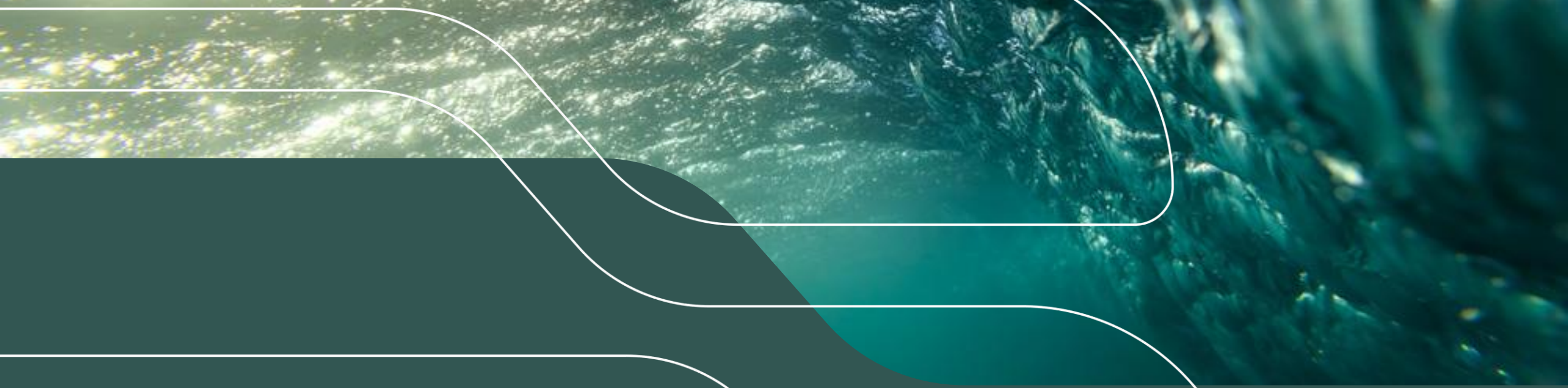


Queensland
Hydro

Borumba pumped hydro project

Stakeholder Reference Group meeting

Acknowledgement of Country

We acknowledge Aboriginal and Torres Strait Islander people as the traditional custodians of the lands in which we work. We pay our respects to the Elders of the past, present and future, and acknowledge their spiritual connection to Country.

Welcome

- Introductions
- Agenda
- Housekeeping and emergency procedures

The team

Christopher Gwynne

Borumba PHES Project Director

Tim McConnell

Water, Dams and Hydropower

Colin Langton

Powerlink Program Manager Borumba Transmission Lines

Anthony Burke

Transport Planning, Logistics and Analytics

Rebecca Grady

Borumba Community and Stakeholder Engagement

Rebecca Powlett

Ecology and Stakeholder Engagement

Agenda

- Queensland Hydro and Powerlink
- Exploratory works
- Hydrology
- Traffic and transport
- Ecology
- Transmission corridor study update
- Next steps

Stakeholder Reference Group meeting

Queensland Hydro and Powerlink

Queensland Hydro and Powerlink

Queensland Hydro

- Queensland Government, as part of the Energy and Jobs Plan, announced the creation of Queensland Hydro on 28 September 2022
- Queensland Hydro is a publicly-owned entity
- Established to deliver the large-scale hydro assets that will be the cornerstone for the transformation of the State's energy system
- Queensland Hydro will progress the detailed analytical studies for the Borumba Pumped Hydro Project

Powerlink

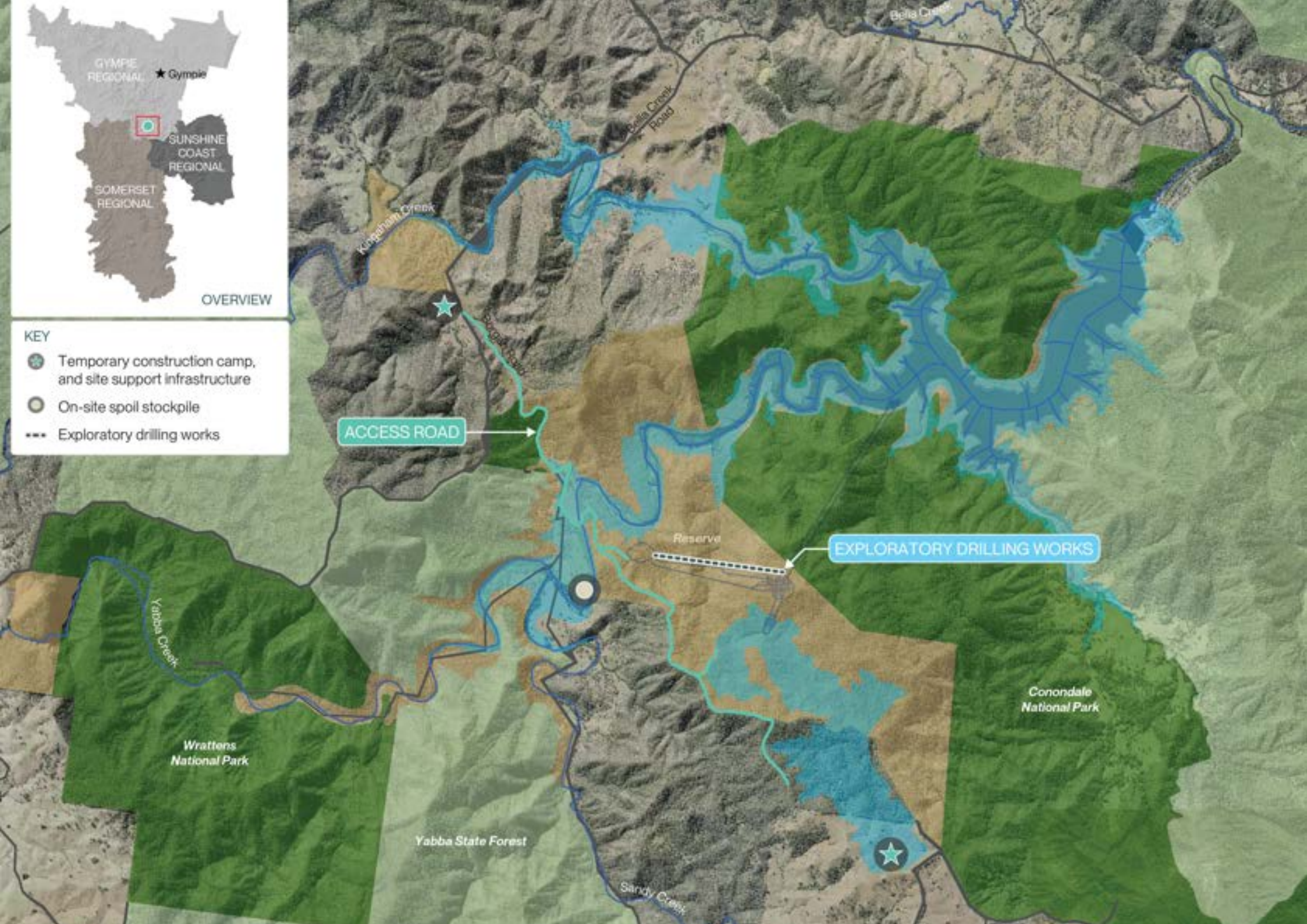
- Powerlink will continue to be responsible for the transmission study which considers the potential transmission corridors to connect the proposed Borumba Pumped Hydro Project to the existing electricity transmission network

