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Submission to 100-day Review of Brisbane 2032 Olympic and Paralympic Games Infrastructure and Planning

Due date: 10 January 2025

The Games Independent Infrastructure and Coordination Authority

100dayreview@gvlda.au

Dear Sir/madam,

Introduction

The Koala Action Group Qld Inc. (KAG) was established 37 years ago in response to community concerns about the long-term survival of the large number of koalas living in the Redlands area. Since that time KAG has accumulated much knowledge in koala habitat usage, assisted scientists with koala surveys, restored habitat and carried out a program of public awareness of koala issues.

Most important of all is KAG's record of strategic tree planting in partnership with the Redland City Council (RCC). Some 100,000 trees have been planted by KAG. Additionally, individual members have gained valuable experience working with sick and injured koalas on the Council and State-run Koala Ambulance and by rearing orphaned koalas.

Redland City Council's lack of transparency

Our concerns are based on the impacts of the new Whitewater Centre (WWC) proposed by the Redland City Council (RCC) for the 2032 Olympics on an environmentally significant site (362-388 Old Cleveland Road East, Birkdale).

This land was previously owned by the Commonwealth Government and our understanding is that it was sold to the RCC in 2019 on the condition that its environmental assets were to be protected by way of a Conservation Agreement between RCC and the Commonwealth Government. Conservation Agreements are intended to protect and conserve Australian biodiversity.

RCC will not release details of the Conservation Agreement and have consistently advised our group the agreement between RCC and the Federal Government has been executed. However, KAG was recently advised by the Department of Climate Change, Energy, Environment and Water that negotiations with RCC were continuing and the Conservation Agreement is yet to be finalised which is of great concern to our group.

RCC has consistently treated their community consultations throughout the process as a public relations exercise and makes it clear they are not interested in oversight and accountability. For example, many of the documents necessary to inform the public of the financial viability and environmental impacts of the proposed WWC on the environment were missing from the RCC's consultation page. These included appendices that were referred to within the provided documents but were not attached and updated engineering reports. This updated information is essential as what was provided on the RCC website was only a preliminary engineering report that was completed before the WWC was even proposed.

In all previous consultation by the RCC, the prime message from the people of the Redlands was that the most important values to be protected were the environmental values of the area and the surveys show that only 9% of residents support the Olympic Whitewater proposal with 79% opposed.

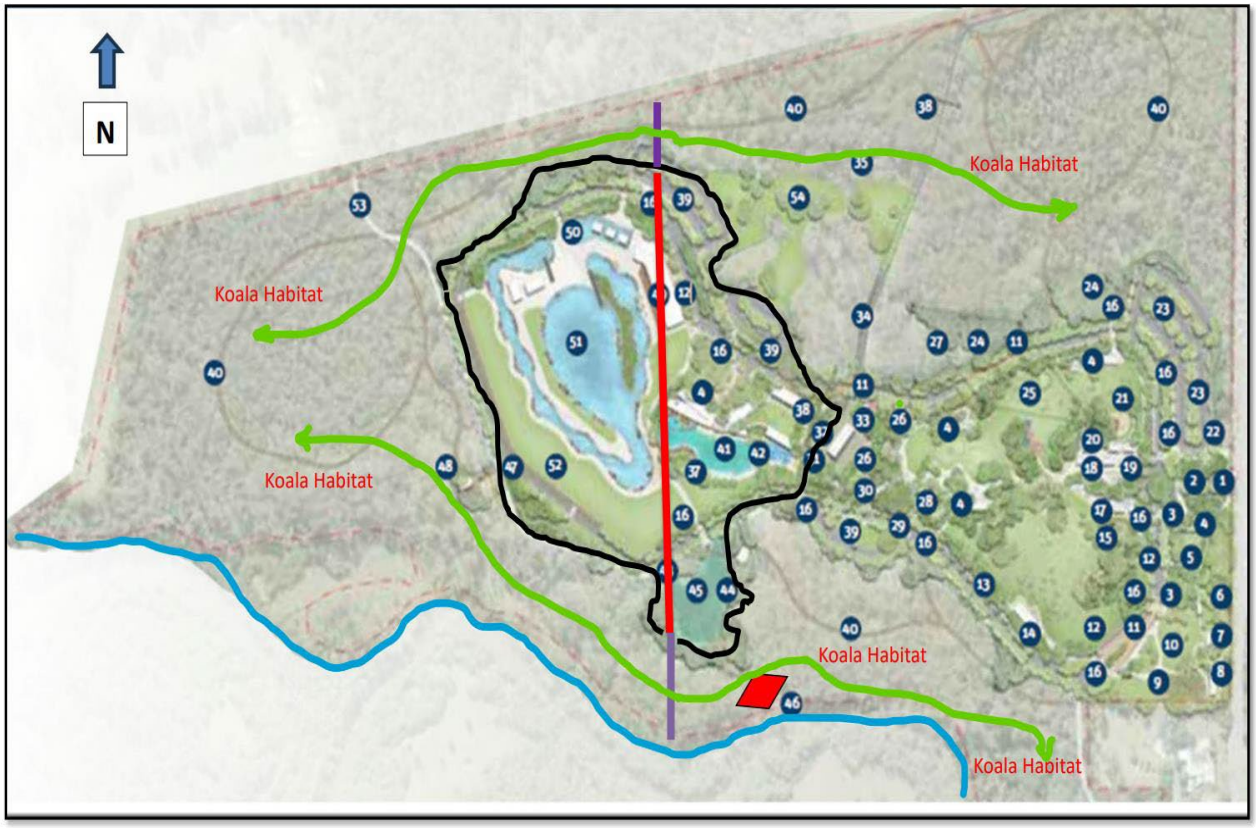
Impacts on Protected Koala Habitat

Our group is deeply concerned about the impacts of building a WWC immediately adjacent to protected conservation areas, especially when it appears the Olympic Host Contract Principles do not condone this:

> *Clause 15.3 of the Olympic Host Contract Principles 2032:*
> *Where new permanent venues need to be constructed, the Hosts, the Host NOC and the OCOG shall ensure that* ***they are not located in or adjacent to statutory nature, cultural protected areas*** *or World Heritage Sites.*

An early draft of the Conservation Agreement between Redland City Council and the Commonwealth Government (2019) mentioned in a report[1] available on the RCC website, emphasised the importance of allowing fauna movement across the site. The Birkdale Community Precinct Master Plan shows fauna movement will be blocked by the Whitewater Centre and proposed lagoon. Figure 1 shows almost four fifths of east-west fauna movement will be blocked by the Whitewater Centre and the lagoon. (Base map is from the Redland City Council's Master Plan for the Birkdale Precinct with our additions showing koala movement.) Koalas in the Redlands are in such a tenuous position that any changes in their usage of the habitat can have profound effects on the remaining koala population.

Figure 1: East-west koala movement across the site is blocked by about 4/5 of the path presently available



Presently available corridor: purple + red + purple lines = 560 metres. After construction: only purple line in south = 65 metres (further blocked by pinch point at canoe launch shown by red diamond); and purple line in north = 50 metres. NB Measurements approximate – property lines as shown on Master Plan (RCC website). Outline of koala impervious WWC (fences, wet areas etc.) Koala east-west movement across site – after WWC Tingalpa Creek

[1] 18th June 2020. *Ecological Assessment Report*. Cardno (Qld) Pty Ltd. Appendix B Environmental Management Plan

Apart from the financial costs to the community, perhaps the greater cost is the loss of our environmental and cultural heritage. Our koalas are endangered and exhibiting severe decline and the Birkdale land contains some of the best koala habitat in the area.

The building of a WWC surrounded on three sides by mapped core koala habitat contrary to the Olympic Principles quoted above, with no provision for buffer areas will inevitably lead to loss of habitat from edge effects. It is likely that parking and viewing stands will markedly increase the size of this area and impinge further on the conservation area than is obvious on the maps.

KAG also has concerns about the indirect impact of changes in the hydrology that may affect the surrounding Threatened Ecological Communities (TEC). The Birkdale Community Precinct is situated on a sensitive estuary where the freshwater aquifers rely on a positive pressure to prevent saltwater intrusion. Considerable earthworks are required for such a project which can cause changes in the hydrology which could affect the surrounding forests leading to dieback, spelling disaster for the koala population.

A recently released expert report[2] details the intricate relationship of groundwater dependent ecosystems and the risks associated when aquifers are interfered with, often resulting in devastating dieback of habitat, of which eucalyptus trees are particularly susceptible. (Attached).

Environment Protection and Biodiversity Conservation Act (EPBC) Referral

RCC had not initially intended to refer the project to the Federal government for assessment under the Environment Protection and Biodiversity Conservation Act 1999. An email received by KAG from RCC on May 22, 2023 confirmed this position:

> *'A summary of the studies and the impact on environmental matters is provided under the current Local Government Infrastructure Designation materials published as part of the public notification process. It is clear from the studies and the resultant environmental planning undertaken for the precinct, that Council is not only protecting and managing environmental values but considerably enhancing them through a range of actions. Based on Council's environmental approach to planning the precinct,* ***assessment under the EPBC Act is not required****.'*

However, after KAG's presentation to the 60-day Sport Venue Review led by former Brisbane Lord Mayor Graham Quirk, the final report (March 2023) gave a recommendation that RCC self-refer the Whitewater Centre project for review under the EPBC Act.
https://www.statedevelopment.qld.gov.au/__data/assets/pdf_file/0029/87581/sport-venue-review-23.pdf

The Sport Venues Final Report March 2023 says EPBC referral will address all environmental concerns:

> *Finding 5.6 Environmental issues raised by community members were examined, however the Panel formed the view that these issues can be managed and will be subject to the Environment Protection & Biodiversity Conservation Act approval. The Queensland Government accepted the findings and recommendations of the Final Report and now expects Redland City Council to self-refer the Whitewater Centre project for review under EPBC Act accordingly.*

Financial Viability

There was limited factual information given by the RCC about the financial viability of the project in the recent consultation. In the Master Plan and Foundation Report, the RCC suggests that there has been due

[2] December.2024, Rodwell, Mark "The risk of groundwater-dependent Koala Habitat Loss caused by construction of an Olympic 2032 Whitewater Course on the Birkdale Community Precinct" Report prepared for the Birkdale Alliance.

diligence that purports to show the WWC "will operate at a breakeven or profit generating level". However, none of these reports have been provided by the RCC leading to doubts about their findings.

