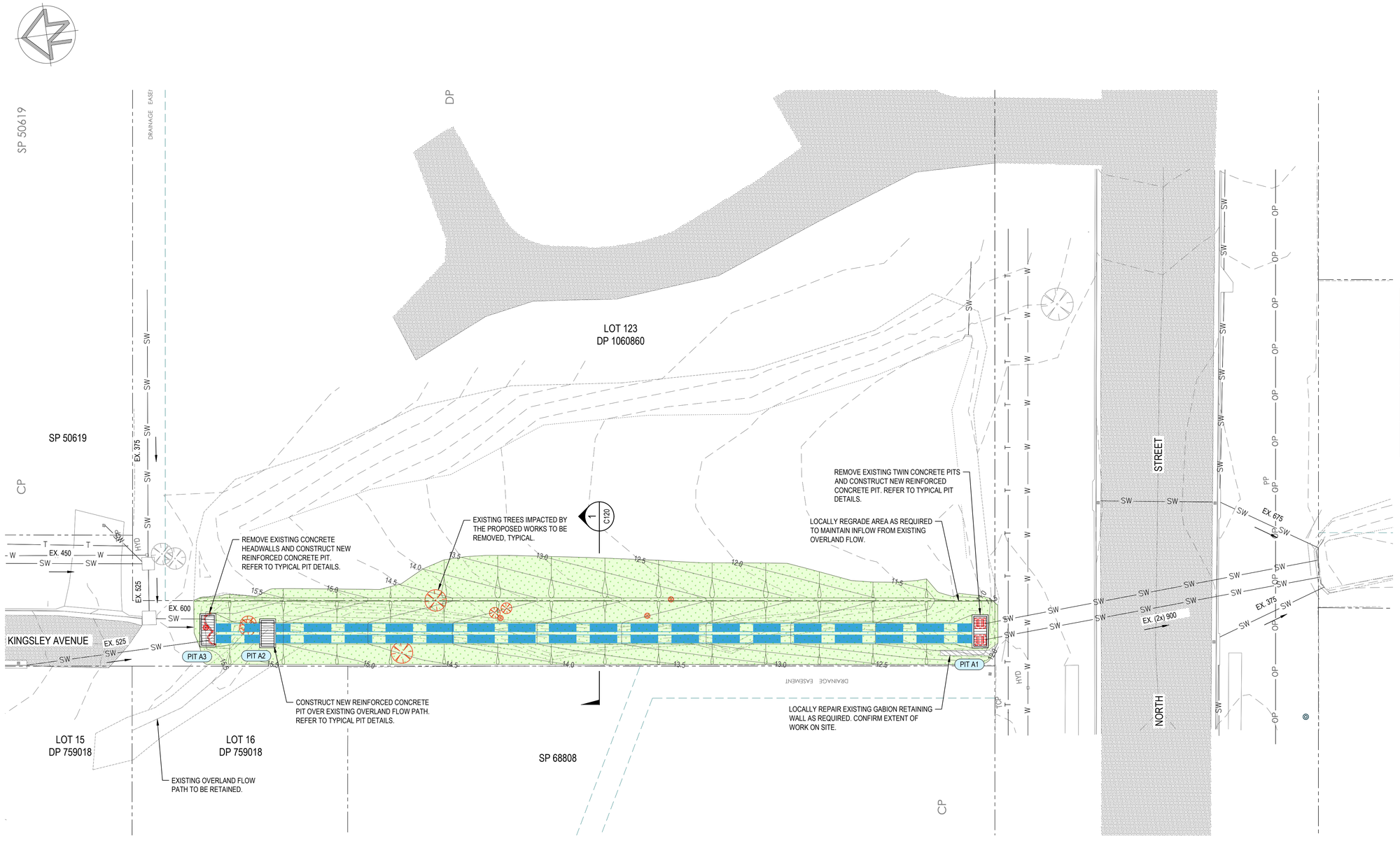
PROJECT : PROPOSED STORMWATER DRAINAGE UPGRADE KINGSLEY AVENUE TO NORTH STREET, ULLADULLA NSW 2539

DRAWING NAME: NOTES SHEET

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
RM	JH	-	A1

DRAWING STATUS: PRELIMINARY
DRAWING No.: C002
PROJECT No.: DN210142
REVISION: A

DO NOT SCALE



LEGEND

- PROPOSED STORMWATER LINE RCP CLASS 4 U.N.O.
- SS — PROPOSED SUB-SURFACE LINE uPVC
- PIT A1 — PROPOSED STORMWATER PIT
- PROPOSED CONTOUR (0.5m INTERVAL)
- EXISTING CONTOUR (0.5m INTERVAL)
- PROPOSED OVERLAND FLOW CHANNEL
- EXISTING SEALED ROAD
- EXISTING TREE TO BE RETAINED (NOTE, NOT ALL TREES SURVEYED)
- EXISTING TREE TO BE REMOVED
- EXISTING FEATURE TO BE DEMOLISHED

PIT SCHEDULE

LABEL	PIT TYPE	DIMENSIONS (mm)		COMMENTS
		W1	W2	
A1	CAST-IN-SITU REINFORCED CONCRETE PIT WITH 2/1200x1200 RAISED STEEL SURCHARGE GRATES	2800	1200	REMOVE EXISTING TWIN CONCRETE PITS AND CONNECT EXISTING (2x)900 RCP
A2	CAST-IN-SITU REINFORCED CONCRETE PIT WITH 2/1200x1200 RAISED STEEL SURCHARGE GRATES	2400	1200	
A3	CAST-IN-SITU REINFORCED CONCRETE PIT WITH 2/1200x1200 RAISED STEEL SURCHARGE GRATES	2800	1200	REMOVE EXISTING CONCRETE HEADWALLS AND CONNECT EXISTING 600mm RCP AND 525 RCP