Stakeholder Reference Group meeting

Exploratory works

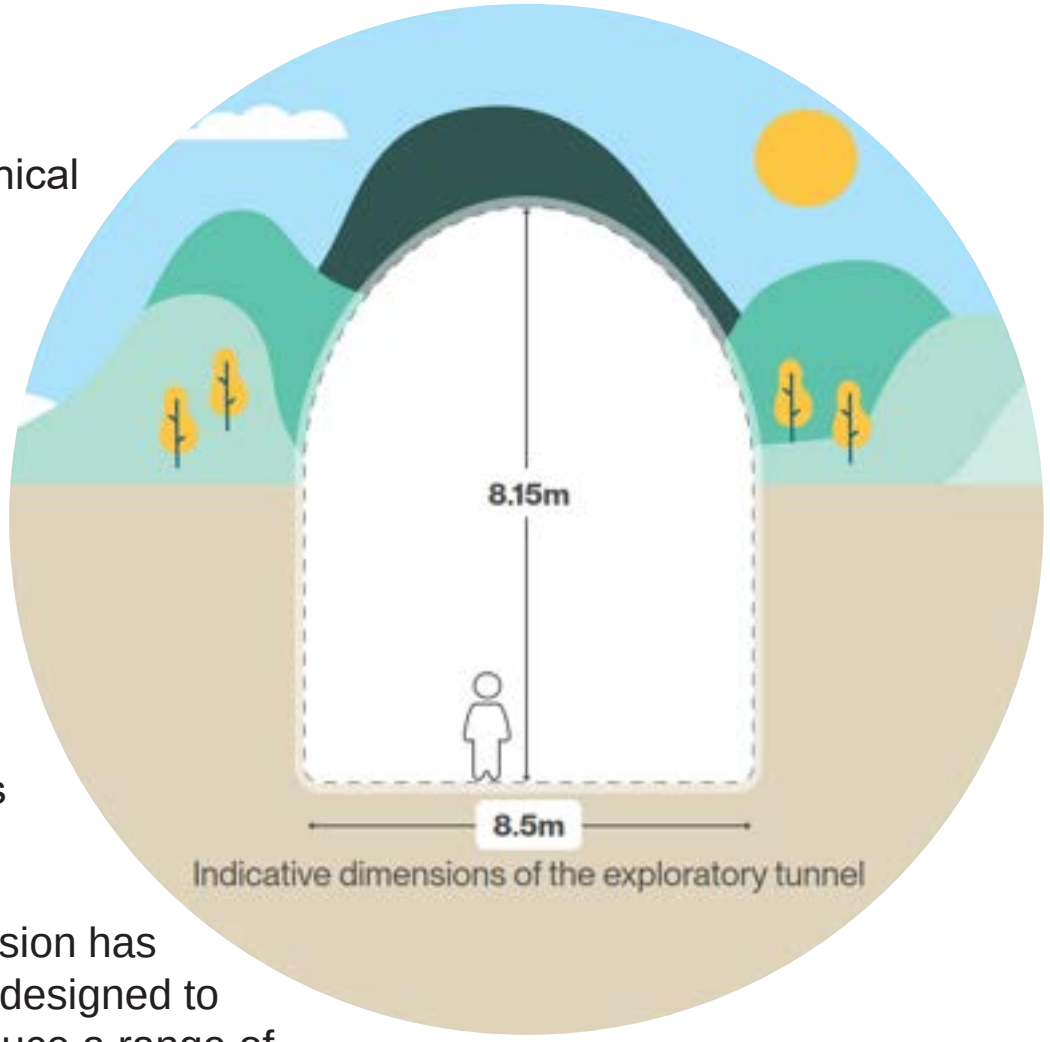
Preliminary Borumba schedule

* Accurate as of Friday 3 January 2023. All dates subject to change throughout project timeline.


GYMPIE REGIONAL
Gympie
SUNSHINE COAST REGIONAL
SOMERSET REGIONAL
OVERVIEW
KEY
Temporary construction camp, and site support infrastructure
On-site spoil stockpile
Exploratory drilling works
ACCESS ROAD
EXPLORATORY DRILLING WORKS
Bella Creek Road
Kingsham Creek
Reserve
Yabba Creek
Wrattens National Park
Yabba State Forest
Sandy Creek
Conondale National Park

Exploratory drilling

- Increase our understanding of the area's geology and will improve the project's engineering design by supplying information on the geotechnical conditions along the tunnel route.
- Involve excavating soil and rock in a D-shaped shaft at the likely location of the potential power station's emergency, communication and ventilation tunnel (ECVT).
- Blast and drilling methods will be used to remove the spoil (or excavated materials), instead of the more intrusive method of using tunnel boring machinery.
- Exploratory works are likely to be undertaken from mid-2023 and throughout 2024, concurrently with the project's environmental studies and approvals processes.
- Undertaking exploratory works does not imply that an investment decision has been made to progress the project. Rather, the exploratory works are designed to increase our understanding of ground conditions which will help to reduce a range of engineering, environmental, and financial risk.



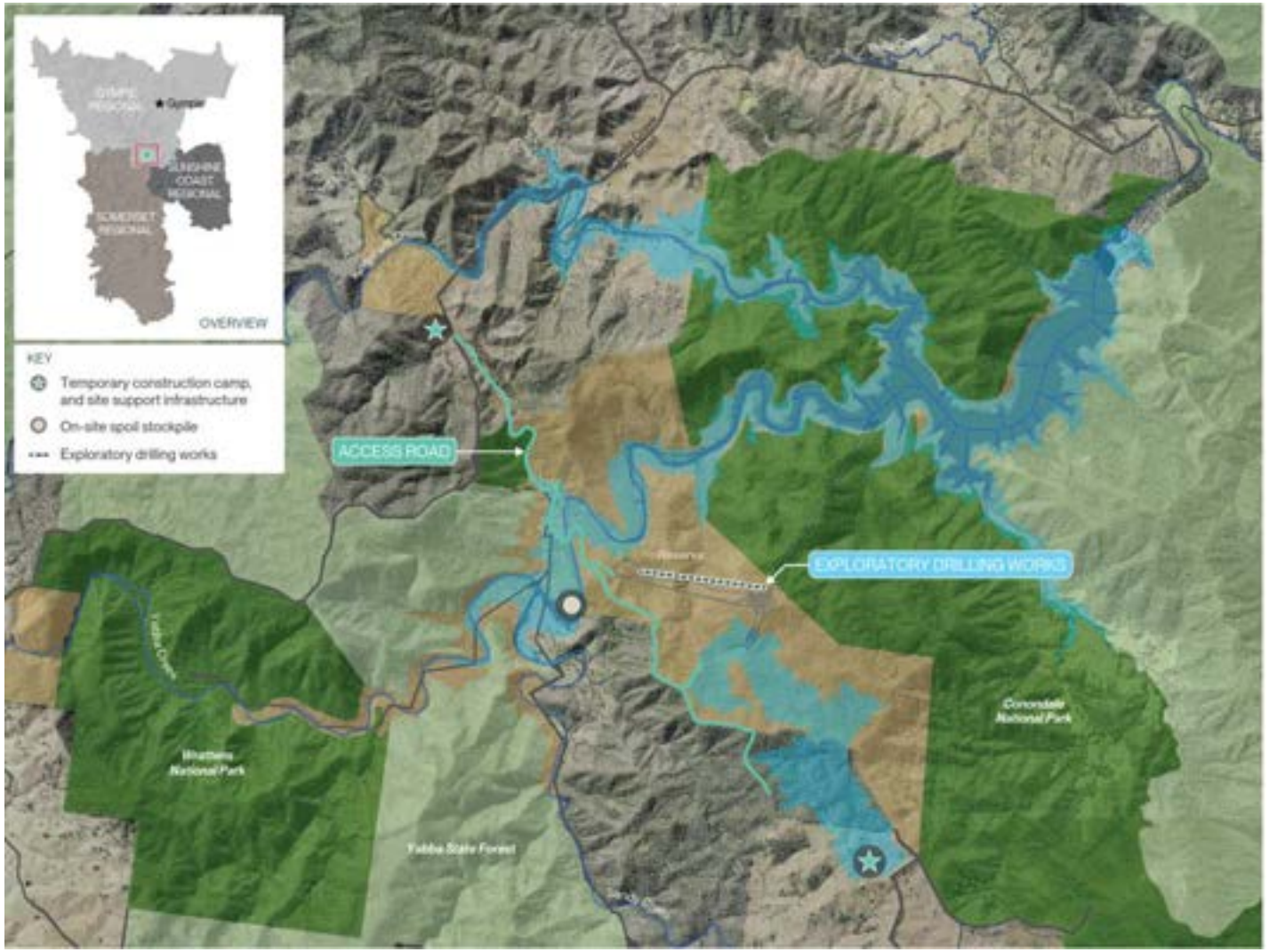
Indicative dimensions of the exploratory tunnel

Other exploratory works

Other activities that are part of exploratory works include:

- Minor road works on Bella Creek Road and Borgan Road – road works to allow safe access to site

- Construction of an on-site access road, and support infrastructure including:
  - A temporary construction camp(s)
  - Site support infrastructure such as site office, workshop, and material and equipment storage
  - On-site spoil movement and stockpile



Stakeholder Reference Group meeting

Hydrology

Strategic water planning considerations

Source: Queensland Government, 2022

Study scope

The scope of hydrologic studies conducted to date include the assessment of:

- compliance of the Borumba Pumped Hydro Energy Storage (PHES) project with the Water Plan (Mary Basin)
- water availability and reliability for operating the PHES

The modelling conducted to date is not suitable for:

- defining impacts and mitigation measures under an Environmental Impact Statement (EIS) level of analysis or
- developing updated water release rules or other provisions in updated water planning instruments (e.g. water plan, resource operations licence, operation manual or water management protocol)

The modelling does not assess flood hydrology or hydraulics used to design the reservoir spillways or embankments, nor does it assess the impacts of the reservoirs on downstream flooding.

Study objectives

The objectives of the hydrologic modelling is to assess:

- compliance of a range of PHES configurations with the current water plan's Environmental Flow Objectives (EFOs) and Water Allocation Security Objectives (WASOs);
- hydrologic performance of the Project under historical climatic conditions versus potential future (2050) climate change scenarios; and
- the probability of initially filling the new storage.

Compliance with current Mary Basin water plan

The Project will involve pumping a quantity of water up and down of water repeatedly between Borumba Dam and the upper reservoir of a volume that is equivalent to the upper reservoir useable volume. Water is not being consumed.

Under historic climate conditions with the existing Borumba Dam forming the lower reservoir:

- all mandatory EFOs were met in all project cases
- all supplemented WASOs were met for all project cases
- all un-supplemented WASO metrics were modelled at or above the Water Resource Plan (WRP) base case values

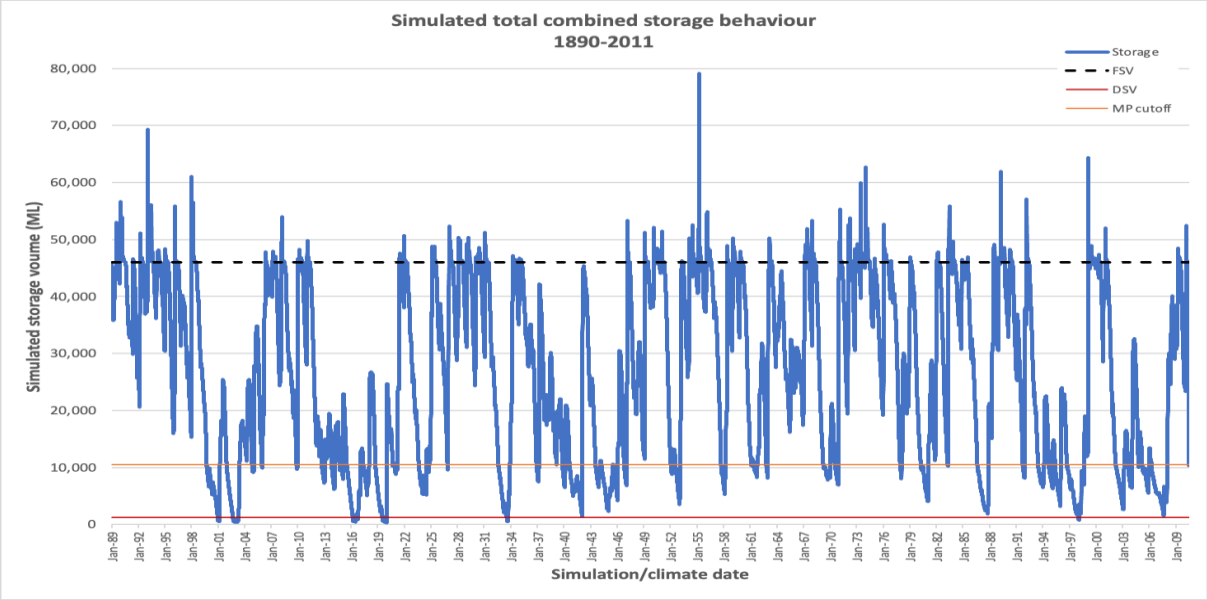
Increasing the Borumba Dam capacity improves the performance of the PHES by improving water availability during extended dry periods.

