

**LAND AND ENVIRONMENTAL COURT PROCEEDINGS NO. 2022/279591**  
**GOLDCORAL PTY LTD (RECIEVER AND MANAGER APPOINTED) V RICHMOND**  
**VALLEY COUNCIL**  
**DEVELOPMENT APPLICATION 2015/96 (AS AMENDED) - 240 IRON GATES ROAD,**  
**EVANS HEAD**

**JOINT EXPERT WITNESS REPORT**

## **1 EXPERTS**

### **Mr Adam McArthur (AM) - Terrestrial Ecology**

- Director / Principal Ecologist, JWA Pty Ltd
- Bachelor of Applied Science (Environmental Resource Management), Southern Cross University, Lismore NSW.
- Biodiversity Assessment Methodology (BAM) accredited assessor (Certification No.: BAAS18069).

See attached CV (**ATTACHMENT 1**).

### **Dr John Thorogood (JT) - Aquatic Ecology**

- Technical Director, frc environmental - a part of SLR
- M.Sc.(University of Sydney), Ph.D (Queensland University), FEIANZ, FAIBiol, GAICD
- Adjunct Assoc. Professor, Aquatic Ecology, Sunshine Coast University

See attached CV (**ATTACHMENT 1**).

### **Mr Jason-jay Naylor (JN) - Arboriculture**

- Director/Principal Arboricultural Scientist, Treescience Pty Ltd.
- AQF level 8 Bushfire Planning & Management, University of Melbourne.
- AQF level 8 Masters Post Graduate Studies in Natural Resources majoring in Urban Forest Principals, University of Queensland.
- AQF level 8 in Arboriculture, Melbourne University.
- AQF level 5, College of Applied Science.
- Certificate in Arboricultural Consulting, Melbourne University.
- Certificate in Advance Certificate in Arboriculture.

See attached CV (**ATTACHMENT 1**).

### Mr Michael Hallinan (MH) - Terrestrial Ecology and Arboriculture

- Senior Ecologist and Arborist, ArborEcological Pty Ltd
- Bachelor of Applied Science (major in Environmental Resource Management). Completed in 1998 at Southern Cross University, Lismore NSW.
- Diploma of Arboriculture (AQF Level 5), completed in 2013 at Wollongbar TAFE.
- Associate Diploma in Horticulture. Completed in 1982 at Hawkesbury Agricultural College, Richmond, NSW (now the University of Western Sydney).

See attached CV (ATTACHMENT 1).

## 2 EXPERT WITNESS CODE OF CONDUCT

In preparing this Joint Expert Report, we, the undersigned, hereby acknowledge that we have read and agreed to the requirements of Part 31 Division 2 of the *Uniform Civil Procedure Rules 2005* and the Expert Witness Code of Conduct contained in Schedule 7 of the *Uniform Civil Procedure Rules 2005*.

## 3 FORM OF JOINT CONFERENCE

3.1 On Friday the 12th of April 2024 a meeting/joint site inspection was convened between the Terrestrial Ecology experts. Joint conferencing continued over the following days via email. A summary of these discussions/expert opinions on SOFACs relevant to Terrestrial Ecology is provided in s4.1 and s4.2 of this report.

3.2 The Aquatic Ecology experts have communicated via e-mail over the period of this JER (and via video-link prior). A summary of the expert opinions on SOFACs relevant to Aquatic Ecology is provided in s4.3 and s4.4 of this report.

3.3 The Arboricultural experts have communicated via e-mail over the period of this JER. A summary of these discussions/expert opinions on SOFACs relevant to Arboriculture is provided in s4.5 and s4.6 of this report.

## 4 MATTERS OF AGREEMENT AND DISAGREEMENT

### Terrestrial Ecology

4.1 In relation to terrestrial ecology matters, and with reference to the relevant SOFACS, the Terrestrial Ecological Experts agree that:

a) In relation to Contention 4 a) i):

- i. It is agreed that the drainage lines on site do not form part of the mapped VC 8 Acacia Regrowth vegetation community and should be plotted on vegetation and impact maps and associated vegetation described more thoroughly.

b) In relation to Contention 4 a) ii):

- i. It is agreed that the western drainage line should be retained within the Littoral rainforest buffer.
- ii. It is agreed that Wallum Froglet habitat occurs on the site.

c) In relation to Contention 4 a) iii):

- i. It is agreed that the site contains core koala habitat as defined in the Biodiversity and Conservation SEPP. A Koala Plan of Management must be prepared as part of the development application in accordance with Part 3 of Chapter 3 of the State Environmental Planning Policy (Biodiversity and Conservation) 2021.

4.2 In relation to terrestrial ecological matters, and with reference to the relevant SOFACS, the Terrestrial Ecological Experts remain in disagreement on the following matters, and **these matters should form the focus of the hearing:**

a) In relation to Contention 4 a) i):

- i. **AM** agrees that the drainage lines on site, although constructed, have some ecological values, however **AM** disagrees with **MH** that the drainage lines have “substantial” conservation values.
- ii. In reference to the RVLEP 2012, **AM** disagrees with **MH** that the proposed development has not been designed and sited to avoid adverse environmental impacts to sensitive environments such as threatened species habitats (e.g. Koala and Wallum Froglet habitats), Threatened Ecological Communities (TECs), and existing drainage lines with wetland vegetation (note that this applies to 4 a) ii) and iii)).
- iii. In reference to the RVLEP 2012, **AM** disagrees with **MH** that the proposed development is not consistent with provisions for protection of various environmental values relating to terrestrial biodiversity and wetlands (note that this applies to 4 a) ii) and iii)).
- iv. **AM** disagrees with **MH** that site values and the full impacts of the proposal have not been considered and ecological assessments have not been completed adequately and in line with relevant guidelines.
- v. **AM** disagrees with **MH** that a Vegetation Management Plan for areas of retained vegetation on site should be prepared and approved prior to any development consent. **MH** believes that the VMP should clarify ongoing vegetation management in areas with the highest conservation values on site, i.e. threatened ecological communities, Koala habitat, Wallum Froglet habitat and drainage lines. **AM** believes that any trees likely to be impacted by construction works should be managed in accordance with a Vegetation

and Fauna Management Plan (VFMP) to be approved by Council prior to commencement of site works.

- vi. **AM** disagrees with **MH** that 1997 Land and Environment Court ordered revegetation works should be incorporated into the current development application to ameliorate unlawful clearing impacts to threatened species habitats.

b) In relation to Contention 4 a) ii):

- i. **MH** believes a minimum 15m width revegetation buffer should be devoted to maintaining and improving the Littoral rainforest TEC values and protect from development impacts. **AM** believes that a minimum 15m buffer to the Littoral rainforest TEC including a dense 5m wide planted zone of native rainforest tree, shrub and groundcover species is adequate.
- ii. **MH** believes that inadequate information has been provided regarding the impacts of proposed removal of wattles (*Acacia* spp.) along endangered Littoral Rainforest edges that serve to protect from damaging edge effects. **AM** believes that sufficient information has been provided and considered in this regard.
- iii. **AM** disagrees with **MH** that ecological roles of buffers should not be diminished and compromised for bushfire protection performance measures such as APZs.
- iv. **AM** disagrees with **MH** that any retained drainage lines require buffers. In this regard **AM** is of the opinion that the retention of the “western drain” should include sufficient setback to ensure retention of Paperbarks growing at or just below the top of bank (i.e. subject to arboricultural assessment). **MH** is of the opinion that a minimum 5m (preferably 10m) bank stabilising vegetated buffer from the top of all retained drainage line banks is appropriate to stabilise sandy erodible banks.
- v. Although **AM** agrees that the eastern drainage line, or a portion of this drain, should be retained, if possible, it is **AM**'s opinion that if retention is not possible, the impacts are not significant. **MH** believes that, in reference to the RVLEP 2012, sensitive environmental areas, including drainage lines, should be retained for their conservation values.
- vi. **MH** believes that approvals should be sought prior to any subdivision approval for likely alteration to the hydrology of the NSW Government mapped SEPP 14 Coastal Wetland with proposed changes to the eastern drainage line. **AM** has been guided by the relevant hydrological experts and understands that there will be no alteration to the hydrology of the NSW Government mapped SEPP 14 Coastal Wetland with proposed changes to the eastern drainage line.
- vii. **MH** believes that acid sulfate soil sampling has been inadequate, and that additional acid sulfate soil sampling is required to determine whether they occur on the site and if so whether they are likely to be disturbed and exposed



from construction works potentially causing multiple damaging environmental impacts. **AM** is not an expert on this matter and has not commented.

- viii. **AM** disagrees with **MH** that the revised JWA wetland mapping is inadequate as an alternative to NSW Government SEPP 14 Coastal Wetlands mapping for the development application.
- ix. **AM** disagrees with **MH** that inadequate information has been provided regarding how protection and rehabilitation of the vegetated riparian corridor between the Evans River and the development footprint would be achieved.

c) In relation to Contention 4 a) iii):

- i. **AM** disagrees with **MH** that the site contains areas of “high-quality” breeding and/or foraging habitat for the Vulnerable Wallum froglet (*Crinia tinnula*).
- ii. **AM** disagrees with **MH** that the Test of Significance (ToS) responses for the Wallum Froglet are inadequate and have not been prepared in line with mandatory guidelines; and that insufficient detailed information has been provided to decide whether the proposal is likely to have a significant effect on the species.

d) In relation to Contention 4 a) vi):

- i. **MH** understands that development consent cannot be granted to the proposal without a KPoM prepared in accordance with the B&C SEPP. **AM** believes that this is a planning/development assessment matter that is outside his area of expertise and has not commented.
- ii. **AM** disagrees with **MH** that the Test of Significance (ToS) responses for the Koala are inadequate and have not been prepared in line with mandatory guidelines; and that insufficient detailed information has been provided to decide whether the proposal is likely to have a significant effect on the Koala.
- iii. In reference to revised engineering plans received on 23/04/24, **MH** believes that a redesign of the proposed development is required prior to any development consent to ensure retention of core Koala habitat within the development footprint (e.g. Trees 116 and 117). **AM** states that, to the extent that any issues are raised about the impacts of earthworks on Trees 116 and 117, consent to develop the Stage 2 areas (which includes all core koala habitat areas), is not sought as part of the application that is before the Court. **AM** believes that any future consent to develop Stage 2 must include a redesign to avoid koala habitat (i.e. Trees 116 and 117) and this redesign must be completed in consultation with an arborist for any works proposed within the relevant Tree Protection Zones (TPZs).

e) In relation to Contention 4 a) vii):

- i. **MH** believes that proposed vegetation clearing will clearly fragment and isolate the Littoral Rainforest TEC which is currently contiguous with large areas of native vegetation and Broadwater National Park; and impacts relating to fragmentation and isolation have clearly not been adequately considered in sufficient detail as required by mandatory guidelines. **AM** has not commented on this matter.
  - ii. **AM** disagrees with **MH** that the Test of Significance (ToS) responses for the Littoral Rainforest TEC are inadequate and have not been prepared in line with mandatory guidelines; and that insufficient detailed information has been provided to decide whether the proposal is likely to have a significant effect on the TEC.
  - iii. **MH** states that Littoral Rainforest TEC impact assessments should be undertaken and documented from revised engineering plans received on 23/04/24. **AM** believes that sufficient information has been provided for an adequate impact assessment to be completed.
- f) In relation to Contention 10 b):
- i. **AM** disagrees with **MH** that the biodiversity offsets package previously agreed to by the previous proponent and the then Office of Environment and Heritage should be reinstated into the proposal.
  - ii. **AM** disagrees with **MH** that in reference to the RVLEP 2012, current proposed measures to compensate for environmental impacts associated with the proposal are considered inadequate.
- g) In relation to Contention 19:
- i. **MH** believes that inadequate impact assessment and reporting has been provided for proposed works along Iron Gates Drive and in the areas of Mangrove Street and Teak Street to determine the full impacts of the proposal. **AM** notes that works along Iron Gates Drive have been assessed in a separate Ecological Assessment Report (JWA 2019). **AM** is not aware of the extent of works proposed “in the areas of Mangrove Street and Teak Street” so cannot comment.

Issues	Terrestrial Ecology Experts	
	Adam McArthur (AM) Comments	Michael Hallinan (MH) Comments
<b>B1 - CONTENTIONS THAT THE APPLICATION BE REFUSED</b>		
<b>Biodiversity and Vegetation Clearance</b>		
4) The proposed development is considered unacceptable pursuant to the provisions of s4.15(1)(a)(i) of the EP&A Act as the proposal has failed to adequately demonstrate consistency with the matters required to be satisfied under clauses 6.6(4), 6.8(4) and 6.10(4) of RVLEP 2012		
<u>Particulars</u>		
<p>a) It has not been adequately demonstrated that the proposal has been designed, sited or will be managed to firstly avoid, secondly to mitigate/minimise, and lastly to offset/compensate for significant adverse environmental impacts pursuant to Clause 6.6(4) of the RVLEP 2012 given:</p> <p>(i) The extent of clearing proposed vegetation clearing(sic.) including threatened species habitats within an EEC;</p>	<p><u>Extent of clearing within an EEC</u> The only impacts to an EEC will be very minor impacts on Littoral rainforest (i.e. 0.04 ha). These impacts are due to the road extension between the eastern and western residential areas of the development along an existing track that will necessitate some vegetation loss (mostly Acacia) and minor pruning of limbs on the edges of the Littoral rainforest.</p> <p>Surveyed trees in this location have been plotted on earthworks plans and shown in relation to proposed infrastructure (<b>ATTACHMENT 2</b>). I refer to the arboriculture experts to discuss retention/mitigation measures for individual trees.</p> <p>An Assessment of Significance (7-part test equivalence) has determined a <u>significant impact</u> on the Littoral rainforest EEC, such that its local occurrence is <u>likely to be placed at risk of extinction</u> will not occur.</p> <p>No additional EEC vegetation occurs within the proposed development footprint.</p>	<ul style="list-style-type: none"> <li>In reference to the RVLEP 2012, the proposed development has not been designed and sited to avoid adverse environmental impacts to sensitive environments such as threatened species habitats (e.g. Koala and Wallum Froglet habitats), Threatened Ecological Communities (TECs), and existing drainage lines with wetland vegetation. The full extent of the site's TECs; threatened species and their habitats; likely impacts, and proposed buffers to sensitive environments remains unclear.</li> <li>The Biodiversity, Conservation and Science Group (BCS) of the NSW Department of Climate Change, Energy, the Environment and Water Recommendation (4) notes that <i>Further information be provided in the Supplementary Terrestrial Ecological Assessment to justify why areas at lower elevations that contain forest red gum (Eucalyptus tereticornis) and swamp turpentine (Lophostemon suaveolens), in particular areas mapped as Vegetation Community 3, are not representative of the Subtropical Coastal Floodplain Forest of the NSW North Coast Bioregion threatened ecological community.</i> I agree with the above BCS recommendation since threatened ecological community values need to be clearly described and ecological impact assessments completed thoroughly and in line with relevant guidelines. This includes the Subtropical Coastal Floodplain Forest TEC.</li> <li>The eastern and western drainage lines were agreed as having substantial conservation values that have developed naturally since the time of unlawful clearing. The vegetation communities are clearly not part of the mapped VC 8 Acacia Regrowth vegetation community. The drainage lines were agreed to be plotted on vegetation and impact maps and described more thoroughly including a description of TEC wetland vegetation elements such as Broad-leaved Paperbark, mangroves, sedges and rushes.</li> </ul>

Issues	Terrestrial Ecology Experts	
	Adam McArthur (AM) Comments	Michael Hallinan (MH) Comments
		<ul style="list-style-type: none"> <li>• BCS Recommendations 7. <i>A Vegetation Management Plan be prepared to manage the retained areas of native vegetation not subject to a biodiversity stewardship agreement and adequately compensate for the impacts of the proposal without conflicting with other requirements including management for bushfire protection; and 8. The Vegetation Management Plan identify the long-term manager of the retained areas of native vegetation and the funding source for implementing the plan.</i></li> <li>• I agree with the above BCS recommendations and think that a Vegetation Management Plan should be prepared and approved prior to any development consent to clarify important ongoing vegetation management matters which are currently unclear, including priority works and funding sources. Adequate compensation for the impacts of the proposed subdivision should be addressed including revegetation and rehabilitation works in areas with the highest conservation values on site, i.e. threatened ecological communities, Koala habitat, Wallum Froglet habitat and drainage lines. Importantly, priority revegetation works should not conflict with bushfire protection needs.</li> <li>• Proposed impacts to threatened plant species remain unclear. BCS Recommendation 3. <i>Targeted threatened flora surveys be undertaken in accordance with the Surveying threatened plants and their habitats survey guide (DPIE 2020) for threatened flora species with the potential to occur on the site including native guava (Rhodomyrtus psidioides) and heath wrinklewort (Rutidosis heterogama) and the Supplementary Terrestrial Ecological Assessment and threatened species Assessment of Significance updated accordingly.</i> I agree with these recommendations and during the joint site assessment (12/04/24), I raised Native Guava (Rhodomyrtus psidioides) as having previously been recorded on site by JWA but not included in the JWA (2023) assessment report. Inadequate survey and impact assessment information has been provided in line with mandatory guidelines to decide whether the proposal is likely to have a significant effect on the threatened Native Guava (Rhodomyrtus psidioides) which has been recorded on site as part of this development application.</li> <li>• Revised biodiversity impact assessments should be undertaken for new or changed biodiversity</li> </ul>

Issues	Terrestrial Ecology Experts	
	Adam McArthur (AM) Comments	Michael Hallinan (MH) Comments
		<p>impacts (e.g. threatened ecological communities and Koala habitat) from revised engineering plans received on 23/04/24.</p> <ul style="list-style-type: none"> <li>• In reference to the RVLEP 2012, current proposed measures to compensate for environmental impacts associated with the proposed subdivision are considered inadequate.</li> <li>• Refer to other comments below regarding threatened species habitats (the Koala and Wallum Froglet); the endangered Littoral Rainforest TEC, and in Contention 19 in relation to Iron Gates Drive.</li> </ul>
<p>(ii) The lack of buffers provided to ecologically sensitive areas including core Koala habitat, Wallum Froglet (<i>Crinia tinnula</i>) habitat, Littoral Rainforest, Coastal Wetlands, and fish habitat;</p>	<p><u>Buffers to core koala habitat</u> The proposed development has been designed to ensure sufficient setbacks are retained to all trees within core koala habitat in accordance with the relevant Australian Standards. Although there may be a discrepancy in the earthworks plans as they relate to Tree 117, consent to develop this part of the site (i.e. Stage 2) is not sought as part of the application that is before the Court (discussed further in response to SOFAC 4 a) (iii) VI below).</p> <p><u>Buffers to Wallum froglet (<i>Crinia tinnula</i>) habitat</u> Habitat on the site is “potential” habitat only. No areas of significant habitat warranting particular consideration of buffers are considered to occur.</p> <p><u>Buffers to Littoral rainforest</u> A minimum 15m buffer, but generally wider, is provided to the Littoral rainforest vegetation on the subject site, with minor earthworks encroachments in some locations to provide compliant earthworks grades, and to construct a proposed road along an existing vehicle track between the two rainforest patches.</p> <p>It was discussed during the meeting/joint site inspection between the Terrestrial Ecology experts on Friday the 12<sup>th</sup> of April 2024 that the buffer should include densely planted rainforest species, a minimum of 5m in width, along the western and southern edges of the Littoral rainforest. Based on a review of the Bushfire JER, this will likely require a redesign of the APZs.</p> <p>Furthermore, the retention of the “western drain” (i.e. along the northern edge of the Littoral rainforest), including sufficient setback to ensure retention of Paperbarks growing at or just below</p>	<ul style="list-style-type: none"> <li>• A minimum 5m (preferably 10m) bank stabilising vegetated buffer from the top of all retained drainage line banks is appropriate to retain the stabilising effect of existing vegetation for sandy soils on highly erodible drainage line banks.</li> <li>• Information has not been provided on buffers (and their management) around existing Koala habitat on the site; and rehabilitation of Koala habitat, e.g. Koala food tree plantings to improve connectivity between Koala habitat within the development footprint and Koala habitat outside the development footprint. Importantly, priority revegetation works should not conflict with bushfire protection needs.</li> <li>• BCS note that <i>The EA and SEE state the proposed development footprint maintains a 15m buffer around TECs and other areas of native vegetation. This appears to be incorrect as the proposed development footprint encroaches on or adjoins the littoral rainforest and swamp sclerophyll forest TECs in several locations. Nevertheless, the EA does not explain the rationale for a 15m buffer which is relatively narrow and unlikely to protect the TECs from the indirect impacts of the proposal.</i> BCS comments (Page 3 of 13). I agree with the above BCS comments and think that revegetation buffers of at least 15m width in all directions should be devoted to maintaining and improving TEC values and protect from development impacts. Compromises for bushfire protection measures such as APZs should not diminish the role of buffers. The design should be amended to ensure revegetation buffers to the proposed development footprint extend in all directions from TECs.</li> <li>• No explanation was provided for the previously proposed 15m buffer to parts of the endangered littoral rainforest until the joint site assessment</li> </ul>