0 4 8 12 16 20m
4 3 2 1
SCALE 1:200

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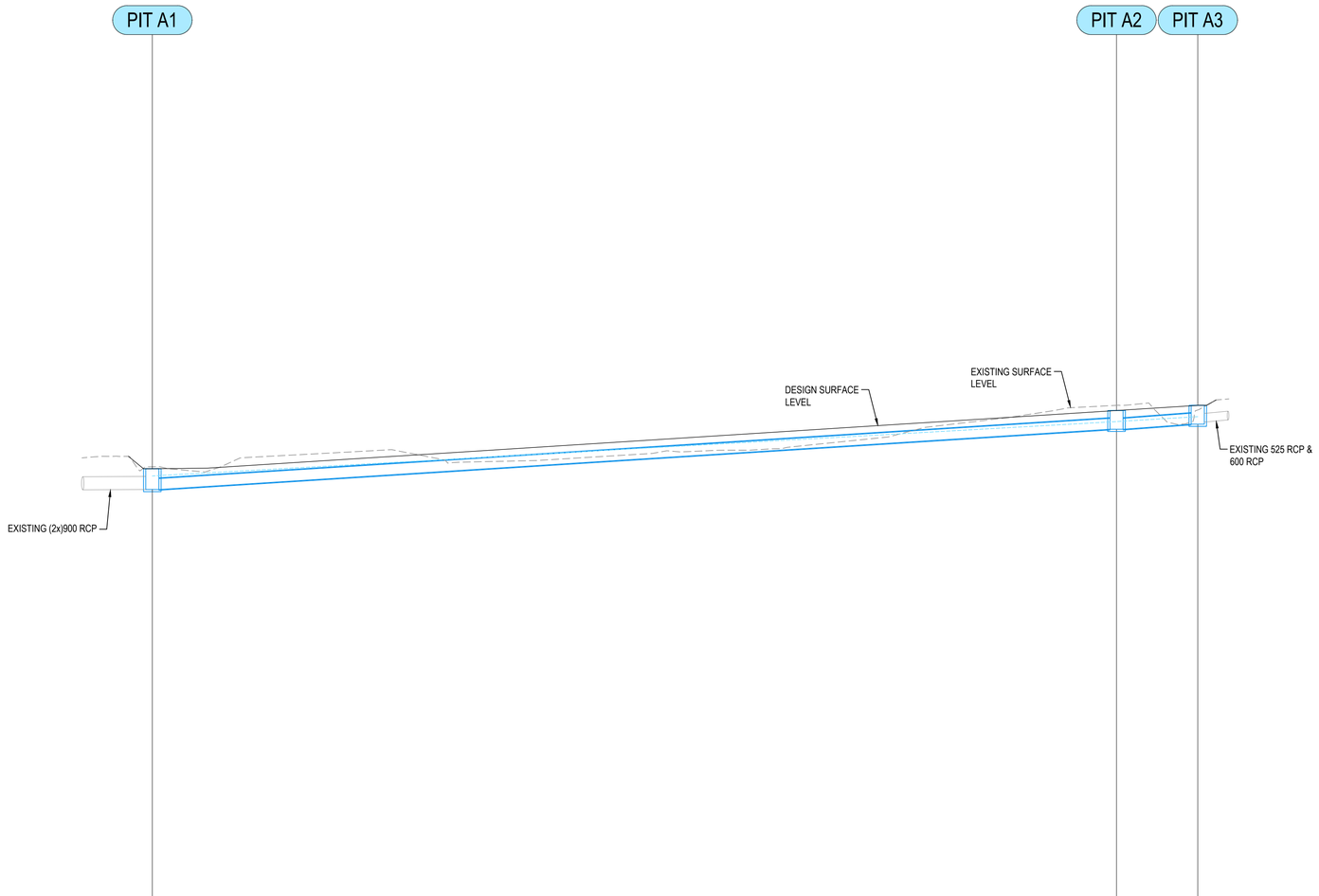
PROJECT :
PROPOSED STORMWATER DRAINAGE UPGRADE
KINGSLEY AVENUE TO NORTH STREET,
ULLADULLA NSW 2539

DRAWING NAME:
GENERAL ARRANGEMENT PLAN

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
RM	JH	1:200	A1

DRAWING STATUS: PRELIMINARY
DRAWING No.: C100
PROJECT No.: DN210142
REVISION: A

DO NOT SCALE



5 YEAR ARI VELOCITY (m/s)	V=2.90		V=2.89
5 YEAR ARI PIPE FLOW (m^3/s)	Q=1.98		Q=1.89
GRADE (%)	6.25%		6.25%
PIPE SIZE (mm) PIPE CLASS	(2x)750 RCP CLASS 4		(2x)750 RCP CLASS 4
DATUM	-29.00		
DEPTH TO INVERT	1.43	1.29	1.29 1.30
5 YEAR ARI H.G.L.	10.58	14.33	14.33 14.67
INVERT LEVEL	9.65	13.80	13.80 14.15
DESIGN SURFACE LEVEL	11.08	15.09	15.45
EXISTING SURFACE LEVEL	11.21	15.45	15.13
CHAINAGE	0.00	66.44	72.04