Raising Borumba Dam plus establishing the upper reservoir will:

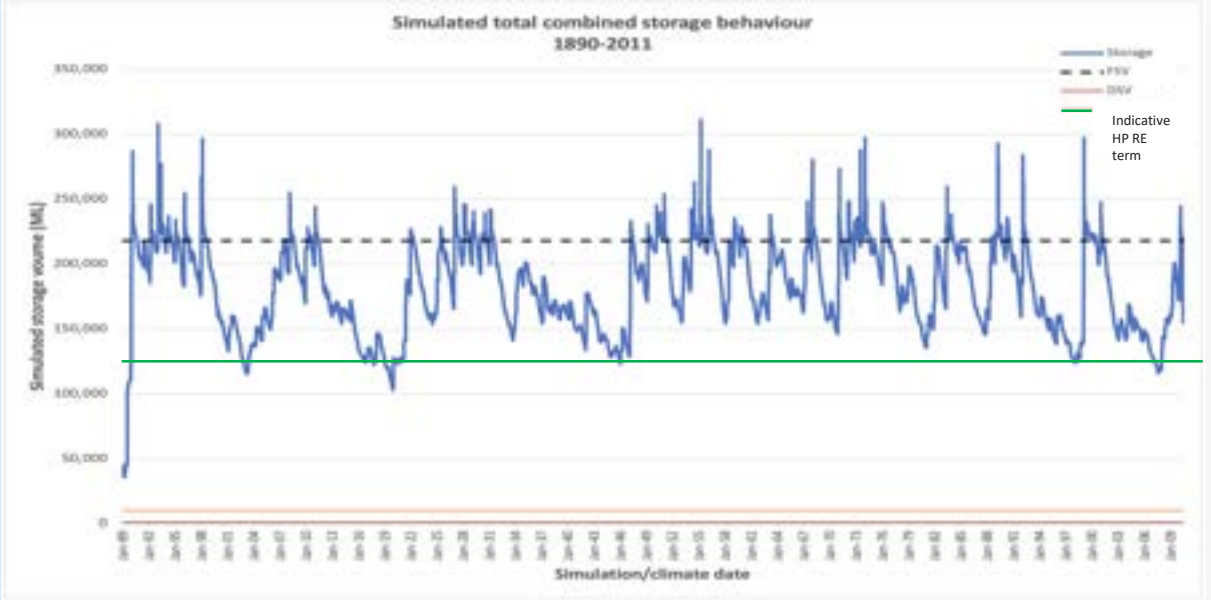
- divert more water from the basin during the initial filling of the storages
- lead to increased seepage and evaporation through greater water storage and stored surface water areas

Accounting for this change is likely to require consideration when reviewing the water plan.

Please note: medium and high priority allocations would not be negatively impacted by the hydropower scheme.



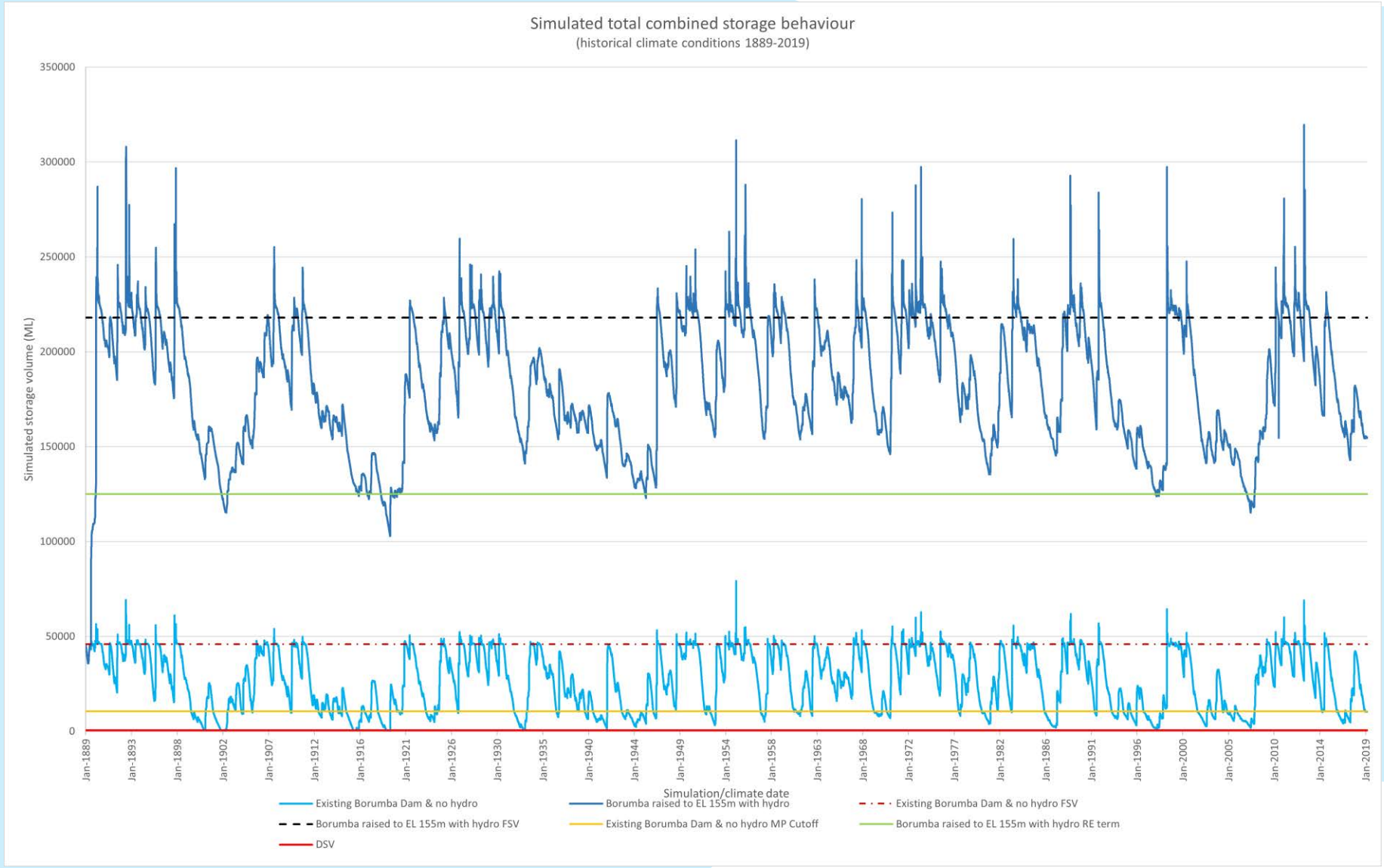
Storage volume plot for base case with **existing Borumba Dam and no hydro** under historical climate conditions



Combined storage volume plot for Project scenario (**Borumba raised to 155 m AHD** with hydro) under historical climate conditions

Note: the vertical scale of the 2nd plot is on a much larger volume given the increased storage size. Both volume plots can be found on the same graph on the next slide (slide 6).

Storage volume plots for (a) base case with existing Borumba Dam and no hydro under historical climate conditions and (b) combined storage volume plot for Project scenario (Borumba raised to 155 m AHD with hydro) under historical climate conditions



Implications of potential 2050 conditions

including climate change

Dry climate change conditions are predicted to reduce mean annual flows and as such reduce medium priority allocations.

Applying dry climate change scenario conditions with the PHES operating and Borumba Dam raised to 155 m AHD resulted in only a slight exacerbation of the level of impacts observed in the no-PHES base case.

