

Tarraleah Redevelopment

Environmental Impact Statement

March 2026

Version 3

Hydro Tasmania

COVER IMAGE
Penstocks at the existing Tarraleah hydropower scheme.

Hydro Tasmania pays respect to the rich, long and ongoing history of Palawa, Tasmanian Aboriginal people, the Traditional Owners and Custodians and their connections to land, sea and community.

The mountains, natural lakes and rivers that capture and channel water for hydropower are rich in Aboriginal history, culture and tradition. We acknowledge ongoing connection to culture and custodianship of the lands and waters of places we share. We pay our respect to Elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples today.

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Executive Summary

Overview

The existing Tarraleah hydropower scheme in Tasmania's Central Highlands is nearing the end of its operational life, and Hydro Tasmania proposes to redevelop the scheme. The redevelopment will increase capacity from 90 megawatts (MW) to approximately 190 MW of peak capacity, while also improving operational flexibility and efficiency. This Environmental Impact Statement (EIS) presents the findings of the assessment of potential impacts of the Tarraleah Redevelopment Project (the Project), which forms part of Hydro Tasmania's Major Projects Program.

The Project will establish a direct pressurised connection between the redeveloped scheme's headwaters at Lake King William and a new power station adjacent to the existing Tarraleah Power Station on the Nive River. The new pressurised water conveyance will comprise both a surface pipeline and an underground tunnel. Part of the existing No. 2 Canal will be retained, and water captured by Derwent Pumps, Horne's Dam and smaller water pick-ups will be transferred into the new conveyance system. Hydro Tasmania, the Project proponent, is a Tasmanian Government Business Enterprise (GBE) that has operated the state's hydropower system for over 100 years. Hydro Tasmania is the trading name of the Hydro-Electric Corporation (formerly the Hydro-Electric Commission). More information about the Project proponent is provided in in Section 1.5.

Project objectives and benefits

The Tarraleah hydropower scheme (Figure ES.1) was commissioned in the 1930s. It currently generates approximately 634 gigawatt hours (GWh) per annum, representing about 7.3% of Hydro Tasmania's total annual generation. Many of its assets are now nearing the end of their operational life and require significant investment to avoid the risk of failure.

The Project proposes to construct new permanent infrastructure, both above and below ground, to secure a reliable and safe renewable energy source for the future. Electricity generated by the Project will support growing demand in Tasmania and be supplied to the National Electricity Market (NEM). Historically dominated by fossil fuel generation, the NEM is transitioning to a future where electricity will be predominantly sourced from variable renewable energy (VRE) such as wind and solar.

With more VRE entering the NEM, flexible generation sources are needed to provide firming capacity to cover renewable energy supply gaps (e.g. when the sun is not shining or the wind is not blowing). This includes conventional hydropower as well as storage systems such as grid-scale battery energy storage systems (BESS) and pumped hydro.

The Project aligns with and supports:

- The Australian Government's emissions reduction targets of a 43% cut by 2030 (compared to 2005 levels) and net zero emissions by 2050.
- Tasmania's renewable energy target to reach 200% renewables by 2040, increasing output from 10,500 GWh to 21,000 GWh.

More information about the Project objectives and benefits is provided in Chapter 1.

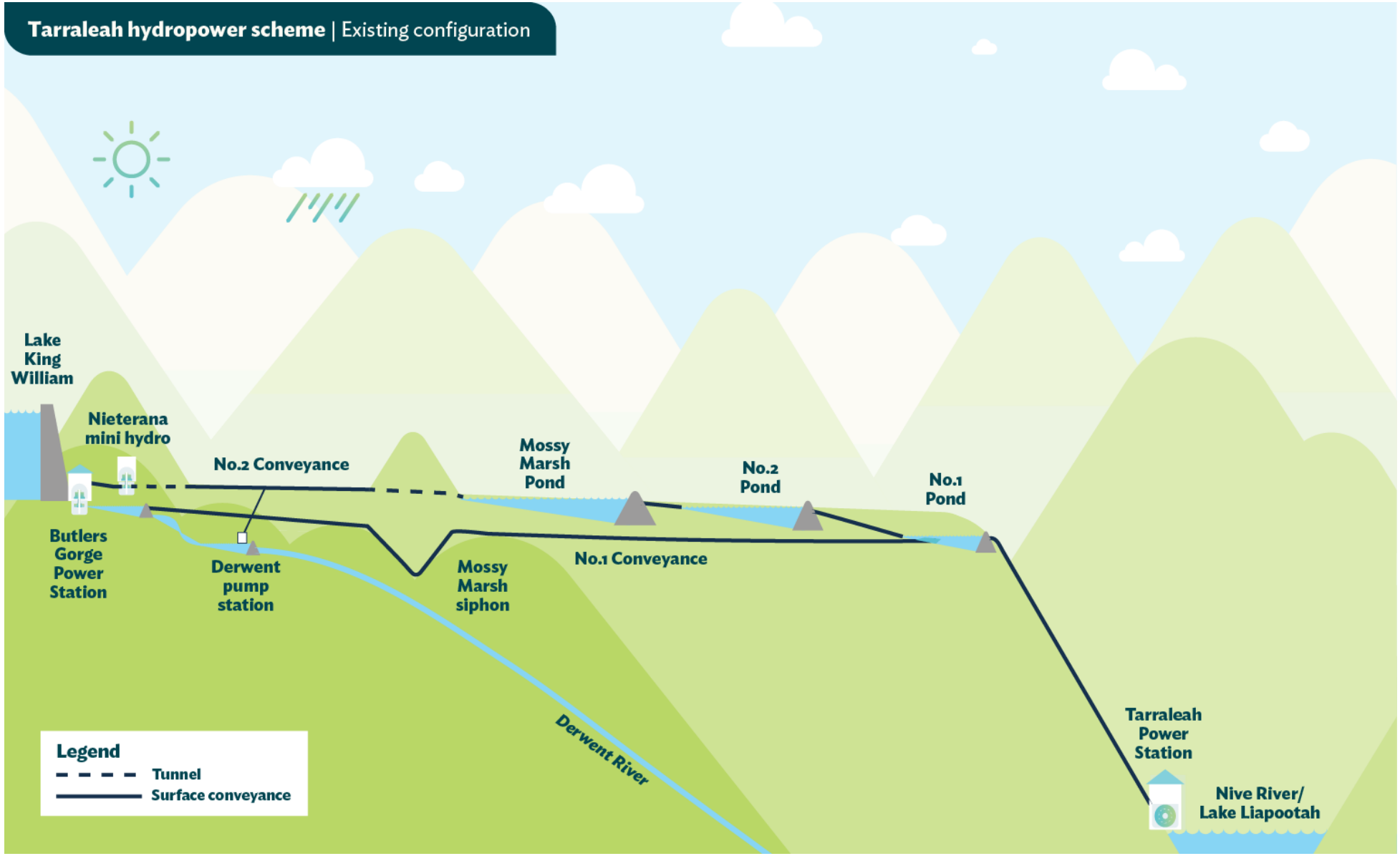


Figure ES.1: Existing configuration of the Tarraleah hydropower scheme

Project details

The key permanent components of the Project are outlined below, with the layout shown in Figure ES.2:

- An approximately 4.2 km headrace pipeline and associated service roads, connecting the Lake King William tunnel (under construction) to the headrace tunnel
- An approximately 9.5 km low-pressure headrace tunnel
- An approximately 2.3 km high-pressure power tunnel that splits into two short penstocks before entering the power station
- A partially underground power station with an installed capacity of approximately 180 MW (peak capacity 190 MW) and rated flow of 60 m^3/s, located adjacent to the existing Tarraleah Power Station
- A surge facility consisting of a 70 m above-ground surge tower and an associated 265 m underground surge shaft to control water pressure in the headrace and power tunnels
- A pumping station (capacity approximately 6 m^3/s) and a 0.8 km rising main to transfer water from the existing No. 2 Pond to the power and headrace tunnels via the surge tower
- A transformer yard and switchyard near the power station, connecting it to the proposed transmission line
- A new 22 kV power supply from the existing 22 kV network to the western, mid-access and Paddy's Quarry portals, the pump station, surge tower and power station, to provide power during construction and operation
- A new 220 kV transmission line. Two options are currently being considered, with only one to be constructed:
    - A 14 km double-circuit line from the existing Tungatinah Switchyard to a new tee at Dee Lagoon (northern option)
    - A 15 km double-circuit line from the proposed Tarraleah Switchyard to the existing Liapootah Substation (southern option).
- Access tunnels, portals and roads to reach the headrace and power tunnels. Excess spoil from tunnel, power station and portal excavations will be stored in one of three permanent spoil emplacement areas at the western portal, mid-tunnel access portal and Paddy's Quarry portals.

Construction of underground works will use drill-and-blast techniques, possibly supported by a tunnel boring machine. Above-ground works will use conventional earthmoving and mechanical excavation.

To support construction, the following temporary infrastructure is proposed:

- A construction compound at Tarraleah Village, supported by smaller compounds at each tunnel portal and the power station. These will house site administration and workshops, handle and store materials and equipment, and include concrete batching and crushing/screening plant.
- Three explosive magazines, located off Butlers Gorge Road, for storing explosives used in excavation.
- A temporary bridge over the Nive River to facilitate construction of the power station.

Upon completion, all temporary construction sites will be rehabilitated (Refer Chapter 7).

Works ancillary to the Project (but not included in this EIS) include Hydro Tasmania's Tarraleah Upgrade Works Project, the relocation of the Tarraleah Switchyard, and construction of a temporary workforce accommodation facility on land adjacent to Tarraleah Village.

The Project will result in many existing Tarraleah hydropower scheme assets becoming redundant. Their decommissioning does not form part of this EIS and will be subject to a future planning process.

Hydro Tasmania intends to engage an Engineering, Procurement and Construction (EPC) Contractor to prepare a detailed design and cost estimate prior to a Final Investment Decision (FID). As this EIS has been prepared before EPC Contractor engagement, the design and construction methods are based on a reference design developed by Hydro Tasmania. This design seeks to avoid and minimise environmental impacts where practicable.

The EPC Contractor will refine the reference design into a tender design during an Early Contractor Involvement (ECI) phase in collaboration with Hydro Tasmania. Further assessment and detailed design may identify alternative solutions or construction methods. Where this occurs, the design and methods will be refined.

Detailed design will include engineering, construction planning and technical assessments, and will incorporate input from key stakeholders and the community. During this process, and potentially during construction, further refinements may occur. Any refinements within the defined disturbance footprint are addressed by this EIS.

Proposal site

The Project is located near Tarraleah in the Central Highlands local government area, approximately 125 km northwest of Hobart, Tasmania. The Project area covers approximately 4,800 hectares (ha) and extends from Lake King William via Tarraleah to either Dee Lagoon or Liapootah (depending on the transmission line option chosen).

Access to the Project area is via the Lyell Highway and Butlers Gorge Road. The Project is located close to the Tasmanian Wilderness World Heritage Area (TWWHA), with some components proposed within the Tarraleah Conservation Area.

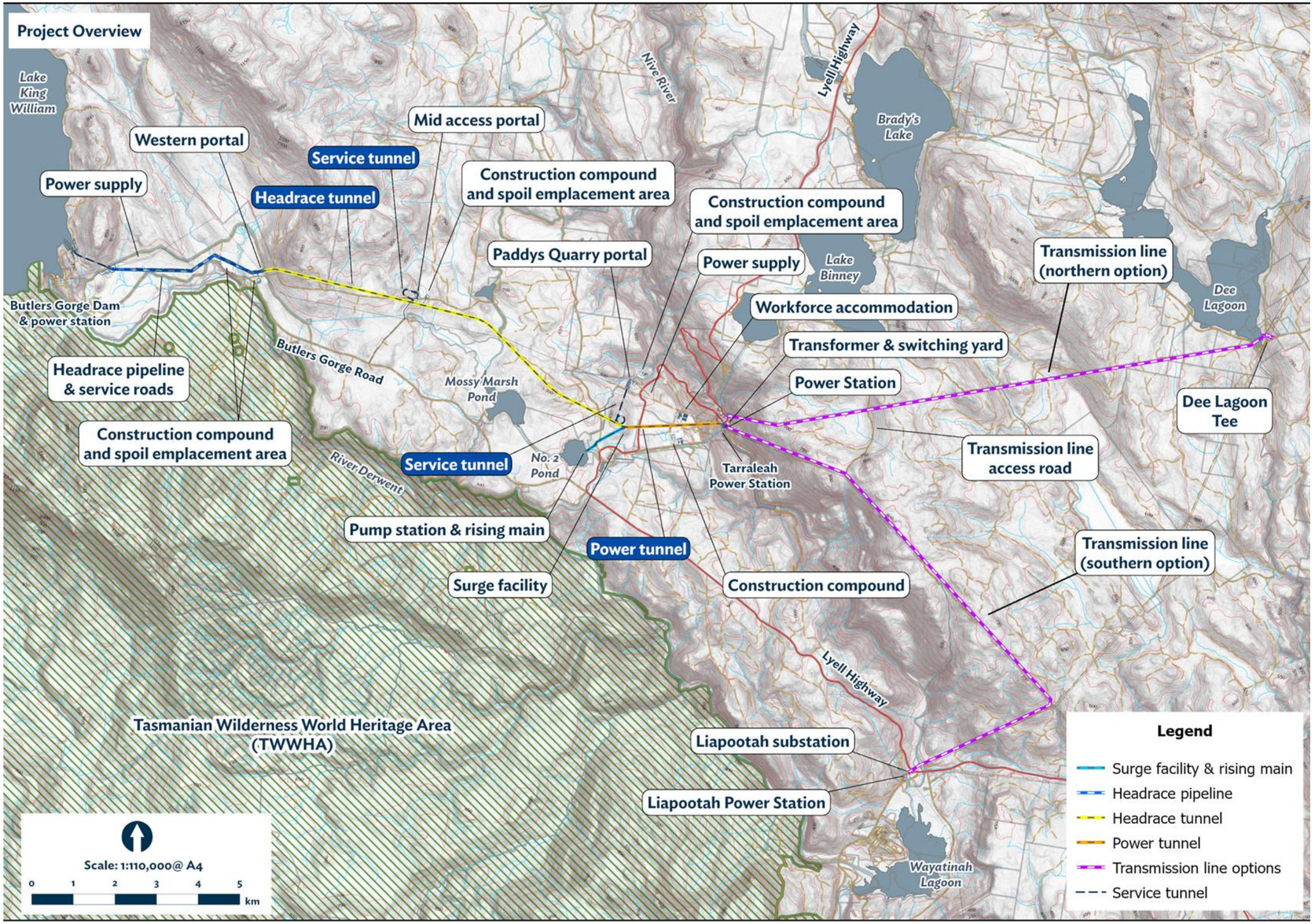


Figure ES.2: Tarraleah Redevelopment Project layout

Project assessment

The Project requires a permit from the Central Highlands Council under the Tasmanian *Land Use Planning and Approvals Act 1993* (LUPA Act) and the Tasmanian Planning Scheme. A development application (DA) was submitted to the Council in June 2024. On 6 June 2024, the Council referred the application to the Environment Protection Authority (EPA) Board under Section 24 of the Tasmanian *Environmental Management and Pollution Control Act 1994* (EMPC Act). A delegate of the EPA Director determined that the Project is subject to Level 2C assessment under Section 24 of the EMPC Act. The EPA Board will therefore assess the environmental impact assessment.

In August 2024, the EPA issued EIS guidelines outlining the matters to be addressed in this assessment. This EIS has been prepared in accordance with the Environmental Impact Statement *Guidelines: Tarraleah Redevelopment Project, Western and upstream component Tarraleah for Hydro Tasmania* (August 2024).

Activities subject to EPA Board assessment are construction works located west and upstream of the proposed new power station on the Nive River, including the crushing of approximately 246,000 cubic metres of rock. Specifically, the EPA Board will assess works related to construction of:

- Headrace pipeline
- Headrace tunnel
- Access tunnels and portals to the headrace and power tunnels, and associated permanent spoil storage stockpiles
- Surge tower and underground surge shaft
- Pumping station and pipeline to transfer water from the existing No. 2 Pond to the surge tower.

Works associated with construction of the proposed new hydropower station, switchyard, and 220 kV transmission line are not included in the EIS guidelines; however, Hydro Tasmania has chosen to address the entire Project in this EIS to provide a clear and holistic document for the community and stakeholders.

Since issuing the EIS guidelines, and upon review of a draft EIS, the Board determined that the excavation of the power station and associated infrastructure will contribute to the level 2 activity related to the 6(a) materials handling facility being assessed and that it would form part of the Board's assessment in addition to the components identified in the EIS guidelines.

Community consultation

Hydro Tasmania has been raising awareness of the Project since 2022, well before preparation of the EIS. Engagement has been guided by Hydro Tasmania's Stakeholder Engagement Charter, which defines the principles and objectives for the Project's engagement program. The program has also been informed by the Guideline for Community Engagement, Benefit Sharing, and Local Procurement published by Renewables, Climate and Future Industries Tasmania (ReCFIT), as well as industry guidelines (e.g. Clean Energy Council). ReCFIT, a division of the Department of State Growth (DSG), advises government, industry and the community on climate change, renewable energy growth and emissions reduction.

Key stakeholder groups engaged included: Tasmanian Aboriginal peoples, Aboriginal and Torres Strait Islander people living in Tasmania, Central Highlands Council, landholders along the Lyell Highway, Sustainable Timber Tasmania, Department of State Growth, local schools, Health Action Team Central Highlands, Inland Fisheries, Anglers Alliance, Trout Guides and Lodges Association Tasmania, Ambulance Tasmania, Tasmanian Fire Service, Derwent Catchment Project NRM group, Hamilton Men's Shed, and the Highlands Community Network Cooperative.

Concerns raised included Aboriginal cultural heritage and landscape values, temporary restrictions on recreational access to lakes for fishing, potential changes to fishing conditions in storages, increased traffic and possible road closures, and perceptions that the Project benefits mainland Australia more than Tasmania. Acknowledged benefits included economic and employment opportunities and increased renewable energy generation.

Further detail on consultation to date, and Hydro Tasmania's plans for ongoing engagement, is provided in Chapter 4.

The approach to assessing and minimising impacts of the Project

The EIS describes and assesses the potential impacts of Project construction and operation, taking into account risks, sensitivities and environmental compliance requirements. The Project is expected to have an operational life of 80–85 years. Prior to decommissioning, a Decommissioning and Rehabilitation Plan will be prepared to ensure the site is left safe, stable and non-polluting.

Specialist technical studies were undertaken to address the environmental and social aspects identified in the EIS guidelines. These studies, provided in the Appendices, involved:

- Assessing existing conditions and identifying relevant values
- Identifying potential impact pathways based on the Project description and spatial data
- Assessing the magnitude and duration of potential impacts
- Recommending management measures to avoid, minimise and mitigate impacts, as well as monitoring programs to test their effectiveness and enable adaptive management
- Assessing residual impacts on values
- Recommending suitable offsets where impacts cannot be avoided or sufficiently mitigated.

Where relevant, technical studies also considered potential cumulative impacts in conjunction with other developments in the region. Only one reasonably foreseeable development was identified as ecologically relevant: the proposed St Patricks Plains Wind Farm, located on the Central Plateau approximately 40 km northeast of Tarraleah.

The Project will be delivered in line with the management measures outlined in this EIS, conditions of approval under the EMPC Act and LUPA Act, and any other required permits or licences, including conditions of approval under the *National Parks and Reserves Management Act 2002* or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The full list of management measures is provided in Chapter 8, with monitoring and review commitments detailed in Chapter 6.

Summary of potential impacts and associated management measures

The key findings of the technical studies regarding the Project's potential environmental impacts are provided in Chapter 5 and summarised below:

Water quality (EIS Section 5.1) and Aquatic ecology (EIS Section 5.4)

- Five potential water quality impact types were identified: erosion and sedimentation, hydrocarbons, pH, metals and nitrates. Many are common across all construction sites (e.g. erosion, hydrocarbons, pH), while others are site-specific (e.g. blasting-related nitrates).
- Sediment from construction could affect aquatic ecosystems including macroinvertebrates, native crayfish (*Astacopsis tricornis*) and platypus. Erosion and sediment controls will mitigate these risks.
- Construction methods using concrete, shotcrete and grouting may raise pH levels in water; hydrocarbons could also contaminate water. A Water Management Plan will address these risks, including spill response and on-site water/wastewater management.
- Drill-and-blast works using ammonium nitrate explosives could release nitrates and ammonium, affecting aquatic organisms. A Nitrate Management Plan will be implemented, incorporating best-practice blasting, wastewater dilution and monitoring. Estimates indicate concentrations will not reach harmful levels and macroinvertebrate monitoring will confirm this.
- Changes to flow regimes in the Nive River and River Derwent could affect threatened riparian species including *Barbarea australis*, *Westringia angustifolia*, *Muehlenbeckia axillaris* and *Pherosphaera hookeriana*. To mitigate, one annual peak flow and three smaller fresh releases are proposed to maintain ecological processes and habitat suitability.

Groundwater (EIS Section 5.2)

- Hydrogeological modelling shows temporary groundwater drawdown during tunnel construction, with recovery expected once operational.
- The threatened *Sphagnum* peatland near Mossy Marsh could be affected by altered water tables. Due to this uncertainty, a precautionary approach has been adopted, and an offset will be provided to secure and manage a larger area of peatland under covenant and conservation management.

Terrestrial ecology (EIS Section 5.3)

- The Project will clear up to 161.1 ha of native vegetation (including 61.2 ha of mature eucalypt forest and 0.5 ha of subalpine *Diplarrena latifolia* rushland, a threatened community). Transmission line works will clear up to a further 63.2 ha of native vegetation. Clearing will be minimised, with exclusion zones marked and rehabilitation of temporary sites required.
- Up to 10.4 ha of native vegetation within the Tarraleah Conservation Area will be cleared for the surge tower, rising main and access road.
- Vegetation clearance and noise may disturb Tasmanian devil and spotted-tailed quoll dens. Surveys will be conducted prior to works; if dens are found, work will stop until permits are obtained.
- Increased construction traffic could cause roadkill of threatened species (devil, quoll, wedge-tailed eagle, eastern barred bandicoot). A Roadkill Management Plan (RkMP) will manage this risk, including reduced night-time traffic, speed controls, carcass removal, and incident recording for adaptive management.
- Construction activities may spread weeds (10 declared species are known on site). A Biosecurity Management Plan will be implemented, including ongoing monitoring and treatment for five years post-construction in the Tarraleah Conservation Area and two years post-construction elsewhere.
- Noise may affect eagle breeding; surveys will be undertaken annually. If active nests are found, construction will cease within 500 m (or 1 km line-of-sight) during the July–January breeding season.

Air Quality (EIS Section 5.5) and Noise and Vibration (EIS Section 5.6)

- Dust may arise from construction, but impacts are expected to be very low due to the lack of sensitive receptors nearby.
- Noise and vibration modelling predicts no impacts on third-party receptors; impacts will be managed for Hydro Tasmania/TasNetworks assets and staff safety.

Visual amenity (EIS Section 5.14)

- Overall impacts are low. The surge tower is the most visible feature but is consistent with the existing hydropower landscape.
- Views from the TWWHA will be limited and of low magnitude due to inaccessibility and low visitation.

Other

- **Hazardous materials (EIS Section 5.7):** The Project will involve the use and storage of explosives, fuels, lubricants, hydraulic oils, flocculants, coagulants for water treatment, cement, weed control chemicals, and potentially contaminated spoil. These will be managed through a Hazardous Materials Management Plan and an Emergency Response Plan.
- **Greenhouse gas emissions (EIS Section 5.8):** Construction will generate both direct and indirect greenhouse gas emissions; however, avoided emissions from hydropower generation compared to fossil fuels over the Project's lifetime are expected to exceed Project emissions by at least 15 times.
- **Social impacts (EIS Section 5.9):** An influx of temporary workers may affect community dynamics in nearby towns (e.g. Bronte Park, Ouse, Hamilton). Most workers will be housed in a dedicated temporary accommodation facility at Tarraleah Village, with bussing arrangements to reduce traffic and community interaction. Some increased traffic is expected on the Lyell Highway and in the Nive Valley, and Butlers Gorge Road will be closed during construction. Despite these impacts, the Project will deliver positive outcomes in terms of employment and economic activity at local and regional levels.
- **Construction waste (EIS Section 5.10)**: Construction will generate a range of solid and liquid waste streams, including vegetation debris, tunnel water, washdown water, waste oils and lubricants, scrap metal, cardboard, plastics, shotcrete and concrete washings, and wastewater from ablution facilities. If not managed, these waste streams could lead to water and soil contamination, chemical leaching, odour, litter, vermin attraction, or visual impacts. A Waste Management Plan will apply circular economy principles, ensure legislative compliance, provide staff training, and be subject to periodic review. A Spoil Management Plan (SMP) will ensure spoil is disposed of as close as possible to source, in permanent emplacement areas, to prevent erosion, ponding and sedimentation.
- **Spoil management (EIS Section 5.10)**: Spoil generated from underground excavation has the potential to affect surface and groundwater quality and visual amenity. The SMP will mitigate these risks by ensuring spoil is placed in permanent emplacement areas designed for long-term stability, rehabilitation and reduced visual impact.
- **Bushfire (EIS Section 5.11):** The risk of bushfire will increase during construction due to greater site activity and occupancy. This risk will be mitigated through implementation of a Bushfire Mitigation Plan, a Bushfire Emergency Plan and a Bushfire Response Plan.
- **Aboriginal heritage (EIS Section 5.13)**: Potential impacts on Aboriginal heritage have been assessed under the Tasmanian *Aboriginal Heritage Act 1975*. Where avoidance is not possible, permits will be sought to disturb or relocate artefacts. All staff engaged in ground-disturbing works will receive cultural heritage awareness training, and an Unanticipated Discovery Plan will guide management of unexpected finds. Consultation with the Aboriginal community is ongoing to identify appropriate mitigation measures for broader cultural landscape values.

- **Traffic (EIS Section 5.12):** Construction will increase light and heavy vehicle movements on the Lyell Highway and surrounding roads. While modelling indicates traffic flow at key intersections will not be significantly impacted, increases in the Nive Valley may result in longer travel times and some displacement of traffic to alternative routes (e.g. Fourteen Mile Road, Victoria Valley Road).
- **Economic impacts (EIS Section 5.13):** During construction, the Project is expected to increase Gross Regional Product by approximately $213 million and generate around 451 FTE job-years. At a state level, it is estimated to increase Gross State Product by approximately $1.12 billion, contribute $0.96 billion in Gross Value Added, and generate around 1,949 FTE job-years. Some reduction in employment in sectors such as agriculture, forestry and mining may occur as labour is redirected to meet Project demand.

Summary of potential residual impacts (post-mitigation)

The management measures described in this EIS are designed to mitigate potential adverse impacts from the construction and operation of the Project and, where mitigation is not possible, to minimise residual impacts. Potential residual impacts are summarised below:

- **Water quality (EIS Section 5.1):** An increase in dissolved nitrogen, mostly as nitrate, is expected in the River Derwent catchment during and after construction; however, given the small load relative to the catchment, its transient nature, and the significant dilution capacity available, these loads are not expected to result in residual impacts.
- **Groundwater (EIS Section 5.2):** Hydrogeological modelling indicates that temporary, localised groundwater table drawdown may impact the *Sphagnum* peatland community near Mossy Marsh Pond. To mitigate this potential residual impact, Hydro Tasmania will offset the potential loss by securing and protecting a larger area of *Sphagnum* peatland than the existing 3-ha patch at Mossy Marsh. The offset area will be protected under covenant and managed under an approved conservation management plan in accordance with the Tasmanian *Nature Conservation Act 2002* (NC Act).
- **Vegetation (EIS Section 5.3):** The Project will clear up to 161.1 ha of native vegetation, including 61.2 ha of mature eucalypt forest (not harvested in recent decades) and 0.5 ha of *Diplarrena latifolia* rushland, a threatened vegetation community under the NC Act.
- **Fauna (EIS Section 5.3):** Vehicle strike and/or roadkill of threatened species remains possible despite implementation of the RkMP. Adaptive management will be applied in response to any incidents involving construction traffic.
- **Aquatic ecology (EIS Section 5.4):** During the operational phase, proposed environmental water releases to maintain aquatic values in the River Derwent downstream of Clark Dam may require adaptive management. Monitoring results may trigger adjustments, including an increase to the annual peak release.
- **Social impacts (EIS Section 5.9):** The Social Impact Assessment indicates that some residual impacts are likely during construction, particularly where cumulative impacts arise from other major projects at the regional or state level. These impacts mainly relate to labour availability, skill development and access to training. A Social Impact Management Plan will be used as an adaptive tool to monitor social and socio-economic impacts and identify appropriate mitigations. At the same time, the Project is expected to provide positive residual impacts through workforce skills development, regional capacity building, and economic stimulus for local businesses.

- **Spoil management (EIS Section 5.10):** Potential residual impacts on water quality and visual amenity from spoil emplacement areas will be minimised through the SMP, which includes land forming, rehabilitation and design measures to promote long-term stability and maintain water quality.
- **Visual impacts (EIS Section 5.14):** There are some residual impacts relating to visual amenity of permanent new infrastructure (such as the Surge Tower) as observed from locations near Tarraleah Village and some locations in the TWWHA, the latter having associated wilderness recreational impacts. These are considered to have a low magnitude of impact.

Next steps

The EIS and supporting technical studies will be published online for public comment. The EIS will be on public exhibition for a minimum of 42 days, during which submissions can be made.

Online

Visit the Project page to access all EIS PDF documents online.

connect.hydro.com.au/reimagining-tarraleah

In person

Community drop-ins

Our team will support the public exhibition period with community drop-in sessions.

We will also have all EIS documents available on USB at these sessions. These will be free to take. Keep an eye on our Project page for when and where these will be.

Central Highlands Council

You can visit Council Chambers to review all EIS documents.

Central Highlands Council
19 Alexander St
Bothwell TAS 7030

Alternative formats

The EIS is a large document and we encourage the use of online versions. If you require access to the EIS in an alternative format, please email or calls us.

Email: **majorprojectsprogram@hydro.com.au**

Phone: **0457 237 453**

Following the exhibition period, the EPA will assess the EIS documentation and may require Hydro Tasmania to provide further information or undertake additional work in response to matters raised in submissions.

Submission must be made in writing and addressed to the Central Highlands Council and can be submitted:

- via email **development@centralhighlands.tas.gov.au** or
- by post to PO Box 20, Hamilton TAS 7140.

Glossary and abbreviations

Acronym	Term
°C	Degrees Celsius
µg/L	Microgram per litre
µS/cm	MicroSiemens per cm (electrical conductivity units)
ABS	Australian Bureau of Statistics
ADSS	All dielectric self-supporting
AEMO	Australian Energy Market Operator
AEP	Annual Exceedance Probability
AH Act	Tasmanian *Aboriginal Heritage Act 1975*
AHC	Aboriginal Heritage Council
AHD	Australian Height Datum
AHO	Aboriginal Heritage Officer
AHT	Aboriginal Heritage Tasmania
AIPP	Australian Industry Participation Plan
AMD	Acid and Metalliferous Drainage
ANZG	Australian and New Zealand Guidelines (for fresh and marine water quality)
APZ	Asset Protection Zone
AS	Australian Standard
AusRivAS	Australian River Assessment System
BESS	Battery Energy Storage System
BLANkET	Base Line Air Network of EPA Tasmania
BPESC	Best Practice Erosion and Sediment Control
CFEV	Conservation of Freshwater Ecosystem Values Database
CGE	Computable General Equilibrium
CHC	Central Highlands Council
CMPP2	Conservation Management Priority Potential
CoPS	Centre of Policy Studies
CSEP	Communication and Stakeholder Engagement Plan
CT	Certificate of Title

Acronym	Term
CTMP	Construction Traffic Management Plan
Cumec	Cubic metres per second
DA	Development Application
dB	Decibels
dBA	A-weighted decibels
DBH	Diameter at Breast Height
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DDP	Den Decommissioning Plan
DEWR	Tasmanian Department of Employment and Workplace Relations
DGV	Default Guideline Values
DO	Dissolved Oxygen
DS	Driver safety
DSG	Tasmanian Department of State Growth
DTH	Down the hole
DVC	Derwent Valley Council
EAP	Employee Assistance Program
EC	Electrical Conductivity
ECI	Early Contractor Involvement
EIS	Environmental Impact Statement
EMPC Act	Tasmanian *Environmental Management and Pollution Control Act 1994*
EMS	Environmental Management System
EPA	Tasmanian Environment Protection Authority
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPC	Engineering, Procurement and Construction
ERP	Emergency Response Plan
ESG	Environment and Social Governance
FID	Final Investment Decision
FIFO	Fly in fly out
FM Act	Forest Management Act 2013
FMBZ	Fuel Management Buffer Zone
FNPP	First Nations Participation Plan
FP Act	Tasmanian *Forest Practices Act 1985*
FPA	Forest Practice Authority
FSL	Full supply level
FTE	Full-time-equivalent
GBE	Government Business Enterprise

Acronym	Term
GMP	Groundwater Management Plan
GRP	Glass Reinforced Polymer
GrRP	Gross Regional Product
GSP	Gross State Product
GSV	Ground Surface Visibility
GVA	Gross Value Added
GWh	Gigawatt hours
ha	Hectares
HATCH	Health Action Team Central Highlands
HEC Act	Tasmanian *Hydro-Electric Corporation Act 1995*
HEV	High Ecological Value
HMP	Hydrocarbon Management Plan
HMMP	Hazardous Materials Management Plan
HNAL	Highly Noise Affected Level
HRMU	Hydrogeological Rock Mass Unit
IAIA	International Association for Impact Assessment
IAP2	International Association for Public Participation
ICN	Tasmanian Industry Capability Network
ICV	Integrated Conservation Value
IECA	International Erosion Control Association
IFS	Inland Fisheries Service
IHA	International Hydropower Association
IRR	Internal Rate of Return
IUCN	International Union for Conservation of Nature
IVMS	In-Vehicle Monitoring System
JMP	Journey Management Plan
kg	Kilogram
km	Kilometres
kV	Kilovolt
L/s	Litres per Second
LBS	Local Benefit Sharing
LCT	Landscape Character Types
LGA	Local government area
LiDAR	Light Detection and Ranging
LOS	Level of Service

Acronym	Term
LUPA Act	Tasmanian *Land Use Planning and Approvals Act 1993*
m	Metres
MBP	Pure buttongrass moorland
MBS	Buttongrass moorland with emergent shrubs
MCA	Multi-criteria analysis
MDS	Subalpine *Diplarrena latifolia* rushland
MERI	Monitoring, evaluation, reporting and improvement
mg/L	Milligrams per Litre
mm	Millimetres
MNES	Matters of National Environmental Significance
MPLCF	Hydro Tasmania's Major Projects Local Content Framework
MW	Megawatts
MWh	Megawatt hour
NAF	Non-Acid Forming
NC Act	Tasmanian *Nature Conservation Act 2002*
NEM	National Electricity Market
NGERS	Commonwealth *National Greenhouse and Energy Reporting Act 2007*
NHVR	National Heavy Vehicle Regulator
NML	Noise Management Level
NMP	Nitrate Management Plan
Noise EPP	Tasmanian Environment Protection Policy (Noise) 2009
NPRM Act	Tasmanian *National Parks and Reserves Management Act 2002*
NPV	Net Present Value
NRE	Tasmanian Department of Natural Resources and Environment
NSW noise guideline	NSW EPA Draft Construction Noise Guideline 2020
NTU	Nephelometric Turbidity Unit (turbidity measurement)
NVA	Natural Values Atlas
NWI	National Wilderness Inventory
OPGW	Optical ground wire
OSOM	Over size over mass
OTR	Other than rock
PAF	Potentially Acid-Forming
PAM	Passive acoustic monitoring
PAS	Potential Areas of Sensitivity

Acronym	Term
PBHA	Preliminary Bushfire Hazard Analysis
PEVs	Protected Environmental Values
PID	Property ID
PM	Particulate Matter
PMST	Protected Matters Search Tool
PTPZL	Permanent Timber Production Zone Land
PWS	Tasmanian Parks and Wildlife Service
PY	Project Year
QCoP	Tasmanian Quarry Code of Practice
RAA	Reserve Activity Assessment
RBL	Rated Background Level
ReCFIT	Renewables, Climate and Future Industries Tasmania
RFA Act	Tasmanian *Regional Forest Agreement Act 2022*
RkMP	Roadkill Management Plan
RL	Reduced Level
RMP	Risk Management Plan
RMS	Root Mean Square
RMPS	Tasmanian Resource and Planning System
SALTAS	Salmon Enterprises of Tasmania
SBR	Broad-leaf scrub
SDS	Safety Data Sheet
SEMP	Site Environmental Management Plan
SEP	Stakeholder Engagement Plan
SF6	Sulphur hexafluoride
SIA	Social Impact Assessment
SGAR	Second-generation anticoagulant rodenticides
SMD	Slightly to Moderately Disturbed
SMP	Spoil Management Plan
SPIBA	Swift Parrot Important Breeding Area
SPMP	Social Procurement Management Plan
SRP	Site Rehabilitation Plan
STRLUS	Southern Tasmanian Regional Land Use Strategy
STT	Sustainable Timber Tasmania
TAC	Tasmanian Aboriginal Centre
TASSI	Tasmanian Acid Sulphate Soils Information

Acronym	Term
TASVEG	Tasmanian vegetation mapping system
TBM	Tunnel Boring Machine
tCO_2e/MWh	Tonnes of carbon dioxide equivalent per megawatt-hour
TDS	Total Dissolved Solids
TEC	Threatened Ecological Community
TFI	Tolerable Fire Intervals
TFS	Tasmanian Fire Service
TIPP	Tasmanian Industry Participation Plan
TPS	Tasmanian Planning Scheme
TREAP	Tasmanian Renewable Energy Action Plan
TRET	Tasmanian Renewable Energy Target
TSP	Total Suspended Particulate
TSP Act	Tasmanian *Threatened Species Protection Act 1995*
TSS	Total Suspended Solids
TWWHA	Tasmanian Wilderness World Heritage Area
UDP	Unanticipated Discovery Plan
VCA	Vegetation Community Assessment
VIA	Visual Impact Assessment
VRE	Variable Renewable Energy
VURM	Victoria University Regional Model
VWP	Vibrating Wire Piezometer
WAF	Workforce accommodation facility
WaMP	Waste Management Plan
WAP	Workforce Accommodation Plan
WM Act	Tasmanian *Water Management Act 1999*
WMP	Water Management Plan
WTDP	Workforce Training and Development Plan
µm	Micrometer

1 Introduction

1.1 Project overview

Hydro Tasmania is proposing to redevelop the Tarraleah hydropower scheme in Tasmania's Central Highlands. The Tarraleah Redevelopment Project (the Project) aims to increase the scheme's capacity from 90 megawatts (MW) to approximately 190 MW (peak capacity). It forms part of Hydro Tasmania's Major Projects Program (previously known as Battery of the Nation).

The Project will improve operational flexibility and efficiency by providing a direct pressurised connection between Lake King William and a new power station located next to the existing Tarraleah Power Station on the Nive River. This new water conveyance will be a combination of surface pipeline and underground tunnel.

Part of the existing No. 2 Canal will be retained. Water captured by Derwent Pumps, Horne's Dam and other smaller pick-ups will be transferred into the new conveyance. All other components of the existing scheme will be decommissioned, including:

- Nieterana Mini-hydro Power Station
- Butlers Gorge Power Station
- Tarraleah Power Station (existing)
- Switchyard
- Water conveyances (No. 1 Canal, Tarraleah No. 1 Pond, parts of No. 2 Canal, hillside penstocks and hilltop valves).

Decommissioning will be guided by a separate, future plan and is not part of this Environmental Impact Statement (EIS). The Project will use the new intake on Lake King William and the associated 950-metre tunnel, currently under construction as part of broader upgrade works. These works are not part of this EIS. The Project proponent is Hydro Tasmania, a Tasmanian Government Business Enterprise that has operated the state's hydropower system for over 100 years. Hydro Tasmania is the trading name of the Hydro-Electric Corporation (formerly the Hydro-Electric Commission). More information is provided in Section 1.5.

1.2 Existing scheme and need for redevelopment

The existing Tarraleah hydropower scheme (Figure 1.1) is part of Hydro Tasmania's Derwent Power Scheme. It includes a headwater storage at Lake King William, created by the construction of Clark Dam on the River Derwent. Water from Lake King William is released through the Butlers Gorge Power Station and the Nieterana Mini-hydro Power Station, then transferred to the Tarraleah Power Station via two water conveyances—No. 1 Canal and No. 2 Canal. No. 1 Canal delivers water directly to No. 1 Pond; No. 2 Canal transfers water via Mossy Marsh Pond and No. 2 Pond before reaching No. 1 Pond. From No. 1 Pond, water is conveyed to the Tarraleah Power Station through a hilltop pipeline and penstocks. The scheme is highly utilised and generates approximately 634 gigawatt hours (GWh) of largely base load power each year—around 7.3% of Hydro Tasmania's total annual generation.

Commissioned in the 1930s, many of the scheme's assets are now approaching the end of their operational life and require significant investment to avoid the risk of failure. This Project proposes to replace ageing infrastructure with new, permanent assets—both above and below ground—to ensure the continued delivery of reliable, safe, renewable energy into the future.

1.2.1 Location

The Project is located near Tarraleah, in the Central Highlands local government area, approximately 125 km northwest of Hobart, Tasmania (Figure 1.2). The Project area extends in a broadly linear path from Lake King William through Tarraleah, to either Dee Lagoon or Liapootah, depending on which of the two proposed transmission line options is constructed.

Access to the area is via the Lyell Highway and Butlers Gorge Road. Bradys Lake and Bronte Lagoon are situated approximately 6 km and 10 km northeast of the Project area, respectively. The Project is located close to the Tasmanian Wilderness World Heritage Area (TWWHA), with some components situated within the Tarraleah Conservation Area.

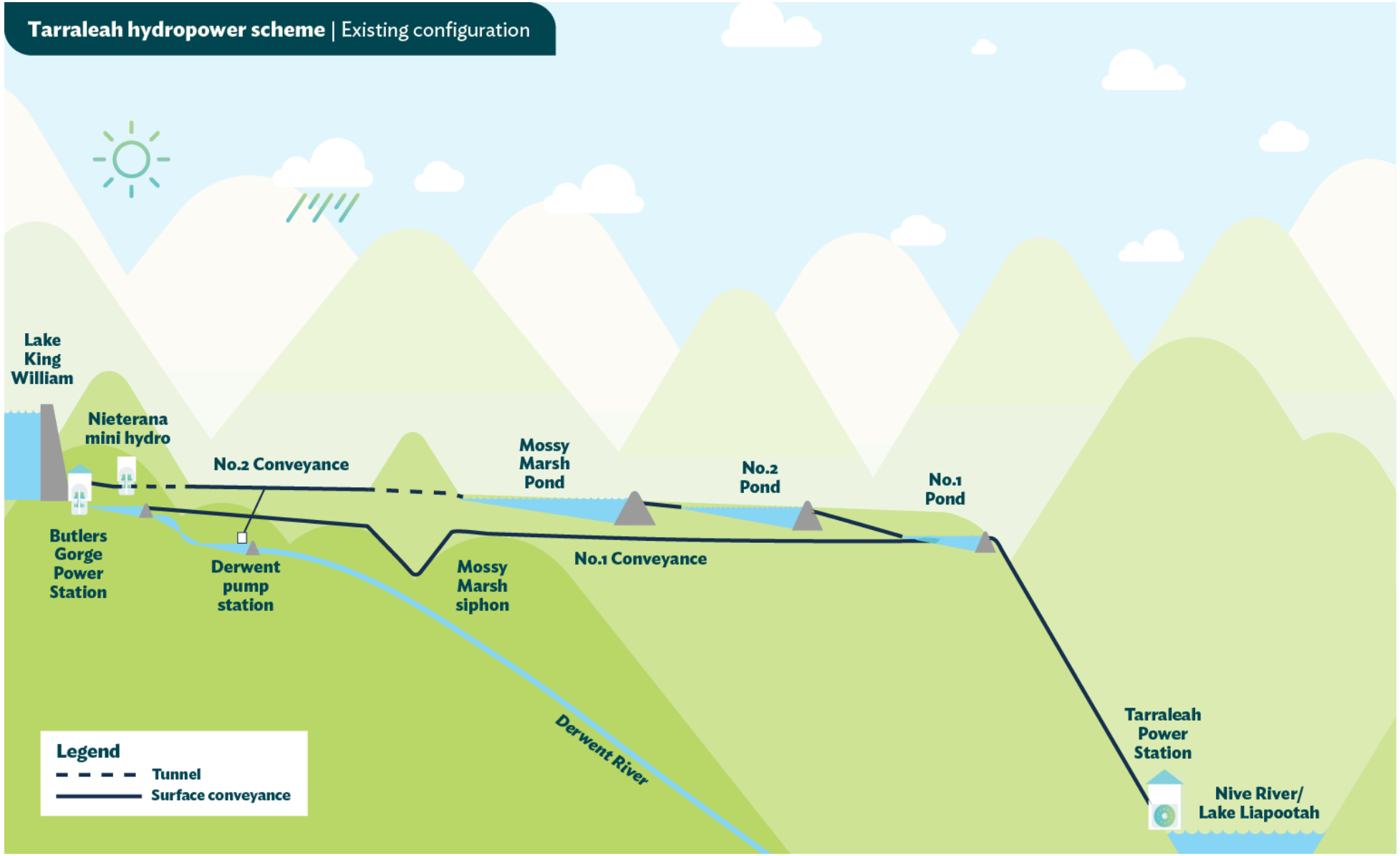


Figure 1.1: Tarraleah hydropower scheme

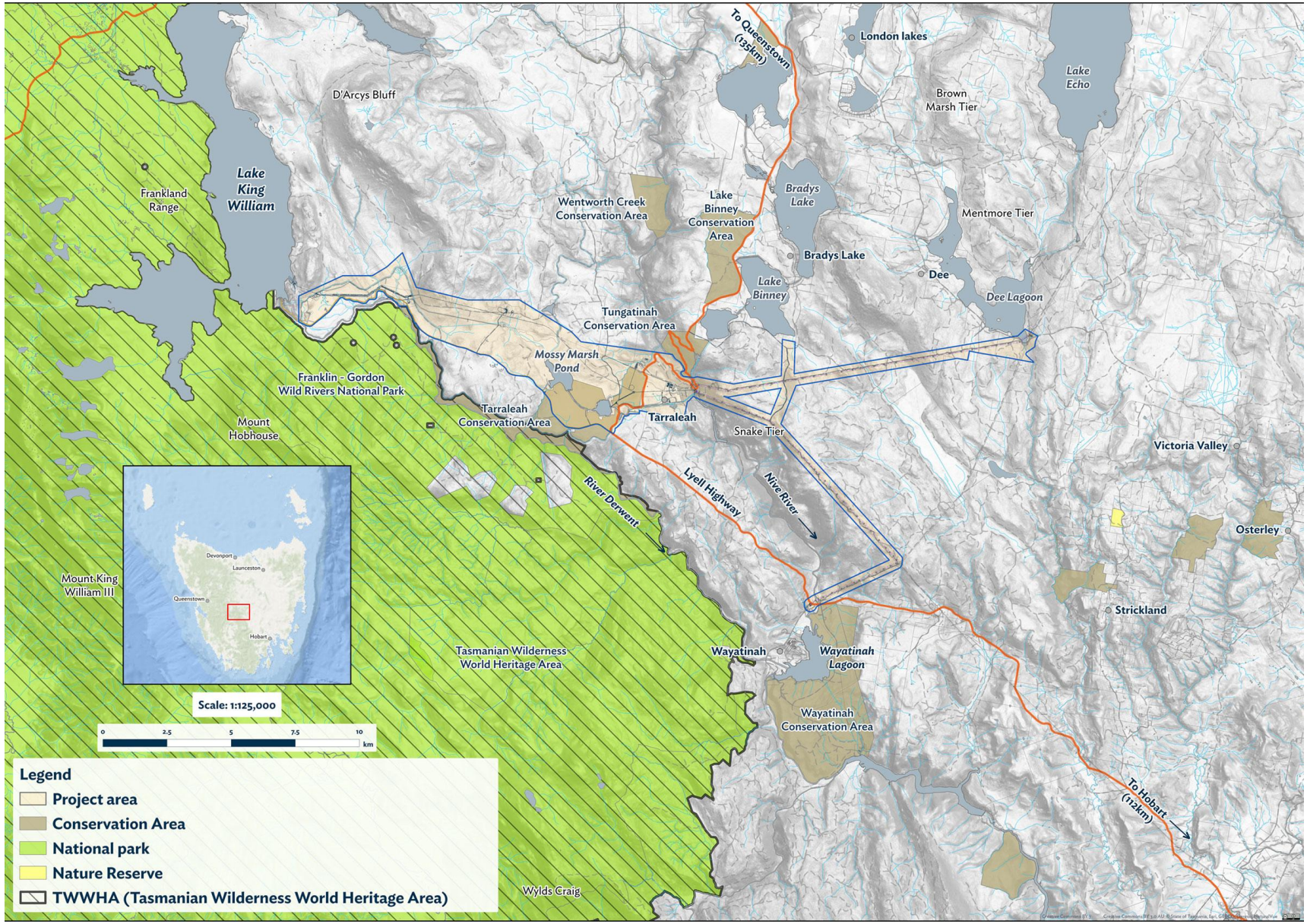


Figure 1.2: Tarraleah Redevelopment Project location

1.2.2 Principal components of the Project

The principal permanent components of the Project are outlined below and shown in Figure 1.3:

- Headrace pipeline: Approximately 4.2 km pipeline and associated service roads connecting the Lake King William tunnel (currently under construction) to the headrace tunnel
- Low-pressure headrace tunnel: Approximately 9.5 km in length
- High-pressure power tunnel: Approximately 2.3 km in length, splitting into two short penstocks before entering the power station
- Power station: A partially underground facility located adjacent to the existing Tarraleah Power Station, with an installed capacity of approximately 180 MW and a rated flow of 60 m^3/s
- Surge facility: Comprising a 70 m above-ground surge tower and an associated underground surge shaft approximately 265 m high, to manage water pressure within the headrace and power tunnels
- Pumping station: Capable of transferring approximately 6 m^3/s of water from the existing No. 2 Pond via a 0.8 km rising main to the headrace and power tunnels via the surge tower
- Transformer yard and switchyard: Located near the power station to connect it to the proposed transmission line
- 22 kV power supply: A new supply line from the existing 22 kV network will power the western, mid-access, and Paddy's Quarry portals, as well as the pump station, surge tower, and power station during both construction and operation
- 220 kV transmission line: Two route options are currently under consideration:
  - A 14 km double-circuit line from the existing Tungatinah Switchyard to the existing Dee Lagoon tee (northern option), or
  - A 15 km double-circuit line from the proposed Tarraleah Switchyard to the existing Liapootah Substation (southern option).
- Access infrastructure: Tunnels, portals, and roads to access the headrace and power tunnels. Excess spoil from excavations will be placed in one of three permanent spoil emplacement areas located at the western portal, mid-tunnel access portal, and Paddy's Quarry portal.

Construction methods and temporary infrastructure:

- Underground works: To be completed using drill and blast techniques, with the potential use of a tunnel boring machine
- Above-ground works: To be delivered through conventional earthmoving and mechanical excavation methods.

Key temporary infrastructure will include:

- Construction compounds: A main compound at Tarraleah Village and smaller compounds at each tunnel portal and the power station. These compounds will accommodate site administration, workshops, materials and equipment storage, and concrete batching, crushing and screening plant.
- Explosives storage: Dedicated explosive magazines located off Butlers Gorge Road
- Temporary bridge: A bridge over the Nive River to facilitate construction of the power station.
- Workforce accommodation facility (WAF): A temporary WAF will be built on land adjacent to Tarraleah Village. It will include up to 300 beds in prefabricated units, plus recreation spaces, a dining hall, canteen, laundry facilities, and essential utilities (power, water, and sewer). The WAF is not part of this EIS.

Upon completion of construction, all temporary infrastructure will be rehabilitated.

A detailed description of the Project is provided in Chapter 2.

There are no plans to expand the operation of the Tarraleah hydropower scheme outside of the works described in this EIS.

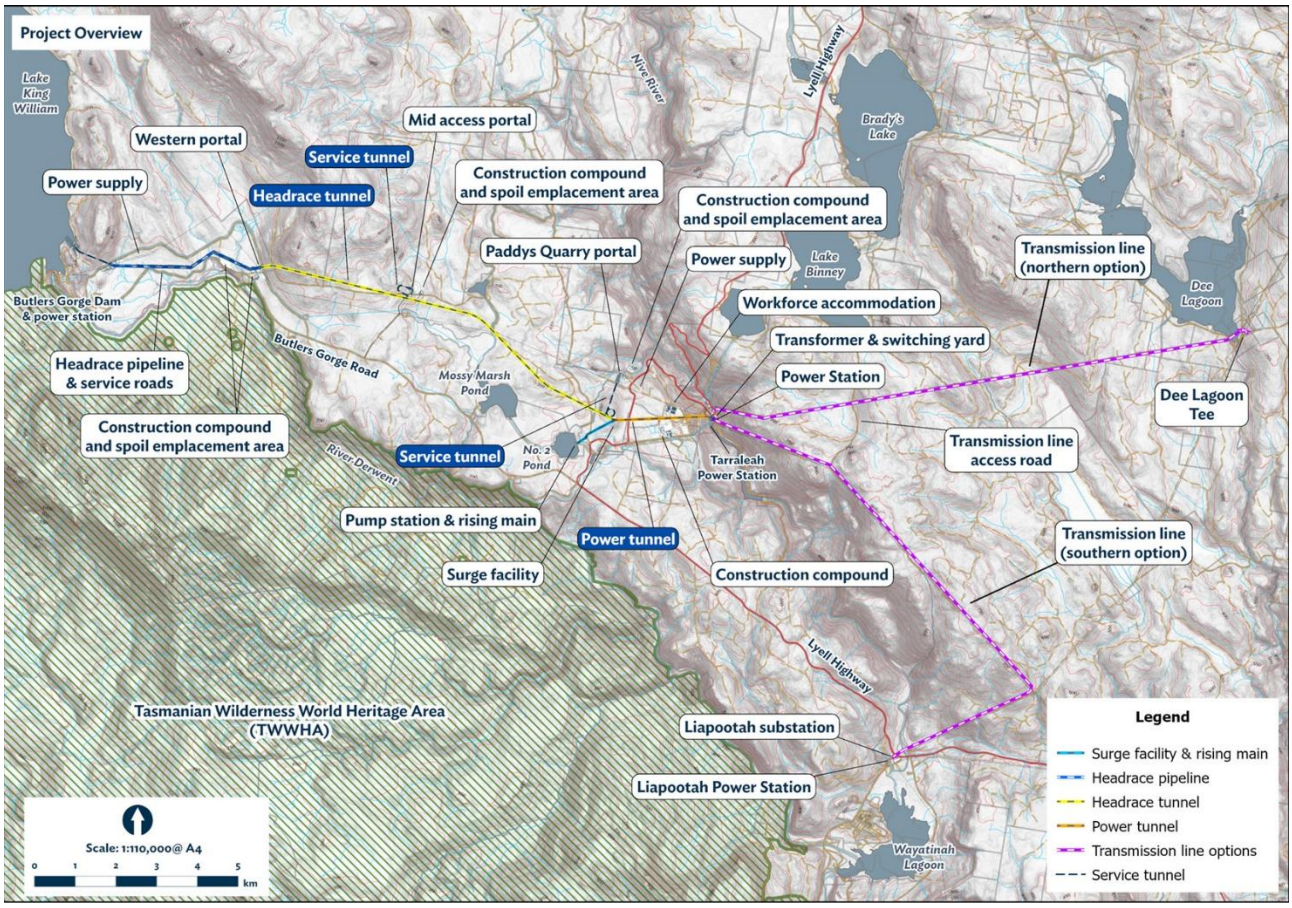


Figure 1.3: Location of key Project components

1.2.3 Project development

Hydro Tasmania intends to engage an Engineering, Procurement and Construction (EPC) contractor for the Project. The EPC contractor will be responsible for developing a tender design, construction methodology, and cost estimates prior to a Final Investment Decision (FID). As this EIS has been completed prior to the engagement of an EPC contractor, the design and construction methods presented are based on a reference design developed by Hydro Tasmania. This reference design retains flexibility to allow the EPC contractor to propose solutions that deliver economically, environmentally, and socially sustainable outcomes.

The purpose of the reference design is to provide sufficient detail to support environmental assessment, stakeholder engagement, and future detailed design. It has been developed to avoid and minimise environmental impacts as far as reasonably practicable. This was achieved through a feedback process, where findings from specialist technical assessments (engineering and environmental) informed refinements to the design. Multi-criteria assessments of design options were used to identify the preferred Project and determine key parameters such as the size and location of major infrastructure (Chapter 3). Where multiple design or construction method options exist, this EIS presents and assesses the reasonable worst-case environmental impact.

The reference design will be developed into a tender design by the EPC Contractor during an Early Contractor Involvement (ECI) phase in collaboration with Hydro Tasmania. During this process, and possibly into the construction phase, further assessment and detailed design may identify different design solutions and different construction method approaches. Where this occurs the reference design and construction method will be refined.

1.3 Strategic context

The Project supports projected growth in state energy demand, contributes to national and state renewable energy targets, and aligns with state, regional, and local government plans for renewable energy and sustainable development. It also supports Hydro Tasmania's corporate strategy. Further detail is provided below.

1.3.1 Likely markets for the product

Electricity generated by the Project will support growing demand in Tasmania and also be supplied to the National Electricity Market (NEM). Historically dominated by fossil fuel-based generation, the NEM is undergoing a transition toward a future where electricity is predominantly sourced from variable renewable energy (VRE) generation—namely wind and solar.

As more wind and solar enter the NEM, flexible generation sources are required to provide firming capacity—ensuring supply during periods when VRE output is low (e.g. when the sun is not shining or the wind is not blowing). These firming sources include conventional hydropower, grid-scale battery energy storage systems (BESS), and pumped hydro.

The Australian Energy Market Operator (AEMO) forecasts that significant increases in both medium-duration storage (4–12 hours) and deep storage (12+ hours) capacity will be required in the NEM by 2044 (AEMO, 2022). Hydropower generators can be designed to provide both medium and deep storage services and are capable of dispatching electricity at full capacity within minutes in response to shortfalls in supply. For this reason, hydropower is expected to play an increasingly important role in the future of the NEM.

1.3.2 Relation to other proposals

Planned developments for further interconnection between Tasmania and the NEM will be critical to the NEM's efficient energy transition, allowing greater energy imports and exports to match supply and demand needs. The proposed Marinus Link (jointly owned by the Australian, Tasmanian and Victorian governments) would help support this transition. Marinus Link would involve two, two-way 750 MW undersea cables delivered in two stages. For Hydro Tasmania, there are greater revenue opportunities from further interconnection, reflecting the high value of its flexible dispatchable generation to the NEM that is increasingly reliant on wind and solar. Increasing interconnection with Victoria will provide greater market access, allowing Hydro Tasmania to optimise energy trading, and realise the value of its hydropower assets. The Project aims to be developed in alignment with the completion of Marinus Link Stage 1 to maximise commercial opportunities and optimise value from Marinus Link.

1.3.3 Relevant federal and state government renewable energy targets

Emissions from the electricity sector currently account for 33% of Australia's total carbon emissions, making it the largest single contributor. The Australian and Tasmanian governments have put reduction targets and renewable uptake targets in place, with key targets relevant to the Project including:

- Tasmanian renewable energy target (TRET). In 2020, the Tasmanian Government announced its ambition to reach 200% renewables by 2040. This target seeks to increase Tasmania's renewable energy generation output from 10,500 GWh to 21,000 GWh by 2040.
- Australian Government's net zero emissions targets. This includes a 43% reduction in emissions by 2030 (compared to 2005 levels) and net zero emissions by 2050. To reach this target, the Australian Government also aims to increase the level of renewable generation to 82% by 2030.
- The Project aligns with and supports these current targets, especially in the case of the Australian Government's net zero emissions targets where Australia's emissions trajectory is falling behind its 43% reduction target. Without the development of flexible renewable energy sources such as this Project, it is likely these reduction targets will not be met. Hydropower will also play an increasingly critical role in the reliability of wind and solar, through its flexible dispatchable generation that can balance the system when the wind is not blowing and the sun is not shining.

1.3.4 Tasmanian Renewable Energy Action Plan

The *Tasmanian Renewable Energy Action Plan* (TREAP) establishes the Tasmanian Government's vision of utilising renewable energy to benefit all Tasmanians through job creation, helping the environment and driving investment and economic growth. The plan sets clear targets and actions designed to build on Tasmania's natural competitive advantages and attract largescale investment to significantly grow and expand Tasmania's renewable energy sector. The Project aligns directly with the TREAP through:

- Action 1.5 (Continue to progress Project Marinus and Battery of the Nation): the Project is a key component of Hydro Tasmania's Major Projects Program (formerly referred to as Battery of the Nation).
- Action 3.4 (Skills Tasmania rollout of Energising Tasmania Skills and Training Initiative): The Project will help support Tasmania to develop a skilled workforce equipped with the expertise needed.

The TREAP also established the *Renewable Energy Coordination Framework* which sets out the *Renewable Energy Roadmap*. The Renewable Energy Roadmap includes the construction of new storage and increasing dispatchable capacity, both directly supported by the Project, as Phase 2 mid-range (2025-2030) goals.

1.3.5 Southern Tasmanian Regional Land Use Strategy

The *Southern Tasmanian Regional Land Use Strategy* (STRLUS) is a regional plan that sets the strategic direction for the 12 local government areas in southern Tasmania, including the Central Highlands—where the Project is located.

Enacted by the Tasmanian Government, STRLUS aims to achieve the key planning objectives of the *Tasmanian Resource Management and Planning System* (RMPS) by providing broad policies and goals to guide change, growth, and development across the region through to 2035.

Section 6 of STRLUS identifies the region's water resources as a key area for sustainable development, with hydroelectric energy production contributing to the strategic goal of *"making the region nationally and internationally competitive."*

This Project will enhance energy generation, support growing energy demand, enable state economic growth, and facilitate the development of new industries. It will also strengthen Tasmania's hydropower generation capacity and help future-proof the energy portfolio—supporting the NEM and positioning the region competitively at the national level.

Accordingly, the Project aligns with and supports the outcomes of STRLUS.

1.4 Legislative framework

1.4.1 Tasmanian Water Management Act 1999

Hydro Tasmania holds a special licence under Division 6, Part 6 of the Tasmanian *Water Management Act 1999* (WM Act). This licence allows Hydro Tasmania to use Tasmania's water resources for electricity generation, including the rights to take, store, and manage water without requiring further licensing.

The Tarraleah scheme and its associated hydrology are located within the Derwent hydro-electric district and are included within the rights granted under Hydro Tasmania's special licence. The operation of both the existing Tarraleah hydropower scheme and the proposed Project are regulated under the WM Act.

1.4.2 Tasmanian Land Use Planning and Approvals Act 1993

A planning permit application (Development Application – DA) was submitted to the Central Highlands Council in June 2024 for assessment of the proposed use and development of land for the Project, in accordance with Section 51 of the Tasmanian *Land Use Planning and Approvals Act 1993* (LUPA Act).

1.4.3 Tasmanian Environmental Management and Pollution Control Act 1994

In accordance with Section 25 of the Tasmanian *Environmental Management and Pollution Control Act 1994* (EMPC Act), the Central Highlands Council referred the Project to the Tasmanian Environment Protection Authority (EPA) in June 2024.

In August 2024, the EPA determined that construction of the proposed new conveyance infrastructure —including crushing more than 1,000 m^3 of rock per year, an activity listed under Schedule 2 of the EMPC Act [6(a) – a materials handling facility]—requires assessment by the Board of the EPA (the Board). The Project has therefore been classified as requiring a class 2C assessment.

Environmental Impact Statement (EIS) guidelines (the EIS Guidelines) were issued for the Project in August 2024. These EIS Guidelines define the Project activities subject to assessment by the Board (refer to Figure 1.4), specifically:

- A headrace pipeline approximately 4.2 km long and up to 4 m in diameter, connected to the Lake King William intake and tunnel completed during upgrade works
- An arched headrace tunnel, approximately 12 km long, up to 6.5 m high and 5.5 m wide
- Access tunnels and portals to the headrace and power tunnels, and associated permanent spoil storage stockpiles
- A surge tower, up to 75 m high (above ground level) and 14 m in diameter, with an associated underground surge shaft to control water pressure in the headrace and power tunnels
- A pumping station and an approximately 1.1 km pipeline to transfer water from the existing No. 2 Pond to the surge tower.

The following components are excluded from assessment by the Board (see Figure 1.4):

- The new hydropower power station
- The new transmission line
- The new switchyard.

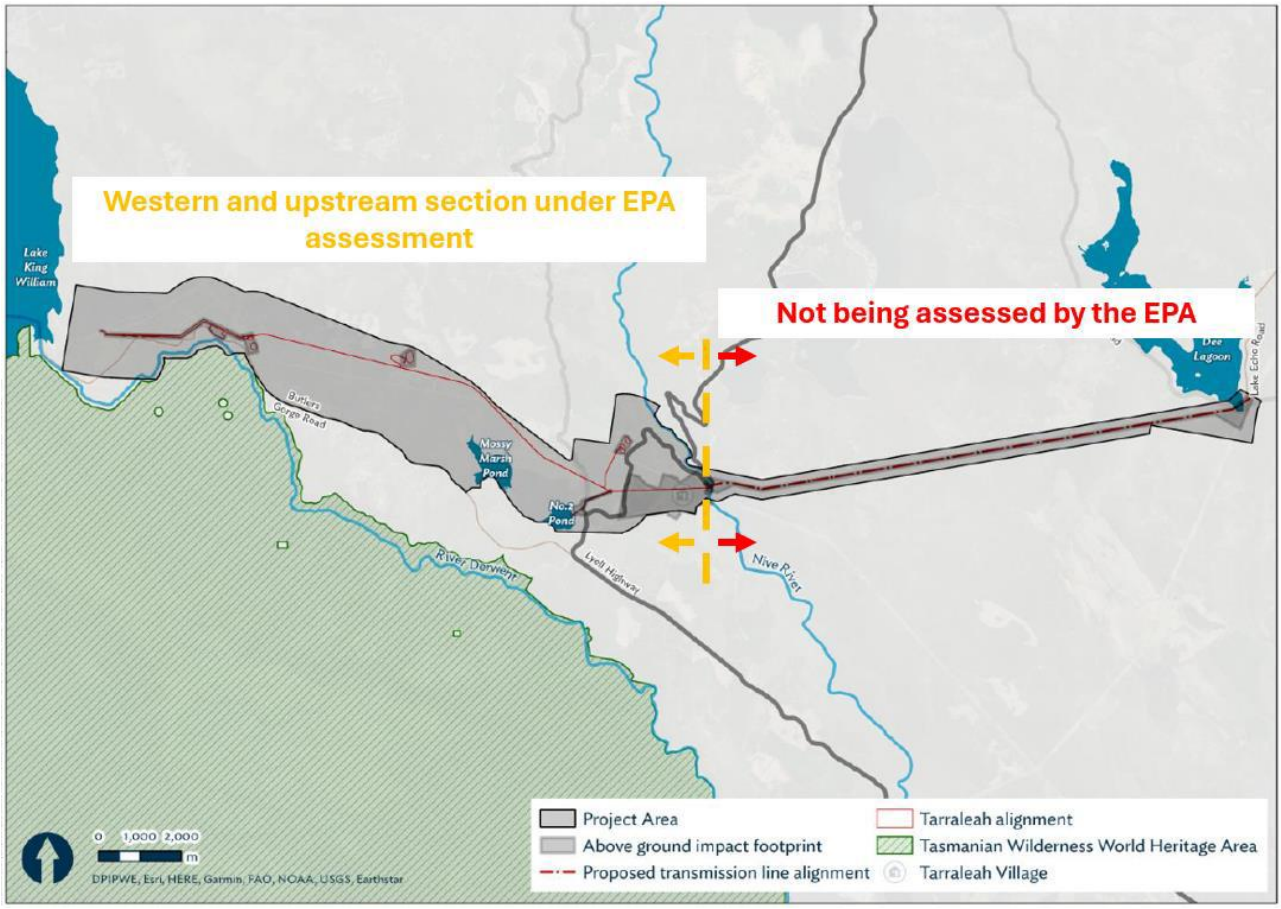


Figure 1.4: Activities to be and not to be assessed by the Board of the Tasmanian Environmental Protection Authority

(Source: Tasmanian EPA)

Since issuing the EIS Guidelines, and upon review of a draft EIS, the Board determined that the excavation of the power station and associated infrastructure will contribute to the level 2 activity related to the 6(a) materials handling facility being assessed and that it would form part of the Board's assessment in addition to the components identified in the EIS Guidelines.

This EIS has been prepared in accordance with both the issued EIS Guidelines and the *EPA Guidelines for Preparing an Environmental Impact Statement* (Environmental Protection Authority, 2019). Although some Project activities are not subject to assessment by the Board, Hydro Tasmania has chosen to include the entire Project in this EIS to provide the community and stakeholders with a clear, accessible, and holistic overview.

1.4.4 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

A referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was submitted to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) in May 2023 (EPBC 2023/09482). The Project was determined to be a controlled action, with the following controlling provisions:

- World Heritage properties
- National Heritage places
- Listed threatened species and communities
- Listed migratory species.

Further design and constructability work since the original referral resulted in an updated Project design and disturbance footprint. After consultation with DCCEEW, the original referral (EPBC 2023/09482) was withdrawn and a new referral was submitted in June 2025 (EPBC 2025/10226). In September 2025, the Project was again determined to be a controlled action.

1.4.5 Tasmanian National Parks and Reserves Management Act 2002

The proposed surge tower, pump station, pipeline, and associated access tracks from Fourteen Mile Road are located within the Tarraleah Conservation Area and therefore require assessment under the Tasmanian *National Parks and Reserves Management Act 2002* (NPRM Act).

The Tasmanian Parks and Wildlife Service (PWS), as the managing authority for the Tarraleah Conservation Area, chose to conduct a parallel Reserve Activity Assessment (RAA) alongside the EIS process.

Additional information requirements provided by PWS in the EIS Guidelines have been addressed in Appendix A of this EIS.

1.4.6 Tasmanian Hydro-Electric Corporation Act 1995

Under Section 8 of the Tasmanian *Hydro-Electric Corporation Act 1995* (HEC Act), approval from both Houses of the Tasmanian Parliament is required to construct a major power facility. This includes any new generating plant with an installed capacity exceeding 40 megawatts (or a limit fixed by regulation), along with associated equipment used to hold water or to direct, monitor, or control the flow of water for hydro-electric generation.

As the Project meets this definition, approval from both Houses of Parliament will be required.

1.4.7 Other relevant legislation

In addition to the statutory approvals process described above, the Project is also subject to a range of other state legislation including:

- **Tasmanian *Threatened Species Protection Act 1995* (TSP Act)** — Twelve species listed under the TSP Act are known or considered likely to occur within the Project area (including transmission line options). If required, permits will be sought to disturb these species prior to construction. Refer to Section 5.3.
- **Tasmanian *Nature Conservation* Act *2002* (NC Act)** — One vegetation community—subalpine *Diplarrena latifolia* rushland (MDS)—may be directly impacted by the Project. Another community—*Sphagnum* peatland (ASP)—may be indirectly affected by hydrological changes resulting from Project operations. An offset for these communities is proposed and will be established under a covenant in accordance with the NC Act. Refer to Section 5.3.
- **Tasmanian *Aboriginal Heritage Act 1975* (AH Act)** — Surveys have recorded several Aboriginal artefacts within the Project area. Upon finalisation of the detailed design and prior to construction, permits will be sought for any artefacts that may be disturbed. Refer to Section 5.13.
- **Tasmanian *Forest Practices Act 1985* (FP Act)** — The clearance and conversion of native vegetation, including threatened vegetation communities listed under the NC Act, would normally require a Forest Practices Plan under the FP Act; however, in accordance with the *Maintaining a Permanent Native Forest Estate Policy*, a Forest Practices Plan is not required for new major infrastructure such as this Project.
- **Tasmanian *Forest Management Act 2013* (FM Act)** — The Project will require revocation of the classification of land within the Project area currently designated as Permanent Timber Production Zone Land. This process will be undertaken in consultation with Sustainable Timber Tasmania (STT), in accordance with Part 4, Section 11 of the FM Act.
- **Tasmanian *State Policy on Water Quality Management 1997*** — Established under the Tasmanian *State Policies and Projects Act 1993*, this policy sets out Protected Environmental Values (PEVs) for all Tasmanian surface waters. Relevant PEVs for the Project include the protection of aquatic ecosystems and species such as the giant freshwater crayfish (*Astacopsis gouldi*). Refer to Section 5.1.

1.5 Project proponent

Hydro Tasmania is Australia's leading clean energy business, the nation's largest water manager, and its largest generator of renewable energy. Since 2005, hydropower in Tasmania has, on average, supplied 82% of the state's annual electricity demand (Open Electricity, 2025).

Since 2020, Tasmania has also become one of the few places globally to consistently generate more renewable energy than its average local power needs, largely due to hydropower.

Hydro Tasmania employs a skilled and dedicated workforce across technical, managerial, and administrative roles. These include: power station operations; dam safety and surveillance; electrical and mechanical maintenance; statutory planning; environmental management; community and stakeholder engagement; heavy machining; legal; financial; energy trading; design (electrical, civil, and mechanical); and project management.

Over the past century, Hydro Tasmania has managed and delivered some of Australia's largest renewable energy projects. Its infrastructure portfolio includes 54 major dams and 30 conventional hydropower stations, producing an average of 9,000 GWh per annum, along with two major wind farms—Musselroe and Woolnorth (now operated as joint ventures and no longer under Hydro Tasmania's control).

Hydro Tasmania's generation portfolio has extensive flexible storage capacity, allowing it to ramp up output during periods of low wind and solar generation, and reduce output when renewable generation is high and market prices are low or negative. While this capacity currently consists solely of conventional hydropower, Hydro Tasmania is actively investigating the addition of pumped hydro to provide long-duration storage to meet the growing demand for energy storage solutions.

The organisation operates in accordance with its ISO 14001-certified Environmental Management System (EMS), as well as its Environmental Policy and Sustainability Principles.

Environmental, Social and Governance (ESG) Objectives have been developed for the Project (refer to Table 1.1). The preparation of this EIS, alongside other required approvals documentation, supports achievement of these ESG Objectives.

Table 1.1: Hydro Tasmania's Major Projects ESG Framework

Hydro Tasmania ESG Objectives	Major Projects ESG Objectives
Planetary Integrity A leading custodian.	Ensure leading environmental management, enhance biodiversity outcomes and minimise project carbon emissions.
Sustainable Resource Use A sustainable energy transition.	Adopt circular economy principles across the Project life cycle, prioritising renewable energy production and sustainable water use for shared value.
People Foster a safe, inclusive and adaptive culture. Provide a holistic employee experience.	Support the development of a safe, skilled, diverse and resilient workforce, including contractors, to enable future energy transition projects.
Prosperity A sustainable energy future for all. Enable the transition.	Deliver social and economic value to local communities and the state, and realise market and Tasmanian consumer benefits. Build trusted relationships with local communities, including Aboriginal communities.
Governance A trusted organisation.	Build stakeholder confidence through ethical, commercial and technical governance, and procurement processes to ensure transparency and accountability.

Proponent information is as follows:

Name of proponent (legal entity): Hydro-Electric Corporation
Name of proponent (trading name): Hydro Tasmania
Registered address of proponent: 4 Elizabeth Street, Hobart Tas 7000
Postal address of proponent: GPO Box 355, Hobart Tas 7001
ABN: 48 072 377 158
Contact person: Matt Errington
Telephone: 03 6240 2270
Email address: matt.errington@hydro.com.au

2 Project description

2.1 Project summary

2.1.1 Location and planning context

Location

The Project is located at Tarraleah in the Central Highlands local government area, approximately 125 kilometres (km) northwest of Hobart, Tasmania. The Project area extends from Lake King William in the west, via Tarraleah, to either Dee Lagoon or Liapootah in a broadly linear alignment, depending on which of the two transmission line options is constructed. Access is primarily via the Lyell Highway and Butlers Gorge Road.

Land zoning

The Project spans five zones under the Tasmanian Planning Scheme (TPS):

- Rural Resource Zone
- Environmental Management Zone
- Village Zone
- Utilities Zone
- Recreation Zone

Discretions for each zone are detailed in Section 2.8.3.

Land tenure

Most of the Project is located on Permanent Timber Production Zone Land (PTPZL), managed by Sustainable Timber Tasmania (STT), as well as land and waterbodies managed by Hydro Tasmania. The Project area also includes the Tarraleah Conservation Area, managed by the Parks and Wildlife Service (PWS). All land parcels within the Project area and their ownership are listed in Section 2.2.1.

Use class and permissibility

Under the TPS, the use of land and water for hydroelectric schemes is classified as “Utilities”. Within the Utilities Zone, this is a permitted use. Across all other zones, the Project is classed as a discretionary use. A summary of use class and permissibility is provided in Section 2.8.2.

2.1.2 Existing site

Land Use

Land use in the Project area is dominated by forestry, hydroelectric generation and electricity transmission. Most of the area is actively managed for forestry operations by Sustainable Timber Tasmania (STT) under the Tasmanian *Forest Management Act 2013* (FM Act). Forest operations include hardwood plantations dominated by Eucalyptus nitens and native forest dominated by *Eucalyptus delegatensis*.

The Project area has been progressively modified since the 1930s, when the original Tarraleah hydropower scheme was built, through to the 1960s, when it was expanded. Infrastructure from this period includes dams, weirs, tunnels, pipelines, flumes, surface canals, penstocks, the Tarraleah Power Station, and the Tarraleah–New Norfolk 110 kV transmission line. The Tungatinah Power Station and Tungatinah–Waddamana 110 kV transmission line are located immediately north of the Project area. The Project's transmission line will partly share an easement with an existing line.

The Project area also contains Tarraleah Village, originally built to support the hydropower scheme's construction and later repurposed, most recently as tourist accommodation. Hydro Tasmania owns the village and will control access during construction. A workforce accommodation facility (WAF) will be built on adjacent land but is not part of this EIS.

Topography

The Project area sits on the Tarraleah Plateau, which features gently undulating slopes, with valleys carved by the River Derwent and Nive River. Elevation ranges from approximately 814 m AHD (at the northern transmission line termination northeast of Dee Lagoon) to about 345 m AHD (at the new power station site). There is a drop of roughly 315 m from the western end of the headrace pipeline to the power station.

Geology

The geology of the Project area includes:

- Permo–Triassic clastic sediments forming basement rocks, exposed extensively around Butlers Gorge, south of Mount Hobhouse, and in the Nive River Valley
- Jurassic dolerite, intruded as an extensive sill 200–350 m thick, forming much of the plateau
- Remnant Tertiary basalt flows overlying dolerite in some areas, with minor interbedded lacustrine and fluvial sediments.

Surficial Quaternary alluvial, glacial, swamp, and colluvial deposits cover much of the region. The area's geological structure is shaped mainly by Late Cretaceous/Early Tertiary faulting, with particularly intense faulting in the Nive River Valley, where dolerite and Triassic strata are down-faulted within a northwest-trending graben.

Potentially acid forming material

The likelihood of acid-forming material in the Project area is extremely low. Mineralogical, petrological and geotechnical testing indicates that local soil and rock types contain little or no sulphides, and therefore minimal acid-forming potential. Reference to appendix and

Geoconservation values

A listed geoconservation feature, the Western Tasmania Blanket Bogs (ID 2527), occurs within the disturbance footprint as pure buttongrass moorlands (TasVeg4.0 code MBP) and buttongrass moorland with emergent shrubs (TasVeg4.0 code MBS).

Soils

Soil types

Soil types vary across the Project area:

- Colluvial and alluvial soils occur along riverbanks and hillsides, with more alluvium near Butlers Gorge and more colluvium on the western slopes of Wentworth Hills
- Quaternary glacial soils are found on flatter, lower-lying parts of the plateau from Lake King William to No. 2 Pond
- Peaty soils occur in swampy areas such as Mossy Marsh and other surface water expressions on the plateau.

Acid sulphate soils

Tasmanian Acid Sulphate Soils Information (TASSI, 2009) identifies two areas with low probability of acid sulphate soils along the headrace pipeline, and three areas with extremely low probability near Mossy Marsh, No. 2 Pond, and the Nive River below Tarraleah Power Station. The overall risk is considered extremely low, as local soils and rocks contain little or no acid-forming minerals (e.g. sulphides), and some rock types (e.g. Jurassic dolerite) include carbonates and zeolites that neutralise acid.

Hydrology

Surface water

All waterbodies associated with the Project are regulated through Hydro Tasmania's operation of the Derwent Power Scheme. These include:

- River Derwent from Clark Dam to Wayatinah Lagoon
- Nive River from Tarraleah Power Station to Wayatinah Lagoon
- Lake King William
- Lake Liapootah
- Wayatinah Lagoon
- Mossy Marsh Pond
- Horne's Pond
- No. 1 Pond and No. 2 Pond.

The Project hydrology is bounded by the River Derwent to the south and the Nive River to the east. These rivers form steep, narrow gorges cut into the Tarraleah Plateau, with meandering gravel- to boulder-bed channels. On the plateau, the Mossy Marsh drainage system and associated ponds are anthropogenically modified and shallow.

Water is currently transferred from Lake King William to No. 1 Pond via either No. 1 or No. 2 Canal. From No. 1 Pond, water is sent via penstocks to the Tarraleah Power Station. Water in No. 2 Canal passes through Mossy Marsh, where surface conveyance waterbodies contain fine lacustrine sediments and basal peaty material.

The Derwent Catchment covers about 8,800 km^2 in south-east and central Tasmania. The River Derwent, Tasmania's second-longest river, originates at Lake St Clair and flows south-east for approximately 187 km to New Norfolk, where it enters the Derwent Estuary. The river and several main tributaries are dammed or diverted into 21 storages for hydro-electric generation.

From its headwaters at Lake St Clair, flow is regulated by St Clair Dam before running 5 km south-east to Lake King William, formed by Clark Dam. Water from Lake King William is diverted to the Tarraleah Power Station, entering the Nive River upstream of Lake Liapootah. The River Derwent continues downstream of Clark Dam for about 31 km past Derwent Pumps Weir to Wayatinah Lagoon, where the Nive River joins it. Downstream, the river flows a further 6 km to Lake Catagunya. Water from Wayatinah Lagoon is diverted through Wayatinah Power Station into Lake Catagunya. Both bypassed river reaches are within steep, narrow valleys with no wetland or floodplain habitats.

Below Clark Dam, all River Derwent flows—except for dam spills—come from tributary inflows. In this reach, the Counsel River and Beech Creek are the only major tributaries. Upstream of these, much of the river channel is dry or contains long sections of pool habitat. In the 6 km reach downstream of Wayatinah Lagoon, tributary inflows are minor, comprising Robinson Creek (mid-reach) and five small unnamed streams. As a result, baseflows are low and the channel is mostly dry or contains long pools.

The Nive River, a major tributary of the Derwent Catchment, originates from Lake Nive in the Walls of Jerusalem National Park. The unregulated upper reach flows south-east for about 25 km to Pine Tier Lagoon, which diverts all flows (except spills) to Bronte Lagoon. Below Pine Tier Lagoon, the regulated Nive River runs south for about 31 km to Lake Liapootah. The existing Tarraleah Power Station discharges directly into the upstream end of Lake Liapootah. With the exception of spills, all water in Lake Liapootah is diverted to Liapootah Power Station. Below Lake Liapootah, the Nive River flows south for another 9 km before entering Wayatinah Lagoon.

See Section 5.4 for further detail on hydrology of the Project area.

Groundwater

Groundwater in the Project area occurs in two principal catchment-scale aquifers: the Nive River Palaeovalley and Mesozoic bedrock. Both aquifers are anisotropic—meaning groundwater flow direction varies—and are located in heterogeneous fractured rock with low storage (specific yield). Transmissivity varies widely in both aquifers, with higher values typically occurring where faults and fracture zones intersect.

Recharge is thought to occur through direct rainfall infiltration and leakage from surface water. Recharge zones are located on Wentworth Hills and the Tarraleah Plateau, while discharge zones occur at the base of Wentworth Hills and in the River Derwent valley. The Project area is considered to have a net positive water budget, with excess recharge expressed locally as springs, seeps, streams, and wetlands.

Regionally, the deeper water table lies at around 40 m depth, although this varies with topography, aquifer properties, stratigraphy, and geological structure. A shallow water table is also present in wetland areas associated with low-lying topography and fault intersections. The River Derwent to the south and the Nive River to the east form hydrogeological discharge boundaries. Regional groundwater flow is generally from the Wentworth Hills southward to the River Derwent.

See Section 5.2 for further detail on groundwater of the Project area.

Natural values

Terrestrial and aquatic ecological surveys of the Project area and its immediate surrounds were conducted between 2018 and 2025.

Vegetation communities

Vegetation communities in the Project area are shaped by underlying geology and past disturbances, including hydropower development, timber harvesting, and plantation forestry. The area contains wet and dry eucalypt forests and woodlands, non-eucalypt forests, buttongrass moorlands, and less than one hectare of subalpine *Diplarrena latifolia* rushland within the headrace pipeline alignment. This rushland is listed as a threatened vegetation community under the NC Act and is in excellent condition.

Upstream and northwest of Mossy Marsh Pond—an artificial impoundment—are three hectares of *Sphagnum* peatland in excellent condition. Sphagnum peatland is listed as a threatened native vegetation community under the NC Act and forms part of the Alpine *Sphagnum* Bogs and Associated Fens ecological community, which is listed as endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

Flora

Field surveys recorded 325 flora species within the Project area, comprising 271 native and 54 introduced species. Five threatened flora species listed under the Tasmanian *Threatened Species Protection Act 1995* (TSP Act) were identified:

- Native wintercress (*Barbarea australis*)—endangered under the EPBC Act and riparian/ flow-dependent
- Small-leaf dogwood (*Pomaderris elachophylla*)—vulnerable
- Mount Mawson pine (*Pherosphaera hookeriana*)—vulnerable
- Narrowleaf westringia (*Westringia angustifolia*)—rare
- Matted lignum (*Muehlenbeckia axillaris*)—rare.

Declared weeds listed under the Tasmanian *Biosecurity Act 2019* (Biosecurity Act) recorded in the Project area include:

- Californian thistle (*Cirsium arvense* var. *arvense*)
- Foxglove (*Digitalis purpurea*)
- Spanish heath (*Erica lusitanica*)
- Gorse (*Ulex europaeus*)
- Ragwort (*Senecio jacobaea*)
- Montpellier broom (*Genista monspessulana*)
- English broom (*Cytisus scoparius*)
- Orange hawkweed (*Pilosella aurantiaca* subsp. *aurantiaca*)
- Blackberry (*Rubus fruticosus* agg.)
- Serrated tussock (*Nassella trichotoma*).

Significant infestations of English broom occur within the Tarraleah Conservation Area and at Tarraleah Village and golf course.

Aquatic fauna

No listed aquatic species have been recorded in the Project area, and based on known distributions, none are expected to occur.

Macroinvertebrate river health scores for the River Derwent indicated healthy communities downstream of the Counsel River inflow, but poor condition upstream. The Nive River downstream of Liapootah Lagoon was assessed as being in poor overall condition.

Self-sustaining populations of native fish are either absent or occur in very low numbers. Introduced brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) were the only fish species commonly recorded in all study reaches and are known to outcompete and predate on native species.

Platypus (*Ornithorhynchus anatinus*) are likely to be common throughout the Project area. The native freshwater crayfish (*Astacopsis tricornis*) was recorded in the River Derwent upstream of Wayatinah Lagoon. Native water rats (*Hydromys chrysogaster*) were not recorded, and there are no historic records in the immediate area, although this cryptic species may still be present.

Terrestrial fauna

The Project area contains three main fauna habitat types: dry sclerophyll forest, wet sclerophyll forest, and buttongrass moorland. Buttongrass moorland generally supports low fauna diversity due to its simple structure and lack of habitat heterogeneity. The two forest habitats—particularly those not harvested for timber in recent decades—are likely to support a greater range of fauna species.

Four eagle nests were recorded within 1 km of the northern transmission line option and one nest within 500 m of the southern transmission line option. These may be used by either the Tasmanian wedge-tailed eagle (*Aquila audax fleayii*), listed as endangered under both the TSP Act and EPBC Act, or the white-bellied sea eagle (*Haliaeetus leucogaster*), listed as vulnerable under the TSP Act.

Tasmanian devil (*Sarcophilus harrisii*)—endangered under both the EPBC Act and TSP Act—and spotted-tailed quoll (*Dasyurus maculatus maculatus*)—vulnerable under the EPBC Act and rare under the TSP Act—may den within mature eucalypt forests in the Project area and are known to forage across suitable habitat. No dens were identified during surveys. Camera trap images of devils showed no signs of Devil Facial Tumour Disease, although the disease is present in the region.

Latham's snipe (*Gallinago hardwickii*) is listed as vulnerable under the EPBC Act, which is also listed as migratory. It may occur on buttongrass moorlands. The swift parrot (*Lathamus discolor*), listed as critically endangered under the EPBC Act and endangered under the TSP Act, may opportunistically forage on eucalypt flowers after breeding; however, the Central Highlands do not contain any Swift Parrot Important Breeding Habitat. The grey goshawk (*Accipiter novaehollandiae*) and Tasmanian masked owl (*Tyto novaehollandiae castanops*) are known to forage over the Project area but are unlikely to nest here due to a lack of suitable nesting habitat (grey goshawk) or the absence of known nest trees within 150 m of the disturbance footprint (masked owl).

A camera trap monitoring program targeting eastern barred bandicoot (*Perameles gunnii gunnii*) habitat was conducted between 8 December 2023 and 9 May 2024. One bandicoot detection was recorded, along with three separate detections of cats (*Felis catus*). Cats living near bushland are known to prey on a wide range of native wildlife, particularly ground-feeding or ground-nesting species.

Protected areas

The surge shaft and tower, with an associated rising main, access track, distribution line, and temporary explosive magazine, are proposed within the 970 ha Tarraleah Conservation Area, an International Union for Conservation of Nature (IUCN) Category IV reserve with no current management plan. The Project area is close to the TWWHA and the Franklin–Gordon Wild Rivers National Park; at its nearest point, the proposed western portal is about 25 m from the TWWHA boundary, across Canal No. 1.

See Section 5.3 and Section 5.4 for further detail on natural values of the Project area.

Heritage

An Aboriginal heritage assessment recorded eight confirmed sites and two legacy sites, mostly associated with the transmission line options, along with four Potential Areas of Sensitivity (PAS) for small scatters and single artefacts. PAS are considered prospective for statutory relics or cultural deposits based on landscape and other predictive factors, despite no surface relics being observed. Surveys conducted during Aboriginal heritage engagement also identified no features of high cultural significance.

A desktop historic heritage assessment found no statutory historic heritage values in the Project area. Hydro Tasmania will complete Heritage Impact Assessments for any affected assets and update the Historic Heritage Conservation Management Plan for the Tarraleah hydropower scheme 12 months before decommissioning.

See Section 5.13 for further detail on Aboriginal heritage values of the Project area.

Potential hazards

Flooding

Some infrastructure, including pipelines and roads, crosses unregulated creeks or is located near relatively unregulated rivers (e.g. the power station next to the Nive River) with potential for flooding. Flood-prone assets will be designed and built to meet or exceed National Construction Code requirements, taking climate change into account.

Seismic activity

A site-specific seismic hazard assessment was completed for the Project, dividing it into three areas based on proposed infrastructure locations: the Nive River Valley, No. 2 Pond grouping, and Butlers Gorge. Peak ground acceleration at a 1:10,000 annual exceedance probability (AEP) was found to range from 0.088 g to 0.104 g across these areas. Earthquake actions and structural requirements for all components will be determined in accordance with AS 1170.4–2007, the Australian Standard for structural design actions for earthquakes.

Fire

Bushfire poses a significant threat to people, communities, industries and the environment in Tasmania. Historical records show that the landscape around the Project area has been frequently affected by bushfires over the past 60 years, indicating the risk will remain in the future. Most vegetation in the area is unsuitable for fuel reduction burning, which increases bushfire risk. While current State Government bushfire risk registers rate Butlers Gorge and Tarraleah settlement areas as low and very low risk, these levels are expected to rise significantly during construction due to higher site occupancy and the increased potential for accidental ignition. See Section 5.11 for further detail.

Landslip

The Project area has a documented history of landslips, with the Geohazards (Landslide) Database mapping features mainly along the banks of the River Derwent near No. 1 Canal and on the hillside above and opposite the Tarraleah Power Station. Landslip hazard areas are also mapped under the Tasmanian Planning Scheme – Central Highlands Local Provisions Schedule. To reduce landslip risk, the Project design locates infrastructure underground where possible, lines the tunnel to prevent leakage near the Nive River Graben, and avoids excavation of the hillside above the Tarraleah Power Station.

Winds

All above-ground infrastructure will be designed to relevant standards to withstand the maximum wind speeds expected in the Project area. The transmission line alignment allows for the removal of hazardous trees with the potential to fall on the line during strong winds.

Climate change

Hydro Tasmania assessed the Project's feasibility using the PLEXOS Hydro Model, a high-resolution power system model designed to provide detailed hydrological, financial, and energy outputs for the Tasmanian hydro system. The model incorporates climate variability by applying a linear decline in catchment inflows of 3% per decade, using 2020 as the baseline. Results indicate there will be sufficient water to operate the Project even with the modelled inflow reductions.

2.1.3 Local region

Climate

Tarraleah is in a high-precipitation, cool-temperate region of central Tasmania, with marked seasonal temperature variation. Summers are warm, while winters often bring occasional snowfall. Long-term Bureau of Meteorology data from the nearest stations at Butlers Gorge (096003) and Tarraleah Village (095018) show temperatures ranging from -13°C to 34°C, with a mean monthly temperature of 20°C in January and -0.3°C in July. The highest mean summer temperature occurs in February (7.1°C–19.9°C), while the coldest month is July (0.4°C–8.3°C).

Rainfall follows an orographic pattern, with western stations recording more rain than eastern ones due to prevailing westerly winds. Mean annual precipitation from 2000 to 2022 was 1,274 mm, with the lowest monthly average in January (81 mm) and the highest in August (185 mm). The maximum recorded daily rainfall is 132 mm. Winds are typically from the northwest to southwest, with speeds generally higher in the afternoon.

Surrounding land zoning, tenure and uses

Land use in the local region is dominated by forestry (managed by STT), hydroelectric generation (Hydro Tasmania), and electricity transmission (TasNetworks). Bradys Lake and Bronte Lagoon, located approximately 6 km and 10 km northeast of the Project area, are popular fishing destinations with both lifestyle and permanent residents. Wayatinah Lagoon, about 10 km south, is also a popular fishing location and includes formal caravan and camping facilities.

Two privately owned land parcels adjoin the Project area—one north of the surge tower and one south of Tarraleah Village—both partly managed for forestry operations.

Species, sites or areas of conservation significance

Two threatened vegetation communities and several threatened flora and fauna species listed under environmental legislation occur in the region and may be impacted by the Project. Less than one hectare of subalpine rushland (*Diplarrena latifolia*) in excellent condition lies within the headrace pipeline alignment. This community is listed as threatened under the NC Act, with about 600 ha mapped in Tasmania, 45% of which is within the National Reserve System. A 3 ha patch of *Sphagnum* peatland, located outside the disturbance footprint, may be indirectly affected by hydrological changes from the Project.

One listed geoconservation feature of regional significance occurs within the disturbance footprint: the Western Tasmania Blanket Bogs (ID 2527). These bogs, supporting buttongrass moorland vegetation, cover about 20 ha within the footprint—mainly in the western portal and pipeline alignment—and are recognised as the most extensive organosol (peat) terrain in Australia and the Southern Hemisphere, covering around 1 million ha (Pemberton et al., 2005).

Threatened and/or migratory fauna species listed under the TSP Act and/or EPBC Act known to occur in the region include:

- Tasmanian devil (*Sarcophilus harrisii*)
- Spotted-tailed quoll (*Dasyurus maculatus maculatus*)
- Eastern quoll (*Dasyurus viverrinus*)
- Eastern barred bandicoot (*Perameles gunnii gunnii*)
- Tasmanian wedge-tailed eagle (*Aquila audax fleayi*)
- White-bellied sea eagle (*Haliaeetus leucogaster*)
- Tasmanian masked owl (*Tyto novaehollandiae castanops*)
- Swift parrot (*Lathamus discolor*)—foraging only, given the distance from breeding habitat
- Grey goshawk (*Accipiter novaehollandiae*)
- Blue-winged parrot (*Neophema chrysostoma*)
- Latham's snipe (*Gallinago hardwickii*)
- White-throated needletail (*Hirundapus caudacutus*).

Threatened flora species listed under the TSP Act and/or EPBC Act known to occur in the region include:

- Small-leaf dogwood (*Pomaderris elachophylla*)
- Mount Mawson pine (*Pherosphaera hookeriana*)
- Narrowleaf westringia (*Westringia angustifolia*)
- Matted lignum (*Muehlenbeckia axillaris*)
- Native wintercress (*Barbarea australis*) — a riparian species occurring in the River Derwent and Nive River.

Other Matters of National Environmental Significance (MNES) under the EPBC Act in the region include:

- One World Heritage property and National Heritage place: the Tasmanian Wilderness World Heritage Area (TWWHA)
- One nationally endangered ecological community: *Sphagnum* peatland (3 ha), in excellent condition, northwest of Mossy Marsh Pond, listed under the NC Act and qualifying as Alpine *Sphagnum* Bogs and Associated Fens under the EPBC Act.

Other fauna of conservation significance, though not listed as threatened under the EPBC Act or TSP Act, include platypus (*Ornithorhynchus anatinus*), native crayfish (*Astacopsis tricornis*), and 26 aquatic macroinvertebrate species.

A comprehensive list of species, communities, and geological features of conservation significance is included in Section 5.3 and Appendix B.

The Franklin–Gordon Wild Rivers National Park and TWWHA lie immediately south of the Project area. Covering 4,463 km^2, the park is a popular destination for walking, rafting, and four-wheel driving, though not in the immediate vicinity of the Project.

2.1.4 Proposed infrastructure

The Project's proposed infrastructure is shown in plan view (Figure 2.1) and cross-section (Figure 2.2), and is summarised below.

Permanent structures

Project element	Description
Headrace pipeline	Approximately 4.2 km of GRP (glass reinforced polymer) pipeline transferring water from Lake King William—via the Lake King William intake and tunnel—to the headrace tunnel. The intake and tunnel are currently under construction as part of Hydro Tasmania's Tarraleah Upgrade Works Project.
Headrace tunnel	An underground low-pressure tunnel approximately 9.5 km long, transferring water from the headrace pipeline to the power tunnel.
Power tunnel	An underground, partly lined high-pressure tunnel approximately 2.3 km long, transferring water from the headrace tunnel to the power station. The tunnel splits into two short underground penstocks, one for each turbine, before entering the power station.
Service tunnels	Depending on construction method, service tunnels and portals may be built at the mid-point tunnel access and Paddy's Quarry. These will provide construction access (e.g. for drill-and-blast works) and operational access to the headrace tunnel.
Power station	A partially underground powerhouse complex, adjacent to the existing Tarraleah Power Station, with an installed capacity of 180 MW (peak capacity 190 MW) comprising two turbine sets and associated mechanical and electrical equipment. Includes a new tail bay discharging water into the Nive River.
Surge facility	An underground surge shaft and above-ground surge tower on an unnamed hill between the Lyell Highway and Fourteen Mile Road. Connected to the headrace tunnel to manage hydraulic transients. The surge shaft will be about 265 m deep, and the surge tower about 70 m above ground level.
Pump station and rising main	A pump station and approximately 0.8 km rising main connecting No. 2 Pond to the base of the surge tower, transferring water from Derwent Pumps, Hornes Pond and intermediate water pick-ups to the headrace tunnel.
Transformer and switching yard	A transformer yard adjacent to the power station, connected to a switchyard located either next to the transformer yard (southern transmission line option) or adjacent to the existing Tungatinah switchyard (northern transmission line option).
Transmission line	A new 220 kV transmission line connecting the switchyard to an existing substation. Two options are under consideration, with only one to be built: • 14 km double circuit line from Tungatinah Switchyard to Dee Lagoon Substation (northern option), or • 15 km double circuit line from Tarraleah Switchyard to Liapootah Substation (southern option).
Access roads	Construction and operational access will be provided by: • Minor modifications to Lyell Highway intersections • Modifications to Fourteen Mile Road for surge facility and pump station access • Upgrade of No. 2 Canal access road to western portal • New mid-tunnel access road from Butlers Gorge Road • New surge tower and pump station access roads from Fourteen Mile Road • New headrace pipeline service access roads on either side of the pipeline • New transmission line access tracks.

Project element	Description
Spoil emplacement areas	Excavation of the power station, portals, tunnels, and shaft will produce about 760,000 m^3 of spoil. Spoil unsuitable for reuse (e.g. for portals or road surfacing) will be stored in three permanent emplacement areas: • Western portal • Mid-tunnel access portal • Paddy's Quarry Due to site constraints, no spoil emplacement will be at the power station; spoil from the power station and power tunnel will be trucked via the Lyell Highway to Paddy's Quarry. All emplacement areas will be landformed and rehabilitated after construction.
Power supply	New 22 kV distribution lines will connect the existing 22 kV network to the western, mid-access, and Paddy's Quarry portals, pump station, surge tower, and power station, supplying electricity during construction and operation.

Temporary structures

Project element	Description
Construction compounds	Construction compounds will provide site administration facilities, workshops, material and equipment storage, and a concrete batch plant. The main compound will be in Tarraleah Village, using retrofitted existing buildings where possible. Temporary administration buildings will also be required at some construction sites. Smaller compounds may be established at the western tunnel portal (including a large laydown area for headrace pipeline sections), mid-access tunnel portal, Paddy's Quarry, and the power station.
Explosives magazines	Three dedicated magazine facilities will be established off Butlers Gorge Road for storing explosives required for excavation works.
Nive River bridge	A temporary bridge will be constructed over the Nive River to facilitate excavation in the constrained power station site area.

2.1.5 Inputs

Water

Construction water will be sourced from captured on-site runoff, Lake King William, existing water conveyances, or the Nive River. Potable water for construction compounds will come from existing supply points or be trucked to site.

Operational water for the Project will be diverted from the River Derwent at Lake King William and returned to the Nive River above its confluence with the River Derwent.

Energy

Energy for construction and operation will be supplied by extending local 22 kV electrical distribution lines to the proposed construction sites, connecting from existing Hydro Tasmania and/or TasNetworks infrastructure.

Other raw materials

The main raw materials required for construction will be concrete, steel, and glass reinforced polymer (GRP), each serving distinct purposes in the Project:

- **Concrete**: for tunnel and shaft lining where required, and for constructing major components such as the power station.
- **Steel**: for tunnel lining, surge tower construction, reinforced concrete, and fabrication of electromechanical equipment.
- **GRP (or similar polymer)**: for the headrace pipeline.

Estimated requirements are approximately 120,000 m^3 of concrete, 14,000 tonnes of steel, and 8,000 tonnes of GRP. Concrete will be produced on site from crushed excavated material, supplemented as needed with aggregate from existing quarries. Cement will be sourced from existing suppliers, while steel and GRP will be transported to the Project area.

The Project's operation will require negligible quantities of raw materials.

2.1.6 Wastes and emissions

Liquid

Liquid waste will be generated during both construction and operation of the Project. During construction, wastewater may contain blast residue (nitrates from explosives) and sediment from runoff. Other liquid wastes that may be produced in smaller quantities include:

- Washdown water
- Wastewater from ablution facilities and site offices
- Drilling fluids
- Waste oils and hydraulic oils.

During operation, only minor liquid waste is expected, including waste oils from periodic maintenance of electromechanical equipment and wastewater from ablution facilities.

Atmospheric

During construction, the Project will generate atmospheric emissions, primarily from:

- Dust from surface works such as excavation and spoil haulage
- Exhaust emissions from machinery and vehicles.

An assessment of air quality for the Project indicates that predicted emission concentrations and dust deposition levels are unlikely to cause adverse air quality impacts.

The Project's operation will not produce any atmospheric waste.

Solid

Construction of the Project will generate around 760,000 m^3 of spoil. Spoil that cannot be reused on site will be disposed of in permanent spoil emplacement areas. Other solid wastes likely to be produced during construction include:

- Cleared vegetation unsuitable for revegetation
- Waste concrete and scrap steel
- Plastic and timber
- General waste from site offices and workshops.

During operation, only minor solid waste will be generated, primarily from periodic maintenance of electromechanical equipment.

Controlled waste

Construction of the Project has the potential to generate several controlled waste streams, including:

- Concrete and concrete washings
- Hydrocarbon waste (e.g. containers, oily rags, filters, grease, absorbents, degreaser)
- Petroleum products from spills (absorbed in spill kit materials or contaminated soil)
- Waste from temporary ablution blocks
- Used chemical containers (e.g. herbicides, paints, adhesives, solvents, flocculants, coagulants)
- Waste oil and oil containers.

During operation, only minor controlled waste will be produced, primarily from periodic maintenance of electromechanical equipment (e.g. hydrocarbon waste) and wastewater from power station ablution facilities.

Noise

Construction noise will result from activities such as:

- Operation of equipment including rock breakers, excavators, dozers, compactors, and trucks
- Increased light and heavy vehicle traffic.

Noise modelling indicates construction noise will be inaudible from the nearest receptors at Bradys Lake (6 km northeast) and Bronte Lagoon (12 km north).

Tarraleah Village, owned by Hydro Tasmania, is not considered a sensitive receptor and is not subject to the NSW EPA *Draft Construction Noise Guideline 2020*. The village will not be open to the public for overnight accommodation during construction.

No other noise-sensitive receptors in separate ownership are expected to be impacted by standard or non-standard hours construction works.

Greenhouse gases

The Project will generate direct and indirect greenhouse gas emissions during both construction and operation; however, it is expected to produce an additional 200 GWh of energy per year compared to the current scheme. Over the Project's lifetime, the emissions avoided through this additional generation are projected to be significantly greater than those produced during construction and operation, even when accounting for the expected decline in the National Electricity Market (NEM) emissions factor.

2.1.7 Construction schedule

Proposed timetable

Construction of the Project is expected to take about six years. Key milestones include:

- Establishment of tunnel portals to commence tunnelling and underground works in Project Year (PY) 1
- Completion of the headrace tunnel and pipeline by PY 5
- Completion of the power station by PY 6.

Construction hours

Subject to workforce availability, standard construction hours will be:

- Above-ground works:
  - 0700 (7 am) to 1800 (6 pm), Monday to Friday
  - 0800 (8 am) to 1300 (1 pm), Saturday
  - No work typically undertaken on Sundays or public holidays
- Underground works (and associated support activities):
  - 24 hours per day, 7 days a week.

If the number of locally based workers is lower than anticipated, non-standard construction hours—including Saturday afternoons, Sundays, and public holidays—may be required for some or all above-ground works, as well as underground works, to align with fly-in fly-out (FIFO) interstate workforce rosters.

Some non-standard hours may also be necessary to accommodate deliveries affected by transport restrictions.

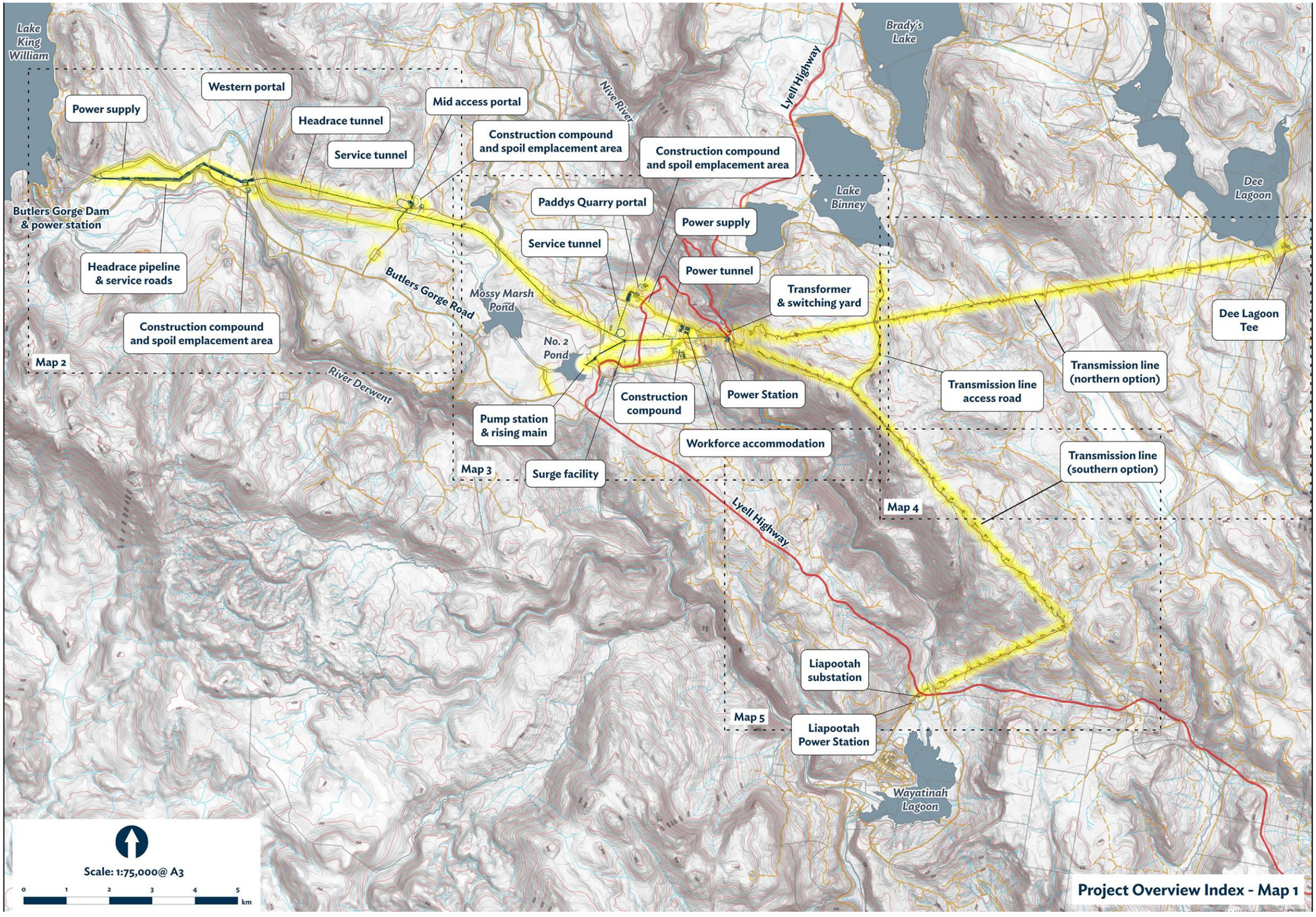
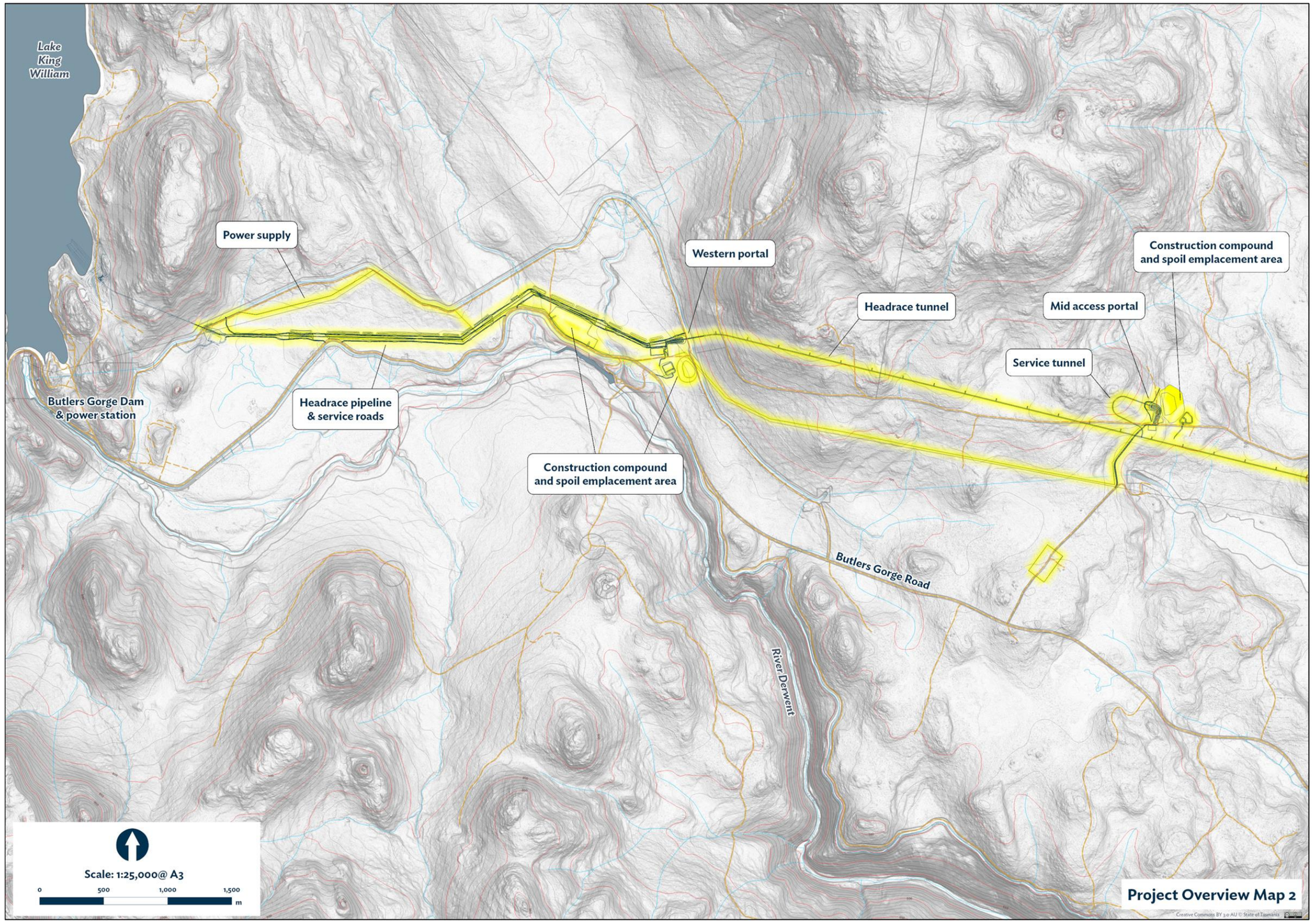
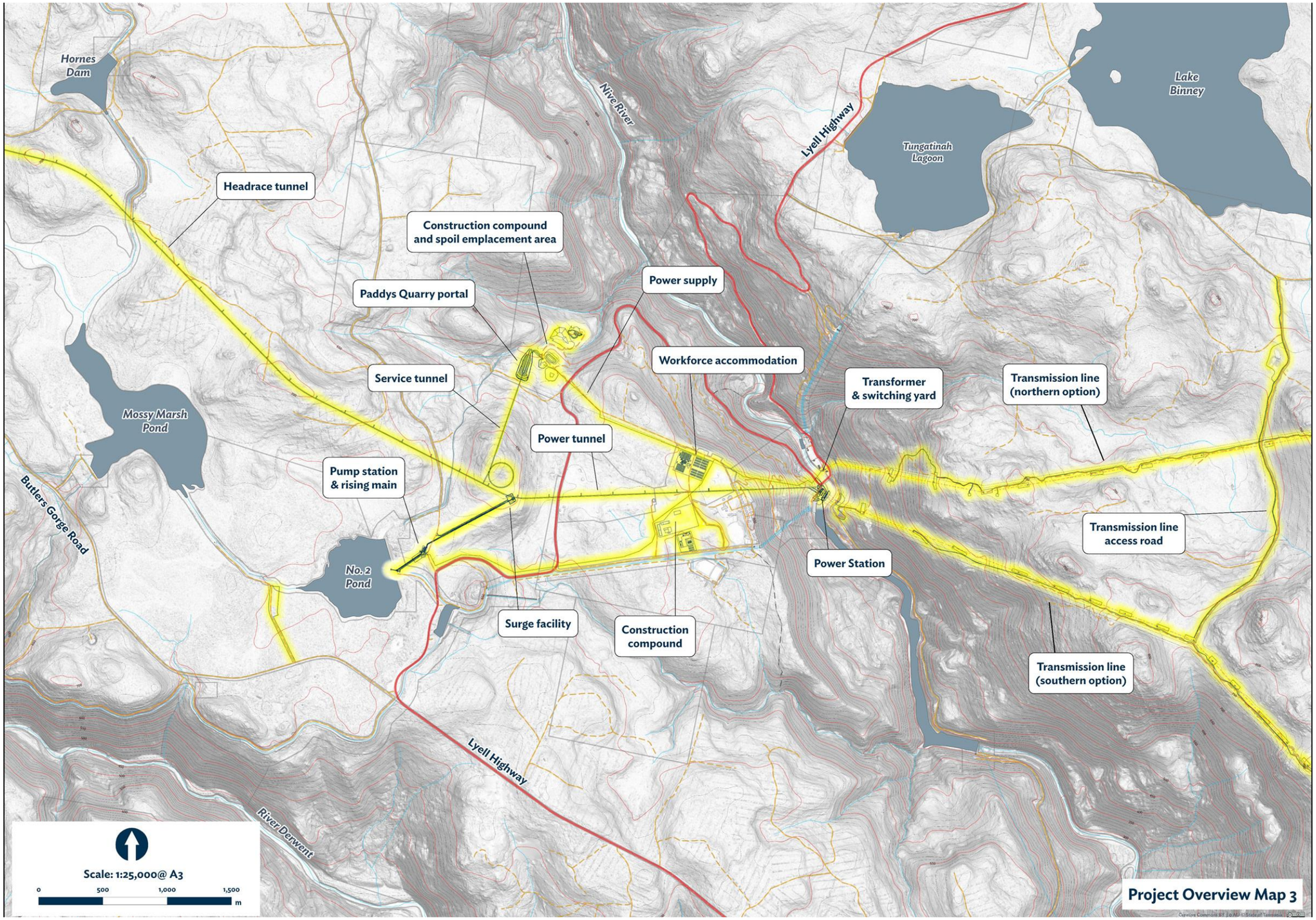


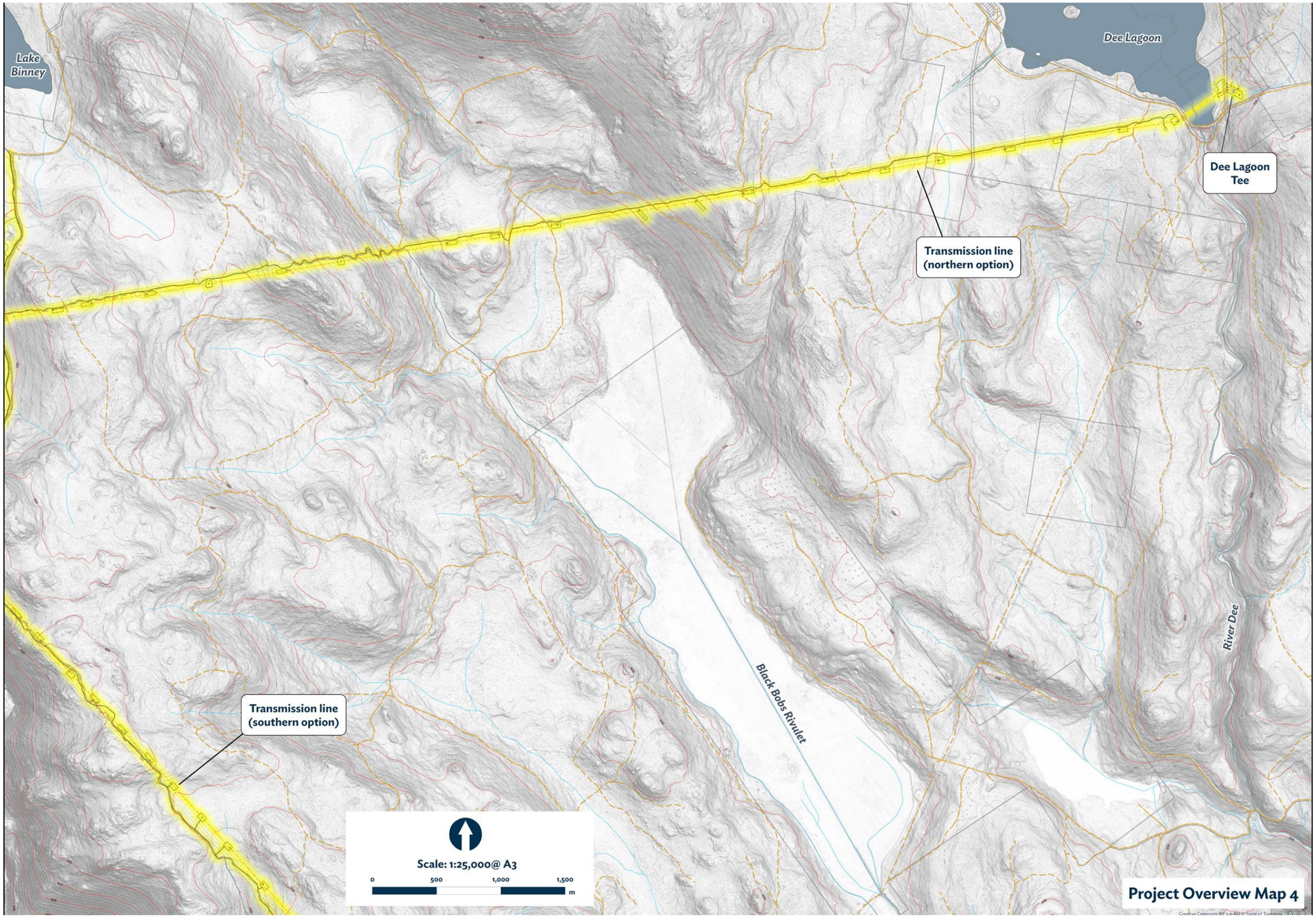
Figure 2.1: Tarraleah Redevelopment Project outline



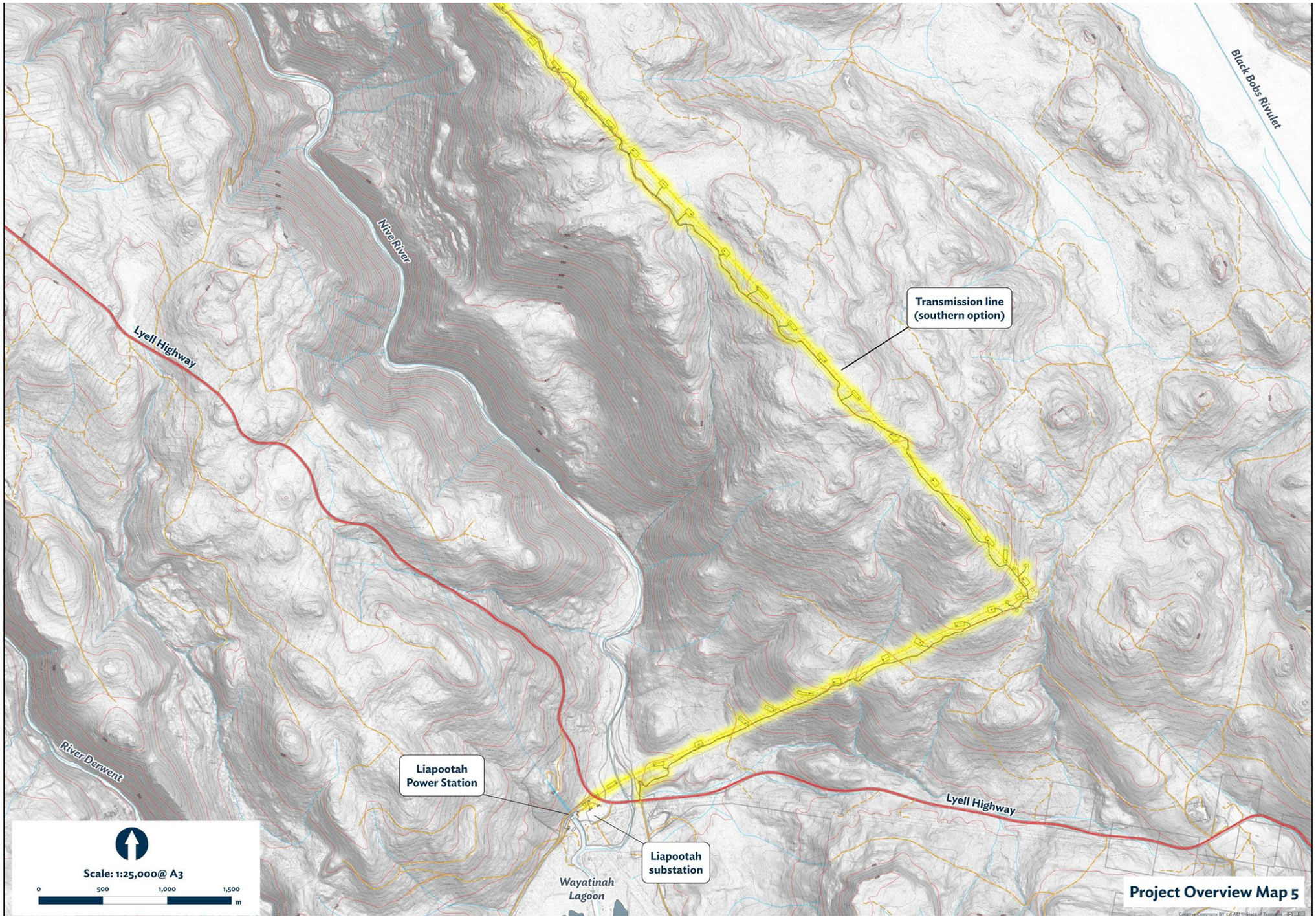
Tarraleah Redevelopment Project outline (Map 2)



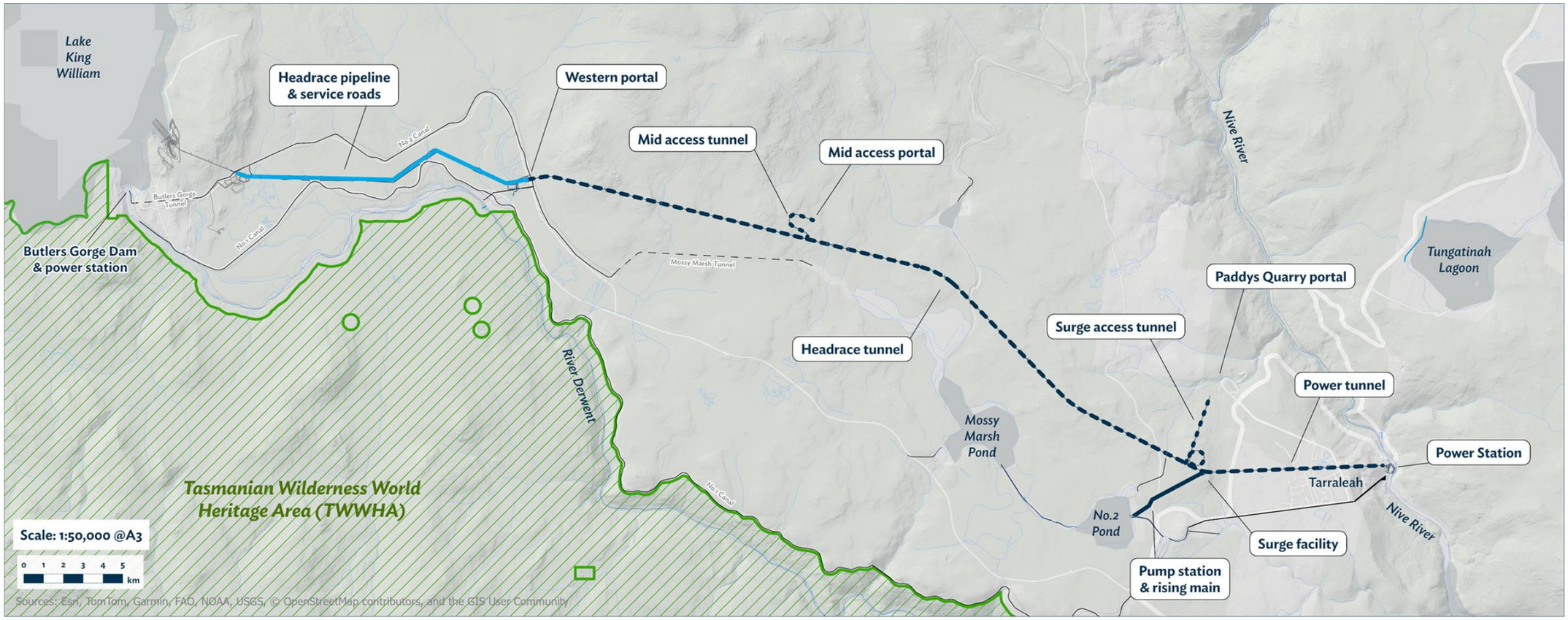
Tarraleah Redevelopment Project outline (Map 3)



Tarraleah Redevelopment Project outline (Map 4)



Tarraleah Redevelopment Project outline (Map 5)



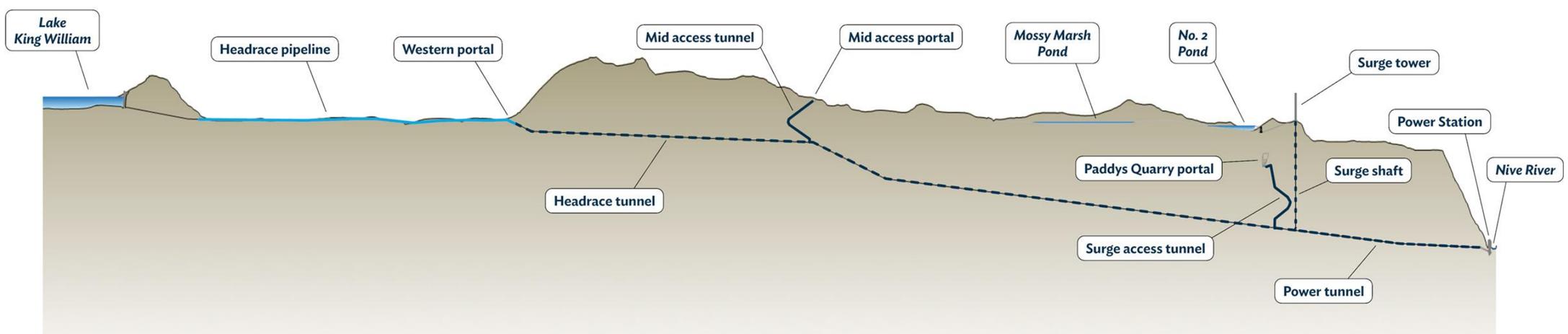


Figure 2.2: Tarraleah Redevelopment Project cross section

2.2 Project land and footprint

2.2.1 Project land area

The Project area includes all land on which the Project will occur. It intersects 50 cadastral parcels, summarised below and shown in Figure 2.3.