LINE A

HORIZONTAL SCALE 1 : 200
VERTICAL SCALE 1 : 200

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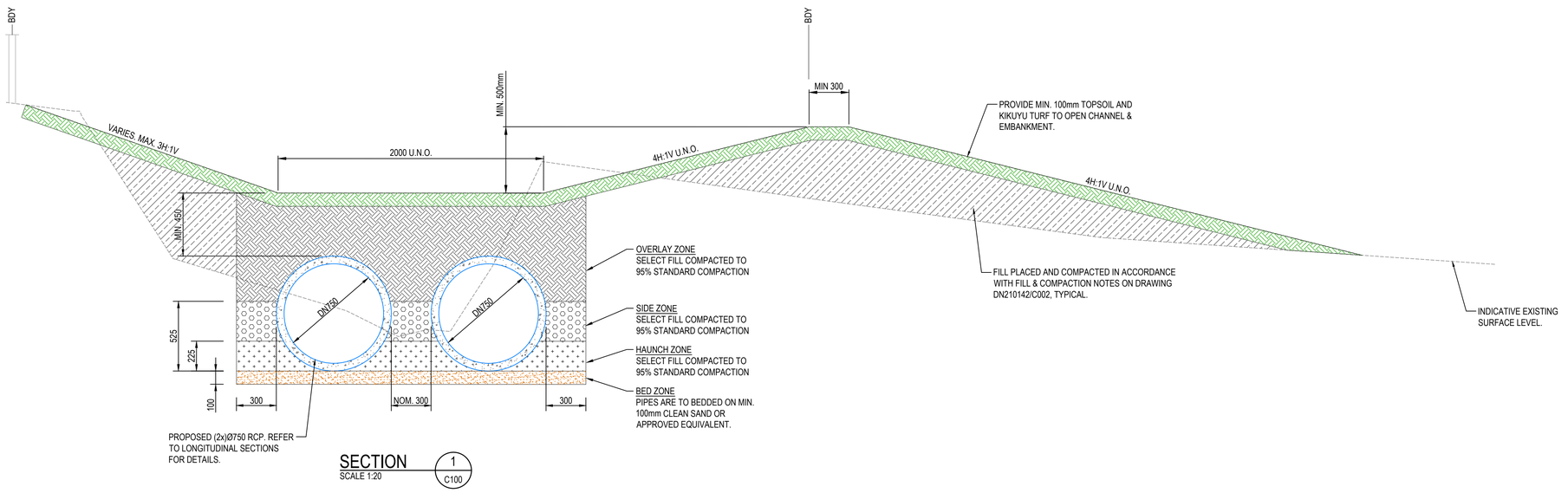
PROJECT : PROPOSED STORMWATER DRAINAGE UPGRADE KINGSLEY AVENUE TO NORTH STREET, ULLADULLA NSW 2539

DRAWING NAME: STORMWATER LONGITUDINAL SECTION

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
RM	JH	1:200	A1

DRAWING STATUS: PRELIMINARY
DRAWING No.: C110
PROJECT No.: DN210142
REVISION: A

DO NOT SCALE

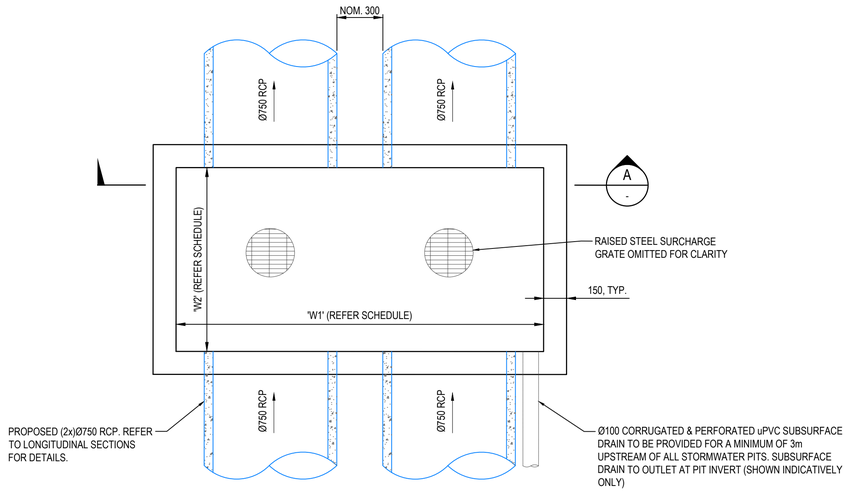


SECTION 1 / C100
SCALE 1:20

TYPICAL STORMWATER PIPE TRENCH DETAIL NON-TRAFFICABLE

SCALE 1:20

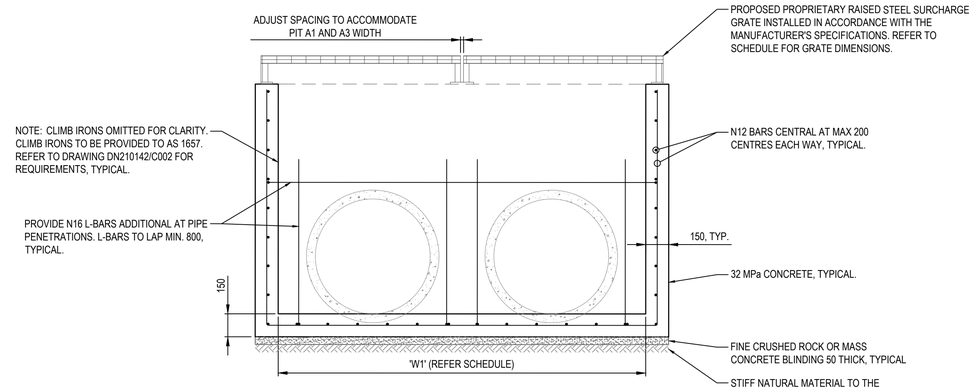
HS2 TRENCH INSTALLATION TO BE IN ACCORDANCE WITH CPAA GUIDELINES, TYPICAL.