> *Public use of the whitewater facility beyond the disaster and resilience training activities is expected to be the majority revenue source. This includes hosting conferences, as well as other training and tours.*

The above statement is questionable in the knowledge that, of the last six WWC built for the Olympics, three are abandoned and the other three are operating at a loss. It is also telling that both the Logan and Gold Coast City Councils initially entertained the option of constructing a WWC and decided against it on financial viability grounds.

Conclusion

The proposal for a new Olympic WWC venue at Birkdale is flawed in many ways. It is not supported by those in the local community who understand what the financial impost on ratepayers will be. The impacts on the site's natural values have not been properly assessed in an open and accountable way. Documents were not supplied or were outdated or incomplete, which affected the community's opportunity to accurately comment on the reports.

The site is too constrained by protected conservation areas to allow for the disturbance that would inevitably come from the construction and operation of a WWC. The community may well lose the potential for sensitive outdoor experiences that value and support the environment. This was the highest priority of the community as shown in the RCC consultation. The endangered koalas that live on the site and move into the site will be affected by the construction and operation of the WWC.

One of the Guiding Principles for the 100-day review is to prioritise the utilisation of existing venues and infrastructure to minimise new construction, thereby enhancing cost-efficiency and promoting sustainability.

This principle reflects the Olympic 'New Norm' policy of locating events away from the Host City instead of building new venues, particularly for single sports events. The most recent example of this is LA28 Games, where the Host City of Los Angeles will hold their Whitewater event 2000 kilometres away in Oklahoma.

Our group believes a much more sensible and acceptable solution is for the recently upgraded, fit for purpose Whitewater facility in Penrith, NSW be used for the two-week Olympic Games Whitewater rafting event.

This video link provides an overview of all the concerns raised above: https://vimeo.com/1044649791

Thank you for the opportunity to comment,

Debbie Pointing – President
Koala Action Group Qld Inc – Redlands
0422 887 027

The risk of groundwater-dependent Koala Habitat Loss caused by construction of an Olympic 2032 Whitewater Course on the Birkdale Community Precinct

December 2024

Executive Summary

The proposed **Redlands Whitewater Centre** (RWC) is a new artificial whitewater course intended to host the Brisbane 2032 Olympic Canoe Slalom events.

Its proposed location is **in Redland City, Queensland** within the **Birkdale Community Precinct** (BCP) – a 62ha site comprising unique natural attributes of remnant and regrowth vegetation, partially wooded grassland as well as unique Indigenous and European cultural heritage assets including the former World War II radio receiving station and the Willard's Farm homestead.

The proposed site of the Whitewater Centre is surrounded by **Core Koala Habitat**, as mapped by the Queensland Government.

Major risk factors in the selection of the proposed Redlands Whitewater Centre site are:

1. its **proximity to protected Core Koala Habitat** with identified groundwater dependency
2. the **presence of one or more aquifers underlying the site,** and what is considered to be insufficient knowledge or practical understanding of the site's hydrogeology characteristics and behaviours.

The **apparent absence of detailed site hydrogeology** makes assessment of groundwater impacts an exercise in speculation at best, fraught with grave potential environmental consequences to a carefully evolved and integrated ecosystem.

To that end, this report seeks to –

1. understand the level of groundwater **diligence applied** in site selection and to –
2. **define the extent** of threats and potential consequences to groundwater systems introduced by this Whitewater project, and consider their possible mitigation.

This report was developed in **four main stages**:

1. **Establishing BCP/ Core Koala Habitat groundwater dependency**
   Proving the existence of multiple hydrogeology contextual overlays over the core habitat area and citing factual evidence of various hydrogeologic site behaviours, which confirm the regional Groundwater Dependent Ecosystem (GDE) mapping contexts.

2. **Ascertaining the extent of research/ investigation undertaken**
   By drawing on information published by Redland City Council, this stage ascertains the extent of research/ investigation undertaken during Whitewater Centre project planning in order to establish a profile of the site's hydrogeologic features and groundwater behaviours.

   Issues arising from the apparently limited investigative scope and some report errors are also identified.

Executive Summary– cont'd:

3. **Identifying the range of potentially disastrous consequences**
   Having shown the apparent scope and limitations of investigative research to be insufficient to predict potential consequences to the site, the third stage identifies the range of potentially disastrous consequences, each with a distinct likelihood of occurring.

4. **Making the case for the use of the existing Olympic Whitewater Stadium in Penrith NSW**
   The fourth stage of this report considers the overall risks to the timely delivery of the proposed Olympic Redlands Whitewater Centre project, from an Olympic Games perspective.

   The risks to the Olympic venue project are represented in terms of time delays, additional costs and the likely refusal of development approval by the Federal Department of Climate Change, Energy, Environment and Water (DCCEEW) on the basis of Matters of National Environmental Significance (MNES), under the *Environment Protection & Biodiversity Conservation (EPBC) Act*.

   In this high-risk context, the case for using the existing Olympic Whitewater Stadium in Penrith, New South Wales in 2032 is made, noting superior cost-benefits, and compliance with the International Olympic Committee's 'New Norm Policy' which strongly advocates the use of existing venues.

The report notes that Redland City Council has selectively withheld information from the community under the banner of 'commercial in confidence' and that the report has been prepared in the context of those constraints.

The lead author of this report is Mark Rodwell who has career experience in the field of catchment hydrology research and environmental compliance. Expert content to the report and its review were provided by a groundwater scientist with a Doctorate in groundwater processes and over 20 years' experience in the field of hydrogeology.

This Report was prepared on behalf of an alliance of six community organisations in the Redlands.

We can be contacted at – contact@carp-redlands.org.au

- Birkdale Progress Association Inc
- Redlands2030 Inc
- Community Alliance for Responsible Planning (CARP) Redlands Inc
- Koala Action Group Queensland Inc
- ACF Community Bayside
- Wildlife Preservation Society Queensland Inc (Bayside Branch)

Introduction

The proposed Redlands Whitewater Centre (RWC) is a new artificial whitewater course intended to host the Brisbane 2032 Olympic Canoe Slalom events.

Its proposed location is in Redland City, Queensland within the Birkdale Community Precinct (BCP) – a 62ha site comprising unique natural attributes of remnant and regrowth vegetation, partially wooded grassland as well as unique Indigenous and European cultural heritage assets including the former World War II radio receiving station and the Willard's Farm homestead.

It is understood the land comprising the Birkdale Community Precinct was purchased from the Federal Government by Redland City Council and is subject to a **Conservation Area Agreement** between these two parties.

The Agreement is **intended to protect** the high conservation value remnant habitat supporting Koalas and other valuable fauna, and accordingly constrains the BCP project area to approximately 23ha.

As at May 2024, the Conservation Area Agreement **had not been finalised** and it appears this remains the case.

Within this project area seven spatial 'hubs' are proposed for development over a period of 20 years and at an estimated cost of some $300 million which includes the Whitewater facility.

The 'Recreation, Resilience & Adventure Sports Hub' is the intended location of the Redland Whitewater Centre[1].

Major risk factors in the selection of the proposed Redlands Whitewater Centre site are:

1. its **proximity to protected Core Koala Habitat** with identified groundwater dependency
2. the **presence of one or more aquifers underlying the sit**e, and – drawing on the available public information published by Redland City Council, the project proponent – what is considered to be insufficient knowledge or practical understanding of the site's hydrogeology characteristics and behaviours.

Habitats with groundwater dependency are characterised as Groundwater Dependent Ecosystems (GDEs), with locations mapped and information derived from scientifically proven methods of satellite-tracked imagery detecting vegetation growth in periods of prolonged rainfall absence.

This indicates that moisture uptake for plant survival and growth is **groundwater sourced via deep and elaborate root systems**.

GDEs are considered complex and dynamic natural systems:

> *"…that require access to groundwater to meet all or some of their water requirements on a permanent or intermittent basis, so as to maintain their communities of plants and animals, ecosystem processes and ecosystem services.*
>
> *The presence of diverse GDEs across a landscape is driven by temporal and spatial groundwater flow variability that is related to geology, climate and land use"*[2].

[1] Birkdale Community Precinct Master Plan 2023
https://yoursay.redland.qld.gov.au/65591/widgets/324331/documents/253897

[2] Section 1.1 https://openresearch-repository.anu.edu.au/server/api/core/bitstreams/392e5673-0294-42d1-81cf-e453fdff19cc/content

Introduction – cont'd:

Two main GDE types considered relevant to the Birkdale Community Precinct are:

- ecosystems dependent on the **surface expression** of groundwater (eg, lakes, vegetated swamps, creeks, rivers, spring wetlands) – often called 'surface expression GDEs'
- ecosystems dependent on the **sub-surface** presence of groundwater (eg, terrestrial vegetation accessing groundwater in the capillary zone) – often called 'terrestrial GDEs'[3]

The **apparent absence of detailed site hydrogeology** makes assessment of groundwater impacts an exercise in speculation at best, fraught with grave potential environmental consequences to a carefully evolved and integrated ecosystem.

To that end, this report seeks to –

1. understand the level of groundwater **diligence applied** in site selection and to –
2. **define the extent** of threats and potential consequences to groundwater systems introduced by this Whitewater project, and consider their possible mitigation.

