MARY RIVER CATCHMENT COORDINATING COMMITTEE

Resource Centre 25 Stewart Terrace, Gympie
Postal PO Box 1027, Gympie, Qld. 4570
Telephone (07) 5482 4766
E- mail admin@mrccc.org.au
Website www.mrccc.org.au
Find us on Facebook

INTEGRATED CATCHMENT MANAGEMENT

Working towards a sustainable and productive future for the Mary River catchment

14 March 2025

Qld Hydro

Borumba Pumped Hydro Energy Storage proposal

Borumba Stakeholder Engagement Team

By email to Borumba@qldhydro.com.au

cc to Qld Coordinator General, Gerrard Coggan cpdinfo@coordinatorgeneral.qld.gov.au

EPBC Referrals epbc.referrals@environment.gov.au

MRCCC submission to Qld Hydro, on the Exploratory Works, draft Preliminary Documentation

Introduction

The Mary River Catchment Coordinating Committee (MRCCC) is a long standing Integrated Catchment Management organisation, established with assistance of the Qld Government in 1993. In addition to our key role in actively engaging with local landholders, industry and community sectors, we have a sound history of productive engagement and partnership with local, state and federal government departments and corporations working in the catchment. As a consequence, we have built a legacy of high-level technical knowledge in water planning, biodiversity, and water infrastructure issues and legislation in the south-east Queensland (SEQ) and Wide Bay-Burnett (WBB) regions. The MRCCC has long-term knowledge of Lake Borumba and water infrastructure proposals for Borumba Dam, dating back to the 1994 water supply options investigation for the Sunshine Coast (predating SEQWater) and has been part of stakeholder consultation with the Borumba Pumped Hydro Energy Storage (PHES) proposal since early 2021, predating the adoption of the proposal by Powerlink and then later by Queensland Hydro.

How to mitigate the environmental impact of Borumba PHES

The MRCCC has identified that the single biggest environmental action to mitigate the impact of the Borumba PHES is to separate the pumped hydropower project from the river system by building two new reservoirs that can work independently of the present Lake Borumba and Yabba Creek. Two new reservoirs that work purely for the production of hydroelectricity will significantly minimise the daily impacts that the current proposal will create, and that cannot be mitigated.

The MRCCC is committed to staying engaged with the Borumba Pumped Hydro proposal, with the explicit aim of minimising the adverse impacts of the project on the Mary River system and associated landscape. As part of this effort, we have put a proposal to Queensland Hydro and to the relevant Queensland Government ministers, to take the project off-river as much as possible by pumping water between the proposed upper reservoir and a new, purpose-built off-stream lower reservoir, instead of pumping water directly back and forth between the Mary River system via Lake Borumba (***Borumba Creek balancing storage proposal***). Without this, in our opinion we see no way that a project of the scale currently being considered can be constructed and operated without causing permanent, irreversible damage to the Mary River system, or increase water treatment costs and/or costly water treatment plant upgrades to Gympie's plant at Jones Hill, or Noosa's town water supply at Lake Macdonald. An outline of the off-stream lower storage proposal has also been sent to the Office of the Coordinator General, and to the team assessing the project under the Federal Environment Protection and Biodiversity Conservation (EPBC) Act.

The MRCCC acknowledges financial and in-kind support from the Sunshine Coast, Noosa, Gympie and Fraser Coast Councils, the Australian Government Department of Climate Change, Energy, the Environment and Water, Seqwater, the Burnett Mary Regional Group, the Queensland Department of Environment, Science and Innovation, the Queensland Department of Main Roads, HQPlantations and landholders throughout the Mary Catchment.
We also acknowledge the Traditional Owners of the country on which we work, and pay our respects to their Elders past, present and emerging.

DONATIONS TO THE MARY CATCHMENT GIFT FUND ARE TAX DEDUCTIBLE

The MRCCC would welcome any opportunity to advance this proposal. Changing this project from being a totally on-river open-loop system as it currently stands, to one that almost primarily protects the river system from the adverse effects of the regular pump/discharge cycle would be the single greatest step towards mitigating at least some of the permanent harm that this project will cause to the Mary River system if it proceeds as currently designed.

Recommend regional EPBC assessment of Matters of National Environmental Significance (MNES) impacts before any planning commences

In hindsight, a regional assessment of EPBC MNES of the Borumba Pumped Hydro proposal should have been performed by the Qld Government before planning commenced to understand the extent of EPBC impacts of this project. This proactive step may have ruled out the current design of BPHES prior to commencement with initial and detailed planning.

Section 1, Overview.

Project justification and risk

In recent years the increasing adverse effects of climate change on the landscape hydrology of the Mary River system have caused concern within the catchment community. These effects are consistent with the long-term climate and hydrological modelling predictions that inform future planning of resource management in the region. The MRCCC has always supported actions to reduce greenhouse gas emissions and sequester atmospheric carbon within the catchment, providing the benefits of these actions outweigh any risks and adverse effects.

We recognise the enormous amount of electrical storage required to allow for decarbonisation of the electrical grid. Such storage is particularly appropriate at key sites of generation and consumption and at critical nodes in the transmission network, where the additional footprint on the landscape and need for associated supporting infrastructure (eg roads, powerlines and impact on watercourses) is minimised. We have studied the long term successful (albeit underutilised) operation of the nearby Splityard Creek/Wivenhoe pumped storage system. *Appropriately sized and located pumped hydro schemes such as Wivenhoe are not comparable in any way with the scale, inherent risk, landscape footprint, biodiversity, and catchment hydrology impact of the Borumba project as currently proposed.*

The MRCCC is yet to be convinced that the economic argument for the project is strong enough to justify the inherent risk that the project poses to the Mary River system and surrounding landscape. It seems that during the conception and development of the project in its current form over the last half decade, the inherent risks and costs of such a complex and difficult project of this unprecedented scale were grossly underestimated, as were its likely significant impacts on matters of national environmental significance.

Over the last half decade, the affordability and feasibility of competing storage technologies and energy market devices for stabilising the power grid have steadily improved, while the costs, risks and recognised adverse impacts of the Borumba project as currently proposed have steadily ballooned. At the end of 2024, the capital costs of power supply capacity ($9200/kW) and nominal energy storage capacity ($383/kWh) of the Borumba proposal are many times higher than any reasonable benchmark costings for pumped hydro storage projects from reputable sources, such as the recent global review by Blakers et al (2025). A comparison with the figures in the 2024/2025 CSIRO GenCost report illustrates what an outlier the Borumba project is (Table 1)

Total capital cost	**Borumba 24hr 2GW**	**GenCost 24 hr PH**	**GenCost 24 hr battery**
/Power capacity -$/kW	9200	6431	6840
/Energy capacity $/kWh	383	264	285

Table 1. Borumba is not a cost effective way of building storage into the grid.

Furthermore, this energy proposal is intrinsically linked to availability of water in an increasingly evaporative landscape to allow transition to a renewable energy source, however the proposed site poses huge environmental challenges.

The MRCCC questions how the economic and political drivers behind a project this far outside all reasonable industry economic benchmarks could be allowed to override the environmental and biodiversity risks posed by the project. The Detailed Analytical Report produced by the Qld State Government to justify the funding commitment to the project is protected by cabinet confidentiality, so an answer to this question may not be available for several decades.

Section 1.4.2 Threatened Species Listing p.13

Conservation Status

MRCCC notes the changes to the conservation status of threatened fauna since Referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC):

- Mary River turtle (*Elusor macrurus*) – changed to Critically Endangered 4 September 2024
- Coxen's Fig-Parrot (*Cyclopsitta diophthalma coxeni*) – changed to Critically Endangered 31 March 2023
- Conondale Spiny Crayfish (*Euastacus hystricosus*) – new listing as Endangered 4 September 2024
- Diamond Firetail (*Stagonopleura guttata*) – new listing as Vulnerable 31 March 2023
- Brown treecreeper (*Climacteris picumnus victoriae*) – new listing as Vulnerable 31 March 2023

Although the Borumba PHES Exploratory Works proposal was declared a Controlled Action in 2022, therefore triggering Referral under the EPBC Act 1999 prior to the up-grading and new listing of the above species, MRCCC maintains it is prudent to assess potential impact to these species according to their current EPBC Conservation Status in this and possible future Environmental Impact Statements (EIS) for the Main Works.

Upgrading the conservation status and new listings of species indicates greater threats and need for greater protection measures for already threatened species. Upgrading species to Critically Endangered is one step away from 'extinct in the wild'. It is critical to factor in cumulative impacts and impacts from climate change when assessing potential impacts to threatened species. The adoption of the "Precautionary Principle" is also required when faced with threats of serious or irreversible damage and lack of scientific certainty. The application of conservative environmental impact assessment, which includes the upgraded conservation status of threatened species is recommended. MRCCC recommends this approach be applied now and in any future EIS for the Proposal.

2.3.2.1 Investigation Areas – Area 1, below Borumba Dam p.44

The proposed crossing and Exploratory Works Area 1 site at Yabba Creek is downstream of the dam wall where the vulnerable Australian lungfish (*Neoceratodus forsteri*), critically endangered Mary River turtle (*Elusor macrurus*), and the critically endangered White-throated snapping turtle (*Elseya albagula*) are known to occur.

Historically, Mary River turtles are reported to have nested on the creek banks at this site in past years. It is likely that the endangered Mary River cod (*Maccullochella mariensis*) use this instream habitat as well. Riverine reaches directly downstream of water storages have been shown to have the greatest potential for restoration of macrophyte beds (Marshall et al., 2015).

The Site Environmental Plan (SEP) for Area 1 (Borumba Dam) must detail site specific constraints and key environmental management measures that minimize all potential interactions with lungfish, Mary River turtles and Mary River cod during the construction, operational and decommissioning phase of the Exploratory works. Management of all potential impacts to threatened species from the proposed works, including the bed-level crossing and bridge construction are to be detailed in the SEP. Details of the Erosion and Sediment Control Plan are also required for assessment during the Exploratory Works phase to ensure that the water quality and high biodiversity values of Yabba Creek and the adjacent riparian vegetation are not compromised or impacted downstream.

Table 5 p.36 indicates 10 light vehicles and 60 heavy vehicles plan to use the bed-level stream crossing per day in this environmentally sensitive area.

The instream habitat and riparian vegetation at Area 1 are of high quality and value. There is excellent potential for Mary River cod and lungfish habitat, due to the overhanging vegetation, potential hydrophyte colonization, instream pools and riffles and instream woody debris found at this location. One Permit to disturb riparian vegetation has already been issued, however the location is not provided.

A request for further information for the location of the Permit is requested in order to assess other areas of riparian vegetation yet to be assessed.

Figure 6 p. 29 does not detail the Yabba Creek bed-level stream crossing design for Site access. Area 1. Table 3 p31 does not indicate what area of instream and riparian vegetation will be directly impacted for the bed-level stream crossing and temporary bridge construction at Yabba Ck Area 1, as the area impacted is rolled into Site Access footprint. The instream habitat and riparian vegetation at Area 1 are of high quality and value. There is excellent potential for Mary River cod and lungfish habitat, due to the overhanging vegetation, potential hydrophyte colonisation, instream pools and riffles, and instream woody debris found at this location.

Table 4 p.32 does not provide detail on the anticipated Project Schedule for the bed-level stream construction and temporary bridge construction for Area 1 – in particular, the timeframe for construction and usage of the temporary crossing. It may be assumed that timing for the construction is covered under 'Construction of new and upgrade to existing tracks at Borumba Dam to service geotechnical investigations, between April and December 2025', but it is not clear.

Section 2.4, Spoil Disposal p.51

The spoil dump proposed at Borgan (area 4) is of great concern to the MRCCC. There are many unknowns about the spoil dump, in particular the size, volumes of dams and sediment detention basins. The volume of spoil can be estimated, but at this point the water ingress from the tunnel is unknown, therefore a water balance study cannot be performed, which will inform the size and volume of detention basins required. Without a water balance study it is very difficult to determine how water will be managed during an extreme rain event (as was predicted with Cyclone Alfred recently). The document states that removal of excess water during an extreme rain event, to be performed by:

1. Trucking offsite. The volume and intensity of water makes this completely unrealistic and if trucked, to where?
2. Irrigation and/or evaporation. This is not an option during an extreme rainfall event.
3. Additional storage at another location. The document does not specify where, in what, and how it gets there. This could be investigated to identify a feasible location for emergency discharge onto a paddock, or like, sited with sufficient buffers to waterways.
4. Release to the environment into Sandy and Yabba Creeks. This is the more likely option, given the other three options won't be feasible during an extreme rainfall event. The MRCCC does not support this option.

The topography and terrain of the tunnel and the associated spoil dump area makes the siting and operation extremely difficult and potentially hazardous. To access the portal pad, staging area, spoil dump and tunnel requires three creek crossings. For the spoil to be moved from the tunnel to the spoil dump also requires 3 creek crossings. There can be up to 380 heavy truck movements daily in Area 4, therefore there is a high risk of incidental spillage of spoil into the waterways if there is accident or flood damage. Diverting runoff water from the landscape above the portal pad, staging area and spoil dump will be extremely difficult, but essential to manage potentially uncontrolled discharges of leachate-laden spoil dump water.

On page 79 the document states the stormwater management will be based on a 24-hour storm event with an average recurrence interval of 1 in 5 years. The MRCCC recommends a higher level standard should be applied to ensure that there is no discharge to the waterways. This is relevant as there have been more than one such event in the past five years.

The Kingaham bypass spoil dump is located across a waterway that discharges directly into Kingaham Creek. The spoil dump is within close proximity to Kingaham Creek itself.

Section 2.5.1.3 Temporary bed level crossings

The timing of bed-level stream crossings construction of Area 1 and 4 is not detailed in the document. This is important given the breeding and spawning periods of the threatened aquatic species occur in the Spring to early Summer months, which is likely to coincide with the bed-level crossing construction.

Management of all potential impacts to threatened species from the proposed works, including the bed-level crossing and bridge construction are to be detailed in the Sediment and Erosion Plan (SEP). The "as constructed" Exploratory Works Erosion and Sediment Control Plan is not likely to be available for scrutiny by the public to ensure that the water quality and high biodiversity values of Yabba Creek and the adjacent riparian vegetation are not compromised or impacted downstream.

The timing of temporary bridge construction is also not detailed. The MRCCC notes that 10-20m3 of rock deposited on the creek bed will lift the crossing out of the creek flow. The MRCCC anticipates that vehicles will not be driving through creek water flowing across the crossing; therefore fish passage will be impeded for the period of time between bed-level stream crossing construction and temporary bridge construction. Given the level of vehicle movements in Area 4 (Borgan creek crossings - 380 heavy vehicle movements per day, p.36), maintaining a crossing that doesn't impede fish passage will be a difficult task.