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	<p>the top of bank (subject to arboricultural assessment) would provide an adequate buffer in my opinion. Based on a review of current earthworks plans, a slight redesign may be required. Based on a review of the Bushfire JER, this retention will likely require a redesign of the APZs.</p> <p><u>Buffers to Coastal wetlands</u> The Coastal Wetland mapping includes heath communities and is therefore incorrect in my opinion. The proposed setback to revised wetland mapping on and adjacent to the site is shown at <b>ATTACHMENT 3</b> and is considered adequate.</p> <p><u>Buffers to fish habitat</u> I refer discussions regarding buffers necessary to any fish habitat to the relevant Aquatic Ecology experts.</p>	<p>(12/04/24). It was then proposed that a 5m dense groundcover and shrub planting buffer be implemented and the 15m buffer meet bushfire protection APZ performance measures. A 5m groundcover and shrub planting buffer is considered insufficient and likely ineffective to ameliorate edge effects of the littoral rainforest TEC and maintain and improve resilience and TEC values. Also, inadequate information has been provided on proposed removal of wattle trees (<i>Acacia</i> spp.) which currently serve to protect from damaging edge effects. Note that 1997 Land and Environment Court orders for a revegetation buffer to the littoral rainforest were for a minimum 50m to the western, northern and eastern edges.</p> <ul style="list-style-type: none"> <li>• Mangroves provide important fish habitat functions including fish habitat, food, erosion control, edge effects, water quality, flood protection and climate change adaption. Mangroves are protected under the FM Act and have naturally recruited since unlawful drain construction. I agree with DPI Fisheries recommended buffer zones that 50m buffers (or less if physically unachievable) to mangroves (including in the eastern drainage line) should be incorporated into the proposed development design for their multiple environmental services.</li> <li>• I recognise the importance of Coastal Wetlands and agree with DPI Fisheries that buffers of 100m from Coastal Wetlands be incorporated into the proposed development design where physically achievable. This includes dense wetland vegetation and threatened Wallum Froglet habitat that has naturally developed since unlawful drain construction in the northern portion of the eastern drainage line.</li> <li>• In regard to SEPP 14 Coastal Wetlands, BCS notes that <i>Under Section 7(1) of SEPP 14, the consent of the council and the concurrence of the Director-General of the Department of Environment, Climate Change and Water (now the Secretary of DCCEEW) is required for any proposal to clear land, construct a levee, drain land or fill land to which the policy applies. Under SEPP 14, 'clearing' means the destruction or removal in any manner of native plants growing on the land. The SEE states the proposal does not involve any of the works specified in Section 7(1) of SEPP 14. However, the 2019 Iron Gates Drive EA describes the clearing of the full road width (20m) to widen</i></li> </ul>

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		<p>the road, and the SEPP 14 coastal wetland mapping overlaps with the road in several locations (see Figure 4 below). The 2019 Iron Gates Drive EA argues that only vegetation pruning, and not complete removal of native plants, would be required for the road widening, and further states this does not meet the definition of 'clearing' under SEPP 14. Given the current encroachment of native vegetation into the road area, we consider it unrealistic that not a single native plant within the mapped area would need to be removed. Furthermore, the northeast corner of the proposed subdivision footprint immediately adjoins, and potentially overlaps with, the SEPP 14 coastal wetland mapping. A constructed drainage line extends south from this point, and the EA states this would be filled as part of the proposal. These works are likely to alter the existing hydrology of the mapped SEPP 14 coastal wetland. Consequently, we consider the proposal does not accord with SEPP 14 because it does not have the consent of the council or the concurrence of the Director-General of the Department of Environment, Climate Change and Water (now the Secretary of DCCEW).... As with the SEPP 14 coastal wetland mapping, the R&amp;H SEPP coastal wetland mapping covers land adjacent to, and potentially overlapping with, the northeast corner of the proposed subdivision footprint. The proposed works in this area are likely to alter the existing hydrology of the mapped R&amp;H SEPP coastal wetland. BCS Recommendation 9. The consent authority determines the applicable environmental planning instrument for the proposal that regulates development on land containing and in proximity to coastal wetlands.</p> <ul style="list-style-type: none"> <li>• I agree with the above BCS comments and believe that the proposed subdivision should be redesigned to avoid likely alteration to the hydrology of the NSW Government mapped SEPP 14 Coastal Wetlands. This area immediately adjoins and potentially overlaps with a waterway that has naturally developed dense wetland vegetation and threatened species habitat since unlawful drain construction. Otherwise, appropriate approvals should be sought prior to any approval.</li> <li>• The revised JWA wetland mapping provided on 15/04/24 is inadequate since it is not consistent with NSW Government Coastal Wetlands mapping,</li> </ul>

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		<p>does not propose an adequate buffer to Coastal Wetlands, and does not include dense wetland vegetation and threatened Wallum Froglet habitat in the northern portion of the eastern drainage line. SEPP 14 clearly references NSW Government mapping. The JWA mapping has not been approved as an alternative to NSW Government SEPP 14 Coastal Wetlands mapping for the development application.</p> <ul style="list-style-type: none"> <li>Inadequate information has been provided regarding how protection and rehabilitation of the vegetated riparian corridor between the Evans River and the development footprint would be achieved. I agree with NSW DPI Fisheries that <i>The protection and rehabilitation of the vegetated riparian corridor between the Evans River and the development footprint is important for maintaining the shape, stability and ecological functions of the river.</i></li> <li>Regarding Acid Sulfate Soils and the first objective of the Acid Sulfate Soils (ASS) Assessment (i.e. to Undertake an appraisal of the site to establish if ASS exist in soils within the investigation area), BCS notes that <i>based on the report it is not possible to establish if ASS occur in soils within the investigation area.</i> BCS Recommendation 12. <i>Additional sampling be undertaken to determine whether acid sulfate soils occur within the investigation area.</i> I agree with this recommendation since exposure of acid sulfate soils from construction works is known to have multiple adverse environmental health impacts including to flora and fauna, waterways and aquatic life, recreational and commercial fishing, etc.</li> <li>Refer to comments above for Contention 4) a) (i) Re the previously proposed 15m buffer around TECs.</li> </ul>
<p>(iii) The inadequate ecological impact assessment information has been provided in relation to Koala habitat, Wallum Froglet (<i>Crinia tinnula</i>) habitat, Littoral Rainforest and fish habitat as follows:</p> <p>II. The subdivision proposal under the Amended Application has not been designed and located, as a primary consideration, to avoid and buffer high-quality breeding and foraging habitats of the threatened Wallum Froglet (<i>Crinia tinnula</i>) associated with the eastern drain and wetland vegetation communities where the species occurs on site.</p>	<p>I do not believe that any “high-quality” breeding habitat occurs on the subject site, or that any “high-quality” forage habitat will be impacted by the proposed works.</p> <p>Recent water quality testing completed within the eastern drain (<b>ATTACHMENT 4</b>) has identified that the majority of this drain is tidally influenced and inhabited by predatory fish. Larvae of <i>C. tinnula</i> are rarely found sympatric with fish. In my opinion, potentially suitable forage and breeding habitat is limited to low-lying areas of vegetation communities 7 and 9 where they occur</p>	<ul style="list-style-type: none"> <li>The <i>highest quality habitat features</i> for the Wallum Froglet is noted by JWA (November 2023) <i>on the subject site is associated with swamp sclerophyll forest (VC7), wet heath (VC9), and man-made drainage lines along the eastern boundary.</i> The Wallum Froglet was recorded vocalising within the eastern drainage line along the property boundary by JWA (July 2019) and Michael Hallinan (10/04/24). In reference to the RVLEP 2012, the proposed subdivision has not been designed and sighted to avoid dense wetland vegetation and threatened Wallum Froglet habitat</li> </ul>



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	<p>outside the development footprint. It is noted however that these areas are inhabited by robust populations of common/less acid-tolerant species including the Eastern dwarf tree frog (<i>Litoria fallax</i>), common froglet (<i>Crinia signifera</i>) and Eastern sign-bearing froglet (<i>Crinia parinsignifera</i>) which are known to displace wallum frog species. <i>Crinia tinnula</i> is broadly sympatric with other <i>Crinia</i> species and is rarely found together with <i>C. parinsignifera</i>.</p> <p>While VC's 7 and 9 are the highest quality Wallum froglet habitat available on the site, they are potential habitat only and are not necessarily "high quality" when compared to available habitats in the immediate vicinity to the site. Impacts of the proposed development will be limited to 0.72 ha of regrowth/historically disturbed potential habitat.</p>	<p>that has naturally developed since unlawful drain construction within the eastern drainage line.</p> <ul style="list-style-type: none"> <li>Refer to comments above for Contention 4) a) (i) and (ii) Re buffers to coastal wetland and threatened Wallum Froglet habitat within the eastern drainage line.</li> <li>The Test of Significance (ToS) responses provided for the Wallum Froglet are superficial and don't look at the mandatory factors for consideration in sufficient detail in line with the mandatory Assessment of Significance guidelines. For example, the ToS does not adequately examine potential breeding habitat impacts, nor applicable key threatening processes. The ToS conclusions regarding impacts to the species are not justified and there is insufficient information to decide whether the proposal is likely to have a significant effect on the Wallum Froglet.</li> <li>Refer to comments in Contention 19 in relation to Iron Gates Drive.</li> </ul>
III. Inadequate information has been provided regarding the nature and extent of expected impacts to the habitat of the Wallum Froqlet ( <i>Crinia tinnula</i> ) on site, including breeding habitat.	See response to SOFAC 4 a) (iii) II above.	Refer to notes above Re the inadequacy of the Wallum Froqlet ( <i>Crinia tinnula</i> ) assessment and acid sulfate soils.
IV. Inadequate measures are proposed to minimise/ mitigate impacts to the high-quality breeding and foraging habitats of the Wallum Froqlet ( <i>Crinia tinnula</i> ), and lastly to offset/ compensate for lost habitat to achieve no net loss of Wallum Froqlet ( <i>Crinia tinnula</i> ) habitat. Court ordered revegetation works to Wallum Froqlet ( <i>Crinia tinnula</i> ) habitat have not been carried out, nor are they noted as proposed to be carried out in line with Figure 8 above, i.e. 1997 Court Ordered Remediation Map.	<p>See response to SOFAC 4 a) (iii) II above.</p> <p>It is noted that there are no specific "court ordered revegetation works to Wallum froqlet (<i>Crinia tinnula</i>) habitat".</p>	Court ordered revegetation works include vegetation which offers preferred Wallum Froglet habitat. These revegetation works have not been undertaken and are not proposed. Revegetation works should be incorporated into the current development application to ameliorate unlawful clearing impacts to threatened species habitats.
V. Inadequate information and analysis have been provided regarding proposed changes to stormwater regimes and subsequent impacts to Wallum Froqlet ( <i>Crinia tinnula</i> ) habitat.	<p>The proposed development layout seeks to maintain the current stormwater drainage regime across the subject site. Bio-retention areas, ponds and gross pollutant traps are proposed to collect and manage stormwater before leaving the site. The Engineering Impact Assessment prepared to accompany the DA includes plans and commentary regarding the proposed stormwater management strategy. It is understood that further detail will form part of the future Construction Certification applications.</p> <p>The proposal does retain a natural drainage feature within the wet Heath community in the north which would constitute potential habitat and is connected to areas to the east where the species was heard vocalizing.</p>	<ul style="list-style-type: none"> <li>The eastern and western drainage lines were agreed as having conservation values that have developed naturally since the time of unlawful clearing. The vegetation communities are clearly not part of the mapped VC 8 Acacia Regrowth vegetation community. The drainage lines were agreed to be plotted on vegetation and impact maps and described more thoroughly including a description of TEC wetland vegetation elements such as Broad-leaved Paperbark, mangroves, sedges and rushes.</li> <li>Refer to comments above for Contention 4) a) (iii)) Re threatened Wallum Froqlet (<i>Crinia tinnula</i>) habitat on the site and proposed impacts to it.</li> </ul>
VI. Significance of impact to the species is unclear:	All koala habitat occurring on site will be retained. Although there may be a discrepancy in the earthworks plans as they relate to Tree 117,	<ul style="list-style-type: none"> <li>BCS notes that <i>The subject site contains core koala habitat as defined in Chapter 3 of the State</i></li> </ul>

Issues	Terrestrial Ecology Experts	
	Adam McArthur (AM) Comments	Michael Hallinan (MH) Comments
<ul style="list-style-type: none"> <li>The new proposal has not been designed and located, as a primary consideration, to avoid and allow for buffers to Koala habitat on the site.</li> </ul>	<p>it is noted that the Stage 2 areas of the development, which includes all the potential core koala habitat areas, have been designed in concept only to illustrate how this part of the site could be developed, not how it will be developed. Consent to develop this part of the site is not sought as part of the application that is before the Court, so to the extent that design amendments should or would need to be made before development in these areas could proceed, those matters should be reflected in the conditions of consent for the concept DA, which would need to be complied with as part of a future, detailed DA for Stage 2.</p> <p>The redesign of stage 2 to avoid koala habitat (Trees 116 and 117) must be completed in consultation with an arborist for any works proposed within TPZs.</p>	<p><i>Environmental Planning Policy (Biodiversity and Conservation) 2021 (B&amp;C SEPP), so development consent cannot be granted to the proposal without a plan of management prepared in accordance with Part 3 of Chapter 3 in the policy. The EA and SEE acknowledge the presence of core koala habitat and the requirement for a plan of management, but no plan of management has been prepared. BCS Recommendation 5. A plan of management be prepared as part of the development application in accordance with Part 3 of Chapter 3 of the State Environmental Planning Policy (Biodiversity and Conservation) 2021. I agree with this recommendation since core Koala habitat occurs on the site and a Koala Plan of Management should be prepared, and peer reviewed (as discussed during the joint site assessment (12/04/24)) to maintain and improve resilience and Koala habitat values to help compensate for the impacts of the proposal.</i></p> <ul style="list-style-type: none"> <li>The KPOM should include proposed retention and loss of Koala habitat (including core Koala habitat from earthworks); potential barriers to free Koala movement to and from Koala habitat within the development footprint; buffers (and their management) around existing Koala habitat on the site; impact minimisation/ mitigation measures; and rehabilitation of Koala habitat, e.g. Koala food tree plantings to maintain and improve connectivity between Koala habitat within the development footprint and Koala habitat outside the development footprint. Priority Koala habitat revegetation works should not conflict with bushfire protection needs. The <i>indicative Koala mitigation/compensation measures (For Discussion Only)</i> provided on 15/04/24 does not address any of these matters.</li> <li>Note that Trees 116 and 117 within the development footprint were acknowledged as core Koala habitat during the joint site assessment (12/04/24) with scat evidence of Koala use. Two nearby Tallowood trees to the south also were found to have scat evidence of Koala use.</li> <li>The Test of Significance (ToS) responses provided for the Koala are superficial and don't look at the factors for consideration in sufficient detail in line with the mandatory Assessment of Significance guidelines. For example, inadequate information has been provided on direct and indirect impacts to the local population and habitat associated with residential development within core Koala</li> </ul>

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		<p>habitat. The ToS conclusions regarding impacts to the Koala are not justified and there is insufficient information to decide whether the proposal is likely to have a significant effect on the Koala.</p> <ul style="list-style-type: none"> <li>• It is understood that development consent cannot be granted to the proposal without a KPoM prepared in accordance with the B&amp;C SEPP.</li> <li>• Revised impact assessments should be done for likely core Koala habitat impacts from revised engineering plans received on 23/04/24, including Trees 116 and 117 with scat evidence of Koala use.</li> </ul>
<ul style="list-style-type: none"> <li>○ Inadequate detail is provided on measures to minimise/ mitigate impacts to the local Koala population, and lastly to offset/compensate for lost habitat to achieve no net loss of Koala habitat. Court ordered revegetation works to Koala habitat have not been carried out, nor are they noted as proposed to be carried out, in line with Figure 8 above.</li> </ul>	<p>The Supplementary Terrestrial Ecological Assessment (JWA 2023) recommended that a Koala Plan of Management (KPoM) be prepared and approved by Council prior to commencement of development works. The KPoM should be modelled on the Kings Forest KPoM (JWA 2020) which was prepared in close consultation with the federal government, relevant state agencies and Tweed Shire Council, and was peer reviewed by a koala expert.</p> <p>Details in the KPoM should include (as a minimum):</p> <ul style="list-style-type: none"> <li>○ a detailed assessment of existing threats to the local koala population;</li> <li>○ the methodology and results of additional population and habitat assessment on surrounding lands, particularly to the east of the site where potential habitat exists;</li> <li>○ design elements to be implemented to minimise potential impacts to koalas including the use of “enclaved” development footprints (i.e. through use of appropriately located koala-proof fencing, grids, traffic calming devices etc. - refer <b>ATTACHMENT 5</b>);</li> <li>○ strict dog controls (i.e. on leashes when outside development enclaves); and</li> <li>○ planting of additional preferred koala food trees to improve habitat values of the site/increase carrying capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to comments above for Contention 4) a) (vi) Re a Koala Plan of Management.</li> <li>• Court ordered revegetation works include vegetation which offers preferred Koala habitat. These revegetation works have not been undertaken and are not proposed. Revegetation works should be incorporated into the current development application to ameliorate unlawful clearing impacts to threatened species habitats, including Koala habitat.</li> </ul>
<ul style="list-style-type: none"> <li>○ No clear statement has been provided regarding the occurrence of core koala habitat on the site.</li> </ul>	<p>Noted. Section 8.7.2 of the Supplementary Terrestrial Ecological Assessment (JWA 2023) does however provide an assessment of Step 3 of the Biodiversity and Conservation SEPP “Is the land core koala habitat”. As detailed in this section, the Biodiversity and Conservation SEPP defines</p>	<p>Refer to comments above for Contention 4) a) (vi) Re a Koala Plan of Management.</p>

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	'core koala habitat' means 'an area of land with a resident population of koalas, evidenced by attributes such as breeding females being, females with young, and recent sightings of and historical records of a population.' The section further goes on to detail the evidence of Koala activity/usage found on the site based on SAT analysis. While not explicitly stated, the section indicates that the land is core Koala habitat for the purposes of the Biodiversity and Conservation SEPP based on the scat records indicating a resident Koala in the local area.	
<ul style="list-style-type: none"> <li>It is incorrectly claimed that no Koala habitat will be cleared when at least one home food tree (i.e. Tree 117) with scat evidence of Koala use (i.e. core koala habitat) is proposed to be removed for Earthworks Cut within the development footprint. The Koala habitat assessment did not adequately assess Koala habitat on the site.</li> </ul>	See comments above regarding Tree 117.	Refer to comments above for Contention 4) a) (vi) Re a Koala Plan of Management.
<ul style="list-style-type: none"> <li>A Koala Plan of Management (KPoM) has not been provided to support the Test of Significance findings that there would be no significant impact to the local Koala population.</li> </ul>	See comments above regarding the preparation of a KPoM.	Refer to comments above for Contention 4) a) (vi) Re a Koala Plan of Management.
<ul style="list-style-type: none"> <li>A KPoM would include proposed retention and loss of Koala habitat (including core Koala habitat from earthworks); potential barriers to free Koala movement to and from Koala habitat within the development footprint; buffers around existing koala habitat on the site; impact minimisation/ mitigation measures; and rehabilitation of Koala habitat.</li> </ul>	Agreed.	Refer to comments above for Contention 4) a) (vi) Re a Koala Plan of Management.
<ul style="list-style-type: none"> <li>The test of significance findings regarding significant impacts to the species are not supported since species impacts remain unclear.</li> </ul>	See comments above regarding preparation of a KPoM.	Refer to comments above for Contention 4) a) (vi) Re a Koala Plan of Management.
<p>VII. In regard to the endangered Littoral Rainforest Endangered Ecological Community (EEC) inadequate information and analysis has been provided regarding:</p> <ul style="list-style-type: none"> <li>Tree removal requirements for construction of the road, pedestrian pathway and retaining walls; removal of existing underground services; and installation of new underground services adjacent to the Littoral Rainforest EEC.</li> </ul>	See above and <b>ATTACHMENT 2</b> .	<ul style="list-style-type: none"> <li>As discussed during the joint site assessment (12/04/24)), for endangered Littoral Rainforest impact assessment purposes, tree removal requirements need to be adequately detailed for proposed earthworks associated with demolition and construction works.</li> <li>Tree removal plan drawing/s are required in relation to proposed removal of existing underground services and construction (e.g. installation of underground services, retaining walls, boardwalk, etc). Tree retention and tree removal should be nominated, and tree identification details provided where known.</li> <li>Tree removal plan drawing/s should indicate all trees proposed to be removed within or directly adjacent to endangered Littoral Rainforest community edges and within the previously proposed 15m buffer. This includes wattle trees (<i>Acacia</i> spp.) which serve to buffer some exposed littoral rainforest edges.</li> <li>Tree removal requirements need to be detailed for the old sewer/water infrastructure outside the property in the areas of Mangrove Street and Teak</li> </ul>