[3] https://www.publications.qld.gov.au/dataset/6460098a-8500-4a44-b2c9-b593290c2e96/resource/9b52a6c5-3461-47ef-b3a0-5aa3d5d38cf4/download/comet-dawson-mackenzie-v1-0.pdf

Stages of this Report

This report was developed in **four main stages**:

1. **Establishing BCP/ Core Koala Habitat groundwater dependency**
   Proving the existence of multiple hydrogeology contextual overlays over the core habitat area by drawing on scientific evidence of localised Groundwater Dependent Ecosystems as represented by various mapping overlays compiled from scientific research datasets sourced from the Queensland Department of Science, Environment & Innovation (DESI) and the Bureau of Meteorology (BoM) respectively.

   Also cited is factual evidence of various hydrogeologic site behaviours experienced first-hand, which confirm the regional GDE mapping contexts.

2. **Ascertaining the extent of research/ investigation undertaken**
   By drawing on the information available supplied by Redland City Council (RCC) as published on *its Local Government Infrastructure Designation (LGID*) website[4], this stage ascertains the extent of research/ investigation undertaken during Whitewater Centre project planning in order to establish a profile of the site's hydrogeologic features and groundwater behaviours to eliminate knowledge gaps and to inform the construction design.

   Issues arising from the apparently limited investigative scope and some report errors are also identified.

3. **Identifying the range of potentially disastrous consequences**
   Having shown the apparent scope of investigative research to be insufficient to predict potential consequences to the site, and with the understanding that limitations to this research still exist, the third stage of this report identifies the range of potentially disastrous consequences, each with a distinct likelihood of occurring (based on apparently known site characteristics).

4. **Making the case for the use of the existing Olympic Whitewater Stadium in Penrith NSW**
   Given that Redland City Council must refer the development of a Whitewater Centre on the Birkdale Community Precinct to the Federal Department of Climate Change, Energy, Environment and Water (DCCEEW) for assessment under the *Environment Protection & Biodiversity Conservation (EPBC) Act,* the fourth stage of this report considers the overall risks to the timely delivery of the proposed Olympic Redlands Whitewater Centre project, from an Olympic Games perspective.

   The risks to the Olympic venue project are represented in terms of time delays, additional costs and the likely refusal of development approval by the Department on the basis of Matters of National Environmental Significance (MNES).

   In this high-risk context, the case for using the existing Olympic Whitewater Stadium in Penrith, New South Wales in 2032 is made, noting superior cost-benefits, and compliance with the International Olympic Committee's 'New Norm Policy' which strongly advocates the use of existing venues.

Pacific Geotech Broadscale Geotechnical Report: Birkdale Community Land p2

[4] https://yoursay.redland.qld.gov.au/imagine/widgets/324331/documents

STAGE 1-

Establishing the BCP Koala Habitat / Groundwater Dependent Ecosystem (GDE) link

Figure 1 gives the location of the BCP in Birkdale, approximately 25km southeast of Brisbane. A visual overlay of the scale and size of the BCP (shaded yellow) and location is presented.

Figure 1 Birkdale Community Precinct area
(Source: Pacific Geotech Broadscale Geotechnical Report: Birkdale Community Land p2)

Figure 2 represents a high-level overview of the BCP design elements relative to the entire BCP, with the location of the Whitewater complex indicated. On close inspection the outline of Whitewater basin and channels can be delineated.

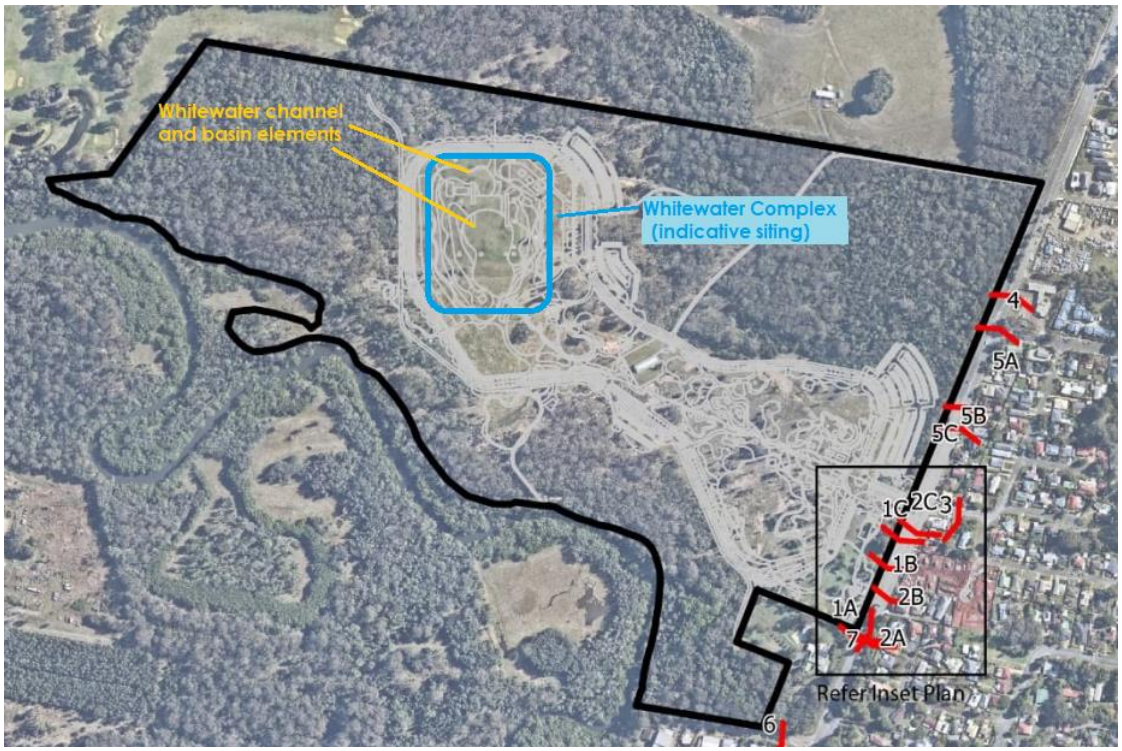


Figure 2 Whitewater location reference, BCP Site Layout (red markings & numbering on the right can be ignored)
(Source: Jacobs BCP LGID Environment Assessment Report Appendix V p26 our overlay)

STAGE 1 – cont'd:

Concept design drawings prepared by Redland City Council's engineering contractors for the BCP development show parking, services infrastructure layouts, and the cut and fill dimensions over the entire site.

In particular, the drawing in **Figure 3 below** shows **excavation depths for Whitewater channels and basin.**

Figure 3 shows the **Plan View** of the proposed site earthworks and end-state modified site topology (green = raised, red = excavated). It provides the **scale and context** to assess potential impacts on the site's hydrogeologic attributes such as surface/ subsurface flow redirection, groundwater infiltration and aquifer recharge.

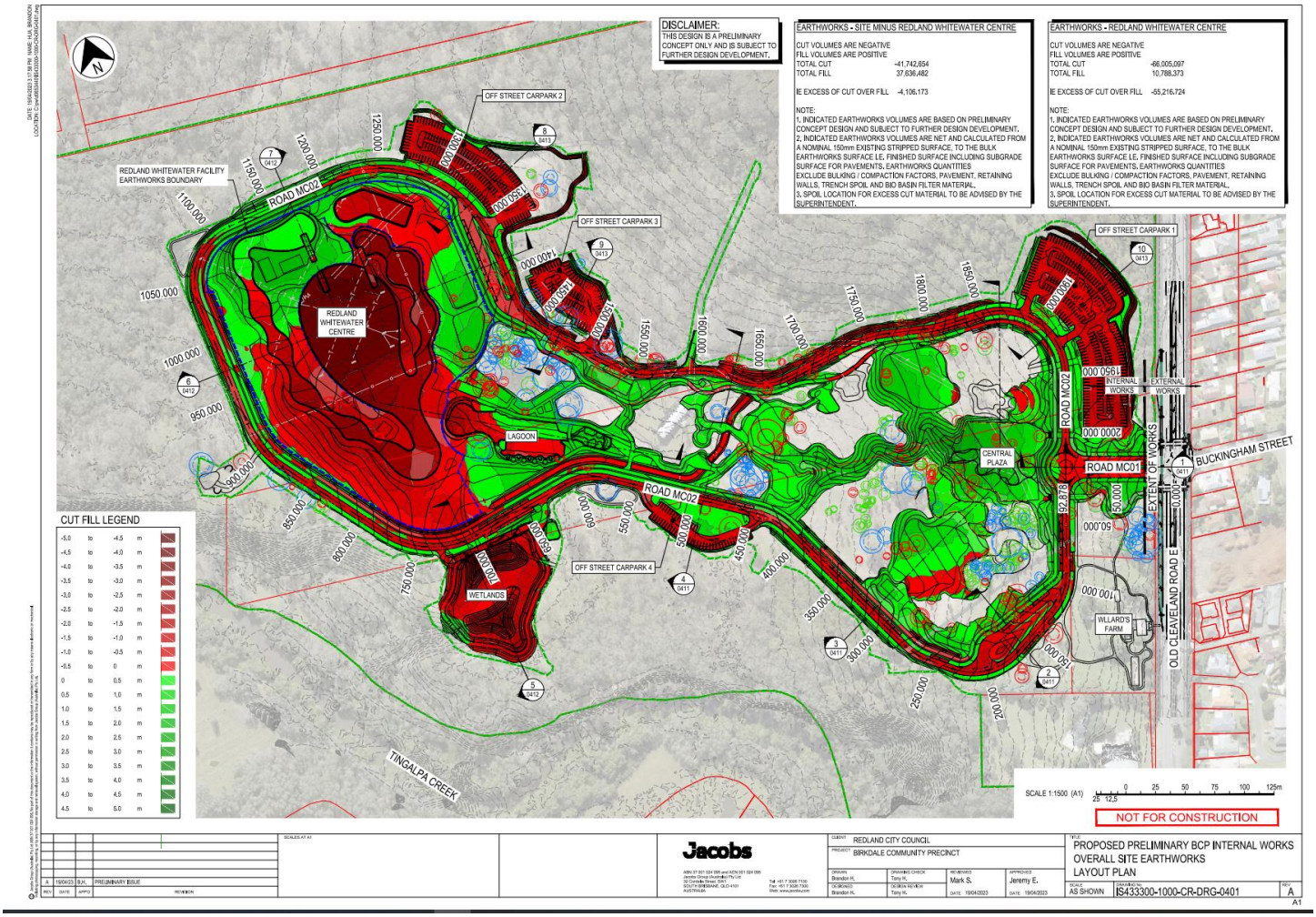


Figure 3 Jacobs Preliminary Civil Drawings of 19 April 2023

(Source: https://yoursay.redland.qld.gov.au/65591/widgets/324331/documents/259906 - p13)

STAGE 1 – cont'd:

Figure 4 below describes the zoning overlay of Protected Core Koala Habitat, classified as **Matters of State Environmental Significance (MSES)**, located substantially within the BCP and bordering to the north and west of the proposed Whitewater complex.