Implications of potential 2050 conditions including climate change on water availability for the PHES

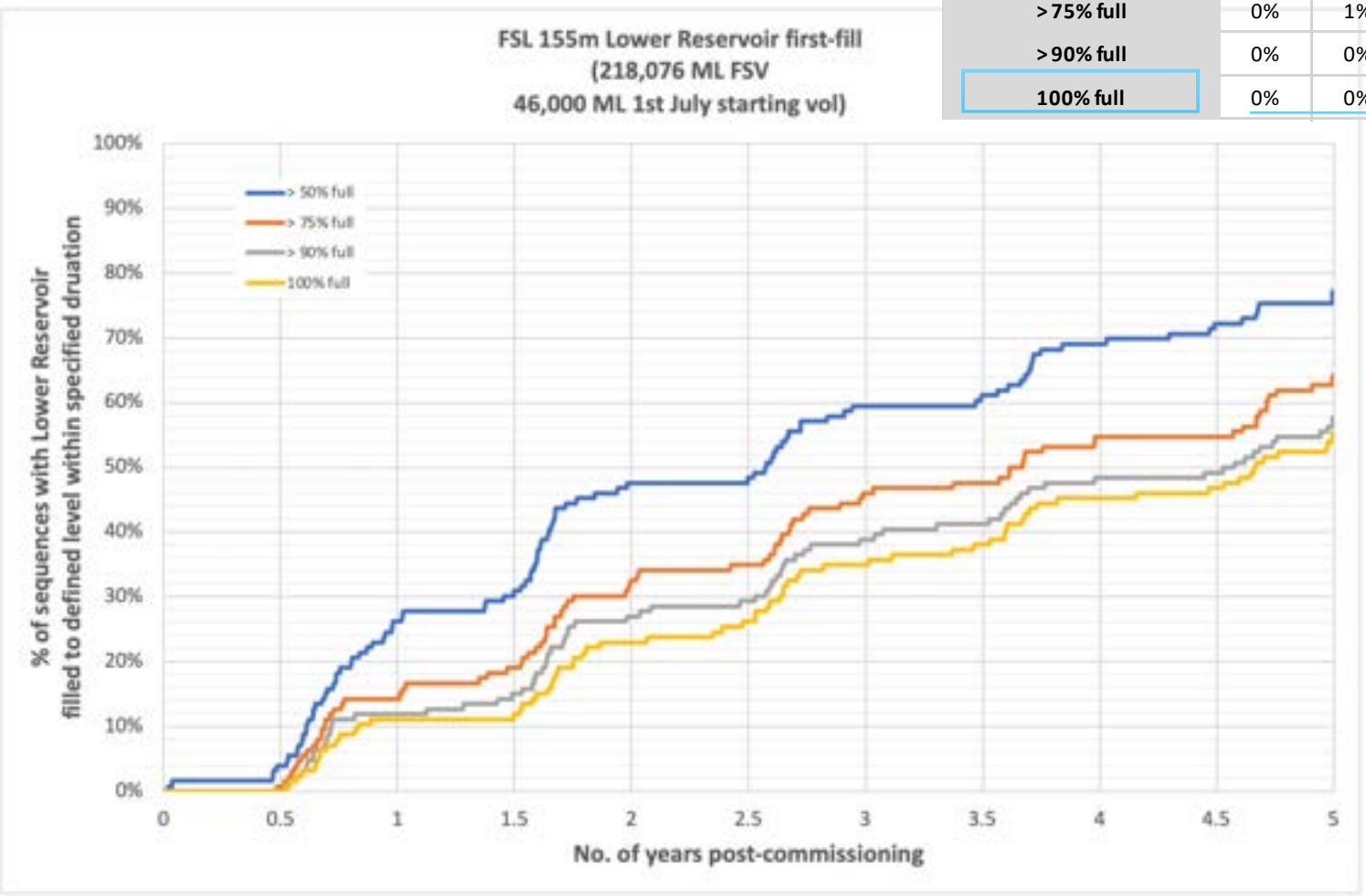
The volume of water for the project scenarios (with raised Borumba Dam and the PHES)

- did not drop below 120 m AHD (5,445 ML) under either historical or dry climate change scenario conditions
- dropped below 130 m AHD (25,833ML) in the project scenarios under historical climate conditions around 0.3% of the time which increased to 6.7% of the time under dry climate change conditions

Modelling indicates that, under historical conditions, around 7,000 ML/a of water (on average) might be attributable to the net increase in the storage evaporation / seepage losses associated with the additional surface area and volume of the upper and lower reservoirs (with Borumba Dam raised to 155m AHD) compared to the base case

Initial fill

	No of years post-commissioning										
	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
>37% full (80,000 ML)	0%	6%	38%	40%	57%	60%	68%	70%	79%	79%	86%
>50% full	0%	4%	26%	31%	48%	48%	60%	61%	69%	72%	77%
>75% full	0%	1%	14%	19%	33%	35%	46%	48%	55%	55%	64%
>90% full	0%	0%	12%	15%	27%	29%	39%	41%	48%	49%	58%
100% full	0%	0%	11%	12%	23%	26%	35%	38%	45%	47%	55%



Implications associated with the initial fill

- If the hydro were able to be operated when Borumba Dam reached 80,000 ML, there would be around 40% chance that the PHES will be able to be operated in the first 1.5 years of completing the construction f the new Borumba Dam, rising to 50% chance in 1.5 to 2 years, and 80% chance in 5 years
- Transitional operating arrangements may need to be developed and implemented during the construction and first fill period to protect the performance of existing water entitlement holders.
- Construction of a new larger dam may provide greater flexibility in maintaining the performance of existing water entitlements.

Next steps

- Provide hydrology report to State Government, which will be reviewed and then made available to the public as a summary version
- Document hydrology findings in a Detailed Analytical Report, particularly setting out water planning requirements for the PHES scheme and associated EFO and WASO impacts
- Refine the PHES project and its operational parameters (through further hydrologic modelling) such that they align with the requirements of the revised Water Plan (Mary Basin)
- Assess impacts to flow regime and supported ecosystems to further optimise the flow release rules and develop other mitigation measures under an EIS level of analysis

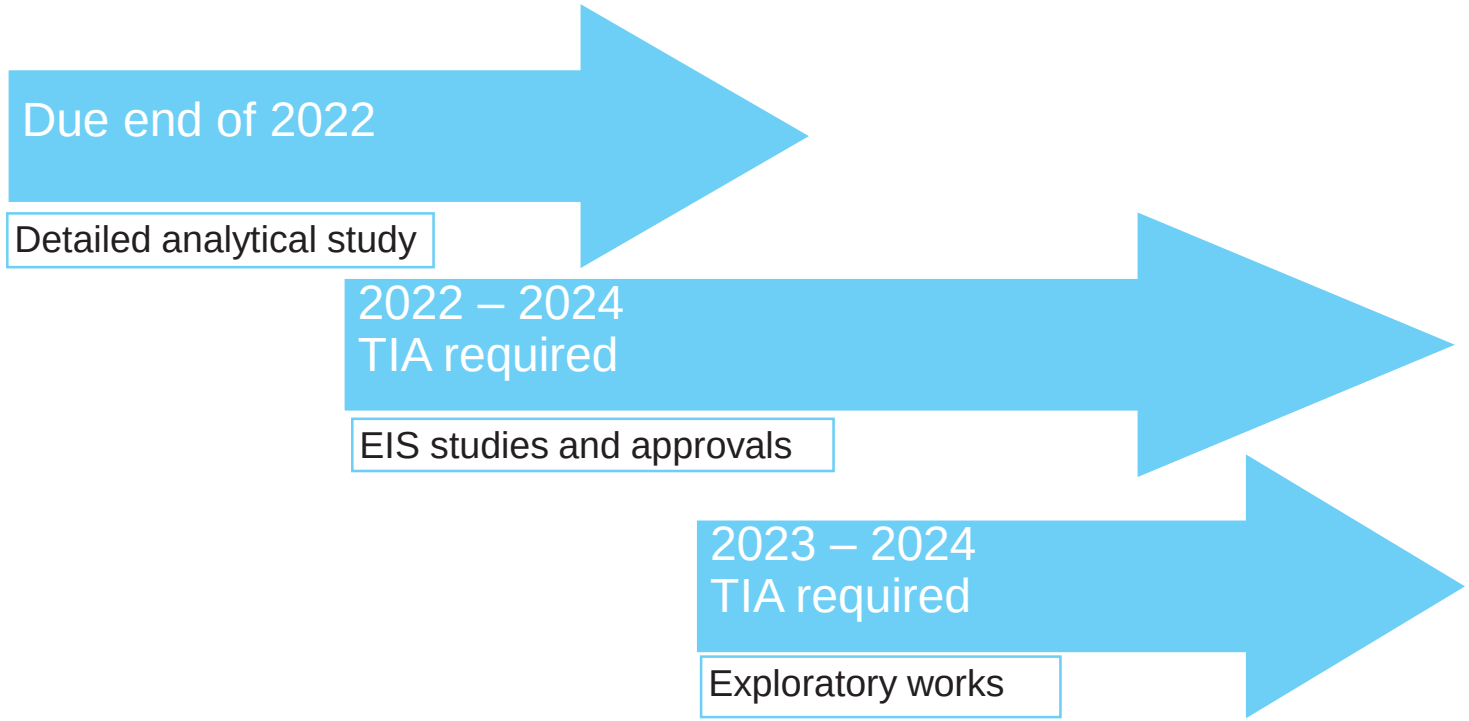
Stakeholder Reference Group meeting

Traffic and transport

The traffic and transport studies will be undertaken in parts, relating to phases or packages of work.

These parts are:

- **Detailed analytical studies** phase, which provides a multi-disciplinary investigation of the feasibility of the project
- **Environmental Impact Statement** phase, which investigates in more detail the impacts of the proposed project
- **Exploratory works** package, which investigates in more detail the ground conditions in the proposed site area



Analytical Study

- First stage of traffic and transport studies is underway – input to the Detailed Analytical Report which is due the State Government early 2023.
- Purpose is to identify if there is at least one viable transport route for major construction and operation traffic
- Includes preliminary estimation of the project's peak traffic demands for both upper and lower reservoir works
- Study is in-progress and scheduled for completion Q4 2022
- The outcomes of this stage are preliminary findings only, subject to further design development and stakeholder input.

Traffic impact assessments

For both the Environmental Impact Statement (EIS) and exploratory works, the project will undertake separate traffic impact assessments (TIA) in accordance with the Department of Transport and Main Roads (TMR) Guide to TIA.

