ASCENTECOLOGY

Kingscliff Ambulance Station – Ecological Assessment

Report to GeoLINK and Mace Group on behalf of Health Infrastructure NSW

flora & fauna | planning & approvals | biodiversity offsetting | environmental management | environmental training

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Document and Project Control

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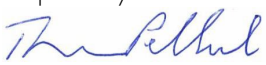
Signature	Prepared by  Dr Tom Pollard Ecologist	Reviewed by  Dr Damian Licari Principal Ecologist

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1 Introduction

1.1 Background

Ascent Ecology Pty Ltd (AE) was engaged by GeoLINK on behalf of Mace Group and Health Infrastructure NSW (HI) to prepare an ecological assessment report to support a Review of Environmental Factors (REF) under Part 5 of the Environmental Planning and Assessment Act and pursuant to Clause 48(1) of ISEPP for construction of a proposed ambulance station.

The footprint of the proposed development (henceforth, referred to as the site) is located on land described as part of Lot 11 DP1269398, 771 Cudgen Road, Cudgen The site covers an area of approximately 0.5 hectares (ha). The site is in the Tweed Local Government Area (LGA) and is situated on the western fringe of the town of Kingscliff.

The development footprint would include the ambulance station building, parking, entrance roads from Turnock Street and internally via the Tweed Valley Hospital entrance, and a sediment/biodetention basin (Appendix A). The road batter alongside Turnock Street will also likely require re-shaping for the proposal.

A tree assessment report has been prepared that identifies trees that would be removed and retained for the proposal (Civica 2019). Relevant documentation to guide this biodiversity assessment includes the Biodiversity Development Assessment Report (BDAR) prepared for the broader Tweed Valley Hospital site (Greencap 2019), and an associated hydrology assessment prepared by SMEC (2019).

1.2 Land use zone

The footprint of the proposed ambulance station is zoned SP2 Special Purpose Zone – Infrastructure (Health Services Facility) under the Tweed Local Environmental Plan 2014 (LEP).

1.3 Site context

From a bioregional perspective, the site is in the South-East Queensland Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and the Burringbar-Conondale Ranges IBRA Subregion.

The site is located within the broader Tweed Valley Hospital site (under construction) and is located at the interface of the urban area of Kingscliff and agricultural lands to the west. There are no mapped watercourses or drainage lines on the site.

2 Statutory assessment

2.1 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) together with the Biodiversity Conservation Regulation 2017 outlines the framework for addressing impacts on biodiversity from development and clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme. For activities assessed under Part 5 of the EP&A Act, the Biodiversity Offsets Scheme is optional.

The proposal is to carry out an activity that does not require development consent and is to be carried out by or authorised by approval of a determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979*. If the activity is likely to significantly affect threatened species a Species Impact Statement or, if the proponent chooses, a Biodiversity Development Assessment Report, must be prepared.

For Part 5 activities, an activity is "likely to significantly affect threatened species" if it is carried out in an area of outstanding biodiversity value or likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3 of the Biodiversity Conservation Act 2016. The biodiversity offset scheme threshold trigger does not apply.

Biodiversity offset Scheme triggers are addressed below in Table 1.

Table 2.1 Biodiversity Offset Scheme triggers

Trigger or threshold	Response
Is the proposed development located on a declared Area of Outstanding Biodiversity Value (AOBV) (BC Act s. 7.2(1)(c))?	The site is not within an area of outstanding biodiversity value (AOBV). The nearest (AOBV) is the critical habitat for Mitchell's Rainforest Snail (*Thersites mitchellae*) in Stotts Island Nature Reserve on the Tweed River, approximately 6 km west of the site. This AOBV would not be impacted by the proposal. This criterion therefore does not trigger entry into the BOS.
After application of the 'Test of Significance' are the impacts considered significant (s. 7.3 BC Act)?	This ecological assessment includes tests of significance for potential impacts of the proposal on threatened entities (Appendix B and Appendix C). The conclusion of the tests of significance (Appendix C) was that the proposal would not result in a significant impact on any of these threatened entities. Therefore, this criterion does not trigger entry into the BOS.

2.2 State Environmental Planning Policy (Koala Habitat Protection) 2021

SEPP (Koala Habitat Protection) 2021 aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline. SEPP (Koala Habitat Protection) 2021 applies to land in relation to which a development application has been made. As the proposal is to carry out an activity that does not require development consent and is to be carried out by or authorised by approval of a determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979*, SEPP (Koala Habitat Protection) 2021 does not apply to the proposal and no further assessment is necessary.

2.3 State Environmental Planning Policy (Coastal Management) 2018

The *Coastal Management Act 2016* (CM Act) categorises the coastal zone into four coastal management areas based on the features of these locales. The State Environmental Planning Policy (Coastal Management) 2018 (Coastal Management SEPP) supports implementation of the management objectives that are set out in the CM Act.

The Coastal Management SEPP applies to land within the Coastal Zone, which is defined to be areas of land comprised of the following four coastal management areas: Coastal Wetlands and Littoral Rainforests Area, Coastal Vulnerability Area, Coastal Environment Area and Coastal Use Area. The Coastal Management SEPP also establishes a strategic land use planning framework for coastal management with mapping and clear planning provisions for each coastal management area to ensure consent authorities apply appropriate management tools and development controls.

No areas of the site are mapped as 'Coastal Wetlands', 'Littoral Rainforests', 'Proximity Area for Littoral Rainforests' or 'Coastal Vulnerability Area'. However, the site is mapped as within the 'Proximity Area for Coastal Wetlands' under the Coastal Management SEPP (Figure 2.1).

Given that the development footprint is mapped as 'Proximity Area of Coastal Wetlands', under Coastal Management SEPP Clause 11(1), the proponent must demonstrate that the proposal will not significantly impact on: the biophysical, hydrological or ecological integrity of the adjacent coastal wetland; or quality and quantity of surface and groundwater flows to the adjacent coastal wetland.

Potential impacts on the Proximity Area for Coastal Wetlands are set out in Section 3.

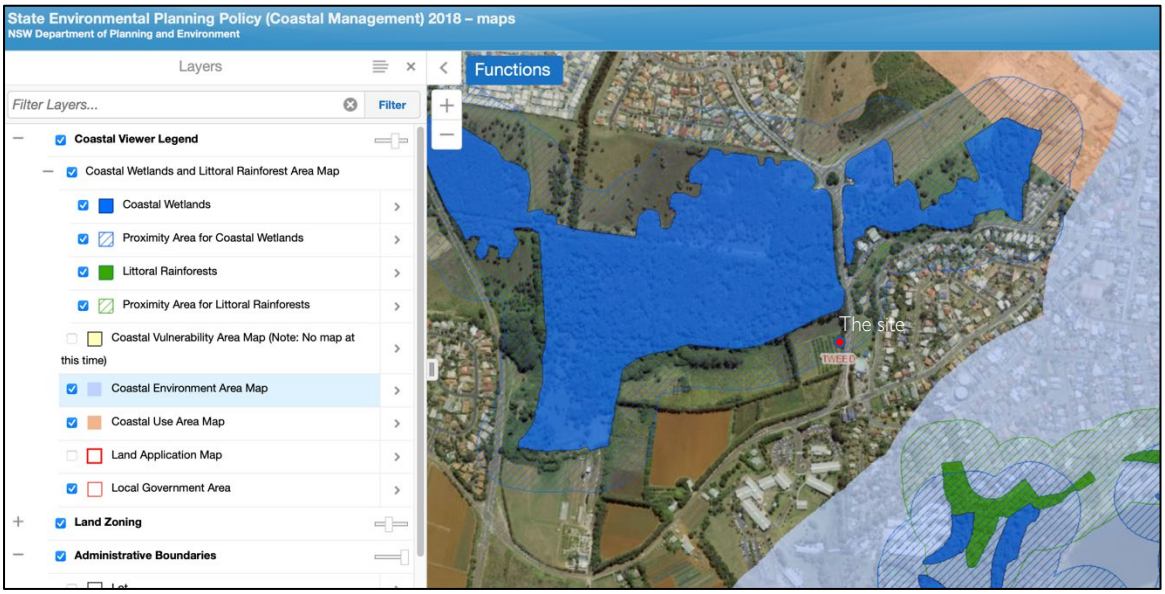

Figure 2.1 Coastal Environment Area map (Coastal Management SEPP)

2.4 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act protects/ regulates matters of national environmental significance (MNES), including:

- World heritage properties.
- National heritage places.
- Wetlands of international importance.
- Nationally threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- A water resource, in relation to coal seam gas development and large coal mining development.

Based on the search results and site assessment, no significant impacts to any MNES would be likely to result from the proposal (refer to Table 2), therefore referral to the Minister for the Environment and Energy is not required.

Table 2.2 Assessment of MNES

Matter	Impact
Any impact on a World Heritage property?	No World Heritage properties occur within the search area and therefore no impact as a result of the proposal would occur.
Any impact on a National Heritage place?	No World Heritage places occur within the search area locality and therefore no impact as a result of the proposal would occur.
Any impact on a wetland of international importance (RAMSAR convention)?	No wetlands of international importance occur within the locality and therefore no impact as a result of the proposal would occur..
Any impact on nationally listed threatened species or communities?	Habitat for five threatened ecological communities, 99 threatened species (29 flora and 70 fauna species) is identified within 10 km of the site.

Matter	Impact
	The results of the site survey indicated that no EPBC Act listed threatened ecological communities (TECs) occur within the site. However, adjacent PCT 1302 vegetation is likely to conform with the TEC Lowland Rainforest of Subtropical Australia and may be subject to indirect impacts of the proposal (e.g. water quality). EPBC Matters of National Environmental Significance (MNES) – significance impact assessment for this TEC indicated that the proposal is unlikely to result in a significant impact (refer to Appendix D). Several EPBC Act listed threatened flora species were considered potential occurrences within the study area (refer to Appendix B). However, none of these species was recorded in the site survey and no further impact assessment was required. Two EPBC Act listed threatened fauna species were determined to potentially occur at the site; the Grey-headed Flying-fox and Mitchell's Rainforest Snail (refer to Appendix B). EPBC Matters of National Environmental Significance (MNES) – significance impact assessments indicated that the proposal is unlikely to result in a significant impact on either of these species (refer to Appendix D). In conclusion, the proposal is unlikely to impact on national listed threatened species or communities and referral to the Australian Government Minister for the Environment (the Minister) for assessment is not required.
Any impact on migratory species?	Habitat for 75 migratory species is identified within 10 km of the site. (many of which rely on oceanic habitats that are not present at the site). Several migratory terrestrial species are potential occurrences on an opportunistic basis (e.g. White-throated Needletail, Fork-tailed Swift, Black-faced Monarch, Spectacled Monarch, Rufous Fantail, Satin Flycatcher). However, no migratory species are likely to be significantly affected by the proposal given that no significant breeding habitat would be affected.
Any impact on a Commonwealth marine area?	The proposal is not located within a Commonwealth marine area.
Any impact on the Great Barrier Reef Marine Park?	The Great Barrier Reef Marine Park is distant from the site.
Does the proposal involve a nuclear action (including uranium mining)?	The proposal does not involve a nuclear action.
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	The proposal does not involve any impact on a water resource, in relation to coal seam gas development and large mining development.

3 Results

3.1 Survey limitations

Despite a thorough search, it is always the case that some cryptic flora species that are difficult to locate may have been overlooked in the survey (e.g. orchids or small herbs).

While the survey only provides a 'snapshot' of fauna usage during the summer period, the techniques utilised provide suitable sampling for a range of fauna with an emphasis on targeting threatened species most likely to occur within the study area. Based on local fauna records and vegetation/ habitat mapping, predictions of fauna usage can be made with a relatively high level of confidence.

3.2 Desktop review

3.2.1 BioNet Wildlife Atlas search results

A search of the BioNet Wildlife Atlas within a 20 km x 20 km grid centred on the site was undertaken (completed 3rd February 2022). The search results identified:

- Records of 43 threatened flora species within 10 km of the site. Eighteen of these species are also listed under the EPBC Act.
- Known occurrence of 10 Threatened Ecological Communities (TECs) from within 10 km of the site listed under the BC Act. Five of these communities are also listed under the EPBC Act.
- The BioNet Atlas search results identified records of 89 threatened fauna species within 10 km of the site, including 34 species also listed in the EPBC Act. Species that are exclusively dependent on marine habitat were excluded from further assessment due to the site not being located within a marine area.

An assessment of potential occurrence for the threatened species identified in the above search was undertaken and is provided in Appendix B.

3.2.2 Protected Matters Search Tool (PMST) results

A search of the Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) within a 5 km radius of the site was undertaken (completed 3rd February 2022). The search results identified:

- Habitat for 29 threatened flora species.
- Potential occurrence of five TECs.
- Habitat for 70 threatened fauna species. Species that are exclusively dependent on marine habitat were excluded from further assessment due to the site not being located within a marine area.
- Habitat for 75 migratory fauna species. Species that are exclusively dependent on marine habitat were excluded from further assessment due to the site not being located within a marine area.

An assessment of potential occurrence for the threatened species identified in the above search was undertaken and is provided in Appendix B.

3.3 Existing environment

3.3.1 Plant communities

The following vegetation occurs within the development footprint:

- Exotic-dominated pastureland/orchard;
- PCT 1235 - Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion (Swamp Oak swamp forest); and
- PCT 1302 - White Booyong – Fig subtropical rainforest of the NSW North Coast Bioregion (White Booyong – Fig subtropical rainforest)

A description of this vegetation follows:

Exotic-dominated pastureland/ orchard

This vegetation occupies approximately 0.5 ha of the site, occurring over all areas except for a narrow linear strip adjacent to Turnock Street that consists of PCT 1235.

No overstorey is present. The midstorey is absent in open pastureland areas, while in the orchard Custard Apple (*Annona* sp. hybrid)* orchard trees are present. Tobacco Bush (*Solanum mauritianum*)* is also present within an overgrown area atop stockpiled dry stone walls.
The understorey is dominated by common exotic pastureland species and weeds such as Broad-leaved Paspalum (*Paspalum mandiocanum*)*, Rhodes Grass (*Chloris guyana*)*, Kikuyu (*Cenchrus clandestinus*)*, Guinea Grass (*Megathyrsus maximus*)*, Blue Billygoat Weed (*Ageratum houstonianum*), Flax-leaf Fleabane (*Conyza bonariensis*)* and Silver-leaved Desmodium (*Desmodium uncinatum*)*.

This vegetation is not characteristic of any NSW Plant Community Type (PCT).

PCT 1235 - Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion

This community occurs as a narrow strip of vegetation within the eastern edge of the site adjacent to Turnock Street and occupies approximately 0.03 ha. This community is likely to be a mix of both planted and naturally regrown vegetation.

The overstorey contains Swamp Oak (*Casuarina glauca*) and River Oak (*Casuarina cunninghamiana*), with occasional Three-veined Laurel (*Cryptocarya triplinervis*). The midstorey is almost exclusively regrowth Macaranga (*Macaranga tanarius*) along with occasional Red Kamala (*Mallotus philippensis*) and planted Bottlebrush (*Callistemon* sp.). The understorey is very sparse owing to the dense leaf litter produced by the Macaranga as well as ongoing weed control that is occurring as part of the biodiversity management plan (BMP) for the Tweed Valley Hospital site (Greencap 2019a). Species recorded include Basket Grass (*Oplismenus aemulus*), Guinea Grass* (particularly on the fringe of

this community and the immediate verge of Turnock Street), Austral Sarsaparilla (*Smilax australis*), Silver-leaved Desmodium* and occasional seedlings of Three-veined Laurel.

The condition of this PCT is low occurring with a modified structure and composition (consisting of a mix of plantings and regrowth) and reflects a disturbance history including historic clearing and weed infiltration. No hollow-bearing trees are present.