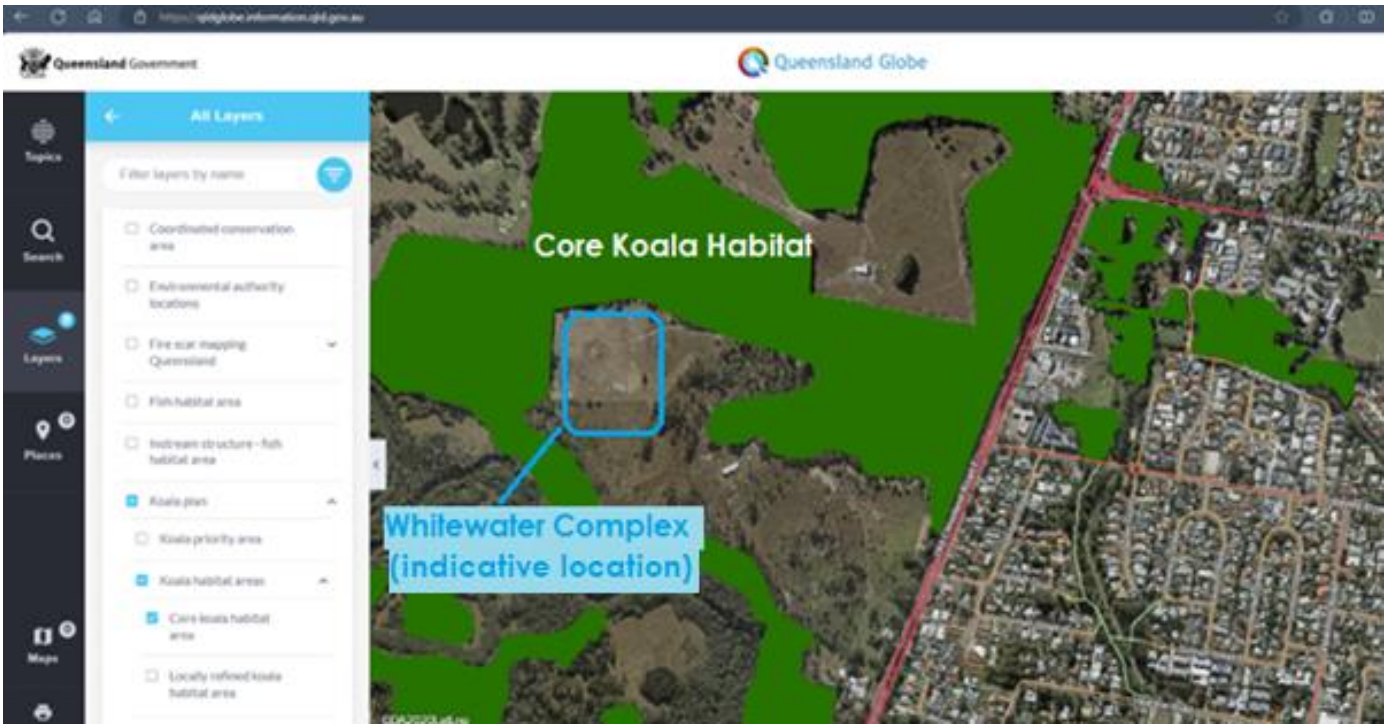


Figure 4 Forested Core Koala Habitat surrounding Birkdale Community Precinct
(Source: Core Koala Habitat Areas – Qld Globe qldglobe.information.qld.gov.au - with our overlay)

In terms of likely **negative impacts on the resident koala population**, the Figure 4 map shows:

- the close ground-level proximity of major Whitewater earthworks and –
- the potential for resultant noise, dust and other destructive impacts of its construction in such close proximity to impact protected Core Koala Habitat.

Also, in comparing this Figure 4 Core Koala Habitat mapping overlay to **Figure 3**, it appears that significant Core Koala Habitat **will be lost** to areas identified for the Redland Whitewater Centre and for general Birkdale Community Precinct public car parking.

Clearly, such likely **impacts** and **potential risks to koalas** contravene the intent of the International Olympic Committee's (IOC) policy and Host City Contract.

Clause VEN 10 of the *IOC Host City Contract – Operational Requirements* states:

> *"As a principle, protected natural and/or heritage areas **must not be impacted** by the construction of Games venues or other Games related activities."*

STAGE 1 – cont'd:

Reinforcing this point, see the following **Figure 5.**

The image is an excerpt from a video record of the Paris 2024 Olympic Canoe Slalom venue 'Vaires-sur-Marne Nautical Stadium' under construction.

The video link is found here[5] . It shows the **staggering scale** of earthworks involved and to be expected during construction of the proposed Redlands Olympic Whitewater Centre on the Birkdale Community Precinct site.

Note –
Additional **earthworks beyond the Whitewater venue footprint** are also expected through the provision of services, parking, buildings, and the like.

Figure 5 Paris 2024 Whitewater venue under construction

Importantly –

The following **Figures 6 through 8** offer Queensland Government geospatial mapping of **vegetation ecosystems** which have been identified as having **groundwater dependency** (GDE) from one or more sources, such as:

- the dynamic groundwater-table
- aquifer discharge, or –
- subsurface inflow/ infiltration.

[5] https://www.youtube.com/watch?v=kmFmD_fbDQw

STAGE 1 – cont'd:

Figure 6 shows the presence of **terrestrial** (green shading) and **surface** (blue block/ diagonal shading) Groundwater Dependent Ecosystems (GDEs):

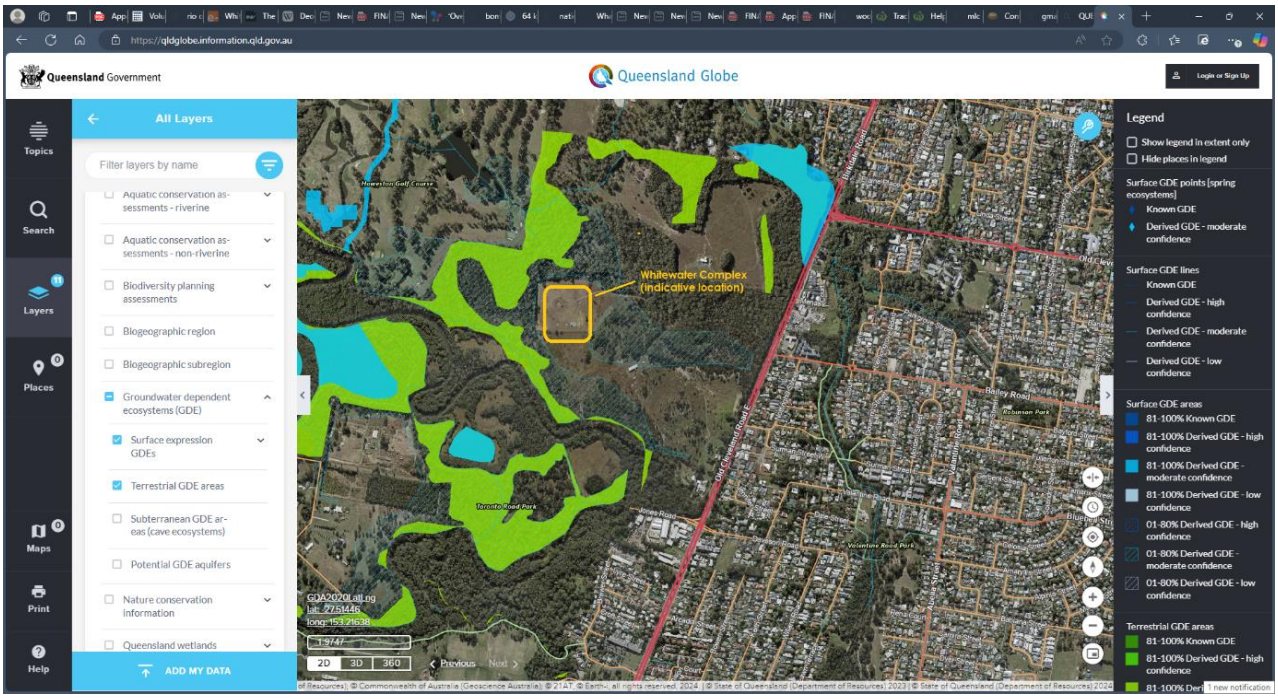


Figure 6 Surface and Terrestrial Derived GDEs (DESI)

Figure 6A is a zoomed view of Figure 6 showing a **blue diagonally-shaded area** indicating/ representative of GDE potential.

Figure 6A Zoom of Figure 5 to highlight GDE shaded overlay

STAGE 1 – cont'd:

Importantly –

The mapping of potential Groundwater Dependent Ecosystems at the site, combined with **evidence of shallow groundwater** (within 6 metres of the ground surface) occurring at the site, increases the likelihood for any GDEs present to be **impacted by construction activities** that intercept (or overlie) the shallow groundwater.