From the start of the headrace pipeline at the Lake King William tunnel through to the new power station site, there are 30 parcels:

Project section	Landowner	Properties intersected by the Project (CID Number)
Start of the headrace pipeline at Lake King William through to the new power station site (30 parcels)	Hydro Electric Corporation	• CID1156123 • CID1446578 • CID1446579 • CID1156135 • CID1156127 • CID1156124 • CID1297596 • CID964259 • CID1297594 • CID964243 • CID964209
	Sustainable Timber Tasmania	• CID1156113 • CID1190172 • CID1190358 • CID964164 • CID1296945 • CID1190043 • CID1154528
	Parks and Wildlife Service	• CID964253 • CID1297597
	Central Highlands Council (Fourteen Mile Road)	• CID1109452 • CID1443380
	Tarraleah Village Holdings Pty Ltd subsidiary of Hydro-Electric Corporation and formerly named Woolnorth Bluff Point Holdings Pty Ltd)	• CID1296889 • CID1296890 • CID1296900 • CID1296899
	Crown Land (Lyell Highway)	• CID1296901 • CID1297598 • CID1297595
	Private Ownership	• CID1247309

Project section	Landowner	Properties intersected by the Project (CID Number)
Northern transmission line option - from Tungatinah Switchyard to Dee Lagoon (10 parcels)	Hydro Electric Corporation	• CID964169 • CID964165
	Sustainable Timber Tasmania	• CID1154526 • CID1190043 • CID1314177 • CID1314178 • CID964191 • CID987915
	Crown Land (reserved road)	• CID1314185 • CID987931
Southern transmission line option - from Tarraleah Switchyard to Liapootah Substation (11 parcels)	Hydro Electric Corporation	• CID1154530 • CID1154529 • CID1154531
	Sustainable Timber Tasmania	• CID1154526 • CID1190043
	Central Highlands Council (Wayatinah Road)	• CID946359
	Crown Land	• CID985910 (onshore water body) • CID984280 • CID1020586 (Lyell Highway) • CID1154552 (Lyell Highway)
	TasNetworks	• CID1417048

2.2.2 Project footprints

2.2.2.1 Land disturbance footprint

Within the Project area, a disturbance footprint has been defined (Figure 2.4) to capture all land that may be physically disturbed during construction. The disturbance footprint is 441.2 ha if the southern transmission line option is selected and 410.5 ha if the northern transmission line option is selected. The disturbance footprint excludes areas used for the Project that will not be physically disturbed, such as existing transmission line easements incorporated into the new easement, or continued use of existing Tarraleah hydropower scheme elements like sections of No. 2 Canal.

The disturbance footprint represents the maximum potential area of land disturbance, allowing for refinement of the Project's design and construction methods. It has been developed from the Project's reference design and construction methodology. Hydro Tasmania plans to deliver the Project using an EPC contracting model, with design and construction methods to be further refined before work begins (refer Section 1.2.3). The actual area disturbed is expected to be smaller but will remain within the defined disturbance footprint.

2.2.2.2 Operational footprint

The disturbance footprint covers both land needed for permanent infrastructure and land used only for construction. The operational footprint is 113.5 ha if the southern transmission line option is selected and 114.5 ha if the northern transmission line option is selected. Areas not required for permanent infrastructure will be progressively rehabilitated during and after construction. Land required for permanent infrastructure will not be rehabilitated and forms the Project's operational footprint (Figure 2.5).

2.3 Socio-economic context

The Project is located away from major towns in an area with very low population density. Approximately nine private residences are within 1 km (direct line) of the Project area, situated near Dee Lagoon and the northern transmission line option.

The small settlements and localities of Tarraleah, Wayatinah, Bronte Park, Dee, Bradys Lake, and London Lakes are all within a 30-minute drive of the Project area. In 2021, none of these localities had a permanent population exceeding 50 people. Consultation feedback and anecdotal evidence indicate populations increase significantly during trout fishing season and over the summer months.

Many of these localities originated during the development of hydropower in the region and are culturally significant. They are associated with lakes such as Lake King William, Wayatinah and Tungatinah Lagoons, Lake Binney, Bradys Lake, and Bronte Lagoon, which are now valued for recreational fishing and other nature-based activities.

Ouse, located about 30 minutes by road southeast of Tarraleah Village, is the closest service centre to the Project area. It offers basic amenities including a general store, hotel, and community centre, and had a 2021 population of 326 people.

The regional setting includes the local government areas (LGAs) of Central Highlands and Derwent Valley, with a combined 2021 population of 13,462—most in the Derwent Valley LGA.

The Central Highlands LGA is predominantly rural with a small, ageing population. Agriculture, forestry, and fishing are key industries, with tourism—particularly eco-tourism and heritage-related activities—playing a growing role. The area faces socio-economic challenges linked to low population density, an ageing demographic, and limited employment opportunities. Skilled worker recruitment and retention are constrained by limited housing, distance from peri-urban areas, lack of public transport, and restricted access to services, especially health services.

The Derwent Valley LGA has a more diverse economy, including agriculture, manufacturing, and health care, with manufacturing making a significant economic contribution; however, the area experiences high unemployment and a skills gap that hampers growth. Similar to the Central Highlands, the population has low educational attainment, affecting job prospects. Many residents face economic hardship, with median incomes below the state average.

Refer to Section 5.9 and Section 5.16 for further information.

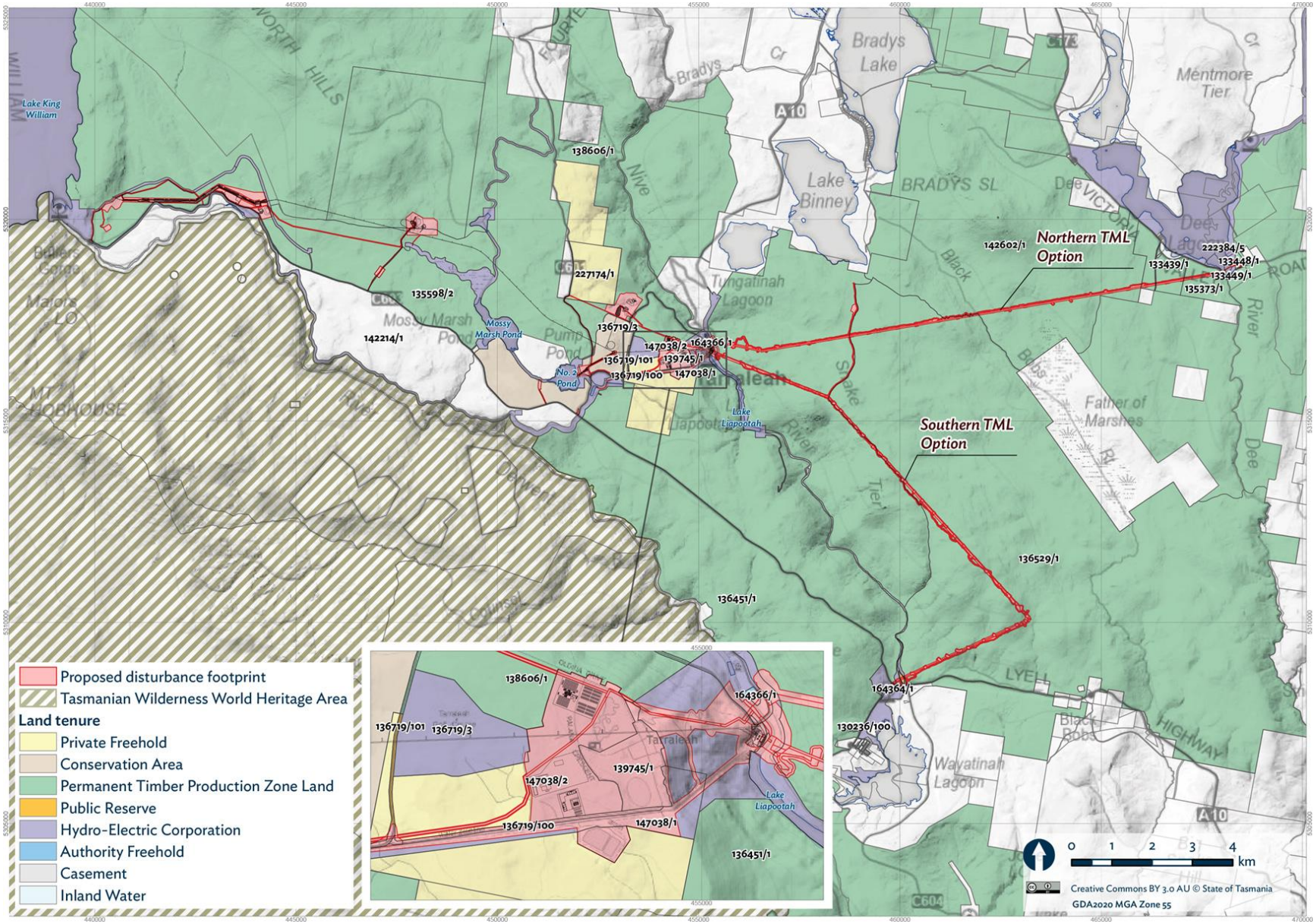


Figure 2.3: Tarraleah Redevelopment Project area and associated land tenure

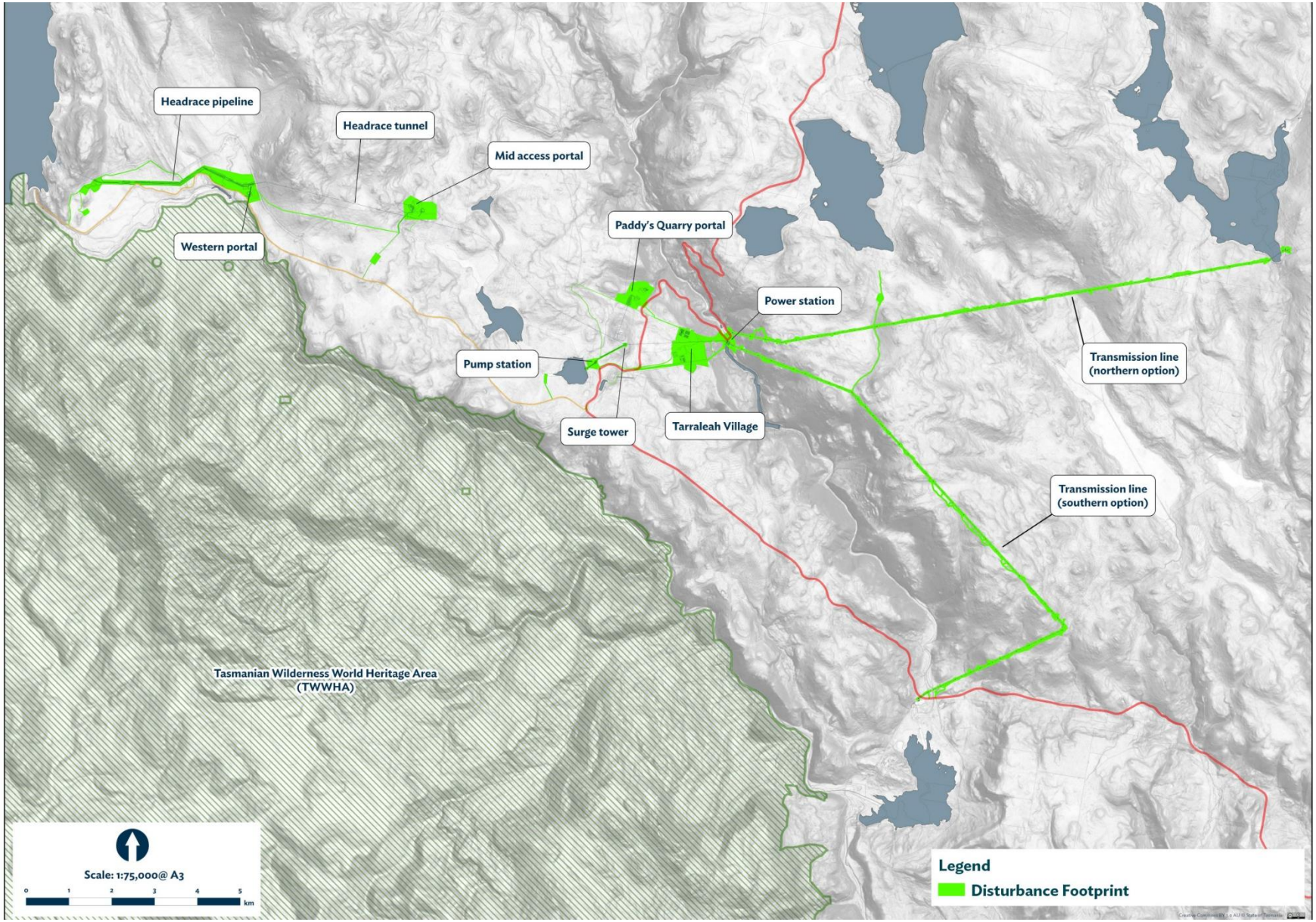


Figure 2.4: Tarraleah Redevelopment Project disturbance footprint

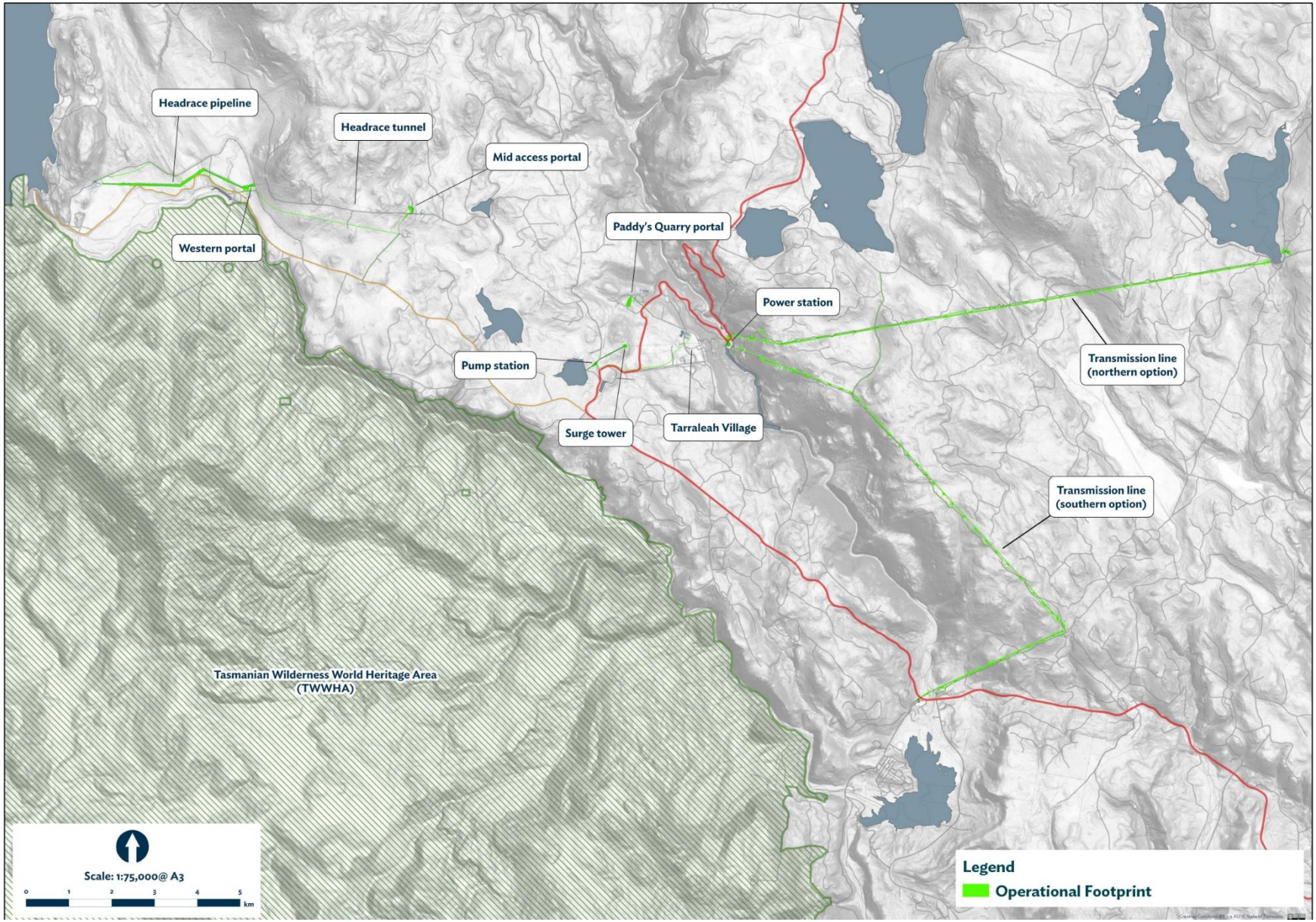


Figure 2.5: Tarraleah Redevelopment Project operational footprint

2.4 Detailed description of the Project

2.4.1 Project components

The permanent components to be constructed as part of the Project (as shown in Figure 2.1) are described below.

2.4.1.1 Tunnel portals

To commence tunnelling, access points (portals) will be excavated. The Project requires up to four portals (Figure 2.6):

- **Western (headrace tunnel access) portal**: Located below the No. 2 Canal at the Derwent Pumps discharge point. If a tunnel boring machine (TBM) is used, this portal is likely to serve as the TBM launch site.
- **Mid access portal**: Located off Butlers Gorge Road, providing for tunnelling from multiple concurrent headings and future maintenance access to the headrace and power tunnels.
- **Paddy's Quarry portal:** May be required depending on the tunnelling method adopted by the EPC Contractor. If used, this portal will provide access to the headrace and power tunnels and the surge connection chamber.
- **Power station portal**: Located at the entrance to the existing Tarraleah Power Station, with a bridge over the portal to maintain access to the power station. Spoil from this portal will be trucked via the Lyell Highway to the Paddy's Quarry spoil emplacement area, as no emplacement area will be located at the power station.

The headrace pipeline will connect to the downstream Lake King William tunnel portal, currently under construction as part of Hydro Tasmania's Tarraleah Upgrade Works Project.

Each portal will generally include an access road, spoil emplacement areas, and a galvanised steel gate to prevent unauthorised access. During construction, temporary facilities such as laydown areas, water treatment facilities, maintenance workshops, and site offices/amenities may also be located at the portals.

2.4.1.2 Headrace pipeline

The headrace pipeline will continue the pressurised water conveyance from the Lake King William intake, constructed under the Tarraleah Upgrade Works Project. It will connect to the Lake King William tunnel approximately 100 m upstream of the downstream tunnel portal and terminate about 155 m into the headrace tunnel (Figure 2.7). The transition from pipeline to tunnel occurs at a local high point. The pipeline will be approximately 4.2 km long, 4 m in diameter, and designed for a discharge of 61 m^3/s.

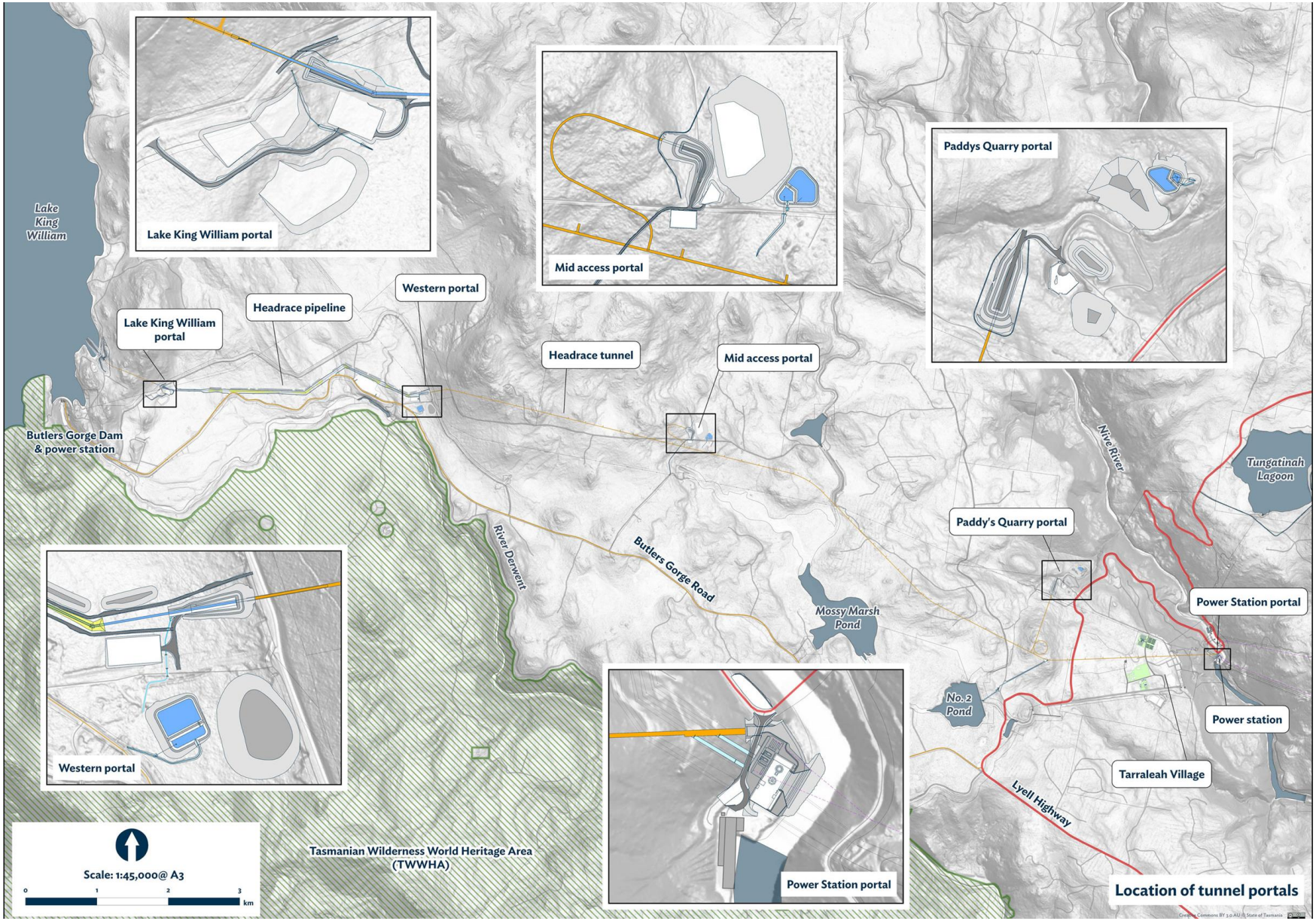


Figure 2.6: Location of tunnel portals

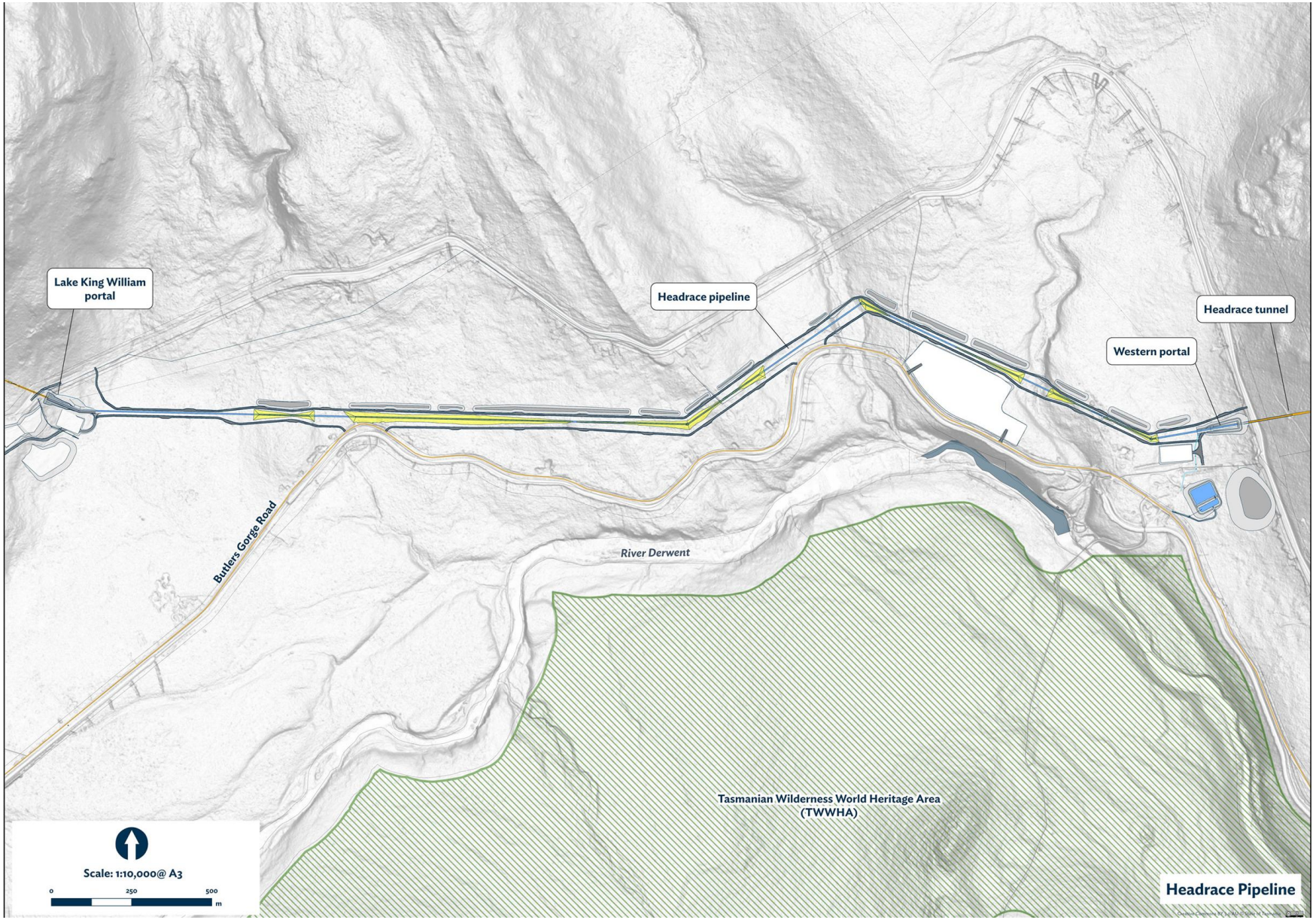


Figure 2.7: Headrace pipeline

Subject to topography, the pipeline will be installed in a trench (either partially or wholly) with some elevated sections across lower-lying areas (Figure 2.8). Above-ground sections will be supported on plinths with shallow footings or pile foundations, depending on ground conditions. Four bends along the alignment will require reinforced concrete thrust blocks or plinths.

The pipeline will generally comprise interconnected GRP sections, delivered in 12 m lengths. Air relief valves will be installed at high points, and scour/dewatering valves at low points, along with drainage works to dissipate residual pressure and return water to existing waterways.

Steel sections will be installed at each end of the headrace pipeline—within the Lake King William and headrace tunnels—to connect to the tunnels and mitigate losses from low topography (Figure 2.8). The pipeline will connect to the tunnels via a mechanical flange coupling to a pipe section embedded in the tunnel plug, with space provided within the tunnel envelope for personnel access.

A removable pipeline section will be located near the Lake King William tunnel connection to allow future access. Additional personnel access for maintenance and inspection will be provided via removable bulkheads at each air valve.

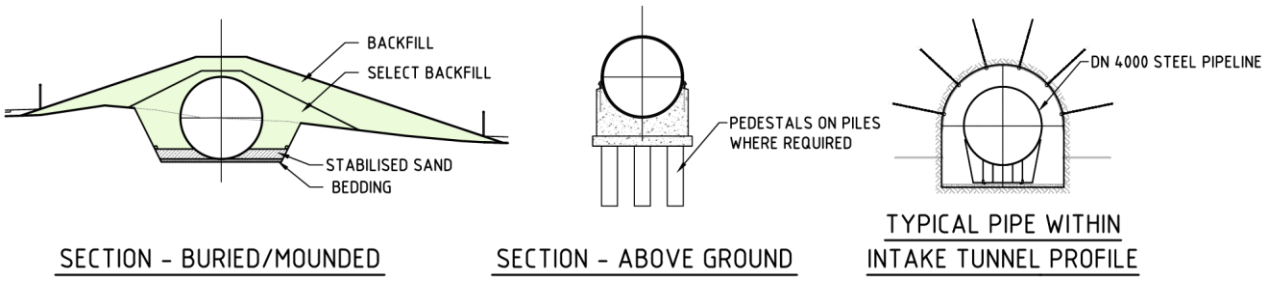


Figure 2.8: Typical pipeline arrangements

2.4.1.3 Water conveyance and access tunnels

The Project will include approximately 12 km of pressurised water conveyance tunnels linking the headrace pipeline to the power station. These consist of:

- **Headrace tunnel**: 9.55 km long, with a horseshoe profile measuring 6 m wide by 6.25 m high (Figure 2.9a and Figure 2.9b). This nominally unlined, low-pressure tunnel begins at the downstream end of the headrace pipeline and carries water to the power tunnel at the surge shaft offtake. Between the headrace tunnel portal and the mid-access tunnel portal, the tunnel depth will reach approximately 190 m below ground level, increasing to about 270 m as it approaches the surge facility and the power tunnel interchange.
- **High-pressure power tunnel**: 2.29 km long and 4 m in diameter (Figure 2.9c), partly concrete- and steel-lined, with the steel section providing impermeability to control water leakage. This tunnel transfers water from the headrace tunnel to the power station penstocks, with a bifurcation (distributor) dividing the flow into the penstocks. It will reach a maximum depth of about 273 m near the surge facility, then rise to about 17 m below ground at the power station entrance. The headrace and power tunnels will form a continuous tunnel.
- **Steel penstocks**: Two penstocks, each 0.20 km long and 2.8 m in diameter, will be encased within separate adit tunnels, connecting the power tunnel distributor to the main inlet valves and turbines.

Depending on the construction method, service tunnels (0.73 km long, arched profile 5.5 m wide by 6.25 m high) will be built from the mid-access and Paddy's Quarry portals to provide additional access to the headrace and power tunnels during construction. The Paddy's Quarry service tunnel will also access the surge connection chamber. The mid-access service tunnel will connect to a surge pond at its portal, functioning as a secondary surge facility during operation.

The headrace tunnel will initially pass through a short section of Triassic sedimentary sandstone before entering the Jurassic dolerite sill that extends from the Wentworth Hills to the Nive River Valley, where all other tunnels will be located. Tunnels will generally be unlined, with a steel liner only where the power tunnel exits the hillside into the Nive Valley. Grouting may be required to control water ingress during construction and water egress during operation.

All unlined tunnels (headrace, mid-access, and Paddy's Quarry) will have a concrete pavement at the invert to improve maintenance access, reduce head loss, and prevent mobilisation of material during commissioning, operations, and dewatering. Ground support will include shotcrete and rock bolts, with heavier support—such as steel sets and canopy tubes—used where ground conditions require. Reinforced concrete rock traps will be located immediately downstream of each access tunnel intersection, and in the headrace and power tunnels, to capture rocks or spalled concrete before they reach the turbines.

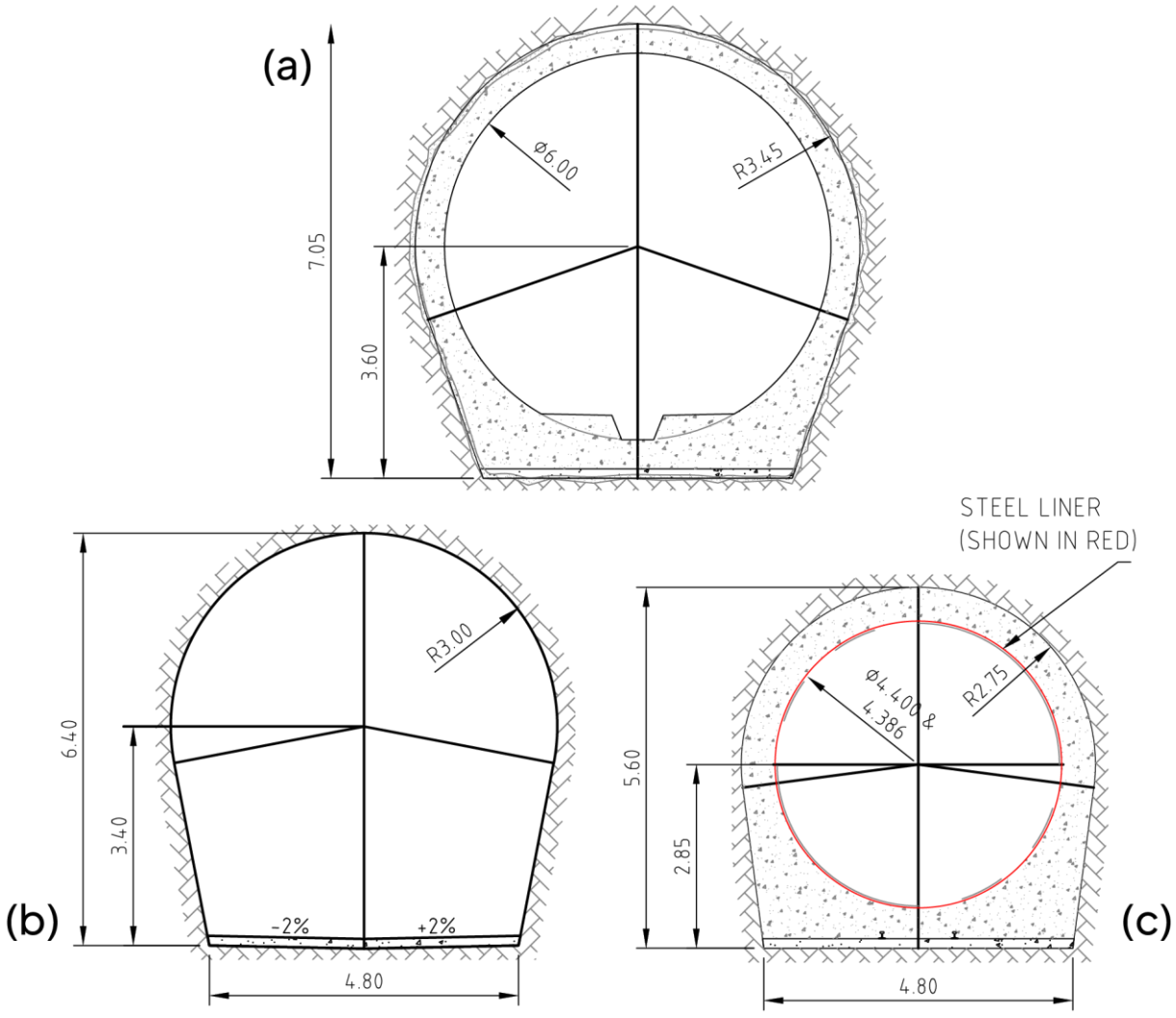


Figure 2.9: Typical water conveyance tunnel cross sections a) TBM, b) drill-and-blast and c) steel lined

2.4.1.4 Surge facility

A surge facility will be constructed on the hilltop directly west of Tarraleah Village. The location has been selected to minimise the height of the surge tower while maintaining close enough proximity to the power station for efficient operation (Figure 2.10 and Figure 2.11). Positioned directly above and between the headrace and power tunnels, the facility will include:

- **Surge shaft**: Approximately 265 m deep and 5 m in diameter, directly connected to the headrace tunnel via a connection chamber at its base. The shaft will be excavated into basalt and Jurassic dolerite, lined with shotcrete at depth if required, and steel-lined for approximately the top 50 m.
- **Surge tower**: Constructed from welded 3 m high steel sections, 14 m in diameter, to a total height of about 70 m. The tower will be finished in silver paint and will also receive water from No. 2 Pond via a rising main from the pump station.
- **Connecting adit (connection chamber)**: Links to the headrace tunnel to enable raised-bore development and construction of an orifice connection to help regulate surge flows.

The surge facility will manage sudden fluctuations in water pressure by collecting water when pressure is high and releasing water when pressure is low, thereby improving the operational stability of the water conveyance tunnels.

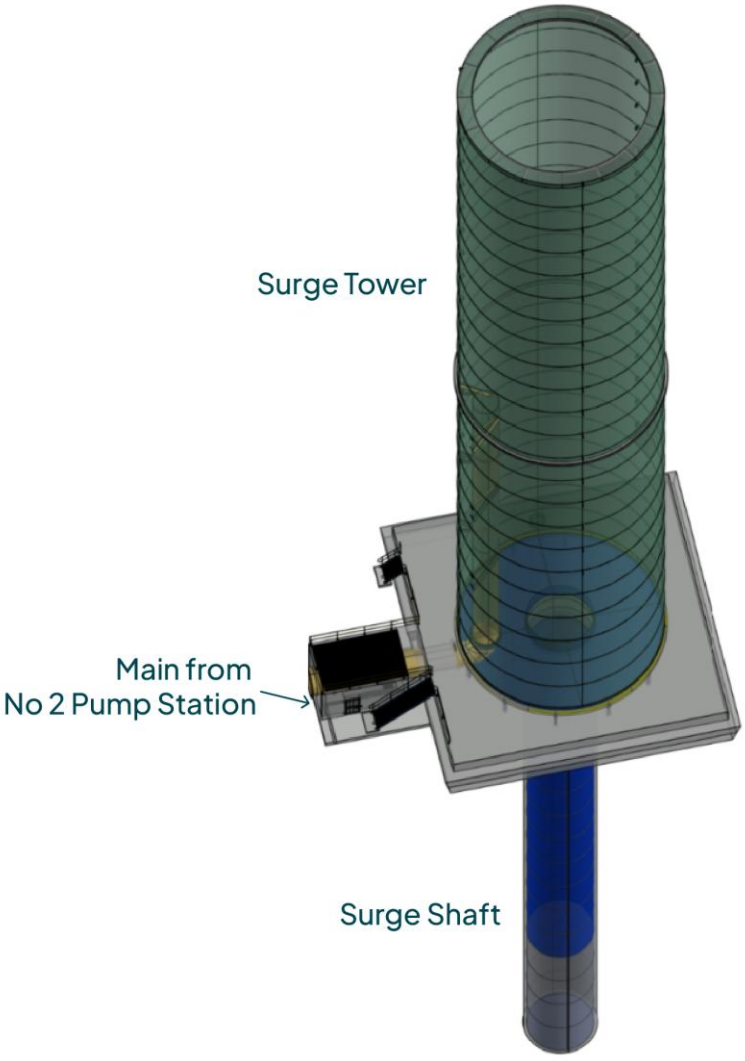


Figure 2.10: Surge shaft and tower

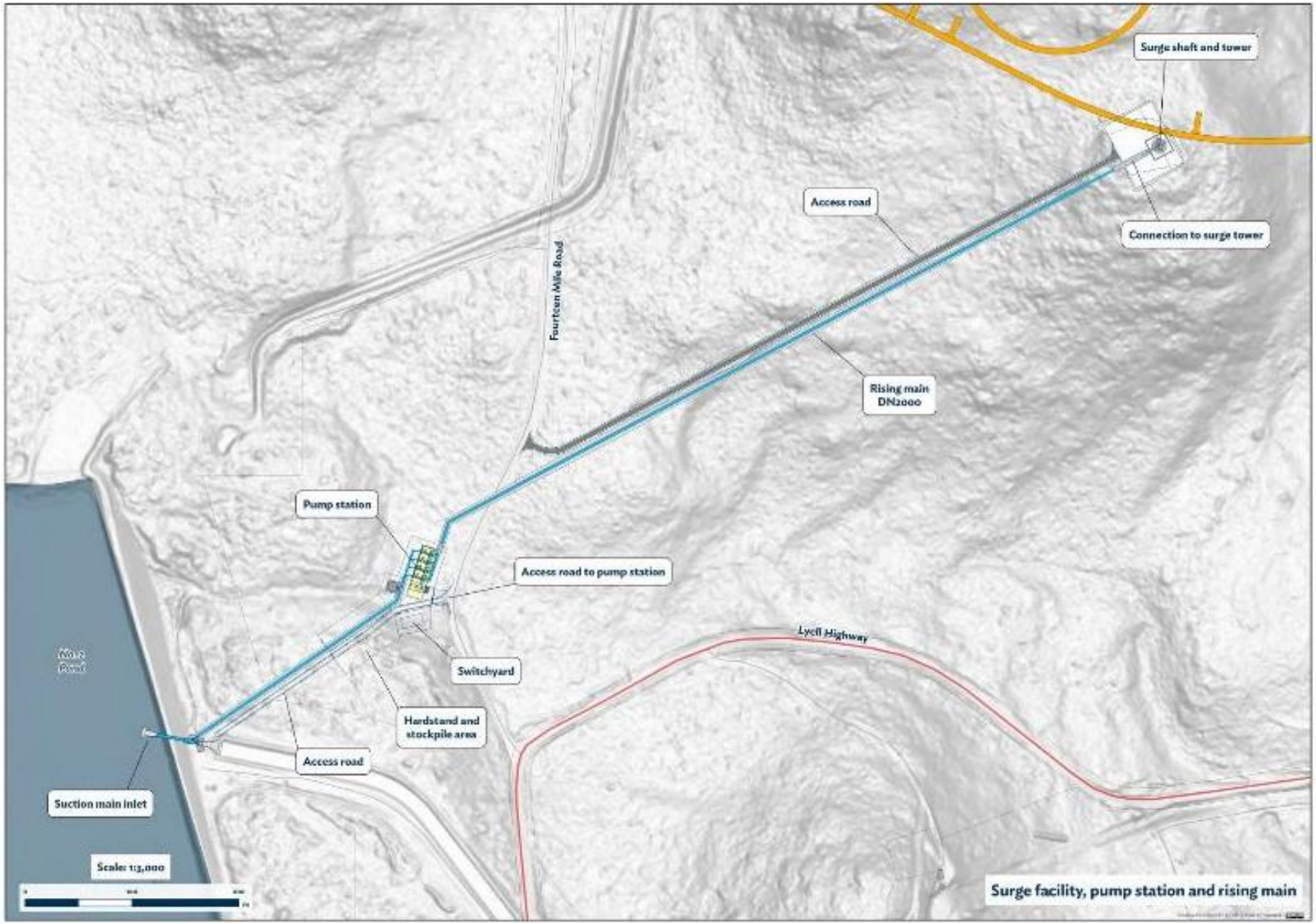


Figure 2.11: Layout of surge facility, pump station and rising main

2.4.1.5 Pump station and rising main

The Project will retain the No. 2 Canal downstream of Derwent Pumps, with water in this conveyance captured via a pump station and rising main connecting No. 2 Pond to the base of the surge tower.

The pump station will be located off Fourteen Mile Road near No. 2 Pond. During operation, it will supplement water supplied from Lake King William by drawing from the catchments feeding No. 2 Pond, thereby reducing the volume required from the lake. When the scheme is not operating, the pump station will enable water from No. 2 Pond to be pumped via the surge shaft connection chamber to the headrace tunnel and pipeline, returning it to Lake King William.

The pump station facility (Figure 2.11) will include:

- **Suction main inlet**: Integrated into the No. 2 Pond outlet and connected to the pump station.
- **Pump station building**: Housing three parallel pump sets with variable speed drives, capable of pumping up to 6 m^3/s via the rising main to the surge facility (Figure 2.12). The building will feature an above-ground superstructure with a below-ground concrete substructure, steel framing to support an internal crane, steel sheet and/or precast concrete walls, and a steel roof. Vegetation screening will be maintained between the station and Fourteen Mile Road.
- **Rising main**: A 0.8 km pipeline from the pump station to an inlet in the surge tower, running adjacent to the surge tower access road. Constructed from nominally 12 m GRP sections, the pipeline will be mostly buried near the pump station, with a section crossing Fourteen Mile Road. At its end, a check valve will prevent dewatering of the surge tower in case of a system failure, with the final lengths to the tower inlet made from steel.
- **Ancillary infrastructure**: Including a surge tank, switchyard, hardstand, and other minor structures.

2.4.1.6 Power station

The new power station will be a multi-storey facility located predominantly below ground level on the site of the existing Tarraleah Power Station switchyard, on the western bank of the Nive River. Access will be via the Lyell Highway, shared with the existing power station, which will remain operational until the new facility is fully commissioned.

The building will accommodate:

- **Generating equipment**: Two 90 MW Francis turbines, associated balance-of-plant systems, and control systems (Figure 2.13).
- **Support facilities**: Offices, staff amenities, and an assembly area to enable future machine refurbishment.

To protect against flooding, the power station will be tanked (with a waterproof membrane in walls and floors) to RL 349 AHD. Above this level, the structure will comprise steel framing with cladding. The transformer yard and switchyard will be constructed at final surface level (Figure 2.13, Section 2.4.1.7).

Water discharge will occur via a tail bay excavated into the Nive River channel. This tail bay will:

- Serve both turbine units
- Include a weir at the discharge point to maintain a minimum tailwater level at the turbines
- Ensure permanent submersion of the machines for efficient operation.

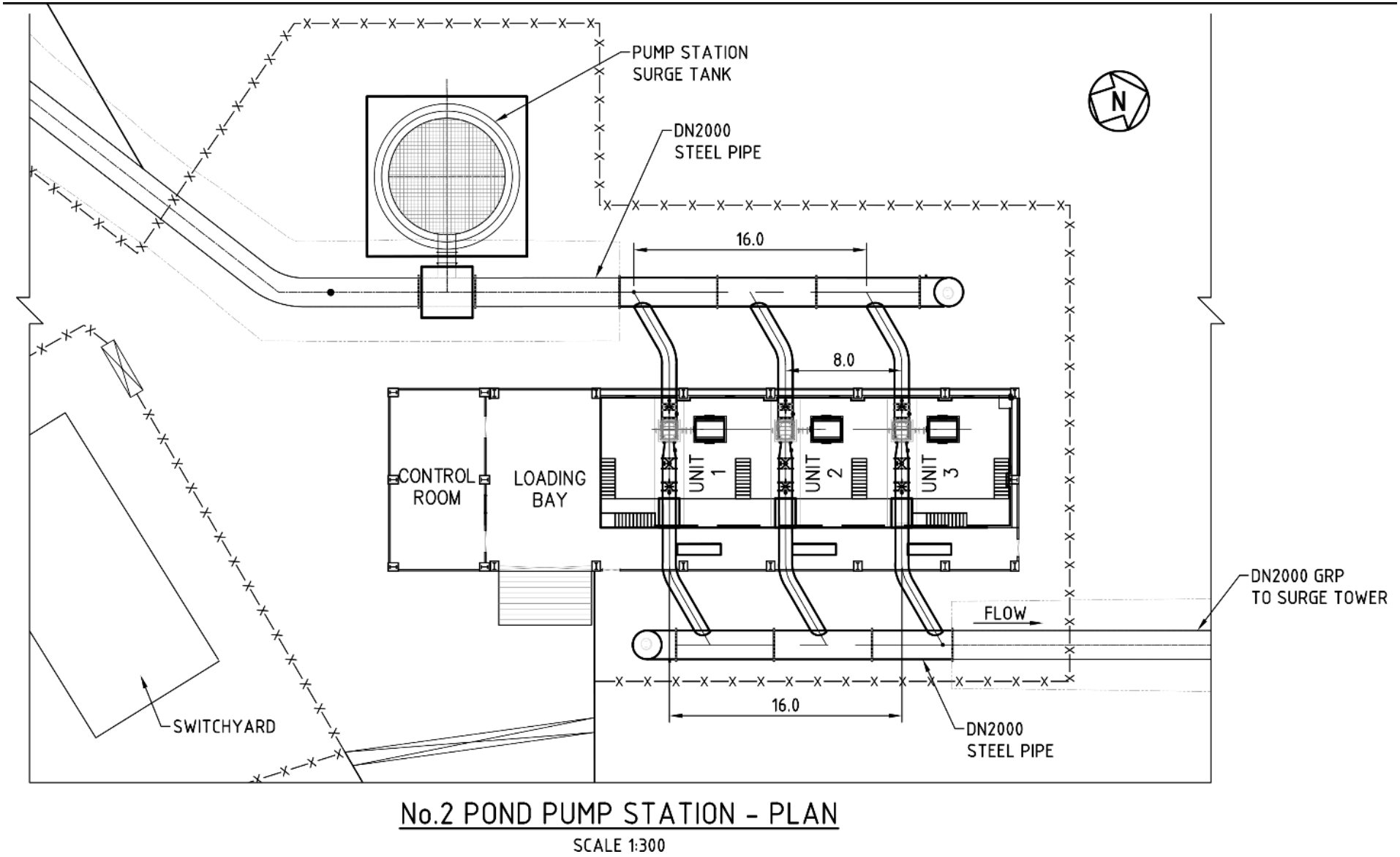


Figure 2.12: Plan of pump station

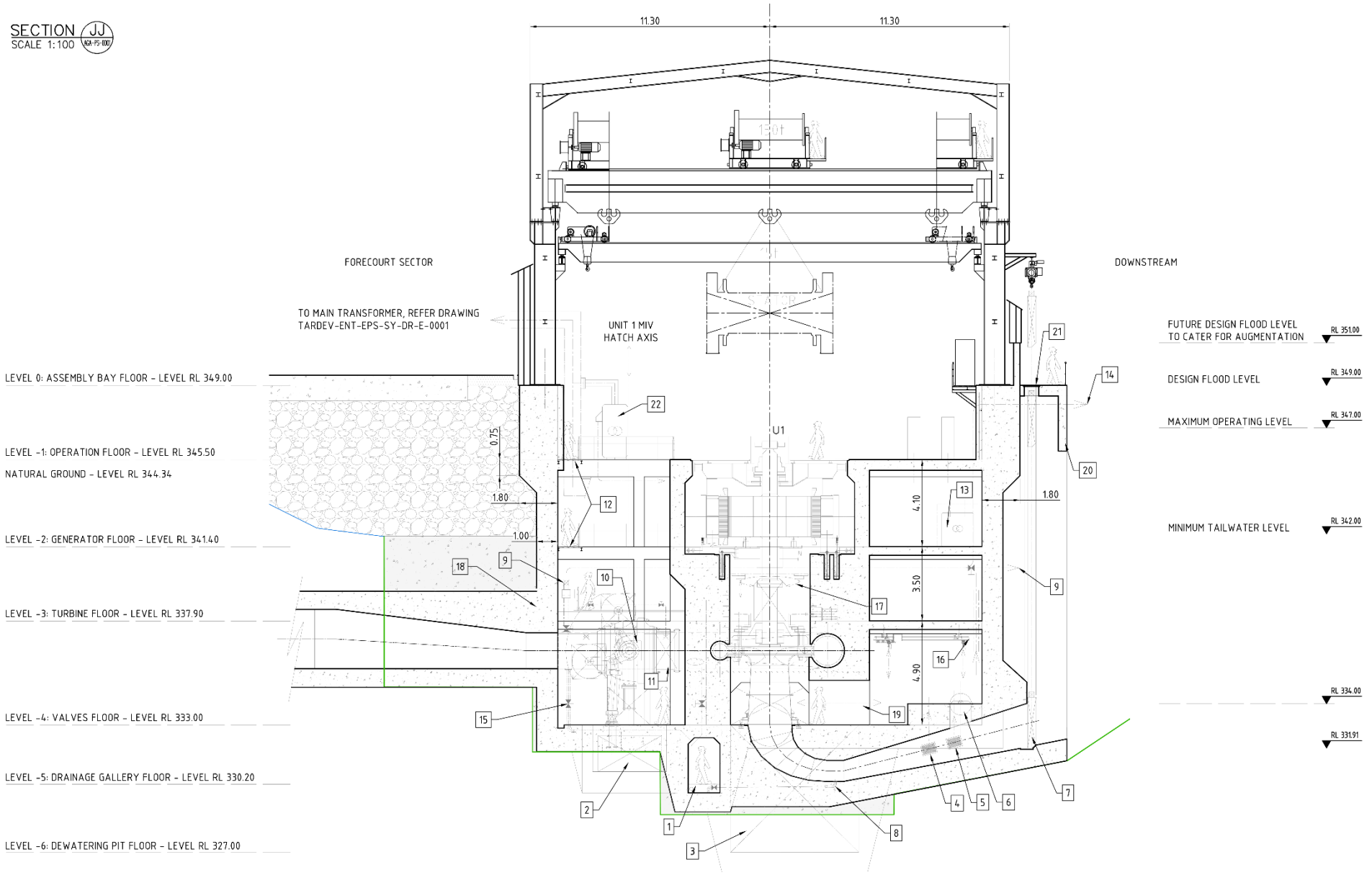


Figure 2.13: Power Station cross section

2.4.1.7 Transformer yard and switchyard

The transformer yard will be located outside the power station building, housing the generator power transformers in separate concrete bunded areas. The bunding will comply with AS 2067 (design and erection of high-voltage installations) and will be designed to prevent spills, ensure fire safety, and protect the surrounding environment.

Key features include:

- **Transformer design**: Outdoor, air-cooled, ester-fluid type with enhanced fire protection, designed to meet Fire Management Global standards.
- **Safety measures**: Each transformer will be in its own fenced and bunded area to prevent unauthorised access and maintain safe approach distances.

Switchyard configuration will depend on the selected transmission line alignment (Section 2.4.1.8):

- **Southern option**: An outdoor, air-insulated 220 kV switchyard located near the generator main power transformers.
- **Northern option**: An indoor, gas-insulated 220 kV switchyard located adjacent to the existing Tungatinah switchyard, replacing the current toilet block between the Tungatinah 110 kV switchyard and Nive River bridge (replacement toilets/rest area to be provided at Tarraleah Village).

In both options, the switchyard will:

- Contain a compact two-bay arrangement with circuit breakers, disconnectors, earth switches, and current/voltage transformers
- Feature gantries that connect the power station to the two 220 kV transmission lines
- Include fencing to prevent unauthorised access
- House protection and control equipment in an electrical protection room within the power station.

As the preferred switchyard option has not been confirmed, the disturbance footprint includes the area required for both configurations.

2.4.1.8 Transmission infrastructure

The new power station will connect to the existing 220 kV network via a double-circuit transmission line from the power station switchyard to either the existing TasNetworks Liapootah–Palmerston transmission line or Liapootah substation (Figure 2.14).

Two route options are under consideration:

- **Tungatinah – Dee Lagoon Tee 220 kV (northern option)**: A 14 km double-circuit transmission line from the proposed Tungatinah 220 kV substation, connecting via a direct tee to the existing Liapootah–Palmerston line at Dee Lagoon. Key features include:
  - **Alignment:** Runs alongside the existing 110 kV transmission lines
  - **Easement:** Nominal extension of 30 m required
  - **Structure:** Steel lattice towers up to 52 m high.
- **Tarraleah – Liapootah 220 kV (southern option)**: A 15 km double-circuit transmission line from the proposed Tarraleah 220 kV switchyard to the existing Liapootah 220 kV substation. Key features include:
  - **Alignment:** Parallel to the existing 110 kV transmission easement.
  - **Easement:** Nominal extension of 30 m required.
  - **Structure:** Concrete poles up to 52 m high.

In addition, a short 0.3 km double-circuit connection will link the switchyard to the Tungatinah 220 kV substation. Key features include:

- **Structure:** Steel poles within the existing easement.
- **Works:** Rationalisation of the existing 110 kV lines to allow space for the new 220 kV lines.

As the preferred alignment has not yet been confirmed, the disturbance footprint allows for both the northern and southern options.

2.4.1.9 Power supply

Power will be supplied to the western portal, mid-access portal, Paddy's Quarry portal, pump station, surge tower and power station sites by extending the local 22 kV distribution network from Hydro Tasmania or TasNetworks lines (Figure 2.15). Supply will be established at the start of construction and maintained during operation. If a TBM is used, additional power will be required for its operation. New lines may be overhead or underground and will be built to TasNetworks standards, with key features including:

- **Pole heights:** 10–13 m.
- **Conductors:** 16.25 mm diameter aluminium for the backbone and 9 mm diameter aluminium alloy for the spurs.
- **Earth/optic wire:** No earth wire or optical ground wire (OPGW); most locations will have 10.5 mm all dielectric self-supporting (ADSS) optic fibre beneath live conductors.
- **Easement width:** Typically 12 m, up to 20 m.
- **Raptor protection:** Large deltas (three-wire configuration) with steel crossarms where surrounding vegetation is shorter than poles, reducing electrocution risk from bridging conductors.
- **TasNetworks-owned extensions:** Large delta construction with fibreglass crossarms on all poles, and concrete-fibreglass poles where pole-mounted equipment is used.

2.4.1.10 New and upgraded access roads

New and upgraded access roads will be constructed to enable construction and long-term operation of the Project (Figure 2.16). These will include:

- **New roads:**
  - Service roads on either side of the headrace pipeline to support future operational requirements
  - An access road from Fourteen Mile Road to the surge tower, sharing the same alignment as the rising main from the pump station. The entry point will be secured by a road closure gate and/or security fence
  - An access road from Fourteen Mile Road to the pump station
  - An access road from Butlers Gorge Road to the mid-tunnel access portal.
- **Upgraded roads:**
  - Minor modifications to Fourteen Mile Road to allow large vehicle access to the pump station and surge tower access roads
  - Upgrade of the No. 2 Canal access road to provide permanent access from Butlers Gorge Road to the western portal and headrace pipeline service roads
  - Upgrades and extensions to existing access tracks along the transmission line alignment (within the existing easement) to reach new structure locations. Several new tracks will be built to access poles in steep terrain near Tarraleah.

Permanent roads will be designed and built in accordance with the *Tasmanian Municipal Standards* (Local Government Association Tasmania, December, 2020) for unsealed rural roads, with a nominal unsealed pavement width of 5.5 m.

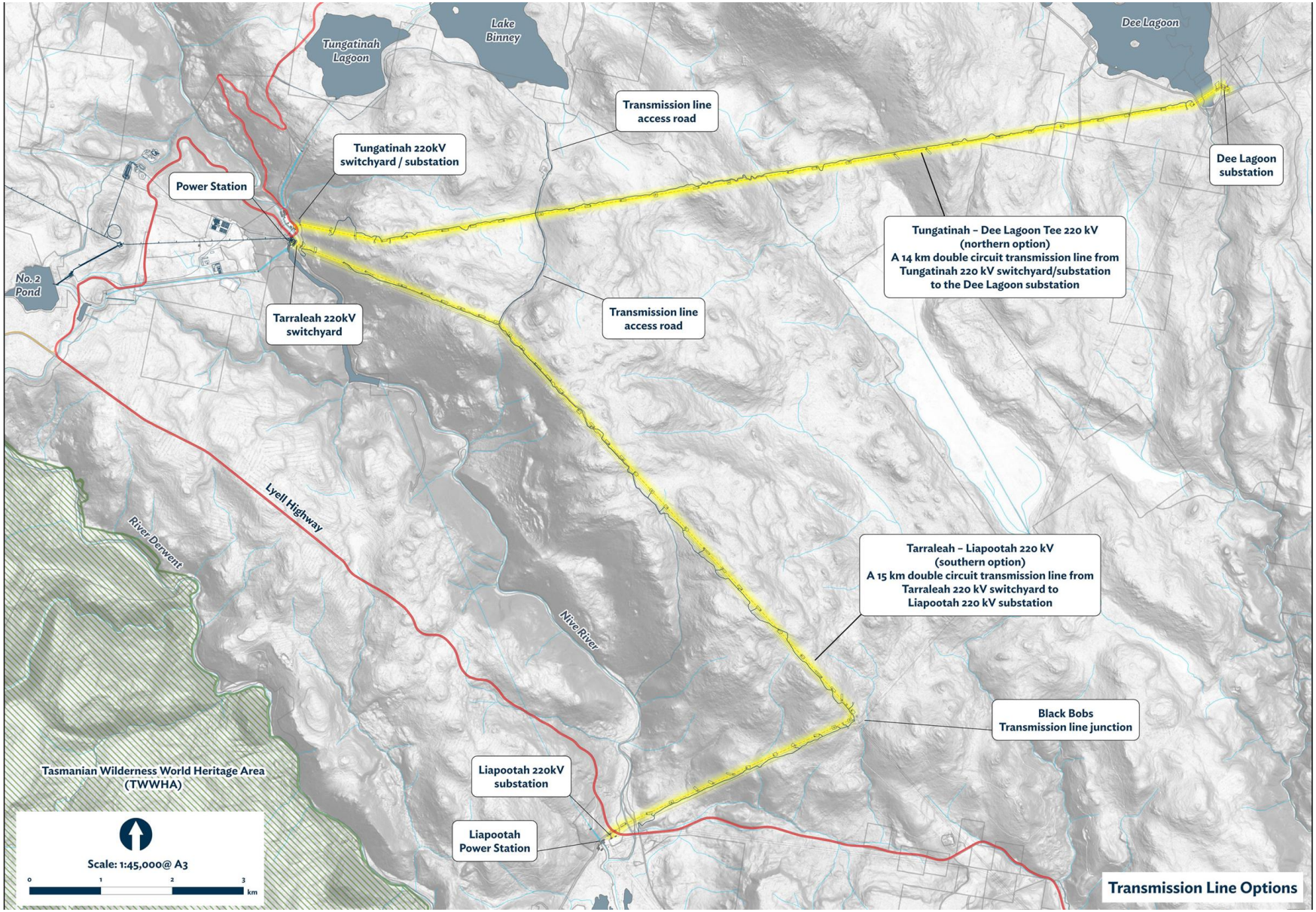


Figure 2.14: Northern and southern transmission line options

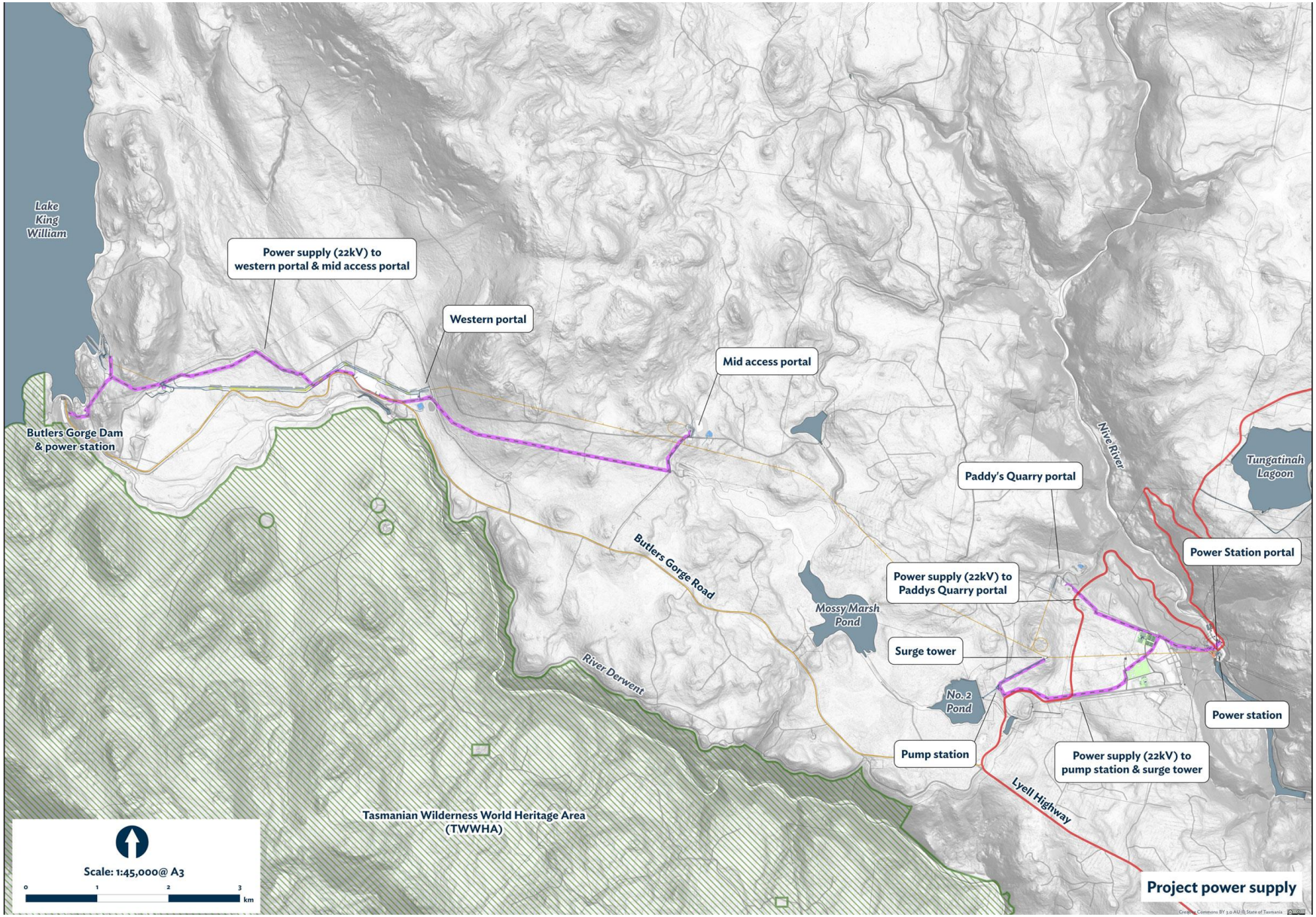


Figure 2.15: Tarraleah Redevelopment Project power supply

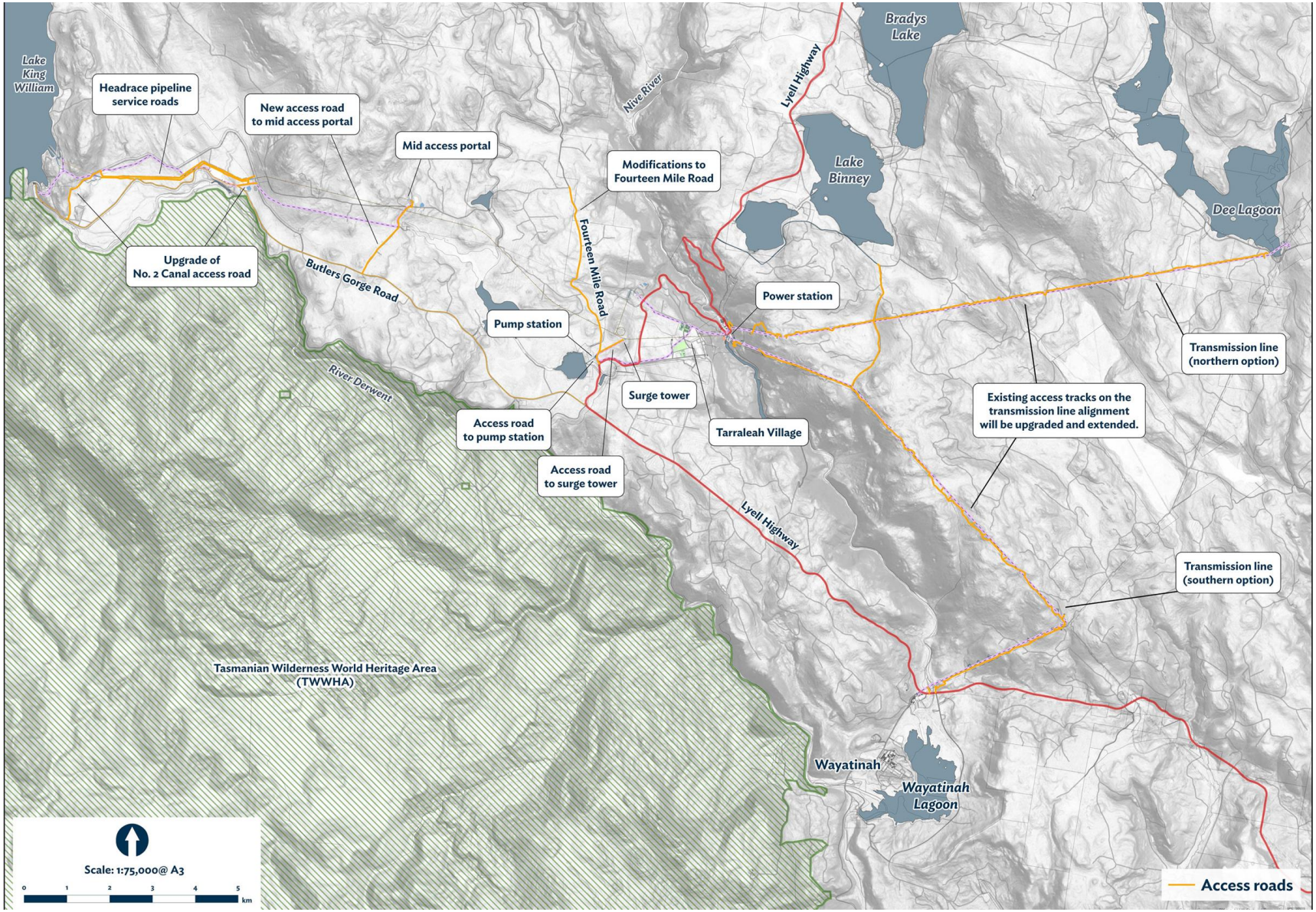


Figure 2.16: Access roads

2.4.1.11 Spoil emplacement areas

Spoil emplacement areas will be used to permanently store material excavated during construction, with locations chosen to minimise haulage and support site efficiency. Three main permanent spoil emplacement areas are proposed:

- **Western portal spoil emplacement area**: Receives spoil from western portal works, headrace pipeline (if TBM method used), and other nearby excavations
- **Mid-access portal spoil emplacement area**: Receives spoil from mid-access portal works, nearby tunnel headings, and associated excavations
- **Paddy's Quarry spoil emplacement area**: Receives spoil from power station and power tunnel excavation (via Lyell Highway), and from the headrace pipeline (if TBM method used).

Table 2.1 outlines the anticipated spoil volumes and their sources for each emplacement area.

Approximately 760,000 m^3 of material is expected to be excavated across all works. Of this:

- Around 190,000 m^3 (loose bulk density) of rock will be crushed and reused on site for portal and laydown area establishment, road pavement, and as aggregate for concrete and shotcrete
- Topsoil will be stockpiled for later use in site rehabilitation
- Remaining rock and other-than-rock (OTR) material will be stored in the permanent spoil emplacement areas.

Spoil stockpiles will be formed by placing and track rolling the material to stable slope angles, in line with the Project's landscaping requirements. Areas will remain unlined but will have erosion and sediment controls in place until stabilised. Spoil may also be temporarily stored in other locations within the disturbance footprint (e.g. topsoil storage).

Table 2.1: Stockpile location, size, volume and sources

Spoil emplacement area	Approximate spoil volume (m^3)	Spoil sources
Western Portal	500,000	Western portal Headrace tunnel Headrace pipeline
Mid Tunnel Access Portal	60,000	Mid-access portal
Paddy's Quarry	200,000	Power station portal Power station excavations Power tunnel Surge shaft

2.4.2 Off-site infrastructure

The Project requires several key off-site infrastructure elements to support construction and operation. These include:

- **Lake King William upgrade works**: Hydro Tasmania is completing the separate Tarraleah Upgrade Works Project, which includes a new intake arrangement on Lake King William (approach channel, intake structure with gates and associated hydro-mechanical and electrical equipment), an approximately 950 m tunnel, and a tunnel portal. The downstream Lake King William tunnel portal will form the connection point for the western end of the Project's headrace pipeline.
- **Workforce Accommodation Facility (WAF)**: Located on land adjacent to Tarraleah Village within the Project area, the WAF will provide up to 300 beds for construction personnel, supplemented by minimal-modification use of existing village accommodation. Hydro Tasmania purchased Tarraleah Village in 2023 for this purpose and the WAF will be subject to a separate development consent and approval process. Facilities will include prefabricated accommodation units, recreation areas, a dining hall, canteen, laundry, and associated utilities (power, water, sewer). The WAF will be demobilised and the site rehabilitated at the end of construction.
- **Ports and freight entry**: Project components arriving from interstate or overseas will enter Tasmania via the ports of Bell Bay, Burnie or Hobart. No upgrades to port facilities are required. Materials will be transported directly from the ports to the Project area without the need for intermediary laydown areas.
- **Heavy vehicle access**: National Heavy Vehicle Regulator (NHVR) Class 1, 2 and 3 vehicles will require transport permits, oversize/over-mass escorts and pilot vehicles, and, in some cases, specific route assessments. From southern Tasmania, vehicles will generally travel via Brooker Avenue, Brooker Highway and the Lyell Highway to Tarraleah. From northern Tasmania, vehicles will generally travel via the Bass Highway, Meander Valley Road, Highland Lakes Road, Marlborough Road, Lyell Highway and Fourteen Mile Road.
- **Transmission network connection:** The Project will connect to the Tasmanian transmission network at a TasNetworks switchyard either at Dee Lagoon or Liapootah (see Section 2.4.1.8).
- **External aggregate supply:** Aggregate materials not sourced on site will be procured from existing Tasmanian quarries for use during construction.

2.5 Construction

2.5.1 Construction environmental management plan

Before construction begins, the selected EPC Contractor will prepare a Construction Environmental Management Plan (CEMP) and associated sub-plans. The CEMP will set out how the construction commitments in this EIS, along with any environmental conditions of regulatory consents, will be implemented. It will include strategies to avoid, minimise and mitigate potential impacts, with further detail provided in Chapter 8.

2.5.2 Construction schedule

Construction works associated with the Project are estimated to be completed over a six-year period. An indicative construction schedule is shown in Figure 2.17.

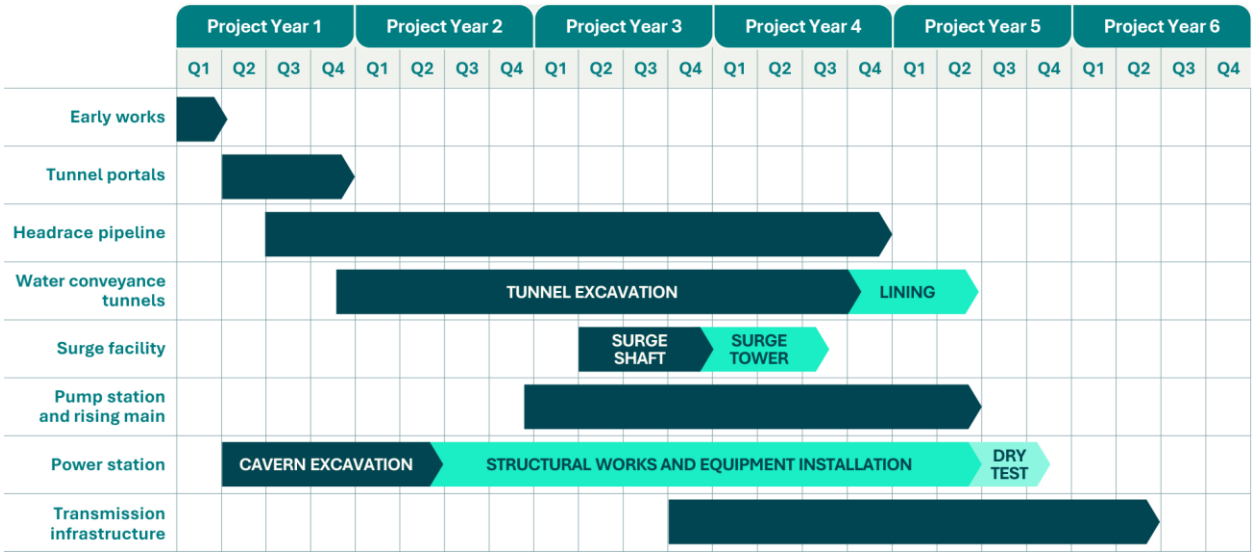


Figure 2.17: Construction schedule

2.5.3 Construction workforce

A quarterly workforce distribution for the Project (excluding the transmission line) is shown Figure 2.18. The peak workforce is expected to reach approximately 330 people.



Figure 2.18: Workforce histogram

2.5.4 Construction hours

2.5.4.1 Standard hours

Proposed standard construction hours for each work area are shown in Table 2.2 and outlined below:

- **Above-ground works**: 0700 to 1800, Monday to Friday; 0800 to 1300, Saturday
- **Underground works** (excluding TBM activities) and essential support operations (e.g. ventilation fans, water treatment facilities): 24 hours a day, 7 days a week
- **TBM tunnelling**: 10 hours a day, six days a week.

No noise-sensitive receptors in other ownership are expected to be affected by works undertaken during these standard hours.

2.5.4.2 Non-standard hours

Non-standard construction hours may be required in certain circumstances, including:

- **Workforce availability**: If insufficient locally based workers are available, above-ground works and TBM activities may extend into Saturday afternoons, Sundays and public holidays to align with FIFO interstate workforce rosters.
- **Transport requirements**: Delivery and unloading of large loads may occur outside standard hours where required by transport restrictions.

No noise-sensitive receptors in other ownership are expected to be affected by works undertaken during non-standard hours.

Table 2.2: Nominal standard hours for each construction work area

Work area	Work hours
Project planning, engineering and procurement activities	8 hours/day, 5 days/week
Standard construction work: all above ground activities and underground civil, mechanical & electrical installation activities	10 hours/day, 5.5 days/week
All tunnelling activities (including TBM excavation)	24 hours/ day, 7 days/week
Power tunnel excavation and penstock excavation	24 hours/day, 7 days/week

2.5.5 Key construction activities

2.5.5.1 Site establishment

Before main construction works commence, a series of preparatory activities will be undertaken to ensure the site is safe, compliant, and ready for construction. These will include:

- **Detailed site surveys and demarcation:** Survey the Project's final disturbance footprint, clearly mark it on plans, communicate boundaries to all construction personnel, and physically mark it on site to avoid unnecessary vegetation removal.
- **Traffic controls:** Install traffic management measures to enable safe access to construction sites during establishment works.
- **Erosion and sediment controls:** Implement controls such as retention basins and catch drains at all construction sites as soon as practicable prior to, or during, clearing and grubbing.
- **Fauna surveys:** Engage a suitably qualified ecologist to survey mature dry and wet eucalypt forest within works sites for Tasmanian devil and quoll denning habitat.
- **Clearing and grubbing:** Progressively remove unwanted surface materials (clearing) and underground materials such as stumps, roots and buried logs (grubbing), with rehabilitation of areas no longer required.
- **Supporting works:** Establish access roads, power supply, construction compounds, explosives magazines, and a temporary Nive River bridge.

A Site Establishment Management Plan (SEMP) will be prepared and implemented prior to, and during, these activities. In addition, a comprehensive Erosion and Sediment Control Plan (ESCP) will be prepared before construction begins, in accordance with the commitments outlined in this EIS (see Section 5.1) and best practice guidelines from the International Erosion Control Association (IECA) Australasia.

2.5.5.2 Portal excavations

Once site establishment and clearing and grubbing are complete, excavation of the three portals will begin. Works will use a combination of conventional earthmoving techniques and drill-and-blast methods (where higher-strength rock is encountered), and will include:

- **Blast designs**: Develop and implement designs to minimise the effects of blasting beyond the work area, including assessment of potential impacts on nearby road infrastructure and Hydro Tasmania structures.
- **Erosion and sediment controls**: Install controls progressively as portal construction advances, commencing prior to the clearing and grubbing phase.
- **Excavation support**: Stabilise excavations using anchors, soil nails, concrete piles, rock bolts, and shotcrete, as required by ground conditions.

Additional ancillary works at each portal will include surface drainage construction, minor concreting, and installation of temporary offices, services, and utility reticulation necessary for site operations. Concrete for these works will be sourced from the temporary batch plants.

Details of predicted cut and fill volumes for portal construction, along with associated cleared and stockpile areas, are provided in Table 2.3. Portal excavation is expected to take 6–12 months to complete and will be among the earliest activities for the Project. Once portals are complete, disturbed areas will be revegetated using topsoiling and hydro-seeding, depending on slope stability requirements and the presence of shotcrete.

Table 2.3: Portal details including estimated construction requirements

Portal	Cut (m^3)	Fill (m^3)	Cleared area (m^2)	Stockpile area (m^2)
Power Station Portal	2,500	Not required	500	No stockpile
Mid Tunnel Access Portal	60,500	7,500	25,000	55,000
Western Portal	49,500	23,500	30,000	25,000

2.5.5.3 Headrace pipeline

Construction of the 4.2 km headrace pipeline will require full clearing and grubbing along the pipeline alignment, including associated access roads, laydown areas, and a 20 m-wide asset protection zone to mitigate bushfire risk during both construction and operation. Access will be via Butlers Gorge Road and newly constructed service roads along both sides of the pipeline, enabling spoil haulage, material transport (including pipe lengths), and construction access to thrust blocks and piling sites.

Two laydown areas will be used for pipe and material storage:

- A new laydown area associated with the western portal construction compound with direct connection to Butlers Gorge Road
- The existing laydown area established for the Tarraleah Upgrade Works Project.

Estimated pipeline lengths and requirements for each section are provided in Table 2.4. Construction methods will vary depending on the location and type of installation:

- **Pipeline sections within tunnels:**
  - Within the Lake King William tunnel, pipeline sections will be mounted on cradles without backfilling
  - Within the headrace tunnel, sections will be welded into place, with the annulus backfilled with concrete or grout.

- **Buried or mounded pipeline sections:**
  - Constructed using conventional earthworks, with isolated drill-and-blast where hard rock is encountered
  - Installation will follow standard methods: pipe stringing, lifting into trench, bedding placement, backfilling, and layer compaction. Bedding material will be imported or sourced from suitable excavated spoil
  - Concrete thrust blocks will be constructed, with excavated material reused where possible to achieve mass balance. Surplus material may be stored at the western portal stockpile.
- **Above-ground pipeline sections:**
  - Footings for pipe plinths will be constructed via piling or surface excavation, including reinforced concrete foundations for thrust blocks
  - Pipes will be placed and secured to plinths upon installation.

Temporary stockpiles will be established alongside trenched sections, with the disturbance footprint allowing for a 40% bulking factor. Once buried sections are installed, the excavated material will be replaced over the pipeline and capped with soil. All disturbed areas will be rehabilitated where no ongoing operational use is planned.

Table 2.4: Details of pipeline sections including estimated construction requirements

Pipeline section	Length (m)	Type	Cut/fill/spoil (m^3)	Concrete (m^3)	Steel (tonnes)	Glass reinforced polymer (tonnes)
Lake King William tunnel plug to first thrust block section	190	Steel	Not required	Not required	250	Not required
Headrace tunnel plug to first thrust block section	150	Steel	Not required	2,000 (backfilled to pipe)	250	Not required
Above ground	1,452	GRP	Not required	2,200	Not required	2,320
Buried	2,483	GRP	Cut: 75,000 Fill: 205,000 Spoil: 41,000	1,500	Not required	3,900

2.5.5.4 Tunnel excavation and lining

Tunnel excavation and support will commence at the portals once the tunnel face is exposed. The preferred method is the use of a tunnel boring machine (TBM), supported by mechanised excavation and drill-and-blast where required. A TBM would complete approximately 75% of the tunnelling works, resulting in less nitrate generation and a likely reduction in the above-ground disturbance footprint.

If a TBM is not used, all tunnelling will be completed using drill-and-blast methods, which has been assessed in this EIS as the reasonable worst-case environmental impact option.

Estimates of construction requirements for each tunnel section are provided in Table 2.5. Actual spoil volumes will vary and will be updated as excavation progresses.

Table 2.5: Details of tunnel sections including estimated construction requirements

Tunnel	Length (m)	Concrete lining	Spoil volume (m^3)	Concrete volume (m^3)	Steel lining (tonnes)
Headrace tunnel	9,555	At invert only	572,000~	14,000#	Not required
Mid-access tunnel	730	At invert only	44,000~	1,250#	Not required
Power tunnel	103	At invert only	5,500~	500#	Not required
	1,580	Concrete	114,000~	35,000~	Not required
	610	Steel/Concrete	26,000~	9,500~	2,120
Penstocks and distributor	200	Steel/Concrete	10,500~	9,500~	2,150

includes estimate for blinding concrete
~ includes allowance for overbreak at 15% and bulking factor of 40%

Tunnelling

A 2 m diameter ventilation duct will run the length of each tunnel, along with temporary services for cooling water, compressed air and dewatering.

Excavation will generally continue until breakthrough, with support types determined on site once ground conditions are mapped. Wastewater will be managed to meet discharge requirements (Section 5.1). Groundwater inflows are expected in all tunnels; higher inflows will be reduced by grouting ahead of the face, based on probe drilling and monitoring. Water will be managed via sumps and pumps or gravity flow, depending on alignment.

Excavation methods may include:

- **TBM**: Simultaneous excavation, support and spoil removal via conveyors. Portal facilities will include grouting supply, water treatment, electrical equipment and laydown areas. On completion, the TBM shield will be buried in place and encased in concrete, with mechanical components removed for recycling.

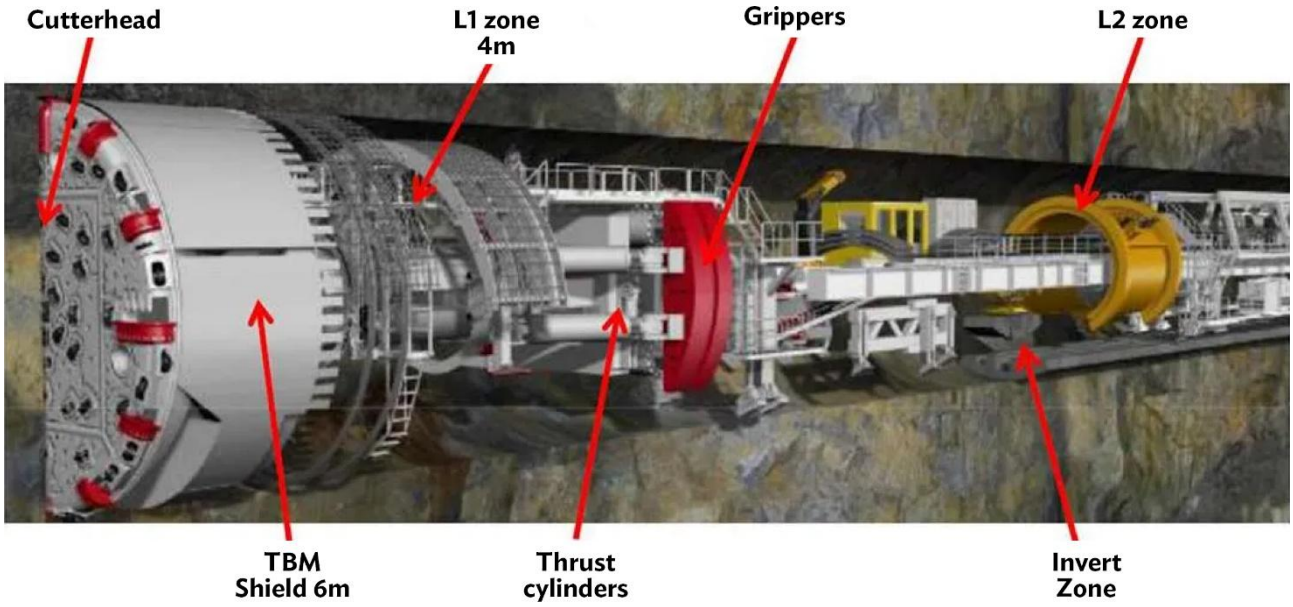


Figure 2.19: Proposed TBM with capability to install rock bolts

- **Drill-and-blast**: May be used for the headrace tunnels as an alternative to TBM, and is required for tunnels such as the penstocks and distributor. Crews would work concurrently from multiple headings. Ventilation would be provided by primary fans at portals, with intermediate fans and/or dust scrubbers. Groundwater management, grouting and ground support would follow a similar process to TBM. This method would increase spoil stockpiles at the portals, with spoil trucked to portal stockpiles or, for the power station, to Paddy's Quarry due to space constraints.

Ground support

Ground support types will be selected based on encountered conditions. The most common methods are expected to include:

- Shotcrete and rock bolts, with increased shotcrete thickness and bolt density in poorer ground.
- Shotcrete, canopy tubes and steel sets, likely only required for a short section of the power tunnel where ground conditions are particularly poor with low rock cover.

Figure 2.20 shows a typical rock bolting rig used at drill-and-blast tunnel locations.



Figure 2.20: Rock bolting rig used at Lake King William tunnel

Lining, rock traps and finishing works

Once tunnel excavation is complete, lining works will begin. The type and extent of lining will depend on water pressure, topography, tunnel depth and ground quality.

Steel lining will be delivered in sections and welded into tubes (if not prefabricated). After placement in the tunnel, the sections will be welded together and the annulus between the rock or shotcrete and the steel lining will be filled with concrete to lock the lining in place.

At access tunnel intersections and before lined tunnel sections, rock traps will be formed by over-excavating the tunnel floor and installing reinforced concrete frames with steel grates.

On completion, tunnel access for maintenance and operation will be available at:

- A removable section at the upstream end of the headrace pipeline
- The mid-access portal
- The power station portal (personnel access only).

2.5.5.5 Surge shaft and tower

Construction of the surge shaft and tower will begin in the later stages of tunnel excavation, once the intersection between the headrace and power tunnels is complete. Key requirements are summarised in Table 2.6.

Works will start with clearing and grubbing to form an access road to the surge shaft site. The site will also be cleared for a laydown area, space for the raise bore operation, and later, surge tower construction. A connection chamber will be excavated from the power tunnel side at the junction of the headrace and power tunnels, using drill-and-blast methods.

The shaft will be constructed using a raise borer (Figure 2.21). A concrete collar will be built at the surface to provide a stable base, followed by drilling a pilot hole down to the connection chamber. A reamer head will then enlarge the hole upwards from the chamber to the final 5 m diameter. Spoil will be trucked from the tunnel to either Paddy's Quarry or the western portal, depending on tunnel progress.

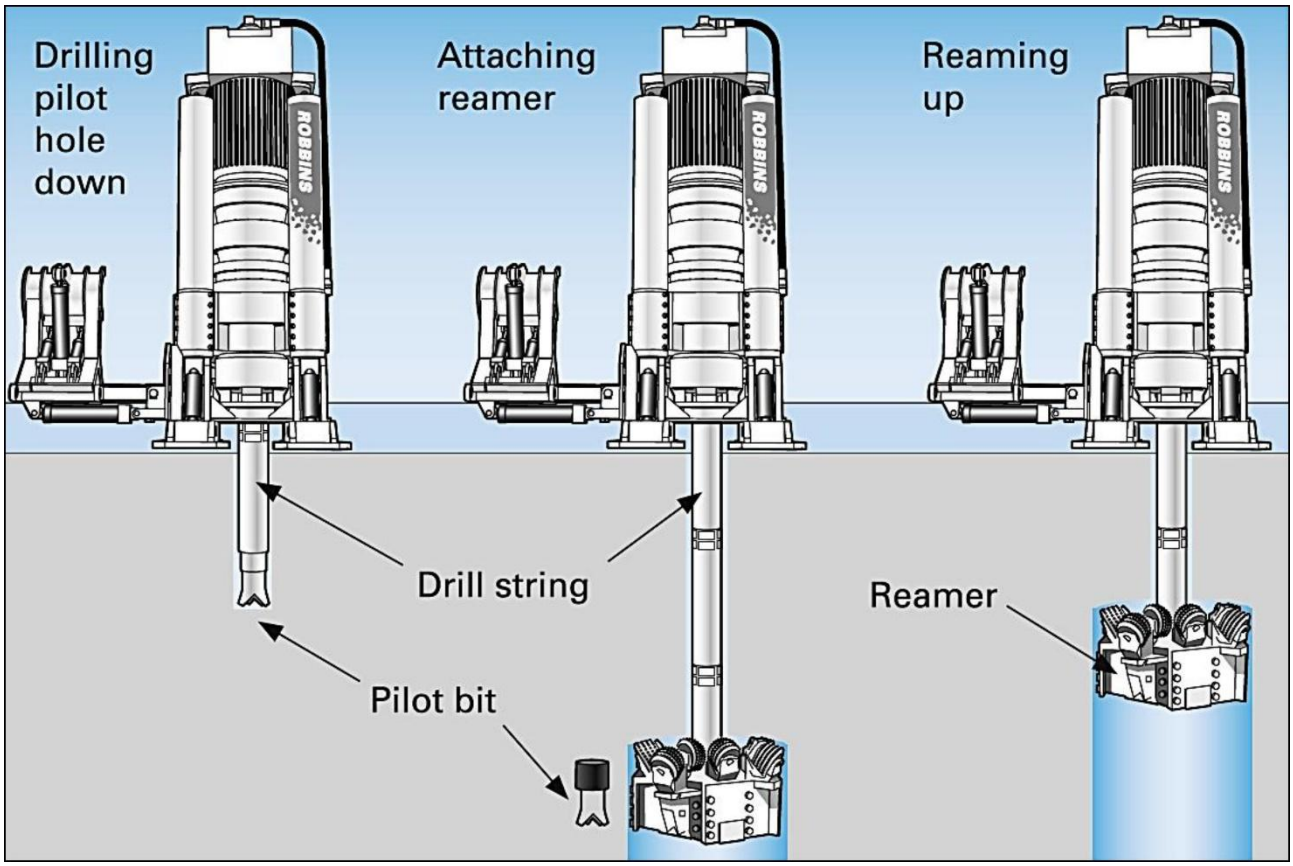


Figure 2.21: Schematic of raise bore operation

Once excavation is complete, the shaft will be lined with shotcrete (if required) and steel lining for the upper 50 m.

Surge tower construction will follow. Reinforced concrete foundations will be built to support the welded steel tower sections. Each section is expected to comprise three prefabricated curved plates, welded together on site or at a nearby workshop, then craned into position and welded in place.

Table 2.6: Surge Shaft and Tower details including estimated construction requirements

Item	Length (m)	Lining	Spoil volume (m^3)	Concrete volume (m^3)	Steel lining (tonnes)
Surge shaft	265 (shaft depth)	Concrete and steel	7,300	190	82
Surge tower and foundations	70 (height)	Steel	6,900	1460	490

2.5.5.6 Pump station and rising main

The pump station site, including the access road and suction main alignment, will be cleared and grubbed before construction. The partially buried pump house will require excavation, followed by construction of a base slab and retaining walls. Above-ground elements will comprise a steel-framed, steel-clad building assembled in situ. The surge tank will be built concurrently to ensure integration with the pump house.

Once the building is complete, electrical and mechanical fit-out will commence, including installation of the pumping units.

Trenching and pipe laying will be undertaken for the suction and rising mains, with surplus material stockpiled on site or transported to Paddy's Quarry. The rising main will be trenched alongside Fourteen Mile Road, crossing under the road at one location.

Expected construction requirements are summarised in Table 2.7.

Table 2.7: Pump station details including estimated construction requirements

Item	Cut Volume (m^3)	Fill Volume (m^3)	Concrete Volume (m^3)	Steel Lining (tonnes)
Pump station building and rising main	5,000	750	800	150

2.5.5.7 Power station excavation

Excavation to the underside of the power station will be carried out in a highly constrained site using a staged approach to:

- Minimise interaction with the Nive River
- Optimise use of limited space
- Manage potentially contaminated surface material
- Reduce dewatering
- Maintain access to the existing power station.

Works will involve excavation for:

- Power access tunnel portal
- Power station site
- Penstock 1 and 2 portals.

Methods will include conventional excavation, rock hammering and drill-and-blast, depending on rock quality. Excavations will be supported by a contiguous pile wall with anchors and rock bolts as required (Figure 2.22). Perimeter and base grouting may be undertaken to reduce dewatering and ensure a safe working environment.

Spoil will be trucked via the Lyell Highway to Paddy's Quarry. Expected construction requirements are in Table 2.8.

Table 2.8: Power station details including estimated construction requirements

Item	Cut volume (m^3)	Fill volume (m^3)	Concrete volume (m^3)	Steel (tonnes)
Power station, power access tunnel and penstock portals	30,000	5,000	9,500	320

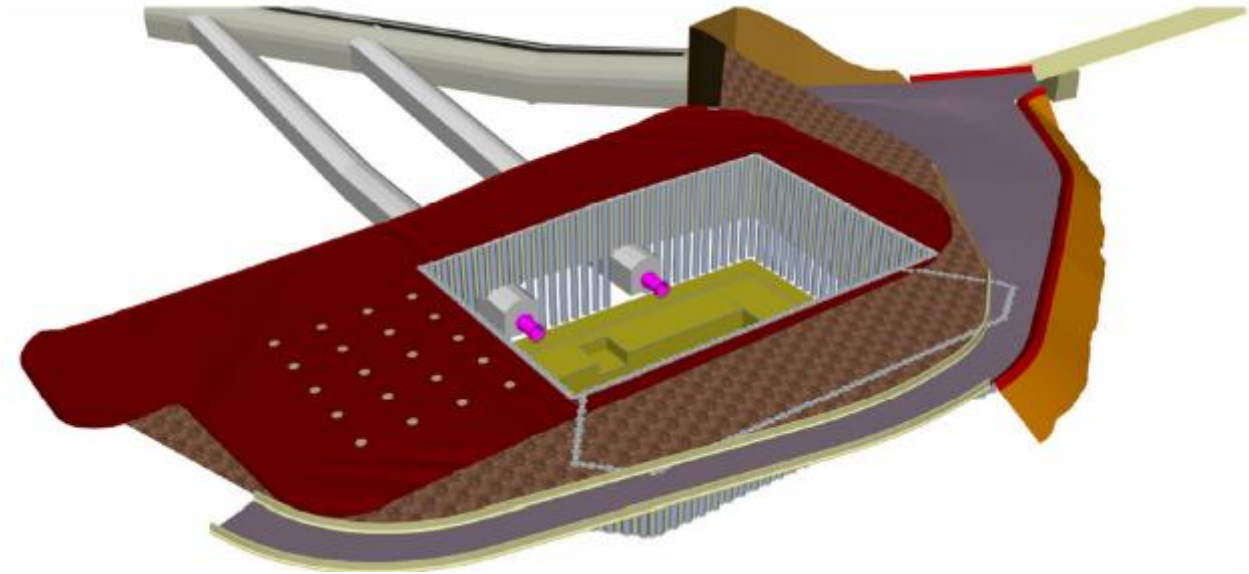


Figure 2.22: Power station main excavation

2.5.5.8 Power station, transformer yard and switchyard

Below RL 349, the power station will be a tanked reinforced concrete structure. As the structure rises above ground, the excavation will be progressively backfilled. The tail bay will be built once the excavation is tanked to the required level, with the spiral casing and draft tube cast in place.

During construction the tail bay will be protected from flow in the Nive River using a retention structure (nominally piles) around the perimeter of the tail bay excavation. The tail bay retention structure will be required to pass minimum floods. Figure 2.23 shows the anticipated tail bay retaining wall footprint.

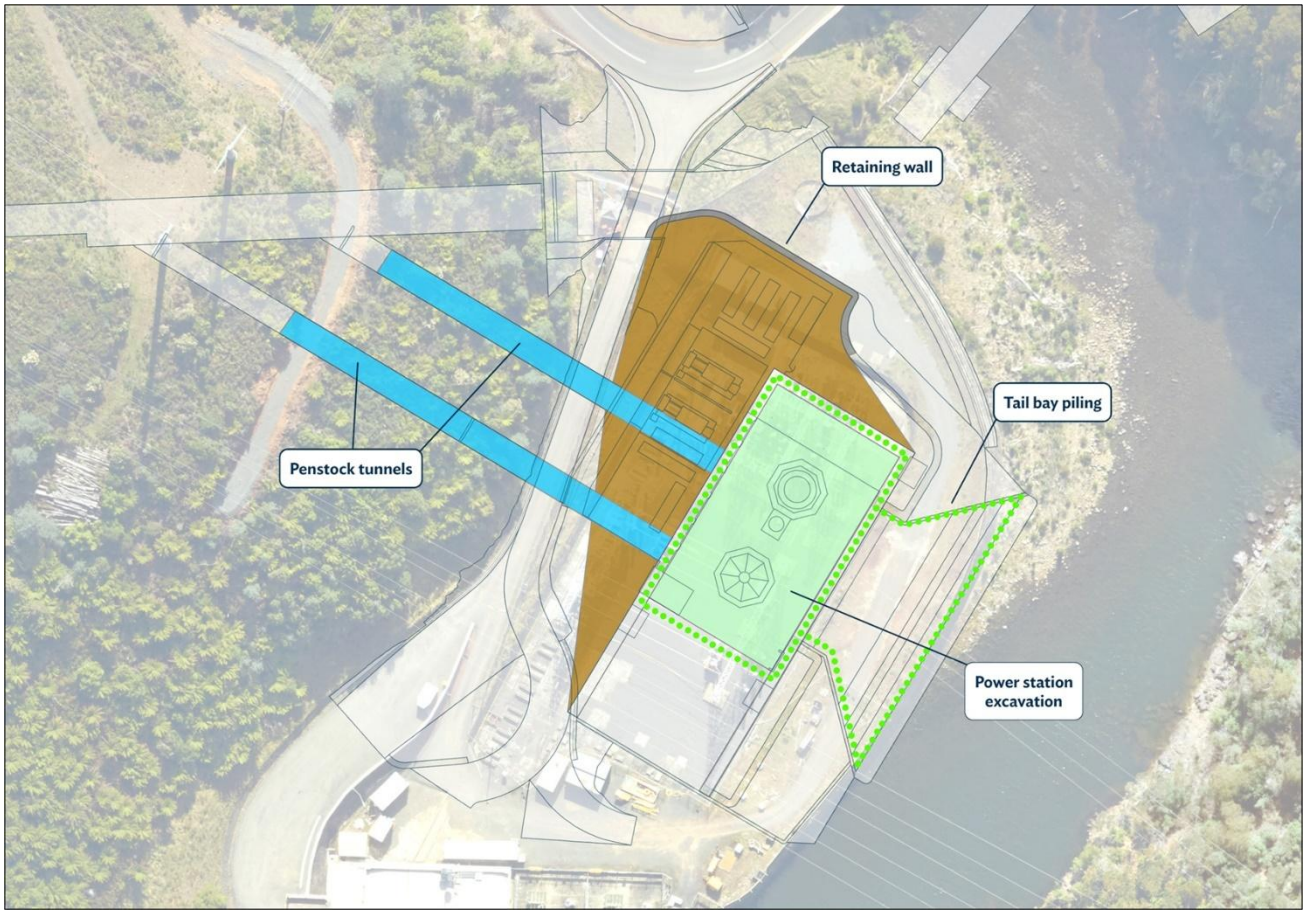


Figure 2.23: Power station tail bay retaining wall

Final structural works include installation of the surface building, roof and gantry cranes, after which electrical and mechanical fit-out will commence. In some cases, the roof may be built earlier to allow works to proceed under cover.

The fit-out will include turbine and generator assembly, installation of 80-tonne transformers, and construction of the switchyard with grid connection for commissioning.

Commissioning will involve online testing of the power station before handover to Hydro Tasmania. Final site rehabilitation and minor civil works will follow.

2.5.5.9 Transmission line

Vegetation clearing will be completed along the transmission line alignment, in accordance with TasNetworks *2025 Activities within TasNetworks Transmission Line Easements*, to widen the easement for construction and operation of the new 220 kV lines. This will include the management of select hazardous trees outside the 30 m-wide easement.

The transmission line will be constructed with either steel lattice towers or steel poles, with a maximum structure height of 52 m. The northern option may use either structure type, while the southern option will use poles.

Construction of the line will include:

- **Steel lattice towers**: Clearing of a nominal ground area of at least 80 m × 50 m for each transmission tower, with each tower having a nominal footprint of 10 m × 10 m. All vegetation will be removed from this area, which may require benching in some instances. A permanently cleared area of approximately 15 m from each tower leg is required for operation and maintenance, including tower inspections.
- **Steel poles**: Clearing of a nominal ground area of at least 80 m × 50 m for each pole, with each pole having a nominal footprint of 3 m × 3 m. The poles will be prefabricated in sections off site and assembled on site. Concrete footings will be constructed at each tower site, followed by assembly and erection of the poles. All vegetation will be removed from this area, which may require benching in some instances. A permanently cleared area of approximately 20 m from each pole centre is required for operation and maintenance, including pole inspections. A hardstand pad will be built at each pole location to allow a crane to be used to erect the poles.
- **Stringing of the transmission lines**: Further hardstands will be required for winch and brake drum sites during stringing. Conductors and optical fibre ground wires will be strung by helicopter and winches using established industry practices. A helicopter will pull the draw wire over pulleys connected to the cross arms of the structures. Winches located at bends and on extensions of straight sections will pull the conductors through suspension towers to strain towers where they will be fixed. Insulator strings will replace the pulleys and connect the conductors to the towers. The conductors and optical fibre ground wires will not contact the ground during stringing. Hurdles will be erected adjacent to roads to ensure the stringing operation does not impede traffic.
- **Temporary workspaces**: Workspaces will be required for the temporary storage of transmission tower components, including conductor drums, materials, construction vehicles, equipment and machinery. These workspaces will be preferentially sited in previously disturbed areas and will be rehabilitated and revegetated when no longer required. Earthworks construction methods and erosion and sediment control measures associated with the hardstand areas and workspaces will be established.

The new switchgear bays at the substation at Dee Lagoon or Liapootah will be designed and constructed by TasNetworks within the existing substation footprint, using conventional equipment (non-SF6 gas where possible) and standard construction techniques.

2.5.6 Supporting works

To construct the permanent infrastructure required for the Project, several temporary works will be established, then removed and the sites rehabilitated following completion of the construction phase.

These include:

- Workshops and laydown areas
- Temporary batch plants for concrete supply (minimum of two required)
- Administration buildings
- Magazine facilities for storing explosives for drill-and-blast activities
- A bridge over the Nive River.

These temporary works are discussed in more detail below. In addition, power will be provided to the construction sites, and water used or generated by the works will be managed appropriately.

2.5.6.1 Workshops, laydown areas and batch plants

Workshops, laydown areas and a minimum of two batch plants for concrete supply will be required to support construction activities. These will be constructed on land owned by Hydro Tasmania at the Tarraleah Village or at other locations within the disturbance footprint, as required to support the works. Construction will involve conventional earthworks activities to create a level area for the workshops. Following this, access roads will be formed and utilities will be installed (power, water and sewer) as required. At the end of construction, the workshops, batch plants and laydown area will be cleared and rehabilitated.

The workshops will include bunded areas where work on construction plant can be carried out with any potential spills appropriately contained. Workshops will be required for mobile plant maintenance, some on site fabrication and construction of specialised formwork. A storehouse will also be required.

2.5.6.2 Administration buildings

An area within Tarraleah Village has been set aside for a Project office. This may involve installing a prefabricated building, to be removed and the site rehabilitated at the conclusion of the Project. Where possible, the interiors of existing village buildings will be retrofitted to optimise space and minimise the need for additional prefabricated structures. Any modifications to Tarraleah Village will be minor and will maintain the heritage value of the village in accordance with Hydro Tasmania's Historic Heritage Conservation Management Plan.

Administration buildings will also be established at the various construction sites. These will generally be prefabricated buildings, demobilised upon completion of works.

2.5.6.3 Explosives magazine facilities

Explosives required for blasting activities will be stored in dedicated magazine facilities. Three locations along Butlers Gorge Road have been identified for these facilities, selected by a blasting specialist in accordance with legislated offset distances from sensitive structures and the forecast explosive requirements of the Project.

2.5.6.4 Bridge over the Nive River

Tunnel excavation and/or steel lining of the power tunnel may be undertaken from the power station site. To support these activities and reduce congestion on the constrained site, a temporary bridge will be constructed over the Nive River (Figure 2.24).

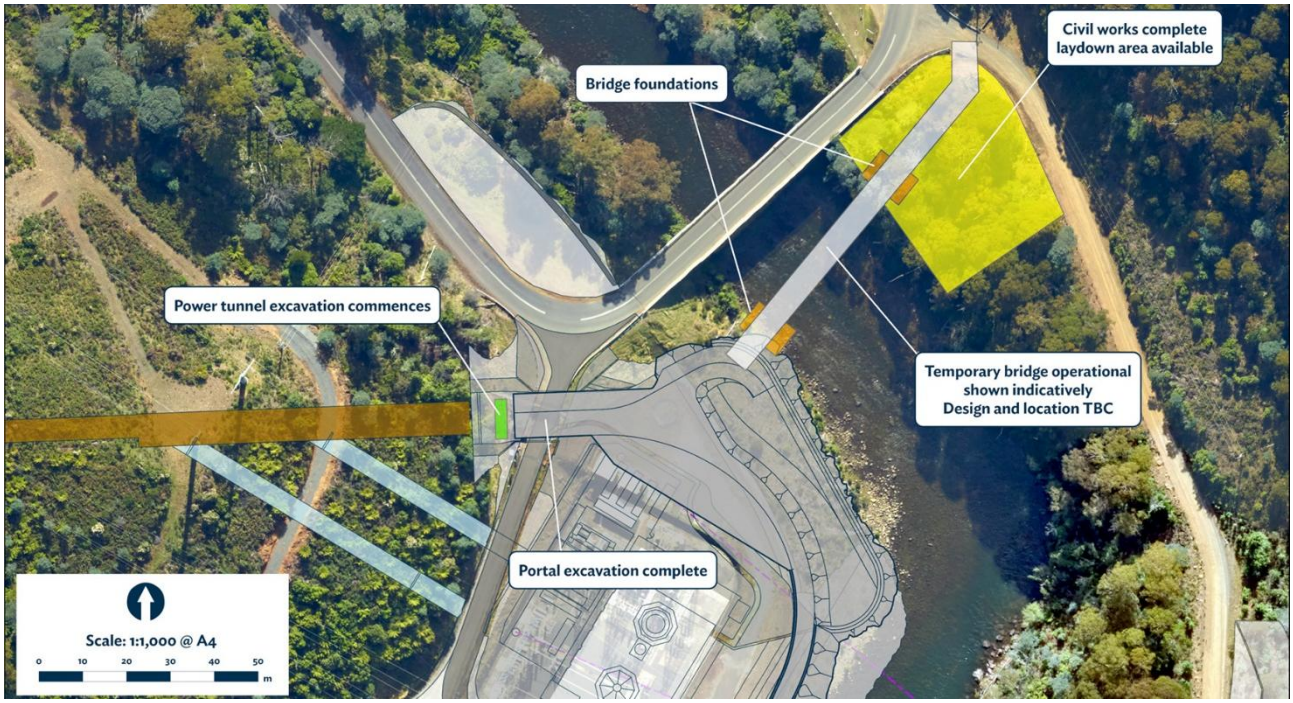


Figure 2.24: Potential temporary access to power tunnel via bridge over the Nive River

Water management

Construction activities will both use and generate water, all of which will be managed in accordance with the Project's Water Management Plan (Section 5.1). The main sources and management measures are:

- **Water use:** Hydro Tasmania will provide access to existing dam storage and canals for construction water supply.
- **Groundwater:** Excavation is expected to intersect groundwater, with inflows collected in sumps and pumped to treatment facilities at the portals.
- **Water treatment:** Each construction site will have treatment facilities, including sediment retention basins and other measures (refer Section 5.1).

A temporary water treatment plant will also be required for the WAF, to be addressed in a separate development consent and approval process by Central Highlands Council.

2.5.7 Access roads and vehicle movements

2.5.7.1 Construction access roads

New and upgraded access roads will be built to reach construction worksites (refer Section 2.4.1.10). Roads will generally be at grade or in shallow cut/fill, unsealed, and surfaced with site-processed or imported material. Modifications to Fourteen Mile Road will provide access to the pump station and surge tower.

Construction of permanent and temporary access tracks will include:

- Establishing erosion and sediment controls
- Excavating with conventional earthmoving equipment, with drill-and-blast used if hard rock is encountered
- Forming batters to stabilise slopes above and below tracks as needed
- Installing drainage infrastructure, including culverts where required.

2.5.7.2 Construction traffic

The Project area is currently accessed by the Lyell Highway, a Category 3 main access road under the Tasmanian State Road Hierarchy, carrying approximately 774 vehicles per day with a speed limit of 100 km/h.

Access to the Project during construction will be via the Lyell Highway, with key access points at Butlers Gorge Road, Fourteen Mile Road, Oldina Drive, Paddy's Quarry and Tarraleah Power Station. Butlers Gorge Road will be closed to public access during construction. Except for temporary closures, Oldina Drive between the Lyell Highway and Tarraleah Lookout will remain open to the public.

Buses and light vehicles transporting workers to and from the WAF at Tarraleah Village will use Oldina Drive, Lyell Highway and Butlers Gorge Road. Trucks will travel between the power station and Paddy's Quarry via the Lyell Highway. Intrastate, interstate and overseas deliveries will use various routes depending on their origin, with key routes identified from major population centres and ports.

Estimated vehicle movements will vary over the course of construction and across the Project area. Peak morning and afternoon traffic volumes for Lyell Highway intersections have been modelled for the busiest construction period, with results showing the most affected intersection, Oldina Drive, would operate with minimal delays.

A Traffic Impact Assessment (refer Section 5.15 and Appendix C) describes the existing road network and usage, identifies key construction access routes and outlines the composition and volume of construction traffic.

2.5.7.3 Project site security

Given the Project's size and remoteness, temporary fencing will not be installed around the entire boundary. Fencing will be used where required for safety or security, such as around magazine facilities.

Nominated access control points, with lockable boom gates and/or staffed security huts, will be installed (where not already existing) and maintained by the EPC Contractor to clearly delineate each Project work site and allow continued access for Hydro Tasmania, STT and TasNetworks personnel and contractors.

Within each work site, the EPC Contractor will be responsible for site movement protocols, with all visitors required to comply.

2.5.8 Rehabilitation

All disturbed areas not required for permanent infrastructure will be rehabilitated progressively during construction and on completion of works. Progressive rehabilitation will be scheduled seasonally to maximise revegetation success, with works completed to suit the final agreed land use, as determined with relevant landholders and/or managers.

Before construction begins, a Site Rehabilitation Plan (SRP) will be prepared, detailing the location, timing, methods, monitoring, and completion criteria for rehabilitation.

2.6 Commissioning, operation and decommissioning

2.6.1 Commissioning

The EPC Contractor will prepare a Commissioning Management Plan outlining the framework, processes and strategies for commissioning, Tests on Completion, and Taking Over. The plan will demonstrate how works will be commissioned to meet Hydro Tasmania's requirements for operation.

The commissioning schedule will generally include:

- **Pre-commissioning:** Dry testing of all electrical and mechanical assets individually, without water in the hydraulic circuit.
- **Wet commissioning:** Staged system testing with water drawn from the Lake King William intake.
- **Taking over for operation**: Handover to Hydro Tasmania once all plant and equipment are satisfactorily commissioned, an agreed list of remaining or corrective works is issued, and all requirements are met. Take-over will occur upon Hydro Tasmania issuing a Take-Over Certificate.
- **Proving period:** Operation by Hydro Tasmania with elevated EPC Contractor support for fault response and resolution.

2.6.2 Operation

Once operational, the scheme will run continuously, 24/7, under remote control. Site attendance will be limited to routine maintenance. Permanent flood lighting will be installed for security at the power station and at the pump station near No. 2 Pond.

A services block at the north-west end of the power station will include:

- Small office with four workspaces
- Kitchen/lunchroom (seating 6–10)
- Male and female toilet and shower facilities
- Cleaning supplies cupboard
- First aid room
- Electrical protection/communications room
- Battery room

Facility usage is detailed in Table 2.9.

Table 2.9: Expected usage of site during operation

Scenario	Estimated occupancy
Site employees during normal power station operation	2–3 employees 1–2 days per week
Site employees during power station outages	4–5 employees 5 days per week Annually for 2–3 week outage period
Site employees during major maintenance outages	15 people (Hydro Tasmania and contractors) 6 days per week Every 4 years for 6–8 years

2.6.3 Decommissioning

The Project is expected to operate for 80–85 years, with potential extension through asset replacement or refurbishment, subject to future energy market conditions. Any replacement or refurbishment will comply with the regulatory requirements in place at the time.

If decommissioned, a Decommissioning and Rehabilitation Plan will be prepared. The objective will be to leave the site safe, stable and non-polluting. At a minimum, works will include removal of above-ground buildings and structures, and reinstatement and rehabilitation of the site to a self-supporting landform suitable for the agreed end use.

2.7 Decommissioning of existing assets

As the existing Tarraleah hydropower scheme nears the end of its operational life, assets made redundant by the Project will be decommissioned and made safe by Hydro Tasmania to ensure public safety, environmental protection, heritage preservation and sustainable asset management. This will include the Nieterana Mini-hydro Power Station, Butlers Gorge Power Station, the existing Tarraleah Power Station and switchyard, and water conveyances such as No. 1 Canal, Tarraleah No. 1 Pond, part of No. 2 Canal, hillside penstocks and hilltop valves.

Many of these assets have heritage value. Decommissioning will therefore be planned in consultation with Heritage Tasmania, with Hydro Tasmania's Historic Heritage Conservation Management Plan updated accordingly. Decommissioning of the existing scheme will be delivered as a separate project and does not form part of this EIS. Further detail is provided in Chapter 7.

2.8 Planning aspects

2.8.1 Land use and ownership

The Project is located within the Central Highlands LGA, where major land uses include national parks, conservation management areas, forestry, and agriculture. Waterways in the region are extensively used for hydropower generation, fish hatcheries, irrigation, drinking water, and industrial supply (Figure 2.25).

Within and around the Project area, land and water are primarily used for hydropower generation (managed by Hydro Tasmania) and forestry operations (managed by STT). There are no sensitive uses, as defined under the Tasmania State Planning Provisions, within the Project area. Land tenure is shown in Figure 2.3.

The TWWHA and the Franklin–Gordon Wild Rivers National Park lie to the southwest of the Project area; however, the Project will have no direct impacts on land within either area.

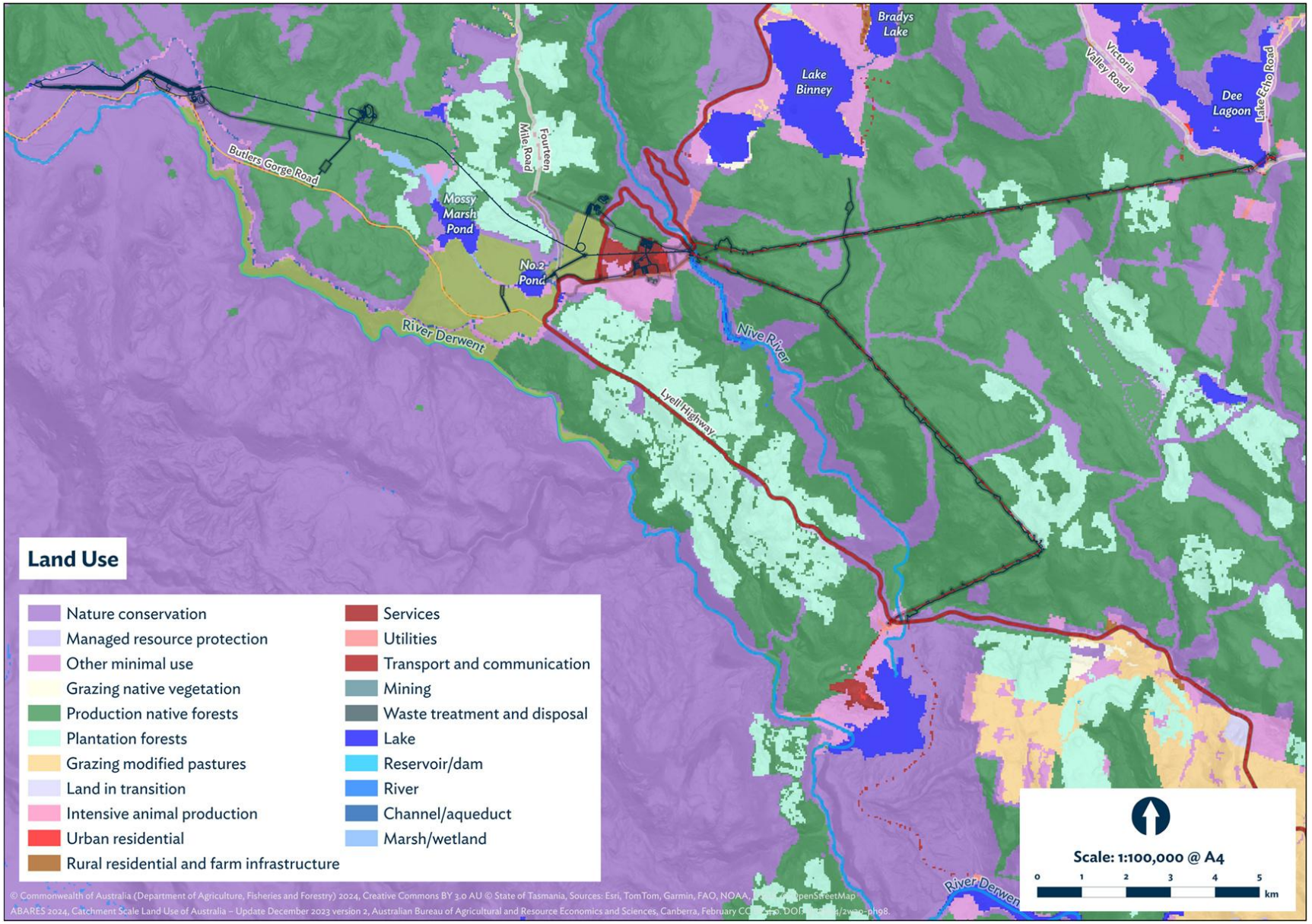


Figure 2.25: Land use within the Project area and its immediate surrounds

2.8.2 Use class

Within the TPS, the use of land and water for hydroelectric schemes is classified as utilities. This is defined under the planning scheme as:

> *"use of land for utilities and infrastructure including:*
>
> *a) telecommunications;*
>
> *b) electricity generation;*
>
> *c) transmitting or distributing gas, oil, or electricity;*
>
> *d) transport networks;*
>
> *e) collecting, treating, transmitting, storing or distributing water; or*
>
> *f) collecting, treating, or disposing of storm or floodwater, sewage, or sullage."*

As outlined in Table 2.10, with the exception of the utility zone, utility developments are a discretionary use and therefore must be assessed under the planning scheme as part of a DA to the local council.

2.8.3 Zones

The Project will have a mixture of underground and aboveground works that will span five different zones identified under the TPS as shown in Table 2.10 and Figure 2.26.

Table 2.10: Summary of zones within the Project area and Project components within those zones

Zone	Use class permissibility	Aboveground works	Underground works
Rural	Discretionary	• Transmission line • Permanent spoil emplacement areas • Access roads • Headrace pipeline	• Headrace tunnel
Environmental management	Discretionary	• Road upgrades • Surge tower and pipeline • Pump station	• Headrace tunnel • Access tunnel and portal to headrace tunnel/power tunnel
Recreation	Discretionary	-	• Headrace tunnel
Village	Discretionary	-	• Headrace tunnel
Utilities	Permitted	• New power station • Transmission line • Upgrades at No.2 Pond	-

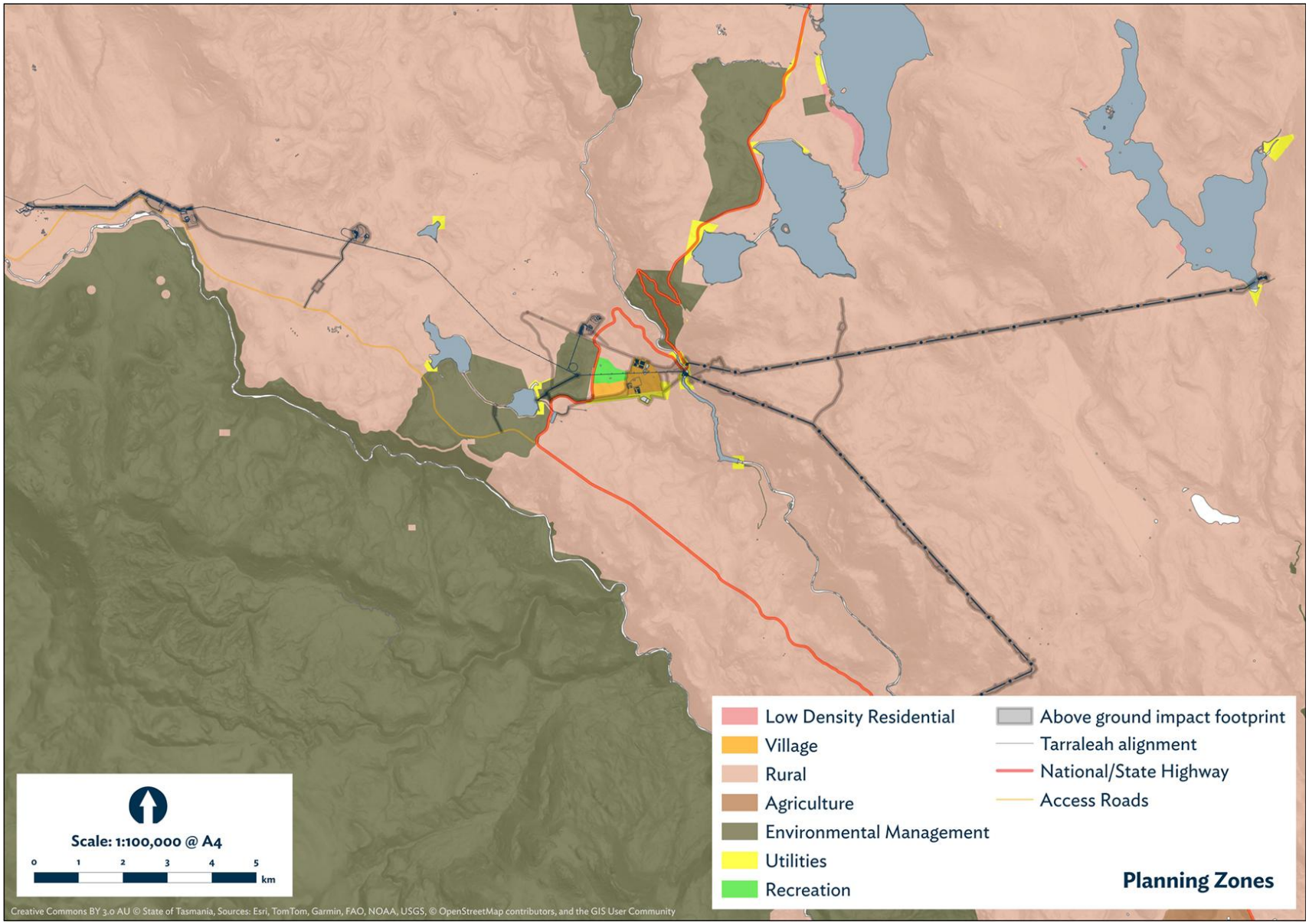


Figure 2.26: Zoning within the Project area and its immediate surrounds

2.8.4 Codes

Five codes/overlays under the TPS are relevant to the Project:

- **C4.0 Electricity transmission infrastructure protection code (Figure 2.27):** Sections of the overlay run over the Project area. As the Project involves the use and development of electricity infrastructure, it is exempt under C4.4.1 of the TPS.
- **C7.0 Natural assets code – priority vegetation and waterway and coastal protection (Figure 2.28 and Figure 2.29):** Development assessed as a Level 2 Activity is exempt under C7.4.1.
- **C9.0 Attenuation code (Figure 2.30):** An attenuation area surrounds a sewage treatment lagoon south of Tarraleah Village. The Project is not a sensitive development and is therefore not impacted.
- **C13.0 Bushfire-prone areas code (Figure 2.31):** The site is entirely within the bushfire-prone overlay. Under C13.2.1, the code applies only to subdivisions, vulnerable or hazardous uses, which do not apply. Fire risk will be managed throughout all stages of the Project, with a fire risk assessment included in Section 5.11.
- **C15.0 Landslip hazard code** (Figure 2.32): Some areas have a low risk of landslip. As the Project is not a critical, hazardous or vulnerable use (C15.3 and C15.4), it is exempt.