PCT 1302 - White Booyong – Fig subtropical rainforest of the NSW North Coast Bioregion

This community occurs as a narrow strip of vegetation within the eastern edge of the site adjacent to Turnock Street close to the roundabout and occupies approximately 0.02 ha. This community is likely to be a mix of both planted and naturally regrown vegetation.

The overstorey contains Three-veined Laurel (*Cryptocarya triplinervis*) and Tuckeroo (*Cupaniopsis anacardioides*). The midstorey is almost exclusively regrowth Macaranga (*Macaranga tanarius*) along with planted Bottlebrush (*Callistemon* sp.). The understorey is very sparse owing to the dense leaf litter produced by the Macaranga as well as ongoing weed control that is occurring as part of the biodiversity management plan (BMP) for the Tweed Valley Hospital site (Greencap 2019a). Species recorded include Basket Grass (*Oplismenus aemulus*) and Austral Sarsaparilla (*Smilax australis* and occasional seedlings of Three-veined Laurel.

The condition of this PCT is low occurring with a modified structure and composition (consisting of a mix of plantings and regrowth) and reflects a disturbance history including historic clearing and weed infiltration. No hollow-bearing trees are present.

Plate 3.1 Exotic-dominated pastureland/ orchard

Plate 3.2 PCT 1235 - Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion

Plate 3.3 PCT 1302 - White Booyong – Fig subtropical rainforest of the NSW North Coast Bioregion

3.3.2 Threatened flora

No threatened flora species listed under the BC Act or EPBC Act were recorded.

3.3.3 Threatened Ecological Communities (TECs)

PCT 1302 occurring at the site is characteristic of the Threatened Ecological Communities (TEC) *Lowland Rainforest in the NSW North Coast and Sydney Basin* Bioregions listed under the BC Act.

The PCT 1235 vegetation consists of a planted Swamp Oak *(Casuarina glauca*) windrow located on a ridge, growing in red-brown silty clay soil derived from basalt. This vegetation is not consistent with the NSW Scientific Committee Final Determination for the TEC *Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions* as it fails to satisfy certain edaphic, topographical and locational criteria in the Scientific Committee's final determination (NSW Scientific Committee 2011). Specifically, the site does not satisfy the topographical or locational criteria of being on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains that are level landform patterns on which there may be active erosion and aggradation by channelled overland stream flow.

PCT 1302 vegetation at the site is broadly consistent with the NSW Scientific Committee Final Determination for the TEC *Lowland Rainforest of the NSW North Coast and Sydney Basin bioregions* (NSW Scientific Committee 2011a*)*. PCT 1302 is not consistent with the equivalent EPBC Act listed TEC 'Lowland Rainforest of Subtropical Australia' based on not meeting key condition thresholds for this community (Department of Sustainability, Environment, Water, Population and Communities 2011). The PCT 1302 vegetation was subject to a test of significance (five-part test under the BC Act) to assess if the proposal would be likely to result in a significant impact (Appendix C). The conclusion of this assessment is that the proposal is unlikely to affect this ecological community, within the meaning of the BC Act and therefore a Species Impact Statement (or BDAR if the proponent elected) is not required.

Adjacent occurrences of TECs to the north of the site include both *Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* and *Lowland rainforest on floodplain in the NSW North Coast Bioregion*. Being downstream and within the same catchment as the proposed development, these TECs could theoretically be indirectly impacted through additional outflows from the development.

However, the assessment by SMEC (2019) of the potential impact on these TECs of increased outflows from the Tweed Valley Hospital development concluded that these outflows would be unlikely to result in any substantial impacts for the following reasons:

- *Swamp sclerophyll forest on coastal floodplains* – the coastal wetlands to the north of the site are dominated by Broad-leaved Paperbark (*Melaleuca quinquenervia*). Although this species cannot survive permanent inundation, it has adaptations such as fibrous roots around their lower trunk that allow the plant to respire during long periods of submersion. Furthermore, the mid and understory species such as rushes, sedges, ferns and grasses are also adapted to periodic inundation. Predicted change in flood level from the project outflows is expected to be very small (<50mm). When compared to the existing flooding from the Tweed River (BMT 2018) which indicates inundation depths for the wetland of approximately 2m for the 5% AEP event and 3m for the 1% AEP event. Suggesting that the Paperbark swamp forest present are naturally resilient to large scale flood events in excess of the inflows likely to be a result of the project;
- *Lowland Rainforest on Floodplain* - the occurrence of this community appears to be limited to the slightly elevated margins of the Broad-leaved Paperbark community and is probably closely linked to the localised limits of the volcanically derived soils in the area. Given its

occurrence in these slightly elevated locations it is considered unlikely to be materially impacted by the additional inflows expected.

It should be noted that the proposal is of a much smaller scale than the broader hospital development, and would have only a minor contribution to the overall inflow levels to these habitats.

3.3.4 Weeds

The site includes the following Priority Weeds as listed in the *Biosecurity Act 2015* (BA Act):

- Giant Devil's Fig (*Solanum chrysotrichum*) – occasional occurrence within PCT 1235

Under the BA Act Giant Devil's Fig is subject to subject to a Regional Recommended Measure that states:

"Exclusion zone: whole region excluding the core infestation area of Richmond Valley Council, Ballina Shire Council, Lismore Council, Kyogle Council, Byron Shire Council and Tweed Shire Council

Whole region: The plant or parts of the plant should not be traded, carried, grown or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land. Core infestation area: Land managers should reduce impacts from the plant on priority assets."

Infestations of Giant Devil's Fig are currently being controlled as directed within the BMP for the Tweed Valley Hospital development (Greencap 2019a).

3.3.5 Fauna habitat assessment

The site footprint contains limited habitat value for fauna reflecting the low condition of native vegetation (PCT 1235 and PCT 1302) occurring at the site. Both these PCTs occurs with a modified structure and composition (consisting of a mix of plantings and regrowth), and reflects a disturbance history including historic clearing and weed infiltration. No hollow-bearing trees are present.

The PCT 1235 and PCT 1302 vegetation within the site would most likely be utilised by non-threatened birds, reptiles and small mammals. However, some occasional usage by threatened birds is also possible. The Custard Apple trees in the exotic pastureland/orchard may also provide a minor opportunistic foraging resource for the threatened Grey-headed Flying-fox.

3.4 Potential for threatened species occurrence

3.4.1 Flora

A substantial number of threatened flora species (based on past records and available habitats) were considered to be potential occurrences at the site or in immediately adjacent areas, primarily associated with PCT 1302 rainforest vegetation (refer to Appendix B).

However, none of these species were recorded in the site survey and all were identifiable at the time the survey was conducted. Therefore, it is assumed to not be present and therefore no assessment of significance for impacts on threatened flora is required.

3.4.2 Fauna

3.4.2.1 Fauna habitat values

Habitat values for threatened fauna at the site include small area of relatively low condition PCT 1235 and PCT 1302 vegetation that would provide potential foraging and/or breeding habitat for several threatened birds. The Custard Apple trees in the exotic pastureland/orchard may also provide a minor opportunistic foraging resource for the threatened Grey-headed Flying-fox.

No Koala food trees are present at the site. An area of suitable Koala habitat consisting of Flooded Gum – Brush Box – Tallowwood mesic tall open forest is present in the broader study area. However, surveys for the Tweed Valley Hospital BDAR did not locate any evidence of koala usage in this area (Greencap 2019). The PCT 1235 and PCT 1302 vegetation at the site does not link areas of suitable koala habitat in the broader area. No other indirect impacts relating to habitat fragmentation, koala movement, vehicle strike on the Koala are likely to occur in relation to the proposal.

The following threatened species have no habitat at the site, but are either potential or known occurrences within the receiving catchment and may be subject to indirect impacts (Appendix B):

- Wallum Froglet and Olongburra Frog – potential occurrence in the receiving catchment, and may be impacted by water quality changes as a result of the proposal.
- Mitchell's Rainforest Snail - a known occurrence in PCT 1302 rainforest vegetation in the study area to the north of the site and may be impacted indirectly by increased outflows from the proposal.

The following threatened fauna species (based on past records, available site habitats and the results the site survey) were considered to be potential (or actual) occurrences in the study area for which impacts relating to the proposal are possible (Appendix B):

Frogs

- Wallum Froglet (*Crinia tinnula*)
- Olongburra Frog (*Litoria olongburensis*)

Birds

- Glossy Black-Cockatoo (*Calyptorhynchus lathami*)
- White-eared Monarch (*Carterornis leucotis*)
- Barred Cuckoo-shrike (*Coracina lineata*)
- Mangrove Honeyeater (*Lichenostomus fasciogularis*)
- Barking Owl (*Ninox connivens*)
- Powerful Owl (*Ninox strenua*)
- Masked Owl (*Tyto novaehollandiae*)

Mammals

- Grey-headed Flying-fox (*Pteropus poliocephalus*)

Gastropods

- Mitchell's Rainforest Snail (*Thersites mitchellae*)

All of the above threatened fauna species were subject to a test of significance (five-part tests under the BC Act) to assess if the proposal would be likely to result in a significant impact (refer to Appendix C). The conclusion of these assessments is that the proposal is unlikely to affect threatened species or their habitats, within the meaning of the BC Act and therefore a Species Impact Statement (or BDAR if the proponent elected) is not required.

The Grey-headed Flying-fox and Mitchell's Rainforest Snail are also dually listed under the EPBC Act. Matters of National Environmental Significance (MNES) – significance impact assessments for these species was also undertaken (refer to Appendix D). The conclusion of this assessment is that the proposal is unlikely to have a significant impact on either of these species and therefore referral of the proposal to the Commonwealth Minister for the Environment is not required.

No migratory species listed under the EPBC Act were recorded. Several EPBC Act listed migratory species may opportunistically forage within the study area (e.g. White-throated Needletail, Fork-tailed Swift, Black-faced Monarch, Spectacled Monarch, Rufous Fantail, Satin Flycatcher). However, no migratory species are likely to be significantly affected by the proposal given that no key breeding habitat would be affected.

4 Impact assessment

4.1 Impacts on coastal wetlands

Potential impacts on the 'Proximity Area of Coastal Wetlands' of the coastal zone are set out in Table 2.

Table 4.1: Potential impacts on the coastal zone

Coastal Management SEPP reference	Potential impact and recommended mitigation measure	Significance of impact
Potential impact on 'Proximity Area of Coastal Wetlands'		
Clause 11(1)(a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest	As discussed in SMEC (2019) for the larger Tweed Valley Hospital development: "the coastal wetlands to the north of the site are dominated by Broad-leaved Paperbark (*Melaleuca quinquenervia*). Although this species cannot survive permanent inundation, it has adaptations such as fibrous roots around their lower trunk that allow the plant to respire during long periods of submersion. Furthermore, the mid and understory species such as rushes, sedges, ferns and grasses are	The proposal will not significantly impact on the hydrological or ecological integrity of the coastal wetland adjacent to the mapped 'Proximity Area of Coastal Wetlands'.
Clause 11(1)(b) the quantity and quality of surface and ground water flows		The proposal will not significantly impact the quantity and quality of surface and ground water flows of the coastal wetland adjacent to and from the

Coastal Management SEPP reference	Potential impact and recommended mitigation measure	Significance of impact
to and from the adjacent coastal wetland or littoral rainforest	also adapted to periodic inundation. Predicted change in flood level from the project outflows is expected to be very small (<50mm). When compared to the existing flooding from the Tweed River (BMT 2018) which indicates inundation depths for the wetland of approximately 2m for the 5AEP event and 3m for the 1% AEP event. Suggesting that the Paperbark swamp forest present are naturally resilient to large scale flood events in excess of the inflows likely to be a result of the project". It should be noted that the proposal is of a much smaller scale than the broader hospital development, and would have only a minor contribution to the overall inflow levels to this coastal wetland habitat.	mapped 'Proximity Area of Coastal Wetlands'.

4.2 Potential impacts and mitigation measures

It is recommended that potential biodiversity impacts are managed through implementation of mitigation measures set out in Table 4.2.

Table 4.2 Potential biodiversity impacts and recommended mitigation measures

Potential impact	Significance of impact	Recommended mitigation measure
Direct impacts		
Native vegetation	Minimal – The proposal would only require removal of a very small area of up to an estimated 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation. Individual trees for proposed removal and retention are shown in the arboricultural impact assessment (Civica 2022). A total of 11 live native trees and four dead trees are proposed for removal (Civica 2022, s. 7.1) and are included in the above area estimates. Although this vegetation would provide potential habitat for several threatened fauna species, the loss of this native vegetation would be unlikely to result in a significant impact in any of these species (refer to Appendix C and D).	*Minimise indirect impact on adjacent native vegetation* It is recommended that retained trees identified in the arborist report (Civica 2019) should be protected during construction with temporary fencing in accordance with Australian Standard AS 4970-2009 Protection of trees on development sites.
Indirect impacts		
Change in downstream water quality from the site (via sediment/bioretention basin)	Potential indirect impact on threatened acid-frogs (Wallum Froglet and Olongburra Frog). As identified in the BDAR prepared for the broader Tweed Valley Hospital development (Greencap 2019), 'the use of gypsum as a flocculent in the sediment basins to quickly	*Minimise changes in water quality during construction and operation* • It is recommended that soil erosion and stormwater quality should be managed during construction in

Potential impact	Significance of impact	Recommended mitigation measure
Direct impacts		
	settle sediment-laden stormwater runoff during construction may impact the abovementioned threatened amphibian species upon discharge from basins to the downstream receiving wetland environment'. The proposed ambulance station is located on the broader Tweed Valley Hospital site and within the same receiving catchment. As the proposal includes retention of stormwater in a sediment basin, the potential indirect impacts on the subject frog species relating to the use of gypsum as a flocculent are also relevant.	accordance with current industry standards (Landcom, 2004). • It is recommended that in accordance with mitigation measures recommended for the Tweed Valley Hospital development (Greencap 2019), to avoid any potential changes in pH and impacts on these threatened frog species, other commercially available flocculants that work as effectively as a gypsum replacement yet do not create the large changes in pH will be used to treat stormwater before discharge on the site
Change in the quantity of water outflow exiting the site (via sediment basin)	Potential indirect impact on Mitchell's Rainforest Snail and TECs (Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions and Lowland rainforest on floodplain in the NSW North Coast Bioregion). Within the context of the much larger Tweed Hospital development, predicted change in flood level from the project outflows is expected to be very small (<50mm) and the predicted change in inflow levels is unlikely to negatively impact or reduce the existing habitat to the north of the site through permanent inundation. It should be noted that the proposal is of a much smaller scale than the broader hospital development, and would have only a minor cumulative contribution to the overall inflow levels to these habitats.	No mitigation measures are proposed.
Noise and dust	The magnitude and short-term impact of noise and dust on biodiversity during construction is negligible.	*Minimise impact of noise and dust during construction* It is recommended that the proposed development: • Minimise indirect impacts associated with construction noise by restricting the construction noise to 7am to 6pm Mon-Fri, 8am to 1pm Sat, and no construction on Sundays or public holidays; • Employ dust control measures such as staged construction, revegetation and wash down procedures to minimise impacts from dust during construction. Dust suppression should be implemented as required.

4.3 Compensation for loss of native vegetation

The proposal would include the loss of a very small area of native vegetation consisting of up to 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302. The BMP for the broader Tweed Valley Hospital development includes a range of measures to enhance fauna habitats at the site (e.g. plantings and landscaping) (Greencap 2019a). Considering the small area of low condition native vegetation proposed for removal in the current proposal and the extensive proposed plantings/landscaping outlined in the BMP to improve native habitat at the broader hospital site, no changes to the BMP are proposed. However, in line with HI policy, replacement of the 11 native trees identified in the arboricultural impact assessment (Civica 2022) with appropriate native trees at a 1:1 ratio is recommended.

The proposal will require the removal degraded exotic orchard trees. The degraded orchard tree offer limited biodiversity values, are identified in the tree removal plan and have not been the subject of individual assessment (Civica 2022). However, in line with HI policy replacement of the orchard trees identified in the arboricultural impact assessment (Civica 2022) at a 1:1 ratio is recommended.