The MRCCC is concerned that bed-level stream construction and/or temporary bridge construction may occur during the spawning period for lungfish and cod and the nesting period for the Mary River turtles.

In-stream disturbance during spawning and nesting can be deleterious to individual viability and reproduction and ongoing population survival. Further, intense rainfall events occur during monsoonal activity in the spring to summer months.

Any delays incurred during the construction of the waterway crossings would cause the construction period to extend into the storm season, negatively impacting downstream water quality.

The Water Quality Risk Assessment (appendix G) discussed bypass channels at the Area 4 bed level crossings. Any details for construction or timing of these bypass channels is not provided in the technical report or discussed in the main document.

One Permit to disturb riparian vegetation has already been issued, however the location is not provided. A request for further information for the location of the Permit is requested in order to assess other areas of riparian vegetation yet to be assessed.

3.10.1 Invasive species and disease, p.133

MRCCC understands that Qld Hydro has prepared a Biosecurity Management Plan, referenced on p.240. The biosecurity management plan hasn't been included in the supporting documents, so cannot be reviewed. There are a number of biosecurity risks to the environment that have been identified including myrtle rust, chytrid fungus, bunya Pine dieback associated with phytophthora species, and more recently, fire ants.

The MRCCC will primarily focus on Weedy *Sporobolus* Grasses (WSG) in this section given the scale of the issue, and the potential risk it poses to the environmental values of the proposed upper reservoir (Walkers Top).

The introduced rat's tail (*Sporobolus*) grasses are invasive grasses that reduce pasture productivity, out-compete native pasture plants, and cause significant degradation of natural areas. They are broadly referred to as weedy *Sporobolus* grasses (WSG).

Four species of introduced Sporobolus grasses are invasive plants in Queensland:

- giant rat's tail grass *(Sporobolus pyramidalis and S. natalensis)*
- American rat's tail *grass (S. jacquemontii)*
- giant Parramatta grass *(S. fertilis)*

Legal requirements

All of the above four *Sporobolus* grasses are declared category 3 restricted invasive plants under the *Biosecurity Act 2014.* The Act requires land managers to take all reasonable and practical measures to minimise the biosecurity risks associated with the spread of these invasive plants under their control. This is referred to as a general biosecurity obligation (GBO).

Firstly, on p.279 of the *Construction Environmental Management Plan* Qld Hydro states they plan to treat "large" infestations of weeds. However the GBO requires Qld Hydro to treat all infestations of declared weeds such as WSG. Given the scale of vehicle movements across the exploratory works area – upwards of 380 heavy vehicle movements per day (p.36), Qld Hydro and its contractors hold a significant biosecurity obligation, particularly with weed seed spread via roads e.g. Bella and Kingaham Creek Roads and the proposed new track network. Controlling WSG infestations on the road networks associated with the exploratory works is essential to minimise weed seed spread given the significantly increased traffic of light and heavy vehicles estimated in the document. MRCCC also recommends Qld Hydro adopts the 'early detection, rapid response' protocol. This will involve regular auditing. In the Construction Environmental Management Plan Qld Hydro has recommended six-monthly audits including weed incursions. MRCCC recommends much more regular weed auditing, particularly along freshly cleared tracks, and tracks with high traffic loads. A weed management plan is recommended to bring all these responsibilities into one clear, concise document that can be communicated to all stakeholders, contractors etc.

Methods of weed seed spread

WSG seeds are mainly spread by livestock, vehicles, and machinery (especially earthmoving equipment and slashers), and also by flowing watercourses. Livestock can spread seed in manure, on fur and with mud on hooves. This includes invasive animals such as feral deer, as well as native animals.

Environmental impacts

WSG infestations can seriously degrade conservation and natural areas (native grass open forest ecosystems), reducing ecosystem values and habitat for native fauna.

Wash-down bays

The current exploratory works include regular vehicle and machinery access along Kingaham Creek road, plus other roads, for a range of purposes including tunnelling operations. Significant roadside infestations of WSGs and their resultant seed banks, currently exist along all of these roads. The seed life of WSG seed is in excess of 10 years. As these past and present infestations contaminate the gravel road surface with WSG seed, Qld Hydro vehicles and other vehicles are also re-contaminated on a daily use basis. This is compounded by these vehicles fording major creeks: Yabba, Sandy, Kingaham Creeks and similar wet creek crossings en-route, as subsequent WSG seed will stick to the wet vehicles due to the seed's gelatinous seed coating (sticky when wet!).

Therefore, professionally designed wash-down bays with elevated ramps, seed-catching mechanisms and water capture/recycling facilities should be priority infrastructure to pressure-wash both the underside and topside of vehicles. These wash-downs need to be done both prior to access to all Qld Hydro landholdings, and again when the vehicles exit the gravel road complex when returning to town. Such wash-down bays would not only play a key role as part of Qld Hydro's Bio-Security Management Plan, but would visibly demonstrate Qld Hydro's professed high standing in the community (especially farming and landholder communities) as a professional and responsible Range Manager.

Upper Reservoir site

This Upland Open Eucalypt Forest with a kangaroo grass meadow understory is a unique land type with high ecological values. Unfortunately, it currently appears to have a comparatively low-level population of WSG plants, probably due to regular access by feral red deer, deer hunting vehicles, and logging operations in past years.

Therefore it is imperative that this unique upland Forest estate is not further infested by WSG-contaminated vehicles and machinery during the current Qld Hydro exploration works. Accordingly, additional wash-down facilities should be installed on both the Kingaham Road and Jimna Road access points to ensure that only ultra-clean vehicles (including cleaning vehicle floors), have access to the Upper Reservoir site.

Wild fires

A further biosecurity-related threat to the Upland is wild fires, the frequency of which has increased in recent years. Wild fires will not only cause severe ecological damage to this fragile land type, but will also provide a window for the germination of WSG seed already present on this site. In wild fire emergencies, bulldozers are frequently employed to cut firebreaks without a prior clean down process. The resultant contaminated machinery and disturbed soil on the fire breaks would create an additional WSG weed seed spread risk as well as a seedbed for the germination of any WSG seed. There is also urgency to develop a Wildfire Management Plan, including winter season controlled patch-burning practices, and construction of a helipad adjacent to the planned Upper Reservoir, to facilitate on the spot fire-fighting helicopter support.

Emerging biosecurity threats

Qld Hydro should also consider the development of additional Bio-Security Management Plans for feral red deer (the population of which could explode when the Upper Reservoir provides permanent water), fireweed *Senecio madagascariensis* – (wind spread seed with the SE trade winds), and fire ants (most recently found within 100 km at North Arm).

5.5 Potential cumulative impacts – RFI item 4.5(b)

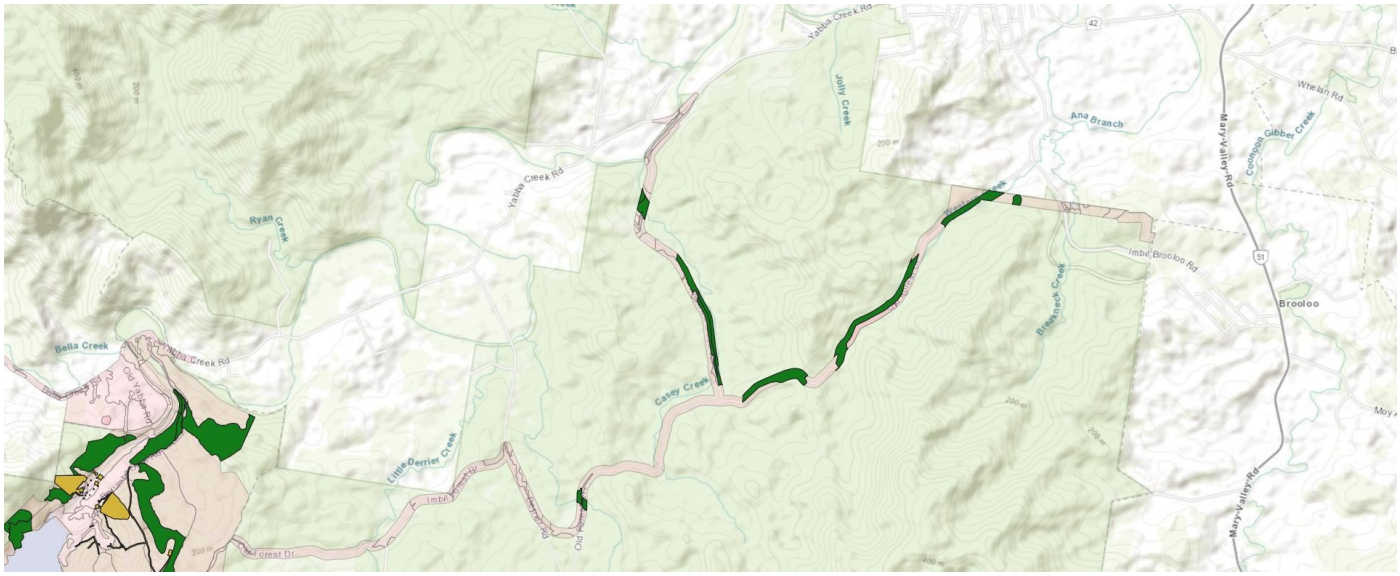
There are many large-scale renewable energy projects in the vicinity of the Borumba project that may or may not have significant impacts on MNES. However, they contribute to the general cumulative impact of the wider changes being planned for the local power grid, of which Borumba is only one component. If the exploratory works for Borumba were not to proceed, the wider impacts of most of these other proposals would still occur, given that the energy storage and grid services required would be provided by means other than Borumba.

The major exception is the Powerlink project for two power line connections from the Borumba site to Halys and Woolooga substations. The Powerlink project will have major impacts on MNES, and its impacts should not be assessed separately from the Borumba exploratory works and main works, as all three referrals are integrally interconnected parts of the same project, artificially divided into separate assessments.

At a smaller scale, there are several actions currently underway or being planned in the Mary River catchment with the specific purpose of enabling the exploratory works for Borumba to proceed, which have not been referred for assessment under the EPBC Act.

These actions will have impacts on the same controlling provisions being assessed for the Borumba exploratory works– namely threatened ecological communities and threatened species. Considered individually, these actions may or may not have significant residual impacts, but because they would not be taking place if the Borumba exploratory works were not proceeding, their impacts should be considered as cumulative impacts of the exploratory works. These actions will also benefit the Borumba main works, but it can be argued that as they are being built and planned now for the exploratory works, their impact and any offset requirement should be assessed as part of the exploratory works referral.

The two main areas of concern for the MRCCC are the planned access route to the exploratory works site along Old Forest Drive, Casey's Gully Road, and Western Creek Road (in conjunction with Gympie Regional Council) and plans for bridge upgrades across Yabba Creek on Yabba Creek Road between Imbil and Borumba (in conjunction with Qld Main Roads).



Eastern routes for Borumba pumped hydro exploratory works

Pink shading shows ground-truthed regional ecosystem mapping published by Queensland Hydro as part of the preliminary documentation for the exploratory works, including a proposed new eastern transport corridor. Green areas indicate verified patches of the Lowland Rainforest of Subtropical Australia TEC. The other proposed eastern access route to the exploratory works is Yabba Creek Road, requiring replacement of existing bridges at multiple crossings of Yabba Creek. Both of these routes will have impacts on MNES, part of the cumulative impacts of the proposed exploratory works. It is not clear whether these impacts are provided for in the offset area management plan. Source: shapefiles provided by Queensland Hydro, Esri topographic basemap.

Vegetation mapping shapefiles provided by Qld Hydro as part of the draft preliminary documentation shows patches of remnant Lowland Rainforest of Subtropical Australia along the planned access route via Old Forest Drive out to the Gympie Brooloo Road. Significant roadworks in these locations will have the effect of further fragmenting important remnant patches of this community (which was purposefully kept intact by early 20th century foresters when clearing for plantations). Overlaying the impact of a 50 m buffer on either side of this access route, would seriously fragment this important connected network of remnant patches**. It is not clear from the documentation whether this impact has been accounted for in the development of the draft OAMP for the exploratory work.**

There are six bridges across Yabba Creek on Yabba Creek Road between Imbil and Borumba Dam, several of them one lane timber bridges not suitable for heavy transport of the size required for the exploratory works. This stretch of Yabba Creek has high ecological value, providing habitat for Mary River cod, Lungfish, Mary River turtle and White throated snapping turtle. In many places the riparian vegetation is Qld Regional Ecosystem 12.3.1, which is very likely to contain the EPBC Lowland Rainforest TEC and individually listed flora species. Queensland Hydro plans to upgrade/rebuild these bridges in conjunction with Main Roads. **The impacts of these upgrades should be considered and assessed as part of the cumulative impacts of the Borumba PH exploratory works, and incorporated into the OAMP for the exploratory works.**

Section 6 Avoidance, mitigation and management measures

6.1.3.1 Refinement of site access

Landslips

The steep slopes of the Mary Valley are prone to landslips. These are often caused by changes to patterns of water flow and sub-surface moisture conditions following the construction and upgrades to tracks, roadways and associated drainage. This effect is evident in the vicinity of the exploratory works (visible from Butlers Corner Road), where a landslip in forestry land was triggered by disturbance from an access track. Minor drainage modifications to tracks on this landslip-prone land can lead to catastrophic consequences, as evident at Butlers Corner Road, Imbil.

Quite often these landslips are associated with an underlying clay layer which loses cohesive strength when hydrated. Once they have occurred, such landslips are usually very difficult to stabilise, contributing high sediment loads to the stream network with each subsequent high rainfall event. Special design and construction attention will be needed to avoid this landslip risk along any new or upgraded access tracks in steep country in the project area.

Section 7 - Significant impact assessment

7.1 Threatened ecological communities

7.1.1 Subtropical lowland rainforest – critically endangered Threatened Ecological Community, p.215

The MRCCC has a long history (over 30 years) of working with private landholders to rehabilitate and restore the subtropical lowland rainforest vegetation community, primarily in riparian zones. These riparian zones tend to have a high edge-to-remnant area ratio, and are therefore exposed to transformational environmental weed incursions. MRCCC understands the importance of maintaining edges and preventing fragmentation to maintain condition; and the issues and costs involved in restoration and rehabilitation of this vegetation community. MRCCC cannot stress the importance of regular surveillance and vigilance to maintain and encourage expansion of these important rainforest patches, and the costs involved cannot also be underestimated. Experience has demonstrated (outlined in the giant barred frog comments) that at least a 25 to 30 year program is required to rehabilitate this vegetation community to restore functionality for key species to return eg. Giant barred frog.