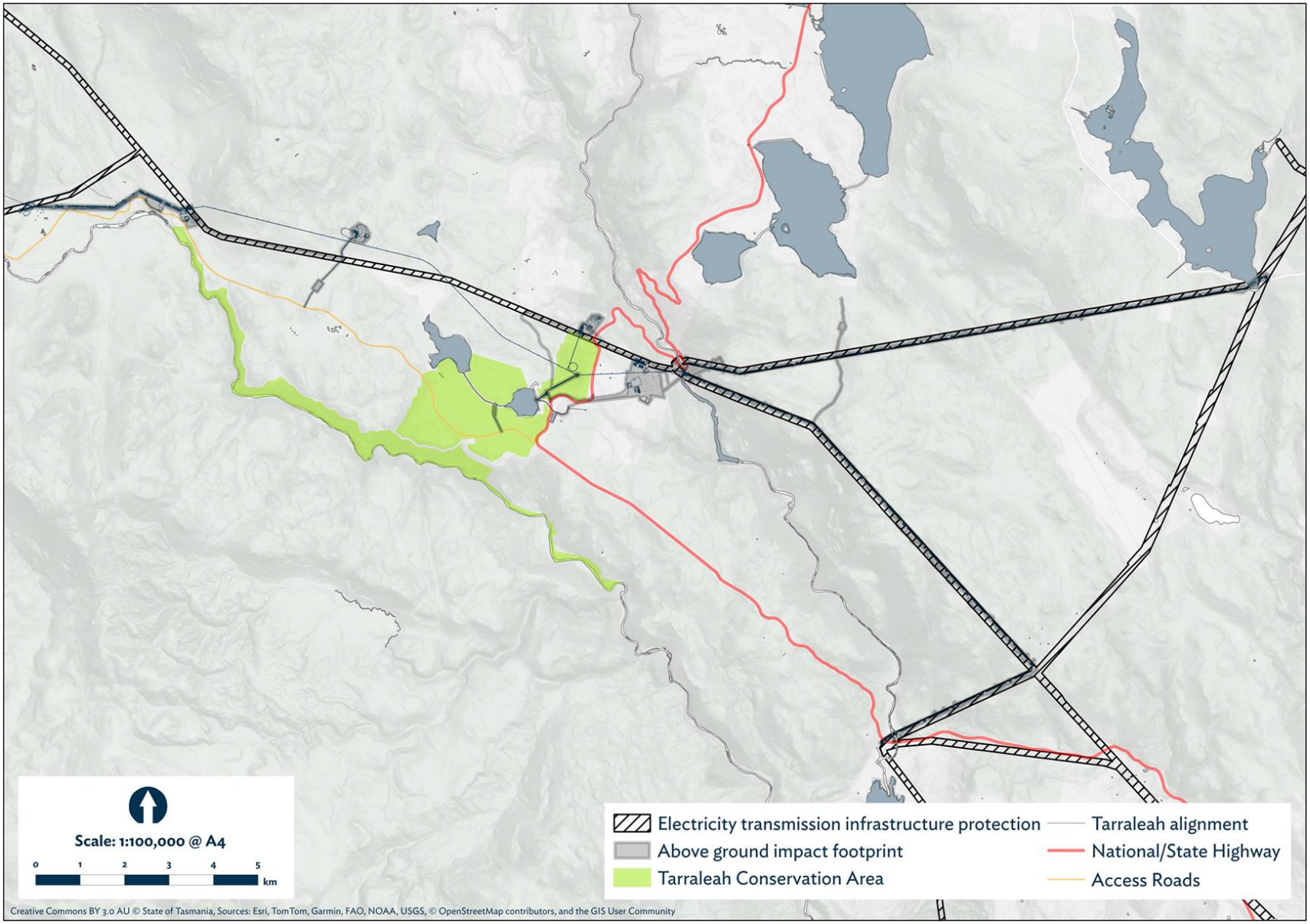


Figure 2.27: Electricity transmission infrastructure protection code overlay

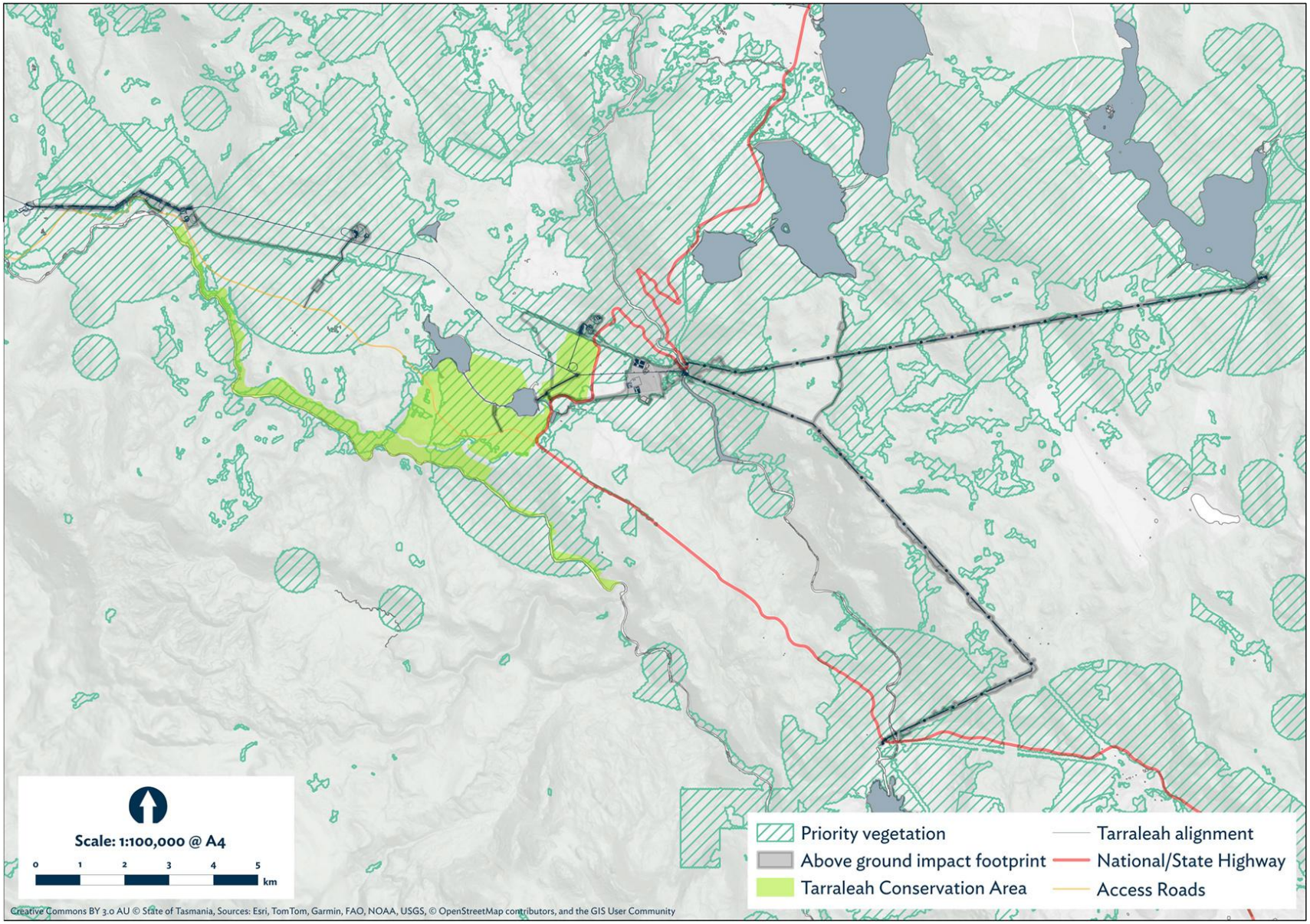


Figure 2.28: Priority vegetation overlay

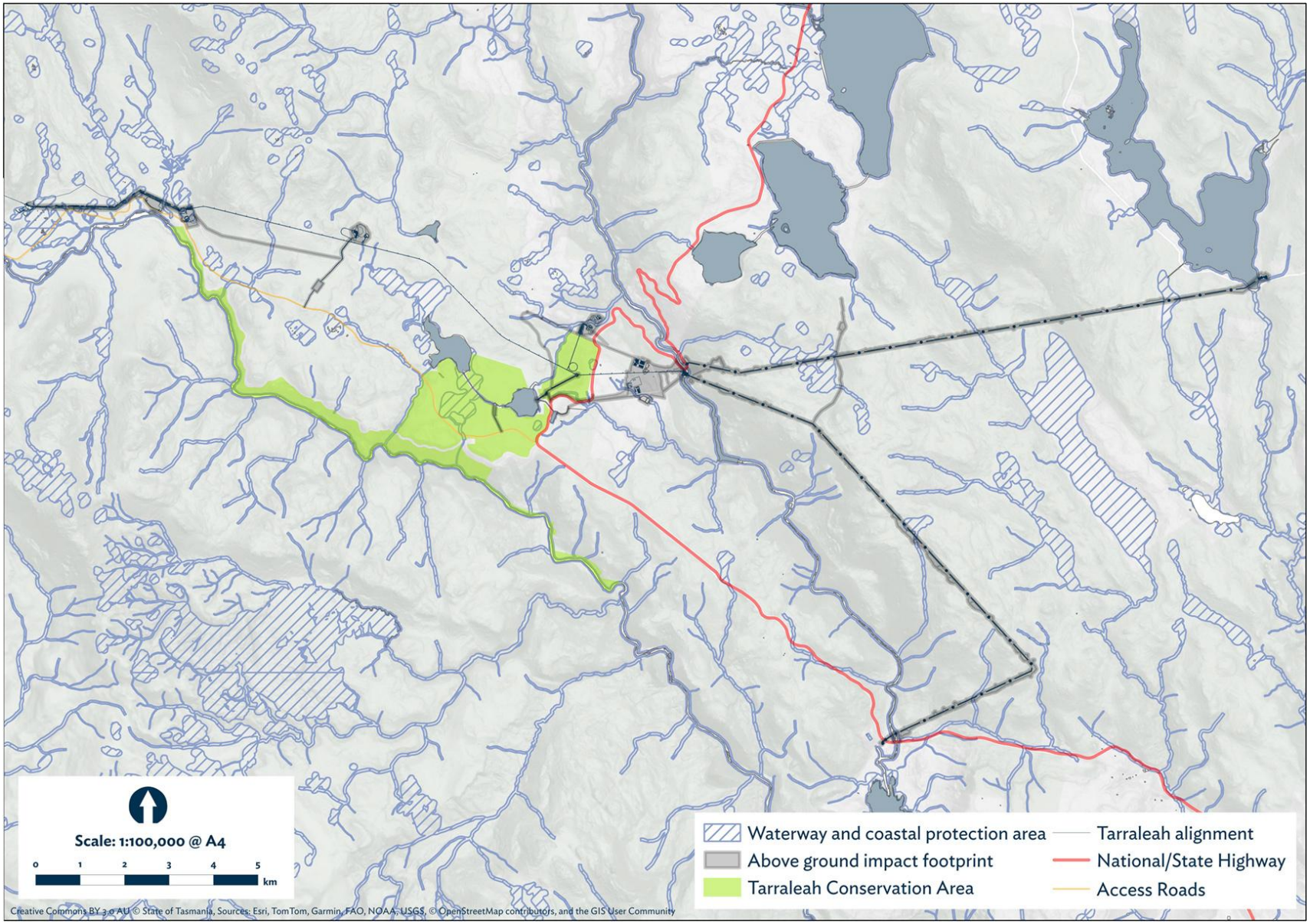


Figure 2.29: Waterway and coastal protection overlay

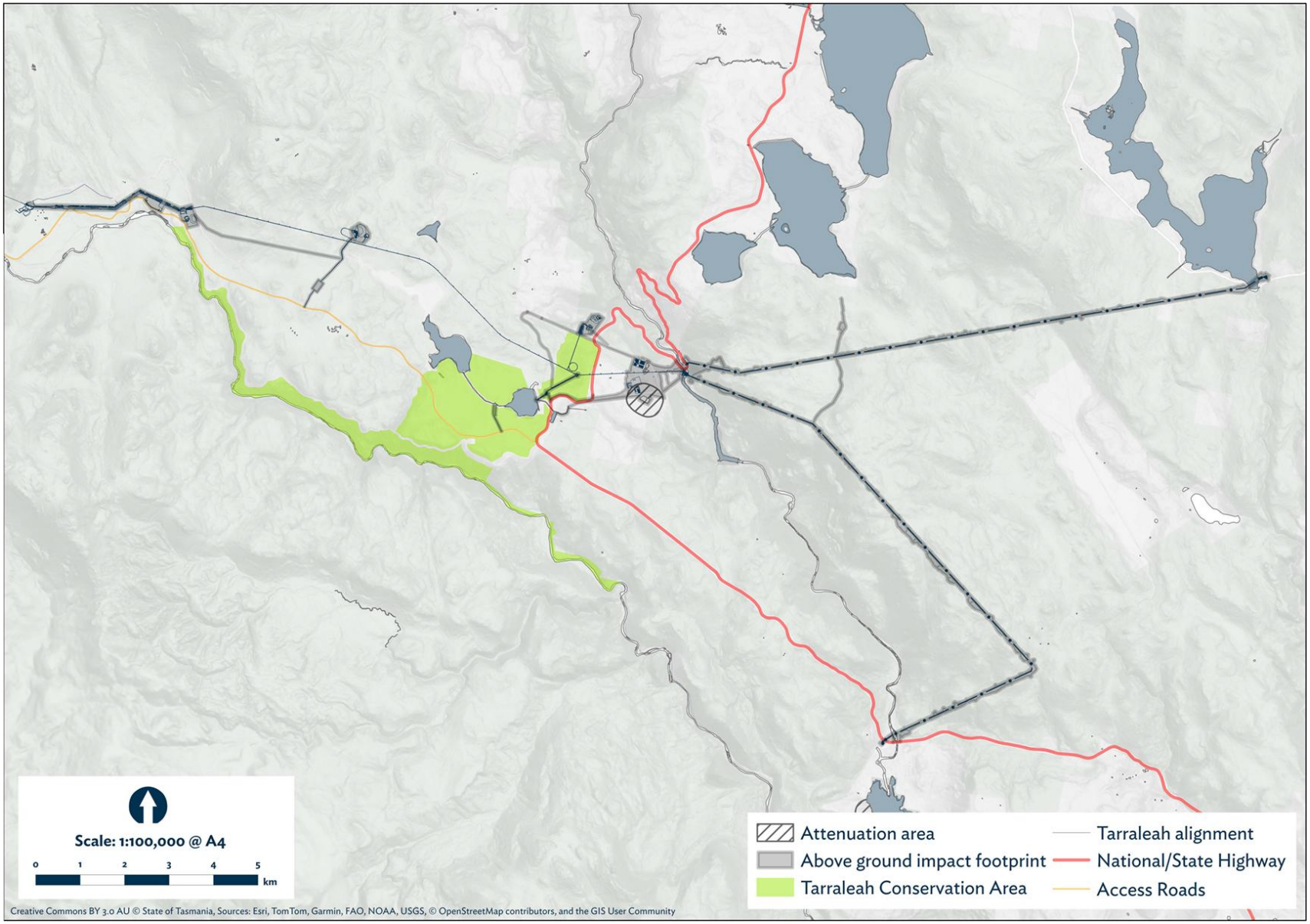


Figure 2.30: Attenuation areas overlay

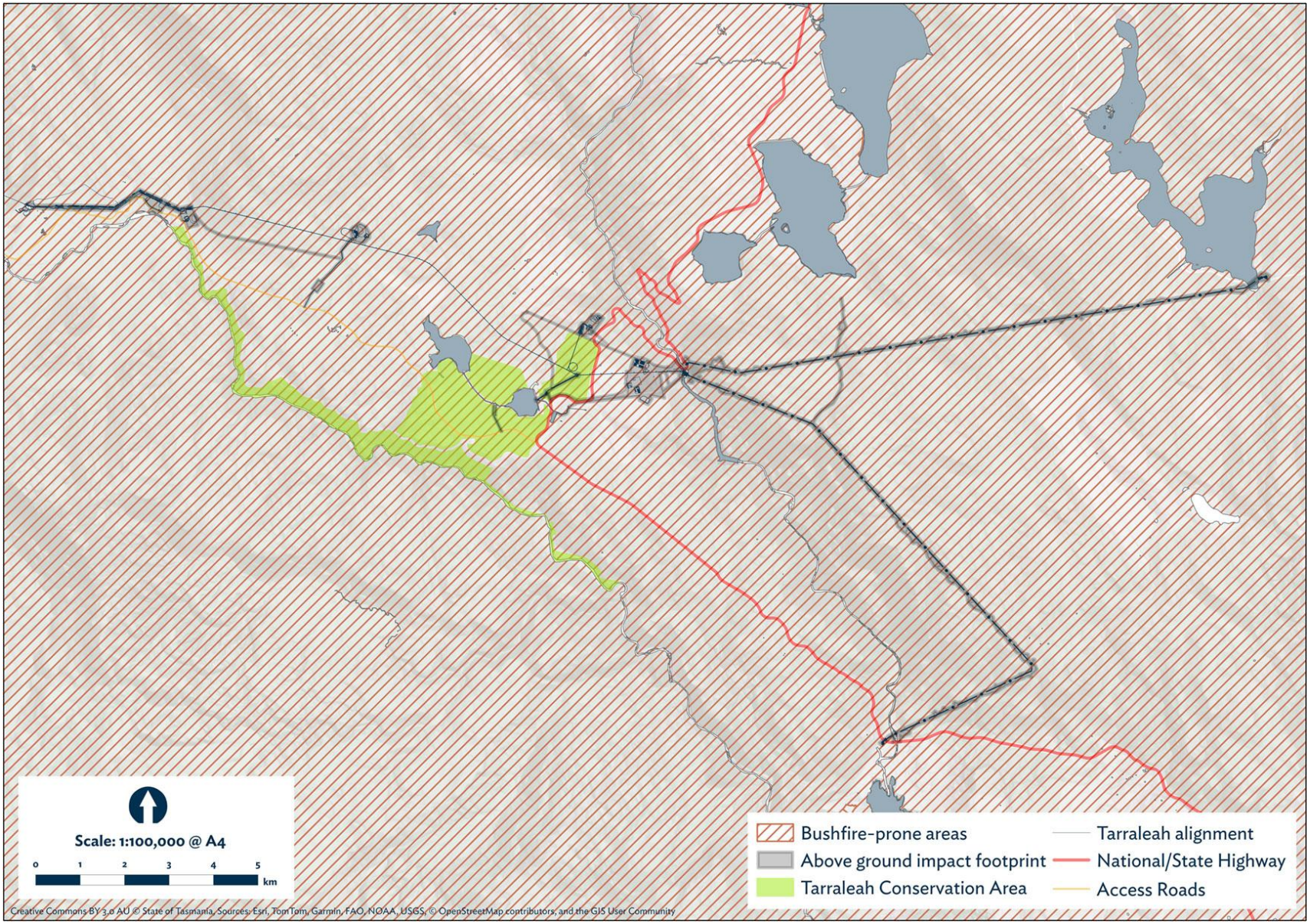


Figure 2.31: Bushfire-prone areas overlay

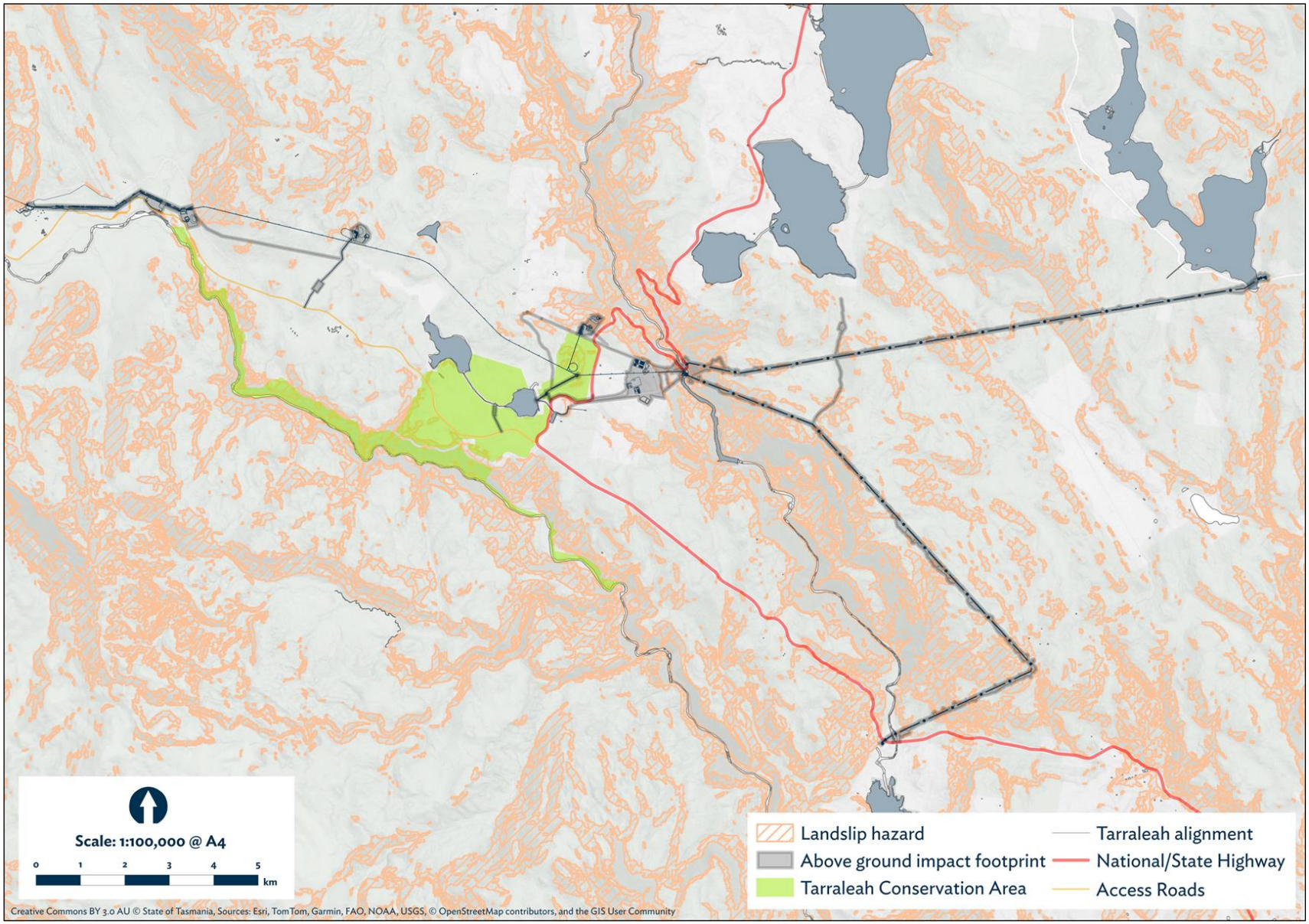


Figure 2.32: Landslip hazard overlay

3 Project alternatives

3.1 Rationale for development

The existing Tarraleah hydropower scheme has been generating electricity for Tasmanians for over 85 years; however, it faces physical and operational constraints that make it increasingly unsuitable for the evolving electricity market, and some of its assets are nearing the end of their operational life.

Hydro Tasmania has undertaken a series of studies to assess viable future options for the scheme, including a pre-feasibility study (2017), feasibility study (2018–2020), and Project design development (2021–2022). These studies identified three key risks associated with continued operation of the existing scheme:

- **Risk of an environmental incident:** Many of Tarraleah's assets, including machinery and water conveyances, are aging. No. 1 Canal presents the highest risk of failure, with an estimated 1-in-50 chance of major failure per year, and a 1-in-20 chance of moderate failure. Large sections of the canal run within 10 metres (m) of the Tasmanian Wilderness World Heritage Area (TWWHA), meaning a failure could have significant environmental consequences. Hydro Tasmania has legal obligations under Tasmanian and Federal law to protect the natural and cultural values of the TWWHA. It is therefore prudent to reduce the risk to a tolerable level by the mid-2030s.
- **Scheme inflexibility:** The current configuration of Tarraleah only supports manual operation and inflexible generation, limiting its ability to respond to electricity market signals or provide the firming capacity needed for system security and reliability. As the electricity market shifts toward higher levels of variable renewable energy (VRE), this inflexibility will become a greater barrier—reducing the scheme's ability to capitalise on opportunities or manage risks associated with increasingly volatile wholesale prices.
- **Future reliability**: Given the age of the power station and its machinery, the risk of operational failure is increasing. Both planned and unplanned outages are expected to become more frequent as equipment continues to age. These disruptions will result in lost output from a scheme that currently contributes around 7.3% of Tasmania's annual electricity generation.

To address these risks and position the Tarraleah scheme for a future energy market dominated by VRE sources, the following objectives were identified for the new scheme:

- **Enable a transition from baseload to flexible generation**, increasing efficiency and capacity to suit a market with high VRE penetration.
- **Provide inter-and intra-seasonal flexibility**, allowing generation to be paused for days or weeks without water spill, while enabling full output during extended periods of high demand.
- **Mitigate risks associated with aging infrastructure**, particularly No. 1 Canal, hillside penstocks, and the generating units in the existing power station.

3.2 Project alternatives

Hydro Tasmania explored a range of operational and project alternatives to assess against the objectives outlined above, including:

- **Status Quo—Do nothing:** Maintain the current scheme. This scenario is included for comparison purposes only. It does not adequately address the environmental, flexibility, or reliability concerns that drive the need for investment and is therefore not considered sustainable in the long-term.
- **Option 1—Decommissioning:** Decommission the existing scheme in the near term once the assets reach the end of their expected operational life.
- **Option 2—Minimum refurbishment:** Refurbish the existing power station and replace the canals and conveyances.
- **Option 3—Refurbishment with Battery Energy Storage System (additional shallow storage capacity):** Equivalent to Option 2, with additional capacity introduced through a two-hour (200 MWh) Battery Energy Storage System (BESS) located elsewhere in the portfolio.
- **Option 4—Redevelopment with headponds (deep storage):** Replace the Tarraleah Power Station and increase the size of the headponds (No. 2 Pond) to provide additional operational flexibility.
- **Option 5—Redevelopment with pressurised conveyance (inter-seasonal storage):** Replace the Tarraleah Power Station and construct a new pressurised conveyance to provide maximum flexibility (including inter-seasonal storage) and enhanced reliability.

Due to the location of Clark Dam and its connection to downstream storages in the Derwent scheme, no alternative locations outside the Project area were considered for a future Tarraleah scheme.

Given the limited range of viable alternatives and the isolated location of the Tarraleah scheme, community consultation did not yield any changes to the alternatives considered.

3.2.1 Status quo – Do nothing

The status quo represents the current Tarraleah scheme, and involves undertaking essential refurbishment works at the Tarraleah and Butlers Gorge Power Stations, with the sole aim of sustaining existing operations. While these works would maintain functionality, they do not address the key issues identified—particularly the environmental risks associated with ageing canals. As such, the status quo is included for comparison purposes only.

3.2.2 Option 1 – Decommissioning

Option 1 involves decommissioning the existing Tarraleah scheme once asset conditions are deemed untenable. Under this option, from around 2030, water released from Lake King William would bypass the Tarraleah and Liapootah Power Stations and flow directly into the River Derwent, feeding Wayatinah Lagoon and the remaining lower Derwent scheme.

Butlers Gorge Power Station would be refurbished to continue operating (with a peak capacity of 12 MW), supporting discharge regulation and flood mitigation. The Nieterana Mini-Hydro Power Station and No. 2 Canal would be decommissioned.

While this option would address the foreseeable environmental risks, it would also significantly reduce the reliability, storage capacity, and operational flexibility of the Tasmanian hydropower portfolio. Decommissioning the scheme would lower energy conversion rates from the Lake King William and Tarraleah catchments, resulting in the loss of approximately 700 GWh of annual generation. This figure includes the current output of the Tarraleah and Nieterana Mini-Hydro Power Stations, as well as about half of the existing output from Liapootah Power Station.

Given the reduction in system capacity and generation, decommissioning was not considered an acceptable option.

3.2.3 Option 2 – Minimum refurbishment

Option 2 involves refurbishing and upgrading the existing Tarraleah scheme to manage the risk of failure. This would enhance environmental protection and improve the long-term reliability of operations.

Key works under this option include upgrading the existing Tarraleah Power Station, constructing a new conveyance system to replace the existing canals, and building new headworks. This would result in a marginal increase in capacity compared to the status quo (Option 1). While the Butlers Gorge and Nieterana Power Stations would be decommissioned (removing 14 MW of capacity), the peak output of the Tarraleah Power Station would increase by 24 MW through new equipment and infrastructure.

The station would gain remote start/stop capabilities, and the new conveyance and headworks would allow it to operate at full capacity (40 m^3/s), enabling some intra-day operational flexibility. Generation could be adjusted in response to negative price periods or morning and evening demand peaks. However, due to limitations of the new conveyance system and no increase to the size of No. 2 Pond, this option would not support inter-day balancing.

3.2.4 Option 3 – Refurbishment with Battery Energy Storage System (additional shallow storage)

Option 3 involves refurbishing the Tarraleah scheme, as outlined in Option 2, with the addition of a 100 MW, two-hour (200 MWh) BESS located elsewhere in the portfolio. Like Option 2, this option addresses the risk of environmental incidents and improves the reliability of the scheme's operations.

The inclusion of a BESS enhances flexibility across Hydro Tasmania's portfolio by providing intra-day balancing capabilities and enabling the capture of higher revenue during peak price periods; however, as with Option 2, this option does not fully meet the flexibility objective, as the storage duration remains short compared to the redevelopment options (Options 4 and 5).

3.2.5 Option 4 – Redevelopment with headponds (deep storage)

Option 4 involves redeveloping the Tarraleah scheme to improve reliability, increase capacity, and provide additional flexibility—both intra-day and inter-day. It addresses the current environmental and reliability risks by replacing the Tarraleah Power Station and constructing new water conveyances (pipelines and tunnels) to connect Lake King William to the headpond storage (No. 2 Pond), bypassing the ageing canals.

To enhance system flexibility, No. 2 Pond would be enlarged to its maximum practical size. This would enable the scheme to operate at a peak output of 160 MW for up to 20 hours. After this period, output would be constrained to 100 MW, limited by the capacity of the conveyance system to replenish No. 2 Pond.

While this configuration supports daily generation cycles and allows the scheme to respond flexibly to morning and evening demand peaks, the full output is only available for 20 hours before the reduced capacity takes effect.

3.2.6 Option 5 – Redevelopment with pressurised conveyance (inter-seasonal storage)

Option 5 involves redeveloping the Tarraleah scheme to improve reliability and capacity, while also enabling electricity balancing across multiple timescales. This supports system security and reliability, in the face of increasing variability in energy demand and supply.

To address current environmental and reliability risks, this option includes replacing the Tarraleah Power Station and constructing a new pressurised conveyance to bypass the existing canals, directly connecting the new station to the head storage at Lake King William. This configuration provides inter-seasonal storage capability, improves energy conversion efficiency, and adds up to 100 MW of capacity—bringing the total peak capacity to 190 MW.

This additional operational flexibility could contribute up to 200 GWh per year to the portfolio, through a combination of improved system efficiency and greater operational flexibility across the Derwent scheme.

In addition to the benefits of Option 4, this option offers stronger responses to short-term periods of low renewable generation—such as cloudy days and windless nights—and supports energy smoothing over longer durations, including during wind droughts. It enables the scheme to balance variable renewable energy with demand across timeframes ranging from inter-day to inter-seasonal.

The new power station will be capable of sustained full-capacity operation during periods of high market prices—both intra-day and across seasons—by storing excess water in Lake King William for later use. The redeveloped Tarraleah Power Station is expected to function primarily as a peaking station, generating at or near full output when demand or market prices are high, and providing system inertia and voltage support during periods of low demand.

3.3 Options assessment

An integrated approach was used to assess the Project options (see Figure 3.1). The status quo and five proposed options were first screened against a set of non-negotiable criteria. Options that passed this initial screening were then evaluated and ranked through a comprehensive assessment that considered multiple impacts in parallel. Based on the combined results, a preferred option was recommended for progression.

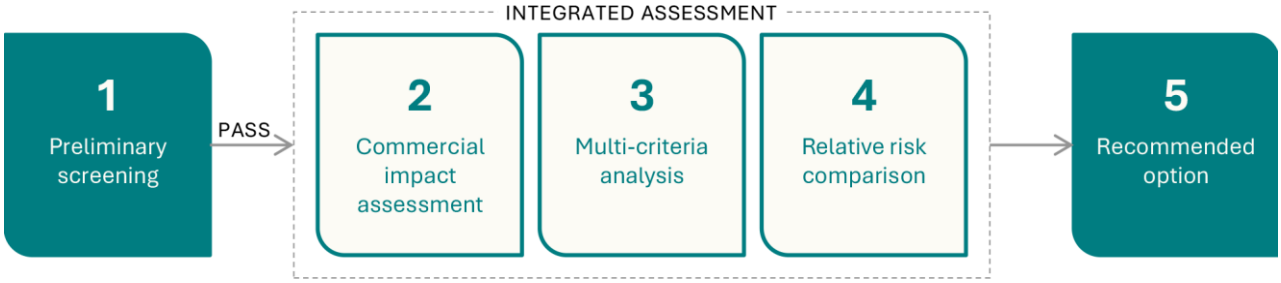


Figure 3.1: Overview of options assessment process

3.3.1 Preliminary screening

Each option was initially screened against three key criteria: technical viability, compliance with legal, regulatory and contractual requirements, and environmental protection (specifically, mitigating the risk of conveyance failure). All options—except for the status quo, which did not involve replacing the ageing conveyances—passed this preliminary screening.

3.3.2 Integrated assessment

The integrated assessment included the following components:

- **Commercial Impact Assessment:** This assessed value for money, with Option 5 (Redevelopment with Pressurised Conveyance) demonstrating the highest internal rate of return (IRR) compared to the other options.
- **Multi-Criteria Analysis (MCA):** A performance assessment against various qualitative criteria using an MCA framework. This included scoring both financial and non-financial impacts to compare the overall value of each option. As value considers both costs and benefits, there is intentional overlap between the commercial impact assessment and the qualitative evaluation.
- **Comparative assessment:** To complement the financial analysis, a broader comparative assessment was conducted using evaluation criteria that reflect the key project drivers and materially differentiate between options. These criteria include:
  - Commercial performance: Whole-of-life net present value (NPV), calculated over a 40-year assessment period (revenue less costs).
  - Policy and strategic alignment: The degree of alignment with Hydro Tasmania's strategic direction and relevant Tasmanian and Australian Government policies and objectives.
  - Mitigation of environmental incident risk: The extent to which downstream environmental risks (e.g. from asset failure) are mitigated.
  - Social impacts: The impact on key stakeholder groups, including local communities and Aboriginal communities.
  - Market opportunity: The option's impact on Tasmanian energy supply security and its flexibility to respond to future market conditions.

The MCA (Table 3.1) indicates that Option 5 scored the highest overall, followed by Option 4. Option 1 (Decommissioning) received the lowest score.

Table 3.1: MCA total scores (weighted and unweighted)

Evaluation criterion	Option 1	Option 2	Option 3	Option 4	Option 5
Average score (unweighted)	2.7	4.6	4.4	5.2	5.8
Weighted Score	2.5	4.4	4.4	5.2	5.7

3.3.3 Preferred option

Based on the options assessment, Option 5 (Redevelopment with pressurised conveyance) was identified as the preferred option because it:

- Provides a peak capacity of approximately 190 MW, with the flexibility to respond to future market conditions, and has the potential to add up to 200 GWh of annual energy generation to the portfolio
- Delivers the highest revenue and internal rate of return (IRR) among all Project options
- Offers the highest net present value (NPV) of any option that maintains operations at Tarraleah, and—along with Options 3 and 4—may be eligible for preferential funding from the Clean Energy Finance Corporation
- Achieves the highest ranking in the MCA, with the top weighted and unweighted scores. As the MCA accounts for both quantitative and qualitative impacts, this indicates strong value for money
- Best aligns with the long-term strategy of Hydro Tasmania and the objectives of the Tasmanian and Australian Governments
- Presents a similar risk profile to other Project options.

3.3.4 Updated analysis

In 2024, a revised options appraisal was conducted—with updated cost estimates and revenue projections—as a prudent step to confirm that Option 5: Redevelopment with pressurised conveyance (later renamed the Tarraleah Redevelopment Project) remained the preferred option. The assessment was completed in three stages:

1) **Revisiting the five options:** This phase incorporated updated cost and revenue projections, refined MCA criteria (reflecting updated project objectives), and the latest risk assessments.
2) **Comparison to lower-cost alternatives:** Additional analysis compared the full redevelopment to lower-cost alternatives aimed at extending the life of existing Tarraleah assets and/or delaying major investment. The alternatives considered were staged refurbishment and extended operations.
3) **Breakeven analysis:** The final phase evaluated Option 5 against alternative technologies that could be deployed elsewhere in Tasmania. The aim was to identify the most cost-effective and reliable energy solution capable of replacing the existing Tarraleah scheme while supporting future grid stability and sustainability. The alternatives assessed included wind, wind with battery energy storage, and gas.

All three phases of the analysis confirmed that the Tarraleah Redevelopment Project (Option 5) remains the preferred option. It is the most effective at addressing the identified issues, offers the strongest financial metrics, and delivers the greatest overall benefit to Tasmania—aligning with strategic objectives and Hydro Tasmania's Ministerial Charter.

3.4 Project design

Project design options have been explored through pre-feasibility and feasibility studies, as well as ongoing design development, from 2017 to the present. The pre-feasibility studies provided an initial assessment of the Project and its potential options, while the feasibility studies examined the technical, financial, environmental, and social implications in greater detail.

All studies were conducted in accordance with Hydro Tasmania's Environmental Management System and reflect best practice environmental management, consistent with Section 4(2) of the Tasmanian *Environmental Management and Pollution Control Act 1994* (EMPC Act).

Key design elements considered through these studies are outlined below.

3.4.1 Scheme capacity

Scheme flow rates ranging from 40 m^3/s (the current scheme capacity) up to 80 m^3/s were considered. Assessments concluded that a flow rate of approximately 60 m^3/s is the most suitable configuration to meet the redevelopment objectives.

A 60 m^3/s flow rate enables the scheme to operate at a 50% utilisation factor annually. This provides the flexibility to dispatch power effectively over short (hourly) and medium-to-long (days to weeks) timeframes—ensuring the scheme can respond to an electricity market with high levels of variable renewable energy.

Alternative flow rates were deemed unsuitable because:

- A lower discharge capacity would limit the flexibility of the generation profile
- A higher discharge capacity would exceed the downstream capacity of Liapootah Power Station, resulting in generation losses due to spill.

3.4.2 Water conveyance arrangement

A direct or pressurised conveyance system from Lake King William to the Nive River enables full use of the available head difference for energy generation, while also replacing ageing conveyance infrastructure. Alternative designs using open waterways—such as canals—to transfer water from Lake King William to a headpond above the power station were found to generate 15–20% less energy for the same water flow. Additional infrastructure like large storage ponds offered limited flexibility and did not meet the objective of providing inter-seasonal storage capacity.

Pre-feasibility studies evaluated several alternative conveyance configurations, including detailed environmental impact assessments of the following options:

- **Option 1:** A new, long pressurised tunnel or pipe from Lake King William to a new power station on the Nive River, near the existing Tarraleah Power Station.
- **Option 2:** A new No. 3 Conveyance from Lake King William to Mossy Marsh Pond (bypassing the existing canals), an enlarged No. 2 Pond for increased storage, and a new pressurised tunnel from No. 2 Pond to a new power station on the Nive River.
- **Option 3:** Refurbishment of existing assets while retaining the current scheme configuration.

These options were further assessed in subsequent studies, which concluded that Option 1 was the only configuration that met all Project objectives.

3.4.3 Power station arrangement

A new power station is required to accommodate larger, more efficient hydro-electric generating units, made necessary by the increased flow and head provided through the redeveloped conveyance system.

Several potential locations and configurations were assessed during the feasibility studies and design development. These assessments concluded that the proposed site—adjacent to the existing Tarraleah Power Station—best meets the Project objectives for the following reasons:

- It is located on the west bank of the Nive River, removing the need for penstock and access bridges across the river.
- It maximises the available head, thereby increasing scheme output.
- The existing terrace provides suitable space for construction, allows for both permanent and temporary flood-proofing measures, and minimises the need for in-river works.

4 Engagement and public consultation

4.1 Introduction

Hydro Tasmania is undertaking a comprehensive stakeholder consultation and engagement program as a key part of the Project's approvals process. The program involves consultation with neighbouring landholders, local government, community groups, and other interested parties.

This section provides an overview of the engagement activities being conducted for the Environmental Impact Statement (EIS) and Development Application (DA), including the program's objectives, the engagement methods used, the stakeholders consulted, the issues raised, and how these issues have been addressed in the EIS.

Details of the engagement activities carried out up to the end of 2024 are outlined in the Engagement Report (Appendix D). This section also includes an update on engagement activities and outcomes from January to April 2025, along with an explanation of how the engagement program informed the Social Impact Assessment (SIA) (Appendix E). Future engagement activities to support the public exhibition of the EIS/DA are also outlined in this section.

4.2 Regulatory requirements

The Project has been assessed against the objectives of the Tasmanian Resource Management and Planning System (RMPS). Objective (c) of the RMPS—*to encourage public involvement in resource management and planning*—requires that the public be given the opportunity to participate in the development process. This is typically achieved through public representations and sets the expectation that Hydro Tasmania engages with local communities early and continues engagement throughout the assessment process.

In August 2024, the EPA issued EIS Guidelines that include requirements for community engagement and public consultation. The Project's engagement program has been designed and implemented in line with these guidelines.

Engagement and consultation have played a key role in identifying and assessing potential environmental, cultural, and socio-economic impacts and opportunities, as well as in validating proposed management measures. Community and stakeholder engagement began early in the feasibility stage of the Project.

This section outlines the phases of the engagement program as they align with major milestones in the Project's regulatory approvals process:

- Preparation of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Referral with the Department of Climate Change, Energy, the Environment and Water (DCCEEW)
- Preparation of the EIS and DA with the EPA and Central Highlands Council
- Public exhibition of the EIS and Development Application.

4.3 Stakeholder and Community Engagement Guidelines

Hydro Tasmania's Stakeholder Engagement Charter set the tone and defined the principles and objectives of the Project's engagement program.

The program was also guided by the *Renewable Energy Development in Tasmania (ReCFIT) Guideline for Community Engagement, Benefit Sharing, and Local Procurement*, as well as various industry guidelines, including those from the Clean Energy Council.

In line with Hydro Tasmania's *AS/NZS ISO 14001:2016 Environmental Management System* (EMS), the organisation's obligations regarding social aspects include:

- **Stakeholder Engagement:** Identifying and engaging with stakeholders—including local communities—to understand their needs and expectations. This supports gaining a social licence to operate and addressing any potential social impacts of the Project.

A summary of the key guidelines that informed the design and delivery of the EIS engagement program is provided in Table 4.1.

Table 4.1: Guidelines informing the EIS engagement program

Guidance Document	Description
Hydro Tasmania Stakeholder Engagement Charter	Hydro Tasmania's commitments to working with our stakeholders are set out in Hydro Tasmania's Stakeholder Engagement Charter. Our communications with internal and external stakeholders will be in plain, clear language underpinned by a commitment to accuracy, honesty and authenticity. hydro-tasmania-stakeholder-engagement-charter-.pdf
Renewable Energy Development in Tasmania – Guidelines (ReCFIT, May 2024)	These guidelines set a clear standard for best practice community engagement, benefit sharing and local procurement for renewable energy development in Tasmania.
Clean Energy Council First Nations engagement guide for the renewables industry	This guide sets out expectations for industry and details key considerations for engagement of First Nations people at each stage of a project's lifecycle
IAP2 Public Participation Spectrum	The International Association for Public Participation (IAP2) Australasia promotes best practices in public participation, aiming to improve environmental, social, and governance outcomes. The IAP2 Public Participation Spectrum and the Quality Assurance Standard for Community and Stakeholder Engagement are key tools that have been used to inform the Stakeholder Engagement Plan (SEP) underpinning this Project.
Clean Energy Council's Best Practice Charter	Hydro Tasmania is a signatory to the Clean Energy Council's Best Practice Charter and reports annually to disclose how Hydro Tasmania is engaging respectfully with the communities we operate in, including First Nations communities, being sensitive to environmental and cultural values, and making a positive contribution to the regions in which we operate

4.4 Principles

The principles adopted for the Stakeholder Engagement Plan (SEP) for the Project are set out in Table 4.2. They are based on Hydro Tasmania's Stakeholder Engagement Charter and refined from the guidelines outlined above.

Table 4.2: Community Engagement Principles

Principle	Description
Genuine	Seek community input and feedback, listen actively, report back what has been heard, respond thoughtfully, and make clear how community feedback has influenced the Project (or not) and why.
Flexible	Allow opportunities for community input to influence actions and decisions relating to matters that affect them directly and to the Project where appropriate. Tailor the approach to match the local context, based on local input.
Trustworthy	Build, maintain and value local relationships. Show that outcomes are delivered on commitments (however small or large)
Inclusive	Reach different people with different needs within the community using a good mix of methods that are sustained over time, recognise and reach out to the many segments of a community (e.g. including First Nations, youth). Support people to participate where required.
Mutually beneficial	Seek outcomes that benefit all parties. Remember that good practice will deliver better outcomes for communities, projects, developers, and government.
Collaborative	Seek out local organisations already doing good engagement and community development in the Project area to get advice from and partner with. Seek out and engage with people's ideas, feedback, and suggestions.

4.5 Objectives

The aim of the engagement program is to identify community and stakeholder issues related to the Project and ensure these are addressed as part of the EIS process. The consultation was designed as an issues-driven program, focused on understanding both the potential negative and positive impacts in context.

The specific objectives are to:

- Identify Project stakeholders
- Inform stakeholders about the Project
- Identify and understand stakeholder concerns and issues
- Use stakeholder insights—particularly around values and aspirations—to develop mitigation and response strategies
- Validate social baseline data and issues identified through engagement.

The overarching objective is to ensure stakeholder and community understanding of the Project, along with support for the proposed mitigation measures and opportunities identified.

4.6 Overview of consultation approach

A SEP was developed to guide the identification and engagement of Project stakeholders, manage potential impacts, and enhance opportunities associated with the Project.

The SEP outlines the engagement activities undertaken during the detailed design, development planning, and approvals phase—up to and including the Final Investment Decision (FID).

It also includes consultation activities supporting the preparation of the SIA, particularly the identification and consideration of potential social impacts and opportunities.

A phased approach was adopted for consultation to ensure each stage built on the outcomes of the previous one and could adapt to changes in the Project design or broader socio-economic and political context.

4.6.1 Phasing

The engagement strategy was delivered in three phases, each with defined purposes, outcomes, and methods:

- **Phase 1 – Project Socialisation and Issue Scoping:** This phase focused on raising stakeholder awareness of the Project and gathering data and insights to inform the social baseline and assess potential social impacts and opportunities. It also aimed to understand stakeholder interests and how they might experience potential impacts. This phase aligned with the preparation and lodgement of the EPBC Referral.
- **Phase 2 – Issue Response:** Engagement findings were used to inform technical studies, including the Social Impact Assessment (SIA). This phase aligned with the preparation of the EIS and DA.
- **Phase 3 – EIS/DA Exhibition and Feedback:** Engagement during and prior to the public exhibition of the EIS and DA aimed to raise awareness of the Project and explain how stakeholder issues are being addressed—through environmental and social impact management measures, local benefit-sharing initiatives, and ongoing communication.

4.6.2 Stakeholder identification

A stakeholder mapping process was carried out, beginning with desktop research and expanded through a ‘snowballing’ approach during consultation and engagement activities. The outcome of this process is illustrated in Figure 4.1.

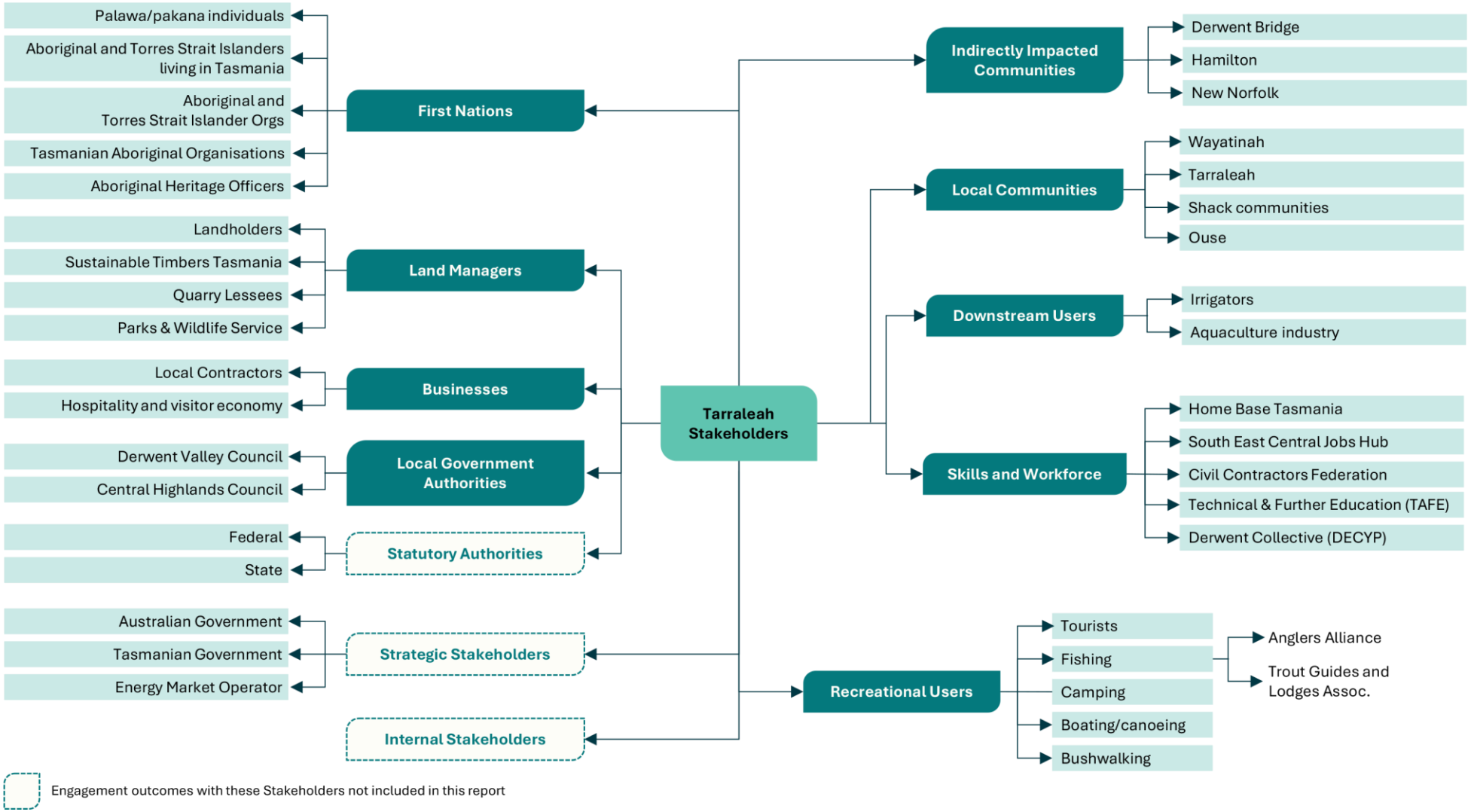


Figure 4.1: Stakeholder Map

4.7 Consultation and engagement undertaken

This section outlines how the engagement process was promoted, the activities carried out, and the stakeholder groups involved.

Figure 4.2 provides an overview of the implementation of the SEP to date.

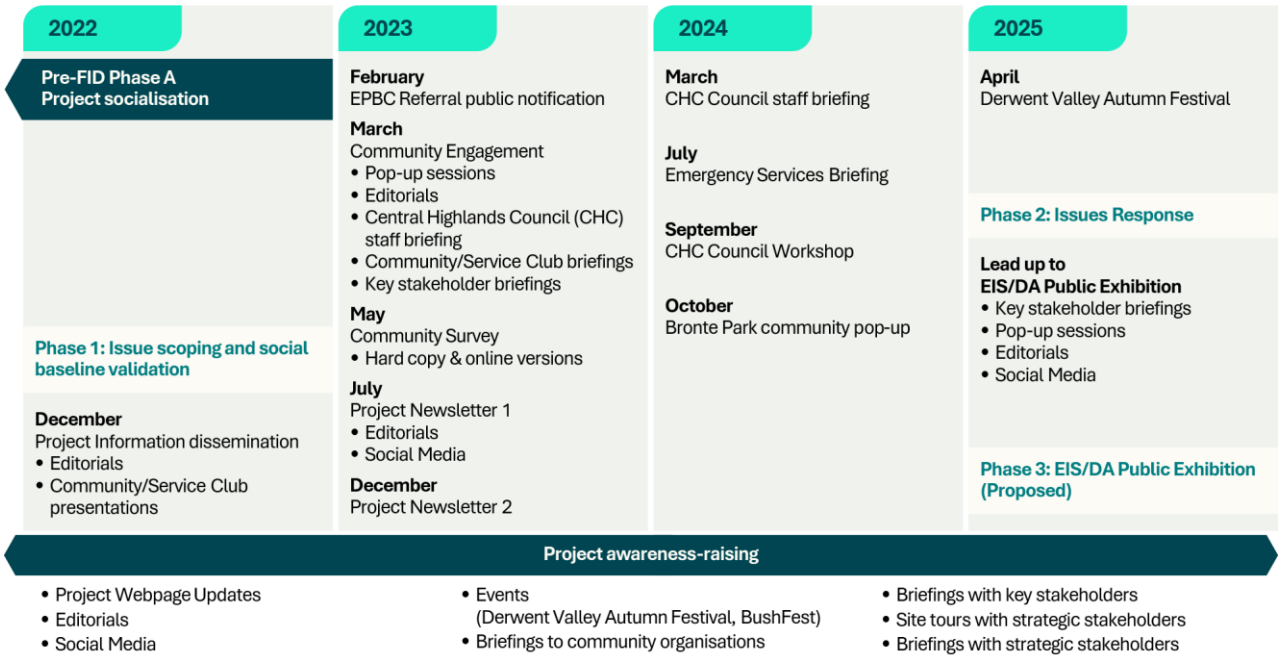


Figure 4.2: Overview of key engagement phases and activities (undertaken and proposed)

4.7.1 Promotion

Hydro Tasmania undertook a range of activities to raise awareness of engagement opportunities and encourage participation. A mix of communication channels was used to ensure broad reach and effective community engagement.

Details of the targeted promotion used to support community involvement in engagement sessions are outlined in Table 4.3.

Table 4.3: Activities undertaken to promote the engagement program

Activity	Details
Project website	connect.hydro.com.au/reimagining-tarraleah
Newsletters	Provide current information on the project status, including approvals, and study findings and outcomes
Flyers and posters	Promote opportunities for engagement with the project team Provide summary project update and promote project webpage
Social media	Share project updates and news of interest / relevance to the project Raise awareness of our project page
Stakeholder emails	To maintain connection with key stakeholders, sharing relevant project updates and news

Activity	Details
Direct invitations to engagement sessions	A range of direct invitations to engagement activities were made to key stakeholder organisations and individuals as part of event promotion
Ad-hoc responses to others' events	Responded to invitations to present to audiences during events organised by others (e.g. presentations to service clubs such as Rotary, Probus, etc) Attended the Liapootah Open Day share with the attending public information on the Project

4.7.2 Engagement activities

A range of engagement activities were delivered, including digital and online engagement, face-to-face information sessions, and targeted engagements with key stakeholders.

4.7.2.1 Digital/online engagement

While relatively low levels of digital access and digital literacy among local community members were recognised as potential barriers, digital engagement was still used to reach absentee or temporary resident landholders and other interested parties who do not live or work in the local area.

Table 4.4: Digital tools used for engagement

Tool	Purpose	When	Participation
Project webpage Q&A	To provide project information, updates, information about key engagement events, host surveys and feedback tools, FAQ, etc. connect.hydro.com.au/reimagining-tarraleah	July 2022 – ongoing	As of November 2024: Total visits: ~7,900; Aware visitors: ~5,400 Questions asked: 7
Places of interest 'online mapping' tool	A 'pin map' was developed and promoted through the project webpage and collateral for the drop-in sessions, newsletters and other media. connect.hydro.com.au/reimagining-tarraleah/maps/pin-map	June 2023 – ongoing	No participants
Surveys	To understand community values relating to the Project area and its surrounds, perceptions of the Project—their concerns and where they see opportunities, and ideas about mitigation of impacts and maximising opportunities.	July – October 2023	31 responses
Social media	Social media posts were made periodically over the past 2.5 years, covering the Tarraleah Village sale, community engagement opportunities, approvals updates, progress on upgrade works and updates to access to Lake King William via Butlers Gorge Road, due to upgrade works traffic control.	October 2022 – ongoing.	Post reach and engagement is topic-dependant, with the Tarraleah Village and the upgrade works being most popular with our audience

4.7.2.2 Information sessions

Drop-in sessions were designed to bring the Project directly to the community, offering an informal opportunity for locals to learn about the Project during their day-to-day activities.

Details of the face-to-face information sessions held are provided in Table 4.5.

Table 4.5: Information sessions 2023 to 2025

Activity	Location	Participation
Drop-in sessions	Hamilton (March 2023)	18
	Ouse (March 2023)	9
	Derwent Bridge (March 2023)	22
	Westerway (March 2023)	3
Information stalls	New Norfolk (Derwent Valley Autumn Festival) April 2023	~70
	New Norfolk (Derwent Valley Autumn Festival) April 2025	~ 40

4.7.2.3 Key stakeholder engagement

Opportunities to brief key stakeholders and present to community groups, service clubs, and other organisations were taken up wherever possible.

A summary of these engagement activities is provided in Table 4.6.

Table 4.6: Key stakeholder engagement summary

Stakeholder	Details	When
Central Highlands Council	Regular phone and email communications with Deputy GM, GM, Mayor	Regular/ongoing
	Briefing to Council staff	June 2023
	Briefing to Councillors	September 2024
Health Action Team Central Highlands	Meetings with Clinical and Consumer groups of HATCH to understand issues, concerns, current services and demand.	September 2023 and February 2024
Inland Fisheries	Phone calls and email updates, particularly around the status of Butlers Gorge Road	Regular/ongoing
Anglers Alliance	Presentation to Annual General Meeting (AGM)	October 2023
	Phone calls and email updates	Regular/ongoing
Trout Guides and Lodges Association Tasmania	Regular phone calls and email updates	Regular/ongoing
	Attendance at AGMs	Annually
Ambulance Tasmania	Phone briefing and data collection with regional manager.	October 2023
Fire Services	Briefing and information collection from Tasmanian Fire Service, Bradys Lake, Ouse, Great Lakes brigades and Brady's Lake State Emergency Service.	July 2024
NRM Groups	Derwent Catchment Project	March 2023 +
Other Community Groups	Hamilton Men's Shed, Highlands Community Network Cooperative	March 2023 +
Skills training, workforce development	Meetings with Colony 47 (now Homebase), Civil Construction Federation, South Central Workforce Network, Jobs Tasmania (State Growth), Derwent Valley Council.	October 2023 +

Stakeholder	Details	When
Department of State Growth (DSG)	Engagement around Lyell Hwy Corridor Strategy	November 2024
Education sector	DECYP Y 9-12 VET, Glenora, New Norfolk and Bothwell secondary schools. Damian Peirce Consulting, The Shift Lab, Social Traders, Social Enterprises Tasmania Network, Beacon Foundation.	October 2023 +
Business Sector	ICN Tas, Civil Contractors Federation, other contractors associated with Tarraleah Upgrade Works	Ongoing
Parks and Wildlife Service	Consultation regarding walker registration logbooks and visitation data.	July 2023 +

4.7.3 Landholder engagement

There are relatively few landholders adjacent to the Project area. Prior to Hydro Tasmania's purchase of the Tarraleah Village, the previous owner was regularly engaged.

Landholder engagement to date has included:

- Liaison with Sustainable Timber Tasmania regarding land access, leases, and related matters
- Liaison with Parks and Wildlife Service regarding recreational user statistics and approvals processes
- Meetings with landholders along the Lyell Highway closest to the Project site, through community drop-in sessions and letterbox drops.

4.7.4 First Nations People

Engagement with First Nations people has been ongoing across multiple fronts and timeframes. Key activities to date include:

- 2022:
  - Hydro Tasmania's Major Projects team engaged a Tasmanian Aboriginal consultant to develop engagement strategies for the Project.
  - A Project update was provided to the Aboriginal Heritage Council (AHC), with seven AHC members in attendance. Hydro Tasmania presented on the Tarraleah Upgrade works and received feedback on the Project.
  - A consultant Aboriginal Heritage Officer (AHO) circulated cultural heritage reports for Lake King William and invited feedback from the Tasmanian Aboriginal Centre (TAC) and 10 other Aboriginal organisations. On 26 April 2022, the AHO visited the site with two Aboriginal community members.
- 2023:
  - Hydro Tasmania met with representatives from the TAC and shared further Project information.
- 2024:
  - Hydro Tasmania's Major Projects Construction Unit re-engaged a Tasmanian Aboriginal consultant to support development of a new engagement plan for both the Tarraleah Redevelopment Project and the Cethana Pumped Hydro Energy Storage Project.
  - Engagement was then aligned with Hydro Tasmania's broader Commitment and Action Plan (CAP) strategy due to strong synergies between the initiatives.

- 2024–2025:
  - CAP-related engagement was implemented with the support of two Aboriginal Advisors. This included letters, emails, and face-to-face meetings with Aboriginal individuals and organisations. Both major projects were discussed, although no specific feedback was provided during this stage.
- 2025:
  - The Hydro Yarns website was launched, providing information and links to both major projects, along with a feedback survey tool that received responses.
  - A public call to action was issued via media advertisements in the Koori Mail and local/regional newspapers, inviting participation in ongoing engagement opportunities.

Further engagement activities and site visits with First Nations people and organisations are currently being planned and will continue as the Project progresses.

4.8 Summary of consultation findings

The following sections summarise the outcomes of consultation and engagement activities to date.

Overall, the community has expressed a positive attitude toward the Project, acknowledging its potential benefits; however, there are also concerns about specific impacts and clear expectations for how Hydro Tasmania will manage these issues and continue engaging with stakeholders.

4.8.1 Underlaying social conditions of relevance to the Project

The following factors were identified through the engagement program and are reflected in Section 5.9 and Appendix E.

- **Telecommunications and digital connectivity:** Poor mobile coverage—particularly in the Project area—affects emergency response capabilities and general safety.
- **Health and community services:** Local services are limited, with no general practice in Ouse since 2020. Residents must travel to access healthcare, which is made more difficult by high fuel costs and a lack of public transport.
- **Emergency services:** Volunteer fire brigades are active and well-supported but may face increasing demands. Ambulance services are generally adequate, though access can be restricted during adverse weather.
- **Housing:** While home ownership is high, much of the housing stock is old. There is a shortage of rental properties, and many seasonal ‘shack’ homes in remote areas lack adequate services.
- **Local labour market and workforce development:** Unemployment is low, but much of the required labour is expected to come from outside the project area. Local schools offer positive work exposure programs, and government initiatives support vocational training and youth employment.
- **Transport:** Limited public transport restricts access to education and employment opportunities. High living costs mean most families rely on a single vehicle.
- **Population and demography:** The region has an ageing population, low digital literacy, and a high proportion of middle to low-income households.
- **Community identity:** There is a strong connection to Tarraleah Village and the former Butlers Gorge settlement. The Tarraleah hydropower scheme is considered a key part of the local and regional identity.

4.8.2 Concerns about the Project

Community members and stakeholders raised the following general concerns about the Project:

- **Recreational access:** Concerns about restricted access to lakes for fishing—primarily from individual recreational fishers. Most were satisfied with temporary restrictions. Bushwalkers accessing the Mt Hobhouse area were expected to raise concerns about ongoing access; however, such concerns have not been communicated to Hydro Tasmania to date.
- **Community connection to place and heritage values:** Fears of losing access to Tarraleah Village and the Butlers Gorge township. Concerns about impacts on heritage values were raised mainly by individuals. Aboriginal cultural heritage and landscape values were also raised, both by individuals and some representatives of Aboriginal organisations.
- **Environmental impacts:** Concerns about changes to water storage levels, fishing conditions, and general environmental values. A small number of individuals raised specific concerns about endangered flora and fauna.
- **Traffic:** Concerns about increased road traffic, poor road conditions, and a higher risk of accidents. Some individuals raised specific concerns about potential road closures affecting commuters and emergency services.
- **Economic concerns:** Some community members worried that the benefits of the Project might go to the mainland rather than Tasmania. While some saw local economic opportunities, there was a general lack of awareness or clarity about what those might be.

4.8.3 Potential benefits or opportunities

Community members and stakeholders identified the following potential benefits and opportunities associated with the Project:

- **Economic and employment:** The Project is seen as a major source of local employment and economic activity. Schools view it as a valuable opportunity to provide work exposure and entry-level jobs for local students.
- **Social procurement:** Opportunities exist to support marginalised groups through partnerships with service providers and inclusive employment practices.
- **Energy and infrastructure:** The Project is expected to increase renewable energy production and improve the efficiency of electricity generation. Continued investment in hydropower assets is valued.
- **Tourism:** There is potential to integrate tourism with hydropower operations, including preserving and promoting Art Deco buildings as visitor attractions.

4.8.4 Expectations of Hydro Tasmania

Community members expressed the following expectations regarding how Hydro Tasmania should deliver the Project:

- **Local employment and economic development:** A strong desire for local hiring, support for local businesses, and the creation of training and employment opportunities—especially for students.
- **Environmental management:** Expectations that the Project will minimise environmental impacts and, where possible, improve conditions such as water quality and fishing habitats.
- **Heritage protection:** A clear expectation to preserve the heritage of Tarraleah, including protection and restoration of historic buildings.

- **Community engagement:** Continued, meaningful consultation is expected throughout the Project—particularly regarding potential impacts and benefits.
- **Project execution and oversight:** Confidence in the Project's timely and professional delivery is important to stakeholders.
- **Recreational and public access:** Community members expect that recreational access will not be reduced and that public access to infrastructure will be maintained.
- **Infrastructure and tourism:** There is support for upgrading infrastructure and exploring opportunities to integrate tourism into the Project

4.9 How have these issues been considered?

Table 4.7 summarises where each issue raised during engagement has been addressed within the EIS and/or in the supporting technical reports. Detailed responses to these issues are provided in the technical reports included in the EIS appendices.

Table 4.7: Summary of key issues and how they will be addressed

Issue	Raised by	Where are these issues addressed
Traffic on Lyell Hwy	• Town residents (Hamilton, Ouse) • Commuters • Emergency Services • Health and community services sector	• Section 2.4.1.10 • Section 5.15
Access to Tarraleah Village	• General community	• Section 2.4.1.10 • Section 5.15.2
Access to Lake King William and surrounding walking tracks	• Recreational fishers (individuals) • Recreational fishing organisations • Bushwalking groups	• Section 2.4.1.10 • Section 5.15.2
Management of Aboriginal cultural heritage	• Aboriginal people and organisations • Aboriginal Heritage Officers (AHO's)	• Section 5.13
Local jobs and local content	• General community • Local businesses	• Section 5.9 • Section 5.16
Access to health and community services	• General community • Service providers	• Section 5.9
Public amenities at Hydro Park (Nive River)	• General community • Tourism industry stakeholders	• Section 2.3 • Section 5.9
Environmental management	• General community	• Chapter 2 • Chapter 5
Community engagement during construction phase	• General community • Service providers • Emergency Services	• Chapter 4 • Section 5.9
Youth work exposure and employment.	• Education Sector • Service Providers	• Section 5.9 • Section 5.16
Social procurement	• Service Providers • State Growth	• Section 5.9 • Section 5.16

4.10 Future engagement

To date, local community engagement levels have been relatively low, largely due to the community's generally positive view of the Project and a limited demand for new information. In contrast, key stakeholders—such as the Central Highlands Council and recreational user groups—have shown stronger interest and participation.

As a result, there have been limited opportunities to validate the issues and mitigation measures proposed in this EIS directly with the broader community. To address this, Hydro Tasmania has planned an intensive engagement round prior to and during the EIS/DA exhibition period to ensure stakeholders are fully informed and able to provide feedback on the identified issues and proposed mitigations.

In addition, the development of the Social Impact Management Plan (SIMP) and the Local Benefit Sharing (LBS) Action Plan will provide further opportunities to engage local communities in responding to specific issues.

Hydro Tasmania remains committed to ongoing community and stakeholder engagement throughout the life of the Project. The following sections outline how this will be achieved.

4.10.1 Environmental Impact Statement/Development Application exhibition engagement

An EIS/DA exhibition engagement round is planned to begin ahead of the public exhibition period. The aim is to raise awareness of the process, timeline, and content of the EIS/DA, and to encourage stakeholder participation. This will include:

- **Communications:** A coordinated media campaign across various channels to inform stakeholders about this key stage of the Project and explain how they can get involved.
- **Targeted engagement:** Key stakeholders—such as local government, community organisations, recreational user groups, and local industry and business representatives—will be invited to engage directly with the Project team to discuss the EIS content and proposed mitigation measures.
- **Broader engagement activities**: A series of community *drop-in sessions* will be held at key locations throughout the Project area. These will include accessible materials summarising the EIS/DA content and proposed mitigations. Project team members will be available to answer questions. Online webinars will also be offered for those unable to attend in person.
- **Project webpage**: The Project website will serve as a central, accessible source of information, providing summaries of the EIS/DA content and details on how to participate.

Stakeholders will be encouraged to make formal submissions—whether in support of or in objection to the Project—during the exhibition period.

4.10.2 Consultation to inform the ongoing development of management measures

A program of focused consultations will be carried out to support the ongoing refinement of management measures. This will include continued monitoring and the identification of initiatives for the community benefit program.

4.10.3 Communication and Stakeholder Engagement Plan (delivery phase)

The SIA includes a commitment to develop a Project Communication and Stakeholder Engagement Plan (CSEP) for the pre-construction and construction phases.

The CSEP will establish a clear and effective approach to communication and engagement, based on proactive issues management, open and transparent two-way communication, and responsiveness to the needs and expectations of key stakeholders and the broader community.

The plan will ensure stakeholders are kept informed about:

- Project construction timelines
- Changes in construction workforce numbers
- Timing of key construction activities and potential impacts
- Changes to existing conditions to accommodate construction (e.g. traffic management, public access to Tarraleah Village)
- Workforce accommodation arrangements.

5 Potential impacts and management

5.1 Water quality

The Project has the potential to affect water quality in several surface waters, including six permanent and ephemeral streams with a total of 11 crossings or tributaries within the Project disturbance footprint (see Section 5.1.1.1), as well as downstream rivers and storages (see Section 5.1.1.2).

Details of these surface waters and potential Project impacts are provided in the Water Quality Assessment (Appendix F) and summarised in this chapter. Aquatic values—such as habitat, geomorphology, and ecology—and the hydrology of waterways potentially impacted by changes in water quality are outlined in Section 5.4 and described in full in the Aquatic Ecology Assessment (Appendix G). Potential hydrogeological impacts are discussed in Section 5.2 and described in full in the Hydrogeological Interpretive Report (Appendix H).

5.1.1 Existing environment

5.1.1.1 Creeks and streams on-site

Streams 1-4: Pipeline and western portal

Four streams flow from north of No. 2 Canal, crossing No. 2 Canal, Butlers Gorge Road, and No. 1 Canal via culverts before entering the River Derwent. These streams intersect the Project disturbance footprint in the vicinity of the headrace pipeline and the western portal.

The streams and their Project crossings are:

- **Stream 1:** A permanently flowing stream that discharges to the River Derwent. Three tributaries cross the disturbance footprint east of the current Downstream Portal construction site (within 700 m), near the start of the headrace pipeline (Crossings 1–3 or C1–C3; Figure 5.1). These are within the footprint for the headrace pipeline and associated construction and maintenance access roads.
    - **C1**: Permanently flowing second-order stream with an existing water quality monitoring site providing background (unimpacted) data for the Downstream Portal construction site (Lake King William Intake Upgrade Project).
    - **C2**: Similar second-order stream located to the east.
    - **C3:** Smaller first-order stream with lower flow.

- **Stream 2:** Enters the River Derwent 670 m upstream of Derwent Pumps Weir. Two tributaries cross the disturbance footprint (Crossings 4 and 5 or C4 and C5; Figure 5.1), more than 1 km west of the western portal.
  - **C4**: Small ephemeral first-order stream, most of which lies within the disturbance footprint.
  - **C5:** Larger second-order stream with permanent flow. These crossings are in the area proposed for the headrace pipeline and associated permanent access tracks.
- **Stream 3**: A larger third-order stream entering the River Derwent just upstream of Derwent Pumps Weir. It crosses the disturbance footprint about 600 m from the headrace tunnel portal at the western portal construction site (Crossing 6 or C6; Figure 5.1), within the area proposed for the pipeline and associated access roads.
- **Stream 4**: A small second-order stream entering the River Derwent about 300 m downstream of Derwent Pumps Weir. Three small tributaries (Crossings 7–9 or C7–C9; Figure 5.1) cross the disturbance footprint before converging and dissecting the proposed western portal construction site and spoil emplacement area.

Descriptions of aquatic values associated with these streams are provided in Section 5.4.

Stream 5: Surge facility and Paddy's Quarry spoil emplacement area

Stream 5 crosses the Project area near the surge facility and spoil emplacement area at Paddy's Quarry (Crossing 10 or C10; Figure 5.1). It intersects the surge facility construction site at the surge tunnel, dissecting the site, and also passes through the spoil emplacement area. This third-order stream flows into the Nive River approximately 2.2 km upstream of the Tungatinah Power Station.

Stream 6: Tarraleah Village

Tarraleah Village is located across the upper reaches of Stream 6 (Crossing 11 or C11; Figure 5.1), a tributary of Wilsons Creek and the Nive River. The drainage line passes through a cleared paddock and provides no aquatic habitat. A small, piped culvert under Oldina Drive discharges into Stream 6, which flows for about 1.5 km before entering Wilsons Creek. Wilsons Creek then flows another 1.5 km before entering Lake Liapootah.

Stream 6 shows signs of eutrophication, with extensive filamentous algae biomass likely caused by local inputs from the village. The stream becomes progressively steeper before joining Wilsons Creek, which is very steep as it descends toward Lake Liapootah.

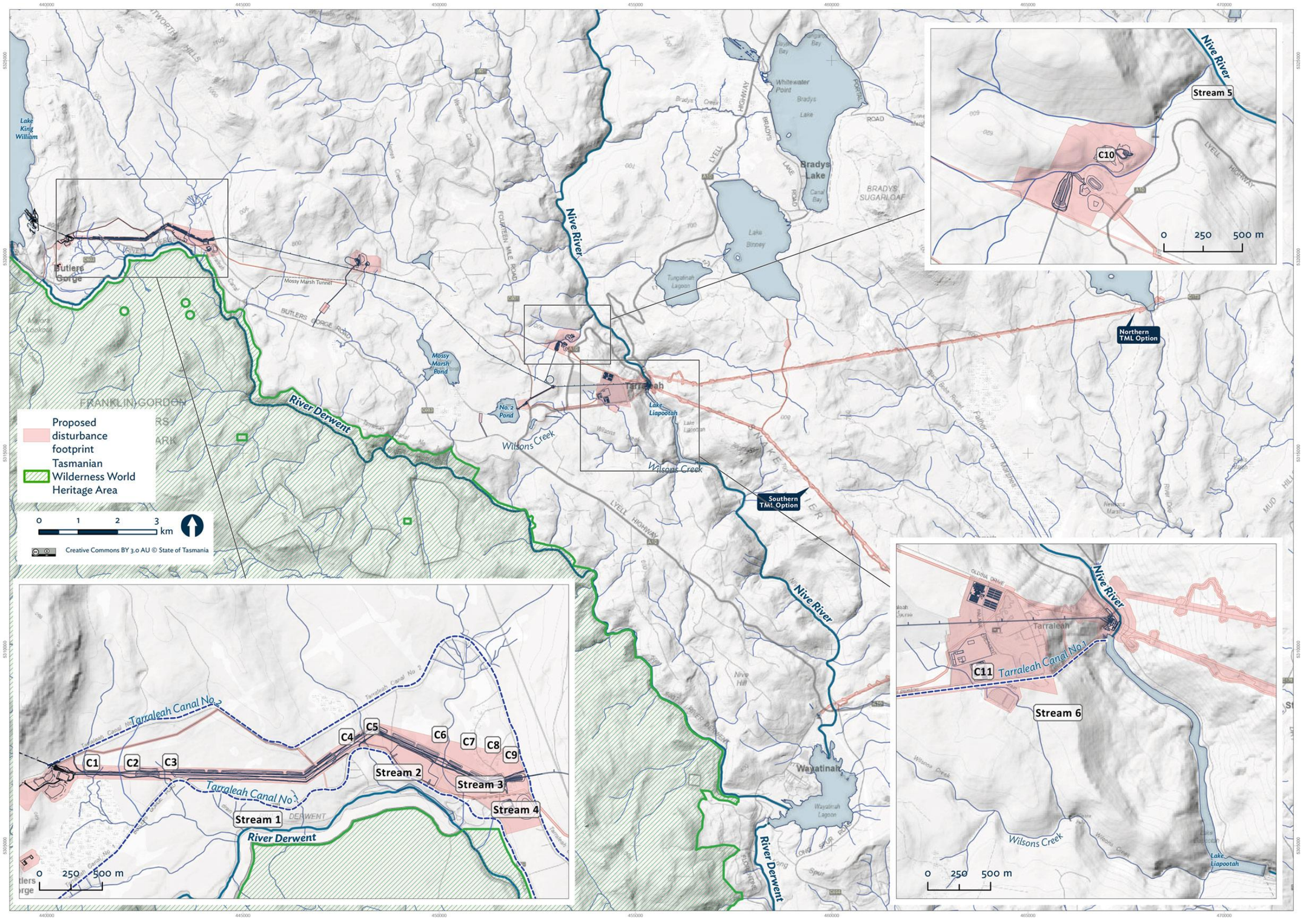


Figure 5.1: Location of Streams 1–6 in relation to the disturbance footprint, with individual tributary crossings indicated (C1 to C11)

5.1.1.2 Rivers and storages

The Project has the potential to impact several rivers and storages, as detailed in Section 5.4 and Appendix G, and in Section 6.3 of Appendix F. These include:

- The River Derwent in the vicinity of the Project
- Mossy Marsh Pond and Pond No. 2—small storages forming part of the current No. 2 conveyance between Lake King William and Tarraleah Power Station
- Hornes Pond—a small diversion storage that supplies additional water to Tarraleah Power Station via Mossy Marsh Pond
- Downstream receiving waters, including the Nive River, Lake Liapootah (Nive River storage), and Wayatinah Lagoon (a run-of-river storage on the River Derwent).

5.1.1.3 Geology and soils

The Project design alignment crosses several geological units. Jurassic dolerite is the dominant rock type along the alignment, including the power station, transmission line upgrades, mid-access portal, pump station and rising main, and parts of the surge and western tunnel portals. Permian–Triassic sedimentary bedrock is exposed in the low-relief section of the headrace and across most of the western tunnel portal area, while Tertiary basalt flows occur across much of the surge tunnel portal, transmission line upgrades, and the pump station.

A range of surficial Quaternary soils—including alluvial, colluvial, glacial, and swamp deposits—are expected at all construction sites. Shallow water tables may occur in bedrock hollows with wetlands, and local perched aquifers are possible within the Tertiary basalt flows. In contrast, the dolerite bedrock is likely to host a deeper, regional water table. Project construction activities within the disturbance footprint will encounter some or all of these geological units.

Acid sulphate soils

The TASSI program has mapped several areas within or near the Project disturbance footprint (Figure 5.2):

- Low-relief, swampy area downstream of the western end of the pipeline on alluvial Dermosol soils—low probability of Acid Sulphate Soils (6–70% chance of occurrence within the mapping unit)
- South-eastern side of Butlers Gorge Road downstream from the pipeline on glacial Dermosol soils—extremely low probability (1–5% chance)
- Low-relief area within the western tunnel portal disturbance footprint on glacial soils—low probability (6–70% chance)
- Low-relief areas associated with Mossy Marsh Pond and No. 2 Pond, and downstream from Mossy Marsh Pond—extremely low probability (1–5% chance)

Groundwater and surface water analysis by hydrogeological consultants PSM found generally neutral pH, low sulphate levels, and low surface water electrical conductivity. PSM concluded that the risk of Acid and Metalliferous Drainage (AMD) from oxidation of potentially acid-forming (PAF) material is low.

Given the low likelihood of acid sulphate soils occurring within the Project area, AMD impacts are not expected at any construction site.

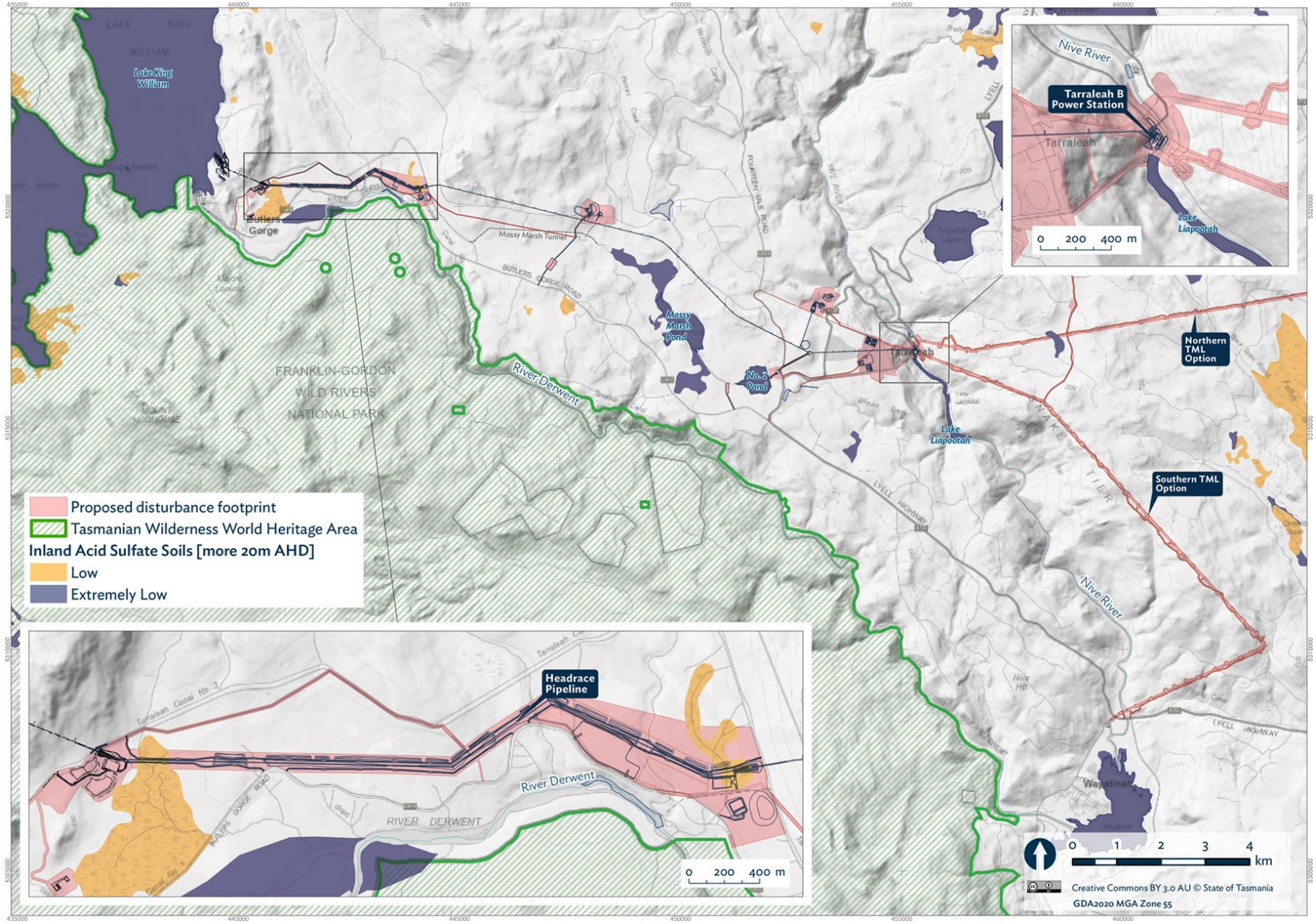


Figure 5.2: TASSI: Inland Areas of Tasmanian with potential to contain acid sulphate soils mapping for the Project area

5.1.1.4 Topography and slope

The pipeline and Tarraleah Village have the lowest relief of all construction sites. The Lyell Highway–Butlers Gorge Road intersection and the western portal have low-to-moderate slopes, although the western portal also contains areas of steep-to-very-steep slopes.

Slopes vary across all construction sites, with some localised steep areas. A preliminary erosion risk assessment, based on monthly average rainfall, indicates that the disturbance footprint has a moderate erosion risk in January, February, and March, and a high erosion risk for all other months (Appendix F).

5.1.1.5 Protected Environmental Values (PEVs)

The Protected Environmental Values (PEVs) for the surface waters of the Derwent catchment were established in 2001–02 under the *State Policy on Water Quality Management 1997* and are published in DPIWE (2003). The Derwent catchment PEVs are summarised in Table 5.1 and cover five categories, applied according to land tenure within the catchment.

Sensitive uses in the immediate vicinity of the Project include raw water for drinking supply, agricultural use, and aquaculture. Of the five categories, the requirement to maintain (modified) aquatic ecosystems applies across all land tenure types and has the most stringent water quality requirements.

Default water quality guideline values for the upper Derwent catchment, developed by the Environment Protection Authority (EPA), provide guidance on the quality required to maintain existing aquatic ecosystems. As part of the baseline studies for this assessment, water quality data was collected in the Project area (Section 5.1.1.6) to establish local baseline conditions and better assess potential Project impacts.

Table 5.1: Summarised Protected Environmental Values for the Derwent catchment

Land tenure	A. Aquatic Ecosystems		B. Recreational Water Quality & Aesthetics			C. Raw Water for Drinking Water Supply	D. Agricultural Water Uses	E. Industrial Water Supply
	(i) Pristine	(ii) Modified	(i) Primary	(ii) Secondary	(iii) Aesthetic			
Private Land		✓	✓	✓	✓	Subject to coarse screening plus disinfection (town water intakes and Bryn Estyn)	• Irrigation • Stock watering	• Aquaculture • Pulp and paper mill Hydropower
Forest Reserves flowing from headwaters in Forest Reserves or National Parks	✓		✓	✓	✓			Hydropower
Forest Reserves flowing from Private Land, State Forest, Unallocated Crown Land or HEC Land		✓	✓	✓	✓			Hydropower
National Parks, State Reserves, Nature Reserves, Historic sites with headwaters within those reserves and parks.	✓		✓	✓	✓	Subject to coarse screening plus disinfection (Lake Fenton catchment)		Hydropower
National Parks, State Reserves or Nature Reserves and Historic sites flowing from Private Land, State Forest, Unallocated Crown Land or HEC Land		✓	✓	✓	✓			Hydropower
Nature Recreation Areas and Reserves with headwaters in reserves or adjacent National Parks	✓		✓	✓	✓			Hydropower

Land tenure	A. Aquatic Ecosystems		B. Recreational Water Quality & Aesthetics			C. Raw Water for Drinking Water Supply	D. Agricultural Water Uses	E. Industrial Water Supply
Nature Recreation Areas and Reserves flowing from Private Land, State Forest, Unallocated Crown Land or HEC Land		✓	✓	✓	✓			Hydropower
Public Reserves flowing from Private Land, State Forest, Unallocated Crown Land or HEC Land		✓	✓	✓	✓			Hydropower
Unallocated Crown Land		✓	✓	✓	✓			Hydropower
Hydro Electric Corporation Land		✓	✓	✓	✓			Hydropower
Commonwealth Land		✓		✓	✓			
Within State Forests		✓	✓	✓	✓			Hydropower

5.1.1.6 Existing surface water quality

Baseline surface water quality data for the Project was collected from 14 sites to characterise existing conditions. These sites include locations between Lake King William and the Nive River, as well as downstream at Wayatinah Lagoon (Figure 5.3).

Monitoring sites were selected to provide baseline data for representative locations where surface water quality impacts from the Project are possible. As such, not all construction sites or potentially affected creeks and streams were sampled.

A summary of site locations, sampling periods, frequency, and parameters is provided in Table 5.2.

Table 5.2: Baseline water quality monitoring sites, frequency and parameters

Site no(s).	Location	Waterway type	Data period	Frequency	Parameters sampled
Lake King William					
128.4	Lake King William at Clark Dam	Headwater lake	April 2023 to March 2025 (ongoing)	**Variable:** • *Monthly:* Apr 2023–Apr 2024 • *Weekly:* May 2024–Jul 2024 • *Fortnightly:* Aug 2024–Dec 2024 • *Monthly:* Jan 2025–Mar 2025	As per Wayatinah Lagoon sites
Vicinity of proposed headrace pipeline					
2621.1	Stream 1	Small stream tributary of River Derwent	December 2023 to March 2025 (ongoing)	**Variable:** • *Sub-weekly/weekly:* Dec 2023–Jun 2024 • *Fortnightly:* Jul 2024–Jan 2025 • *Monthly:* Jan 2025-Mar 2025	**Field observations**: Electrical conductivity, pH, dissolved oxygen, temperature, turbidity, **Total solids**: Total Dissolved Solids Total Suspended Solids **Alkalinity**: Total alkalinity, alkalinity $C0_3$, alkalinity HCO_3
No. 2 Canal upstream of Mossy Marsh to No. 2 Pond					
SW-P1 (161.26)	No. 2 Canal below tunnel outlet	Exit point of No. 2 Canal from tunnel, before entering canal	June 2024 to March 2025 (ongoing)	Monthly	
SW-P2 (1433.1)	Mossy Marsh Pond at Dam	Shallow storage on No. 2 Canal	April 2023 to March 2025 (ongoing)	**Variable:** • *Monthly:* Apr 2023–Jan 2024 • *Sub-weekly/weekly:* Jan 2024-–Jun 2024 • *Fortnightly:* Jul 2024–Jan 2025 • *Monthly:* Jan 2025–Mar 2025	

Site no(s).	Location	Waterway type	Data period	Frequency	Parameters sampled
SW-P3 (156.3)	No. 2 Canal below Mossy Marsh	Canal structure conveying water between Mossy Marsh Pond and No. 2 Pond	June 2024 to March 2025 (ongoing)	Monthly	**Dissolved Nutrients**: nitrite, nitrate, ammonia, phosphorus dissolved reactive **Total Nutrients:** nitrogen and phosphorus **Dissolved metals** **Chlorophyll-*a*** (except sites 2621.1 and SW-P8)
SW-P4 (553.1)	No. 2 Pond	Shallow final storage on No. 2. Canal	June 2024 to March 2025 (ongoing)	Monthly	
SW-P5 (2509.3)	Hornes Pond	Shallow storage diverting water to Mossy Marsh Pond	June 2024 to March 2025 (ongoing)	Monthly	
SW-P6 (257.2)	Overland flow between No. 2 Canal and Mossy Marsh	Braided overland channel – flow from No. 2 Canal	June 2024 to March 2025 (ongoing)	Monthly	
Tarraleah Village					
SW-P7 (1049.2)	Tarraleah Village – Ponded Water	Pond in Tarraleah	June 2024 to March 2025 (ongoing)	Monthly	
SW-P8 (10172.2)	Tarraleah Penstock	Spring downslope from Tarraleah Village	June 2024 to March 2025 (ongoing)	Monthly	
Nive River downstream of Tarraleah Power Station					
98.1	Nive River below existing Tarraleah Power Station	Nive River	April 2023 to March 2025 (ongoing)	**Variable** • *Monthly:* Apr 2023–Dec 2023 • *Sub-weekly/weekly:* Jan 2024–Jun 2024 • *Fortnightly:* Jul 2024–Nov 2024 • *Monthly:* Dec 2024–Mar 2025	**Field observations**: Electrical conductivity, pH, dissolved oxygen, temperature, turbidity, **Dissolved Nutrients**: nitrite, nitrate, ammonia, phosphorus dissolved reactive
Wayatinah Lagoon					
190.3	Wayatinah Lagoon at River Derwent inflow	Wayatinah Lagoon	April 2023 to March 2025 (ongoing)	**Variable** • *Monthly:* Apr 2023–Jun 2024 • *Quarterly*: Sep 2024–Mar 2025	

Site no(s).	Location	Waterway type	Data period	Frequency	Parameters sampled
190.4	Wayatinah Lagoon at Wayatinah PS intake	Wayatinah Lagoon	April 2023 to March 2025 (ongoing)	**Variable** • *Monthly:* Apr 2023–Jun 2024 • *Quarterly*: Sep 2024–Mar 2025	**Total Nutrients**: nitrogen and phosphorus **Dissolved metals** **Chlorophyll-*a***
190.7	Wayatinah Lagoon at Liapootah PS Bay	Wayatinah Lagoon	April 2023 to March 2025 (ongoing)	**Variable** • *Monthly:* Apr 2023–Jun 2024 • *Quarterly*: Sep 2024–Mar 2025	

The following summarises existing water quality for waterways associated with the Project. Data are presented for six reaches/locations (14 sites in total):

- Lake King William (LKW (Site no. 128.4))
- Vicinity of proposed headrace pipeline (Stream 1 (Site no. 2621.1))
- No. 2 Canal upstream of Mossy Marsh to Pond No. 2:
  - SW-P1: No. 2 Canal
  - SW-P2: Mossy Marsh Pond
  - SW-P3: No. 2 Canal between Mossy Marsh Pond and No. 2 Pond
  - SW-P4: No. 2 Pond
  - SW-P5: Hornes Pond
  - SW-P6: No. 2 Canal overland flow upstream Mossy Marsh Pond
- Tarraleah Village: SW-P7 (pond in village) and SW-P8 (downslope from village)
- Nive River downstream of Tarraleah Power Station (NR (Site no. 98.1))
- Wayatinah Lagoon (WL (Site no. 190.3), WL (Site no. 190.4) and WL (Site no. 190.7).

At each site, a range of physicochemical (e.g. temperature, pH, turbidity, dissolved oxygen), nutrient, and metal parameters were recorded (refer to Appendix F for full dataset).

Results for in situ physicochemical parameters and nutrients have been compared to the annual Default Guideline Values (DGVs) for the Upper Derwent Catchment (EPA, 2021; Table 5.3) using the *Slightly to Moderately Disturbed* (SMD) ecosystem category. This category was chosen over *High Ecological Value* (HEV) because the aquatic environment from Lake King William to downstream of Tungatinah is highly modified due to River Derwent and Nive River regulation in the 1930–1960s.

Monitoring at several sites (SW-P1 to SW-P8) began in June 2024, meaning there is currently insufficient data for a seasonal assessment. Instead, annual statistics for each parameter are provided in Figure 5.4 and Figure 5.5, with results compared against the annual DGVs. Baseline monitoring will continue for a further 12 months to build a dataset sufficient for seasonal analysis.

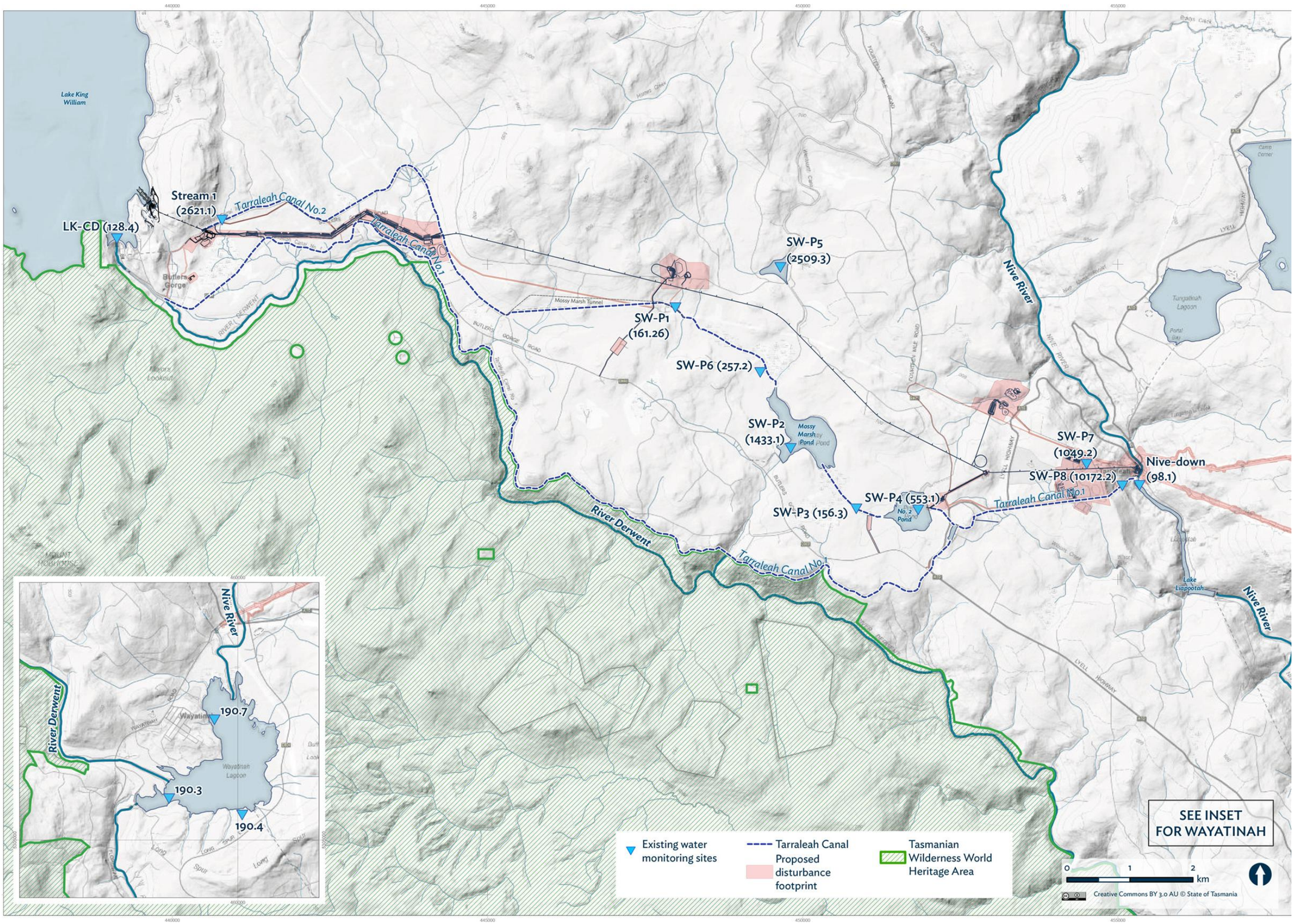


Figure 5.3: Project water quality baseline sampling sites in relation to the project disturbance footprint

Table 5.3: DGVs for the Upper Derwent Catchment (EPA 2021)

Parameter	Units	Lower (20th %ile)	Median	Upper (80th %ile)
Temperature	°C	6.5	9	13.5
Turbidity	NTU	-	2.6	8.3
Conductivity	µS/cm	-	75.5	123.4
pH		6.2	6.7	7.4
Dissolved Oxygen	mg/L	9.4	10.6	11.8
Dissolved Oxygen	% Saturation	90.3	98.5	103.8
Chlorophyll *a*		-	NA	NA
Total Suspended Solids(1.5µm)	mg/L	-	5	5
Total Phosphorus	mg P/L	-	0.01	0.022
Dissolved Reactive Phosphorus	mg P/L	-	0.003	0.004
Total Nitrogen	mg N/L	-	0.25	0.394
Nitrate	mg N/L	-	0.002	0.02
Nitrite	mg N/L	-	0.001	0.003
$NO_3 + NO_2$	mg N/L	-	NA	NA
TAN	mg N/L	-	0.008	0.012

NA: no DGV defined
TAN: Total Ammoniacal Nitrogen (NH_3 and NH_4+).

Generally, in situ physicochemical parameters and nutrient levels were within the annual SMD DGVs at all sites (Figure 5.4and Figure 5.5), except at Tarraleah Village, where one site appears to be impacted by seepage from the village sewage pond, as outlined below:

- **Temperature**: Median water temperatures varied by more than 5 °C between sites, with smaller, slower-flowing waterbodies (SW-P2, SW-P4, SW-P5, SW-P7) generally recording higher temperatures than larger, faster-flowing sites. Maximum and 80th percentile temperatures tended to increase downstream, while minimum temperatures showed little change. Only two sites (LKW and SW-P1) fell below the lower DGV (20th percentile), and only two sites (SW-P1 and SW-P8) were below the upper DGV (80th percentile). Five sites (SW-P3 to SW-P5 and SW-P7) recorded median temperatures above the upper DGV; all were associated with smaller, slower-flowing waterbodies (Mossy Marsh, Hornes Pond, Pond No. 2, Tarraleah Village Pond).
- **Turbidity**: 80th percentile values were within the DGV at all sites. Four sites recorded maximum turbidity above the DGV: three (Stream 1, SW-P8, WL-190.3) exceeded it by less than 1 NTU, and one (SW-P7) by less than 3 NTU. The highest turbidity (10.9 NTU) was in Tarraleah Village Pond (SW P7).
- **Conductivity**: All sites met the DGV limit for conductivity (123.4 µS/cm) except SW-P8, where only the minimum reading (111 µS/cm) was below the limit. Other metrics ranged from 132 to 163.9 µS/cm, indicating a slightly higher but still low level of dissolved ions or salts, likely linked to seepage from the village sewage pond upslope.

- **pH**: pH was generally neutral and within the DGVs, with minimal site-to-site variation. Only one site (SW-P8) had 80th percentile values slightly above the DGV (by less than 0.5). Minimum pH values below the DGV were recorded at LKW, Stream 1, SW-P2, SW-P7 and NR. Acidic pH is common in Tasmanian waterways due to high humic content and low mineral input. Most sites recorded maximum pH above the DGV (except SW-P1, SW-P4, SW-P5, SW-P6, WL-190.4), with the highest value (10.77) at SW-P8, likely influenced by sewage pond seepage.
- **Dissolved Oxygen (DO)**: All sites had 80th percentile values within the upper DGVs, with most maximum values within or slightly over the limit (by less than 1 mg/L). One site (SW-P5) had a median below the lower DGV, and over half the sites had 20th percentile values below the lower DGV, though still above 7 mg/L and 80% saturation—levels typically adequate for ecosystem health. The lowest DO (2.82 mg/L; 27.6% saturation) occurred at SW-P8, likely due to organic matter breakdown from sewage pond seepage.
- **Chlorophyll *a***: Levels were generally low and below the ANZG (2018) aquatic ecosystem guideline (5 µg/L). Higher levels were found at SW-P7 (Tarraleah Village Pond) and WL-190.3 (Wayatinah Lagoon), though both were below the recreational use guideline (25 µg/L). Elevated chlorophyll *a* in Wayatinah Lagoon is likely due to nutrient inputs from the nearby fish hatchery. Chlorophyll *a* was not sampled at Stream 1 or SW-P8.
- **Total Suspended Solids (TSS)**: TSS values were below the DGV at all sites, with little variability, consistent with the low turbidity recorded.
- **Nutrients**: Nutrient levels were generally low and within DGVs at sites not linked to Tarraleah Village. SW-P8 consistently recorded high nutrient levels (total phosphorus, dissolved reactive phosphorus, total nitrogen, nitrate, nitrate + nitrite, and ammonia), again likely due to sewage pond seepage. Stream 1 showed higher nitrate, ammonia, and dissolved reactive phosphorus, typical of smaller streams. At WL-190.3 in Wayatinah Lagoon, dissolved reactive phosphorus, total phosphorus, nitrate, nitrite, and ammonia were elevated—likely from the adjacent fish hatchery. Other Wayatinah Lagoon sites further from the hatchery had lower nutrient and chlorophyll *a* levels.

  Stream 1 showed higher concentrations of nitrate, ammonia, and dissolved reactive phosphorus, which are typical of smaller streams.

  At site 190.3 in Wayatinah Lagoon, levels of dissolved reactive phosphorus, total phosphorus, nitrate, nitrite, and ammonia were also elevated compared to DGVs. This site is closest to the fish hatchery near the River Derwent inflow, while other lagoon sites further from the hatchery recorded lower nutrient and chlorophyll *a* levels.

Overall, water quality in the River Derwent below Clark Dam is good in the upper reaches and within DGVs, reflecting the quality of Lake King William. Below Derwent Pumps Weir and within the TWWHA, limited initial sampling indicates higher nutrient concentrations—likely due to low flows and surrounding forestry—although all key physicochemical parameters (turbidity, dissolved oxygen, pH, conductivity, temperature) remained within DGVs.

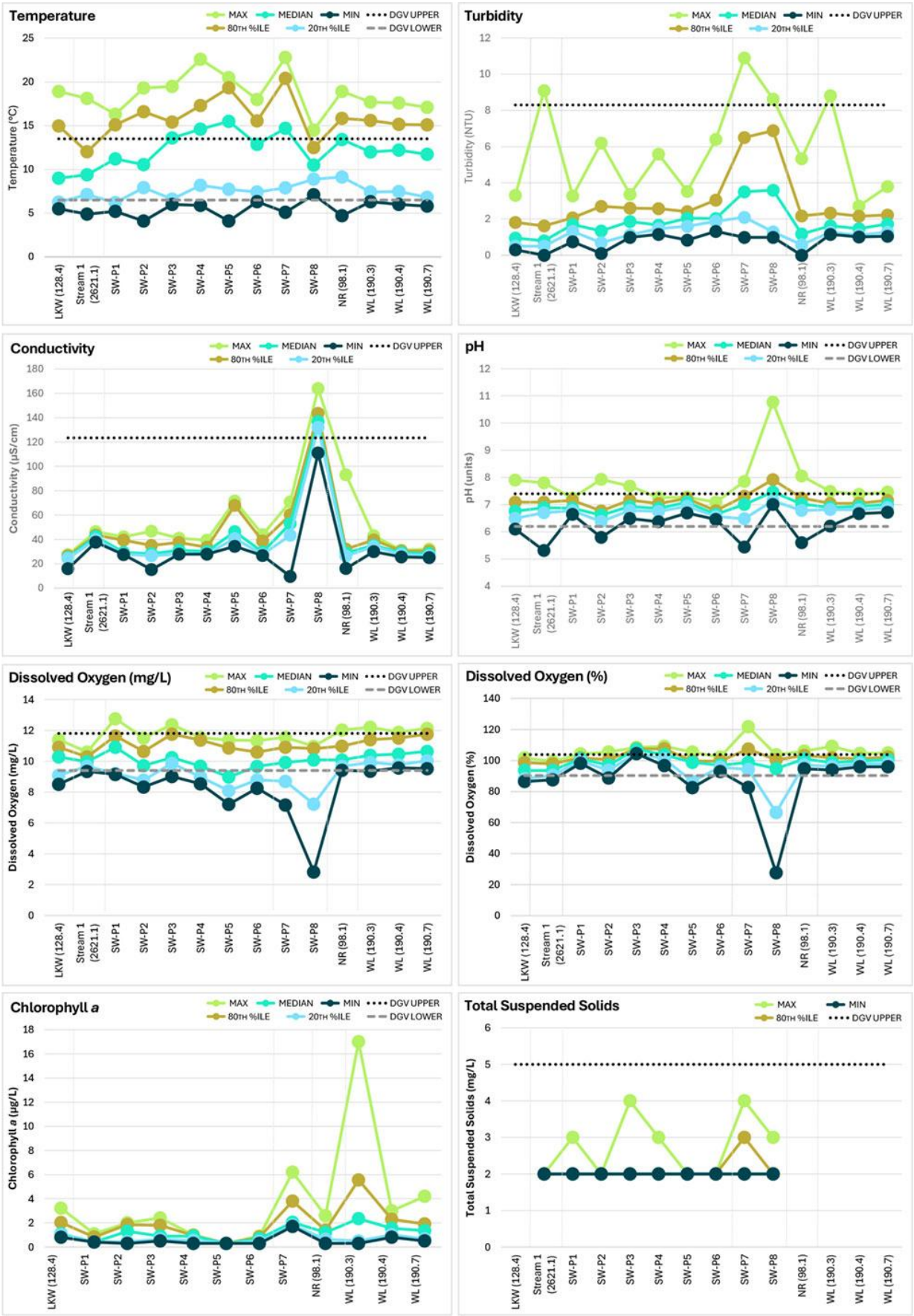


Figure 5.4: Surface *in-situ* physicochemical water quality, chlorophyll-*a* and TSS



Figure 5.5: Surface water quality nutrient laboratory results

5.1.2 Assessment

Five potential water quality impact types have been identified for the Project: erosion and sedimentation, hydrocarbons, pH changes, metals, and nitrates. Each is discussed below, followed by site-specific impacts. Many impact types—such as erosion, sedimentation, hydrocarbons, and pH changes—are common across all construction sites, while others, such as blasting-related releases of nitrate and ammonium, are specific to certain activities.

5.1.2.1 Impact types

Erosion and sedimentation

Clearing and construction activities have the potential to cause erosion and release sediments into local waterways, impacting water quality and aquatic habitats through smothering or altered habitats. Potential sediment sources include clearing, grubbing, earthworks, excavation and site levelling, spoil emplacement and laydown areas, vehicle washdown areas, road runoff and dust, site offices and buildings, and wastewater/sediment basin discharge. Local creeks within the catchments of construction sites are most likely to be affected, with lesser risk to the River Derwent and Nive River. All construction sites are considered high risk for erosion and sedimentation.

Hydrocarbons

The use of heavy machinery and the storage of fuels, oils and lubricants on site present a risk of hydrocarbon contamination. Potential sources include leakages and spills from storage and machinery, machinery breakages, and the use of oil-based drilling lubricants. Spills can impact water quality and aquatic ecosystems.

As oils and fuels float on water, their main effect is shoreline smothering unless dispersed physically or chemically (ANZG, 2018). In confined environments (e.g. small freshwater streams or lakes), biodegradation can reduce dissolved oxygen if toxic fractions accumulate (ANZG, 2018).

The toxicity of oils to freshwater fish varies depending on type and exposure method; however, diesel spills into creeks can kill invertebrates even if fish survive, leading to indirect effects such as reduced fish food sources and increased algal growth (ANZG, 2018). All construction sites will involve heavy machinery and fuel use.

pH

The use of concrete, shotcrete and grouting in constructing buildings, portals and tunnels can raise the pH of water that may need to be discharged from site. Two temporary concrete batch plants are proposed, most likely at the western portal and at either Paddy's Quarry or Tarraleah Village (final locations will be determined by the Engineering, Procurement and Construction (EPC) Contractor). Shotcrete use in portals, tunnels and the power station excavation is likely to produce alkaline water requiring management. If discharged directly, elevated pH could affect local waterways—particularly small creeks or rivers with low flows and limited dilution.

High pH can affect aquatic environments, especially fish, by reducing condition, altering behaviour and increasing susceptibility to other stressors. It can also increase the proportion of ammonia in its toxic, unionised form. Very high pH (>10.5) is rapidly lethal to salmonids (e.g. brown trout), while prolonged exposure to pH 9.0–9.5 is likely to be harmful (Alabaster and Lloyd, 1980).

Metals

Although the potential for metal contamination is low, some construction activities may release metals into the environment. Aluminium could be introduced through flocculants used for sediment removal or products used in shotcrete to accelerate setting. Other metals, such as chromium, may also be present in some construction materials.

Nitrate and ammonium

Drill-and-blast techniques using ammonium nitrate explosives will be used to construct tunnel portals, excavate the power station site and in tunnelling (depending on whether a TBM is used). They may also be used for sections of the headrace pipeline if hard rock is encountered. Ammonium nitrate use has the potential to release nitrate and ammonium into the environment, primarily from undetonated explosives in blast holes or spillage on site.

Experience from Hydro Tasmania's Tarraleah Upgrade Works—which used drill-and-blast methods for a 950 m tunnel between Lake King William and the downstream portal—has informed modelling of nitrate loads for this Project. For nitrates, the potential impact has been assessed against the 95th percentile DGV of 0.073 mg/L, chosen because variations in flow and discharge may lead to higher concentrations than the 80th percentile DGV of 0.02 mg/L, and toxic effects on aquatic biota occur at much higher concentrations. A maximum of 2 mg/L is reported to protect the most sensitive freshwater species (Camargo et al., 2004)).

Nitrate and ammonium can both be toxic to aquatic organisms at high concentrations and provide biologically available nitrogen, increasing nutrient loads in local waterways. Discharges containing nitrate and/or ammonia can promote phytoplankton, benthic algae, filamentous algae and macrophyte growth. Where additions are large enough, and under suitable light, flow and nutrient conditions, this can contribute to eutrophication, increased chlorophyll *a*, changes in phytoplankton species composition, and greater algal production.

5.1.2.2 Potential impacts by construction site

The impact types described above (erosion/sedimentation, hydrocarbons, pH, metals, nitrate and ammonium) have varying risk profiles depending on the site-specific characteristics and activities at each construction site. The potential impacts and unmitigated risks for each site are described in Appendix F and summarised below. Where risks are identified, management measures have been developed to minimise surface water quality impacts to local waterways from the Project (Section 5.1.3).

Headrace pipeline

The headrace pipeline will be constructed within the catchments of Streams 1–3 (Figure 5.1). Potential water quality impacts include:

- **Erosion and sedimentation:** High potential from vegetation clearing, temporary laydown areas, transport of fill and spoil, and civil works for access tracks and the pipeline; in particular:
  - Site drainage during rainfall events could carry sediment from cleared areas, roads and laydown areas.
  - Culvert construction over Streams 1–3 may increase erosion and sediment deposition into these creeks.

  The pipeline corridor is a linear disturbance with a high perimeter-to-area ratio, intersecting multiple watercourses and swamp areas linked to Streams 1–3, which flow into the River Derwent. Slopes are mostly <10%, but soils are likely erodible and may produce turbid runoff.

- **Hydrocarbons:** Low potential for release into Streams 1–3, as only temporary laydown areas will be located along the pipeline, with main laydown, workshop and refuelling facilities at the portals. Machinery will include conventional earthworks plant and trucks.
- **pH changes:** Low potential, as only limited concrete will be used for access road culverts and pipeline works. Concrete will be batched off-site (at a portal facility), reducing the chance of high pH runoff. Any such runoff would likely be small in scale, readily diluted, and have minimal impact.
- **Metals:** Low potential, as there are no major on-site concrete works and only temporary laydown areas along the route. While small amounts of metals could be released from shotcrete or aluminium-based flocculants in sediment treatment, concentrations are expected to be low and rapidly diluted.
- **Nitrate and ammonia:** Low potential, as drill-and-blast methods will only be used if hard rock is encountered. Any residual ammonium nitrate from blasting would be minimal and unlikely to significantly affect Streams 1–3 or the downstream River Derwent.

Western portal and headrace tunnel

Construction activities at the western portal—including headrace tunnel excavation and spoil emplacement—have the potential to affect water quality in Stream 4 and the River Derwent (Figure 5.1). Stream 4 is a small creek with generally low flows (Figure 5.6, recording a median flow of 20 litres per second (L/s) and a 30th percentile base flow (70% time-exceeded) of 7 L/s. These low flows limit the creek's capacity to dilute contaminants, making it more vulnerable to discharges from the western portal site.

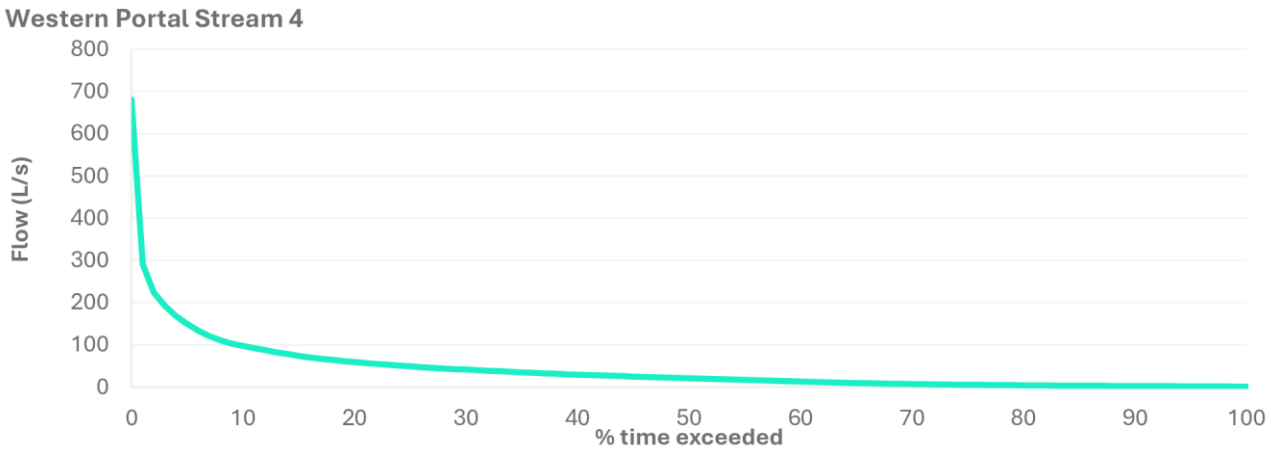


Figure 5.6: Flow duration curve of modelled flow data for Stream 4, located near the western portal

For this site, potential water quality impacts include:

- High potential for erosion and sedimentation from clearing of vegetation, use of the spoil emplacement area, and civil works associated with construction of the portal and headrace tunnel. The potential risk will increase during rainfall events when site drainage may carry sediment from cleared areas, roads, spoil and associated laydown areas. The western portal is a non-linear construction site with slopes primarily <10% gradient and soils likely to be erodible and produce turbid runoff. The site also contains a large spoil emplacement area from tunnelling and other construction activities. The western portal intersects Stream 4 and associated creeks and swamp areas, which will require specific drainage controls.
- Moderate potential for the release of hydrocarbons into Stream 4, as there will be laydown and workshop/refuelling areas located at the western portal. In addition, a TBM, if used, may operate from this location.

- High potential to increase pH in Stream 4 due to the use of shotcrete and grout within the portal and headrace tunnel, and the potential to discharge contaminated wastewater into local waterways. A concrete batch plant is also likely to be located at the portal.
- Low potential for the release of metals into Stream 4. While some metals may be released from shotcrete, workshops, laydown areas, or flocculants, any concentrations are expected to be low and rapidly diluted, resulting in a low unmitigated impact.
- High potential for elevated nitrate and ammonia concentrations in Stream 4 due to the use of explosives for tunnel and portal construction. A block model analysis (Section 7.3, Appendix F), informed by the current Tarraleah Upgrade Works, predicts unmitigated nitrate concentrations in Stream 4 could peak above 20 mg/L in Years 2 and 3, with a median of approximately 3 mg/L in Year 3. These peaks are at chronic toxicity levels for some freshwater aquatic species (National Institute of Water and Atmospheric Research (NIWA), 2013).

  For the River Derwent, based on a median flow of 20 L/s in Stream 4 and a conservative low base flow of 185 L/s in the River Derwent, median nitrate concentrations immediately downstream of the confluence during Years 2 and 3 are estimated at 0.29 mg/L, with peaks exceeding 2 mg/L. These values are substantially greater than existing background nitrate concentrations in the River Derwent (~0.04 mg/L at Derwent above Wayatinah Lagoon) and above the Upper Derwent SMD DGV 80th percentile (0.020 mg/L) and 95th percentile (0.073 mg/L).

  Modelling of potential nitrate and ammonia loads to groundwater was also undertaken using the block model. Estimated loads from spoil emplacement locations are minimal for the western portal and considered a low impact (Section 7.3, Appendix F).

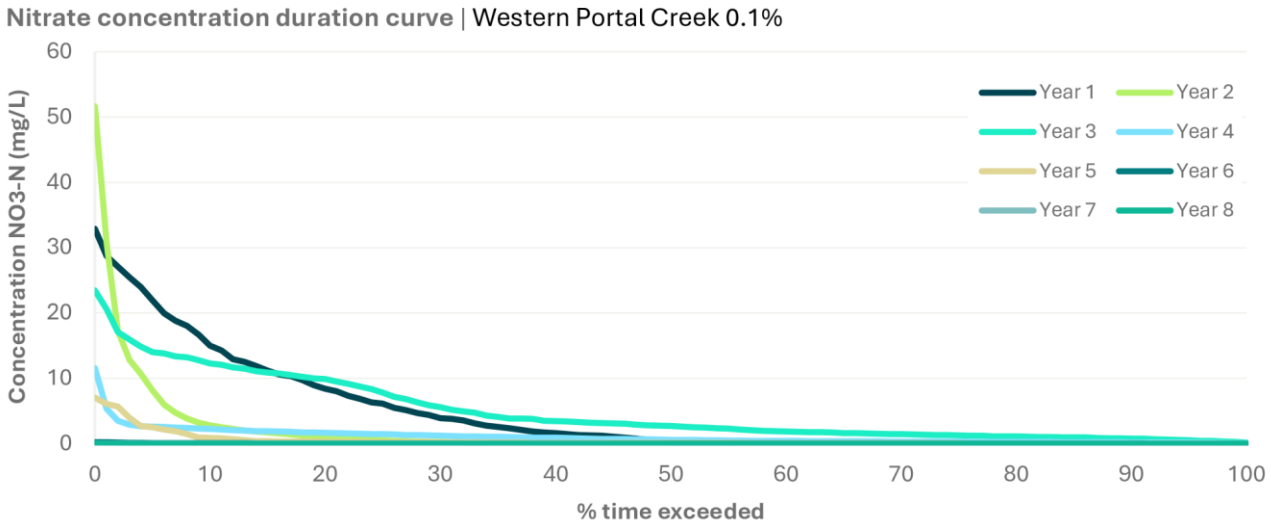


Figure 5.7: Estimated distribution of nitrate concentrations in Stream 4 in the absence of mitigation

Mid-access portal

Surface water quality impacts for the mid-access portal are similar to those described above for the western portal and headrace tunnel. Discharge from the mid-access tunnel portal would affect the water quality of local receiving waters, including No. 2 Canal, Mossy Marsh Pond, and No. 2 Pond, and to a lesser extent Hornes Pond, the Nive River, and Lake Liapootah.

For this site, potential impacts to water quality include:

- High potential for erosion and sedimentation from clearing of vegetation, use of the spoil emplacement area, and civil works associated with the construction of the mid-access portal and headrace tunnel. The potential risk will increase during rainfall events when site drainage could carry sediment from cleared areas, roads, spoil, and associated laydown areas. The mid-access portal is a non-linear construction site with variable slopes and soils likely to be erodible and produce turbid runoff. It contains a large spoil emplacement area derived from tunnelling and other construction activities and is located on the catchment divide, naturally draining into No. 2 Canal/Mossy Marsh Pond and Hornes Dam.
- Moderate potential for the release of hydrocarbons into No. 2 Canal, Mossy Marsh Pond, and No. 2 Pond, as there will be laydown and workshop/refuelling areas located at the portal.
- Moderate potential to increase pH in No. 2 Canal, Mossy Marsh Pond, and No. 2 Pond due to the use of shotcrete and grout within the portal and headrace tunnel, and the potential to discharge contaminated wastewater into local waterways. A concrete batch plant is unlikely to be located at this portal.
- Low potential for the release of metals into No. 2 Canal, Mossy Marsh Pond, and No. 2 Pond. While some metals may be released from shotcrete, workshops, laydown areas, or flocculants, any concentrations are expected to be low and rapidly diluted, resulting in a low unmitigated impact.
- Low potential for elevated nitrate and ammonia concentrations in No. 2 Canal, Mossy Marsh Pond, and No. 2 Pond due to the use of explosives in construction of the mid-access portal.

Local impacts to surface water are likely to be low due to the substantial flow and/or volume in the No. 2 conveyances (Mossy Marsh Pond, No. 2 Pond) and Hornes Pond. The high dilution in both the canal and associated storages, along with the low residence times (12 to 24 hours) in each of the storages that form part of the No. 2 conveyance, means there is only minor potential for impact. Such an impact may include increased primary productivity in these locations, either as greater growth of macrophytes, benthic algae, or phytoplankton (indicated by increased chlorophyll *a*).

Modelling of potential nitrate and ammonia loads to groundwater was also undertaken using the block model. Estimated loads from spoil emplacement locations are small and considered a low impact. Further discussion of these loadings and their impact is provided in Section 7.3 of Appendix F.

Paddy's Quarry

Due to the construction activities proposed at the surge facility and Paddy's Quarry—including tunnelling of the surge tunnel access, surge tunnel, and headrace tunnel, as well as spoil emplacement—there is potential to impact water quality in Stream 5 and the Nive River (Figure 5.1). Stream 5 is a moderately sized creek with a median flow of 35 L/s and a 30th percentile base flow (equivalent to the 70th % time-exceeded flow) of 13 L/s. These flows are insufficient to provide rapid dilution for large loads from the surge tunnel and Paddy's Quarry site.

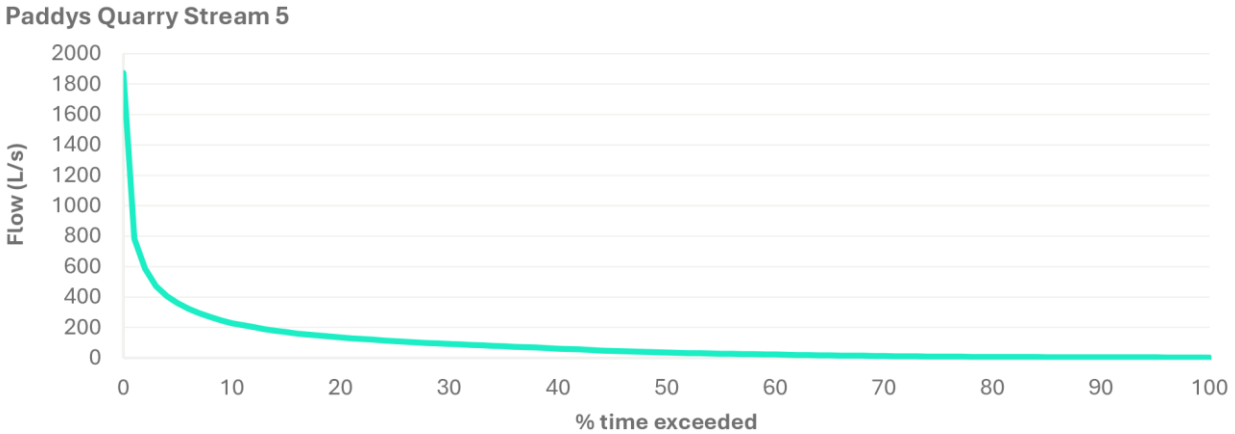


Figure 5.8 Flow duration curve of modelled flow data for Stream 5, located near the surge tunnel access and Paddy's Quarry site.