5 Conclusions

The proposal to construct a new ambulance station on the Tweed Valley Hospital site at Kingscliff is unlikely to have a significant impact on threatened species and therefore does not trigger entry into the Biodiversity Offsets Scheme.

The biodiversity impacts of the proposal are not likely to be significant and therefore it is not necessary for an Environmental Impact Statement to be prepared and approval to be sought for the proposal from the Minister for Planning under Part 5.7 of the *Environmental Planning and Assessment Act 1979*. The proposal is unlikely to affect threatened species or ecological communities or their habitats, within the meaning of the *Biodiversity Conservation Act 2016* and therefore a Species Impact Statement (or BDAR if the proponent elected) is not required.

The proposal is also unlikely to affect Commonwealth land or have an impact on any matters of national environmental significance and therefore referral of the proposal to the Commonwealth Minister for the Environment is not required. Only minor impacts of the proposal are expected on biodiversity and mitigation measures are proposed to minimise these impacts.

6 References

Civica (2022). Arboricultural Impact Assessment Report (19 September 2022) – Kingscliff Rural Ambulance Infrastructure Reconfiguration development. Civica, Coffs Harbour, NSW.

Greencap (2019). Stage 2 SSD: Biodiversity Development Assessment Report. Tweed Valley Hospital Health Infrastructure. Greencap, Brisbane.

Greencap (2019a) Stage 2 Biodiversity Management Plan Tweed Valley Hospital Health Infrastructure. Greencap, Brisbane.

Landcom (2004), *Managing Urban Stormwater: Soils and Construction Volume 1*, Fourth Edition. Landcom, Parramatta, NSW.

NSW Scientific Committee (2011). Final Determination. *Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions - Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act.* NSW Scientific Committee, Sydney, NSW.

NSW Scientific Committee (2011a). Final Determination. *Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions - Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act.* NSW Scientific Committee, Sydney, NSW

SMEC (2019). Tweed Valley Hospital Hydrology Assessment. Report prepared for Lendlease. SMEC, Lyneham, ACT.

Appendix A – Proposed site plan & tree removal plan

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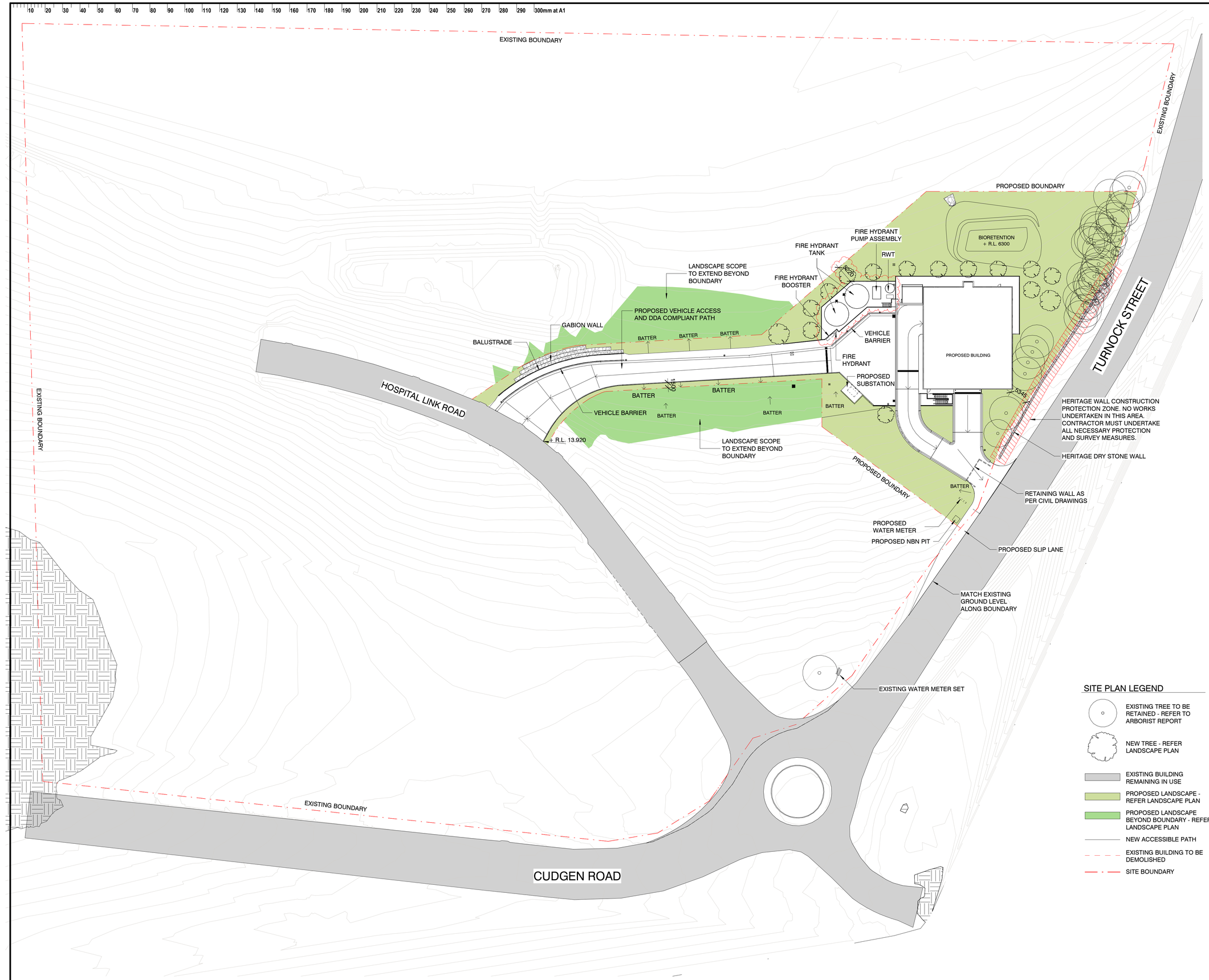

This drawing should be read in conjunction with all relevant contracts, specifications and drawings. Dimensions are in millimetres. Levels are metres. Do not scale off drawings. Use figured dimensions only. Check dimensions on Site. Report discrepancies immediately.

NOTES

DEVELOPMENT SCHEDULE	
SITE AREA	6984m2
LOWER GROUND FLOOR AREA	310m2
GROUND FLOOR AREA	740m2
GROSS FLOOR AREA	1050m2

1:500
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ISSUE	DATE	SUBJECT	AUTHORISED
L	27.07.22	CONTRACT ISSUE UPDATE	MR
K	20.07.22	CONTRACT ISSUE UPDATE	MR
J	17.07.22	CONTRACT ISSUE	MR
I	01.07.22	REVISED REF SET	MR
H	17.06.22	DRAFT CONTRACT ISSUE	MR
G	29.04.22	FOR TENDER	MR
F	22.04.22	FOR COORDINATION	MR
E	25.02.22	REF ISSUE	MR
D	11.02.22	FOR COORDINATION	MR
C	28.01.22	BASE ARCHITECTURE SET	MR
B	20.01.22	FOR COORDINATION	MR
A	22.12.21	BASE ARCHITECTURE SET	MR

SITE PLAN LEGEND

- EXISTING TREE TO BE RETAINED - REFER TO ARBORIST REPORT
- NEW TREE - REFER LANDSCAPE PLAN
- EXISTING BUILDING REMAINING IN USE
- PROPOSED LANDSCAPE - REFER LANDSCAPE PLAN
- PROPOSED LANDSCAPE BEYOND BOUNDARY - REFER LANDSCAPE PLAN
- NEW ACCESSIBLE PATH
- EXISTING BUILDING TO BE DEMOLISHED
- SITE BOUNDARY

DATE PRINTED:27/07/2022 4:35:51 PM

PROJECT MANAGER
mace
LEVEL 16
44 MARKET STREET
SYDNEY NSW 2000
T +61 2 9299 3555

SERVICES
JHA
23/101 MILLER ST
NORTH SYDNEY
NSW 2060
T +61 2 9437 1000

STRUCTURE & CIVIL
MEINHARDT BONACCI
LEVEL 4
66 CLARENCE STREET
SYDNEY NSW 2000
T +61 2 8247 8400

CLIENT
NSW GOVERNMENT Health Infrastructure
NSW Ambulance

ARCHITECT
djrd architects
T +612 9319 2955
ABN: 48 942 921 969
Nominated Architects:
Andrew Hipwell 6562
Daniel Beekwilder 6192
63 Myrtle Street
Chippendale NSW 2008
Sydney Australia
djrd.com.au

PROJECT
RURAL AMBULANCE INFRUSTRUCTURE PROGRAM (RAIR) KINGSCLIFF

KINGSCLIFF, NSW, 2487
LOT11 : DP1269398

PHASE

DRAWN	SCALE	SHEET SIZE
AF	As indicated	A1

DESCRIPTION
PROPOSED SITE PLAN - OPT 1

PROJECT No	DRAWING No	REVISION
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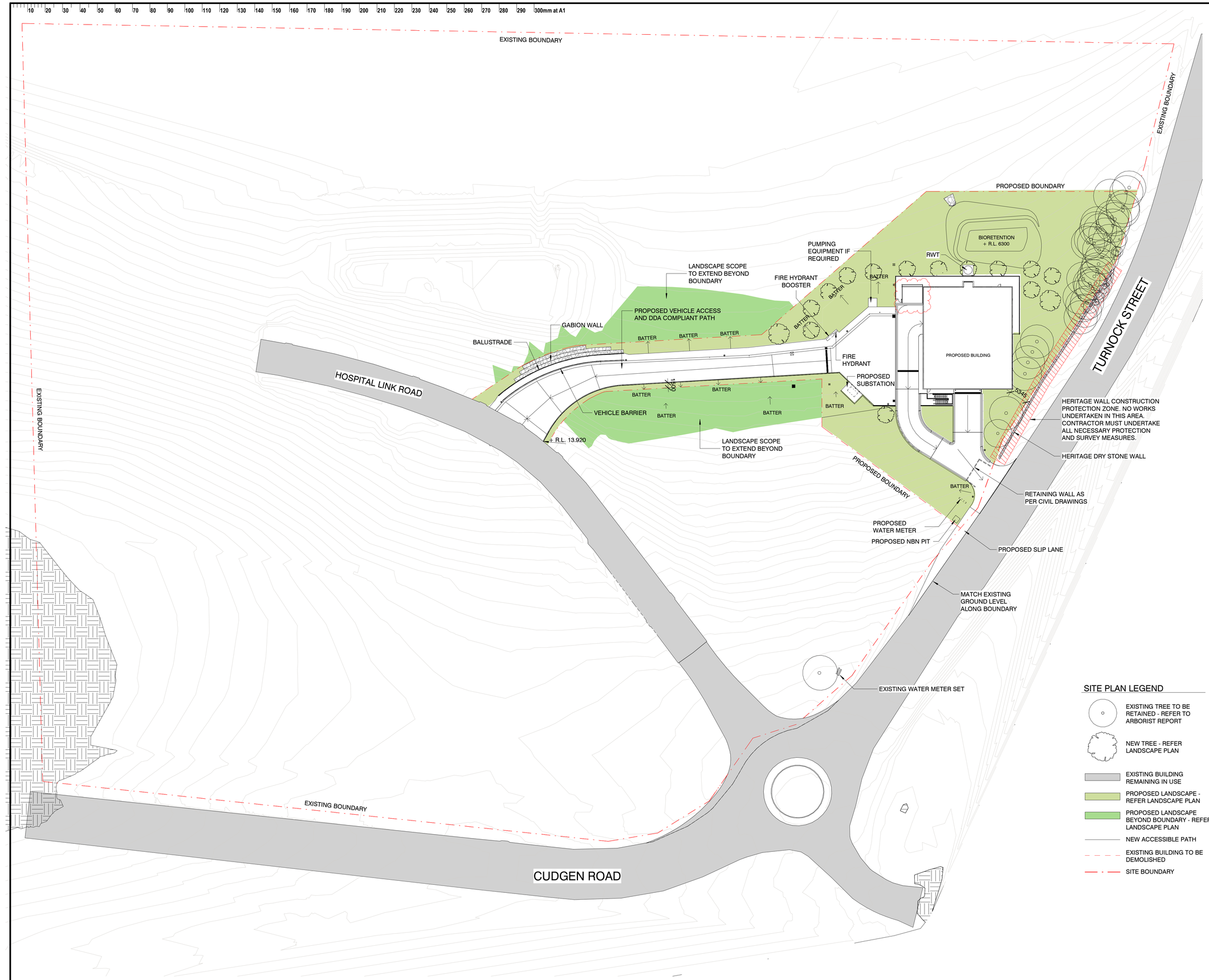

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NOTES

DEVELOPMENT SCHEDULE	
SITE AREA	6984m2
LOWER GROUND FLOOR AREA	310m2
GROUND FLOOR AREA	740m2
GROSS FLOOR AREA	1050m2

1:500
0 5 10 15 20 25 50

ISSUE	DATE	SUBJECT	AUTHORISED
D	20.07.22	CONTRACT ISSUE UPDATE	MR
C	17.07.22	CONTRACT ISSUE	MR
B	17.06.22	DRAFT CONTRACT ISSUE	MR
A	29.04.22	FOR TENDER	MR

SITE PLAN LEGEND

- EXISTING TREE TO BE RETAINED - REFER TO ARBORIST REPORT
- NEW TREE - REFER LANDSCAPE PLAN
- EXISTING BUILDING REMAINING IN USE
- PROPOSED LANDSCAPE - REFER LANDSCAPE PLAN
- PROPOSED LANDSCAPE BEYOND BOUNDARY - REFER LANDSCAPE PLAN
- NEW ACCESSIBLE PATH
- EXISTING BUILDING TO BE DEMOLISHED
- SITE BOUNDARY

DATE PRINTED:20/07/2022 3:35:11 PM

PROJECT MANAGER
mace
LEVEL 16
44 MARKET STREET
SYDNEY NSW 2000
T +61 2 9299 3555

SERVICES
JHA
23/101 MILLER ST
NORTH SYDNEY
NSW 2060
T +61 2 9437 1000

STRUCTURE & CIVIL
MEINHARDT BONACCI
LEVEL 4
66 CLARENCE STREET
SYDNEY NSW 2000
T +61 2 8247 8400

CLIENT
NSW GOVERNMENT Health Infrastructure
NSW Ambulance

ARCHITECT
djrd architects
T +612 9319 2955
ABN: 48 942 921 969
Nominated Architects:
Andrew Hipwell 6562
Daniel Beekwilder 6192
63 Myrtle Street
Chippendale NSW 2008
Sydney Australia
djrd.com.au