Bureau of Meteorology (BoM) groundwater mapping also corroborates this status, identifying shaded vegetation surrounding the Whitewater venue as **Inflow Dependent Ecosystems (IDEs)** in **Figure 7** below:

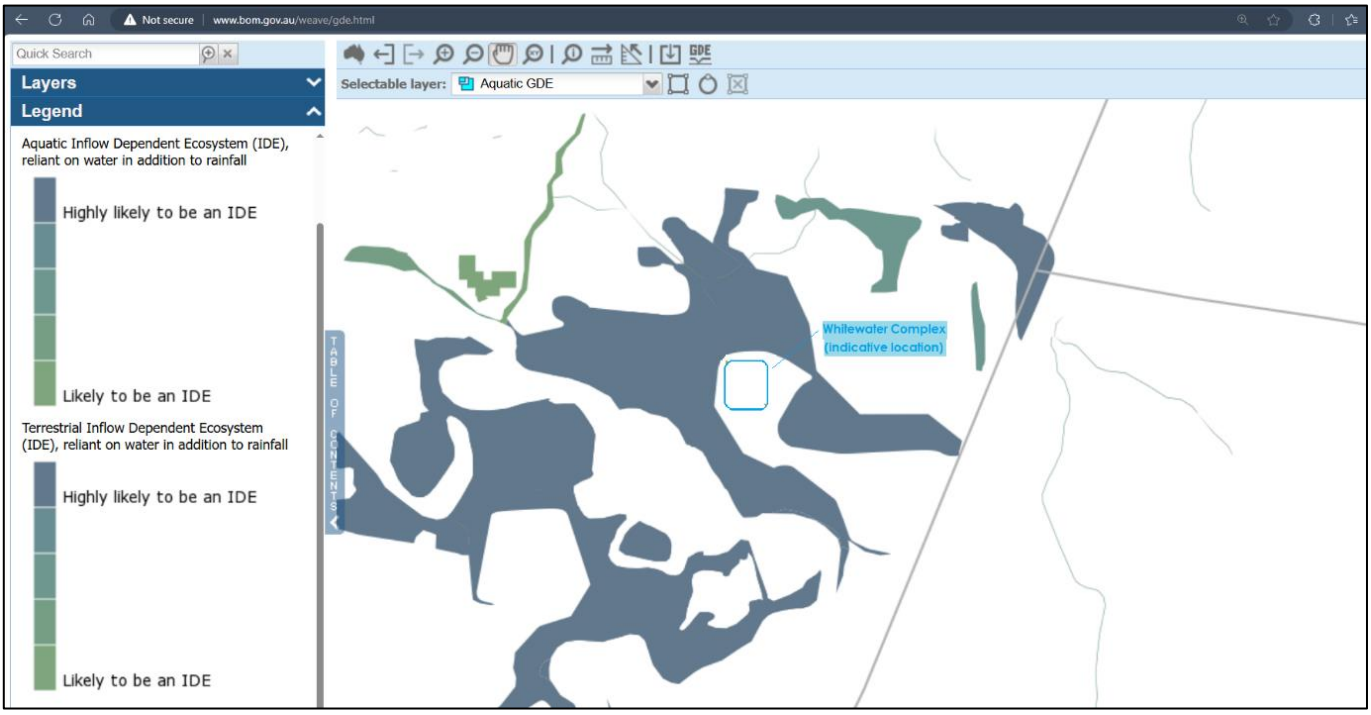


Figure 7 BCP & Inflow Dependent Ecosystem (IDE) – Bureau of Meteorology

The Bureau of Meteorology generically describes **Inflow Dependent Ecosystems (IDEs)** as "ecosystems using another source of water other than rainfall."

The IDEs shaded areas **correlate to most of BCP tree-covered vegetation.**

They also **align strongly** with Core Koala Habitat mapping**,** demonstrating a **life-sustaining dependence** on **subsurface water** sources.

STAGE 1 – cont'd:

Figure 8 is a mapping representation of GDE **aquifer types** underlying the surrounding local area.

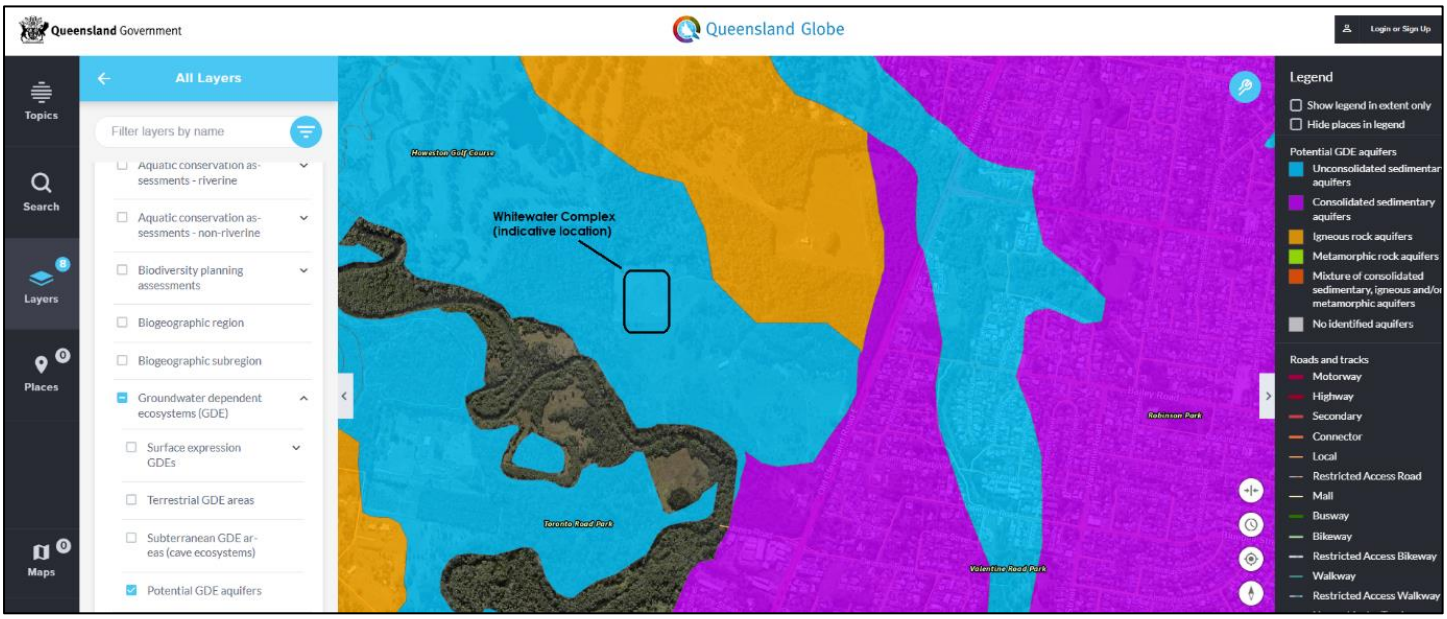


Figure 8 BCP underlying aquifer structure

The aquifer structure **overlaying the Whitewater site** and BCP is classed as an **'unconsolidated sedimentary aquifer.'**

According to the *National Water Commission's Groundwater Essentials:*

> *"**Unconsolidated,** or surficial aquifers, consist of mixtures of clays, silts, sands and gravels. They are formed by the deposition of eroded material and found in river valleys, deltas and basins...*
>
> *These aquifers are commonly used because they are close to the ground's surface and easily accessed. They are a major source of potable groundwater in Australia"*[6].

Unconsolidated aquifers display **geophysical attributes** of –

- high porosity
- greater connectivity (eg - to creeks and GDEs)
- high permeability
- bi-directional lateral water movement, and –
- high rates of subsurface flow.

In addition to surface infiltration - and depending on recharge volume - the **water table may also fluctuate** throughout the unconsolidated layer.

Importantly –

The unconsolidated aquifer underlying the BCP site is **considered fundamental to establishing the Core Koala Habitat/ GDE relationship**, as tree root systems permeating this layer derive moisture from groundwater inflows or rising water table dynamics independent of any rainfall.

[6] https://groundwater.com.au/wp-content/uploads/2023/02/groundwater-essentials.pdf

STAGE 1 – cont'd:

The **survival** of Groundwater Dependent Ecosystem habitats is also sensitive to **quality** and **quantity aspects of groundwater:**

> "***Quantity*** *refers to aspects of the groundwater regime, such as the volumes, pressures, timing and variability of groundwater supply, that govern the location, timing, frequency and duration of groundwater connection to GDEs.*
>
> ***Quality*** *refers to physical and chemical characteristics of water, such as temperature, salinity, and concentrations of nutrients and dissolved organic matter.*
>
> *When investigating and monitoring GDEs, it is* ***essential to understand*** *the underlying geology and related aquifer and flow systems, trends in groundwater level, spatial and temporal variability in the GDE–groundwater connection, and ecosystem composition ..."*[7]
>
> *(Source - 'Information Guidelines Explanatory Note: Assessing Groundwater Dependent Ecosystems' DCCEEW)*

Based on publicly available information, there appears to be **no evidence** of an investigation and monitoring regime as described above being performed by project proponents of the Whitewater Centre or BCP development.

Further validating the evidence found in the BCP Ground Dependent Ecosystem mapping of **Figures 6-8** are anecdotal accounts of the Birkdale site hydrology.

Some examples are documented in the 2021 report *'Preliminary Assessment of the Natural Heritage Values of Birkdale Land'* including -

> *"Another interesting feature of the site is the freshwater springs. Locals maintain these springs flow steadily which is consistent with the presence of an underground aquifer supplying this flow."*
>
> *(Report by L Roberts, BSc (AES) & Vice President of the Koala Action Group Inc)*

In the 2021 report, the presence of an **alluvial sediment layer supporting vegetation** is identified and is representative of subsurface soil profiles of unconsolidated hydrogeologic zones.