TYPICAL CAST-IN-SITU STORMWATER PIT DETAIL - PLAN

SCALE 1:20

NOTE: FOR DIMENSIONS REFER TO PIT SCHEDULE.
FOR LEVELS REFER TO LONGITUDINAL SECTION



SECTION A / -
SCALE 1:20

TYPICAL CAST-IN-SITU STORMWATER PIT DETAIL

SCALE 1:20

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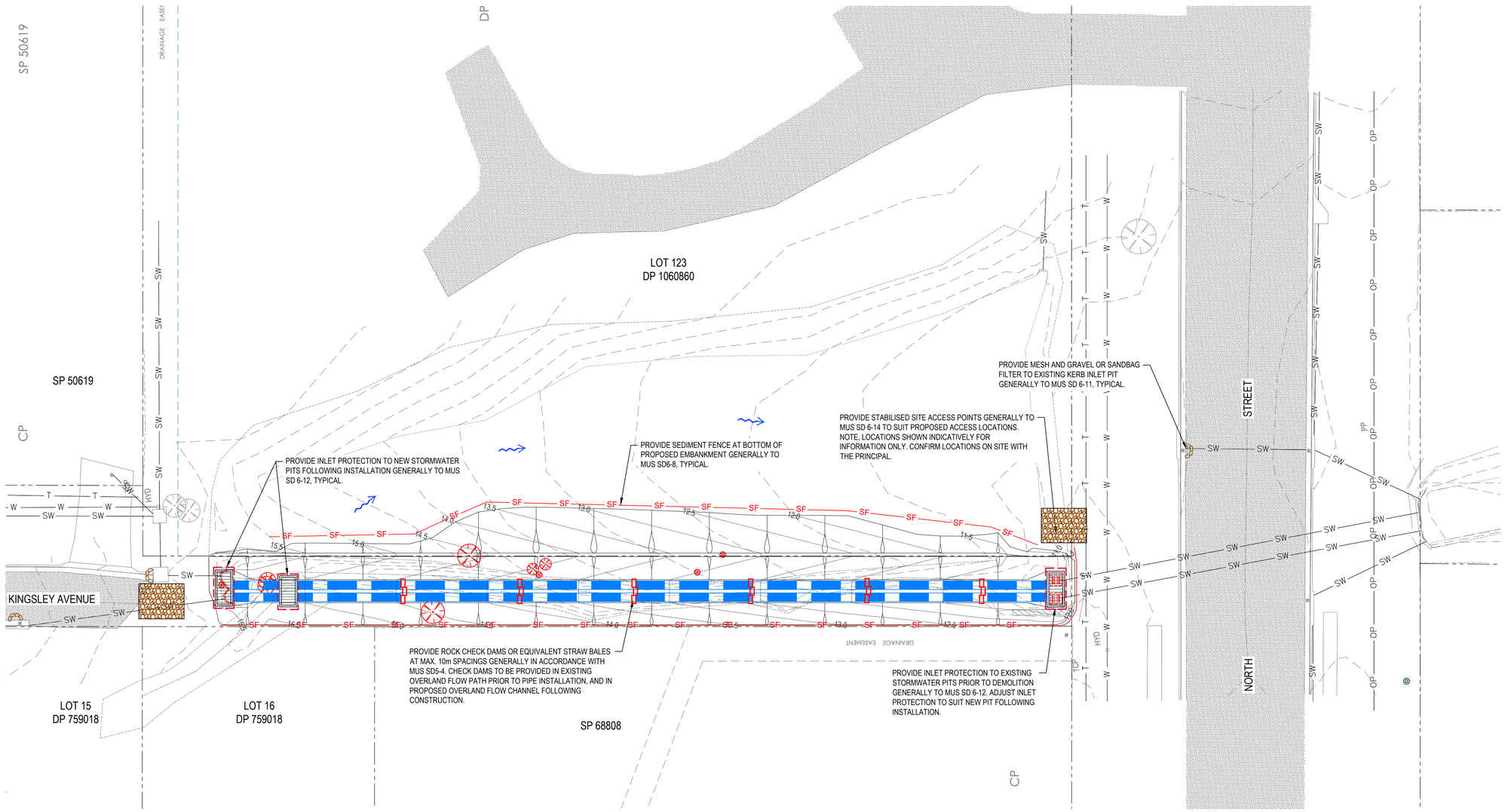
PROJECT: PROPOSED STORMWATER DRAINAGE UPGRADE KINGSLEY AVENUE TO NORTH STREET, ULLADULLA NSW 2539

DRAWING NAME: TYPICAL DETAILS & SECTIONS

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
RM	JH	AS NOTED	A1

DRAWING STATUS: PRELIMINARY
DRAWING No.: C120
PROJECT No.: DN210142
REVISION: A

DO NOT SCALE



0 4 8 12 16 20m

4 3 2 1

SCALE 1:200

SOIL & WATER MANAGEMENT LEGEND

- SF — PROPRIETARY SEDIMENT FENCE (SD 6-8)
- TEMPORARY STABALISED CONSTRUCTION ENTRY/EXIT. (SHAKER PAD) (SD 6-14)
- DIRECTION OF FLOW
- DIVERSION BANK (SD 5-5)
- SURFACE INLET DRAINAGE PIT WITH SURROUNDING FILTER FABRIC INLET SEDIMENT TRAP OR FILTER TUBES (SANDBAGS) (SD 6-11/SD 6-12)
- ROCK CHECK DAMS OR STRAW BALE SEDIMENT TRAP (SD 5-4)
- SANDBAG SEDIMENT INLET TRAP