PROJECT
RURAL AMBULANCE INFRUSTRUCTURE PROGRAM (RAIR) KINGSCLIFF

KINGSCLIFF, NSW, 2487
LOT11 : DP1269398

PHASE

DRAWN	SCALE	SHEET SIZE
GF	As indicated	A1

DESCRIPTION
PROPOSED SITE PLAN - OPT 2

PROJECT No	DRAWING No	REVISION
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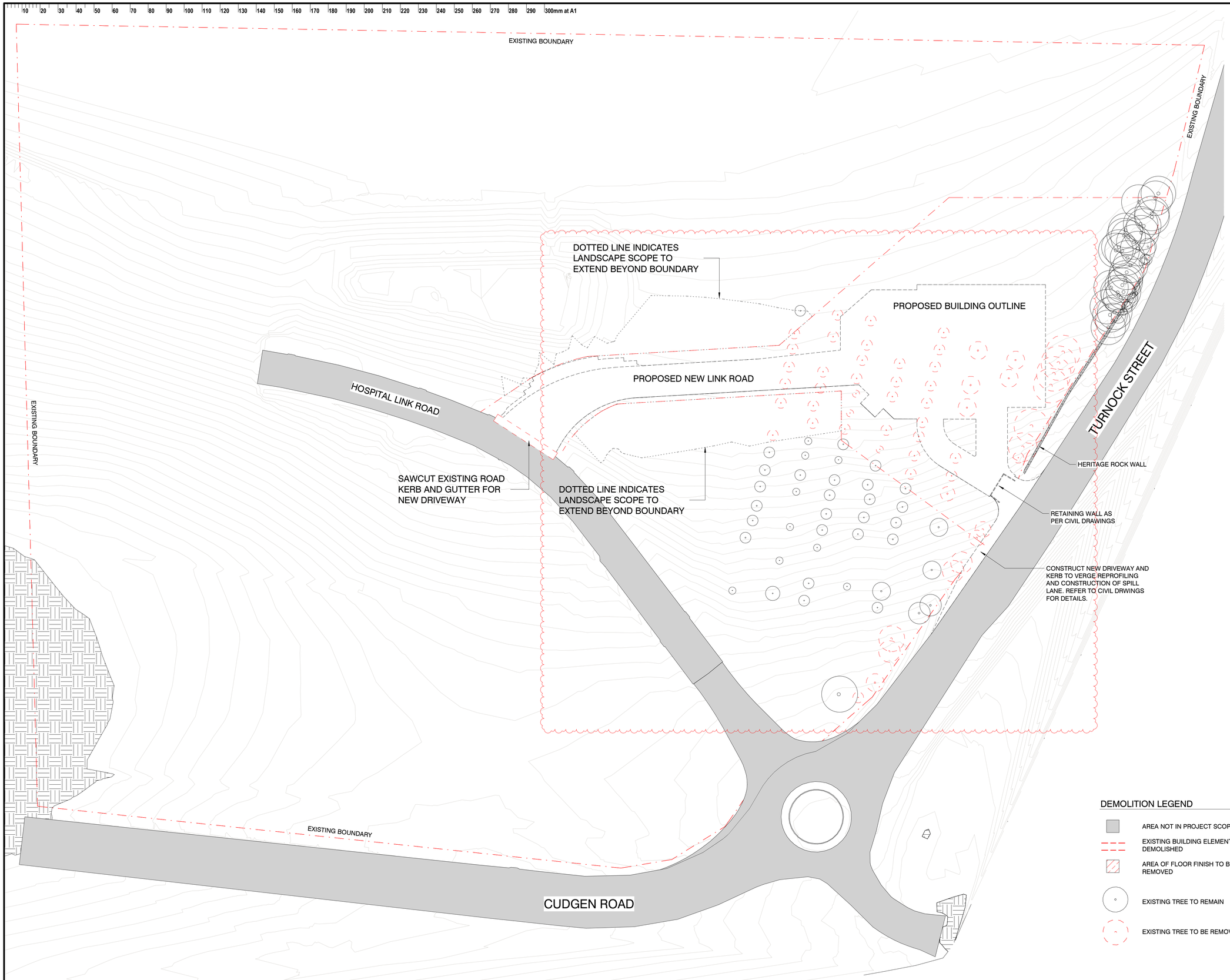

This drawing should be read in conjunction with all relevant contracts, specifications and drawings. Dimensions are in millimetres. Levels are metres. Do not scale off drawings. Use figured dimensions only. Check dimensions on Site. Report discrepancies immediately.

NOTES

1. HERITAGE WALL AND EXCLUSION ZONE (EXTENT SHOWN IS INDICATIVE) - NO WORKS TO BE UNDERTAKEN TO WALL OR ADJACENT AREA. CONTRACTOR MUST UNDERTAKE ALL NECESSARY PROTECTION AND SURVEY MEASURES.

2. THE DEGRADED ORCHARD OFFERS LIMITED BOTANICAL SIGNIFICANCE AND COMMERCIAL POTENTIAL. THESE TREES (OR AT LEAST SOME OF THEM) MAY REQUIRE REMOVAL FOR CONSTRUCTION ACCESS. THESE TREES WILL BE REPLACED WITH APPROPRIATE ENDEMIC NATIVE SPECIES

1:500
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ISSUE	DATE	SUBJECT	AUTHORISED
L	26.09.22	REF ISSUE	MR
K	23.08.22	CONTRACT ISSUE UPDATE	GF
J	17.07.22	CONTRACT ISSUE	MR
I	01.07.22	REVISED REF SET	MR
H	17.06.22	DRAFT CONTRACT ISSUE	MR
G	29.04.22	FOR TENDER	MR
F	22.04.22	FOR COORDINATION	MR
E	25.02.22	REF ISSUE	MR
D	11.02.22	FOR COORDINATION	MR
C	28.01.22	BASE ARCHITECTURE SET	MR
B	20.01.22	FOR COORDINATION	MR
A	22.12.21	BASE ARCHITECTURE SET	MR

DEMOLITION LEGEND

- AREA NOT IN PROJECT SCOPE
- EXISTING BUILDING ELEMENTS TO BE DEMOLISHED
- AREA OF FLOOR FINISH TO BE REMOVED
- EXISTING TREE TO REMAIN
- EXISTING TREE TO BE REMOVED

DATE PRINTED: 26/09/2022 09:58:00

PROJECT MANAGER
mace
LEVEL 16
44 MARKET STREET
SYDNEY NSW 2000
T +61 2 9299 3555

SERVICES
JHA
23/101 MILLER ST
NORTH SYDNEY
NSW 2060
T +61 2 9437 1000

STRUCTURE & CIVIL
MEINHARDT BONACCI
LEVEL 4
66 CLARENCE STREET
SYDNEY NSW 2000
T +61 2 8247 8400

CLIENT
NSW GOVERNMENT Health Infrastructure
NSW Ambulance

ARCHITECT
djrd architects
T +612 9319 2955
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Andrew Hipwell 6562
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63 Myrtle Street
Chippendale NSW 2008
Sydney Australia
djrd.com.au

PROJECT
RURAL AMBULANCE INFRUSTRUCTURE PROGRAM (RAIR) KINGSCLIFF

KINGSCLIFF, NSW, 2487
LOT11 : DP1269398

PHASE

DRAWN	SCALE	SHEET SIZE
AF	As indicated	A1

DESCRIPTION
TREE REMOVAL PLAN

PROJECT No	DRAWING No	REVISION
21 408	R25-AR- 0101	L

Appendix B – Potential occurrence assessment for threatened entities

Table B.1 Potential occurrence assessment for threatened flora

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Acacia bakeri	Marblewood	V	-	Lowland subtropical rainforest and adjacent wet sclerophyll eucalypt forest.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Acalypha eremorum	Acalypha	E	-	Subtropical and dry rainforest and vine thickets.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Acronychia littoralis	Scented Acronychia	E	E	Littoral rainforest on sand.	No suitable habitat is present.	No	Assessment of significance is not required.
Archidendron hendersonii	White Laceflower	V	-	Riverine and lowland subtropical rainforest and littoral rainforest.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Arthraxon hispidus	Hairy Jointgrass	V	V	Moist shady places in or on the edges of rainforest and wet eucalypt forest, often near creeks or swamps. Its preferred habitat on the North Coast of NSW is dense ground-cover formations in high-moisture, low-canopy	Broadly suitable moist grassland habitat is present.	**Potential.** However, not recorded in the site survey which was adequate to identify	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
				conditions. Cover is highest in moisture-associated assemblages in and around wetlands, drainage lines and groundwater seepages, often in association with native grasses, sedges and herbs (White 2014).		the presence of this species.	
Baloghia marmorata	Jointed Baloghia	V	V	Subtropical rainforest on soils derived from basalt.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Bosistoa transversa	Yellow Satinheart	V	V	Lowland subtropical rainforest up to 300 m in altitude.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Cassia marksiana	Brush Cassia	E	-	Littoral and riverine rainforest, and in regrowth vegetation on farmland and along roadsides.	No suitable habitat is present.	No	Assessment of significance is not required.
Centranthera cochinchinensis	Swamp Foxglove	E	-	Swampy areas and other moist sites. In NSW, north from Wooli.	No suitable habitat is present.	No	Assessment of significance is not required.
Chamaesyce psammogeton	Sand Spurge	E	-	Fore-dunes and exposed headlands, often with Spinifex (*Spinifex sericeus*).	No suitable habitat is present.	No	Assessment of significance is not required.
Cryptocarya foetida	Stinking Cryptocarya	V	V	Littoral rainforest in sandy soils, mature trees known on basalt soils.	No suitable habitat is present.	No	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	The Leafless Tongue Orchid has been recorded from as far north as Gibraltar Range National Park south into Victoria around the coast as far as Orbost. Does not have well defined habitat and is known from a range of communities, including swamp-heath and woodland.	No suitable habitat is present.	No	Assessment of significance is not required.
Cupaniopsis serrata	Smooth Tuckeroo	E	-	Subtropical and dry rainforest. In NSW, confined to the Tweed Valley.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Cynanchum elegans	White-flowered Wax Plant	E	E	Occurs primarily at the transition zone (ecotone) between dry subtropical rainforest and sclerophyll forest/woodland communities.	No suitable habitat is present.	No	Assessment of significance is not required.
Davidsonia johnsonii	Smooth Davidson's Plum	E	E	Wet sclerophyll forests, with a smaller number of sites known from subtropical rainforest. Plants still persist in cleared areas as isolated clumps in paddocks or in regrowth dominated by Lantana (Lantana camara) and other weed species.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Dendrocnide moroides	Gympie Stinger	E	-	Lowland rainforest especially in gaps or disturbed sites.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Desmodium acanthocladum	Thorny Pea	V	V	Fringes of riverine subtropical and dry rainforest on basalt-derived soils at low elevations.	No suitable habitat is present.	No	Assessment of significance is not required.
Diospyros mabacea	Red-fruited Ebony	E	E	Usually grows as an understorey tree in lowland subtropical rainforest, often close to rivers. Soils are generally basalt-derived or alluvial.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Diospyros yandina	Shiny-leaved Ebony	E	-	Understorey of riverine or lowland subtropical rainforest, in north-east NSW and south-east Queensland.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Diploglottis campbellii	Small-leaved Tamarind	E	E	Riverine and subtropical rainforest and Brush Box forest, some trees isolated in paddocks and roadsides.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Drynaria rigidula	Basket Fern	E	-	Grows on plants, rocks or ground in rainforest and moist eucalypt forest.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Eleocharis tetraquetra	Square-stemmed Spike-rush	E	-	Damp locations on stream edges and in and on the margins of freshwater swamps.	No suitable habitat is present.	No	Assessment of significance is not required.
Elyonurus citreus	Lemon-scented Grass	E	-	In NSW occurs north from Grafton in sandy soils near rivers or along the coast in wallum areas or sand dunes (including in infertile white sands).	No suitable habitat is present.	No	Assessment of significance is not required.
Endiandra floydii	Crystal Creek Walnut	E	E	Warm temperate or subtropical rainforest with Brush Box overstorey, and in regrowth rainforest and Camphor Laurel forest.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Endiandra hayesii	Rusty Rose Walnut	V		Sheltered moist gullies in subtropical and warm temperate rainforest on alluvium or basalt.	No suitable habitat is present.	No	Assessment of significance is not required.
Endiandra muelleri ssp. bracteata	Green-leaved Rose Walnut	E		Subtropical rainforest or wet eucalypt forest, chiefly at lower altitudes.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Fontainea australis	Southern Fontainea	V	V	Lowland subtropical rainforest, usually on basaltic alluvial flats, and also in cooler subtropical rainforest.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Geodorum densiflorum	Pink Nodding Orchid	E	-	Dry eucalypt forest at lower altitudes on coastal sand.	No suitable habitat is present.	No	Assessment of significance is not required.
Gossia fragrantissima	Sweet Myrtle	E	E	Dry subtropical and riverine rainforest, isolated plants can be found in paddocks from regrowth mostly on basalt-derived soils.	No suitable habitat is present.	No	Assessment of significance is not required.
Grammitis stenophylla	Narrow-leaf Finger Fern	E	-	Rainforest and moist eucalypt forest, moist places usually near streams, on rocks or trees.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Grevillea hilliana	White Yiel Yiel	E	-	Only populations known in NSW in Brunswick Heads and Tweed Heads, in small remnant patches.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Hicksbeachia pinnatifolia	Red Boppel Nut	V	V	Subtropical rainforest, moist eucalypt forest and Brush Box forest.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Lepiderema pulchella	Fine-leaved Tuckeroo	V	-	Lowland subtropical rainforest in NSW. Found on infertile metasediments, fertile basalts and backswamp alluvium in the Tweed Valley.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that	**Potential.** However, not recorded in the site survey which was	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
					is potentially suitable habitat.	adequate to identify the presence of this species.	
Lindsaea fraseri	Fraser's Screw Fern	E	-	Poorly drained infertile soils in swamp forest or open eucalypt forest.	No suitable habitat is present.	No	Assessment of significance is not required.
Macadamia integrifolia	Macadamia Nut	-	V	Not known to occur naturally in the wild in NSW.	n/a	n/a	Assessment of significance is not required.
Macadamia tetraphylla	Rough-leaved Queensland Nut	V	V	Subtropical rainforest usually near the coast.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Marsdenia longiloba	Slender Milkvine	E	V	Subtropical and warm temperate rainforest, lowland moist eucalypt forest adjoining rainforest and, sometimes, in areas with rock outcrops.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Niemeyera whitei	Rusty Plum	V	-	Rainforest and adjoining moist eucalypt forest.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Ochrosia moorei	Southern Ochrosia	E	E	Riverine and lowland subtropical rainforest.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Oldenlandia galioides	Sweet False Galium	E	-	Margins of seasonally inundated wetlands in paperbark swamps and Forest Red Gum (*Eucalyptus tereticornis*) woodlands.	No suitable habitat is present.	No	Assessment of significance is not required.
Peristeranthus hillii	Brown Fairy-chain Orchid	V	-	Restricted to coastal and near-coastal environments, particularly Littoral Rainforest and Lowland Rainforest on Floodplain. The species is an epiphyte, growing in clumps on tree trunks and thick vines. Flowers appear during September and October.	No suitable habitat is present.	No	Assessment of significance is not required.
Phaius australis	Southern Swamp Orchid	E	E	Occurs in Queensland and north-east NSW as far south as Coffs Harbour. Historically, it extended farther south, to Port Macquarie. Swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest mostly in coastal areas.	No suitable habitat is present.	No	Assessment of significance is not required.
Randia moorei	Spiny Gardinia	E	E	Subtropical, riverine, littoral and dry rainforest, with Hoop Pine and Brush Box canopy.	No suitable habitat is present.	No	Assessment of significance is not required.
Rhodamnia maideniana	Smooth Scrub Turpentine	CE	-	Occurs in subtropical rainforest on basaltic soils, including red-brown loams and clay loams.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
						the presence of this species.	
Rhodamnia rubescens	Scrub Turpentine	CE	CE	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Rhodomyrtus psidioides	Native Guava	CE	CE	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Sarcochilus fitzgeraldii	Ravine Orchid	V	V	North-east NSW, north of the Macleay River, to Maleny in south-east Queensland. Grows mainly on rocks, amongst organic matter, in cool, moist, shady ravines, gorges and on cliff faces in dense subtropical rainforest at altitudes between 500 and 700 m.	No suitable habitat is present.	No	Assessment of significance is not required.
Sophora fraseri	Brush Sophora	V	V	Brush Sophora is usually found in wet situations in wet sclerophyll forest or vine forest, often near rainforest.	No suitable habitat is present.	No	Assessment of significance is not required.
Sophora tomentosa subsp. australis	Silverbush	E	-	Occurs on coastal dunes in Queensland and northern NSW.	No suitable habitat is present.	No	Assessment of significance is not required.
Syzygium hodgkinsoniae	Red Lilly Pilly	V	V	Riverine and subtropical rainforest on rich alluvial or basaltic soils.	A very small area of up to 0.02 ha of low condition PCT 1302	**Potential.** However, not recorded in the site	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
					vegetation is present that is potentially suitable habitat.	survey which was adequate to identify the presence of this species.	
Syzygium moorei	Durobby	V	V	Subtropical and riverine rainforest.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Thesium australe	Austral Toadflax	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*).	No suitable habitat is present.	No	Assessment of significance is not required.
Tylophora woollsii	Cryptic Forest Twiner	E	E	This species has been recorded from wet sclerophyll/rainforest margins, Eucalypt-dominated open forests, and disturbed road verges.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.
Xylosma terrae-reginae	Queensland Xylosma	E	-	Littoral and subtropical rainforest on coastal sands derived from metasediments.	A very small area of up to 0.02 ha of low condition PCT 1302 vegetation is present that is potentially suitable habitat.	**Potential.** However, not recorded in the site survey which was adequate to identify the presence of this species.	Assessment of significance is not required.