TIA best practice and State policy requires the TMR Guide to TIA is used to investigate impacts to the transport network's operation, efficiency, safety and pavements/structures.

Purpose of the project's TIAs:

Assess the base case (or "without project" scenario) versus the "with project" scenario to determine if there are any impacts to the road network.

Scope of the TIAs:

This varies between the exploratory works package and EIS package (next slides explain in detail).

Expected outcome of the TIAs:

Avoid, manage or mitigate the impacts to the transport network's operation, efficiency, safety and pavements/structures.

TIA for exploratory works

Exploratory works TIA assumptions:

- Workforce: 37 in total for all exploratory works activities, a peak would be approximately ~25 to 30 workers
- Hours of operation:
    - Logistics support typically Monday to Friday 6 am to 4 pm
    - Exploration drilling typically 24 hours a day, 7 days a week
- Vehicle Types:
    - Workers in four-wheel drives
    - Small rigid trucks for daily activities and camp supplies/fuel/maintenance
    - Semi or truck and dog for materials – reinforcement, sand and gravel, cement, etc.
    - Excavators and special machinery once to site and once off site – some will need low loaders for delivery which are expected to be have escort vehicles
- Approximate number of vehicle movements on Bella Creek Road (one-way per week):
    - 30 light vehicles
    - 40 heavy vehicles

TIA for exploratory works

TIA for exploratory works

Exploratory works TIA known constraints and issues:

Known constraints/issues:

- culverts/floodways with poor maintenance, low weight limits and potential flooding
- narrow bridges and cattle grids with one-way operations
- narrow roads with poor sight lines around bends
- unsealed sections with potential for dust

Other considerations:

- timber logging periods with increased heavy vehicles
- regular and special events in community such as weekend markets

TIA for EIS

As this TIA will investigate the potential traffic and transport impacts for the construction and operation of the project, it will be much larger and more complex.

EIS TIA assumptions:

For lower dam construction

- Construction is scheduled to commence late 2025 and anticipated to take four years
- Investigating vehicle movement between quarry, crushing plant, stockpiles, batching plant and dam site on dedicated construction roads
- Current preference is for busing workers in for planned shifts (two day shifts and a night shift, seven days per week) from surrounding towns or larger regional centres
- Anticipating two busses for each shift change, dependant on final number of required pickup points
- Expected bus movements to be outside AM peak but may be in PM peak periods

EIS TIA assumptions:

For upper dam construction

- Includes power generation/turbine chamber/intakes (hydropower scheme) as well as dams for upper reservoir.
- This includes the main access tunnels, intake tunnels to existing Lake Borumba, switchyard and powerhouse including electro-mechanical and hydro-mechanical works, the upper reservoir, emergency spillway, upper intakes and power waterway
- Scheduled to commence in 2025 and is anticipated to take six years
- Bella Creek Road does represent a viable possible access route to site (several other possible routes are also under assessment).
- Options for alternative access from the west under consideration. This would support construction supply delivery and may also support a potential second upper reservoir construction camp
- Main access road between Borgan area and upper reservoir to be provided for construction and operational purposes
- Optimisation (final selection) of access route will occur during EIS phase (2023 – 2025).
- Preference is for a quarry location within the upper reservoir site to minimise offsite materials movements
- Total workforce est. 2,500 at 830 per shift
- Approximately 20 busses per shift from surrounding towns to site
- Construction vehicle demands still being determined but site mobilisation likely to be highest demand but likely to be over a short period

Stakeholder Reference Group meeting

Ecology

Ecology studies

Purpose of the project's ecology studies:

To describe the existing ecology values in the study area and to determine and assess potential impacts and mitigation measures.

Expected outcome of the ecology studies:

Studies carried out in 2022 will feed into the detailed analytical studies and will contribute to the suite of baseline studies for the EIS. Additional ecological studies will be undertaken in 2023 to support the EIS.

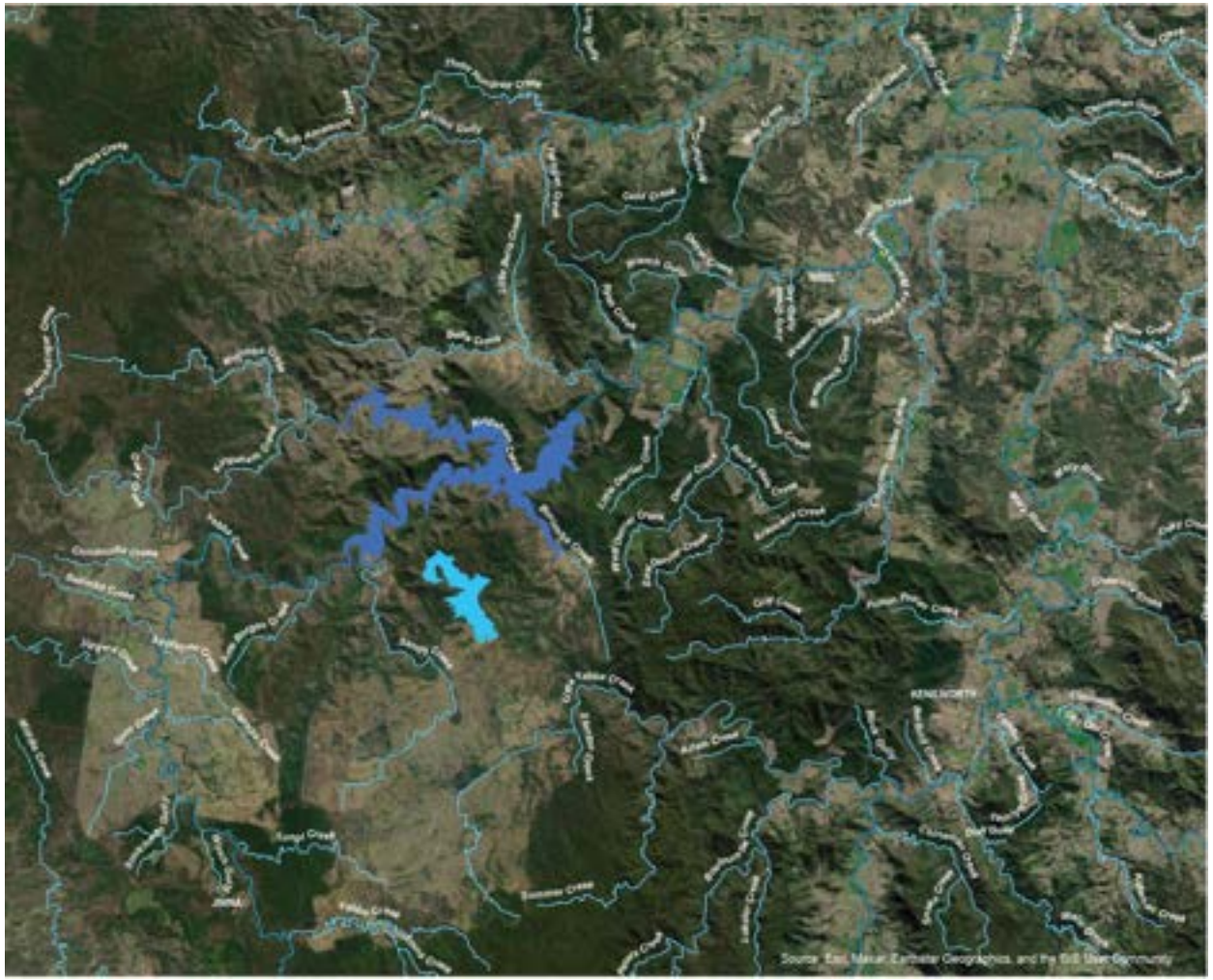
The detailed analytical study will provide preliminary consideration of potential impacts and mitigation measures. The EIS will build on this preliminary assessment and provide detailed assessment of potential impacts and identify proposed management and mitigation measures.