For this site, potential impacts to water quality include:

- High potential for erosion and sedimentation from clearing of vegetation, use of the spoil emplacement area, and civil works associated with the construction of the portal. The risk increases during rainfall events when site drainage could carry sediment from cleared areas, roads, spoil, and associated laydown areas.
- As with the other portal sites, Paddy's Quarry is a non-linear construction zone. The slope is primarily <20 % gradient, and the soil types present—particularly clay and silt soils—are likely to be erodible and may produce turbid runoff. The site also contains a large spoil emplacement area derived from tunnelling and other construction activities. Paddy's Quarry intersects with Stream 4 and associated creeks and swamp areas, which will require specific drainage controls.
- Moderate potential for the release of hydrocarbons into Stream 5, as there will be laydown and workshop/refuelling areas located at the surge facility and/or Paddy's Quarry.
- High potential to increase pH in Stream 5 due to the use of shotcrete and grout within the portal and headrace tunnel, and the potential to discharge contaminated wastewater into local waterways. In addition, a concrete batch plant is likely to be located at Paddy's Quarry.
- Low potential for the release of metals into Stream 5 at the surge facility or Paddy's Quarry. While some metals may be released from the worksites (e.g. from shotcrete, workshops, laydown areas, or flocculants), concentrations are expected to be low and diluted in the local waterways, such that the potential unmitigated impact is low.
- High potential for elevated nitrate and ammonia concentrations in Stream 5 due to the use of explosives in construction of the surge facility and Paddy's Quarry portal, and from the spoil emplacement area. To understand the potential scale of nitrate discharge impacts, a block model analysis was undertaken to examine likely nitrate generation from construction and potential discharges, based on empirical observations and experience from the current Tarraleah Upgrade Works (Section 7.3 of Appendix F).

  As for the western portal, modelling of nitrate concentrations in Stream 5 over the construction period (Figure 5.9; Appendix F) indicates that, without mitigation, high concentrations may occur, with median values in Years 2 and 3 of approximately 3 mg/L and peaks exceeding 25–30 mg/L. These concentrations are at chronic toxicity levels for some freshwater aquatic species (NIWA, 2013).

  An estimate of nitrate concentrations in the Nive River at the confluence with Stream 5 (approx. 2.2 km upstream from the Tungatinah tailrace) was also made for an unmitigated scenario. Based on a median flow of 35 L/s in Stream 5 and a low base flow of 140 L/s for the Nive River, median nitrate concentrations in the Nive River during Year 2 are estimated at 0.75 mg/L, with peaks exceeding 2 mg/L. These values are higher than existing background nitrate concentrations in the Nive River (median ~0.009 mg/L) and above the Upper Derwent SMD DGV 80th percentile (0.020 mg/L) and 95th percentile (0.073 mg/L) values. Background levels in the Nive River have been estimated from data collected at the Nive River above Tarraleah (downstream of the Tungatinah tailrace) during periods of no discharge from Tungatinah Power Station.

  An estimate was also made of nitrate concentration increases in the Nive River downstream of the Tarraleah tailrace in the absence of mitigation. This used a median flow of 35 L/s in Stream 5 and a combined very low flow (occurring <2 % of the time) from Tungatinah Power Station, Tarraleah Power Station, and the Nive River upstream of Tungatinah Power Station of 20 m^3/s. Based on this, the median nitrate concentration in the Nive River downstream of the Tarraleah tailrace in Year 2 is estimated to be below 0.005 mg/L for 98 % of the time. This is below the existing background nitrate concentration (median 0.007 mg/L at Nive River downstream of Tarraleah Power Station) and below the Upper Derwent SMD DGV 80th and 95th percentile values. Peak values below the tailrace in Year 2 are estimated at over 0.04 mg/L for 2 % of the time, but still within the Upper Derwent SMD DGV 95th percentile value.

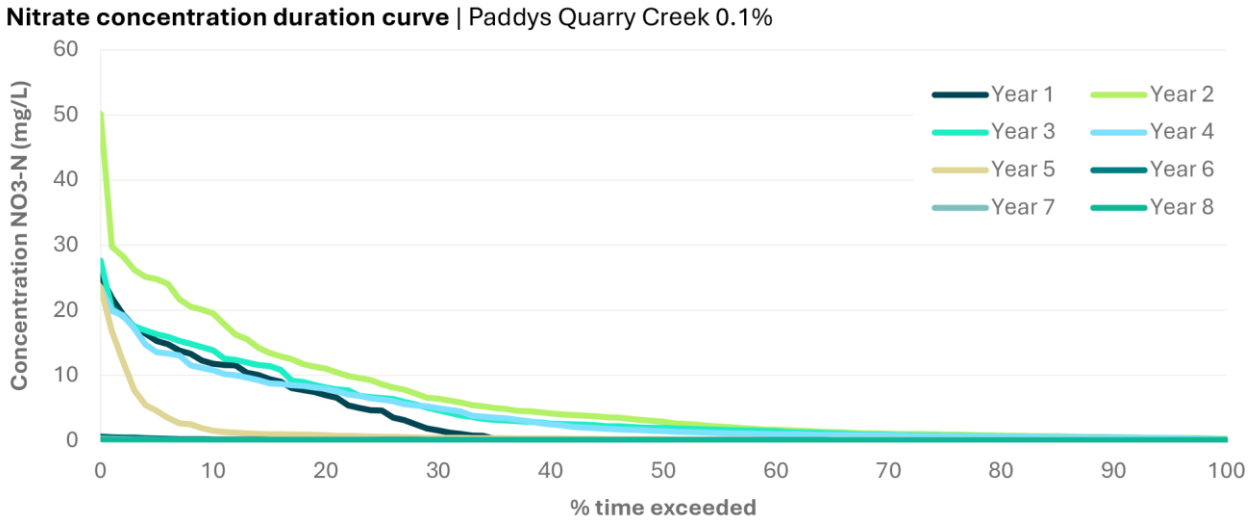


Figure 5.9: Estimated distribution of nitrate concentrations in Stream 5 in the absence of mitigations

Power station site

The activities for construction of the power station with potential to impact water quality include excavation of the site below water level, as well as instream works within the Nive River. The site will be a source of potential discharges to the Nive River from the construction of the power station, the power tunnel, power station portal and tailbay, and will include groundwater ingress, tunnel and power station wastewater, and surface runoff during rainfall events. As a receiving environment, the Nive River generally has high flow due to the combined discharges from Tungatinah Power Station and Tarraleah Power Station, along with the river's natural flow.

For this site, potential impacts to water quality include:

- High potential for erosion and sedimentation from bank and instream works in the Nive River, and from civil works associated with the construction of the power station and related infrastructure. The risk will increase during rainfall events when drainage may carry sediment from exposed areas into the river. The site and associated hillslope and laydown areas are mostly within steep slopes (>20% gradient), except for the power station footprint which is on existing levelled ground. The soils are likely to be erodible and produce turbid runoff. Existing drainage at the site flows directly into the Nive River, and construction will include instream and riverbank works.
- Moderate potential for hydrocarbon release to the Nive River from conventional earthworks plant and trucks.
- Moderate potential for increased pH in local waterways due to the use of shotcrete and grout at the site, with potential for contaminated wastewater discharges.
- Low potential for metal release into the Nive River. While some release may occur (e.g. from shotcrete, workshops, laydown areas, flocculants), concentrations are expected to be low and rapidly diluted, resulting in a low unmitigated impact.

- Low potential for elevated nitrates and ammonia in the Nive River from explosives used in construction of the power station and associated structures. If all Project sites discharge via existing conveyances (Figure 5.10), and flows enter the Nive River at the power station, the impact potential is low due to the substantial flow and/or volume in the Nive River and Liapootah Pond downstream. High dilution would likely keep nitrate and ammonia concentrations low.

  To assess potential nitrate and ammonia impacts, a block model analysis was undertaken, based on empirical data and observations from the current Tarraleah Upgrade Works (Section 7.3 of Appendix F). Modelling of nitrate concentrations in the Nive River, incorporating inputs from all construction sites, indicates sufficient dilution to maintain concentrations within the 80th percentile DGV (0.020 mg/L) for most of the time, with only a low potential to exceed the 95th percentile DGV (0.073 mg/L).

  Year 3 is predicted to have the highest daily nitrate loads and greatest potential for elevated concentrations. Exceedance of the 95th percentile DGV (0.073 mg/L) is estimated for just 0.4% of the time (about 1.5 days in Year 3). On these rare occasions, combined flows from Tungatinah, Tarraleah, and the Nive River may be insufficient to dilute nitrate below 0.073 mg/L (Figure 5.1)

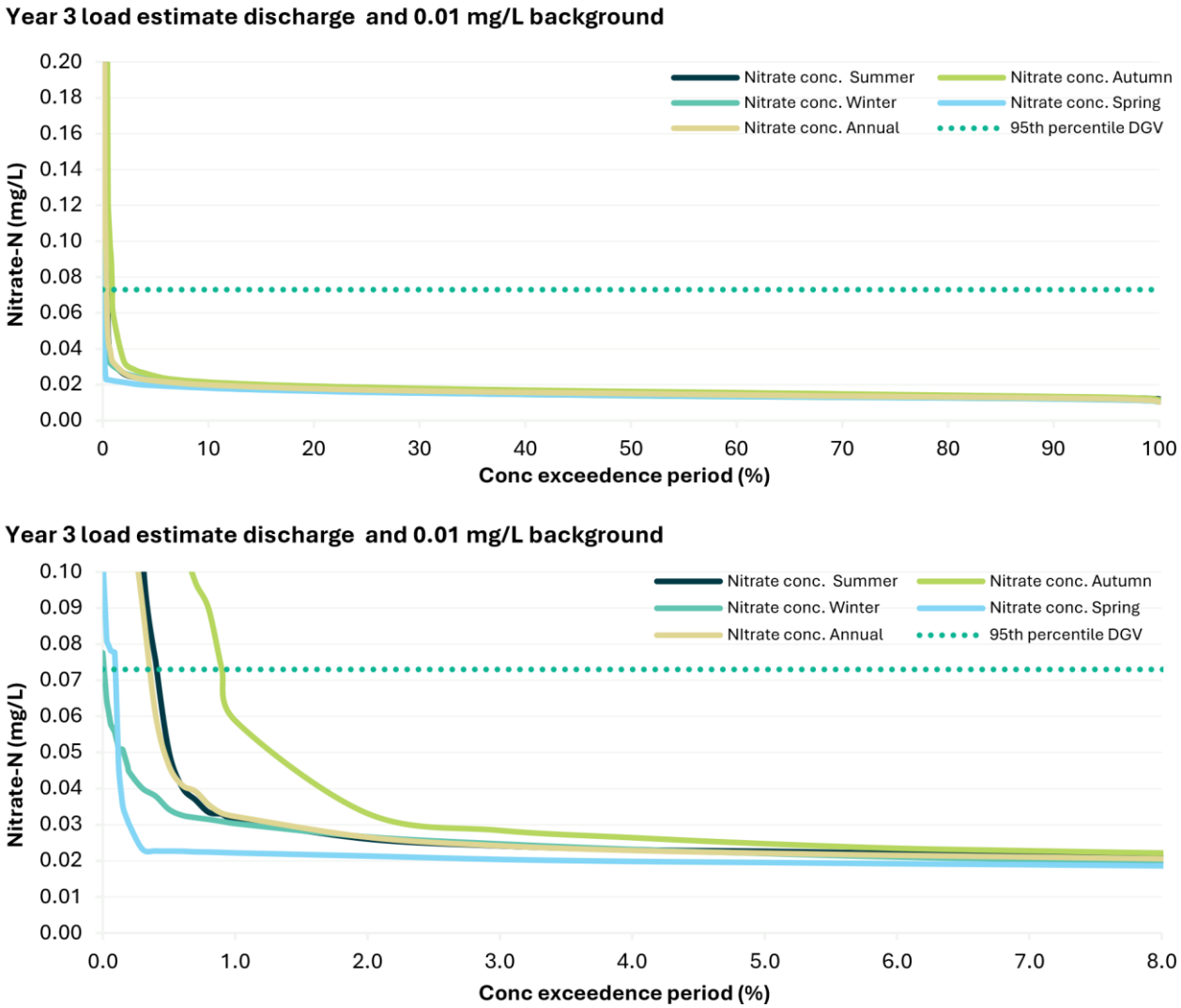


Figure 5.10: Concentration duration curve for nitrate in Year 3 of construction.

Tarraleah Village

The Tarraleah Village Pond is a small waterbody located north of the village, downslope from the golf course. Water quality in the pond is indicative of eutrophication, with some measurements showing elevated conductivity, slightly elevated pH, elevated nutrients and chlorophyll *a*, and variable dissolved oxygen (Section 5.1.1.6). These conditions are most likely due to local inputs, including runoff from the golf course.

In addition to the pond, Stream 6 flows through the site to Wilsons Creek and the Nive River. While sampling has not yet been undertaken, visual observations indicate signs of eutrophication in this creek.

For this site, potential impacts to water quality include:

- Low potential for erosion and sedimentation as there will be limited clearing and no major civil works. Construction will be limited to building laydown and workshop areas, and installing prefabricated administration buildings. The construction zones are primarily low relief (<10% gradient) except for the sewage treatment area, where some steeper slopes occur, including the pond batters. The zones intersect numerous small drainage lines associated with Stream 6, which flows to Wilson Creek and Lake Liapootah; some internal drainage in the village is diverted to the pond. While soil type is unknown, it is likely similar to other sites in the disturbance footprint and may be susceptible to erosion, producing turbid runoff.
- Moderate potential for hydrocarbon release into Stream 6 due to the presence of laydown and workshop/refuelling areas in the village.
- High potential for increased pH in Stream 6 if a concrete batch plant is located in the village, and due to the use of concrete for laydown and workshop areas, both of which could result in contaminated wastewater discharge to local waterways.
- Low potential for metal release into local waterways. While some release may occur (e.g. from workshops or laydown areas), concentrations are expected to be low and rapidly diluted in Stream 6 and Wilson Creek, resulting in low unmitigated impact.
- No potential for nitrate and ammonia release as drill-and-blast construction techniques will not be used at Tarraleah Village.

5.1.2.3 Other construction sites

In addition to the potential impacts at the main construction sites (Western portal, Mid-access portal, Paddy's Quarry, power station, Tarraleah Village), there is also potential for water quality impacts—particularly erosion and sedimentation—from other Project components:

- **Transmission line (northern and southern options):** These alignments have the largest areas of potentially exposed soil and are long, linear corridors with a high perimeter length. Slope length—and therefore the potential for rill erosion—could be significant, depending on whether the alignment follows or crosses contours. Slopes vary, but a high proportion of the route has moderate to steep gradients, which can increase erosion risk through higher velocity runoff. Both transmission line options intersect streams, creeks, and small swamps, draining downslope into major rivers and waterbodies. The termination points are located on the banks of the Nive River, requiring specific drainage controls. While soil types have not been tested in these areas, it is conservatively assumed they are easily erodible, similar to other sites within the disturbance footprint, and capable of generating turbid runoff.
- **Surge tower and rising main:** These construction zones are primarily linear, with a high perimeter-to-area ratio, and intersect creeks associated with Wilsons Creek, which flows to the Nive River. Slopes are variable but mostly <20 % gradient. The area is located on a glacial Quaternary surface, with soil types likely to be erodible and to produce turbid runoff.

- **Pump station:** The pump station construction zone is relatively compact and drains to the Nive River via No. 2 Pond or via waterways associated with Wilsons Creek. Slopes are variable but mostly <20 % gradient, with soils likely to be erodible and to produce turbid runoff.
- **Explosive magazine:** The construction zone for the potential explosive magazine is small, with variable slopes but mostly <10 % gradient. Both magazine areas are located on a glacial Quaternary surface, with soils likely to be erodible and to produce turbid runoff. All three of these sites are intersected by watercourses that flow to major rivers.

5.1.2.4 Catchment loading and far-field impacts

The nitrogen loading of the Project from nitrate and ammonia represents a small portion of the total catchment loads for a short period of time. It is estimated that total nitrogen loads from the Project will be greatest in Year 2 and 3 at approximately 13,000-14,000 kg/annum. This corresponds to approximately 1.55 % additional total nitrogen load for the Derwent River at Bryn Estn, based on catchment estimates from Proemse et al (2022) (Figure 5.11). The transitory use of explosives by the Project ensures that loading at this rate will be limited to approximately two years, with subsequent years estimated to reduce to loads equivalent to around 1 % of the catchment total nitrogen (Year 4) and less than 0.5 % (Year 5), and halving every subsequent year.

The catchment as a whole has a number of nutrient inputs that come from a large and complex array of diffuse sources and a number of point sources. Due to the size and complexity of nutrient inputs to the catchment, it is difficult to quantify the potential impact of the loads from the Project on the downstream catchment. Proemse et al (2022) indicate that the River Derwent is potentially under stress from existing nutrient loads and that issues such as benthic cyanobacteria in the lower Derwent, which have been responsible for taste and odour issues in drinking water sourced at Bryn Estyn, are a symptom of high nutrient loads. The loads from the Project are estimated to be material for a period of 2 to 3 years and then declining substantially in subsequent years. The combination of high dilution in the immediate vicinity of the site discharge and the transitory nature of loading will see the impact minimised, with a short period of potential impact from a relatively small increase in total nitrogen to the lower catchment.



Figure 5.11: Total nitrogen contributions from individual industries and natural environments for the entire River Derwent catchment (from Proemse et al, 2022) and incorporating the Project maximum contribution in Year 3

5.1.3 Avoidance and mitigation measures

5.1.3.1 Water Management Plan

WQ 1: A Water Management Plan (WMP) will be prepared prior to the commencement of construction and implemented throughout the Project. The WMP will reflect the final project design and construction methods and will include, at a minimum:

- Objectives and commitments, including water quality performance criteria designed to minimise impacts on the aquatic environment (refer to Section 8 of Appendix F for detail).

WQ 2: For the duration of construction, water from a range of sources (tunnel process water, groundwater, surface runoff) will require discharge from site. Discharge criteria will apply to all water discharged from the following sites:

- Western Portal
- Mid-access Portal
- Paddy's Quarry (including Surge Tunnel Access Portal)
- Power station

Water quality performance criteria for point source discharge monitoring locations:

- **TSS:** 50 mg/L (or equivalent turbidity measure), based on erosion and sediment control construction guidelines published by the Tamar Estuary and Esk Rivers Program and the Derwent Estuary Program.
- **pH:** Between 6.0 and 9.0, guided by EPA DGVs. The lower limit matches the 10th percentile value (6.0) and the upper limit is above the 95th percentile (8.1) to allow for point discharges to be readily diluted below 8.1.

WQ 3: For the duration of construction, water at the Liapootah Pond Outlet will meet the following criteria:

- **Nitrate concentration:** Measurements must not exceed background concentration (measured upstream of Tungatinah Power Station on the Nive River) by more than 0.07 mg/L for two consecutive measurements, guided by the EPA DGV 95th percentile (0.073 mg/L).
- **Turbidity:**
  - *During in-stream works*: No more than 30 NTU above upstream background turbidity on a 72-hour rolling average (final value to be confirmed based on final design and methods). Guided by the EPA DGV 95th percentile (30.7 NTU).
  - *At other times*: No more than 10 NTU above upstream background on a 72-hour rolling average, guided by the EPA DGV 80th percentile (8.3 NTU).
- **pH:** Measurements not to exceed 8.1 for more than two consecutive measurements.

WQ 4: Hydrocarbon Management Plan (HMP) to include:

- Appropriate transport, storage, handling and disposal of all hydrocarbons to prevent spills and minimise impact to waterways
- Use of on-site treatment, where appropriate, to separate hydrocarbons from site water
- Disposal of hydrocarbon waste through licensed waste management facilities.

WQ 5: Concrete batching and washout areas will be:

- Located away from drainage lines, stormwater drains and waterbodies
- Clearly signposted and conveniently located for equipment washout
  - Fully bunded with impervious surfaces, with all washdown water either treated on-site to meet WQ2/WQ3 criteria or disposed of at a licensed waste facility.
- Water and wastewater management (including requirements outlined in *Wastewater management* below):
  - Clean water diversion around construction sites
  - Capture, storage and treatment of wastewater
- A site water balance showing expected water sources (flows, groundwater, rainfall, wastewater) and discharge points over the construction period
- Performance criteria for wastewater discharge, or requirements for disposal at accredited facilities.
- Spoil emplacement management (cross-referenced to Spoil Management Plan in Section 5.10):
  - Drainage and erosion/sediment control measures (cross-referenced to the ESCP – 5.1.3.2).
  - Capture of surface water drainage from spoil sites using bunds, drains/pipes, ponds and pumps, with discharge managed as per wastewater measures.
- Spill Response Plan to include:
  - Spill prevention measures
  - Spill kit requirements
  - Equipment and procedures for spill response
  - Training requirements, including simulations.
- Nitrate Management Plan (NMP) (see Section 5.1.3.3 for details):
  - Blasting procedures to minimise nitrate generation
  - Collection and storage of wastewater
  - Use of existing conveyances (e.g. No. 1 and No. 2 Conveyances, storages) and/or the Nive River to dilute nitrate concentrations to near background
  - On-site storage during periods of low/no power station discharge
- Contractor training and induction, including emergency response simulations
- Incident response and reporting procedures
- A water quality monitoring program for all construction sites (see Section 5.1.3.4 and Section 8.5 of Appendix F), covering parameters, methods, frequency, responsibilities, performance criteria, and reporting
- Internal and external audit requirements and frequency.

Wastewater management

Elevated pH, nitrate concentrations and sediment levels in wastewater from construction sites will be managed through the collection, storage and discharge measures described below.

Collection, storage and discharge of wastewater

To reduce the risk of elevated nitrate, sediment, or pH levels in local waterways, the following measures will be implemented:

- Limiting water discharge from site to local waterways, including:
  - Using on-site capture methods such as drains, bunds, pipes, tanks or ponds. This includes collecting surface water drainage from below stockpiles, portal and tunnel ingress, and other site runoff.
  - Redirecting collected water through on-site treatment processes before discharge to meet water quality criteria (e.g. sediment ponds/flocculants, pH adjustment).
- Discharging to locations that provide dilution to maintain compliance with performance criteria, including:
  - No. 1 Canal (Western Portal)
  - No. 2 Canal and storages (Mid-access Portal and Paddy's Quarry)
  - Nive River (Power Station)

An overview of the proposed discharge pathways is provided in Figure 5.13. The canals are assumed to be used for dilution/conveyance during construction (approximately four years) and for one year after blasting ceases.

It is expected the existing Tarraleah Power Station will operate for around 12 months following the end of blasting, allowing for the wastewater discharge locations from each site to continue to be utilised to achieve dilution.

While the existing power station is still operating, wastewater at all construction sites will continue to be discharged to No. 1 Canal, No. 2 Canal and the Nive River until such time that the water quality is suitable for discharge locally. However, when:

- the existing power station (including No. 1 Canal) is decommissioned, and/or
- water quality remains unacceptable to discharge locally,

measures will be taken to ensure that wastewater is not discharged locally and continues to be discharged via the No. 2 Canal or No. 2 Pond to the Nive River via the new power station. This will continue until water from each of the sites is considered adequate to release locally.

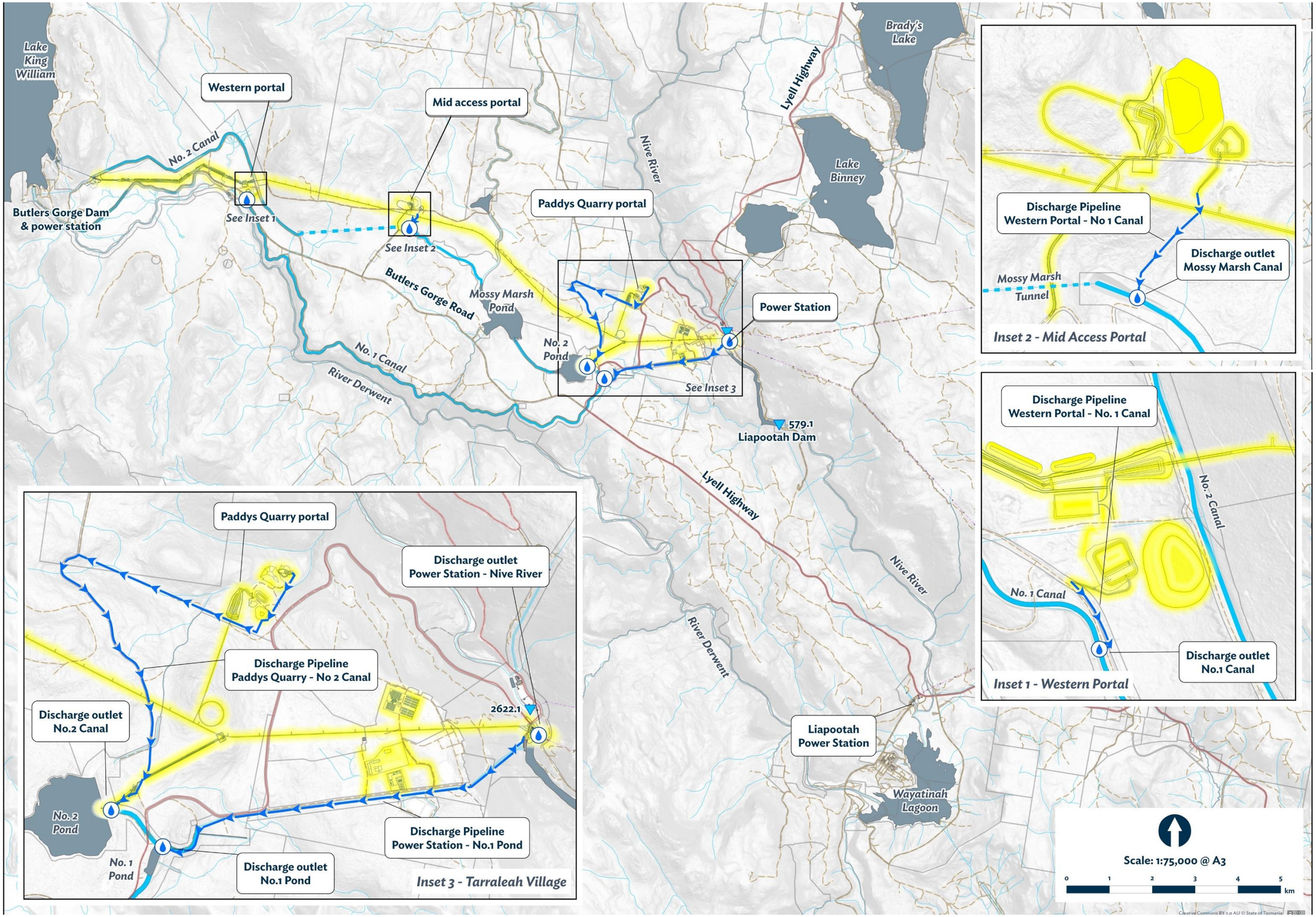


Figure 5.12: Proposed water management pathways

Periods of low or no power station operation (lowered dilution capacity)

WQ 6: On-site storage capacity will be provided to accommodate rare periods when there is low or no flow for dilution of discharges in the Nive River from Tarraleah Power Station (via No. 1 or No. 2 Canals) and Tungatinah Power Station. This will include:

- Ensuring each portal location has sufficient on-site storage to hold water with elevated nitrate concentrations for at least 72 hours without the need to discharge.
- Using No. 2 Pond as additional overflow storage capacity (beyond the 72-hour on-site capacity).
- Managing subsequent discharges at a controlled flow rate to remain below the nitrate performance criterion.

The basis for the provision of 72 hours of storage capacity is from a recent historical analysis of diluting flows overlain with predicted nitrate loading (See Section 7.3.6.2, Appendix F), that indicates this provides storage for double the annual period historically when flows are unlikely to be sufficient to provide adequate dilution.

These measures will be applied to manage planned low-flow or no-flow events scheduled by Hydro Tasmania (e.g. annual cleaning of No. 1 Canal). While unlikely, if an unplanned event occurs during construction that prevents discharge via No. 1 and No. 2 Canals or from Tarraleah and Tungatinah Power Stations for an extended period, Hydro Tasmania will engage with the EPA to agree on alternative water management strategies.

5.1.3.2 Erosion and Sediment Control Plan

WQ 7: Prior to commencing construction at each site, an ESCP will be prepared by a suitably qualified professional, as defined in the *IECA Australasia Position Statement – Definition of a Suitably Qualified Professional* (Nov 2023). The ESCP will be developed in accordance with the principles and guidance in *IECA Australasia's Best Practice Erosion and Sediment Control* (BPESC) document (2008).

At a minimum, the ESCP will include:

- **Objectives and commitments** for erosion and sediment management
- **General classification** of erosion potential for each land type and topography likely to be disturbed by construction
- **Pre-construction controls**, including identification of erosion and sediment control management zones
- **Targeted soil testing** and erosion hazard assessment
- **Management controls**, including timing of works, defining work areas, and minimising clearing to retain vegetation where possible
- **Physical controls** such as:
    - Drainage controls within and around construction sites, including diversion of clean water around work areas and dirty water drainage
    - Sediment basins
    - Vehicle washdown facilities
    - Concrete washout areas
    - Floating silt curtains
    - Sediment controls and treatment for stockpiles, laydown areas, and general construction zones
    - Controls for in-stream works in the Nive River.

- **Construction controls** covering:
  - Maintenance of drainage infrastructure to ensure proper function
  - Road construction and maintenance drainage considerations
  - Dust control procedures to limit sediment mobilisation
  - Contingency measures for extreme rainfall, poor performance, or operational changes
  - Progressive rehabilitation and revegetation of disturbed areas.
- **Training and induction** requirements for all contractors, subcontractors, and suppliers, including refresher sessions
- **Incident response and reporting procedures**
- **Erosion and sediment monitoring program** for all construction sites (see Section 5.1.3.4 and Section 8.3 of Appendix F), detailing frequency, responsibilities, performance criteria/guideline values, and reporting requirements
- **Audit requirements**, both internal and external, and their frequency
- Consolidated table of management measures and monitoring requirements including those in this report (refer Chapter 6 and Chapter 8, including reporting requirements and frequency, and roles and responsibilities.

5.1.3.3 Nitrate Management Plan

WQ 8: A NMP will be developed and implemented to manage nitrate generated from the use of explosives, in line with best practice blasting procedures. The NMP will also include measures to manage wastewater with elevated nitrate concentrations.

At a minimum, the NMP will include:

- **Objectives and commitments**, including performance criteria to ensure impacts to the aquatic environment are minimised (refer Appendix F for further detail)
- **Best practice blasting procedures** to limit nitrate generation, including reducing:
  - **Nitrate generation through explosive selection**, where practicable:
    - Where practical and cost-effective, explosives with properties that reduce nitrate generation will be selected
    - This may include products with optimised ammonium nitrate composition, greater resistance to dissolving, and the potential for more complete detonation.
  - **Spillage of explosive nitrate emulsion products**:
    - Careful handling and containment measures (e.g. bunding) where spills are more likely to occur
    - Avoiding the deposition of excess explosive on the ground
    - Collecting excess emulsion from hoses into a dedicated, sealable explosive waste container
    - Cleaning up large spills promptly
    - Disposing of waste emulsion at an appropriate off-site waste management facility.
  - **Nitrate generation during charge setting**:
    - Filling blast holes to appropriate levels to minimise unexploded emulsion
    - Using methods that minimise failed charges
    - Keeping the wait time (sleep time) between charge setting and detonation to a minimum.

WQ 9: In line with the WMP:

- All water exposed to blasted materials (e.g. tunnel excavation water, surface runoff from spoil emplacement areas) will be collected and contained within the disturbance footprint prior to discharge.
- Collected water will be discharged to one of the following locations:
  - No. 1 Canal
  - No. 2 Canal and storages
  - Nive River
  - On-site storage during periods of low or no flow in the Nive River from either Tarraleah Power Station (via No. 1 or No. 2 Canals) or Tungatinah Power Station.
- For the rare occurrence when both power stations are not operating and flow in the Nive River is low—resulting in reduced dilution—storage will provide 72 hours detention capacity to avoid discharge during these conditions.
- **Training and induction** requirements for all contractors, subcontractors, and suppliers, including refresher sessions.
- **Monitoring and reporting** requirements for all construction sites (refer Appendix F), including frequency, responsibilities, performance criteria/guideline values, and reporting frequency.
- **Audit requirements**, both internal and external, and their frequency.

5.1.3.4 Monitoring

The following monitoring programs will be implemented to confirm the effectiveness of management measures, with some activities extending into the post-construction phase (see M3).

Baseline monitoring

M1: The existing baseline water quality monitoring program will:

- Continue at the 14 existing baseline sites (except SW-P8) until 2 years of data has been collected
- Be undertaken at additional sites on Streams 1–6 and the River Derwent until 12 months of data has been collected or the water quality monitoring program (refer **M2**) commences
- Potential locations for the above additional baseline monitoring sites are shown in Figure 5.13; final locations will be confirmed based on accessibility and safety.
- Monitoring at existing and additional sites will occur monthly and include:
  - *In-situ physico-chemical parameters:* turbidity, electrical conductivity, pH, dissolved oxygen (mg/L and %), chlorophyll *a*.
  - *Laboratory analysis:* dissolved and total nutrients, total suspended solids, and the standard metals suite.
- This program will provide a seasonal water quality baseline for all sites with potential construction-related impacts, including two sites on the River Derwent to monitor potential effects on the TWWHA (Figure 5.13).
- The baseline program may be reviewed and updated as Project design progresses, subject to periodic review of results.

Pre-construction and construction monitoring

M2: The WMP will adapt the baseline water quality monitoring program and specify monitoring locations, frequency, and parameters based on the final design and construction methods.

The WMP will be informed by analysis of all baseline data, including seasonal trends.

Objectives:

- Establish a pre-construction monitoring program, targeting water quality risks associated with the selected construction method, to add to existing baseline monitoring results and provide a construction baseline.
- Establish a construction monitoring program to address specific risks, including:
  - Erosion and sedimentation
  - Hydrocarbons
  - Elevated pH
  - Metals
  - Nitrates from explosives
- At a minimum, construction monitoring locations will include:
  - Point source discharge locations at each work site
  - Streams 1–5
  - Mossy Marsh and No. 2 Pond
  - River Derwent within and downstream of the TWWHA
  - Upstream of the Tungatinah Power Station discharge (Nive River)
  - Lake Liapootah outlet
- Monitoring will include in-situ physiochemical parameters (i.e. turbidity, electrical conductivity, pH, dissolved oxygen (mg/L and percent)) along with laboratory analysis of nitrate and ammonia, total suspended sediments and any dissolved metals of concern. Chlorophyll a will also be monitored at Nive River upstream of Tungatinah Power Station and Lake Liapootah outlet only.
- At a minimum, monitoring will be completed at a frequency sufficient to demonstrate compliance with performance criteria

Post construction / operation monitoring

M 3: Post-construction monitoring for nitrates at point source discharge locations from spoil emplacement areas will continue until nitrate concentrations have returned to pre-construction levels, or there is clear evidence they are attenuating to levels that will not cause environmental harm to a slightly to moderately disturbed aquatic ecosystem.

5.1.3.5 Residual impacts

Construction of the Project poses a risk to the water quality of local waterways. Potential impacts from construction site runoff to these small waterways include:

- Reduced habitat quality due to sediment release
- Increased pH from the use of concrete
- Elevated nitrate concentrations from explosive residues.

Management measures will be implemented to prevent significant impacts on water quality. The WMP will outline controls for water and potential contaminants, including on-site capture, storage, treatment, and discharge of water, along with spill response, hydrocarbon handling, and concrete washout procedures. The ESCP and NMP will further reduce the generation and discharge of sediment and nitrate.

- Key water management measures include:
- Capturing and storing water at main construction sites, including below spoil emplacement locations, and treating all discharged water to meet pH and suspended sediment (turbidity) performance criteria.
- Using the Tarraleah water conveyances and the Nive River for dilution to ensure compliance with receiving environment criteria for nitrate, pH, and suspended sediment.
- Providing contingency storage for 72 hours in case of short-term outages of the Tarraleah water conveyances, where dilution cannot be assured, to maintain compliance with performance criteria.

With these measures in place, no residual impacts on water quality resulting in environmental harm are expected. While there will be an increase in dissolved nitrogen loads—mostly as nitrate—into the Derwent catchment during and shortly after blasting, these loads are considered to have no residual impacts due to their relatively small size in the context of the greater catchment, their temporary nature, and the significant dilution available to reduce concentrations.

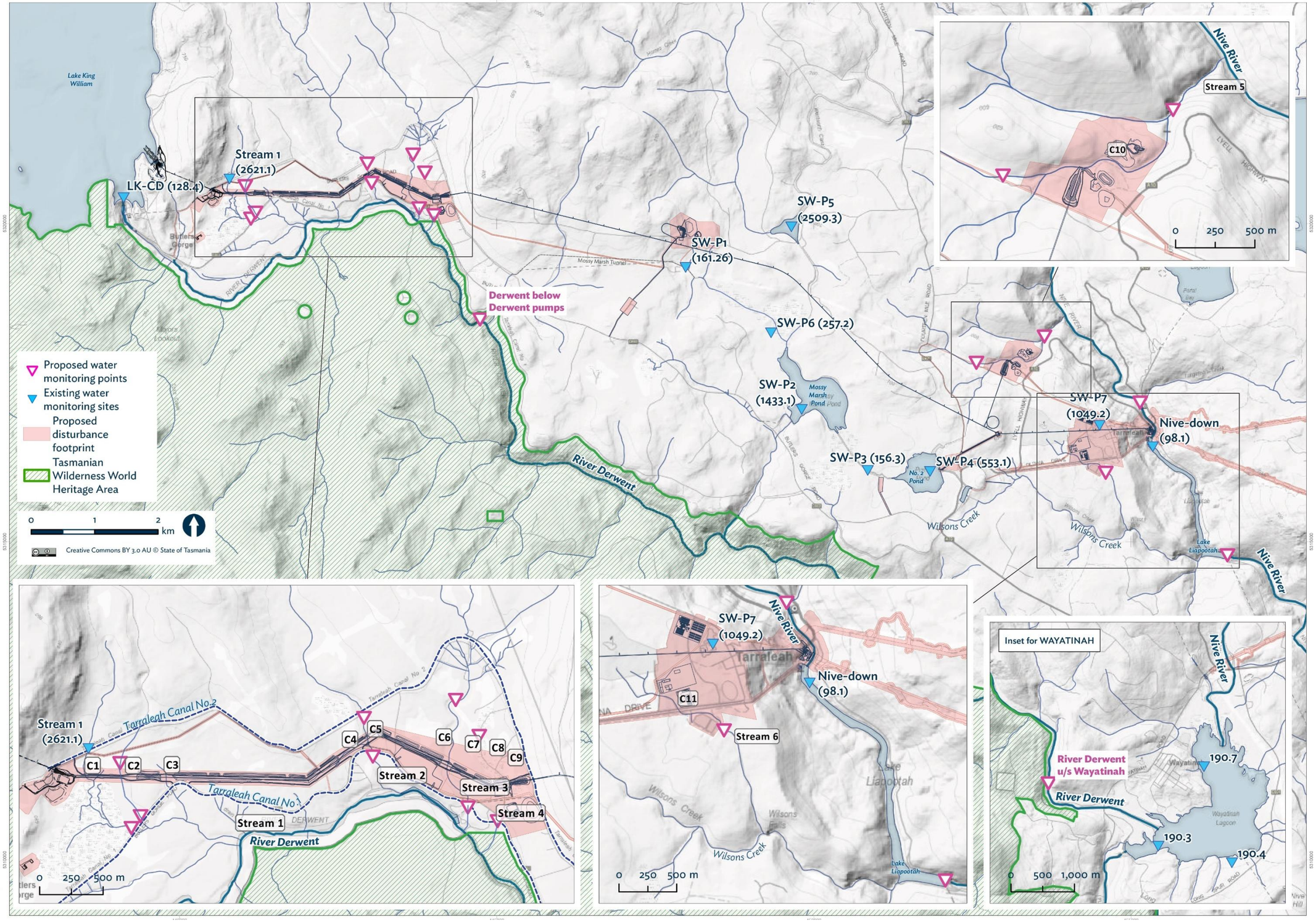


Figure 5.13: Overview of existing and proposed surface water quality baseline monitoring sites

5.2 Groundwater

A hydrogeological assessment has been completed for the Project (Appendix H) and is summarised below. Potential impacts to terrestrial and aquatic biodiversity from changes in hydrogeology are described in Section 5.3 and Section 5.4, with detailed assessments in Appendix B and Appendix G. Potential impacts to surface water quality, including from groundwater discharged at the surface (e.g. tunnel inflows), are described in Section 5.1 and assessed in detail in Appendix F.

The conceptual hydrogeology was informed by geological and structural interpretations, site investigations (geological and geotechnical assessments completed for the Project), and groundwater monitoring observations.

5.2.1 Existing environment

Tarraleah is characterised by a net positive water balance, with rainfall exceeding annual evapotranspiration by about 700 mm, and by anthropogenic (artificial) recharge supplied by surface flows from No. 2 Canal to Mossy Marsh.

A schematic of recharge, throughflow, and local- to catchment-scale (regional) discharge concepts is shown in Figure 5.14a (after Woessner, 2020). This schematic illustrates local, intermediate, and regional flow lines emanating from upland and local hillock recharge zones. Figure 5.14b provides an adaptation for the Wentworth Hills, plateau, and River Derwent.

The evidence informing these schematics indicates:

An aquifer system that is full, as shown by shallow water tables and the presence of Mossy Marsh and other wetlands.

- Recharge from rainfall infiltration varies with topographic elevation and slope
- Local flow lines discharge to wetlands and hollows on the plateau
- Intermediate flow lines originate beneath Wentworth Hill and terminate in wetlands on the plateau
- Regional flow lines extend from Wentworth Hills to the River Derwent
- The River Derwent (south) and Nive River (east) act as deeply incised hydrogeological discharge boundaries, with groundwater heads correlating to riverbed elevations.

Local, intermediate, and catchment-scale flow lines from the Wentworth Hills to the River Derwent are predominantly controlled by interconnected fracture zones in weathered and fresh dolerite.

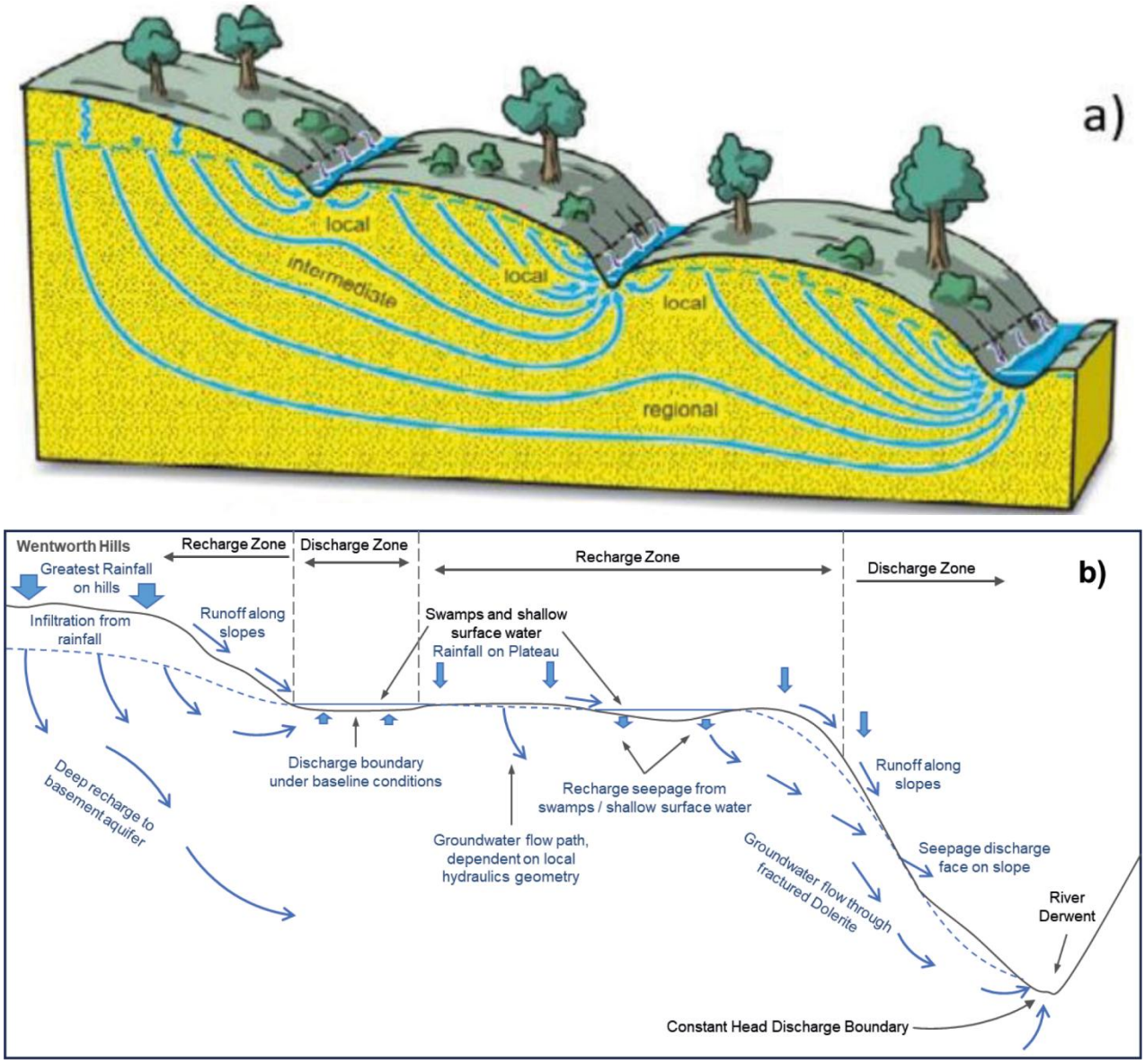


Figure 5.14: Schematic cross sections of a) simplified groundwater flow model (Woessner, 2020) and b) groundwater recharge and discharge concepts

5.2.1.1 Groundwater to surface water interactions

Groundwater–surface water interactions are evident within the Project area, with groundwater discharge occurring mainly across low-lying areas of the plateau, forming shallow water bodies associated with swamp deposits. The occurrence and nature of these discharges depend on local hydraulic gradients, which may promote either deep drainage towards the River Derwent or shallow upwelling into swamps (Figure 5.14b).

Conceptually, groundwater discharge occurs in the following settings:

- Across the dolerite plateau at the base of the Wentworth Hills, contributing baseflow to watercourses and wetlands
- Along the Tarraleah Hillside, through ephemeral springs sourced from the Tertiary palaeovalley and Mesozoic aquifers. Discharge is expected as small springs in incised stream headwaters and as seepage at the base of outcropping permeable basalt horizons
- At the deeply incised River Derwent and Nive River, which act as baseflow discharge zones

A key control on groundwater–surface water interactions is the water exchange capacity of soils beneath ponded water, perennial watercourses, and wetlands. This capacity is influenced by soil thickness and effective vertical infiltration. At Mossy Marsh and associated wetlands, soils are conceptually assumed to comprise a 2 m thick peat horizon overlying a 3 m thick residual soil horizon.

5.2.1.2 Prospective aquifers

Hydrogeological rock mass units (HRMUs), based primarily on the geotechnical rock mass units from Appendix H, were used to characterise soils and rocks and to discretise the main fractured rock aquifer units. Other datasets used to classify the HRMUs included:

- Core photos and geotechnical borehole log review
- Hydraulic packer testing
- Rising and falling head slug tests
- Stereographic structural data
- Auger hole and test pit data.

The HRMUs describe two predominant fractured rock aquifers within the Project area:

- Tertiary palaeovalley basalt lava flows—HRMUs H-B1 to H-B5
- Mesozoic bedrock, predominantly dolerite sills—HRMUs H-D0 to H-D6

Both aquifers consist of anisotropic and heterogeneous fractured rocks. Groundwater is stored in fractures and transmitted through secondary permeability. Transmissivity is highly variable and may be significantly enhanced within, and at the confluence of, fracture zones where the rock mass is more deformed. The interpreted geology and fracture zone distributions are shown in Appendix H—Figure 11(a).

5.2.1.3 Tertiary palaeovalley basaltic lava flows

The Nive River Palaeovalley is located on the western flank of the present-day Nive River Valley, with a tributary extending northwest beneath Mossy Marsh. Locally, the palaeovalley has been infilled with a ~150 m thick succession of columnar-jointed massive, amygdaloidal, and vesicular basalt lava flows, typically 10–15 m thick. Interlayered with the basalt flows are unconformity zones characterised by scoria breccia, altered palaeosol material, and terrestrial unconsolidated sand and silt beds. A schematic of the Nive River Palaeovalley and its tributary is shown in Figure 5.15.

Secondary permeability is provided by the prevalent columnar jointing of the basalt. Connected porosity within the porous and vesicular basalt flows contributes a widely variable and uncertain element of primary permeability.

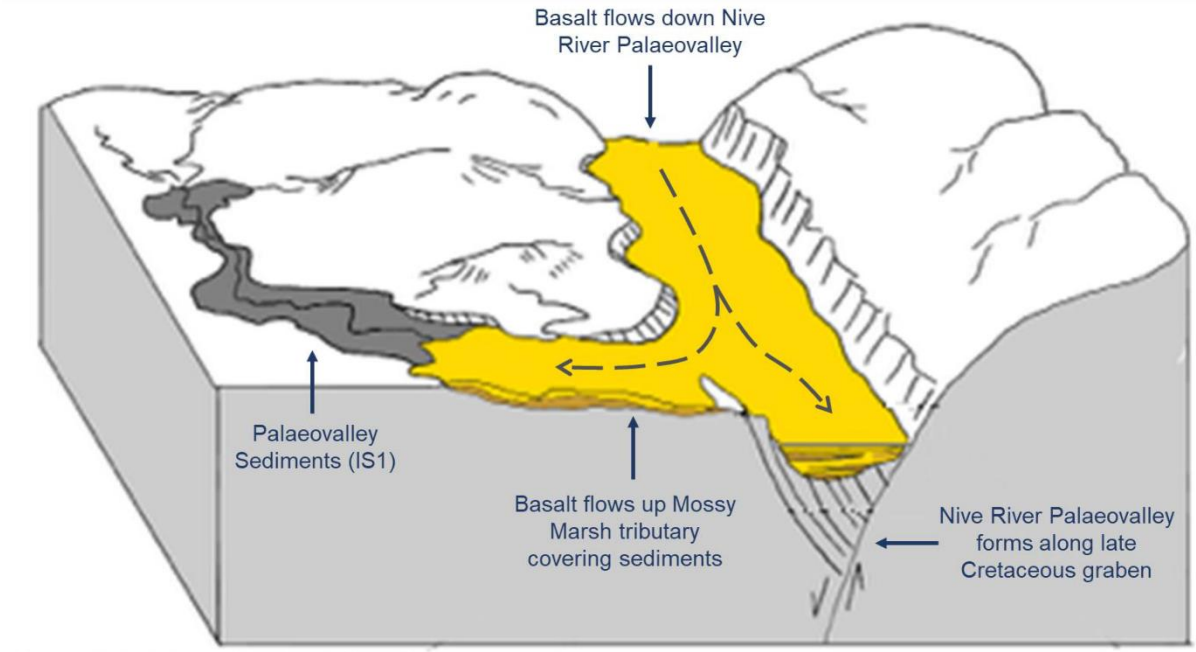


Figure adapted from Stuart-Smith (2023)

Figure 5.15: Schematic block diagram of interpreted Nive River Palaeovalley

5.2.1.4 Mesozoic bedrock, predominantly dolerite sills

The basement rocks around Tarraleah are typical of the Mesozoic succession in Tasmania, comprising flat to shallow-dipping Triassic sandstone intruded by laterally extensive Jurassic dolerite sills that locally cap the sandstone.

Fracturing of the dolerite, which provides secondary permeability, likely occurred during northeast–southwest trending extension in the Late Cretaceous (Figure 5.16).

Vertical columnar joints, formed by contraction during cooling after emplacement, are well developed throughout the dolerite sills. These joints are pervasive at both outcrop and project scales, forming a hexagonal framework of interconnected structures that controls the fractured rock aquifer. The framework contains three equally weighted strike orientations: east–west, northeast–southwest, and southeast–northwest.

The left-lateral stepover of the Nive River graben produces a negative flower structure (Figure 5.16). The graben is defined by down-faulted dolerite blocks and associated fracturing along the fault planes.

Groundwater flow within the fractured dolerite aquifer is inferred to occur preferentially along fracture zones, with little or no flow through intact blocky dolerite.

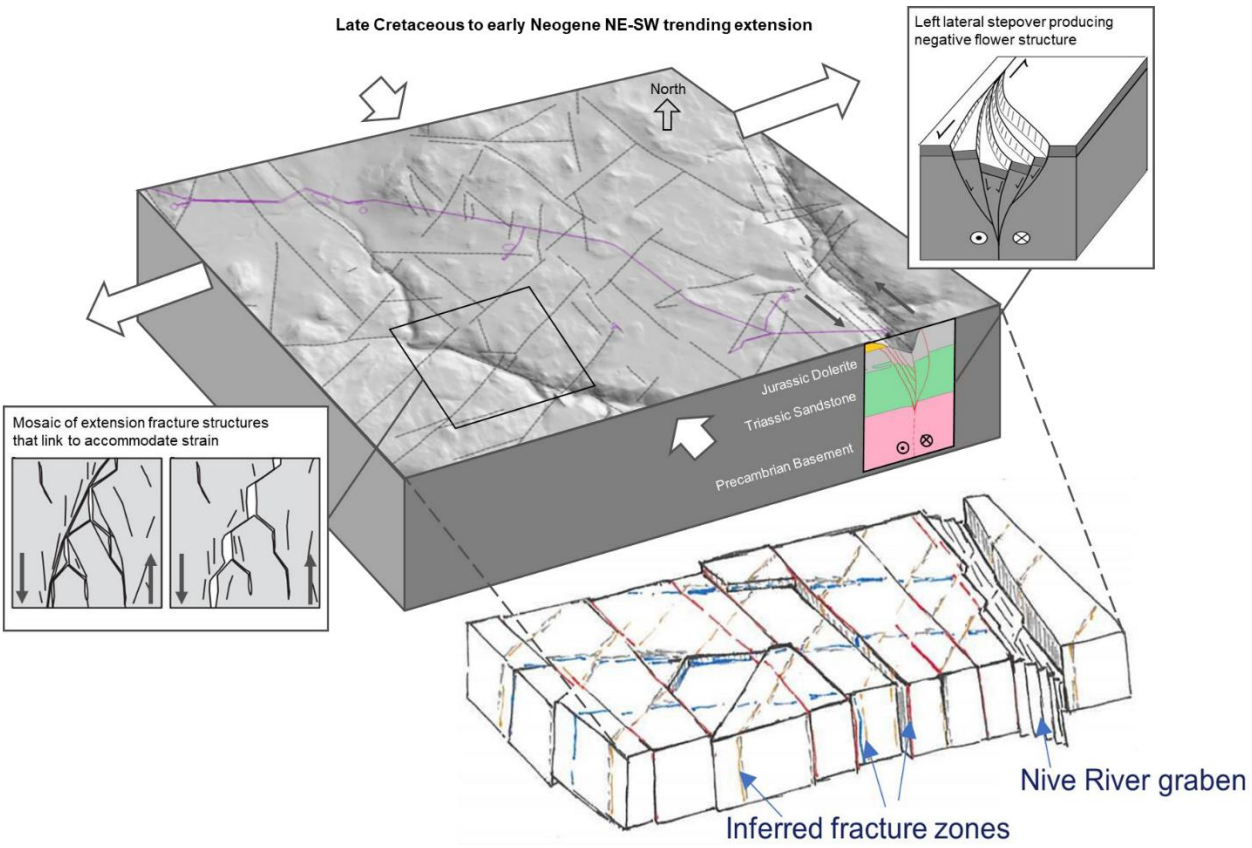


Figure 5.16: Schematic block diagram of Mesozoic fractured rock aquifer

5.2.1.5 Fracture zones

A schematic conceptualisation of the vertical fracture zones is shown in Figure 5.17. Broad fracture zones, 60–300 m wide (Appendix H—Figure 11(a)), have been identified from topographic depressions, geophysical surveys, and borehole coring. These dolerite fracture zones are composed of numerous discrete damage zones.

For the conceptual and numerical hydrogeological model, individual damage zones have been simplified as vertical features typically 1–15 m wide. These zones form the preferential groundwater flow pathways within the broader dolerite fracture zone.

Between discrete damage zones, the H-D3 blocky HRMU typically occurs. This unit has lower groundwater flow potential and limits hydraulic connection between fracture features.

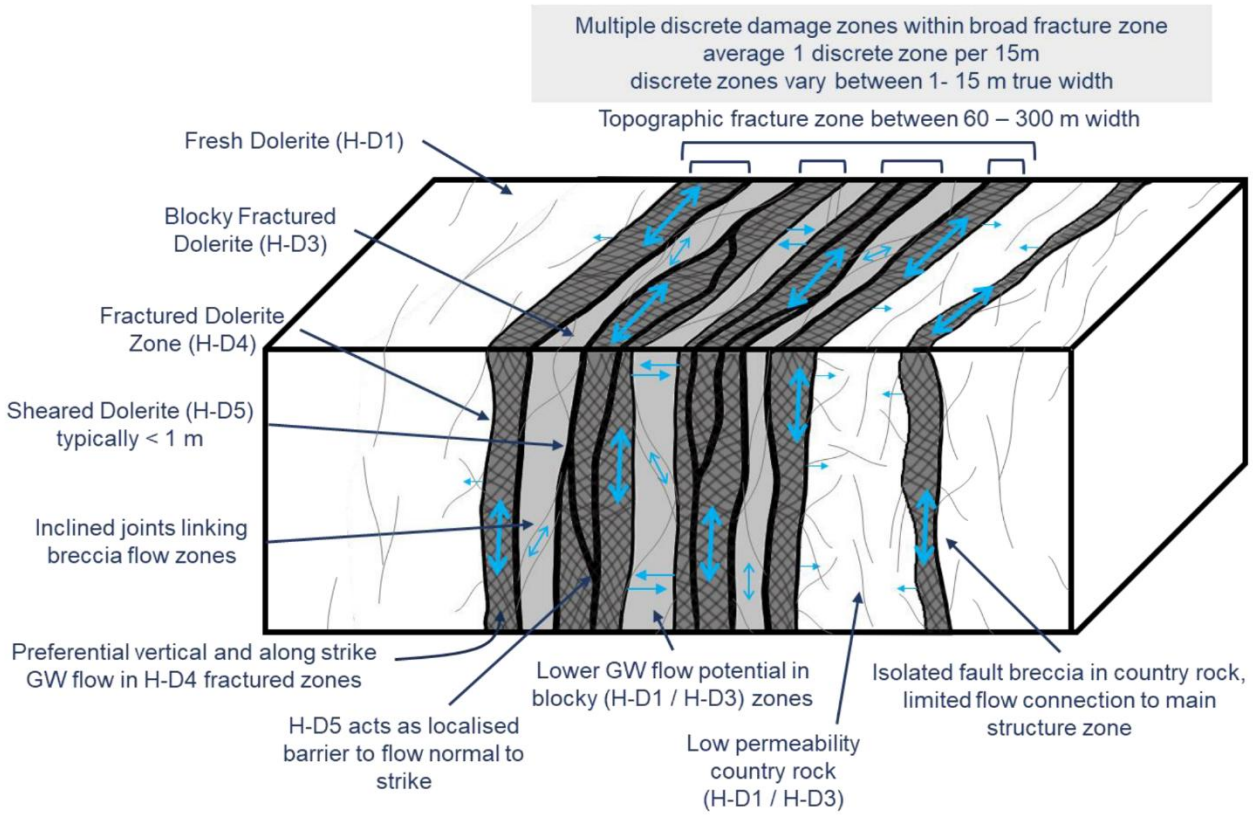


Figure 5.17: Schematic block diagram illustrating simplified composition of fractures zones within dolerite for hydrogeological modelling purposes

5.2.1.6 HRMU hydraulics

Table 5.4 summarises all HRMUs and the applied values of hydraulic conductivity, derived from Lugeon, slug, and Guelph permeameter tests. The Lugeon test distributions were based on packer tests.

The HRMUs comprise:

- Soils—alluvium, colluvium, glacial till, and peats
- Basalt
- Tertiary sediments
- Dolerite
- Triassic sandstone.

Table 5.4: HRMUs and interpreted hydraulics

HRMU code	Lithology	Brief description	Lugeon range	No. of tests	Hydraulic conductivity [1] (m/day)
SCol	Soil	Alluvium / Colluvium	-	5 [3]	0.027–13
SGl [2]		Glacial till	-	-	0.0001–1
SPt		Peat swamp	-	11 [3]	0.001–0.075
H-B1	Basalt	Massive and blocky Basalt	0.10–5.87	7	0.003–0.024
H-B3		Basalt Flow Margin	1.54–153	12	0.04–0.42
H-B5		Broken near surface Basalt	-	0 [4]	0.015–0.068
H-IS1	Tertiary Sediments	Mudstone, semi-consolidated silts, fine sands	0.01–0.28	3	0.001–0.002
H-D0 [5]	Dolerite	Anomalous high yield defects	8.4–263.8	10	Not applicable
H-D1		Intact or massive to blocky rock mass, joint spacing > 1.0 m	0.001–1.18	25	0.0004–0.003
H-D3		Blocky-broken rock mass with typical joint spacing between 0.3 and 1.0 m. Some reduction in rock mass strength and increased weathering possible.	0.002–6.62	39	0.002–0.017
H-D4		Shallow D4 (<100 m). Very blocky/disturbed rock mass. Closely spaced jointing, discrete faults and shears.	0.35–152	37	0.18–0.59
		Deep D4 (>100 m). Same as above but defects tighten with depth.			0.012–0.024
H-D5		Shallow D5 (<100 m) Disintegrated to blocky/disturbed rock mass. Characterised by faults and shears, crushed and brecciated.	0.10–11.3	17	0.017–0.044
		Deep D5 (>100 m). Same as above but defects tighten with depth.			0.003–0.006
H-D6		Jointed rock mass with typically joint spacing between 0.6 and 2 m.	0.64–22.3	8	0.015–0.068
H-TS	Triassic Sandstone	Intact to blocky siltstone and sandstone, and HW and EW Triassic rafts.	0.04–13.5	13	0.002–0.04

1. Applied hydraulic conductivity ranges for HRMUs (excluding soils) are derived from packer testing data distributions.
2. Applied hydraulic conductivity ranges for glacial soils are indicative only and not supported by hydrogeologic testing.
3. Slug tests and Guelph tests (not packer tests).
4. No testing data for H-B5 so applied hydraulic conductivity range assumed to be comparable to H-D6.
5. No hydraulic conductivity (K) values are applied for D0 rock mass unit.

5.2.1.7 Interpreted baseline water table

Water table head contours (Appendix H—Figure 8) are interpreted from spot heights captured by standpipe monitoring wells, water strikes during drilling, and transient vibrating wire piezometer (VWP) heads. Interpreted and interpolated depths to groundwater contours are shown in the Appendix H—Figure 9.

Local potentially perched groundwater occurs in the Nive River Palaeovalley, associated with basalt contacts and in landslide deposits on the Tarraleah Hillside. Schematics of perched groundwater potentials are provided in:

- Figure 5.18: In the landslide located alongside existing penstocks, with shallow perched heads within clay-bound colluvium overlying lower heads in permeable bedrock and blocky landslide material
- Figure 5.19: In Tertiary sediments which have hydraulics which inhibit vertical fluxes and result in groundwater perched on top of porous basalt. An alternative interpretation would show connection between deeper and shallow heads within a pseudo-hydrostatic or losing-hydrostatic flow field
- Figure 5.19: Recognised during drilling of TA-DC268, TA-DC269, and TA-DC270 and constructed VWPs within a landslide immediately upslope of the proposed power station.

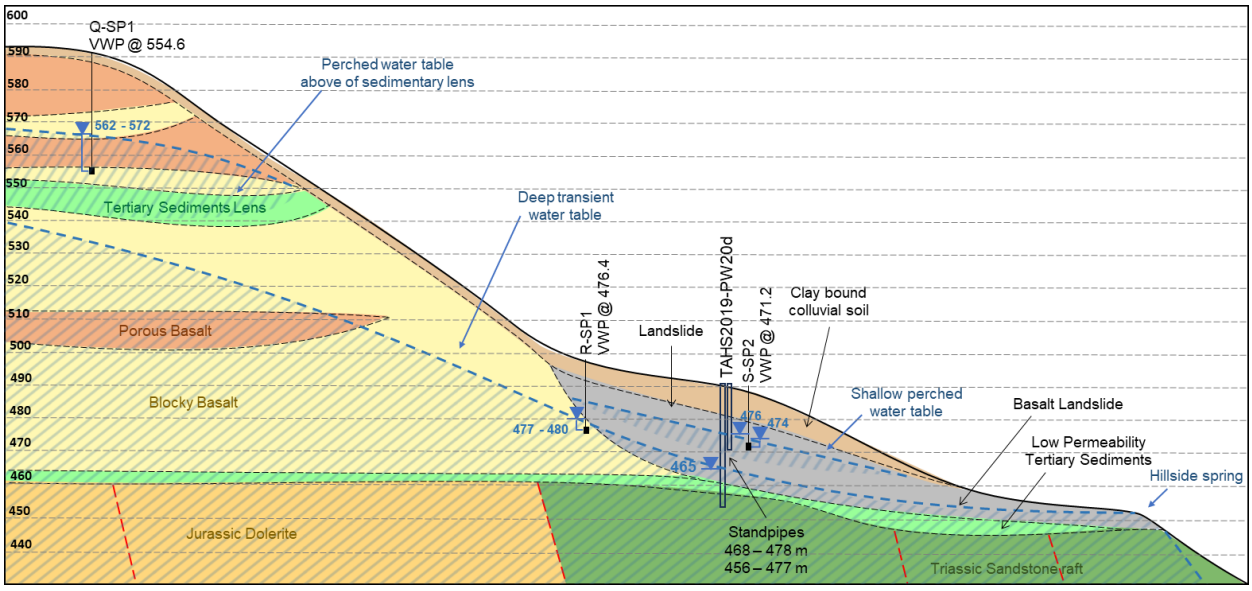


Figure 5.18: Schematic cross section of penstocks landslide with inferred perched groundwater

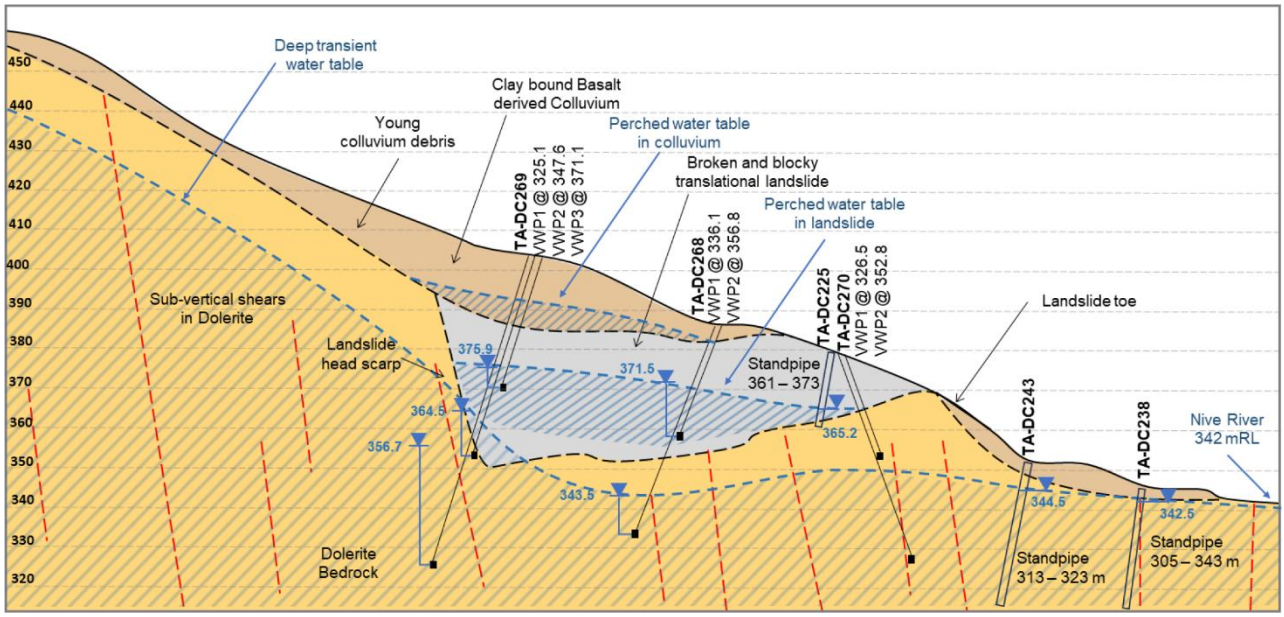


Figure 5.19: Schematic cross section of the disturbed dolerite showing inferred perched groundwater

5.2.1.8 Flow nets

Schematic flow nets were developed for hydrogeological sections extending from Wentworth Hills to the River Derwent. The flow nets assess potential discharge in depressions of the dolerite plateau, which can form shallow water bodies and wetlands. This outcome is assumed to depend partly on the geometry of fracture zones and the hydraulics of the fractured rock aquifer, which influence both deep drainage to the River Derwent and shallow upwelling to swamps.

Scenarios considered by the flow nets (Appendix H—Figure 22) included:

1) **Scenario 1**—Dolerite and sandstone homogeneous, no structural zones:
   a) Isotropic conditions; sandstone hydraulic conductivity = dolerite hydraulic conductivity
   b) Isotropic conditions; sandstone hydraulic conductivity > dolerite hydraulic conductivity
   c) Anisotropic conditions; sandstone hydraulic conductivity = dolerite hydraulic conductivity
2) **Scenario 2**—Dolerite and sandstone heterogeneous, with fracture zones beneath swamps and river valley:
   a) Isotropic conditions; sandstone hydraulic conductivity = dolerite hydraulic conductivity
   b) Isotropic conditions; sandstone hydraulic conductivity > dolerite hydraulic conductivity
   c) Anisotropic conditions; sandstone hydraulic conductivity = dolerite hydraulic conductivity

Main observations from the flow nets:

- Wetlands at the base of slopes act as discharge locations, except in Scenario 2b where fracture zones and Triassic sandstone provide sufficient deep drainage paths to the river.
- Applying anisotropy promotes deep downwelling and deep upwelling through the dolerite.
- Discharge to the River Derwent is concentrated in fracture zones where present; in their absence, groundwater discharges diffusely along the lower hillside and into the River Derwent.

5.2.1.9 Groundwater quality

The suite of groundwater quality parameters selected to develop baseline values is summarised in Table 5.5.

Table 5.5: Water quality parameters for field and laboratory testing

Parameters for field analysis	Parameters for laboratory analysis
Electrical Conductivity (EC), pH, Dissolved Oxygen (DO), temperature, turbidity.	• Physicochemical parameters: pH, EC, TSS, Total Dissolved Solids (TDS), total alkalinity, alkalinity as CaCO3, bicarbonate alkalinity as CaCO3, carbonate alkalinity as CaCO3, hydroxide alkalinity as CaCO3 • Major ions: calcium, magnesium, sodium, chloride, sulphate, bicarbonate, potassium • Minor ions: carbonate, silica, hydroxide, fluoride • Metals (total and soluble): aluminium, arsenic, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, sodium, zinc • Nutrients: nitrite, nitrate, nitrite plus nitrate, total nitrogen, total nitrogen kjeldahl, ammonia, dissolved phosphorus, total phosphorus

Thirteen rounds of groundwater analytical data were used to develop a Piper Diagram (Figure 5.20). Sodium was not analysed directly and was instead inferred using charge balance estimations and mass balance difference methods.

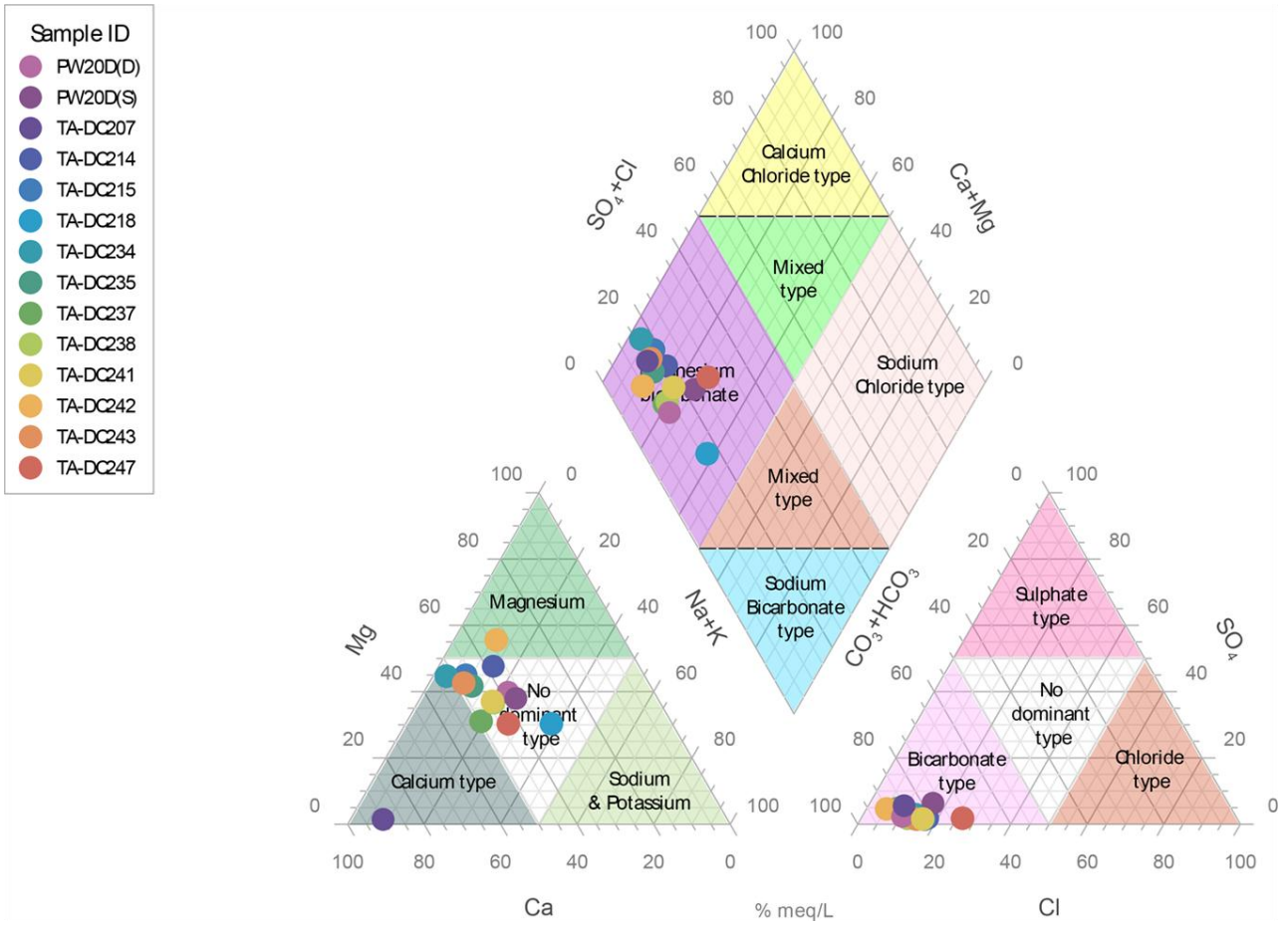


Figure 5.20: Piper Plot Illustrating Hydrochemical Facies in Groundwater Samples

The major ion distributions on the Piper Diagram indicate:

- Samples plot within a relatively tight cluster, suggesting a uniform hydrochemical signature
- Magnesium-bicarbonate (Mg-HCO_3) is the dominant groundwater type. This type is characteristic of recently recharged groundwater with limited mineralisation and interaction with mafic igneous rocks such as dolerite and basalt, which are rich in silicate minerals (plagioclase feldspar, pyroxenes, olivine). Weathering in the presence of carbon dioxide produces bicarbonate ions and releases calcium into groundwater.

A summary of physicochemical, nutrient, and selected metal results is presented in Table 5.6. The most recent sampling round (March 2025) is detailed in Table 5.7. Together, these datasets provide insight into groundwater quality trends over time and highlight the following key observations:

- **Electrical conductivity (EC):** 110–314 µS/cm (average 215 µS/cm), reflecting fresh groundwater with low TDS.
- **pH:** 6.6–8.4 (average 7.6), indicating circum-neutral to mildly alkaline conditions. These values are consistent with carbonate-buffered groundwater and show no evidence of significant acidification.
- **Sulphate:** 1–40 mg/L in most samples, suggesting limited sulphide mineral oxidation and shallow water table settings, with correspondingly low AMD risk under baseline conditions.
- **Nutrients:** Nitrate, nitrite, and phosphorus concentrations were consistently low across most samples, implying negligible anthropogenic nutrient inputs.
- **Dissolved metals:** Iron, manganese, and trace metals were present at low concentrations, generally within acceptable guideline ranges.

Sample outliers and potential causes (Table 5.6, Table 5.7; Appendix H—Figure 23(a)):

- **TA-DC207:** Elevated pH (~11) and aluminium, likely from grout signatures during standpipe construction.
- **TA-DC242:** Higher EC, sulphates, and dissolved iron, manganese, and nickel, likely reflecting reducing conditions in the Mossy Marsh Wetland.
- **TA-DC237:** Unusually high EC and sulphate from March–July 2024, returning to typical ranges by November 2024. Likely due to sampling or laboratory error; current elevated levels may also be influenced by the nearby switchyard.
- **PW20d (D):** Elevated TSS and phosphorus in the deeper screen, not replicated in the shallow PW20d (S). Suspended solids may have skewed phosphate concentrations, reducing reliability. Sediment disturbance may have originated from permeable in situ basement or blocky landslide material (cobble- to boulder-sized fragments), creating variation along preferential flow paths.

Table 5.6: Groundwater Quality Summary—Tarraleah Plateau (January 2024 to March 2025)

Parameter, and (Units)	Field observations (Range; Average)	Laboratory measurements (Range; Typical; Comment)
Physicochemical characteristics		
TDS (mg/L)	-	68–213; 100 –170
EC (µS/cm)	110–314; 215	64–1782; 140–230; TA-DC237 outlier
pH (-)	6.4–11.1; 7.8	6.5–10.4; 6.5–7.2; TA-DC207 outlier
DO (%)	2.4–84; 40	-
Temperature (°C)	9.3–18.1; 12.5	-
Turbidity (NTU)	0–999; 125	-
TSS (mg/L)	-	2–4130; 15–160; PW20d (D) outlier
Sulphate (mg/L)	-	<0.1–7.5; 1–15
Nutrients		
Nitrate (mg N/L)	-	<0.002–0.2.44; <0.002–1.8
Nitrite (mg N/L)	-	LOR <0.002–<0.02; <0.002–<0.02
Phosphorus (Total, mg P/L)	-	0.01–2.15; 0.2
Dissolved Metals		
Aluminium (µg/L)	-	<8–1600; <8; TA-DC207 outlier
Cadmium (µg/L)	-	<0.1
Chromium (µg/L)	-	<1–7; <1
Copper (µg/L)	-	<1–2; <1
Iron (µg/L)	-	<20–45700; <20–50; TA-DC242 outlier
Lead (µg/L)	-	<0.05
Manganese (µg/L)	-	<1–2440; <1–30; TA-DC242 outlier
Nickel (µg/L)	-	<0.8–28; <0.5–2; TA-DC242 outlier
Nickel (µg/L)	-	<2–4; <2–4

Table 5.7: Groundwater Quality Summary—Tarraleah Plateau (March 2025)

Sample Site	TDS	EC	pH	TSS	SO_4	NO_3	NO_2	P	Al	.	Cr	Cu	Fe	Pb	Mn	Ni
Unit	**mg/L**	**µS/cm**		**mg/L**		**mg N/L**		**mg P/L**	**µg/L**							
NHMRC[1]	1200	-	6.5–8.5	-	-	50	3	-	-	2	50	2000	300	10	500	20
ANZECC[2]	-	-	-	-	-	0.7	-	-	55 pH>6.5	0.2	1	1.4	-	3.4	1900	11
TA-DC214	165	227	7.19	19	1.7	0.41	0.02	0.076	8	0.1	2[2]	1	20	0.5	2	0.5
TA-DC215	198	305	7.45	267	2	0.76[2]	0.02	0.141	8	0.1	1	1	20	0.5	1	0.5
TA-DC218	191	309	8.44	5	3.7	0.66	0.02	0.013	8	0.1	1	1	20	0.5	10	0.5
TA-DC234	151	217	7.22	2	2.4	1.64[2]	0.02	0.023	8	0.1	1	1	20	0.5	7	0.5
TA-DC235	164	230	7.46	2	1.8	1.09[2]	0.02	0.031	8	0.1	1	1	20	0.5	1	0.5
TA-DC237	190	295	8.12	7	5.4	1.02[2]	0.08	0.038	8	0.1	1	1	20	0.5	23	0.5
TA-DC238	171	253	7.18	4	1.8	1.59[2]	0.02	0.036	8	0.1	1	1	20	0.5	1	0.5
TA-DC242	186	339	6.70	36	6.5	0.02	0.02	0.073	8	0.1	1	1	10500[1]	0.5	2440[2]	7.1
TA-DC243	156	212	6.83	2	1.3	1.55[2]	0.02	0.029	8	0.1	1	1	20	0.5	18	0.7
PW20d Deep	146	216	7.92	4130	2.4	0.4	0.02	1.8	8	0.1	1	1	20	0.5	216[2]	0.5
PW20d Shallow	95	120.5	6.74	515	3.1	0.88[2]	0.02	0.131	8	0.1	2[2]	1	20	0.5	41	0.7
TA-DC207	150	381	11.22[1]	2	5.6	0.02	0.02	0.046	720	0.1	1	1	20	0.5	1	0.5
TA-DC241	133	179.8	6.58	757	1.2	0.12	0.02	0.204	8	0.1	1	1	20	0.5	4	0.5
TA-DC247	81	103.3	6.97	4	0.8	0.02	0.02	0.022	61	0.1	1	4[2]	120	0.5	25	1.6

1. Indicates exceedance of NHMRC Drinking Water Standards.
2. Indicates exceedance of ANZECC Freshwater Ecology Guidelines.

5.2.1.10 Summary of existing conditions

The conceptual hydrogeology recognised:

- Groundwater–surface water connection under baseline conditions. Demonstrated by vertical flux potentials observed in multi-level monitoring bores, which were used to differentiate recharge and discharge zones.
- Potential for surface water–groundwater connection during Project construction. Conceptualisation included:
  - Inflows to the tunnel during construction would predominantly occur where it intercepts fracture zones in HRMUs H-D3, H-D4, and H-D5
  - Inflows would be dominated by surface waters sourced from:
    - wetlands (e.g. Mossy Marsh)
    - perennial stream reaches (e.g. Horne's Creek Canal).
  - Artificially recharged streams, such as Mossy Marsh Canal discharges, increase available surface water.
- Groundwater inflow contributions would be minimal, given fractured rock aquifers have low (<1%) primary and secondary porosity.
- Significant sustained inflows would mainly derive from perennial recharge and surface waters.
- Leakage from the tunnel during operation. Maximum operating heads would pressurise the tunnel to levels above baseline water table elevations and, in some areas, above ground surface, leading to leakage of tunnel water along fracture zones in the dolerite.

5.2.2 Assessment

5.2.2.1 Numerical modelling

The potential impacts of the Project were assessed through numerical groundwater modelling, focused on the tunnels during construction and operation. The objectives of the modelling were to evaluate:

- Groundwater inflows into the works during excavation
- Tunnel water loss during operation
- Temporary drawdown caused by seepage into the works.

The engineering elements of existing and proposed infrastructure included in the model are listed in Appendix H—Section 8.2. Appendix H—Figure 42 shows the Project works, existing tunnels, and water storages included in the model.

The modelling assumed an impermeable steel liner along ~690 m of the Power Tunnel (chainage 16,300–16,986 m). The uppermost 50 m of the Surge Shaft was also assumed to be impermeable. Tunnels without steel lining were modelled as drained during construction and pressurised during operation.

Two construction schedules were simulated:

- **Base case**: representing the standard excavation and lining program.
- **Longer duration scenario**: same start date as the base case, but with excavation and lining durations extended by 30%. This scenario provides a practical upper bound for drawdown duration.

The construction schedule may be refined as the Project develops.

Appendix H—Figure 46 shows the groundwater model domain (~137 km^2) and the boundary conditions applied, which included:

- Recharge from rainfall, expressed as a percentage of monthly rainfall at Butlers Gorge Power Station
- Seepage faces representing the tunnels, activated and deactivated to reflect construction chronology and lining
- Cauchy boundaries applied to soils and unlined watercourses (e.g. parts of No. 2 Canal, Mossy Marsh, Mossy Marsh Pond, and other perennial wetlands), assigned conductance values based on interpreted hydraulics and infiltration capacities. These values limited vertical flux from surface water to groundwater.

The simulated HRMU hydraulic and storage properties for base case, lower-bound, and upper-bound models are summarised in Appendix H—Tables 19 and 20.

The model was calibrated under steady-state conditions, achieving a Root Mean Square (RMS) error of 6.8 m and an average residual of 5.6 m across 27 calibration targets. It was then validated under transient conditions.

The calibration reflects the baseline groundwater environment and excludes significant transient stressors and surface water–groundwater interactions expected under the Project. As a result, the Cauchy boundary conditions applied to soils and unlined watercourses (e.g. No. 2 Canal, Mossy Marsh, Mossy Marsh Pond, other wetlands) host uncertainty and sensitivity in model outcomes.

Numerical modelling scenarios

The Project was simulated using base-case and longer-duration construction schedules, with grouted and ungrouted tunnel scenarios applied to both.

5.2.2.2 Construction

Groundwater inflow

During construction, groundwater will flow into the headrace and power tunnels. The groundwater model predicts:

- **Base case, ungrouted scenario:** Tunnel inflows peaking at ~121 L/s around the 47th month of construction, decreasing to ~114 L/s by the start of operations. The full inflow range, accounting for hydrogeological uncertainty (upper and lower bound models), spans 47–283 L/s.
- **With grouting of significant inflow zones:** Predicted inflows are notably reduced, with peaks limited to ~87 L/s during the 47th month, decreasing slightly to ~85 L/s before operations commence.

Minimal variation in peak inflows was observed between the base case and longer-duration construction schedules.

Groundwater table

Groundwater inflows into the headrace and power tunnels will cause a temporary, localised drawdown of the groundwater table. Drawdown was assessed using the base-case ungrouted scenario, considered conservative as grouting (included in the Project's reference design) would reduce inflows and therefore drawdown.

Predicted groundwater drawdown is shown in Figure 5.21. Model results indicate that drawdown at the *Sphagnum* peatland at Mossy Marsh propagates through fractured dolerite zones, then drains into the Tertiary sediments and basalt palaeovalley. Key findings include:

- Drawdown of ~1 m at the *Sphagnum* peatland at Mossy Marsh during construction (Figure 5.21)
- Propagation of drawdown via fractured dolerite zones, locally underdraining the Tertiary sediments and basalt palaeovalley
- Recovery of groundwater heads within the *Sphagnum* peatland at Mossy Marsh once pressurisation begins during operations.

The potential impacts of this drawdown on the *Sphagnum* peatland at Mossy Marsh, as well as other potentially groundwater-dependent vegetation communities, are assessed in Section 5.3.

Groundwater quality

Groundwater quality may be impacted during construction through infiltration of surface water containing elevated levels of contaminants such as nitrate, ammonium, hydrocarbons, and metals. Measures to avoid and manage potential impacts to groundwater and receiving surface waters are described in Section 5.1, including consideration of the *State Policy on Water Quality Management 1997*.

Acidic drainage

AMD can occur when rocks and soils containing sulphides are excavated, acidic soils are disturbed, or the water table is lowered, exposing sulphides to oxygen. Potential characteristics of AMD include low pH, reduced dissolved oxygen, and elevated sulphate and metal concentrations.

Mineralogical, petrological, and geotechnical laboratory testing was conducted on soil and rock drill cores across the Project area. Trace quantities of sulphides (pyrite) were identified within dolerite and basalt rocks; however:

- Dolerite is carbonate-dominant and classified as Non-Acid Forming (NAF)
- The dominant metals in dolerite are iron, with lesser magnesium and titanium
- Combined with circum-neutral groundwater pH, the potential for metal leaching is low.

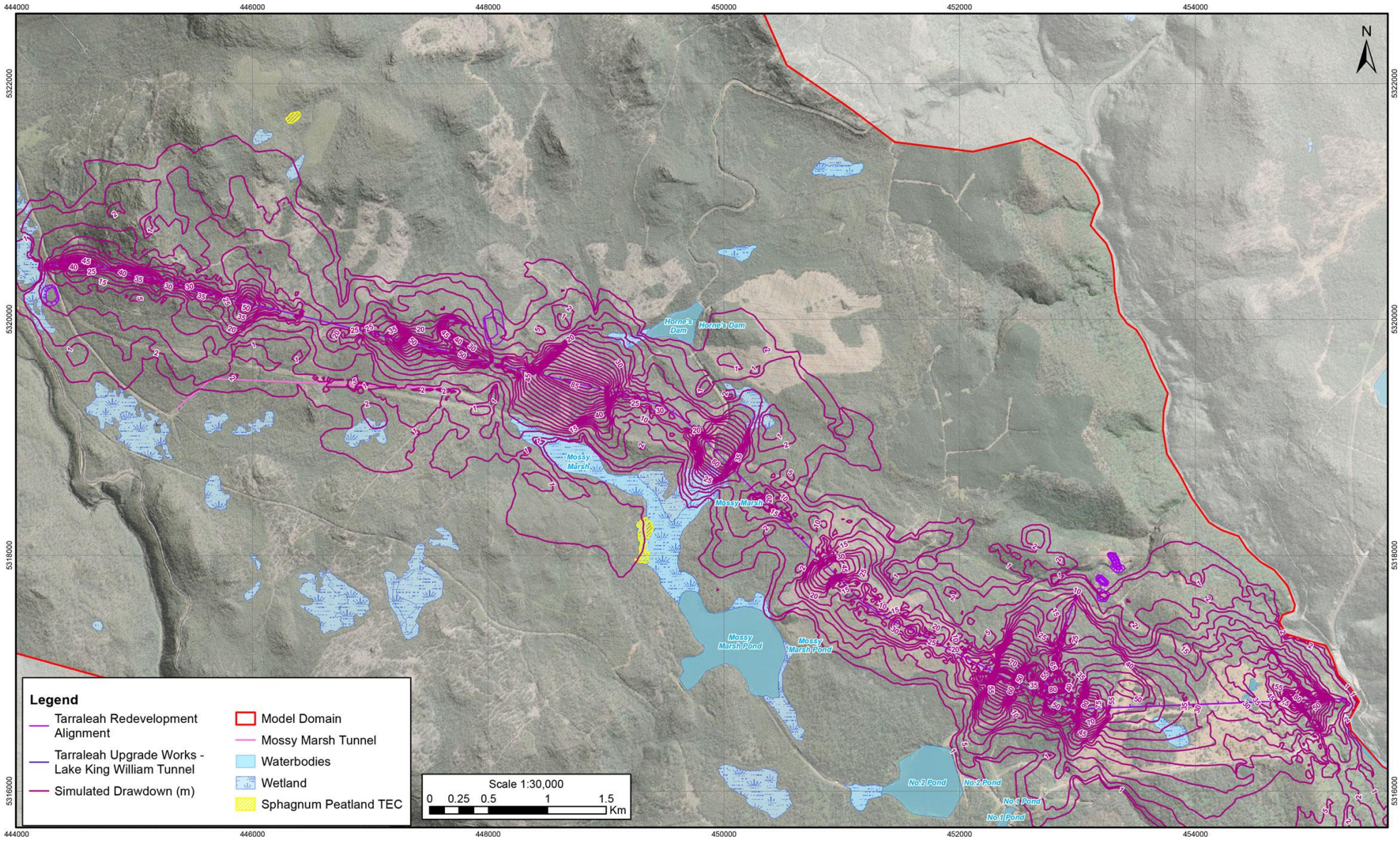


Figure 5.21: Predicted base case drawdown, base schedule (no grouting)

5.2.2.3 Operation

Water loss

During operation, the headrace and power tunnels will be pressurised, resulting in water flow from the tunnel to groundwater:

- **No grouting scenario:** Initial water loss was estimated at ~128 L/s, reducing to a steady-state loss of ~44 L/s.
- **Grouted scenario:** Peak water loss was reduced to ~60 L/s, stabilising at ~29 L/s.

Groundwater table

Tunnel pressurisation generally induced recovery of the groundwater table; however, in areas where baseline water table elevations were higher than tunnel pressurised heads, full recovery was not achieved. This resulted in residual drawdowns persisting after 80 years of operation.

As tunnel pressurisation continues, groundwater is predicted to emerge at the ground surface. New springs are expected to form dynamically along dolerite structures, initially expanding to saturate available rock mass storage before discharging at existing springs or low-lying areas. Over time, this dynamic phase transitions to steady state as storage is filled and water loss balances with discharge. Discharge locations in the base-case scenario are shown in Figure 5.22, stabilising after ~10 years.

No impacts to terrestrial biodiversity are anticipated from groundwater table changes during operation (see Section 5.3).

Pore pressures beneath Tarraleah Hillside were predicted to increase locally by up to 5 m within 60 m depth below the slope. Tarraleah Hillside includes identified landslide features, and landslide risk remains the subject of ongoing hydrogeological, geological, and geotechnical investigations. Findings from these studies have informed the reference design and will inform detailed design.

Groundwater quality

No impacts to groundwater quality are anticipated during Project operation.

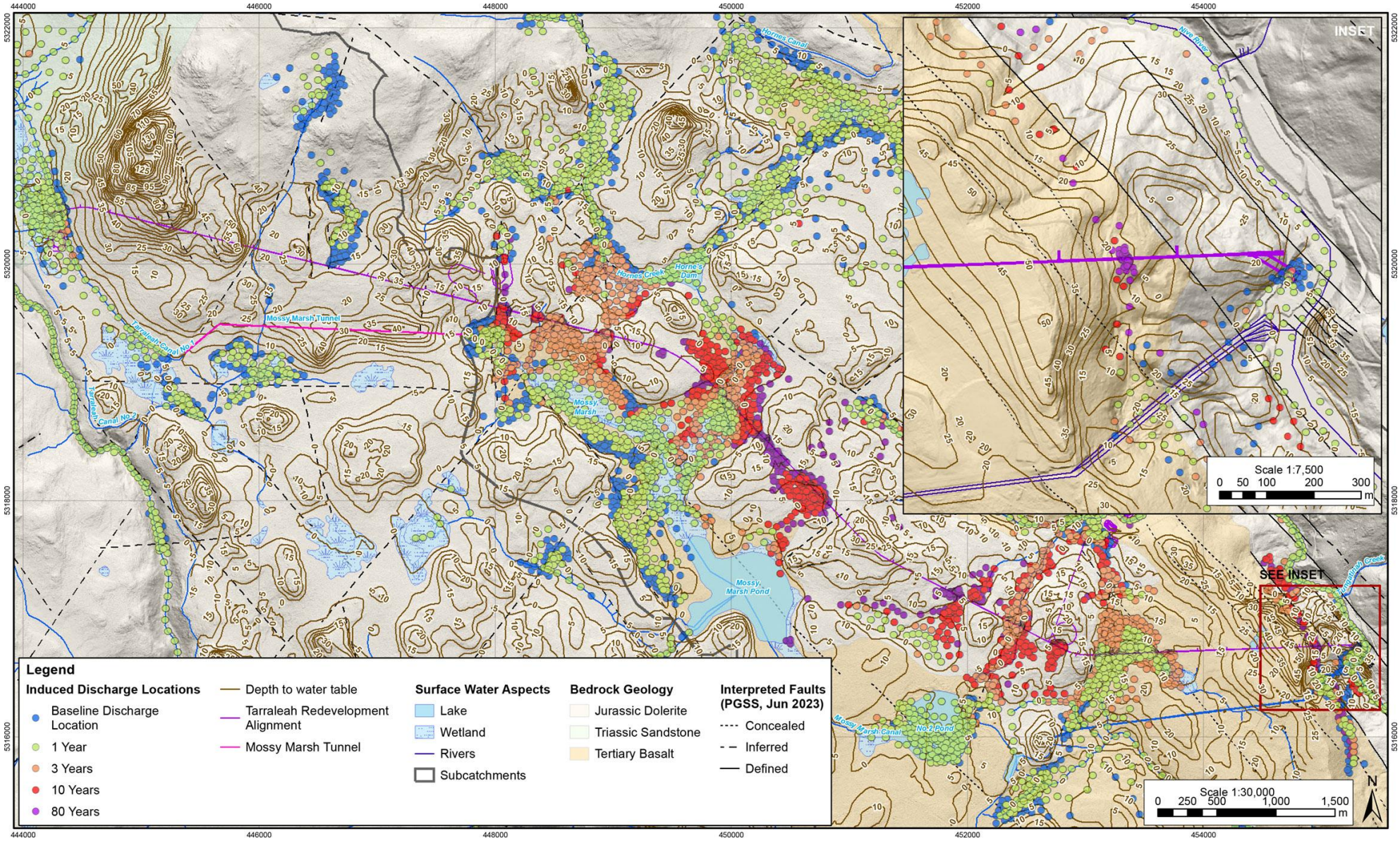


Figure 5.22: Induced base case discharge locations, base schedule (no grouting)

5.2.3 Avoidance and mitigation measures

Avoidance and mitigation of potential impacts to surface water quality, including groundwater discharged at the surface, are described in Section 5.1. Potential impacts to aquatic biodiversity are described in Section 5.4, and potential impacts to terrestrial biodiversity from groundwater level changes are described in Section 5.3.

This section sets out measures to avoid, manage, and monitor potential impacts to groundwater quality and groundwater levels.

5.2.3.1 Groundwater Management Plan

GW 1: A Groundwater Management Plan (GMP) will be prepared prior to construction, reflecting the final project design and construction methods. At a minimum, the GMP will include:

- **Objectives and commitments:** Including development of groundwater performance criteria consistent with the *State Policy on Water Quality Management 1997*, where relevant (e.g. early AMD signature levels).
- **Site water balance:** Showing expected water sources (flows, groundwater, rainfall, wastewater) and discharges (groundwater, wastewater, clean water) at each construction site over the construction period, cross-referenced to the Project's WMP.
- **Measures to:**
  - Minimise potential groundwater contamination during construction
  - Capture and remove tunnel wastewater (cross-referenced to the Project's WMP)
  - Manage hazardous materials used in tunnelling and excavation, including:
    - Hydrocarbons and drilling fluids (cross-referenced to the WMP and HMP)
    - Explosives (cross-referenced to the NMP)
    - Spill response (cross-referenced to the WMP and Hazardous Materials Management Plan [HMMP])
    - Manage spoil emplacement, including limiting surface water infiltration to stockpiles by diverting surface water around stockpiles and proactively draining landforms as they develop (cross-referenced to the Spoil Management Plan in Section 5.10.3.2).
  - Implement incident response and reporting procedures.
- **Groundwater monitoring program:** Covering all construction sites, including parameters sampled, sampling method and frequency, responsibilities, performance criteria/guideline values, and reporting requirements. Program requirements are detailed in Section 5.2.3.2.
- **Trigger action response plan:** Including adaptive management measures.
- **Audit requirements:** Internal and external, with specified frequency.
- **Consolidated mitigation and monitoring table:** Summarising measures from this EIS (Chapter 6 and Chapter 8), reporting requirements, and roles and responsibilities.

The GMP will be prepared as soon as practicable following engagement of the EPC Contractor, with the aim of adapting the baseline groundwater monitoring program for construction monitoring, in line with groundwater risks associated with the Project's final design and construction methods.

5.2.3.2 Monitoring

Baseline monitoring

M 4: To provide a seasonal baseline of groundwater head and quality, the existing baseline monitoring will continue until 2 years of data has been collected from all sites.

The existing groundwater baseline monitoring program includes:

- Groundwater quality and level sampling at 14 baseline sites (Figure 5.23–Figure 5.26)
- Continuous head sampling at 14 VWP sites
- *In-situ* field parameters: electrical conductivity, pH, dissolved oxygen (mg/L and %), temperature, turbidity
- Laboratory analysis of physicochemical parameters, major and minor ions, metals, and nutrients (as per Table 5.5).

The baseline monitoring program may be reviewed and updated, subject to periodic review of results as Project design progresses.

Pre-construction and construction monitoring

M 5: The GMP will adapt the baseline program and define monitoring locations, frequency, and analytes for groundwater quality sites, based on the final Project design and proposed construction methods.

The design of the monitoring program will be informed by analysis of baseline data (including Hydro Tasmania's Tarraleah Upgrade Works) and linked to the WMP (Section 1.3.2).

Objectives:

- Establish a preconstruction monitoring program, targeting groundwater head and quality risks associated the selected construction method, to add to existing baseline monitoring results and provide a construction baseline. The pre-construction monitoring program will include new sites at the location of each spoil emplacement area (nominally western portal, mid-access portal, and Paddy's Quarry). Each new location will include:
  - Sites immediately upstream and downstream of the spoil emplacement areas
  - Sites between spoil emplacement areas and the tunnel alignment
  - A minimum of two sites at the perimeters of adjacent groundwater discharge zones.
- Monitoring at these sites will:
  - Characterise transient groundwater table depths and water quality
  - Commence at the earliest time possible following completion of final design and construction methods.
- Establish a construction monitoring program targeting risks from potential groundwater impacts during construction, including:
  - Leaching of nitrates from spoil emplacement areas and infiltration into local groundwater
  - Changes in local groundwater levels, including beneath Mossy Marsh
  - AMD risk from lowered water tables and exposure of sulphide minerals to oxidation (noting AMD risk is considered low; see Section 5.2.2.2)

At a minimum, construction monitoring will include:

- Monitoring sites at all spoil emplacement areas
- Monthly groundwater quality and head monitoring (with continuous head monitoring) at sites TA-DC207, TC-DC312, and TA-DC252 to support ecological monitoring of the Sphagnum peatland and quantify potential impacts
- Monthly sampling at sites TA-DC241, TA-DC247, and TA-DC263 to identify early AMD signatures (e.g. lower pH, reduced bicarbonate, and increased TSS, sulphate, iron, aluminium, and dissolved metals).

Where required, monitoring locations from Hydro Tasmania's Tarraleah Upgrade Works will be incorporated into the GMP pre-construction and/or construction monitoring. Responsibility for monitoring these sites will transfer to the Project once the Upgrade Works are complete.

Post construction/operation monitoring

M 6: Post-construction monitoring for nitrates at spoil emplacement monitoring sites will continue until groundwater nitrate concentrations have returned to pre-construction levels, or there is clear evidence they are attenuating to levels that will not cause environmental harm to a slightly to moderately disturbed aquatic ecosystem. Following completion of post-construction monitoring, biannual nitrate monitoring will continue at spoil emplacement sites to detect any temporary pulse in concentrations as the groundwater system recharges after tunnel pressurisation. This monitoring will continue for a minimum of five years after the completion of the post-construction program.

5.2.3.3 Residual impacts

Conceptual and numerical modelling predicts that during construction, groundwater will flow into the headrace and power tunnels, causing temporary localised drawdown of the groundwater table. Once the Project is operational, water will flow outward from the tunnels and the water table will generally recover.

With the exception of the *Sphagnum* peatland at Mossy Marsh, no residual impacts to biodiversity values are expected from water table changes during construction or operation (see Section 5.3).

With implementation of the WMP, no residual impacts are expected from wastewater generated by groundwater inflows to the tunnels during construction, or from groundwater contamination (refer Section 5.1 and Section 5.4).

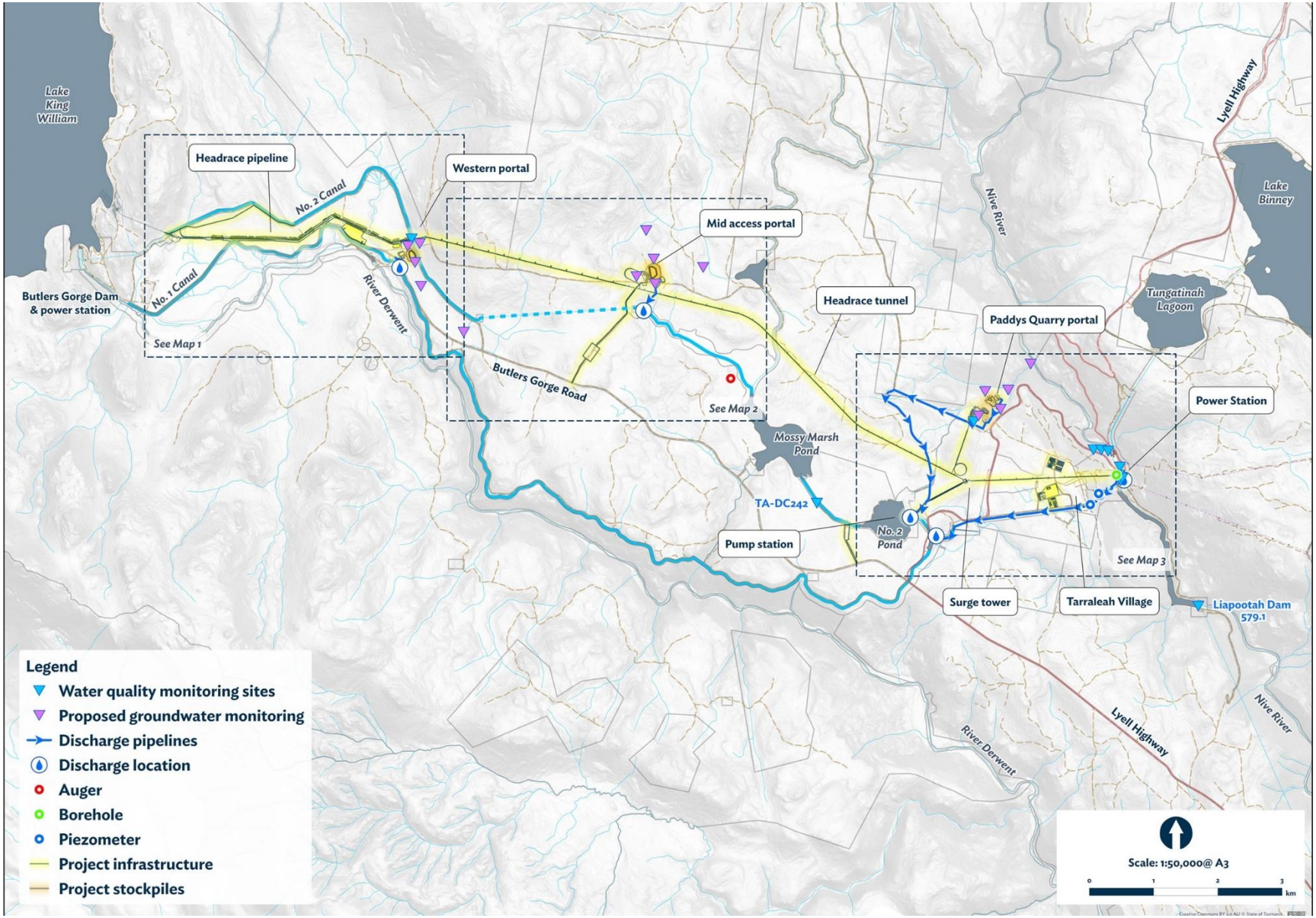


Figure 5.23: Baseline groundwater quality monitoring locations

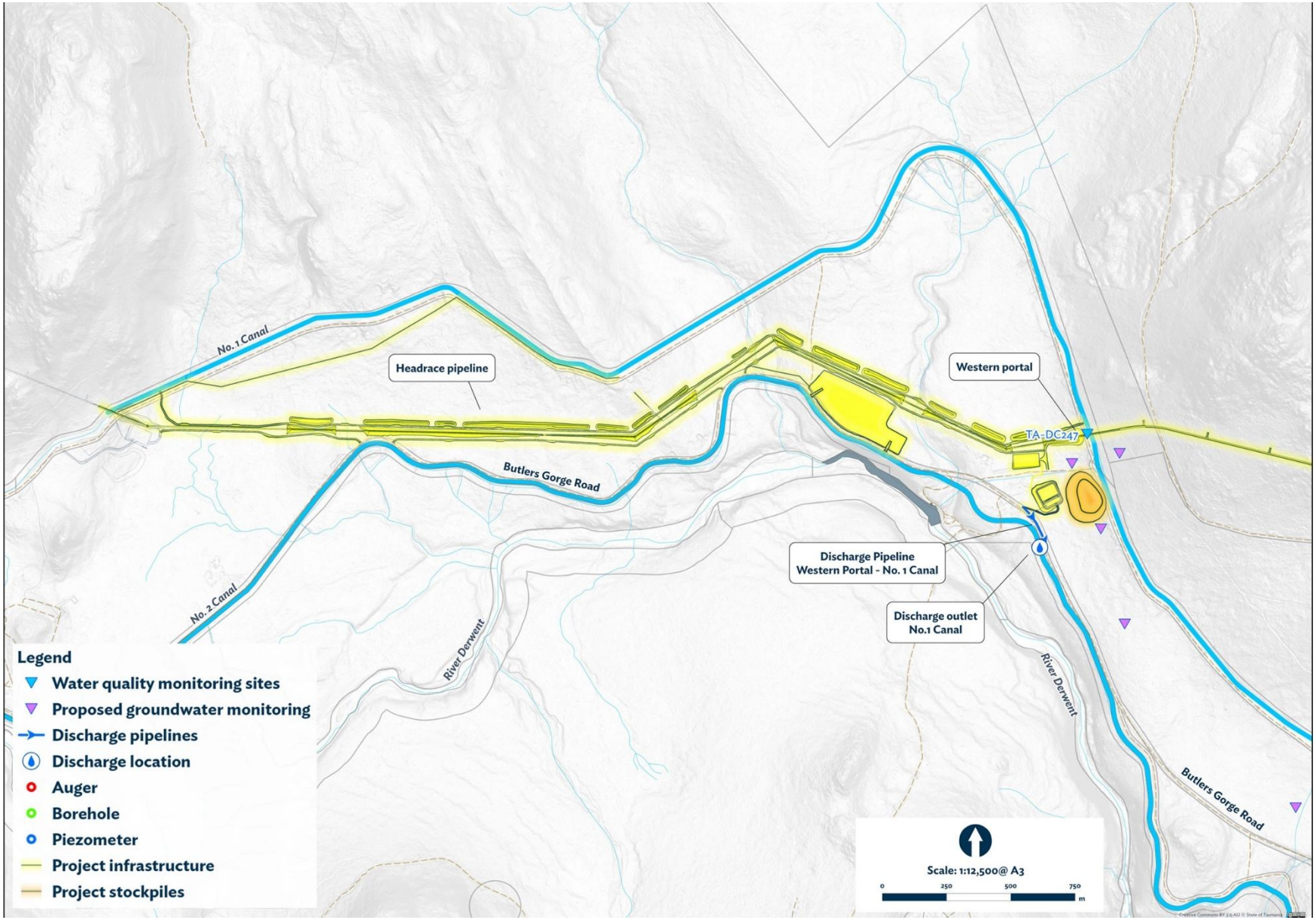


Figure 5.24: Baseline groundwater monitoring locations, Western portal

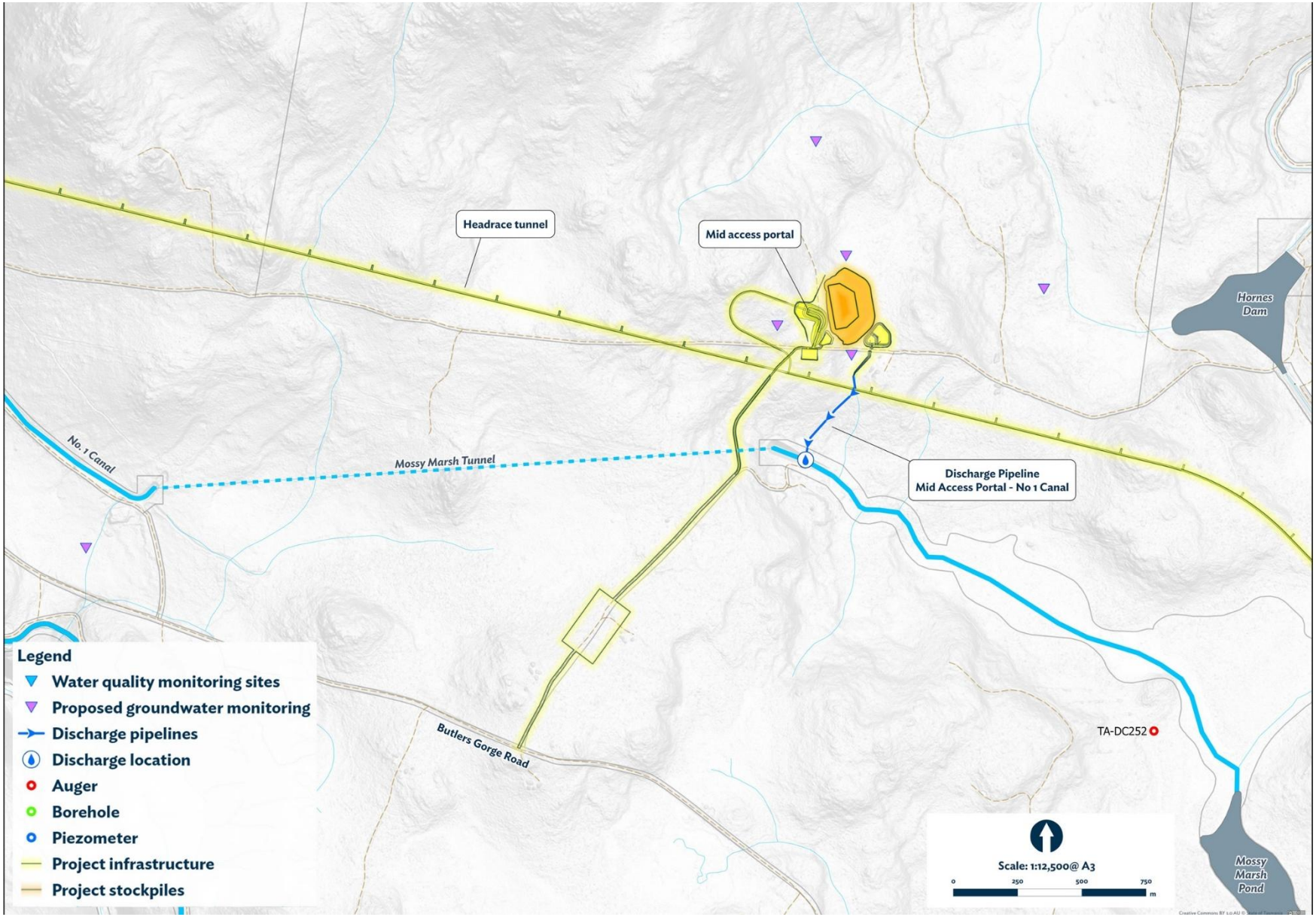


Figure 5.25: Baseline groundwater monitoring locations, Mid Access Portal

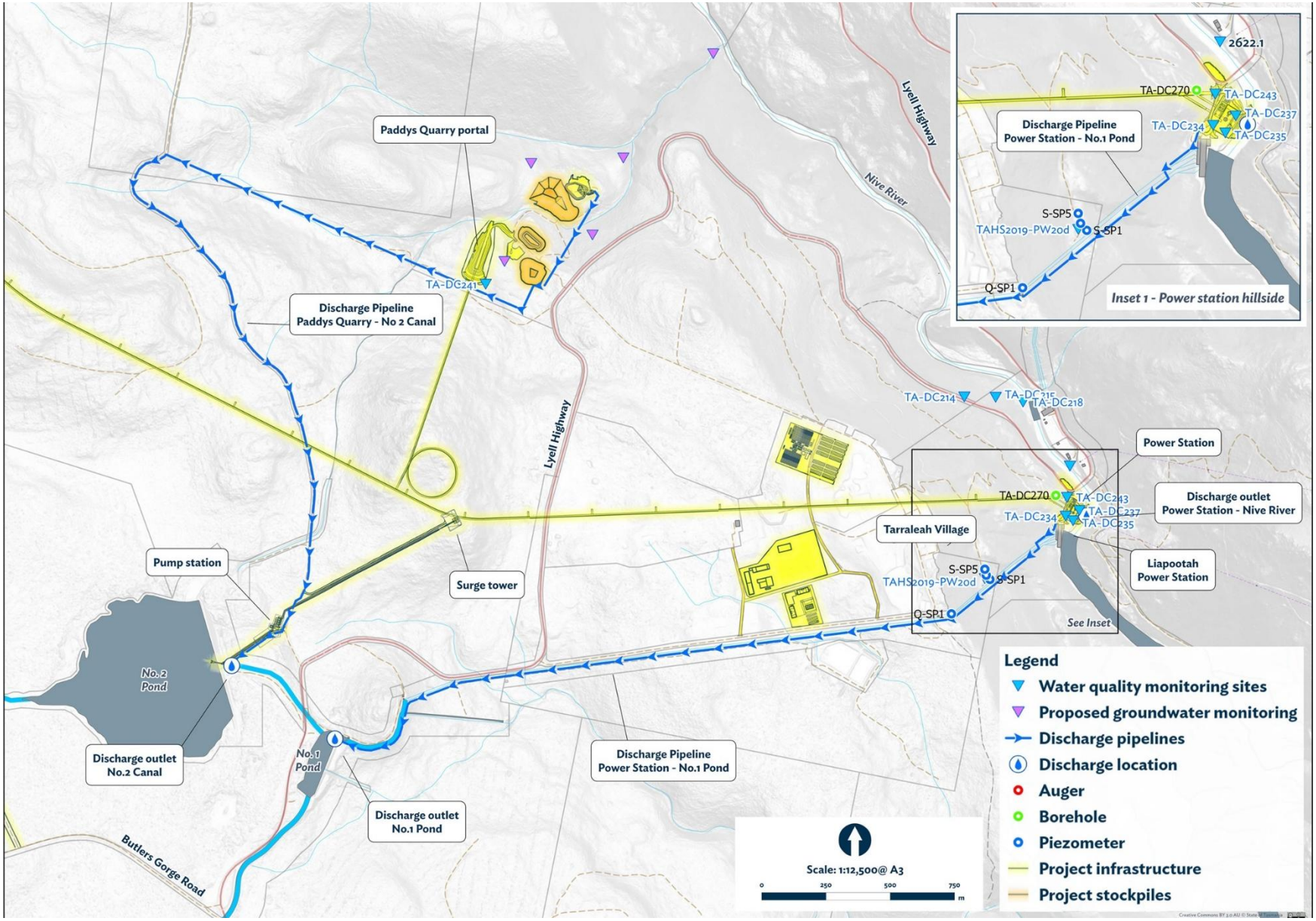


Figure 5.26: Baseline groundwater monitoring locations, Paddys Quarry Portal

5.3 Terrestrial biodiversity and natural values

A comprehensive terrestrial ecology assessment was conducted between October 2018 and January 2025. This included both desktop and field studies to survey and verify vegetation communities, flora, fauna, habitat values, and weed species within and around the disturbance footprint (as defined in Chapter 2).

The assessment involved:

- Verification and mapping of vegetation communities
- Flora surveys in all seasons over five years
- Three aerial searches for Tasmanian wedge-tailed eagle (*Aquila audax fleayi*) and white-bellied sea-eagle (*Haliaeetus leucogaster*) nests
- Targeted passive acoustic monitoring and nest tree searches for Tasmanian masked owl (*Tyto novaehollandiae castanops*)
- Camera trapping for eastern barred bandicoot (*Perameles gunnii gunnii*) and mammalian carnivores (Tasmanian devils and quolls)
- Targeted *Sphagnum* peatland surveys and groundwater level monitoring
- Formal vegetation condition assessments of two threatened vegetation communities: *Sphagnum* peatland and subalpine *Diplarrena latifolia* rushland
- Field assessment of mature habitat availability.

The survey area included the disturbance footprint plus at least 100 m beyond its boundary. All surveys followed the *Guidelines for Natural Values Surveys – Terrestrial Development Proposals* (Natural and Cultural Heritage Division, 2015). Full survey methods and results are provided in the Terrestrial Ecology Assessment (Appendix B).

5.3.1 Existing environment

5.3.1.1 Native vegetation communities

Field surveys identified 18 Tasmanian vegetation mapping system (TASVEG[1]) vegetation communities within the disturbance footprint (excluding the 220 kV transmission line corridor), comprising 12 native vegetation communities and 6 modified communities (Table 1.1, Table 5.9). A map of vegetation within the disturbance footprint is shown in Figure 5.27, with detailed community descriptions in Appendix B.

The proposed disturbance footprint (excluding the 220 kV transmission line) covers up to 295.2 ha, of which:

- 161.1 ha is native vegetation
- 61.2 ha is mature eucalypt forest (not harvested in recent decades)

Four non-forest communities are present:

- 1.0 ha broad-leaf scrub (SBR)
- 2.3 ha buttongrass moorland with emergent shrubs (MBS)
- 18.4 ha pure buttongrass moorland (MBP)
- 0.5 ha subalpine Diplarrena latifolia rushland (MDS) – listed as threatened under the Tasmanian *Nature Conservation Act 2002* (NC Act).

1 TASVEG is a comprehensive digital map of Tasmania's vegetation, including sub-Antarctic Macquarie Island.

Two alignment options are under consideration for the proposed 220 kV transmission line, both involving the widening of an existing transmission line easement:

- **Northern option**: From the existing Tungatinah Switchyard to the Dee Lagoon substation—disturbance footprint of 115.1 ha, including 63.2 ha native vegetation, of which 31.0 ha is mature eucalypt forest.
- **Southern option**: From the proposed Tarraleah Switchyard to the Liapootah substation—disturbance footprint of 146.0 ha, including 48.8 ha native vegetation, of which 8.3 ha is mature eucalypt forest.

Table 5.8: Area of native vegetation communities within the disturbance footprint excluding the 220 kV transmission line.

Vegetation community[2]	TASVEG Code	Disturbance footprint excluding transmission line (ha)	Mature forest area (ha)
Broad-leaf scrub	SBR	1.0	N/A
Buttongrass moorland with emergent shrubs	MBS	2.3	N/A
Eucalyptus dalrympleana–Eucalyptus pauciflora forest and woodland	DDP	39.6	38.3
Eucalyptus delegatensis dry forest and woodland	DDE	38.1	0
Eucalyptus tasmaniensis forest over rainforest	WDR	13.0	5.4
Eucalyptus tasmaniensis forest with broad-leaf shrubs	WDB	29.1	5.4
Eucalyptus tasmaniensis forest over *Leptospermum*	WDL	1.2	0
Eucalyptus rodwayi forest and woodland	DRO	12.1	12.1
Leptospermum forest	NLE	5.5	N/A
Pure buttongrass moorland	MBP	18.4	N/A
Subalpine *Diplarrena latifolia* rushland	MDS	0.5	N/A

Table 5.9: Area of non-native vegetation in the disturbance footprint excluding the transmission line.

Vegetation community	TASVEG Code	Disturbance footprint excluding transmission line (ha)
Agricultural land	FAL	1.6
Extra-urban miscellaneous	FUM	72.2
Permanent easement	FPE	25.7
Regenerating cleared land	FRG	3.9
Urban areas	FUR	27.1
Weed infestation of English broom (*Cytisus scoparius*)	FWU	1.0

2 Note that the 3 ha *Sphagnum* peatland (TASVEG code ASP) approximately 400 m northwest of Mossy Marsh Pond is not within the disturbance footprint of the Project and therefore is not included in this table. This *Sphagnum* peatland will not be directly impacted by Project activities. It may, however, be indirectly impacted by hydrological changes associated with decommissioning part of Canal No. 2 and/or changes to groundwater associated with construction of the tunnel.

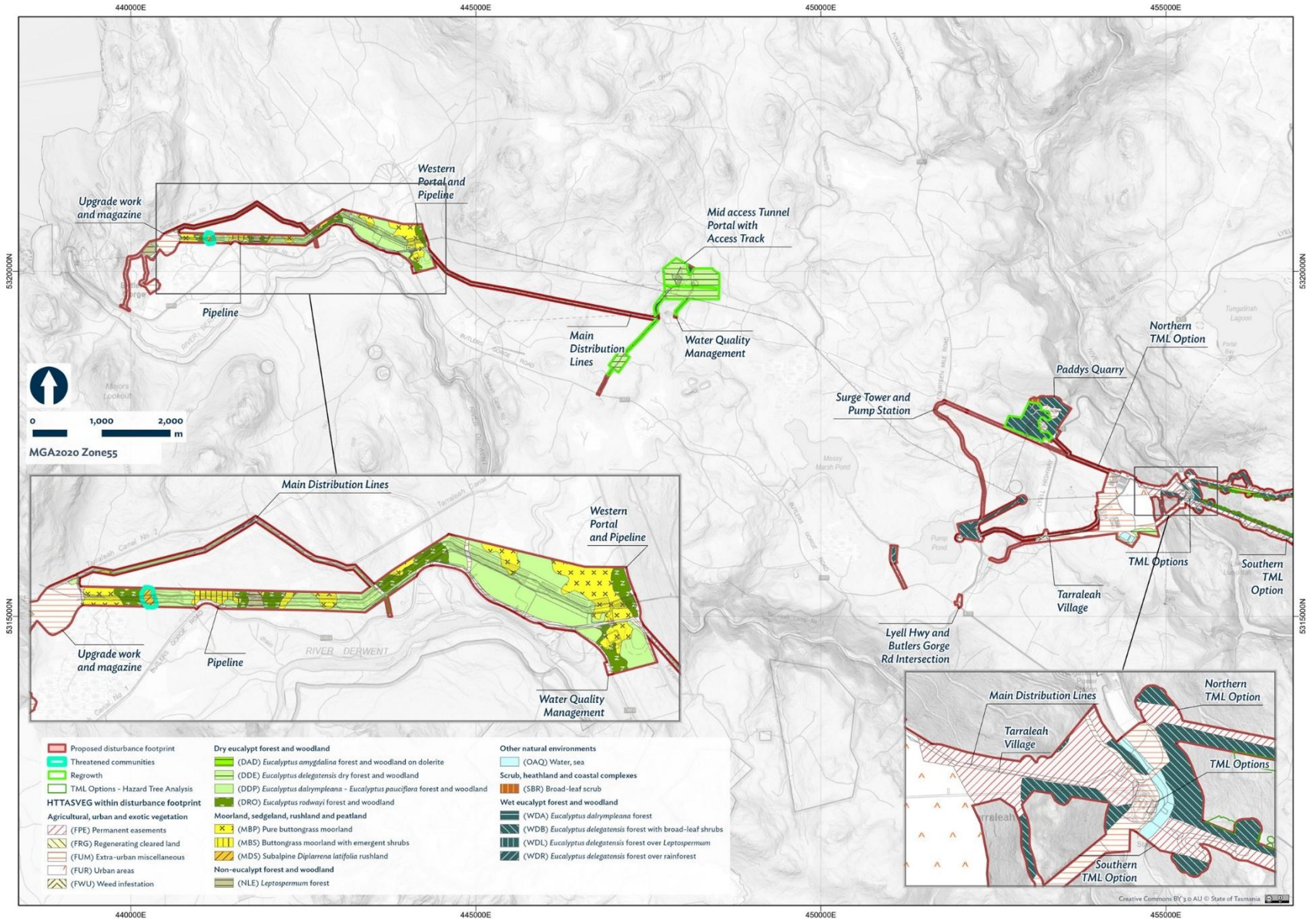


Figure 5.27: Vegetation communities verified within the disturbance footprint, excluding the 220 kV transmission line

A patch of *Sphagnum* peatland (ASP) located outside the disturbance footprint was identified as potentially indirectly affected by hydrological changes from the construction and operation of the Project. *Sphagnum* peatland is listed as "*threatened*" under the NC Act and is also a component of the *Alpine Sphagnum Bogs and Associated Fens* ecological community listed as "*endangered*" under the EPBC Act. The community occupies an area of 3.0 ha and is located approximately 400 m northwest and upstream of Mossy Marsh Pond, on the western bank of an unconfined channel that conveys water from the No. 2 Canal to Mossy Marsh Pond (Figure 5.28). There is potential that groundwater conditions at the peatland are influenced by water flowing past it, which may change when part of No. 2 Canal is decommissioned. The construction of the tunnel may also affect groundwater conditions beneath the peatland by drawing down the water table during construction.

A vegetation condition assessment of this *Sphagnum* peatland was undertaken in January 2024 using the TASVEG Vegetation Community Assessment (VCA) method (Michaels et. al., 2020) (Appendix B). All five 0.25 ha sample sites scored 77 out of a possible 100 for an overall condition score. The overall condition was assessed as very good, based on the relatively pristine, unmodified, contiguous nature of the *Sphagnum* peatland at Mossy Marsh, with a high proportion of cover by *Sphagnum* moss species.