Table B.2 Potential occurrence assessment for threatened fauna

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Frogs							
Crinia tinnula	Wallum Froglet	V	-	Acid paperbark and sedge swamps known as 'wallum', this is a banksia-dominated lowland heath ecosystem characterised by acidic waterbodies.	No suitable habitat is present at the site or in adjacent areas. However, suitable habitat (areas of wallum swamp containing inundated areas with emergent sedges) occurs offsite within the catchment downstream of the site.	No - at the site and in adjacent areas.. **Potential** - in suitable habitat offsite within the catchment downstream of the site.	**Assessment of significance is required** to assess potential for indirect impacts.
Litoria olongburensis	Olongburra Frog	V	V	Paperbark swamps and sedge swamps of the coastal 'wallum' country amongst sedges and rushes.	No suitable habitat is present at the site. However, suitable habitat (areas of wallum swamp containing inundated areas with emergent sedges) occurs offsite within the catchment downstream of the site.	No - at the site and in adjacent areas. **Potential** - in suitable habitat offsite within the catchment downstream of the site.	**Assessment of significance is required** to assess potential for indirect impacts.
Mixophyes fleayi	Fleay's Barred Frog	E	E	Rainforest and wet eucalypt forest of the escarpment and foothills, close to gravely streams.	No suitable habitat is present.	No	Assessment of significance is not required.
Birds							
Amaurornis molucanna	Pale-vented Bush-hen	V	-	Variety of coastal wetlands from wetlands, mangroves, lagoons and swamps to river margins and creeks running through rainforest.	No suitable habitat is present.	No	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Anseranas semipalmata	Magpie Goose	V	-	Shallow wetlands (<1 m deep), large swamps and dams with dense growth of rushes or sedge.	No suitable habitat is present.	No	Assessment of significance is not required.
Anthochaera phrygia	Regent Honeyeater	CE	E	Dry open forest and woodland with an abundance of nectar-producing eucalypts, particularly box-ironbark woodland, swamp mahogany forests, and riverine sheoak woodlands.	No suitable habitat is present.	No	Assessment of significance is not required.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	No suitable habitat is present.	No	Assessment of significance is not required.
Botaurus poiciloptilus	Australasian Bittern	E	E	Permanent freshwater wetlands with tall dense vegetation, particularly bullrushes and spikerushes.	No suitable habitat is present.	No	Assessment of significance is not required.
Burhinus grallarius	Bush Stone-curlew	E	-	Lightly timbered open forest and woodland, and partly cleared farmland with woodland remnants, preferring areas with dry leaf-litter, fallen timber and sparse ground cover.	No suitable habitat is present.	No	Assessment of significance is not required.
Calidris ferruginea	Curlew Sandpiper	E	CE	Tidal mudflats, sandy ocean shores and occasionally inland freshwater or salt-lakes.	No suitable habitat is present.	No	Assessment of significance is not required.
Calyptorhynchus banksii banksii	Red-tailed Black-Cockatoo (Coastal species)	CE	-	Dry open forest and areas of mixed rainforest-eucalypt forest.	No suitable habitat is present.	No	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Dependent on large hollow-bearing eucalypts for nest sites.	A very small area of up to 0.03 ha of low condition PCT 1235 vegetation containing *Casuarina glaucal Casuarina cunninghamiana* is present (these two species can be used for foraging on a very occasional basis). No breeding habitat in hollows is present.	Potential There is some (minor) potential for foraging on *Casuarina glaucal Casuarina cunninghamiana* at the site.	Assessment of significance is required
Carterornis leucotis	White-eared Monarch	V	-	Coastal rainforest, swamp forest and wet eucalypt forest, prefers edges where trees frequently covered with vines.	A very small area of up to 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable habitat.	Potential	Test of significance is required
Circus assimilis	Spotted Harrier	V	-	Grassy open woodland, inland riparian woodland, grassland and shrub steppe.	No suitable habitat is present.	No	Assessment of significance is not required.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	Eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range, and less commonly on coastal plains and ranges.	No suitable habitat is present.	No	Assessment of significance is not required.
Coracina lineata	Barred Cuckoo-shrike	V	-	Rainforest, eucalypt woodlands, swamp woodlands and timber along watercourses.	A very small area of up to 0.03 ha of low condition PCT 1235	Potential	Test of significance is required

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
					and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable habitat.		
Cyclopsitta diophthalma coxeni	Coxen's Fig-parrot	CE	E	Drier rainforests and adjacent wet eucalypt forest, wetter lowland also wetter lowland rainforests.	No suitable habitat is present.	No	Assessment of significance is not required.
Daphoenositta chrysoptera	Varied Sittella	V	-	Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	No suitable habitat is present.	No	Assessment of significance is not required.
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Swamps, mangroves, mudflats, dry floodplains.	No suitable habitat is present.	No	Assessment of significance is not required.
Erythrotriorchis radiatus	Red Goshawk	CE	V	Along or near watercourses, swamp forest and woodlands on the coastal plain. There are no currently known nest sites in NSW.	A very small area of up to 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable foraging habitat.	Unlikely No DPIE BioNet records in the locality and no currently known nest sites in NSW.	Assessment of significance is not required.
Falco hypoleucos	Grey Falcon	E	-	Inhibits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded watercourses and agricultural land with scattered remnant trees.	No suitable habitat is present.	No	Assessment of significance is not required.
Falco subniger	Black Falcon	V	-	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions.	No suitable habitat is present.	No	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Glossopsitta pusilla	Little Lorikeet	V	_	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species.	No suitable habitat is present.	No	Assessment of significance is not required.
Haliaeetus leucogaster	White-bellied Sea Eagle	V	-	Habitats are characterised by the presence of large areas of open 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 swamps, lakes, reservoirs, billabongs and saltmarsh.	No suitable habitat is present.	No	Assessment of significance is not required.
Hieraaetus morphnoides	Little Eagle	V	-	Open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used.	No suitable habitat is present.	No	Assessment of significance is not required.
Hirundapus caudacutus	White-throated Needletail	-	V	In Australia, the White-throated Needletail is almost exclusively aerial.	Suitable aerial foraging habitat is present	Potential	As this species is an aerial forager that does not breed in mainland Australia, no foraging or breeding habitat would be removed for the proposal. Therefore, an EPBC MNES Significant impact

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
							assessment is not required.
Irediparra gallinacea	Comb-crested Jacana	V	-	Among vegetation floating on slow-moving rivers and permanent lagoons, swamps, lakes and dams.	No suitable habitat is present.	No	Assessment of significance is not required.
Ixobrychus flavicollis	Black Bittern	V	-	Dense vegetation fringing and in streams, swamps, tidal creeks and mudflats, particularly amongst swamp sheoaks and mangroves.	No suitable habitat is present.	No	Assessment of significance is not required.
Lathamus discolor	Swift Parrot	E	E	On the mainland the Swift Parrot occurs in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species.	No suitable habitat is present.	No	Assessment of significance is not required.
Lichenostomus fasciogularis	Mangrove Honeyeater	V	-	Mangrove forest, also near coastal forests and woodlands including casuarina and paperbark swamps.	A very small area of up to 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable habitat.	Potential	Test of significance is required
Limosa lapponica baueri	Bar-tailed Godwit	-	V	The bar-tailed godwit (western Alaskan) occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats.	No suitable habitat is present.	No	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Limosa limosa	Black-tailed Godwit	V	-	Tidal mudflats, sandspits, swamps, shallow river-margins and reservoirs.	No suitable habitat is present.	No	Assessment of significance is not required.
Lophoictinia isura	Square-tailed Kite	V	-	Dry woodland and open forest, particularly along major rivers and belts of trees in urban or semi-urban areas. Home range can extend over at least 100 km2.	No suitable habitat is present.	No	Assessment of significance is not required.
Ninox connivens	Barking Owl	V	-	Habitat includes eucalypt woodland, open forest, swamp woodlands and timber along watercourses. Potential nest trees are living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground.	A very small area of up to 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable foraging habitat. (as part of a much larger home range). No breeding habitat is present (hollow-bearing trees).	Potential	Assessment of significance is required
Ninox strenua	Powerful Owl	V	-	Woodland and open forest to tall moist forest and rainforest, common along drainage lines. The species can breed and forage in very small patches of vegetation, although this is hugely variable across their range.	A very small area of up to 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable habitat (as part of a much larger home range). No breeding habitat is present (hollow-bearing trees).	Potential	Assessment of significance is required

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Numenius madagascariensis	Eastern Curlew	-	E	In NSW the species occurs across the entire coast but is mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River, Richmond River and ICOLLs of the south coast. It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts.	No suitable habitat is present.	No	Assessment of significance is not required.
Pachycephala olivacea	Olive Whistler	V	-	Wet high altitude forests above 500 m.	No suitable habitat is present.	No	Assessment of significance is not required.
Petroica boodang	Scarlet Robin	V	-	Dry eucalypt forests and woodlands, usually with an open grassy understorey with few scattered shrubs. An abundance of logs and fallen timber appear to be an important habitat feature for this species.	No suitable habitat is present.	No	Assessment of significance is not required.
Ptilinopus magnificus	Wompoo Fruit-dove	V	-	Rainforests, low-elevation moist eucalypt forest, and Brush Box forests. Feeds on a diverse range of tree and vine fruits and is locally nomadic - following ripening fruit.	No suitable habitat is present.	No	Assessment of significance is not required.
Ptilinopus regina	Rose-crowned Fruit-dove	V	-	Subtropical and dry rainforest, moist eucalypt forest and swamp forest.	A very small area of up to 0.03 ha of low condition PCT1235 and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable habitat. However, this vegetation contains only a few rainforest fruiting trees/shrubs that could	Unlikely	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
					be used for foraging. Vegetation structure is degraded and the vegetation is therefore unlikely to be used for nesting.		
Ptilinopus superbus	Superb Fruit-dove	V	-	Subtropical and dry rainforest, moist eucalypt forest and swamp forest.	A very small area of up to 0.03 ha of low condition PCT1235 and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable habitat. However, this vegetation contains only a few rainforest fruiting trees/shrubs that could be used for foraging. Vegetation structure is degraded and the vegetation is therefore unlikely to be used for nesting.	Unlikely	Assessment of significance is not required.
Rostratula australis	Australian Painted Snipe	E	V	Well-vegetated shallows and margins of wetlands, dams, sewage ponds, wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub, and open timber.	No suitable habitat is present.	No	Assessment of significance is not required.
Stictonetta naevosa	Freckled Duck	V	-	Permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. In drier times they move from ephemeral breeding swamps to more permanent waters	No suitable habitat is present.	No	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
				such as lakes, reservoirs, farm dams and sewage ponds.			
Todiramphus chloris	Collared Kingfisher	V	-	Restricted to mangroves and other estuarine habitats, occur about mouths of larger coastal rivers.	No suitable habitat is present.	No	Assessment of significance is not required.
Turnix melanogaster	Black-breasted Button-quail	E	V	Drier rainforests and viney scrubs, often in association with Hoop Pine and a deep moist leaf litter layer.	No suitable habitat is present.	No	Assessment of significance is not required.
Tyto longimembris	Eastern Grass Owl	V	-	Areas of tall grass, including tussocks in swampy areas, grassy plains, swampy heath, cane grass, sedges on flood plains.	No suitable habitat is present.	No	Assessment of significance is not required.
Tyto novaehollandiae	Masked Owl	V	-	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides.	A very small area of up to 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable habitat (as part of a much larger home range). No breeding habitat is present (hollow-bearing trees).	**Potential**	**Assessment of significance is required**
Tyto tenebricosa	Sooty Owl	V	-	Dry, subtropical and warm temperate rainforests and wet eucalypt forests. Nest in large tree hollows.	No suitable habitat is present.	No	Assessment of significance is not required.
Xenus cinereus	Terek Sandpiper	V	-	Tidal mudflats, estuaries, shores and reefs of offshore islands and coastal swamps.	No suitable habitat is present.	No	Assessment of significance is not required.
Mammals							

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Cercartetus nanus	Eastern Pygmy-possum	V	-	Habitats range from rainforest to heath. North Coast mainly in rainforest, wet eucalypt forest and tee-tree-banksia scrub.	No suitable habitat is present.	No	Assessment of significance is not required.
Planigale maculata	Common Planigale	V	-	Habitat is rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas with surface cover close to water.	No suitable habitat is present.	No	Assessment of significance is not required.
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. This species usually roosts in tree hollows, but has also been found in buildings.	No suitable habitat is present.	Unlikely	Assessment of significance is not required.
Ozimops lumsdenae	Northern Free-tailed Bat	V	-	A range of vegetation types in northern Australia, from rainforests to open forests and woodlands, and are often recorded along watercourses. The only confirmed record in NSW is of a colony found in the roof of a house in Murwillumbah, however, calls have been detected from a few other locations in the far north east of the State.	No suitable habitat is present.	Unlikely	Assessment of significance is not required.
Micronomus norfolkensis	Eastern Freetail-bat	V	-	Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Roosts in tree hollows.	No suitable habitat is present.	Unlikely	Assessment of significance is not required.
Pseudomys novaehollandiae	New Holland Mouse	-	V	Occurs in open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes.	No suitable habitat is present.	No	Assessment of significance is not required.
Xeromys myoides	False Water-rat	-	V	Primarily in habitats mangrove forests but has been recorded in a variety of well-watered habitats including, freshwater lagoons, sedged lakes close to foredunes, and swamps.	No suitable habitat is present.	No	Assessment of significance is not required.
Petaurus norfolcensis	Squirrel Glider	V	-	Blackbutt, bloodwood and ironbark eucalypt forest with heath understorey in coastal areas, and box-ironbark woodlands and River Red Gum	No suitable habitat is present.	No	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
				forest inland. Key habitat requirements include; abundant tree hollows for refuge and nesting, areas with more than one eucalypt species and/or an understorey of wattles.			
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Found mainly in areas with extensive cliffs and caves. Near cave entrances and crevices in cliffs.	No suitable habitat is present.	No	Assessment of significance is not required.
Potorous tridactylus tridactylus	Long-nosed Potoroo, Cobaki Lakes and Tweed Heads West population	E	-	Long-nosed Potoroo habitat is characterised by dense groundcover for shelter in proximity to small open areas for foraging. At Cobaki, potoroos appear to prefer Scribbly Gum Heathland, although they have been recorded in a variety of other vegetation communities, including Scribbly Gum/Swamp Mahogany Forest, Tree Broom Heath, Scribbly Gum Forest, Black She-oak Heath and Swamp Mahogany Forest.	No suitable habitat is present.	No	Assessment of significance is not required.
Potorous tridactylus tridactylus	Long-nosed Potoroo	V	V	Cool temperate rainforest, moist and dry forests, and wet heathland, inhabiting dense layers of grass, ferns, vines and shrubs.	No suitable habitat is present.	No	Assessment of significance is not required.
Petauroides volans	Greater Glider	-	V	The distribution of the Greater Glider includes the ranges and coastal plain of eastern Australia, where it inhabits a variety of eucalypt forests and woodlands..	No suitable habitat is present.	No	Assessment of significance is not required.
Nyctimene robinsoni	Eastern Tube-nosed Bat	V	-	Streamside habitats within coastal subtropical rainforest and moist eucalypt forests with well-developed rainforest understorey.	No suitable habitat is present.	No	Assessment of significance is not required.
Syconycteris australis	Eastern Blossom-bat	V	-	Littoral rainforest and feed on flowers in adjacent heathland and paperbark swamps.	No suitable habitat is present.	No	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	The site contains a small area of custard apple (*Annona* sp. hybrid) plantation that may be utilised as an opportunistic foraging resource. No breeding habitat (flying-fox camps) are located at the site or in close proximity.	Potential	Assessment of significance is required
Phascolarctos cinereus	Koala population between the Tweed River and Brunswick River east of the Pacific Highway	E	E	Approximately 3,328 hectares of fragmented but otherwise suitable koala habitat remains between the Tweed and Brunswick Rivers east of the Pacific Highway. Of this, 237 hectares is considered to be primary koala habitat where the preferred food trees Swamp Mahogany (*Eucalyptus robusta*), Forest Red Gum (*E. tereticornis*) and/or Tallowwood (*E. microcorys*) grow on medium to high nutrient soils. A further 2,143 hectares is considered to be secondary (Class A) koala habitat where Swamp Mahogany, Forest Red Gum and/or Tallowwood are sub-dominant elements. An additional 948 hectares is considered secondary (Class B) habitat containing Tallowwood and/or Grey Gum (*E. propinqua*) growing on low nutrient soils.	The site does not contain any koala food trees. Nearby (offsite) habitat is present in PCT 1569 that would not be impacted by the proposal.	Unlikely – onsite vegetation has no function as a corridor between areas of koala habitat in the broader area.	Assessment of significance is not required (no other indirect impacts – e.g. relating to habitat fragmentation, koala movement, or vehicle strike are likely to occur in relation to the proposal).
Phascolarctos cinereus	Koala	V	E	Appropriate food trees in forests and woodlands, and treed urban areas.	The site does not contain any koala food trees	Unlikely – onsite vegetation has no function as a corridor between areas of	Assessment of significance is not required (no other