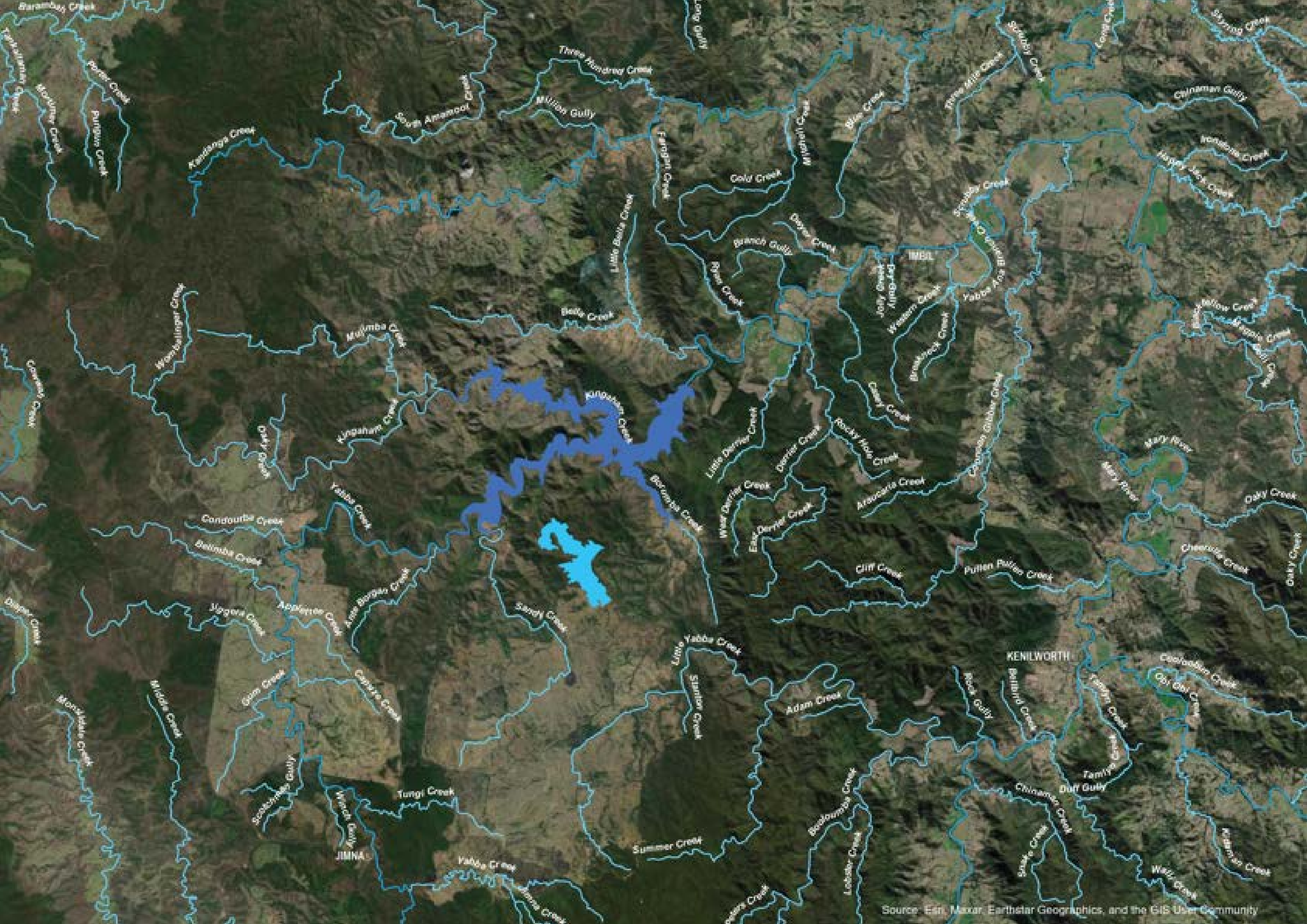
Aquatic ecology

Study area

The study area is within the Mary River basin, specifically within the Upper Mary River drainage sub-basin and a limited portion within the Lower Mary River drainage sub-basin. It includes survey sites:

- within and upstream of Lake Borumba, including within the proposed new full supply level
- within and downstream of the proposed upper reservoir
- downstream of Borumba Dam along Yabba Creek and its tributaries
- within the Mary River, upstream and downstream of the confluence with Yabba Creek.





Three Hundred Creek
South Amamoor Creek
Cold Creek
Chinaman Gully
Kandanga Creek
Ironbark Creek
Branch Gully
IMBIL
Bella Creek
Little Bella Creek
Mulimba Creek
Kingaham Creek
Yabba Creek
Condouba Creek
Bellimba Creek
Appletree Creek
Yiggera Creek
Sandy Creek
Little Yabba Creek
Little Derrier Creek
Rocky Hole Creek
Araucaria Creek
West Derrier Creek
East Derrier Creek
Cliff Creek
Pullen Pullen Creek
Mary River
Oaky Creek
Cheerwile Creek
KENILWORTH
Adam Creek
Station Creek
Gum Creek
Middle Creek
Tungi Creek
Summer Creek
JIMNA
Chinaman Creek
Duff Gully
Walli Creek
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Aquatic ecology

Study results

Waterbodies in the study area can be broadly grouped into the following four areas and habitat types:

- Upper reservoir – steep confined valley
- Creeks upstream of Lake Borumba – partly confined valley
- Lake Borumba
- Downstream of Lake Borumba – partly confined valley

Aquatic ecology

Study results

A diverse aquatic fauna community with several conservation significant species were found, including:

- lungfish
- Mary River cod
- white throated snapping turtle
- Mary River turtle
- platypus
- non-native species were found (but were not abundant)

Aquatic fauna habitats found in Yabba & Kingaham creeks and the Mary River include:

- riffles, runs, pools (shallow and deep)
- stream edges and shallow margins
- aquatic plants
- woody debris and tree roots

Aquatic ecology

Study results

Potential impacts on aquatic ecology will occur during construction and operation phases of the project and be associated with:

- changes in water speed from fast to still
- rapid changes in water levels in the lower reservoir
- barriers to fauna movement

A preliminary significant residual impact (SRI) assessment indicated the residual impact to threatened species is not anticipated to lead to their long-term population decrease. However, the project may interfere with the recovery of some species at the local scale, including white throated snapping turtle, Mary River cod and Mary River turtle, lungfish and platypus.

Terrestrial ecology

Study area

The study area comprises the upper reservoir and lower reservoir areas, including Kingaham and Yabba creeks, and contains a mix of remnant vegetation and cleared grazing areas and has rolling and steep mountains and hills.

What we found

A total of 406 terrestrial flora species and 147 terrestrial fauna species were identified within the study area.

Threatened flora species identified includes:

- yellow satin heart
- ball nut
- macadamia nut
- toadflax

Threatened fauna species identified includes:

- black-breasted buttonquail
- glossy black cockatoo
- koala
- long-nosed potoroo
- the spectacled monarch

Terrestrial ecology

Preliminary impact assessment

Potential impacts to terrestrial ecology will mostly occur during the construction phase but may extend into the operation phase of the project. Potential impacts can be associated with:

- vegetation clearance and habitat loss
- dam barriers restricting fauna movement, particularly around the potential upper reservoir and affecting movement into and from Conondale National Park
- increased distribution of and/or introduction of pest fauna and weeds

Though some impacts are unavoidable because they are in the inundation area, key mitigation measures include:

- locating infrastructure to avoid sensitive terrestrial ecological areas wherever possible
- where avoiding sensitive terrestrial ecological areas is not possible, minimise vegetation clearance to minimum required to accommodate works and/or infrastructure
- improving off-site habitat connectivity
- application of best practice biosecurity

Stakeholder Reference Group meeting

Transmission corridor study update

Welcome

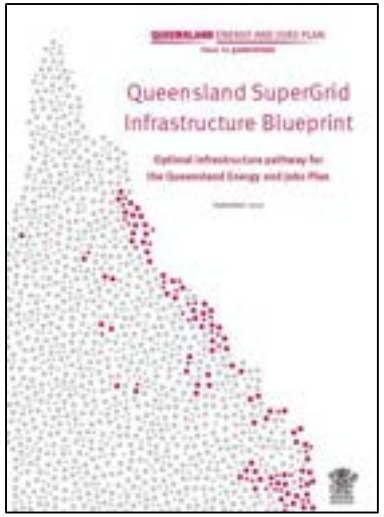
- Queensland Energy and Jobs Plan
- Borumba Pumped Hydro Project - Transmission network connection
- Community and stakeholder engagement activities
- Potential transmission corridor options
- What’s next

Queensland Energy and Jobs Plan

Plan & Blueprint

Three focus areas

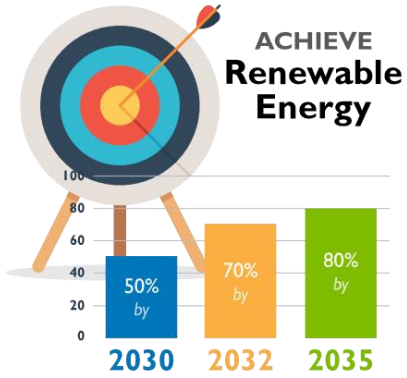
- Clean Energy Economy
- Empowered households and businesses
- Secure jobs and communities

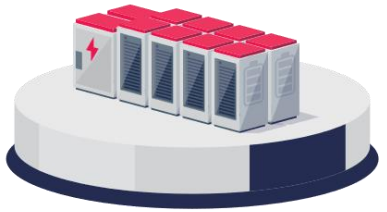


Queensland SuperGrid

- Infrastructure Blueprint outlines the infrastructure to enable the decarbonisation of the existing electricity system.
- Includes Renewable Energy Zones, Pumped Hydro Energy Storage and High Capacity Transmission

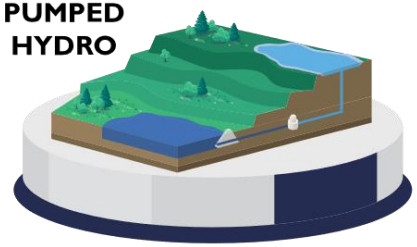
Key targets and Objectives





Connect an additional
22GW
WIND & SOLAR
in Queensland Renewable Energy Zones by 2035

Develop up to
7GW
PUMPED HYDRO



Borumba Pumped Hydro Project - Transmission network connection

- Two new transmission lines will need to be built to connect the pumped hydro facility to the existing transmission network at Powerlink's Woolooga Substation (to the north) and Tarong/Halys substations (to the west).

- We are currently investigating important factors for the potential transmission corridors including:
  - Environmental and physical
  - Social
  - Economic

- At the same time, we are engaging early with local communities and stakeholders to gain valuable insights and input to help identify potential transmission corridor options.