Figure 5.28: *Sphagnum* peatland northwest of Mossy Marsh Pond

5.3.1.2 Groundwater-dependent ecosystems

A 3.0 ha patch of *Sphagnum* peatland (ASP), located outside the disturbance footprint, has been identified as potentially indirectly impacted by hydrological changes during construction and operation of the Project. This community is listed as Threatened under the NC Act and forms part of the Alpine *Sphagnum* Bogs and Associated Fens ecological community, which is listed as Endangered under the EPBC Act.

The *Sphagnum* peatland lies approximately 400 m northwest and upstream of Mossy Marsh Pond, on the western bank of an unconfined channel that conveys water from the No. 2 Canal to Mossy Marsh Pond (Figure 5.27). Groundwater conditions at this site may be influenced by flows past the peatland, which could change when part of the No. 2 Canal is decommissioned. Tunnel construction could also affect the peatland by temporarily lowering the water table below it.

A vegetation condition assessment, undertaken in January 2024 using the TASVEG VCA method (Michaels et al., 2020), found the *Sphagnum* peatland to be in very good condition. All five 0.25 ha sample sites scored 77/100, reflecting its relatively pristine, unmodified and contiguous state, with a high proportion of cover by *Sphagnum* moss species.

5.3.1.3 Flora species

Field surveys recorded 325 flora species within the overall disturbance footprint for the Project, including the northern and southern transmission line options. Of these, 271 were native and 54 were introduced. Nine of the introduced species are declared weeds under the Biosecurity Act. A tenth declared weed species (serrated tussock) was recorded and removed by Tasmania Parks and Wildlife Service (PWS) at the Tarraleah picnic area in March 2025.

Of the 271 native species, two are listed as threatened under the Tasmanian *Threatened Species Protection Act 1995 (*TSP Act)—*Barbarea australis* (native wintercress) and *Pomaderris elachophylla* (small-leaf dogwood)—and were recorded within the disturbance footprint (excluding the transmission line). A further 13 species listed under the TSP Act were identified within 5 km of the footprint in the Tasmanian *Natural Values Atlas* (NVA), but none were recorded during field surveys between 2018 and 2025, and are therefore considered unlikely to occur.

The riparian, flow-dependent *Barbarea australis*, listed as Endangered under both the TSP Act and EPBC Act, occurs in the River Derwent and Nive River. Within the disturbance footprint, up to 10 plants were recorded where the southern transmission line option would span the Nive River, and approximately 11 plants were recorded on the upstream face of the Tarraleah Pump Pond No. 2 dam wall, above the existing outflow pipe (Figure 5.29). Records of *B. australis* in the River Derwent and Nive River outside the disturbance footprint are described in Section 5.4.



Figure 5.29: *Barbarea australis* plants at the Nive River near Liapootah substation (left) and on the Tarraleah Pump Pond No. 2 dam wall (right)

Pomaderris elachophylla (vulnerable, TSP Act) was recorded adjacent to No. 2 Canal in the maintained easement along the canal access track, with 10 plants found in an area 10 m by 3 m (Figure 5.29). A further patch of 30 plants and a single plant were recorded approximately 180 m apart within the existing distribution line easement between Lake King William and Derwent Pumps, which is proposed for upgrade under the Project.

Westringia angustifolia (narrowleaf westringia), listed as rare under the TSP Act, was recorded at two locations within the disturbance footprint for the northern transmission line option.



Figure 5.30: *Pomaderris elachophylla* plants near No. 2 Canal

A detailed description of flora survey results and species likelihood assessments is provided in Appendix B. A map of all threatened flora species within or near the disturbance footprint is shown in Figure 5.31.

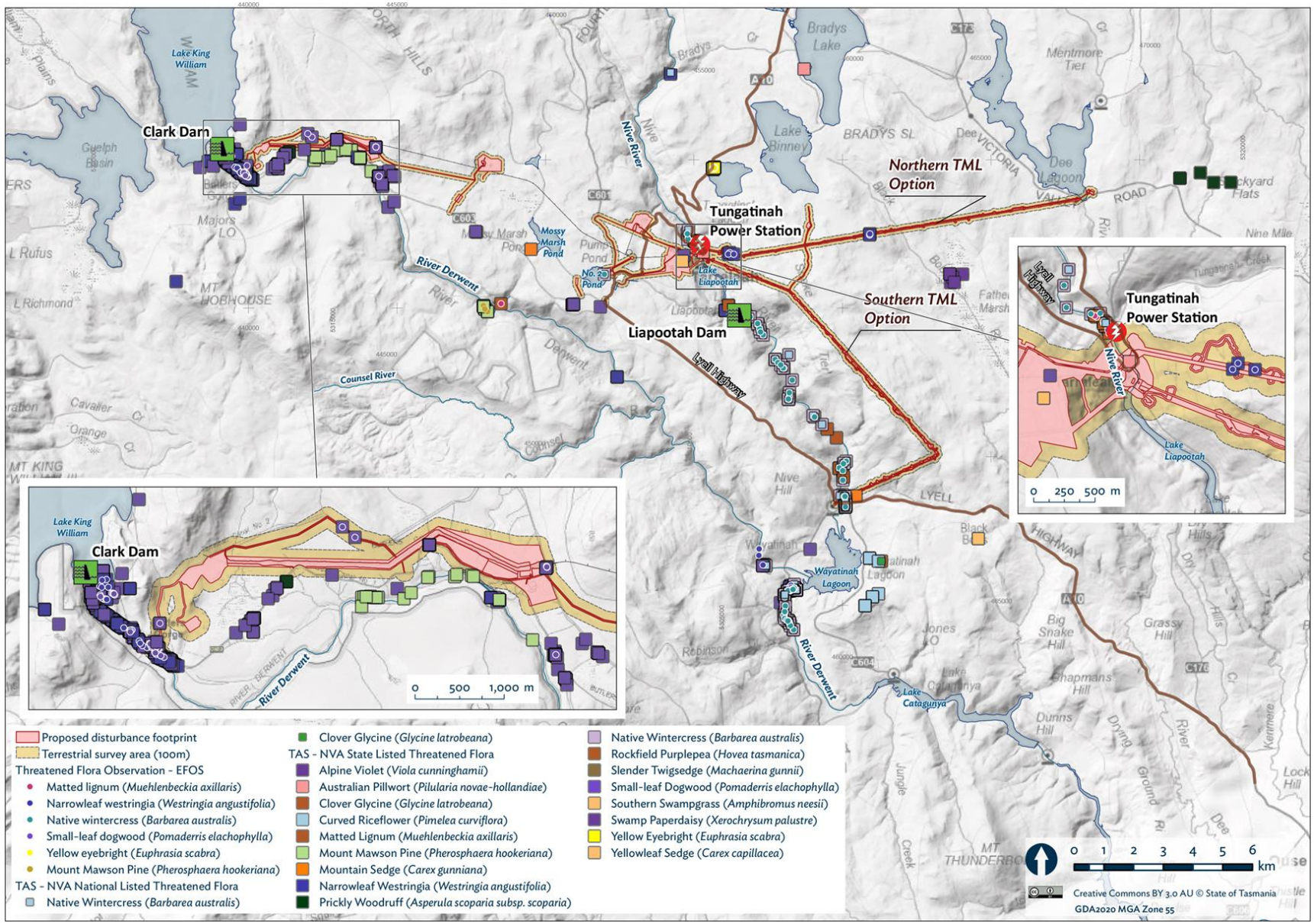


Figure 5.31: Threatened flora records within and near the Project's disturbance footprint

5.3.1.4 Fauna species

All surveys were undertaken in accordance with the *Guidelines for Natural Values Surveys – Terrestrial Development Proposals* (Natural and Cultural Heritage Division, 2015). Survey methods are detailed in Appendix B.

Seven terrestrial fauna species listed as threatened under the TSP Act are known or have potential to forage over the disturbance footprint:

- Tasmanian devil (*Sarcophilus harrisii*)
- Spotted-tail quoll (*Dasyurus maculatus maculatus*)
- Tasmanian wedge-tailed eagle (*Aquila audax fleayi*)
- White-bellied sea eagle (*Haliaeetus leucogaster*)
- Tasmanian masked owl (*Tyto novaehollandiae castanops*)
- Swift parrot (*Lathamus discolor*)
- Grey goshawk (*Tachyspiza novaehollandiae*, formerly *Accipiter novaehollandiae*).

Tasmanian devils and spotted-tailed quolls may also den within mature eucalypt forest in the footprint, although no dens were recorded during field surveys. Eastern quolls (*Dasyurus viverrinus*, not listed under the TSP Act) are unlikely to be resident within the disturbance footprint due to the absence of suitable open dry forest.

Aerial (helicopter) raptor nest searches on 13–14 April 2023, 6 June 2024, 13 May 2025 and 21 May 2025 confirmed there are no known eagle nests within 1 km of the disturbance footprint (excluding the transmission line). Eight nests were recorded between 1 and 2 km from the footprint: nests 1451, 1411, 1565, 2105, 3071, 3175, 3453 and 3454. Within 1 km of the two transmission line options, five eagle nests were recorded. Nest searches were informed by the Forest Practices Authority's eagle nesting habitat models (FPA, 2014a) and were undertaken in accordance with the protocols described in the *Guide to Eagle Nest Searches and Activity Checks* (EPA, 2023).

Tasmanian masked owls are unlikely to nest within 150 m of the disturbance footprint, and there are no *NVA* records of nests within 5 km. The closest is a historic 1985 record, 12 km north of Tarraleah. Targeted passive acoustic monitoring (Gros et al., 2023) at four mature eucalypt forest sites detected characteristic screeches[3], prompting follow-up call-playback surveys and nest tree searches. While the species forages over the area, the critical habitat feature of large tree hollows is absent within 150 m of the footprint.

The Lake Fenton trapdoor spider (*Plesiothele fentoni*), recorded within 5 km on the NVA, was not found during targeted surveys; no suitable moss bed habitat was identified in mature wet forest within the footprint.

A camera trapping program resulted in three separate cat (*Felis catus*) detections on the golf course and an additional 14 separate detections (15 cameras, 1,318 trap days/nights) during the mature dry forest camera trap survey.

One eastern barred bandicoot (*Perameles gunnii gunnii*)—listed as vulnerable under the EPBC Act and not listed under the TSP Act—was also recorded. The only suitable habitat for this species within the footprint is the existing easement along Oldina Drive within the golf course.

Arboreal marsupials, bats and birds use tree hollows, and all hollow-dependent species are priority-listed under the RFA Act. Known habitat trees in the survey area are shown in Figure 5.32.

A detailed description of fauna survey results and assessments of species likelihood of occurrence is provided in Appendix B.

3 It has been reported that in Tasmania, most female masked owls lay eggs in mid-October to early November (Mooney, 1997). It is assumed that a spring peak in breeding would encompass the months of October to February, inclusive; however, given that masked owls are highly versatile foragers, breeding probably occurs in response to prey availability and could therefore occur at any time of year. As described above, passive acoustic monitoring (PAM) was undertaken during the breeding season for the Tasmanian masked owl. The acoustic recorder that was deployed northeast of the Tarraleah Power Station on the other side of the River Derwent recorded nine individual calls over 8 months between the 27 September 2023 and 23 May 2024. The call analysis revealed that 8 of these calls were recorded at dusk and one a few hours later. The second acoustic recorder was deployed along Butlers Gorge Road 4 km east of Clarke Dam over 4 months between 27 September 2023 and 17 January 2024; no calls were recorded at this location despite being deployed over the breeding season. Some screeches were detected in the Tarraleah Conservation Area.

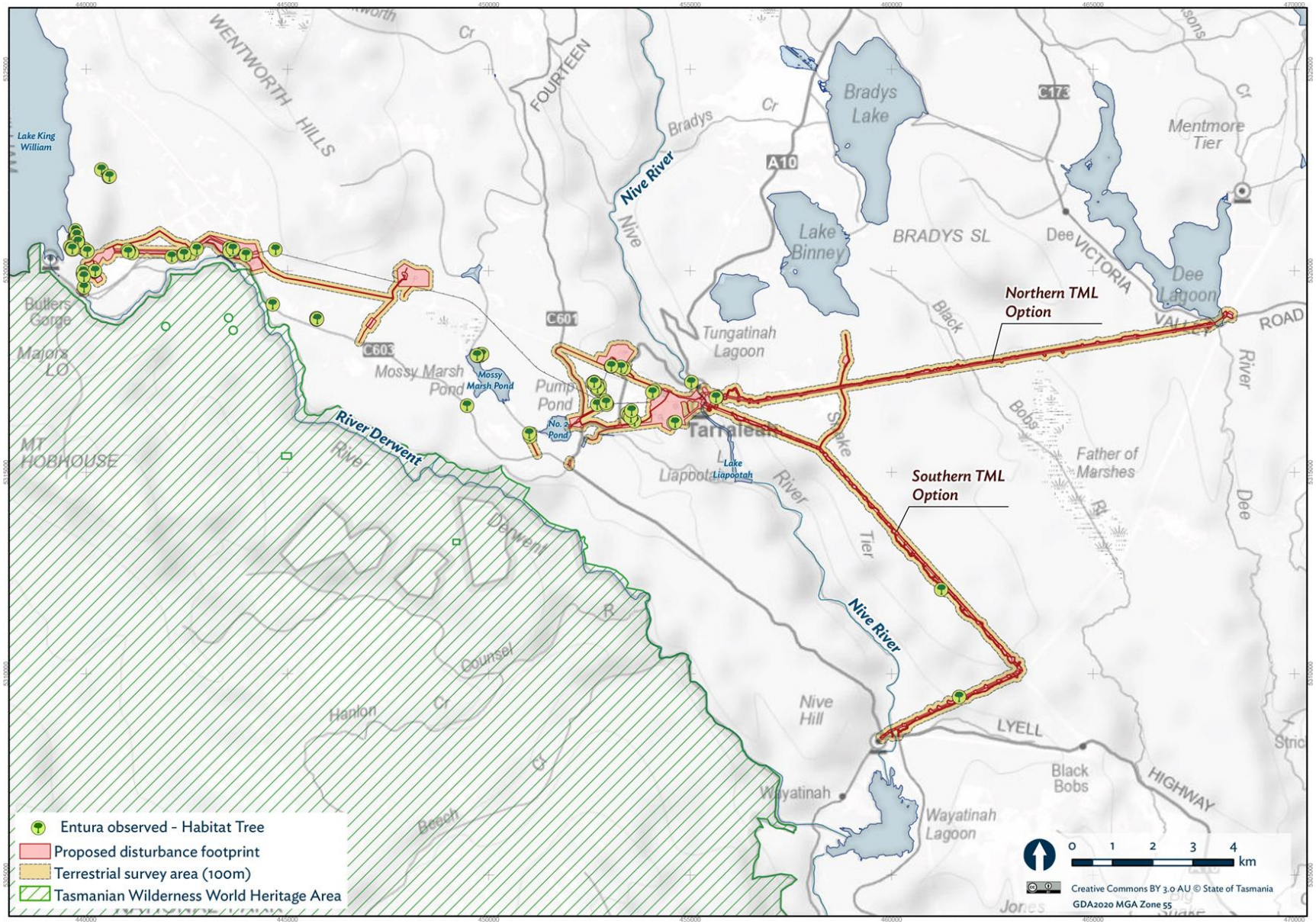


Figure 5.32: Map of habitat trees within and near the survey area

5.3.1.5 Threats to natural values

Field surveys recorded all introduced (non-native) flora and fauna species encountered. Figure 5.33 shows the location of declared weeds (e.g. English broom, foxglove), environmental weeds, introduced fauna (e.g. fallow deer, feral cats), and *Phytophthora cinnamomi* in the vicinity of the survey area.

Weeds

Fifty-four introduced plant species were recorded within the survey area, nine of which are declared weeds under the Biosecurity Act. Tasmania Parks and Wildlife Service (PWS) reported a tenth declared weed in March 2025. A complete list of introduced species is provided in Appendix A of Appendix B. The ten declared weeds known to occur are:

- **Californian thistle** (*Cirsium arvense* var. *arvense*): Recorded throughout the survey area, including near all Project components, the aquatic survey area on the Nive River downstream of Tungatinah Power Station to Wayatinah Lagoon, and the River Derwent upstream of Wayatinah Lagoon.
- **English broom** (*Cytisus scoparius*): Recorded at two locations.
- **Foxglove** (*Digitalis purpurea*): Recorded at four locations—the surge tower off Fourteen Mile Road (outside the Tarraleah Conservation Area), the Tarraleah Golf Course, Tarraleah Village, and adjacent to Tungatinah Power Station.
- **Spanish heath** (*Erica lusitanica*): Recorded at one location, adjacent to the Lyell Highway south of the distribution line associated with the surge tower.
- **Montpellier broom** (*Genista monspessulana*): Recorded at four locations—the Lyell Highway north of the Tarraleah Power Station, around Tungatinah Power Station, east of Paddy's Quarry, and a large infestation at the eastern end of the northern transmission line option at Dee Lagoon.
- **Orange hawkweed** (*Pilosella aurantiaca* subsp. *aurantiaca*): Recorded at three locations—along the access road to the downstream portal Project component, along the Lyell Highway south of the surge tower in the Tarraleah Conservation Area, and along Oldina Drive east of its intersection with the Lyell Highway.
- **Blackberry** (*Rubus fruticosus*): Recorded at one location near the Lyell Highway close to the Tarraleah Power Station.
- **Ragwort** (*Senecio jacobaea*): Recorded at four locations in the aquatic survey area on the River Nive downstream of Lake Liapootah.
- **Gorse** (*Ulex europaeus*): Recorded at one location in the aquatic survey area on the River Derwent downstream of Wayatinah Lagoon.
- **Serrated tussock** (*Nassella trichotoma*): Although not observed by Entura ecologists during field surveys, PWS recorded and removed serrated tussock from the Tarraleah picnic area at in March 2025.

Diseases

Several plant and animal diseases with potential to affect biodiversity values were considered during surveys, including:

- **Phytophthora root rot** (*Phytophthora cinnamomi*): A soil-borne fungal pathogen that attacks plant roots, starving them of nutrients and water. There are no *P. cinnamomi* records on the NVA within 5 km of the disturbance footprint, and no symptoms (e.g. dieback in susceptible species) were recorded during field surveys. Most of the disturbance footprint is at the upper limit of the pathogen's altitudinal range.
- **Chytrid fungus** (*Batrachochytrium dendrobatidis*): Causes chytridiomycosis, a disease threatening native amphibians. No NVA records occur within 5 km of the disturbance footprint.
- **Tasmanian Devil Facial Tumour Disease:** No known records in the Project area, though the disease is endemic to the Central Highlands bioregion (Woods et al., 2018).
- **Toxoplasmosis:** No known records in the Project area, but the protozoan parasite *Toxoplasma gondii* may be transmitted to native marsupials by cats in the region.
- **Sarcoptic mange** (*Sarcoptes scabiei*): Bare-nosed wombats (*Vombatus ursinus tasmaniensis*) photographed at the Tarraleah Golf Course showed no signs of infection.

Pest animals

Introduced European fallow deer (*Dama dama*), European rabbits (*Oryctolagus cuniculus*), and cats are present in the region.

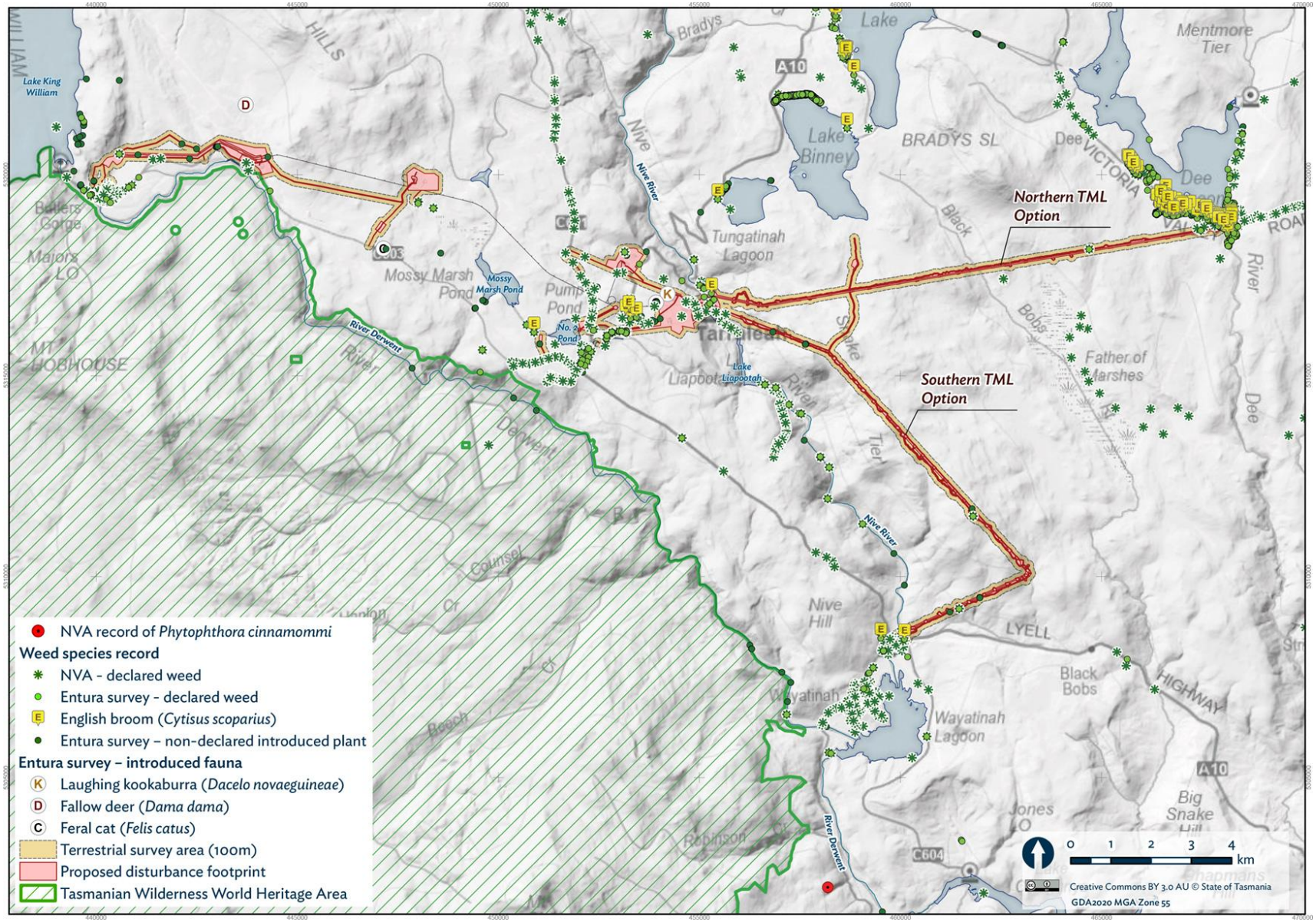


Figure 5.33: Map of record of weeds, introduced fauna, and disease in the vicinity of the Project

5.3.1.6 Natural processes of particular importance for the maintenance of the existing environment

Fire has shaped the ecology of Tasmania's Central Highlands for tens of thousands of years. Human occupation of the region may date back 35,000–70,000 years, with Tasmanian Aboriginal people likely using fire as a primary land management tool.

Since European arrival about 200 years ago—and the associated disruption of Aboriginal fire management—the region's fire regime has changed markedly. Fire has spread into fire-sensitive temperate rainforests and alpine vegetation (Kirkpatrick & Dickinson, 1984). Silvicultural regeneration burns conducted by Sustainable Timber Tasmania (STT) are not comparable to traditional Aboriginal practices.

It is also likely that fire frequency has decreased in highly flammable, fire-dependent buttongrass moorlands, potentially reducing biodiversity and altering ecological processes (Kirkpatrick, 1994). The old-growth buttongrass moorland within the disturbance footprint may benefit from a regime of low-intensity burns to reduce the risk of large-scale, ecologically damaging wildfire (Marsden-Smedley, 1998; Marsden-Smedley et al., 2001).

5.3.1.7 Sites of geoconservation significance

Within the disturbance footprint, approximately 20.7 ha of the Western Tasmania Blanket Bogs are present. This geoconservation feature represents the most extensive organosol (peat) terrain in Australia and the Southern Hemisphere, with over one million hectares occurring across western Tasmania (Pemberton et al., 2005).

Figure 5.34 shows verified buttongrass moorlands in the vicinity of the Project area. Field-verified vegetation mapping in this region supersedes the outdated Geoconservation Database 7.0 spatial layer (LISTmap). Accordingly, Figure 5.34 presents both the relevant verified buttongrass moorland communities and the Geoconservation Database 7.0 layer.

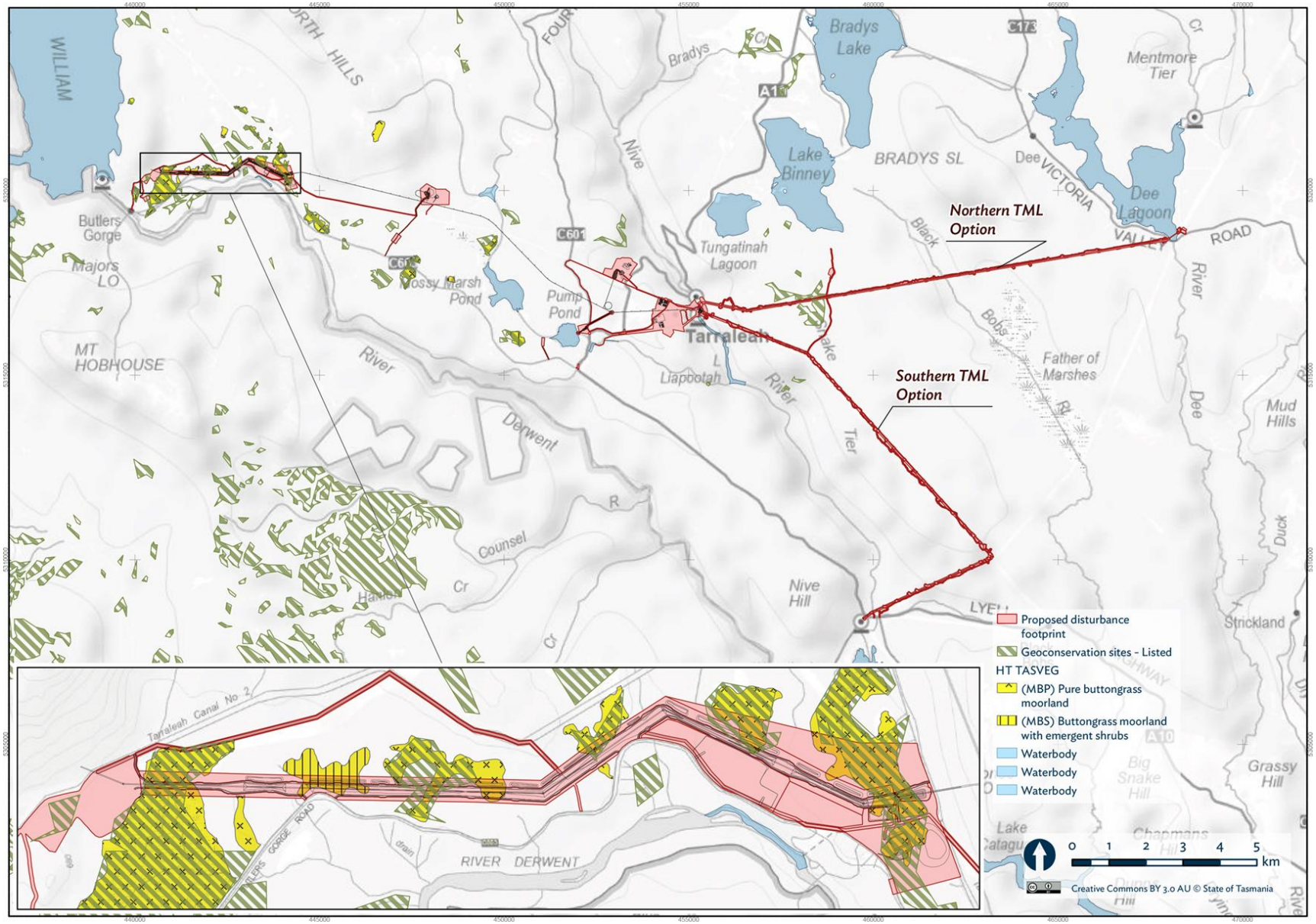


Figure 5.34: Location of mapped buttongrass moorlands over organosols within the vicinity of the Project area

5.3.1.8 Reserves

The Tasmanian Wilderness World Heritage Area (TWWHA) lies to the south of the Project area, with the closest point of the disturbance footprint located 25 m away, near the Western Portal.

Hydro Tasmania proposes to develop the surge tower—along with the associated rising main, access track, and distribution line from Tarraleah Pump Pond No. 2—and to upgrade the intersection of the Lyell Highway and Butlers Gorge Road within the Tarraleah Conservation Area. A detailed description of these works and anticipated environmental impacts within the Conservation Area is provided in Appendix A.

The disturbance footprint also includes up to 105.4 ha of informal reserves on Permanent Timber Production Zone Land (PTPZL) or other STT–managed land, or 98 ha excluding the transmission line. Of this, approximately 80 ha comprise native vegetation communities, predominantly *Eucalyptus dalrympleana–Eucalyptus pauciflora* forest and woodland, buttongrass moorland, and *Eucalyptus rodwayi* forest and woodland. The remaining 17.9 ha consist of modified (non-native) vegetation, primarily roads and permanent easements.

5.3.1.9 Tasmanian Permanent Native Forest Estate

Within the disturbance footprint (excluding the transmission line), four forest communities are managed under the Tasmanian *Policy for Maintaining a Permanent Native Forest Estate* (Department of State Growth, 2017)[4]. This policy is implemented by the Forest Practices Authority (FPA) under the *Forest Practices Act 1985 (Tas)* and is required for compliance with the RFA Act.

There are 133.5 ha of native forest communities within the disturbance footprint:

- Dry *Eucalyptus tasmaniensis* forest
- *Acacia dealbata* forest
- *E. pauciflora* forest on Jurassic dolerite
- *E. rodwayi* forest
- Tall *E. delegatensis* forest (Appendix B).

Of this, 123.1 ha are on a single property (PID 3384222). Clearance and conversion of native forest on this property would be considered ‘broad-scale clearance and conversion’.

Under the RFA Act classifications, none of these forest communities will lose more than 0.3% of their current extent within the Central Highlands bioregion as a result of the Project.

5.3.1.10 Modelled wilderness value

The Tasmanian ListMap layer of modelled wilderness value is based on the National Wilderness Inventory (NWI) method, which informed the RFA Act. High-quality wilderness areas are defined as those with a score of 12 or higher out of 20.

No high-quality wilderness areas (score ≥12) will be impacted by the Project (Figure 5.4). Most of the disturbance footprint has an NWI score between 1.0 and 8.0, with the westernmost section scoring between 8 and 10 (Figure 5.35).

4 Tasmania’s Policy for Maintaining a Permanent Native Forest Estate (Department of State Growth 2017) regulates the extent to which native forests can be cleared and converted to other land uses across the State. The Policy limits “clearance and conversion of more than 20 hectares of native forest in any period of five consecutive years (based on calendar years) per property” except where it is for the construction of new significant infrastructure or is to facilitate any development that demonstrates substantial public benefit as determined by the Minister administering the *Forest Practices Act 1985*.

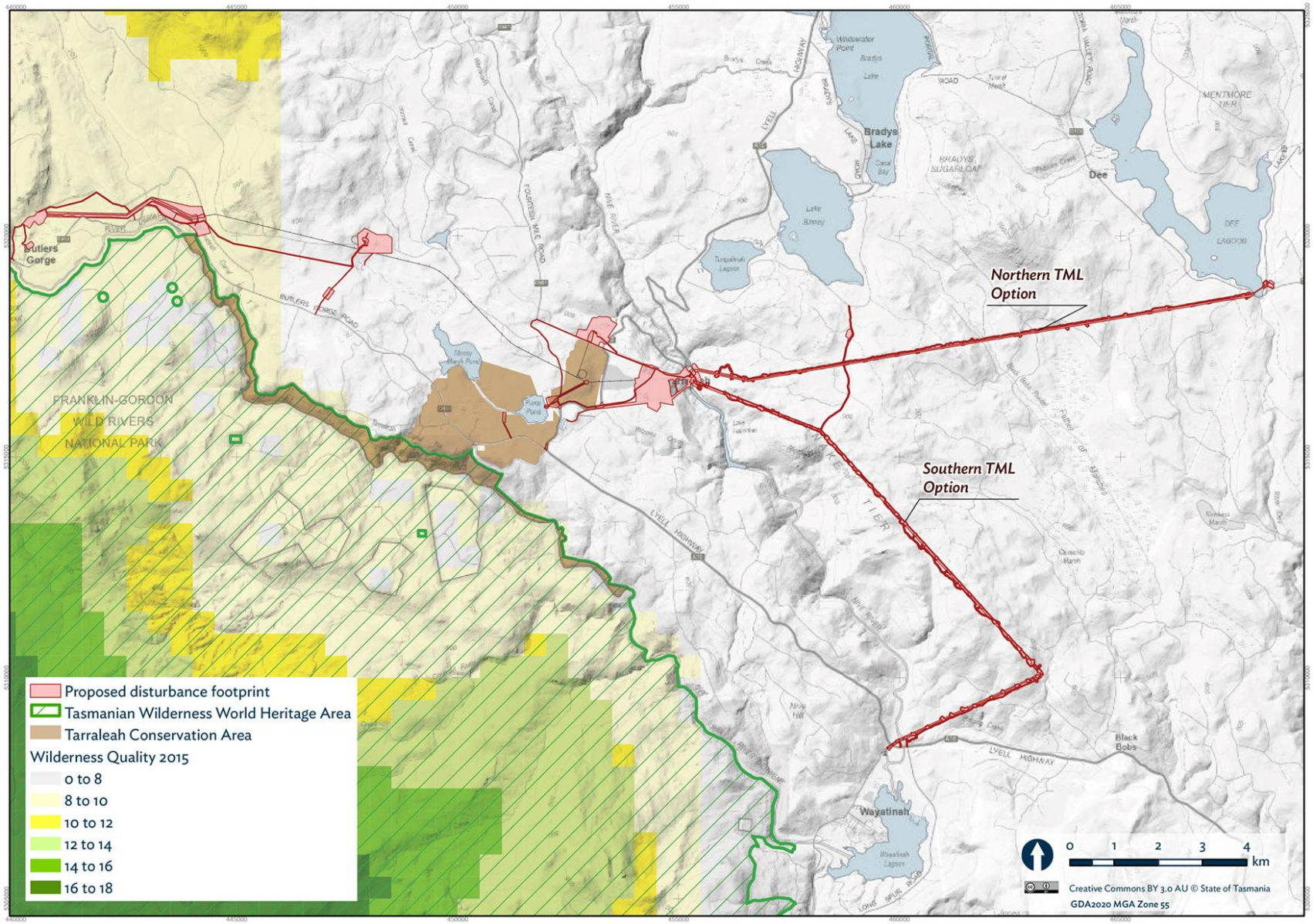


Figure 5.35: Modelled wilderness value in the vicinity of the Project area

5.3.2 Assessment

5.3.2.1 Vegetation communities

The Project (excluding the transmission line) will require clearance of up to 161.1 ha of native vegetation (Figure 5.27). Of this, 61.2 ha are mature eucalypt forest, 71.9 ha are regrowth eucalypt forest, 6.9 ha are non-eucalypt forest and scrub, and 20.7 ha are buttongrass moorlands. Within the disturbance footprint, eucalypt forest totals 133.1 ha, comprising 89.8 ha of dry forest (predominantly *Eucalyptus dalrympleana–E. pauciflora* forest and woodland) and 43.3 ha of wet forest (predominantly *E. tasmaniensis* forest with broad-leaf shrubs).

One vegetation community within the disturbance footprint is listed as threatened under the NC Act—a 0.5 ha patch of subalpine *Diplarrena latifolia* rushland (MDS) associated with the pipeline alignment. There are approximately 600 ha of subalpine *D. latifolia* rushland mapped across Tasmania, of which 45% is within the secure National Reserve System, increasing to 83% when informal reserves are included (Department of Natural Resources and Environment Tasmania, 2022). The patch within the pipeline alignment represents 0.08% of the statewide extent and 0.10% of the extent within the Tasmanian Reserve Estate (including formal and informal reserves).

Sphagnum peatland (ASP) is listed as a threatened vegetation community under the NC Act and is also a component of the Alpine *Sphagnum* Bogs and Associated Fens ecological community, listed as endangered under the EPBC Act. A 3.0 ha *Sphagnum* peatland community is located approximately 400 m upstream of Mossy Marsh Pond, outside the disturbance footprint. This community will not be directly impacted by the Project; however, it could be indirectly affected by changes to local hydrology and hydrogeology from partial decommissioning of No. 2 Canal and/or construction and operation of the headrace tunnel.

No. 2 Canal will be decommissioned between the current outlet at Clark Dam and the inlet from the Derwent Pumps but will continue to deliver water into Mossy Marsh Pond from the Derwent Pumps (up to 2.8 cumecs) and through continued diversion of minor creeks. Peak discharge from Canal No. 2 past the *Sphagnum* peatland is estimated to decrease from 12.7 cumecs to about 4.5 cumecs, while median discharge will drop from about 9 cumecs to 1 cumec.

Hydrological investigations found that groundwater heads near the *Sphagnum* peatland correlate with water levels in Mossy Marsh Pond and/or discharges from the Mossy Marsh Canal. Flows and water levels in Mossy Marsh are also closely tied to rainfall, which is likely the main driver of groundwater levels at the peatland. The hydrogeological assessment indicates that the aquifer system beneath the peatland is full due to its location in a persistently wet area adjacent to a wetland, with impeded drainage in peat swamps. Groundwater is maintained near the surface by rainfall, impeded drainage, and supplementary water from the canal. Given the limited infiltration from surface water to groundwater, the reduced canal flows are unlikely to significantly affect the peatland. However, impacts cannot be definitively ruled out (refer to Section 1.3 of Appendix H for further details).

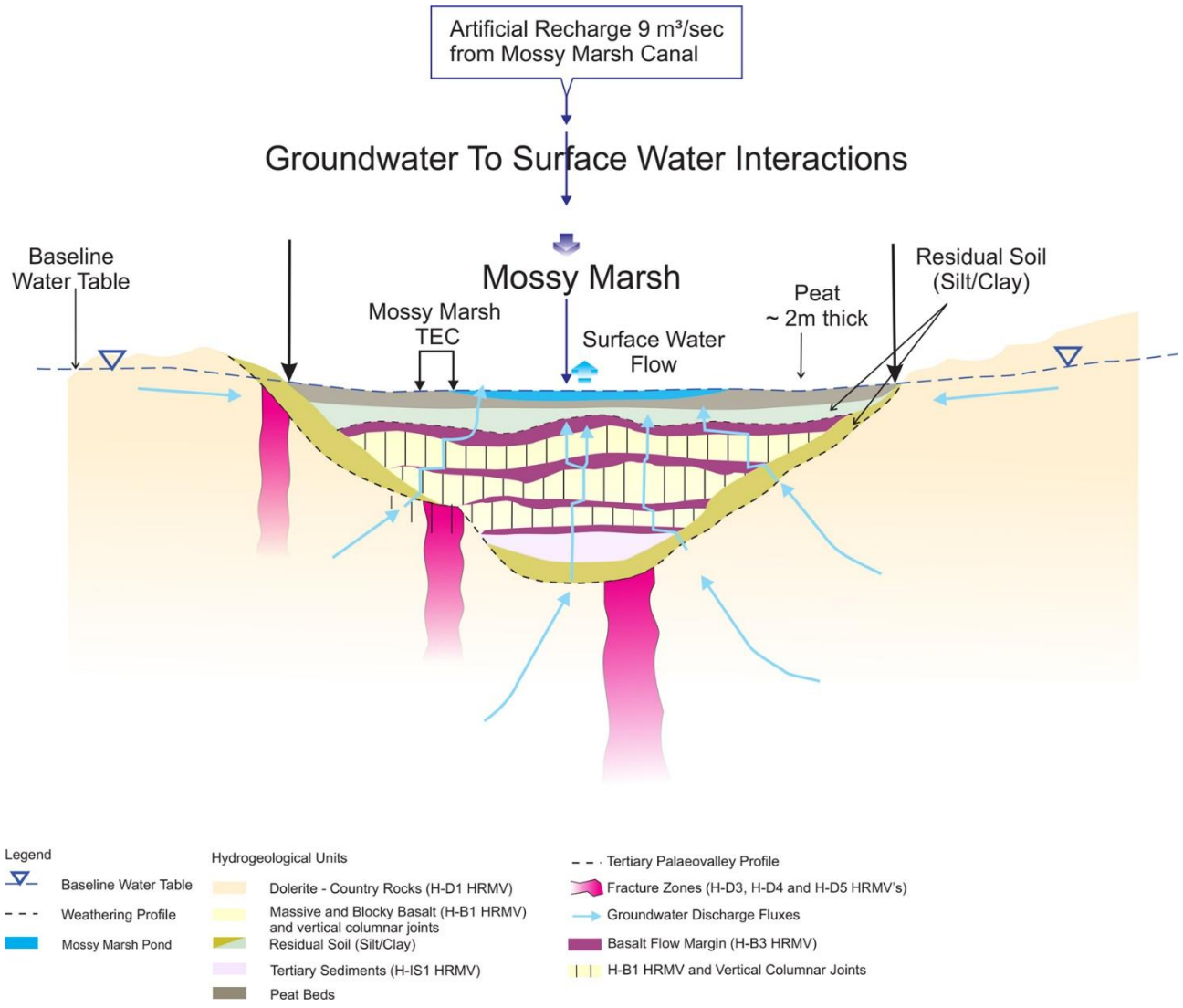


Figure 5.36: Conceptual model of the groundwater/surface water interactions at the *Sphagnum* peatland

Tunnel excavation could also cause prolonged drawdown of the shallow water table during low rainfall, potentially affecting *Sphagnum* moss cover, altering floristic composition, or degrading community condition; however, the hydrogeological assessment concluded that surface water availability and infiltration would likely offset any drawdown effects.

During operation, the tunnel will be full of pressurised water, at levels above the baseline water table. This may lead to local leakage into and above ground along fracture zones in the dolerite, potentially causing waterlogging of the peatland and altering its floristic structure (e.g. reduced *Sphagnum* moss cover and increased sedge cover). The groundwater investigations suggest limited connectivity between the tunnel and the peatland, meaning operational impacts from tunnel leakage are likely to be insignificant (Appendix H). The location of leakages will largely correspond with the existing wetlands, ponds, and streams on the Tarraleah Plateau that are located above fracture zones near the tunnel alignment (Appendix H). The duration and magnitude of these localised leakages during operation are unlikely to be sufficient to change the conservation status of any other GDEs. Similarly, leakages are unlikely to modify the species composition of any non-GDE to the extent that the vegetation community at the surface would change.

Due to uncertainty in groundwater dynamics and potential impact magnitude, a precautionary approach has been adopted, and the Project is considered to have potential indirect impacts on the *Sphagnum* community. Appendix H provides further detail on the hydrogeological modelling and potential hydrological changes.

Regarding the other four potential groundwater-dependent ecosystems in the modelled drawdown zone (none listed as threatened), prolonged changes to water table levels could shift floristic composition enough for communities to transition into different types. Even in this worst-case scenario, the impacts are unlikely to alter the conservation status of these widespread communities.

For example:

- The 43.6 ha of buttongrass moorlands (pure buttongrass moorlands and buttongrass moorlands with emergent scrubs) potentially impacted represents less than 0.005% of the one million ha statewide extent.
- The 10.1 ha of *Melaleuca squarrosa* scrub represents less than 0.05% of the 23,774 ha statewide extent.
- The 0.3 ha of *Restionaceae* rushland represents less than 0.03% of the 12,777 ha statewide extent.

Drawdowns during tunnel construction are therefore unlikely to affect the conservation status of any of these communities.

5.3.2.2 Threatened flora

Barbarea australis (native wintercress), listed as endangered under the TSP Act and EPBC Act, was recorded on the upstream face of the dam wall above the existing outflow pipe at Tarraleah Pump Pond No. 2, within the disturbance footprint of the pump station. This riverine species was also recorded at the Nive River near the Liapootah substation, within the disturbance footprint of the southern transmission line option. *B. australis* populations within the disturbance footprint will be protected by exclusion zones during construction (Figure 5.37) and will not be impacted. Potential indirect impacts on *B. australis* and its habitat in other locations along the Nive River and River Derwent are addressed in Section 5.4.

The patch of *Pomaderris elachophylla*, listed as vulnerable under the TSP Act and recorded adjacent to No. 2 Canal in a maintained easement, will also be protected by an exclusion zone during construction and will not be impacted.

Impacts to *Westringia angustifolia* within the disturbance footprint for the northern transmission line option are addressed in Appendix B, and impacts to riparian *W. angustifolia* are addressed in Appendix G.

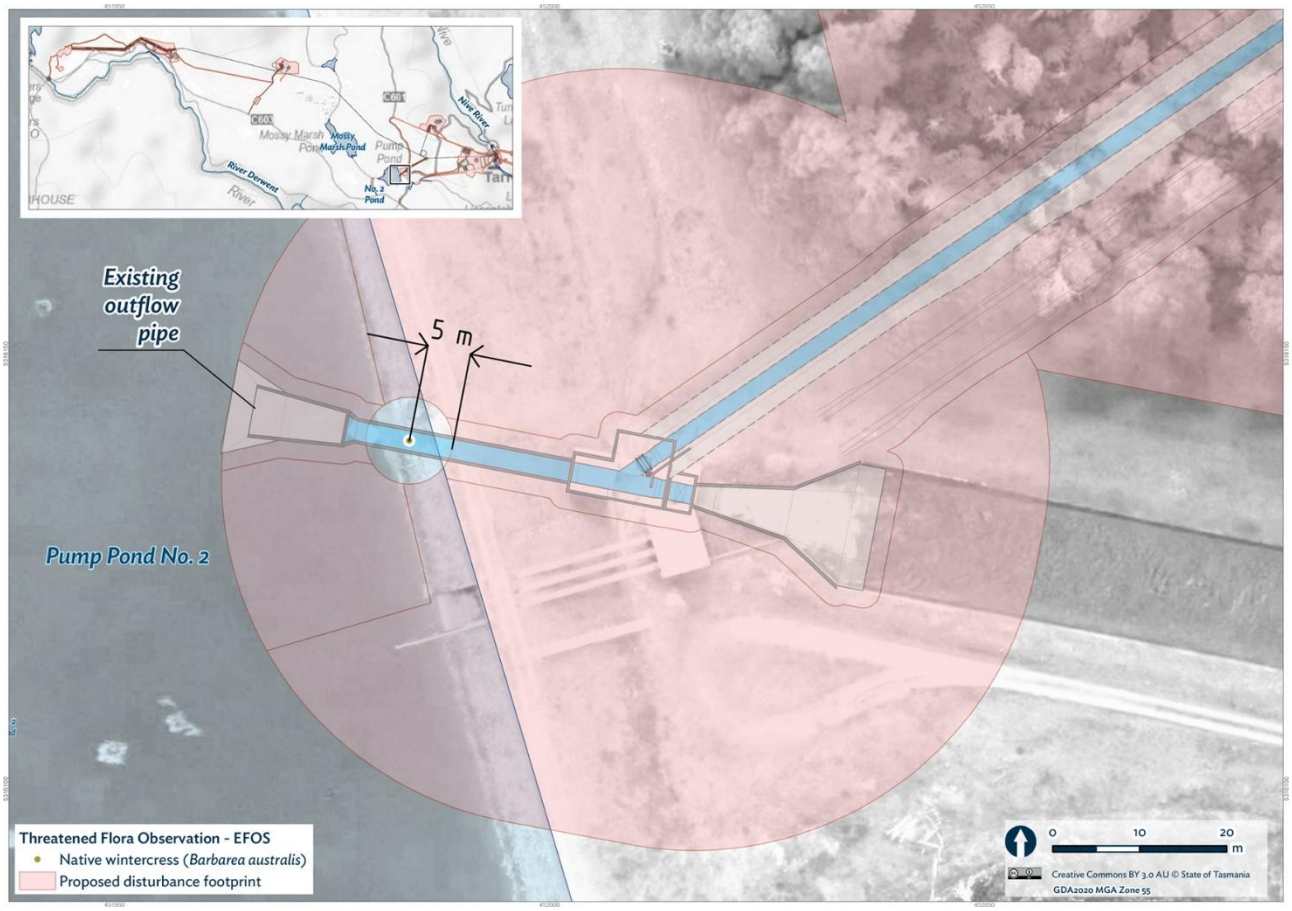


Figure 5.37: Map of known location of *Barbarea australis* plants and proposed exclusion zone at Pump Pond No. 2

5.3.2.3 Threatened fauna

Tasmanian devil

Potential Project impacts on the Tasmanian devil include:

- **Modification of foraging habitat** from the clearance of up to 140.0 ha of suitable native vegetation within the disturbance footprint (excluding the transmission line), which may alter prey availability (Figure 5.38).
- **Loss of potentially suitable denning habitat** due to the clearance of up to 61.2 ha of mature eucalypt forest (Figure 5.39), which is the most likely habitat type to contain denning features.
- **Disturbance to active dens** within 50 m of works from noise and vibration generated during construction of above-ground infrastructure.
- **Increased vehicle strike risk** associated with higher construction traffic volumes.

Habitat degradation and loss

The proposed vegetation clearance will not modify, destroy, remove, isolate, or decrease habitat availability or quality to an extent likely to cause a decline in the Tasmanian devil population. Loss of potentially suitable foraging habitat is unlikely to have a substantial impact given the species' large home range, mobility, and the extensive area of dry and wet forests in the Central Highlands. In particular, there are 302,003 ha of *Eucalyptus tasmaniensis* wet and dry forest within the bioregion.

Habitat fragmentation is also unlikely due to the Tasmanian devil's broad habitat tolerance and occurrence across a variety of altered landscapes, including production forests (Jones et al., 2021; Jones & Rose, 1996). Areas cleared for construction will not necessarily represent permanent habitat loss, as those not required post-construction will be rehabilitated to native vegetation and will quickly become suitable foraging habitat again. Devils are known to forage in regenerating cleared land.

Construction disturbance

Vegetation clearing may destroy dens, and noise and vibrations from clearing and construction activities have the potential to disturb Tasmanian devil dens within 50 m of works, including sensitive maternal dens. Adults are believed to use the same den sites long-term, so den destruction or disturbance can have significant implications for devil populations (Owen & Pemberton, 2005).

Construction activities—particularly night-time lighting and dust from 24/7 underground works—may interfere with typical foraging behaviour at localised construction sites (e.g. tunnel portals) during the construction period, with devils and/or prey species potentially avoiding these areas; however, this avoidance is unlikely to materially reduce prey availability or foraging success given the species' high mobility. Tasmanian devils are not territorial, and their home ranges often overlap, meaning any avoidance of construction sites may shift home ranges but is unlikely to reduce their extent or cause intraspecific competition.

Roadkill

Roadkill is a recognised threat to the Tasmanian devil, which may be struck and killed by vehicles—particularly when scavenging carcasses of other road-killed animals (DEWHA, 2009). Increased traffic volumes on Project transport routes during construction have the potential to raise road mortality rates.

According to the *Survey Guidelines and Management Advice for Development Proposals that may impact on the Tasmanian Devil (Sarcophilus harrisii)* (Survey Guidelines) (Environment Strategic Business Unit, 2023), a 10% or greater increase in night-time traffic indicates potential for a substantial impact on the local devil population. Night-time traffic is defined as one hour before sunset to one hour after sunrise.

A Traffic Impact Assessment (Appendix C) for the Project assumed night-time to occur between approximately 3:40 pm and 8:40 am during the worst-case (winter) scenario. Construction vehicles will operate on Project-area roads during these hours. No increase in day or night traffic is expected during the operational phase post-construction.

The assessment found that 17 road segments will experience a 10% or greater increase in night-time traffic during construction (excluding transmission line works)[5], representing a potential increase in threatened fauna road mortalities. Desktop roadkill analysis identified 61 threatened fauna roadkill records on relevant roads (Table 5.10, Figure 5.40), including 48 Tasmanian devil carcasses recorded over ten years (February 2005–September 2025). Without mitigation measures, roadkill poses a risk to Tasmanian devils in the Project area.

5 Road segments likely to experience a 10% or greater increase in night-time traffic during construction are the Lyell Highway (New Norfolk to Tarraleah, Butlers Gorge Road to Oldina Drive, Oldina Drive to Tarraleah Power Station, and the Tarraleah Power Station to Marlborough Road sections), Poatina Road, Bogan Road, Golden Valley Road, Highland Lakes Road (the Golden Valley Road to Marlborough Road section), Highland Lakes Road (Poatina Road to Marlborough Road and Meander Road to Golden Valley Road sections), Butlers Gorge Road, Fourteen Mile Road, Marlborough Road, Exton Road, Saundridge Road, Palana Crescent and Oldina Drive.

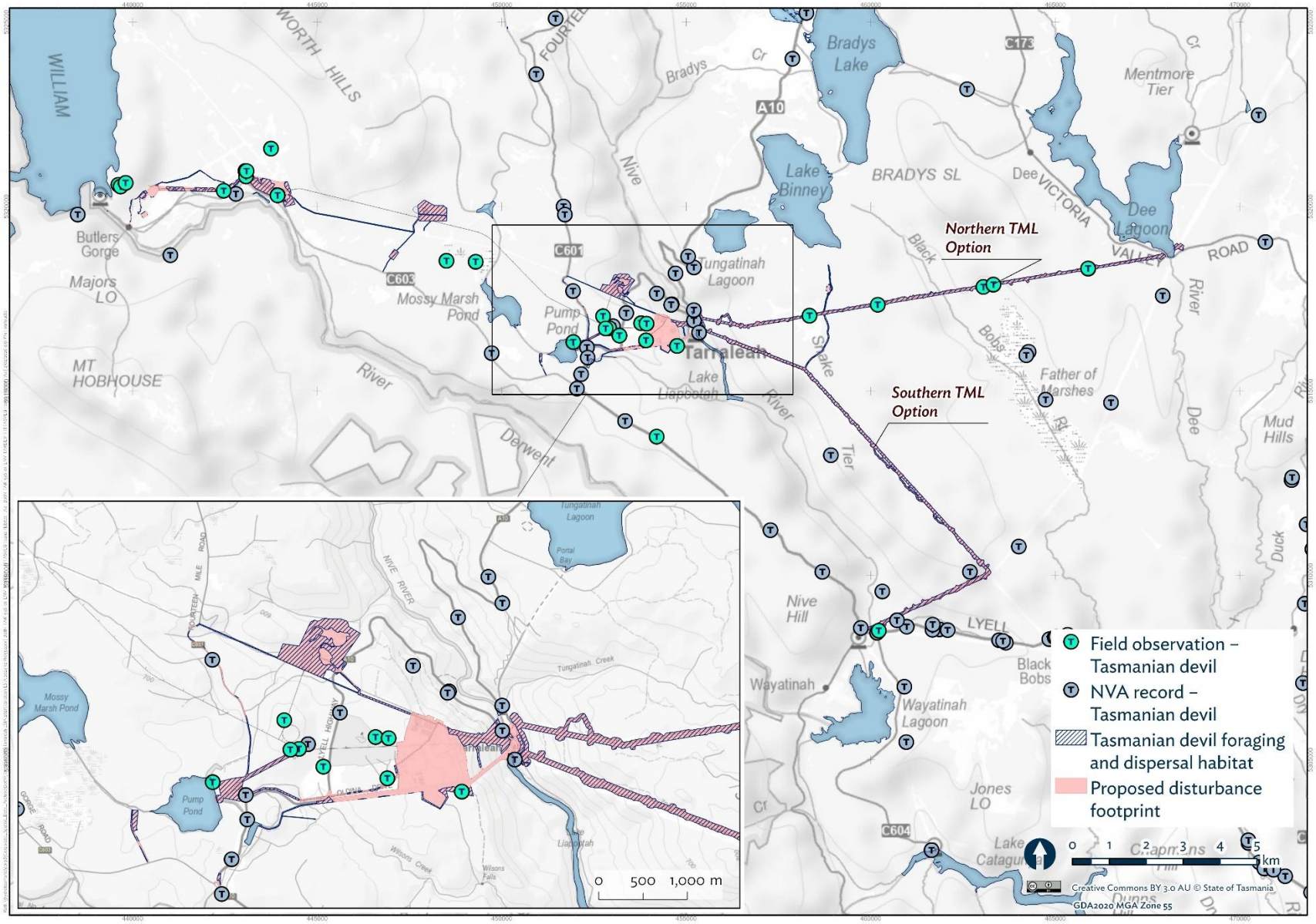


Figure 5.38: Potentially suitable Tasmanian devil foraging and dispersal habitat within the disturbance footprint

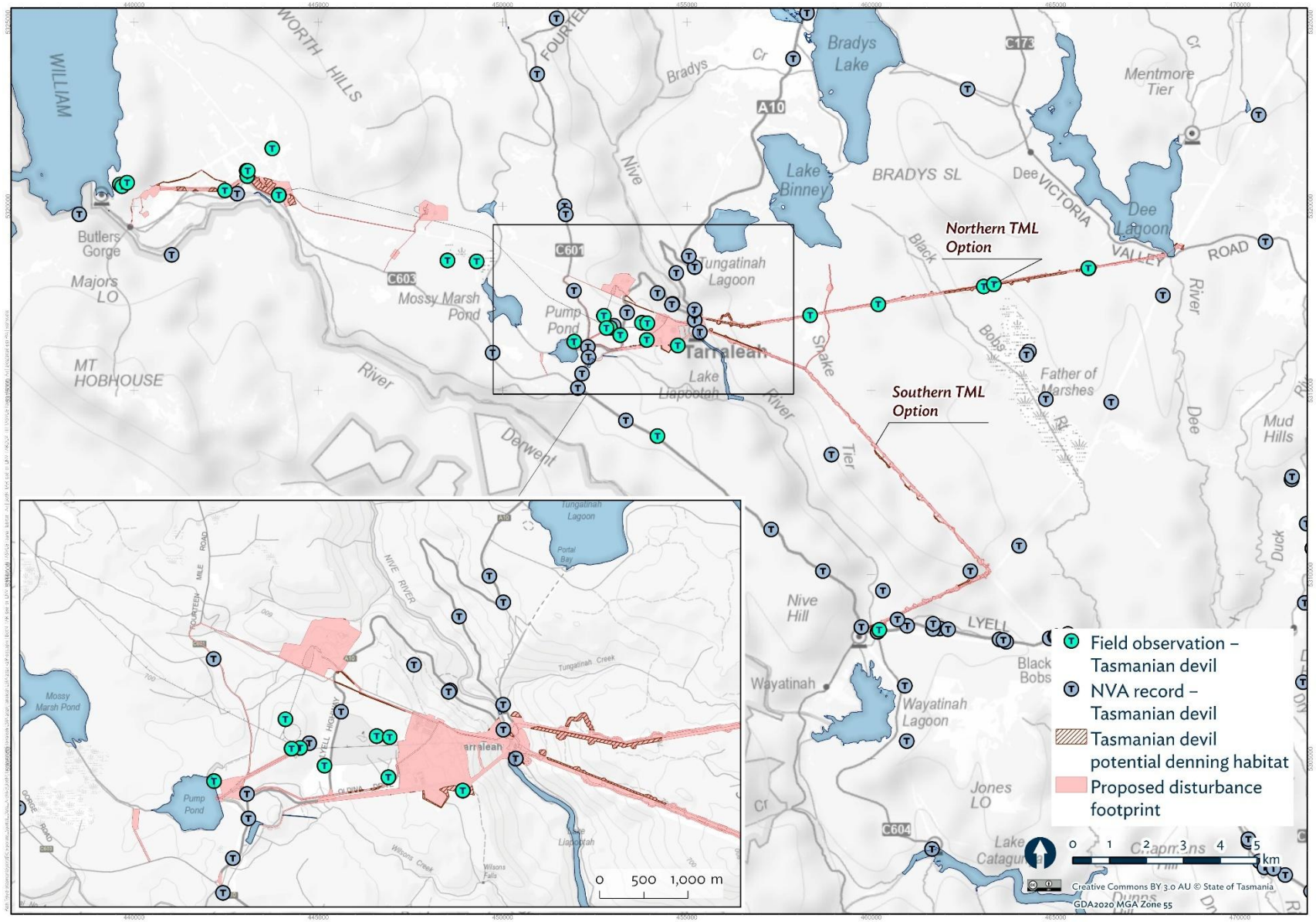


Figure 5.39: Mature eucalypt forest habitat within the disturbance footprint that may provide devil denning features

Table 5.10: Carcass records of threatened fauna species on the road segments anticipated to experience a 10% or greater increase in night-time traffic volumes during construction

Species	Count of carcass records	Most recent record date
Tasmanian wedge-tailed eagle (*Aquila audax. fleayi*)	**3**	**5/02/2024**
Highland Lakes Rd - Golden Valley Rd to Marlborough Rd	1	3/08/2019
Lyell Highway – New Norfolk to Tarraleah	2	5/02/2024
Spotted-tailed quoll (*Dasyurus maculatus maculatus)*	**4**	**30/06/2025**
Lyell Highway – New Norfolk to Tarraleah	2	24/01/2025
Marlborough Road	2	12/06/2017
Butlers Gorge Road	1	30/06/2025
Eastern quoll (*Dasyurus viverrinus*)	**4**	**23/01/2025**
Butlers Gorge Road	1	23/01/2025
Lyell Highway – New Norfolk to Tarraleah	3	27/03/2023
Butlers Gorge Road	1	30/06/2025
Tasmanian devil (*Sarcophilus harrisii*)	**48**	**17/09/2025**
Bogan Road	2	6/02/2022
Butlers Gorge Road	3	17/09/2025
Fourteen Mile Road	4	27/02/2014
Highland Lakes Rd – Golden Valley Rd to Marlborough Rd	6	5/02/2024
Highland Lakes Road – Poatina Road to Marlborough Road	2	25/11/2020
Lyell Highway – New Norfolk to Tarraleah	23	24/01/2025
Lyell Highway – Oldina Drive (south) to Tarraleah PS	2	11/06/2024
Lyell Highway – Tarraleah PS to Marlborough Road	3	6/03/2021
Poatina Road	3	3/04/2022
Tasmanian masked owl (*Tyto novaehollandiae castanops*)	**1**	**9/10/2012**
Lyell Highway – New Norfolk to Tarraleah	1	9/10/2012
TOTAL	**61**	**17/09/2025**

Overall assessment of impact

The EPBC Act significant impact assessment determined that, given the Tasmanian devil's broad habitat requirements, the surrounding landscape's history of widespread forestry activity, and the implementation of mitigation measures to reduce the risk of disturbance to maternal dens and roadkill (see Section 5.3.3), the Project is unlikely to have a significant impact on the species.

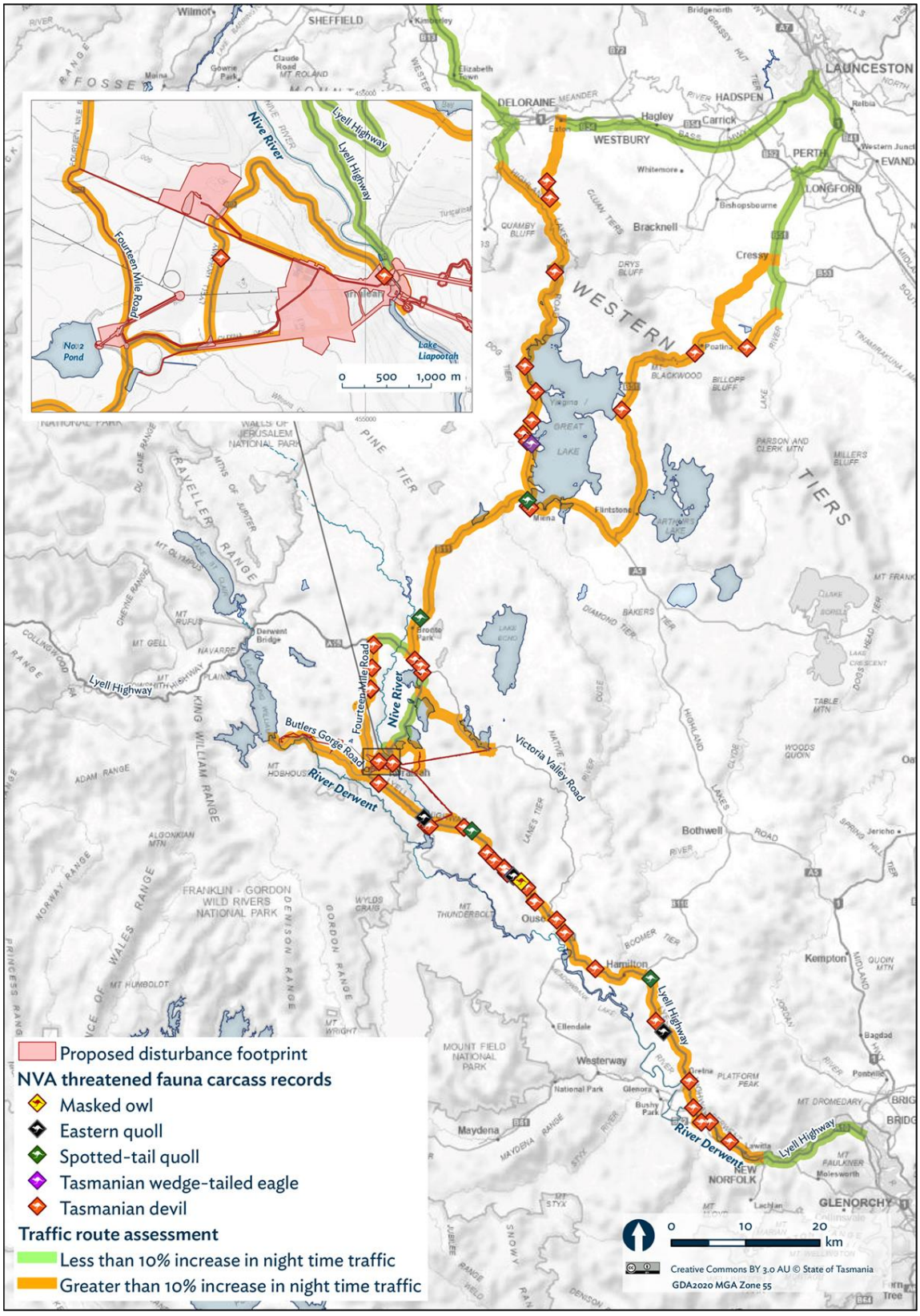


Figure 5.40: Natural Values Atlas data of threatened fauna species carcass records on roads anticipated to experience a 10% or greater increase in night-time traffic during construction

Spotted-tailed quoll

There are nine records of the spotted-tailed quoll (*Dasyurus maculatus maculatus*) within the last 40 years from areas within 5 km of the disturbance footprint (excluding the 220 kV transmission line) (NVA data). Camera trapping at the Tarraleah Golf Course over 1,163 camera trap days and nights also recorded no detections, supporting the NVA data that the species is relatively rare in this part of the Central Highlands. During the camera trap monitoring program targeting game trails within mature dry eucalypt forest in the disturbance footprint, five spotted-tailed quoll detection events were recorded by motion-triggered cameras. These detections occurred along game trails in *Eucalyptus tasmaniensis* dry forest and woodland (DDE) within the northern transmission line option disturbance footprint and the Tarraleah Village disturbance footprint.

The impact assessment has considered the species' possible presence and identified that, without avoidance and mitigation measures, the following potential impacts may occur:

- Loss of foraging habitat due to clearance of up to 140.0ha of forest and scrub within the disturbance footprint (excluding the transmission line) (Figure 5.41)
- Loss of habitat that may provide denning features due to clearance of up to 61.2 ha of mature eucalypt forest (Figure 5.42)
- Potential destruction of active dens or potential future denning features due to clearing of mature wet and dry eucalypt forest
- Potential disturbance of dens within 50 m of works by noise and vibration associated with construction of above-ground infrastructure
- Potential increase in vehicle strike and roadkill risk associated with construction traffic.

The *National Recovery Plan for the Spotted-tailed Quoll* (DELWP, 2016) does not identify the Central Highlands as an important population.

Habitat degradation and loss

Vegetation clearance associated with the Project may reduce the availability of denning features if suitable hollow logs and piles of woody debris are removed, and removal of the tree canopy will decrease habitat suitability for spotted-tailed quolls (Troy, 2014).

The loss of potentially suitable foraging habitat, however, is unlikely to substantially impact the species, given its large home range and mobility, the extensive area (302,003 ha) of dry and wet eucalypt forests in the Central Highlands, and its apparent low abundance within the Project area. No individual home range is likely to be significantly affected.

The surrounding landscape is already subject to larger-scale vegetation clearance through forestry operations, and ongoing conversion of mature wet and dry eucalypt forest occurs as part of routine harvesting activities.

Construction disturbance

Vegetation clearance may destroy dens, and noise and vibration from clearing and construction activities could disturb quoll dens, including sensitive maternal dens. The Survey Guidelines, which also apply to the spotted-tailed quoll, recommend maintaining a 50 m buffer around any active den (Environment Strategic Business Unit, 2023). No known den sites occur within 50 m of the disturbance footprint.

Construction activities—particularly night-time lighting and dust from 24/7 underground works—may interfere with typical quoll foraging behaviour at localised construction sites (e.g. tunnel portals) during the construction period, causing quolls and/or their prey to avoid these areas. Such avoidance is unlikely to materially reduce prey availability or foraging success, given the species' mobility. Spotted-tailed quoll home ranges overlap, so avoidance of these sites may shift home ranges but is unlikely to reduce their extent or cause intraspecific competition.

Roadkill

As with Tasmanian devils, spotted-tailed quolls may be struck and killed by vehicles, particularly while scavenging carcasses on roads. Increased traffic volumes during the Project's construction phase could raise the risk of road mortalities. According to the *Survey Guidelines*—considered applicable to the spotted-tailed quoll in the absence of species-specific guidelines—a 10% or greater increase in night-time traffic indicates potential for a substantial impact on the local population from increased road mortality (Environment Strategic Business Unit, 2023).

As outlined in the roadkill assessment for the Tasmanian devil (Section 5.15) and the Traffic Impact Assessment (Appendix C), 17 road segments are expected to experience more than a 10% increase in night-time traffic from construction vehicle movements. This presents a potential for increased road mortalities on these roads during construction. Refer to Appendix B and Appendix C for detailed traffic assessment results and roadkill data analysis.

Four spotted-tailed quoll roadkill records were identified on relevant roads: two from Marlborough Road and two from Lyell Highway. Given the apparent low density of the species in the Project area, the overall risk of vehicle strike and roadkill is considered low.

Overall assessment of impact

The significant impact assessment under the EPBC Act determined that the Project is unlikely to have a significant impact on the spotted-tailed quoll. This is because it will not affect an important population, as defined in the *National Recovery Plan for the Spotted-tailed Quoll* (DEWLP, 2016), and the anticipated habitat loss is unlikely to significantly affect any single home range. In addition, pre-construction den surveys and the implementation of a Roadkill Management Plan (RkMP) (Section 5.3.3) will further mitigate potential impacts.

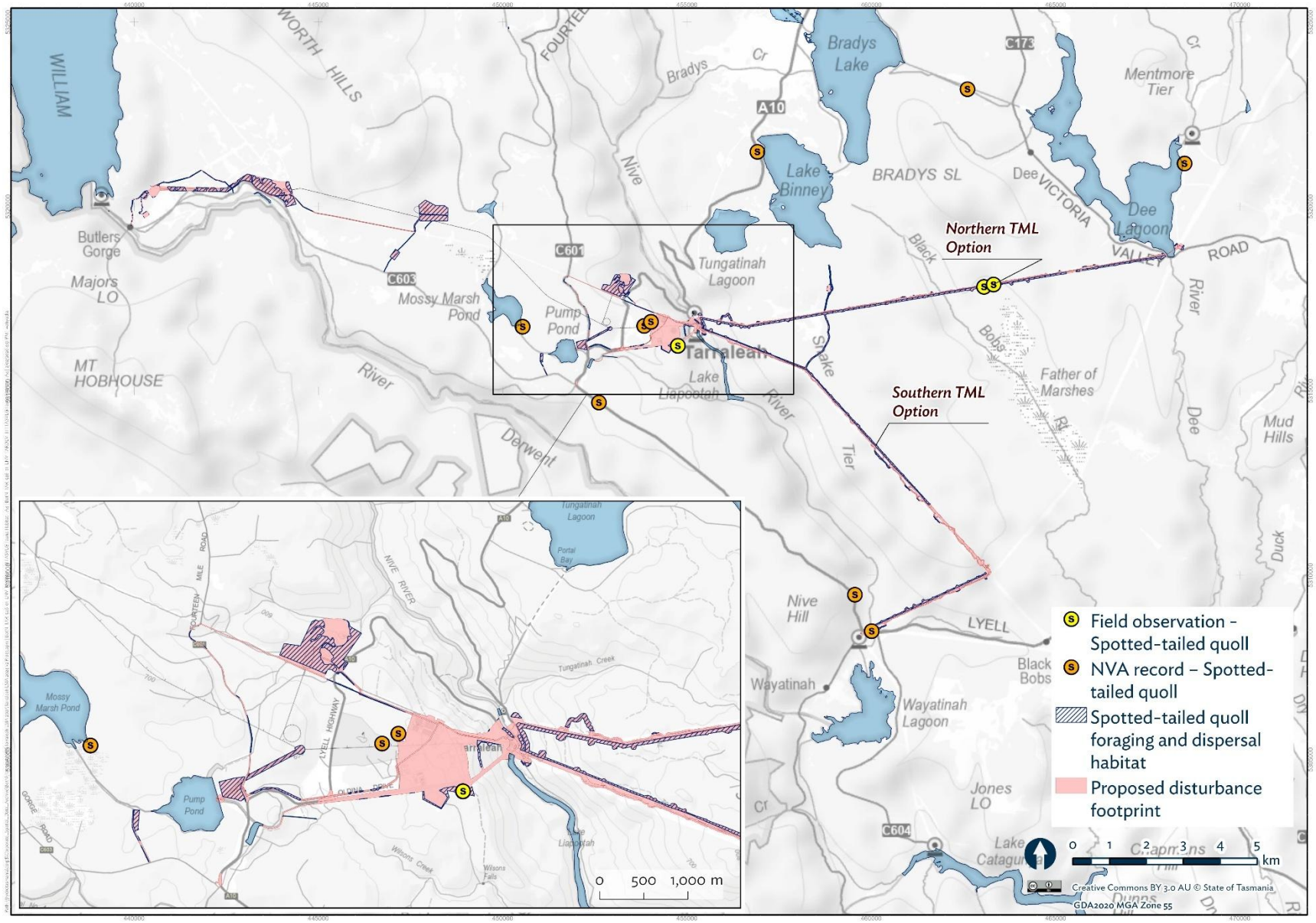


Figure 5.41: Potentially suitable spotted-tailed quoll foraging and dispersal habitat within the disturbance footprint

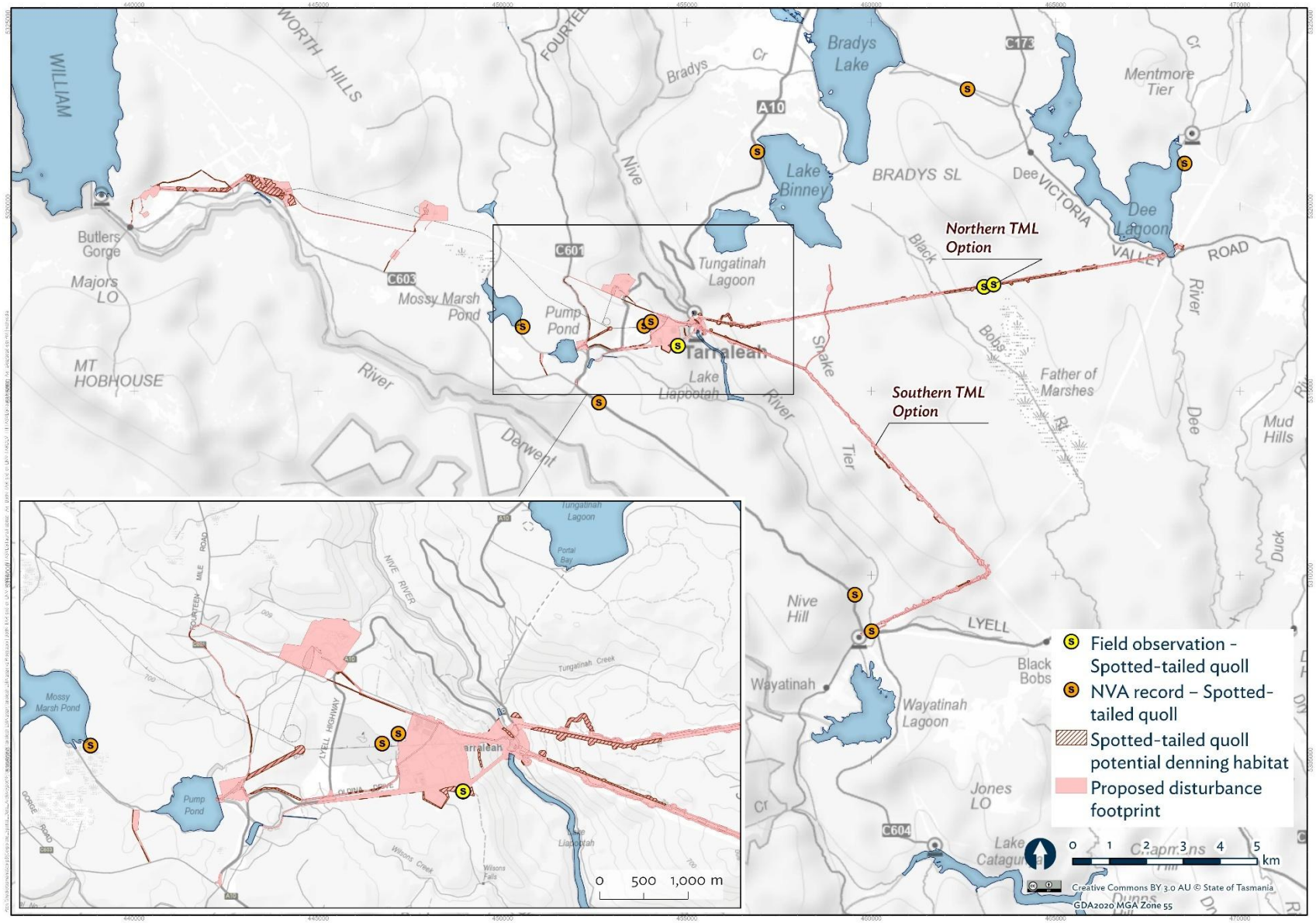


Figure 5.42: Mature eucalypt forest habitat within the disturbance footprint that may provide quoll denning features

Wedge-tailed eagle and white-bellied sea-eagle

Foraging habitat assessment

The Tasmanian wedge-tailed eagle is listed as endangered under both the TSP Act and the EPBC Act. Clearance of native vegetation is unlikely to materially affect its foraging behaviour or success, as this species hunts across a wide range of habitats, is highly mobile with large home ranges, and generally prefers open areas (Department of the Environment, 2025).

Similarly, the clearing of native vegetation is unlikely to affect the foraging behaviour of the white-bellied sea-eagle, whose preferred foraging habitat is open water (Threatened Species Section, 2023; Debus, 2008).

Nesting habitat assessment

Nesting habitat is considered critical to the survival of the Tasmanian wedge-tailed eagle and white-bellied sea-eagle, and it is defined as patches of eucalypt forest dominated by old-growth trees, greater than 10 ha in area (Threatened Species Section, 2006).

There are no known eagle nests within the disturbance footprint, and no nest trees will be removed. The Project will clear approximately 0.3 ha of potentially suitable *future* eagle nesting habitat (Forest Practices Authority, 2014a) within the disturbance footprint, excluding the transmission line. This increases to 0.4 ha when the transmission line is included.

This level of clearance is unlikely to have a significant impact on either species, given their wide-ranging nature, large territory size, and the prevalence of existing nests in the area—likely within defended territories of current breeding pairs. Tasmanian wedge-tailed eagle territory densities range from a maximum of one pair per 2,000–3,000 ha in lowland eastern and northern Tasmania, to a minimum of one pair per 120,000 ha in the highland landscapes of western and south-western Tasmania (Bell & Mooney, 2002).

Breeding disturbance

The two Tasmanian eagle species are sensitive to disturbance during the breeding season, which typically starts in early July and extends to the end of January—and in late-breeding years, into February (FPA, 2023). If a nesting eagle perceives a disturbance as a threat, even from hundreds of metres away, it may leave its eggs or chicks exposed to cold, heat, or predation. Eagles may also abandon a nest site for years after the disturbance has ceased (Threatened Species Section, 2006).

Disturbance late in the breeding period can cause young birds to attempt flight before they are fully fledged (Threatened Species Section, 2006). For this Project, potential disturbance may arise from loud blasting works.

There are no known eagle nests within 500 m or within 1 km line-of-sight of the disturbance footprint (excluding the transmission line), including portal areas where blasting will occur. "*Line-of-sight*" refers to the areas a breeding eagle can see from the nest. The nearest nest to a tunnel portal is over 2.6 km northwest of the western portal. Four nests are within 1 km of the northern transmission line option, and one nest is within 500 m of the southern transmission line option. Appendix B provides further details on these nest locations and an assessment of disturbance risk.

Increased risk of vehicle strike

Collision with vehicles is identified in the *Threatened Tasmanian Eagles Recovery Plan 2006–2010* as a threat to wedge-tailed eagles (Threatened Species Section, 2006). Wedge-tailed eagles are known to scavenge on roadkill carcasses and, due to their large size, are slow to take flight, making them particularly vulnerable to vehicle strike (Pay, 2019).

Appendix B provides further details on roads expected to experience increased traffic during construction. Two records of wedge-tailed eagle carcasses have been documented on the New Norfolk to Tarraleah section of the Lyell Highway, and one has been recorded on the Golden Valley Rd to Marlborough Rd section of Highland Lakes Rd (Table 5.10).

Secondary poisoning

The wedge-tailed eagle's habit of feeding on carrion exposes it to the risk of secondary poisoning, for example through ingestion of rabbits laced with pindone. Anti-coagulant rodenticides—particularly second-generation anticoagulant rodenticides (SGARs) such as brodifacoum, bromadiolone, difethialone, difenacoum and flocoumafen—pose a significant secondary poisoning risk to raptors (Pay et al., 2021). The Project will use appropriate rodenticides to avoid secondary poisoning of raptors.

Increased risk of collision or electrocution from new power lines

The Project may increase the risk of bird collision or electrocution from new power lines. Power will be supplied to the western portal, mid-access portal, Paddy's Quarry portal, pump station, surge tower and power station sites by extending the local 22 kV electrical distribution network from lines operated by either Hydro Tasmania or TasNetworks. This power supply will be established at the commencement of construction and maintained during operation.

Overall assessment of impact

The Project is unlikely to have a substantial impact on the wedge-tailed eagle or the white-bellied sea-eagle because there are no known nests within 500 m or 1 km line-of-sight of the disturbance footprint. If a nest is located during annual nest surveys prior to construction, no construction activity will occur during the breeding season (July to January inclusive) within 500 m or 1 km line-of-sight of the nest if it is active (see Section 5.3.3). Use of the SGAR class of chemicals will be avoided during all phases of the Project, including at the new power station on the Nive River.

Tasmanian masked owl

The Tasmanian masked owl (*Tyto novaehollandiae castanops*) is listed as vulnerable under the EPBC Act and endangered under the TSP Act, and it is a 'priority species requiring consideration' under the RFA Act. Tasmanian masked owls are likely to fly and forage over the Project area, as indicated by occasional detections at the passive acoustic monitoring (PAM) sites. There is no evidence of resident (roosting or nesting) masked owls within 150 m of the disturbance footprint.

Foraging and nesting habitat assessment

The vegetation clearance required for the Project will not impact the Tasmanian masked owl, as there are no known roost or nest sites within the disturbance footprint. Clearance will also not affect the species' foraging behaviour, as the masked owl hunts widely across Tasmania in a range of wet and dry forest types and modified landscapes (DEWHA, 2010b). During both construction and operation, the population is expected to continue flying and foraging over the Project area at night as usual.

Nest hollows are considered habitat features critical to the species' survival (Young et al., 2020). Potential nesting trees for the masked owl include those with large hollows, usually with an entrance larger than 15 cm in diameter. Trees over 100 cm diameter-at-breast height (DBH) have a higher probability of containing hollows suitable for masked owls than smaller trees (FPA, 2014b). Although PAM surveys in potentially suitable nesting habitat detected occasional masked owl calls, there was no evidence of residency (roosting or nesting); therefore, while the area may be visited occasionally, it is not considered important habitat for the species.

Construction disturbance

Construction works are unlikely to directly impact Tasmanian masked owls because:

- the species has large territories that often include areas of human activity
- there are no resident (roosting or nesting) masked owls within 150 m of the disturbance footprint that could be disturbed by noise or vibration from construction.

Secondary poisoning

The Tasmanian masked owl's habit of feeding on rabbits and introduced rodents exposes it to the risk of secondary poisoning, for example through ingestion of rabbits laced with pindone. Anti-coagulant rodenticides—particularly second-generation anticoagulant rodenticides (SGARs, including brodifacoum, bromadiolone, difethialone, difenacoum and flocoumafen)—pose a significant secondary poisoning risk to raptors, including owls (Pay et al., 2021). The Project will use only appropriate rodenticides to avoid secondary poisoning of owls.

Impacts of vehicle strike

Seventeen road segments are expected to experience increased night-time traffic from construction vehicle movements. One Tasmanian masked owl carcass has been recorded on the Lyell Highway between Ouse and Wayatinah; however, masked owls take live prey (Higgins, 1999) and are not known to scavenge carrion, such as roadkill carcasses, on roads (Dr. Phil Bell, pers. comm.). Accordingly, the Project is unlikely to increase vehicle strike risk for the species above existing background levels.

Overall assessment of impact

The Project is unlikely to have a significant impact on the Tasmanian masked owl because:

- Foraging success will not be affected due to the species' mobility and large territory size
- There are no known nest trees within 150 m of the disturbance footprint, so breeding will not be impacted
- Secondary poisoning will be avoided through the use of appropriate rodenticides, including at the switchyard and the new Tarraleah Power Station on the Nive River.

Mitigation measures for the Tasmanian masked owl are outlined in Section 5.3.3.

Swift parrot

Foraging habitat assessment

The swift parrot is an occasional visitor to the Central Highlands, including the Tarraleah area, following breeding in the forests of eastern and south-eastern Tasmania before dispersing to western and north-western Tasmania and then migrating to mainland Australia for winter (DCCEEW, 2024). The species has been recorded in mature *Eucalyptus tasmaniensis* wet forest in the Tarraleah area and may also forage on eucalypt blossom nectar resources in mature *E. dalrympleana–E. pauciflora* and *Eucalyptus rodwayi* dry forest. These forest types are not considered priority foraging habitat, as they are not *Eucalyptus globulus* or *E. ovata* communities, do not contain these species, and are outside the recognised breeding range of the swift parrot (DCCEEW, 2024).

Within the Central Highlands bioregion, there are 302,003 ha of *E. tasmaniensis* wet and dry forests cover, 16,643 ha of *E. dalrympleana–E. pauciflora* dry forest covers, and 5,302 ha of *E. rodwayi* dry forest covers.

Excluding vegetation clearance required for the transmission line, the Project will require clearance of up to 61.2 ha of mature eucalypt forest dominated by *Eucalyptus tasmaniensis, E. dalrympleana, E. pauciflora* or *E. rodwayi* trees where swift parrots may occasionally forage after their breeding season ends. This clearance of approximately 0.01% of the mapped extent of these forests within the bioregion is unlikely to affect foraging behaviour or success given the swift parrot's mobility, the swift parrot's ability to track flowering resources across fragmented landscapes, and the already modified landscape from forestry activity.

Nesting habitat assessment

The main threat to the swift parrot is loss of breeding habitat through forestry operations and land clearing (Threatened Species Scientific Committee, 2016; Commonwealth of Australia, 2019). The disturbance footprint is outside the recognised breeding range, which is mostly within 10 km of the eastern and south-eastern coastlines, with some breeding in certain years along the central north and north-west coasts (DCCEEW, 2024).

Increased risk of vehicle strike

Vehicle collisions are a recognised threat to the swift parrot (Saunders & Tzaros, 2011), although most occur in urban areas (Pfennigwerth, 2008). Of 13 swift parrot carcass records on the NVA, only 1 was attributed to vehicle strike (in the Hobart suburb of Taroona in 2010). Swift parrots are fast flyers and may fly low when moving between nearby trees (Smales, 2005), but the canopies of potentially suitable *Eucalyptus* forage trees in the disturbance footprint are generally 40–50 m above ground level, making low flights at vehicle height unlikely. The swift parrot is a transient visitor to Tarraleah, occurring only opportunistically when flowering *E. tasmaniensis* resources are available.

Overall assessment of impact

The Project is unlikely to have a substantial impact on the swift parrot because it is not located within a Swift Parrot Important Breeding Area (SPIBA) as defined in the National Recovery Plan for the Swift Parrot (*Lathamus discolor*) (DCCEEW, 2024), and no priority foraging or breeding habitat will be affected.

Grey goshawk

The grey goshawk (*Tachyspiza novaehollandiae*, formerly *Accipiter novaehollandiae*) is listed as endangered under the TSP Act and is not listed under the EPBC Act. Preferred nesting habitat is mature wet forest at low elevations, almost always near a watercourse (Brereton & Mooney, 1994; Young et al., 2025).

No grey goshawk nests were detected during aerial raptor nest searches in April 2023, June 2024 and May 2025, and there are no known nests within 1 km of the disturbance footprint. Suitable nesting habitat is absent within the disturbance footprint and within 100 m of it.

Given the lack of suitable nesting habitat and known nest sites, the Project is considered unlikely to impact the grey goshawk.

EPBC Act listed fauna

Four species listed under the EPBC Act but not under the TSP Act were identified as potentially occurring within the disturbance footprint:

- Eastern quoll (*Dasyurus viverrinus*)—Endangered
- Eastern barred bandicoot (*Perameles gunnii gunnii*)—Vulnerable
- Latham's snipe (*Gallinago hardwickii*)—Vulnerable, Migratory
- White-throated needletail (*Hirundapus caudatus*)—Vulnerable, Migratory.

Significant impact assessments for these species, along with other EPBC Act-listed threatened species, were undertaken in accordance with the *Matters of National Environmental Significance – Significant Impact Guidelines 1.1* (Department of the Environment, 2013). As detailed in Appendix B, none of these species are expected to be significantly impacted by the Project if the proposed mitigation measures are implemented.

5.3.2.4 Protected wildlife

Two potential bare-nosed wombat (*Vombatus ursinus tasmaniensis*) burrows were recorded within the disturbance footprint during field surveys, neither showing signs of recent use. Wombats and their burrows are protected under the *Nature Conservation (Wildlife) Regulations 2021* of the NC Act.

If required, a permit will be obtained to destroy wombat burrows, as they are considered products of wildlife. The same protocols will apply if additional wombat burrows or other native fauna dens are identified during the construction phase that were not detected in the pre-construction den surveys (Section 5.3.3).

5.3.2.5 Threats to natural values

Ten declared weeds under the Biosecurity Act have are known to occur within the survey area. The Central Highlands municipality is a Zone B municipality for:

- California thistle (*Cirsium arvense* var. *arvense*)
- Foxglove (*Digitalis purpurea*)
- English broom (*Cytisus scoparius*)
- Spanish heath (*Erica lusitanica*)
- Montpellier broom (*Genista monspessulana*)
- Blackberry (*Rubus fruticosus*)
- Ragwort (*Senecio jacobaea*)
- Gorse (*Ulex europaeus*)
- Serrated tussock (*Nassella trichotoma*).

The Zone B weed management objective is: *containment within municipal boundaries, protection of specified areas within municipal boundaries, and prevention of spread to Zone A municipalities*.

The Central Highlands municipality is Zone A for orange hawkweed (*Pilosella aurantiaca* subsp. *aurantiaca*) and serrated tussock (*Nassella trichotoma*), and it is Class A[6] for foxglove (*Digitalis purpurea*), with the management objective to *implement integrated eradication programs and prevent future occurrences*.

Construction activities, particularly vehicle and machinery movement, pose a risk of introducing new weed species and diseases or spreading existing ones. Weed and disease management protocols will be implemented during the works, with a focus on hygiene measures for vehicles, machinery, equipment and construction materials. These protocols will align with:

- Relevant Statutory Weed Management Plans (or Biosecurity Management Plans)
- *Weed and Disease Planning and Hygiene Guidelines* (DPIPWE, 2015)
- Any other requirements under the Biosecurity Act, including weed disposal obligations.

6 Foxglove (*Digitalis purpurea*) was listed as a declared weed under the Biosecurity Act in February 2025. The management objectives for Biosecurity Weed Management Class A are eradication and prevention, whereby "these areas generally have localised, but limited infestations or no Digitalis. The management outcome is achieving and maintaining the total absence of *Digitalis* from within identified biosecurity weed management Class A areas. All gazetted Reserved Land, which includes the land within the TWWHA [and the Tarraleah Conservation Area], are deemed to be biosecurity weed management Class A (unless otherwise noted).

There are no *Phytophthora cinnamomi* records within 5 km of the survey area, and no obvious signs of the pathogen were observed. The disease is therefore considered unlikely to be present within the disturbance footprint (excluding the transmission line). Approximately 20.7 ha of buttongrass moorland—moderately susceptible to *P. cinnamomi*—occur within the project area, but are located at the upper altitudinal range of the pathogen (Schahinger et al., 2003). *Check, Clean and Disinfect* protocols (DPIPWE, 2015) will be applied to all equipment, vehicles and heavy machinery before entering the site and when moving materials between sites.

Chytrid fungus is unlikely to occur within water bodies in the Project area, but hygiene protocols will be implemented to prevent its introduction and maintain amphibian viability. The Project is also unlikely to influence Devil Facial Tumour Disease dynamics in the region.

Feral cat, European fallow deer and European rabbit populations in the region are not expected to be affected by the Project.

Mitigation measures for weeds and diseases are described in Section 5.3.3.

5.3.2.6 Sites of geoconservation significance

The Western Tasmania Blanket Bogs site of geoconservation significance (ID 2527) is recognised as *"the most extensive organosol (peat) terrain in Australia and the Southern Hemisphere"*. This terrain underlies the 20.7 ha of buttongrass moorland communities that will be affected by the Project's headrace pipeline (Figure 5.34).

The construction and operation of the Project are unlikely to impact the extent or condition of the underlying organosols, as these flammable peats are not expected to experience changes to their fire regime as a result of the works. Furthermore, the loss of 0.002% of the one million ha Tasmanian extent will not alter the status of this organosol terrain as the most extensive in Australia and the Southern Hemisphere.

5.3.2.7 Reserves

Formal Reserves

The Project will have a direct impact on the Tarraleah Conservation Area, with 13.7 ha of the disturbance footprint located within the reserve. The PWS will undertake a parallel Level 3 Reserve Activity Assessment (RAA) for the Tarraleah Conservation Area in conjunction with the Environmental Impact Assessment process under the EMPC Act.

Within the reserve, the Project will require the clearance of up to 10.4 ha of native vegetation, most of which is wet forest dominated by *Eucalyptus tasmaniensis*. This represents approximately 1.6% of the 653.3 ha of mapped *E. tasmaniensis*-dominated native vegetation, and around 1.2% of the total native vegetation mapped within the reserve. No vegetation communities within the disturbance footprint are listed as threatened under either the NC Act or the EPBC Act. A detailed assessment of the impacts on the Tarraleah Conservation Area is provided in Appendix A.

The TWWHA will not be directly affected during either construction or operation. Given the inaccessibility and low visitation rates of many locations from which Project infrastructure may be visible, any visual impact is expected to be of low magnitude.

Informal reserves

The Project will result in the loss of approximately 98 ha of informal reserves on PTPZL or other STT-managed land (excluding 7.4 ha of informal reserves within the transmission line disturbance footprint). As of 30 June 2025, there were 124,000 ha of informal reserves on PTPZL or other STT-managed land across Tasmania, and 21,500 ha on other (non-STT-managed) public land.

The most affected vegetation communities will be dry eucalypt forest (53.3 ha excluding the transmission line) and pure buttongrass moorlands (20.7 ha). Tasmania has over one million ha of buttongrass moorland (Kitchener & Harris, 2013), so the loss of 20.7 ha—equating to 0.002% of the state's extent—is unlikely to significantly affect its reservation status.

The loss of up to 55.8 ha of eucalypt forest, up to 3.1 ha of non-eucalypt forest, and up to 20.7 ha of buttongrass moorland within informal reserves is also unlikely to materially affect the reservation status of these vegetation types.

The Project will also result in the loss of 0.5 ha of the threatened subalpine *Diplarrena latifolia* rushland (MDS) community—representing 0.083% of its 600 ha statewide extent, and 0.1% of its 498 ha extent within the Tasmanian Reserve Estate. The impact of this loss, which occurs within an informal reserve, is discussed in Section 5.3.2.1.

5.3.2.8 Tasmanian Permanent Native Forest Estate

The disturbance footprint contains 133.5 ha of native forest communities as defined in the RFA Act. Of this, 123.1 ha on a single property (PID 3384222) is proposed to be cleared and converted within a period of less than five years. Under the Tasmanian *Policy for Maintaining a Permanent Native Forest Estate* (Department of State Growth, 2017), this constitutes "broad-scale clearance or conversion."

Broad-scale clearance or conversion is prohibited unless the Minister administering the Tasmanian *Forest Practices Act 1985* determines that the project is "new significant infrastructure" of "substantial public benefit." Hydro Tasmania will seek such a determination from the Minister.

5.3.2.9 Cumulative impacts

Only one reasonably foreseeable project was identified as ecologically relevant to a cumulative impact assessment for the Project—the St Patricks Plains Wind Farm. This proposed 47-turbine, 300 MW wind farm is located on the Central Plateau, approximately 40 km north-east of the Project, 10 km south-east of Miena and 25 km north of Bothwell. It will connect via a new substation to the Palmerston–Waddamana powerlines owned by TasNetworks (ERA Planning and Environment, 2023). The St Patricks Plains Wind Farm is a Level 2 activity under the EMPC Act, a controlled action under the EPBC Act, and is being assessed as a Class 2C project under a bilateral assessment agreement. Planning approval was granted by Central Highlands Council (CHC) on 30 July 2024.

Potential cumulative impacts between the two projects relate primarily to TSP Act–listed fauna recorded at the St Patricks Plains Wind Farm site (Table 5.11), including Tasmanian devil, spotted-tailed quoll, Tasmanian wedge-tailed eagle, grey goshawk and Tasmanian masked owl. One TSP Act–listed flora species, *Barbarea australis* (native wintercress), also occurs in the region but will be avoided during Project construction and will not contribute to cumulative impacts.

For the Tasmanian devil and spotted-tailed quoll, both projects have the potential to disturb maternal dens during construction, potentially disrupting breeding, if there are any dens within 50 m of the activities. The Project's pre-construction den surveys and active den protection measures will mitigate this risk, reducing the likelihood of cumulative impacts with the St Patricks Plains Wind Farm.

No eagle nests occur within 500 m or 1 km line-of-sight of the Tarraleah Redevelopment Project (excluding the transmission line). All new Project power lines will be located within existing easements with established powerlines, or in tall forest where collision risk is lower. Recent research indicates that eagle collision risk with powerlines is highest in landscapes with a mosaic of open and closed habitats (Pay et al., 2025). With management and mitigation measures implemented, the Tarraleah Redevelopment Project is not expected to contribute to a cumulative risk to the Tasmanian wedge-tailed eagle.

Table 5.11: Threatened species with potential for cumulative impacts from both the Project and the proposed St Patricks Plains Wind Farm (ERA Planning and Environment 2023)

Potential cumulative impact	St Patricks Plains Wind Farm project impacts
Tasmanian devil (listed as endangered under the under both the TSP Act and EPBC Act)	The entire St Patricks Plains Wind Farm site is identified as potential foraging habitat for devils and quolls, and the development has the potential to impact a total area of approximately 481 ha (including both construction phase impacts and the operational footprint). A significant impact assessment concluded that the Project is unlikely to have a significant impact on Tasmanian devils and quolls.
Eastern quoll (listed as endangered under the EPBC Act)	
Spotted-tail quoll (listed as rare under the TSP Act and vulnerable under the EPBC Act)	
Tasmanian wedge-tailed eagle (listed as endangered under both the EPBC Act and TSP Act)	The key risk for wedge-tailed eagles at the St Patricks Wind Farm site is collision with wind turbine generator rotors. Surveys identified 7 eagle nests within the project site and a further 10 within 1 km of the site. Given the high occurrence of wedge-tailed eagles at the St Patricks Wind Farm, collision risks are relatively high.
Tasmanian masked owl (listed as endangered under the TSP Act and vulnerable under the EPBC Act)	Potential impacts of the St Patricks Wind Farm to the Tasmanian masked owl are related to habitat loss and potential collision with wind turbine generators. It was concluded that the risk of masked owl collision at St. Patricks Wind Farm is relatively low due to the low density of Tasmanian masked owls, occurring in suboptimal habitat and large home ranges.
Latham's snipe (listed as vulnerable under the EPBC Act)	The potential impacts of the St Patricks Wind Farm project to the Latham's snipe are related to loss of habitat and potential collision with wind turbine generators. The risk of impact at St Patricks Wind Farm is considered low.
Alpine *Sphagnum* bogs and associated fens (listed as endangered under the EPBC Act)	While Alpine *Sphagnum* bogs and associated fens were identified through desktop research as potentially occurring in the area, they were not found onsite at the St Patricks Wind Farm project site.
Native wintercress (listed as endangered under both the EPBC Act and TSP Act)	Approximately 20 *Barbarea australis* plants were identified in the St Patricks Plains Wind Farm site.
Matted lignum (listed as rare under the TSP Act)	The St Patricks Plains Wind Farm project area contains 241 isolated matted lignum plants. Four of those plants are within the construction footprint. This species occurs in riparian areas along the River Derwent and along the Nive River that may be impacted by changed spill regime associated with the Project.
Grey goshawk (listed as endangered under the TSP Act)	The risk of impacts to the grey goshawk from the St Patricks Plains Wind Farm project is considered negligible, despite one grey goshawk being observed onsite.

5.3.3 Avoidance and mitigation measures

5.3.3.1 General fauna protection measures

TB 1: Any pits and trenches (e.g. for the pipeline or underground distribution lines) will remain open for the shortest time possible and, where practicable, will not be left open during heavy rain or forecast weather events that may cause inundation. A suitably qualified person will inspect open excavations (pits and trenches) for fauna daily—within five hours after sunrise, before sunset, and prior to backfilling. Work will not commence until inspections are complete. Trapped fauna will be recorded, including location, species, and condition.

TB 2: Habitat trees (hollow-bearing trees important for arboreal mammals and hollow-nesting birds) within the disturbance footprint will be avoided as far as practicable, with a root protection buffer zone applied. The buffer radius will equal 12 times the tree's DBH.

5.3.3.2 Vegetation management measures

TB 3: A final Project disturbance footprint (within the footprint presented in this EIS) will be established based on the Project's final design and construction method. The disturbance footprint and vegetation clearing exclusion zones will be clearly shown on Project plans, communicated to all construction personnel, and physically marked on site. Vegetation clearing will be limited to the minimum necessary to construct and operate the Project. The SEMP (CM 2) will specify procedures to ensure clearance is minimised.

TB 4: Hazard trees associated with the Project's 220 kV transmission line and 22 kV distribution lines will be identified and assessed by a suitably qualified arborist prior to construction. Trees marked for removal or trimming will be checked for fauna use of hollows by a suitably qualified person before removal. If native fauna is found using hollows of trees that must be cleared, a permit to 'Take' under the TSP Act and/or NC Act will be required.

TB 5: *Diplarrena latifolia* (western flag-iris) within subalpine *Diplarrena latifolia* rushland, and buttongrass (*Gymnoschoenus sphaerocephalus*) within buttongrass moorlands in the disturbance footprint, will be stockpiled as close as possible to their original location. After construction, they will be spread back over areas no longer required for operation (DR 2).

M 7: Sites rehabilitated in accordance with the Site Rehabilitation Plan (SRP) (DR 1) will be progressively monitored during construction and for at least two years following completion, except for sites within the Tarraleah Conservation Area which will be monitored for five years post-construction, or until success criteria in the plan are achieved. Monitoring of subalpine *Diplarrena latifolia* rushland and buttongrass moorlands will be undertaken by a suitably qualified ecologist to ensure re-establishment of *Diplarrena latifolia* (western flag-iris) and *Gymnoschoenus sphaerocephalus* (buttongrass) meets the success criteria.

5.3.3.3 *Sphagnum* peatland mitigation and monitoring measures

M 8: A monitoring program will assess potential hydrogeological impacts on the *Sphagnum* peatland located ~400 m upstream (northwest) of Mossy Marsh Pond, either from changes in discharge from No. 2 Canal or groundwater changes due to tunnel construction and operation. Monitoring began in 2023 and will continue until five years after construction is completed. The program has three components: groundwater monitoring, aerial imagery, and vegetation condition assessments:

- **Groundwater monitoring:** Groundwater levels on the northwestern side of the peatland have been recorded by a piezometer installed in January 2023. Monitoring using this piezometer will continue until five years post-construction.
- **Aerial imagery:** The extent of the peatland has been monitored since September 2024 through a drone program capturing high-resolution imagery. Extent measurements will be used to assess expansion or contraction of the community and potential correlation with Project construction or operation. Drone surveys will be undertaken twice yearly—at the end of summer (when impacts from reduced rainfall and recharge are most evident) and at the end of spring (when growth is greatest). Imagery will include both photographic and thermal infrared data to map peatland extent.
- **Vegetation assessments:** Suitably qualified ecologists will undertake a formal vegetation condition assessment no more than six months before construction, to provide a current baseline beyond the December 2024 assessment. Condition will also be assessed at five years post-construction to identify any substantial change.

TB 6: An offset for potential impacts to the *Sphagnum* peatland downstream of No. 2 Canal (~400 m upstream of Mossy Marsh Pond) will be secured before construction begins. The offset will involve protecting a *Sphagnum* peatland area larger than the 3 ha Mossy Marsh patch, under a covenant and approved conservation management plan in accordance with the NC Act. It will also align with the *EPBC Act Environmental Offsets Policy* (2012) and *Offsets Assessment Guide* (2012). Hydro Tasmania has identified a suitable 9.5 ha offset site in Western Tasmania. Entura ecologists have verified this site contains high-quality *Sphagnum* peatland, listed as threatened under the NC Act and as an endangered ecological community under the EPBC Act (Alpine *Sphagnum* Bogs and Associated Fens*)*. The peatland at this site is in similarly excellent condition to Mossy Marsh. Hydro Tasmania has contracted to purchase the property on particular conditions. Registration of a conservation covenant will be pursued by Hydro Tasmania in consultation with Natural Resources and Environment Tasmania (NRE Tas).

5.3.3.4 Threatened flora management and mitigation measures

TB 7: Threatened flora exclusion zones of 5 m from the outermost plant will be established for:

- *Barbarea australis* (native wintercress) plants at the Nive River and Pump Pond wall locations.
- *Pomaderris elachophylla* (small-leaf dogwood) plants at the No. 2 Canal location and the two sites along the Lake King William to Derwent Pumps distribution line alignment.

Exclusion zones will be shown on Project plans, communicated to all construction personnel, and physically marked on site.

TB 8: If new occurrences of threatened flora are detected during construction, exclusion zones of at least 5 m from the outermost plant will be established. If avoidance is not possible, a permit to 'Take' under the TSP Act will be required.

TB 9: The final disturbance footprint for the northern transmission line (if selected) will be designed to minimise impacts on narrowleaf westringia (*Westringia angustifolia*) plants recorded at proposed sites for Towers 3 and 14. Where plants can be avoided, exclusion zones will be shown on Project plans, communicated to construction personnel, and physically marked on site. Where impacts are unavoidable, a permit to 'Take' under the TSP Act and/or the NC Act will be required.

5.3.3.5 Tasmanian devil and spotted-tailed quoll management and mitigation measures

TB 10: A suitably qualified ecologist will survey suitable denning habitat (mature dry and wet eucalypt forest) within the disturbance footprint at least 30 days before construction begins at each site. The survey will locate potential Tasmanian devil or quoll dens, including wombat burrows, and determine the occupant species and whether any are active maternal carnivore dens, in line with the *Survey Guidelines and Management Advice for Development Proposals that may impact on the Tasmanian Devil* (Environment Strategic Business Unit, 2023). Camera traps may be used to confirm activity and determine the occupant species.

- If a Tasmanian devil or quoll den is identified, management will follow the above guidelines and advice from NRE Tasmania. Where avoidance is not possible, a decommissioning plan will be prepared and a permit to 'Take' under the TSP Act and/or NC Act will be obtained.
- If an active wombat burrow is found within the disturbance footprint, it will be closed in accordance with NRE Tasmania advice, and a permit to 'Take' under the NC Act will be required.

TB 11: If an unexpected den is discovered during construction, surface works will cease at the den location. A suitably qualified ecologist will determine whether the den is used by a native or non-native animal.

- If non-native, works may continue.
- If native, no surface works will recommence within 50 m of the den until a permit to 'Take' under the TSP Act and/or NC Act is obtained.

TB 12: A RkMP will be prepared and implemented to minimise vehicle strike risk. The plan will apply to roads expected to experience a ≥10% increase in night-time traffic (defined as one hour before sunset to one hour after sunrise) due to construction. The plan will follow Caring for Nature – Reducing Roadkill guidelines (PWS, 2006) and address elevated risks for threatened species that scavenge on roadkill carcasses (Tasmanian devils, spotted-tailed quolls, eastern quolls, and Tasmanian wedge-tailed eagles). Mitigation measures will include:

- Minimising night-time construction traffic where practicable
- Reducing Project vehicle night-time speed limits by at least 10 km/hr on all roads that are expected to experience a 10% or greater increase in night-time traffic volume due to Project construction[7]
- Environmental training for site workers covering threatened species awareness, reporting procedures for vehicle strikes and roadkill, and recommended rescue procedures (e.g. reporting to Bonorong Wildlife Rescue on 0447 264 625)
- Reporting Project-related vehicle strikes and threatened species roadkill to Hydro Tasmania within 24 hours
- Investigating Project-related threatened species roadkill incidents within three working days
- Installing advisory signs in high-risk areas
- Continuing verge maintenance along Oldina Drive and Butlers Gorge Road to maintain visibility and reduce browsing
- Prompt removal of roadkill carcasses along Oldina Drive and Butlers Gorge Road, as soon as safe, to reduce scavenger attraction.

M 9: In line with the RkMP, all Project-related vehicle strikes and roadkill incidents involving threatened species (e.g. Tasmanian devils, spotted-tailed quolls, eastern quolls, eastern barred bandicoots, eagles, swift parrots) will be monitored and reported to Hydro Tasmania.

5.3.3.6 Eagle management and mitigation measures

Eagle nest searches

As at June 2025, there are no known eagle nests within 1 km of the disturbance footprint (excluding the transmission line). There are four eagle nests within 1 km of the northern transmission line option and one eagle nest within 500 m of the southern transmission line option.

TB 13: Annual eagle nest searches will be undertaken before the start of construction and repeated until construction is complete, to identify new or previously unknown eagle nests and to monitor the condition of known nests.

7 Current speed limits on roads subject to the Roadkill Management Plan are as follows:
- 100 km/h on the Lyell Highway (Butlers Gorge Road to Oldina Drive, Oldina Drive to Tarraleah Power Station, and the Tarraleah Power Station to Marlborough Road sections), Poatina Road, Bogan Road, Golden Valley Road, Highland Lakes Road – Golden Valley Road to Marlborough Road
- 80-100 km/h on two sections of Highland Lakes Road (Poatina Road to Marlborough Road; Meander Road to Golden Valley Road)
- 80 km/h on Butlers Gorge Road, Fourteen Mile Road and Marlborough Road
- 60-100 km/h on the New Norfolk to Tarraleah section of the Lyell Highway and on Exton Road
- 50-100 km/h on Saundridge Road
- 50 km/h on Palana Crescent
- 25-60 km/hr on Oldina Drive.

Searches and activity checks will follow the Tasmanian EPA's *Guide to Eagle Nest Searches and Activity Checks* (EPA Tasmania, 2023), the Tasmanian FPA's Fauna Technical Note No. 1: Eagle nest searching, activity checking and nest management (Forest Practices Authority, 2023), and the Survey Guidelines for Australia's Threatened Birds (Department of the Environment, Water, Heritage and the Arts, now DCCEEW, 2010a). Searches will be guided by the FPA's eagle nesting habitat models (FPA, 2014a).

TB 14: For all eagle nests within either 500 m or 1 km line-of-sight of proposed surface works, no surface works will occur within these buffers during the breeding season (July–January inclusive, or July—-February inclusive in late season years) unless the nest is confirmed inactive for that breeding season. Where required, nest activity checks will be undertaken during the breeding season before relevant construction works commence, and repeated annually until construction of the relevant infrastructure is complete.

An annual report summarising eagle nest search results will be prepared and provided to the EPA upon request. Any previously unrecorded raptor nests, or failures to locate previously recorded nests, will be reported to the Tasmanian Natural Values Atlas (NVA) as soon as practicable. Photographs and descriptions of known nests re-located during surveys will also be provided to the NVA as soon as practicable after each search.

Roadkill Management Plan

The RkMP (refer TB 12) will be implemented during construction to reduce the risk of vehicle strike with eagles, which are slow to take flight due to their large size.

TB 15: Anticoagulant rodenticides—especially second-generation products (SGARs: brodifacoum, bromadiolone, difethialone, difenacoum, flocoumafen)—that pose a secondary poisoning risk to raptors will be avoided during all phases of the Project, including at the new power station on the Nive River.

TB 16: The new 22 kV power distribution lines will be designed and built in accordance with TasNetworks standards, which seek to minimise electrocution risk and collision risk for avifauna.

5.3.3.7 Masked owl mitigation measures

TB15: Anticoagulant rodenticides—especially second-generation products (SGARs: brodifacoum, bromadiolone, difethialone, difenacoum, flocoumafen)—which pose a risk of secondary poisoning to raptors, will be avoided during all phases of the Project, including at the new power station on the Nive River.

5.3.3.8 Weeds and diseases mitigation measures

TB 17: A Biosecurity Management Plan will be prepared and implemented in accordance with the *Arrive Clean, Leave Clean* guidelines (Commonwealth of Australia, 2015) and the *Weed and Disease Planning and Hygiene Guidelines – Preventing the spread of weeds and diseases in Tasmania* (DPIPWE, 2015). The plan will aim to:

- Prevent the spread of weeds and diseases (e.g. *Phytophthora cinnamomi* and the chytrid fungus *Batrachochytrium dendrobatidis*), and
- Eradicate, where practicable, known declared weed infestations within the disturbance footprint prior to construction.

Targeted eradication efforts will focus on foxglove, orange hawkweed, English broom, serrated tussock and Montpellier broom.

The plan will also include training in weed and disease management for all staff, contractors, subcontractors and visitors, outlining responsibilities.

If herbicides are required, application will be undertaken only by a suitably qualified weed contractor in approved areas. Weed identification and herbicide use will be recorded by the contractor and provided to Hydro Tasmania for entry into the corporate GIS; declared weed observation records will be supplied to the Tasmanian Natural Values Atlas database.

Tasmania Parks and Wildlife Service (PWS) will be notified when weed control actions are taken within the Tarraleah Conservation Area.

M 10: Monitoring and treatment of weeds in areas disturbed by the Project will continue throughout construction and for at least two years post-construction, except for areas disturbed within the Tarraleah Conservation Area which will be monitored for five years post-construction (at six-monthly intervals). At both construction completion and two and five years post-construction, a report will be prepared demonstrating implementation of the Biosecurity Management Plan.

5.3.3.9 Residual impacts

Vegetation

The Project will result in the clearance of up to 161.1 ha of native vegetation, including up to 61.2 ha of mature eucalypt forest (i.e. not harvested in recent decades) and 0.5 ha of subalpine *Diplarrena latifolia* rushland, which is listed as a threatened vegetation community under the NC Act.

The final Project disturbance footprint and vegetation clearing exclusion zones, based on the EPC Contractor's detailed design, will be clearly marked on Project plans and on site to ensure clearing is limited to the minimum required for construction and operation. All temporary construction sites will be progressively rehabilitated upon completion of works.

Material from the *Diplarrena latifolia* rushland will be stockpiled close to its original location and spread back over the area once construction of the relevant pipeline section is complete. Revegetation and rehabilitation will be monitored to ensure re-establishment of the community with *Diplarrena latifolia* as the dominant species.

Within the Tarraleah Conservation Area, up to 10.4 ha of native vegetation (primarily *Eucalyptus tasmaniensis*-dominated wet forest) will be cleared for the surge facility, distribution power lines and one explosives magazine and its associated access track. The general vegetation management measures for the Project will apply here, ensuring clearing is minimised and temporary sites rehabilitated.

After mitigation, residual impacts on vegetation communities are not considered substantial, given the broader landscape context of production forestry and hydropower infrastructure.

Sphagnum peatland

A 3.0 ha patch of *Sphagnum* peatland (ASP) outside the disturbance footprint may be indirectly affected by hydrological changes from Project construction and/or operation. *Sphagnum* peatland is listed as threatened under the NC Act and forms part of the Alpine *Sphagnum* Bogs and Associated Fens ecological community, listed as endangered under the EPBC Act.

Groundwater conditions at the site are maintained by good groundwater supply, impeded drainage, and rainfall that keeps the water table near the surface. Hydrogeological modelling indicates that partial decommissioning of No. 2 Canal is unlikely to affect the peatland.

Tunnel excavation could temporarily lower the water table, while tunnel operation could cause localised leakage and saturation; however, the Project's hydrogeological assessment determined both scenarios unlikely due to surface water conditions and limited hydrogeological connections (fracture zones) between the tunnel and the peatland.

Given uncertainties in groundwater dynamics and potential impact magnitude, a precautionary approach has been adopted. An offset will be secured before construction, protecting an area of *Sphagnum* peatland larger than the 3 ha Mossy Marsh patch and in similar condition.

Flora

Two threatened flora species were recorded within the disturbance footprint:

- *Barbarea australis* (native wintercress), a riverine plant listed as endangered under both the EPBC Act and the TSP Act. A small population occurs on the Tarraleah Pump Pond No. 2 dam wall near the proposed pumping station. This population will be marked and protected during construction.
- *Pomaderris elachophylla* (small-leaf dogwood), a terrestrial woody shrub listed as vulnerable under the TSP Act. Plants occur along the Lake King William to Derwent Pumps distribution line and on the edge of the western portal and pipeline footprint. These plants will be marked and avoided during construction.

As a result, no residual impacts are expected on these threatened plants.

Fauna

Vegetation clearance may destroy fauna dens, while noise and vibration may disturb Tasmanian devil and spotted-tailed quoll dens within 50 m of works, including maternal dens. No known devil or quoll dens occur within 50 m of the disturbance footprint, but targeted surveys will be conducted before construction. If an unexpected den is found, work will cease until its status is determined and, if required, a permit to 'Take' under the TSP Act and/or NC Act is obtained.

Increased traffic from construction activities (e.g. along Butlers Gorge Road and the Lyell Highway) poses a risk of vehicle strike to threatened species such as Tasmanian devil, spotted-tailed quoll, and the Tasmanian wedge-tailed eagle. A RkMP will be implemented on all roads expected to experience a ≥10% increase in night-time traffic (defined as one hour before sunset to one hour after sunrise). Measures will include:

- Minimising night-time traffic where practicable
- Reducing construction vehicle speeds,
- Promptly removing roadkill carcasses to reduce scavenger attraction, and
- Recording threatened fauna strikes to support adaptive management.

There is no potential for construction-related noise or vibration to affect freshwater or marine fauna.

5.4 Aquatic biodiversity and natural values

A detailed freshwater values assessment was undertaken to survey and verify aquatic habitat and aquatic and riparian communities within and surrounding the Project area. The assessment was conducted between October 2018 and October 2024 and included:

- Hydrological and hydraulic modelling to describe current and proposed flow regimes and their impact on instream and riparian habitats
- Collation of desktop information (river health data, species, habitats, flow regime, and fluvial geomorphology)
- Field surveys to identify and verify aquatic habitats and communities
- Impact analysis of construction and operation on habitat and biological values
- Mitigation and monitoring measures to address potential impacts.

The assessment is documented in Appendix G (including survey methods) and summarised in this Chapter. Survey methods were consistent with those used by the Water Management Branch of NRE Tasmania, and the development of environmental flow mitigation followed best practice for holistic environmental flow assessments (see Section 4 in Appendix G for details).

5.4.1 Existing environment

5.4.1.1 Project area overview

The Derwent Catchment covers approximately 8,800 km^2 in southeast and central Tasmania. The River Derwent, Tasmania's second-longest river, originates at Lake St Clair and flows southeast for about 187 km to New Norfolk, where it enters the Derwent Estuary.

A 23 km section of the river lies within the TWWHA, beginning just below Derwent Pumps Weir, with the downstream boundary about 2.8 km upstream of Wayatinah Lagoon.

The river and its tributaries are heavily modified for hydroelectric power, with 21 storages and multiple dams and diversions (Figure 5.43):

- The headwaters begin at Lake St Clair, regulated by St Clair Dam, before flowing southeast for 5 km to Lake King William, formed by Clark Dam. From here, water is diverted to Tarraleah Power Station and into the Nive River shortly before it enters Lake Liapootah. The Nive River continues downstream of Liapootah Dam for ~9 km to Wayatinah Lagoon.
- The River Derwent continues downstream of Clark Dam for ~31 km southeast past Derwent Pumps Weir to Wayatinah Lagoon.
- Downstream of Wayatinah Lagoon, the river runs southeast for 6 km to Lake Catagunya. Water from Wayatinah Lagoon is diverted through Wayatinah Power Station into Lake Catagunya.
- The flow regime below Clark, Wayatinah, and Liapootah dams, apart from occasional spills, is derived from tributary inflows.
- Aside from a narrow channel of low baseflow, much of the riverbed in these reaches is dry or consists of long sections of pool/run habitat.
- For the River Derwent downstream of Clark Dam, the Counsel River and Beech Creek (entering ~22 km downstream) are the only major tributaries contributing a more natural, higher flow regime.
- There are no significant tributaries entering the River Derwent downstream of Wayatinah Dam, or the Nive River downstream of Liapootah Dam.
- The river sections bypassed by these diversions lie in steep, narrow valleys disconnected from wetlands and floodplains.

The flow and habitat summary for waterbodies associated with the Project area is provided in Table 5.12. A detailed description of the existing physical and biological environment for the study reaches, including streams within the disturbance footprint, is provided in Appendix G—Sections 6.1 to 6.6.

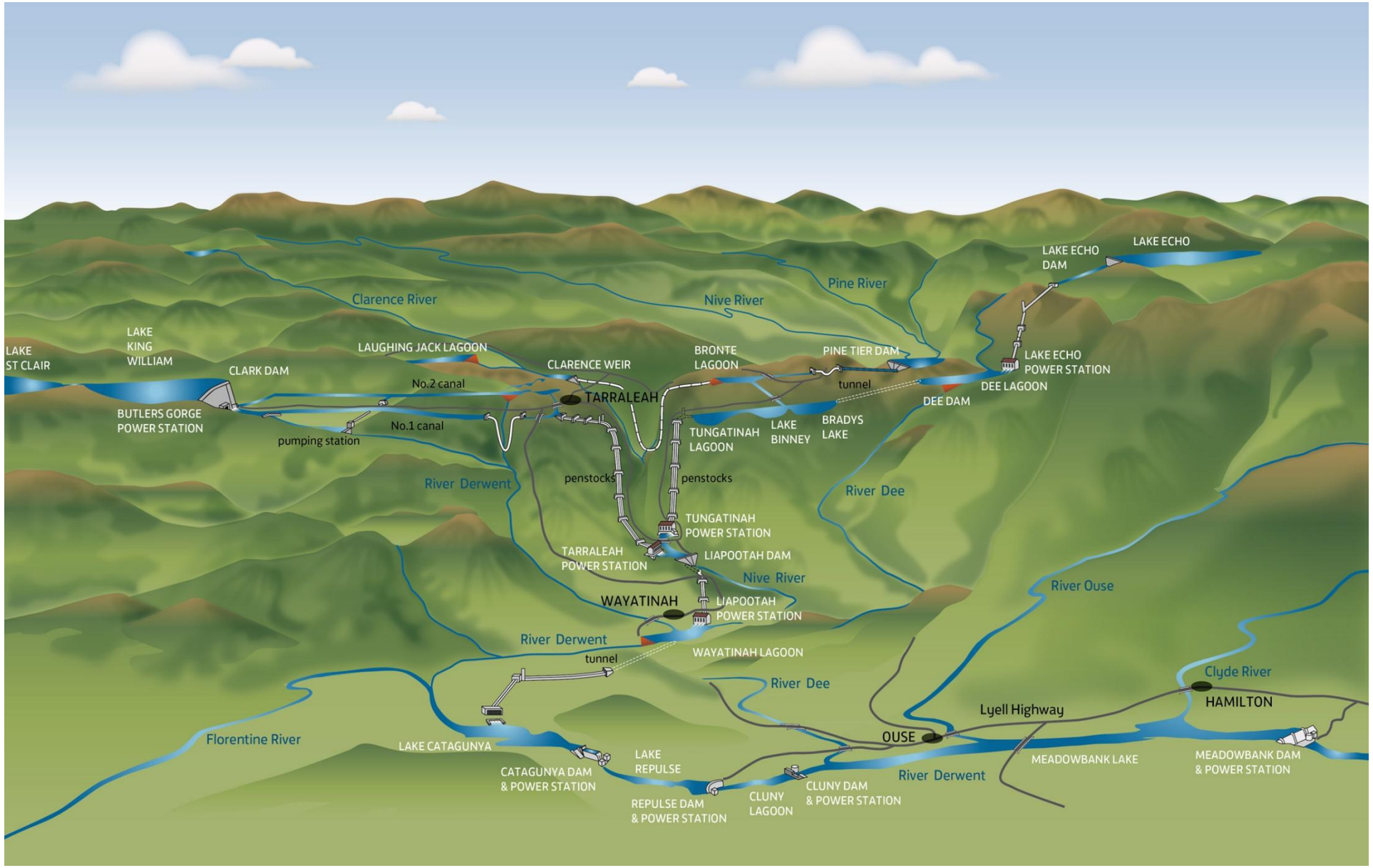


Figure 5.43: Schematic of the Derwent Hydropower Scheme

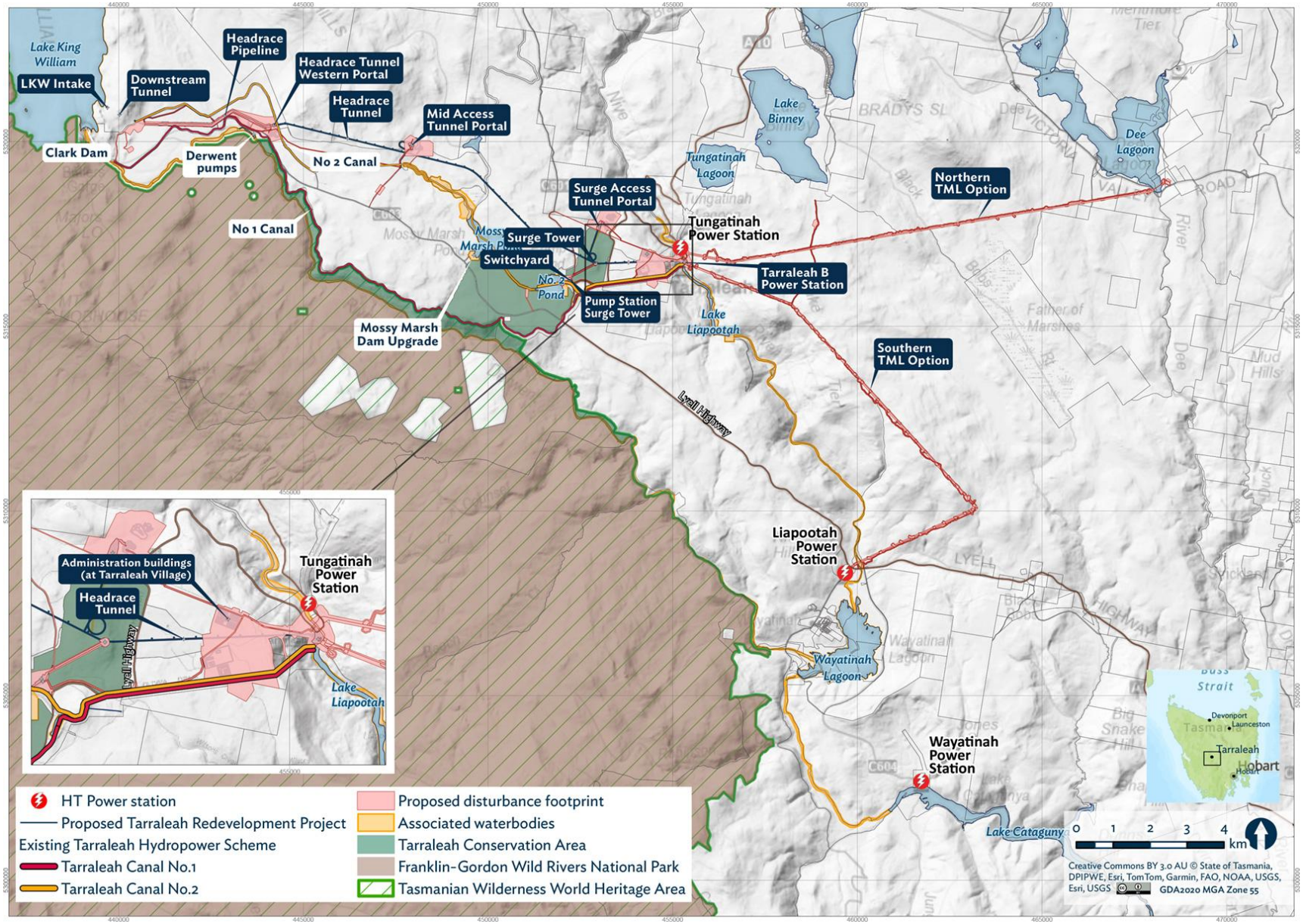


Figure 5.44: Overview of the Project showing the existing infrastructure, disturbance footprint, associated waterbodies and conservation areas

Table 5.12: Flow and habitat summary for associated waterbodies of the Project. Rows shaded green encompass all the reaches within the TWWHA

Reach	Length (km)	Existing flow regime	Flow habitats	Dominant substrate	Influence on habitat
River Derwent downstream of Clark Dam to Wayatinah Lagoon					
Clark Dam to Derwent Pumps Weir	6	Mainly low baseflow from minor tributaries, occasional higher flows from dam spill	Low gradient, mainly long, slow run habitats and pools	Bedrock and boulder	Lack of high flows allows dense biofilms to accumulate on the benthos, significantly degraded
Derwent Pumps Weir to Counsel River	16	Tributary inflow accumulates with distance downstream to restore baseflow and small higher flow events; however, largest flow events from dam spill	Low to moderate gradient, long slow runs and pools with small sections of riffles and short cascades	Bedrock, boulder and cobble	Lack of high flows allows dense biofilms to accumulate on the benthos, significantly degraded
Counsel River to Wayatinah Lagoon	9	Significant tributary inflow and more natural flow regime variability including peak flows but largest flow events still from dam spill	Moderate gradient, all flow habitats present	Bedrock to pebble, but mainly bedrock, boulder and large cobble	Tributary input provides scouring flows, dense biofilms are less apparent, relatively healthy in terms of habitat condition for macroinvertebrates and freshwater crayfish. Good habitat for platypus
River Derwent downstream of Wayatinah Lagoon to Lake Catagunya					
Wayatinah Dam to Lake Catagunya	6	Very low baseflows as minor tributary inflows	Low gradient, mainly long slow runs and pool, occasional short riffle sections present	Bedrock, boulder and cobble	Lack of high flows allows dense biofilms and mats of filamentous algae to accumulate on the benthos, significantly degraded
Nive River from Tarraleah Power Station to Wayatinah Lagoon					
Nive River downstream of Tarraleah Power Station to Lake Liapootah	~0.3	Significant prolonged high discharge from Tarraleah Power Station, regulated by Pine Tier Lagoon upstream	Moderate gradient, fast riffle and run habitats	Boulder and cobble	High power station discharge provides armoured riverbed
Nive River downstream of Lake Liapootah	9	Minor tributary inflows with occasional spill events	Low gradient, mainly long slow runs and pools, occasional riffles present at breaks in slope at river bends	Boulder to pebble	Channel bed mostly dewatered, very little flow regime variability in the wetted sections, significantly degraded

5.4.1.2 Listed species

Flora

Native wintercress (*Barbarea australis*) is a riparian, flow-dependent plant species listed as endangered under the TSP Act and EPBC Act. Surveys recorded *B. australis* in the Nive River upstream of Liapootah Dam (the reaches upstream of Tungatinah Power Station); downstream of Liapootah Dam to Wayatinah Lagoon; and in the River Derwent downstream of Wayatinah Lagoon to Lake Catagunya (Figure 5.45). This species has previously been recorded in these locations (Appendix G—Section 6.5); however, *B. australis* was not recorded in the River Derwent downstream of Clark Dam to Wayatinah Lagoon in the surveys conducted for the Project, and this species has not been recorded in this reach since 2001.