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
						koala habitat in the broader area.	indirect impacts relating to habitat fragmentation, koala movement, vehicle strike are likely to occur in relation to the proposal).
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Forages in a variety of habitats, roosts in tree hollows and buildings.	No suitable habitat is present.	Unlikely	Assessment of significance is not required.
Miniopterus australis	Little Bent-winged Bat	V	-	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings. Only five nursery sites /maternity colonies within caves are known in Australia.	A very small area of up to 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable habitat (marginal). No breeding habitat is present.	Unlikely	Assessment of significance is not required.
Myotis macropus	Southern Myotis	V	-	Bodies of water, rainforest streams, large lakes, reservoirs. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.	No suitable habitat (foraging or breeding) is present.	No	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Nyctophilus bifax	Eastern Long-eared Bat	V	-	Lowland subtropical rainforest and wet and swamp eucalypt forest, extending to adjacent moist eucalypt forest.	No suitable habitat is present.	No	Assessment of significance is not required.
Chalinolobus nigrogriseus	Hoary Wattled Bat	V	-	Dry open eucalypt forest dominated by spotted gum, boxes and ironbarks. Also healthy coastal forests where Red Bloodwood and Scribbly Gum are common. Naturally sparse understorey is favourable.	No suitable habitat is present.	No	Assessment of significance is not required.
Dasyurus maculatus maculatus	Spotted-tailed Quoll	V	E	Habitat includes dry and moist eucalypt forests and rainforests, fallen hollow logs, large rocky outcrops.	No suitable habitat is present (and in particular no key habitats such as fallen hollow logs and large rocky outcrops essential as breeding habitat).	Unlikely	Assessment of significance is not required.
Miniopterus orianae oceanensis	Large Bent-winged bat	V	-	Forest or woodland, roost in caves, old mines and stormwater channels.	A very small area of up to 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation is present that is broadly suitable habitat (marginal). No breeding habitat is present.	Unlikely	Assessment of significance is not required.
Insects							
Argynnis hyperbius inconstans	Australian Fritillary	E	CE	The Australian Fritillary is restricted to south-east Queensland and north-east NSW in open swampy coastal areas where the larval food plant Arrowhead Violet *Viola betonicifolia* occurs.	No suitable habitat is present.	No	Assessment of significance is not required.

Scientific Name	Common Name	Status		Habitat Requirement	Site Habitat Suitability	Likelihood of Occurrence	Requirement for Assessment of Significance
		BC Act	EPBC Act				
Phyllodes imperialis (southern subspecies)	Pink Underwing Moth	E	E	Found in undisturbed subtropical rainforest below 600 m. Breeding habitat is restricted to areas where the caterpillar's food plant, a native rainforest vine, *Carronia multisepalea,* grows in a collapsed shrub-like form.	No suitable habitat is present.	No	Assessment of significance is not required.
Gastropoda							
Thersites mitchellae	Mitchell's Rainforest Snail	E	CE	Remnant areas of lowland subtropical rainforest and swamp forest on alluvial soils, found amongst leaf litter on the forest floor.	No suitable habitat is present at the site. However, suitable habitat occurs in nearby PCT 1302 vegetation downstream of the site.	No - at the site. **Known occurrence** - in adjacent downstream PCT 1302 vegetation.	**Assessment of significance is required** to assess potential for indirect impacts.
Reptiles							
Delma torquata	Collared Delma	-	V	Usually inhabits eucalypt dominated woodland and open forest where it is associated with suitable micro-habitats i.e. exposed rocky outcrops.	No suitable habitat is present.	No	Assessment of significance is not required.
Coeranoscincus reticulatus	Three-toed Snake-tooth Skink	V	V	Rainforest and occasionally moist eucalypt forest, on loamy or sandy soils.	No suitable habitat is present.	No	Assessment of significance is not required.
Furina dunmalli	Dunmall's Snake	-	V	Preferred habitat is Brigalow forest and woodland with fallen timber and ground litter, growing on cracking clay soils and clay loam soils. Also occurs in eucalypt and Callitris woodland with fallen timber and ground litter.	No suitable habitat is present.	No	Assessment of significance is not required.

Appendix C – BC Act Tests of Significance

Five-part test of significance under Section 7.3 of the BC Act for Threatened Ecological Communities

Lowland Rainforest in the New South Wales North Coast and Sydney Basin Bioregions

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,

Not relevant to assessment of threatened species.

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,

This community is listed as an Endangered TEC under Schedule 2 of the BC Act.

Lowland Rainforest in the New South Wales North Coast and Sydney Basin Bioregions (Lowland Rainforest) is an ecological community of subtropical rainforest and some related, structurally complex forms of dry rainforest. Lowland Rainforest, in a relatively undisturbed state, has a closed canopy, characterised by a high diversity of trees whose leaves may be mesophyllous and encompass a wide variety of shapes and sizes. Typically, the trees form three major strata: emergents, canopy and sub-canopy which, combined with variations in crown shapes and sizes results in an irregular canopy appearance. The trees are taxonomically diverse at the genus and family levels, and some may have buttressed roots. A range of plant growth forms are present in Lowland Rainforest, including palms, vines and vascular epiphytes. In disturbed stands of this community the canopy cover may be broken, or the canopy may be smothered by exotic vines.

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Within the site this TEC corresponds with PCT 1302 White Booyong – Fig subtropical rainforest of the NSW North Coast Bioregion.

Threatening processes for this TEC include:

- Clearing from rural, agricultural and urban development leading to edge effects, degradation and further fragmentation.

- Invasion and establishment of transformer weed species changing community structure and floristic composition.
- Inappropriate fire regimes associated with burning off and hazard reduction pose a threat to the margins of rainforest stands and the entirety of small stands in fragmented landscapes.
- Myrtle rust infection of characteristic species resulting in changes to community structure and floristic composition.
- Grazing and trampling by livestock causing loss of or damage to plants, compaction of soil, erosion, influx of nutrients and dispersal of weeds.
- Climate Change.
- Reduced pollination and lack of seed.
- Bell Miner associated dieback affecting the eucalypts in some remnants
- Damage caused by human disturbance including trampling, rubbish dumping, arson, motorbikes, bicycles, and the construction of jumps for bikes within the TEC.
- Biogeographic homogenisation of lowland rainforest with native (non-endemic) garden plants.

Potential Impacts of the proposal

The proposal requires clearing of a very small area of approximately 0.02 ha low condition Lowland Rainforest TEC. Although highly fragmented, small remnants and regrowth areas of this TEC are scattered throughout the study area and broader locality. The vegetation clearing required for the proposal would impact on only a very small area of the subject TEC that occurs within the broader locality.

The potential for indirect impacts on adjacent downstream occurrences of this TEC is low (refer to section 3.3.3).

Therefore, it is unlikely that the proposal would have an adverse effect on the extent of Lowland Rainforest TEC such that its local occurrence is placed at risk of extinction, or that the composition of this community would be substantially and adversely modified such that its local occurrence is placed at risk of extinction.

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

The proposal requires clearing of a very small area of approximately 0.02 ha low condition Lowland Rainforest TEC.

(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

The proposal would require minimal clearing of up to 0.02 ha at the northern periphery of a linear patch of low condition planted/regrowth PCT 1302 that occurs along Cudgen Road and

part of Turnock Street. As this TEC is already substantially fragmented across its range, primarily due to historic land clearing, the proposal would result in a negligible increase to this existing fragmentation. Furthermore, the proposed removal of this small area of PCT 1302 would not result in further isolation of this (already isolated) area of PCT 1302.

(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 habitat to be removed is not considered to be of particular importance to the survival of this TEC in the locality for the following reasons:

- The area of 0.02 ha of this TEC that would be removed for the proposal is only a very minor portion of the area that occurs within the broader locality (albeit heavily cleared for farming and residential development and highly fragmented); and
- The occurrence of TEC at the site consists of low condition planting/regrowth vegetation, with low plant species diversity and modified structure. This vegetation has been subjected to a range of past and ongoing disturbances including clearing, previous road and bridge works, infiltration by weeds and cattle grazing, thereby limiting the overall importance of the habitat to be removed.

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 nearest area of outstanding biodiversity value (AOBV) is the critical habitat for Mitchell's Rainforest Snail (*Thersites mitchellae*) in Stotts Island Nature Reserve on the Tweed River, approximately 6 km west of the site. This AOBV would not be impacted by the proposal.

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.

A key threatening process (KTP) is defined under the BC Act as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species or ecological communities. The current list of KTP under the BC Act, and whether the proposal is recognised as a KTP is shown in Table D.1.

Table D.1 Key Threatening Processes

Key Threatening Process (as per Schedule 4 of the BC Act)	Is the development or activity a key threatening process or part of a key threatening process or likely to increase the impact of a key threatening process?		
	Likely	Possible	Unlikely
Aggressive exclusion of birds by noisy miners (Manorina melanocephala)			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic climate change			✓
Bushrock removal		✓	

Clearing of native vegetation	✓		
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)			✓
Competition and habitat degradation by feral goats (*Capra hircus*)			✓
Competition from feral honeybees (*Apis mellifera*)			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest eucalypt dieback associated with over-abundant psyllids and bell miners			✓
Habitat degradation and loss by Feral Horses (brumbies, wild horses), *Equus caballus* Linnaeus 1758			✓
Herbivory and environmental degradation caused by feral deer			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Importation of red imported fire ants (*Solenopsis invicta*)			✓
Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis		✓	
Infection of native plants by *Phytophthora cinnamomi*			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae		✓	
Introduction of the large earth bumblebee (*Bombus terrestris*)			✓
Invasion and establishment of exotic vines and scramblers		✓	
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)			✓
Invasion and establishment of the Cane Toad (*Bufo marinus*)			✓
Invasion, establishment and spread of Lantana (*Lantana camara*)		✓	
Invasion of native plant communities by African Olive (*Olea europaea* L. subsp. cuspidata)			✓
Invasion of native plant communities by Chrysanthemoides monilifera (bitou bush and boneseed)			✓
Invasion of native plant communities by exotic perennial grasses		✓	
Invasion of the Yellow Crazy Ant (*Anoplolepis gracilipes*) into NSW			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants		✓	
Loss of hollow-bearing trees			✓
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and hybridisation by feral dogs (*Canis lupus familiaris*)			✓
Predation by the European Red Fox (*Vulpes vulpes*)			✓
Predation by the feral cat (Felis catus)			✓
Predation by Gambusia holbrooki (Plague Minnow or Mosquito Fish)			✓
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island			✓
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)			✓
Removal of dead wood and dead trees	✓		

As shown in Table D.1 the following two KTPs are likely to be contributed to by the proposal:

Clearing of native vegetation: Clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of stand or stands.

The proposal would require the removal of:

- Up to approximately 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation.

Considering the very small area of native vegetation to be removed, it is unlikely that the proposal would contribute significantly to this KTP more broadly.

Removal of dead wood and dead trees: Four stag trees may be removed from the site for the proposal. This would only represent a minor contribution to this KTP. Considering the relatively small amount of dead wood and dead trees to be removed for the proposal, it is unlikely that the proposal would contribute significantly to this KTP more broadly.

The proposal is such that no other KTPs are considered likely to be substantially contributed to, especially with effective implementation of the mitigation measures in this report.

Overall, although the action proposed constitutes or is part of two KTPs, the minor nature of the proposal is such that this contribution is very small and insignificant within the broader locality.

Conclusion

It is considered unlikely that a local occurrence of any of the subject threatened fauna species would be placed at risk of extinction as a result of the proposal.

References

NSW Office of Environment and Heritage (2019). Lowland Rainforest on in the New South Wales North Coast and Sydney Basin Bioregions - profile (accessed 2nd March 2022). https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20073

Five-part test of significance under Section 7.3 of the BC Act for Threatened Fauna

Depending on the nature of the impacts, part (a), (c), (d) and (e) are answered per species or as a collective group of species when they have similar life histories (e.g. forest owls). Part (b) deals specifically with threatened ecological communities, and hence is not relevant to the subject threatened species assessment.

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,

FROGS (Wallum Froglet and Olongburra Frog)

Wallum Froglet

The Wallum Froglet are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests.

The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Wallum Froglets shelter under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp and often located near the water's edge.

Threatening processes for this species include:

- Destruction and degradation of coastal wetlands as a result of roadworks, coastal developments and sandmining.
- Reduction of water quality and modification to acidity in coastal wetlands.
- Changes to hydrology of coastal wetlands as a result of a changing climate and/ or sea level rise.
- Nutrient enrichment and chemical run off from urban and agricultural areas and as a result of mosquito control.
- Predation of tadpoles and eggs by the Plague Minnow Gambusia holbrooki. While little is known of the extent of Plague Minnow predation on Wallum Froglets, it must be considered a potential threat.
- Habitat disturbance by feral pigs.

Olongburra Frog

The Olongburra Frog is an "acid" frog confined to the coastal sandplain wallum swamps. Their life-cycle is adapted to the acidic pH (2.8-5.5) of these wetlands. Frogs are highest in abundance in relatively undisturbed wallum swamps.

Breeding habitat is characterised by the presence of emergent sedges, with upright species such as *Baumea* spp. and *Schoenus* spp. preferred by adult frogs for perching. Frogs can be found in

breeding habitat all year. However, little is known about habitat use when breeding is not occurring and drier areas adjacent to primary habitat may also be utilised.

Threatening processes for this species include:

- Destruction and degradation of wallum habitat for coastal development.
- Reduction of water quantity and/or quality (including changes to pH) in coastal wetland habitat.
- Changes in average and extreme temperatures and the amount and timing of rainfall due to climate change.
- Severe fires in very dry periods that result in insufficient refuge remaining post-fire.
- Roadkill (it has been estimated that >10,000 Olongburra Frogs are killed annually on one 4km stretch of road near Lennox Head).
- Predation of tadpoles and eggs by the Plague Minnow Gambusia holbrooki. While little is known of the extent of Plague Minnow predation on Olongburra Frogs, it must be considered a potential threat.