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		Street. It is understood that this infrastructure would need to be replaced to service the proposed subdivision and bridge replacement may be required along Iron Gates Drive. Refer to comments in Contention 19 in relation to Iron Gates Drive. Consideration is required of the full impacts of the proposal in adequate detail in line with relevant guidelines.
<ul style="list-style-type: none"> <li>Proposed changes to stormwater input and hydrological regimes, and subsequent impacts to the health, condition and composition of the endangered Littoral Rainforest EEC. Changes to hydrological regimes is a recognised threat to the endangered ecological community.</li> </ul>	<p>It is noted that the hydrological regimes of the site have already been significantly altered due to:</p> <ol style="list-style-type: none"> <li>Historical sand mining activities (<b>ATTACHMENT 6</b>); and</li> <li>Construction of a drain along the northern edge of the northern patch.</li> </ol> <p>Despite these significant historical impacts, the Littoral rainforest patches on the site have shown excellent resilience, as evidenced by the good quality of the vegetation (i.e. diversity &amp; structure) and the general lack of significant edge effects (e.g. weed encroachment).</p> <p>As discussed above, the “western drain” (i.e. along the northern edge of the Littoral rainforest) should be retained, including sufficient setback to ensure retention of Paperbarks growing at or just below the top of bank.</p>	<ul style="list-style-type: none"> <li>Refer to comments above (Contention 4) a) (i)) Re buffers to the Littoral Rainforest community.</li> <li>Refer to comments above (Contention 4) a) (ii)) Re buffers to the existing drainage lines.</li> </ul>
<ul style="list-style-type: none"> <li>Significant impacts to the endangered Littoral Rainforest community.</li> </ul>	See above.	<ul style="list-style-type: none"> <li>In regard to the Littoral Rainforest EEC Assessment of Significance factors (Local occurrence, Risk of extinction, Composition and Application), BCS notes that: <i>The response to these factors of the AoS in the Supplementary Terrestrial Ecological Assessment is cursory, does not examine the impacts on the littoral rainforest TEC in sufficient depth or detail, and does not accord with the AoS guidelines, which are mandatory. The local occurrence of the TEC is not defined in the response, and it does not consider critical TEC thresholds or the impact on life cycles of the species which make up the TEC, as required by the guidelines, in the context of the intensive residential land uses that will surround the TEC as a result of the proposal. The proposal will also result in the largest patch of the littoral rainforest TEC on the site and patches of the Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregion TEC on the site becoming fragmented and isolated by surrounding them</i></li> </ul>

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		<p><i>with residential lots and roads. These TECs on the site are currently contiguous with relatively large areas of native vegetation in the surrounding area and have connectivity to protected areas including the Broadwater and Bundjalung National Parks. Indirect impacts of the proposal on these TECs are likely to include weed and feral animal invasion, dumping of garbage, incursion by human inhabitants and potential nutrient leaching due to imported fill deposited in adjacent areas. The former Section 5A(2)(d)(ii) and (iii) of the EP&amp;A Act, which apply to the proposal, require the consent authority to consider whether an area of habitat for a TEC is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action and the importance of that habitat to the long-term survival of the TEC in the locality. The locality is not defined, short-term and long-term impacts have not been fully considered, the patterns and extent of habitat connectivity have not been identified, and the dispersal and genetic exchange mechanisms of individual species that make up the TECs have not been considered. The response states that no areas of habitat are likely to become fragmented or isolated when the proposal will clearly isolate the largest patch of littoral rainforest TEC on the site by surrounding it with residential land uses. The EA and SEE state the proposed development footprint maintains a 15m buffer around TECs and other areas of native vegetation. This appears to be incorrect as the proposed development footprint encroaches on or adjoins the littoral rainforest and swamp sclerophyll forest TECs in several locations (see Figure 1 below). Nevertheless, the EA does not explain the rationale for a 15m buffer which is relatively narrow and unlikely to protect the TECs from the indirect impacts of the proposal. The proposal will result in at least one key threatening process listed under Schedule 3 of the TSC Act: clearing of native vegetation. Additional key threatening processes listed under Schedule 3 that are likely to result from the proposal include alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands, invasion and establishment of exotic vines and scramblers, cane toads, lantana, and exotic perennial grasses, loss and degradation of native plant and animal habitat by invasion of escaped garden plants including aquatic plants, predation</i></p>

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		<p><i>by feral dogs, European red foxes, and feral cats, and removal of dead wood and dead trees. There are also additional impacts to both TECs not described in the EA from the widening of Iron Gates Drive, and these are discussed further in a subsequent section of this response. There is insufficient information in the AoS for the consent authority to decide whether the proposal is likely to have a significant effect on the TECs to be impacted.</i></p> <ul style="list-style-type: none"> <li>• I agree with the above BCS comments and recommendations since the whole site values and the full impacts of the proposal need to be adequately considered and ecological assessments completed thoroughly and in line with relevant guidelines. I agree that there is insufficient information in the AoS for the consent authority to decide whether the proposal is likely to have a significant effect on the TECs to be impacted. This includes key threatening processes; TEC thresholds or the impact on life cycles of the species which make up the TEC; short-term and long-term impacts; the patterns and extent of habitat connectivity; dispersal and genetic exchange mechanisms of individual species that make up the TECs; removal of wattle trees (<i>Acacia</i> spp) directly adjacent to rainforest edges and within the proposed buffer that serve to protect from damaging edge effects; and various indirect impacts associated with surrounding the remnant with residential land uses.</li> <li>• Proposed vegetation clearing will clearly fragment and isolate TECs which are currently contiguous with large areas of native vegetation and Broadwater National Parks. Impacts relating to fragmentation and isolation have clearly not been adequately considered in sufficient detail as required by mandatory guidelines. The proposed subdivision should be redesigned to maintain vegetation connectivity to protect multiple biodiversity values associated with vegetated corridors and vegetation connectivity.</li> <li>• A revised endangered Littoral Rainforest TEC impact assessment is required Re revised engineering plans received on 23/04/24. This includes any new and changed impacts such as stormwater inputs, additional sediment and nutrient inputs, tree impacts, and changes to the previously proposed 15m buffer.</li> </ul>

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<ul style="list-style-type: none"> <li>Adequate setback to the surveyed edge of the Littoral Rainforest capable of incorporating court ordered Rainforest Rehabilitation area.</li> </ul>	<p>Minimum setbacks and retention of “western drain” as discussed above.</p>	<ul style="list-style-type: none"> <li>Setbacks to the surveyed edge of the Littoral Rainforest are inadequate and have further reduced in revised engineering plans received on 23/04/24.</li> <li>Refer to comments above (Contention 4) a) (vii) and for Contention 4) a) (i) Re the Littoral Rainforest community.</li> <li>Court ordered revegetation works have not been undertaken and are not proposed. Revegetation works should be incorporated into the current development application to ameliorate edge effects of the exposed littoral rainforest edges, and maintain and improve resilience and values of the endangered ecological community.</li> </ul>
<p>IX. Vegetation community mapping in the area of the eastern drain should be revised to discern threatened wetland and other high conservation value vegetation from low conservation value VC 8 (Acacia regrowth). Current photos and photos around the time of the illegal vegetation clearing and drain construction indicate substantial paperbark wetland and forest vegetation existed in this area prior to the clearing and drain construction.</p> <p>This vegetation community can be expected to continue to revert back to high conservation value wetland vegetation over time.</p> <p>Insufficient information has been provided regarding the current wetland vegetation proposed to be cleared, including Mangrove and Paperbark wetland. Projected future changes to vegetation communities and threatened species habitats, including Koala and Wallum Froglet habitats should be considered in the context of continuing succession of the dynamic seral Acacia regrowth vegetation community over time following the illegal vegetation clearing and drain construction.</p>	<p>Thin fringing strips of regrowth paperbarks, scattered clumps of sedges and occasional mangroves have colonised the constructed drainage channel after unlawful clearing works. I do not consider this vegetation to be analogous with any described EECs or represent “high conservation value vegetation”.</p> <p>I agree that the extent of the “eastern drain” should be plotted on vegetation and impact maps and described more thoroughly.</p> <p>I also agree that although the constructed drain represents a highly disturbed ecosystem and is subject to an existing court order requiring it to be filled in, the drain does provide some habitat values for a range of native fauna species, frogs and fish in particular, and should be retained if/where possible. If retention is not possible, the impacts in my opinion are not significant as habitat for common frog species will be provided on site through construction of bioretention devices, and habitat for fish species is not limited in the vicinity of the subject site.</p> <p>I contend that it is highly unlikely that acacia dominated vegetation on the site (VC 8) would revert back to “high conservation value wetland vegetation” over time given the history of disturbance (i.e. extensive sand mining operations between 1965 - 1971) (ATTACHMENT 6).</p>	<ul style="list-style-type: none"> <li>Refer to comments above for Contention 4) a) (iii) Re threatened Wallum Froglet (<i>Crinia tinnula</i>) habitat on site and proposed impacts to it.</li> <li>Court ordered revegetation works have not been undertaken and are not proposed. Revegetation works should be incorporated into the current development application to ameliorate unlawful clearing impacts to sensitive environments such as threatened species habitats (e.g. Koala and Wallum Froglet habitats), Threatened Ecological Communities (TECs), and existing drainage lines with wetland vegetation.</li> <li>Refer to comments in Contention 19 in relation to Iron Gates Drive.</li> </ul>
<p>X. Inadequate information has been provided regarding vegetation clearing requirements and associated ecological impacts for any upgrade of the old sewer/water infrastructure outside the property in the areas of Mangrove Street and Teak Street. It is understood that this infrastructure would need to be replaced to service the proposed subdivision.</p>	<p>Any upgrade of the old sewer/water infrastructure outside the property in the areas of Mangrove Street and Teak Street did not form part of the scope of my assessment.</p>	<ul style="list-style-type: none"> <li>It is understood that impact assessments have not been undertaken in relation to this matter.</li> <li>Refer to comments in Contention 19 in relation to Iron Gates Drive which similarly apply in this instance. This includes the reassessment of site</li> </ul>



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		values and reconsideration of the full impacts of the proposal in adequate detail in line with relevant guidelines.
<p>XI. No assessments have been provided regarding land currently mapped as Coastal Wetlands under State Environmental Planning Policy (Resilience and Hazards) 2021, refer to Figure 15 above (i.e. Planning Portal Extract of Coastal Wetlands); nor land mapped as Biodiversity Values" under Chapter 2 of the State Environmental Planning Policy (Biodiversity and Conservation) 2021, refer to Figure 12 above (i.e. Biodiversity Values Map). Recognised high conservation value lands, including wetlands, should be prioritised for conservation along with appropriate buffers to development.</p>	<p>It is my understanding that the transitional and savings provision of various NSW legislation is applicable to the current development proposal. In this regard, the following repealed legislation is relevant to this assessment:</p> <ul style="list-style-type: none"> <li>• <i>Threatened Species Conservation Act 1995</i> (TSC Act) - the version in force immediately before its repeal (which is saved under the transitional provisions of the Biodiversity Conservation Act);</li> <li>• State Environmental Planning Policy No. 14 (SEPP 14) - the version in force immediately before its repeal (which was saved under the transitional provisions of the State Environmental Planning Policy (Coastal Management) 2018 (Coastal Management SEPP), which are in turn saved by virtue of provisions in the <i>Interpretation Act 1987</i> despite the repeal of the Coastal Management SEPP by the State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP);</li> <li>• State Environmental Planning Policy No. 26 (SEPP 26) - the version in force immediately before its repeal (which is saved for the same reasons as SEPP 14);</li> <li>• State Environmental Planning Policy No. 71 (SEPP 71) - the version in force immediately before its repeal (which is saved for the same reasons as SEPP 14); and</li> <li>• State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) - in particular the current version of Chapter 3.</li> </ul> <p>The State Environmental Planning Policy (Resilience and Hazards) 2021 and Chapter 2 of the State Environmental Planning Policy (Biodiversity and Conservation) 2021 are not relevant to the proposal.</p>	<ul style="list-style-type: none"> <li>• Refer to BCS comments and recommendations 9 and 10 in relation to the applicability of various SEPPS are outside my areas of expertise and are referred to other experts for comment.</li> <li>• Refer to comments in Contention 19 in relation to Iron Gates Drive.</li> </ul>

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(iv) Inadequate consideration of alternative layout including buffer zones and designing a development footprint to site conditions to minimise environmental impact on site from the proposed works.	<p>Buffers to the majority of ecologically significant areas have been discussed above.</p> <p>The proposed setback to revised wetland vegetation mapping on and adjacent to the site is shown at <b>ATTACHMENT 3</b> and is considered adequate.</p> <p>I refer discussions regarding buffers necessary to any fish habitat to the relevant Aquatic Ecology experts.</p> <p>I note that it was agreed during the meeting/joint site inspection between the Terrestrial Ecology experts on Friday the 12th of April 2024 that future consideration of a buffer to the sea-eagle nest (Stage 2) would be subject to additional survey/monitoring to determine its use (i.e. is the nest active?).</p>	<ul style="list-style-type: none"> <li>The proposed development has not been designed and sited to avoid adverse environmental impacts to sensitive environments such as threatened species habitats (e.g. Koala and Wallum Froglet habitats), Threatened Ecological Communities (TECs), and the eastern drainage line with wetland vegetation.</li> <li>Re buffers, refer to comments above for Contention 4) a) (i), (ii) and (iii).</li> </ul>
(b) The proposal has not adequately demonstrated pursuant to Clause 6.8(4) of the RVLEP 201 2 that key fish habitats will be protected or maintained. The Amended Application has not clearly detailed an analysis of the proposed stormwater management arrangements on wetland and Littoral Rainforest ecosystems. inadequate buffer zones are proposed to the Evans River and wetland areas.	I refer discussions regarding any key fish habitat to the relevant Aquatic Ecology experts.	<ul style="list-style-type: none"> <li>Refer to comments in Contention 19 in relation to Iron Gates Drive.</li> <li>Re buffers to mangroves, Evans River, key fish habitats and coastal wetlands, Refer below to aquatic ecology comments (Contention 4) a).</li> </ul>
(c) The proposal has not adequately demonstrated pursuant to Clause 6.10(4) of the RVELP 2012 that the wetlands can be preserved and protected from the impacts of the proposed development.	Council has incorrectly mapped heath communities on and adjacent to the site as wetland vegetation. Regardless, the majority of the mapped area will be retained.	<ul style="list-style-type: none"> <li>Refer to wetland and acid sulfate soil comments above for Contention 4) a) (i), (ii) and (iii); and refer to comments in Contention 19 in relation to Iron Gates Drive.</li> <li>I agree with BSC comments and believe that the proposed subdivision should be redesigned to avoid likely alteration to the hydrology of the NSW Government mapped SEPP 14 Coastal Wetlands. This area immediately adjoins and potentially overlaps with a waterway that has naturally developed dense wetland vegetation and threatened species habitat since unlawful drain construction. Otherwise, appropriate approvals should be sought prior to any approval.</li> <li>The revised JWA wetland mapping provided on 15/04/24 is inadequate since it is not consistent with NSW Government Coastal Wetlands mapping, does not propose an adequate buffer to Coastal Wetlands, and does not include dense wetland vegetation and threatened Wallum Froglet habitat in the northern portion of the eastern drainage line. SEPP 14 clearly references NSW Government mapping. The JWA mapping has not been approved as an alternative to NSW Government SEPP 14 Coastal Wetlands mapping for the development application.</li> </ul>

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	Adam McArthur (AM) Comments	Michael Hallinan (MH) Comments
<p><b>Impact on Threatened Species</b></p> <p>6) The proposal fails to demonstrate that proposed development will not have a significant adverse impact on threatened species, populations or ecological communities, or their habitats is considered unacceptable pursuant to the provisions of s5A (as in force at the time of lodgement of the development application) and the provisions of sections 1.3(e) and 4.15(a)(i) of the EP&amp;A Act.</p> <p><u>Particulars</u></p>		
(a) See Particular 4(a)(iii) above.	See responses to SOFAC 4 a) (iii) above.	Refer to comments above for Contention 4) a) (i) and (iii)
(b) It has not been demonstrated that the proposal will not result in adverse impacts on biodiversity as required by clause 6.6 of RVLEP 2012.	See response to SOFAC 4 a) (i) above.	Refer to comments above for Contention 4) a) (i) and (iii)
<p>(c) The proposal is not consistent with the objectives of the land use zones applying to the site under Clause 2.3 of RVLEP 2012') in that:</p> <p>(i) The proposal is contrary to the objectives of the C2 Environmental Conservation zone as the proposal does not protect, manage or restore areas of high ecological value and does not prevent development that could destroy, damage or otherwise have an adverse effect on those values as a result of the impacts of the proposal arising from a lack of adequate buffer zones and mitigation of edge effects and fragmentation.</p>	See responses to SOFACs 4 a) (i) - (iii) above.	Refer to comments above for Contention 4) a) (i) and (iii)
<p><b>Loss of Biodiversity</b></p> <p>10) The proposed development is considered unacceptable pursuant to the provisions of s4.15(1)(b) of the EP&amp;A Act as it has not been demonstrated that the proposal will not result in adverse impacts on the biodiversity values on the site.</p> <p><u>Particulars</u></p>		
(a) Refr(sic.) Particular 4(a)(iii) above.	See responses to SOFAC 4 a) (iii) above.	Refer to comments above for Contention 4) a) (i) and (iii)
(b) The Amended Application is not supported by a biodiversity offset package to provide for no net loss of biodiversity. No assessment has been made in accordance with the Biodiversity Assessment Methodology (BAM) to calculate the credits that will need to be purchased or retired as an offset for biodiversity impacts arising from the development. Inadequate information has been provided in regard to offsetting/compensating for the residual impacts of the proposal that cannot be avoided and mitigated/minimised.	The Biodiversity Assessment Methodology (BAM) does not apply to the proposal. The appropriate test is the Assessment of Significance (7-part test equivalence) which is used to determine if a <u>significant impact</u> will occur on threatened species or ecological communities, such that their local occurrence is <u>likely to be placed at risk of extinction</u> .	<ul style="list-style-type: none"> <li>BCS Recommendation 6 notes that <i>The biodiversity offsets package previously agreed to by the proponent and the then Office of Environment and Heritage be reinstated into the proposal</i>. I agree with this recommendation as a measure to offset development impacts and since JWA (2019) note this as being required by the NSW Office of Environment and Heritage.</li> <li>In reference to the RVLEP 2012, proposed measures to compensate for environmental impacts associated with the proposal are considered inadequate. There is no proposed works to maintain and improve vegetation connectivity between threatened species habitats and large vegetated areas including Broadwater National Park.</li> <li>Refer to comments above for Contention 4) a) (i) and (ii) Re preparation of a Vegetation Management Plan and buffers.</li> </ul>
(c) The proposal does not maintain terrestrial biodiversity of the site by protecting native fauna and flora, protecting the ecological processes necessary for their continued existence or encouraging the	See responses to SOFAC 4 a) (i) - (iii) above.	Refer to comments above for Contention 4) a) (i), (ii) and (iii).