Barbarea australis was also recorded during water quality surveys in 2023 on the dam wall of Tarraleah No. 2 Pond, which is within the Project disturbance footprint (refer Appendix G—Section 6.5).

Three other threatened flora species listed under the TSP Act were recorded within the riparian area of the River Derwent during surveys for *Barbarea australis*: narrowleaf westringia (*Westringia angustifolia*), matted lignum (*Muehlenbeckia axillaris*) and Mount Mawson pine (*Pherosphaera hookeriana*):

- Narrowleaf westringia (*Westringia angustifolia*), listed as rare under the TSP Act, was recorded at three locations along the River Derwent, comprising one plant at each location. This species is often found growing in open, disturbed habitats.
- Matted lignum (*Muehlenbeckia axillaris*), listed as rare under the TSP Act, was recorded at one location along the River Derwent between Clark Dam and Wayatinah Lagoon. This species is often found growing between boulders and on cobble banks on the river edge. It is not intrinsically linked to flow regimes but appears to be a poor competitor and needs open ground to establish.
- Mount Mawson pine (*Pherosphaera hookeriana*), a small conifer endemic to Tasmania and listed as vulnerable under the TSP Act, was recorded along a bank in a single location (11 plants). This species grows in woodland, heath and scrub, typically in areas near watercourses and waterbodies (Threatened Species Section, 2016a).

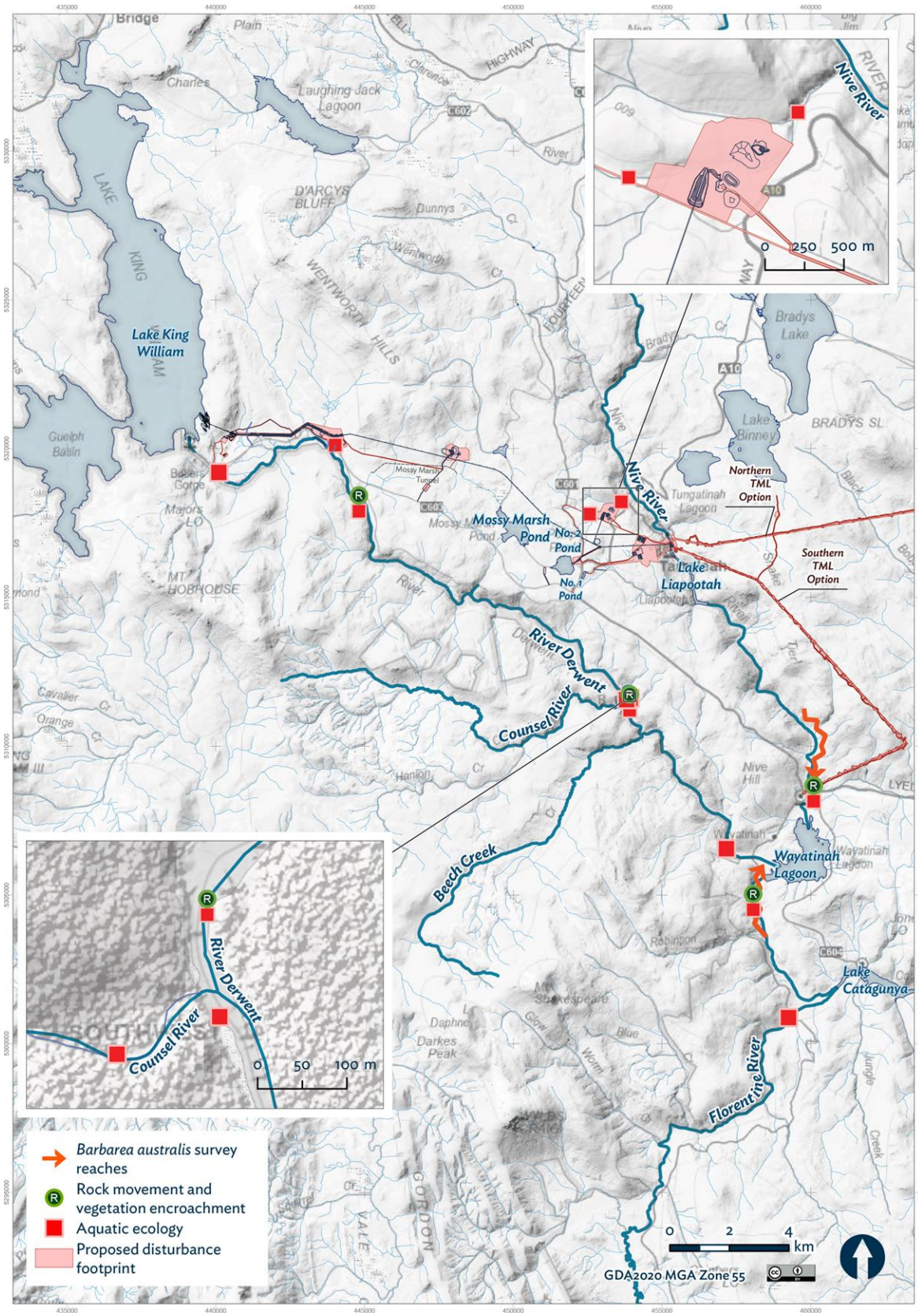


Figure 5.45: Reaches surveyed for *Barbarea australis* for the Project; observations during surveys for the Project and historic records

Fauna

The Clarence galaxias (*Galaxias johnstoni*) was identified as potentially present in the Project area through the Protected Matters Search Tool (PMST) based on records within a 5 km buffer of the Project area. This species is listed as endangered under the TSP Act and the EPBC Act.

Fish surveys were undertaken as part of the surveys for the Project; however, there is no potential for this species to be present in the waterways potentially affected by the Project. This assessment is based on the ecology of the species, its known distribution, and its vulnerability to introduced fish species, which are present throughout the waterbodies associated with the Project. Senior staff at Tasmania's Inland Fisheries Service (IFS) were consulted and agreed with this assessment (refer Appendix G—Section 5.1.1.1).

No other fauna species were identified as present or potentially present on the NVA or PMST tool. Based on known distributions, there is a very low likelihood of any other threatened aquatic fauna species occurring within the disturbance area of the Project.

5.4.1.3 Protected areas - Tasmanian Wilderness World Heritage Area (TWWHA)

The River Derwent enters the TWWHA immediately downstream of Derwent Pumps Weir (located 6 km downstream of Clark Dam) and continues for approximately 23 km, with the downstream boundary about 2.8 km upstream of Wayatinah Lagoon (Figure 5.44). The TWWHA is inscribed on the World Heritage List under four natural criteria (vii, viii, ix, x) and three cultural criteria (iii, iv, vi), described in detail in Section 5.2.1 of Appendix G.

A summary of aquatic values for the River Derwent within the TWWHA is provided in Section 5.4.1.5, with further detail in Sections 5.2 and 6.1 of Appendix G.

5.4.1.4 Threatened native vegetation communities

The only threatened aquatic vegetation community identified through online searches is *Sphagnum* peatland (ASP). This community is listed as rare under the NC Act and occurs in association with Mossy Marsh Pond. *Sphagnum* peatland is also listed as an endangered ecological community under the EPBC Act. Further detail is provided in Section 5.3.

5.4.1.5 Species classified as of Conservation Significance in Tasmania

- Species of special conservation significance include those with restricted distributions, high sensitivity or vulnerability to threats, and/or primitive species considered evolutionary relics that do not qualify for listing under the TSP Act or EPBC Act.
- In Tasmania, the platypus (*Ornithorhynchus anatinus*) is protected under the *Wildlife Regulations 2010* and the NC Act. Platypus are widespread and common in Tasmania; however, their conservation status is difficult to assess as population abundance is not readily measured across the state.
- The native freshwater crayfish *Astacopsis tricornis* and 26 species of freshwater macroinvertebrates occurring in the River Derwent catchment are classified as species of conservation significance due to being endemic to Tasmania, or to Tasmania and restricted areas of mainland Australia.
- None of the species listed as of conservation significance have restricted distributions within Tasmania.

5.4.1.6 Streams within the disturbance footprint

Waterways within the disturbance footprint include eleven stream crossings along tributaries of six small unnamed streams. Of these, four streams are intersected within the disturbance footprint of the headrace pipeline and western portal, one flows through the Paddy's Quarry spoil site, and one flows through the disturbance footprint adjacent to Tarraleah Village.

Streams 1-4: Headrace pipeline and western portal (Crossings C1-9)

The headrace pipeline alignment crosses nine stream channels, which feed into four unnamed tributaries of the River Derwent. Streams 1–3 enter the river upstream of the Derwent Pumps Weir, while Stream 4 joins downstream of the weir. Stream 1 is currently used for baseline water quality monitoring, with data indicating typical, unimpacted conditions for the Upper Derwent catchment.

Aquatic macroinvertebrates are the most widespread fauna in these streams, with flow-obligate species in riffle habitats and edge/backwater species present in lower-gradient sections. The community composition is likely similar to that recorded in River Derwent sampling sites (Appendix G—Section 6.1.5). Macroinvertebrate surveys will also be undertaken in Stream 4 prior to and during construction to monitor potential water quality impacts, while fish surveys will be conducted to establish a baseline dataset.

The larger channels (C1, C2, C5, C6 and C9) provide suitable habitat for platypus (*Ornithorhynchus anatinus*), freshwater crayfish (*Astacopsis tricornis*), introduced brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*). Native fish, which may be present in low numbers, include climbing galaxias (*Galaxias brevipinnis*) and short-finned eels (*Anguilla australis*), the latter present only through occasional stocking of lakes in the broader catchment. The aquatic macrophyte (*Isolepis fluitans*) was also observed in the lower gradient sections of most channels.

The smaller crossings (C3, C4, C7, C8 and C11) are on ephemeral drainage lines that provide only temporary aquatic habitat for macroinvertebrates, fish and platypus (Appendix G—Section 6.6). *Astacopsis tricornis* is unlikely to occur in these first-order streams due to the limited availability of rocky substrate.

Stream 1 (Crossing 1 – 3)

The disturbance footprint of the headrace pipeline crosses three channels on Stream 1. Channels C1 and C2 become second-order, likely permanent streams that flow through a mosaic of tea tree (*Leptospermum lanigerum*) scrub, dry eucalypt forest and woodland, and buttongrass moorland. The riparian zone is intact except for clearing associated with Butlers Gorge Road and No. 1 Canal. These channels are low gradient with alternating rocky and soft sediment substrates. C3 is likely an ephemeral channel that provides only temporary aquatic habitat.

All three channels pass through culverts beneath No. 1 Canal. These culverts are likely passable to fish and platypus as there are no elevated perches at either end. Stream 1 enters the River Derwent approximately 1.9 km upstream of Derwent Pumps Weir.

The Conservation of Freshwater Ecosystem Values (CFEV) Database assigns a Conservation Management Priority Potential (CMPP2) rating of moderate to C1 and C3 (C2 is not mapped), based on medium land security and a low to moderate Integrated Conservation Value (ICV). Special values mapped for these crossings[8] included the potential for highland grassy sedgeland (MGH), a threatened flora community in Tasmania; however, field surveys confirmed that MGH is not present in the catchment of the headrace pipeline (Appendix B). The final segment of Stream 1 has a very high CMPP2 due to the potential presence of *Eucalyptus rodwayi* forest which is an RFA Act priority community in Tasmania. *Eucalyptus rodwayi* was recorded in this area during flora surveys for the Project (Appendix B).

8 Other than platypus which are mapped as potentially present for all stream sections in Tasmania.

Stream 2 (Crossing 4 – 5)

Stream 2 enters the River Derwent approximately 670 m upstream from Derwent Pumps Weir. Two headrace pipeline crossings present on Stream 2:

- C4 is a small, first-order drainage line that is likely ephemeral.
- C5 is a second-order stream with a relatively large catchment, located just upstream of Butlers Gorge Road.

Stream 2 flows through a riparian setting similar to Stream 1 but with a steeper gradient. It supports a diverse range of flow and channel forms, with substrates transitioning from boulder, cobble, and pebble in riffle sections to pebble, gravel, and coarse sand in lower gradient runs. No culverts are present. These features provide diverse habitat for aquatic macroinvertebrates, macrophytes, fish, platypus, and *A. tricornis*.

The CFEV classifications for naturalness appear inaccurate for C4 and C5 as both are assessed as significantly altered despite field observations showing they are in relatively natural condition. Accordingly, the CMPP2 rating is moderate for C4 and low for C5. The final segment of Stream 2, by contrast, has a very high CMPP2, reflecting a high naturalness score and the verified presence of *Eucalyptus rodwayi* forest (an RFA Act priority community) in this area (Appendix B).

Stream 3 (Crossing 6)

Stream 3 enters the River Derwent a few metres upstream of Derwent Pumps Weir. The headrace pipeline crosses the main branch of this third-order stream at C6. The instream habitat is similar to that of the lower reaches of Stream 2.

A series of steep piped culverts extend from immediately upstream of its confluence with the River Derwent to Butlers Gorge Road. Each culvert has a perched drop of 0.3–0.5 m from the outlet to the stream bed, likely forming an impassable barrier to brown trout (*Salmo trutta*); however, native climbing galaxias (*Galaxias brevipinnis*), if present, and short-finned eels (*Anguilla australis*) would be capable of passing through or around these culverts.

Within the reach intersected by the headrace pipeline, the aquatic community is likely to include macroinvertebrates, *A. tricornis* and potentially platypus, climbing galaxias and short-finned eels.

Although the CFEV database assigns Stream 3/C6 a high CMPP2, this appears inconsistent with field observations, as the mapped values (including *Eucalyptus rodwayi* forest and highland grassy sedgeland are not both present in the vicinity of the headrace pipeline. Field surveys confirmed the absence of highland grassy sedgeland.

Stream 4 (Crossing 7 – 9)

The headrace pipeline and western portal disturbance footprint crosses the main branch of Stream 4 (C7) and two minor drainage lines (C8 and C9). The main branch dissects the proposed western portal construction site and spoil emplacement area. While the main branch may have permanent flow, both C8 and C9 are ephemeral, and were observed dry during the September 2024 site visit despite significant rainfall in the preceding week.

In the vicinity of the western portal, the main branch is a low-gradient channel dominated by fine sediments within a moorland, sedgeland and rushland setting. Higher gradient, rocky habitats are present downstream from Butlers Gorge Road where the channel runs alongside the Derwent Pumps pipelines to its juncture with the River Derwent a short distance downstream from Derwent Pumps Weir.

The steep section of the creek immediately upstream from its junction with the River Derwent may be impassable to brown trout. The aquatic values described for Stream 3 are likely to be present in Stream 4, although most of the habitat is probably sub-optimal for *A. tricornis* due to the dominance of fine substrates.

Stream 4 is not mapped in the CFEV database but its characteristics suggest a classification similar to Stream 3.

Stream 5: Surge facility and Paddy's Quarry spoil emplacement area (Crossing C10)

The proposed surge facility, Paddy's Quarry portal, and associated spoil emplacement area intersect the main branch of Stream 5 (C10), a third-order tributary of the Nive River. The riparian zone, comprising wet eucalypt forest, woodland, and *Acacia dealbata* forest, has been partially cleared within the existing quarry footprint.

Within Paddy's Quarry, the stream is a high-gradient reach characterised by riffle and run habitats dominated by cobble, pebble, and gravel substrates. Downstream, the creek descends through a steep river valley for approximately 750 m before entering the Nive River, 2.4 km upstream of Tarraleah Power Station.

The lower reaches of Stream 5 feature several waterfalls that are likely impassable to brown trout. Aquatic values in the vicinity of Paddy's Quarry primarily comprise macroinvertebrates, platypus, and freshwater crayfish (*Astacopsis tricornis*), with climbing galaxias and short-finned eels also potentially present.

Crossing C10 and the last reach of Stream 5 have a high CMPP2 rating, reflecting the combination of high naturalness scores, moderate to high ICV scores, and a medium land security rating.

Macroinvertebrate sampling will be undertaken in Stream 5 prior to and during construction to monitor potential water quality impacts from Project activities. Baseline fish surveys will also be conducted to establish species presence.

Stream 6: Tarraleah Village (Crossing C11)

Tarraleah Village lies across a drainage line of Stream 6, a tributary of Wilsons Creek and ultimately the Nive River. The drainage line passes through a cleared paddock and provides no aquatic habitat. A small, piped culvert carries flow beneath Oldina Drive, discharging into Stream 6, which continues for approximately 1.5 km before entering Wilsons Creek. Wilsons Creek flows for a further 1.5 km before discharging to Lake Liapootah.

Stream 6 shows signs of eutrophication, with an extensive biomass of filamentous algae observed during the site visit. The riparian zone is minimal where the stream passes by sewage treatment ponds, and the channel substrate is dominated by gravels, coarse sands, and fines. The stream becomes progressively steeper before entering Wilsons Creek, which flows through a steep valley to Lake Liapootah. Macroinvertebrates are the primary aquatic values likely to occur in Stream 6.

Wilsons Creek has an intact riparian zone along its northern bank, while the southern bank is bordered by logging coupes. Logging activities are likely to have affected aquatic habitat quality in this creek.

The CFEV database assigns Stream 6 a medium CMPP2, reflecting low land security, moderate ICV, and a medium naturalness score; however, the naturalness score is likely inaccurate, as Stream 6 is severely altered from its natural condition. Wilsons Creek is assigned a very high CMPP2, reflecting low land tenure security and a high ICV due to its classification as a palaeobotanical site.

5.4.1.7 Wetlands within the disturbance footprint

CFEV mapping identifies five wetlands within the disturbance footprint of the headrace pipeline and western portal, and two wetlands adjacent to the upstream and downstream ends of Mossy Marsh Pond; however, TASVEG (4.0) does not map any of these areas as wetlands.

Flora surveys for the Project confirmed that the areas within the headrace pipeline and western portal are mapped as eastern buttongrass moorland (MBE), while the areas adjacent to Mossy Marsh Pond are mapped as *Leptospermum lanigerum* scrub (SLL).

The only wetland community present within the disturbance footprint is *Sphagnum* peatland (ASP), located adjacent to Mossy Marsh Pond. This community is discussed further in Section 5.3.

5.4.1.8 Rivers and storages

River Derwent downstream of Clark Dam to Wayatinah Lagoon

Twenty-three km of the 31 km reach of the River Derwent downstream of Clark Dam to Wayatinah Lagoon is within the TWWHA which extends from directly downstream of Derwent Pumps Weir to approximately 2.8 km upstream of Wayatinah Lagoon. Flow regulation has significantly altered sediment transport and resupply, channel morphology and the condition of the biological communities. The impacts of regulation are most severe in the upper two thirds of the reach (including the first 16 km of the 23 km of river which lies within the TWWHA) which are upstream of the Counsel River inflow.

The impacts of flow regulation and reduced sediment transport have also affected the baseline health of aquatic communities in this reach. Freshwater macroinvertebrate communities are widely used as indicators of river condition because they are sensitive to short and long-term changes in habitat quality. Flow-induced changes are the key driver of aquatic habitat in rivers and streams. AusRivAS sampling, undertaken at five sites in this reach since 2019, has demonstrated impaired river condition scores at three sites in the upper and middle reaches of the river; however, river health scores have consistently been in reference condition for the two sites which are downstream of the Counsel River inflow. These findings are consistent with the hydrology, geomorphology and aquatic habitat assessments which concluded that flow, sediment dynamics and habitat conditions improve substantially downstream from the Counsel River.

The diversity of native riverine fish in Tasmania is limited upstream of large instream barriers because most are obligatory migratory species, needing free access to and from the marine to freshwater environment to complete their life histories. The only native fish recorded in this reach was the short-finned eel (*Anguilla australis*), which is an obligatory migratory species and is only present through occasional stocking of storages by the IFS. The climbing galaxias (*Galaxias brevipinnis*) can form self-sustaining populations upstream of dams and were recorded in this reach in 1965 but were not recorded during surveys for the Project. Introduced brown trout (*Salmo trutta*) were by far the most abundant species recorded and are known to outcompete and predate on native fish species (refer Appendix G—Section 6.16).

Listed values and species of conservation significance

No listed aquatic species have been recorded in the reaches of the river within the TWWHA, either historically or during the surveys for the Project. Based on the known range of listed aquatic species in Tasmania, it is also highly unlikely that any occur. Freshwater species of conservation significance in Tasmania, such as the platypus (*Ornithorhynchus anatinus*), which is phylogenetically distinct, and several endemic invertebrate species, are present in this reach (refer Appendix G—Section 6.1).

Three state-listed riparian species have been recorded in the TWWHA reaches: the endemic Mount Mawson pine (*Pherosphaera hookeriana*) and narrowleaf westringia (*Westringia angustifolia*), both listed under the TSP Act, and the matted lignum (*Muehlenbeckia axillaris*), listed as rare under the TSP Act.

The flow-dependent riparian plant native wintercress (*Barbarea australis*) was recorded at the bottom of this reach, downstream from the TWWHA boundary, in 2000 and 2001. *B. australis* was not found in this reach during surveys for the Project; however, patches of suitable habitat remain, and nearby populations occur in the River Derwent downstream of Wayatinah Lagoon and in the Nive River upstream of Wayatinah Lagoon.

Surveys for the Project also recorded several species classified as significant in Tasmania (refer Appendix G—Section 6.1):

- Platypus (*Ornithorhynchus anatinus*), classified as a species of conservation significance in Tasmania as a phylogenetically distinct fauna species.
- The endemic Tasmanian freshwater crayfish (*Astacopsis tricornis*).
- 26 species of freshwater macroinvertebrates, endemic to Tasmania or with a reduced range in Australia (none restricted in distribution within Tasmania).

River Derwent downstream of Wayatinah Lagoon to Lake Catagunya

The River Derwent, Nive River, and outflow from Liapootah Power Station feed into Wayatinah Lagoon, a hydropower storage created by Wayatinah Dam. Most of this water is diverted to Wayatinah Power Station, which discharges into Lake Catagunya downstream. When the lagoon exceeds its full supply level (FSL), excess water spills into a 6 km stretch of the original River Derwent channel between Wayatinah and Catagunya Lagoons. This stretch has a narrow catchment with minor tributaries, including Robinson Creek, and experiences significant flow only during spill events, as there are no baseflow releases and only minor dam leakage. Consequently, most of the reach consists of long pool and run habitats with short, narrower riffles (Appendix G—Section 6.2).

As in the reach downstream of Clark Dam, flow regulation and reduced sediment transport and resupply have significantly impacted aquatic habitat and communities. AusRivAS scores indicate impaired condition, particularly for the pool and slow run habitats that dominate this reach.

Brown trout (*Salmo trutta*) were the only fish species recorded. The pest species redfin perch (*Perca fluviatilis*) is known to occur in Wayatinah Lagoon and all of the storages downstream, and is likely also present in this reach. Native river blackfish (*Gadopsis marmoratus*) have also been recorded in Lake Catagunya and may occur in this reach as well.

Listed values and species of conservation significance

No listed aquatic fauna species were recorded in this reach, and none are expected to occur based on known distributions. The flow-dependent riparian plant, native wintercress (*Barbarea australis*), which is protected under the EPBC Act and TSP Act, is present in the broader area as discussed in Section 5.3 and detailed in Appendix G—Section 6.5.2.2.

Ten species of freshwater macroinvertebrates were recorded that are classified as of conservation significance in Tasmania because they are endemic or have a restricted range in Australia. Neither platypus nor *A. tricornis* were observed during surveys but both are likely to be present.

Nive River

Potential construction impacts are largely confined to a 2.7 km reach of the Nive River upstream of Liapootah Dam. This section extends from the confluence with Stream 5 to the river's entry into Lake Liapootah, immediately downstream of the Tarraleah Power Station tailrace. Stream 5 may be affected during construction due to spoil emplacement at Paddy's Quarry, while the lower end of this Nive River reach could be impacted by construction of the new power station.

Operational impacts of the Project are limited to the 9 km reach of the Nive River downstream of Lake Liapootah, where potential changes in the annual spill pattern from Liapootah Dam may influence sediment movement and aquatic habitats.

Upstream of Liapootah Dam

Aquatic values in the ~670 m reach of the Nive River downstream of Tungatinah Power Station are affected by the high discharge from the station, typically 40–50 m^3/s. No macroinvertebrate sampling has been undertaken in this reach; however, reaches immediately downstream of power station discharges generally show low abundance, low diversity, and poor river condition scores. The high flows in this section are also likely to provide poor habitat for fish and platypus.

The 2.1 km reach upstream from Tungatinah Power Station to the confluence with Stream 5 is regulated by Pine Tier Dam, which has reduced the natural flow regime. With only small tributary inflows over the 30 km downstream of Pine Tier Dam, this section has low baseflows for much of the year, although higher flows occur during winter and spring. Previous macroinvertebrate river health monitoring at a site just upstream of Tungatinah has reported variable scores, ranging from equivalent to reference condition to significantly impaired.

Fish populations in the Nive River upstream of Lake Liapootah are likely dominated by introduced brown trout, although short-finned eels may be present due to occasional stocking of nearby lakes. The pest species redfin perch has not been recorded upstream of Lake Liapootah but is present in Bradys Lake, Lake Binney, and Tungatinah Lagoon, all of which drain into the Nive River.

Downstream of Liapootah Dam

Flow regulation has significantly altered aquatic habitats in this 9 km reach. Aside from occasional dam spills, all flow is derived from minor tributary inflows that maintain a small baseflow. As a result, most of the channel remains dry except for a narrow wetted strip and occasional wider pools (Appendix G—Section 6.3).

Unlike the regulated reaches of the River Derwent, this section of the Nive River has retained a mobile riverbed with a range of substrate sizes from small gravels to large cobbles and boulders; however, much of the aquatic habitat appears degraded, particularly pool habitats, due to the reduced flow regime. AusRivAS condition scores support this assessment: a long-term riffle site has frequently reported impaired condition, while edge habitats sampled since 2019 have consistently fallen within the significantly impaired band.

Fish surveys recorded abundant introduced brown trout, redfin perch, and a single short-finned eel.

Listed values and species of conservation significance

No listed aquatic species were recorded in these reaches, and none are expected to occur based on known distributions. The flow-dependent riparian plant species, native wintercress (*Barbarea australis*), which is protected under the EPBC Act and TSP Act, is present in the Nive River both upstream and downstream of Liapootah Dam, as discussed in Section 5.4.1.2 and in detail in Appendix G—Section 6.5.2.3.

Seven species of freshwater macroinvertebrates were recorded at the monitoring site downstream of Liapootah Dam. These are classified as species of conservation significance in Tasmania because they are either endemic or have a restricted range in Australia. No platypus or A. *tricornis* were observed during the surveys; however, both species are likely to occur in the reaches upstream and downstream of Liapootah Dam.

Mossy Marsh, No. 2 and No. 1 ponds

The ponds associated with the existing Tarraleah Power Scheme are all artificial waterbodies with relatively stable water levels. Mossy Marsh Pond is directly connected to No. 2 Pond via Mossy Marsh Canal, while water from No. 2 Pond enters No. 1 Pond via No. 2 Canal.

Mossy Marsh Pond is a shallow waterbody (up to 3 m deep) with abundant submerged dead trees and thick organic sediments. The shoreline is densely vegetated with no exposed banks, indicating a stable water level for over 50 years. Dense aquatic plant (macrophyte) beds occur along the northern and eastern shores, consisting of species in the genera *Myriophyllum*, *Isolepis*, *Potamogeton*, *Triglochin* and *Juncus*. The remaining shorelines consist mainly of bare, organic-rich sediment with abundant dead, submerged standing and fallen trees.

No. 2 Pond has fewer organic sediments and macrophyte beds than Mossy Marsh Pond, with vegetation mostly restricted near the western inflow and southern stormwater inflow. The pond bed is mostly coarse material overlain with fine, iron-rich silt, and contains fallen and standing submerged dead trees throughout.

The macroinvertebrate fauna in Mossy Marsh and No. 2 Pond is typical of still-water habitats with aquatic macrophytes. Hemipterans, caddisflies (Trichoptera), damselflies and dragonflies (Odonata), and dipterans were the most common taxa. Fish abundance was low during the surveys, with brown trout and short-finned eels recorded. Climbing galaxias were recorded in Mossy Marsh Pond in 1961 and may still be present.

Listed values and species of conservation significance

There are no listed aquatic species previously associated with these ponds, none were recorded during surveys for the Project, and none are predicted to occur based on known distributions. *Barbarea australis* was recorded on an isolated section of the dam wall of No. 2 Pond in 2023 (Appendix G—Section 6.4).

No platypus or *A. tricornis* were recorded but these species are likely to be present in all the ponds.

No. 1 Pond is a narrow, canal-like waterbody (50–70 m wide, 1.8 ha area) connecting No. 1 Canal and the outflow from No. 2 Pond to the Tarraleah Power Station. It has concrete and rock-lined banks and limited structural diversity. No fish or macroinvertebrate sampling was conducted in No. 1 Pond.

None of the ponds are mapped as wetlands or waterbodies in the CFEV database.

Lake Liapootah

Lake Liapootah is a 2.5 km long storage that begins a short distance downstream from the discharge of the Tarraleah Power Station and ends at Liapootah Dam. The lake is situated in a steep valley vegetated with wet eucalypt forest and woodland to the water's edge. It is narrow—only 40 to 60 m wide along most of its length—and the shorelines are generally very steep. Lake Liapootah has a 3.5 m operating range, with levels often fluctuating by more than 2 m daily. Water from the storage is diverted to Liapootah Power Station, with spills to the Nive River downstream of Liapootah Dam occurring approximately 7% of the time under current operation.

Aquatic macroinvertebrates are expected to be the main natural aquatic value in Lake Liapootah; however, sampling of other hydropower storages in Tasmania with frequent and large water-level changes demonstrates very low diversity and abundance of macroinvertebrates. Frequent and large fluctuations in water levels affect aquatic communities by rapidly altering habitat availability and quality. For example, invertebrate eggs are often exposed when lake levels drop, primary productivity is reduced as benthic algae is stranded, and the growth of aquatic macrophytes is largely restricted to permanently inundated areas.

Other natural aquatic values likely to be present include platypus, *A. tricornis*, and potentially short-finned eels and climbing galaxias. Introduced brown trout are present in Lake Liapootah, and it is also likely that redfin perch occur, as they are widespread in the upper Derwent storages that connect to the Nive River upstream of Lake Liapootah via the Tungatinah Penstocks and Power Station.

The CFEV database assigns Lake Liapootah a very high CMPP2 due to its high ICV, low land tenure security, and special values (platypus).

Wayatinah Lagoon

Wayatinah Lagoon receives inflows from the River Derwent, the Nive River, and Liapootah Power Station. Water from the lagoon is diverted to the Wayatinah Power Station, with spills into the River Derwent via the Wayatinah spillway occurring approximately 15% of the time under current operation.

The lagoon has a 3 m operating range but typically fluctuates within a narrower range, with changes of 0.5 to 1 m occurring over a few days. Most shorelines consist of steep boulder and cobble sections, although flatter bays with softer sediments occur along the north-western end of the storage.

As described above for Lake Liapootah, shorelines in hydro-impoundments often provide poor habitat quality for aquatic macroinvertebrates due to rapid changes in water levels. Although water levels in Wayatinah Lagoon do not fluctuate as rapidly or to the same extent as Lake Liapootah, operation is still likely to reduce the diversity and abundance of aquatic fauna compared to more stable natural lakes.

Other natural aquatic values likely to be present include platypus, *A. tricornis*, short-finned eels, and potentially climbing galaxias. Introduced brown trout and redfin perch are present, as is Canadian pondweed (*Elodea canadensis*).

The CFEV database assigns Wayatinah Lagoon a very high CMPP2 due to its high ICV, low land tenure security, and special values (platypus).

5.4.2 Assessment

5.4.2.1 Construction impacts

Potential water quality impacts from the construction sites and associated activities include increased turbidity, changes in pH, elevated concentrations of metals, hydrocarbon contamination, and elevated levels of nitrate and ammonium (Section 5.1). These impacts would be greatest in the immediate vicinity of disturbance areas but may also extend downstream to receiving waterways, including the River Derwent, Nive River, Mossy Marsh, No. 2 and No. 1 ponds, Lake Liapootah, and Wayatinah Lagoon.

The potential sources of pollutants arising from the Project and their impacts on aquatic values are summarised below:

- **Fine sediments**: High inputs of fine sediments can degrade aquatic habitats and species by smothering surface and interstitial spaces. This reduces habitat suitability for many macroinvertebrate families, decreases the productivity of benthic algae, clogs the gills of fish and macroinvertebrates, and reduces the abundance of prey available to predatory macroinvertebrates and platypus.
- **Hydrocarbons**: Hydrocarbons may be directly toxic to aquatic species, cause oxygen depletion, bind to sediments (reducing habitat suitability), smother habitats, alter water chemistry, and disrupt food webs and biodiversity.
- **pH**: Rapid or significant increases in pH can stress or kill aquatic species, impair biological functioning, promote algal blooms, increase the bioavailability of metals, or reduce nutrient availability for aquatic plants.
- **Nitrates**: Very high nitrate concentrations can affect aquatic species by altering behaviour, impairing physiology, increasing susceptibility to other stressors, or causing direct mortality. Small increases in nitrates can lead to eutrophication, altering community structure and food webs.
- **Metals**: Elevated concentrations of metals, particularly in dissolved form, can be directly toxic to aquatic life.

The following sections provide an assessment of potential construction impacts both with and without the proposed mitigation measures in place.

Streams within the disturbance footprint

The water quality assessment identified a high potential for construction-related impacts on Streams 1–6. The primary risks are erosion and sedimentation, with hydrocarbon and metal release assessed as low to moderate risk. The sites with the greatest potential for water quality impacts are:

- **Stream 4**, which drains the Western Portal area
- **Stream 5**, which drains the spoil emplacement area at Paddy's Quarry.

Both Streams 4 and 5 were assessed as having a high potential for elevated pH, nitrates, and ammonia.

If left unmitigated, decreased water quality—particularly elevated levels of fine sediment—would likely degrade aquatic habitats and impact populations of aquatic macroinvertebrates, *Astacopsis tricornis*, platypus, and potentially climbing galaxias.

In Streams 4 and 5, estimated peak (~20–30 mg/L) and median nitrate levels indicate concentrations at or above chronic toxicity thresholds for some freshwater species (NIWA, 2013). The level of risk depends on exposure duration and species tolerance (NIWA, 2013).

Implementation of a WMP, including an ESCP and NMP, will minimise these risks. With these measures in place, elevated inputs of sediments, nitrates, and pH are not expected, and the ecological condition of Streams 1–6 is expected to remain comparable to current baseline condition.

Pre-construction and construction-phase monitoring of macroinvertebrates and benthic algae in Streams 4 and 5 will form part of the Project's monitoring plan (Section 5.4.3.1).

Listed values

The only listed values associated with waterways and riparian communities within and surrounding the Project area are the terrestrial plant species Mount Mawson pine (*Pherosphaera hookeriana*), narrowleaf westringia (*Westringia angustifolia*), matted lignum (*Muehlenbeckia axillaris*), and native wintercress (*Barbarea australis*). Construction-related water quality impacts are not expected to affect these species.

- native wintercress (*Barbarea australis*) was recorded within the Project disturbance footprint on the dam wall of Tarraleah No. 2 Pond and in the Nive River near the proposed transmission line. Mitigation measures to protect these populations during construction are outlined in Section 5.3.

Species of conservation significance and general aquatic values

Streams 1 - 6

Aquatic species of conservation significance recorded include the platypus, the *Astacopsis tricornis*, and 26 species of freshwater macroinvertebrates. The streams within the disturbance footprint would all contain at least a subset of the macroinvertebrate species classed as species of conservation significance. *Astacopsis tricornis* and platypus are also likely to be present in at least the downstream reaches of these streams.

General natural aquatic values include other invertebrate species, short-finned eels, only present through stocking), and potentially climbing galaxias.

Without mitigation, it is likely that construction would reduce the habitat suitability in these streams for many of the WMP (Section 5.4.3.1), water quality impacts are predicted to be low. Elevated nitrates potentially pose the largest impacts at Streams 4 and 5; however, nitrate levels are predicted to remain similar to background levels with implementation of the NMP (Section 5.1). Therefore, construction is expected to have no impacts on species of conservation significance in Streams 1–6.

River Derwent downstream of Clark Dam and Wayatinah Lagoon

Poor water quality may also impact species of conservation significance and general values in the receiving waterways. For example, estimates of nitrate concentrations in the River Derwent in the absence of mitigation, at the Western Portal site, were made based on a conservative low base flow for the River Derwent (Section 5.1). Peak nitrate loads in the River Derwent during Years 2 and 3 of construction are estimated to be >2 mg/L with a median concentration of up to 0.29 mg/L—above the Upper Derwent SMD DGV 95th percentile value of 0.073 mg/L. Existing background nitrate concentration in the River Derwent is around 0.04 mg/L at Derwent above Wayatinah, already above the Upper Derwent SMD DGV 80th percentile (0.020 mg/L) and 95th percentile values (0.073 mg/L).

Nitrate concentrations of approximately 2 mg/L are approaching levels that are chronically toxic to some of the invertebrate species most sensitive to nitrates (based on the toxicological studies available in the literature). The level of risk is dependent on the length of exposure, but many consecutive days at this peak level are likely to be required before toxicity could occur. Note that the estimates provided are based on modelled flow data at a site close to where Stream 4 enters the River Derwent. Increasing flow levels with distance downstream would further dilute nitrate concentrations.

The inflow of the Counsel River, Beech Creek and other smaller tributaries significantly increases the flow regime in the final third of this reach such that dilution levels are highly likely to reduce nitrate levels to below the Upper Derwent SMD DGV 95th percentile value of 0.073 mg/L. Further dilution would occur when the River Derwent enters Wayatinah Lagoon.

With implementation of the WMP, there are expected to be minimal impacts to the water quality of the streams entering the River Derwent, including minimal increases in nitrate levels in Stream 4 (Section 5.1). Therefore, there are not expected to be any impacts to species of conservation significance, or general aquatic values, in the River Derwent or Wayatinah Lagoon resulting from poor water quality from the construction areas.

Nive River and Lake Liapootah

In the absence of mitigation, estimates of nitrate concentrations arising from construction activities are as follows (refer to Section 5.1):

- Where Stream 5 enters the Nive River, approximately 2.2 km upstream from the Tungatinah tailrace and 2.8 km upstream from the Tarraleah tailrace:
  - Peak nitrate concentrations in the Nive River during Year 2 are estimated to be > 2 mg/L, with a median concentration of up to 0.75 mg/L. These values are greater than existing background nitrate concentrations in the Nive River (median around 0.009 mg/L) and above the Upper Derwent SMD DGV 80th percentile (0.020 mg/L) and 95th percentile values (0.073 mg/L). Nitrate concentrations > 2 mg/L approach levels that may be chronically toxic for some species if maintained over long periods.
- Downstream from the Tarraleah tailrace (2.8 km downstream from where Stream 5 enters):
  - Peak values below the tailrace in Year 2 are estimated to be > 0.04 mg/L, 2% of the time and within the Upper Derwent SMD DGV 95th percentile value.
  - Median nitrate concentrations in Year 2, as a result of works at Paddy's Quarry, are estimated to be below 0.005 mg/L 98% of the time. This concentration is below the existing background nitrate concentration in the Nive River (median 0.007 mg/L at the site downstream of Tarraleah Power Station) and below both the 80th and 95th percentile Upper Derwent SMD DGV values.

With implementation of the Nitrate Management Plan, Stream 5 is not predicted to deliver elevated nitrates to the Nive River upstream of Tungatinah.

Modelling of nitrate concentrations in the Nive River below the Tarraleah tailrace has been undertaken to show potential impacts over the construction period, taking into consideration the inputs from all construction sites. In summary:

- Modelling indicates that sufficient dilution is possible within the Nive River to maintain concentrations at or below the 80th percentile DGV (0.020 mg/L) for the majority of time, with only a minor (low) potential to exceed the 95th percentile concentration (0.073 mg/L) (see Section 5.1).
- The year with the highest estimated daily loads, and greatest potential for elevated nitrate concentrations in the Nive River as a result of the Project, is Year 3 (Section 5.1). A predicted < 0.4% of time (1.5 days in Year 3) has the potential to exceed the Upper Derwent DGV 95th percentile value of 0.073 mg/L. On such days, the combined flows of Tungatinah, Tarraleah, and the Nive River are not expected to be sufficient to dilute the nitrate load below 0.073 mg/L.
- Nitrate concentrations would be further diluted when the Nive River enters Lake Liapootah.

Overall, water quality impacts from construction of the Project are predicted to have no impact on species of conservation significance or general aquatic values in the Nive River or in Lake Liapootah.

Other potential water quality impacts from construction will be mitigated through implementation of the WMP (Section 5.1).

Other associated waterways

Options outlined in the WMP (Section 5.1) for discharging site water include the No. 1 and No. 2 Canals and the Nive River. No. 2 Canal discharges into Mossy Marsh Pond, No. 2 Pond, and No. 1 Pond before entering the Tarraleah Power Station and the Nive River. Nitrate levels would be significantly diluted in the canals and then further diluted through the ponds.

No species of conservation significance are likely to be present in the canals. In Mossy Marsh Pond, macroinvertebrates, platypus (*Ornithorhynchus anatinus*), and Tasmanian giant freshwater crayfish (*Astacopsis tricornis*) are highly unlikely to be impacted by site water discharged from the canals.

TWWHA: River Derwent downstream of Clark Dam to Wayatinah Lagoon

Potential construction impacts to the TWWHA are the same as those outlined above for species of conservation significance and general aquatic values in the reach of the River Derwent downstream of Derwent Pumps Weir (Section 5.4.2.1). With implementation of the WMP, construction of the Project is expected to have no impact on aquatic values in the TWWHA.

5.4.2.2 Operational impacts

The significance of potential impacts to matters protected under the EPBC Act, whether direct or indirect, was evaluated using the criteria in the *Matters of National Environmental Significance – Significant Impact Guidelines 1.1* (Department of the Environment, 2013). The aquatic impact assessment presented below focuses on *Barbarea australis*, the TWWHA, and aquatic fauna of conservation significance. The assessment considers the operation of the Project both with and without the proposed mitigation measures.

The main operational impact predicted for the Project is a reduced magnitude of spill from Clark Dam and Derwent Pumps Weir. Hydrological modelling indicates that the frequency and magnitude of annual spills would be significantly reduced compared to current operation (Appendix G—Section 8.1). This reduction is likely to degrade the quality of instream and riparian habitats in the 31 km reach of the River Derwent downstream of Clark Dam to Wayatinah Lagoon.

Hydrological modelling also predicted a reduction in the magnitude of peak annual spills from Wayatinah Dam; however, large annual spills are still expected to occur under Project operation, along with an increase in the frequency of small spills. Spill patterns for the Nive River downstream of Liapootah Dam are predicted to remain broadly similar, although with an increased frequency of small spills. Overall, there is no evidence that these changes to spill patterns are likely to negatively impact physical or biological processes.

Listed species

Barbarea australis

Native wintercress (*Barbarea australis*) was not recorded in this reach downstream of Clark Dam during surveys for the Project; however, there are historical records, suitable habitat is present, and nearby populations occur in the River Derwent downstream of Wayatinah Lagoon. Therefore, the assessment assumes that the species may be present in low numbers or may re-establish in the future.

Reduced spill downstream of Clark Dam has the potential to reduce the area of mobile rocks that form isolated patches of habitat for *B. australis* and to accelerate the encroachment of terrestrial vegetation into the channel. Without the planned high-flow mitigation (Section 5.4.3.2), operation of the Project is predicted to negatively impact habitat suitable for *B. australis* in this reach. Implementation of an annual high-flow release will increase the frequency of large flows compared to current operation; this mitigation is predicted to maintain suitable habitat for the species.

Hydrological modelling suggests that the frequency of spill will increase but the magnitude of peak annual spills will be reduced in the reach of the River Derwent downstream of Wayatinah Lagoon; however, large annual spills will still occur, and hydraulic modelling and the geomorphology assessment indicate that the reduction in spill size will have minimal impact on maintaining the patches of suitable mobile substrate for *B. australis*. There was also no indication of increased spill over summer during Project operation that could increase scour of *B. australis* plants during the peak flowering season. Overall, Project operation is predicted to have no impact on *B. australis* in this reach.

For the Nive River downstream of Liapootah Dam, hydrological modelling predicted the pattern and size of annual spills to remain similar to current conditions during Project operation; therefore, the Project is predicted to have no impact on *B. australis* in this reach.

For all three reaches, monitoring is planned to validate rock mobilisation under different flow events and to record annual trends in vegetation establishment within channels. Annual population surveys for *B. australis* will also be undertaken in the River Derwent downstream of Wayatinah Lagoon and in the Nive River downstream of Liapootah (Section 5.4.3.3).

Listed riparian plant species

Reduced spill downstream of Clark Dam could impact riparian structure and function, including the distribution of narrow-leaf westringia (*Westringia angustifolia*), creeping lignum (*Muehlenbeckia axillaris*), and Mount Mawson pine (*Pherosphaera hookeriana*), which were recorded in this reach. Without mitigation, operation of the Project may negatively affect these species, as they generally occur in open riparian areas created by flood disturbance and are poor competitors, occupying bank and channel bar areas kept open by high-flow events.

Implementation of an annual high-flow release will increase the frequency of large flows in this reach compared to current operation. This mitigation is predicted to maintain, and potentially improve, riparian condition in the River Derwent downstream of Clark Dam.

Species of conservation significance and general aquatic values

Aquatic species of conservation significance recorded include platypus, *Astacopsis tricornis*, and 26 macroinvertebrate species. None of these species have a restricted distribution in Tasmania. General aquatic values include other invertebrate species, short-finned eels (present only through stocking), and potentially climbing galaxias).

Permanent aquatic habitat for these species in river reaches potentially affected by operation of the Project is maintained by tributary inflows downstream of the dam; however, dam spills provide most high-flow events, which perform important physical and biological functions influencing habitat quality (Appendix G—Section 8.4).

Without mitigation, reduced spill magnitude and frequency is likely to lower habitat quality for these species in the River Derwent reach downstream of Clark Dam to Wayatinah Lagoon. Reduced spill is also predicted to impact general aquatic values in this reach, including other freshwater macroinvertebrates, introduced trout, and potentially climbing galaxias. Implementation of an annual high-flow release, along with three small fresh releases, is expected to maintain—and potentially improve—habitat conditions for both species of conservation significance and general aquatic values. Improvement may occur because the planned releases increase the frequency of ecologically beneficial flow events relative to current operation.

During operation, the pattern and magnitude of spill to the River Derwent downstream of Wayatinah Dam and to the Nive River downstream of Liapootah Dam is assessed as sufficient to maintain habitat conditions for aquatic species of conservation significance. In addition, more frequent small spills predicted during Project operation may benefit these species.

TWWHA: River Derwent downstream of Clark Dam to Wayatinah Lagoon

Operation of the Project without flow mitigation is predicted to negatively impact riparian and instream physical and biological conditions in the River Derwent within the TWWHA. This is due to the essential role of high-flow events in maintaining river structure, habitat diversity, and ecological processes.

Physical processes:

- **Sediment transport and deposition**: High flows mobilise and redistribute sediments (gravel, cobbles, boulders), maintaining riverbed structure, preventing compaction, and sustaining bank–floodplain connectivity. They also transport woody debris and organic matter, adding habitat complexity.
- **Channel morphology**: High flows shape the river channel by eroding banks, depositing sediments, and creating diverse habitats such as pools, riffles, and bars.
- **Vegetation scour**: High flows remove encroaching terrestrial vegetation, maintaining open-water habitats and a dynamic river channel.

Biological processes:

- **Habitat maintenance**: By mobilising sediments and maintaining channel form, high flows sustain habitats suitable for aquatic species, including spawning grounds and shelter.
- **Nutrient cycling**: High flows exchange nutrients between the river and floodplain, boosting productivity and distributing organic matter through aquatic and riparian food webs.
- **Species dispersal and life-history cues**: High flows aid dispersal of fish, invertebrates, and plant seeds, and provide cues for migration and spawning.
- **Water quality**: High flows flush pollutants and stagnant water, improving water quality and overall ecosystem health.

Implementation of an annual high-flow release and three small fresh releases is expected to maintain—and potentially improve—instream and riparian conditions in the TWWHA. Improvements may result because the planned releases will increase the frequency of ecologically beneficial flows compared to current operation.

5.4.3 Avoidance and mitigation measures

5.4.3.1 Construction mitigation

Mitigation of potential impacts to aquatic communities during construction will be achieved by protecting water quality. Implementation of the WMP, NMP and ESCP (refer Section 5.1) will minimise risks to streams within the disturbance footprint and downstream receiving waterways.

AB 1: New watercourse crossings for access roads will be designed, constructed and maintained in accordance with the Forest Practices Authority Code of Practice to minimise disturbance to fish and other aquatic fauna. Machinery activity in watercourses will be minimised. Where practicable, culvert pipes will be set at or marginally below the natural bed level to facilitate aquatic fauna passage.

5.4.3.2 Operational mitigation

To mitigate the impact of a reduced spill/high flow regime in the River Derwent downstream of Clark Dam, planned spill events of sufficient magnitude and frequency are proposed to maintain geomorphic processes, habitat, and species values in the TWWHA, including habitat suitability for *Barbarea australis*. Hydraulic modelling was used to determine the flow size required to mobilise the riverbed components that remain mobile. The modelling indicated that a flow of 60 m^3/s has the potential to move gravels and small cobbles to the channel margins in most reaches. These high flows also support other key physical and biological functions (Appendix G—Section 9.2.1).

AB 2: The proposed mitigation measures are one annual high flow release and three annual lower fresh releases:

- **High flow releases:** To offset the reduction in overall spill frequency, an alternating annual release is proposed: 60 m^3/s in one year and up to 100 m^3/s in the following year. Each release will span three days (ramp up, peak flow, ramp down). If natural flows of equivalent magnitude occur, no managed release will be made. Where required, releases will occur in spring, prior to the key growing season (November–April) for *B. australis*. The releases are expected to:
  - Increase the frequency of ≥ 60 m^3/s events
  - Ensure at least one event ≥ 60 m^3/s each year, which does not occur under current operation
  - Deliver mean annual maximum flows similar to or higher than baseline operation
  - Avoid years with very low peak flows (~≤ 20 m^3/s).
- **Lower flow releases (freshes):** Three 24-hour releases of 5–10 m^3/s are proposed annually (one at the end of summer, one in the first month of winter, and one in December). As for high flow releases, no managed release will occur if natural events of equivalent size occur. These smaller freshes will assist in flushing algae and biofilms, provide high flow cues for aquatic species, enhance nutrient exchange between banks and the low flow channel, and recharge water supply to the river banks.

A detailed discussion of the objectives, delivery, and predicted performance of these measures is provided in Appendix G—Section 9.2.

Operational constraints may occasionally limit the ability to deliver the full 100 m^3/s release; however, such constraints are not expected to be common (Appendix G—Section 9.2.2.1). If a planned high flow cannot be delivered in a given year, it will be implemented at the next available opportunity outside the B. australis growing season.

AB 3: Any impacts on B. australis from altered spill downstream of Wayatinah Dam will be monitored, with adaptive management applied if required to avoid negative impacts on populations.

5.4.3.3 Monitoring

Monitoring measures for the Project are detailed in Appendix G—Section 9 and are summarised below. Proposed monitoring locations are shown in Figure 5.46.

Geomorphology and vegetation monitoring

M11: Geomorphology and vegetation monitoring will be undertaken to:

- assess riverbed condition, including sediment mobilisation and vegetation encroachment
- provide baseline data and assess the effectiveness of Management Measure AB2 (refer Chapter 8), with results used to determine whether the magnitude of planned releases needs adjustment (capped at 100 m^3/s)
- assess potential impacts from the changed spill regime in the Nive River downstream of Liapootah Dam and the River Derwent downstream of Wayatinah Dam, including any impacts on *Barbarea australis*, as outlined in Management Measure AB3.

Sediment mobilisation will be monitored through rock rollover surveys, where rocks of varying sizes are painted with a highly visible paint at fixed locations. Following high flow events, the same sites will be revisited to record which rocks moved and how far.

Vegetation encroachment will be monitored at the same reaches using transects to record percentage cover and species composition, supplemented by drone photogrammetry to provide overall vegetation cover assessments.

Five monitoring sites will be established:

- three in the River Derwent downstream of Clark Dam
- one in the River Derwent downstream of Wayatinah Dam
- one in the Nive River downstream of Liapootah Dam.

Monitoring will be undertaken annually prior to construction, during construction, and for five years post-commissioning. A review after five years will determine the need and frequency for ongoing monitoring (annual, biannual, etc.). Triggers for ongoing monitoring include uncertainty in trends (e.g. high seasonal or interannual variation) or evidence of declining sediment mobilisation and/or increasing vegetation encroachment.

Barbarea australis monitoring

M 12: Surveys of *Barbarea australis* populations will record the number, life stage, and habitat association of each plant observed. These surveys will help establish population fluxes for this opportunistic colonising species and allow assessment of whether population sizes during operation remain within pre-operation bounds.

Monitoring will be undertaken along a representative 3 km reach of the Nive River downstream of Liapootah Dam and the River Derwent downstream of Wayatinah Lagoon. Surveys will be conducted annually prior to construction, during construction, and for five years following commencement of operation.

After five years of operation, all relevant data (population size, spill, sediment mobilisation, and vegetation encroachment) will be reviewed to determine whether ongoing monitoring is required and, if so, at what frequency. Triggers for continued monitoring include uncertainty in trends (e.g. high seasonal or interannual variation) or a clear declining trend in population size.

Macroinvertebrate monitoring for operation of the Project

M 13: Macroinvertebrate sampling using the AusRivAS method will be undertaken to assess any impacts of changed operation and the effectiveness of flow mitigation measures. River health scores from pre-construction and construction will provide the baseline for assessing trends between and within sites over time, and during operation (including the effectiveness of Management Measure AB2 (refer Chapter 8).

Monitoring will be undertaken at:

- five existing sites in the River Derwent between Clark Dam and Wayatinah Lagoon
- two reference sites (Counsel and Florentine rivers):
    - the Nive River downstream of Liapootah Dam
    - the River Derwent downstream of Wayatinah Dam.

Monitoring will occur each spring and autumn prior to construction, during construction, and for five years following commencement of operation.

After five years of operation, a review of all relevant data (river health scores, macroinvertebrate community composition and diversity, spill/flow data, and sediment mobilisation) will determine the need for ongoing monitoring and the required frequency. Triggers for continued monitoring include uncertainty in trends (e.g. high seasonal or interannual variation) or a clear declining trend in macroinvertebrate communities or river health scores below baseline bounds.

Macroinvertebrate monitoring Streams 4 and 5

M 14: Monitoring will be undertaken to characterise baseline and potential impact conditions (abundance, diversity and relative composition of macroinvertebrates, and algal biomass) downstream of stockpiles, and to assess the effectiveness of Management Measures WQ8 and WQ9.

Macroinvertebrate sampling will include:

- Quantitative Surber sampling (10 pooled samples) and AusRivAS sampling at each site
- Benthic algal scrapes, collected using the method recently developed by NRE Tasmania.

Monitoring sites will be established in Stream 4 and Stream 5.

Monitoring will be undertaken each spring and autumn prior to construction, during construction, and (if required) following commencement of operation. Operational sampling will only be triggered if impacts to macroinvertebrate communities are detected during construction and show no upward trend during the final construction sampling event.

Flow monitoring

M 15: Monitoring of flow at existing sites will be undertaken to provide a summary of:

- Flow releases from Clark Dam (magnitude and duration), including environmental releases (compliance monitoring)
- Flow recorded at Derwent Pumps Weir
- Flow recorded at the Derwent above the Nive River
- Spill recorded at Wayatinah Dam
- Spill recorded at Liapootah Dam.

Reporting

An annual report will summarise ecological, geomorphology, and flow regime monitoring. This report will inform associated monitoring programs and support the assessment of impacts and trends.

If monitoring continues beyond five years (based on evaluation of monitoring triggers), the annual report will be provided for the duration of the revised monitoring program. Beyond this period, reporting will continue as part of Hydro Tasmania's internal environmental reporting.

5.4.3.4 Residual impacts

Construction impacts

Construction impacts on waterways are limited to potential changes in water quality. Implementation of the WMP will minimise the risk of poor water quality affecting streams and impoundments within and downstream of the disturbance footprint. Construction activities are therefore not predicted to have any residual impacts on aquatic values.

Operational impacts

The proposed environmental water releases were designed to at least maintain aquatic values in the River Derwent downstream of Clark Dam. These releases are proposed to occur each year of operation unless natural spill events of sufficient magnitude occur before the trigger dates. Physical and ecological monitoring will occur prior to, and for at least the first five years of, operation. The releases have been developed within an adaptive framework, whereby the annual peak release can be increased from 60 m^3/s up to 100 m^3/s if monitoring indicates that flows > 60 m^3/s are required. With this framework, operation is predicted to have no residual impacts on aquatic values in this reach.

Hydrological modelling indicates that the spill regime into the Nive River downstream of Liapootah Dam will be similar to current operation, while spills downstream of Wayatinah Dam into the River Derwent are predicted to occur more frequently but with smaller peak magnitudes. Geomorphology and hydraulic assessments concluded that the condition of this reach is likely to be maintained. Overall, the spill regimes for both the Nive River downstream of Liapootah Dam and the River Derwent downstream of Wayatinah Dam are predicted to maintain geomorphic processes and habitat suitability for *Barbarea australis*.

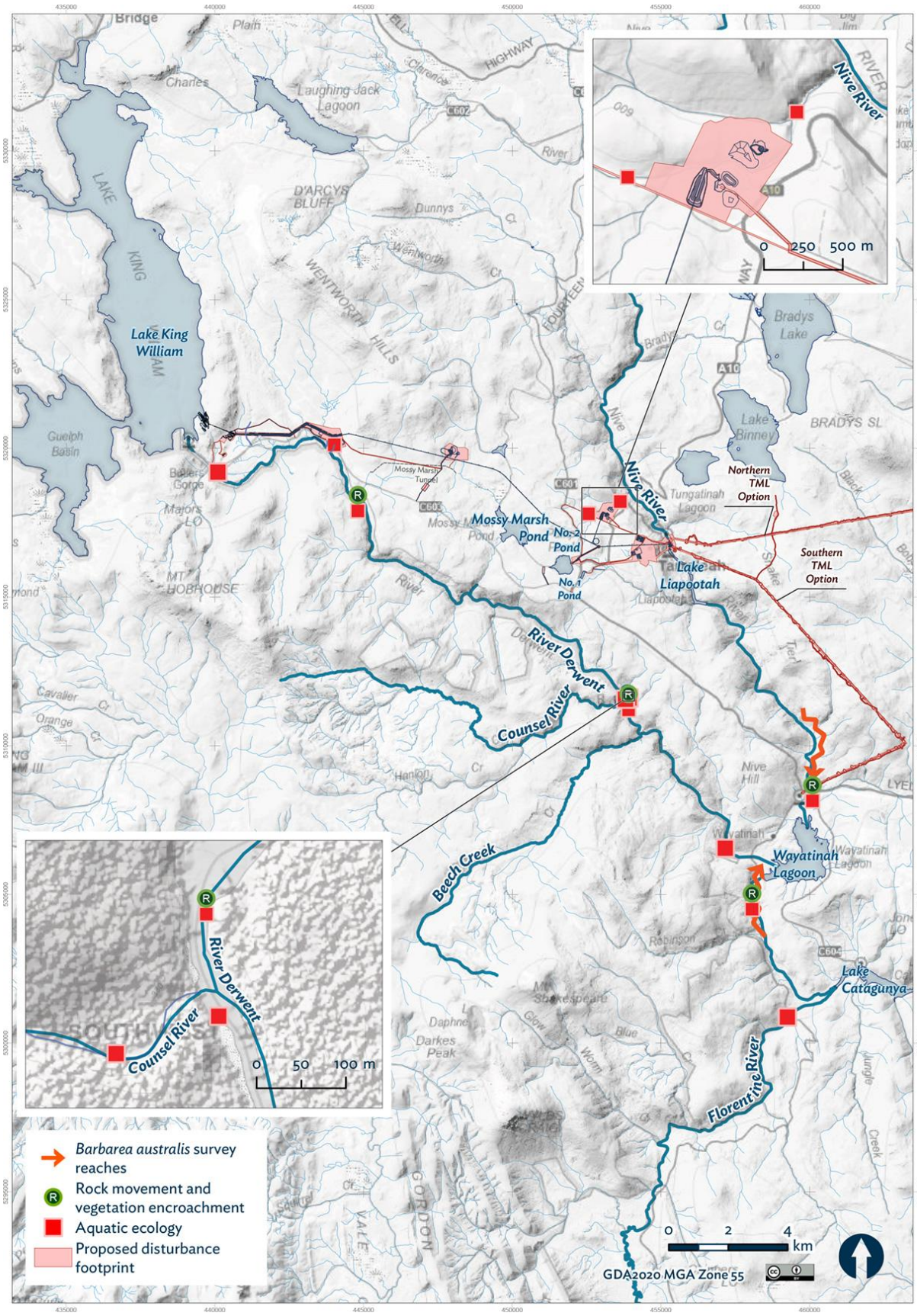


Figure 5.46: Location of proposed monitoring locations for aquatic values

5.5 Air quality

An air quality assessment has been completed for the Project and is provided in Appendix I and summarised in this Chapter.

5.5.1 Existing environment

5.5.1.1 Air quality

There are no air quality monitoring stations in the Project area, with the nearest located at Gretna, approximately 50 km to the south-east. Data from the Gretna station, part of the Base Line Air Network of EPA Tasmania (BLANkET), were used to provide indicative particulate concentrations.

Particulate matter (PM) describes small solid particles and liquid droplets suspended in the air. These can include nitrates, sulphates, organic chemicals, metals, soil or dust, and allergens such as pollen or mould spores[9]. In the atmosphere, particles range in size from 0.1 to 50 µm. The size of particles influences their potential to cause health impacts:

- PM10 (particles <10 µm) are small enough to pass through the throat and nose and enter the lungs, where they can affect the heart and lungs and cause health problems.
- PM2.5 (particles <2.5 µm) can penetrate deep into the lungs and bloodstream, with long-term exposure linked to adverse health effects.

Indicative particulate concentrations for the Project area are low, based on 2023 data from the Gretna BLANkET station (Figure 5.47). This suggests the local airshed is not overloaded with particulate matter, although levels increase at times, particularly in late autumn and winter (most likely due to wood heater emissions). Given the distance between Gretna and the Project area, the station's location near a small population centre (~250 people), and the very low population at Tarraleah, wood heater emissions are unlikely to significantly influence local particle concentrations near the Project.

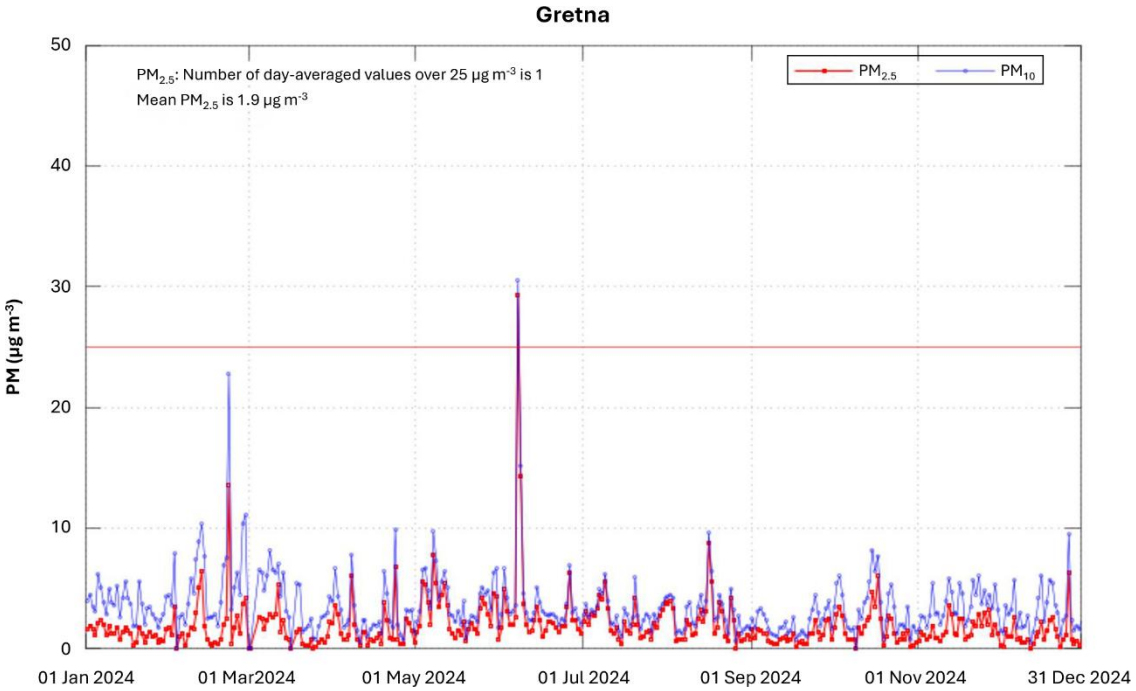


Figure 5.47: PM10 and PM2.5 concentrations (24 hour average) over 2024 at Gretna BLANkET station

9 health.nsw.gov.au/environment/air/Pages/particulate-matter.aspx

5.5.1.2 Local conditions

Tarraleah lies in a high-precipitation, cool-temperate climatic region of central Tasmania. Data from the Bureau of Meteorology's Butlers Gorge weather observation station (Station 094029), at the western end of the Project area, show mean temperatures ranging from -1 °C to 20 °C, with July the coldest month and January–February the warmest. Rainfall is high, with the greatest falls in winter and the lowest in late summer. Mean annual rainfall is approximately 1,671 mm.

Annual and seasonal wind roses for Butlers Gorge (Figure 5.48) indicate prevailing north-west and westerly winds, with a notable south-west component. Wind influence is reduced in winter when speeds are generally lower. Calm conditions account for 15–20% of recorded winds across all seasons.

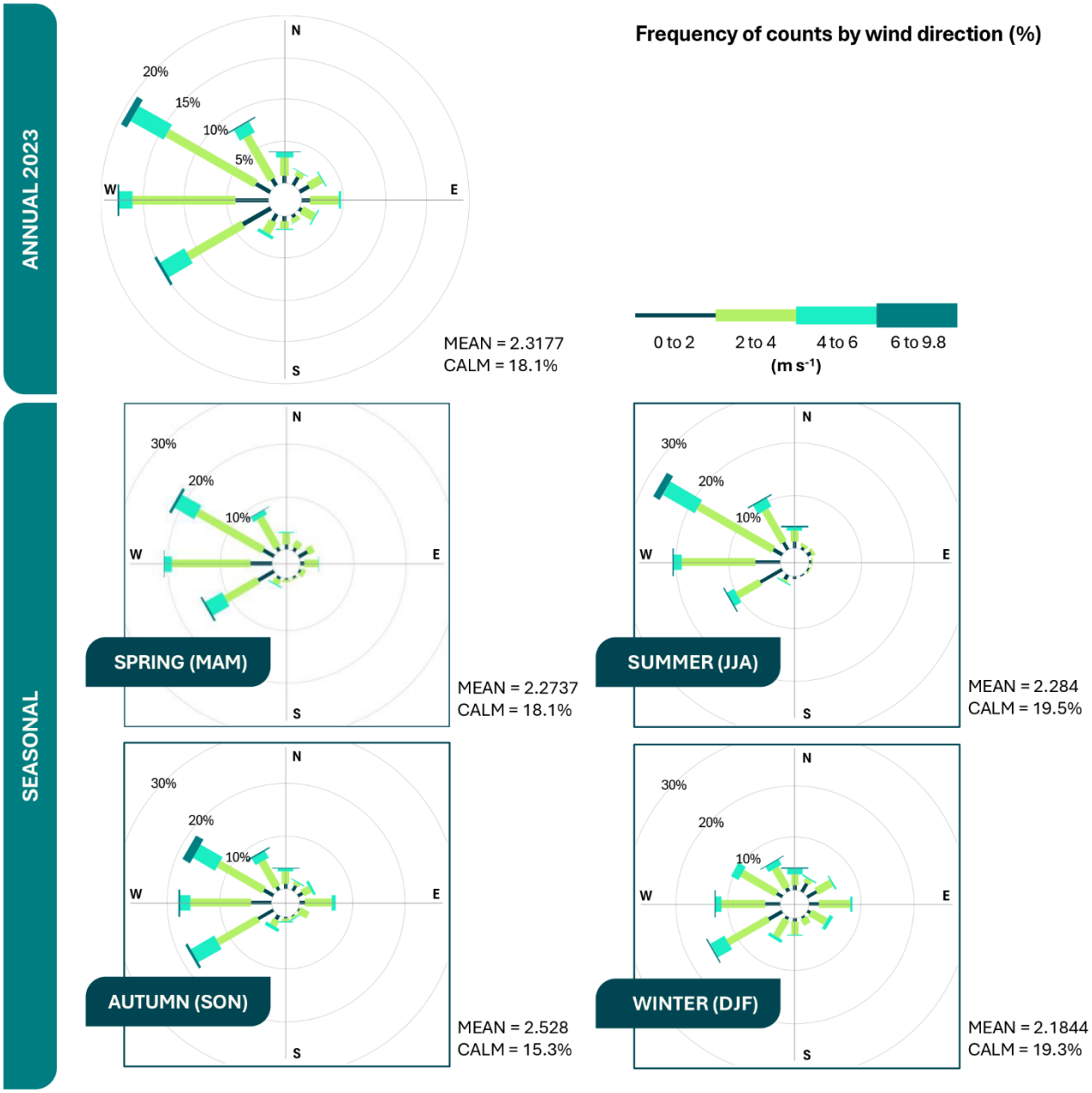


Figure 5.48: Annual and seasonal wind roses for Butlers Gorge

5.5.2 Methods

A qualitative air quality assessment was prepared for the Project.

5.5.2.1 Acceptable management levels

Relevant criteria for air constituents of concern with the potential to cause environmental harm or nuisance to sensitive receptors were sourced from the *Environment Protection Policy (Air Quality) 2004* and the EPA Board Statement (January 2022), *Update to Air Pollutant Design Criteria used in the Environmental Impact Assessment Process*. For total suspended particulate (TSP) matter and dust deposition, criteria were drawn from the NSW EPA, as these are not specified in Tasmanian documentation.

Table 5.13: Relevant criteria for air constituents of concern with the potential to cause environmental harm/nuisance to sensitive receptors (Appendix I)

Particulate Matter	Averaging period	Maximum concentration
PM_{10}	1 day	50 µg/m^3
	1 year	25 µg/m^3
$PM_{2.5}$	1 day	25 µg/m^3
		20 µg/m^3*
	1 year	8 µg/m^3
		7 µg/m^3*
*2025 goal from National Environment Protection (Ambient Air Quality) Measure.		
TSP	1 year	90 µg/m^3
Deposition of insoluble solids	Maximum rate	Maximum increase
	4 g/m^2/month	2 g/m^2/month

5.5.3 Assessment

5.5.3.1 Construction emission sources

Construction of the Project has the potential to affect air quality. Key locations within the disturbance footprint where particulate emissions may occur include construction sites associated with above-ground infrastructure such as the headrace pipeline alignment, tunnel portals, spoil emplacement areas, surge tower, transmission easements and access tracks (Figure 2.1).

During construction, emissions may be generated from:

- **Vegetation removal:** Disturbance of root systems and exposure of surfaces can entrain particulates. Vegetation removal will occur throughout the disturbance footprint primarily for the headrace pipeline, tunnel portals, pumpstation and rising main, new access roads and transmission line tower locations as well as for supporting works.
- **Wind erosion:** Large exposed surfaces created during earthworks may release particulates, particularly under high wind speeds. Exposed surfaces will occur where vegetation is removed as well as at the power station.

- **Vehicle movements:** Interaction between tyres and unsealed surfaces, uncovered truck loads, and diesel exhaust emissions may release particulates. Vehicle movements will occur on all Project roads and access tracks throughout the disturbance footprint.
- **Extraction and loading of materials:** Digging and transferring materials can emit particulates. Extraction and loading of materials will primarily occur at the headrace pipeline, pumpstation and rising main and tunnel portals.
- **Blasting:** Each blast generates a plume of particulate matter and gases, in particular NO with NO_2. Blasting is confined to the tunnel portals and potentially the headrace pipeline and power station, if required.
- **Crushing and screening:** Particle release may occur during crusher interactions, screening, and conveyor drop points. Crushing and screening will be confined to tunnel portals.
- **Material stockpiles:** Loose material may be entrained by wind, particularly at high wind speeds. Material stockpiles will primarily be located at the headrace pipeline and tunnel portals.
- **Concrete batching plants**: Particulates from cement dust, aggregate and sand. Point sources associated dust collectors and fugitive sources include the transfer of materials, and wind erosion from sand and storage areas. Concrete batching plants may be located at the tunnel portals and/or Tarraleah Village.

5.5.3.2 Sensitive receptors

The population in the Tarraleah area is low. Key receptor locations are:

- The western half of the Project area (headrace pipeline, headrace tunnel, surge tower, power tunnel and new power station) is isolated from sensitive receptors. The closest residences are at Bradys Lake, approximately 6.5 km northeast of the power station.
- Both the northern and southern transmission line options are closer to sensitive receptors but retain significant buffers:
    - ~3.8 km from residences at Bradys Lake
    - ~900 m from residences at Dee, on the western side of Dee Lagoon
    - 1.6 km from scattered rural residences east of the Liapootah–Palmerston transmission line corridor
    - ~2.3 km from scattered residences southeast of the Liapootah–Palmerston transmission line corridor
    - ~1.2 km from sensitive uses (e.g. caravan park) southwest of the Liapootah HV substation.

Figure 5.49 shows the location of buildings within and around the Project area, including Hydro Tasmania-owned infrastructure associated with the existing Tarraleah hydropower scheme and Tarraleah Village, as well as private residences around Bradys Lake and Dee Lagoon. Hydro Tasmania infrastructure is not considered a sensitive receptor.

5.5.3.3 Impact assessment

Construction

Weather data from the Butlers Gorge station indicates the highest risk of particulate emissions occurs in summer, when temperatures are higher, rainfall is lower, and afternoon winds are stronger (though rainfall remains high compared to lowland areas further east).

The risk of particulate emissions from the Project affecting environmental values or sensitive receptors is assessed as *very low* (Appendix I), based on:

- **Location:** Significant buffers exist between construction areas and residences such that particulate emissions, including from batching plants, are not anticipated to impact receptors. The transmission line works are closest to receptors and represent the highest relative risk, but this remains very low.

  Blasting gases are expected to dissipate to ambient concentrations within 5 km of blasting location and will not impact the closest sensitive receptor located approximately 6.5 km from the closest potential blasting location (power station). Public roads are located within 5 km of blasting locations and may be exposed to blast gas plumes.
- **Meteorology:** High rainfall reduces dust risk. Summer presents the highest relative risk due to stronger winds and drier conditions.
- **Ambient conditions:** Background particulate levels are generally low, though winter wood-heater use can cause elevated levels in residential areas. These typically occur during calm, stable conditions, when construction emissions are unlikely to be significant.

Operation

As the Project will be predominantly underground during operation, air emissions are expected to be negligible.

5.5.4 Avoidance and mitigation measures

AQ 1: An Air Quality Management Plan (AQMP) will be prepared prior to construction. The AQMP will identify potential and existing dust sources and outline best-practice design controls, air quality management measures, responsibilities, key personnel, adaptive management, and community engagement. Management measures to be considered include:

- Minimising exposed surfaces through construction planning and progressive rehabilitation (e.g. hydromulching, surface matting, and revegetation)
- Watering haul routes within the disturbance footprint during hot, dry, and windy summer conditions
- Locating temporary stockpiles in wind-protected areas and controlling dust generation (e.g. water sprays)
- Installing dust suppression systems (e.g. water sprays) on crushing and screening equipment
- Ensuring adequate water supply for watering rates and spray systems
- Minimising surface blasting during hot, dry, and windy conditions, where practicable

- Risk-based management approaches outlined in *Code of Practice – Prevention and Management of Blast Generated Nox Gases in Surface Blasting* (AEISG 2011) to manage the risk of NO2 exposure to vehicles travelling on public roads from blast gases.
- Regularly monitoring the effectiveness of dust control measures. Where measures are found to be ineffective, they will be reviewed (internally and/or by an external dust specialist if required) and amended as necessary.

5.5.4.1 Residual impacts

Due to the Project's isolated location, the risk of construction air emissions affecting the environment or sensitive receptors is considered very low. With implementation of the AQMP, no residual impacts are anticipated. During operation, air emissions will be negligible and no residual impacts are expected.

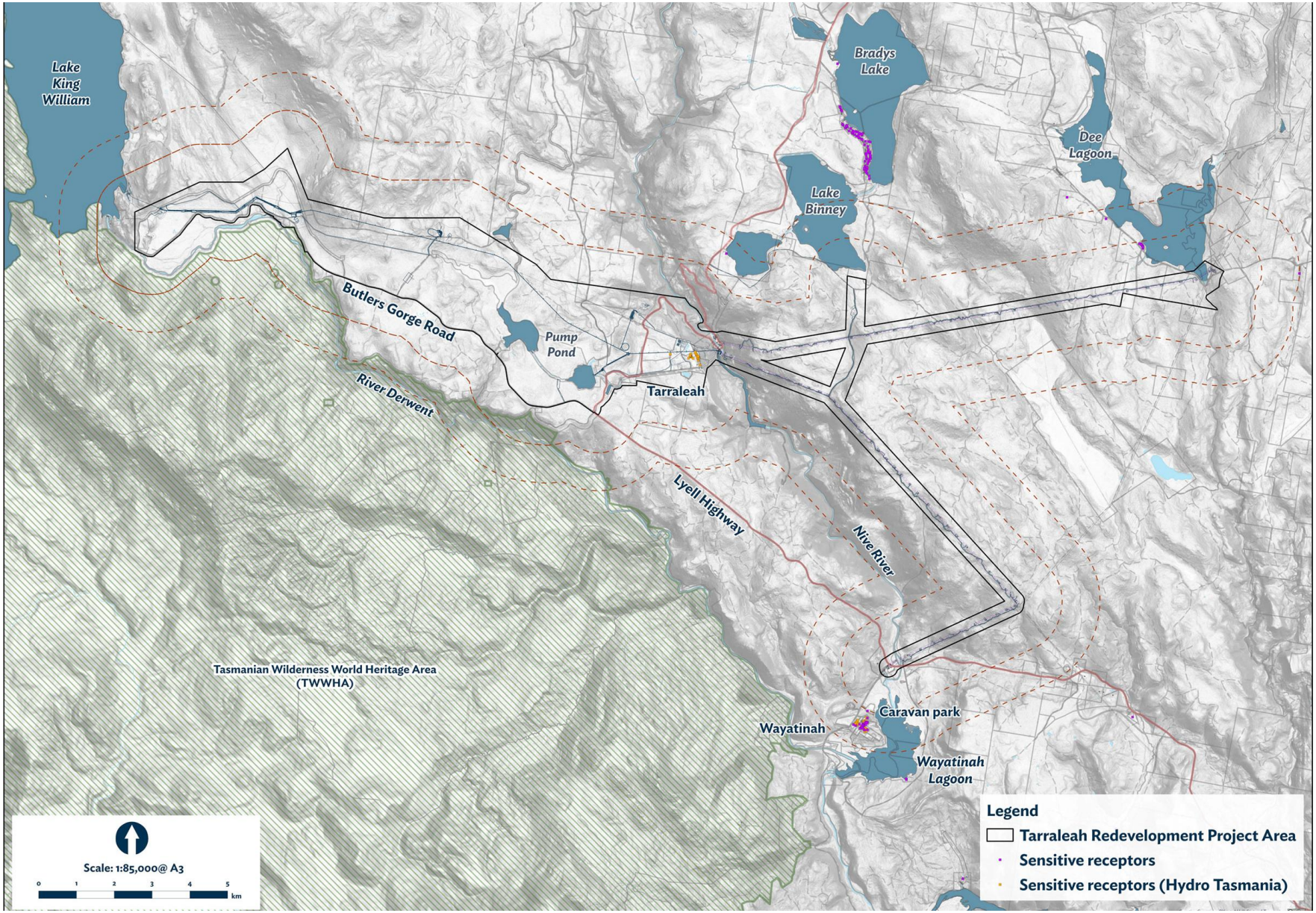


Figure 5.49: Project overview showing location of buildings (red) within and surrounding the Project area

5.6 Noise and vibration

A noise and vibration assessment has been completed for the Project. The assessment is provided in Appendix J and summarised in this Chapter.

5.6.1 Existing environment

Operation of the existing Tarraleah hydropower scheme produces negligible noise emissions, and there are no other major sources of noise in the vicinity of the Project area.

A noise-sensitive receptor is defined as any location where inhabitants or users may be impacted by noise generated by the Project. The Tasmanian *Quarry Code of Practice* (QCoP) defines sensitive uses as residential premises, libraries, schools, hospitals, aged and childcare facilities, caravan parks, and other places where individuals may reside for long periods for reasons other than employment or active recreation. Accordingly, camping areas and recreational users of lakes surrounding the Project area are not considered sensitive uses under the assessment.

Key sensitive receptors (Figure 5.50) within and surrounding the Project area include Tarraleah Village (owned by Hydro Tasmania), Bradys Lake (6 km northeast), Bronte Lagoon (12 km north), and Wayatinah (10 km southeast).

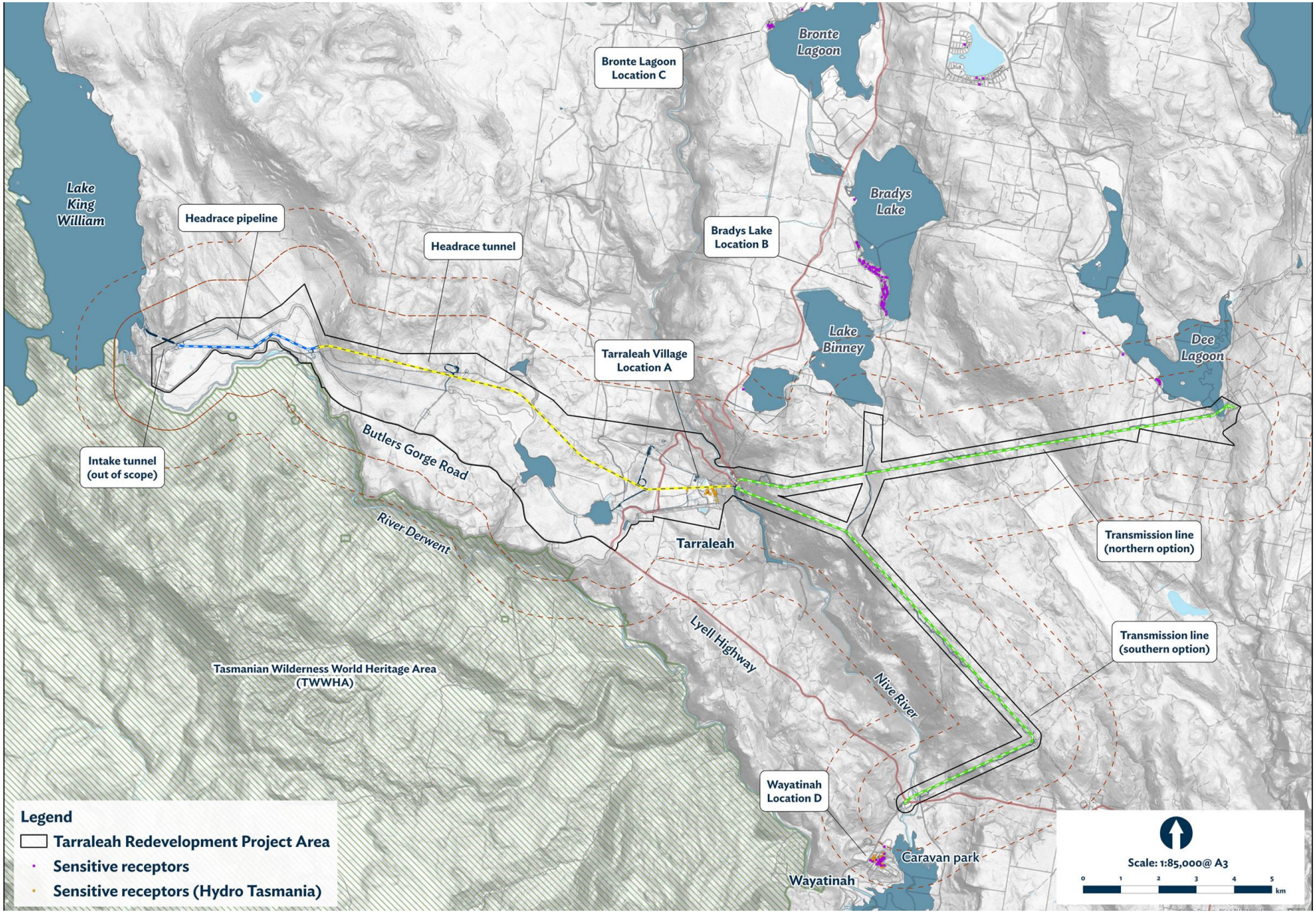


Figure 5.50: Location of sensitive receptors

5.6.2 Methods

5.6.2.1 Ambient noise conditions

Ambient environmental noise was measured between 5 and 15 April 2024 using Svan Type 1 sound level meters, logging in A-weighted decibels with a Fast response time. Measurements were taken within Tarraleah Village, adjacent to existing accommodation cottages, as this location was considered representative of overall noise levels in the village.

The dataset comprised overall levels, one-third octave spectra and full statistical data, including:

- **Leq (dBA)** [10]**:** the equivalent continuous (average energy) level of audible noise, used to assess impacts against existing limits and to identify an acceptable noise limit.
- **L10 (dBA):** the noise level exceeded for 10% of the monitoring period.
- **L90 (dBA):** the noise level exceeded for 90% of the monitoring period.

Weather conditions over the monitoring period were generally fine. Maximum wind speed only exceeded the 5 m/s limit outlined in the *Noise Measurement Procedures Manual* (DEPHA, 2008) on two days. Noise data from those periods has been excluded from the results.

5.6.2.2 Noise modelling

Noise emissions for the Project were modelled using iNoise software, which implements ISO 9613 algorithms for environmental noise (see Appendix J for detail). Predictions account for geometric divergence, barrier attenuation, atmospheric absorption, building reflections/screening, and ground absorption.

Key modelling assumptions included:

- 5 m topographical contours (from LiDAR data) were used to model the site and surrounding area.
- A ground factor of 0.5 (50% reflective) was applied across the model. This is conservative, given the prevalence of thick vegetation.
- All building façades were modelled with a reflection factor of 0.8 (80% reflective).
- Noise levels were predicted at 1.2 m above ground level, consistent with the *Noise Measurement Procedures Manual*.
- Equipment was modelled based on expected construction needs and timelines provided by Hydro Tasmania, representing a worst-case scenario for each working area.

Input sound power levels for typical construction equipment are provided in Table 5.14.

Modelling notes:

- Multiple dump/tipper truck movements were included at each site (e.g. 15 daily movements from three trucks travelling five times each).
- Truck movements between Tarraleah Village, the power station site, and Paddy's Quarry were included.
- Noise sources were modelled at ground level (e.g. engine/exhaust).
- Modelling represents a worst-case period when noise emissions are expected to be highest for each site.
- refers to construction of the workforce accommodation facility and compound, while "Tarraleah Village (operation)" refers to their temporary operation during construction.

10 epa.nsw.gov.au/~/media/EPA/Corporate%20Site/resources/noise/130127NGLGPart2.ashx

Table 5.14: Modelled sound power levels sources

Equipment	Quantity										Sound power levels (dBA/unit)	Height AGL (m)
	Tarraleah Village (implementation)	Tarraleah Village (operation)	Power station	Switchyard	Surge tower and pump station	Paddy's quarry portal	Mid access portal	Western portal	Headrace pipeline	Transmission lines		
Excavator (2.8 T)		1	1								95	1
Excavator (8 T)		1	1							1	99	1.5
Excavator (22 T)	1		1						1	1	103	1.5
Excavator (32 T)	1		1	1	1	1	1	2			104	1.5
Excavator (40 T)							1	1	1		114	1.5
Excavator (71 T)					1						105	1.5
Excavator (89 T)					1						108	1.5
12 T Tipper truck		2	1	1		1				1	104	1
30 T Dump truck	3		1	1	1			1	1		114	1
D6 Dozer (23 T)			1		1						107	1.5
D7 Dozer (28 T)	1									1	107	1.5
D8 Dozer (41 T)											108	1.5
D9 Dozer (50 T)			1	1		1	2	1			107	1.5
WA200 Wheeled loader	1		1		1					1	101	1.5
3 T Twin roller					1				1		101	1.5
15 T Multi-wheeled roller											102	1.5
12 T Vibratory roller	1										112	1.5
20 T Franna crane									1		101	2
Cone crusher						1		1			128	2
Down-the-hole hammer drill			1								125	0
Chainsaw										2	109	1

In addition, an assessment for intrusive or dominant characteristics was undertaken in accordance with the Tasmanian *Noise Measurement Procedures Manual* (DEPHA, 2008). Where a sound contains such characteristics, the measured sound pressure level must be adjusted. The assessment considers the following (DEPHA, 2008):

- **Tonality:** where a noise emission has a tonal characteristic.
- **Impulsiveness:** where a sound includes rapid, short changes in amplitude.
- **Modulation:** a variation in the sound pressure level, measured with fast time response, that is:
  - more than 3 dB overall, or in any one-third octave band
  - present for at least 10% of the representative assessment period
  - regular, cyclic, and audible.
- **Low frequency:** where a noise contains significant energy within the frequency range 20 Hz to 250 Hz.

5.6.2.3 Ground vibration modelling

Expected ground vibration from key construction activities was calculated using an exponential decay model developed by Amick. The model estimates peak ground vibration levels from anticipated construction vibration sources. It accounts for vibration source characteristics, distance from the source, soil properties, and geometrical attenuation.

Modelling assumptions included:

- Vibrations travel via surface wave propagation
- Soil properties of the intervening land and associated damping loss values.

5.6.2.4 Acceptable management levels

Noise

Noise management levels for the Project's construction phase have been developed using the NSW EPA *Draft Construction Noise Guideline 2020* (NSW noise guideline). This guideline was selected as the Tasmanian *Environmental Protection Policy (Noise) 2009* (Noise EPP) does not provide criteria relevant to construction and instead applies to typical, regularly occurring noise sources. The NSW guideline focuses on minimising impacts to sensitive receptors and ensuring all 'feasible' and 'reasonable' work practices are applied.

The guideline defines:

- **Noise Management Level (NML):** background noise level (Rated Background Level, RBL) plus 10 dB.
- **Highly Noise Affected Level (HNAL):** 75 dBA.

Table 5.15 outlines the adopted noise criteria for the Project, based on recorded background noise levels (refer to Section 5.6.3.1) and the NSW guideline. Given the low background noise levels in the Project area, the NML is considered conservative.

Table 5.15: Adopted Project Noise Criteria – NSW Interim Construction Noise Guideline

Sound Pressure Level (dBA)	Metric	Noise management action	Location	Hours
40	NML ($Leq_{(15\text{-minute})}$)	Requires consideration of noise management strategies.	All external locations	Day
75	HNAL ($Leq_{(15\text{-minute})}$)	Requires work to be paused if feasible. Assess the duration of the subject noise source and provide respite periods.	All external locations	Day

Ground vibration

Acceptable ground vibration management levels for the Project's construction phase have been developed using the following (see Appendix J for further detail):

- **NSW noise guideline**: which considers human exposure to vibration from construction.
- **German standard *DIN 4150-3 (1999) - Structural vibration: Effects of vibration on structures***: used to define criteria for assessing potential continuous or intermittent short-term ground vibration impacts on structures and residences. This standard provides guideline values which, if met, will prevent damage affecting a structure's serviceability. The guideline considers three types of structures:
  - **Commercial & industrial:** buildings used for commercial or industrial purposes, and those of similar design
  - **Residential:** dwellings and buildings of similar design and/or use
  - **Heritage-listed:** structures with particular sensitivity to vibration that do not fall into the above categories.
- DIN 4150 also provides recommended vibration criteria for underground pipe and tunnel works.

The adopted vibration management levels for the Project are shown in Table 5.16.

Table 5.16: Adopted ground vibration management levels for the Project's construction phase

Level	Peak Particle Velocity, (mm/s)		
	Human comfort	Heritage structures	Commercial structures
Warning	0.56	3	20
Alarm	1.1	5	25

5.6.3 Assessment

5.6.3.1 Ambient conditions

Ambient environmental noise monitoring (Appendix J) confirmed very low background levels consistent with the Project's remote location. Recorded values for Leq, L10 and L90 at Tarraleah Village ranged between 27–43 dBA (Table 5.17).

- **Daytime (6 am – 10 pm):** 30–43 dBA
- **Night-time (10 pm – 6 am):** 27–31 dBA

For context, Safe Work Australia's *Managing noise and preventing hearing loss at work – Code of Practice* (Nov 2024) equates these levels to between whispering (30 dBA) and quiet radio music (40 dBA).

Table 5.17: Ambient noise levels at Tarraleah Village

Noise source	Sound Pressure Level (dBA)		
	L10	L90	LEQ
Day time (6 am–10 pm)	40	30	43
Night-time (10 pm–6 am)	31	27	31

5.6.3.2 Impact assessment

Noise levels

Noise modelling was undertaken for each of the identified sensitive receptor locations:

- Tarraleah Village
  - Location A: Southern side of the existing accommodation cottages near Oldina Drive.
  - Location A.2: Eastern side of the accommodation cottages (off Trawala Crescent), with greater exposure to construction noise from the power station and switchyard sites.
- Bradys Lake (Location B)
- Bronte Lagoon (Location C)
- Wayatinah (Location D).

Tarraleah Village (implementation)

Table 5.19 presents predicted noise levels at each sensitive receptor during implementation of the workforce accommodation and construction compound at Tarraleah Village. This phase is reported separately as it will occur prior to commencement of the main construction works, and therefore will not contribute to cumulative noise levels from the broader Project.

Table 5.18: Predicted noise levels across the Project area and surrounds – Tarraleah Village implementation

Noise source	Predicted Sound Pressure Level (dBA)				
	Location A Tarraleah Village	Location A.2 Tarraleah Village (east)	Location B Brady's Lake	Location C Bronte Lagoon	Location D Wayatinah
Tarraleah Village (implementation)	40	33	<20	<20	<20

Project construction

Table 5.19 summarises the predicted noise levels at each sensitive receptor during Project construction. Predicted noise contours for the broader Project area (excluding Location D, Wayatinah, where no impacts are expected) are shown in Figure 5.51, with Figure 5.52 providing detail for Tarraleah Village.

Table 5.19: Predicted noise levels across the Project area and surrounds Project construction

Noise source	Predicted Sound Pressure Level (dBA)				
	Location A Tarraleah Village	Location A.2 Tarraleah Village (east)	Location B Brady's Lake	Location C Bronte Lagoon	Location D Wayatinah
Tarraleah Village (temporary operation)	26	25	<20	<20	<20
Power station (TAPS2)	31	44	<20	<20	<20
Switchyard	23	36	<20	<20	<20
Surge tower and pump station	28	28	<20	<20	<20
Paddy's Quarry	40	40	22	<20	<20
Mid access portal	<20	<20	<20	<20	<20
Western portal	<20	<20	<20	<20	<20
Headrace tunnel	<20	<20	<20	<20	<20
Overall	**41**	**46**	**23**	**<20**	**<20**

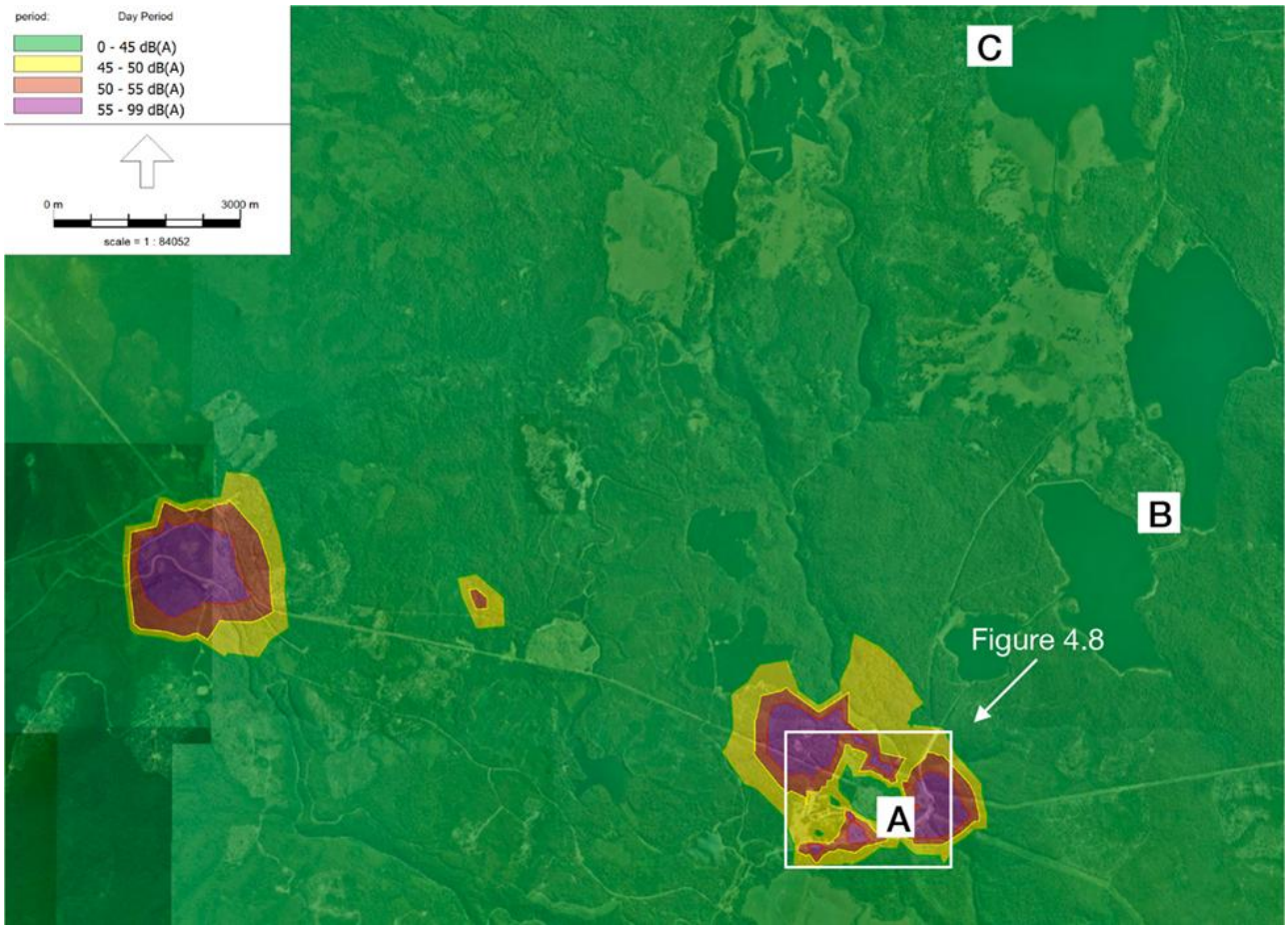


Figure 5.51: Predictive noise contours across the Project area and surrounds

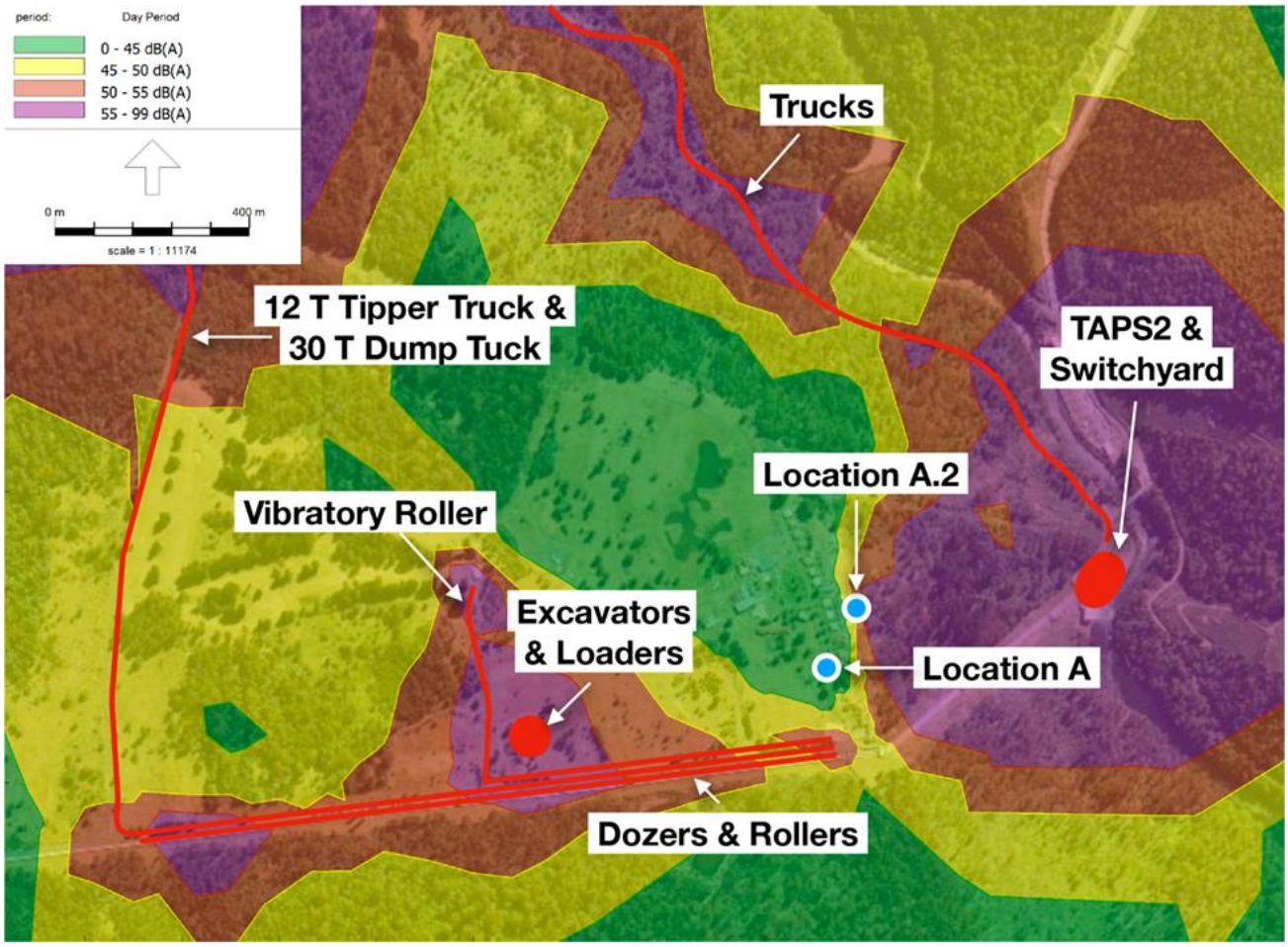


Figure 5.52: Predictive noise contours at Tarraleah Village (inset of Figure 5.51)

As certain noise characteristics—such as tonality, impulsiveness, modulation and low-frequency components—can increase the potential for interference, an assessment for intrusive or dominant characteristics was carried out (Appendix J). These features generally increase audibility. The assessment was undertaken only for sensitive receptors where predicted noise levels exceeded existing background levels. It is noted that the existing and/or future noise environment will mask some intrusive or dominant characteristics from construction sites; however, a 2 dBA adjustment was applied for impulsiveness at sites where crushing (Paddy's Quarry and western portal) or down-the-hole (DTH) hammer drilling (power station) may occur. This adjustment increases the predicted noise level within Tarraleah Village (Table 5.20). No adjustments were required for tonality, low frequency or modulation.

Table 5.20: Adjusted predicted noise levels across the Project area and surrounds based on assessment for intrusive or dominant characteristics

	Location A Tarraleah Village	Location A.2 Tarraleah Village (east)	Location B Brady's Lake	Location C Bronte Lagoon	Location D Wayatinah
Overall predicted noise level (dBA)	44	46	23	<20	<20
Intrusive or dominant characteristics – required adjustment (dBA)					
Tonality	-	-	-	-	-
Low frequency	-	-	-	-	-
Impulsiveness	2	2	Inaudible	Inaudible	Inaudible
Modulation	-	-	-	-	-
Overall adjusted noise level (dBA_{adj})	46	48	23	<20	<20

Transmission lines

Table 5.21 presents the predicted noise levels at each sensitive receptor for transmission line construction, with Figure 5.51 showing the predictive noise contours for each option. Each option was modelled using five clusters of noise sources, with the model assuming all equipment in all clusters operated simultaneously. As this scenario is highly unlikely, the model is considered conservative.

Table 5.21: Predicted noise levels across the Project area and surrounds – Transmission lines

Noise source	Predicted Sound Pressure Level (dBA)				
	Location A Tarraleah Village	Location A.2 Tarraleah Village (east)	Location B Brady's Lake	Location C Bronte Lagoon	Location D Wayatinah
Transmission line – northern option	34	37	<20	<20	<20
Transmission line – southern option	32	37	<20	<20	34

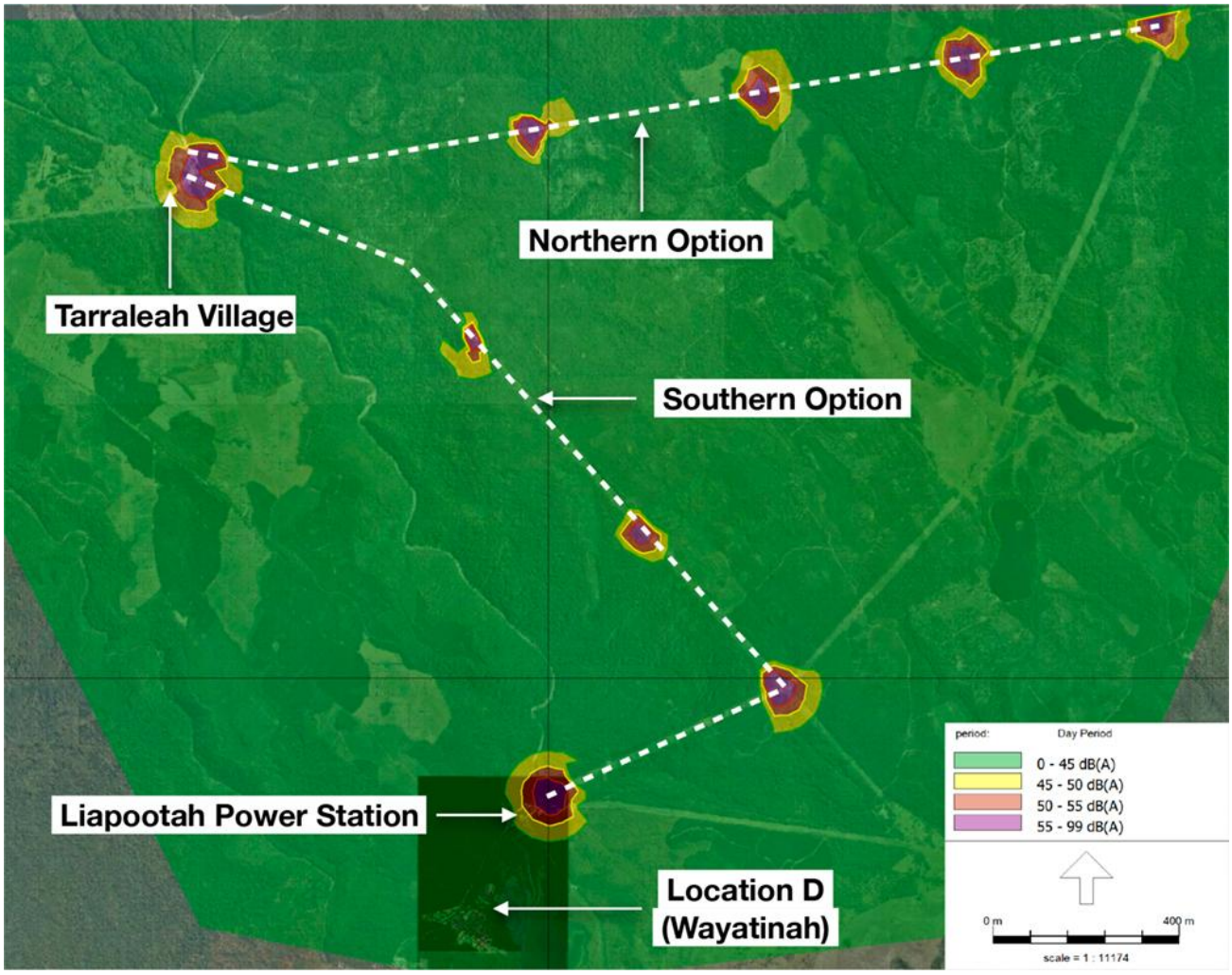


Figure 5.53: Predictive noise contours at transmission line options

In addition to modelled noise levels from transmission line construction, a helicopter is expected to be used for stringing activities. Its use is anticipated to be limited to a period of up to four days. Based on a nominal sound power level of 130 dBA, helicopter operations would exceed the adopted 75 dBA HNAL when within 225 m of a sensitive receptor and the adopted 40 dBA NML when within 12.5 km.

Traffic

Traffic noise on public roads does not fall within the scope of the EIS assessment but is expected to remain well below the adopted NML due to the infrequent nature of vehicle movements and the very low existing ambient noise levels.

Receptors

Bradys Lake, Bronte Lagoon

Construction noise is predicted to be inaudible at sensitive receptors at Brady's Lake and Bronte Lagoon, with levels of approximately 23 dBAadj and <20 dBAadj respectively, both below the adopted NML (Table 5.21). No management measures are required.

Wayatinah

Construction noise is predicted to be inaudible at Wayatinah for all activities except construction of the southern transmission line option near the Liapootah substation, where noise levels are predicted to reach 34 dBA. This is below the NML, and no management is required.

Tarraleah Village

During construction of the workforce accommodation facility (WAF) and construction compound, noise levels on the western side of Tarraleah Village are predicted to reach the adopted NML of 40 dBA. During construction of either transmission line option, noise levels within Tarraleah Village are expected to remain below the adopted NML.

For the Project as a whole, the worst-case predicted noise level within Tarraleah Village is nominally 48 dBAadj, above both the adopted NML of 40 dBA and the existing background/ambient noise levels, and would be clearly audible externally. This scenario represents a conservative worst case, requiring all equipment to operate simultaneously across all construction sites, which is unlikely. In practice, equipment use will vary with the construction schedule, and dominant noise sources (such as DTH drilling at the power station) will occur only for relatively short durations (approximately four months).

As Tarraleah Village is owned by Hydro Tasmania, it is not classified as a sensitive receptor under the NSW noise guideline. Nonetheless, noise levels may affect the amenity of workers accommodated at the WAF and village during construction. Potential disturbance, particularly to sleeping areas, can be mitigated through design measures to reduce noise intrusion. Compliance with internal noise standards for residential use (e.g. AS2107: *Acoustics – Recommended design sound levels and reverberation times for building interiors*) will ensure acceptable conditions for workers and align with the Project's health and safety management requirements. Tarraleah Village will not be available for public overnight accommodation during construction.

Ground vibration

Results of the expected ground vibration propagation modelling, expressed as Peak Particle Velocity (PPV, mm/s), at distances of 20 m, 100 m and 1000 m from the source are shown in Table 5.22. Typical vibration management distances to ensure vibration levels generated by various equipment remain below acceptable thresholds for human comfort, heritage structures and commercial structures are provided in Table 5.23.

Table 5.22: Predicted vibration velocities at stated distances

Vibration source	Typical PPV (mm/s) at Stated Distance		
	20 m	100 m	1 km
Rock breaker on 30 T excavator	2.1	0.8	0.0
Dozer 20 T (D6)	2.0	0.8	0.1
Excavator 30 T	2.5	1.0	0.1
Excavator 5 T	1.0	0.4	0.0
Vibratory roller 20 T	7.0	2.8	0.2
Vibratory roller 7 T	3.9	1.5	0.1
Truck and trailer (laiden, rough surface)	0.7	0.3	0.0
Tunnel boring machine	10.0	3.8	0.2
Down-The-Hole Hammer Drill	2.7	1.1	0.1

Table 5.23: Typical vibration management distances for construction equipment

Vibration source	Vibration Management Distance (m) for Stated Criteria		
	Human Comfort (0.56 mm/s)	Heritage Structures (3 mm/s)	Commercial Structures (20 mm/s)
Rock breaker on 30 T excavator	150	10	Avoid contact
Dozer 20 T (D6)	170	9	Avoid contact
Excavator 30 T	200	15	Avoid contact
Excavator 5 T	60	<5	Avoid contact
Vibratory roller 20 T	570	90	3
Vibratory roller 7 T	350	33	Avoid contact
Truck and trailer (laiden, rough surface)	30	<5	Avoid contact
Tunnel boring machine	60	140	6
Tunnel boring machine (underground)	190	45	8
Down-the-hole hammer drill	250	16	Avoid contact

Human comfort

Most works for the Project will occur well beyond the vibration management distances (Table 5.23); however, construction of the WAF and construction compound is expected to occur within attenuation distances, particularly when vibratory rollers, excavators and potentially bulldozers are used. These works will take place early in the construction schedule, when the number of workers at Tarraleah Village is relatively low.

Building structures

Although predictions are based on conservative assumptions, modelled vibration management levels for heritage structures (Table 5.15) may be exceeded under the following circumstances:

- Vibratory rolling within Tarraleah Village may exceed the management level for the existing sensitive penstock infrastructure when undertaken at the eastern end of Oldina Drive.
- Tunnelling may exceed management limits:
  - Beneath Tarraleah Village
  - Beneath the existing penstock infrastructure
  - Near the existing Tarraleah power station:
    - When tunnelling is commenced nearby
    - When DTH drilling occurs within ~16 m of sensitive infrastructure (potentially further if drilling into bedrock forming the power station foundations).
  - Near the existing open-air canals when tunnel boring machinery is operating
  - When heavy/large excavators or dozers operate within ~15 m of historical infrastructure.

Blasting

Blasting will comprise tunnel excavation blasting and bulk excavation blasting:

- Tunnel blasting is expected up to once per day per tunnel heading, for up to six concurrent headings (≈1,800 blasts per year). Powder factors are expected to range from 1.4–2.3 kg/m^3, with 30–200 m^3 of rock excavated per blast.
- Bulk excavation blasting is typically larger in scale but lower in frequency, occurring about once per week for each excavation (≈200 blasts per year). Powder factors are expected to range from 0.7–1.0 kg/m^3, with >2,000 m^3 of rock excavated per blast.

Air blast overpressure effects are typically confined to areas immediately adjacent to blasting and will be managed with strict exclusion zones. Sensitive structures will be offset from blasting activities to ensure no damage from overpressure.

5.6.4 Avoidance and mitigation measures

With the exception of helicopter use (refer NV2 below), no noise impacts from construction or operation of the Project are predicted at sensitive receptors not owned by Hydro Tasmania. Management and monitoring recommendations in the assessment will be considered when determining noise management measures for Hydro Tasmania-owned receptors but have not been included as commitments in this EIS.

Similarly, no ground vibration impacts are predicted at sensitive receptors outside Hydro Tasmania or TasNetworks ownership. Management recommendations will be considered when setting vibration limits but have not been included as commitments in this EIS.

5.6.4.1 Noise

NV1: To minimise noise in Tarraleah Village, where reasonably practicable, noisier plant (e.g. the crusher at Paddy's Quarry) will be located in areas providing topographic screening relative to Tarraleah Village.

NV2: To minimise impacts from helicopter stringing of the transmission line, operations will be restricted to between 7 am and 6 pm when near Wayatinah or Tarraleah Village. Residents of Bradys Lake, Bronte Lagoon and Wayatinah will be notified at least one week in advance of planned helicopter use.

5.6.4.2 Ground vibration

Ground vibration from construction equipment and blasting will be managed by setting vibration limits for building structures and, where relevant, human comfort at sensitive Hydro Tasmania and TasNetworks assets. Limits will be established either in accordance with published standards (e.g. AS 2187 Explosives – Storage, Transport and Use) or based on expert site-specific engineering and blast assessments. Construction equipment use and blasting will be designed by reference to these limits.

5.6.4.3 Residual impacts

Noise and vibration modelling under worst-case scenarios predicts no impacts at sensitive receptors outside Hydro Tasmania and TasNetworks ownership. During construction, noise and vibration are expected to be readily managed to maintain staff safety and amenity at Hydro Tasmania facilities and the structural integrity of Hydro Tasmania and TasNetworks infrastructure. No operational noise or vibration impacts are expected, and no residual impacts are anticipated.

5.7 Dangerous goods and environmentally hazardous materials

5.7.1 Assessment

During construction and operation of the Project, dangerous goods and environmentally hazardous materials are anticipated to be used, stored and transported within and to and from construction and operation sites.

5.7.1.1 Construction phase

During construction, the storage and handling of dangerous goods and environmentally hazardous materials is likely to include:

- Explosives for tunnel portals, tunnels and excavation, stored in designated explosive magazines and transported to construction sites as required
- Fuels (several thousand litres) for vehicles, machinery and equipment, stored at construction compounds. Refuelling will occur onsite in designated areas within compounds
- Lubricants and hydraulic oils (several thousand litres) for machinery and equipment, stored at compounds. Maintenance will occur onsite in designated areas
- Flocculants and coagulants (several thousand litres), stored at compounds and used in water treatment systems or sediment ponds
- Cement (approximately 15,000 tonnes) stored in bulk silos at concrete batch plants within compounds, for concrete and shotcrete production
- Shotcrete accelerant (several thousand litres), stored at compounds
- Paints, adhesives and solvents (several hundred litres) for general construction, stored at compounds
- Potentially contaminated spoil (approx. 200,000 m^3) from excavation of the power station site
- Weed control chemicals (several hundred litres), stored at compounds and used across the site

The location of construction compounds is shown in Figure 2.1. A complete list of dangerous goods and environmentally hazardous materials, with expected quantities, will be provided in a Hazardous Materials Management Plan (HMMP) (refer to DG 1 below).

Construction sites and compounds will be located in areas containing native flora and fauna, with some compounds close to waterways. Accidental spills of environmentally hazardous materials (e.g. from equipment or machinery failure) could reach nearby waterways or infiltrate groundwater. Spills that enter waterways (e.g. via drainage lines) pose significant risks to aquatic flora and fauna, ranging from direct toxicity to smothering effects (e.g. hydrocarbons).

5.7.1.2 Operational phase

During operation, dangerous goods and environmentally hazardous materials expected to be stored or used include:

- Transformer oil (tens of thousands of litres) contained within transformers in the transformer yard
- Lubricants and hydraulic oils (several hundred litres) for power station maintenance, stored in designated areas within the station
- Paints, solvents and adhesives (minor quantities) for maintenance activities.

Hydro Tasmania has committed to avoiding the use of sulphur hexafluoride (SF_6) in electrical infrastructure where possible. If SF_6 is required (e.g. within switchgear), it will be managed in accordance with the Tasmanian *Work Health and Safety Regulations 2022*, based on the quantity present onsite.

The new Tarraleah Power Station will be located on the banks of the Nive River. Failure of equipment containing environmentally hazardous materials, or accidental spills, could reach the river and adversely affect downstream aquatic flora and fauna.

5.7.2 Avoidance and mitigation measures

5.7.2.1 Construction

DG 1: A Hazardous Materials Management Plan (HMMP) will be prepared prior to construction. The HMMP will cover the storage, handling, containment and disposal of environmentally hazardous materials. Management measures will include:

- Environmentally hazardous materials, including dangerous goods, will be purchased, used, stored, transported and disposed of in accordance with relevant Safety Data Sheets (SDS) and applicable legislation, regulations and Australian Standards.
- Fuels, oils and lubricants will be stored and handled in accordance with *AS 1940:2017 – The storage and handling of flammable and combustible liquids*. Fuel dispensing areas will be designed to facilitate spill management and clean-up.
- Explosives will be kept in locked, purpose-built explosive magazines and stored, used and transported in accordance with *AS 2187.1:1998 – Explosives: Storage, Transport and Use – Storage*.
- Hazardous materials will be stored in dedicated, fenced and bunded areas with suitable ventilation and signage. Bunded areas will have capacity to hold 110% of the largest container. SDSs will be available onsite.
- The transport of dangerous goods will comply with the Australian Code for the Transport of Dangerous Goods by Road and Rail and the Dangerous Goods (Road and Rail Transport) Act 2010.
- Cement for batching will be stored in separate bulk silos at batch plants to prevent wind-blown waste and runoff.
- Containment devices (e.g. bunds, separators, catch trays) will be used wherever spillage risks exist.
- Spill kits will be placed adjacent to containment devices, on large machinery, in refuelling/maintenance areas and at other designated locations. Spill kits will be sized to match material volumes stored. Aquatic spill kits will be available near waterways.
- Management of hazardous materials will be included in site inductions. Relevant staff will undergo spill response, safe handling and storage training.
- All dangerous goods and hazardous substances will be registered on a Project chemical register with safety, storage, segregation and handling information, including SDSs.

DG 2: An Emergency Response Plan (ERP) will be prepared prior to construction and implemented throughout. The plan will:

- Provide contingency measures for control failures, equipment breakdowns or accidental releases
- Document notification procedures, including to Hydro Tasmania and the Tasmanian EPA
- Detail clean-up measures for terrestrial and aquatic environments, including:
  - Collection of affected soils/water into suitable containers or vehicles
  - Disposal of contaminated material at a temporary construction bioremediation area or licenced disposal facility (depending on spill type, quantity and severity)
  - Site remediation.

5.7.2.2 Operation

DG 3: During operation of the Project:

- Dangerous goods and hazardous materials will be managed in accordance with Hydro Tasmania's Hazardous Chemicals Management Procedure (HSEP0921).
- Generator power transformers will be located in a transformer yard outside the station building, each in a separate concrete bunded area. Bunds will meet the requirements of *AS 2067 – Design and erection of high voltage installations*.
- Fuels, oils and lubricants will be stored and handled in accordance with AS 1940:2017 – The storage and handling of flammable and combustible liquids.
- Hazardous materials within the power station will be stored in fenced and bunded areas with ventilation and signage. Bunds will have capacity to hold 110% of the largest container.

5.7.2.3 Residual impacts

Implementation of the HMMP, ERP and operational measures will mitigate risks of adverse environmental impacts from hazardous materials and dangerous goods during both construction and operation. No residual risks are anticipated.

5.8 Greenhouse gas emissions, ozone depleting substances and climate change

5.8.1 Impacts of climate change

The potential impacts of climate change on the Project include variations in rainfall patterns (including droughts and floods), and increased occurrence of severe storms, bushfires, heatwaves and damaging winds.

Historic climatic trends, along with modelled future trends for the area, were reviewed and informed Project design. The design considers the changing climate over the 80-85 year operational life, particularly weather extremes that may affect safe operation of infrastructure (including conveyances and the power station) and access to the site. Key design considerations include:

- Remotely controlled systems to reduce the need for site travel, particularly during extreme weather such as storms, heatwaves and periods of high fire danger
- Flood mitigation measures incorporated into the power station design, with allowance for future upgrades
- Reliable equipment and low-maintenance design elements to reduce site visits for planned or reactive maintenance, particularly during extreme weather
- Design for wind loading on structures and dams during storms
- Resilience to bushfires, including resistance to fire, heat and smoke damage, and protection of water quality
- Contribution of Lake King William to flood and drought management in the wider region
- Design of site access to account for storms, fire, landslides and temperature extremes
- Design of temporary infrastructure during construction to accommodate potential weather variations
- Transmission line route and tower design to manage fire risk, provide stable foundations for high wind loading, and ensure equipment is resilient to high temperatures.