Further, a **sensitive freshwater/ saltwater interface** in the Tingalpa Creek estuarine environment is described, and the risk of salinity contamination from site disturbance is identified.

A salient fact is the role **surface expressed groundwater** played in the successful operation of the **WW II US Radio Receiving Station** in critical US military communications:

> *"... the main reason for its selection was because the land was swampy, described as a damp earth-mat, ideal for rhombic antennas that was conducive to receiving clearer radio signals", and –*
>
> *"... the US Radio Receiving Station's communication success was due to the freshwater aquifer, the land's geological suitability that was conducive to receiving clearer radio signals. This Radio Receiving Station was the first site in Australia to receive* ***General MacArthur's telegram of the Japanese surrender*** *in 1945, from the Pacific.".*[8]

[7] https://www.iesc.gov.au/sites/default/files/2022-07/information-guidelines-explanatory-note-assessing-groundwater-dependent-ecosystems.pdf

[8] Submission 89 Birkdale Progress Association: https://www.aph.gov.au/DocumentStore.ashx?id=e7d6afd3-fd3c-422c-92be-a6bde91e3060&subId=747056

STAGE 1 – cont'd:

The swampy nature of the site is apparent in **Figure 9** below - a photograph of Wildlife Carers returning a rehabilitated Koala to the Birkdale Community Precinct.

It is understood that **groundwater discharge** is likely responsible for the wet state of the land.

Figure 9 Saturated swamp-like site conditions in the Birkdale Community Precinct

STAGE 2 – Ascertaining the extent of research/ investigation undertaken

The mapping representations (see Figures 4, 6, 7 & 8) of Groundwater Dependent Ecosystems (GDEs), corroborated by groundwater reported site bore data, are **evidence** of a shallow, unconsolidated aquifer underlying the BCP project area.

This demonstrates the **groundwater relationship** and **strong connectivity potential** between Core Koala Habitat and the Whitewater Centre development footprint.

Against this backdrop, it was necessary to **consider the extent of site investigation** as undertaken by Redland City Council (the Whitewater proponent) to determine the feasibility of the Birkdale location from the perspective of hydrogeologic impact and risk, and to do this through understanding the:

a) **site hydrogeology characteristics** (ie - physical subsurface properties, water table dynamics, aquifer structure, capillary zone, seasonal variation etc) and –

b) **impacts of Whitewater excavation** (and potentially other BCP landform changes) to the hydrogeology profile of the site.

The suite of technical and engineering reports published on Council's LGID website page was evaluated, and the following **site groundwater research documents** were identified:

1. **Report on a Geotechnical drilling program**
   Appendix G - Broadscale Geotechnical Report of document
   FINAL_Preliminary_Engineering_Infrastructure_Report_(A4849206).pdf
2. **Individual Bore Hole drilling reports**
   Appendix B of the *Broadscale Geotechnical Report*
3. **A coarse map of drill hole locations across the precinct**
   Appendix D of the *Broadscale Geotechnical Report*
4. **Engineering Design concept drawings detailing the scale and depths of excavation cut and fill** across the entire Birkdale Precinct development.
   Appendix_E_Preliminary_Civil_Drawings_(A7480285).pdf

Importantly –

The review of the technical LGID documentation from a hydrogeologic scope found **no apparent evidence** of a **detailed site baseline hydrogeologic profile** of formations and flow dynamics against which impacts of the proposed Whitewater excavation could be measured[9].

The review commenced with the geotechnical information from Document 1 of the list, that detailed an 18-hole drilling program undertaken across the Birkdale Precinct, sampling physical soil and rock geology, as well as detecting instances of groundwater to a shallow 6m drilling depth. (Hereafter, this and the other three documents listed above are referenced by their numeric 1, 2, 3 or 4.)

Each of the **18 Bore Holes drilled** were reported individually (Document 2), with groundwater detected in six of the holes. A map (Document 3) allegedly showing the positioning of the 18 Bore Holes as an array across the BCP site was provided.

[9] This scope includes only documentation RCC has publicly disclosed to its LGID portal.

STAGE 2 – cont'd:

What the review found:

a) Discrepancies in reporting of Bore Hole drilling locations in Document 3

On reviewing the drilling configuration (as per Bore Hole sitings published in Document 3, labelling errors (duplicates) were detected, triggering further inspection. See **Figure 10** below**.**

The **drill sites were then re-plotted** from location co-ordinates provided in each of the 18 Bore Reports, using both open-source map-grid (MGA94), and GPS Google Map conversion methods. The GPS example is shown in **Figure 10** below[10].

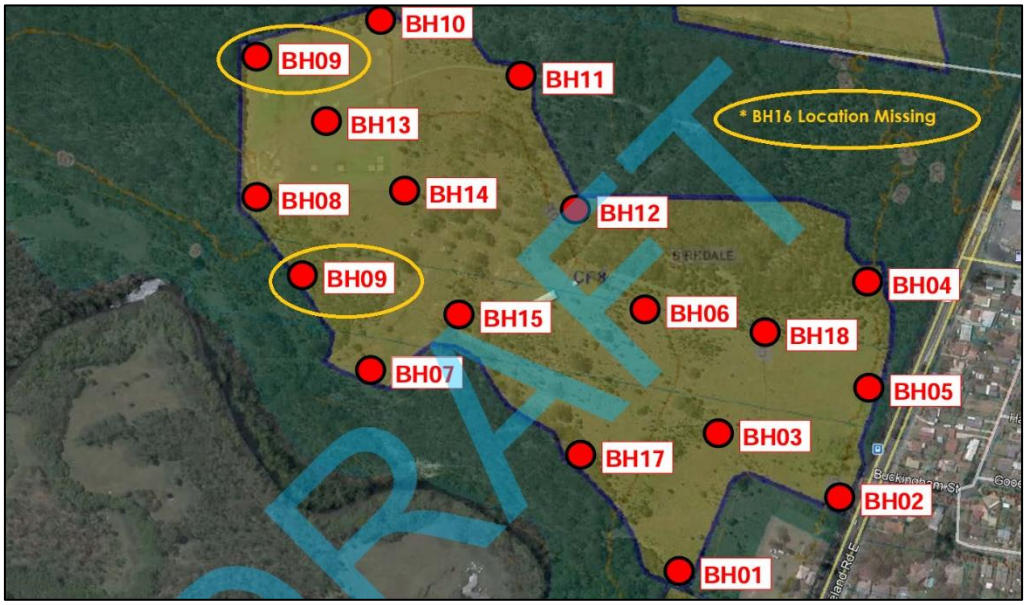


Figure 10 Geotechnical Bore map (apparent errors highlighted in yellow)

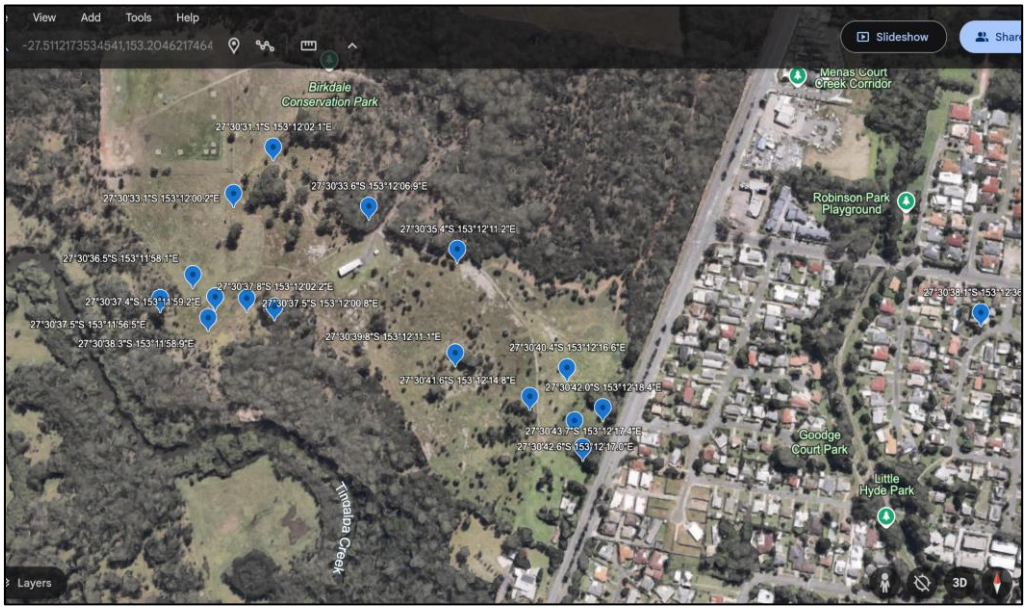


Figure 11 Corrected GPS bore coordinate mapping

[10] GPS Conversion by Keith Eigeland BE (Mech); Grad Dip Env Mgt

STAGE 2 – cont'd:

Importantly –

The corrected mapping in **Figure 11** shows **bores more clustered** than indicated in Document 3, and an **absence of drilling within or near** the anticipated **footprint** of the Whitewater Basin and Channel excavation.

b) Shallow-groundwater drilling cluster

The subset of Bore Holes in which groundwater was detected and those of geographic relevance to the Whitewater siting were then **plotted according to corrected locations,** as per **Figure 12 below.**

Shallow groundwater was detected in the set of drill holes located south of the proposed Whitewater site (depth value shown in blue):