Issues	Terrestrial Ecology Experts	
	Adam McArthur (AM) Comments	Michael Hallinan (MH) Comments
conservation and recovery of native fauna and flora and their habitats contrary to the provisions of clause 6.6(1) of RVLEP 2012.		
(d) It has not been adequately demonstrated that the proposal has been designed, sited or will be managed to firstly avoid, secondly mitigate/minimise, and lastly offset/compensate for the impacts of the development.	See responses to SOFAC 4 a) (i) - (iii) above.	Refer to comments above for Contention 4) a) (i), (ii) and (iii).
<b>Loss of Koala Habitat</b> <b>12) The proposed development is considered unacceptable pursuant to the provisions of s4.15(1)(a)(i) of the <i>Environment Planning and Assessment Act 1979</i> as the proposal is contrary to State Environmental Planning Policy No. 44 Koala Habitat Protection and is likely to have an adverse impact on the local Koala population.</b> <u>Particulars</u>		
(a) The land is core koala habitat and a Koala Plan of Management has not been provided pursuant to Cause 9(1) of SEPP 44;	See responses to SOFACs 4 a) (iii) VI above.	Refer to comments above for Contention 4) a) (vi)
(b) The proposal is contrary to the aims of SEPP 44 as it does not encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline;	See responses to SOFACs 4 a) (iii) VI above regarding preparation of a KPoM and <b>ATTACHMENT 5</b> .	Refer to comments above for Contention 4) a) (vi)
(c) The proposal does not provide adequate measures to mitigate/minimise the impact and offset/compensate for the loss of koala habitat;	See responses to SOFACs 4 a) (iii) VI above regarding preparation of a KPoM and <b>ATTACHMENT 5</b> .	Refer to comments above for Contention 4) a) (vi)
(d) It has not been demonstrated that the proposed removal of core koala habitat from the site will not result in a significant impact on the koala;	See responses to SOFACs 4 a) (iii) VI above regarding Stage 2.	Refer to comments above for Contention 4) a) (vi)
(e) A Koala Plan of Management has not been provided in relation to the proposal.	See responses to SOFACs 4 a) (iii) VI above regarding preparation of a KPoM and <b>ATTACHMENT 5</b> .	Refer to comments above for Contention 4) a) (vi)
<b>B3 - CONTENTIONS THAT THERE IS INSUFFICIENT INFORMATION TO ASSESS THE APPLICATION</b>		
<b>19) Inadequate information has been provided in relation to the extent of vegetation clearance and the nature of the vegetation to be removed to enable the widening of Iron Gates Drive and provision of all associated infrastructure and construction disturbance areas.</b>	A separate Ecological Assessment (JWA 2019) has been prepared for the proposed upgrades to Iron Gates Drive.	<p>BCS notes that <i>The 2023 EA does not include any assessment of the road widening, and so it does not assess the full impacts of the proposal.</i></p> <p><i>The separation of these impacts between two different ecological assessments confounds the description of the proposal's impacts and results in misleading conclusions. For example, the 7-part test for the swamp sclerophyll forest TEC in the 2023 EA states there will be no direct impacts on the TEC and that the proposed development is located a considerable distance from any occurrences of the TEC. However, the 2019 Iron Gates Drive EA states that 0.51 ha of this TEC would be cleared to widen the road.</i></p> <p><i>These issues extend to other threatened entities that would be impacted by either or both the road widening and the residential subdivision.</i></p> <p><i>The 2019 Iron Gates Drive EA for the upgrade of the road is at least five years old, but the field data for the assessment were collected in 2016, so it is more appropriate to consider the study to be eight years</i></p>

Issues	Terrestrial Ecology Experts	
	Adam McArthur (AM) Comments	Michael Hallinan (MH) Comments
		<p><i>old. Flora and fauna studies more than five years old are unlikely to provide valid and current information on the biodiversity values of the study area. Given the council does not manage the Iron Gates Drive road reserve, there has likely been substantial growth and recruitment of vegetation since the data were collected.</i></p> <p><i>BCS Recommendations 1. Additional flora and fauna surveys be undertaken to gather contemporary information about the biodiversity values of the study area, given the data used to inform the ecological assessment for the upgrade of Iron Gates Drive are more than five years old; and 2. Once recommendation 1 has been addressed, the Supplementary Terrestrial Ecological Assessment and threatened species Assessment of Significance for the proposal be amended to:</i></p> <p><i>a. assess all the direct and indirect impacts of the proposal, including the impacts of the Iron Gates Road upgrade required for the subdivision.</i></p> <p><i>b. accord with the mandatory Threatened Species Assessment Guidelines by providing the information required by the guidelines, particularly for factors (c) and (d) of the Assessment of Significance.</i></p> <p><i>I agree with the above BCS comments and recommendations since the whole site values and the full impacts of the proposal need to be considered and ecological assessments completed in adequate detail in line with relevant guidelines to enable a valid assessment of significance to be made.</i></p> <p><i>The EA and SEE consider the now repealed State Environmental Planning Policy No 14-Coastal Wetlands (SEPP 14) continues to apply to the proposal. Under Section 7(1) of SEPP 14, the consent of the council and the concurrence of the Director-General of the Department of Environment, Climate Change and Water (now the Secretary of DCCEEW) is required for any proposal to clear land, construct a levee, drain land or fill land to which the policy applies. Under SEPP 14, 'clearing' means the destruction or removal in any manner of native plants growing on the land. The SEE states the proposal does not involve any of the works specified in Section 7(1) of SEPP 14. However, the 2019 Iron Gates Drive EA describes the clearing of the full road width (20m) to widen the road, and the SEPP 14 coastal wetland mapping overlaps with the road in several locations. The 2019 Iron Gates Drive EA argues that only vegetation pruning, and not complete removal of native plants, would be required for the road</i></p>

Issues	Terrestrial Ecology Experts	
	Adam McArthur (AM) Comments	Michael Hallinan (MH) Comments
		<p>widening, and further states this does not meet the definition of 'clearing' under SEPP 14. Given the current encroachment of native vegetation into the road area, we consider it unrealistic that not a single native plant within the mapped area would need to be removed..... Consequently, we consider the proposal does not accord with SEPP 14 because it does not have the consent of the council or the concurrence of the Director-General of the Department of Environment, Climate Change and Water (now the Secretary of DCCEEW).</p> <p>I agree with the above BCS comments since appropriate approvals need to be in place for clearing or drainage works within or that may impact NSW Government mapped SEPP 14 Coastal Wetlands.</p>
20) The Amended Application does not identify how the proposed subdivision and associated works and occupation would be consistent with the objectives for land mapped as Terrestrial Biodiversity under RV LEP 2012.	See responses to SOFACs 4 a) (i) - (iii) above.	Refer to comments above for Contention 4) a) (i), (ii) and (iii).
21) The Amended Application does not identify how the proposed subdivision and associated works and occupation would be consistent with the objectives for land mapped as Wetlands, Riparian Land and Waterways under RVLEP 2012.	See responses to SOFACs 4 a) (i) - (iii) above.	<ul style="list-style-type: none"> <li>Refer to comments above for Contention 4) a) (i), (ii) and (iii).</li> <li>Refer to comments in Contention 19 in relation to Iron Gates Drive.</li> </ul>
22) The Amended Application does not provide an assessment on whether the subdivision and future occupation will impact on land mapped as Biodiversity Values under the <i>Biodiversity Conservation Act 2016</i> .	The transitional and savings provision of the <i>Biodiversity Conservation Act 2016</i> is applicable to the current development proposal. Assessment of land mapped as Biodiversity Values under <i>the Biodiversity Conservation Act 2016</i> is not relevant or required.	This planning matter is outside my area of expertise and is referred to other experts for comment.
23) The Amended Application does not demonstrate how the subdivision proposal avoids the Coastal Wetlands and Proximity areas within the site and why they have not been prioritised for conservation. are best avoided for development and prioritised for conservation(sic.).	For the proposed development the repealed Coastal Wetlands SEPP (No. 14) applies. The Coastal Wetlands SEPP was saved under the transitional provisions of the Coastal Management SEPP, which are in turn saved by virtue of provisions in the Interpretation Act 1987 despite the repeal of the Coastal Management SEPP by the Resilience and Hazards SEPP.	<ul style="list-style-type: none"> <li>Refer to comments above for Contention 4) a) (i), (ii) and (iii).</li> <li>Refer to comments in Contention 19 in relation to Iron Gates Drive.</li> </ul>

## Aquatic Ecology

4.3 In relation to aquatic ecology matters, and with reference to the relevant SOFACS, the Aquatic Ecology Experts agree that:

a) In relation to Contention 1(a)i:

- i. The western drain has developed naturalistic characteristics since unlawful clearing and should be retained.

b) In relation to Contention 4(a)i:

- i. We acknowledge the protected status of mangroves under the *Fisheries Management Act 1994*, and the consequent need for a permit to 'harm' the small number of mangroves that have colonised the eastern drain.

4.4 In relation to aquatic ecology matters, and with reference to the relevant SOFACS, the Aquatic Ecology Experts remain in disagreement on the following matters, and **these matters should form the focus of the hearing**:

a) In relation to Contention 4(a), and Contention 17(a):

- i. In reference to the RVLEP 2012, **JT** disagrees with **MH** that the proposed development has not been designed and sited to avoid adverse environmental impacts to sensitive environments such as the Evans River and the eastern drainage line with wetland vegetation including Broad-leaved Paperbark, mangroves, sedges and rushes.
- ii. As agreed, a permit is required to harm mangroves that have colonised the eastern drainage line since unlawful drain construction due to their protected status under the *Fisheries Management Act 1994*. **MH** understands that that the permit has not been obtained and is required prior to any development consent.

b) In relation to Contention 4(a)ii, Contention 4(a)(iii)I (second bullet point) and Contention 11(d):

- i. **JT** disagrees with **MH** on the required set-back of development from marine plant communities associated with the Evans River.
- ii. **MH** believes that acid sulfate soil sampling has been inadequate, and that additional acid sulfate soil sampling is required to determine whether they occur on the site and if so whether they are likely to be disturbed and exposed from construction works potentially causing multiple damaging environmental impacts. **JT** has not commented on this matter.

**JT** notes that Contention 4(a)iii is premised on the contention that 'inadequate ecological impact assessment information has been provided', yet its sub-clauses are direct criticisms of aspects of the proposed development. **MH** has provided no comment on this matter.

Considering the remaining sub-clauses of Contention 4(a)iiil:

c) In relation to Contention 4(a)iiil (first bullet point), Contention 6, Contention 7(c) and Contention 24:

- i. **MH** considers that further information is required regarding how protection and rehabilitation of the vegetated riparian corridor between the Evans River and the development footprint would be achieved. **JT** notes that the riparian corridor is elevated above the level of the river and comprises an assemblage of well-established terrestrial plants - and as such its protection and rehabilitation (if required) should be addressed by the terrestrial ecologists. In its current condition, the riparian corridor serves as a highly effective buffer between proposed development and the river.
- ii. **MH** is of the view that the eastern drainage line has developed naturalistic characteristics since illegal drain construction (e.g. substantial wetland vegetation and threatened species habitat) similar to the western drain. **JT** responds that the eastern drain does not provide habitat for any threatened species of fish (including the Oxleyan pigmy perch), crustacean or other invertebrate. The drain remains a straight, v-shaped channel that is frequently subject to eutrophication due to poor drainage and restricted tidal flushing.
- iii. **JT** disagrees with **MH** who considers that current proposed measures to compensate for wetland and aquatic habitat impacts associated with the proposal are inadequate. **JT** sees no need to compensate for the predicted impacts to aquatic habitat as they will be ecologically negligible.

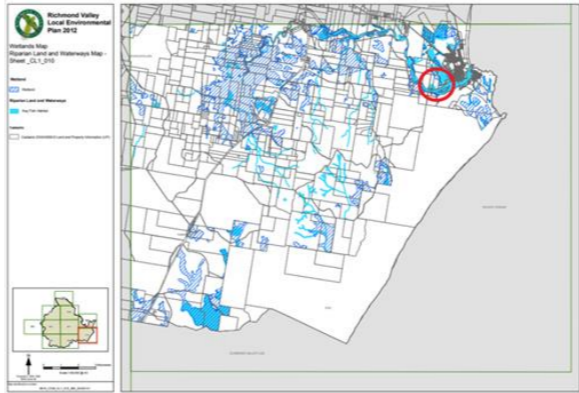
d) Considering Contention 16:

- i. **JT** advises that the proposed site stormwater management plan specifies bio-swales that drain completely within 96 hours. Consequently, the site's stormwater infrastructure will not provide habitat that supports mosquito breeding. **MH** has provided no comment on this matter.

e) Considering Contention 19:

- i. **MH** believes that further wetland and aquatic habitat impact assessments are required for the proposed upgrades to Iron Gates Drive and associated infrastructure to allow the full impacts of the proposal to be considered. **JT** is not aware of the extent of works proposed, so cannot comment.

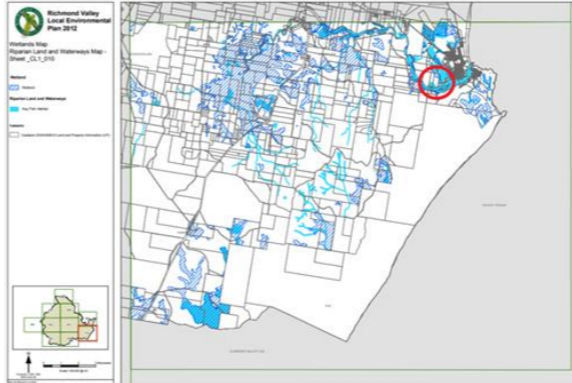


Issues	Aquatic Ecology Experts	
	John Thorogood Comments	Michael Hallinan Comments
<b>B1 - CONTENTIONS THAT THE APPLICATION BE REFUSED</b>		
<b>Biodiversity and Vegetation Clearance</b>		
<p>4) The proposed development is considered unacceptable pursuant to the provisions of s4.15(1)(a)(i) of the EP&amp;A Act as the proposal has failed to adequately demonstrate consistency with the matters required to be satisfied under clauses 6.6(4), 6.8(4) and 6.10(4) of RVLEP 2012</p> <p><u>Particulars</u></p>		
<p>a) It has not been adequately demonstrated that the proposal has been designed, sited or will be managed to firstly avoid, secondly to mitigate/minimise, and lastly to offset/compensate for significant adverse environmental impacts pursuant to Clause 6.6(4) of the RVLEP 2012 given:</p> <p>(ii) The lack of buffers provided to ecologically sensitive areas including core Koala habitat, Wallum Froglet (<i>Crinia tinnula</i>) habitat, Littoral Rainforest, Coastal Wetlands, and fish habitat;</p>	<p><b>Introduction</b></p> <ul style="list-style-type: none"> <li>The Site does not have frontage to the Evans River. The Site adjoins a Crown Foreshore Reserve and the Reserve has frontage to the Evans River.</li> <li>The Crown Foreshore Reserve supports a variety of vegetation communities, including: cleared grassland, threatened ecological communities including sclerophyll forest and littoral rainforest, and coastal mangroves.</li> <li>There are two waterways (drains) on the site, each draining to the Evans River. Both drains have been excavated.</li> <li>State Environmental Planning Policy No 14 - Coastal Wetlands and State Environmental Planning Policy No 71 - Coastal Protection apply to the Amended Application.</li> </ul> <p><b>Key Fish Habitat</b></p> <ul style="list-style-type: none"> <li>Whilst the Site is mapped under the RVLEP as containing 'key fish habitat' (undefined in the RVLEP), the RVLEP's mapping of fish habitat does not reflect the waterways of the Site.</li> </ul>  <ul style="list-style-type: none"> <li>Whilst frc environmental's survey found the eastern drain to support empire gudgeon, Pacific</li> </ul>	<ul style="list-style-type: none"> <li>In reference to the RVLEP 2012, the proposed development has not been designed and sited to avoid adverse environmental impacts to sensitive environments such as the Evans River and the eastern drainage line.</li> <li>Mangroves provide important fish habitat functions including fish habitat, food, erosion control, edge effects, water quality, flood protection and climate change adaption. Mangroves are protected under the FM Act and have naturally recruited since unlawful drain construction. I agree with DPI Fisheries recommended buffer zones that 50m buffers (or less if physically unachievable) to mangroves (including in the eastern drainage line) should be incorporated into the proposed development design for their multiple environmental services.</li> <li>Prior to any development consent, a permit is required to harm mangroves that have colonised the eastern drainage line since unlawful drain construction due to their protected status under the Fisheries Management Act 1994.</li> <li>I recognise the importance of Coastal Wetlands and agree with DPI Fisheries that buffers of 100m from Coastal Wetlands be incorporated into the proposed development design where physically achievable and where wetland vegetation occurs nearby. This includes dense wetland vegetation and threatened Wallum Froglet habitat that has naturally developed since unlawful drain construction in the northern portion of the eastern drainage line.</li> <li>Inadequate information has been provided regarding how protection and rehabilitation of the vegetated riparian corridor between the Evans River and the development footprint would be achieved. I agree with NSW DPI Fisheries that <i>The protection and rehabilitation of the vegetated riparian corridor between the Evans River and the development footprint is important for maintaining the shape, stability and ecological functions of the river.</i></li> </ul>
<p>(iii) The inadequate ecological impact assessment information has been provided in relation to Koala habitat, Wallum Froglet (<i>Crinia tinnula</i>) habitat, Littoral Rainforest and fish habitat as follows:</p> <p>I. The subdivision layout under the Amended Application has not been designed and located, as a primary consideration, to avoid and buffer key fish habitat in the eastern drain which is proposed to be filled/modified.</p>		
<ul style="list-style-type: none"> <li>As a secondary consideration, inadequate measures are proposed to minimise/ mitigate impacts to key fish habitat. and lastly to offset/compensate for lost habitat to achieve no net loss of key fish habitat.</li> </ul>		
<ul style="list-style-type: none"> <li>Buffers have not been incorporated into the design proposal consistent with DPI Fisheries recommendations. i.e. foreshore buffers of 50-100m width adjacent to Type 1 marine vegetation and a minimum 50m width adjacent to Type 2 marine vegetation, and 100m from Coastal Wetlands.</li> </ul>		

Issues	Aquatic Ecology Experts	
	John Thorogood Comments	Michael Hallinan Comments
	<p>blue-eye, mullet, crescent grunter and 3 goby species, there is no habitat of significance to any species of fish on the Site. The mapping referred to is of very large scale. The eastern drain has a restricted tidal exchange and exhibits a salinity gradient along its length. Dissolved oxygen concentration was low throughout the eastern drain. When inspected in xx 2023, it was eutrophic. The aquatic macrophytes and fishes associated with the drain are described in frc environmental's report 'Iron Gates, Oxleyan pigmy perch survey, April 2024', appended to this JER. In the context of DPI Fisheries 'Policy and guidelines for fish habitat conservation and management, update 2013', the drain would not be considered 'key fish habitat'. The drain does not support any fish or invertebrate species of conservation significance.</p> <ul style="list-style-type: none"> <li>The western waterway is highly ephemeral and was largely dry on the two occasions it was inspected by frc environmental ecologists. As no more than a 2nd order stream, it also is considered not to be 'key fish habitat'.</li> <li>Suitably Qualified aquatic ecologists conducted a focused survey for Oxleyan pigmy perch of both the eastern and western waterways. No Oxleyan pigmy perch were recorded. Noting the lack of connectivity and the brackish nature of the water within the eastern drain, it is highly unlikely that the site has ever, or would ever, support Oxleyan pigmy perch.</li> <li>The eastern drain will be removed and that work will not affect any key fish habitat. The western drain, having developed naturalistic characteristics is to be retained. The proposed development will not result in the loss of any 'key fish habitat' - consequently no offset is required.</li> </ul> <p><b>Buffers to Marine Plants and Fish Habitat</b></p> <ul style="list-style-type: none"> <li>One of the key objectives of the Fisheries Management Act is to conserve 'key fish habitats'. We acknowledge that DPI Fisheries (Policy and guidelines for fish habitat conservation and management, update 2013) recommend foreshore buffers (set-backs) of at least 50m width adjacent to mangroves (Type 2</li> </ul>	<ul style="list-style-type: none"> <li>Re aquatic ecologist comments <i>The western drain, having developed naturalistic characteristics is to be retained</i>, it is considered that the eastern drainage line has also developed naturalistic characteristics since unlawful drain construction (e.g. substantial wetland vegetation and threatened species habitat) and should similarly be retained.</li> <li>Regarding Acid Sulfate Soils and the first objective of the Acid Sulfate Soils (ASS) Assessment (i.e. <i>to Undertake an appraisal of the site to establish if ASS exist in soils within the investigation area</i>), BCS notes that <i>based on the report it is not possible to establish if ASS occur in soils within the investigation area. Recommendation 12. Additional sampling be undertaken to determine whether acid sulfate soils occur within the investigation area.</i> I agree with this recommendation since exposure of acid sulfate soils from construction works is known to have multiple adverse environmental health impacts including to flora and fauna, waterways and aquatic life, recreational and commercial fishing, etc.</li> <li>In reference to the RVLEP 2012, current proposed measures to compensate for wetland and aquatic habitat impacts associated with the proposal are considered inadequate.</li> <li>Refer also to comments in Contention 19 in relation to Iron Gates Drive and wetlands.</li> <li>Regarding aquatic ecologist and BCS comments Re the SEPPs that apply to the proposal, this matter is outside my areas of expertise and is referred to other experts for comment.</li> <li>Regarding aquatic ecologist comments Re site frontage to the Evans River, this matter is outside my areas of expertise and is referred to other experts for comment.</li> <li>Specific fish habitat matters are outside my areas of expertise and are referred to other experts for comment.</li> </ul>