Several of these design features will also help limit emissions during Project operation (Section 5.8.5).

5.8.2 Climate change policy context

The Tasmanian *Climate Change (State Action) Act 2008* sets a target for Tasmania to achieve net zero greenhouse gas (GHG) emissions, or lower, by 2030. Net zero represents the balance between anthropogenic emissions and removals each year.

The Project will result in both direct and indirect emissions from fossil fuel use, land use changes, vegetation clearing, industrial processes and waste management; however, as outlined in Section 5.8.5, measures are in place to minimise these emissions. Over its expected lifetime, the avoided emissions of the Project are estimated to exceed its total lifetime emissions by at least 15 times (accounting for the declining emissions intensity of the National Electricity Market (NEM)).

Tasmania's *Climate Change Action Plan 2023–25* sets out government commitments, including:

- Tasmanian Renewable Energy Target (TRET): *"Double Tasmania's renewable electricity production (from 2020 levels) by 2040, with an interim target of 150 per cent by 2030."*
- Ongoing investment in hydro-electricity assets and support for Hydro Tasmania's Major Projects Program (formerly Battery of the Nation), which highlights the importance of this Project.

The increased output, reliability and flexibility delivered by the Project will contribute to Tasmania's renewable electricity generation and support both the 2030 interim and 2040 TRET targets.

At the Commonwealth level, the *Climate Change Act 2022* sets targets to reduce Australia's net GHG emissions by 43% below 2005 levels by 2030, and to achieve net zero by 2050. The Project will contribute to these targets by:

- Increasing renewable electricity generation in Tasmania and on the mainland
- Replacing emissions-intensive generation
- Providing long-duration storage and flexible dispatch to support firming of variable renewable energy (wind and solar) in the NEM.

The Project is also being developed in alignment with the international *Hydropower Sustainability Standard* managed by the Hydropower Sustainability Alliance, including the *Climate Change Mitigation and Resilience Guidelines*.

5.8.2.1 Hydro Tasmania Towards Net Zero Action Plan

Launched in July 2023 and updated in September 2024, Hydro Tasmania's *Toward Net Zero Action Plan* is a voluntary initiative with a wide range of activities to measure, reduce and offset emissions. Examples include:

- Further electrification of fleet vehicles
- Integration of solar into the hybrid energy system on King Island
- Matching all electricity consumption (Scope 2 emissions) with International Renewable Energy Certificates from Tasmanian hydropower generation
- Quantifying Scope 3 emissions, with independent audit prior to publication.

The 2024 update also acknowledges key challenges, including emissions from the Tamar Valley Power Station and the lack of an agreed methodology for quantifying Scope 1 lake emissions. Hydro Tasmania will continue to review and adapt its approach in response to emerging research, global best practice, and shareholder expectations.

5.8.2.2 National Greenhouse and Energy Reporting Act 2007

The existing Tarraleah hydropower scheme has reported under the Commonwealth *National Greenhouse and Energy Reporting Act 2007* (NGERs) since its introduction. Hydro Tasmania reports:

- **Facility 1:** Tarraleah Hydropower Station
- **Facility 2:** Butlers Gorge Hydropower Station, Nieterana mini-hydropower and Derwent Pumps.

Reporting includes:

- **Scope 1 emissions:** fuel use for maintenance, contractor construction activities, and SF6 switchgear leakage.
- **Scope 2 emissions:** grid electricity use for station services and water pumping.
- **Energy production:** renewable electricity generation from hydropower.
- **Energy consumption:** self-generated renewable electricity for station services, water pumping and system losses, plus grid electricity and fuel combustion.

The facilities will continue to report during construction. Anticipated changes include:

- **Construction phase:**
  - Increased fuel use by contractors.
  - Increased grid electricity consumption for construction activities.
- **Operational phase of the new scheme:**
  - Reduced Scope 1 emissions from SF6 leakage due to the adoption of alternative switchgear.
  - Increased renewable electricity generation from higher generator capacity and efficiency.
  - Increased grid electricity consumption when the new generator operates in synchronous condenser mode, supporting grid stability for non-synchronous wind and solar generation.

5.8.3 Direct and indirect project impacts

The Project will result in both direct and indirect GHG emissions.

- **Direct emissions**: will be generated from fossil fuel use by heavy machinery and blasting during construction, and from maintenance works during operation. Emissions from land use change associated with the formation of Lake King William in 1951 will continue throughout the life of the Project; however, these occur regardless of whether the redevelopment proceeds.
- **Indirect emissions:** will arise mainly from the procurement of construction materials, particularly concrete, glass-reinforced plastic pipe, steel, explosives, and other inputs with embodied emissions from fossil fuel use and industrial processes. During operation, indirect emissions are expected to be minimal, given the low emissions factor of the Tasmanian electricity grid.

No ozone-depleting substances are expected to be used during construction or operation.

The Project will deliver a redeveloped hydropower scheme capable of operating for longer periods at full capacity, managing generation timing through water storage in Lake King William, and providing system inertia and voltage support for variable renewable generation in the NEM (solar and wind). Overall, the Project is expected to generate up to 200 Gigawatt hours (GWh) per year of additional hydroelectricity compared with the existing scheme.

A simple estimate of avoided GHG emissions considers the alternative source of this electricity to be the NEM, where generation would otherwise occur at the grid-average emissions factor.

- The current NEM Scope 2 and 3 emissions factor is 0.71 tCO_2e/MWh, compared with Tasmania's current factor of 0.18 tCO_2e/MWh. The NEM factor has declined over time and will continue to reduce as fossil-fuelled generation is displaced by renewables, eventually approaching zero.
- The lifecycle emissions factor for the redeveloped Tarraleah scheme, including construction, maintenance, ongoing reservoir emissions, and use of grid electricity and fuels during operation, is estimated at 0.019 tCO_2e/MWh.
- Excluding the continuing reservoir emissions, the lifecycle factor reduces to 0.0036 tCO_2e/MWh. Both estimates are substantially lower than the current NEM and Tasmanian factors.

Over the Project's 80-year life, the avoided emissions from the additional 200 GWh of annual hydro generation are expected to be 13 times greater than the emissions created during construction, maintenance and operation. This calculation assumes a continued reduction in NEM grid emissions over time and excludes ongoing reservoir emissions, which are unaffected by the Project.

5.8.4 Construction emissions

A high-level assessment of the main sources of construction emissions has been undertaken, based on:

- Bill of Quantities from the design as of early 2024 (subject to change)
- Emission factors from Ecoinvent v3.6 and v3.9, environmental product declarations, and industry experience
- Goods and services included in the quantification:
  - Concrete
  - Steel for civil infrastructure (rebars, lining, gates, trash racks, penstock)
  - Steel for electrical and mechanical infrastructure (turbine, generator, transformer, head crane)
  - GRP pipe
  - Underground rock excavation
  - Open-air soil and rock excavation
  - Spoil disposal and fill.

The quantified emissions (Figure 5.54) cover:

- Direct emissions from fossil fuel use by heavy machinery and blasting
- Indirect emissions from embodied emissions of concrete, steel, GRP pipe, and ammonium nitrate, associated with fossil fuel use and industrial processes during manufacture

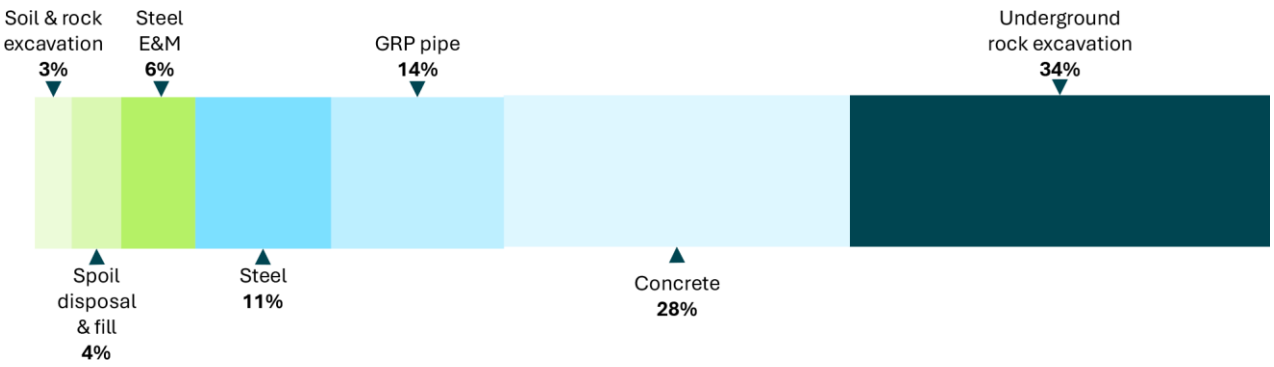


Figure 5.54: Quantified emissions of key construction activities and materials

- Total construction emissions from the above sources are estimated at 95 ktCO_2e
- Emissions from professional services, camp and accommodation, commuting, other energy consumption, freight, balance-of-plant works (e.g. transmission line), and waste management have not been quantified as they are considered immaterial

Decommissioning of the existing power stations and canals does not form part of the Project.

5.8.5 Measures to minimise construction emissions

The Project design has reduced potential emissions by maximising the use of existing storages and assets, including Clark Dam, Mossy Marsh Dam, No. 2 Pond and Tarraleah Village. This avoids emissions from constructing new infrastructure and reservoir emissions associated with land use change.

GHG 1: During detailed design and construction, the following measures will be considered where practicable and consistent with Technical Specification requirements:

- Use of GRP pipe rather than steel pipe where feasible (e.g. for surface installations accessible for maintenance), as steel has higher embodied and transport emissions
- Minimising the final disturbance footprint and rehabilitating disturbed land not required for ongoing operations, reducing direct emissions from land use change (refer Chapter 7):
- Preference for electric vehicles and construction machinery
- Avoidance of SF_6 (a potent GHG) in electrical infrastructure (e.g. switchboards)
- Reducing transport fuel emissions by reusing or disposing of spoil at designated spoil emplacement sites
- Implementing a Local Industry Participation Plan to preference local suppliers of goods and services where commercially and technically viable (refer Section 5.9).

GHG 2: To ensure value engineering opportunities are captured beyond the commitments in this EIS:

- Contractors will be required to demonstrate, through the selection and use of key construction materials (including concrete, steel, GRP pipe and blasting materials), that lower embodied emission options have been chosen where consistent with Technical Specification requirements.
- GHG emissions from fuel and electricity use during construction will be tracked to monitor performance.

5.8.6 Measures to minimise operational emissions

Operational emissions associated with the Project will primarily result from the use of fossil fuels for maintenance activities (e.g. vehicle travel to and from site). The Project's reference design has incorporated measures to minimise these direct impacts, including:

- Remote operation of scheme infrastructure from Hydro Tasmania's head office in Hobart, reducing the need for a regular site presence
- Installation of new, reliable equipment to reduce the frequency of reactive maintenance and associated fossil fuel use
- Incorporation of low-maintenance design elements, such as avoiding unnecessary painted surfaces, to reduce planned maintenance requirements and the associated use of fossil-fuelled equipment.

The design has also addressed indirect operational emissions by:

- Incorporating a high-efficiency Francis turbine (up to 95% efficiency) to maximise electricity production from available water
- Designing flexible conveyance systems to optimise the timing of electricity generation, reducing the need for fossil-fuelled generation elsewhere in the grid
- Selecting turbines with rapid response capability that support the integration of variable renewable generation (wind and solar) while maintaining high efficiency during periods of low flow.

5.8.6.1 Residual impacts

Over the Project's lifetime, the emissions avoided by the additional 200 GWh of hydroelectricity generated each year are expected to be approximately 13 times greater than the emissions created during construction, maintenance and operation. The Project is therefore anticipated to deliver a positive residual impact on GHG emissions.

5.9 Social impact

Social Impact Assessment (SIA) is a process used to identify, analyse, monitor and manage the social, cultural and economic effects of a Project on communities and stakeholders. An SIA has been completed for the Project (Appendix E), with key findings summarised in this Chapter.

5.9.1 Scope and methods

5.9.1.1 Social Impact Assessment scope

The SIA assesses potential socio-economic impacts and opportunities associated with direct Project activities within the Project area. While the assessment considers both construction and operations, the primary focus is the construction phase, as this is when the most significant impacts are expected.

The scope was informed by:

- Statutory requirements and guidelines (e.g. the EIS Guidelines)
- Key Project elements such as workforce characteristics, construction methods and operational arrangements
- Socio-economic characteristics of the study area
- Findings of relevant EIS technical studies
- Stakeholder inputs on potential impacts and opportunities.

5.9.1.2 Approach

Tasmanian legislation and guidelines do not prescribe the content or methods for SIA. The approach was therefore guided by industry best practice standards, including:

- International Association for Impact Assessment (IAIA) SIA *Guidance for Assessing and Managing the Social Impacts of Projects* (Vanclay et al., 2015)
- NSW Government Social Impact Assessment Guideline and Technical Supplement (NSW DPIE, 2020).
- International Hydropower Association (IHA) Good Practice Guide: Hydropower Environmental and Social Assessment and Management (IHA, 2021).

The SIA process is intended to ensure that the Project contributes positively to local communities by enabling beneficial social change and development (Vanclay et al., 2015). The methodology is illustrated in Figure 5.55.

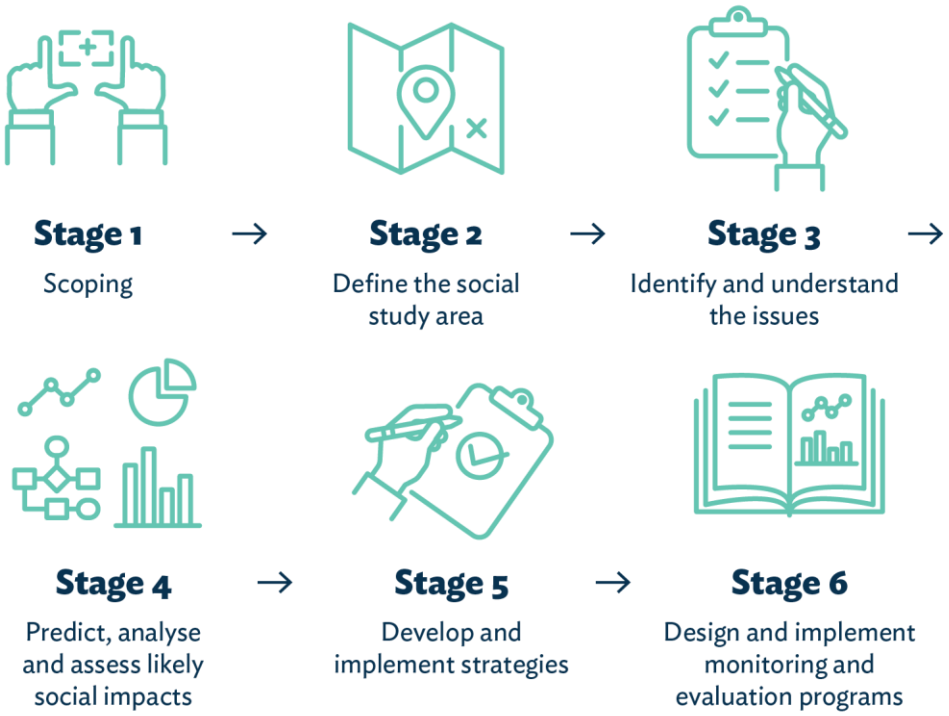


Figure 5.55: Social Impact Assessment Methodology

Stage 1 Scoping

Preliminary identification of potential socio-economic issues, impacts and opportunities, considering:

- The nature and scale of Project activities
- The likely spatial distribution of impacts
- The location of potentially affected individuals and communities.

This stage informed the issues to be further investigated through the SIA.

Stage 2 Define the social study area

The study area defines the spatial focus for the SIA and includes:

- **Local study area**: Communities expected to experience direct impacts such as changes to accessibility, surroundings, way of life and livelihoods.
- **Regional study area**: Areas potentially affected by broader socio-economic effects such as demand on infrastructure, services and facilities, increased through traffic, or cumulative effects of other projects. Benefits may include economic opportunities from supply, procurement and workforce participation.

The study area is detailed in Table 5.24.

Stage 3 Identify and understand the issues

A social baseline study established socio-economic conditions in the absence of the Project. This was informed by:

- Targeted consultation with stakeholders and communities
- Analysis of qualitative and quantitative primary and secondary data.

Baseline socio-economic characteristics are summarised in Section 5.9.2.

Stage 4 Predict, analyse and assess likely impacts

Potential social impacts and opportunities for construction and operations were identified using:

- Baseline data and community consultation
- Findings of technical studies (e.g. traffic, noise)
- Impact pathway analysis
- Case studies from comparable renewable energy projects.

A risk-based approach was applied to assess significance, considering likelihood, consequence and community sensitivity. Assessment was made from the perspective of those expected to be affected.

Stage 5 Develop and implement strategies

Mitigation measures were developed for all potentially significant social impacts, informed by:

- Industry-standard and leading practice approaches
- Findings of technical studies
- Outcomes of community consultation

Measures were also identified to enhance Project opportunities. These will be consolidated into a Social Impact Management Plan (SIMP) for the pre-construction and construction phases. The SIMP provides a framework for management, monitoring and adaptive management of social impacts and opportunities.

Design and implement monitoring and evaluation programs

Hydro Tasmania will develop a monitoring, evaluation, reporting and improvement (MERI) program as part of the SIMP. Once finalised, this program will align with the MERI Framework of the broader Major Projects Social Program.

The Social Program includes:

- Community and stakeholder engagement activities
- Action plans for managing Project impacts and opportunities
- Continuous improvement and reporting processes.

The Program will be implemented by the Major Projects Construction Unit in collaboration with the EPC Contractor's community engagement team. The MERI Framework is one of the Program's key tools for evaluation and improvement.

Community consultation

Community and stakeholder consultation was central to the SIA. Engagement included:

- Neighbouring landholders
- Local, state and Australian governments
- Industry bodies, community groups and organisations
- Other interested parties.

Methods included tailored interviews, stakeholder meetings and surveys, which provided both qualitative and quantitative data. This data helped validate baseline assumptions, identify and test potential impacts and opportunities, and inform management responses.

5.9.1.3 Study area

Table 5.24 describes the SIA study area with reference to Australian Bureau of Statistics (ABS) statistical boundaries, which are used for data collection. The terminology presented in the table is used throughout this Chapter.

Table 5.24: SIA study area

Study area	Geographic area	ABS data terminology	Report terminology
Local study area	Tarraleah Wayatinah Bronte Park Dee Ouse Bradys Lake London Lakes Butlers Gorge	Tarraleah SAL Wayatinah SAL Bronte Park SAL Dee SAL Ouse SAL Bradys Lake SAL London Lakes SAL Butlers Gorge SAL	Tarraleah Wayatinah Bronte Park Dee Ouse Bradys Lake London Lakes Butlers Gorge
Regional study area	Central Highlands Derwent Valley	Central Highlands local government area (LGA) Derwent Valley LGA	Central Highlands LGA Derwent Valley LGA Region
State of Tasmania	Tasmania	Tasmania STE	State / Tasmania
Other areas of reference	South-East Region	South-East Region SA4	South-East Region

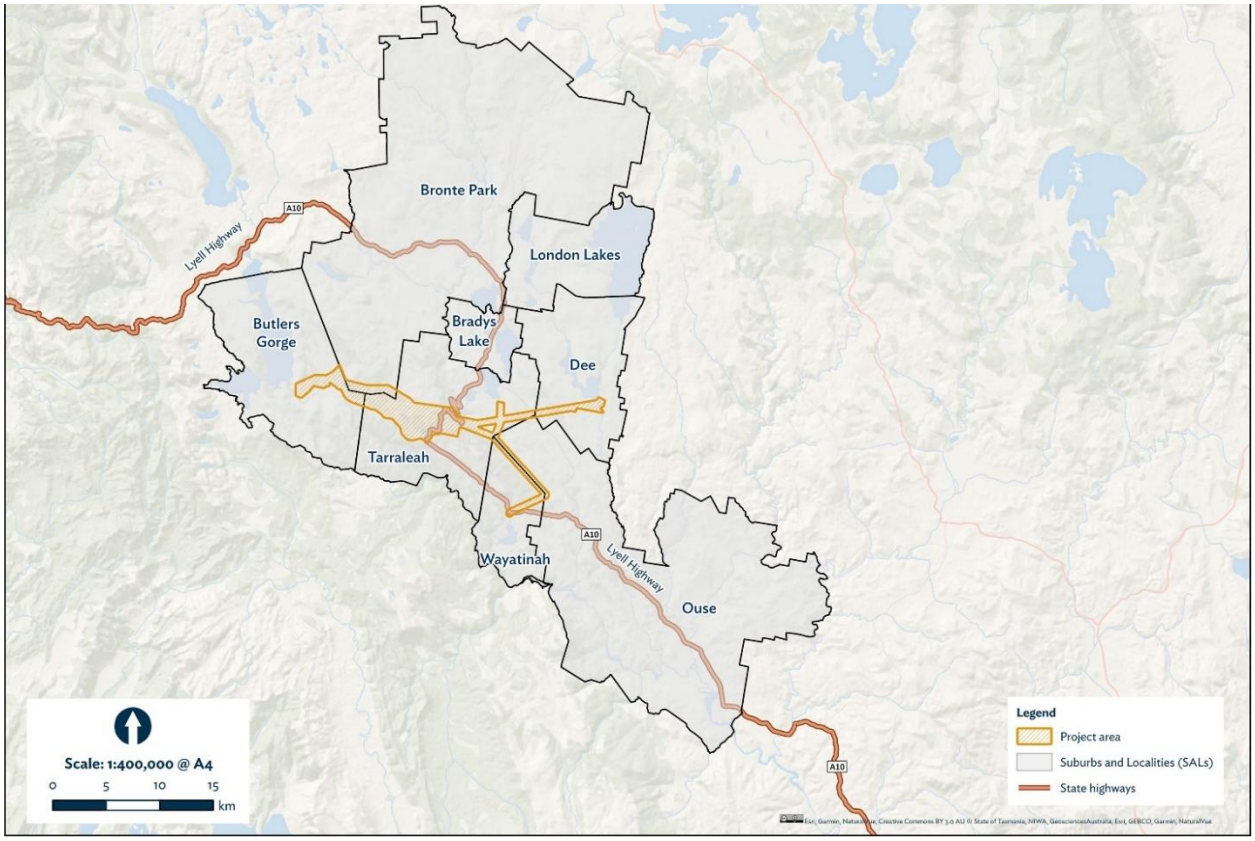


Figure 5.56: Local study area

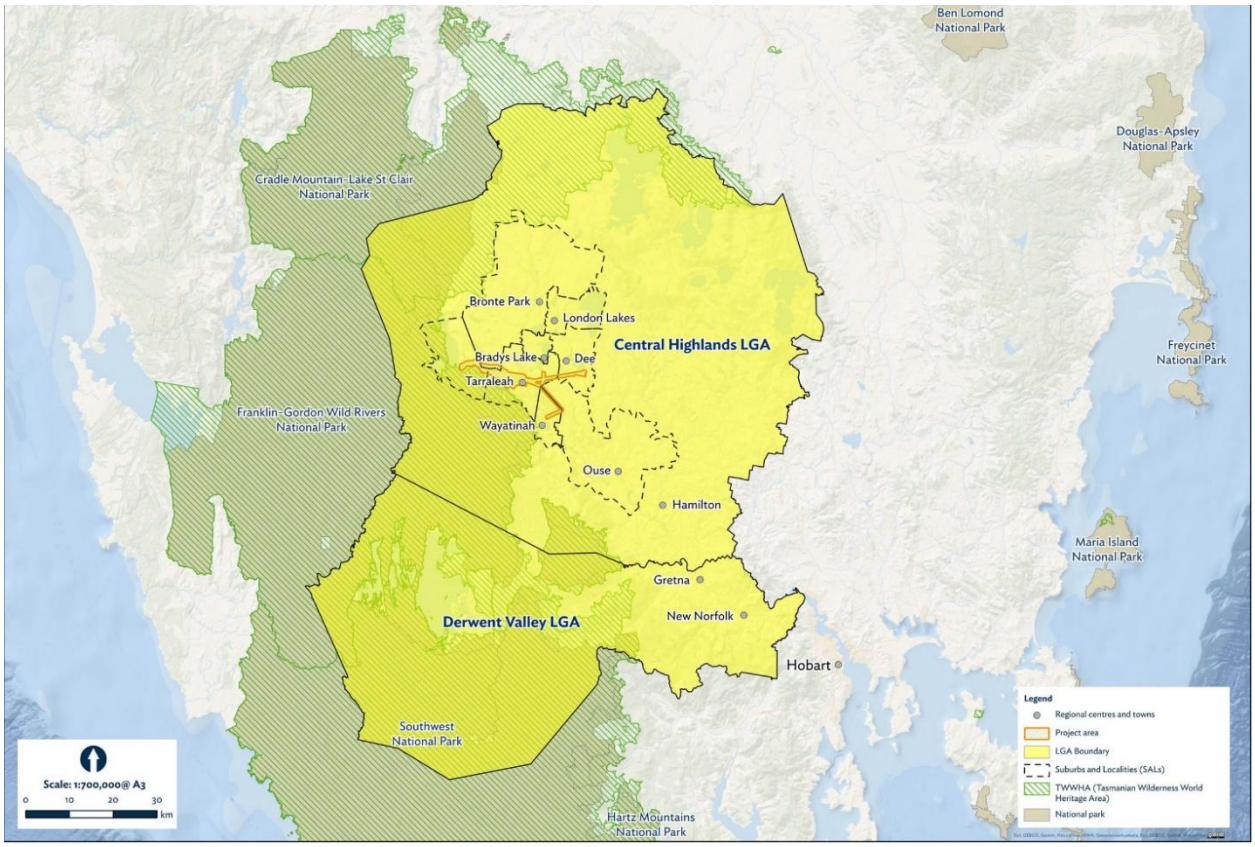


Figure 5.57: Regional study area

5.9.2 Existing social environment

This section summarises the existing socio-economic environment of the SIA study area. It includes an overview of the historical First Nations cultural setting and current social and settlement characteristics.

5.9.2.1 Historical First Nations cultural setting

At the time of European arrival, the upper Derwent region, including the tributaries draining the Central Plateau, lay within the territory of the Big River nation, the most landlocked group of Tasmanian Aboriginal peoples. The nation's domain extended from New Norfolk in the south to Surrey Hills in the northwest and to the edge of the midland plains in the east. Without direct coastal territory, the Big River people accessed the lowlands and coasts through social agreements with neighbouring groups.

The Big River nation is thought to have comprised five or six clans, with the Larmairremener clan occupying the high country west of the Dee River. This clan, estimated at 60–80 individuals, practiced a culture well-adapted to sub-alpine life.

Occupation of the highlands was generally seasonal, with clans migrating east to spend winters with the Oyster Bay Nation, although year-round occupation was possible when required. Movement through the Big River domain was facilitated by a network of radiating tracks, committed to memory and marked in places, linking hunting and foraging areas with campsites.

For the first decade following European arrival, the Larmairremener continued their culture relatively undisturbed. This changed rapidly as settlers moved cattle and sheep into key hunting grounds along the Derwent, Ouse and Clyde rivers, and as summer grazing expanded onto highland marshes. From 1822, British expropriation of Aboriginal lands escalated, and by the mid-1820s the Ouse and Clyde valleys became strategic corridors for Aboriginal resistance.

Between 1824 and 1831, guerrilla-style resistance was met with severe reprisals. By 1831, when conciliator G. A. Robinson persuaded survivors to lay down arms, the Big River nation had been reduced to only 26 people, including several Larmairremener (Ryan, 2012).

Further information on Aboriginal cultural heritage is provided in Section 5.13.

5.9.2.2 Project area

The Project area is situated near Tarraleah and Wayatinah[11] in the Central Highlands local government area (LGA), approximately 30 minutes northwest of Ouse.

Access is provided via the Lyell Highway and Butlers Gorge Road, a 17 km unsealed road connecting the highway to Lake King William and Butlers Gorge Power Station. The Lyell Highway links Hobart (southeast) and Queenstown (west).

The region has a long history of hydropower development, timber harvesting and plantation forestry. Dams, canals, flumes, penstocks and transmission lines are prominent in the landscape. The TWWHA and Franklin-Gordon Wild Rivers National Park are located southwest of the Project area.

11 Tarraleah and Wayatinah are referred to as 'villages' and were established by Hydro Tasmania in the early 1930's and 1950's (respectively) during the development of the Derwent Hydropower Schemes.

5.9.2.3 Local study area

The Project area is located in a sparsely populated region. Within 1 km of the site, there are approximately nine private residences, mainly around Dee Lagoon and near the northern transmission line option.

A number of small settlements are located within a 30-minute drive, including Tarraleah, Wayatinah, Butlers Gorge, Bronte Park, Dee, Bradys Lake and London Lakes. In 2021, the permanent population of each locality was fewer than 50 people. Populations increase seasonally, particularly during trout fishing season and summer months. Many of these settlements originated during hydropower development and retain cultural significance.

Key locality characteristics are summarised below (and in Table 5.25):

- **Tarraleah**: Former Hydro village, now a tourist attraction and accommodation hub. Facilities include a café, restaurant, campground, golf club, historic penstock lookout and access to Tarraleah Falls track. Currently no permanent residents but provides worker and visitor accommodation.
- **Wayatinah:** Established in the 1950s for Hydro workers. In 2021 recorded a population of 18. Includes a tavern/store (Hydro-operated), community hall, 47 houses (22 Hydro-owned, 25 private—7 owned by Salmon Enterprises of Tasmania (SALTAS)). Hosts a SALTAS salmon hatchery, a caravan park, and a 9-hole golf course. Primarily accommodates Hydro and SALTAS workers.
- **Butlers Gorge:** No permanent residents. Contains Lake King William and hydro infrastructure. The former township site is marked by a monument and visited by families of past workers. Butlers Gorge Road provides access to Hydro sites and Mossy Marsh.
- **Bronte Park**: Rural locality with three settlement areas: Bronte Village, Bronte Estate and Highland Cabins & Cottages. In 2021 population was 49. A hub for trout fishers and outdoor recreation. Bronte General Store provides fuel and basic services.
    - **Bronte Village:** Former Hydro settlement, now mostly privately owned shacks and a caravan park.
    - **Bronte Estate:** Post-Hydro development with a mix of permanent and semi-permanent residents.
    - **Highland Cabins & Cottages:** Tourist accommodation south of Bronte Estate.
- **Bradys Lake**: Popular fishing and kayaking area with a small residential population. Hosts the nearest Tasmanian Fire Service to the Project.
- **Dee**: Small settlement centred on Dee Lagoon, a popular trout fishing location.
- **London Lakes**: Contains Lakes Big Jim, Samuel, Highland Waters and much of Lake Echo. A renowned fly-fishing destination with a small population.
- **Ouse**: Closest service centre (population 326). Provides limited retail, commercial, tourism, accommodation and recreation services.

Table 5.25: Selected characteristics – Local study area

Location*	Population	Private dwellings	Median Age	Median weekly household income ($)
Wayatinah	18	53	39	1,625
Bronte Park	49	111	59	649
Dee	7	27	74	474
Ouse	326	184	46	850
Bradys Lake	42	123	67	665
London Lakes	10	48	62	724
Total	452	546	-	-

Source: (ABS 2021)

* Demographic information is unavailable for the Tarraleah or Butlers Gorge localities as they had no recorded population or a very small population at the time of the ABS 2021 Census.

5.9.2.4 Regional study area

The regional setting of the Project is shown in Figure 5.57 and described below.

Central Highlands LGA

The Central Highlands LGA, located in central Tasmania, contains the small townships of Bothwell, Hamilton and Ouse as well as numerous villages. The CHC chambers are based in Bothwell, with a works depot at Hamilton.

In 2021, the LGA recorded a population of 2,520 people, along with approximately 3,700 ratepayers who own holiday "shacks" around the lakes and mountains (CHC, 2024a). Around 6.1% of the population identified as Aboriginal and Torres Strait Islander. Bothwell is the largest settlement (379 residents in 2021). Much of the LGA is considered isolated, with limited services available.

The LGA is predominantly rural, with the economy reliant on agriculture, forestry and fishing, and with tourism—particularly eco-tourism and heritage-based activities—playing a growing role. The area has a small and ageing population, negligible dwelling and population growth over the past decade, and limited economic diversity. These factors are beginning to challenge the long-term sustainability of smaller communities.

Like many regional areas, the Central Highlands LGA faces socio-economic challenges, including:

- Limited housing and employment opportunities
- Difficulties recruiting and retaining skilled workers
- Lack of public transport
- Restricted access to health and social services.

Household incomes are below the state average, unemployment is relatively high, educational attainment is low, and there is a growing need for health and aged-care services.

The LGA encompasses part of the Tasmanian Wilderness World Heritage Area, two national parks, and other conservation areas. Recreational fly fishing, hunting and bushwalking are popular activities. The region is also the birthplace of Hydro Tasmania's hydro-electric power system.

Key socio-economic characteristics[12] compared with Tasmania overall include:

- **Population profile:** Stagnant growth, fewer people aged 0–17, and a higher proportion aged 60+.
- **Households:** High proportion of lone-person households (33% vs 28% for Tasmania).
- **Income**: Lower median household income ($1,114 vs $1,368); fewer high-income households (9.6% vs 13.4%); more low-income households (36% vs 29%).
- **Housing**: Lower proportion of renters (16% vs 26%).
- **Education**: 10% hold a university qualification (vs 22%); 23% hold a trade certificate (vs 22%).
- **Employment**: Unemployment rate 5.9% (similar to state) but lower labour force participation (49% vs 58%).
- **Disadvantage:** Higher rates of socio-economic disadvantage.

Derwent Valley LGA

The Derwent Valley LGA lies northwest of Hobart and approximately 94 km by road from the Project area. In 2021, the LGA population was 10,942 people, with more than half living in and around New Norfolk, which serves as the regional hub and is the seat of the Derwent Valley Council (DVC). New Norfolk is located about 1 hour 15 minutes by road from the Project and provides the closest significant service centre.

The Derwent Valley LGA has a more diverse economy than the Central Highlands, with strength in agriculture, manufacturing and health care. Manufacturing makes a substantial contribution, and the council is actively pursuing economic diversification.

However, the LGA faces significant challenges, including high unemployment, a local skills gap, and low educational attainment, all of which constrain economic growth. Median household incomes are below the state average, and many households experience economic hardship. Health challenges are also prevalent, with higher rates of chronic illness and mental health issues.

Major features of the LGA include extensive freshwater resources and productive agricultural land that supports agriculture and horticulture industries.

Key socio-economic characteristics[13] compared with Tasmania overall include:

- **Population profile**: Growing population, with more residents aged 0–19 and fewer aged 65+.
- **Households**: Smaller proportion of renters (21% vs 26%).
- **Income**: Fewer high-income households (9.5% vs 13.4%) and more low-income households (29.2% vs 29%).
- **Education**: 9% hold a university qualification (vs 22%); 25% hold a trade certificate (vs 22%).
- **Employment**: Higher unemployment (7.3% vs 5.9%) and lower labour force participation (55% vs 58%).
- **Youth engagement**: Higher youth disengagement (14.9% disengaged and 16.9% partially engaged vs 11.9% and 15.4% for Tasmania).
- **Disadvantage**: Higher rates of socio-economic disadvantage.

A full summary of existing social conditions in the SIA study area is provided in Appendix E – Section 7.

12 Based on 2021 Australian Bureau of Statistics Census Data.
13 Based on 2021 Australian Bureau of Statistics Census Data.

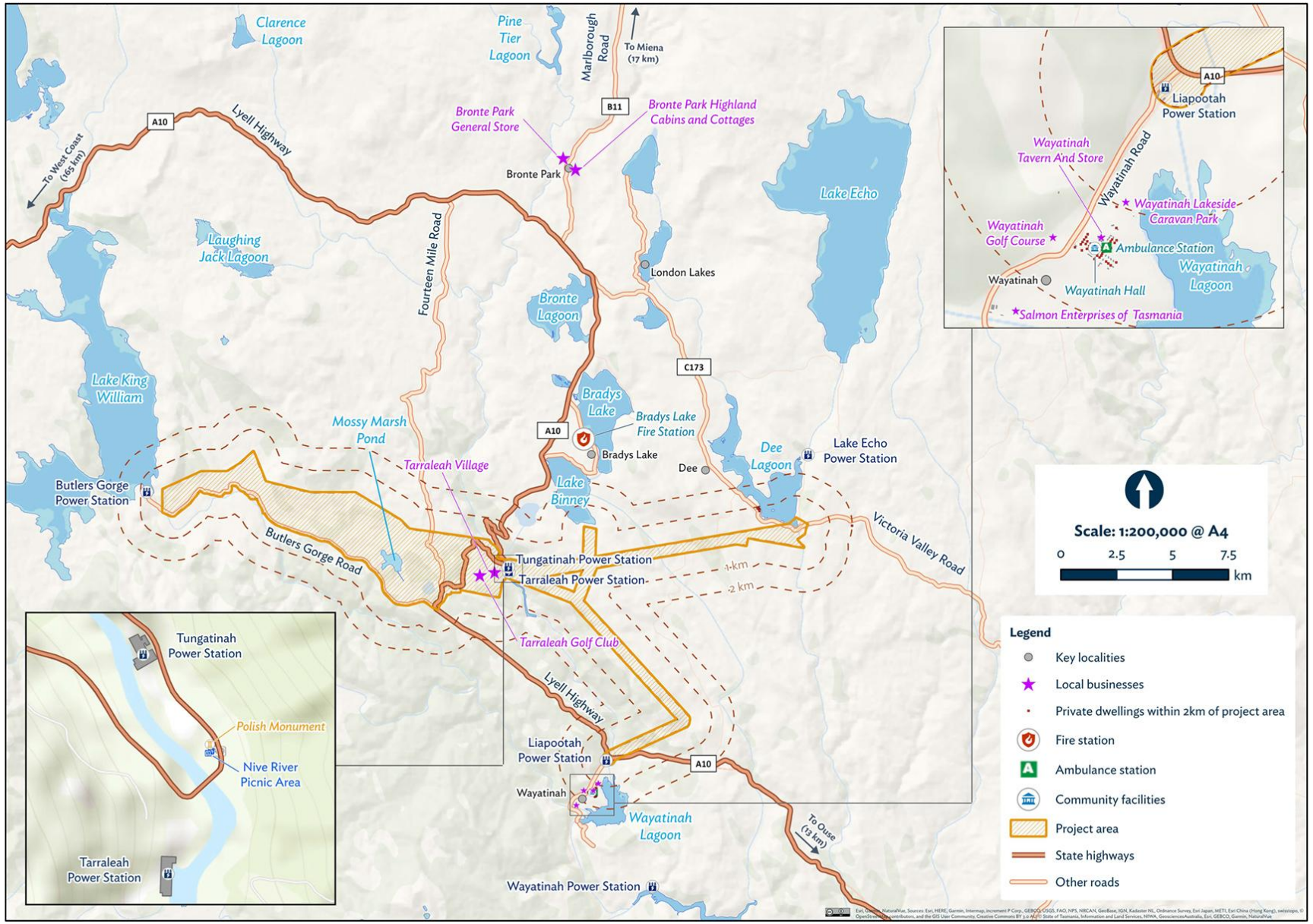


Figure 5.58: Local Setting

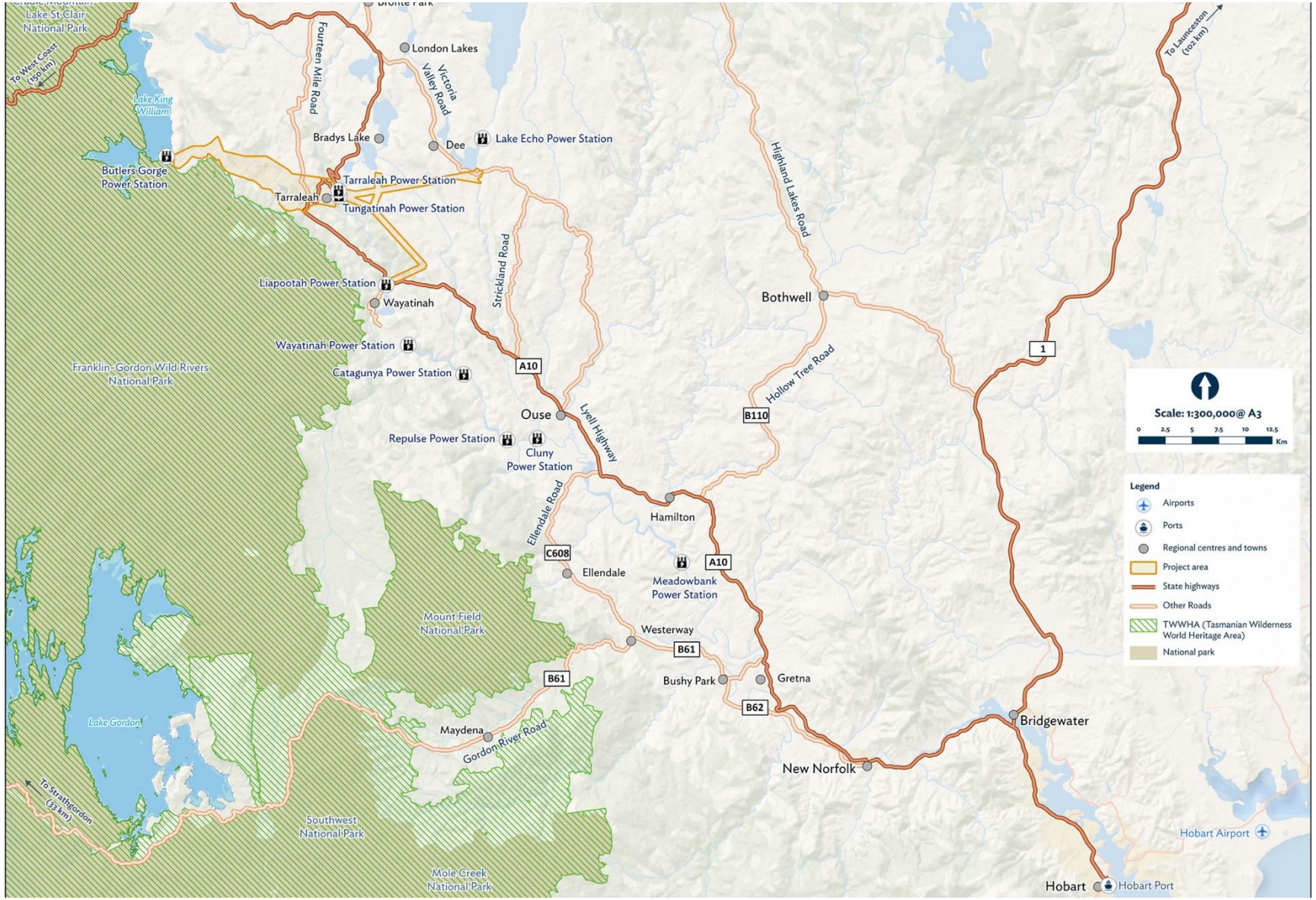


Figure 5.59: Regional Setting

5.9.3 Assessment and management

This section summarises the potential social impacts and opportunities associated with the Project, along with Hydro Tasmania's commitments to managing these impacts. Potential impacts—both positive and negative—have been assessed based on actual or perceived changes to the social and biophysical environment.

The SIA considered potential effects across a range of social impact categories, including:

- Way of life
- Community
- Accessibility
- Culture
- Health and wellbeing
- Surroundings
- Livelihoods.

The development of social impact management measures has been guided by Hydro Tasmania's Major Projects frameworks and strategies, including:

- **Major Projects Local Benefit Sharing (LBS) Strategy:** LBS refers to deliberate measures undertaken by Hydro Tasmania to ensure communities share in the benefits of the Project. These measures extend beyond statutory requirements, compensation obligations, or standard socio-economic and environmental risk mitigation. The strategy establishes three key mechanisms for delivering local benefits:
  - Incorporating design elements that enable ancillary infrastructure to provide long-term community or economic value
  - Requiring and supporting the EPC Contractor to maximise local industry participation and capacity building
  - Establishing and investing in a community benefit sharing fund to support co-designed initiatives that respond to locally identified needs.
- **Major Projects Local Content Framework (MPLCF)**: The MPLCF sets out Hydro Tasmania's objectives for achieving economic and social benefits for host communities through investment in major hydropower developments. It ensures that construction activity generates value for local communities by prioritising the use of local labour, materials and services. This approach supports immediate economic participation, builds skills and capacity, and contributes to the long-term resilience of local, regional and statewide economies.

5.9.3.1 Construction phase

The potential social impacts and opportunities of the construction phase, along with proposed management measures, are summarised in Table 5.26 (negative impacts) and Table 5.27 (positive impacts).

Where management measures are referenced in Table 5.26, they are described in full on first mention, and thereafter identified by their management measure reference ID. A full description of each measure is provided in Table 5.30.

Table 5.26: Summary of potential negative impacts and management measures

Impacts	Management measures
Community	
An influx of temporary workers to the regional area may adversely affect community dynamics in nearby communities such as Bronte Park, Ouse of Hamilton. The presence of a sizeable temporary workforce has the potential to adversely impact the social cohesion, character and amenity of smaller settlements such as Bronte Park, Ouse and Hamilton. Impacts may include perceived changes in safety and security within townships, increased occurrence of antisocial behaviour in public spaces, and overcrowded living conditions with streets heavily utilised by parked vehicles. The majority of workers will be accommodated in the WAF at Tarraleah Village. Interactions between the workforce and the broader public will largely be limited to the movement of un-rostered personnel between their port of arrival or place of residence and Tarraleah Village or Wayatinah. The potential for interactions is further limited by a preference for workers to be bussed to the Project rather than use private vehicles.	**SI 1** Prior to the commencement of construction, develop and implement a SIMP for the pre-construction and construction phase of the Project. **SI 2** Prior to the commencement of construction, develop and implement a Community and Stakeholder Engagement Framework (Project CSEP) for pre-construction and construction. **SI 3** Prior to the commencement of construction, develop and implement a Project workforce code of conduct. **SI 4** Prior to the commencement of construction, develop and implement a construction phase workforce accommodation plan (WAP). **SI 5** Develop and implement actions that encourage workforce contribution to community and seek to build relationships between the workforce and the community. **SI 6** Undertake regular community perception surveys during construction to inform SIMP review, including the evaluation of impacts and outcomes **SI 7** Prior to the commencement of construction, establish a publicly accessible Project information centre at Tarraleah Village for the duration of construction.
Changes in heritage and landscape values, amenity and accessibility adversely affect sense of place for existing residents, visitors to the region and people with historic connection to the Project area. The findings of engagement highlight the strong community connection to the hydro power heritage of the local area, and to Tarraleah Village. Some participants expressed concern about the temporary change in public access to the Tarraleah Village. Concern was also expressed in relation to potential Project effects on visual and landscape quality in the local area, impacting how individuals experience their surrounds.	**SI 1, SI 2, SI 3 SI 4, SI 6, SI 7** **SI 8** Where possible during construction provide public access to existing regional visitor experiences located in proximity to the Tarraleah Village. **SI 9** Prior to the commencement of construction, persons with connection to the Polish monument in the Nive Valley will be identified and engaged through a structured process to explore solutions for monument relocation.

Impacts	Management measures
Disturbance of Aboriginal artefacts or areas of cultural significance, disturbance of existing landscape and temporary or permanent changes in access to country for Aboriginal people. The Project has potential to disturb culturally important sites or artefacts, and to disturb landscape with Aboriginal cultural value. The cultural values of the Project area are described in Section 5.13.	**SI 1, SI 2** **SI 10** Prior to and during construction facilitate a program of access to Hydro Tasmania managed land in the Derwent hydropower scheme so that Tasmanian Aboriginal People can connect to Country and share stories. This will inform the development of a broader cultural values mapping process to support Hydro Tasmania's future land management practices. **SI 11** Prior to the commencement of construction, develop and implement a First Nations Participation Plan (FNPP). The FNPP will establish desired outcomes and key actions to be implemented to support First Nations participation during the construction phase.
Economy and livelihoods	
Increased competition for labour and services. Labour demand generated by the Project may lead to labour draw (direct and indirect) from other industry sectors, adversely affecting the economic output and service delivery capacity of these industry sectors.	**SI 1, SI 2, SI 6, SI 8** **SI 16** Prior to commencement of construction, engage with tourism industry sector stakeholders to identify potential strategies to offset or minimise potential adverse construction phase effects and create opportunities for the sector during Project construction.
Health and wellbeing	
Reduced access to health services for residents due to additional Project demands. Health services in the local area are currently highly constrained with limited accessibility for existing residents. The Project workforce has the potential to exacerbate these issues.	**SI 2** **SI 17** Provide appropriately resourced health services for the duration of the construction phase, with access available to all Project construction workers. Provide the construction workforce with access to an Employee Assistance Program (EAP) service for the duration of construction. **SI 18** Prior to the commencement of construction, develop a Local Benefit Sharing Action Plan for the Project consistent with the Major Projects LBS Strategy.
Reduced access to emergency services for residents in the local area, and increased service response times. During construction the Project has the potential to increase demand for emergency services adversely affecting access to these services for the local community and affecting service response times.	**SI 2, SI 18** **SI 19** Prior to the commencement of construction, develop an emergency response plan in consultation with local emergency service providers. Provide qualified and experienced medical personnel with responsibility for responding to and managing medical and trauma incidents, including stabilising and transporting patients to onsite facilities or designated handover points.

Impacts	Management measures
Changes in accessibility to valued public recreational areas affects way of life. Project construction activities will lead to changes in access to some valued public recreational areas located within the Project area, e.g. Lake King William. Analysis of use data for Lake King William indicates that it experiences low levels of use compared to other nearby recreation areas.	**SI 1, SI 2** **SI 20** During construction promote to the public other regional opportunities for recreational fishing, camping and boating activities.
Project construction activities impact connectivity and accessibility across the regional road network. The closure of Butlers Gorge Road to the public for the duration of the construction phase will restrict access to the eastern shore of Lake King William adjacent to Clark Dam. Project traffic on the local and regional road network, particular on the Lyell Highway and in the Nive Valley, may increase journey times and result in displacement of traffic impacts and effects to other localities, e.g. Fourteen Mile Road or Victoria Valley Road. During construction there will be regular daily heavy vehicle movements on the Lyell Highway between the Nive Valley and Paddy's Quarry for the transportation of spoil from excavation areas. Locals may experience some disruption to their way of life due to a potential increase in journey times, and the journey experience of visitors, particularly those towing caravans, may be negatively impacted. Traffic impacts are further discussed in Section 5.15.	**SI 2, SI 4, SI 6** **SI 21** Before and during construction monitor traffic on alternative routes around Tarraleah and advise CHC/State Growth of changes in usage patterns.
Changes in perceptions of road safety due to addition of Project traffic. During engagement some participants expressed concern about the potential increase in traffic on the Lyell Highway in the vicinity of the Project and likely flow-on effects to road safety. The additional Project traffic on the local and regional road network, and an increase in the number of road users who are likely unfamiliar with the local area and road conditions may reduce road safety for existing road users and the workforce. Traffic impacts are further discussed in Section 5.15.	**SI 4** **SI 22** Prior to the commencement of construction, develop and implement controls to minimise risks to workers and the public when driving. **SI 23** Prior to the commencement of construction, relocate the public amenities from the Nive Valley to the Tarraleah Village and provide 24 hr public access to the relocated facilities for the duration of construction.
Housing and accommodation	
Reduced accessibility to housing in local communities, and increased housing costs. The inclusion of the WAF in the Project minimises the potential for direct Project impacts to the housing markets in nearby communities, e.g. Ouse; however, it is likely there will still be some Project personnel who will choose to stay in nearby towns. There will also be an indirect workforce seeking accommodation.	**SI 1, SI 4**
Reduced accessibility to short-term accommodation in the regional area for visitors, and other industry sectors. It is likely there will be some direct and indirect workers who will seek short-term accommodation in nearby communities, e.g. Ouse. Depending on the level of demand, this may impact the availability of short-term accommodation for the visitor economy, seasonal workers, local residents and people experiencing housing insecurity.	**SI 1, SI 2, SI 4**

Table 5.27: Summary of potential opportunities and enhancement measures

Opportunities	Enhancement measures
Economy and livelihood	
Increased opportunity for employment and training. The Project will create employment opportunities accessible to residents across the state. The Project will also generate opportunities for existing labour force upskilling across the state.	**SI 1, SI 11** **See also EI 3, EI 4, EI 6** **SI 12** Prior to the commencement of construction, develop a Workforce Training and Development Plan (WTDP) for the construction phase. The WTDP will detail the strategy for employee training programs, available apprenticeships, traineeships and other workforce development programs.
Economic diversification and capacity building. Project procurement activities will generate industry and business opportunities across the state, supporting industry and business capacity and capability improvements and enabling diversification. Economic benefits to the state have been estimated in Section 5.16.	**SI 1, SI 2,** **See also EI 4, EI 6**
Local spend by the Project workforce increases trade for local businesses including retailers and hospitality businesses. Non-resident workers may increase patronage at local businesses, particularly in Hamilton and Ouse. SIA engagement identified increased patronage and the associated economic stimulus into the local and regional economies as a Project benefit.	**SI 1, SI 2, SI 13**
Enhanced employment and economic outcomes for marginalised people living in the local and regional area. There is considerable socio-economic disadvantage in the local and regional study area. The Project presents an opportunity to enhance health and wellbeing outcomes for marginalised people, through direct and indirect employment, capacity building and training.	**SI 1, SI 11, SI 12, SI 14, SI 18**. **SI 15** Prior to the commencement of construction, develop and implement a cultural awareness training program for Project construction. Prior to the commencement of work, all Project personnel will be required to complete cultural awareness training in support of a culturally safe work environment for First Nations people.

5.9.3.2 Operations phase

The potential social impacts and opportunities associated with the operation of the Project, together with the proposed management measures, are summarised in Table 5.28.

A more detailed description of these impacts, opportunities, and their management is provided in Appendix E.

Table 5.28: Summary of potential impacts and management measures

Impact description	Management commitment
Community	
Changes in existing Tarraleah Scheme operations arising from the Project may affect downstream recreational amenity. The lakes and lagoons downstream of Clark Dam are popular locations for angling, summer camping and aquatic recreation e.g. Wayatinah Lagoon. Changes in operations may affect the recreational use and enjoyment of these downstream areas. Operational changes are described in Section 2.6. Proposed operational changes are not expected to be material below Wayatinah Lagoon.	**SI 24** Prior to the commencement of operations, Hydro Tasmania will develop and implement a stakeholder engagement plan to communicate to downstream users changes in operational flow regimes and likely effects.
Permanent changes in local landscape and visual amenity adversely affect community held values and aspirations. Permanent changes to the visual character of the landscape will occur due to the Project. People who are highly familiar with the Project area will recognise these changes as they occur. The existing landscape is valued for its beauty, associated natural values, and contribution to local identity and sense of place. Section 5.14 describes the nature and scale of likely changes and outlines measures to minimise and mitigate impacts.	**SI 2**
Economy and livelihood	
Changes in existing Tarraleah Scheme operations arising from the Project may adversely affect the economic operations and livelihood of downstream water consumers. Downstream water consumers include irrigators, drinking water offtakes, fish hatchery water users and firefighting. Modelling conducted for the EIS indicates that there is little difference between the level duration curves for Lake Liapootah and Wayatinah Lagoon due to the Project. It is also not expected that lake level operation in Lake Meadowbank will impact on irrigation as existing rules are assumed to stay in place and pumps are being upgraded as part of spillway upgrade works.	**SI 24**
The withdrawal of construction phase economic stimulus adversely effects the economy and livelihood of businesses, households and the broader communities in the local and regional area. Project construction will act as a significant economic stimulus for the region and state (refer Section 5.16). Given the size of the proposed investment, the Project will stimulate the regional and state economy through job creation and spending, infrastructure improvements and efficiency, attracting investment and business; however, when construction ceases, the economic stimulus associated with construction ceases. Unplanned, the withdrawal of transformational economic stimulus such as that presented by the Project can leave individuals, communities and businesses highly exposed to adverse impacts, this is particularly relevant to local people who may be employed directly on the Project.	**SI 25** Prior to the completion of Project construction, develop and implement a plan to support the transition from construction to operations. Engage with key stakeholders and potentially affected communities in the development of the plan.

5.9.3.3 Cumulative impacts

The SIA assessed the potential for cumulative impacts from other significant projects occurring in a similar time and space to the Project. Cumulative impacts are the successive, incremental and/or combined effects of human activities and natural variations over time (DPE, 2021).

Projects that may contribute to cumulative social impacts include:

- **North West Transmission Developments** (TasNetworks), North West Tasmania.
- **Cethana Pumped Hydro Energy Storage Project** (Hydro Tasmania), Kentish LGA.
- **Macquarie Point Stadium Project** (Tasmanian Government), Hobart.
- **Whaleback Ridge Renewable Energy Project** (Westcoast Renewable Energy), West Coast Tasmania.
- **Gordon Power Station Refurbishment program** (Hydro Tasmania), Strathgordon, West Coast Tasmania.
- **West Coast Refurbishment program** (Hydro Tasmania), West Coast Tasmania.

Given the characteristics of the Project—particularly workforce size, construction schedule, and anticipated traffic generation—the assessment of potential cumulative social impacts has focused on the construction phase, with emphasis on:

- Employment and labour
- Skills development and access to training.

Cumulative impacts and opportunities are summarised in Table 5.29.

Table 5.29: Summary of potential cumulative impacts, opportunities, and management measures

Impacts and opportunities	Mitigation/Enhancement
Cumulative labour demand has the potential to significantly affect access to labour for other industry sectors. Should key projects occur simultaneously to development of the Project, there would be a requirement for more than 1000 construction personnel in the Southern Tasmanian Region, with a possible further 1,000 construction personnel in Northern Tasmania to service other major projects in the north. Given the relatively small size of the Tasmanian population and the construction industry labour force located within Tasmania, this is likely to cause a significant adverse impact on other industries' access to labour, potentially exacerbating current skill shortages, constraining industry output and realisation of opportunities from cumulative economic stimulus[14].	**SI 26** Collaborate with key stakeholders (e.g. State Growth, ReCFIT) and industry sector stakeholders to facilitate workforce forecasting and inform labour force planning. Advocate for policies that support workforce development and facilitate the movement of workers between regions and sectors.
The cumulative expansion in the Tasmanian construction sector will generate additional flow-on opportunities (ripple effects). Expansion would necessitate a higher supply of goods and services, leading to increased demand from suppliers within the region and state. The construction workforces, with higher incomes from employment, would likely spend more on consumer goods and services, boosting local businesses. Cumulative growth in the sector will also generate demand for complementary services such as transportation and logistics, which in turn will further stimulate the economy.	**SI 1, SI 12, SI 13, SI 26**

5.9.3.4 Summary of social mitigation and management measures

Proposed measures to mitigate potential adverse impacts and enhance opportunities associated with the Project are outlined in Table 5.30.

In addition to the measures developed through the SIA, a number of mitigation and management actions described in other subject-matter chapters are also relevant to the management or enhancement of social and economic issues. These include:

- Section 5.6 (Noise and vibration)
- Section 5.15 (Traffic)
- Section 5.14 (Visual)
- Section 5.13 (Aboriginal heritage)
- Section 5.16 (Economics).

14 Refer to Section 8.4.1 Construction Phase Cumulative Impacts in Appendix E for further details.

Table 5.30: Management responses

ID#	Mitigation and management	Project phases
SI 1	A SIMP will be prepared for the pre-construction and construction phase of the Project. The SIMP will be developed in consultation with relevant government and local government agencies, key stakeholders, and directly affected parties to minimise construction phase social impacts. The SIMP will address key components of the construction program. The SIMP will be made readily available to the public in a format easily interpreted, and will: • Include an updated social baseline assessment focussing on the social indicators of relevance to the identification and management of construction phase impact • Include a summary of the anticipated social impacts (positive and negative), potential residual impacts and consideration for cumulative impacts. • Identify the desired management outcomes for the key performance areas of: ◦ Workforce management (including workforce behaviour, housing and accommodation) ◦ Community health and wellbeing ◦ Tasmanian industry and business participation ◦ Social Procurement ◦ Workforce employment and training ◦ First Nations participation and engagement ◦ Local benefit sharing ◦ Visitor economy ◦ Community and stakeholder engagement • Incorporate key strategies for achieving the desired management outcomes, responsibilities for implementation, timing and key partners in strategy delivery. • Document the monitoring, evaluation and reporting process for ensuring the effectiveness of mitigation measures and adopting an adaptive management approach • Describe the approach to complaints management during construction • Define the roles and responsibilities for social performance management during construction.	Pre–construction (preparation and implementation) Construction (implementation)
SI 2	A Project Communication and Stakeholder Engagement Plan (CSEP) will be developed for pre-construction and construction phases. The Project CSEP will outline an effective approach to communication and engagement underpinned by a proactive issues-management approach, open and transparent two-way communication processes and responsiveness to the communication needs and expectations of key stakeholders and the broader community. This would include ensuring community and key stakeholders are kept informed of: • Project construction timelines • Changes in construction workforce numbers • Timing of key construction activities and potential affects • Any required changes in existing conditions to accommodate construction activities, e.g. introduction of traffic management, changes in public access arrangements to Tarraleah Village. • Workforce accommodation arrangements. The Project CSEP will document the approach to grievance management.	Pre–construction (preparation and implementation) Construction (implementation)
SI 3	A Project workforce code of conduct will be prepared prior to the commencement of construction and implemented during the construction of the Project. The workforce code of conduct will establish expectations in relation to workforce behaviour both on-site and off-site (i.e. in community) and demonstrates how potential impacts on the rural and heritage character of local communities (e.g. Ouse and Hamilton) will be minimised.	Pre–construction (preparation) Construction (implementation)

ID#	Mitigation and management	Project phases
SI 4	A Workforce Accommodation Plan (WAP) will be prepared prior to the commencement of construction and implemented during the construction of the Project. The WAP will be based on the final construction workforce profile and will: • Demonstrate how the peak Project workforce will be accommodated and serviced and how flow-on impacts to host communities will be minimised. • Consider pedestrian and vehicle access and connectivity within the Tarraleah Village during construction to always ensure pedestrian safety. • Detail controls to be implemented to minimise workforce related traffic on the public road network. • Include a plan for monitoring workforce accommodation arrangements to enable proactive response to off-site impacts. • Achieve the objectives of the Project SIMP.	Pre–construction (preparation) Construction (implementation)
SI 5	During construction, identify actions that encourage workforce contribution to community and seek to build relationships between the workforce and the community, as a component of the SIMP.	Construction
SI 6	Undertake regular community perception surveys during construction to inform Project SIMP reviews, including the evaluation of impacts and outcomes.	Construction
SI 7	Prior to commencement of construction, establish a publicly accessible project information centre at Tarraleah Village for the duration of construction. Ensure visitors can continue to engage with the village and construction progress, including latest events and opportunities to engage. Incorporate heritage interpretation into the project information centre to enable remote connection for the public to Tarraleah Village and components of the Tarraleah hydropower scheme. As a component of interpretation, identify opportunities to provide public access to the Tarraleah locality during construction.	Pre–construction (preparation) Construction (implementation)
SI 8	Where possible during construction, provide public access to existing regional visitor experiences located in proximity to the Village. This includes the penstock lookout at Tarraleah Village, the Tarraleah Falls walking track and areas of the Tarraleah Village valued by community.	Construction
SI 9	Prior to the commencement of construction, persons with connection to the Polish monument in the Nive Valley will be identified and engaged through a structured process to explore solutions for monument relocation.	Pre-construction
SI 10	Prior to and during construction facilitate a program of access to Hydro Tasmania managed land in the Derwent hydropower scheme so that Tasmanian Aboriginal People can connect to Country and share stories. This will inform the development of a broader cultural values mapping process to support Hydro Tasmania's future land management practices.	Pre–construction (preparation) Construction (implementation)
SI 11	Prior to commencement of construction, develop a First Nations Participation Plan (FNPP) as a component of the construction phase Project SIMP. The FNPP will establish desired outcomes and key actions to be implemented to support First Nations participation during the construction phase. The FNPP will reflect the core pillars of Hydro Tasmania's CAP. Key themes to be addressed in the FNPP include: • Supporting connection to Country for Tasmanian Aboriginal people during construction • Recognising culture through project design and delivery • Delivery of cultural safety training for the workforce • Realising employment and economic development opportunities. The FNPP actions will be implemented prior to and during construction and monitored through the Project SIMP.	Pre–construction (preparation) Construction (implementation)

ID#	Mitigation and management	Project phases
SI 12	A Workforce Training and Development Plan (WTDP) will be prepared prior to the commencement of construction and implemented during the construction of the Project. The WTDP will detail the strategy for employee training programs, available apprenticeships, traineeships and other workforce development programs. The WTDP will include a local and regional workforce development program. This program will demonstrate the Project's commitment to: • Reducing barriers to employment and training participation • Equipping local workers with the necessary skills and certifications to participate in project opportunities (direct and indirect) • Training a workforce that contributes to the development of an improved local and regional skills base. WTDP actions will be implemented during construction and monitored through the Project SIMP.	Pre–construction (preparation) Construction (implementation)
SI 13	The Project will apply Hydro Tasmania's Major Projects Local Content Framework to the Project construction phase as outlined in EI4.	Pre-construction and construction
SI 14	Through the SIMP, develop and implement actions that support the realisation of the social procurement objectives established in Hydro Tasmania's Major Projects Local Benefit Sharing Strategy, as outlined in EI6.	Pre-construction and construction
SI 15	Prior to commencement of construction, develop a cultural awareness training program for Project construction. Prior to the commencement of work, all Project personnel will be required to complete cultural awareness training in support of a culturally safe work environment for First Nations people.	Pre–construction (preparation) Construction (implementation)
SI 16	Prior to commencement of construction, engage with tourism industry sector stakeholders to identify potential strategies to offset or minimise potential adverse construction phase effects and create opportunities for the sector during Project construction. Agreed strategies would be considered through the LBS Strategy process (SE18).	Pre–construction (preparation) Construction (implementation)
SI 17	Provide appropriately resourced health services for the duration of the construction phase, with access available to all Project construction workers. Provide the construction workforce with access to an EAP service for the duration of construction.	Construction
SI 18	Prior to commencement of construction, develop a Local Benefit Sharing Action Plan for the Project consistent with the Major Projects LBS Strategy. The LBS Action Plan would be informed through a structured engagement process with key stakeholders and affected communities. There could be a range of core community needs that are identified and that the LBS may respond to. These may include addressing barriers to participation and realisation of project opportunities.	Pre–construction (preparation) Construction (implementation)
SI 19	Prior to commencement of construction, develop an emergency response plan in consultation with local emergency service providers. Implementation of the emergency response plan will be monitored through the Project SIMP. Provide emergency response personnel for the Project for the duration of construction. The emergency response service may be called upon to assist in incidents that occur within or near the project area, including those involving public roadways intersecting the site. In the event of external bushfire threat to the Project, the emergency response personnel will assist Tasmanian Fire Service (TFS) in coordinating workforce evacuations and facilitate safe access for state response teams. Provide qualified and experienced medical personnel with responsibility for responding to and managing medical and trauma incidents, including stabilising and transporting patients to onsite facilities or designated handover points. These personnel will interface with the Tasmanian Ambulance Services and support further off-site medical evacuation co-ordination.	Pre–construction (preparation) Construction (implementation)

ID#	Mitigation and management	Project phases
SI 20	During construction promote to the public other regional opportunities for recreational fishing, camping and boating activities.	Construction
SI 21	Before and during construction monitor traffic on alternative routes around Tarraleah and advise CHC/State Growth of changes in usage patterns.	Pre-construction and construction
SI 22	Prior to the commencement of construction, develop and implement the following controls to minimise risks to workers and the public when driving: • Driver Safety and Journey Management Plan (DS & JMP)—to address hazards such as distance of journey, wildlife interaction, adverse weather and interaction with public vehicles. • Installation of In-Vehicle Monitoring System (IVMS) in all vehicles used for travel to and from site. • Fitness for Work Management Plan to protect and support workforce health and wellbeing whilst minimising safety risks to the surrounding communities. • Driver Code of Conduct outlining the minimum driver behaviour requirements to ensure compliance with the legislative requirements. • Commence early and ongoing engagement with the Department of State Growth, Central Highlands Council and Tasmanian Police in relation to public safety and construction traffic management.	Pre-construction and construction
SI 23	Prior to commencement of construction, relocate the public amenities from the Nive Valley to the Tarraleah Village and provide 24-hour public access to the relocated facilities for the duration of construction.	Pre-construction
SI 24	Prior to the commencement of operations, Hydro Tasmania will develop and implement a stakeholder engagement plan to communicate to downstream users changes in operational flow regimes and likely effects. Downstream users will be provided with information regarding Hydro Tasmania's Complaints Management, including how to raise issues or concerns regarding operational impacts.	Commissioning/ Operations
SI 25	Prior to the completion of Project construction, develop and implement a plan to support the transition from construction to operations. Engage with key stakeholders and potentially affected communities in the development of the plan. Development of the plan could involve: • Identification of areas and demographic cohorts likely to experience potential economic and social impacts from the cessation of construction. • Identification of the services, funding opportunities, programs that can help to soften the transition	Commissioning/ Operations
SI 26	Prior to the completion of Project construction, collaborate with key stakeholders (e.g. Department of State Growth, ReCFIT) and industry sector stakeholders to facilitate workforce forecasting and inform labour force planning. Advocate for policies that support workforce development and facilitate the movement of workers between regions and sectors.	Pre-construction and construction

5.9.4 Management and monitoring framework

5.9.4.1 Management approach

The Project's approach to social impact mitigation and management involves:

- **Project design:** As described in Chapter 2, the Project has been designed to avoid negative social impacts where possible (e.g. inclusion of a workforce accommodation facility at Tarraleah Village). Monitoring during construction and operations will identify whether refinements to design or operations are needed to manage unforeseen impacts.
- **Management and mitigation responses:** As detailed in Section 5.9.3 and relevant discipline-specific EIS chapters. The primary tool for managing social impacts is the Project's SIMP.
- **EPC Contractor's Environmental Management System (EMS):** The EPC Contractor will implement an EMS as part of its environmental management plan. While primarily an environmental tool, the EMS will indirectly support social impact mitigation by guiding construction practices. Further information is provided in Chapter 1.

5.9.4.2 Monitoring and reporting

Consistent with the principle of adaptive management, the SIMP will include a monitoring, evaluation, reporting and improvement program. This program will define KPIs and targets to measure the effectiveness of management measures and the extent to which desired outcomes are achieved.

The SIMP monitoring program will align with Hydro Tasmania's broader Major Projects MERI framework. Reporting on the SIMP's delivery and effectiveness will be integrated with overall Project reporting. Copies of the SIMP will be provided to CHC and DVC, and made available for public viewing on the Project website.

Participatory monitoring, reporting and review will be undertaken with CHC, DVC, key stakeholders and local communities. This process is designed to empower stakeholders to contribute ideas and feedback, assist in addressing monitoring results that fall short of targets, and support the enhancement of Project benefits.

5.9.5 Residual impact

The SIA indicates that some residual impacts are likely during the construction phase, particularly in areas influenced by cumulative effects from other major projects in the region or at the state level. These include impacts on traffic, housing, labour, and Aboriginal cultural values.

To address these, the SIMP will function as an adaptive management tool, enabling ongoing monitoring of social and socio-economic impacts and the development of appropriate mitigations to respond to emerging trends.

At the same time, the Project is expected to deliver positive residual impacts, including regional skills development, workforce capacity building, and economic stimulus for local businesses.

5.10 Waste management

5.10.1 Hydro Tasmania's Circular Economy Framework

Hydro Tasmania is committed to minimising waste and maximising resource recovery across its Major Projects construction program and operations. To support this, a *Major Projects Circular Economy Framework* (Framework) has been developed to drive environmental and social benefits by embedding circular economy principles in project delivery.

Applying circularity principles adds value by improving resource efficiency, reducing environmental impact, and supporting long-term sustainability. By minimising landfill disposal, emissions, and reliance on virgin materials—while extending the lifecycle of materials—the Project can achieve environmental gains as well as economic benefits through cost savings and potential revenue generation.

This approach aligns with Hydro Tasmania's net zero objectives and supports economic opportunities through innovative resource recovery methods and creative design to eliminate waste. Embracing circularity also enhances biodiversity outcomes and optimises material use, contributing to a sustainable energy transition and creating value for local communities.

Framework objective: To minimise waste, maximise resource efficiency, and support Tasmania's emerging circular economy industry by demonstrating the value of circular economy principles in major construction projects.

Framework goals:

- **Maximise resource efficiency:** Ensure materials are sourced, used, and disposed of with minimal environmental impact.
- **Enhance longevity of** products**:** Design systems and technologies that extend the lifecycle of Project assets.
- **Promote recycling and reuse:** Establish pathways for recycling and repurposing Project components and materials.
- **Foster community and local business engagement:** Involve local communities and businesses in the circular economy transition through education and participation.

5.10.1.1 Waste avoidance and mitigation measures

The Project's waste avoidance and mitigation measures are shaped by the Framework to ensure compliance with statutory requirements while also delivering social and economic benefits through circular economy practices.

Hierarchy of waste management

The Project will adopt the waste management hierarchy outlined in the EIS Guidelines. Opportunities include:

- **Avoidance and reduction:** Achieved through design and construction planning, alternative products, appropriate technologies, and procurement processes.
- **On-site reuse:** Materials such as spoil and vegetation waste reused on- or off-site.
- **Treatment/stabilisation for reuse:** Treating wastewater for dust suppression or crushing spoil for aggregate.
- **Recycling:** Off-site recycling of waste oils, scrap metal, paper, cardboard, glass, plastics, tins and cans.
- **Energy recovery:** Sending waste oils to licensed facilities for refining and reuse.
- **Disposal:** Used only where no other reasonably viable option exists.

5.10.2 Waste sources and impacts

In addition to the focus on the circular economy, Hydro Tasmania is committed to waste minimisation in alignment with its 'Towards Net Zero' plan[15] and Environmental Policy[16].

5.10.2.1 Existing environment

The nearest municipal waste management centres for offsite disposal are the Bronte Park Waste Transfer Station and Hamilton Refuse Disposal Site. Consultation with CHC will confirm the waste types that can be accepted and where alternative arrangements are required.

Several legacy waste sites exist in the area, including old tip and dump sites, disused quarries, and former camps and work areas. Historical fill is also likely in places, associated with construction of Butlers Gorge Road, Canal No. 1 and No. 2, and above-ground pipelines and unsealed roads built before 1967. Additional sources of fill may relate to road upgrades carried out between 1974 and 1982.

Current waste-generating activities in the area include operation and maintenance of Tarraleah Village and Power Station, Hydro Tasmania infrastructure upgrades, and active forestry operations.

15 hydro.com.au/sustainability/towardsnetzero
16 hydro.com.au/docs/default-source/about-us/our-governance/codes-and-policies/environmental-policy_2022_ib.pdf?Status=Master&sfvrsn=b6206d29_3/Environmental-Policy_2022_IB.pdf

5.10.2.2 Construction waste

Construction will generate a wide range of solid and liquid waste streams from activities such as vegetation clearing, excavation, tunnelling, pipeline and road construction, batching plants, temporary facilities, and equipment use. Anticipated waste streams include vegetation debris, spoil, tunnel and washdown water, waste oils and lubricants, scrap metal, cardboard, plastics, and controlled wastes such as shotcrete and concrete washings, and wastewater from ablution facilities.

If not managed appropriately, these wastes could cause soil and water contamination, chemical leaching, litter, odour, GHG emissions, visual impacts, vermin attraction, and added pressure on landfill. Safety risks for workers and the public may also arise.

The Project will generate approximately 760,000 m^3 of spoil. Spoil that cannot be reused will be placed at permanent emplacement areas located at the western portal, mid access portal, and Paddy's Quarry. These areas have been chosen to minimise transport distance, impacts, and emissions. Space constraints prevent emplacement at the power station site; therefore, spoil from the power station excavation and power tunnel will be transported via the Lyell Highway to Paddy's Quarry.

5.10.2.3 Operational waste

During operations, waste will mainly arise from periodic maintenance of electro-mechanical equipment and office activities. Waste streams include general waste, recyclables (e.g. cardboard, scrap metal), hazardous materials (e.g. waste oils, hydraulic fluids), and sewage. While minor in volume, these require ongoing management to avoid soil and groundwater contamination, safety hazards, vermin, and site cleanliness issues.

5.10.2.4 Waste management measures

Table 5.31and Table 5.32 summarise the sources, types, volumes, and management methods for all waste streams generated during construction. Operational waste volumes are minor and managed as part of routine maintenance practices.

Table 5.31: Source, nature, quantity, and method of treatment, storage and disposal for each general waste stream

Waste stream	Origin	Waste management hierarchy	Waste management measures	Estimated total quantity
Vegetation waste	Clearing and grubbing for infrastructure construction	Reuse	• Store in stockpiles in accordance with the Rehabilitation Plan (refer Chapter 7). • Mulch to reuse for rehabilitation. • Vegetation may be reused for the provision of wildlife habitat.	To be determined upon final disturbance footprint
Construction wastewater*	Groundwater ingress into underground works and excavations, surface water run-off from cleared sites and stockpiles.	Treatment Reuse	• Groundwater and surface water to be collected and treated for release within water quality criteria (refer Section 5.1). • Treated surface and groundwater may be available for general site uses such as dust suppression.	To be determined through detailed design and upon finalisation of construction methodology
Topsoil	Clearing and grubbing for infrastructure construction	Reuse	• Place in temporary windrow stockpiles as per the Rehabilitation Plan for reuse in rehabilitation of disturbed areas (refer Chapter 7).	To be determined through detailed design and upon finalisation of construction methodology
Rock spoil	Excavation and tunnelling	Reuse Disposal	• Spoil will be disposed of as close as possible to its source in permanent spoil emplacement areas. • Reuse the rock spoil for other purposes such as concrete aggregate, road base, embankments and construction pads.	Approximately 760,000m^3
Scrap metal (reinforcing bar cuts, offcuts, electrical cabling, formwork, packaging, drums, containers)	Workshops Power station construction	Avoidance Reuse Recycle	• Minimise waste through design and by only ordering what is required. • Store in designated areas for reuse or recycling by a contractor for off-site recycling.	~300 tonnes
Timber	Formwork, pallets and offcuts from construction activities	Avoidance Reuse Recycle	• Minimise waste by ordering only what is required. • Return good pallets to sender for reuse. • Formwork stripping and reuse where practicable.	~15 tonnes

Waste stream	Origin	Waste management hierarchy	Waste management measures	Estimated total quantity
Paper, cardboard, plastics, glass and packaging materials	Construction offices Workshops	Avoidance Recycling	• Select products with minimal plastic packaging and avoid and minimise single use plastics • Minimise waste by ordering only what is required. • Collection on-site and storage in segregated area.	~40 tonnes
Batteries	Workshops Construction offices	Recycled	• Store in designated area onsite until there are sufficient numbers to be collected by a licenced waste contractor for recycling off-site.	~0.5 tonnes
General wastes including putrescible waste.	Construction offices Workshops	Avoidance Disposal	• Minimise waste by ordering only what is required. • Collection on-site and storage in segregated area. • Transportation by a waste contractor for off-site recycling and/or disposal in landfill.	~200 tonnes

Table 5.32: Source, nature, quantity, and method of treatment, storage and disposal for each controlled waste stream

Waste stream	Waste classification	Origin	Waste management hierarchy	Waste management measures	Estimated total quantity
Concrete, shotcrete and concrete washings	Controlled Waste Code C100 (Basic solutions or bases)	Construction of infrastructure	Avoidance Reuse Disposal	• Produce only what is necessary. • Use designated washout areas with proper containment to manage concrete wash water. • Crush waste and reuse. • Excess waste transported by an EPA licensed contractor and disposed in accordance with EPA regulations.	To be determined upon finalisation of design and construction methodology
Explosives (ammonium nitrate)	E120 Waste of an explosive nature not subject to other legislation	Tunnel construction	Avoidance	• Minimise use of explosives in accordance with Project's NMP (refer Section 5.1)	To be determined upon finalisation of construction methodology
Hydrocarbon waste (contaminated soil/spoil, containers, oily rags, filters, grease, absorbents and degreaser)	Controlled Waste Code J120 (waste oil/water, hydrocarbons/water mixtures or emulsions).	Workshops	Disposal	• Segregation and collection on-site. • Transported by an EPA licensed contractor and disposed in accordance with EPA regulations. • Where investigations and testing demonstrate that contamination or other undesirable characteristics, are present in the spoil at concentrations that are unacceptable for reuse/stockpiling on the Project or placing in spoil emplacement area, this material will be nominated for off-site disposal. This material will be tested and classified in accordance with Information Bulletin 105 (Tas EPA 2018) to determine a suitable disposal method and location. • Transported by an EPA licensed contractor and disposed in accordance with EPA regulations	To be determined upon finalisation ofconstruction methodology

Waste stream	Waste classification	Origin	Waste management hierarchy	Waste management measures	Estimated total quantity
Contaminated spoil	Controlled waste codes D130, D140, D210, D230	Switchyard	Reuse Disposal	• Handled under appropriate procedures to avoid impacts to human and ecological receptors. • Visually and olfactorily inspected for signs of potential contamination (e.g. staining, odours, oily film, refuse, demolition rubble, etc.). • Temporarily stockpiled (segregated by material type, e.g. clean soil, clean gravel, mixed fill, stained / potentially contaminated soils or gravel, etc.) until testing has been completed and EPA approval obtained (where necessary) to remove the soils from site. • Sampled and classified for offsite disposal in accordance with the requirements of IB105. • Disposed offsite (where applicable) by an appropriately licenced waste transporter to a landfill licenced to accept.	To be determined upon finalisation of construction methodology
Petroleum products from spills (absorbed in spill kit material or contaminated soil)	Controlled Waste Code J100 (Waste mineral oils unfit for their original intended use)	Workshops Contaminated groundwater from tunnelling works Contaminated soil	Disposal	• Segregation and collection on-site. • Transported by an EPA licensed contractor and disposed in accordance with EPA regulations.	<5 tonnes
Waste water (sewage)	Controlled Waste Code K130 (Sewage sludge, sewage residue, soil or sludge from an onsite wastewater management system).	Construction offices and amenities	Disposal	• Waste from onsite ablution blocks will be stored in the portable system and removed from site by a suitably licensed contractor and disposed in accordance with EPA regulations.	~5000 litres per day

Waste stream	Waste classification	Origin	Waste management hierarchy	Waste management measures	Estimated total quantity
Used chemical containers such as herbicides, paints, adhesives, solvents, flocculants and coagulants	Controlled Waste Codes N100 (Containers which are contaminated with residues of substances referred in the Controlled Waste Category Codes List).	Workshops Sediment ponds	Avoid Disposal	• Minimise waste by ordering only what is required. • Store in designated areas for collection and disposal by a licensed contractor. • Follow requirements of the relevant SDS.	To be determined upon finalisation of construction methodology
Waste oil and containers	Controlled Waste Codes N100, (Containers which are contaminated with residues of substances referred to in this list)	Workshops	Recycling Disposal	• Collected and stored on-site in a bunded area or tank. • Waste oil can be recycled in Tasmania. • Transported off-site by a licensed regulated waste transporter, to a licensed facility for recycling/disposal.	To be determined upon finalisation of construction methodology
Tyres	Controlled Waste Code T140	Light and heavy vehicles	Recycle	• Segregation and collection on-site. • Collected and transported to a tyre recycler.	To be determined upon finalisation of construction methodology

5.10.3 Avoidance and mitigation

5.10.3.1 Waste Management Plan

WM 1: A Waste Management Plan (WaMP) will be prepared prior to the commencement of construction and implemented throughout the construction phase. The WaMP will:

- Incorporate circular economy principles to enhance resource efficiency, minimise environmental impact, and promote sustainability by eliminating waste, circulating materials, and supporting ecological regeneration
- Ensure compliance with all relevant legislation, including systems to demonstrate regulatory compliance
- Include the waste management measures in Table 5.31 and Table 5.32
- Apply the waste management hierarchy: avoidance, on-site reuse, treatment/stabilisation for reuse, off-site recycling, energy recovery, recovery storage, treatment/stabilisation for disposal, and permanent containment
- Identify waste types and sources
- Define waste handling procedures, roles, and responsibilities
- Specify infrastructure and equipment needed to manage waste
- Provide training for relevant personnel to ensure effective implementation
- Include periodic reviews to assess performance and drive continuous improvement.

5.10.3.2 Spoil Management Plan

WM 2: A Spoil Management Plan (SMP) will be prepared prior to construction to guide the design and management of permanent spoil emplacement areas.

Key objectives:

- Ensure long-term stability through appropriate slope design, drainage, and compaction, preventing erosion, ponding, and sedimentation.
- Protect water quality by minimising leachate and integrating landforms with surrounding topography.
- Enable re-establishment of native vegetation through natural regeneration and assisted revegetation.
- Minimise visual impacts through sensitive land forming and revegetation.
- Ensure compatibility with future scheme operation, safe access, and protection of sensitive ecological and cultural heritage areas.

The SMP will:

- Detail how permanent spoil emplacement areas will be designed to be safe, stable, and non-polluting.
- Describe measures to minimise spoil generation and maximise beneficial reuse.
- Characterise anticipated spoil volumes and potential contamination, and outline a program for spoil classification during construction, if required.
- Provide plans for managing and disposing of reactive or contaminated spoil, including contingencies for unanticipated volumes.
- Identify spoil volumes for each activity, along with reuse opportunities and placement areas.
- In conjunction with the WaMP, GMP, and ESCP, detail management of potential water quality impacts from emplacement areas, including monitoring of surface water and groundwater.

- In conjunction with the SRP, provide a rehabilitation plan for each emplacement area, including measures to retain topsoil, incorporate organic matter, reduce visual impact, and support long-term stability.

5.10.3.3 Off-site disposal

WM 3: Where spoil is found to be contaminated at levels unsuitable for reuse, stockpiling, or emplacement, it will be designated for off-site disposal. Such spoil will be tested and classified in accordance with *Information Bulletin 105* (EPA, 2018) to determine the appropriate disposal method and location.

5.10.3.4 Residual impacts

Implementation of the WaMP and measures in Table 5.31 and Table 5.32 will mitigate potential adverse impacts from both general and controlled waste streams during construction and operation. No significant residual risks are anticipated.

Spoil emplacement areas will be designed, constructed, and maintained in accordance with the SMP, supported by the WaMP (Section 5.1), GMP (Section 5.2) and ESCP (Section 5.1). These measures will manage water quality risks and reduce visual impacts through land forming and rehabilitation, ensuring long-term stability and protection of environmental values.

5.11 Fire risk

5.11.1 Existing environment

The Project is located in a landscape highly susceptible to bushfire due to the presence of dry and wet eucalypt forests, extensive vegetation cover, and a documented history of significant bushfire events. The site is subject to the Bushfire-prone Areas Overlay under the *Tasmanian Planning Scheme – Central Highlands Local Provisions Schedule* (refer Section 2.8).

A bushfire risk assessment, informed by both desktop and on-ground assessments and supported by Phoenix RapidFire modelling, has assessed bushfire risks to and from the Project. The assessment analysis addresses bushfire risks only; other fire types (e.g. underground or building fires) will be managed during detailed design and construction planning in accordance with statutory requirements. The assessment is provided in Appendix L and summarised in this Chapter.

5.11.1.1 Fire risks

A risk assessment using the Tasmanian State Fire Management Council's *Bushfire Risk Management Planning Guidelines* and the *Tasmanian State Emergency Service Emergency Risk Assessment Guidelines* (TERAG) identified the following significant bushfire risks:

- A bushfire originating outside the Project area and directly impacting part or all of the site.
- Accidental ignition during construction or operation (e.g. hot works, plant and machinery, smoking, or poor maintenance), with potential for fire to spread beyond the site.
- Butlers Gorge Road being impacted during a fire event, preventing safe egress and creating entrapment risk.
- Project staff and contractors lacking training or equipment to manage a major bushfire event.
- Communication blackspots delaying fire warnings and evacuations, increasing entrapment risk.

Although the Midlands Fire Management Area Bushfire Risk Management Plan (BRMP) Risk Register currently identifies bushfire risk levels at Butlers Gorge and Tarraleah as low and very low, these risks are expected to increase significantly during construction due to higher occupancy and activity.

5.11.2 Assessment

The primary bushfire risk to natural assets within and beyond the Project area is associated with fire regimes (planned or unplanned) occurring outside Tolerable Fire Intervals (TFIs). A TFI is the period required for vegetation types to reach reproductive maturity after fire. Maintaining TFIs within thresholds supports long-term viability, while TFIs outside thresholds can progressively alter vegetation structure and floristics, reducing habitat quality.

High-intensity bushfires across all or part of the Project area may damage or destroy fauna habitat, including:

- Tree hollows used by birds and arboreal mammals
- Mature, deteriorating or dead trees that provide habitat for invertebrates, birds and reptiles, and are slow to replace
- Understorey vegetation that provides nesting, shelter and food resources for birds and mammals
- Fallen logs, bark, and leaf litter that support invertebrates, frogs, reptiles, birds, and mammals.

5.11.3 Avoidance and mitigation measures

5.11.3.1 Construction

To reduce bushfire risk during construction, the following measures will be implemented:

FR 1: Prepare a Construction Bushfire Mitigation Plan prior to construction. The plan will set out how each principle and site-specific measure in Table 8 of Appendix L will be applied, based on strategic asset management principles with the overriding priority being preservation of life.

FR 2: Develop and implement a Bushfire Emergency Plan prior to construction, including:

- Procedures for altering activities during total fire bans and high, extreme, or catastrophic fire danger days
- Procedures for altering activities, including ceasing hot work, on land managed by the Tasmania Parks and Wildlife Service (PWS) when the Forest Fire Danger Index (FDI) is calculated as equal to or greater than HIGH 20, or the relative humidity is equal to or less than 30%
- Consideration of reducing site personnel on such days
- Pre-emptive triggers for risk reduction during extreme and catastrophic conditions
- Identification of refuge locations.

The plan will:

- Be consistent with the TFS Bushfire Emergency Planning Guideline
- Be prepared and reviewed annually (until practical completion) by a suitably experienced and TFS-accredited Bushfire Hazard Practitioner
- Be incorporated into site inductions during bushfire season.

FR 3: Prepare a Bushfire Response Plan before construction, identifying responsible officers and procedures for accidental onsite fires. The plan will align with relevant external documents (e.g. TFS Local Area Fire Management Plan, Sustainable Timber Tasmania Fire Management Plan, Parks and Wildlife Service Fire Action Plan).

FR 4: The HMMP (DG 1) will specify the minimum fire protection measures for onsite hazardous material storage.

FR 5: Provide fire response agencies with copies of the Bushfire Emergency and Response Plans.

FR 6: Include bushfire risk in Project and site-specific inductions, covering:

- Site-specific bushfire procedures, Emergency Plans and Response Plans
- Training in basic bushfire awareness where appropriate (e.g. 11318NAT – Course in Basic Wildfire Awareness).

FR 7: Brief fire response agencies and relevant land managers prior to each bushfire season on Project access/egress arrangements, limitations for large firefighting appliances, and areas restricted to smaller appliances. (The Tasmanian bushfire period typically extends from November to mid-May, subject to annual climate conditions and TFS advice.)

FR 8: Ensure all activities during the fire danger period comply with the Tasmanian *Fire Service Act 1979* and Total Fire Ban declarations.

FR 9: Ensure site access roads, tracks and roadside vegetation management comply with State Government guidelines and industry best practice for bushfire-prone areas.

FR 10: Establish and maintain asset protection zones, hazard management areas, and fuel breaks consistent with State Government guidelines and best practice.

FR 11: Provide sufficient static firefighting water supply and equipment fill points, scaled to the site's bushfire risk and compliant with relevant guidelines and best practice.

5.11.3.2 Residual impacts

Bushfire risk is expected to increase during construction due to higher site occupancy and activity; however, implementation of the Construction Bushfire Mitigation Plan, Bushfire Emergency Plan, Bushfire Response Plan, and measures in Section 5.11.3.1 will mitigate these risks. No significant residual impacts are anticipated.

5.12 Infrastructure and offsite ancillary facilities

5.12.1 Roads and infrastructure

The Project will require a wide range of vehicles, including light vehicles, buses, concrete agitators, haul trucks, excavators, semi-trailers, and various specialised over-size/over-mass (OSOM) vehicles. Over-size/over-mass vehicle combinations will be needed to deliver major infrastructure items such as 100 MVA transformers.

The Port of Bell Bay has been identified as the most suitable location for shipping and storing GRP pipes and transformers. An OSOM route to the Project has been identified from the Port of Bell Bay to New Norfolk (potentially via Frankford Road and the Bass Highway due to height restrictions) and then north-west along the Lyell Highway. No upgrades or modifications to this route are anticipated, and no environmental impacts are expected.

The Project will temporarily increase light and heavy vehicle traffic on the local network, primarily due to the delivery of materials and equipment to construction sites, movement of spoil from the power station to Paddy's Quarry, and Project staff travelling to Tarraleah Village (including the workforce accommodation facility) and between worksites. Traffic volumes will vary across the Project area and throughout the construction period.

Upgrades to intersections providing access from the Lyell Highway, Butlers Gorge Road and Fourteen Mile Road may be required. These upgrades are outside the scope of this EIS and will be planned in consultation with the Department of State Growth (DSG) and CHC.

A Traffic Impact Assessment has been completed (refer Section 5.15), describing the existing road network and usage, identifying key construction access routes, and outlining the expected traffic composition and volumes. Section 5.3 outlines a Roadkill Management Plan (RkMP) to mitigate the increased risk of fauna strikes from higher traffic volumes. Increased traffic is not expected to cause significant noise impacts (Section 5.6).

5.12.2 Ports

The Ports of Burnie and Bell Bay have been identified as the most suitable facilities for receiving large and heavy equipment such as turbines, GRP pipe sections, and major mechanical and electrical components. Both ports have existing infrastructure capable of handling such loads, and no upgrades will be required. The Project's use of either port is not anticipated to result in adverse environmental impacts.

5.12.3 Quarries

Materials such as crushed rock, aggregate, and sand for concrete production and civil works will be sourced from existing licensed quarries, to be selected by Hydro Tasmania's EPC Contractor. No new quarries or expansions of existing quarries are expected to be required.

Where possible, spoil excavated from underground works or Hydro Tasmania's Tarraleah Upgrade Works Project will be re-used for Project construction (e.g. as crushed rock or concrete aggregate). Excavated and tunnelled material from the Tarraleah Upgrade Works Project may also be used.

5.12.4 Electrical infrastructure

Two transmission line connection options are being considered:

- A connection to the existing TasNetworks 220 kV Liapootah to Palmerston transmission line at Dee Lagoon (requiring a new tee connection)
- A connection to the existing Liapootah substation (requiring minor enabling works to allow construction of new transmission line bays).

Connection studies confirm that the existing line has capacity to support the additional generation from the Project. No other infrastructure upgrades are required. The potential environmental impacts of both options are assessed in Section 5.3.

5.12.5 Ancillary works

Ancillary works associated with the Project, but outside the scope of this EIS, include Hydro Tasmania's Tarraleah Upgrade Works Project, the relocation of the Tarraleah switchyard, and the construction of a WAF at Tarraleah Village.

Tarraleah Upgrade Works Project

Hydro Tasmania is undertaking upgrade works at Lake King William under a separate approvals process. These works include construction of a new intake arrangement comprising an approach channel, intake structure with gates and associated equipment, a ~950 m tunnel, and a tunnel portal. Refurbishment or replacement of the existing No. 1 Canal is not considered feasible due to alignment risks. The new intake arrangement is designed to support both the Project and the possible future replacement of No. 1 Canal.

Relocation of the Tarraleah Switchyard

Hydro Tasmania proposes to relocate the existing 110 kV transmission lines and transformer connections from their current location adjacent to Tarraleah Power Station to the nearby Tungatinah Power Station. This relocation is required to enable construction of the new power station. It will occur before Project construction commences and will either be undertaken under the Tasmanian *Electricity Supply Industry Act 1995* (*ESI Act)* or subject to approval under the Tasmanian *Land Use Planning and Approvals Act 1993* (*LUPA Act)*. No environmental impacts are anticipated.

Temporary workforce accommodation facility

A temporary WAF is proposed adjacent to Tarraleah Village (on the same land title but separate from the existing village). Hydro Tasmania purchased Tarraleah Village in 2023 to accommodate the WAF. Construction is expected to occur prior to, or in conjunction with, Project construction and will be subject to a separate approvals process.

It is anticipated that most Project staff will be housed in the WAF, supplemented by accommodation in Tarraleah Village and potentially in regional facilities. A SIMP (SI 1) will be developed to guide workforce accommodation outcomes, including minimising flow-on impacts to host communities (e.g. rental affordability and accommodation shortages) (refer Section 5.9 and Appendix E). Potential environmental impacts associated with the WAF are expected to be readily mitigated.

5.13 Aboriginal heritage

An Aboriginal heritage assessment has been completed for the Project. Due to the culturally sensitive information it contains, the full report is not publicly available with this EIS but has instead been provided to Aboriginal Heritage Tasmania (AHT) in accordance with the Tasmanian *Aboriginal Heritage Act 1975* (AH Act). This chapter provides a summary of the Aboriginal heritage assessment process.

5.13.1 Existing environment

5.13.1.1 Traditional ownership

At the time of European arrival, the upper Derwent region lay within the territory of the Big River nation, the most landlocked of the Tasmanian Aboriginal groups. European settlers named the Ouse River the “Big River,” though the traditional name recorded was *bangener wappo* (Robinson and Plomley, 2008).

The Big River nation’s territory encompassed the highland lake country, extending south to New Norfolk, north-west to Surrey Hills, and east to the edge of the midland plains. Without a coastline, the Big River people maintained access to lowlands and coasts through social agreements with neighbouring groups.

The nation is thought to have comprised five or six distinct clans. The Larmairremener, numbering an estimated 60–80 people, occupied the high country west of the Dee River. Specialists in sub-alpine life, they practiced a culture adapted to highland conditions.

Occupation of the highlands was usually seasonal, with clans migrating east during colder months to live among the Oyster Bay Nation, with whom relations were generally amicable (Ryan, 2012). Year-round highland occupation was possible when required, supported by a network of well-known tracks linking settlements and providing access to resources beyond clan boundaries.

In summer, the Upper Derwent, Nive (*trarrerkinnbineer*), Dee and Ouse rivers and associated plains provided abundant resources, including kangaroo, wallaby, possum, wombat, cats, and birds and eggs. Plant foods included native bread (*Polyporus myllitae*), manna (*E. viminalis*), tubers such as native potato (*Gastrodia sesamoides*), and cider gum (*E. gunnii*) (Cosgrove, 1984).

The Big River people wore skins and constructed huts, often clustered into villages near lagoons, lakes, rivers and adjacent grasslands maintained by burning. A semi-sedentary lifestyle is suggested by historical accounts of huts re-occupied and maintained across generations, some decorated internally with artwork and cultural symbols (Robinson and Plomley, 2008).

Movement relied on a radiating track network, largely memorised but marked in places, connecting hunting areas, foraging grounds and campsites, often following river valleys and plains (Cosgrove, 1984). Historical accounts note three major routes linking the Upper Derwent to the eastern lowlands: one to Pittwater, one via Jericho to the southern midlands, and one to the northern midlands via the Macquarie River (Cosgrove, 1984). An internal thoroughfare, *bangener menanyer*, followed Kenmore Creek from the lower Derwent to the lake country (Robinson and Plomley, 2008).

To the north, a road ran via yingina/Great Lake and through the Great Western Tiers near Quamby Bluff, joining an east–west route past the Gog Range ochre mines to the Hampshire Hills. Another is thought to have led from Lake St Clair past Cradle Mountain to the Middlesex Plains and on to the Hampshire Hills Road (Ryan, 2012). Archaeological evidence at Lake Rowallan suggests an alternative northern route via the Mersey River.

For the first decade of European settlement, the Larmairremener continued their culture largely undisturbed. This changed in the 1820s as settlers, cattle and sheep moved into hunting grounds along the Derwent, Ouse and Clyde rivers, with summer grazing on the highland marshes.

From 1822, expropriation of clan lands for white pastoralists turned the Ouse and Clyde valleys into strategic corridors for Aboriginal resistance. Between 1824 and 1831, the Big River people mounted sustained guerrilla-style attacks on settlers and property. By the end of 1831, after sustained reprisals and hardship, only 26 Big River people remained, including several Larmairremener, when conciliator G.A. Robinson persuaded them to lay down their arms (Ryan, 2012).

5.13.1.2 Methods

Desktop assessment

A preliminary desktop heritage assessment was completed in March 2019 during the Project's pre-feasibility stage. This assessment collated existing heritage information and applied a notional risk mapping scheme, classifying the area into zones of high, medium and low potential for statutory relics. The purpose of this zoning was to guide concept planning and prioritise areas for survey to support the staged geotechnical investigation program.

The 2019 assessment has since been revised and updated. As the predictive zoning has served its purpose of guiding early investigations, it has now been retired.

Field surveys

Field surveys were undertaken across eight days (25 September–4 October 2024) and three days (8–10 April 2025).

- The 2024 spring survey focused on:
  - Headrace pipeline and western portal (2 days)
  - Mid access portal (1 day)
  - Paddy's Quarry Portal (0.5 day)
  - Pump pond to surge tower rising main (2 × 0.5 days)
  - 14 km Tungatinah to Lake Echo transmission line option (2 days).
- The 2025 autumn survey focussed on the 15 km Tarraleah to Liapootah transmission line option (2.5 days).

Surveys typically involved pedestrian transects spaced 10–20 m apart along the development footprint, centred on the reference design. Survey teams consisted of a Hydro Tasmania archaeologist and an Aboriginal Heritage Officer (AHO) for three days of the 2024 survey, with two trainee AHOs (seconded from AHT under a partnership agreement) joining for the final five days. The 2025 transmission line survey involved all four personnel.

Several areas were not resurveyed due to existing coverage:

- 22 kV transmission line segments between the Western Portal and Tarraleah (assessed by Huys and Sainty, 2019) and between the downstream portal and headrace pipeline (within an existing 220 kV easement or along the No. 2 Canal access road).
- The southern transmission line alignment, previously assessed in 2002. While AHT confirmed no further survey was required, the majority was resurveyed to address the time elapsed and updated regulatory requirements.
- Tarraleah Village and the power station site, where extensive historical development and landscaping precluded meaningful survey.

Surveys followed AHT's *Aboriginal Heritage Standards and Procedures* (2024) and Hydro Tasmania's *Cultural Heritage Procedure*, which prioritises safety and restricts surveys in terrain steeper than 20°. As a result, limited areas—such as parts of the southern alignment in the Nive River Valley—were not physically assessed.

GPS tracklogs (GDA2020/MGA55) were recorded for each surveyor. For coverage calculations, transects were taken as 4 m wide (2 m either side of each surveyor). Coverage was mapped by buffering GPS tracks and merging to eliminate duplication. Ground visibility was estimated in 10% increments along the archaeologist's transects.

All features were documented with written descriptions, digital photography, and DGPS positioning (Trimble Catalyst), accurate to 0.1–1 m depending on vegetation cover.

Community consultation

Engagement with Traditional Owners and custodians is a core principle of heritage management[17] and is reinforced by State and Commonwealth standards and guidelines. These include:

- AHT's Aboriginal Heritage Standards and Procedures (2024)
- DCCEEW's Interim Engaging with First Nations People and Communities on Assessments and Approvals under the EPBC Act (2023)
- Australian Institute of Aboriginal and Torres Strait Islander Studies Principles for engagement in projects concerning Aboriginal and Torres Strait Islander peoples (2020)

AHT's standards emphasise that consultation should occur for all Aboriginal heritage assessments, proportional to project scale and potential impact:

> *"A level of consultation proportionate to the significance and impact of a proposed project is essential for successful outcomes, particularly if a proponent cannot avoid potential impact to Aboriginal heritage." (AHT, 2024)*

They also highlight the importance of engaging an AHO—and for larger projects, the Aboriginal Heritage Council (AHC) and wider community—early in the planning process.

Engagement with the AHC and Tasmanian Aboriginal community has been ongoing for more than three years (refer to Chapter 4). A summary of this engagement is provided in the Aboriginal heritage assessment.

17 i.e., refer the ICOMOS statement on Indigenous Cultural Heritage australia.icomos.org/wp-content/uploads/Australia-ICOMOS-Statement-on-Indigenous-Cultural-Heritage.pdf

5.13.1.3 Survey coverage and ground surface visibility

A total of 174 km of pedestrian transects were completed for the Aboriginal heritage assessment, comprising ~53 km across the main Project area and 121 km for transmission line options.

For the survey, the Project footprint was divided into two zones:

- **Design footprint**: areas of major impact where infrastructure (e.g. roads, pipelines, excavations, spoil heaps) was proposed.
- **Adjacent area**: the remaining footprint where no specific uses were identified.

The design footprint was prioritised for survey. Based on 4 m transect widths, physical survey coverage of the disturbance footprint from the headrace pipeline to the power station ranged from 3.6% to 47%.

For transmission line options:

- **Northern option:** 29.6% coverage
- **Southern option:** 19.3% coverage (lower due to no survey of the 2 km descent into the Nive River valley between Poles P1–P7, excluded under Hydro Tasmania's *Cultural Heritage Procedure* due to slope >20°).

Survey coverage of adjacent forested areas proposed for easement widening and tower construction was lower: 1.2% (northern option) and 4.2% (southern option).

Ground surface visibility (GSV) was typically <10% across conveyance areas due to dense vegetation and limited prior disturbance. Ground surface visibility was lowest in design footprint zones, rising slightly in adjacent areas incorporating existing access tracks. For the surge tower and pump station sites, GSV was 0% due to wet forest cover.

For transmission line options, GSV was influenced by transect location. Visibility at easement edges was reduced by rock and vegetation windrows, resulting in conservative figures. Even so, average GSV was higher for the northern (9.7%) and southern (7.3%) options compared with conveyance areas, reflecting the focus on existing cleared easements. Adjacent uncleared areas averaged ~5% visibility.

A detailed tabulation of survey coverage and GSV is provided in the Aboriginal heritage assessment report.

5.13.1.4 Aboriginal heritage sites

Ten Aboriginal heritage sites, all small surficial stone artefact scatters, are located within or near the Project footprint. Seven were identified during Project assessments; three were recorded in earlier assessments of transmission line upgrades. Two of the latter could not be relocated and are presumed lost, though they remain registered under the AH Act.

A detailed description of each site is provided in the Aboriginal heritage assessment.

The small number, size and low density of sites between Dee Lagoon and Butlers Gorge suggest this country was not intensively managed prior to European arrival. Rather, it was likely used for rapid transit and opportunistic resource harvesting when travelling between larger, more intensively occupied living areas. One probable focus was the Lake King William impoundment valley, which historic imagery indicates was a fire-modified cultural landscape. While no historical records survive, this valley may have formed part of an Aboriginal route linking the western highlands via Lake St Clair to the Middlesex Plains or Mersey Valley.

This interpretation aligns with previous research (e.g. Huys & Sainty, 2019), which proposes seasonal or sporadic hunting and foraging in hinterland areas, with major river valleys serving as primary travel corridors. In this case, the glacial valley between Tarraleah and Butlers Gorge may have offered an easier transit route, with more resources, than the adjacent steep and resource-poor Derwent River valley.

5.13.1.5 Potential Areas of Sensitivity

Under AHT's *Standards & Procedures*, a Potential Area of Sensitivity (PAS) refers to a zone considered prospective for statutory relics or cultural deposits, based on predictive factors such as landscape, geomorphology or cultural associations, even if no surface relics are visible.

Project assessments identified:

- **No PAS** for medium–large artefact scatters, given the small size and low density of recorded sites, poor ground visibility, and absence of strongly predictive environments.
- **Possible PAS** for small scatters and single artefacts, which are difficult to delineate due to low-intensity land use and rapid movement through country. Localised areas of higher sensitivity are suggested along forest–buttongrass interfaces at the northern footslopes, based on:
    - A site near the downstream portal
    - Two sites on the northern margins of Mossy Marsh
    - A site near Tungatinah Creek intersected by the northern transmission line option.

On this basis, four PAS for small artefact sites have been delineated for management. Further detail is provided in the Aboriginal heritage assessment.

5.13.1.6 Aboriginal Cultural Landscape Values

Unlike statutory artefacts defined under the AH Act, there is no formal definition of Aboriginal cultural landscape values in lutruwita/Tasmania. Guidance is available from AHT's statement on values within the TWWHA:

> *"Cultural landscapes are areas containing natural features which have been physically modified and managed by human activity... The physical evidence of this connection is apparent today in elements such as the vegetation types and coverage, which were managed and modified by targeted burning regimes implemented by Aboriginal people. Aboriginal cultural heritage sites provide further evidence of the long connection with the landscape."*
> *(AHT, Aboriginal cultural values – TWWHA Fact Sheet)*

Knowledge of land management systems used by Big River people was lost soon after European arrival and cannot be reconstructed without contemporary Aboriginal involvement; however, it is clear that the area between Lake King William and Tarraleah was culturally managed until dispossession. Today, the landscape reflects nearly 200 years of neglect or management based on introduced values.

Historic photographs of the Lake King William impoundment and western conveyance areas show persistent edges, belts, clumps and clearings long after Aboriginal maintenance ceased. Some features may also reflect 'sympathetic' colonial practices (e.g. grazing in clearings, ring-barking trees to mimic fire-maintained edges).

Within the disturbance footprint, 102 culturally significant plant species have been identified and mapped, along with their traditional uses. The western section (Butlers Gorge to western portal) supports the greatest diversity, spanning dry eucalypt forest, woodland, button grass moorland and modified zones. Further east, culturally significant plants are also present at Paddy's Quarry, the Nive River, parts of Lake Echo, and along the Liapootah transmission line, albeit at lower frequency. The northern and southern line options are dominated by wet eucalypt forest, interspersed with dry forest and modified zones.

The distribution of plants with food, medicinal, tool and other cultural uses demonstrates that the Project area still retains high biodiversity of cultural relevance despite two centuries of dispossession. The landscape's cultural significance lies not only in individual species, but in their arrangement into sustainable ecosystems maintained by Aboriginal land practices. As with all such values, significance can only be determined by Aboriginal people.

5.13.2 Assessment

5.13.2.1 Aboriginal heritage sites

All registered sites within the Project's disturbance footprint are located close to, or on, existing transmission line access tracks. As such, potential impacts relate primarily to direct physical disturbance or concealment.

Key potential impacts include:

- Physical disturbance or concealment due to track widening or laydown activities
- Vehicular impacts.

A detailed description of potential impacts on each Aboriginal heritage site is provided in the Aboriginal heritage assessment.

5.13.2.2 Potential Areas of Sensitivity

The very low levels of ground surface visibility (GSV) create poor conditions for identifying artefacts. Consequently, there is a high likelihood that undetected Aboriginal heritage sites are present within the Project's development footprint.

Key potential impacts on PAS include:

- Vegetation clearance, full-depth disturbance for portal construction, and concealment during spoil management
- Minor encroachment on transmission line corridors
- Physical disturbance or concealment due to track widening, upgrades, and laydown activities
- Vehicular impacts.

A detailed description of potential impacts for each PAS is provided in the Aboriginal heritage assessment.

5.13.2.3 Aboriginal cultural landscape values

Aboriginal cultural landscape values, along with other intangible cultural values, cannot be adequately identified through the assessment process set out in AHT's *Standards & Procedures*. These values are currently being explored through voluntary Aboriginal community engagement, including on-country visits, which will be reported separately.

Feedback received to date suggests that impacts on non-statutory cultural values will mainly result from above-ground works in greenfield settings, rather than underground works. The headrace pipeline, which intersects button grass plains and tree belts, will introduce a significant visual change in an area with a wide diversity of cultural plant resources. Both the new infrastructure and changes to landforms and vegetation patterns may result in cultural landscape impacts.

Other work areas, such as portals, occur in timbered country with lower levels of traditional use, are more visually contained, and are already affected by activities such as plantation forestry. The proposed surge tower, however, will interrupt the forested skyline and may also create a cultural landscape impact.

Additional transmission lines along existing 220 kV easements and widening of forest setbacks, particularly in forestry areas, are more likely to compound existing impacts rather than create new, significant cultural landscape impacts.

While the traditional social and spiritual meanings of water within the Project area are not documented, accounts from other regions of *lutruwita*/Tasmania suggest that diverting water between the *rayghepyerrenne*/River Derwent and *trarrerkinnbineer*/Nive River catchments could have supernatural and social consequences under traditional belief systems. The validity and contemporary relevance of this interpretation, and its implications for intangible cultural values, can only be determined by the Tasmanian Aboriginal community.

5.13.3 Avoidance and mitigation measures

All Aboriginal artefacts in Tasmania are protected under the AH Act. Avoiding impacts is the preferred management outcome to meet Aboriginal community expectations. The management measures outlined below will be confirmed in consultation with AHT and Aboriginal community organisations.

5.13.3.1 Managing potential impacts on registered Aboriginal sites and artefacts

Eight confirmed Aboriginal heritage sites and two legacy sites are situated within or near the Project disturbance footprint. One site is already protected within a 2 m flagged exclusion zone at the western end of the headrace pipeline (associated with Hydro Tasmania's Tarraleah Upgrade Works Project).

The other seven confirmed artefact sites, along with the two legacy sites, are located on or near transmission line access tracks and will require management to protect them during construction. Avoidance, supported by appropriate design and construction measures, remains the preferred option. Detailed management recommendations are provided in the Aboriginal heritage assessment.

Management measure

AH 1: The location of all confirmed Aboriginal heritage sites, plus the two legacy sites (with effective buffers), will be included in Project plans. Where practicable, these sites will be avoided in the final disturbance footprint. Where avoidance is not possible, a permit under the AH Act (AH Act permit) will be sought to relocate or disturb the affected artefacts.

5.13.3.2 Managing impacts to Potential Areas of Sensitivity

Four PAS have been delineated in areas where forest meets button grass plains, including near the western portal and sections of the 22 kV power supply alignment. As PAS are not recognised under the AH Act, they cannot be registered or covered by permits. Instead, they serve as caution zones where extra care should be taken. Avoiding or minimising ground disturbance within PAS is considered good risk management.

Management measure

AH 2: The location of the four PAS will be included in Project plans. Where practicable, PAS will be avoided. Where avoidance is not possible, Project staff will be made aware of their locations prior to ground disturbance and AHT's Unanticipated Discovery Plan (UDP) will be implemented if relics are encountered.

5.13.3.3 Managing potential impacts to cultural landscape values

Aboriginal cultural landscape values within the Project area have not yet been formally identified, and impacts have not been fully assessed. This knowledge gap is being addressed through ongoing community consultation and facilitated access to Project areas (Section 5.13.3.5).

5.13.3.4 Managing unexpected discoveries

Aboriginal relics, including isolated stone artefacts and scatters, occur across Tasmania and may not be detected even with thorough survey. To safeguard against impacts on undiscovered sites, provisions must be in place for managing unexpected finds.

Management measures

AH 3: If unanticipated Aboriginal relics are discovered during works not covered by an AH Act permit, ground disturbance will cease immediately and AHT's UDP will be implemented.

AH 4: All Project staff engaged in ground-disturbing works will complete cultural heritage awareness training to ensure effective implementation of the UDP.

5.13.3.5 Aboriginal community consultation

The Tasmanian Aboriginal community generally considers that heritage legislation and planning provisions do not adequately reflect their perspectives. Their interests and expectations regarding land and heritage on Hydro Tasmania-managed land are currently being addressed through a broader organisation-wide Commitment and Action Plan (CAP).

As part of this commitment, Aboriginal community views will be sought in identifying and managing heritage and cultural values within the Project footprint. This will include sharing the findings of the heritage assessment and providing opportunities for on-country visits to assess cultural landscape and intangible values.

Management measures

AH 5: Provide a copy of the Aboriginal heritage assessment to Aboriginal community organisations and interested individuals to support Project-level consultation.

AH 6: Hydro Tasmania will support additional community-led engagement, including on-Country visits, to identify cultural landscape values and potential impacts. Where practicable, outcomes will be incorporated into Project execution.

AH 7: Requests for AH Act permits will allow sufficient time for Aboriginal community engagement, in line with AHT's *Aboriginal Heritage Standards and Procedures* (2024).

Section 5.9 also includes commitments to develop and implement a Project Communication and Stakeholder Engagement Plan and a First Nations Participation Plan (refer to mitigation measures SI 2 and SI 11).

5.14 Visual amenity

A Visual Impact Assessment (VIA) has been completed for the Project. The VIA is provided in Appendix M and summarised in this Chapter.

5.14.1 Existing environment

Landscape character types (LCTs) are physiographic regions with common visual characteristics defined by landform, waterform, vegetation, and cultural influences. In Tasmania, there are generally considered to be 11 regional LCTs. Tarraleah is located on the northern edge of the High Mountains Landscape type, adjacent to the Central Plateau type.

Hydro-electric development is a characteristic feature of both LCTs, and includes elements such as power stations, surge towers, penstocks, canals, transmission lines, intakes, tunnels, and associated infrastructure. Production forestry is another key feature of the regional landscape around Tarraleah, particularly to the east and south-east. Further west, the landscape is dominated by extensive buttongrass plains and the mountains of the southern Cradle Mountain–Lake St Clair National Park, extending into the TWWHA to the south-west.

5.14.1.1 Factors influencing the visual setting

A range of factors influence the visual setting and potential impacts on wilderness values. For the Project, the factors identified in the VIA as influencing landscape sensitivity are listed in Table 5.33.

Table 5.33: Biophysical factors influencing the visual setting of the Project

Factor	Influence on visual setting of the Project
Climate	Elevation 630 m ASL, inland from the coast means the Project area is subject to frost and snowfall. Relatively cool temperatures and high rainfall results in slow growing but lush vegetation. Weather patterns create striking ephemeral atmospheric effects with frequent winter fogs and occasional snowfall and frosts.
Geology, Geomorphology and Topography	Topographically varied site with many steep sections and landslide hazards. While lacking the dramatic views associated with Tasmania's iconic dolerite peaks, the landscape is nevertheless varied and interesting. Quartzite colour will potentially contrast with the surrounds when spoiled.

Factor	Influence on visual setting of the Project
Geoconservation	Blanket bog is dominated by low growing buttongrass and does not provide the visual screening of taller forest vegetation. It is however of global conservation significance because of its status as a key World Heritage value in its own right. Wilsons Falls macrofossil site is located 1.6 km south of Tarraleah.
Surface hydrology	Various incised valleys and rivers are a visual feature of scenic interest across the landscape, notably the Nive River, with viewing opportunities from the Lyell Highway and the upper reaches of the River Derwent, viewed along Butlers Gorge Road. Hydropower infrastructure including open aqueducts and ponds have been a feature of the area since the late 1930's when the Tarraleah Scheme was built.
Fire	Fire can temporarily or permanently change the visual setting by removing vegetation. Hot and repeated fires can alter the vegetation such that the succeeding overstorey/ understory is different to what occurred previously, potentially altering the screening capacity of the vegetation.
Soils	Low contrast between the soil colour and surrounding vegetation mean bare areas are unlikely to be highly visible from higher elevations in the seen view. Dark colours over most of the site but areas of yellow colour soils contrast with surrounding vegetation and could be visible from higher elevations if disturbed.
Flora	Any removal of forest and its screening potential, through bushfire, timber extraction or construction processes, could open views to new infrastructure. Care needs to be taken not to disturb existing vegetation given its high value as a screen to construction works in views from roads as well as from natural areas, including the TWWHA.
Fauna	Retention of trees is important for raptor nests and habitat and is also important for screening the Project to maintain as many natural views as possible.

Source: Adapted from Inspiring Place, Tarraleah Visual Impact Assessment Report, Appendix M.

5.14.1.2 Future integrity based on existing use

Permanent Timber Production Zones cover much of the Project area, including Butlers Gorge Road and areas north of Mossy Marsh and Tarraleah. Timber harvesting can open up views to existing and proposed hydropower infrastructure, particularly from the Lyell Highway, where most public viewing opportunities are concentrated.

Bushfire is a common feature of the Tasmanian landscape—occurring naturally, as a management tool, or through human causes. Aboriginal people traditionally used fire to shape the landscape to meet cultural needs. More recently, fire has been applied in forest regeneration, to promote ecosystem diversity, and to reduce fuel loads. With predicted climate change, bushfires are expected to become more frequent and intense.

Bushfire can significantly alter the landscape by reducing vegetation that screens hydropower infrastructure. Regenerating vegetation may differ in type and density, potentially changing the effectiveness of this natural screening.

Potential impacts of both fire and timber harvesting on views of new hydropower infrastructure, particularly during construction, are considered in the visual mitigation strategies and measures (see Section 5.14.3).

5.14.2 Assessment

This Section outlines the methodology and outcomes of the visual assessment.

5.14.2.1 Methodology

The VIA was based on the Tasmanian Forest Practices Authority's *A Manual for Forest Landscape Management* (2006) (the Manual), the primary visual management tool used by Tasmanian planning professionals. The Manual is derived from systems first developed in the United States, and has been adapted to reflect contemporary best practice techniques, including extensive use of GIS. In Tasmania, this system has been applied to a wide range of projects, including transmission lines, wind farms, telecommunication facilities, heavy industry, residential developments, waste disposal operations, and tourism attractions. It is therefore considered well suited to assessing this Project.

The system of analysis in the Manual evaluates factors that influence how people perceive changes to the visual qualities of a place. These include:

- **Alteration type**: the scale, character and location of the Project
- **Landscape context**: the biophysical and social factors that combine to create the character and scenic quality of the setting
- **Viewing disposition**: who sees what, from where, and how often—assessed using viewshed analysis (refer to Figure 5.60)
- **Visual absorption capability**: the inherent capacity of the landscape to accommodate change without significant impact
- **Landscape sensitivity**: the contribution the landscape makes to sense of place, and its susceptibility to change
- **Magnitude of impact**: the degree to which a proposed alteration changes the scenic attributes of the landscape and alters the viewing experience.

Together, these factors inform an understanding of the overall significance of visual impacts and the need for targeted mitigation measures.

It should be noted that the southern transmission line option was not specifically modelled for visual impacts. Although it follows a different alignment to the northern option, it traverses similar landscapes and interacts with similar viewing points (e.g. roads). Both options also involve comparable landscape modifications, including selective vegetation clearing within existing corridors and easements. While minor differences in impact may arise, the significance of these differences is considered low. Accordingly, management measures for both transmission line options are the same.

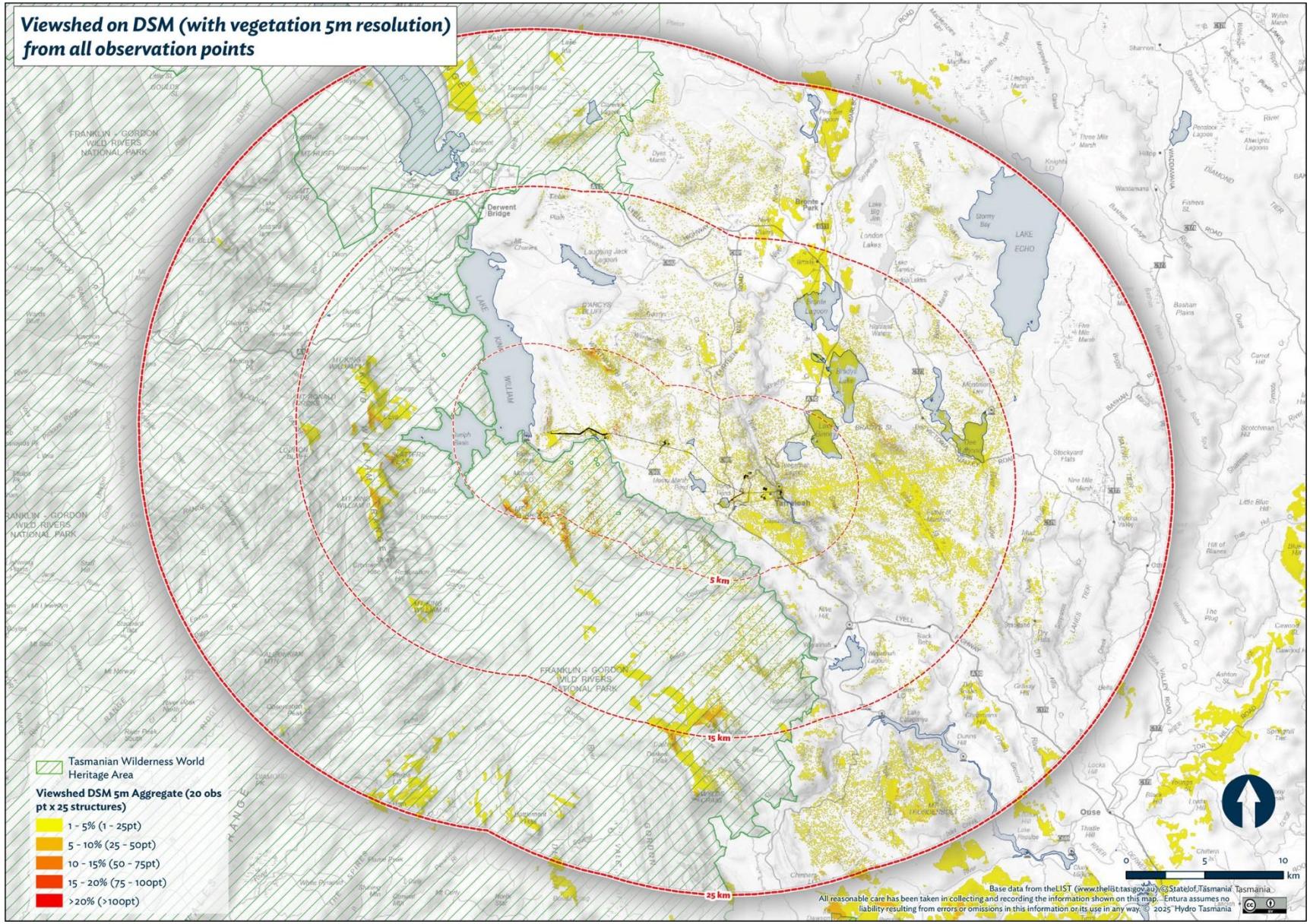


Figure 5.60: Viewshed analysis of all observation points, based on digital surface model (DSM), which includes vegetation

5.14.2.2 Sensitivity to change

Visual sensitivity refers to the contribution a landscape makes to the sense of place, and the degree to which it is susceptible to changes in character. Because most landscapes are viewed from multiple locations, some areas will be more sensitive to alteration than others.

Key factors contributing to sensitivity include:

- Viewing distance—foreground, midground, background, far view
- Viewing composition
- Frequency of viewing from representative viewpoints
- Duration of viewing
- Viewer expectations.

Sensitivity to change reflects the combination of these factors. While viewer expectations are inherently subjective and can lead to varied reactions to the introduction of new infrastructure, fixed measures such as distance and frequency of view help define the likely extent of impacts.

The existing landscape in the Project region is already characterised by hydroelectric power generation and electricity transmission infrastructure. As a result, its sensitivity to further change of this type is lower than landscapes where such infrastructure is absent.

5.14.2.3 Magnitude of impact

Visual impact refers to the degree of change in the scenic attributes of a landscape, particularly where new elements lack contextual fit or coherence. Such impacts arise when visual contrasts are introduced that alter the viewing experience. Visual impacts may be positive or negative; however, changes that diminish the viewer's appreciation of the scene are generally considered negative.

In many landscapes, change is anticipated as development progresses and cultural patterns of settlement evolve. While visual variety can enhance a landscape, alterations that permanently diverge from its established character are typically regarded as negative within visual management planning.

The criteria used to evaluate the magnitude of impact are outlined in Table 5.34.

Table 5.34: Magnitude of visual impact evaluation

Magnitude of impact	Rationale
High	Changes contrast strongly with the landscape character and viewing experience where the alteration will be viewed as a permanently dominant change to the setting.
Medium	Changes that are permanently visible but of a scale that is sub-ordinate to the setting or of an alteration type consistent with the landscape character and viewing experience.
Low	Changes that are permanently visible but of a scale or alteration type that is subsumed in the setting and consistent with the landscape character and viewing experience.

Parts of the Project, such as the surge tower and transmission line, are prominent by design and are therefore noticeable in the landscape. The type of alteration, its apparent departure from the existing landscape character, and the capacity of the landscape to absorb or mitigate change all interact to influence the magnitude of visual impact.