Table 38, assessment of impacts, p.218

Changes to habitat quality as a result of erosion and sedimentation, p.220.

Dispersive soils are likely to occur throughout the exploratory works areas, and Area 1 will involve clearing of vegetation (and Threatened Ecological Community [TEC] fragmentation) on steep slopes that are likely to be impact, as identified by Qld Hydro. MRCCC acknowledges that an Erosion and Sediment Control (ESC) plan has been developed, but sodic and dispersive soils require specific treatments and erosion control measures. Mitigation strategies need to be developed beyond the ESC Plan that includes gully erosion control measures. Ideally, avoidance of exposure of dispersive soils should be the first priority, and if there has to be disturbance, contractors need to demonstrate experience working in dispersive soils, whereby they understand the importance and how to create minimal disturbance, not exposing the dispersive, sodic subsoils that create the fine sediment plume and severe erosion issues. MRCCC has observed many instances where contractors maintain that they understand how to work in dispersive soils (or even remediate these areas), but subsequently create bigger problems leading to exacerbated, more expensive outcomes.

The document also states that TEC located outside and downslope of the project footprint could be at risk of erosion. However, often sheet wash and subsequent gully erosion moves up-slope thus creating issues with loss of surface (including potentially TEC) via gully erosion, once the dispersive sub-soil is exposed.

Changes to the local bushfire regime

The risk assessment underestimates the fact that more vehicles and human activity is likely to create a higher fire risk to areas that were previously inaccessible. Increased fragmentation will also create greater fire risk. A Fire management plan is recommended, which links to MRCCC recommendations to protect the Glider species.

Spread of weeds, pests and disease due to increased human activity

The risk assessment clearly identifies that the TECs have minimal weed threat at present, by only identifying lantana, corky passion vine and noogurra burr as weed threats. These weeds are relatively easily controlled compared to Sub Tropical Lowland Rainforest (STLR) transformer weeds such as Cat's claw vine and Madeira vine.

As a consequence of minimal weed threat at present, higher levels of vigilance are required as fragmentation will allow easier pathways for new 'transformer' weed incursions to occur.

To minimise the incursion of these weeds, greater attention is required to the threat posed by edge effects (section 5.3.2). It is well recognised in the Mary River catchment that many environmental weeds are introduced through wind-blown sources and establish themselves via TEC edges initially. Once established they are near impossible to eradicate.

Impacts to surface and groundwater… On page 222, the document is quoted, "The Project will improve the hydrology of Borgan Road which is surrounded by TEC". This statement is cryptic, without any validation. MRCCC is unsure how this project will actually improve the hydrology. The hydrology will be changed, whether the hydrology is improved is debateable.

Impact criteria, table 39, p.224

Cause a substantial change in the species composition of an occurrence of an ecological community… It is likely that fragmentation of STLR via new or upgraded roads/tracks will change the species composition of the ecological community, through increased edge effects favouring specific species or potentially transformational environmental weed species.

Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community…. On page 225 the document is quoted, "the Project is unlikely to facilitate the further spread of weeds and pests into areas where they are not". The MRCCC's maintains that this project is likely to cause a reduction in the quality of the TEC. The introduction of transformational environmental weeds such as Cat's claw vine, Madeira vine, ochna, privet and some grass species through increased edge effect can cause a substantial reduction in the quality of the STLR. These weed species are present within the sub-catchment, and are currently kept at bay through resilient vegetation communities and isolation from vehicles and humans. Presently these remnant patches are sealed in some form from weed encroachment, however the exploratory works opens these remnant patches to greater exposure from threats that can transform and degrade the TEC. This results in costly long-term weed control activities, unless a weed control plan is developed, with frequent (greater than six-monthly) monitoring and surveillance, early detection, and rapid response measures.

7.3 Threatened fauna

Section 7.3.3 Giant barred frog, p.366

The document's risk assessment states that there is 'Unlikely to be impact on the species'

However, has this assessment been within and external to the area of works? We assume the risk assessment is only within the exploratory works footprint. Recommendation to assess the potential external impacts to the giant barred frog from increased human, vehicle and threats e.g. potentially increased pig threat due to more human disturbance, and chytrid fungus spread at higher elevations.

There are known populations in adjacent Coonoongibber Creek sub-catchment. Therefore, it is very likely that *M. iteratus* occurs at least in the upper Yabba catchment (see comment and map below).

Records demonstrate there is/was a connection in a north/south direction for this species in upper catchments and to the east and west of the main trunk of the Mary River (i.e. Six Mile sub-catchment with Tinana Creek sub-catchment, and Little Yabba with Coonoongibber Creek (Yabba) system). There has been a historical connection between the Mary River catchment and the Burrum River system (i.e. record of *M. iteratus* on Doongul Creek).

Dams cause impenetrable barriers laterally and longitudinally in these vital upper regions of sub-catchments for movement of adults, juveniles and tadpoles. The main trunk of the Mary River is not a good conduit for movement of this species.

Statement 'The Conservation Advice for the Giant barred frog states that the species is a large, ground-dwelling frog, often found in lowland open wet forests….'

Conservation advice also states that '…the species is showing some signs of recovery at mid-elevations, with small numbers of individuals recorded at sites at 500 m in the Conondale Range and Lamington National Park'.

Area of direct impact of the project is between 150 and 500 m and therefore likely to create barriers to movement (roads, tracks, water pipes, and infrastructure). To the north of Coonoongibber Creek its distribution is information deficient.

Conservation Advice says 'The Giant barred frog is predominantly found in a limited range of wet forest types. This specialisation, together with the noted fragmentation of the population, the low number of individuals at localities (particularly within the south of the species range), its sensitivity to disturbance, and its low dispersal ability, increases the susceptibility of *M. iteratus* to local extinction.'

Therefore further fragmentation (via the exploratory works stage) of key habitat ie subtropical lowland rainforest may prevent potential recolonisation of the species from adjacent populations or could lead to further risk of localised extinction, based on the Conservation Advice.

Populations within the footprint and surrounding upper catchment streams could have declined or become locally extinct and may be currently recovering, as they are in the Conondale and Blackall ranges at altitude. Known declines elsewhere have been likely caused by infection from the *Batrachochytrium dendrobatidis* (i.e. Chytrid) fungus and may be the reason for apparent absence of *M. iteratus* within the survey area.

The headwaters of the streams impacted by the project are adjacent to the upper catchments of Little Yabba and Coonoongibber Creeks (both with populations of *M. iteratus*). Landscape connection is possible through the upper Borumba Creek system.

We recommend creating more and robust corridors, not further barriers or fragmentation to distribution movement and genetic pathways. The Conservation Advice for *M. iteratus* provides the following Conservation and Management Priorities – 'Identify and conserve landscape characteristics that facilitate movement between subpopulations.' and 'Investigate options for linking, enhancing or establishing additional subpopulations.'. This project has the potential to restrict movements, against the recommendations of the Conservation Advice priorities, by habitat clearing, fragmentation and barrier creation.

Recent observations of the species (in 2023 and 2024) have been made in Imbil State Forest and near Yabba Creek (iNaturalist, 2023), less than 10 km from the Exploratory Works Project footprint. However, as these observations were lodged through a secondary source, they are subject to confirmation.

This record is verified having been confirmed by Eva Ford (MRCCC) and Harry Hines (DETSI). Location information blurred in iNaturalist but may be in Coonoongibber Creek, or possibly Derrier Creek.

M. iteratus records WildNet (two specimens) collected within 3 km of point on map below.

The document needs to be reviewed to include these records and recognise the possible recovery of species that may be occurring or has the potential to occur with rehabilitation effort in disturbed areas.

The proponent needs to recognise the threat of the project to what may be the last remaining small populations through clearing and replacement of habitat with barriers for connections between sub-catchments.

Habitat Critical to the Survival of the Species: 'While the Project area is near the Conondale Ranges in the Mary River catchment, as the species was not detected within the Borumba PHES Survey Area despite extensive survey effort, and no records of the species have been recorded in the Exploratory Works Survey area, it is considered unlikely the Exploratory Works Survey area supports habitat critical to the survival of the species.'

MRCCC recommends that the survey area does contain habitat that could support the Giant barred frog, and therefore the area should be identified as 'possible' habitat not 'unlikely' habitat.

- Survey effort
    - Amphibian targeted surveys only between 11 to 21 December 2022 at only seven sites. While 2022 is remembered as a very wet year in the Mary River catchment, the last few months of 2022 were drier than usual. December 2022 mean rainfall for Upper Kandanga (Oakwood rainfall station) is 124mm, however December 2022 only recorded 73mm; therefore conditions may not have been conducive for Giant barred frog acoustic detection.
    - No mention of effort for targeted amphibian surveys.
    - Where are the seven amphibian targeted survey sites?
    - Call playback was only for one hour during each of the periods 5th to 9th December 2024 and 5th to 9th February 2025. Not very long periods. How many sites?

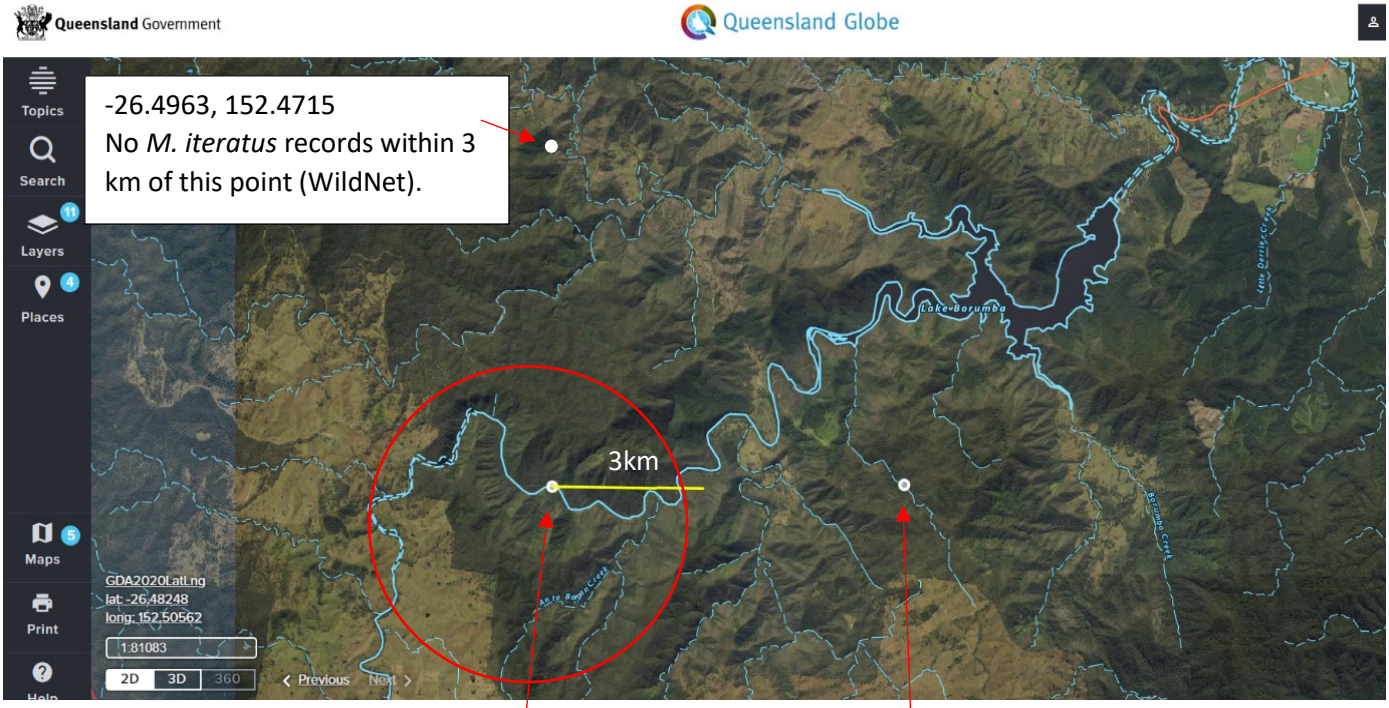
Unfortunately February 2025 was not a good survey period with below average rainfall conditions according to the Oakwood rainfall station. MRCCC frog surveys in February 2025 were not as successful compared to other wetter years. December conditions? No description of conditions conducive for *M. iteratus* activity and calling. More information is required.

We have evidence that at some of the MRCCC's long-term frog monitoring transects (20+ years of annual surveying along standard transects), some periods of non-detectability occur even where there are known to be large populations (e.g. Cooroora Creek)

- Potential habitat on Cedar Creek (Upper reservoir feeder creek) was not included within the survey area therefore not identified as potential habitat. This needs to be assessed for habitat potential, and surveyed.

Other systems that may not have been surveyed, and should be, are:

- Cedar Creek in gorge reach.
- Little Bella Creek
- Upper Kingaham Creek.



-26.5556, 152.4692
M. iteratus records x two specimens collected within 3 km of this point (WildNet).

-26.5555, 152.5397
No *M. iteratus* records within 4 km of this point (WildNet).

Section 7.3.9 Mary River cod (*Maccullochella mariensis*) p.410

Reference sources seem old in general. The document does not refer to any other *Maccullochella* species as a potential reference for some of the unknown aspects of the Mary River cod.

Table 94:

- Spawning habitat: No mention of undercut banks. *M. peeli* (Murray Cod) recorded use of undercuts.
- Distribution: the 2016 data used only mentions "Tinana-Coondoo Creek, Six Mile Creek, and upper Obi Obi Creek". Qld Hydro do recognise that Yabba, Lake Borumba has previous records of Mary River cod. Yabba Creek is a key cod habitat.
- Survey effort: The following doesn't make sense and should be clarified, "Surveys involved visual observations of the Mary River cod via kayaking in the Kingaham, Yabba and Sandy Creeks, eDNA surveys, fyke netting, cathedral trapping, electrofishing (backpack and boat-based electrofishing), snorkelling, angling, and box trapping (Hydrobiology, 2023)."

Table 95:

- Bed level crossings: the constructed bed level may be designed to not restrict fish passage but the level of traffic will, especially at times of higher activity for cod (Dusk and dawn). Light pollution is considered, but not vehicles headlights while crossing. Contamination via petroleum based oils during vehicles crossing is a potential risk that is likely to impede fish passage.