Issues	Aquatic Ecology Experts	
	John Thorogood Comments	Michael Hallinan Comments
	<p>marine vegetation) and 100m from Coastal Wetlands. It is to be emphasised that these set-backs are generic guidelines and do not take into account the buffering features of the set-back (that may increased or decrease the set-backs capacity to buffer significant vegetation from impacting processes.</p> <ul style="list-style-type: none"> <li>The set-back from the proposed new road to the Evans River varies between approximately 35m to over 70m, and to mangroves varies between approximately 20m to 55m. From lot boundaries the minimum setback to the river is approximately 50m.</li> <li>Whilst the set-back afforded by the proposed development is less than that suggested by the guidelines, the limited functions required of the set-back to the river / mangroves, together with the buffering capacity of the set-back suggests that the set-back will achieve the objective of contributing to the conservation of 'key fish habitat'. The set-back is for the most-part comprised of dense and structurally complex terrestrial vegetation within the Crown Foreshore Reserve. As little as a few meters of this vegetation effectively attenuates the transmission of light and sound (obscuring human activity to landward from the river and trapping litter). Further, there is a steep scarp from the Crown Foreshore Reserve to HAT and mangrove habitat (below HAT). Both the mangroves and fauna associated with mangroves will be set-down below the level of the site. Stormwater is directed to treatment trains away from the river (so the set-back is not required to filter stormwater run-off). In conclusion, the proposed set-back will contribute to achieving the objective of conserving 'key fish habitat'.</li> </ul>	
<ul style="list-style-type: none"> <li>Inadequate ecological assessment information is provided in regard the potential impacts to marine vegetation, key fish habitat, threatened species and key threatening processes.</li> </ul>		
<ul style="list-style-type: none"> <li>No assessment information has been provided in regard to the Fisheries Management Act 1994 (FM Act). A test of significance has not been provided regarding matters relating to the FM Act including potential impacts to marine vegetation, key fish habitat, Threatened species and key threatening processes.</li> </ul>	<p><b>Marine Plants and Key Fish Habitat</b></p> <ul style="list-style-type: none"> <li>See above.</li> </ul> <p><b>Threatened Species and Key Threatening Processes</b></p>	

Issues	Aquatic Ecology Experts	
	John Thorogood Comments	Michael Hallinan Comments
	<ul style="list-style-type: none"> <li>Whilst the Evans River may support threatened species including the black cod and White's sea horse, the proposed development will not detrimentally impact these species or their habitat. The Site does not have frontage to the Evans River. A substantive set-back and tall, dense, native vegetation serves to buffer the river from the Site. The DPI Fisheries has identified a number of key threatening processes that pose threats to native fish and vegetation: none are applicable to the proposed development. The stormwater from the Site discharged to the river will meet Council's required contaminant reduction standards and will not adversely impact the estuary's aquatic flora and fauna. An 'assessment of significance' for the black rock cod and White's sea horse is appended.</li> </ul>	
<p>(b) The proposal has not adequately demonstrated pursuant to Clause 6.8(4) of the RVLEP 201 2 that key fish habitats will be protected or maintained. The Amended Application has not clearly detailed an analysis of the proposed stormwater management arrangements on wetland and Littoral Rainforest ecosystems. inadequate buffer zones are proposed to the Evans River and wetland areas.</p>	<p><b>Buffers to Key Fish Habitats</b></p> <ul style="list-style-type: none"> <li>See above.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to relevant aquatic ecology comments above for Contention 4) a) (i), (ii) and (iii).</li> </ul>
<p><b>Impact on Threatened Species</b></p> <p>6) The proposal fails to demonstrate that proposed development will not have a significant adverse impact on threatened species, populations or ecological communities, or their habitats is considered unacceptable pursuant to the provisions of s5A (as in force at the time of lodgement of the development application) and the provisions of sections 1.3(e) and 4.15(a)(i) of the EP&amp;A Act.</p> <p><u>Particulars</u></p>		
<p>(a) See Particular 4(a)(iii) above.</p>	<p><b>Threatened Species and Key Threatening Processes</b></p> <ul style="list-style-type: none"> <li>Whilst the Evans River may support threatened species including the black cod and White's sea horse, the proposed development will not detrimentally impact these species or their habitat. The Site does not have frontage to the Evans River. A substantive set-back and tall, dense, native vegetation serves to buffer the river from the Site. The DPI Fisheries has identified a number of key threatening processes that pose threats to native fish and vegetation: none are applicable to the proposed development. The stormwater from the Site discharged to the river will meet Council's required contaminant reduction standards and will not adversely impact the estuary's aquatic flora and fauna. An 'assessment of significance' for the black rock cod and White's sea horse is appended.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to relevant aquatic ecology comments above for Contention 4) a) (i), (ii) and (iii).</li> </ul>

Issues	Aquatic Ecology Experts	
	John Thorogood Comments	Michael Hallinan Comments
<p><b>Loss of Biodiversity</b></p> <p>10) The proposed development is considered unacceptable pursuant to the provisions of s4.15(1)(b) of the EP&amp;A Act as it has not been demonstrated that the proposal will not result in adverse impacts on the biodiversity values on the site.</p> <p><u>Particulars</u></p>		
<p>(a) Refr(sic.) Particular 4(a)(iii) above.</p>	<p><b>Introduction</b></p> <ul style="list-style-type: none"> <li>The Site does not have frontage to the Evans River. The Site adjoins a Crown Foreshore Reserve and the Reserve has frontage to the Evans River.</li> <li>The Crown Foreshore Reserve supports a variety of vegetation communities, including: cleared grassland, threatened ecological communities including sclerophyll forest and littoral rainforest, and coastal mangroves.</li> <li>There are two waterways (drains) on the site, each draining to the Evans River. Both drains have been excavated.</li> <li>State Environmental Planning Policy No 14 - Coastal Wetlands and State Environmental Planning Policy No 71 - Coastal Protection apply to the Amended Application.</li> </ul> <p><b>Key Fish Habitat</b></p> <ul style="list-style-type: none"> <li>Whilst the Site is mapped under the RVLEP as containing 'key fish habitat' (undefined in the RVLEP), the RVLEP's mapping of fish habitat does not reflect the waterways of the Site.</li> </ul>  <ul style="list-style-type: none"> <li>Whilst frc environmental's survey found the eastern drain to support empire gudgeon, Pacific blue-eye, mullet, crescent grunter and 3 goby species, there is no habitat of significance to any</li> </ul>	<ul style="list-style-type: none"> <li>Refer to relevant aquatic ecology comments above for Contention 4) a) (i), (ii) and (iii).</li> </ul>

Issues	Aquatic Ecology Experts	
	John Thorogood Comments	Michael Hallinan Comments
	<p>species of fish on the Site. The mapping referred to is of very large scale. The eastern drain has a restricted tidal exchange and exhibits a salinity gradient along its length. Dissolved oxygen concentration was low throughout the eastern drain. When inspected in xx 2023, it was eutrophic. The aquatic macrophytes and fishes associated with the drain are described in frc environmental's report 'Iron Gates, Oxleyan pigmy perch survey, April 2024', appended to this JER. In the context of DPI Fisheries 'Policy and guidelines for fish habitat conservation and management, update 2013', the drain would not be considered 'key fish habitat'. The drain does not support any fish or invertebrate species of conservation significance.</p> <ul style="list-style-type: none"> <li>• The western waterway is highly ephemeral and was largely dry on the two occasions it was inspected by frc environmental ecologists. As no more than a 2nd order stream, it also is considered not to be 'key fish habitat'.</li> <li>• Suitably Qualified aquatic ecologists conducted a focused survey for Oxleyan pigmy perch of both the eastern and western waterways. No Oxleyan pigmy perch were recorded. Noting the lack of connectivity and the brackish nature of the water within the eastern drain, it is highly unlikely that the site has ever, or would ever, support Oxleyan pigmy perch.</li> <li>• The eastern drain will be removed and that work will not affect any key fish habitat. The western drain, having developed naturalistic characteristics is to be retained. The proposed development will not result in the loss of any 'key fish habitat' - consequently no offset is required.</li> </ul> <p><b>Buffers to Marine Plants and Fish Habitat</b></p> <ul style="list-style-type: none"> <li>• One of the key objectives of the Fisheries Management Act is to conserve 'key fish habitats'. We acknowledge that DPI Fisheries (Policy and guidelines for fish habitat conservation and management, update 2013) recommend foreshore buffers (set-backs) of at least 50m width adjacent to mangroves (Type 2 marine vegetation) and 100m from Coastal Wetlands. It is to be emphasised that these set-</li> </ul>	

Issues	Aquatic Ecology Experts	
	John Thorogood Comments	Michael Hallinan Comments
	<p>backs are generic guidelines and do not take into account the buffering features of the set-back (that may increased or decrease the set-backs capacity to buffer significant vegetation from impacting processes.</p> <ul style="list-style-type: none"> <li>The set-back from the proposed new road to the Evans River varies between approximately 35m to over 70m, and to mangroves varies between approximately 20m to 55m. From lot boundaries the minimum setback to the river is approximately 50m.</li> <li>Whilst the set-back afforded by the proposed development is less than that suggested by the guidelines, the limited functions required of the set-back to the river / mangroves, together with the buffering capacity of the set-back suggests that the set-back will achieve the objective of contributing to the conservation of 'key fish habitat'. The set-back is for the most-part comprised of dense and structurally complex terrestrial vegetation within the Crown Foreshore Reserve. As little as a few meters of this vegetation effectively attenuates the transmission of light and sound (obscuring human activity to landward from the river and trapping litter). Further, there is a steep scarp from the Crown Foreshore Reserve to HAT and mangrove habitat (below HAT). Both the mangroves and fauna associated with mangroves will be set-down below the level of the site. Stormwater is directed to treatment trains away from the river (so the set-back is not required to filter stormwater run-off). In conclusion, the proposed set-back will contribute to achieving the objective of conserving 'key fish habitat'.</li> </ul>	
<b>B3 - CONTENTIONS THAT THERE IS INSUFFICIENT INFORMATION TO ASSESS THE APPLICATION</b>		
<p>24) No assessment has been undertaken to determine whether the proposed' development will impact known or potential habitat for the Oxleyan Pygmy Perch. An assessment is required to determine if there will be indirect or direct impacts. Should such impacts be identified then an assessment of significance under the <i>Fisheries Management Act 1994</i> is required to be undertaken.</p>	<p><b>Oxleyan Pigmy Perch</b></p> <ul style="list-style-type: none"> <li>Suitably Qualified aquatic ecologists conducted a focused survey for Oxleyan pigmy perch of both the eastern and western waterways. No Oxleyan pigmy perch were recorded. Noting the lack of connectivity and the brackish nature of the water within the eastern drain, it is highly</li> </ul>	<p>Specific fish habitat matters are outside my area of expertise and are referred to other experts for comment.</p>

Issues	Aquatic Ecology Experts	
	John Thorogood Comments	Michael Hallinan Comments
	unlikely that the site has ever, or would ever, support Oxleyan pigmy perch.	



4.5 In relation to arboricultural matters, and with reference to the relevant SOFACS, the Arboriculture Experts agree that:

- a) In relation to Contentions:
  - i. **MH** states trees along the edges of the endangered littoral rainforest community have substantial conservation values and should be retained where possible.
  - ii. **MH** states Eucalypt trees on site have substantial conservation values and should be retained where possible.
  - iii. It is agreed by **JN** and **MH**, that additional information is required to enable an Arboricultural Impact Assessment and Tree Constraints Management Plan (AIA & TCMP) to be undertaken for the various areas such the property boundary along Iron Gates Drive and in the areas of Mangrove Street and Teak Street.

4.6 In relation to arboricultural matters, and with reference to the relevant SOFACS, the Arboriculture Experts remain in disagreement on the following matters, and **these matters should form the focus of the hearing**:

- a) **MH** notes that detailed tree impact assessment findings in relation to proposed demolition and construction should be provided at this stage for the endangered Littoral Rainforest, with trees required to be removed clearly indicated on tree removal plan drawings. **JN** has not commented on this matter.
- b) **MH** notes that tree identification details should be provided where known at this stage. **JN** has not commented on this matter.
- c) **MH** notes that details of all trees proposed to be removed are required within or directly adjacent to endangered Littoral Rainforest community edges and within the proposed 15m buffer. This includes wattle trees (*Acacia* spp.) which serve to buffer and protect TEC edges from damaging edge effects. **JN** has not commented on this matter.
- d) **MH** notes that to inform biodiversity impact assessments, revised arborist assessments are required for any new tree clearing requirements and new or changed tree impacts associated with revised engineering plans received on 23/04/24. **JN** has not commented on this matter.

Issues	Arboriculture Experts	
	Jason-jay Naylor Comments	Michael Hallinan Comments
<b>B1 - CONTENTIONS THAT THE APPLICATION BE REFUSED</b>		
<b>Biodiversity and Vegetation Clearance</b>		
<p>4) The proposed development is considered unacceptable pursuant to the provisions of s4.15(1)(a)(i) of the EP&amp;A Act as the proposal has failed to adequately demonstrate consistency with the matters required to be satisfied under clauses 6.6(4), 6.8(4) and 6.10(4) of RVLEP 2012</p> <p><u>Particulars</u></p>		
<p>a) It has not been adequately demonstrated that the proposal has been designed, sited or will be managed to firstly avoid, secondly to mitigate/minimise, and lastly to offset/compensate for significant adverse environmental impacts pursuant to Clause 6.6(4) of the RVLEP 2012 given:</p> <p>(iii) The inadequate ecological impact assessment information has been provided in relation to Koala habitat, Wallum Froglet (<i>Crinia tinnula</i>) habitat, Littoral Rainforest and fish habitat as follows:</p> <p>VIII. The preliminary findings of the arborist report do not adequately inform tree removal requirements in relation to core koala habitat, the endangered Littoral Rainforest trees, and Iron Gates Drive, road widening and associated roadway infrastructure including possible bridge replacement requirements. The report lacks supporting detailed information for the 171 trees included in the assessment including tree identification, Structural Root Zones, Tree Protection Zones and proposed Tree Protection Zone encroachments (e.g. from earthworks) in relation to proposed works.</p>	<p>I Jason-jay Naylor did not attend the joint site inspection on the 12<sup>th</sup> of April 2024 nor has a representative joint expert conclave occurred between myself and Michael Hallinan to date. Therefore, it should be noted and appreciated that just because I have not addressed every aspect of Michael Hallinan response jointly it should not be taken that I necessarily agree with the aspects I have not addressed.</p> <p>My review of the engineering drawings dated the 7<sup>th</sup> of June 2023 and updated engineering drawings dated the 12<sup>th</sup> of June 2023 concluded minor design changes have occurred in and around the various trees of critical interest with respect to the guidelines within Australian Standards AS4970-2009: Protection of Trees on Development Sites (AS4970-2009).</p> <p>A total of 171 trees were assessed with majority of the trees established around the perimeter of the proposed development based on my review of the updated engineering drawings dated the 12<sup>th</sup> of June 2023.</p> <p>Approximately 132 trees have no perceived bulk earth works or significant interferences within their respective Tree Protection Zones (TPZ's) based on my review of the updated engineering drawings dated 12<sup>th</sup> of June 2023.</p> <p>Approximately 39 trees have bulk earth works within their TPZ's.</p> <ul style="list-style-type: none"> <li>o 19 trees have minor TPZ encroachments which largely relates to fill placement.</li> <li>o 20 trees have major TPZ encroachments. However, trees #33, #112, #138 and #154 may require removal if the earth works are not modified or appropriate mitigation work methods adopted.</li> </ul>	<ul style="list-style-type: none"> <li>• As discussed during the joint site assessment (12/04/24)), for endangered Littoral Rainforest impact assessment purposes, tree removal requirements need to be adequately detailed for proposed earthworks associated with demolition and construction.</li> <li>• Tree removal plan drawing/s are required in relation to proposed removal of existing underground services and construction (e.g. installation of underground services, retaining walls, boardwalk, etc). Tree retention and tree removal should be nominated, and tree identification details provided where known.</li> <li>• Tree removal plan drawing/s should indicate all trees proposed to be removed within or directly adjacent to endangered Littoral Rainforest community edges and within the previously proposed 15m buffer. This includes wattle trees (<i>Acacia</i> spp.) which serve to buffer some exposed littoral rainforest edges and protect from damaging edge effects.</li> <li>• Tree removal requirements need to be detailed for the old sewer/water infrastructure outside the property in the areas of Mangrove Street and Teak Street. It is understood that this infrastructure would need to be replaced to service the proposed subdivision and bridge replacement may be required along Iron Gates Drive.</li> <li>• Refer to comments in Contention 19 in relation to Iron Gates Drive.</li> <li>• To inform biodiversity impact assessments, revised arborist assessments are currently required for any new tree clearing requirements and new or changed impacts from revised engineering plans received on 23/04/24.</li> </ul>

Issues	Arboriculture Experts	
	Jason-jay Naylor Comments	Michael Hallinan Comments
	<p>The TPZ encroachments can be mitigated through the development of work method statement/s, TPZ exclusion fencing and signage, site induction and awareness briefing and project Arborist supervision on a need by basis.</p> <p>Majority of the TPZ encroachments can be adequately offset given the subject trees are established around the proposed development area perimeter.</p> <p>The TPZ offsets are identified as a contiguous TPZ offset in accordance with AS4970-2009.</p> <p>Based on my review of the updated engineering drawings dated the 12<sup>th</sup> of June 2023, it appears the proposed development footprint is outside of the trees assessed Structural Root Zones (SRZ's). The SRZ is effectively an 'exclusion zone' for all activities and development, as it defines the area around the tree in which major structural (anchorage) root are likely to occur. Therefore, interference within the SRZ generally results in premature tree decline and/or compromised tree structure.</p> <p>The TPZ's and SRZ's have been calculated applying the matrix within AS4970-2009.</p> <p>The Treescience Arboriculture Report dated 21<sup>st</sup> of November 2023 was a preliminary review of the proposed development design based on my review of the earlier engineering drawings dated the 7<sup>th</sup> of June 2023. This preliminary assessment was unbiased and provided tree related information as a design tool to inform the proposed layout and identify any foreseen tree preservation requirements.</p> <p>The Treescience preliminary Arboriculture Report dated 21<sup>st</sup> of November 2023 concluded an arboricultural Impact Assessment and Tree Constraints Management Plan (AIA &amp; TCMP) was to be commissioned.</p> <p>This staged approach for tree preservation and management aligns to the guidelines outlined within AS4970-2009.</p> <p>The AIA &amp; TCMP will determine that the final layout designs have satisfactorily been considered in alliance with a construction methodology where works are proposed within a TPZ to ensure the development can be successfully achieved in accordance with AS4970-2009.</p>	

Issues	Arboriculture Experts	
	Jason-jay Naylor Comments	Michael Hallinan Comments
	<p>The development has been designed and positioned to avoid trees of critical interest.</p> <p>The proposed development design consistently attempts to avoid the trees around the project area perimeter to reduce potential conflicts while allowing suitable TPZ contiguous offsets where a TPZ is encroached.</p> <p>The TPZ encroachments in some instances can be managed or completely avoided to ensure the various trees of critical interest not only survive but thrive for years to come through the development of an AIA &amp; TCMP, along with work method statement/s, TPZ exclusion fencing and signage, site induction and awareness briefing and project Arborist supervision on a need by basis.</p> <p>The matters pertaining to ecology fall outside my area of expertise (arboriculture) and therefore it is assumed these matters will be addressed by the relevant expert/s.</p>	
<p><b>Impact on Threatened Species</b></p> <p>6) The proposal fails to demonstrate that proposed development will not have a significant adverse impact on threatened species, populations or ecological communities, or their habitats is considered unacceptable pursuant to the provisions of s5A (as in force at the time of lodgement of the development application) and the provisions of sections 1.3(e) and 4.15(a)(i) of the EP&amp;A Act.</p> <p><u>Particulars</u></p>		
<p>(a) See Particular 4(a)(iii) above.</p>	<p>This area is outside of my expertise (arboriculture).</p>	<p>Refer to comments above</p>
<p><b>Loss of Biodiversity</b></p> <p>10) The proposed development is considered unacceptable pursuant to the provisions of s4.15(1)(b) of the EP&amp;A Act as it has not been demonstrated that the proposal will not result in adverse impacts on the biodiversity values on the site.</p> <p><u>Particulars</u></p>		
<p>(a) Refr(sic.) Particular 4(a)(iii) above.</p>	<p>This area is outside of my expertise (arboriculture).</p>	<p>Refer to comments above</p>

## 5 SIGNATURES



Mr Adam McArthur  
08:57, 3<sup>rd</sup> May 2024



Dr John Thorogood  
08:40, 2<sup>nd</sup> May 2024



Mr Jason-jay Naylor  
12:21, 3<sup>rd</sup> May 2024



Mr Michael Hallinan  
09:00, 3<sup>rd</sup> May 2024

## **ATTACHMENT 1 - CVs**

## ADAM MCARTHUR

### DIRECTOR / PRINCIPAL ECOLOGIST

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#### Biography

Adam has over 20 years experience as an ecological consultant/environmental scientist throughout NSW and Qld and is an accredited assessor to apply the Biodiversity Assessment Methodology (BAM) in accordance with the requirements of the NSW *Biodiversity Conservation Regulation 2017* (Certification No.: BAAS18069).