Engagement activities for Borumba Pumped Hydro Project – Transmission line connections

- Engagement with stakeholders and the wider community on pumped hydro project started late 2021
- Community information sessions on transmission connections #1 at Imbil and Gympie in July 2022 and Yarraman and Nanango in August 2022
- One-on-one briefings with local community groups in Kandanga in July 2022; and Yarraman, Nanango, Kingaroy in September 2022
- Stakeholder list include landholders in the area, Traditional Owners, local and state government reps, business groups, wider community
- Early discussions focused on information gathering to help with our decision-making and planning
- Ongoing engagement with landholders and other stakeholders via Burnett Stakeholder Reference Group, catch ups in person, phone calls, project website, email and interactive map

Borumba Dam community survey findings

Survey undertaken in August and September 2022, 327 responses received

Q. Ranking of key factors that Powerlink should consider when developing new transmission lines and substations

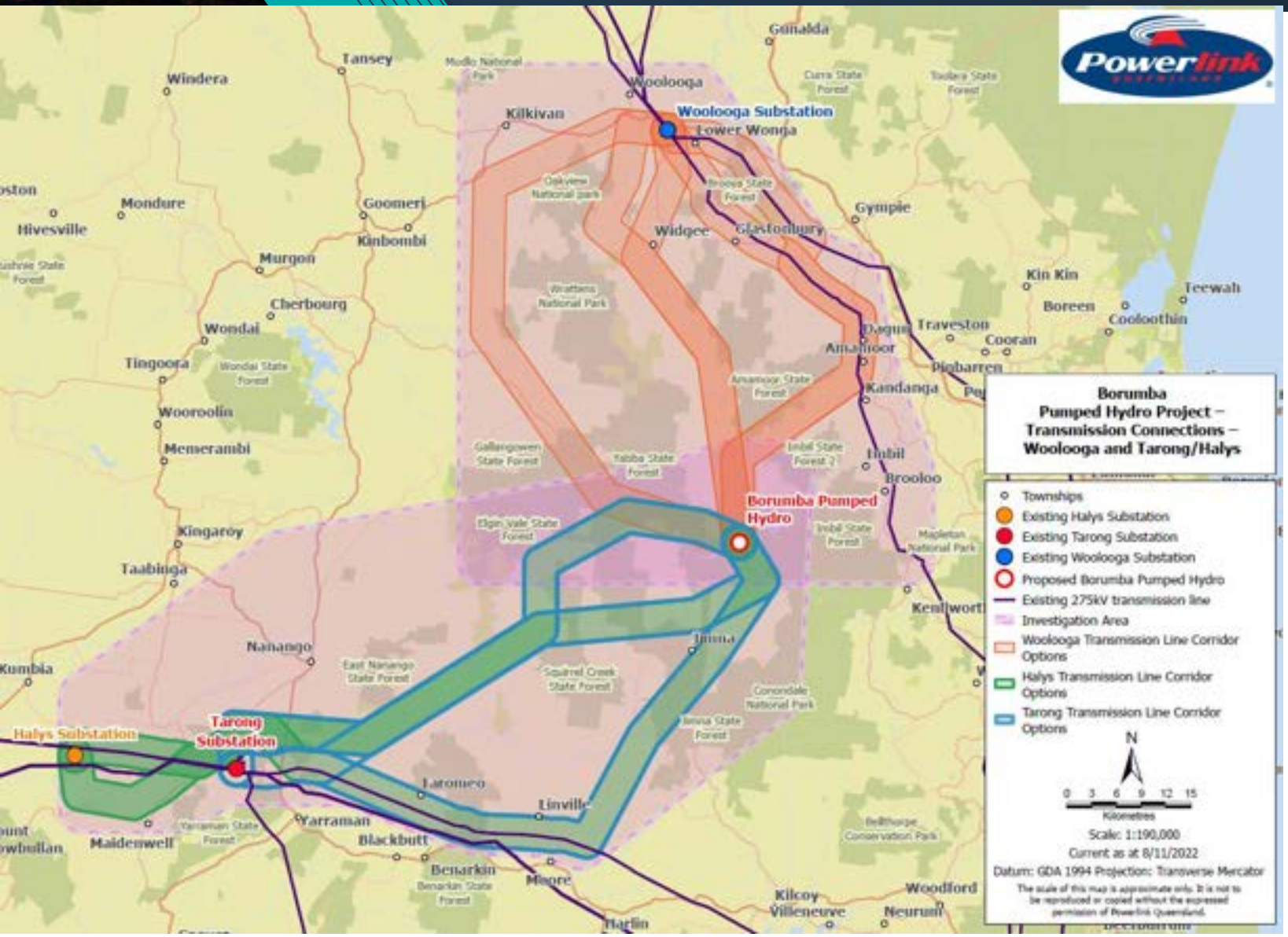
Top four factors are:

1. Locate new transmission line with an existing line
2. Avoid areas of significant Aboriginal and non-Aboriginal cultural heritage
3. Avoid known recreation and tourism areas
4. Avoid residential dwellings and key buildings

Q. Is there something that isn't listed above or a particular point of interest you would like us to consider? (free text question)

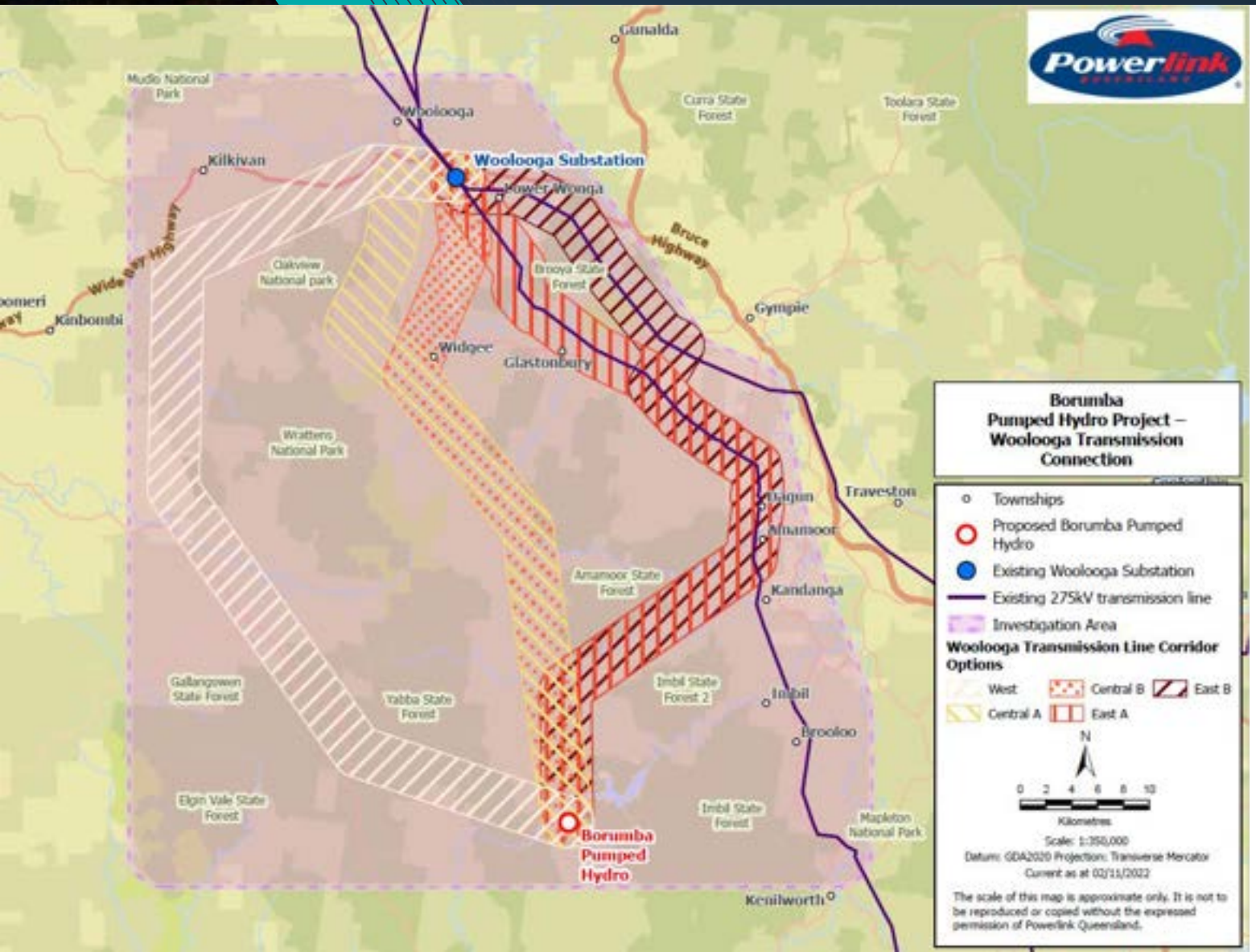
- Reduce transmission line footprint and clearing of corridors
- Place powerlines underground
- Keep to existing transmission line pathways
- Pest and weed management and mitigation during construction
- Ongoing engagement and early notification of activities
- Impact on landholders and livelihoods
- Landscape and visual amenity impacts
- Electric and magnetic fields
- Environmental impacts – koala habitat, local flora and fauna, and clearing of native vegetation.