Table 96:

Due to the project's "temporary nature" the impacts are deemed "unlikely to lead to a long-term decrease in the size of a population". However, there are likely to be significant localised effects.

Section 7.3.1 Lungfish *(Neoceratodus forsteri*) p. 335

Table 72, Impact Criteria: Disrupt the Breeding cycle of an important population:

"Unlike Australian lungfish in the Burnett catchment, the Mary River catchment population is not known to undertake spawning migrations (Kind, 2003) p.335" – This information is provided from one publication by Peter Kind (2003) where it is stated that Australian lungfish spawning migration in the Mary River catchment was not detected. The Burnett catchment is more highly modified than the Mary River catchment.

Lungfish are known to spawn in the Brisbane River (Kemp, 2017). The population of lungfish sampled from the Brisbane River were actively spawning and recruiting young to the population (Kemp, 1996 and Kemp, 2005 in Kemp, 2017). Research suggests that populations of lungfish in riverine systems are reproductively viable (Kemp, 1996 & Kemp, 2005 in Kemp, 2017). In contrast, lungfish sampled from Enogerra Reservoir were all of advanced age with no recruitment occurring from 1974. All samples taken from water impoundments during fish kills have been adults, with no sub-adults or juveniles (Kemp, 2017). Further research into the current spawning population of lungfish in Yabba Creek and the Mary River system is required.

Lungfish spawn on dense macrophytes beds such as Eelgrass or Ribbon plant (*Vallisneria nana* and/or *V. annua*). Lungfish spawn seasonally in early to mid-spring during low-flow events where water temperatures range between 18 and 28 C. (Espinoza et al, 2013). Oviposition may occur on short, dense macrophytes in shallow water (Espinoza et al, 2013). The impoundment of riverine habitats changes water depths and impedes establishment and development and therefore the growth and distribution of macrophytes (Marshall et al., 2015).

This information emphasizes the importance of riverine lungfish populations where the viability of fish eggs and recruitment success is greater than populations found in aquatic impoundments. All efforts to sustain and protect populations of lungfish in riverine systems such as the Sandy and Yabba Creek confluence in the vicinity of Area 4, Borgan, in particular the potential impact to this important riverine habitat by uncontrolled discharge of leachate-laden from the spoil dump, is of the highest importance. This also applies to Exploratory works Area 1 – the reach of Yabba Creek downstream of Borumba Dam, where lungfish occur.

References

Espinoza, T., Marshall, S.M. and McDougall, A.J. (2013) Spawning of the endangered Australian lungfish (*Neoceratodus forsteri*) in a heavily regulated river: a pulse for life, *River Research Applications 29: 01215 - 1225*

Kemp, A, (2017) Environmental alterations in southeast Queensland endanger the Australian lungfish, *Neoceratodus forsteri* (Osteichthyes: Dipnoi), *The Proceedings of the Royal Society of Queensland*

Marshall, S.M., Espinoza, T. and McDougall, A.J. (2015) Effects of water level fluctuations on spawning habitat of an endangered species, The Australian lungfish *(Neoceratodus forsteri)*, *River Research Applications 31: 552 – 562*

Section 7.3.5 p.368 Greater Glider

Greater Glider – *Petauroides volans*, Endangered

- 33.9 ha of habitat to be cleared in Exploratory works project.
- A total of five records of greater glider (southern and central) were detected within the Borumba PHES Survey Area. One observation was recorded in the Exploratory Works Survey area along Walkers Top Road in Area 3 – Walkers Top.
- 33.9 ha of habitat occurs in the Exploratory Works survey area, which will all be cleared.

Survey Effort:

- Appendix K - Table M4 identifies the survey methodology and effort for Greater Gliders and other nocturnal species. The document identifies a Victorian Spotlighting Method which is substandard (at 2 observers over 40 minutes and over 1km) compared to the Qld Terrestrial Vertebrate Fauna Guidelines for Spotlighting which is 30 person minutes over a 100m x 100m site. The document mentions that some areas were spotlight surveyed from a moving car which does not align with any accepted survey methodology and would be ineffectual in nature.
- Appendix M – Table 2.6.The document identifies the number of survey hours that were conducted over the larger Borumba Hydro site but it does not show nor specify how many transects or surveys and survey hours that were conducted specifically within the impact area subject to the Investigatory Works application nor does it show the areas inadequately surveyed from a moving car.
- The survey results are deficient given the KNOWN inadequacies of spotlight surveys for Greater Glider detection at under 7% effective for transect surveys and 25% for patch surveys (Lindenmayer et al. 2001).
- No spotlighting surveys occurred in Spring and as such the life-cycle and maternal stages of the species were not covered adequately.
- Emerging (and known to the project team) best practice methodologies for Greater Gliders including Thermal Drone surveys and Scat Detection Dogs were not employed for identifying the occupation and density of Greater Gliders in the Impact areas. Consequently, the value of the area and the impact of the clearing works on the population can not be feasibly determined.

Qld Hydro plans to undertake vegetation clearing of prime habitat to establish roads, access tracks and facilitate the geotechnical investigations. This work will fragment high quality habitat and involve **clearing up to 11 hollow-bearing trees** for supporting infrastructure in Area 4 – Borgan, and **clearing up to 16 hollow-bearing trees** for temporary water infrastructure, access tracks and geotechnical investigations in Area 3 – Walkers Top.

As quoted on p.369 "*the Borumba PHES Survey area supports large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees, it is considered to support habitat critical to the survival of the species".*

Disturbance to Greater Gliders is problematic of a species that are Endangered to Extinction, as they are slow to recover due to their life history traits, they have high site fidelity, low fecundity, and limited dispersal ability. Greater Gliders are unlikely to move from their home range.

Greater Gliders prefer mature, relatively undisturbed forests with significant importance placed on mature habitat to provide refuge during and in the aftermath of a disturbance event. Tree cover and mature trees are especially significant as feed trees and den trees. *Cally, JG, Macak, PV, Chick, MP, Blake, B, Wagner, B & Ramsey, DSL 2025, 'Mature forest habitat mitigates the decline of an endangered greater glider population through a widespread disturbance event.*

Greater Gliders will use hollows from 10cm in diameter and larger. Every hollow is important for the future survival of the species; the species is known to use upward of 18+ hollows.

The treatment of hollows (replacement and removal) is not clear throughout the document. In some sections there is the statement that salvaged hollows will be prioritised to the Offset sites as opposed to re-installation adjoining the impact site where the actual animals that are using them will remain after translocation. The proposed installation of nest boxes prior to the felling of hollow bearing trees and over 100 hollows lost, rests on the assumption that the translocated animals will take them up, an assumption that is not based in solid science given the early stage of knowledge collectively known on this topic. The MRCCC maintains that all hollows felled should be relocated in close proximity to the felled tree and within the same territory of the animal that resided within it. It is more likely that the animal with take up occupation of the hollow given their familiarity to it than a new nest box.

Any animal found to be within a nesting hollow during clearing works should have the nesting hollow re-mounted in a tree in close proximity (within 100m) of the original location and the animal placed back within it. This facilitates continuance of habitat within the same territorial area as opposed to hard released without a familiarised hollow at night. This is standard practice in wildlife rehabilitation and rescue for displaced wildlife and should be the case also in this project. Currently, the documented approach does not stipulate this, only stating that the animal will be released at night. Greater Gliders are sensitive to heat. Natural hollows in trees are much cooler than surrogate hollows; extreme heat inside surrogate hollows and incorrect placement will lead to Greater Gliders spending time outside the hollow to regulate body temperature, which could lead to mortality and increased predation events.

The Exploratory Works Flora and Fauna Management Sub-plan - Appendix D -Tree hollow replacement strategy, should consider that Greater Glider boxes are rear-facing and should not be mounted in tree species that shed large strips of bark as they can obscure and block the hollow entrance over time.

Peer-reviewed literature on the ecology and behaviour of the Greater Glider includes extreme sensitivity to disturbance, often resulting in death and reduced population numbers. These include reduced population numbers within a 1km radius of previous land clearing, fire, or logging activities. The species will often **not** move on during activities and will likely perish (similar behaviour to Koala (*Phascolarctos cinereus*).

The preliminary document fails to recognise the following important factors of this species, that contribute to their fragile population status which emphasises the importance of the Exploratory works habitat.

The Greater Glider has the following lifecycle characteristics that impair fecundity:

a. Breeding occurs between March and June – relatively small breeding window
b. One joey per litter – recruitment is low given only single joey per litter
c. Stays with mum in pouch until it's 9 months old – mum needs to care for the young over a long time period (high risk of mortality)
d. Sexual maturity 18 months and live for only 15 years
e. Solitary, and some males are monogamous

The Greater Glider has a strong home range fidelity, requires habitat of old growth forest ecosystems and will disperse 3km from their selected dens. Greater Gliders need up to 6 dens which are required for daytime shelter and night-time housing of offspring (they do not glide with offspring on their back). *McGregor, D, Nordberg, E, Yoon, HJ, Youngentob, K, Schwarzkopf, L & Krockenberger, A 2023, 'Comparison of home range size, habitat use and the influence of resource variations between two species of greater gliders (Petauroides minor and Petauroides volans)', PloS one, vol. 18, no. 10, pp. e0286813–e0286813.*

This occurrence was recently supported by genetic findings from Scat surveys conducted in Tiaro by Noosa Landcare in 2024, where closely related individuals that have the same DNA sequence (called Haplotypes - typically mother-child or sibling relationships) were found over 3.7km apart.

This has significance for the project's proposed delayed/ staged rollout of Greater Glider Nest Boxes at the Offset site as detailed in the Exploratory Works Offset Area Management Plan. Nest boxes and other hollow augmentation should all be installed early in the project so that they could be taken up by dispersing individuals that may travel a distance to a new territorial area.

Research indicates that species decline due to habitat fragmentation could result in possible extinction within 50 years as a result of population size and inbreeding. *Mulley, B, Gracanin, A & Mikac, KM 2024, 'Population Viability of an Endangered Population of Greater Gliders (Petauroides volans) and Management Implications', Conservation, vol. 4, no. 4, pp. 871–887.* As identified on p.369, this location is prime habitat for the species and there will be 33.9 ha of habitat clearing, coupled with much increased traffic and human interaction causing fragmentation which could assist in species decline to the point of local extinction.

Qld Hydro states on p.371 that tracks and disturbance will only be 6m wide. However, the presence of vehicles machinery, humans, light and noise will likely cause broader fragmentation (indirect fragmentation) of these previously high quality habitats, resulting in species decline and possible local extinction. More vehicle and human interaction within this prime habitat could also lead to increased bushfire threat, which is a key threatening process for the species.

Research has shown that the impacts of fire and logging on hollow dependent arboreal marsupials significantly reduces the abundance of the Greater Glider through the loss of hollow bearing trees and forest canopy. *McLean, CM, Kavanagh, RP, Penman, T & Bradstock, R 2018, 'The threatened status of the hollow dependent arboreal marsupial, the Greater Glider (Petauroides volans), can be explained by impacts from wildfire and selective logging', Forest ecology and management, vol. 415–416, pp. 19.* The clearing of Greater Glider habitat for new roads/tracks and pipelines will lead to loss of hollow bearing trees (as identified by QH), open the forest canopy and expose the prime habitat to increased fire risk due to presence of greater vehicle and human interaction.

It is therefore necessary to have a fire strategy plan developed that is embedded through the construction program and links to Qld Parks and Wildlife, HQPlantations and local fire groups, creating a coordinated approach to fire containment or management.

Qld Hydro has identified "likely" impact on these three criteria:

1. Adversely affect habitat critical to the survival of a species.
2. Disrupt the breeding cycle of a population.
3. Interfere with the recovery of the species.

MRCCC contends it is "highly probable" to "Lead to a long-term decrease in the size of the population" through clearing of 33ha of prime habitat compared to fragmentation via roads, tracks, pipelines and greater human disturbance.

The MRCCC recommends avoidance of further fragmentation by road/ track construction and pipelines to ensure a viable population of Greater Gliders can be maintained in this largely undisturbed habitat. It is recommended that Qld Hydro further consolidate their road/track network to prevent further fragmentation, avoiding the larger trees that are recognised as providing essential habitat and retain the hollow bearing trees identified (no loss of hollow bearing trees).

In the section on impacts to Greater Gliders from clearing vegetation and habitat degradation, the document mentions the preservation of "sap trees" for Greater Gliders, which are folivores feeding on Eucalyptus spp). There seems to be confusion here with the requirements of the Yellow-bellied glider. Further, the statement made regarding the preference of *Eucalyptus mollucana* for Greater Glider is not correct. In the South East Queensland Bioregion, several other trees species hold much higher significance to the species (Eyre et al 2022).

Section 7.3.12 p.441 Yellow-bellied glider.

Of the 21 records of Yellow-bellied glider detected within the Borumba PHES Survey area, the majority (19 observations) were recorded in the Exploratory Works Survey area indicating that the exploratory works area will have a major impact on the local population.

- 685 ha of denning habitat and 15 ha of foraging habitat occurs in the Exploratory Works Survey area.
- 34.1 ha of habitat plans to be cleared by Qld Hydro in the Exploratory project area

The Project would result in the clearing of 34 ha of Yellow-bellied glider habitat. Habitat clearing has the potential to result in habitat fragmentation for the species, if patches of suitable habitat become isolated from other areas of suitable habitat.

It should be noted that many of the impacts on Greater Gliders detailed previously in this submission also apply to the Yellow-bellied glider ie fragmentation, fire risk due to increased human activity etc.

Survey Effort:

• Appendix K - Table M4 identifies the survey methodology and effort for Yellow Bellied Glider and other nocturnal species. The document identifies a Victorian Spotlighting Method which is substandard (at 2 observers over 40 minutes and over 1km) compared to the Qld Terrestrial Vertebrate Fauna Guidelines for Spotlighting which is 30 person minutes over a 100m x 100m site. The document mentions that some areas were spotlight surveyed from a moving car which does not align with any accepted survey methodology and would be ineffectual in nature.

• Appendix M – Table 2.6.The document identifies the number of survey hours that were conducted over the larger Borumba Hydro site but it does not show nor specify how many transects or surveys and survey hours that were conducted specifically within the impact area subject to the Investigatory Works application nor does it show the areas inadequately surveyed from a moving car.

No spotlighting surveys occurred in Spring and as such the life-cycle and maternal stages of the species were not covered adequately.

It is unclear if the detections noted within the Survey reports are incidents of glider sightings and / or feed tree locations. Given the large territorial size of the species it is important that both occupation evidence indications are mapped and noted.