In addition to aptitude in a broad environmental management role, he possesses expertise in wildlife biology and is also proficient in flora and fauna assessments and vegetation mapping. He has prepared baseline ecological surveys, impact assessments, rehabilitation plans, offset assessments/offset area management plans, bushfire assessments, due diligence investigations and threatened species management plans. He has completed environmental monitoring programs and compliance audits for numerous urban development, resource extraction and linear infrastructure projects.

Adam has managed teams of scientists, coordinated numerous ecological field surveys and authored/reviewed/approved countless technical reports.

Adam is proficient in the assessment of local government planning schemes, State and Commonwealth legislation, including the preparation of referrals under the EPBC Act, responses to Information Requests, and also the preparation of court evidence.

Adam's work has contributed to several major projects including:

- Altitude Aspire - prepared ecological assessment, vegetation and rehabilitation management plans including a *Macadamia tetraphylla* translocation plan and a Biodiversity Development Assessment Report (BDAR) as part of a Master Planned Residential Community at Tweed Heads, northern NSW.
- Altitude Central - prepared an ecological assessment including detailed flora and fauna surveys, and a Biodiversity Development Assessment Report (BDAR) as part of a Master Planned Development at Tweed Heads, northern NSW.
- Kings Forest - prepared ecological assessments, EPBC referrals, targeted flora and fauna surveys and various management plans for a 10,000 dwelling Master Planned Development near Kingscliff, northern NSW.
- Cobaki Estate - prepared ecological assessments, EPBC referrals, targeted flora and fauna surveys, and various management plans for a 5,500 dwelling Master Planned Development near Tweed Heads, northern NSW.

## **ADAM MCARTHUR**

### **DIRECTOR / PRINCIPAL ECOLOGIST**

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- Coolum Ridges - prepared ecological assessments and various management plans, and implemented a detailed monitoring program for threatened flora and fauna species for a 1,500 lot Master Planned Development on the Sunshine Coast, QLD.
- Peregian Springs - prepared and implemented a detailed monitoring program for threatened flora and fauna species for a 1,500 lot Master Planned Development on the Sunshine Coast, QLD.
- Pacific View Estate Residential Development - prepared ecological constraints assessments including targeted surveys for threatened flora and fauna species, and assisted in the identification, securing and preparation of management plans for potential vegetation offsets for a 340ha site on the Gold Coast, QLD.
- Flinders Grove - prepared ecological constraints assessments including targeted surveys for threatened flora and fauna species over a 4,000ha site within the Greater Flagstone Structure Plan Area, QLD.

### **Expertise**

- Flora Survey, Vegetation Mapping and Conservation Assessment
- Ecological Assessment Reporting/Impact Assessment
- Licensing and Approvals (State and Federal)
- Wildlife Ecology and Management
- Threatened Species Survey and Management
- Environmental Monitoring
- Offset Management Strategies

### **Education**

2002 Bachelor of Applied Science (Environmental Resource Management)  
Southern Cross University, Lismore NSW

### **Short Courses and Qualifications**

- Biocondition Assessment training - Determining equivalency in habitats (Queensland Herbarium)
- Regional Ecosystem training - Identification and classification of regional ecosystems in QLD and vegetation condition assessment (Queensland Herbarium)
- Advanced first aid certificate



## **ADAM MCARTHUR**

### **DIRECTOR / PRINCIPAL ECOLOGIST**

- 4x4 driving and recovery course
- Blue card (Course in General Safety Induction - Construction Industry)
- GIQ Coal Safety Induction - Standard 11 (Surface)
- Venomous snake handling
- Translocation of threatened plants
- Environmental Expert training course
- Chainsaw operations (Level 1)
- Occupational Health and Safety in the workplace
- Wildlife Rescue and Rehabilitation - Basic Training

### **Relevant Professional Experience**

July 2017 - Present	Director/Principal Ecologist JWA Pty Ltd
March 2015 - June 2017	Principal Ecologist/Qld Operations Manager JWA Pty Ltd
July 2014 - March 2015	Senior Environmental Scientist DFS Group
March 2014 - June 2014	Environmental Advisor (Contract) Northern Stevedoring Services
May 2012 - March 2014	Senior Environmental Scientist RPS Group
Sept 2007 - April 2012	Senior Environmental Scientist James Warren & Associates
July 2004 - August 2007	Environmental Scientist James Warren & Associates

### **Professional Memberships**

Member of the Ecological Society of Australia (MESA)

# CERTIFICATE OF ACCREDITATION AS A BIODIVERSITY ASSESSMENT METHOD ASSESSOR under the *Biodiversity Conservation Act 2016* (NSW)

<b>BAM Assessor</b>		
Adam Michael McArthur		
<b>Accreditation number</b>	<b>Accreditation date (Date of issue)</b>	<b>Expiry Date of</b>
BAAS18069	4 April 2022	4 April 2025

The person named above is accredited under section 6.10 of the *Biodiversity Conservation Act 2016* (NSW) (**BC Act**) as a Biodiversity Assessment Method Assessor to apply the Biodiversity Assessment Method in connection with the preparation of biodiversity stewardship site assessment reports, biodiversity development assessment reports and biodiversity certification assessment reports pursuant to Part 6 of the BC Act.

The accreditation is in force until and including the Expiry Date. The accreditation is subject to the conditions set out in the *Accreditation Scheme for the Application of the Biodiversity Assessment Method*, under the BC Act, and the conditions specified on the reverse of this certificate.



**TIMOTHY SIDES**

Senior Team Leader, Biodiversity Offset Program Accreditation and Training  
Department of Planning & Environment

**NOTES**

- DPE maintains a register of Accredited Biodiversity Assessment Method (BAM) Assessors accessible from the DPE website.
- The BAM Assessor’s accreditation expires on the Expiry Date unless renewed in accordance with the *Accreditation Scheme for the Application of the Biodiversity Assessment Method*. It is the BAM Assessor’s responsibility to monitor the Expiry Date of their accreditation, and apply for any renewal with sufficient time for the application to be processed prior to the Expiry Date.
- Words and expressions used in this accreditation instrument and which are also used in the Act have the same meaning.





# Southern Cross University

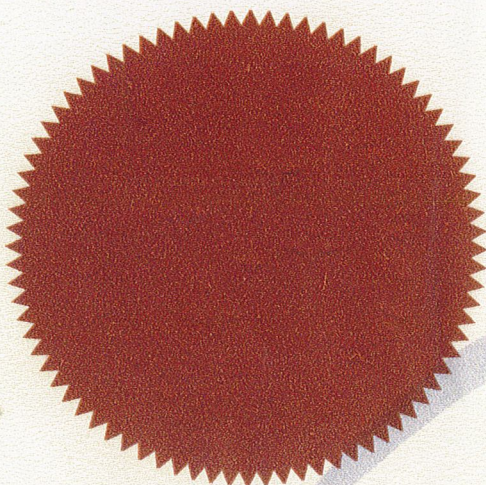
*Adam Michael McArthur*

*having fulfilled the conditions prescribed by  
the University is this day admitted to the degree of*

## Bachelor of Applied Science

*Given under the Common Seal of  
Southern Cross University on the*

*11th April, 2003*



*John Dowling*  
Chancellor

*John A. Dickard*  
Vice-Chancellor

*M. Washell*  
Council Secretary



Dr John Thorogood has over 30 years of 'hands on' experience as one of the industry's most highly respected aquatic ecologists. John has specialist skills in strategic planning and environmental approvals, in assessment, management and monitoring of aquatic ecosystems, fisheries science and aquaculture. His hallmark is the identification of key issues and the delivery of practical advice based on a sound appreciation of the project's overall objectives and constraints.

John has undertaken a diverse variety of projects relating to major transport, power and water / wastewater infrastructure, resources, defence, urban, industrial, tourism and agricultural development and climate change adaptation, spanning all Australian states and territories, Asia, the Pacific and Middle East.

Whilst continuing to enjoy a 'hands-on' approach to consulting practice, John is increasingly sought for his insight, strategic advice, and approvals-related expertise.

He holds a suite of practical qualifications, from commercial marine and diving tickets to electrofishing and drone operations.

## Education

- B.Sc, University of Sydney (1981)
- M.Sc, (Fisheries Biology), University of Sydney (1984)
- PhD, University of Queensland (1991)

## Key Experience\*\*

### Environmental Assessment, Monitoring & Management

Over 3 decades, designed and led the implementation of studies aimed at assessing environmental values and ecosystem health; and predicting, mitigating and monitoring environmental impact.

### Water & Sediment Quality

Over 3 decades of experience designing and implementing rigorous, focused and cost-effective sampling and analysis programs for government, the resources and development industries.

### Marine and Estuarine Ecosystems

John has contributed to the development of ports and marinas, sub-sea cable networks, designed and implemented outfall monitoring programs and assessed the impacts of coastal development, tourism, maritime activity, dredging programs, beach nourishment and commercial fishing.

### Freshwater Ecosystems

John has supported local government, and the resources, development, and tourism industries through the applied understanding of freshwater ecosystems. Supported the development of river operations plans, guided the operations of hydro-electric plants and the design of fish passage, and developed focused, robust, and cost-effective ecosystem health monitoring programs based on macro-invertebrate, macrophyte and fish communities.

### Mosquito & Biting Midge Assessment & Management

John has supported local government, and the resources, development, and tourism industries through the applied understanding of freshwater ecosystems. Supported the development of river operations plans, guided the operations of hydro-electric plants and the design of fish passage, and developed focused, robust and cost-effective ecosystem health monitoring programs based on macro-invertebrate, macrophyte and fish communities.

## Memberships and Associations

- Fellow, Environmental Institute of Australia and New Zealand
- Fellow, Australian Institute of Biology
- Graduate, Australian Institute of Company Directors
- Member, Queensland Environmental Law Association
- Member, Australian Coral Reef Society

## Additional Training / Field Qualifications

- USL Coxswains (trading) - unrestricted
- ADAS Commercial SCUBA
- Construction Industry White Card
- 1<sup>st</sup> Aid and Advanced Resuscitation

## CURRICULUM VITAE

### PERSONAL PROFILE

**Given names:** Jason-jay

**Surname:** Naylor (formally Fletcher \*2 & McLwain \*1)

**Country of Birth:** Australia

**Nationality:** Indigenous Australian

**Languages:** English

### EDUCATION

**2020:** Melbourne University external/part-time - Graduate Certificate-Bushfire Planning and Management (AQF Level 8) where I achieved passes in all subjects studied.

**2016-2017:** East Coast Tafe external/part time – (upgraded qualifications) Diploma in Arboriculture (AQF Level 5) where I achieved passes in all subjects studied.

**2012 - 2013:** Melbourne University external/part-time - Graduate Certificate in Arboriculture (AQF level 8) where I achieved passes in all subjects studied.

**2006 - 2010:** University of Queensland external/part-time Post-Graduate Masters in Natural Resources (Urban Forest Principals) (AQF level 9) where I achieved passes in all subjects studied.

**2009:** Southern Cross University and Soil Food Web Institute (interactions and benefits of plant production) where I achieved passes in all subjects studied and was Awarded Senior Biological Advisor Role.

**2000 - 2002:** College of Applied Science external/part-time - Diploma in Arboriculture (AQF Level 5) where I achieved passes in all subjects studied.

**2000:** Melbourne University Certificate in Arboricultural Consulting external/part-time - where I achieved passes in all subjects studied.

**1997 - 1999:** Melbourne University Advance Certificate in Arboriculture external/part-time - where I achieved passes in all subjects studied.

### CERTIFICATIONS *(renewals pending)*

**2014:** Obtained Tree Risk Assessment Qualifications (TRAQ) by the International Society of Arboriculture.

**2010:** Qualified Tree Risk Assessment (QTRA) by Qualified Tree Risk Assessment Ltd.

**2005:** Certified Arborist AU0026 by the International Society of Arboriculture

### PRACTICAL EXPERIENCE

I have been working and studying within all fields of arboriculture since 1995 <sup>1</sup>- utility arboricultural, <sup>2</sup>-urban arboricultural, <sup>3</sup> Municipal arboricultural followed by <sup>4</sup>- research, <sup>5</sup>- technical advisory, and <sup>6</sup>- industry expert.

**2012 to present:** Director/Head Researcher: Scar Edge Consulting Pty Ltd.

**2010 to present:** Director/Principal Arboricultural Scientist: Treescience Pty Ltd

**2003 - 2010:** Senior Arboricultural Scientist: Brisbane City Council

**2001 - 2003:** Treescience sub-contracted directly Top End Tree Surgery Pty Ltd and other companies such as Johns Electrical as technical expert, estimator, and project manager for delivery of their various Energex powerline contracts.

**1998 - 2000:** Works manager, lead climbing arborist, company consulting arborist and industry trainer: Treescap Professional Tree Services Pty Ltd

**1995 - 1998:** Crew Leader/lead climbing company Arborist: Arbor Co Pty Ltd

**1996 - 1995:** EWP operator and tree climber around powerlines: Smokey Flats Tree Company Pty Ltd

## RESEARCH

- 2015 - 2022:** Investigating the soil management strategies for the release of *Trichoderma* within urban microflora and undertake baiting trails in conjunction with Brisbane City Council, Southern Cross University and Soilfood Wed.
- 2008 - 2009:** Investigate the use of *Trichoderma* as a natural antagonist to eliminate or control the following four key funguses (*Phellinus noxius*, *Phellinus robusta*, *Ganoderma applanatum* and *Ganoderma australis* in conjunction with Professor F.W.M.R Schwarze, Brisbane City Council and ENSPEC).
- 2009:** Bunya pine nut fruit distribution and predicted cycles for proactive risk management in conjunction with Toowoomba Regional Council and Brisbane City Council.
- 2008:** Leopard tree seed dispersal and mitigation management strategies for inner City environments in conjunction with Brisbane City Council.
- 2008:** 2,4-D for the control of mistletoe in park and street trees in conjunction with Brisbane City Council, Gold Coast City Council, Moreton Bay Regional Council and Fraser Coast Council.
- 2008 - 2009:** Determining the appropriate tree root crown investigation methodology using a Resistograph and Refractor meter for tree's infected with *Ganoderma* species and *Phellinus noxius* in conjunction with Tree Test Australia and IML.
- 2007 - 2009:** Determining the reasons behind sudden tree failures within New Farm Park in conjunction with DPI&F, Brisbane City Council and SE Qld Tree Managers Forum
- 2006:** Water saving trials using Hydro-cell and Terra Cottem in a nursery environment in conjunction with Ibrox Nursery, Hydro-cell, Terra Cottem and Brisbane City Council.
- 2005:** Benefits and methods for harvesting road water using Atlanis configuration for significant landscape trees during drought in conjunction with Brisbane City Council.
- 2003 - 2009:** Research partner with DPI&F and Qld Forestry for *Phellinus noxius*.

## TECHNICAL FIELD STUDIES

- 2017 - 2020:** Measuring the photosynthetic capacity of trees along with correlations with soil microbiology/soil carbon properties for trees prior and after development in conjunction with Matt Daniels and Swinburne University of Technology.
- 2008 - 2014:** Benefits of beneficial fungi in an urban tree soil environment with the present *Phellinus noxius* influences in conjunction with Soil Food Web.
- 2011 - 2013:** Heat Island effect and canopy cover within the Gold Coast City in conjunction with Gold Coast City Council.
- 2011 - 2013:** Investigating the benefits of fungal compost for acid sulfate soils treatment for early tree establishment in conjunction with the Gold Coast City Council.
- 2007 - 2009:** Lateral root initiation with the introduction of hydro-cell for Roma Street parkland in consultation with Roma Street Park Land, Hydro Cell, Qld Tree Mangers Forum, and Brisbane City Council.
- 2006 - 2009:** Determining the indigenous weather patterns using native species to identify the beneficial periods to prune street trees with Brisbane City in consultation with various indigenous mobs.

## PRESENTATIONS

- 2021:** Queensland Arboricultural Associated – industry report writing course
- 2009, 2011 and 2013:** Channel 7 news – discussing tree failures patterns based on the storm events.
- 2009:** Southern Cross University - benefits of soil micro-organisms within an urban environment.
- 2008:** Tree Managers Forum Qld - November 2008 Storm event.
- 2008:** ISA Inaugural Asian Pacific Conference - loss of urban tree heritage due to decline and mortality associated with aggressive root and butt root fungi (*Phellinus noxius* and *Ganoderma* species).
- 2007, 2008 & 2009:** Tree Managers Forum Qld and SECROC - wood degradation rates and methodologies applied for New Farm Park tree failures.
- 2004 - 2007:** Brisbane City Council 'Wipe out Weeds and Green Day' –urban arboricultural management principles applied for newly planted and early maturing trees.

**2002-2003:** Bay FM – ‘talking trees with Jay’ (weekly segment on radio).

**2002:** Redland City Council, Green & Grow Expo - tree care & management of trees in urban green spaces.

**2001 - 2002:** Channel 9 – TV program ‘Y’ (children’s science program/daily) guest appearance with host Joseph May on several occasions for all questions pertaining to trees.