Project map and potential transmission corridor options



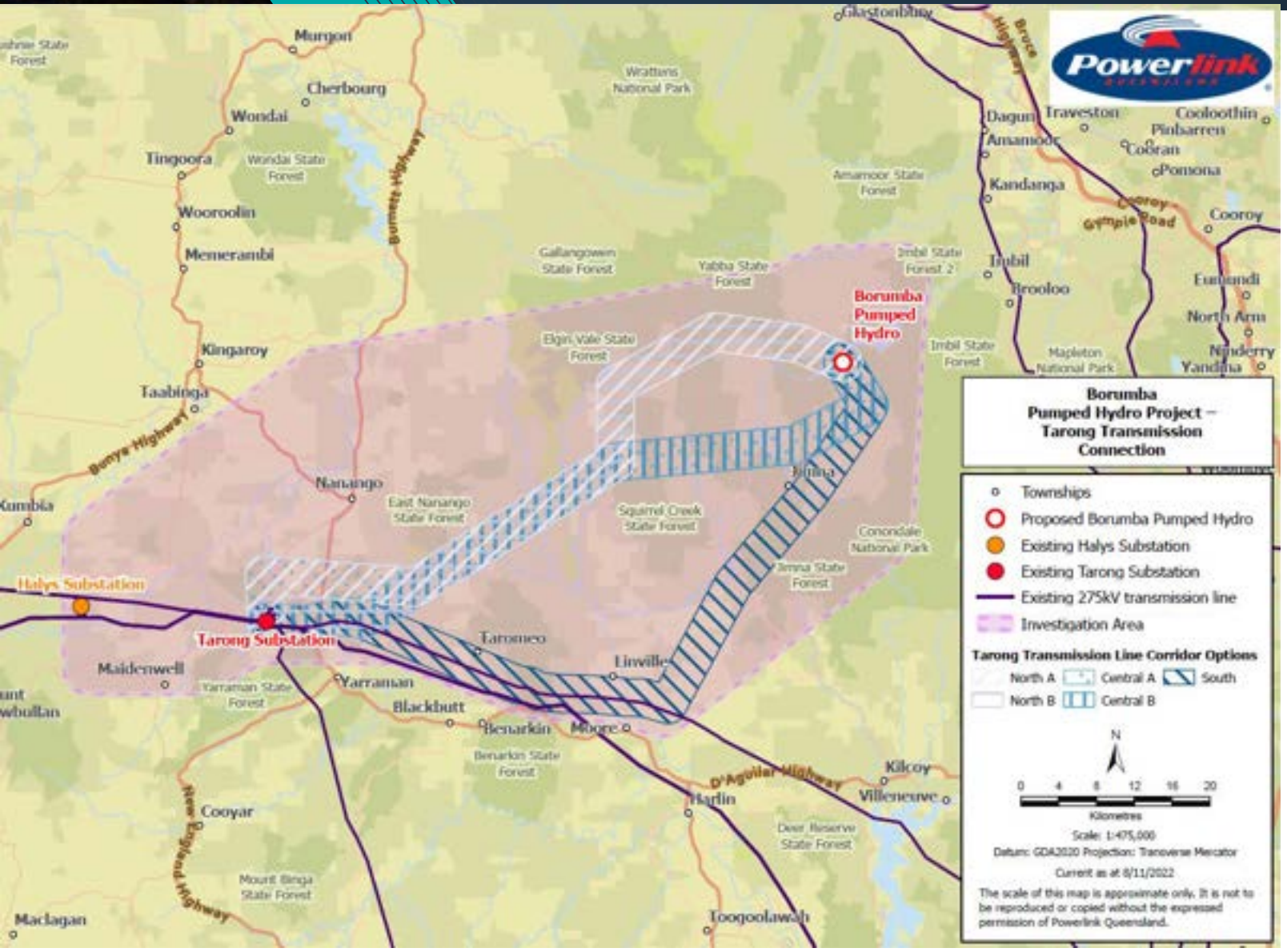
- Following feedback from the wider community and initial desktop investigations, we identified:
- Three potential corridor options for the Woolooga end - Western, Central and Eastern
- Three potential corridor options for the Tarong/Halys end - Northern, Central and Southern
- Connection may be 275kV (similar to existing lines in the area) or up to 500kV, if required
- Corridors are 4km wide, final selected easement is 60m (275kV), 70m (500kV)
- We are now seeking feedback from the community regarding the proposed transmission line corridor options

Woolooga Transmission Line Corridor Options



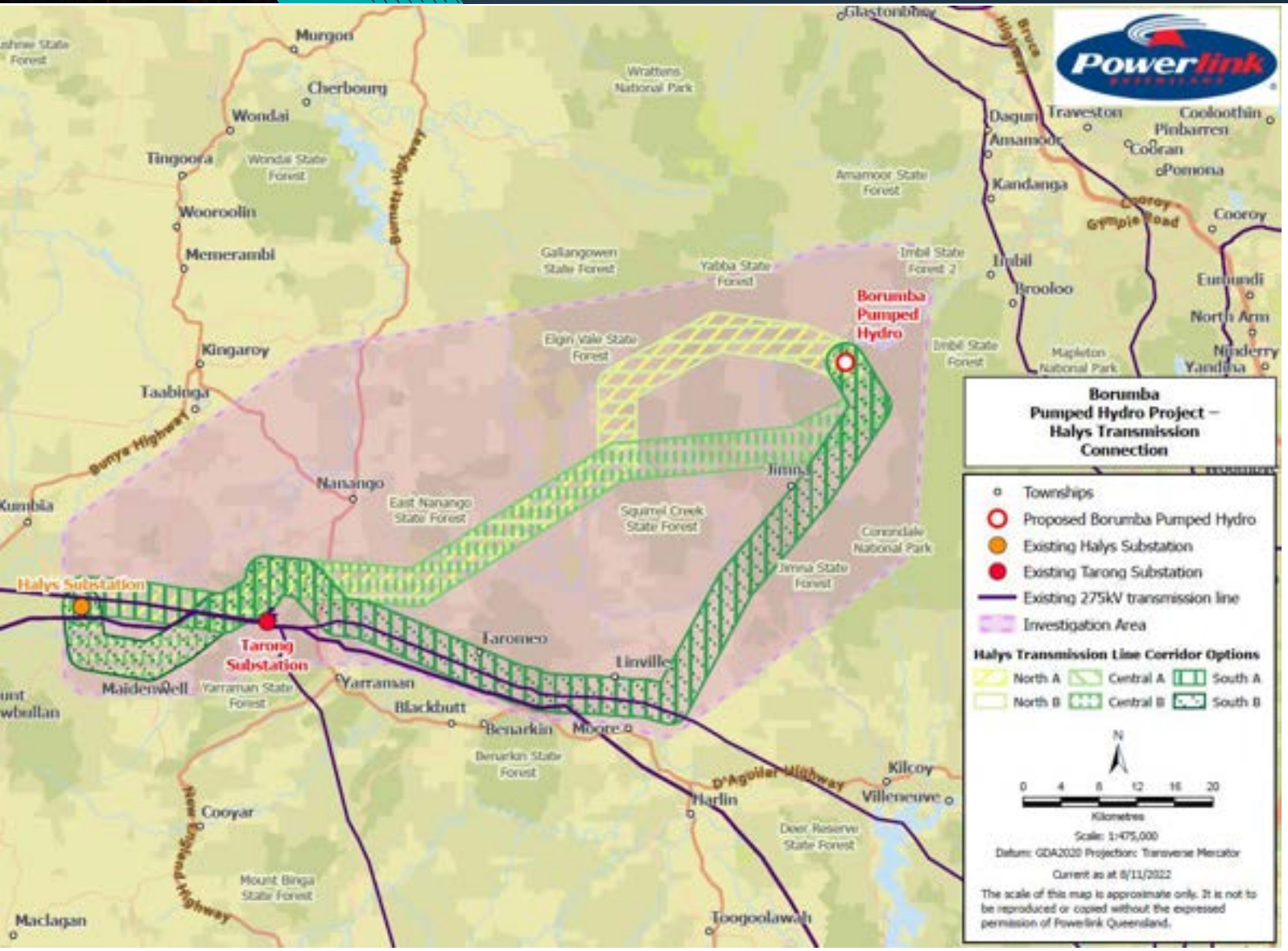
- New line to connect into Woolooga Substation
- Three options proposed
  - Woolooga West Option
  - Woolooga Central (with options A & B)
  - Woolooga East (with options A & B)
- Corridor extends across Brooloo, Imbil, Kandanga, Amamoor, Dagun, Glastonbury, Lower Wonga, Widgee and Kilkivan
- Some impact on intensively cultivated areas
- Opportunity to follow property boundaries
- Potential impacts to remnant vegetation

Tarong Transmission Line Corridor Options



- New line to connect into Tarong Substation
- Three options proposed:
  - Tarong North (with options A & B)
  - Tarong Central (with options A & B)
  - Tarong South Option
- Corridor extends across Nanango, Jimna and Linville
- Opportunity to co-locate with existing lines
- Some impact on intensively cultivated areas
- Opportunity to follow property boundaries
- Potential impacts to remnant vegetation

Halys Transmission Line Corridor Options



- New line to connect into Halys Substation
- Connection to Halys follows a similar corridor proposed for Tarong
- Three options proposed:
  - Halys North (with options A & B)
  - Tarong Central (with options A & B)
  - Tarong South (with options A & B)
- Opportunity to co-locate with existing lines
- Some impact on intensively cultivated areas
- Opportunity to follow property boundaries
- Potential impacts to remnant vegetation

When selecting a corridor, we consider a range of factors including:

- social impacts, including proximity to residential dwellings
- topography (features of the land, such as hills and creeks)
- important agricultural land and activities
- significant Aboriginal and non-Aboriginal Cultural Heritage
- environment and conservation areas
- constructability (where it can be built)
- location of towns and high population areas
- location of existing infrastructure
- economic cost

Transmission engagement timeline to early 2023

July

Early engagement with key stakeholders including Council, Traditional Owners and Peak Bodies

July/August

Wider community engagement, based on Preliminary Study Area, to gain better insights into constraints and matters of interest

September/October

Incorporate community feedback into consideration of corridor options

November/December

Community engagement to gain feedback on a number of corridor options and next engagement

Early 2023

Develop and release Draft Corridor Selection Report – with recommended corridor

Community engagement on Draft Corridor Selection Report begins

What's next

- Burnett Stakeholder Reference Group meeting 16 Nov
- Borumba Stakeholder Reference Group meeting 24 Nov

- Community information sessions at:
  - Kilkivan 22 Nov 10am-12pm
  - Woolooga 22 Nov 3-7pm
  - Imbil 23 Nov 3-7pm
  - Gympie 24 Nov 3-6pm
  - Jimna 28 Nov 3-6pm
  - Yarraman 29 Nov 3-7pm
  - Nanango 30 Nov 3-7pm

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Any questions?

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