The Yellow-bellied glider has the following lifecycle characteristics that impair fecundity:

a) Breeding occurs in Spring – relatively small breeding window
b) Young stay in den for 2-3 months – clearing could occur when young are denning in the hollow
c) Become dependant 18-24 months – mum needs to care for the young over a long time period (high risk of mortality)
d) Sexual maturity when 2 years old, with a short lifespan

Within the Construction Environment Management Plan Section 6.1.3, it was concerning to see that reference was made to assessing sap trees using the existence of a 'V' shaped scar. Yellow-bellied glider have a wide variety of sap groove patterns that are often geographic specific. For example, in the Cooloola population, groves are shaped as a mainly horizontal sloping scar up to a foot long. In the Carnarvon population the groove comprises a horizontal dash (- - - -) pattern. Ecologists and Spotter Catchers must have knowledge of this in order to undertake micro-siting adequately.

Like the Greater Glider, there is a positive relationship between the number of hollow bearing trees and occurrence of arboreal species given that they cannot persist in areas where hollow bearing trees are absent. *Lindenmayer, DB, Blanchard, W, Blair, D, McBurney, L, Taylor, C, Scheele, BC, Westgate, MJ, Robinson, N & Foster, C 2021, 'The response of arboreal marsupials to long-term changes in forest disturbance', Animal conservation, vol. 24, no. 2, pp. 246–258.*

The hollow wall thickness was the primary determinant of protective value for hollow dependent species such as the Yellow-bellied glider.

Therefore larger trees with hollows were extremely valuable to maintaining viable populations of gliders. *Zylstra, P 2023, 'Quantifying the direct fire threat to a critically endangered arboreal marsupial using biophysical, mechanistic modelling', Austral ecology, vol. 48, no. 2, pp. 266–288.*

The treatment of hollows (replacement and removal) is not clear throughout the document. In some sections there is the statement that salvaged hollows will be prioritised to the Offset sites as opposed to re-installation adjoining the impact site where the actual animals that are using them will remain after translocation. The proposed installation of nest boxes prior to the felling of hollow bearing trees and over 100 hollows lost, rests on the assumption that the translocated animals will take them up, an assumption that is not based in solid science given the early stage of knowledge collectively known on this topic. The MRCCC maintains that all hollows felled should be relocated in close proximity to the felled tree and within the same territory of the animal that resided within it. It is more likely that the animal with take up occupation of the hollow given their familiarity to it than a new nest box.

Any animal found to be within a nesting hollow during clearing works should have the nesting hollow re-mounted in a tree in close proximity (within 100m) of the original location and the animal placed back within it. This facilitates continuance of habitat within the same territorial area as opposed to hard released without a familiarised hollow at night. This is standard practice in wildlife rehabilitation and rescue for displaced wildlife and should be the case also in this project. Current the documented approach does not stipulate this, only stating that the animal will be released at night.

MRCCC does not agree that the project is unlikely to directly result in the alteration to bushfire regimes, given the scale of vehicle movements and human interaction likely to occur in this relatively inaccessible prime forest habitat for these threatened glider species. Similarly, the MRCCC does not agree that the project is unlikely to reduce the area of occupancy of an important population.

Since the EPBC listing of gliders, habitat destruction and population decline has continued both directly (deforestation) and indirectly (wildfire facilitated by human induced climate change). *Ashman, KR, Watchorn, DJ, Lindenmayer, DB & Taylor, MFJ 2022, 'Is Australia's environmental legislation protecting threatened species? A case study of the national listing of the greater glider', Pacific conservation biology, vol. 28, no. 3, pp. 277–289.*

Therefore it appears as though this species is exposed to 'death by a 1000 cuts' whereby each project declares only a small proportion of their habitat is being lost (in this instance 34 ha) of a much larger habitat area; but still their habitat is continually declining irrespective of their EPBC listing.

Similar to the Greater Glider, MRCCC sees the Exploratory works as having a likely impact on the Yellow-bellied glider, requiring far greater protection measures than detailed in the Preliminary Documentation.

Section 7.3.7 Koala (*Phascolarctos cinereus*) p.389

Koalas exist through the project area. The area forms a regional corridor that facilitates and connects a wider koala population in the region.

Despite the plethora of best practice approaches that could have been selected and outlined in the project that have been utilised in other local State projects, the documentation falls well short in several areas.

Survey effort:

- Best practice koala surveys for several years now have included the use of thermal drones to gauge location of individuals and density of population. The project to date as shown in survey documentation utilises largely outdated and ineffective Koala Spot Assessment Techniques (SAT) which are subjective and rely extensively on the expertise of individual ecologists.
- Acoustic surveys were documented as having been used however no methodology for survey layout or locational detection detail of the results of this survey or others used have been provided.

- Appendix M – Table 2.6.The document identifies the number of survey hours that were conducted over the larger Borumba Hydro site but it does not show nor specify how many transects or surveys and survey hours that were conducted specifically within the impact area subject to the Investigatory Works application nor does it show the areas inadequately surveyed from a moving car.

Table 89 fails to include koala habitat features, in particular heavily used food trees, as values requiring protection during micro-siting track development. These need to be included and adequately trained and experienced ecologists used that can identify them.

During proposed clearing operations, Koalas are omitted from careful consideration.

It is well known that visual detection of koalas from ground level even by highly experienced koala spotters is extremely poor. A study undertaken in NSW identified the following success rates for koala detection - 38.9 ± 20.03% for visual human detection /Spotlight, 83.3 ± 11.39% for RPAS and 4.2 ± 4.17% for SAT.

The project documentation and proposed clearing methods significantly fall short of both identifying and protecting koalas during the clearing process, namely:

- There is no outline of specific methods for the clearance of koalas during the vegetation clearing works other than mentioning the use of Spotter Catchers.
- As such it is perceived to rely on spotter catcher and ecologist visual observation of koalas in trees prior to felling. Given that only 40% of koalas are able to be seen in trees from ground level, even by experienced spotters, it is an unacceptable and poor clearance technique.
- It does not include thermal drone surveys on the day of clearing which is the accepted best practice for recent State projects in the region, including TMR's Stage C & D Cooroy to Curra programs.

Further, project documentation does not specify who undertakes the mentioned health and injury assessment of koalas encountered during clearing activities. Ecologists and Spotter Catchers DO NOT have sufficient knowledge, training or qualification to undertake koala health assessment before relocation.

Relocation techniques are not mentioned within the project documentation and as such the techniques used cannot be assessed against the various animal welfare standards and Wildlife Codes of Practice.

No koala health data has been provided as part of documentation that given an indication of the level of physiological stress of the population in the impact areas. As such the impact of the works, machinery and activities in the impact areas cannot be determined. This information needs to be released to all parties for consideration and analysis.

No consideration of the impact of an extra 970 vehicle movements per day during the investigation stage on the local koala population has been provided. While a statement has been made about the likelihood of vehicle strike on site, it does not consider the impact the activities will have on the local road network, including an increase in dawn and dusk traffic travelling to and from the area. This includes the already high koala vehicle strike areas of the Mary Valley Highway, the Old Bruce Highway, Yabba Creek Rd, Mooloo-Kenilworth Rd etc. These are real impacts of the project on the koala population that have not been addressed in any way in the EIS response.

Further to this, no consideration has been made nor discussions held with local volunteer wildlife rescuers or facilities mentioned in the documentation in regards to the treatment of animals requiring assistance. Local wildlife rescue support in the Mary Valley is extremely limited and the need for local Hydro staff to have training and hold equipment to respond in a timely manner is needed. As an example, in February 2025 a Whiptail Wallaby was hit by a car at the dam wall. It took over 3 hours for the animal to be attended to by the nearest available volunteer Trauma Carer based over an hours drive away (Woombye).

It also needs to be noted that there is no Wildlife vet or hospital in the vicinity of the project site. The closest facilities for treatment of injured wildlife are located at Eumundi (RSPCA Wildlife Hospital) or Beerwah (Australia Zoo Wildlife Hospital). The lengthy delay in locating, rescuing and transporting injured wildlife extends the time an animal is suffering and frequently results in additional complications from stress related myopathy.

7.3.10 Mary River turtle, p.419

The Mary River turtle is now listed as critically endangered.

Table 97

Habitat: Primarily quotes Sam Flakus research. A considerable number of papers have been published since Sam Flakus' research released that has improved our knowledge of Mary River turtle habitat

Previous records: Col & Duncan Limpus and Sam Flakus undertook surveys around Borumba dam wall and caught Mary River turtle, post 1999 floods, indicating that the turtles were washed down from the Lake above in 1999 flood. Unsure if they caught any Mary River turtle above the wall.

In the Survey area: Quoted from the document: "Nesting habitat for the Mary River turtle includes unconsolidated sediments, particularly alluvial sand banks, within 100m of pool habitat." Unsure about the reference to within 100m of pool habitat, while it is highly likely, unsure that there is research evidence. Predated nests have been observed on suitable sandbanks in the upper reaches and fringing habitat of Lake Borumba.

Present threats: on page 421 the document is quoted "invasive weeds including *Lantana camara*, passionflower, Noogoora burr, Crofton weed, and mistflower grow in riparian zones degrading habitat"; while these species are some minor concern, they rarely impact on the turtle given their nesting habitat occurs on dynamic fluvial features (sand banks) in the river system which is regularly naturally reset by low to medium streamflows. Thus this regular resetting (accretion or retreat of the sand banks) rarely allows these weed species to colonise on these banks. This is not a key threat – very minor. As identified in the Conservation Advice, and on page 420, the key threat is predation of eggs in nests by foxes. Feral cats and Dingoes have minimal impact upon the Mary River turtle. Vegetation clearing, creation of road/track networks and increased human activity are likely to increase fox populations and movement, and directly impact upon the long-term turtle population.

Table 98

Instream earthworks causing: Mitigation Options: It isn't clear what Qld Hydro plans to do should they find suitable breeding places. Unless maybe the Exclusion zone marked as 'no go' actually means if they find a suitable breeding place it will be marked as a 'no go'. Will this no-go zone stay for the entire duration of the incubation period of the turtle eggs – which is minimum 55 days, however can extend to over 80 days if cloudy or cooler weather conditions occur?

Bed level crossings will be used for the initial 6 months of the project before the Bailey bridges are constructed. These bed level crossings will be used extensively during construction of the Bailey bridges and to access the tunnel area (up to 380 truck movements each day p.36), and will need to have regular (daily) maintenance with the risk that large rock material will be washed downstream impacting upon potential turtle nest banks. The temporary bed level crossings are planned to be constructed in April 2025 for use until Spring 2025 (maybe later if delays are incurred building the bridges); therefore these crossings could be in place during turtle nesting when they move distances to nest. With this many truck movements there is also the potential for continual downstream turbidity, and if the crossing is required to be maintained regularly there is the risk that the structure will be constructed above bed level thus impeding passage. While a low rock structure will likely have a low impact on turtles moving upstream (or downstream), that impact coupled with regular traffic and turbidity will likely result in a turtle abandoning potential nesting habitat upstream and downstream of the crossing.

Changes to habitat quality…: Of the utmost importance is control of erosion and sediment. There is a risk that the spoil dump could uncontrollably release leachate-laden fine sediment rich water into Sandy and Yabba Creek during high rainfall events which visually appear (aerial photography analysis) to have suitable nesting habitat before entering Lake Borumba. Depending upon the leachate content of the release water and fine sediment content, this could significantly impact directly upon the turtle and its nesting habitat.

While the actions identified broadly cover the impacts, there are still many unknown elements eg. leachate discharge from spoil dump, impact of three creek crossings from high traffic loads for a 6+ month period etc..

We encourage Qld Hydro to 'Rehabilitate exposed area as soon as possible' but it is difficult to determine what this actually entails, therefore we recommend Qld Hydro to sow a grass cover crop immediately, as well as other measures detailed.

Injury and mortality…reference is made to identifying nesting habitat and pre-clearance checks prior to activity. If a nest is identified in the construction area or near creek crossings, these nests should be relocated to safer, more

appropriate locations by an experienced and trained freshwater turtle expert. It is very difficult to detect a turtle nest site, and there are very few turtle nest experts with the experience of nest relocation although Tiaro Landcare and MRCCC have a number of experienced and trained ecologists capable of undertaking this work if necessary.

Impacts to surface water quality et al from construction…

This is a real risk to species such as the Mary River turtle. There is no reference made of the potential contamination of surface water quality to Sandy and Yabba Creeks from an uncontrolled release of leachate-laden spoil dump runoff if a high rainfall event overwhelms any systems built into the spoil dump location.

The Water Quality Risk assessment (Appendix G) tends to under-estimate the potential for this scenario to occur, and simply recommends that 'coir logs' or like could be used to bund the spoil dump area which is likely to contain 1,000,000 tonnes of rock, blasted using nitrate-based explosives up to 5metres high (potentially 7m high). This area should be bunded with much more substantial materials than coconut coir logs; and the contamination risk should be treated with much greater respect to the environment than is currently given by Qld Hydro. The Snowy 2.0 project uses nitrate-based explosives, and there have been multiple water quality breaches of nitrate-laden releases into sensitive waterways.

Light impacts to turtles

Natural light=dark cycle is vital to the survival of a vast number of species, essential for the correct synchronization of periodic behaviours. Light pollution at nesting beaches is detrimental to sea turtles because it alters critical nocturnal behaviours namely:

1. How sea turtles choose nesting sites
2. How they return to the sea after nesting
3. How hatchlings find the sea after emerging from their nests
4. Swimming hatchlings may orient towards light cues and can be lured to shore again

Section 2.2.2.1 (p.35) Hours of Work states "Geotechnical drilling 24 hrs a day, 7 days a week for boreholes equal to or more than 200m deep and shallower boreholes by exception.

Underground construction activities (including blasting) and associated enabling works are planned24 hours a day, 7 days a week.

Works outside of the above listed construction hours may occur during the Project.

Within the *Construction Environment Management Plan*, Appendix J: Exploratory works flora and fauna sub-plan, section 5 impacts and risks identifies light emissions impacts (section 5.7, p.26) and Table 11 (p.53).

Management: Artificial light to be very low intensity during breeding season for both turtle species (specifically during nesting and hatching). Although no studies have been conducted on these species, guidelines can be drawn from marine turtle studies (same taxa) as Elusor and Elseya are generally nocturnal breeders. Marine turtles are particularly sensitive between violet and green wavelengths (400 to 500 nm) (Kamrowski, Limpus, Moloney & Hamann 2012. Coastal light pollution and marine turtles: assessing the magnitude of the problem. Endangered Species Research. Vol 19:85-98). Very little light is necessary to disrupt orientation of hatchlings. Lights to be installed away from potential turtle breeding locations. Any lights installed that throw any light onto breeding areas to be on a separate circuit so they can be switched off during breeding season.