**2002:** Channel 9 - Brisbane Extra - Trees and Storm Hazards.

**2001:** Channel 9 - Brisbane Extra - Stop Before You Lop.

**1999:** Various Local Government Entities within Melbourne - Elm Leaf Beetle control.

#### **PUBLISHED PAPERS**

**2007:** Author of various media releases pertaining to veteran trees & water harvesting strategies.

**2006:** Author media release on saving grand old trees and holistic management.

**2002:** Author of Quality Assurance manual for the arboricultural industry.

#### **POLICIES/GUIDELINES AND STRATEGIC MANAGEMENT PLAN**

**2023:** Corporate Tree Risk Policy and Tree Management Guidelines for Fraser Coast Council.

**2021 - 2023:** Veteran Tree Management plan for Toowoomba Regional Council.

**2016:** Strategic Risk Management for the urban forest for Gold Coast City Council.

**2015:** Phellinus noxius guidelines for Sunshine Coast Council.

**2014:** Tree Management Procedure for Sunshine Coast Council and individual Tree Risk Rating Methodology for Urban Trees

**2013:** Management of Trees on Council Controlled Land policy for Gold Coast City Council

**2011:** Individual Tree Risk Rating Methodology for Urban Trees for Brisbane City Council, Gold Coast City Council and Sunshine Coast Council.

**2007:** Memorandum of Understanding (MoU) between Energex and Local Government Municipality for SE Qld Tree Managers Forum

#### **TRAINING:**

**2007 to present:** Dispelling the myths’ – 12-week tree training course for local government departments.

**2000 to present:** Various tree climbing courses from general to advance in local government and private sector.

#### **PROFESSIONAL AFFILIATIONS/QUALIFIED MEMBERSHIPS**

- Queensland Arboricultural Association
- International Society of Arboriculture

#### **CRITICAL INFRASTRUCTURE PROJECTS** in a technical field capacity.

- Coomera Connection (2023 – ongoing) - \$2.15 billion
- Brisbane Metro project (2020 – ongoing) - \$1.25 billion
- Brisbane Cross River Rail project (2019-ongoing) – \$5.4 billion
- Coomera to Helensvale Duplication JV project (2022 – ongoing) – \$163 million
- ICB Upgrade project (2017) – \$80 million
- Minnippi (2016 – ongoing)
- Ripley Valley (2016 – ongoing)
- Yarrabilba (2015 – ongoing)
- Legacy Way JV project (2010-2015) - \$2.4 billion

#### **LARGE INFRASTRUCTURE GROUPS** in a technical field capacity

- Acciona
- APA Group
- BMD
- QUU
- Hutchinson Builders
- McNab



**LOCAL and STATE GOVERNMENT** in a technical field capacity

- Queensland State Government
- QBuild
- NSW State Government
- AMU
- Brisbane City Council
- Gold Coast City Council
- Sunshine Coast City Council
- Moreton Bay Regional Council
- Toowoomba Regional Council
- Fraser Coast Council

**PROFESSIONAL COMMITTEE PANEL MEMBER**

**2021:** Expert panel member for Qld Climate Adaptive Homes Actions Research Project for Qld Government and Suncorp Insurance.

**2007 to 2008:** Arboricultural Australia – Technical Advisor for annual conference proceedings for delivery content and relevance.

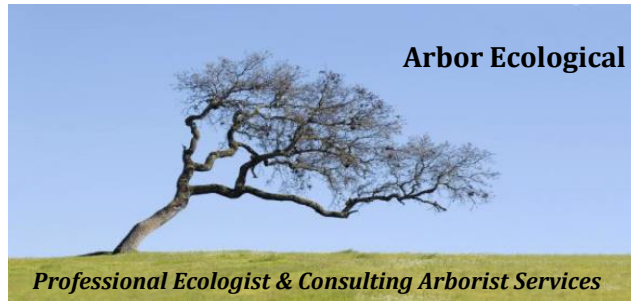
**2003 to 2009:** SE Qld Tree Managers Forum – Technical Advisor.

**FURTHER EDUCATION**

I further certify that I am a registered active professional member of the Queensland Arboricultural Association (#1481) where I am registered as an approved tree consultant. I further demonstrated commitment to ongoing professional development through regular attendance and participation in arboriculture and other related conferences or seminars within Australia, New Zealand and Southeast Asia with the relevant peak industry bodies.

**LEGAL REPRESENTATION**

I have been involved in Arboriculture since 1995, being an expert witness in the field of Arboriculture for the Supreme Courts of Australia, Magistrates Courts of Australia, for the Planning and Environmental Courts of Australia, NCAT (New South Wales) and QCAT (Queensland). Additionally, I commonly perform expert duties for WH&S where I review fatalities and provide expert evidence for inclusion in coroner's reports.



## Curriculum Vitae

### Michael Hallinan - Principal Ecologist & Arborist - ArborEcological Pty Ltd

#### Qualifications

- **Bachelor of Applied Science** (major in Environmental Resource Management). Completed in 1998 at Southern Cross University, Lismore NSW
- **Diploma of Arboriculture**. Completed in 2013 at TAFE NSW, Wollongbar
- **Associate Diploma in Horticulture**. Completed in 1982 at Hawkesbury Agricultural College, Richmond NSW (now the University of Western Sydney)

**Scientific Licence:** SL100965 - Ecological survey and consultancy, Part 2 Biodiversity Conservation Act 2016

**Biodiversity Assessment Method (BAM) Accredited Assessor: BAAS21025,**  
Department of Planning and Environment

#### Certificates:

- WorkCover Construction Induction Training (OH&S White Card), Card No. CGI1423170SEQ01
- Partnering with Aboriginal Communities, North Coast Institute of TAFE
- Bushfire Planning and Assessment for Local Government Officers, NSW Rural Fire Service
- Environmental Education for Local Government Officers, NSW Stormwater Trust, Grafton

#### Ecological Project Experience

- Environmental impact assessment
- Flora & fauna survey
- Vegetation Management Plans (VMPs)
- Pre-clearing ecological survey
- Ecologist monitoring/ fauna spotter catcher services
- Threatened species management
- Koala Plans of Management (KPoMs)
- Environmental condition monitoring
- Review of Environmental Factors (REFs)
- GIS mapping.

## **Arboricultural Project Experience**

- Arborist tree assessments and reporting including:
  - Development impact assessment and tree protection plans
  - Tree health and condition assessment and monitoring
  - Tree risk and hazard assessment
  - Pest & disease diagnosis & treatment
  - Tree survey

I have over twenty-five years of ecologist workplace experience including development assessment, management planning and reporting. Recent works are outlined as follows:

## **Ecological Assessments and Reporting since 2022**

- Threatened Species Test of Significance for the Koala (*Phascolarctos cinereus*) and Vegetation Management Plan (VMP) preparation, proposed residential subdivision of lot 4 DP 406893, 658 Ballina Road, Goonellabah NSW, Land and Environment Court Case number 2021/00044443, Case title Graham Peter Meineke trading as GM Project Development and Management v Lismore City Council, Praedium Partnership.
- Baseline Ecological Assessment and Report, Residential Development, 90 Patemans Road, Ashby NSW, Catherine Connors.
- Koala Habitat Impact Assessment and Report, Infill Single Residential Development, Lot 2 DP 709351 Chinamans Lane Bagotville NSW, James Laird
- Ecological Impact Assessment and Report, Vegetation Clearing for Rural Production, 90 Manifold Road, North Casino NSW, Forest Enterprises Development and Consulting Pty Ltd.
- Ecological Impact Assessment Report, Multiple Occupancy Development, Lot 12 DP 852320, 189 Federal Drive Federal NSW, Wentworth Point Investments and Barker Ryan Stewart Northern Rivers.
- Ecological Impact Assessment Report, Crown Road Development, 217 Goonengerry Mill Road, Goonengerry NSW, Silvia Pestalozzi and Barker Ryan Stewart Northern Rivers.
- Preliminary ecological constraints assessment and report, vegetation clearing under LLS provisions, 2981 Kyogle Road Kunghur NSW, Tweed Rural Pty Ltd.
- In-preparation of numerous Reviews of Environmental Factors (REFs) for bridge replacement and construction, Kyogle Shire Council.
- Ecological Impact Assessment Report, Residential Subdivision Development, 128 Donnans Road, Lismore Heights NSW, Barker Ryan Stewart Northern Rivers.
- Ecological Impact Assessment Report, Animal Rehoming Facility Development, 92 - 102 Lunderg Drive, South Murwillumbah, BKA Architecture.
- Ecological Impact Assessment and Report, Avalon Estate Subdivision Stages 6a and 6b, Lot 129 DP 1276352 and Lot 43 DP 1242246, Rifle Range Road and 22 Scarlett Court Wollongbar NSW, Colin Brown.
- Ecological constraints assessment, proposed subdivision, 18-30 Kerry Street, Maclean NSW, Luxeland Development Pty Ltd and Barker Ryan Stewart Northern Rivers.
- Review of Environmental Factors (REF), HW16 Piora Stockpile Spoil Consolidation Site, Adjacent to Bruxner Highway, 900m east of Bulmers Road, Piora NSW Transport for New South Wales.
- Ecological monitoring and clearing assessments and reporting, Dunloe Sand Quarry, Pottsville NSW, Holcim Australia.

- Ecological monitoring and clearing assessments and reporting, Holcim Rock Quarry, Teven NSW, Holcim Australia.
- Ecological Impact Assessment Report, Restaurant and Associated Infrastructure Development, 103 Yagers Lane Skinners Shoot NSW, G. Norman C/o Rosalie Stollery Architects Pty Ltd.
- Ecological Impact Assessment Report, Land Subdivision Development, 6 to 20 Fitzroy Street Wardell, Lots 2 3 4 and 5 Section10 DP759050, Le Mottee Group.
- Ecological Impact Assessment Report, Land Rezoning and Subdivision Development, 15 Owens Crescent and 2 and 14 Dulcet Lane Alstonville, Lot 6 DP 258150; Lot 1 DP 738412; and Lots 11 and 13 DP 1059499, Wayne Porter.
- Numerous ecologist pre-clearing assessments and monitoring of clearing works.

### **Arboricultural Assessments and Reporting since 2022**

- Arboricultural Impact Assessment Report, Residential and Commercial Development, 9-13 Clifford Street Suffolk Park NSW, Land and Environment Court Case number 2022/00269686, Case title Denwol Suffolk Pty Ltd Byron Shire Council.
- Arboricultural Tree Health and Condition Assessment Report, Alstonville Community Preschool, 1A Freeborn Place Alstonville NSW.
- Arboricultural Impact Assessment Report, Seniors housing development NSW Land & Housing Corporation, 3 Cooke Avenue & 1, 3 and 5 Deegan Drive, Alstonville, DTA Architects.
- Arboricultural Impact Assessment Report, Flood Relief Village, Burnet Street Ballina NSW, John Holland Pty Ltd
- Arboricultural Impact Assessment Report, Proposed development, 7 Leslie Street Bangalow NSW, Michael Fahey.
- Arboricultural Impact Assessment Report, Child Care Centre Development, 42 Colches Street Casino NSW, GM Project Development and Management.
- Arboricultural Impact Assessment Report, 34-36 Light Street & 42 Walker Street & 64-70 Stapleton Avenue Casino, NSW Land & Housing Corporation NSW, Brewster Murray.
- Preliminary Arboricultural Impact Assessment Report, Flood Relief Coraki Project, 5 Spring Street Coraki NSW, Lipman Pty Ltd.
- Arboricultural Impact Assessment Report, Proposed development, 3 Brighton St East Ballina NSW, Parras Hospitality Pty Ltd c/o Luchetti Krelle P/L.
- Arboricultural Impact Assessment Report, Telecommunication Facility Installation, 6 Industry Drive East Lismore NSW, Catalyst One Pty Ltd
- Tree Removal and Tree Protection Plan, Platypus Park, 805 & 811 Ballina Road Goonellabah NSW, Northern Rivers Land Solutions.
- Project Arborist, Kingscliff High School and Kingscliff Public School redevelopment projects, Richard Crookes Construction.
- Arboricultural Tree Health and Condition Assessment Report, Kyogle Gardens Caravan Park, Kyogle NSW, Kyogle Council.
- Arboricultural Impact Assessment Report, Land Subdivision Development, 160 North Creek Road Lennox Head NSW, Ardill Payne & Partners.
- Arboricultural Impact Assessment Report, Residential Development, 11 Airforce Road, East Lismore NSW, Mothers Group Australia Pty Ltd
- Arboricultural Impact Assessment Report, Ballina Road and Molesworth Street Intersection Upgrade, Lismore NSW, Civil Consulting & Highway Design.
- Arboricultural Assessment Report, 23 Richmond Street, Wardell NSW, Dr John Jarzynski

- Bushfire affected roadside hazard tree assessment, New England Highway, Tenterfield NSW, Transport for NSW.

## **Employment history**

**Employment period:** 2013 to 2014.

**Position:** Ecologist

**Client:** Byron Shire Council

**Duties:**

- Development Application assessment condition recommendations including review of flora & fauna management plans, threatened species assessments, Vegetation Management Plans (VMPs) and bushfire assessment reports.
- Hollow-bearing tree and threatened species assessments on Council-managed land.
- High Conservation Value roadside vegetation assessments with bush regenerators.
- Tree removal assessments including offset/ compensatory plantings;

**Employment period:** 2008 to 2010

**Position:** Catchment Officer – Native Vegetation.

**Employer:** Northern Rivers Catchment Management Authority, Alstonville office.

**Duties:**

- Assess property vegetation type; composition; structure; condition; threats; rehabilitation requirements; priority works; and conservation values including threatened species, EECs, wildlife habitats and corridor values.
- Prepare with landholders Property Vegetation Plans and site action plans.

**Employment period:** 2004 to 2007.

**Position:** Ecologist.

**Employer:** Lismore City Council.

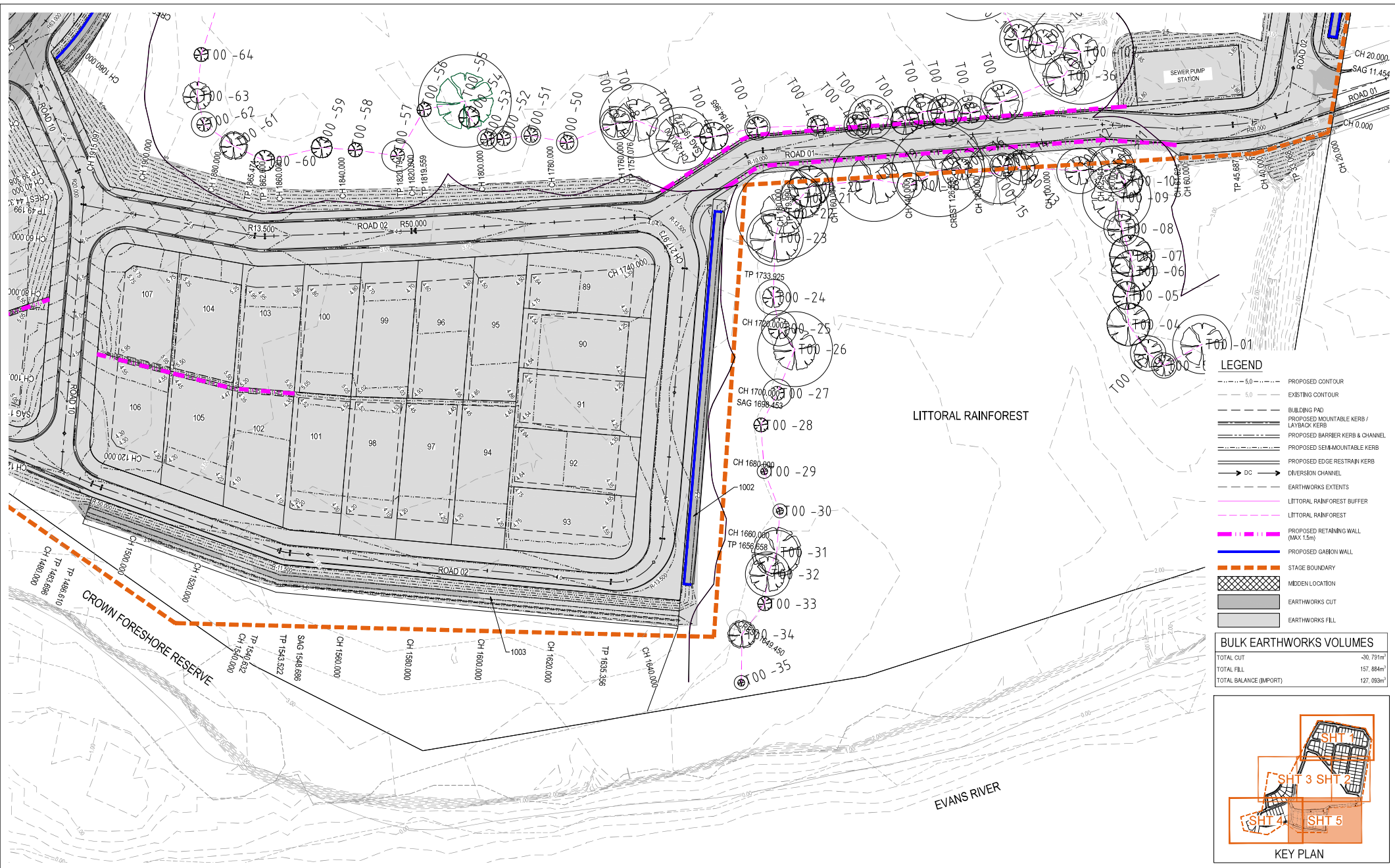
**Duties:**

- Development Application assessment and condition recommendations including review of flora & fauna management plans, threatened species assessments, Vegetation Management Plans (VMPs), Review of Environmental Factors (REFs), bushfire assessment reports & landscape plans.
- Prepare reports including threatened species assessments and REFs for proposed Council developments in Koala and other threatened species habitats.
- Coordinate contract bush regenerators and Green Corps teams of volunteer youths working on rehabilitation projects.

## **Contract Work**

- Boyds Bay Environmental Services - Fauna trapping and survey works.
- Various threatened species and EEC assessments and reporting, Cumberland Ecology and Greenloaning Biostudies.
- Various threatened species and EEC assessments and reporting, Geolink.
- Various vegetation impact assessments and reporting, David Fell Environmental.