SOIL & WATER MANAGEMENT NOTES

1. REFER GENERALLY TO DRAWING DN210142/C002 FOR SOIL & WATER MANAGEMENT NOTES.
2. EXAMPLE MANAGING URBAN STORMWATER (MUS) STANDARD DRAWINGS ARE PROVIDED ON DRAWING DN210142/CE02.
3. TOPSOIL & OTHER MATERIAL STOCKPILE LOCATIONS ARE TO BE DETERMINED ON SITE BY THE CONTRACTOR AND APPROVED BY THE PRINCIPAL. TOPSOIL IS TO BE STOCKPILED GENERALLY IN ACCORDANCE WITH MUS SD 4-1.

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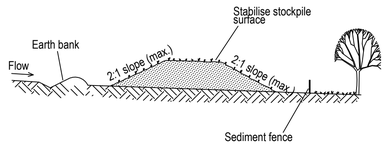
PROJECT: PROPOSED STORMWATER DRAINAGE UPGRADE KINGSLEY AVENUE TO NORTH STREET, ULLADULLA NSW 2539

DRAWING NAME: SOIL & WATER MANAGEMENT PLAN

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
RM	JH	1:200	A1

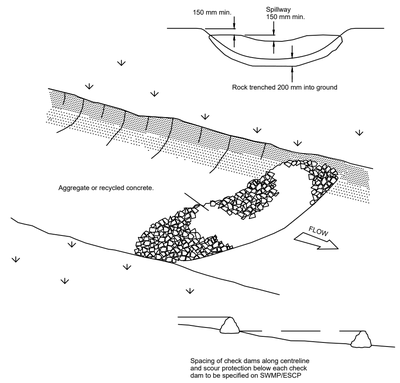
DRAWING STATUS: PRELIMINARY
DRAWING No.: CE01
PROJECT No.: DN210142
REVISION: A



Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

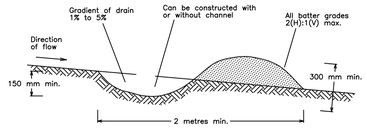
STOCKPILES SD 4-1



Construction Notes

1. Check dams can be built with various materials, including rocks, logs, sandbags and straw bales. The maintenance program should ensure their integrity is retained, especially where constructed with straw bales. In the case of bales, this might require their replacement each two to four months.
2. Trench the check dam 200 mm into the ground across its whole width. Where rock is used, fill the trenches to at least 100 mm above the ground surface to reduce the risk of undercutting.
3. Normally, their maximum height should not exceed 600 mm above the gully floor. The centre should act as a spillway, being at least 150 mm lower than the outer edges.
4. Space the dams so the toe of the upstream dam is level with the spillway of the next downstream dam.

ROCK CHECK DAM SD 5-4

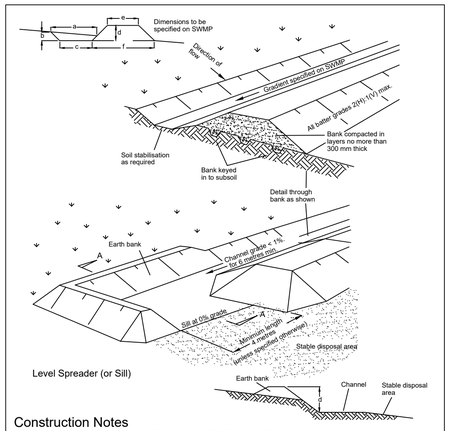


NOTE: Only to be used as temporary bank where maximum upslope length is 80 metres.

Construction Notes

1. Build with gradients between 1 percent and 5 percent.
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction.

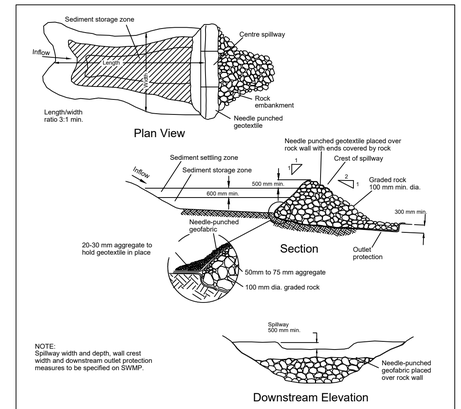
EARTH BANK (LOW FLOW) SD 5-5



Construction Notes

1. Construct at the gradient specified on the ESCP or SWMP, normally between 1 and 5 percent
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V-shaped, at the dimensions shown on the SWMP.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction
7. Where discharging to erodible lands, ensure they outlet through a properly constructed level spreader.
8. Construct the level spreader at the gradient specified on the ESCP or SWMP, normally less than 1 percent or level.
9. Where possible, ensure they discharge waters onto either stabilised or undisturbed disposal sites within the same subcatchment area from which the water originated. Approval might be required to discharge into other subcatchments.