Monitoring:

Light levels to be monitored around potential nesting beaches during nesting and hatching for both turtle species.

Trigger for corrective action:

If light levels are higher than 500 nm at potential turtle breeding locations, actions must be taken immediately to reduce light level to within acceptable range.

Table 99

Lead to long-term decrease….. again only Sam Flakus and Departmental research referenced. Marilyn Connell paper from 2018 Table 1 clearly shows species abundance.

The Qld Hydro document quotes "*The disturbance or temporary loss of 0.4 ha of foraging habitat and 0.1 ha of nesting habitat within the Project footprint is unlikely to reduce available breeding, foraging, or dispersal resources such that this loss would likely lead to a long-term decrease in the size of the population".* Using these figures tends to be irrelevant to the Mary River turtle; the use of these figures deliberately appears to create a situation that the impact is relatively small. By comparison total nesting habitat used by the turtle across the Mary River catchment is likely to total only approximately 1 to 2 hectares; given the small turtle population and their high site fidelity for specific nesting sand banks (Mary River Turtle Conservation Advice pg 10). If 0.1 ha of nest habitat is likely to be affected, that is a relatively large area of nesting habitat in the catchment. A typical nest bank is only 10m x 5m (0.005ha), and throughout the catchment there are 12 to 15 nest banks. The loss of any nest bank habitat is a significant impact to this species given there are so few breeding pairs.

Reduce area of occupancy: same comment… poorly researched. Historical records suggest that the Mary River turtle demonstrates nest-site fidelity and returns to the same nesting sites each year. Nesting is concentrated on a small number of sand banks. Not all females show nest-site fidelity, given that fewer than half of the females recorded nesting during 2009 at sites along the Mary River were recorded as returning to the same nesting bank in 2010 and 2011 (Micheli-Campbell 2012; Micheli-Campbell et al. 2013a). While the turtle is known to occur across 200km of the Mary River, its nesting habitat is very, very specific within that 200km distribution. As detailed above, there are specific nesting sand banks that the turtle utilises, with high site fidelity, therefore there is not 200km of habitat available. The statement is misleading, and under-estimates the site specificity and value of core habitat such as nest banks.

Fragment an existing population: quotes species occurs from Conondale to Tidal barrage at Tiaro, whereas previous paragraph says Kenilworth to Tiaro; somewhat inconsistent. The Mary River turtle within Lake Borumba has now been potentially isolated from the rest of the Mary River catchment for the past 60 years.

7.3.11 White -throated snapping turtle, p.429

Many of the actions detailed by MRCCC for the Mary River turtle also apply for the White-throated snapping turtle. Nesting season differs from the Mary River turtle as they nest in the Autumn to winter months.

Table 100

Profile: Threats: Qld Hydro has referenced Conservation Advice 2014 when Recovery Plan supersedes it in 2016.

Changes to habitat quality…: Same as notes as for the Mary River Turtle.

Injury and Mortality: Qld Hydro states March – August breeding season. Recovery Plan (pg 12) states May – June.

Impacts to surface water quality et al from construction… this is a real risk to species such as the White-throated snapping turtle and the Mary River turtle. There is no reference made of the potential contamination of surface water quality to Sandy and Yabba Creeks from an uncontrolled release of leachate-laden spoil dump runoff if a high rainfall event overwhelms the systems built into the spoil dump location. Refer to comments made in the Mary River turtle section.

In conclusion, the MRCCC maintains that the impact to these turtle species has been underestimated. The nesting habitat for the White-throated snapping turtle is broader than that of the Mary River turtle with nesting occurring on sand banks closer to the water's edge and higher on the streambank in places with heavier soil content. Predicting White-throated snapping turtle nesting habitat can be difficult.

7.3.2 Black-breasted button-quail (*Turnix melanogaster*) p.337

Discrepancies were found regarding the breeding season of BBBQ in the document. The breeding season is 9 months (September to May). The document states, "To mitigate the impacts of clearing on breeding, the clearing of potential habitat will be timed to avoid the species breeding period (May – June), where possible," which is incorrect.

Mitigation of airborne particles includes "regular wetting down" p.344. Wetting down could eliminate platelets and therefore evidence of BBBQ presence in the area. Will Qld Hydro check areas for platelets before "wetting down " occurs?

7.3.4 Glossy black cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*) p.359

Important populations, p.358.. According to the Conservation Advice for the species, "the main threat causing the decline of south-eastern Glossy black cockatoo is a result of habitat loss, degradation, and fragmentation. Historic land clearance was the main cause of decline in the past, leading to the loss of both feeding and breeding habitats". The estimated total number of mature individuals is 7,500, and is declining rapidly (Cameron et al. 2021). Glossy black cockatoo populations are known from within the Conondale Ranges, and the properties that adjoin these ranges. Given the extensive prime habitat of sheoak and large eucalypt trees throughout the Conondales, the population of Glossy black cockatoos identified near Area 4, Borgan, an area which will be highly impacted by vegetation clearing, workers, vehicles and tunnelling operations, should be considered an important population.

Glossy black cockatoos have a highly specialised diet, with a preference for individual feed trees. They nest only in very old trees with large hollows, which can take centuries to form.

They are a long lived species with a slow breeding cycle.

The species is also culturally significant for traditional owners including the Kabi Kabi, Jinibara and Butchulla First Nations peoples.

Table 80, p.359 Vegetation clearing

1. Assess for location of nesting hollows, identify location and dimensions and record loss of hollows due to clearing.
2. Install purpose-designed nesting boxes

Recommended monitoring as per "Habitat survey for Bushfire Recovery for Wildlife and Habitat Community Grants Program, GLENRAC, 2020" https://landcare.nsw.gov.au/groups/glenrac/providing-homes-and-habitat-for-gliders-glossy-black-cockatoos/

Acoustic monitoring of Glossy Black Cockatoos is a useful and informative technique to both assess the site for occurrence of the species but to also gauge the utilisation of nesting sites through call behaviour. Acoustic monitoring should be utilised for nest site monitoring in proposed Offset areas.

A study on the natural nest hollows, and the strategic placement of artificial hollows is recommended. This recommendation is based upon findings by the Glossy Black Conservancy, Qld that "Strategic placement of hollows requires a better understanding of the status and supply of natural nest hollows in the landscape. A study of hollow-bearing trees in urban forest fragments on the Gold Coast revealed that while there was a relatively high availability of hollows compared to other regions, many of these hollows were small (10cm) and trees with larger hollows may be limiting (Treby and Castley 2015). Treby, D.L. and Castley, J.G. (2015). Distribution and abundance of hollow-bearing trees in urban forest fragments. Urban Forestry and Urban Greening, 14: 655-663. https://doi.org/10.1016/j.ufug.2015.06.004 Quoted from Glossy Black-Cockatoo Conservation Guidelines for south-eastern Queensland and far North-eastern New South Wales 2022. Glossy Black Conservancy, Cleveland, Qld.

Section 12

Environmental record of the person proposing to take the action

The proponent, Queensland Hydro, is a new government-owned corporation created specifically to build pumped hydro projects for the Queensland power grid, and Borumba is their first project. As a corporation, Queensland Hydro has no demonstrated environmental record (good or bad) in building anything, particularly a project of this magnitude and complexity, with such an inherently high level of environmental risk.

However, senior Queensland Hydro staff who are responsible for the Borumba project's design, execution and environmental management, (including the CEO mentioned in the preliminary documentation), formerly held similar senior positions on the Snowy 2.0 project, either as employees of Snowy Hydro, or major contractors such as Clough/WeBuild and SMEC. Snowy 2.0 has a well-documented history of environmental breaches and non-compliances on similar issues that are of concern to the MRCCC regarding the Borumba project ie:. water quality, sediment and erosion control, development and successful implementation of detailed management plans required as conditions of project approval. These breaches occurred while relevant Queensland Hydro staff were in positions

of responsibility on the Snowy 2.0 project. The MRCCC seeks assurance that any aspects of an organizational culture that may have contributed to the environmental breaches on Snowy 2.0 are not transmitted to the Borumba project. Ideally, this would involve the application of relevant approval conditions addressing these risks, timely and independent compliance checks, coupled with regular inspections by the EPBC unit and prompt effective enforcement/remedial action if required.

The MRCCC notes that Queensland Hydro has announced an intention to seek independent certification for the Borumba project under the International Hydropower Sustainability Standard and we support this decision, and their plan to meet the guidelines and standards with this project. A reporting framework on their compliance with this standard is recommended to be developed that allows for independent scrutiny and public consultation.

MRCCC Comments on Appendices in the Preliminary Documentation

Appendix G - Review of WQ risk assessment

The summary on p.1 states there is 'low risk to water quality from most site activities and the risks relate primarily to suspended sediment rather than toxicity issues". MRCCC maintains the project will impact on water quality, from fine sediment and potential toxicity issues.

The WQ risk assessment does acknowledge an elevated risk of WQ contamination from the spoil dump area; but states that with the construction measures in place this risk can be reduced to low. MRCCC does not agree that the construction measures identified in the WQ risk assessment for the spoil dump area sufficiently reduce the risk of contamination.

On page 4 (Relevant MNES section) the list of MNES does not include the endangered Giant barred frog as a potential species impacted by WQ contamination from the project. Given this species spends a part of its lifecycle instream, and habitat exists in the project area, impacts from WQ contamination on this species and potentially the Cascade treefrog should be considered. The recently listed freshwater crayfish should also be considered for inclusion in the WQ risk assessment.

On page 10 (3.1 Surface water quality) there is reference made to an SKM, 2007 report which is not included in the List of References on page 30.

Page 12 (3.5 Soil Qualities) states there is no evidence of salinization of lands of Yabba, Kandanga and Conondale Ranges. However salt expressions have occurred in the lower Yabba Creek, and dispersive soils are generally associated with high electrical conductivity levels. The Groundwater Impact Assessment (Appendix B) clearly identifies salinity as an issue in the upper reservoir – within the subsoils, p.30; and within the Quaternary alluvium in the lower dam wall area.

Dispersive soils are present immediately below the Borumba Dam, the lower Yabba Creek catchment, and are evident on the Borumba lakeshore.

On page 16 (4.1.1 Clearing generally) the report states that "vegetation cleared will be moved to the Spoil disposal area". Does that mean all vegetation cleared from the entire Exploratory works phase will be moved and stored in the spoil disposal area? The spoil disposal area is 8.7 ha in size and is planned to stockpile ~1,000,000 tonnes of tunnel rock, 5m high; will there be room for cleared vegetation too?

Bella Creek Road upgrade (page 16) states that any runoff from the new road will enter Kingaham Creek. However the spoil dump for the Kingaham Creek bypass is not referred too, which is planned to be located adjacent to a waterway that enters directly into Kingaham Creek. The location of this spoil dump could result in WQ contamination of fine sediment directly into Kingaham Creek.

On page 18 (4.1.3 Tunnelling) there is some discussion on measures to address excess water eg. groundwater discharge, excessive or high rainfall event. It is likely a large rainfall event will occur, in which case, evaporation, irrigation, trucking offsite and storage in tanks are insufficient contingency measures, resulting in few, if any other measures available. This will almost certainly result in uncontrolled discharge of leachate (nitrate and other oxidising minerals) and fine sediment laden water contaminating Sandy and Yabba Creeks. There has been no water balance study conducted to understand the potential water volumes the project will encounter, apart from some basic estimates of water ingress into the tunnel from groundwater.

The tunnelling will generate the largest WQ impact of the exploratory works. At present the rock and its qualities are unknown. The spoil dump site is located on the banks of two creeks – Sandy and Yabba Creeks. To access the spoil dump area from the tunnel requires access via two bridges. The site is confined within steep hills, where controlling water runoff into the staging areas and spoil dump from the surrounding landscape will be extremely difficult, and have a huge impact on the landscape irrespective. These are all high level risks posed by the tunnelling and spoil dump area to water quality, therefore MRCCC does not believe the risk of WQ contamination from the project is low.

On page 20 (4.1.7 Spoil disposal area) the report recommends the spoil dump area be surrounded by a silt fence or coir logs. This recommendation is inappropriate to address the potential WQ risk posed by the spoil dump and the blast rock which could be contaminated with nitrates or oxidising materials. MRCCC recommends that Qld Hydro take the containment of contaminated water/leachate in the spoil dump area seriously with a more robust method (or suite of methods) than just coir logs. Also the testing parameters provided on page 20 are only an example, and do not provide the full suite of parameters planned to be tested. Furthermore, a turn-around for lab results of 12-14 days is not satisfactory. Contaminated material could be tested and remain in-situ during an unprecedented rainfall event leading to uncontrolled runoff before decontamination will have been identified. A spoil dump management plan is required that includes the analytical testing and the response measures and procedures required to pre-emptively manage exceptional events.

On page 22 (5.1 Location) investigations in the upper storage are considered an inherently low WQ risk, but MRCCC recommends that threatened streamfrogs and freshwater crayfish also be considered; which may be located in the gorge section of Cedar Creek immediately below the area planned to be heavily investigated by bore holes for the upper reservoir dam wall. Surveys of this gorge area on Cedar Creek have not occurred although the proposed dam wall and spillway is planned to be upstream of this location.

The report also states on page 20 that the "proposed disturbance areas are individually small but cumulatively significant". MRCCC agrees. The tunnelling and spoil dump area located in such a difficult location on the banks of Sandy and Yabba Creeks, which flow into an urban water storage, can cumulatively have a significant impact on WQ. However, he MRCCC does not agree that the bed level crossing construction is the main WQ contamination risk; the risk of uncontrolled leachate and fine sediment rich contaminated runoff from the spoil dump is of much greater risk. Snowy 2.0 has incurred a number of breaches of contaminated WQ releases (nitrates from urea-based explosives) into the environment. As a consequence MRCCC maintains this is one of the main WQ issues.

The final paragraph on page 22 appalled the MRCCC. Dilution is not the solution to pollution – not in 2025. This paragraph almost implies that Qld Hydro can avoid pre-emptive mitigation measures because the lake will solve the problem. This statement disregards the substantial impact that contaminants could have to the aquatic environment of Sandy and Yabba Creek (where significant ecological values and processes have been maintained); and assumes this would occur during full supply level (FSL); however this could occur when the lake is at half FSL or even 10% of FSL, which would have a detrimental impact to the WQ and the aquatic ecology.