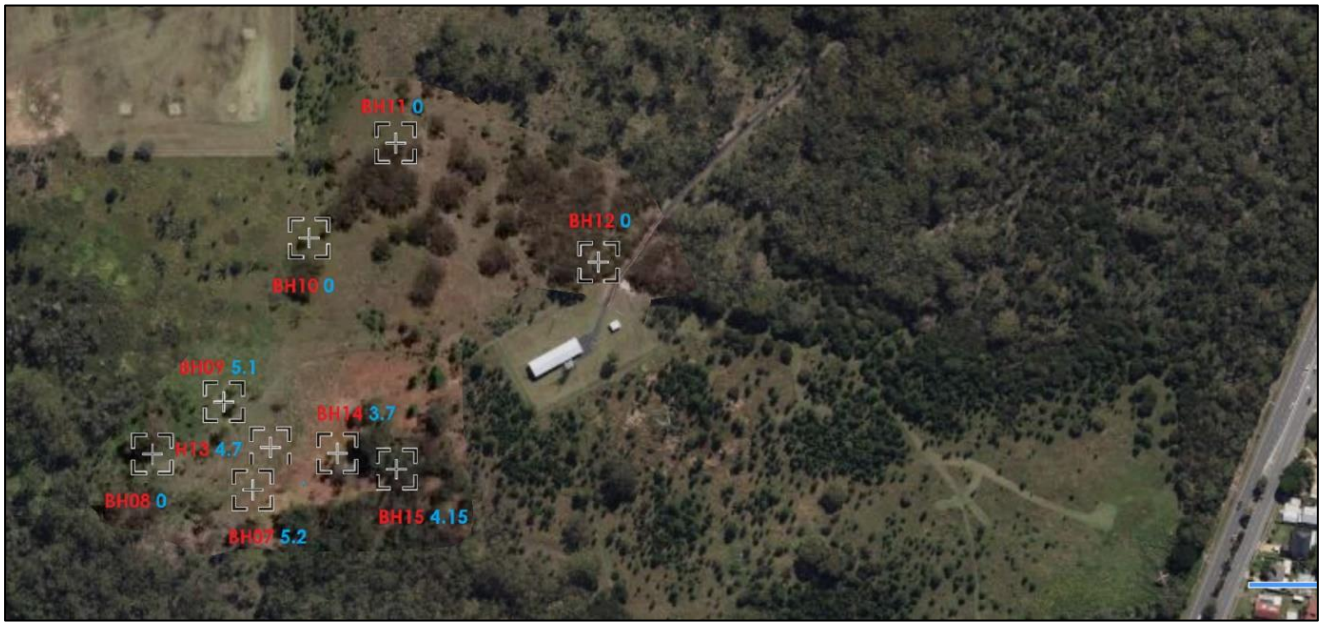


Figure 12 Subset of Bore holes detecting shallow groundwater

Importantly –

The **depths of the water table remain unknown** between this subset of drilled test holes and the 70m deep water bore described in (c) below.

c) Full Scale Water Bore drilled in the immediate proximity to the proposed Whitewater location[11]

Analysis of the *Queensland Globe Hydrology* dataset provided visual locations of numerous **registered water bores** within the Birkdale groundwater catchment, including a **70 metre bore (RN205152)** drilled in September 2023, in what is considered immediate proximity of the proposed Whitewater Centre location as indicated in **Figure 13** below:

[11] The Bore Report details were not located in RCC LGID documentation portfolio. It is inferred from Bore-related questioning during Council's General Meeting of 14.10.23 that this Bore was drilled for BCP groundwater research/ water quality investigation purposes.

STAGE 2 – cont'd:

Figure 13 Registered Bore Location

Contractor Bore Logs confirmed a presence of groundwater at a 6m depth.

Source: https://www.business.qld.gov.au/industries/mining-energy-water/water/bores-and-groundwater/bore-reports

Importantly –

Both **Figure 12 and 13** indicate that a **viable and shallow water table** exists, which in turn appears to demonstrate the site's hydrogeological characteristics and flow function, as per the Groundwater Dependent Ecosystems mapping representations in Stage 1 of this report.

d) Unsuitability of drilling methods used for hydrogeologic profiling and monitoring

In Document 1, the review found the broadscale geotechnical study conducted did not provide sufficient information to characterise the hydrogeology at the site, or to establish a groundwater monitoring network. It appears that the geotechnical study was not intended to focus on groundwater but instead, that groundwater happened to be encountered during the shallow geotechnical investigation.

The equipment used and the depth limits characterise the drilling **as primarily geotechnical soil and rock testing**, with the drilling method apparently **unsuitable for groundwater monitoring** purposes.

The **groundwater limitations of the geotechnical study** (Document 1) are acknowledged by the contractors and described in their *'Appendix A - Notes Relating to This Report':*

"Where groundwater levels are measured in boreholes, there are several potential problems:

- ***Although groundwater may be present**, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.*
- *A localised perched water table may lead to **an erroneous indication** of the true water table.*
- ***Water table levels will vary from time to time** with seasons or recent weather changes and may not be the same at the time of construction."*

STAGE 2 – cont'd:

e) Insufficient hydrogeological detail to inform venue design work

Site concept designs (Document 4) including plan and cross-section excavations, appear to have been developed **without reference of a fully-detailed hydrogeologic baseline**, the absence of which means design concept drawings and specifications may progress to project costings and validation stages **without appropriate consideration** of the groundwater/ Groundwater Dependent Ecosystem risk.

STAGE 3 – Identifying the range of potentially disastrous consequences

The Redlands Olympic Whitewater Centre project appears to have progressed through early-stage planning **without sufficient diligence** given to complex groundwater systems present on the Birkdale site.

Arising from this apparently inadequate groundwater baseline is an **inability to determine the detrimental impacts** of such broad-scale depth of excavation in close proximity to Groundwater Dependent Ecosystems and other hydrogeologic formations within the aquifer-defined catchment.

A good explanation of this damage potential is described in the '*Information Guidelines Explanatory Note: Assessing Groundwater Dependent Ecosystems':*

> "***Surface water*** *is also an essential component of water requirements for many GDEs, and any surface water regulation and/or change to its water quality can have a severe impact on the condition of GDEs*.
>
> ***Aquifers*** *are the* ***connecting features*** *and impacts from developments can be transferred to GDEs through changes in the structure of the aquifer and/or the water it contains. As a result, subterranean, aquatic and terrestrial GDEs are at risk of altered ecological condition*[12]**"**.

Importantly –

Potential impacts causing **adverse hydrogeological outcomes**, relevant to the BCP and the proposed Olympic Whitewater project, include:

a) **altering the surface layer** (use of concrete), thereby reducing recharge to the groundwater table beneath the excavation

b) **removal of permeable silt and alluvium sediment** in the unconsolidated zone, affecting zone capacity to serve as a storage and transport medium to supply water to interconnected GDEs

c) **altering the surface topology**, potentially altering the direction of surface/ subsurface flow away from GDE root zones

d) **altering the subsurface stratigraphy**, potentially altering groundwater flow directions which may impact connected creeks – in particular, **Tingalpa Creek** which is a **critical coastal catchment** to Moreton Bay RAMSAR wetlands

e) **providing a pathway for groundwater contamination** during the construction phase, as the ability for the unconsolidated layer to contain contaminants in the transmission of recharging water is compromised

f) **potential lowering of the groundwater table** below GDE root zones from reduced infiltration

g) **potential for saltwater incursion** from Tingalpa Creek estuarine systems into the coastal aquifer from reduced subsurface flow pressure gradient

h) unknown root system architecture of Core Koala Habitat GDE and whether maximum rooting depths reach deeper confined permeable rock- aquifer structures that may be present, and if so whether such **deeper rock aquifers are vulnerable to construction impacts**.

[12] https://www.iesc.gov.au/sites/default/files/2022-07/information-guidelines-explanatory-note-assessing-groundwater-dependent-ecosystems.pdf

STAGE 3 – cont'd:

Conversely, **hydraulic lifting stresses** from **rising groundwater levels** are a known problem for sunken concrete foundations (eg, swimming pools).

According to current design drawings (Document 4) construction of the Whitewater Centre will require **concreting the base of its main basin**, excavated to a **depth in the order of 6m**.

This risk is identified in the *Broadscale Geotechnical Report* (Document 1) in Section 9 *'Deep Foundations'*:

> "*Bored Piles, CFA piles, driven piles or screw piles could be considered for the support of the proposed structures. Construction difficulties associated with the use of bored piles where groundwater is encountered may make this option cost prohibitive and further advice must be sought if this option is chosen.*"

The Geotechnical Report (Document 1) suggests that **hydraulic rock breakers** may be required for stronger rock formations, **below the 6m bore termination depth** and acknowledges groundwater in certain formations being worked:

> "*Some provisions should be made for encountering stronger, less weathered rock which may result in slower excavation rates even with the abovementioned plant and may require the localised use of hydraulic rock breakers.*
>
> *Blasting techniques are not expected to be required for the encountered rock. Additionally, it must be noted that the geology associated with duricrust formations typically comprises bands of weathered rock underlain by soils and* ***the presence of groundwater throughout the subsurface profile is common***."

Without necessary groundwater reference data, **it is unclear** whether the deeper rock likely to undergo breaking, extraction, and/or being pile-driven, forms part of aquifer or permeable rock-based **groundwater layer formations.**

Importantly –

Given **all indications** are of an **aquifer rock sublayer supporting a 6m shallow water-table** across the Birkdale catchment, such destructive action to underlying weathered rock supporting the aquifer structure is a **highly plausible risk.**

STAGE 4 - Making the case for the use of the existing Olympic Whitewater Stadium in Penrith NSW

Given the absence of a detailed and well understood **hydrogeological site profile**, the scale of Whitewater Centre excavation to be undertaken will likely see the potential to cause **significant** and **consequential habitat loss** within groundwater dependent Core Koala Habitat realised.

In Finding 5.6 of its March 2024 (Brisbane Olympics) *Sport Venue Review*[13], the State Government **mandated referral** of the Whitewater Centre project to the Federal Government for assessment under the *Environment Protection & Biodiversity Conservation (EPBC) Act*.

This recommendation was adopted by Redland City Council. [14]

Advice from expert hydrogeologists confirms that the likely impacts to GDE supporting Koala habitat are **within the scope** of EPBC Assessment.

The Koala, being listed as Endangered under the Federal Government's EPBC Act, requires the referral to DCCEEW of **any project likely to impact the Koala or its habitat**.