EARTH BANK (HIGH FLOWS) SD 5-6

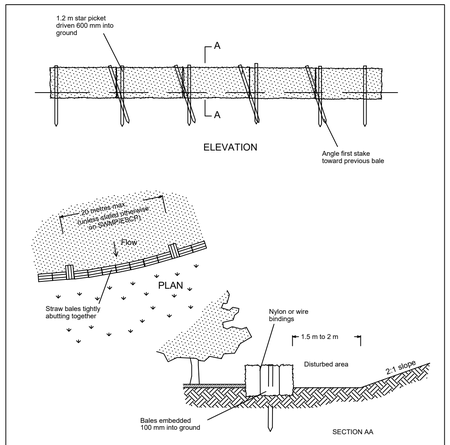


NOTE:
Spillway width and depth, wall crest width and downstream outlet protection measures to be specified on SWMP.

Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Excavate to 300 mm depth for base of the dam wall.
3. Line the excavation with a needle-punched geotextile allowing sufficient to line below the wall, and over the upstream rock and the spillway to 500 mm below the spillway exit on the downstream face.
4. Make up the wall profile and outlet protection with100 mm (min.) diameter graded rock. Spread a layer of 50 mm to 75 mm diameter aggregate over the upstream batter for a more even surface, and add 100 mm to 150 mm of 20 mm to 30 mm gravel over the 50 mm to 75 mm diameter aggregate.
5. Lay geotextile over the upstream batter and through the spillway, fixing in place with 100 mm rock.
6. Place a "Full of Sediment" marker to show when less than design capacity occurs and sediment removal is required.
7. Replace the upstream geotextile layer each time sediment is removed

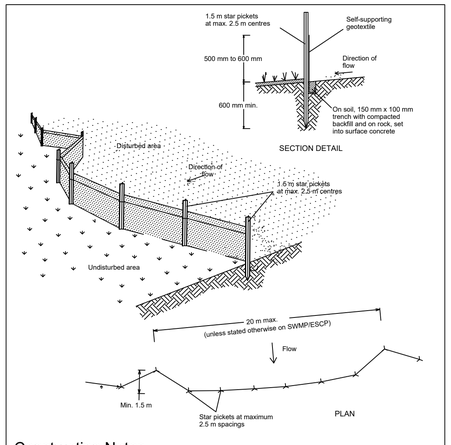
ROCK SEDIMENT BASIN SD 6-1
(APPLIES TO 'TYPE C' SOILS ONLY)



Construction Notes

1. Construct the straw bale filter as close as possible to being parallel to the contours of the site.
2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws are to be placed parallel to ground.
3. Ensure that the maximum height of the filter is one bale.
4. Embed each bale in the ground 75 mm to 100 mm and anchor with two 1.2 metre star pickets or stakes. Angle the first star picket or stake in each bale towards the previously laid bale. Drive them 600 mm into the ground and, if possible, flush with the top of the bales. Where star pickets are used and they protrude above the bales, ensure they are fitted with safety caps.
5. Where a straw bale filter is constructed downslope from a disturbed batter, ensure the bales are placed 1 to 2 metres downslope from the toe.
6. Establish a maintenance program that ensures the integrity of the bales is retained - they could require replacement each two to four months.

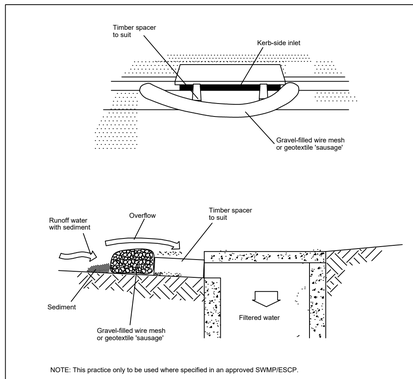
STRAW BALE FILTER SD 6-7



Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE SD 6-8

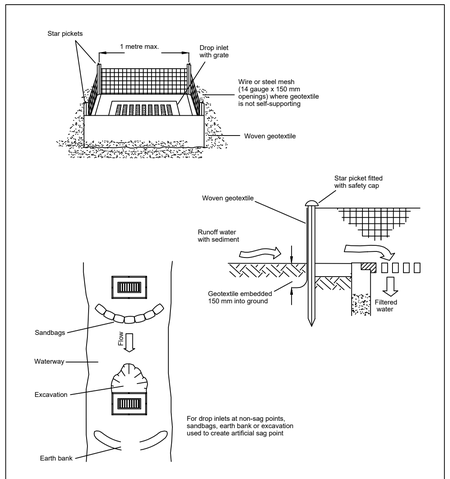


NOTE: This practice only to be used where specified in an approved SWMP/ESCP.

Construction Notes

1. Install filters to kerb inlets only at sag points.
2. Fabricate a sleeve made from geotextile or wire mesh longer than the length of the inlet pit and fill it with 25 mm to 50 mm gravel.
3. Form an elliptical cross-section about 150 mm high x 400 mm wide.
4. Place the filter at the opening leaving at least a 100-mm space between it and the kerb inlet. Maintain the opening with spacer blocks.
5. Form a seal with the kerb to prevent sediment bypassing the filter.
6. Sandbags filled with gravel can substitute for the mesh or geotextile providing they are placed so that they firmly abut each other and sediment-laden waters cannot pass between.