## **ATTACHMENT 2 - EARTHWORKS BETWEEN LITTORAL RAINFOREST PATCHES SHOWING TPZs**

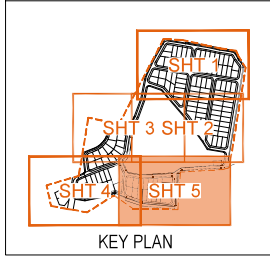


**LEGEND**

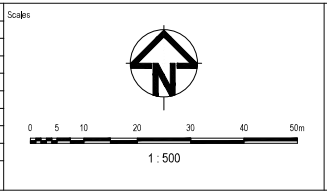
- 5.0 --- PROPOSED CONTOUR
- 5.0 --- EXISTING CONTOUR
- BUILDING PAD
- PROPOSED MOUNTABLE KERB / LAYBACK KERB
- PROPOSED BARRIER KERB & CHANNEL
- PROPOSED SEMI-MOUNTABLE KERB
- PROPOSED EDGE RESTRAIN KERB
- DC --- DIVERSION CHANNEL
- EARTHWORKS EXTENTS
- LITTORAL RAINFOREST BUFFER
- LITTORAL RAINFOREST
- PROPOSED RETAINING WALL (MAX 1.5m)
- PROPOSED GABION WALL
- STAGE BOUNDARY
- MIDDEN LOCATION
- EARTHWORKS CUT
- EARTHWORKS FILL

**BULK EARTHWORKS VOLUMES**

TOTAL CUT	-30,791m <sup>3</sup>
TOTAL FILL	157,884m <sup>3</sup>
TOTAL BALANCE (IMPORT)	127,093m <sup>3</sup>



Issue	Description	DR	CH	VE	Date
03	AMENDED P/L DESIGN	GP	LP	LP	02.04.24
02	AMENDED LAYOUT DESIGN	HP	LP	LP	10.11.23
01	ORIGINAL ISSUE	JS	LP	LP	12.06.23



Surveyor  
**ROBERT A HARRIES SURVEYOR**

Client  
**GOLDCORAL PTY LTD**

Status: **FOR APPROVAL**

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Original Issue Signatures	Original Size	<b>A1</b>
Drawn: J. SANTOS	Height	AHD
Designed: MA, STA, CRUZ	Grid	GDA94
Project Manager: L. PRIZEMAN		
Verified: L. PRIZEMAN		

Project: **RESIDENTIAL DEVELOPMENT LOT 277 IRON GATES ROAD EVANS HEAD**

**BULK EARTHWORKS CUT AND FILL PLAN SHEET 5**

**ARCADIS**

Arcadis Australia Pacific Pty Limited  
Level 16, 500 George Street  
SYDNEY NSW 2000  
ABN 76 104 465 289  
Tel No: +61 2 8007 8000  
www.arcadis.com.au

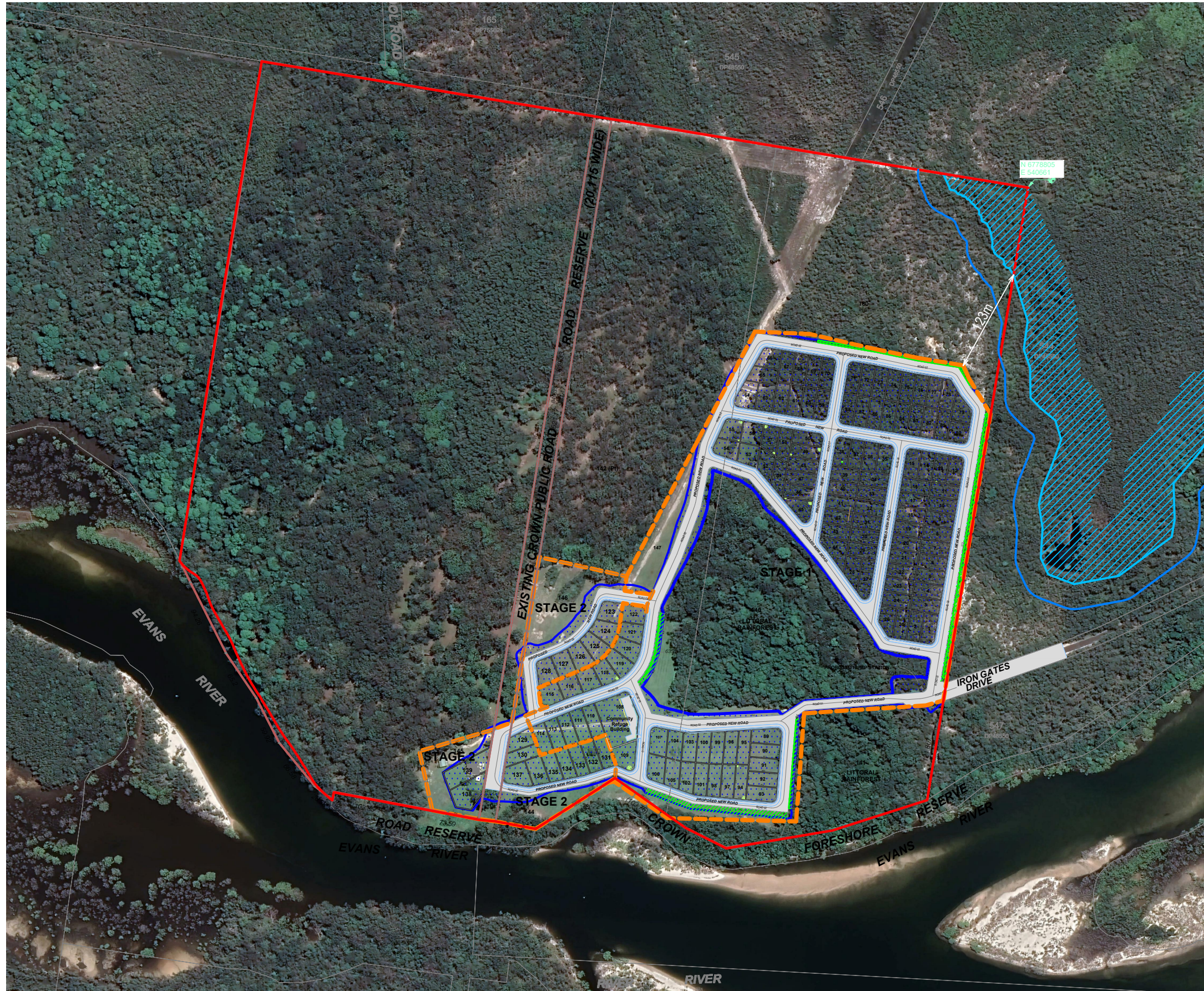
Project Number: **30180356**

Issue: **03**

Drawing No: **IRG-AAP-DA-00-DRG-CV-0105**

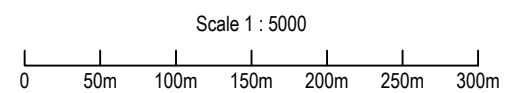
## **ATTACHMENT 3 - REVISED WETLAND MAPPING (JWA 2024)**





**LEGEND**

- Subject Site
- Proposed Development Layout**
- Impact Area
- Lot Boundary
- Stage Boundary
- Drainage Reserve
- Rehabilitation Areas**
- Revised SEPP 14 Coastal Wetland
- 30m Buffer to Revised SEPP 14 Coastal Wetlands



SOURCE: JWA Site Investigations 2023;  
Arcadis (Ref: 22-070 - SITE PLAN 1-2500 - TRUE NORTH.dwg)

SCALE: 1 : 5000 @ A3

*JWA PTY LTD*  
Ecological Consultants

CLIENT  
Goldcoral Pty Ltd  
PROJECT  
Joint Expert Report  
Iron Gates Residential Development  
Iron Gates Drive, Evans Head NSW  
Richmond Valley Council LGA

ATTACHMENT 5

PREPARED: BW  
DATE: 15 April 2024  
FILE: N16006\_JER\_20240415.dwg

TITLE

REVISED  
WETLAND MAPPING



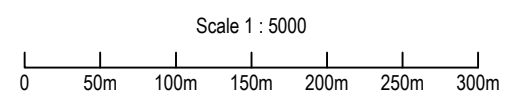
## **ATTACHMENT 4 - PHOTO POINTS (SOURCE: SLR CONSULTING)**





**LEGEND**

- Photo Point
- Water Quality Sampling Point
- Subject Site



SOURCE: FRC Site Investigations 2024;  
Google Earth Aerial dated 02/02/23

SCALE: 1 : 5000 @ A3

**JWA PTY LTD**  
Ecological Consultants

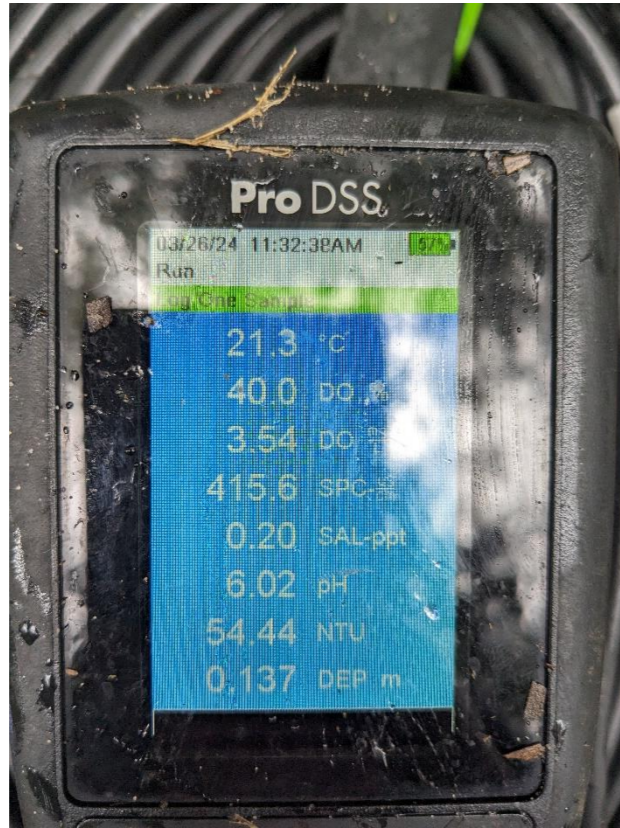
CLIENT  
Goldcoral Pty Ltd  
PROJECT  
Joint Expert Report  
Iron Gates Residential Development  
Iron Gates Drive, Evans Head NSW  
Richmond Valley Council LGA

**ATTACHMENT 2**

PREPARED: BW  
DATE: 15 April 2024  
FILE: N16006\_JER\_20240415.dwg

TITLE  
**PHOTO POINTS &  
WATER QUALITY  
SAMPLING LOCTIONS**

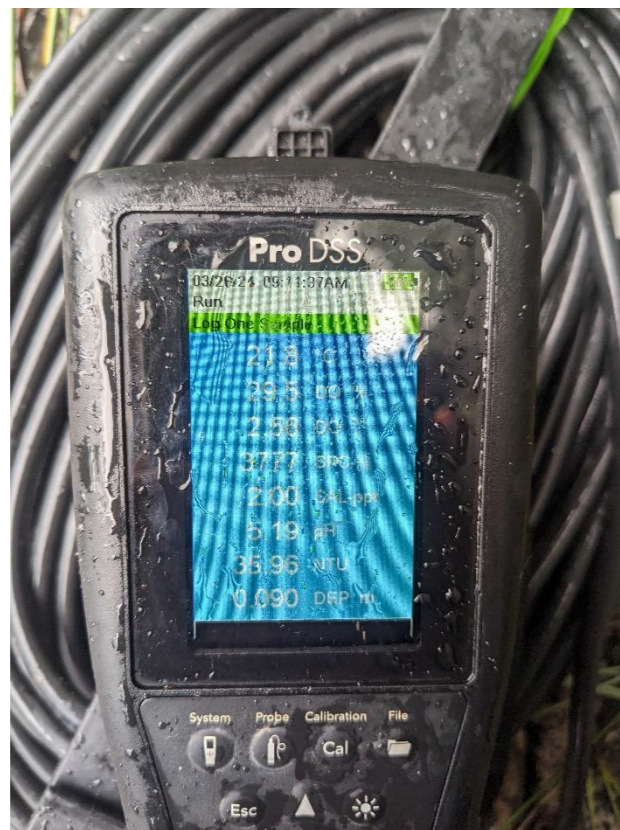




WQ1



WQ2



WQ3



WQ4





WQ5



WQ6



WQ7



PP1





PP2



PP3



PP4



PP5





PP6



PP7



PP8



PP9





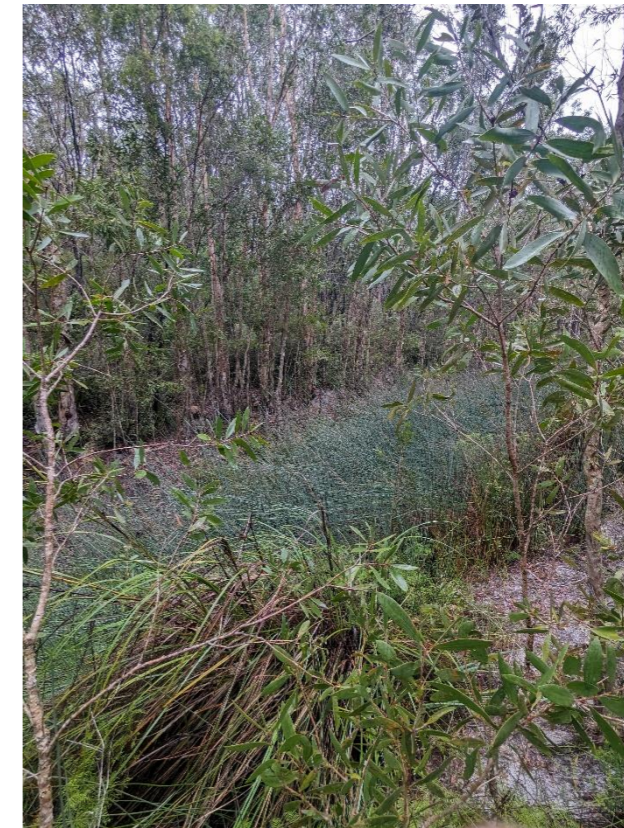
PP10



PP11



PP12



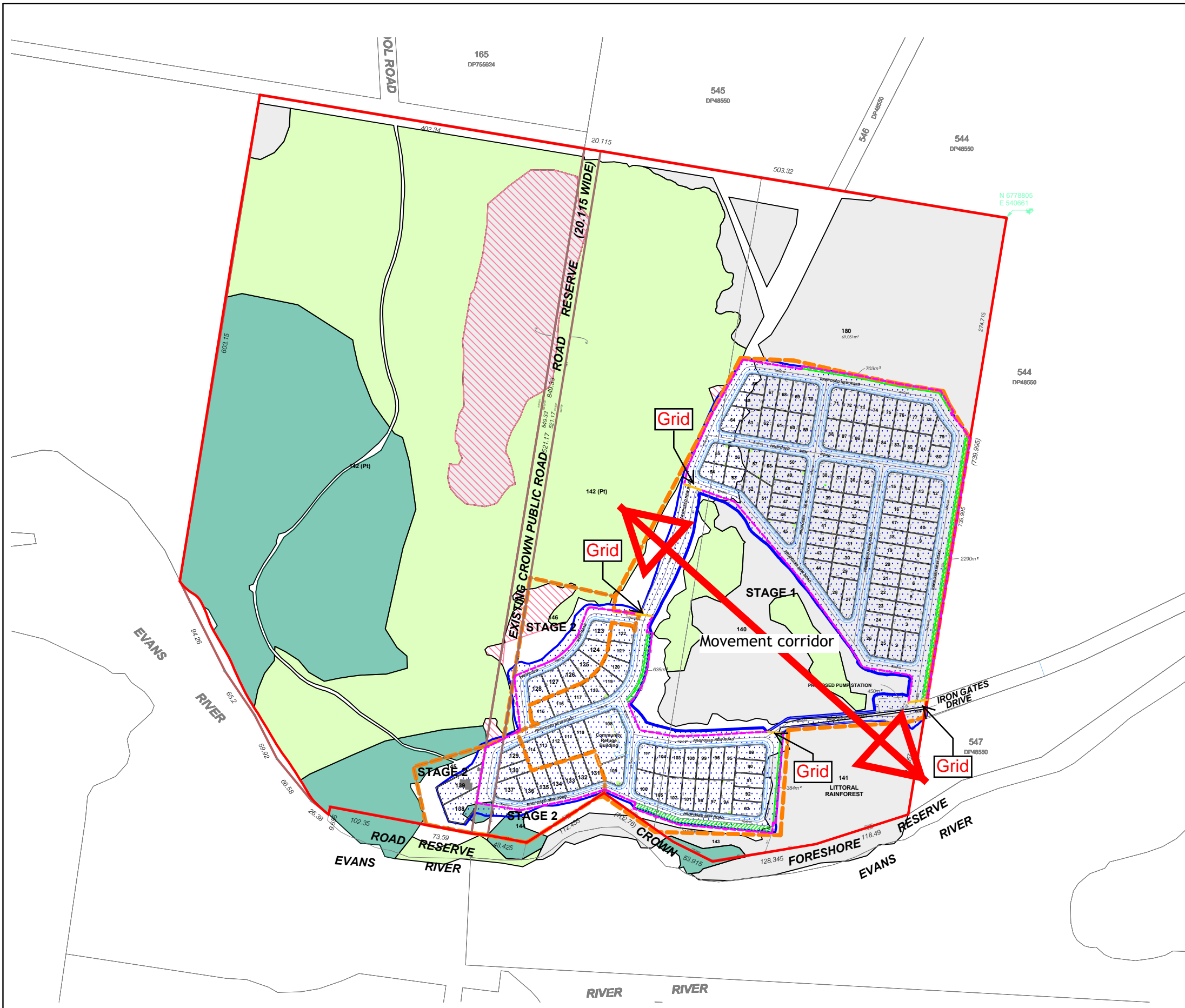
PP13



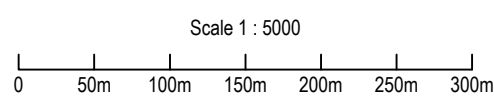


**PP14**

## **ATTACHMENT 5 - INDICATIVE KOALA MITIGATION / COMPENSATION MEASURES (FOR DISCUSSION ONLY)**



- LEGEND**
- Subject Site
  - Koala Habitat**
    - Primary Koala habitat
    - Supplementary Koala habitat
    - Other Koala habitat
  - Proposed Development Layout**
    - Impact Area
    - Lot Boundary
    - Stage Boundary
    - Drainage Reserve
  - Koala Mitigation / Compensation Measures**
    - Revegetation Area - Koala food tree planting
    - Indicative Grid Location
    - Indicative Koala-proof Fence Location



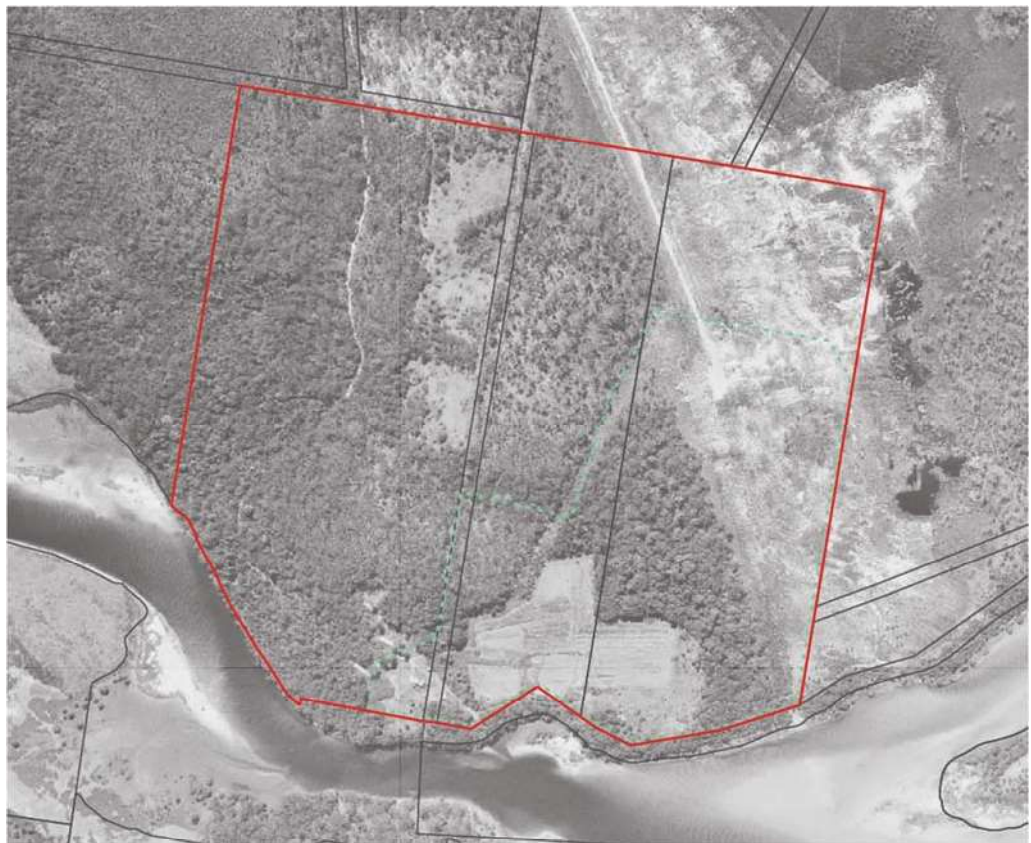
<p>SOURCE: JWA Site Investigations 2023; Arcadis (Ref: 22-070 - SITE PLAN 1-2500 - TRUE NORTH.dwg)</p> <p>SCALE: 1 : 5000 @ A3</p> <p style="text-align: center;"><b>JWA PTY LTD</b> Ecological Consultants</p>	<p>CLIENT Goldcoral Pty Ltd</p> <p>PROJECT Joint Expert Report Iron Gates Residential Development Iron Gates Drive, Evans Head NSW Richmond Valley Council LGA</p>	<p><b>ATTACHMENT 3</b></p>	<p>TITLE INDICATIVE KOALA MITIGATION / COMPENSATION MEASURES (FOR DISCUSSION ONLY)</p>
		<p>PREPARED: BW DATE: 15 April 2024 FILE: N16006_JER_20240415.dwg</p>	

## **ATTACHMENT 6 - HISTORICAL AERIAL PHOTOGRAPHY**





**PLATE 2 - 1971 aerial photograph showing extent of mineral sands mine (Source: Martens 2023)**



**PLATE 3 - 1977 aerial photograph showing horticultural uses in the southern portion of the site (Source: Martens 2023)**