According to the Department's *Threatened Species* webpage:

> *"Listed threatened species are matters of national environmental significance (protected matters) under the EPBC Act's assessment and approval provisions.*
>
> *A person must not take an action that has, will have, or is likely to have, a significant impact on a listed threatened ecological community, without approval from the Minister.*
>
> *To obtain approval, an action must undergo an environmental assessment and approval process.*
>
> *The key principle underwriting EPBC referrals is the direction "You must avoid impacts to the environment wherever possible."*[15]

Coupled with this direction is a requirement that **'Feasible Alternatives'** have been considered and discounted, as a condition for approval.

An excerpt from the Department of Climate Change, Energy, the Environment & Water (DCCEEW) Environment *Impact Statement (EIS) Guidelines 2018-8225-file-EIS Guidelines* (p6) states:

> *"FEASIBLE ALTERNATIVES*
>
> *Any feasible alternatives to the action to the extent reasonably practicable, including:*
>
> *a) ... the alternative of **taking no action**;*
>
> *b) a comparative description of the impacts of each alternative on the MNES protected by controlling provisions of Part 3 of the EPBC Act for the action; and*
>
> *c) sufficient detail to make clear why any alternative is preferred to another."*

[13] https://www.statedevelopment.qld.gov.au/__data/assets/pdf_file/0029/87581/sport-venue-review-23.pdf
[14] https://yoursay.redland.qld.gov.au/imagine/news_feed/council-confirms-commitment-to-proposed-redland-whitewater-centre
[15] https://www.dcceew.gov.au/environment/biodiversity/threatened/publications/referral-guidelines-endangered-koala

STAGE 4 – cont'd:

In the context of this potentially highly-damaging Whitewater Centre, the possibility of (a) **"*Taking No Action*"** immediately gives rise to utilising the existing alternative world-class, Olympic competition-standard Whitewater Venue in Penrith, New South Wales - a **solution with zero environmental impact**, and vastly superior benefits. (Refer **Figure 14**)

Figure 14 Aerial view of Penrith Whitewater Stadium

Using the existing Penrith Whitewater Stadium also clearly satisfies the EPBC direction to "*avoid impacts to the environment where possible*".

Importantly –

It is acknowledged at this point that likely destructive environmental impacts to Koala Habitat from Whitewater excavation are not limited to groundwater dependent ecosystems, but also include:

- above-ground factors of Koala tree loss in clearing for parking and services
- habitat disruption from long-term construction operations, and –
- restriction of Koala movement between habitats

These impacts have been well-documented by the Koala Action Group Inc in its various submissions to Redland City Council's community consultation on its proposed Olympic Whitewater project.

STAGE 4 – cont'd:

Another consideration is that **EPBC Assessment** of 'protected' Groundwater Dependent Ecosystem impacts will likely demand greater detailed analysis of groundwater conditions than presently exists for the Birkdale Community Precinct.

By way of illustration:

> *"**Groundwater***
>
> *The EIS must include an assessment of the potential impacts to MNES associated with changes (including altered porosity and permeability associated with any land disturbance) to local groundwater resources associated with the development.*
>
> *The impact assessment must define the extent of the area within which groundwater resources are likely to be affected by the development and the significance of the development to groundwater depletion or recharge, and potential to contaminate groundwater resources.*[16]*"*
>
> *(Source: **Toondah Harbour** Priority Development Area Environmental Impact Statement (EIS) Guidelines)*
>
> **Note:**
> In April 2024, using powers under the EPBC Act, the Federal Minister for the Environment announced a proposed **decision to refuse** the application for a development on Toondah Harbour, and the application was subsequently withdrawn.

Importantly –

The gaps in the BCP hydrogeologic knowledge base are considered an **insurmountable obstacle** to successful EPBC Groundwater Dependent Ecosystem assessment.

These include -

- lacking **mapped depths** to groundwater
- no determination of **temporal variability** in groundwater levels
- no determination of **groundwater flow directions**
- no assessments of **groundwater-surface water interactions** and –
- no determinations of **baseline water quality**.

This situation appears to be further exacerbated by **inadequate investment** in groundwater bore drilling for investigation and monitoring purposes, noting:

- up to **12 additional** monitoring bores, **spaced throughout** the Whitewater excavation footprint are considered an essential prerequisite to establishing a bore pressure-testing and monitoring regime
- monitoring should run over a **protracted period to** account for climatic variations.

[16] Guidelines for the Preparation of a Draft Environment Impact Statement - Environment Protection and Biodiversity Conservation Act 1999

STAGE 4 – cont'd:

Once the monitoring period has been completed, and having obtained necessary detailed data, predictive 3D modelling of the effects and impacts to groundwater structures and flow dynamics from broad scale excavation and concreting at depth, can occur.

Crucially, establishing this multi-year hydrogeologic 'ground-truthing' baseline would provide only the **starting point** for EPBC Assessment - with official unconditional approval **far from guaranteed**.

Importantly –

A decision to use the existing Penrith Whitewater Stadium would clearly circumvent this costly, unnecessary, and time-consuming compliance pathway, and circumvent the risk of not securing approval as the outcome.

The **case for Penrith is compelling,** delivering across-the-board benefits in areas of:

1. **finance** - avoided capital expenditure and construction project cost-blowout risk
2. **environment** – avoided impacts to site ecology, habitats and hydrogeologic formations
3. **delivery** – a turnkey, world-class canoe-slalom facility available to use immediately – avoiding cost-blowout risk (an accepted norm in today's overheated construction industry)
4. **social license** - unwanted by community; running cost burden to ratepayers and –
5. **compliance** – avoiding added costs of expanded drilling and monitoring regimes; costs in EIS preparation etc.

   (Source: CARP Supplementary Submission to Senate Inquiry 18.08.23 – FINALx.pdf)

Finally, this **unnecessary assault** on one of the last untouched urban Koala wildernesses in Brisbane entirely contradicts the primary goal of the ***'National Recovery Plan for the Koala'*** to which the Queensland Government is a signatory, ie -

> *"... to stop the trend of decline in population size of the listed Koala, by having resilient, connected, and genetically healthy metapopulations across its range, and to increase the extent, quality and connectivity of habitat occupied"*[17].

The effects of Koala **habitat loss** from adverse hydrogeologic impacts will likely **endure long after** the Olympic Games.

Considering the suitable alternative venue readily available to host the 2032 Olympic Canoe Slalom events, it is imperative that the **'precautionary principle'** be applied and the proposed Redlands 2032 Olympic Whitewater Centre project **be abandoned**.

This prudent and logical decision will avoid unnecessary impacts to the sensitive Groundwater Dependent Ecosystems of the Birkdale Community Precinct and will avoid the inherent **risk to the 'Olympic brand'** of being tarnished by direct association with this unnecessary harm.

[17] https://www.dcceew.gov.au/environment/biodiversity/threatened/publications/recovery/koala-2022

STAGE 4 – cont'd:

The decision to not construct a duplicate Whitewater venue at Birkdale, in favour of the Penrith alternative, will **preserve this invaluable Koala habitat**, and ensure that the -

- Queensland State Government and Redland City Council **conform** to their Koala-protection obligations, and the –
- Brisbane 2032 Olympic Games **stay true** to the IOC's 'New Norm' venue-reuse and sustainability principles.

A note about Redland City Council

Redland City Council declines further groundwater, hydrology and hydrogeological studies

At Redland City Council's General Meeting of 14 October 2023, the following was put forward as part of the Council Resolution 2023/233 - Notice of Motion[18]:

> "That Council resolve as follows: To conduct relevant sitewide groundwater, hydrology, and hydrogeological studies ..."

In speaking to his motion, the Councillor highlighted **the risk** the impacts of Whitewater construction pose to the unconsolidated sedimentary layer of the Birkdale aquifer and consequentially, to **Groundwater Dependent Core Koala Habitat.**

The Councillor also highlighted a perceived **lack** of detailed site hydrogeological investigation.

A Senior Officer responded to the effect that:

1. Council was in receipt of **'better and further information'** that satisfied its concern that excavation depth would not interrupt groundwater flows in the shallow aquifer

2. a **new tranche** of drilling had been undertaken to inform site hydrology that gave confidence that groundwater would not be affected by construction

3. **earthworks modelling** done indicates excavation away from groundwater; this work forms part of the reference design and is subject to Project Validation Report **confidentiality**.

Importantly –

Without Council's documented evidence that the additional drilling work referred to constitutes a **comprehensive, longitudinal study** of groundwater behaviour and sub-surface flow dynamics under various climatic conditions, we remain unconvinced that the information verbally described in this forum meets the **essential prerequisite** of a **detailed hydrogeologic baseline study** being completed prior to development of this ecologically sensitive site.

At that General Meeting of 14 October 2023, Redland City Council **declined** the opportunity to satisfy this requirement, ie - 'to conduct relevant sitewide groundwater, hydrology and hydrogeological studies' - **by a vote of 6-4**.

The Councillor's motion was lost.

[18] See from 3:31:17 https://webcast.redland.qld.gov.au/archive/video23-1011.php

About the Authors

The lead author of this report is Mark Rodwell who has career experience in the field of catchment hydrology research and environmental compliance. Expert content to the report and its review were provided by a groundwater scientist with a Doctorate in groundwater processes and over 20 years' experience in the field of hydrogeology.

Last Note

The report was prepared on behalf of an alliance of six community organisations in the Redlands.

Our organisations are well respected, long-serving local community groups whose principal focus ranges across community progress and heritage, transparency and accountability in governance, land use planning, koalas, conservation and wildlife preservation.

We can be contacted at – contact@carp-redlands.org.au

- Birkdale Progress Association Inc
- Redlands2030 Inc
- Community Alliance for Responsible Planning (CARP) Redlands Inc
- Koala Action Group Queensland Inc
- ACF Community Bayside
- Wildlife Preservation Society Queensland Inc (Bayside Branch)