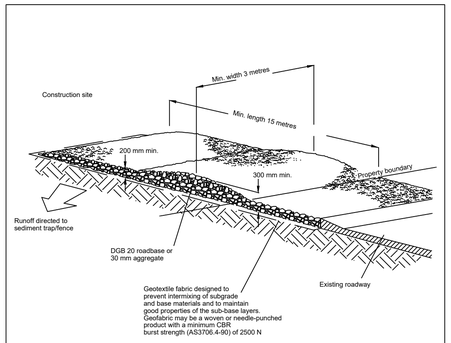
MESH AND GRAVEL INLET FILTER SD 6-11



Construction Notes

1. Fabricate a sediment barrier made from geotextile or straw bales.
2. Follow Standard Drawing 6-7 and Standard Drawing 6-8 for installation procedures for the straw bales or geofabric. Reduce the picket spacing to 1 metre centres.
3. In waterways, artificial sag points can be created with sandbags or earth banks as shown in the drawing.
4. Do not cover the inlet with geotextile unless the design is adequate to allow for all waters to bypass it.

GEOTEXTILE INLET FILTER SD 6-12



Construction Notes

1. Strip the topsoil, level the site and compact the subgrade.
2. Cover the area with needle-punched geotextile.
3. Construct a 200 mm thick pad over the geotextile using road base or 30 mm aggregate.
4. Ensure the structure is at least 15 metres long or to building alignment and at least 3 metres wide.
5. Where a sediment fence joins onto the stabilised access, construct a hump in the stabilised access to divert water to the sediment fence

STABILISED SITE ACCESS SD 6-14

NOT FOR CONSTRUCTION

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MIENGINEERS.COM

PROJECT :
PROPOSED STORMWATER DRAINAGE UPGRADE
KINGSLEY AVENUE TO NORTH STREET,
ULLADULLA NSW 2539

DRAWING NAME:
SOIL & WATER MANAGEMENT DETAILS

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
RM	JH	NTS	A1

DRAWING STATUS: PRELIMINARY
DRAWING No.: CE02
PROJECT No.: DN210142
REVISION: A

Appendix B: Threatened Species Likelihood of Occurrence and Need for Assessment

(based on Bionet Atlas Search 29/07/2022)

Species / EECs	No. of records	Assessment – likelihood of occurrence and need for assessment
Stuttering Frog *Mixophyes balbus*	1	Unlikely. The species is found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. This habitat is not present at the site of the proposed activity. Further assessment is not required.
Giant Burrowing Frog *Heleioporus australiacus*	4	Unlikely. The species is found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. This habitat is not present at the site of the proposed activity. Further assessment is not required.
Loggerhead Turtle *Caretta caretta*	1	Unlikely. This is an ocean-dwelling species. Further assessment is not required.
Green Turtle *Chelonia mydas*	3	Unlikely. This is an ocean-dwelling species. Further assessment is not required.
Freckled Duck *Stictonetta naevosa*	1	Unlikely. The species prefers permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. This habitat is not present at the site of the proposed activity. Further assessment is not required.

Species / EECs	No. of records	Assessment – likelihood of occurrence and need for assessment
Superb Fruit-Dove *Ptilinopus superbus*	3	Unlikely. The species inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. This habitat is not present at the site of the proposed activity. Further assessment is not required.
Shy Albatross *Thalassarche cauta*	3	Unlikely. This is a pelagic or ocean-going species inhabits subantarctic and subtropical marine waters, spending the majority of tis time at sea. This habitat is not present at the site of the proposed activity. Further assessment is not required.
Black-browed Albatross *Thallassarche melanophris*	3	Unlikely. This species inhabits Antarctic, subantarctic, subtropical marine and coastal waters over upwellings and boundaries of currents. This habitat is not present at the site of the proposed activity. Further assessment is not required.
Southern Giant Petrel *Macronectes giganteus*	1	Unlikely. Over summer, the species nests in small colonies amongst open vegetation on Antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory. This habitat is not present at the site of the proposed activity. Further assessment is not required.
White-bellied Sea-eagle *Haliaeetus leucogaster*	24	Unlikely. Habitats are characterised by the presence of large open areas of water including larger rivers, swamps, lakes and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater

Species / EECs	No. of records	Assessment – likelihood of occurrence and need for assessment
		swamps, lakes, reservoirs, billabongs and saltmarsh. This habitat is not present at the site of the proposed activity. Further assessment is not required.
Square-tailed Kite *Lophoictinia isura*	4	Unlikely. The species is found in a variety of timbered habitats including dry woodlands and open forests. Shows a preference for timbered watercourses. This habitat is not present at the site of the proposed activity. Further assessment is not required.
Eastern Osprey *Pandion cristatus*	6	Unlikely to occur. The species favours coastal areas, especially the mouths of large rivers, lagoons and lakes and feeds on fish over clear, open water. There is no such habitat on the proposed development site. As a result, there is no need for further assessment
Sooty Oystercatcher *Haematopus fuliginosus*	25	Unlikely to occur This species favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Pied Oystercatcher *Haemotopus longirostris*	26	Unlikely. The species favours intertidal flats of inlets and bays, open beaches and sandbanks. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Eastern Hooded Dotterel *Tninornis cucullatus cucullatus*	12	Unlikely. The species prefers sandy beaches. There is no such habitat on the proposed development site. As a result, there is no need for further assessment

Species / EECs	No. of records	Assessment – likelihood of occurrence and need for assessment
Little Tern *Sternula albifrons*	4	Unlikely. The species almost exclusively favours coastal sheltered environments. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Gang-gang Cockatoo *Callocephalon fimbriatum*	7	Possible to occur The species has been recorded within 5 kilometres of the proposed development and the site comprises suitable habitat. However there is no need for further assessment as: • There are no actual populations known to occur at the site • There are no hollow-bearing trees that could provide a nest to be affected by the activity • The species is highly mobile and would leave the site in the unlikely event of the species being present in the area. The proposed activity would have no effect on individuals in a population and further assessment is not warranted.
Glossy Black-cockatoo *Calyptorynchus lathami*	46	Unlikely. The species inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Swift Parrot *Lathamus discolor*	3	Unlikely. This species migrates to the Australian south-east mainland between February and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp infestations. Favoured feed trees include winter flowering species such as swamp Mahogany, Spotted Gum, Red Bloodwood, Forest Red Gum, Mugga Ironbark, and White Box. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.