Potential impacts of the proposal on threatened frogs

The proposal would not remove any areas of suitable habitat for the subject threatened frog species. However, there are previous DPIE BioNet records of both species within 1.5 km of the site and within the receiving catchment. As identified in the BDAR prepared for the broader Tweed Valley Hospital development (Greencap 2019), 'the use of gypsum as a flocculent in the sediment basins to quickly settle sediment-laden stormwater runoff during construction may impact the abovementioned threatened amphibian species upon discharge from basins to the downstream receiving wetland environment'. The proposed ambulance station is located on the broader Tweed Valley Hospital site and within the same receiving catchment. As the proposal includes retention of stormwater in a sediment basin, the potential indirect impacts on the subject threatened frog species relating to the use of gypsum as a flocculent are also relevant.

Within the context of the much larger Tweed Hospital development, an assessment of potential indirect impacts on these species was undertaken by ecologist Jon Alexander (SMEC 2019) as part of the BDAR for the project (Greencap 2019). This assessment concluded that (in relation to the potential for occurrence of this species in adjacent downstream habitats and indirect impacts):

- 'The Wallum froglet and Olongburra frog prefer areas of generally different habitat such as inundated habitat with emergent sedge species. If present, there is no apparent likelihood that the additional inflows expected would negatively impact these species; and
- Additionally, if the above species are present, the expected improvement in water quality as a result of the Projects stormwater management system could potentially be of benefit. However, additional data from long term monitoring of these species would be required to assess any potential impacts as a result of the Project in greater detail'.

To further mitigate the potential indirect impacts of the Tweed Valley Hospital development on the subject frog species, to avoid any potential changes in pH and impacts on these threatened species, other commercially available flocculants that work as effectively as a gypsum replacement

yet do not create the large changes in pH will be used to treat stormwater before discharge on the Site (Greencap 2019).

Therefore, the proposal is considered unlikely to significantly affect any potentially occurring local population of the subject threatened frog species for the following reasons:

- no foraging or breeding habitat would be directly affected;
- alternative (and better quality) potential habitat is present within wallum swamps within the broader locality that would not be affected by the proposal (i.e. outside of the receiving catchment); and
- potential indirect impacts on downstream water quality relating to the retention and discharge of stormwater from the site can be mitigated using the same methods as those proposed for the Tweed Valley Hospital development.

On this basis it would be highly unlikely that an adverse effect on the life cycle of the subject threatened frog species would occur such that a viable local population of the species is likely to be placed at risk of extinction.

BIRDS (Glossy Black-cockatoo, passerine birds, and forest owls)

Glossy Black-cockatoo

The Glossy Black-cockatoo inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak (*Allocasuaraina diminuta*), and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill.

The Glossy Black-cockatoo is dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.

Threatening processes for this species include:

- Reduction of suitable habitat through clearing for development.
- Decline of hollow bearing trees over time due to land management activities.
- Excessively frequent fire which eliminates sheoaks from areas, prevents the development of mature sheoak stands, and destroys nest trees.
- Firewood collection resulting in loss of hollow bearing trees, reduced recruitment of hollow bearing trees, and disturbance of breeding attempts.
- Decline in extent and productivity of sheoak foraging habitat due to feral herbivores.
- Limited information on the location of nesting aggregations and the distribution of high quality breeding habitat.
- Disturbance from coal seam gas and open cut coal mining causing loss of foraging and breeding habitat as well as disturbing reproductive attempts.

- Forestry activity resulting in loss of hollow bearing trees, reduced recruitment of hollow bearing trees, degradation of foraging habitat, and disturbance of breeding attempts.
- Decline in extent and productivity of sheoak foraging habitat caused by moisture stress due to climate change.
- Degradation of foraging habitat and reduced regeneration of sheoak stands due to grazing by domestic stock.
- Loss of foraging habitat due to slashing/underscrubbing.
- Change in the spatial and temporal distribution of foraging resources due to global warming.
- Illegal bird smuggling and egg-collecting.
- Habitat infestation by weeds such as African boxthorn, Gazania, buffel grass and other invasive grasses.

Potential impacts of the proposal on the Glossy Black-cockatoo
The proposal would result in removal of foraging habitat for the Glossy Black-cockatoo, consisting of approximately 0.03 ha of low condition PCT 1235 vegetation containing *Casuarina glauca/ Casuarina cunninghamiana*. These two species can be used for foraging on a very occasional basis (Glossy Black Conservancy 2010).

The proposal would not have any impact on breeding habitat for the Glossy Black-cockatoo (i.e. large tree hollows).

Despite this potential impact, other stands of Casuarina/Allocasuarina are present in surrounding coastal forests (including stands of *Allocasuarina littoralis* and *A. torulosa* – both key feeding species) that would not be affected by the proposal and would therefore provide potential foraging habitat for the Glossy Black-cockatoo post-works. With consideration of this, and that no breeding habitat would be removed (hollow-bearing trees) it would be highly unlikely that an adverse effect on the life cycle of the Glossy Black-cockatoo would occur such that a viable local population of the Glossy Black-cockatoo is likely to be placed at risk of extinction.

Passerine birds (White-eared Monarch, Barred Cuckoo-shrike, and Mangrove Honeyeater)

White-eared Monarch
In NSW, White-eared Monarchs occurs in rainforest, especially drier types, such as littoral rainforest, as well as wet and dry sclerophyll forests, swamp forest and regrowth forest.
They appear to prefer the ecotone between rainforest and other open vegetation types or the edges of rainforest, such as along roads.

Threatening processes for this species include:
- Clearing and increasing fragmentation and isolation of habitat, especially low-elevation subtropical rainforest, littoral rainforest and wet sclerophyll forest, through agricultural, tourist and residential development or forestry activities.
- Forest management that results in conversion of multi-aged forests to young, even-aged stands.
- Invasion of forests by weeds.

- Inappropriate fire regimes that degrade habitat or allow invasion by weeds.
- Degradation or loss of habitat through grazing of stock.
- Changes to rainforest habitat with climate change including drying and increased fire frequency.
- Lack of information on the species habitat requirements in NSW, particularly breeding habitat.
- Easily disturbed by the presence of people.

Barred Cuckoo-shrike

Rainforest, eucalypt forests and woodlands, clearings in secondary growth, swamp woodlands and timber along watercourses.

Threatening processes for this species include:

- Reduction of habitat, particularly rainforest, due to clearing for agriculture, development and timber harvesting.

Mangrove Honeyeater

The primary habitat of the species is mangrove woodlands and shrublands but Mangrove Honeyeaters also range into adjacent forests, woodlands and shrublands, including casuarina and paperbark swamp forests and associations dominated by eucalypts or banksias.

They occasionally forage in parks and gardens of coastal towns and villages.
Mangrove Honeyeaters eat nectar, from flowers, and invertebrates, including marine snails and crabs. They generally forage in mangroves, mainly taking food from among the foliage but also feeding at flowers, and from the trunks and roots. They also sometimes forage among flowering trees and shrubs in adjacent habitats.

Threatening processes for this species include:

- Clearing of mangroves, especially old stands, and adjoining forest and woodland vegetation, for residential, infrastructure or tourism, development, or for aesthetic reasons associated with such development.
- Use of herbicides and pesticides in agriculture and to protect tourist and residential areas that may affect habitat of the species or prey densities.
- Pollution of estuaries and mangrove vegetation and accumulation of herbicide and pesticide residues resulting from agricultural, tourism and residential use of pesticides.
- The unknown but apparently small population of this species in NSW, restricted to a few known sites, leaves the mangrove Honeyeater vulnerable to declines resulting from unpredicted and random events.

Potential impacts of the proposal on threatened passerine birds

The proposal would result in removal of a very small area of potential foraging and breeding habitat for the subject threatened passerine birds, consisting of removal of up to 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302. However, this represents only a

tiny portion of the potential foraging and breeding habitat available within coastal forests occurring in the locality that would not be affected by the proposal.

Despite the removal of this area of this potential foraging and breeding habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of the subject threatened passerine birds for the following reasons:

- only a very small area of habitat would be directly affected; and
- alternative (and better quality) potential foraging and breeding habitat is present within forests in the study area and broader locality that would not be affected by the proposal.

On this basis it would be highly unlikely that an adverse effect on the life cycle of the subject threatened passerine birds would occur such that a viable local population of any of these species is likely to be placed at risk of extinction.

Forest owls (Barking Owl, Masked Owl, and Powerful Owl)

Barking Owl

The Barking Owl inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile riparian soils.

The Barking Owl roosts in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. Preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch.

Requires very large permanent territories in most habitats due to sparse prey densities. Monogamous pairs hunt over as much as 6,000 hectares, with 2,000 hectares being more typical in NSW habitats. Two or three eggs are laid in hollows of large, old trees. Living eucalypts are preferred though dead trees are also used. Nest sites are used repeatedly over years by a pair, but they may switch sites if disturbed by predators (e.g. goannas).

Threatening processes for this species include:

- Clearing and degradation of habitat, mostly through cultivation, intense grazing and the establishment of exotic pastures.
- Inappropriate forest harvesting practices that remove old, hollow-bearing trees and change open forest structure to dense regrowth.
- Firewood harvesting resulting in the removal of fallen logs and felling of large dead trees.
- Too-frequent fire leading to degradation of understorey vegetation which provides shelter and foraging substrates for prey species.

- Disturbance of nesting and excessive disturbance of foraging by inappropriate use of call-playback surveys
- Competition for prey by foxes
- Poor organisation and availability of species data
- Nest predation by native species such as goannas and brush-tailed possums

Powerful Owl

The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine (*Syncarpia glomulifera*), Black She-oak (*Allocasuarina littoralis*), Blackwood (*Acacia melanoxylon*), Rough-barked Apple (*Angophora floribunda*), Cherry Ballart (*Exocarpus cupressiformis*) and a number of eucalypt species.

The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all of the prey for a pair of Powerful Owls. Flying foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As most prey species require hollows and a shrub layer, these are important habitat components for the owl.

Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats a mere 400 can support a pair; where hollow trees and prey have been depleted the owls need up to 4,000 ha.

Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him.

Threatening processes for this species include:

- Historical loss and fragmentation of suitable forest and woodland habitat from land clearing for residential and agricultural development. This loss also affects the populations of arboreal prey species, particularly the Greater Glider which reduces food availability for the Powerful Owl.
- Inappropriate forest harvesting practices that have changed forest structure and removed old growth hollow-bearing trees. Loss of hollow-bearing trees reduces the availability of suitable nest sites and prey habitat.
- Can be extremely sensitive to disturbance around the nest site, particularly during pre-laying, laying and downy chick stages. Disturbance during the breeding period may affect breeding success.

- High frequency hazard reduction burning may also reduce the longevity of individuals by affecting prey availability.
- Road kills.
- Secondary poisoning.
- Predation of fledglings by foxes, dogs and cats.

Masked Owl

Lives in dry eucalypt forests and woodlands from sea level to 1,100 m. A forest owl, but often hunts along the edges of forests, including roadsides.

The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.

Threatening processes for this species include:

- Loss of mature hollow-bearing trees and changes to forest and woodland structure, which leads to fewer such trees in the future.
- Clearing of habitat for grazing, agriculture, forestry or other development.
- A combination of grazing and regular burning is a threat, through the effects on the quality of ground cover for mammal prey, particularly in open, grassy forests.
- Secondary poisoning from rodenticides.
- Being hit by vehicles.

Potential impacts of the proposal on threatened forest owls

The proposal would result in removal of a very small area of potential foraging habitat for the subject threatened forest owls, consisting of approximately 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302. The proposal would not result in the removal of any potential nesting habitat (large hollow trees).

Despite the removal of this area of potential foraging habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of any of the subject threatened forest owls for the following reasons:

- only a small area of potential foraging habitat (which is a tiny portion of a much more extensive home range) would be directly affected;
- alternative foraging for the subject species is present within coastal forests in the broader locality, and this and would not be affected by the proposal; and
- No breeding habitat for any of the subject species would be impacted by the proposal.

On this basis it would be highly unlikely that an adverse effect on the life cycle of any of the subject threatened forest owls would occur such that a viable local population of the species is likely to be placed at risk of extinction.

MAMMALS

Grey-headed Flying-fox

Grey-headed Flying-foxes (GHFF) have a distribution that typically extends approximately 200 km from the coast of Eastern Australia, from Rockhampton in Queensland to Adelaide in South Australia. Foraging areas include subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. GHFF feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines, as well as from cultivated gardens and orchards. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. GHFF may travel up to 50 km from the camp to forage; commuting distances are more often <20 km.

Threatening processes for this species include:

- Clearing of woodlands for agriculture
- Loss of roosting and foraging sites
- Electrocution on powerlines, entanglement in netting and on barbed-wire
- Heat stress
- Conflict with humans
- Incomplete knowledge of abundance and distribution across the species' range.

Potential impacts from the proposal on the Grey-headed Flying-fox

The proposal would require the removal of a very small area of potential foraging habitat for the GHFF consisting of:

- up to 0.5 ha of exotic-dominated pastureland/orchard containing Custard Apple (*Annona* sp. hybrid) trees

This vegetation provides an opportunistic foraging resource (fruit) for the Grey-headed Flying-fox. However, alternative equivalent and better quality foraging habitat is present in the broader locality within native forests that support key foraging resources (e.g. Broad-leaved Paperbark (*Melaleuca quinquenervia*) and Swamp Mahogany (*Eucalyptus robusta*) Eby and Law (2008)).

No known roost habitat would be affected. Two flying-fox camps are known from within a 1 km radius of the site (Kingscliff Library and Elrond Drive, Chinderah). However, there are no flying-fox camps located at the site, or in close proximity, and these known camps would not be impacted by the proposal.

As only a minor area of foraging habitat would be removed for the proposal and no breeding habitat, it would be highly unlikely that an adverse effect on the life cycle of GHFF would occur such that a viable local population of the species is likely to be placed at risk of extinction.

GASTROPODS

Mitchell's Rainforest Snail

Remnant areas of lowland subtropical rainforest and swamp forest on alluvial soils. Slightly higher ground around the edges of wetlands with palms and fig trees are particularly favoured habitat. Typically found amongst leaf litter on the forest floor, and occasionally under bark in trees.

Threatening processes for this species include:

- Clearing of lowland rainforest, swamp forest and wetland margins for agriculture.
- Clearing of lowland rainforest, swamp forest and wetland margins for urban development.
- Damage to remnant areas of habitat from grazing by domestic stock.
- Damage to remnant areas of habitat by fire.
- Damage to remnant areas of habitat by weed invasion.
- Predation of snails by introduced rats.
- Habitat fragmentation increasing edge effects including increasing the severity of disturbance from fire, weeds and predation by introduced rats .
- Use of herbicides and pesticides in and near areas of habitat.
- Impacts on habitat as a result of dieback caused by root rot fungus (Phytophthora cinnamomi).
- Loss of coastal populations from sea level rise and climate change
- Damage to habitat from changes in hydrology
- Poor knowledge of species distribution
- Lack of awareness of the species within the community

Potential impacts from the proposal on Mitchell's Rainforest Snail

The proposal would not directly remove any areas of suitable habitat for Mitchell's Rainforest Snail. However, there are several recent records of this species approximately 100-200 m north of the site within PCT 1302 and PCT 1064 vegetation (Greencap 2019).

Within the context of the much larger Tweed Valley Hospital development, an assessment of potential indirect impacts on the Mitchell's Rainforest Snail was undertaken by ecologist Jon Alexander (SMEC 2019) as part of the BDAR for the project (Greencap 2019). The available information on habitat suggests the species is dependent on high moisture levels, low fire frequency, and a well-developed leaf litter layer and are typically found on somewhat elevated ground around the edges of wetlands (DEE 2019; OEH 2019). It was assessed that the predicted change in inflow levels is unlikely to negatively impact or reduce the existing habitat to the north of the site through permanent inundation (SMEC 2019). It should be noted that the proposal is of a much smaller scale than the broader hospital development, and would have only a minor contribution to the overall inflow levels to these habitats.