Appendix F - review of Construction Environmental Management Plan (EMP)

MRCCC expectations

1. That Qld Hydro and their contractors understand the sensitive environment that they plan to work in, want to genuinely minimise risk and harm to this sensitive environment and take full accountability and responsibility of maintaining the highest environmental outcomes and standards as a result of these exploratory works activities.
2. That Qld Hydro sets in place a culture of continuous improvement and sense of pride to deliver the best possible outcomes established at the highest level and filtered to all operators / staff / subcontractors.

Without assurances to deliver on these expectations, it is anticipated operators and their management will be focused on meeting time and budget demands and environmental management will be compromised.

Qld Hydro Monitoring frequency

The EMP is generic and conservative in its approach to monitoring regardless of the risk and regardless of time in delivery. The monitoring should be increased during the high risk periods and risk reassessed as the project progresses. With this methodology, a culture of continuous improvement and accountability can be established very early on and tolerances well defined by Qld Hydro. Quarterly and annual audits are not frequent enough in the early stages to establish these expectations. Audit intervals need to be designed based upon environmental risk.

For example, the sequential clearing will require quarterly and annual audits.

This level of monitoring by Qld Hydro is not frequent enough to prevent inappropriate clearing methods and to issue penalties for breaches into no go areas. Monitoring also needs a response system. Monitoring is fine when systems are operating as planned and no breaches are occurring, but a response system is required when breaches and non-compliance does occur. For instance, water quality monitoring programs will identify when compliance or non-compliance is occurring, but the next step of an action/ response plan for breaches is the most important component of a water quality monitoring program.

Lines of communication between Qld Hydro EMP and contractor

Site environmental plans (SEP) pp 22

- If this is the main avenue of communicating where the MNES issues are located for the contractor and sub-contractors, it is important that this is continuously reviewed and reworked to ensure it is absolutely fool proof. If there is any ambiguity, the contractor will have an opportunity to breach conditions based on lack of information. There must therefore be assurances that a quick response and turn-around time can be achieved as further delays could result in further breaches.

Roles and responsibilities pp 22 – 24

- This is where the 'culture' can be well defined and words used to ensure all persons involved in the project are engaged in the environmental responsibility to continuously improve the delivery. Each contractor should be able to present a method of how this can be achieved.

Communication

- What backup is there in place of failed phone signal if an immediate breach has occurred to prevent further work and reduce further impacts to MNES?

<u>Management of Environmental Elements (Flora , fauna, water quality, noise , dust, light pollution)</u>

FLORA & FAUNA DURING CLEARING

Statement – unregulated clearing and inappropriate clearing methods will impact potential MNES fauna. Further loss of TEC beyond the authorised clearing limit will reduce the TEC total area resulting in less of this unique ecology

Pre-clearance survey design falls short in two specific areas:
1) The treatment of koalas and the absence of best practice pre-clearance drone surveys and or use of detection dogs on the day of clearing. This practice was successfully implemented on the DTMR Cooroy to Curra clearing with zero wildlife fatalities – why is it not included in this project? This is incredibly important in this instance with the existence of EPBC listed glider species that are difficult to detect in the field. The wording in the CEMP need to be changed from 'should' to 'will/must'. Further the specific koala capture and relocation actions mentioned require more detail and caveats to ensure compliance with Wildlife Codes of Practice for handling and holding until suitable for the species release (ie nocturnal vrs diurnal species).
2) The treatment of hollow bearing trees, namely those that are not detected by ecologists and spotter catchers. To this end we request that ALL trees over 30cm DBH that hold possibility of hollows and hollow dwelling species (including small microbats and Feathertail Gliders) be <u>control lowered</u> to the ground as opposed to felled. Each hollow can then be searched, wildlife collected, hollow salvaged and re-mounted the same day with the animal's replaced into the hollows that night in areas directly adjoining the impact area.

Sequential clearing (pp277) is to be done 'where possible'. Repetitive use of this wording provides contractors an opportunity to justify activity which does not protect the environment. It is suggested that sequential clearing will be done unless guided by Qld Hydro to do otherwise in consultation with the environmental manager.

- Will timber worth logging be logged along all access tracks / proposed cleared areas?
- Where will cleared vegetation stockpiles will be located? The CEMP states that all timber will be stored in the spoil dump area, but realistically will Qld Hydro transport timber fallen from Walkers Top down to Borgan (Area 4) – this is a massive round-trip over difficult terrain. It is highly likely the timber will remain on-site where it is cleared, particularly if from Walkers Top.

- What is the volume of cleared material?
- Will flora worth saving / transplanting / seed saving be done?
- Will a chipper be used to mulch vegetation and how will fauna residing in stockpiles be protected?
- Management of fauna and salvaging fauna from hollows – use of cherry picker is recommended. How will this be done practically in steep country?
- What contingency plans are in place to relocate MNES fauna species found on the site?
- Use of' blade and grubbing clearing methods' (pp369) is not recommended. Employing these methods can lead to gullies occurring in dispersive country. What methods will contractors employ if these commonly used techniques are not to be used?
- Will access track design include whoa boys or spur drains? The latter is not recommended as cleared vegetation will be 'pushed' into no go zones and will further add to erosion with clays from dispersive soils reaching drainage lines. Whoa boys are preferred to slow traffic and ensure rainfall impacts are minimized. Will the contractor maintain these whoa boys / spur drains to prevent clays from entering waterways? Drainage issues has led to landslips in the HQPlantations estate. Drains need to be checked during rainfall events to prevent unanticipated consequences such as major landslips.
- There is no mention of edge effects on the MNES communities, particularly surrounding the TEC area. Additional biosecurity measures would be required. A site specific approach to environmental management is required.

Turtles

- Mary River turtle (MRT) monitoring daily inspections will need to be undertaken by trained personnel skilled in Turtle nest observation and management and cannot be assigned to a contractor EO unless they have undertaken appropriate training and have genuine experience in identifying nesting sites.
- If daily inspections are to monitor for hatchlings and hatchlings are observed, this should be identified as a stop works notice. Continued work will impact hatchlings. Also impacts of light on hatchling migration to the creek needs to be accounted for.
- Mary River Turtle/White throated snapping turtle/stream frog exclusion fencing is recommended at key turtle nesting banks along the creek. How will this be achieved without additional clearing of riparian vegetation? What success does this have in a construction context?
- MRT nest protection structures – pp 297' "…10cm grid –sized over nests) around key nesting reaches to prevent nesting turtles from accessing the construction areas". The sizing is wrong and the wording does not reflect the intent of the outcome. It is a confusing instruction. Furthermore, a protected nest would need to be left for 55+ (80) days. Is the proponent willing to leave a site for this length of time as a no go zone?
- MRT breeding season ends in February, not January (pp 297).

All other aquatic fauna

- Table 4 identifies a generic mitigation to 'avoid construction on creek banks with dense overhanging riparian vegetation" and, "where possible retain suitable breeding places". Does the contractor have an ecologist skilled in identifying aquatic threatened species habitat to delineate these areas for exclusion? There are few experienced personnel with the key skills for these species. Some are located in the Mary River catchment.
- Another mitigation measure should be to include a total fishing ban throughout the duration of the works.

Transparency in Animal interactions

- For transparency and community confidence, all wildlife interactions need to be reported by contractors and the Spotter Catcher and the reports made available to at least the Environment Stakeholder Group. Currently only negative wildlife interactions are identified as requiring report.

Advanced Spotter Catcher Expertise

- Inadequately experienced Fauna Spotted Catchers are regularly used on projects with negative outcomes. Due to the low permitting standards and no formalised course for Spotter Catchers to undertake, wildlife carers and wildlife facilities regularly receive injured animals not seen or not treated appropriately during clearing works.
- Further, the ability for Fauna Spotter Catchers to subcontract or employ other non-permitted staff to work on projects under them without supervision exacerbates the above-mentioned issues.
- We request QLD Hydro employs the highest standard Ecologists and Spotter Catchers with all operating individuals (not just permit holders) assessed for competence and compliance.

General

If breeding window avoidance is the practice recommended, Mary River turtle, October to February; White-throated snapping turtle, April to July; Mary River cod and Lungfish August to December, March is the only month for works to occur in aquatic areas. It is therefore very likely works will occur during the critical breeding / hatching periods for aquatic MNES species. Mitigation detailed in the EMP is therefore currently insufficient.

WATER QUALITY DURING ALL ACTIVITIES

Statement - Inability to meet water quality objectives will impact downstream MNES fauna

- Event sampling – there are no records of what the water quality results were during periods of heavy rain to place a background tolerance for occasions when the sites become inundated. As an example the Queensland Department of Transport and Main Roads (DTMR) conducted 2 years of event sampling (24 months minimum for seasonal variation) to obtain water quality results which then guided Erosion and Sediment Control and understanding of the natural loads of the system prior to major construction works. The Qld Hydro CEMP is based on regular 6 month monitoring leading up to commencement of construction work which is insufficient to gain a clear indication of water quality. Further, when does the actual start of 'construction work' commence? Gathering baseline data before any construction work will be difficult given that work will commence once the approval is given by the Australian Government.
- Daily monitoring - Turbidity, pH and visuals are recorded by the contractor for monitoring purposes however, the EMP does detail risks from nitrates leaching from use of explosives. E-coli from contractor laydown areas / toilets is also a point source pollution to be monitored especially after rain events. In addition, heavy metals can also leach at this time. Pp 347 states there were noted exceedances of some heavy metals at sampling sites. What is not known is the threshold beyond which downstream MNES fauna will be directly impacted..
- 'Nitrate loaded water' (pp366) to be reused as underground service water. Then what happens to this water which presumably will still have nitrates?
- WATER MONITORING – MRCCC recommends an INDEPENDENT WATER MONITOR, based on experience from involvement with large scale DTMR projects. The monitoring conducted by contractors is dubious at times, and often does not occur during key times, ie rainfall events, post rainfall, flow events; is not timely to address issues and tends to be a task given to inexperienced operators. The water monitoring plan does need to be tailored to capture the suite of parameters expected to be problematic in the local environment.
- Clean water diversions round the stands should be a requirement not an 'if feasible' option. If clean water cannot be channelled around the site, the sediment basins will be overwhelmed and it will become highly likely leachate-laden water will be 'released to the environment'. The site is compact, and surrounded by

difficult terrain. Diversion banks and measures to contain water, and provide construction area will be extremely difficult. Pp 113 states that 'where permitted by design and site space, a clean water diversion bank or similar should be constructed at the top of the activity zone…". This is unacceptable and offers the contractor a get out clause. Clean water diversions should be mandatory.

- Pp116 states that 'where disturbed areas are not being worked for long periods (>30 days), temporary stabilisation treatments are to be considered, especially during summer (Dec – Feb). This demonstrates lack of attention to site specific conditions and the requirement for the contractor to plan for future weather events, undertaking risk assessments as required. There can be no assumptions made on wet vs dry season. Storms can happen at anytime. Usually BOM provides notice during which time plans can be made to reduce the impacts. This tailored approach needs to filter through in the contractors EMP.
- Do we understand the impact of Floculant to MNES if a water quality breach occurs? Snowy 2.0 has had a number of water quality breaches, so it is highly likely to occur with this project.
- Sediment traps will be emptied within 5 days of filling and spoil to be stored in the spoil area. How will this be possible when the site is likely to be closed following heavy rain with road access impassable particularly early in the construction before proper roads are complete with drainage infrastructure etc. And it is highly likely that sediment traps will need to emptied on a more regular basis than 5 days when heavy rainfall is occurring.
- There appears to be some discrepancies with responsibilities in table 4 pp 362. Why is the environmental manager not given joint responsibility for Kingaham Creek, site access / new access tracks?
- Tunnel spoil site – what is the plan if Borumba PHES does not go ahead? Where will all the spoil material go? There seems very little land available for it to be spread within the landform contour as detailed in the EMP. Will it be trucked out to paddocks downstream?
- Tunnel spoil – if Borumba PHES does go ahead, and the spoil is inundated, how will resultant turbidity and leachates be controlled and stopped from entering waterways? Or will it be trucked out requiring road upgrades, which has been ruled out in the Preliminary Documentation providing the reason for the poorly located spoil dump on the banks of Sandy and Yabba Creek, requiring 3 creek crossings to move the spoil from the tunnel to the spoil dump.
- It is noted that Kingaham spoil area will be placed at 1% AEP but there does not appear any reference to AEP objective for the tunnel spoil site.
- Pp 352 discusses the spoil management and use of silt fence and coir logs as a minimum to manage any lateral movement of sediment towards the creek. The spoil site will be 5m – 7m high. A silt fence would quickly become overwhelmed and is not a realistic mitigation measure. Secure bunding of this nitrate-rich spoil water is required to maintain the environmental values of Sandy and Yabba Creeks. What contingency plans and redundancies will be in place if a spill/breach occurs and what additional 'room' will be needed to install a second bunding measure?
- Pp 353 and 354 discusses the benefits of dilution effects from contaminants if entering the Lake Borumba bottom storage and that little would go past the Imbil weir. This implies that Qld Hydro do not take seriously avoidance of potential water quality breaches, and the Lake will solve these breaches. Wording such as 'unlikely' 'lower risk' for potential impacts to MNES is an oversight which dismisses the importance of addressing these issues.
- Tunnelling activities will be 24/7 and 12 hours /7 days a week for all other activities. This presents considerable pressure on all fauna drawn to night lights and requiring calling for breeding / foraging activities.

Specific items contained in the CEMP

Pp 177 mentions spoil from vegetation as presenting a high fire hazard and with controls reduced to medium. How will they control the volume and reduce the fire hazard? Has potential ash contamination on Borumba water supply been considered if a bushfire occurs? Pp215 water with "nitrates reused underground service water" – not sure what is underground service water.

Pp 219 green waste processing - "for surplus material transported for green waste processing. Some reused onsite and weeds treated and some felled trees placed on ground as habitat" - The sheer volumes need to be better understood. This overlooks a massive 'green waste issue'.

Pp221 waste water transported to appropriate licensed facility for treatment and disposal (wash down and waste water) - where would this be located? What volume of waste water is likely?

Pp224 Qld Hydro do not have an agreement yet with Gympie Regional Council for sewage collection and disposal. At this stage there may be an agreement with South East Queensland water utility, Unity Water..