Species / EECs	No. of records	Assessment – likelihood of occurrence and need for assessment
Eastern Ground Parrot *Pezoporus wallicus wallicus*	1	Unlikely. The species occurs in high rainfall coastal and near coastal low heathlands and sedgelands, generally below one metre in height and very dense (up to 90% projected foliage cover). There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Powerful Owl *Ninox strenua*	24	Unlikely. The Powerful Owl inhabits woodland, open sclerophyll forest to tall open wet forest and rainforest. It requires large tracts of forest of woodland habitat. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Masked Owl *Tyto novaehollandiae*	4	Unlikely. The species lives in dry eucalypt forests and woodlands. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Sooty Owl *Tyto tenebricosa*	8	Unlikely The species occurs in rainforest, including rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Regent Honeyeater *Anthochaera Phrygia*	5	Unlikely. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forest of River Sheoak. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Varied Sittella *Daphoenositta chrysoptera*	3	Unlikely.

Species / EECs	No. of records	Assessment – likelihood of occurrence and need for assessment
		The species inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums and dead branches, mallee and Acacia woodland. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Dusky Woodswallow *Artamus cyanopterus cyanopterus*	1	Unlikely. The species primarily inhabits dry, open eucalypt forests and woodlands, including mallee associates, with an open or sparse understorey or eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. There is no such habitat at the proposed activity site or in the vicinity of the proposed activity.
Scarlett Robin *Petroica boobang*	2	Unlikely. The species lives in dry eucalypt forest and woodlands. The understorey is usually open and grassy with few scattered shrubs. There is no such habitat in the area of the proposed activity. Further assessment is not necessary.
Spotted-tailed Quoll *Dasyurus maculatus*	3	Unlikely. The species has been recorded across a range of habitat types, including rainforest, woodland, coastal heath and inland forest. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. There is no such habitat in the area of the proposed activity. Further assessment is not necessary.
Grey-headed Flying-fox *Pteropus poliocephalus*	48	Possible. The species has been recorded within five kilometres of the proposed development and the site comprises suitable habitat. However there is no need for further assessment as: • there are no actual populations known to occur at the site; there is only potential low quality habitat

Species / EECs	No. of records	Assessment – likelihood of occurrence and need for assessment
		• the loss of the small amount of vegetation would be inconsequential to the species use of the area • there are no camps currently or historically recorded in the area • At a local scale, the species has been recorded over a wide area. Nationally, it occurs within the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria (and sometimes South Australia). The loss of a small number of trees that are not breeding or roosting habitat would be inconsequential to the species. The proposed activity would have no effect on individuals in a population and habitat, further assessment is not required.
Eastern Coastal Freetail-bat *Mormopterus norfolkensis*	2	Possible occurrence but unlikely to be affected by the proposal for the following reasons: • No hollow-bearing trees or caves etc that could provide roosting sites or camp or maternity sites would be removed. • All specified bat species have been recorded over a wide area throughout the area. The impact resulting from the loss of a small amount of vegetation to construct the drainage upgrade is unlikely to have a significant impact to these mobile species • The amount of disturbance is considered insignificant in comparison to the amount of potential habitat available in the immediate vicinity of the site. • The new crossing would not impact on the species' ability to forage for food, hunt, and breed The presence of these species at the proposed activity site is possible from time to time. The site, however, is not considered useful or important or critical to the survival of the species and, because of the lack of suitable roosting trees, are unlikely to be present during construction works. As a result of the above assessment, no further assessment is required.
Eastern False Pipistrelle *Falsistrellus tasmaniansis*	4	
Large Bent-winged Bat *Miniopterus orianae oceanensis*	4	
Greater Broad-nosed Bat *Scoteanax rueppellii*	2	

Species / EECs	No. of records	Assessment – likelihood of occurrence and need for assessment
Southern Myotis *Myotis macropus*	3	Unlikely. The species generally roost in groups of 10 – 15 close to water. They forage over streams and pools catching insects. This type of habitat does not occur at the site.
Scrub Turpentine *Rhodamnia rubescens*	3	Unlikely. The species is found in littoral, warm temperate and subtropical and wet sclerophyll forest usually on volcanic and sedimentary soils. There is no such habitat in the area of the proposed activity. Further assessment is not necessary.
Magenta Lilly Pilly *Syzygium paniculatum*	1	Unlikely. The species occurs on grey soils over sandstone in remnant stands of littoral rainforest. There is no such habitat in the area of the proposed activity. Further assessment is not necessary.
Thick Lip Spider Orchid *Caladenia tessellata*	1	Unlikely. The species is generally found in grassy sclerophyll woodland on clay loam or sandy soils. There is no such habitat in the area of the proposed activity. Further assessment is not necessary.
Leafless Tongue Orchid *Cryptostylis hunteriana*	2	Unlikely. The species typically occur in woodland dominated by Scribbly Gum, Silvertop Ach, Red Bloodwood, and Black Sheoak. There is no such habitat in the area of the proposed activity. Further assessment is not necessary.
Austral Toadflax *Thesium australe*	1	Unlikely. The species occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass. There is no such habitat in the area of the proposed activity. Further assessment is not necessary.