Therefore, the proposal is considered unlikely to significantly affect any potentially occurring local population of the Mitchell's Rainforest Snail for the following reasons:

- no habitat would be directly affected;

- alternative potential habitat is present within subtropical rainforest and swamp forest with a rainforest understorey within the broader locality that would not be affected by the proposal (i.e. outside of the receiving catchment); and
- potential indirect impacts relating to additional inflows from the proposal would be unlikely to negatively impact or reduce the existing habitat to the north of the site through permanent inundation (SMEC 2019).

On this basis it would be highly unlikely that an adverse effect on the life cycle of the Mitchell's Rainforest Snail would occur such that a viable local population of the 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,

Not relevant to assessment of threatened species.

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

The proposal would require the removal of:
- up to approximately 0.03 ha of low condition PCT 1235 and 0.02 ha of PCT 1302 vegetation.
- up to 0.5 ha of exotic-dominated pastureland/orchard.

Removal of this vegetation would also remove the following habitat values for the subject threatened species:
- Foraging and breeding habitat for subject threatened passerine birds (White-eared Monarch, Mangrove Honeyeater and Barred Cuckoo-shrike) within PCT 1235 and PCT 1302
- Foraging habitat for subject threatened forest owls within PCT 1235 and PCT 1302 (a very small area within a much larger home range)
- Foraging habitat for the Glossy Black-cockatoo (minor area of non-preferred she-oaks) within PCT 1235
- Small area of potential opportunistic foraging habitat for GHFF within the exotic-dominated pastureland/orchard area (feeding on custard apple fruit).

Indirect impacts on habitat of the subject threatened frogs is also possible in relation to changes in water quality exiting the site (particularly elevated pH). However, these potential impacts are manageable by way of effective implementation of mitigation measures.

Any indirect impacts on downstream habitat of Mitchell's Rainforest Snail relating to increased outflows from the proposal are considered negligible (refer to SMEC 2019 and impacts for the larger Tweed Valley Hospital development).

(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

Considering the very small amount of native vegetation removal required (up to 0.05 ha in total) the proposal would not result in significant fragmentation or isolation of habitats that would limit dispersal or movement within the home range for all subject species. All subject species that would be potentially directly impacted are highly mobile (birds and flying-fox), and therefore able to access nearby alternative habitats post-works.

(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,

Only a very minor area of native and exotic vegetation would be removed for the proposal with limited value to all subject species. Alternative habitats of equivalent or better quality would be present within the study area and the broader locality (e.g. forests, woodlands, and fruit trees) that would not be affected by the proposal.

Potential downstream habitat for the subject threatened frogs may be present within the receiving catchment and potentially subject to indirect impacts relating to water quality changes (particularly pH). However, these impacts can be managed with effective implementation of mitigation measures (refer to section 4.2). Alternative habitats of equivalent quality are present within the broader locality (outside of the catchment) that would not be subject to any impacts from the development.

As mentioned previously, although an occurrence of Mitchell's Rainforest Snail is present in the study area to the north of the site, any indirect impacts on this habitat relating to increased outflows from the proposal are considered negligible (refer to SMEC 2019 and impacts for the larger Tweed Valley Hospital development).

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 nearest area of outstanding biodiversity value (AOBV) is the critical habitat for Mitchell's Rainforest Snail (*Thersites mitchellae*) in Stotts Island Nature Reserve on the Tweed River, approximately 6 km west of the site. This AOBV would not be impacted by the proposal.

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.

A key threatening process (KTP) is defined under the BC Act as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species or ecological communities. The current list of KTP under the BC Act, and whether the proposal is recognised as a KTP is shown in Table D.1.

Table D.1 Key Threatening Processes

Key Threatening Process (as per Schedule 4 of the BC Act)	Is the development or activity a key threatening process or part of a key threatening process or likely to increase the impact of a key threatening process?		
	Likely	Possible	Unlikely
Aggressive exclusion of birds by noisy miners (Manorina melanocephala)			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic climate change			✓
Bushrock removal		✓	
Clearing of native vegetation	✓		
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)			✓
Competition and habitat degradation by feral goats (*Capra hircus*)			✓
Competition from feral honeybees (*Apis mellifera*)			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest eucalypt dieback associated with over-abundant psyllids and bell miners			✓
Habitat degradation and loss by Feral Horses (brumbies, wild horses), *Equus caballus* Linnaeus 1758			✓
Herbivory and environmental degradation caused by feral deer			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Importation of red imported fire ants (*Solenopsis invicta*)			✓
Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis		✓	
Infection of native plants by *Phytophthora cinnamomi*			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae		✓	
Introduction of the large earth bumblebee (*Bombus terrestris*)			✓
Invasion and establishment of exotic vines and scramblers		✓	
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)			✓
Invasion and establishment of the Cane Toad (*Bufo marinus*)			✓
Invasion, establishment and spread of Lantana (*Lantana camara*)		✓	
Invasion of native plant communities by African Olive (*Olea europaea* L. subsp. cuspidata)			✓

Invasion of native plant communities by Chrysanthemoides monilifera (bitou bush and boneseed)			✓
Invasion of native plant communities by exotic perennial grasses		✓	
Invasion of the Yellow Crazy Ant (*Anoplolepis gracilipes*) into NSW			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants		✓	
Loss of hollow-bearing trees			✓
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and hybridisation by feral dogs (*Canis lupus familiaris*)			✓
Predation by the European Red Fox (*Vulpes vulpes*)			✓
Predation by the feral cat (Felis catus)			✓
Predation by Gambusia holbrooki (Plague Minnow or Mosquito Fish)			✓
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island			✓
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)			✓
Removal of dead wood and dead trees	✓		

As shown in Table D.1 the following two KTPs are likely to be contributed to by the proposal:

Clearing of native vegetation: Clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of stand or stands.

The proposal would require the removal of:

- up to approximately 0.03 ha of low condition PCT 1235 and 0.02 ha of low condition PCT 1302 vegetation.

Considering the very small area of native vegetation to be removed, it is unlikely that the proposal would contribute significantly to this KTP more broadly.

Removal of dead wood and dead trees: Several stag trees may be removed from the site for the proposal. This would only represent a minor contribution to this KTP. Considering the relatively small amount of dead wood and dead trees to be removed for the proposal, it is unlikely that the proposal would contribute significantly to this KTP more broadly.

The proposal is such that no other KTPs are considered likely to be substantially contributed to, especially with effective implementation of the mitigation measures in this report.

Overall, although the action proposed constitutes or is part of two KTPs, the minor nature of the proposal is such that this contribution is very small and insignificant within the broader locality.

Conclusion

It is considered unlikely that a local occurrence of any of the subject threatened fauna species would be placed at risk of extinction as a result of the proposal.

References

Department of Planning, Environment and Industry (2022). Threatened Species profiles. Available at https://www.environment.nsw.gov.au/threatenedspeciesapp/

Appendix C – EPBC Act MNES Assessment of Significance

EPBC Act Matters of National Environmental Significance assessment for Threatened Fauna
Grey-headed Flying-fox

The Grey-headed Flying-fox (GHFF) is listed as a Vulnerable species under the EPBC Act.
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

a) lead to a long-term decrease in the size of an important population of a species:

An 'important population' is defined to be a population that is necessary for a species' long-term survival and recovery (Department of Environment 2013). This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal;
- Populations that are necessary for maintaining genetic diversity; and/or
- Populations that are near the limit of the species range.

Any GHFF individuals that may opportunistically forage at the site are part of the single national GHFF population. As this broader population is necessary for maintaining genetic diversity it can therefore be considered an important population.

The proposal would require the removal of a very small area of potential foraging habitat for the GHFF consisting of:

- up to 0.5 ha of exotic-dominated pastureland/orchard containing Custard Apple (*Annona* sp. hybrid) trees

This vegetation provides an opportunistic foraging resource (fruit) for the GHFF. However, alternative equivalent and better quality foraging habitat is present in the broader locality within native forests that support key foraging resources (e.g. Broad-leaved Paperbark (*Melaleuca quinquenervia)* and Swamp Mahogany (*Eucalyptus robusta*) Eby and Law (2008)).

No known roost habitat would be affected. Two flying-fox camps are known from within a 1 km radius of the site (Kingscliff Library and Elrond Drive, Chinderah). However, there are no flying-fox camps located at the site, or in close proximity, and these known camps would not be impacted by the proposal.

Therefore, the project would not be likely to lead to a long-term decrease in the size of an important population of the GHFF.

b) reduce the area of occupancy of an important population:

The proposal would only affect a relatively small area of vegetation representing a very small proportion of foraging habitat for the GHFF that occurs in the broader locality. No breeding habitat (flying-fox camps) would be impacted by the proposal.

Therefore, the proposal would be unlikely to substantially reduce the area of occupancy of an important population of the GHFF.

c) fragment an existing important population into two or more populations:

The GHFF is highly mobile and extremely wide-ranging. The proposal would be unlikely to result in fragmentation of a population of the species.

d) adversely affect habitat critical to the survival of a species:

No GHFF camps will be impacted by this proposal. Furthermore, the extent of foraging habitat that would be affected is negligible given the extent of available habitat in the broader locality.

Therefore, the proposal will not adversely affect habitat critical to the survival of the GHFF population.

e) disrupt the breeding cycle of an important population:

No GHFF camps will be impacted by this proposal. Therefore, the proposal will not disrupt the breeding cycle of the Grey-headed Flying-fox population.

f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline:

The proposal would only affect a relatively small area of vegetation representing a very small proportion of foraging habitat for the GHFF that occurs in the broader locality. No breeding habitat (flying-fox camps) would be impacted by the proposal.

The removal of this small area of potential foraging habitat would not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat:

The proposal would be unlikely to introduce or facilitate the establishment of any invasive species at the site that that would be harmful to habitat of the GHFF.

h) introduce disease that may cause the species to decline:

The proposal would not be likely to introduce any new disease to the site that is not already present within the population and habitat of the GHFF.

i) interfere substantially with the recovery of the species:

There is a Draft Recovery Plan for the GHFF (Commonwealth Department of Environment and Energy 2017). The primary known threat to this species is stated as loss and degradation of foraging and roosting habitat. Recovery objectives are to identify, manage and secure key foraging and roosting habitat, and manage community tolerance of flying-foxes.

Considering that only a small area of opportunistic foraging habitat for the GHFF would be removed for the proposal, and that no impacts on breeding habitat (camps) would occur, the proposed development would be unlikely to interfere with any of the recovery actions for this species.

Mitchell's Rainforest Snail

The Mitchell's Rainforest Snail is listed as a Critically Endangered species under the EPBC Act. An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

a) lead to a long-term decrease in the size of a population

The proposal would not directly remove any areas of suitable habitat for Mitchell's Rainforest Snail. However, there are several recent records of this species approximately 100-200 m north of the site within PCT 1302 and PCT 1064 vegetation (Greencap 2019).

Within the context of the much larger Tweed Hospital development, an assessment of potential indirect impacts on the Mitchell's Rainforest Snail was undertaken by ecologist Jon Alexander (SMEC 2019) as part of the BDAR for the project (Greencap 2019). The available information on habitat suggests the species is dependent on high moisture levels, low fire frequency, and a well-developed leaf litter layer and are typically found on somewhat elevated ground around the edges of wetlands. It was assessed that the predicted change in inflow levels is unlikely to negatively impact or reduce the existing habitat to the north of the site through permanent inundation (SMEC 2019). It should be noted that the proposal is of a much smaller scale than the broader hospital development, and would have only a minor contribution to the overall inflow levels to these habitats.

Therefore, the proposal is considered unlikely to lead to a long-term decrease in the size of a population of Mitchell's Rainforest Snail for the following reasons:

- no habitat would be directly affected;
- alternative potential habitat is present within subtropical rainforest and swamp forest with a rainforest understorey within the broader locality that would not be affected by the proposal (i.e. outside of the receiving catchment); and
- potential indirect impacts relating to additional inflows from the proposal would be unlikely to negatively impact or reduce the existing habitat to the north of the site through permanent inundation (SMEC 2019).

b) reduce the area of occupancy of the species

As mentioned in response to a), potential indirect impacts relating to additional inflows from the proposal would be unlikely to negatively impact or reduce the existing habitat to the north of the site through permanent inundation (SMEC 2019).

c) fragment an existing population into two or more populations

The proposal would result in no direct removal of habitat, and potential indirect impacts relating to additional inflows from the proposal would be unlikely to negatively impact or reduce the existing habitat to the north of the site through permanent inundation (SMEC 2019).

Therefore the proposal is unlikely to result in the fragmentation of an existing Mitchell's Rainforest Snail population into two or more populations.

d) adversely affect habitat critical to the survival of a species

The proposal would result in no direct removal of habitat, and potential indirect impacts relating to additional inflows from the proposal would be unlikely to negatively impact or reduce the existing habitat to the north of the site through permanent inundation (SMEC 2019).

Furthermore, critical habitat that has been declared or Mitchell's Rainforest Snail (*Thersites mitchellae*) in Stotts Island Nature Reserve on the Tweed River is approximately 6 km west of the site. This critical habitat would not be impacted by the proposal.

e) disrupt the breeding cycle of a population

The proposal would result in no direct removal of habitat, and potential indirect impacts relating to additional inflows from the proposal would be unlikely to negatively impact or reduce the existing habitat to the north of the site through permanent inundation (SMEC 2019).

Therefore, the proposal would be unlikely to disrupt to breeding cycle of a population of Mitchell's Rainforest Snail.

f) modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The proposal would result in no direct removal of habitat, and potential indirect impacts relating to additional inflows from the proposal would be unlikely to negatively impact or reduce the existing habitat to the north of the site through permanent inundation (SMEC 2019).
Therefore, the proposal would not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

g) result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

The Tweed Valley Hospital development includes provision for actions within a Biodiversity Management Plan (BMP) to manage weeds within the site, including on the northern fringe of the site between disturbed exotic-dominated pastureland and known habitat for Mitchell's Rainforest Snail in PCT 1302 (Greencap 2019a). Therefore, the proposal is unlikely to result in invasive species harmful to the Mitchell's Rainforest Snail to become established.

h) introduce disease that may cause the species to decline, or

The proposal is of a relatively small scale and unlikely to introduce any known disease that may cause Mitchell's Rainforest Snail to decline.

i) interfere with the recovery of this species

A recovery plan for the Mitchell's Rainforest Snail has been developed (NSW National Parks and Wildlife Service 2001). The recovery objectives of this plan are as follows:
The overall objective of this recovery plan is to promote the recovery of Mitchell's Rainforest Snail in the wild. Specific objectives for the first five years of this recovery plan are listed below.

- Objective 1: to assist identification of potential habitat for Mitchell's Rainforest Snail.
- Objective 2: to assist identification of additional populations of Mitchell's Rainforest Snail.
- Objective 3: to maximise the protection of the population of Mitchell's Rainforest Snail on Stotts Island.
- Objective 4: to improve the protection and management of other populations of Mitchell's Rainforest Snail and remaining areas of habitat.
- Objective 5: to encourage community participation in the recovery of Mitchell's Rainforest Snail.

The proposal is not inconsistent with the above recovery objectives and therefore would be unlikely to interfere with the recovery of Mitchell's Rainforest Snail.

References

Commonwealth Department of Environment and Energy (2017). Draft National Recovery Plan for the Grey-headed Flying-fox (*Pteropus poliocephalus*). Commonwealth of Australia, Canberra.

Department of Environment and Energy (2022). Species Profile and Threats Database. Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

NSW National Parks and Wildlife Service (2001). Mitchell's Rainforest Snail *Thersites mitchellae* recovery plan. NPWS, Hurstville, NSW.