Pp236/7 Flora and fauna … does not mention the temporary barrier to terrestrial fauna corridors - light / physical / vehicle movement/ human etc. Terrestrial fauna have established corridors and migratory paths for foraging and breeding. This is not addressed in the mitigation (pp 289)

Pp239 Reporting … Any fauna sightings and/or road kill regardless of MNES should be reported as contractors may not be able to distinguish the difference. Reporting on sightings and road kill will inform the locations of fauna corridors and guide site specific mitigation..

Pp 239 What does it mean "FSC report on a regular basis"? This should be tailored to the activity risk ie initial clearing etc. For example, daily initially and maybe weekly as project progresses

Pp239....Potentially site staff could attend night walks with local experts eg Rachel Lyons (Wildcare Australia) to better understand first-hand the night fauna – better than just toolbox alone. Toolboxes can be too academic, appear as though the risk is at arm's length and not really relevant – can be seen as a box ticking exercise. Needs to be more imaginative to build awareness and understand with training otherwise there is no genuine care for natural assets.

Pp245 would be useful to have on the map the RE status next to the RE in the legend. It's very difficult to tell which is the least concern RE

Pp 252 why does the explosive compound have to be so close to the subtropical eucalypt floodplain forest, with potential for bushfire risk.

Pp274 says 10cm grid size mesh over turtle nests. Should be much smaller 5cm?

Pp277 is the "use of cherry picker, drone or tree climber"

Pp277 is it even possible to clear the site of fauna using a smoking technique simulating a bushfire?

Pp277 how can Qld Hydro "maintain a habitat link" along an access road. Presumably the canopy won't be a closed canopy?

Pp279 instead of treating only "large infestations" (eg weeds Cats Claw Vine and Giant Rats Tail grass), general biosecurity obligation should be to treat all infestations or else they become large infestations – need for a comprehensive weed management plan, with surveillance and early detection, rapid response measures.

Erosion and sediment control sub plan - this is really very comprehensive and appears to be broadly best practice but from experience how that is implemented in the field, maintained, improved etc is the most important aspect.

MRCCC requests to review the contractor's final Erosion and Sediment Control plan to identify improvements or issues based on local knowledge

MRCCC recommends a clause in the EMP that additional measures needed during construction will undergo a full flora and fauna impact assessment and consultation prior to implementation.

Appendix I – review of Offset Area Management Plan

Summary

- Environmental weed threat to offset properties is of great concern. MRCCC recommends a 50 year management plan is required for the offset properties to ensure landscape integration and resilience. MRCCC recommends Qld Hydro's offset policy should be to create resilient riparian corridor linkages of Subtropical Lowland Rainforest along Yabba Creek as the first priority. There is potential to create important north-south landscape scale corridors from Conondale Ranges, through the Burnett Range to the north to the adjoining Burrum River catchment. Page 119 of the Preliminary Documentation recognizes this important south-north corridor.
- That the rehabilitation be supported for maintenance and replacement planting for at least a 25-year period after planting (as supported by the findings of long-term monitoring of Giant barred frog on Maleny Plateau – see article attached for Maleny Giant barred frog recovery)
- Agreed Rehabilitation Performance Criteria should be publically disclosed for transparency. Qld Hydro should be independently scrutinised and monitored by a third party with ecological restoration knowledge and not only subject to agreements between QLd Hydro and contractors.
- Legal Security of Site - a VDEC is considered a relatively weak form of security for the offset site and does not preclude owners of the property to undertake actions including clearing after the 20 year offset period. The conversion of the area to National Park status either immediately or at the conclusion of the 20 year period should alternately be undertaken.

The 20 year timescale of the OAMP is far too brief to ensure the security of condition improvement aimed for (score 7 to score 9), particularly for the lowland rainforest TEC.

The plan needs to allow for more flexible adaptive management responses to unforeseen events (fires, storms, unusual seasonal conditions, new weed and pest species outbreaks) and be based on vegetation community successional responses carefully observed on the ground.

The likely required weed management effort seems to be greatly underestimated.

The 5 year monitoring/review interval in the later stages of the plan is absolutely insufficient to allow for timely and effective adaptive management. Based on MRCCC of rehabilitated STLR, an annual program of inspection and small scale weed control is required. Employing the 'early detection, rapid response' method has ensured very small weed infestations are controlled early to significantly reduce the threat or eradicate.

The likely cost of ongoing management effort required to achieve and maintain offset condition is very difficult to estimate in advance, and is usually grossly underestimated by most contractors in this country defined by difficult terrain. For example, the true costs of adequate management are several times the estimate produced by the current (very outdated) state government financial offsets calculator. Realistic benchmark costings should be derived from a number of well documented sources and past projects in similar situations that have been successful (many have not been). The cheapest tender may simply be a path to non-compliance with the required offset outcomes.

Therefore, learnings and realistic costings from implementing the exploratory works OAMP must inform any OAMP being developed for the main works.

Managed natural regeneration (where appropriate) is much more cost and labour efficient than block replanting projects, but requires close observation, active weed control and careful species management by thinning if necessary (eg strategic stem-by stem selective thinning of regrowth).

Several known high-risk ecological architect/transformational weed species likely to dominate management concerns in the area are not given enough attention (principally cats claw creeper, madeira vine, ochna, hamil guinea grass and introduced twining legumes such as glycine).

Several new and emerging weed threats in the local area are likely to become important over the next decade - particularly chinese burr and creeping inch plant.

Lantana removal has to be managed carefully at the margins of forested patches- removal that is too rapid destroys useful habitat for several MNES species (eg black breasted button quail and potoroos) before replacement understory structure is in place, and often opens up patches for invasion from much higher risk weeds such as hamil guinea grass.

Suggested feral pig control measures are not the current best practice for country typical of the upper Yabba sub-catchment - a large pen-trapping program should be implemented in conjunction with sodium nitrite baiting, before attempting mop-up control with well managed professional ground shooting/hunting. Prior shooting/hunting disrupts the social structure of the sounder groups, consequently disrupting attempts at large scale trapping and baiting programs (the most effective control methods).

MRCCC recommends that Qld Hydro commit to long-term support for landholder engagement that promotes and assists best practice land and waterway management to ensure that the rehabilitation is secure for generations into the future. A concerning statement is contained in 3.3.1 'Key considerations in offset site selection' section stating 'Landowner was supportive of the land being secured and managed as an environmental offset.' as a consideration for off-set site selection. It is easy to walk away after initial contact with an unenthusiastic landholder. This requires broad community engagement and long-term contact.

The offset areas don't reach far enough geographically for species movement and therefore genetic transfer across the broader landscape and over the very long-term.

Section 6.2 - Restoration of regrowth and non-remnant areas (Pg 95) - Timing of planting will preferably avoid high temperatures of summer and frosts of winter. Preferably plantings occur after rains when the soil is moist. Between February and April are recognised as good times to plant in Gympie Region.

Many revegetation sites fail when planted under unfavourable conditions. Planting must occur during favourable conditions (i.e. change the word 'preferably' to 'must').

Budget considerations for offset properties

Estimate of site management costs over a 10 year block (based on a real-life example property).

Assumptions would be that intensive maintenance in first 3 years, addressing woody and vine weeds and strategic infill planting, then routine maintenance each year.

The calculations are based on a 20% reduction in labour each year as the site improves, and costing $500 per labour day (current rates, no adjustments for CPI).

Depending on the starting condition of the site then 500 to 1000 seedlings per hectare could be planted in years 1, 3, 5 to increase diversity/coverage which considers an uplift in condition scores as the site improves.

	Labour Days	Cost at $500/LD	
Y1	72	$36,000.00	Based on 6 LD per hectare per month
Y2	58	$28,800.00	
Y3	46	$23,040.00	
Y4	37	$18,432.00	
Y5	29	$14,745.60	Assumption of climatic event in year 5 taking the site back to a year 2 or 3 condition
Y6	47	$23,592.96	i.e. flood/drought/fire, could include vine weed incursion
Y7	38	$18,874.37	
Y8	30	$15,099.49	
Y9	24	$12,079.60	
Y10	19	$9,663.68	
TOTAL	**401**	**$200,327.69**	

Note this is labour costs only – based on 24/25 rates. Seedling costs are $10/seedling, supplied, site prepared and planted at 2,500 seedlings per hectare ($25,000 per hectare planted) in the first year, with some infill required over time (minimal cost though).

Assuming that minimum maintenance rounds should be once or twice a year (eg, 2 x 4 LD's per hectare) and timed according to specific site conditions/needs – i.e. vine weeds/lantana. So minimum requirements would be $4,000 per year (at current costs).

Table 31 – Offset Area Planting and Restoration Actions.

This table provides no context to the work effort required. In fact it suggests that only 2 person days is required to manage the entire offset for the life of the project.

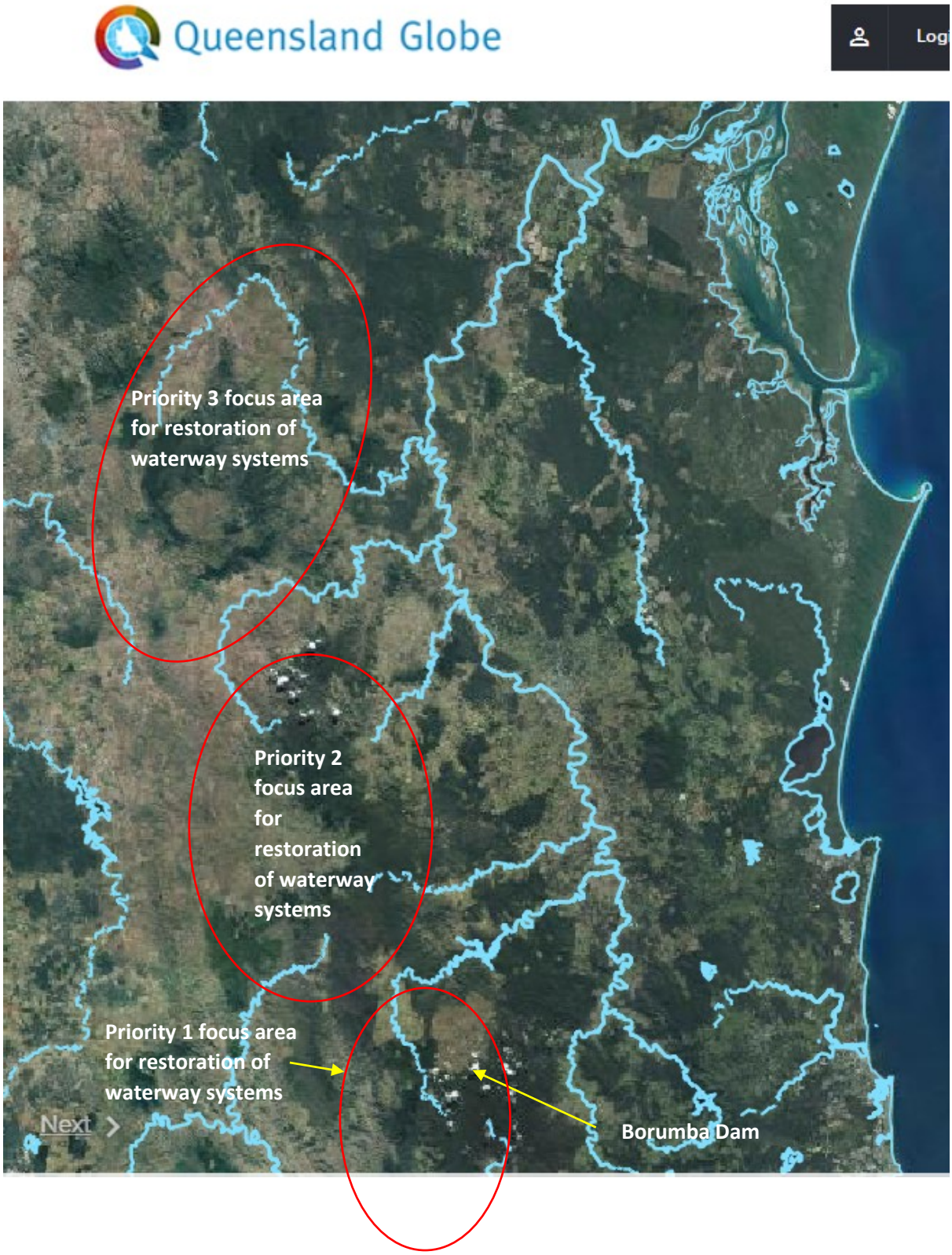
Throughout the document there appears to be inconsistencies with the hectares stated, compared with the Preliminary Documentation. On P.103, the hectares for protection and restoration for Yellow Belly Gliders is inconsistent with the rest of the documentation.

The areas of disturbed vegetation to be restored are small and not 4 times replacing habitat that is completely lost forever (i.e Overall area of impact stated as 85.3 ha. Multiplied x 4 = 431 ha. only 252.2 ha to be rehabilitated). Offset rehabilitation of non-remnant area only 71.37 ha. Not nearly enough to replace x 4 (or even x 1!) what is completely lost. Rehabilitation of regrowth is not the same value as rehabilitation of non-remnant areas.

Giant barred frog consideration of the potential to create landscape corridor linkages through offsets

M. iteratus:

- *M. iteratus* not included in the list of MNES – it should be!! This is because there are records within close proximity and in surrounding sub-catchments, and that there would have been historical connection northwards to Doongul Creek in the Burrum River catchment (northern extent of Giant barred Frog). Also because waterways need to be targeted as connection corridors for many fauna species and for support systems to the broader terrestrial landscape.
- Given the WildNet records within the vicinity of the footprint, the historical record of *M. iteratus* in Doongul Creek (Burrum catchment) and the barrier to movement that will be created by the works and the site in operation, the MRCCC strongly advises the following to be considered, particularly for *M. iteratus*, but also for the benefit of other MNES fauna:
    - That resources be put into extensive surveys of all waterways upstream of the site and in adjacent sub-catchments of Little Yabba, Coonoongibber, all of Yabba upper tributaries, Kandanga, Amamoor, Wide Bay, and along the upper Burnett systems that rise from the western watershed of these systems from Monsildale Creek in the south to Barambah Creek tributaries.
    - That resources be provided to at least 10 key sites determined from the above to monitor 3 time/breeding season for 25 years.
    - That extensive rehabilitation of linking upper waterways be implemented with landholders (fencing, weed control, revegetation) to provide landscape connection across the landscape for M. iteratus and other species. This is especially important in the cleared areas in the upper and middle Yabba system, Kandanga Creek, upper Widgee, Wide Bay Creek system where clearing is extensive and through to Doongul Creek – see landscape corridor map below)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