Overall, the Project is assessed as having a low magnitude of impact, with some elements reaching moderate impact, for the following reasons:

- Many components are located within already disturbed areas (low)
- Works will largely occupy relatively level ground with dark soils and/or remain screened by existing vegetation (low)
- Highway users will have clear but brief views; however, such views occur in a landscape already characterised by hydropower infrastructure, so alterations are expected (low–moderate, depending on viewer)
- Most elements are screened by vegetation or topography, though some features—particularly the surge tower—are more visible, albeit fleetingly (moderate).

5.14.2.4 Significance of visual impact

The VIA methodology concludes with an assessment of impact significance, which combines the landscape sensitivity and magnitude of impact assessments using a risk matrix. The interactions are then evaluated to determine the overall significance of an impact.

For the Project, the assessment is that overall significance is low, even before additional mitigation measures are applied.

Viewpoint mapping (Figure 5.61 and Figure 5.63) and photomontages (Figure 5.62 and Figure 5.64) illustrate the extent and character of landscape change associated with one of the Project's largest permanent infrastructure elements—the surge tower—as viewed from Mount King William and Oldina Drive, Tarraleah Village.

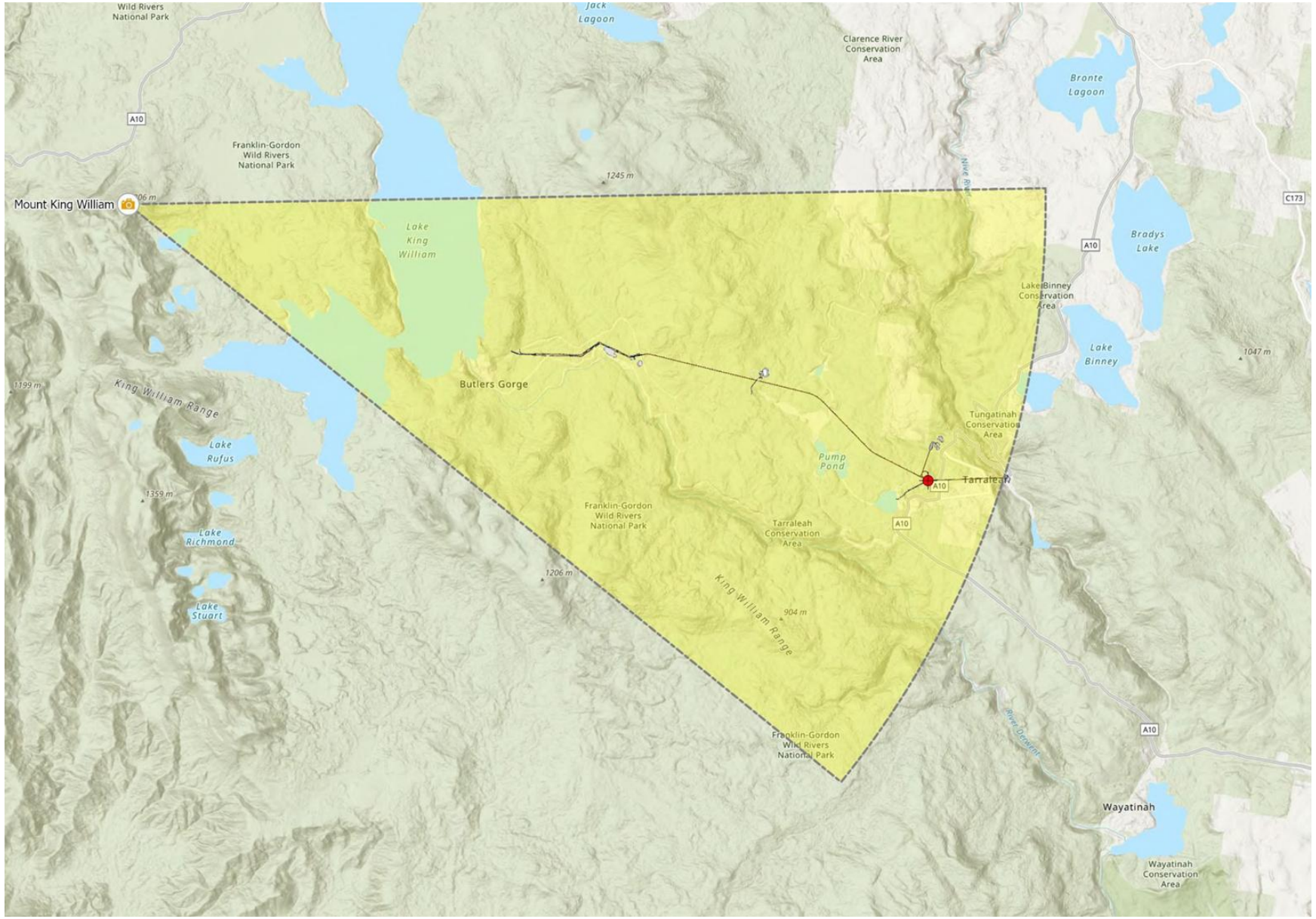


Figure 5.61: View Point Map – Surge Tower Visual Simulation – View from Mount King William



Figure 5.62: Tarraleah Surge Tower Visual Simulation, view from Mount King William (surge tower is within red circle)

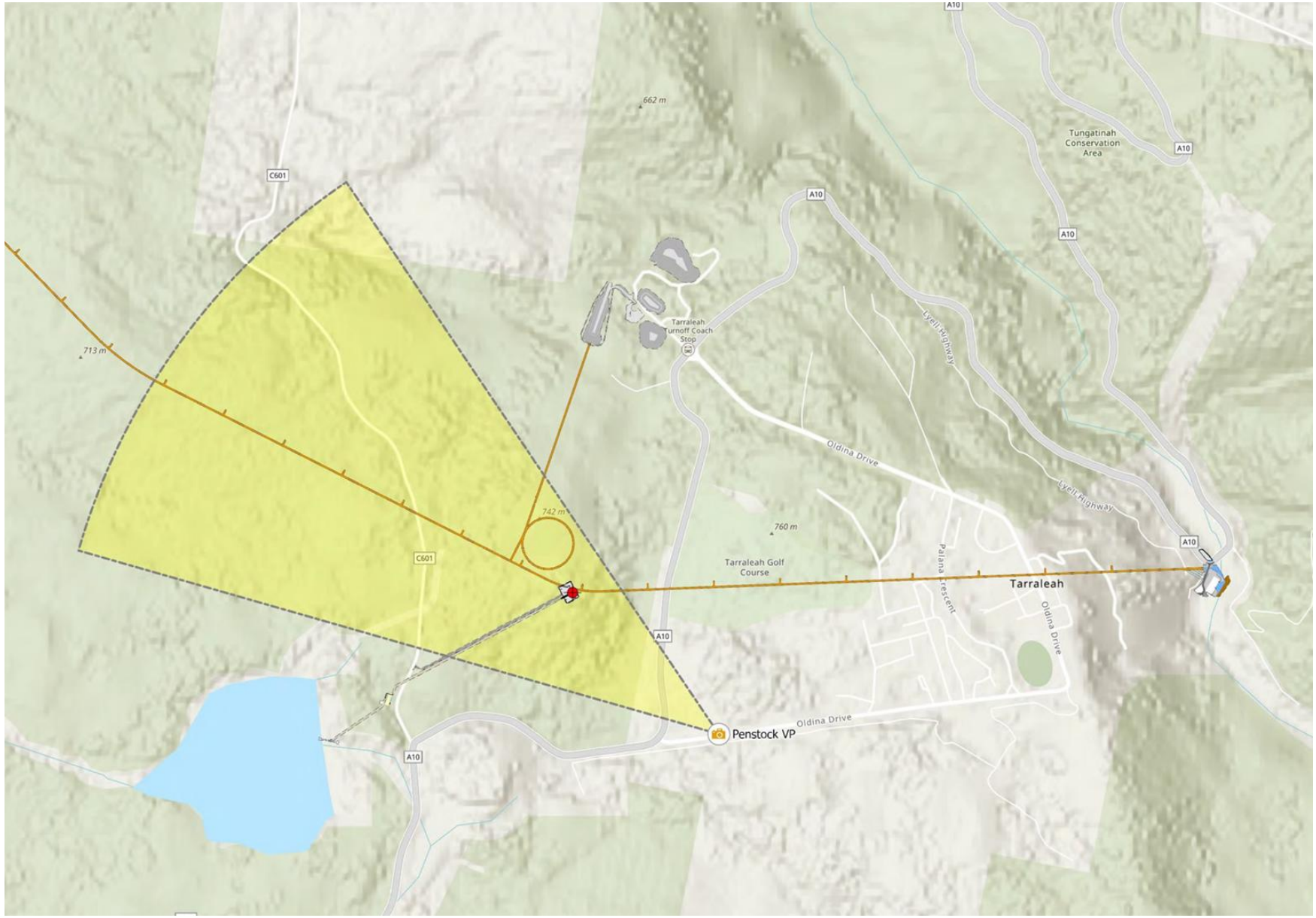


Figure 5.63: View Point Map – Surge Tower Visual Simulation – View from Oldina Drive, beside existing penstocks



BotN – Tarraleah Surge Tower Visual Simulation
Oldina Drive – view from beside Penstocks
Recommended viewing distance when viewed with both eyes is 550mm

Easting: 453,464m
Northing: 5,316,162m
Elevation: 602.6m
Photo Bearing : 306°

Date: 06/07/2023
Time: 11:38 AM
Weather: Partial cloud cover
Visibility: Normal

Camera: Canon EOS 5D Mark IV
Camera Height: 1.65m
Focal Length (35mm eq.): 50mm
Hz FOV: 40.0°

Distance : 0.765 km

Figure 5.64: Visual Simulation – Surge Tower – View from Oldina Drive

5.14.3 Avoidance and mitigation measures

This section outlines how the Project's effects on visual amenity are managed through avoidance and mitigation.

Visual impact mitigation refers to actions taken (in order of preference) to:

- Avoid or minimise the impact to reduce its overall significance
- Rectify an impact by repairing, rehabilitating, or restoring the affected landscape
- Reduce the significance of the impact over time.

5.14.3.1 Avoidance in early design phase

Based on preliminary visual assessments undertaken early in the Project design phase, Hydro Tasmania made several refinements to the siting and design of Project elements. This early assessment and design work, undertaken as part of the reference design and siting process, included:

- Use of GIS data to understand visible views
- Integration of the Project with the existing Tarraleah hydropower scheme infrastructure
- Consolidation of the Project in locations with other hydro infrastructure and facilities, thereby using existing access roads and minimising vegetation clearing in previously undisturbed areas
- Siting much of the water conveyance infrastructure underground, avoiding the visual impacts of existing canals
- General avoidance, where practicable, of siting infrastructure elements on skylines
- Preliminary field investigations by Hydro Tasmania staff to understand potential visual impacts and inform specialist consultants.

The preliminary design phase investigated options for locating infrastructure away from ridgelines and reducing infrastructure height to limit visibility against the skyline. The final Project design reflects this process, while also considering the technical and operational constraints of the Tarraleah hydropower scheme. For example, the surge tower's height above ground is determined by its relative elevation to Lake King William—a fixed design constraint. Its siting relative to the power station is also constrained by hydraulic, geotechnical and other engineering requirements.

Similarly, advice on minimising visual impacts included avoiding direct line-of-sight views to major works and infrastructure by avoiding straight, linear access tracks. These considerations have been incorporated into the design but will continue to be reviewed in the context of maintaining access to adjoining infrastructure (e.g. pipelines), safety, and minimising the disturbance footprint.

5.14.3.2 Mitigation measures

The low significance of visual impact means the principal opportunities to further mitigate residual impacts from the Project are to:

a) Refine the design specifications of key Project elements so they either blend into the surrounding landscape or are designed as features—for example, through public art (e.g. murals) and/or inclusion in a broader interpretation project of the Tarraleah/Upper Derwent hydropower scheme[18]

b) Reduce the visibility of Project elements (during construction and operation) by maintaining and managing vegetative screening as far as practicable

   i) Minimise the short-term visual impacts of sediment, dust and other contaminants during construction activities around the Project footprint.

18 A scheme interpretation and/or visitor experience strategy is a future initiative of Hydro Tasmania as the Project nears completion. This would be undertaken as part of the Project's Local Benefits Sharing Action Plan and would be developed through the construction phase so that benefits to the regional visitor economy start to be realised soon after Project commissioning.

In reference to **a** above, during detailed design consideration will be given to those areas where the potential significance of the Project's visual impact is assessed as moderate. Mitigation measure VI 1 provides that residual visual amenity impacts may be addressed through:

- Use of materials with appropriate finish and colour to blend with the landscape and minimise potential for glint and glare, particularly for the surge tower.
- Using non-reflective materials, black powder-coated fencing, and reducing the contrast and reflectivity of concrete elements in high-sensitivity areas. This may include:
  - Adding dark-coloured additives to general purpose concrete mixes
  - Applying surface colour treatments such as oxidising compounds
  - Spray bitumen applications.
- Separating topsoil from rock during excavation to enable revegetation. Applying topsoil over freshly cut rock can reduce brightness and visibility.
- Shaping spoil emplacement areas using 'geoforming' methods to achieve a more naturalistic landform and support revegetation.
- Varying vegetation boundaries along access tracks, roads and transmission easements to break up linearity of edges and soften visual impacts, while maintaining the minimum practicable disturbance footprint. (Note: this may not be feasible in areas with sensitive flora and fauna values.)

In reference to **b** above, a range of mitigations have been recommended and will be considered/implemented in the following ways:

- Maintaining vegetative buffers, where practicable, to screen visible worksites. 'Visual buffer zones' will be prescribed in contract documentation and specifications as protected areas. A particular focus will be to maintain the vegetation screen around Paddy's Quarry along the Lyell Highway to provide both short- and long-term screening of spoil emplacement areas.
- The Construction Environmental Management Plan (CM 1) and its sub-plans will describe how vegetation clearing will be minimised, disturbed areas rehabilitated, and spoil and waste managed. Relevant visual impact mitigation measures will include:
  - Minimising disturbance of existing vegetation, with works located in already cleared areas where possible
  - Reusing removed vegetation where feasible and appropriate disposal of vegetation not reused
  - Delineating works areas to avoid over-clearance
  - Favouring the use of native vegetation in revegetation programs
  - Geoforming permanent spoil emplacement areas to facilitate effective rehabilitation
  - Monitoring rehabilitation to detect weed invasion, erosion or sedimentation and to evaluate revegetation success.

In reference to **c** above, the following measures will reduce the significance of construction-phase visual impacts:

- The Water Management Plan (WQ 1) will reduce visual impacts from turbidity in streams and waterways, bare-soil exposure and other factors affecting visual amenity.
- Construction contract requirements for good housekeeping by the EPC Contractor, including:
  - Prohibiting onsite burning
  - Maintaining clean worksites
  - Use of tyre washes to reduce sediment tracking onto roads
  - Progressive removal of stakes and flagging.

5.14.3.3 Residual impacts

Given its relatively remote location and setting within a landscape already characterised by hydropower infrastructure and production forestry, the Project's visual impact is assessed as low significance prior to any mitigation being applied.

Most visual impacts will occur during the construction phase, when changes to the landscape are most evident. Implementation of the proposed mitigation measures will help minimise both the extent and duration of these impacts.

Over time, further improvements to visual amenity are expected as:

- Disturbed areas are rehabilitated and revegetated
- Natural weathering softens the appearance of new infrastructure
- Regular viewers acclimatise to changes in the landscape, making them less noticeable.

Due to the technically unavoidable size and location of key new permanent infrastructure (particularly the surge tower), there are some residual impacts relating to visual amenity when observed from locations near Tarraleah Village and some locations in the TWWHA, the latter having associated wilderness recreational impacts. With the adoption of mitigations (such as colour selection) these are considered to have a low residual magnitude of impact.

5.15 Traffic

A Traffic Impact Assessment (TIA) has been completed for the construction and operation of the Project. The TIA is provided in Appendix C and summarised in this Chapter.

5.15.1 Vehicle composition

A range of vehicles will be used during construction of the Project (Table 5.35), including:

- **Light vehicles**: primarily for Project staff travelling to the WAF at Tarraleah Village and between construction sites.
- **General access heavy vehicles**: for transporting materials to, from, and around the site. To reduce light vehicle movements, shuttle buses will transport workers between the WAF and construction sites.
- **Class 1, 2 and 3 heavy vehicles** (as defined by the NHVR Heavy Vehicle National Law): for transporting materials and equipment to and from the site. This includes Class 1 OSOM vehicles.

Table 5.35: Vehicle types for Project construction

Vehicle class	Vehicle type
General access vehicles	2-axle truck
	3-axle truck
	3-axle truck (12-tonne)
	5-axle articulated vehicle (AV)
	7-axle AV
	4-axle truck with 4-axle pig trailer
	5-axle flatbed tray truck
	5-axle concrete truck
	4-axle truck
	3-axle rigid bus
NHVR Class 1	Prime mover and low loader with dolly (gooseneck)
	Prime mover and steerable platform trailer with push block truck
	Special purpose vehicles – cranes, truck mounted drill rigs, graders etc.
NHVR Class 2	6x4 low loader
NHVR Class 3	Primer mover and semitrailer towing converter dolly

5.15.2 Vehicle movement (origin, destination and routes)

National Heavy Vehicle Regulator (NHVR) Class 1, 2 and 3 heavy vehicles are expected to travel to the Project area from Hobart, Launceston, Ulverstone and Wynyard, as well as from the Port of Bell Bay and Port of Burnie. Routes from these locations are outlined in Appendix C—Table 24. Generally:

- Heavy vehicles from southern Tasmania will travel via Brooker Avenue, Brooker Highway and the Lyell Highway.
- Heavy vehicles from northern Tasmania will travel via the Bass Highway, Meander Valley Road, Highland Lakes Road, Marlborough Road, Lyell Highway and Fourteen Mile Road.

An OSOM vehicle combination will be required to deliver GRP pipe sections and three 100 MVA transformers (weighing ~100 tonnes each). Road network studies conclude that the Port of Bell Bay is the most appropriate port for shipping and storing these components. The OSOM route would travel from Port of Bell Bay to New Norfolk (potentially via Frankford Road and the Bass Highway due to height restrictions on the East Tamar Highway), and then north-west along the Lyell Highway (Appendix C). No route upgrades or modifications are anticipated. The total number of OSOM vehicle movements during construction is estimated at ~400.

Project staff will primarily be accommodated in the WAF at Tarraleah Village, with travel to and from it expected from across Tasmania and interstate. Transport will be by light vehicle and shuttle bus (for interstate workers) and will generally follow the same routes as heavy vehicles. Staff movements are expected to occur outside peak periods, at varied times, and are therefore unlikely to significantly impact the surrounding road network.

During construction, both heavy vehicles and Project staff light vehicles will primarily use the following DSG and CHC–owned roads: Lyell Highway, Oldina Drive (south), Fourteen Mile Road, Victoria Valley Road (northern transmission line option), and Wayatinah Road (southern transmission line option). In addition, several Hydro Tasmania–owned private roads and access tracks will be used, including Butlers Gorge Road, a section of Oldina Drive (south) approaching Tarraleah Village, and circulation roads within Tarraleah Village (Appendix C—Section 3.4).

Transport of staff between construction sites and the WAF will predominantly be by bus. Butlers Gorge Road will be closed to public access during construction. Except for temporary safety-related closures, Oldina Drive (south) between the Lyell Highway and Tarraleah Lookout will remain open for public access. Other sections of Oldina Drive (south) within Tarraleah Village will be closed during construction. Aside from staff transport, the main vehicle movement between construction sites will be the haulage of spoil from the power station site to the Paddy's Quarry spoil emplacement area.

5.15.3 Traffic volume

Anticipated traffic volumes during construction (including both existing and construction traffic) are described in the TIA with reference to AM and PM peak hours. Vehicle movements during each peak period are assumed to represent 25% of daily movements. This is considered conservative, as deliveries are typically spread throughout the day.

Defined peak hours are:

- **AM peak:** 7:00 am–8:00 am
- **PM peak:** 3:30 pm–4:30 pm.

Estimated traffic volumes for the peak construction period are shown in Figure 5.65 (AM) and Figure 5.66 (PM). In these figures, numbers within light grey squares represent light vehicle movements per peak hour, and numbers within dark grey squares represent heavy vehicle movements per peak hour.

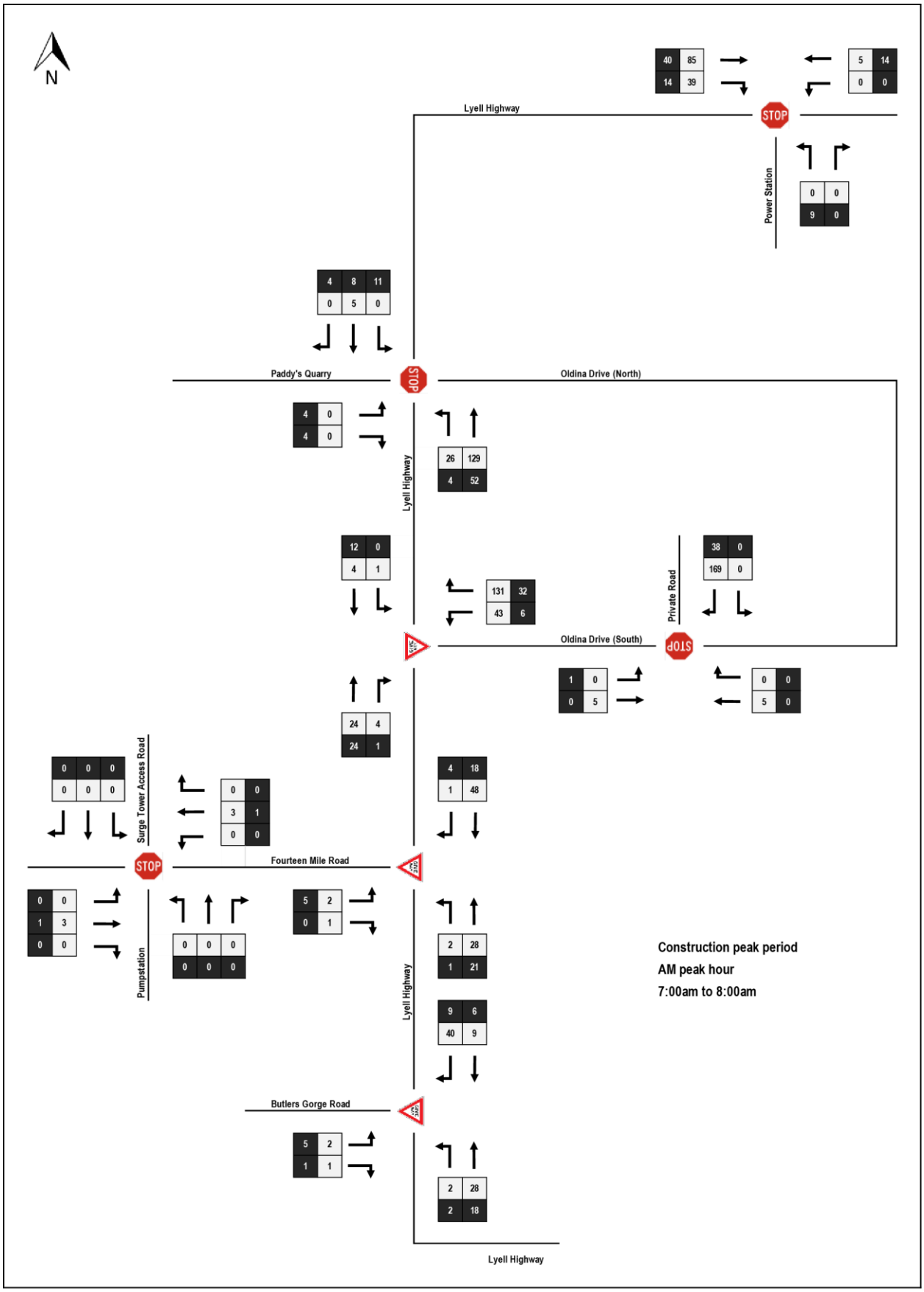


Figure 5.65: Construction traffic volumes – AM peak hour

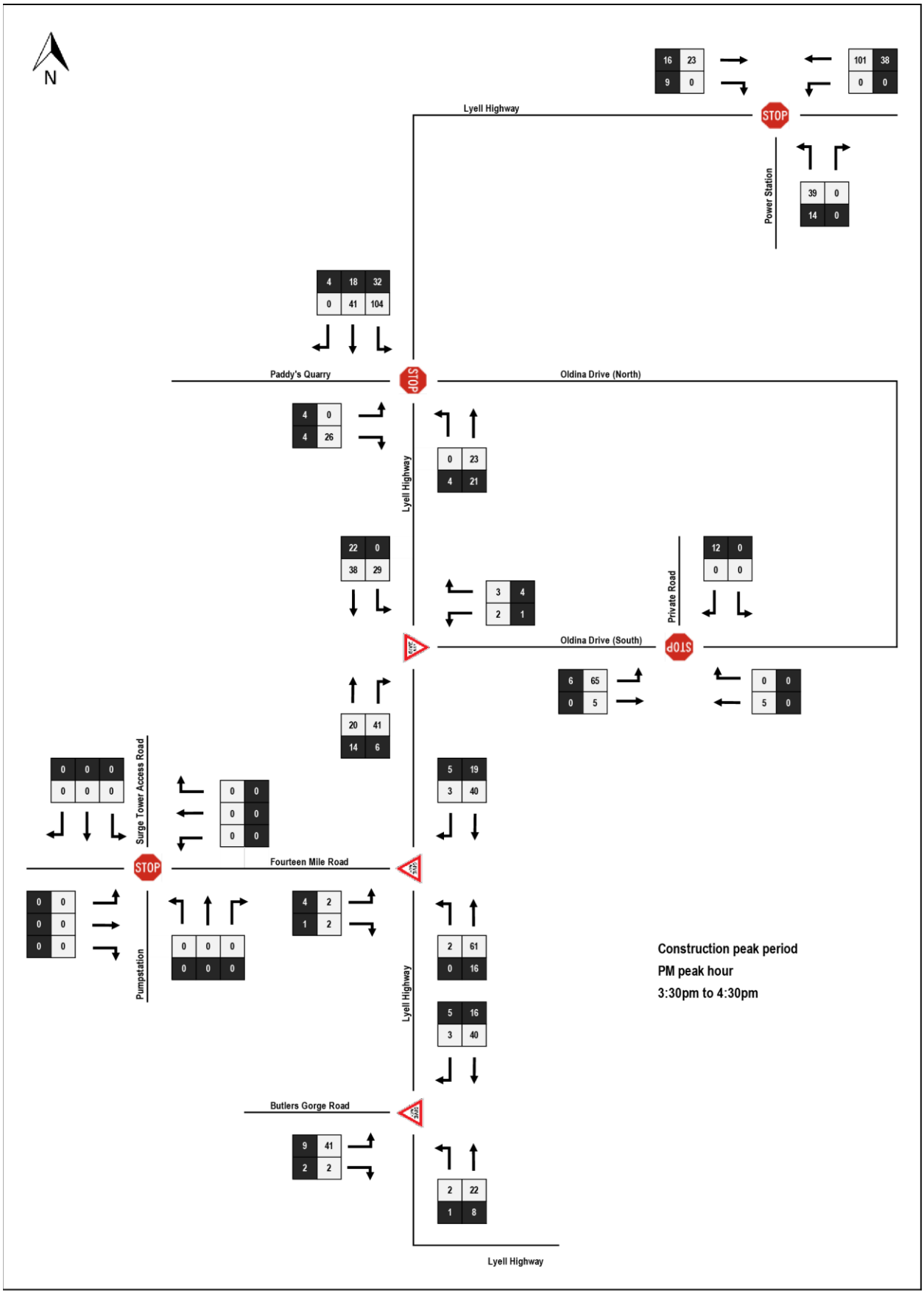


Figure 5.66: Construction traffic volumes – PM peak hour

Traffic modelling using SIDRA Intersection 9.1 software was undertaken for the intersections with the highest number of opposing traffic movements during the AM and PM peak hours: the Lyell Highway/Oldina Drive (south) intersection and the Lyell Highway/Tarraleah Power Station intersection. These were assessed as representing the worst-case potential outcomes on the network during peak periods.

Level of Service (LOS) is a measure of the quality of service experienced by road users, considering factors such as speed, delay, travel time and safety. LOS A indicates free-flowing traffic with minimal delay, while LOS F represents heavy congestion and long delays.

The modelling results, summarised in Table 5.36, show that both intersections are expected to maintain LOS A during both AM and PM peaks. This indicates that, although traffic volumes will increase during Project construction, traffic flow at the two key intersections will not be adversely affected.

Table 5.36: Construction peak intersection SIDRA model results

Intersection	Peak hour	Approach	Degree of saturation	Average delays (seconds)	95 percentile queue (metres)	LOS
Lyell Highway/ Oldina Drive (south) intersection	AM	South: Lyell Highway	0.032	1.0	0.3	A
		East: Oldina Drive (south)	0.200	6.0	7.4	A
		North: Lyell Highway	0.005	0.9	0.0	A
		All	0.200	5.2	7.4	A
Lyell Highway/ Tarraleah Power Station intersection	PM	South: Tarraleah Power Station	0.047	1.2	1.6	A
		North-east: Lyell Highway	0.094	5.8	4.0	A
		North-west: Lyell Highway	0.037	8.5	0.8	A
		All	0.094	5.3	4.0	A

The Project is not expected to increase staffing requirements during operation and will therefore not result in additional light or heavy vehicle movements or overall traffic volumes.

The potential for vehicle strike of Tasmanian devils, spotted-tailed quolls, wedge-tailed eagles and white-bellied sea eagles from increased traffic during construction has been assessed. With the implementation of the proposed RkMP, these impacts are not expected to be significant (refer to Section 5.3).

No impacts from traffic-related noise are anticipated during construction (refer to Section 5.6).

5.15.4 Avoidance and mitigation measures

TI 1: A Construction Traffic Management Plan (CTMP) will be developed and implemented prior to the commencement of construction. The CTMP will set out measures, processes and responsibilities to minimise potential impacts on the community and the operation of the surrounding road network during construction.

The CTMP will be developed in consultation with relevant stakeholders, including Central Highlands Council, Department of State Growth, Sustainable Timber Tasmania, emergency services, and public transport operators. Where appropriate, the plan will incorporate additional reasonable and feasible measures identified through this consultation.

5.16 Economic impact

An Economic Impact Assessment (EIA) for the Project was prepared by SGS Economics and Planning (SGS) in partnership with the Centre of Policy Studies (CoPS) at Victoria University. The assessment considers both local and state-wide impacts and benefits. The EIA is provided in Appendix K and summarised in this Chapter.

5.16.1 Methods

5.16.1.1 CGE Modelling

A Computable General Equilibrium (CGE) modelling framework was used for the analysis. Economic modelling for the Project was undertaken using the Victoria University Regional Model (VURM), a dynamic CGE model that treats each Australian state and territory as a distinct economy. The modelling involved inputting Project-specific capital and operational expenditure, assessing impacts at the state level, and disaggregating results to the South East Tasmania SA4 and Hobart SA4 regions. This best-practice CGE approach ensures robust, regionally detailed economic impact assessment.

The CGE model impact assessment tool delivers robust results for approval processes for renewable energy and major infrastructure projects in Australia. It has been used to analyse many economic policies, including changes in taxes, tariffs, environmental regulations and competition policy[19].

The operational phase of the Project was modelled over a 30-year period, consistent with standard practice in CGE modelling. While the expected operational life of the hydropower asset may extend to 80 years or more, a 30-year horizon is typically sufficient to capture the majority of economically relevant impacts[20].

5.16.1.2 Modelling inputs

Estimates of impact are derived by inputting both timing and capital investment values associated with the construction and ongoing operations of the Project:

- The construction phase is estimated at 8 years, and the operating period has been modelled for 30 years, which is conservative given the Project would be in operation for more than 30 years.
- The capital investment is estimated to be $1.87 billion. Approximately 60% of capital costs are anticipated to occur within Tasmania, while the remaining costs will be split between mainland Australia and international suppliers and contractors (see also Figure 5.68).

19 Refer to Section 4 and Appendix A of SGS Economics and Planning: Tarraleah Redevelopment Project Economic Impact Assessment, Final Report for information about the application of CGE modelling for similar projects.

20 This timeframe reflects the diminishing marginal value of long-term projections due to discounting, increasing uncertainty in economic assumptions, and the reduced reliability of forecasting inputs beyond three decades. Additionally, CGE models are computationally intensive, and extending the horizon significantly increases complexity without proportionate analytical benefit. The 30-year window aligns with common infrastructure appraisal periods and ensures robust, credible results for decision-making and approvals.
(see for example: atap.gov.au/sites/default/files/documents/t4-cge-models.pdf and pc.gov.au/inquiries/completed/infrastructure/submissions/submissions-test2/submission-counter/subdr117-infrastructure-attachment1.pdf

- The Project is expected to have a direct construction workforce of 1,330 full-time-equivalent (FTE) job-years[21]. Approximately 30% of workers employed by the Project are anticipated to already reside in Tasmania, with the remainder likely to come from mainland Australia. This is in part due to local industry capacity constraints, the specific specialised skillsets required (e.g. tunnelling), and skills shortages in the Tasmanian labour force.
- The annual operational costs are estimated to be $5 million and will likely be incurred within Tasmania. Total operational costs amount to approximately $144 million over the 30-year operational phase; however, the operating life of the Project will be significantly longer than 30 years, as described in Chapter 2. Therefore, the long-term operational impacts on gross state product (GSP[22]), gross regional product (GrRP[23]), gross value added (GVA[24]) and FTE job-years in this analysis are conservative.

5.16.1.3 Modelling geography

The modelled economic impacts reported in this Chapter are presented at the regional (South East Tasmania SA4 and Hobart SA4) and state (Tasmania) levels, as defined by Australian Bureau of Statistics (ABS) Statistical Area boundaries.

5.16.1.4 Modelling limitations

Beyond the model's technical limitations, it is noted that at the time of writing the EIA it was not feasible to quantify some operational impacts from the Project. While estimates of the Project's operational costs were provided to SGS by Hydro Tasmania, the following operational outcomes were not available for modelling:

- Hydro Tasmania revenue estimates from the Project, including the split of revenue from Tasmanian consumption and mainland Australia consumption
- Quantification of the extent to which energy costs might change for household, commercial or industrial consumers as a result of additional dispatchable capacity from the Project.

As such, it was not possible to estimate the spillover impacts (or consumption-induced impacts) related to such outcomes.

21 FTE is a way to measure work hours. One FTE equals the hours worked by one full-time employee. For example, if 20 people each work 50 per cent of a fulltime job, together they make up 10 FTE workers. When we talk about job-years, it means the total amount of full-time work done in a year. So, if a project reports 10 FTEs, it means there are 10 job-years of work, not necessarily 10 separate jobs. This helps to understand the total work done over the project period.

22 Gross State Product (GSP) is the total value of all goods and services produced in a state or territory over a year. It's a smaller version of Gross Domestic Product (GSD) which measures the economic activity of a whole country. GSP shows how much a particular state contributes to the national economy. It helps compare the economic strength of different states. If a state has a high GSP, it means businesses there are producing a lot of goods and services, and the economy is doing well.

23 Gross Regional Product (GrRP) is the total value of all goods and services in a specific region, such as a city, local government area, or smaller area within a state, over a year. It's like GSP but on a smaller scale. GrRP shows how much a particular region contributes to the economy of the state or country. It helps compare the economic performance of different local areas. A region with a high GrRP likely has strong industries or businesses that are generating a lot of economic activity.

24 Gross Value Added (GVA) is the value a business, industry, or sector adds to the economy by producing goods and services. GVA helps measure how much each part of the economy (like farming, construction or manufacturing) contributes to the overall economy It's used to calculate both GSP and GDP.

5.16.2 Existing environment

This section provides a summary of key economic characteristics of the regional study area and the component LGAs of Central Highlands and Derwent Valley. These LGAs are likely to experience economic impacts or benefits from the Project given the proximity of component towns and villages to the Project area.

- **Central Highlands LGA:** The small but thriving communities of the Central Highlands support a rural-based economy strong in the agricultural, aquaculture, forestry and tourism industries. There are investment opportunities in farming, cropping, aquaculture, tourism, renewable energy and mining (Tasmanian Government, 2021). The Central Highlands LGA economy accounts for less than 1% of Southern Tasmania's regional economic value in terms of GrRP.
- **Derwent Valley LGA:** The Derwent Valley has a growing economy supported by emerging niche agricultural specialties, an internationally competitive hop industry, strong natural resources, new housing developments, and recent advances in the culture and arts sector (Derwent Valley Council, 2022). The Derwent Valley LGA economy accounts for approximately 2.5% of Southern Tasmania's regional economic value in terms of GrRP.

Table 5.37 presents key economic characteristics of the two LGAs and the Southern Tasmania Region (the combined area of the South East Tasmania SA4 and Hobart SA4).

Table 5.37: Key economic characteristics – SIA Regional Study Area LGAs and Southern Tasmania

Indicator	Central Highlands LGA	Derwent Valley LGA	Southern Tasmania*
Estimated Resident Population (2023)	2,595	11,341	297,472
GrRP (2022/23)	$164 million	$500 million	$19.99 billion
Output (2022-23)	$249.6 million	$745 million	$31.39 billion
Highest output by industry sector	Agriculture, forestry & fishing Construction Electricity, Gas, Water and Waste Services	Agriculture, forestry & fishing Manufacturing Construction	Construction Health care and social assistance Public administration and safety
Businesses (2024)	265	494	22,273
Jobs (June 2023)	963	3,246	156,511
Unemployment rate (September 2024)	5.5%	7.4%	6.1%
Highest employing industries (2021)	Agriculture, forestry & fishing Accommodation & food services Retail trade	Health care and social assistance Manufacturing Agriculture, forestry & fishing	Health care & social assistance Education & training Public administration & safety

Source: (ABS 2021) and ABS statistics via .idcommunity, 2025).
**Includes southeast Tasmania SA4 and Hobart SA4*

Further information on the socio-economic baseline of the study area is presented in Section 5.9

5.16.3 Assessment

5.16.3.1 Overall economic impact

The Project is expected to contribute significantly to both the regional and state economy by generating economic activity during its construction and operational stages. The overall economic impact of the Project, including both direct and indirect effects across all stages, is anticipated to be positive, with the following contributions to the Tasmanian economy:

- **$1.6 billion** in the total value of all goods and services produced in the state (GSP).
- **$1.34 billion** in value added to the overall economy (GVA).
- **2,203 full-time-equivalent (FTE) job-years** anticipated across all phases of the Project (Figure 5.67), comprising:
  - **Construction phase:**
    - 1,330 direct FTE job-years will be created during the Project's construction (including 399 direct FTE job-years in the South East Tasmania and Hobart SA4 regions).
    - 873 indirectly supported FTE job-years in upstream and downstream industries (including 609 FTE job-years in Tasmania).
  - **Operational phase:**
    - 254 FTE job-years generated over the modelled 30-year operational period, equating to an average of approximately 8 FTE job-years per year.
- The peak annual impact is projected to occur in Year 4, when more than 490 FTE jobs are expected to be generated in the state economy.

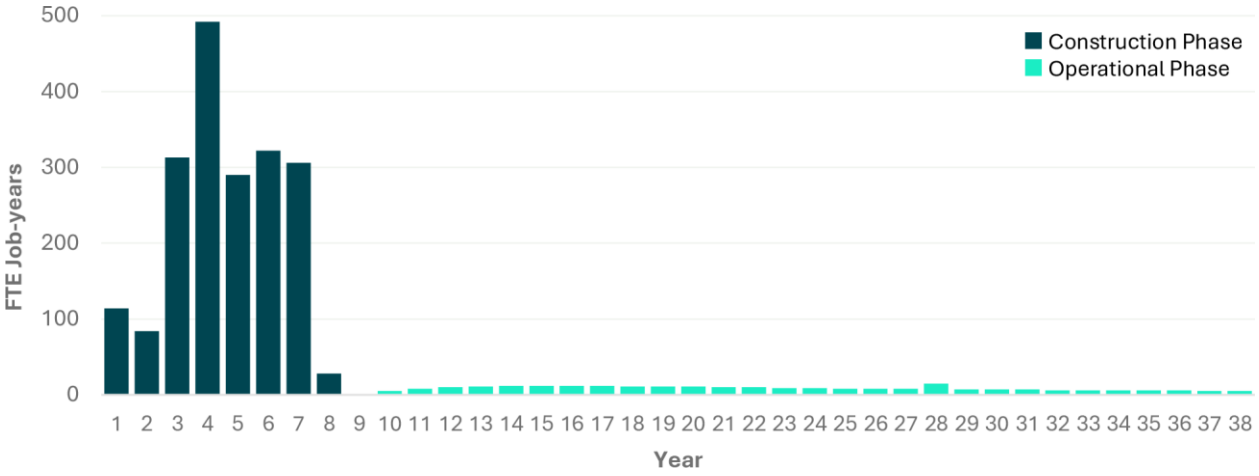


Figure 5.67: Labour force impacts (FTE job-years), Tasmania, Year 1-38

Source: SGS Economics and Planning and Centre of Policy Studies (2024)

The direct and indirect effects of the Project across all stages are anticipated to contribute $2.98 million to the total value of all goods and services in the region (GrRP) and 515 FTE job-years to the regional economy (South East Tasmania and Hobart SA4 regions).

These increases are expected to be primarily driven by greater demand for local materials, services, and workforce.

Some short-term challenges may also arise, including heightened competition for labour and resources, as well as potential impacts on land values and housing availability. These considerations are discussed further in Section 5.9.

A breakdown of the projected economic activity by Project phase is provided below.

5.16.3.2 Construction phase

In the region, the construction phase of the Project, including direct and indirect effects, is estimated to:

- Increase GrRP by approximately $213 million, averaging $27 million per year
- Generate approximately 451 FTE job-years, averaging 56 FTE jobs per annum.

At the state level, the construction phase of the Project, including direct and indirect effects, is estimated to:

- Increase GSP by approximately $1.12 billion, averaging $140 million per annum
- Contribute approximately $0.96 billion in GVA, averaging $120 million per annum
- Generate approximately 1,949 FTE job-years, averaging 244 FTE jobs per annum.

During construction, employment will be concentrated in the construction industry, which accounts for nearly one third of total state employment generated by the Project. The retail trade sector accounts for a further 10% of FTE job-years, followed by professional services at 7%.

Modelling also shows a net negative impact in the agriculture, forestry and fishing sector (-40 FTE job-years) and the mining sector (-20 FTE job-years). This reflects a constrained labour market, where jobs are expected to be drawn away from these sectors to meet Project labour demand.

With reference to the geographic distribution of Project expenditure, Figure 5.68 provides a breakdown of modelled inputs for manufactured and construction expenditure.

- **Capex – Manufacturing**: includes the cost of mechanical and electrical equipment and supplies, most of which are produced on the Australian mainland (14% of total Capex) or internationally (5%).
- **Capex – Construction**: includes labour, consumables (e.g. fuel), services, and general construction materials (cement, aggregates, steel, etc.). The modelled input for Capex – Construction comprises 10% of total Capex spent locally, 50% across the rest of Tasmania, and 21% across the rest of Australia.

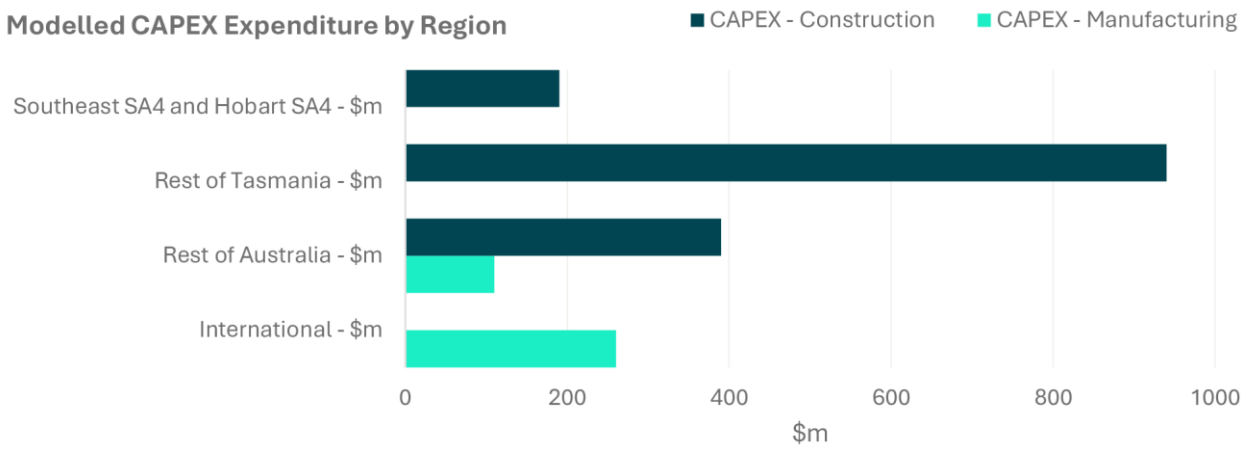


Figure 5.68: CGE Model inputs, expenditure by region

5.16.3.3 Operation phase

Over a 30-year modelled operational period, the Project, including its direct and indirect effects, is estimated to:

- Increase GSP by approximately $0.48 billion, averaging $16 million per annum.
- Increase GrRP by approximately $85 million, averaging $3 million per annum.
- Contribute approximately $0.38 billion in GVA, averaging $13 million per annum.
- Generate an average of 2 FTE jobs per annum.

5.16.3.4 Other economic impacts and opportunities

The economic impact assessment also identified broader social and economic impacts and opportunities, including:

- **First Nations employment and procurement opportunities**: The Project provides opportunities to advance First Nations self-determination and wellbeing through training, skills development, employment, and procurement opportunities.
- **Skills and training opportunities**: The Project will contribute to the development of a skilled workforce capable of benefiting from jobs directly and indirectly related to the Project, including in upstream and downstream industries.
- **Local benefits sharing**: Hydro Tasmania has developed a Major Projects Local Benefits Sharing Strategy. Funding will be available during construction to support community-led initiatives, helping to deliver long-term socioeconomic benefits in the region**.**
- **Energy exports to mainland Australia**: The Project is designed to add dispatchable capacity that supports energy exports from Tasmania to the mainland. When realised, additional Hydro Tasmania revenues will benefit the Tasmanian economy, as dividends from this Government Business Enterprise (GBE) flow back to the State and, ultimately, the community.
- **State energy price and market implications**: By adding dispatchable capacity, the Project is expected to exert downward pressure on wholesale electricity prices. This represents a material benefit to Tasmanian households and businesses at a time of high and rising energy costs.
- **Impacts on local amenity and community infrastructure**: The Project is expected to generate local, state and federal tax revenues, creating opportunities to invest in social amenity and community infrastructure, supported by Hydro Tasmania's Benefits Sharing Strategy.
- **Carbon footprint reduction**: The Project's emissions intensity is modelled to be below the global median for hydropower, lower than solar, and significantly below gas and coal. The Project is therefore anticipated to deliver meaningful GHG savings.
- **Support for other renewable energy projects**: By providing additional dispatchable hydro capacity, the Project is expected to enhance the feasibility of other renewable energy initiatives, including Tasmania's Hydrogen Action Plan. This supports national decarbonisation efforts across sectors such as transport, agriculture and industry, subject to the pace of Green Hydrogen sector development.

5.16.4 Avoidance and mitigation measures

The Project is anticipated to deliver significant economic benefits to Tasmania. Mitigation of potential negative externalities will ensure these benefits are realised and shared equitably.

The following management measures are proposed to mitigate potential adverse economic impacts and enhance opportunities. As many measures apply across both social and economic outcomes, full details are provided in Section 5.9. The measures specific to economic outcomes include:

EI 1: Develop and implement a SIMP for the pre-construction and construction phases, in consultation with government, local councils, key stakeholders, and directly affected parties. The SIMP will:

- Identify desired outcomes for Tasmanian industry and business participation, social procurement, workforce training, and First Nations engagement
- Define strategies, responsibilities, timing and key partners
- Refer also to SI 1 for further detail.

EI 2: Prior to construction, develop a First Nations Participation Plan (FNPP) as part of the SIMP. The FNPP will outline actions to support First Nations participation, reflecting the pillars of Hydro Tasmania's Commitment and Action Plan (CAP) (refer SI 11).

EI 3: Develop and implement a Workforce Training and Development Plan (WTDP) for the construction phase. The WTDP will set out training, apprenticeship, traineeship and workforce development opportunities, including local and regional programs (refer SI 12).

EI 4: Apply Hydro Tasmania's Major Projects Local Content Framework during construction. Prior to construction, prepare an Australian Industry Participation Plan (AIPP) and, where relevant, a Tasmanian Industry Participation Plan (TIPP). A Project-specific local industry action plan will:

- Facilitate participation of local, regional, social and First Nations businesses in procurement opportunities.
- Build capacity and capability across local industry.
- Outline how supplier and subcontracting opportunities will be presented to maximise local participation.

The Project will utilise the Tasmanian Industry Capability Network (ICN), vendor registration systems, local Jobs Hubs and the Tasmanian Department of Employment and Workplace Relations (DEWR)representatives to connect with local businesses.

EI 5: Develop and implement a Local Benefits Sharing Action Plan in line with Hydro Tasmania's Major Projects LBS Strategy. The plan will identify community needs, barriers to participation, and priority initiatives, along with governance arrangements for administering the local benefits fund (refer SI 18).

EI 6: Prior to construction, prepare a Social Procurement Management Plan (SPMP) aligned with the Major Projects LBS Strategy and the SIMP. The SPMP will:

- Enhance opportunities for youth, First Nations people, migrants, women and vulnerable groups
- Establish performance targets and goals for social procurement
- Provide strategies for achieving and reporting against these targets.

6 Monitoring and review

Environmental monitoring is a core component of Hydro Tasmania's commitment to its Major Projects ESG Framework and regulatory compliance. It ensures that all relevant management measures are effectively implemented, evaluated, and refined as needed.

Monitoring will follow best-practice scientific methods to enable early detection of potential issues that could result in non-compliance or poor environmental performance. This proactive approach supports timely intervention and adaptive management, helping to minimise the risk of significant or unforeseen impacts.

Monitoring activities will focus on key environmental measures and outcomes, consistent with the commitments and predicted impacts outlined in this Environmental Impact Statement (EIS).

Table 6.1 outlines the monitoring locations, key parameters, frequency, and reporting requirements. Figure 6.1 shows the location of proposed monitoring sites.

The primary objectives of environmental monitoring are to:

- Establish a robust understanding of pre-construction conditions as a baseline for future comparisons
- Detect environmental changes, trends, or impacts early to support adaptive management
- Evaluate compliance with approval conditions, performance criteria, and regulatory requirements
- Assess the effectiveness of mitigation and management measures
- Validate the predicted environmental impacts identified in the EIS through data collection
- Support continuous environmental improvement through adaptive management.

Monitoring results will be reported regularly in line with the commitments outlined in Table 6.1. Where non-compliance or performance exceedances are identified, corrective actions will be implemented promptly.

Table 6.1: Monitoring and Reporting Commitments

Ref#	Monitoring approach	Monitoring locations	Project Phase and timing			Reporting	EIS ref
			Pre-construction	Construction & commissioning	Operation		
M1	The existing baseline water quality monitoring program will continue with additional monitoring sites included in the program. Monitoring will include: • *In-situ* physico-chemical parameters: turbidity, electrical conductivity, pH, dissolved oxygen (mg/L and %), chlorophyll *a*. • Laboratory analysis: dissolved and total nutrients, total suspended solids, and the standard metals suite.	Existing baseline sites (except SW-P8) Additional sites on Streams 1-6 and River Derwent (refer Figure 5.12)	Existing sites - monthly until 2 years of data has been collected Additional sites - monthly until 12 months of data has been collected			An annual report summarising the results of monitoring will be prepared and will be provided to the Environment Protection Authority (EPA) on request.	Section 5.1.3.4
M2	The WMP will adapt the baseline water quality monitoring program and define the pre-construction and construction monitoring locations, frequency and parameters for surface water quality based on the final Project design and proposed construction methods. The design of the WMP will be informed by analysis of all existing baseline data, including seasonal trends. Monitoring will include *in-situ* physiochemical parameters (i.e. turbidity, electrical conductivity, pH, dissolved oxygen (mg/L and percent)) along with laboratory analysis of nitrate and ammonia, total suspended sediments and any dissolved metals of concern. Chlorophyll a will also be monitored at Nive River upstream of Tungatinah Power Station and Lake Liapootah outlet only.	To be determined as part of WMP but at a minimum include • Streams 1-5 • Point source discharge locations • Mossy Marsh Pond • No. 2 Pond • River Derwent within and downstream of the TWWHA • Nive River upstream of Tungatinah Power Station • Lake Liapootah Outlet	To be determined as part of WMP	To be determined as part of WMP at a frequency to demonstrate compliance with performance criteria		An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request. To be determined as part of WMP.	Section 5.1.3.4
M3	Post-construction monitoring for nitrates at point source discharge locations from spoil emplacement areas will continue until nitrate concentrations have returned to pre-construction levels, or there is clear evidence they are attenuating to levels that will not cause environmental harm to a slightly to moderately disturbed aquatic ecosystem.	Point source discharge locations at spoil emplacement areas			To be determined as part of the WMP	An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request.	Section 5.1.3.4

Ref#	Monitoring approach	Monitoring locations	Project Phase and timing			Reporting	EIS ref
			Pre-construction	Construction & commissioning	Operation		
M4	The existing baseline monitoring program will continue including: • Groundwater quality and level sampling at 14 baseline sites (Figure 5.23–Figure 5.26) • Continuous head sampling at 14 VWP sites • *In-situ* field parameters: electrical conductivity, pH, dissolved oxygen (mg/L and %), temperature, turbidity • Laboratory analysis of physicochemical parameters, major and minor ions, metals, and nutrients (as per Table 5.5).	Existing baseline sites	Monthly until 2 years of data has been collected			An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request.	Section 5.2.3.2
M5	The GMP will adapt the baseline program to develop a pre-construction and construction monitoring program that defines monitoring locations, frequency, and analytes for groundwater quality sites, based on the final Project design and proposed construction methods. The minimum requirements of the monitoring program are outlined in Section 5.2.	To be determined as part of GMP monitoring program but at a minimum include: • Spoil emplacement areas • TA-DC207, TC-DC312, and TA-DC252 • TA-DC241, TA-DC247, and TA-DC263	To be determined as part of GMP	To be determined as part of GMP but at a minimum monthly for identified monitoring locations		An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request. To be determined as part of GMP monitoring.	Section 5.2.3.2
M6	Post-construction monitoring for nitrates at spoil emplacement monitoring sites will continue until groundwater nitrate concentrations have returned to pre-construction levels, or there is clear evidence they are attenuating to levels that will not cause environmental harm to a slightly to moderately disturbed aquatic ecosystem. Following completion of post-construction monitoring, biannual nitrate monitoring will continue at spoil emplacement sites to detect any temporary pulse in concentrations as the groundwater system recharges after tunnel pressurisation.	Spoil emplacement area monitoring locations to be determined as part of GMP			To be determined as part of the GMP Biannually for 5 years after completion of post construction monitoring	An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request.	Section 5.2.3.2

Ref#	Monitoring approach	Monitoring locations	Project Phase and timing			Reporting	EIS ref
			Pre-construction	Construction & commissioning	Operation		
M7	Sites rehabilitated in accordance with the Site Rehabilitation Plan (SRP) (DR 1) will be progressively monitored during construction and for at least two years following completion except for sites within the Tarraleah Conservation Area, which will be monitored for five years post-construction, or until success criteria in the plan are achieved. Monitoring of subalpine *Diplarrena latifolia* rushland and buttongrass moorlands will be undertaken by a suitably qualified ecologist to ensure re-establishment of *Diplarrena latifolia* (western flag-iris) and *Gymnoschoenus sphaerocephalus* (buttongrass) meets the success criteria.	Sites rehabilitated in accordance with the SRP (**DR 1**)		As required	Annually for 2 / 5 years	An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request.	Section 5.2.3.2
M8	A monitoring program will assess potential hydrogeological impacts on the Sphagnum peatland located ~400 m upstream (northwest) of Mossy Marsh Pond. The program has three components: • **Groundwater monitoring**: Groundwater levels on the northwestern side of the peatland have been recorded by a piezometer installed in January 2023. Monitoring using this piezometer will continue. • **Aerial imagery**: The extent of the peatland has been monitored since September 2024 through a drone program capturing high-resolution imagery. Extent measurements will be used to assess expansion or contraction of the community and potential correlation with Project construction or operation. Drone surveys will continue. Imagery will include both photographic and thermal infrared data to map peatland extent. • **Vegetation assessments**: Suitably qualified ecologists will undertake a formal vegetation condition assessment.	*Sphagnum* peatland community northwest of Mossy Marsh Pond	Continuous groundwater level Aerial imagery: twice annually (February and September) Condition assessment - No more than 6 months before the commencement of construction	Continuous groundwater level Twice annually (February and September)	Continuous groundwater level for five years Twice annually (February and September) for five years Condition assessment Year 5 of operation	An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request. After five years of operation, a *Sphagnum* peatland monitoring report, including the final vegetation condition assessment and any changes in the community's original 3-ha extent, will be prepared and will be provided to the EPA upon request.	Section 5.3.3.3

Ref#	Monitoring approach	Monitoring locations	Project Phase and timing			Reporting	EIS ref
			Pre-construction	Construction & commissioning	Operation		
M9	In line with the RkMP, all Project-related vehicle strikes and roadkill incidents involving threatened species (e.g. Tasmanian devils, spotted-tailed quolls, eastern quolls, eastern barred bandicoots, eagles, swift parrots) will be monitored and reported to Hydro Tasmania.	Roads subject to the Roadkill Management Plan		As required		Vehicle strikes and roadkill incidents involving threatened species (e.g. Tasmanian devils, spotted-tailed quolls, eastern quolls, eastern barred bandicoots, eagles, swift parrots) will be reported to Hydro Tasmania. An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request.	
M10	Monitoring and treatment of weeds in areas disturbed by the Project will continue throughout construction and for at least two years post-construction, except for areas disturbed within the Tarraleah Conservation Area which will be monitored for five years post-construction (at six-monthly intervals). At both construction completion and two and five years post-construction, a report will be prepared demonstrating implementation of the Biosecurity Management Plan.	All construction sites		Annually	Annually for 2 / 5 years	At completion of construction and 2 / 5 years post-construction, a report will be prepared demonstrating how the Biosecurity Management Plan was implemented and can be provided to the EPA upon request.	Section 5.2.3.2

Ref#	Monitoring approach	Monitoring locations	Project Phase and timing			Reporting	EIS ref
			Pre-construction	Construction & commissioning	Operation		
M11	Geomorphology and vegetation monitoring will be undertaken to: • assess riverbed condition, including sediment mobilisation and vegetation encroachment • provide baseline data and assess the effectiveness of Management Measure AB2 (refer Chapter 8), with results used to determine whether the magnitude of planned releases needs adjustment (capped at 100 m^3/s) • assess potential impacts from the changed spill regime in the Nive River downstream of Liapootah Dam and the River Derwent downstream of Wayatinah Dam, including any impacts on *Barbarea australis*, as outlined in Management Measure AB3. Sediment mobilisation will be monitored through rock rollover surveys, where rocks of varying sizes are painted with a highly visible paint at fixed locations. Following high flow events, the same sites will be revisited to record which rocks moved and how far. Vegetation encroachment will be monitored at the same reaches using transects to record percentage cover and species composition, supplemented by drone photogrammetry to provide overall vegetation cover assessments.	Five monitoring sites will be established: • three in the River Derwent downstream of Clark Dam • one in the River Derwent downstream of Wayatinah Dam • one in the Nive River downstream of Liapootah Dam.	Annually	Annually	Annually for five years	An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request. A review of the data after 5 years of post-commissioning monitoring will determine the need for ongoing monitoring and the frequency required (annual, biannual, etc.). Triggers for ongoing monitoring are: 1) uncertainty in the trend (high seasonal or interannual variation) 2) clear declining trend in sediment mobilisation and/or increase in vegetation encroachment. The review would be undertaken by a suitably qualified geomorphologist and ecologist who are responsible for analysing the survey data. Any recommendations for continuing the monitoring would be written as recommendations in the annual report stating the rationale and proposed period for increased monitoring.	Section 5.4.3.3

Ref#	Monitoring approach	Monitoring locations	Project Phase and timing			Reporting	EIS ref
			Pre-construction	Construction & commissioning	Operation		
M12	Surveys of Barbarea australis populations will record the number, life stage, and habitat association of each plant observed. These surveys will help establish population fluxes for this opportunistic colonising species and allow assessment of whether population sizes during operation remain within pre-operation bounds.	A representative approximately 3 km reach of Nive River downstream of Liapootah Dam and the River Derwent downstream of Wayatinah Lagoon	Annually	Annually	Annually for five years	An annual report summarising the results of monitoring will be prepared and will be provided to the EPA on request. After five years of operation, a review of all the relevant data inputs (population size, spill, sediment mobilisation and vegetation encroachment) will determine the need for ongoing monitoring and the frequency required. Triggers for ongoing monitoring are: 1) uncertainty in the trend (high seasonal or interannual variation) 2) clear declining trend in population size. The review would be undertaken by a suitably qualified ecologist who is responsible for analysing the survey data. Any recommendations for continuing the monitoring would be written as recommendations in the annual report stating the rationale and proposed period for increased monitoring.	Section 5.4.3.3

Ref#	Monitoring approach	Monitoring locations	Project Phase and timing			Reporting	EIS ref
			Pre-construction	Construction & commissioning	Operation		
M13	Macroinvertebrate sampling using the AusRivAS method will be undertaken to assess any impacts of changed operation and the effectiveness of flow mitigation measures. River health scores from pre-construction and construction will provide the baseline for assessing trends between and within sites over time, and during operation (including the effectiveness of Management Measure AB2 (refer Chapter 8).	Five existing monitoring sites in the River Derwent between Clark Dam and Wayatinah Lagoon. Two reference sites (Counsel and Florentine rivers): 1) Nive River downstream of Liapootah Dam 2) River Derwent downstream of Wayatinah Dam.	Spring and autumn (until there is a minimum of 10 sampling events for each site)	Spring and autumn	Spring and autumn for five years	An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request. A review of all the relevant data inputs (river health scores, relative composition and diversity of the macroinvertebrate community, spill/flow data, and sediment mobilisation) will determine the need for ongoing monitoring and the frequency required. Triggers for ongoing monitoring are: 1) uncertainty in the trend (high seasonal or interannual variation) 2) clear declining trend in macroinvertebrate communities and river health scores below the bounds observed during baseline.	Section 5.4.3.3
M14	Monitoring will be undertaken to characterise baseline and potential impact conditions (abundance, diversity and relative composition of macroinvertebrates, and algal biomass) downstream of stockpiles, and to assess the effectiveness of Management Measures WQ8 and WQ9. Macroinvertebrate sampling will include: • Quantitative Surber sampling (10 pooled samples) and AusRivAS sampling at each site • Benthic algal scrapes, collected using the method recently developed by NRE Tasmania.	Stream 4 and Stream 5.	Minimum of two sampling events in spring and autumn	Spring and autumn	Spring and autumn (if required)	An annual report summarising the results of monitoring will be prepared and will be provided to the EPA upon request. The need for operational sampling would be triggered if impacts to macroinvertebrate communities are detected during construction and that show no upward trend during the last construction sampling event.	Section 5.4.3.3

Ref#	Monitoring approach	Monitoring locations	Project Phase and timing			Reporting	EIS ref
			Pre-construction	Construction & commissioning	Operation		
M15	Flow monitoring will be undertaken to provide a summary of: • Flow releases from Clark Dam (magnitude and duration) including the environmental releases (compliance monitoring) • Flow recorded from Derwent Pumps Weir • Flow recorded at the Derwent above Nive River • Spill recorded at Wayatinah Dam • Spill recorded at Liapootah Dam.	Clark Dam Derwent Pumps Weir Derwent above Nive River Wayatinah Dam Liapootah Dam	Annual report of hourly flow data	Annual report of hourly flow data	Annual report of hourly flow data	An annual report will summarise the flows delivered and the overall flow patterns in the upper reaches (Clark Dam to Derwent Pumps Weir, downstream of Derwent Pumps Weir) and lower reaches (downstream of Counsel River inflow) of the river. Flow monitoring reporting for downstream Wayatinah and Liapootah dams will be limited to reporting on the annual pattern of dam spill. The annual report will inform associated monitoring programs and the assessment of impacts and trends. If any monitoring programs continue beyond 5 years following evaluation of monitoring triggers, then the annual flow monitoring report is to be provided for the same period as the revised monitoring program duration. The annual flow report would continue beyond this period as part of Hydro Tasmania's internal environmental reporting.	Section 5.4.3.3

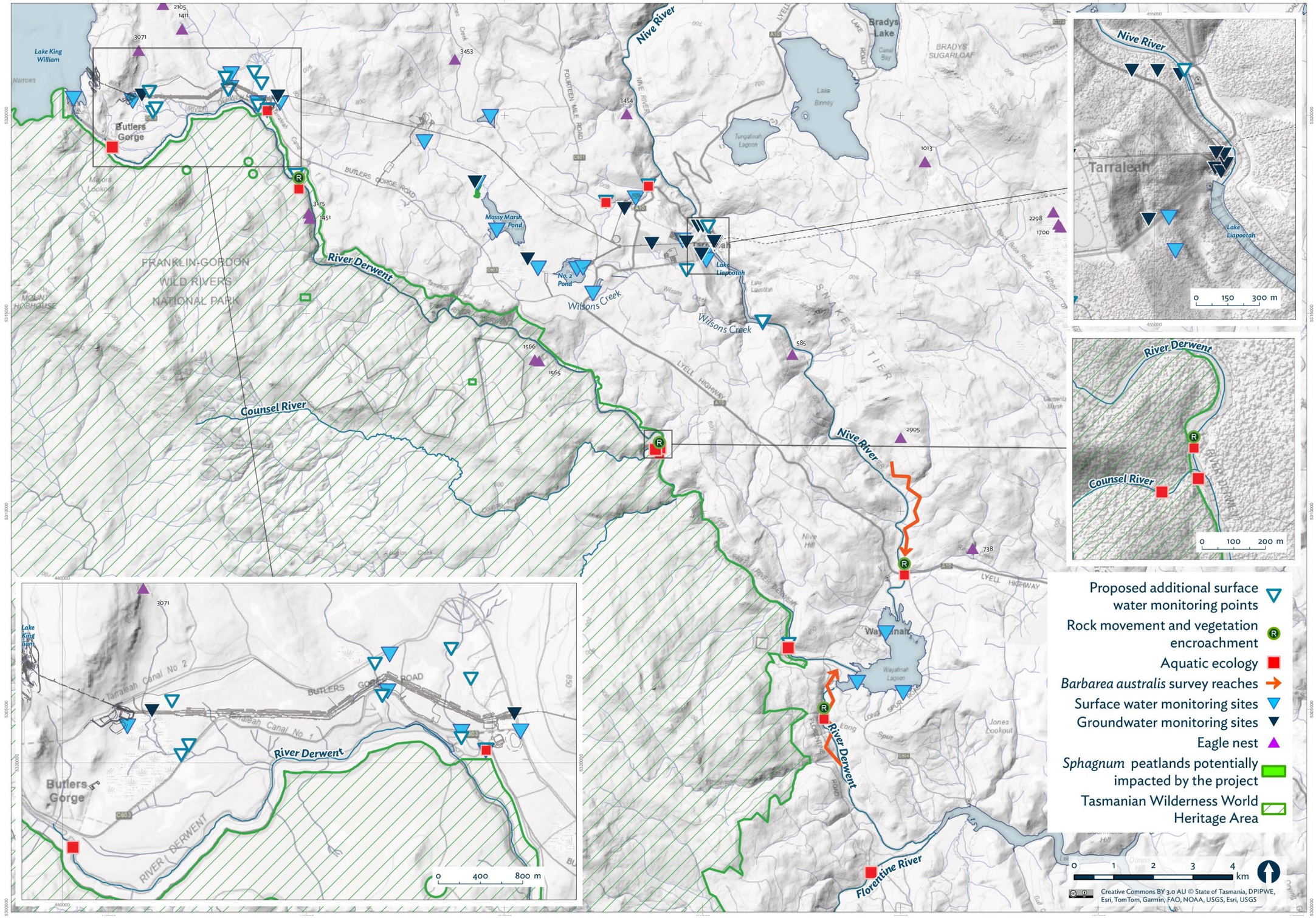


Figure 6.1: Map of water quality and aquatic ecology monitoring site

7 Decommissioning and rehabilitation

7.1 Decommissioning of the existing Tarraleah hydropower scheme

The Project will render the majority of existing Tarraleah hydropower scheme assets redundant. The decommissioning of these redundant assets is not included in this EIS and will be addressed through a future planning process.

Prior to decommissioning, Hydro Tasmania will engage with Heritage Tasmania, the community, and other key stakeholders to explore options for treatment, rehabilitation, and preservation of the existing assets, taking into account the following strategic objectives:

- Discharging Hydro Tasmania's duty of care regarding risks to the public and the environment
- Fulfilling Hydro Tasmania's obligations to protect and maintain historic and Aboriginal cultural heritage values within the Tasmanian community.

A Decommissioning and Rehabilitation Plan for the redundant assets will be finalised 12 months prior to decommissioning. Hydro Tasmania's existing Historic Heritage Conservation Management Plan will be updated following finalisation of the Decommissioning and Rehabilitation Plan.

7.2 Decommissioning and rehabilitation of the Project

The operational lifespan of the Project is expected to be 80–85 years. At the end of this period, an options assessment will be undertaken to determine the Project's future—whether it will be decommissioned or upgraded to extend its operational life. This assessment will include consideration of stakeholder and community interests.

If decommissioning proceeds, a Decommissioning and Rehabilitation Plan will be prepared prior to the planned end of service. The scope of decommissioning activities and potential impacts will be guided by the requirements in place at that time.

The objectives of Project decommissioning will include:

- Ensuring a safe and environmentally responsible shutdown of the scheme
- Complying with all relevant legislation, licensing conditions, and decommissioning requirements
- Protecting and restoring ecosystem function and landscape stability
- Leaving the decommissioned site in a safe condition
- Considering the heritage values of the scheme
- Supporting future compatible land uses through effective rehabilitation and risk mitigation.

The Decommissioning and Rehabilitation Plan will include:

- A sequenced shutdown procedure to manage operational risks
- A detailed rehabilitation strategy aligned with environmental values at the time. This will include site stabilisation, soil reconditioning, recontouring of disturbed land, and revegetation using local native species
- Testing of soil, surface water, and groundwater for contaminants, and subsequent remediation. Where contamination is detected, a remediation strategy will be developed and implemented to ensure safe and appropriate site conditions for future land uses
- A heritage impact assessment of operational assets with historical or cultural significance. Any removal, interpretation, or preservation activities will be conducted in consultation with Aboriginal communities, local stakeholders, and relevant heritage authorities
- Future land use plans, which may include conservation, community use, adaptive reuse of infrastructure, or restoration to natural values
- Management measures for safe demolition and recycling of waste materials. Assets such as the pipeline will be assessed for safe dismantling, and waste will be segregated for reuse, recycling, or disposal in line with best practice. Hazardous materials will be managed in accordance with applicable legislation.

7.3 Construction rehabilitation

Rehabilitation of disturbed areas will be carried out progressively during the Project's construction phase. These areas will be restored to a stable, safe, and ecologically compatible condition, in line with operational requirements and long-term land use plans.

7.3.1 Rehabilitation objectives

Rehabilitation during the Project's construction phase aims to achieve the following objectives:

- Vegetation, topsoil, and subsoil are removed and stored to maximise revegetation success
- A healthy, self-sustaining native plant cover is established, comparable to pre-existing vegetation
- Landforms are stable, erosion-free, and have minimal bare patches
- Weed and disease introduction is prevented, and existing issues are contained.

Specific objectives for different areas are outlined below:

- Re-establish native vegetation on disturbed land:
  - All disturbed areas are planted with native species comparable to surrounding vegetation within 12 months
  - Temporary planting with sterile grass may be used if native planting is delayed
  - Roadside verges are planted with non-weedy, maintainable grass species within 12 months of road works completion
  - All areas are monitored and managed for weeds and disease for two years post-completion.

- Vegetative cover on battered slopes**:**
  - All slopes are stabilised and visually improved
  - Steep slopes (1.5H:1V or steeper) that cannot be vegetated will be stabilised using alternatives (e.g. shotcrete) or left as exposed rock
  - Maintenance-friendly, non-weedy vegetation is established within 12 months
  - Low-maintenance slopes are vegetated with comparable native species.
- Vegetation in bushfire management zones (Asset Protection Zone (APZ) and Fuel Management Buffer Zone (FMBZ)**):**
  - Vegetated with low-growing native species
  - APZ vegetation must be suitable for slashing to maintain low fuel loads
  - FMBZ will include low native vegetation, isolated trees, and shrub clusters
  - All bushfire management zones will be monitored and managed for weeds for two years post-completion.

7.3.2 Rehabilitation of spoil emplacement areas

The footprint, height, and maximum batter slopes of spoil emplacement areas will be determined during detailed design and will comply with the Project's Spoil Management Plan (refer Section 5.1).

Specific objectives for rehabilitating spoil emplacement areas are:

- Establish vegetation using native species through natural regeneration, as well as topsoil and vegetation recovered during site clearing
- Establish native vegetation around stockpile edges to provide visual screening
- Achieve a minimum of 50% vegetative cover on stockpile surfaces
- Keep stockpiles free from weeds and diseases.

7.3.3 Decommissioning and rehabilitation stages

Decommissioning and rehabilitation of temporary construction infrastructure are expected to be completed in the following stages.

7.3.3.1 Vegetation clearance

Rehabilitation requirements during construction will be minimised by restricting vegetation clearance to the minimum necessary for Project construction and effective operation. All vegetation clearance will be carried out in accordance with the Site Establishment Management Plan (SEMP) (refer to Section 2.5.5.1).

Where required, native vegetation, topsoil, and subsoil will be removed and stored separately in predetermined locations to support successful post-construction revegetation. Topsoil stockpiles will be managed to preserve biological activity in the soil.

7.3.3.2 Progressive revegetation

Revegetation will occur progressively, with disturbed areas rehabilitated as soon as they are no longer needed for construction activities. Rehabilitation will take place in parallel with ongoing construction works.

7.3.3.3 Demobilisation of equipment and temporary infrastructure

- Dismantling and removal of temporary construction facilities, including site offices, fencing, ablution blocks, laydown areas, storage containers, workers' accommodation, and other infrastructure not required post-construction
- Disassembly and removal of plant and equipment
- Decommissioning of temporary access roads, unless they are needed for ongoing maintenance
- Waste segregation and disposal, including sorting and managing recyclable, reusable, and hazardous materials. All debris, hazardous substances, and construction waste will be removed from the site
- If a Tunnel Boring Machine (TBM) is used, the TBM shield will be decommissioned, cleaned, encased in concrete, and buried in situ to minimise additional ground disturbance. Most mechanical components and equipment will be removed and recycled. Burying a TBM shield is a common construction practice in Australia.

7.3.3.4 Landform restoration and soil treatment

- Spreading of topsoil and preparing sites for revegetation
- Soil stabilisation, including erosion control measures to prevent soil loss during and after decommissioning
- Reshaping disturbed land to match natural contours or the intended future use of the area as part of the power scheme
- Re-establishing drainage systems to manage runoff and prevent erosion.

7.3.3.5 Vegetation and erosion control

- Progressive seeding and/or planting of native vegetation using locally sourced native seeds or species compatible with bushfire protection and maintenance requirements
- Installation of erosion control measures as needed—such as sterile cover crops, geofabrics, soil binders, mulch, coir logs, sediment basins, or jute matting/mesh—until vegetation or rock cover has stabilised the site.

7.4 Mitigation and monitoring

7.4.1 Site Rehabilitation Plan

DR1: A Site Rehabilitation Plan (SRP) will be developed and implemented to guide progressive revegetation and rehabilitation of disturbed areas. It will detail methods, monitoring, and ongoing management requirements. Rehabilitation will occur progressively, as construction activities allow. The primary objective is to return non-permanent disturbance areas to stable, self-sustaining, vegetated landforms.

The SRP will be prepared by a suitably qualified person prior to the commencement of works and will include:

- Identification of relevant environmental legislation, regulatory requirements, and Project-specific commitments, along with measures to ensure compliance
- Detailed methods for infrastructure removal and offsite waste disposal in accordance with the Sustainability Management Plan and Waste Management Plan (see Section 5.10).
- Procedures for stripping, stockpiling, and reinstating topsoil and vegetation to support natural regeneration, including avoiding mixing or contamination of different soil types
- Identification of native plant species—trees, shrubs, and ground covers—endemic to the Project area and suitable for rehabilitation
- Selection of rehabilitation species compatible with anticipated long-term land use, environmental risks, and rehabilitation goals
- A schedule outlining when and where rehabilitation activities will occur, timed appropriately with seasonal conditions
- Rehabilitation of erosion and sediment control structures in line with the *Best Practice Erosion and Sediment Control Guidelines* (IECA, 2008)
- Monitoring and maintenance of rehabilitated sites for a minimum of two years post-rehabilitation, or five years within the Tarraleah Conservation Area (at six-monthly intervals) to be conducted by a suitably qualified ecologist
- Maintenance of rehabilitated sites including:
    - Weed control (Refer Section 5.3)
    - Maintenance and reinstatement of erosion and sediment controls, as needed post-construction
    - Replanting or reseeding of failed areas if more than 20% of the vegetation fails to establish

Success criteria may include:

- A stable, erosion-free landform
- Healthy, self-sustaining, and diverse native vegetation cover with at least 50% coverage after two years
- No evidence of nutrient deficiency (as observed through plant growth and health) or disease
- No introduction of new weed or disease species, and no expansion of existing populations

Community-specific success criteria:

- In *Diplarrena latifolia* rushland, western flag-iris *(Diplarrena latifolia*) re-establishes as the dominant species, and the community is recognisable as a rushland
- In buttongrass moorlands, buttongrass (*Gymnoschoenus sphaerocephalus*) re-establishes as the dominant species

8 Management measures

8.1 Approach to environmental management

Hydro Tasmania has an established environmental governance framework to ensure that environmental considerations are integrated into decision-making at all levels. Its *Environmental Policy and Sustainability Principles* guide catchment management to protect Tasmania's natural values and resources for future generations.

Environmental responsibilities are managed through Hydro Tasmania's Environmental Management System (EMS), which is consistent with the principles of ISO 14001. The Project's development is also aligned with Hydro Tasmania's Major Projects ESG Framework (Table 1.1).

As described in Chapter 1, Hydro Tasmania intends to appoint an EPC Contractor to deliver the detailed design and construction of the Project. The environmental management approach during the design and construction phases will involve:

- **Hydro Tasmania's EMS:** Used to oversee the implementation of the EPC Contractor's Construction Environmental Management Plan (CEMP) during construction, including compliance with approval conditions, licences, and permits. Hydro Tasmania will also use its EMS to manage Project operations.
- **EPC Contractor's EMS:** Used to identify and manage environmental risks and opportunities while promoting continual improvement. This EMS will serve as the foundation for the development and implementation of the CEMP.
- **CEMP and associated sub-plans:** Developed and implemented by the EPC Contractor, the CEMP will outline how compliance will be achieved with EIS commitments and any conditions of approval.
- **Sustainability Management Plan:** Also developed by the EPC Contractor, this plan will establish sustainability targets aligned with Hydro Tasmania's Major Projects Circular Economy Framework, with performance tracked against these targets.

8.2 Construction Environmental Management Plan

CM1: The Construction Environmental Management Plan (CEMP) will serve as the central document for managing all environmental impacts during the construction phase. It will outline the systems and procedures required to minimise environmental impacts and ensure compliance with legislative and approval requirements.

The CEMP will detail how specific management and monitoring measures outlined in this EIS—and required under approval conditions—will be implemented. It will also include sub-plans addressing specific construction activities and environmental impacts, including but not limited to those listed in Table 8.1.

As a minimum, the CEMP will include:

- The Contractor's environmental policy and other relevant guiding documents
- Clear environmental objectives and performance targets for construction activities
- References to all relevant statutory requirements and obligations, and how they apply to Project construction
- Refer to a change management procedure in the event of scope and design changes
- Resource requirements and defined roles and responsibilities for all Contractor environmental personnel and subcontractors
- Induction and training requirements with regards to environmental site management
- Environmental control measures for all potential environmental impacts
- Communication requirements, including liaison with stakeholders and the community and complaints handling
- Identification of project specific environmental risks, including preparation and maintenance of an Environmental Aspects and Impacts Register.
- Register of Hold Points which lists activities where Hydro Tasmania's acceptance is required prior to proceeding with the activity
- Monitoring and reporting requirements aligned with the CEMF and conditions of approval
- Procedures for monitoring and evaluating environmental performance
- Procedures for incident management and reporting
- Procedures for environmental audits
- Procedures for the control of environmental records

Table 8.1: CEMP and sub-plans

Construction Environmental Management Plan	
Site Establishment Management Plan	Hazardous Materials Management Plan
Water Management Plan	Emergency Response Plan
Erosion and Sediment Control Plan	Spill Response Plan
Hydrocarbon Management Plan	Waste Management Plan
Nitrate Management Plan	Spoil Management Plan
Groundwater Management Plan	Bushfire Mitigation Plan
Biosecurity Management Plan	Bushfire Emergency Plan
Den Decommissioning Plan	Bushfire Response Plan
Roadkill Management Plan	Construction Traffic Management Plan
Air Quality Management Plan	Site Rehabilitation Plan

8.3 Site Establishment Management Plan

CM2: A Site Establishment Management Plan (SEMP) will be prepared prior to the commencement of site establishment activities and implemented throughout their duration. The SEMP will outline the environmental management practices and procedures to be applied during this phase.

The SEMP will be submitted to the EPA before the CEMP and its sub-plans for the main construction works. This will allow site establishment activities to proceed concurrently with the preparation, review, and approval of the other plans.

Once site establishment is complete and main construction works commence, the SEMP will no longer apply, and the CEMP and associated sub-plans will take effect.

8.4 Sustainability Management Plan

CM3: A Sustainability Management Plan, along with associated sub-plans, will be prepared prior to the commencement of construction. It will outline sustainability targets for the Project, which will be embedded within the CEMP and relevant sub-plans, and will include strategies for achieving these targets.

8.5 Management measures table

Table 8.2: Management measure table

Ref	Management Measure (s)	Phase	EIS ref.
	Construction management		
CM 1	A Construction Environmental Management Plan (CEMP) and associated sub-plans will be prepared prior to the commencement of construction and implemented during the construction of the Project. The CEMP will fulfil the minimum requirements outlined in Section 8.2 above. The CEMP will align with the environmental management measures outlined in this EIS and any subsequent approval conditions issued by the Tasmanian EPA and Central Highlands Council.	Pre–construction (preparation) Construction (implementation)	Section 8.2
CM 2	A Site Establishment Management Plan (SEMP) will be prepared prior to the commencement of site establishment activities and implemented during their execution. The SEMP will outline the environmental management practices and procedures to be implemented for site establishment activities.	Pre–construction (site establishment)	Section 8.3

Ref	Management Measure (s)	Phase	EIS ref.
CM 3	A Sustainability Management Plan will be prepared prior to the commencement of construction and implemented during the construction of the Project. The Sustainability Management Plan will identify sustainability targets for the Project that include, but are not limited to: • Reduction in materials use / consumption against baseline • Re-use of water generated (including process / construction water, stormwater and wastewater) • Waste diversion from landfill • Waste repurposing / re-use • Topsoil re-use • Spoil re-use • Native vegetation clearing reduction.	Pre–construction (preparation) Construction (implementation)	Section 8.4
	Water quality		
WQ 1	A Water Management Plan (WMP) will be prepared prior to the commencement of construction and implemented during the construction of the Project. The WMP will fulfil the minimum requirements outlined in Section 5.1.	Pre – construction (preparation) Construction (implementation)	Section 5.1.3.1
WQ 2	For the duration of Project construction, surface water discharged from the western portal, mid-access portal, Paddy's Quarry and the power station sites will meet the following criteria at discharge monitoring locations: • TSS of 50 mg/L (or equivalent turbidity measure) • pH of between 6.0 and 9.0.	Construction	Section 5.1.3.1
WQ 3	For the duration of Project construction, water at the Liapootah Pond Outlet will meet the following criteria: • Nitrate concentration: measurements must not exceed background concentration (measured upstream of Tungatinah Power Station on the Nive River) by more than 0.07 mg/L for two consecutive measurements. • Turbidity: ◦ *During in-stream works*: No more than 30 NTU above upstream background turbidity on a 72-hour rolling average (final value to be confirmed based on final design and methods). Guided by the EPA DGV 95th percentile (30.7 NTU). ◦ *At other times*: No more than 10 NTU above upstream background on a 72-hour rolling average, guided by the EPA DGV 80th percentile (8.3 NTU). • pH: measurements not to exceed 8.1 for more than two consecutive measurements.	Construction	Section 5.1.3.1
WQ 4	A Hydrocarbon Management Plan (HMP) will be prepared prior to the commencement of construction and implemented during the construction of the Project. The HMP will fulfil the minimum requirements outlined in Section 5.1.	Pre–construction (preparation) Construction (implementation)	Section 5.1.3.1

Ref	Management Measure (s)	Phase	EIS ref.
WQ 5	Concrete batching and washout areas will be: • Located away from drainage lines, stormwater drains and waterbodies • Clearly signposted and conveniently located for equipment washout • Fully bunded with impervious surfaces, with all washdown water either treated on-site to meet WQ2/WQ3 criteria or disposed of at a licensed waste facility.	Construction	Section 5.1.3.1
WQ 6	On-site storage capacity will be provided to accommodate rare periods when there is low or no flow for dilution of discharges in the Nive River from Tarraleah Power Station (via No. 1 or No. 2 Canals) and Tungatinah Power Station. This will include: • Ensuring each portal location has sufficient on-site storage to hold water with elevated nitrate concentrations for at least 72 hours without the need to discharge. • Using No. 2 Pond as additional overflow storage capacity (beyond the 72-hour on-site capacity). • Managing subsequent discharges at a controlled flow rate to remain below the nitrate performance criterion.	Construction	Section 5.1.3.1
WQ 7	Prior to the commencement of construction at each construction site identified in Section 5.1, an Erosion and Sediment Control Plan (ESCP) will be prepared in accordance with the minimum requirements outlined in Section 5.1. The ESCP will be prepared by a suitably qualified professional as defined the IECA *Australasia Position Statement – Definition of a Suitably Qualified Professional (Nov 2023)* in accordance with the principles and guidance provided in IECA Australasia's *BPESC document* (2008).	Pre–construction (preparation) Construction (implementation)	Section 5.1.3.2
WQ 8	A Nitrate Management Plan (NMP) will be prepared prior to the commencement of construction and implemented during the construction of the Project. The NMP will fulfil the minimum requirements outlined in Section 5.1.	Pre–construction (preparation) Construction (implementation)	Section 5.1.3.3
WQ 9	In line with the WMP, all water exposed to blasted materials (e.g. tunnel excavation water, surface runoff from spoil emplacement areas) will be collected and contained within the disturbance footprint prior to discharge. Collected water will be discharged to one of the following locations: • No. 1 Canal • No. 2 Canal and storages • Nive River • On-site storage during periods of low or no flow in the Nive River from either Tarraleah Power Station (via No. 1 or No. 2 Canals) or Tungatinah Power Station.	Construction	Section 5.1.3.3

Ref	Management Measure (s)	Phase	EIS ref.
	Groundwater		
GW 1	A Groundwater Management Plan (GMP) will be prepared prior to construction and implemented during the construction of the Project. The GMP will fulfil the minimum requirements outlined in Section 5.2.	Pre–construction (preparation) Construction (implementation)	Section 5.2.3.1
	Terrestrial biodiversity		
TB 1	Any pits and trenches (e.g. for the pipeline or underground distribution lines) required will remain open for the shortest time possible and, where practicable, will not be left open during periods of heavy rain or forecast weather events that may cause inundation. A suitably qualified person will inspect open excavations (pits and trenches) for fauna daily – within five hours after sunrise, before sunset, and prior to backfilling. Work will not commence until inspections are complete. Trapped fauna will be recorded including location, species and condition.	Construction	Section 5.3.3.1
TB 2	Habitat trees (hollow-bearing trees important for arboreal mammals and hollow-nesting birds) within the disturbance footprint will be avoided as far as practicable within a root protection buffer zone applies. The buffer radius will equal to the length of the habitat tree's diameter at breast height (DBH) multiplied by 12.	Detailed design	Section 5.3.3.1
TB 3	A final Project disturbance footprint (within the Project disturbance footprint presented within this EIS) will be established based on the Project's final design and construction method. The disturbance footprint and vegetation clearing exclusion zones will be clearly shown on Project plans, communicated to all construction personnel and physically marked on site. Vegetation clearing will be limited to the minimum necessary to construct and operate the Project. The SEMP (**CM 1**) will specify appropriate procedures to ensure that vegetation clearance is minimised.	Detailed design Pre–construction Construction	Section 5.3.3.2
TB 4	Hazard trees associated with the Project's 220 kV transmission line and 22 kV distribution lines will be identified and assessed by a suitably qualified arborist prior to construction. Trees marked for removal or trimming will be checked for fauna use of tree hollows by a suitable qualified person before removal. If native fauna are found using hollows of trees that must be cleared, a permit to 'Take' under the Tasmanian *Threatened Species Protection Act 1995* (TSP Act) and/or Tasmanian *Nature Conservation Act 2002* (NC Act) will be required.	Pre–construction Construction	Section 5.3.3.2
TB 5	*Diplarrena latifolia* (western flag-iris) within the subalpine *Diplarrena latifolia* rushland within the pipeline corridor and *Gymnoschoenus sphaerocephalus* (buttongrass) within buttongrass moorlands in the disturbance footprint will be stockpiled as close as possible to their original location. After construction, they will be spread back over areas no longer required for operation (**DR 2**).	Construction	Section 5.3.3.2

Ref	Management Measure (s)	Phase	EIS ref.
TB 6	An offset for potential impacts to the *Sphagnum* peatland downstream of No. 2 Canal (~400 m upstream of Mossy Marsh Pond) will be secured before construction begins. The offset will involve protecting a *Sphagnum* peatland area larger than the 3 ha Mossy Marsh patch, under a covenant and approved conservation management plan in accordance with the NC Act. It will also align with the *EPBC Act Environmental Offsets Policy* (2012) and *Offsets Assessment Guide* (2012). Hydro Tasmania has identified a suitable 9.5 ha offset site in Western Tasmania. Entura ecologists have verified this site contains high-quality *Sphagnum* peatland, listed as threatened under the NC Act and as an endangered ecological community under the EPBC Act (Alpine *Sphagnum* Bogs and Associated Fens*)*. The peatland at this site is in similarly excellent condition to Mossy Marsh. Hydro Tasmania is in ongoing negotiations with the property owner to acquire freehold title.	Pre–construction	Section 5.3.3.2
TB 7	Threatened flora exclusion zones of 5 m from the outermost plant will be established for: • The *Barbarea australis* (native wintercress) plants at the Nive River and the Pump Pond wall locations. • The *Pomaderris elachophylla* (small-leaf dogwood) plants at the No. 2 Canal location and the two locations along the Lake King William to Derwent Pumps distribution line alignment. Exclusion zones will be shown on Project plans, communicated to all construction personnel and physically marked on site.	Pre-construction (exclusion zones) Construction	Section 5.3.3.4
TB 8	If any new occurrences of threatened flora are detected during construction, exclusion zones of at least 5 m from the outermost plant will be established. If avoidance is not possible, a permit to 'Take' under the TSP Act will be required.	Construction	Section 5.3.3.4
TB 9	The final disturbance footprint for the northern transmission line (if selected) will be designed to minimise impacts to *Westringia angustifolia* (narrowleaf westringia) plants at proposed sites for Towers 3 and 14. Where *W. angustifolia* plants can be avoided, exclusion zones will be shown on Project plans, communicated to construction personnel and physically marked on site. Where avoidance is not possible, a permit to 'Take' under the TSP Act and/or NC Act will be required.	Detailed design Pre–construction (exclusion zones, permit) Construction	Section 5.3.3.4

Ref	Management Measure (s)	Phase	EIS ref.
TB 10	A suitably qualified ecologist will survey suitable denning habitat (mature dry and wet eucalypt forest) at least 30 days before construction begins at each site. The survey will locate possible Tasmanian devil or quoll den sites, including wombat burrows, and determine the occupant species and if any are active maternal carnivore dens, in accordance with the *Survey Guidelines and Management Advice for Development Proposals that may impact on the Tasmanian Devil* (Environment Strategic Business Unit, 2023). Camera traps may be used to confirm activity and determine the occupant species. • If a Tasmanian devil or quoll den is identified, management will follow the above guidelines and advice from Department of Natural Resources and Environment Tasmania (NRE Tasmania). Where avoidance is not possible, a decommissioning plan will be prepared and a permit to 'Take' in accordance with the TSP Act and/or NC Act will be required. • If an active wombat burrow is found within the disturbance footprint, it will be closed accordance with advice from NRE Tasmania. A permit to 'Take' in accordance with the NC Act will be required.	Pre–construction (at each construction site)	Section 5.3.3.5
TB 11	If an unexpected den is discovered during construction, surface works will cease at the den location. A suitably qualified ecologist will determine whether the den is used by a native or non-native animal. • If non-native works may continue. • If native, no surface works will recommence within 50 m of the den until a permit to 'Take' under the TSP Act and/or NC Act is obtained.	Construction	Section 5.3.3.5
TB 12	A Roadkill Management Plan (RkMP) will be prepared and implemented to minimise vehicle strike risk. The plan will apply to roads expected to experience a ≥10% increase in night-time traffic (defined as one hour before sunset to one hour after sunrise) due to construction. The plan will follow *Caring for Nature – Reducing Roadkill guidelines* (PWS, 2006), and address elevated risks for threatened species that scavenge on roadkill carcasses (Tasmanian devils, spotted-tailed quolls, eastern quolls, and Tasmanian wedge-tailed eagles). The RkMP will fulfil the minimum requirements outlined in Section 5.3.3.5.	Pre – construction (preparation) Construction (implementation)	Section 5.3.3.5
TB 13	Annual eagle nest searches will be undertaken before the start of construction and repeated until construction is complete, to identify new or previously unknown eagle nests, and to monitor the condition of known nests. Searches and activity checks will follow the Tasmanian EPA's *Guide to Eagle Nest Searches and Activity Checks (*EPA Tasmania, 2023), the Tasmanian FPA's *Fauna Technical Note No. 1: Eagle nest searching, activity checking and nest management* (Forest Practices Authority, 2023), and the *Survey Guidelines for Australia's Threatened Birds* (Department of the Environment, Water, Heritage and the Arts, now DCCEEW, 2010a). Searches will be guided by the FPA's eagle nesting habitat models (FPA, 2014a).	Pre-construction Construction	Section 5.3.3.6

Ref	Management Measure (s)	Phase	EIS ref.
TB 14	For all eagle nests either within 500 m or 1 km line-of-sight of proposed surface works, no surface works will occur within these buffers during the breeding season (July to January inclusive, or July-February inclusive in late season years) unless the nest is confirmed inactive for that breeding season. Where required, nest activity checks will be undertaken during the breeding season before relevant construction works commence, and repeated annually until construction of the relevant infrastructure is complete. An annual report summarising eagle nest search results will be prepared and provided to the EPA upon request. Any previously unrecorded raptor nests, or failures to locate previously recorded nests, will be reported to the Tasmanian Natural Values Atlas (NVA) as soon as practicable. Photographs and descriptions of known nests re-located during surveys will also be provided to the NVA as soon as practicable after each search.	Construction	Section 5.3.3.6
TB 15	Anticoagulant rodenticides—especially second-generation products (SGARs: brodifacoum, bromadiolone, difethialone, difenacoum, flocoumafen)—that pose a secondary poisoning risk to raptors will be avoided during all phases of the Project, including at the new power station on the Nive River.	Construction Operation	Section 5.3.3.6 and Section 5.3.3.7
TB 16	To minimise electrocution and collision risk for birds, the new 22 kV power distribution lines will be designed and built in accordance with TasNetworks standards.	Detailed design	Section 5.3.3.6

Ref	Management Measure (s)	Phase	EIS ref.
TB 17	A Biosecurity Management Plan will be prepared and implemented in accordance with the *Arrive Clean, Leave Clean* guidelines (Commonwealth of Australia, 2015) and the *Weed and Disease Planning and Hygiene Guidelines – Preventing the spread of weeds and diseases in Tasmania* (DPIPWE, 2015). The plan will aim to: • Prevent the spread of weeds and diseases (e.g. *Phytophthora cinnamomi* and the chytrid fungus Batrachochytrium dendrobatidis), and • Eradicate, where practicable, known declared weed infestations within the disturbance footprint prior to construction. • Targeted eradication efforts will focus on foxglove, orange hawkweed, serrated tussock, English broom and Montpellier broom. The plan will also include training in weed and disease management for all staff, contractors, subcontractors and visitors, outlining responsibilities. If herbicides are required, application will be undertaken only by a suitably qualified weed contractor in approved areas. Weed identification and herbicide use will be recorded by the contractor and provided to Hydro Tasmania for entry into the corporate GIS; declared weed observation records will be supplied to the Tasmanian Natural Values Atlas database. Tasmania Parks and Wildlife Service (PWS) will be notified when weed control actions are taken within the Tarraleah Conservation Area.	Pre–construction (preparation) Construction (implementation) Operation (implementation and monitoring)	Section 5.3.3.8
	Aquatic Biodiversity		
AB 1	New watercourse crossings for access roads will be designed, constructed and maintained in accordance with the Forest Practices Authority Code of Practice to minimise disturbance to fish and other aquatic fauna. Machinery activity in watercourses will be minimised. Where practicable, culvert pipes will be set at or marginally below the natural bed level to facilitate aquatic fauna passage.	Construction	Section 5.4.3.1
AB 2	An environmental flow downstream of Clark Dam will be delivered consisting of annual high and low flow releases. **High flow releases:** To offset the reduction in overall spill frequency, an alternating annual release is proposed: 60 m^3/s in one year and up to 100 m^3/s in the following year. Each release will span three days (ramp up, peak flow, ramp down). If natural flows of equivalent magnitude occur, no managed release will be made. Where required, releases will occur in spring, prior to the key growing season (November–April) for *B. australis*. **Lower flow releases (freshes):** Three 24-hour releases of 5–10 m^3/s are proposed annually (one at the end of summer, one in the first month of winter, and one in December). As for high flow releases, no managed release will occur if natural events of equivalent size occur.	Operation Annually in spring (high flow) and early autumn, winter and summer (low flow), if spill events/releases of this magnitude have not already naturally occurred.	Section 5.4.3.2

Ref	Management Measure (s)	Phase	EIS ref.
AB 3	Any impacts on *B. australis* from altered spill downstream of Wayatinah Dam will be monitored, with adaptive management applied if required to avoid negative impacts on populations.	Operation Annually in spring (high flow) if required	Section 5.4.3.2
	Air quality		
AQ 1	An Air Quality Management Plan (AQMP) will be prepared prior to construction. The AQMP will identify potential and existing dust sources and outline best-practice design controls, air quality management measures, responsibilities, key personnel, adaptive management, and community engagement. Management measures to be considered include: • Minimising exposed surfaces through construction planning and progressive rehabilitation (e.g. hydromulching, surface matting, and revegetation) • Watering haul routes within the disturbance footprint during hot, dry, and windy summer conditions • Locating temporary stockpiles in wind-protected areas and controlling dust generation (e.g. water sprays) • Installing dust suppression systems (e.g. water sprays) on crushing and screening equipment • Ensuring adequate water supply for watering rates and spray systems • Minimising surface blasting during hot, dry, and windy conditions, where practicable • Risk-based management approaches outlined in Code of Practice – Prevention and Management of Blast Generated Nox Gases in Surface Blasting (AEISG 2011) to manage the risk of NO_2 exposure to vehicles travelling on public roads from blast gases • Regularly monitoring the effectiveness of dust control measures. Where measures are found to be ineffective, they will be reviewed (internally and/or by an external dust specialist if required) and amended as necessary.	Pre–construction (preparation) Construction (implementation)	Section 5.5.4
	Noise and vibration		
NV 1	To minimise noise in Tarraleah Village, where reasonably practicable, noisier plant (e.g. the crusher at Paddy's Quarry) will be located in areas providing topographic screening relative to Tarraleah Village.	Construction	Section 5.6.4.1
NV 2	To minimise impacts from helicopter stringing of the transmission line, operations will be restricted to between 7 am and 6 pm when near Wayatinah or Tarraleah Village. Residents of Brady's Lake, Bronte Lagoon and Wayatinah will be notified at least one week in advance of planned helicopter use.	Construction	Section 5.6.4.1

Ref	Management Measure (s)	Phase	EIS ref.
	Dangerous goods and environmentally hazardous materials		
DG 1	A Hazardous Materials Management Plan (HMMP) will be prepared prior to construction. The HMMP will cover the storage, handling, containment and disposal of environmentally hazardous materials. Management measures will include: • Environmentally hazardous materials, including dangerous goods, will be purchased, used, stored, transported and disposed of in accordance with relevant Safety Data Sheets (SDS) and applicable legislation, regulations and Australian Standards. • Fuels, oils and lubricants will be stored and handled in accordance with *AS 1940:2017 – The storage and handling of flammable and combustible liquids*. Fuel dispensing areas will be designed to facilitate spill management and clean-up. • Explosives will be kept in locked, purpose-built explosive magazines and stored, used and transported in accordance with *AS 2187.1:1998 – Explosives: Storage, Transport and Use – Storage*. • Hazardous materials will be stored in dedicated, fenced and bunded areas with suitable ventilation and signage. Bunded areas will have capacity to hold 110% of the largest container. SDSs will be available onsite. • The transport of dangerous goods will comply with the *Australian Code for the Transport of Dangerous Goods by Road and Rail* and the *Dangerous Goods (Road and Rail Transport) Act 2010*. • Cement for batching will be stored in separate bulk silos at batch plants to prevent wind-blown waste and runoff. • Containment devices (e.g. bunds, separators, catch trays) will be used wherever spillage risks exist. • Spill kits will be placed adjacent to containment devices, on large machinery, in refuelling/maintenance areas and at other designated locations. Spill kits will be sized to match material volumes stored. Aquatic spill kits will be available near waterways. • Management of hazardous materials will be included in site inductions. Relevant staff will undergo spill response, safe handling and storage training. • All dangerous goods and hazardous substances will be registered on a Project chemical register with safety, storage, segregation and handling information, including SDSs.	Pre–construction (preparation) Construction (implementation)	Section 5.7.2.1

Ref	Management Measure (s)	Phase	EIS ref.
DG 2	An Emergency Response Plan (ERP) will be prepared prior to construction and implemented throughout. The plan will: • Provide contingency measures for control failures, equipment breakdowns or accidental releases • Document notification procedures, including to Hydro Tasmania and the Tasmanian EPA • Detail clean-up measures for terrestrial and aquatic environments, including: • Collection of affected soils/water into suitable containers or vehicles • Disposal of contaminated material at a temporary construction bioremediation area or licenced disposal facility (depending on spill type, quantity and severity) • Site remediation.	Pre–construction (preparation) Construction (implementation)	Section 5.7.2.1
DG 3	During operation of the Project. • Dangerous goods and environmentally hazardous materials will be managed in accordance with Hydro Tasmania's *Hazardous Chemicals Management Procedure (HSEP0921)*. • The generator power transformers will be located in a transformer yard outside the power station building, each in their own separate concrete bunded area. The bunding areas will meet the requirements of *AS 2067*, the Australian Standard for design and erection of high voltage installations. • Fuels, oils and lubricants will be stored and handled in accordance with *AS 1940:2017 - The storage and handling of flammable and combustible liquids*. • Hazardous materials will be stored in dedicated fenced and bunded areas with suitable ventilation and signage within the power station. The bunded areas will have capacity to hold 110% of the capacity of the largest container.	Operation	Section 5.7.2.2
	GHG emissions		
GHG 1	During detailed design and construction, the following measures will be considered where practicable and consistent with Technical Specification requirements: • Use of GRP pipe rather than steel pipe where feasible (e.g. for surface installations accessible for maintenance), as steel has higher embodied and transport emissions • Minimising the final disturbance footprint and rehabilitating disturbed land not required for ongoing operations, reducing direct emissions from land use change (refer Chapter 7): • Preference for electric vehicles and construction machinery • Avoidance of SF_6 (a potent GHG) in electrical infrastructure (e.g. switchboards) • Reducing transport fuel emissions by reusing or disposing of spoil at designated spoil emplacement sites • Implementing a Local Industry Participation Plan to preference local suppliers of goods and services where commercially and technically viable (refer Section 5.9).	Detailed design	Section 5.8.5

Ref	Management Measure (s)	Phase	EIS ref.
GHG 2	To ensure value engineering opportunities are captured beyond the commitments in this EIS: • Contractors will be required to demonstrate, through the selection and use of key construction materials (including concrete, steel, GRP pipe and blasting materials), that lower embodied emission options have been chosen where consistent with Technical Specification requirements. • GHG emissions from fuel and electricity use during construction will be tracked to monitor performance.	Construction	Section 5.8.5
	Social		
SI 1	A Social Impact Management Plan (SIMP) will be prepared for the pre-construction and construction phase of the Project. The SIMP will be developed in consultation with relevant government and local government agencies, key stakeholders, and directly affected parties to minimise construction-phase social impacts. The SIMP will address key components of the construction program. The SIMP will be made readily available to the public in a format easily interpreted, and will: • Include an updated social baseline assessment focussing on the social indicators of relevance to the identification and management of construction phase impact. • Include a summary of the anticipated social impacts (positive and negative), potential residual impacts and consideration for cumulative impacts. • Identify the desired management outcomes for the key performance areas of: ◦ Workforce management (including workforce behaviour, housing and accommodation) ◦ Community health and wellbeing ◦ Tasmanian industry and business participation ◦ Social procurement ◦ Workforce employment and training ◦ First Nations participation and engagement ◦ Local benefit sharing ◦ Visitor economy ◦ Community and stakeholder engagement • Incorporate key strategies for achieving the desired management outcomes, responsibilities for implementation, timing and key partners in strategy delivery. • Document the monitoring, evaluation and reporting process for ensuring the effectiveness of mitigation measures and adopting an adaptive management approach. • Describe the approach to complaints management during construction. • Define the roles and responsibilities for social performance management during construction.	Pre–construction (Preparation and Implementation) Construction (implementation)	Section 5.9.3.1

Ref	Management Measure (s)	Phase	EIS ref.
SI 2	A Project Communication and Stakeholder Engagement Plan (CSEP) will be developed for pre-construction and construction phases. The Project CSEP will outline an effective approach to communication and engagement underpinned by a proactive issues-management approach, open and transparent two-way communication processes and responsiveness to the communication needs and expectations of key stakeholders and the broader community. This would include ensuring community and key stakeholders are kept informed of: • Project construction timelines • Changes in construction workforce numbers • Timing of key construction activities and potential affects • Any required changes in existing conditions to accommodate construction activities, e.g. introduction of traffic management, changes in public access arrangements to Tarraleah Village. • Workforce accommodation arrangements. The Project CSEP would document the approach to grievance management. The Contractor will prepare a CSEP in accordance with the requirements of the Project CESP.	Pre–construction (Preparation and Implementation) Construction (Implementation)	Section 5.9.3.1
SI 3	A Project workforce code of conduct will be prepared prior to the commencement of construction and implemented during the construction of the Project. The workforce code of conduct will establish expectations in relation to workforce behaviour both on-site and off-site (i.e. in community) and demonstrates how potential impacts on the rural and heritage character of local communities (e.g. Ouse and Hamilton) will be minimised.	Pre-construction	Section 5.9.3.1
SI 4	A Workforce Accommodation Plan (WAP) will be prepared prior to the commencement of construction and implemented during the construction of the Project. The WAP will be based on the final construction workforce profile. The WAP will: • Demonstrate how the peak Project workforce will be accommodated and serviced, and how flow-on impacts to host communities will be minimised • Consider pedestrian and vehicle access and connectivity within the Tarraleah Village during construction to always ensure pedestrian safety • Detail controls to be implemented to minimise workforce related traffic on the public road network. • Include a plan for monitoring workforce accommodation arrangements to enable proactive response to off-site impacts • Achieve the objectives of the Project SIMP.	Pre–construction (Implementation) Construction (Implementation)	Section 5.9.3.1
SI 5	During construction, identify actions that encourage workforce contribution to community and seek to build relationships between the workforce and the community, as a component of the SIMP.	Construction	Section 5.9.3.1
SI 6	Undertake regular community perception surveys during construction to inform Project SIMP reviews, including the evaluation of impacts and outcomes.	Construction	Section 5.9.3.1

Ref	Management Measure (s)	Phase	EIS ref.
SI 7	Prior to commencement of construction, establish a publicly accessible project information centre at Tarraleah Village for the duration of construction. Ensure visitors can continue to engage with the village and construction progress, including latest events and opportunities to engage. Incorporate heritage interpretation into the project information centre to enable remote connection for the public to Tarraleah Village and components of the Tarraleah Hydro Power Scheme. As a component of interpretation, identify opportunities to provide public access to the Tarraleah locality during construction.	Construction	Section 5.9.3.1
SI 8	Where possible during construction, provide public access to existing regional visitor experiences located in proximity to the Village. This includes the penstock lookout at Tarraleah Village, the Tarraleah Falls walking track and areas of the Tarraleah Village valued by community.	Construction	Section 5.9.3.1
SI 9	Prior to the commencement of construction, persons with connection to the Polish monument in the Nive Valley will be identified and engaged through a structured process to explore solutions for monument relocation.	Pre-construction	Section 5.9.3.1
SI 10	Prior to and during construction, facilitate a program of access to Hydro Tasmania managed land in the Derwent hydropower scheme so that Tasmanian Aboriginal People can connect to Country and share stories. This will inform the development of a broader cultural values mapping process to support Hydro Tasmania's future land management practices.	Pre-construction and Construction	Section 5.9.3.1
SI 11	Prior to commencement of construction, develop a First Nations Participation Plan (FNPP) as a component of the construction phase Project SIMP. The FNPP will establish desired outcomes and key actions to be implemented to support First Nations participation during the construction phase. The FNPP will reflect the core pillars of Hydro Tasmania's CAP. Key themes to be addressed in the FNPP include: • Supporting connection to Country for Tasmanian Aboriginal people during construction • Recognising culture through project design and delivery • Delivery of cultural safety training for the workforce • Realising employment and economic development opportunities. The FNPP actions will be implemented prior to and during construction and monitored through the Project SIMP.	Pre-construction	Section 5.9.3.1

Ref	Management Measure (s)	Phase	EIS ref.
SI 12	A Workforce Training and Development Plan (WTDP) will be prepared prior to the commencement of construction and implemented during the construction of the Project. The WTDP will detail the strategy for employee training programs, available apprenticeships, traineeships and other workforce development programs. The WTDP will include a local and regional workforce development program. This program will demonstrate the Project's commitment to: • Reducing barriers to employment and training participation • Equipping local workers with the necessary skills and certifications to participate in project opportunities (direct and indirect) • Training a workforce that contributes to the development of an improved local and regional skills base. WTDP actions will be implemented during construction and monitored through the Project SIMP.	Pre-construction	Section 5.9.3.1
SI 13	The Project will apply Hydro Tasmania's Major Projects Local Content Framework to the Project construction phase as outlined in EI 4.	Pre-construction and Construction	Section 5.9.3.1
SI 14	Through the SIMP, develop and implement actions that support the realisation of the social procurement objectives established in Hydro Tasmania's Major Projects Local Benefit Sharing Strategy as outlined in EI 6.	Pre-construction and Construction	Section 5.9.3.1
SI 15	Prior to commencement of construction, develop a cultural awareness training program for Project construction. Prior to the commencement of work, all Project personnel will be required to complete cultural awareness training in support of a culturally safe work environment for First Nations people.	Pre-construction and Construction	Section 5.9.3.1
SI 16	Prior to commencement of construction, engage with tourism industry sector stakeholders to identify potential strategies to offset or minimise potential adverse construction phase effects and create opportunities for the sector during Project construction. Agreed strategies would be considered through the LBS Strategy process (SI 18).	Pre-construction and Construction	Section 5.9.3.1
SI 17	Provide appropriately resourced health services for the duration of the construction phase, with access available to all Project construction workers. Provide the construction workforce with access to an EAP service for the duration of construction.	Pre-construction and Construction	Section 5.9.3.1
SI 18	Prior to commencement of construction, develop a Local Benefit Sharing (LBS) Action Plan for the Project consistent with the Major Projects LBS Strategy. The LBS Action Plan would be informed through a structured engagement process with key stakeholders and affected communities. There could be a range of core community needs that are identified and that the LBS may respond to. These may include addressing barriers to participation and realisation of project opportunities.	Pre-construction and Construction	Section 5.9.3.1

Ref	Management Measure (s)	Phase	EIS ref.
SI 19	Prior to commencement of construction, develop an emergency response plan in consultation with local emergency service providers. Implementation of the emergency response plan will be monitored through the Project SIMP. Provide emergency response personnel for the Project for the duration of construction. The emergency response service may be called upon to assist in incidents that occur within or near the project area, including those involving public roadways intersecting the site. In the event of external bushfire threat to the Project, the emergency response personnel will assist Tasmanian Fire Service (TFS) in coordinating workforce evacuations and facilitate safe access for state response teams. Provide qualified and experienced medical personnel with responsibility for responding to and managing medical and trauma incidents, including stabilising and transporting patients to onsite facilities or designated handover points. These personnel will interface with the Tasmanian Ambulance Services and support further off-site medical evacuation co-ordination.	Pre-construction and Construction	Section 5.9.3.1
SI 20	During construction, promote to the public other regional opportunities for recreational fishing, camping and boating activities	Construction	Section 5.9.3.1
SI 21	Before and during construction monitor traffic on alternative routes around Tarraleah and advise Central Highlands Council (CHC)/Department of State Growth (DSG) of changes in usage patterns	Pre-construction and Construction	Section 5.9.3.1
SI 22	Prior to the commencement of construction, develop and implement the following controls to minimise risks to workers and the public when driving: • Driver Safety (DS) and Journey Management Plan (JMP)—to address hazards such as distance of journey, wildlife interaction, adverse weather and interaction with public vehicles. • Installation of an In-Vehicle Monitoring System IVMS in all vehicles used for travel to and from site. • Fitness for Work Management Plan to protect and support workforce health and wellbeing whilst minimising safety risks to the surrounding communities. • Driver Code of Conduct outlining the minimum driver behaviour requirements to ensure compliance with the legislative requirements. • Commence early and ongoing engagement with the DSG, CHC and Tasmanian Police in relation to public safety and construction traffic management.	Pre-construction and Construction	Section 5.9.3.1
SI 23	Prior to commencement of construction, relocate the public amenities from the Nive Valley to the Tarraleah Village and provide 24 hr public access to the relocated facilities for the duration of construction.	Pre-construction	Section 5.9.3.1

Ref	Management Measure (s)	Phase	EIS ref.
SI 24	Prior to the commencement of operations, Hydro Tasmania will develop and implement a stakeholder engagement plan to communicate to downstream users changes in operational flow regimes and likely effects. Downstream users will be provided with information regarding Hydro Tasmania's Complaints Management, including how to raise issues or concerns regarding operational impacts.	Commissioning/ Operations	Section 5.9.3.2
SI 25	Prior to the completion of Project construction, develop and implement a plan to support the transition from construction to operations. Engage with key stakeholders and potentially affected communities in the development of the plan. Development of the plan could involve. • Identification of areas and demographic cohorts likely to experience potential economic and social impacts from the cessation of construction. • Identification of the services, funding opportunities, programs that can help to soften the transition.	Construction	Section 5.9.3.1
SI 26	Prior to the completion of Project construction, collaborate with key stakeholders (e.g. DSG, Renewables, Climate and Future Industries Tasmania (ReCFIT)) and industry sector stakeholders to facilitate workforce forecasting and inform labour force planning. Advocate for policies that support workforce development and facilitate the movement of workers between regions and sectors.	Pre-construction and Construction	Section 5.9.3.1
	Waste management		
WM 1	A Waste Management Plan (WaMP) will be prepared prior to the commencement of construction and implemented during the construction of the Project. The WaMP will fulfil the minimum will minimum requirements outlined in Section 5.10.3.1.	Pre–construction (Preparation) Construction (Implementation)	Section 5.10.3.1
WM 2	A Spoil Management Plan (SMP) will be prepared prior to construction to guide the design and management of permanent spoil emplacement areas in accordance with the minimum requirements outline in Section 5.10.3.2.	Pre–construction (preparation) Construction (Implementation)	Section 5.10.3.2
WM 3	Where spoil is found to be contaminated at levels unsuitable for reuse, stockpiling, or emplacement, it will be designated for off-site disposal. Such spoil will be tested and classified in accordance with Information Bulletin 105 (EPA, 2018) to determine the appropriate disposal method and location.	Construction	Section 5.10.3.3
	Fire risk		
FR 1	Prepare a Construction Bushfire Mitigation Plan prior to construction. The plan will set out how each principle and site-specific measure in Table 8 of Appendix L will be applied, based on strategic asset management principles with the overriding priority being preservation of life.	Pre–construction (Preparation) Construction (Implementation)	Section 5.11.3.1

Ref	Management Measure (s)	Phase	EIS ref.
FR 2	Develop and implement a Bushfire Emergency Plan prior to construction, including: • Procedures for altering activities during total fire bans and high, extreme, or catastrophic fire danger days • Procedures for altering activities, including ceasing hot work, on land managed by the Tasmania Parks and Wildlife Service (PWS) when the Forest Fire Danger Index (FDI) is calculated as equal to or greater than HIGH 20, or the relative humidity is equal to or less than 30% • Consideration of reducing site personnel on such days • Pre-emptive triggers for risk reduction during extreme and catastrophic conditions • Identification of refuge locations. The plan will: • Be consistent with the TFS Bushfire Emergency Planning Guideline • Be prepared and reviewed annually (until practical completion) by a suitably experienced and TFS-accredited Bushfire Hazard Practitioner • Be incorporated into site inductions during bushfire season.	Pre–construction (Preparation) Construction (Implementation)	Section 5.11.3.1
FR 3	Prepare a Bushfire Response Plan before construction, identifying responsible officers and procedures for accidental onsite fires. The plan will align with relevant external documents (e.g. TFS Local Area Fire Management Plan, Sustainable Timber Tasmania Fire Management Plan, Parks and Wildlife Service Fire Action Plan).	Pre – construction (preparation) Construction (implementation)	Section 5.11.3.1
FR 4	The HMMP (DG 1) will specify the minimum fire protection measures for onsite hazardous material storage.	Pre – construction	Section 5.11.3.1
FR 5	Fire response agencies will be provided with copies of the Bushfire Emergency and Response Plans.	Construction	Section 5.11.3.1
FR 6	Include bushfire risk in Project and site-specific inductions, covering: • Site-specific bushfire procedures, Emergency Plans and Response Plans • Training in basic bushfire awareness where appropriate (e.g. 11318NAT – Course in Basic Wildfire Awareness).	Construction	Section 5.11.3.1
FR7	Brief fire response agencies and relevant land managers prior to each bushfire season on Project access/egress arrangements, limitations for large firefighting appliances, and areas restricted to smaller appliances. (The Tasmanian bushfire period typically extends from November to mid-May, subject to annual climate conditions and TFS advice.)	Construction	Section 5.11.3.1
FR 8	Ensure all activities during the fire danger period comply with the Tasmanian *Fire Service Act 1979* and Total Fire Ban declarations.	Construction	Section 5.11.3.1
FR 9	Ensure site access roads, tracks and roadside vegetation management comply with State Government guidelines and industry best practice for bushfire-prone areas.	Construction	Section 5.11.3.1

Ref	Management Measure (s)	Phase	EIS ref.
FR 10	Establish and maintain asset protection zones, hazard management areas, and fuel breaks consistent with State Government guidelines and best practice.	Construction	Section 5.11.3.1
FR 11	Provide sufficient static firefighting water supply and equipment fill points, scaled to the site's bushfire risk and compliant with relevant guidelines and best practice.	Construction	Section 5.11.3.1
	Aboriginal heritage values		
AH 1	The location of all confirmed Aboriginal heritage sites, plus the two legacy sites (with effective buffers), will be included in Project plans. Where practicable, these sites will be avoided in the final disturbance footprint. Where avoidance is not possible, a permit under the AH Act will be sought to relocate or disturb the affected artefacts.	Pre–construction	Section 5.13.3.1
AH 2	The location of the four PAS will be included in Project plans. Where practicable, PAS will be avoided. Where avoidance is not possible, Project staff will be made aware of their locations prior to ground disturbance and AHT's Unanticipated Discovery Plan (UDP) will be implemented if relics are encountered.	Construction	Section 5.13.3.2
AH 3	If unanticipated Aboriginal relics are discovered during works not covered by an AH Act permit, ground disturbance will cease immediately and AHT's UDP will be implemented.	Construction	Section 5.13.3.4
AH 4	All Project staff engaged in ground-disturbing works will complete cultural heritage awareness training to ensure effective implementation of the UDP.	Construction	Section 5.13.3.4
AH 5	Provide a copy of the Aboriginal heritage assessment to Aboriginal community organisations and interested individuals to support Project-level consultation.	Pre–construction	Section 5.13.3.5
AH 6	Hydro Tasmania will support additional community-led engagement, including on-Country visits, to identify cultural landscape values and potential impacts. Where practicable, outcomes will be incorporated into Project execution.	Pre–construction Construction	Section 5.13.3.5
AH 7	Requests for AH Act permits will allow sufficient time for Aboriginal community engagement, in line with AHT's *Aboriginal Heritage Standards and Procedures* (2024).	Pre–construction Construction	Section 5.13.3.5

Ref	Management Measure (s)	Phase	EIS ref.
	Visual		
VI 1	During detailed design consideration will be given to those areas where the potential significance of the Project's visual impact is assessed as moderate. Residual visual amenity impacts may be addressed through: • Use of materials with appropriate finish and colour to blend with the landscape and minimise potential for glint and glare, particularly for the surge tower. • Using non-reflective materials, black powder-coated fencing, and reducing the contrast and reflectivity of concrete elements in high-sensitivity areas. This may include: ◦ Adding dark-coloured additives to general purpose concrete mixes ◦ Applying surface colour treatments such as oxidising compounds ◦ Spray bitumen applications. • Separating topsoil from rock during excavation to enable revegetation. Applying topsoil over freshly cut rock can reduce brightness and visibility. • Shaping spoil emplacement areas using 'geoforming' methods to achieve a more naturalistic landform and support revegetation. • Varying vegetation boundaries along access tracks, roads and transmission easements to break up linearity of edges and soften visual impacts, while maintaining the minimum practicable disturbance footprint. (Note: this may not be feasible in areas with sensitive flora and fauna values.)	Detailed design	Section 5.14.3.2
	Traffic		
TI 1	A Construction Traffic Management Plan (CTMP) will be developed and implemented prior to the commencement of construction. The CTMP will set out measures, processes and responsibilities to minimise potential impacts on the community and the operation of the surrounding road network during construction. The CTMP will be developed in consultation with relevant stakeholders, including Central Highlands Council, Department of State Growth, Sustainable Timber Tasmania, emergency services, and public transport operators. Where appropriate, the plan will incorporate additional reasonable and feasible measures identified through this consultation.	Pre–construction (Preparation) Construction (implementation)	Section 5.15.4
	Economic impact		
EI 1	Develop and implement a SIMP for the pre-construction and construction phases, in consultation with government, local councils, key stakeholders, and directly affected parties. The SIMP will: • Identify desired outcomes for Tasmanian industry and business participation, social procurement, workforce training, and First Nations engagement • Define strategies, responsibilities, timing and key partners • Refer also to SI 1 for further detail.	Pre-construction (Preparation) Construction (Implementation)	Section 5.16.1.4

Ref	Management Measure (s)	Phase	EIS ref.
EI 2	Prior to construction, develop a First Nations Participation Plan (FNPP) as part of the SIMP. The FNPP will outline actions to support First Nations participation, reflecting the pillars of Hydro Tasmania's Commitment and Action Plan (CAP) (refer SI 11).	Pre–construction (Preparation) Construction (Implementation)	Section 5.16.1.4
EI 3	Develop and implement a Workforce Training and Development Plan (WTDP) for the construction phase. The WTDP will set out training, apprenticeship, traineeship and workforce development opportunities, including local and regional programs (refer SI 12).	Pre–construction (Preparation) Construction (Implementation)	Section 5.16.1.4
EI 4	Apply Hydro Tasmania's Major Projects Local Content Framework during construction. Prior to construction, prepare an Australian Industry Participation Plan (AIPP) and, where relevant, a Tasmanian Industry Participation Plan (TIPP). A Project-specific local industry action plan will: • Facilitate participation of local, regional, social and First Nations businesses in procurement opportunities. • Build capacity and capability across local industry. • Outline how supplier and subcontracting opportunities will be presented to maximise local participation. The Project will utilise the Tasmanian Industry Capability Network (ICN), vendor registration systems, local Jobs Hubs and the Tasmanian Department of Employment and Workplace Relations (DEWR) representatives to connect with local businesses.	Pre–construction (Preparation) Construction (Implementation)	Section 5.16.1.4
EI 5	Develop and implement a Local Benefits Sharing Action Plan in line with Hydro Tasmania's Major Projects LBS Strategy. The plan will identify community needs, barriers to participation, and priority initiatives, along with governance arrangements for administering the local benefits fund (refer SI 18).	Pre–construction (Preparation) Construction (Implementation)	Section 5.16.1.4
EI 6	Prior to construction, prepare a Social Procurement Management Plan (SPMP) aligned with the Major Projects LBS Strategy and the SIMP. The SPMP will: • Enhance opportunities for youth, First Nations people, migrants, women and vulnerable groups • Establish performance targets and goals for social procurement • Provide strategies for achieving and reporting against these targets.	Pre–construction (Preparation) Construction (Implementation)	Section 5.16.1.4
	Decommissioning and rehabilitation		
DR 1	A Site Rehabilitation Plan (SRP) will be prepared prior to the commencement of construction and implemented during the construction of the Project. The SRP will fulfil the minimum requirements outlined in Section 7.4.1.	Pre–construction (Preparation) Construction (Implementation)	Section 7.4.1

9 Conclusion

9.1 Overview

This Environmental Impact Statement (EIS) has presented the findings from assessments of potential impacts of the Project. The proposed redevelopment of the Tarraleah hydropower scheme in Tasmania's Central Highlands will increase the scheme's capacity from 90 megawatts (MW) to approximately 190 MW of peak capacity.

This will be achieved through a direct pressurised connection between the scheme's headwaters at Lake King William and a new power station adjacent to the existing Tarraleah Power Station on the Nive River. In addition to conveyance infrastructure (above-ground pipeline and underground tunnels) and the new power station, other key construction components include:

- A surge tower and underground surge shaft to control water pressure in the tunnels
- A pumping station and pipeline to transfer water from the existing No. 2 Pond to the new conveyance via the surge tower
- Access tunnels and portals to the underground tunnels, with associated permanent spoil emplacement areas.
- A new 14–15 km, 220 kilovolt (kV) transmission line connecting the new power station to the TasNetworks network at either Dee Lagoon or Liapootah.

Several redevelopment options were considered; however, this Project was the only option able to meet the objectives of transitioning the scheme from baseload to flexible generation, enabling inter- and intra-season generation flexibility, and addressing risks associated with aging and end-of-life assets.

Key environmental, social and economic impacts were identified through comprehensive technical investigations, assessments, and stakeholder engagement, addressing the EIS Guidelines issued by the Tasmania Environment Protection Authority (EPA) in August 2024.

Overall, the Project has been designed to minimise impacts on environmental and community values. Where impacts cannot be avoided, management measures will be applied. Key potential environmental and social impacts from construction include:

- Loss of vegetation, flora and fauna habitat from clearing above-ground components
- Impacts on groundwater-dependent vegetation communities due to localised changes in groundwater levels
- Contamination of surface and groundwater from wastewater generated by underground works and surface runoff
- Indirect greenhouse gas emissions
- Increased roadkill and reduced road user amenity from higher traffic volumes.

Operational impacts may arise from the Project's increased flexibility and capacity, which will alter how the Tarraleah scheme is operated. This will affect flows in the Nive River, River Derwent, Mossy Marsh Pond and No. 2 Pond, potentially modifying ecological processes such as habitat provision, nutrient cycling, seed dispersal and behavioural cues.

Mitigation and management measures outlined in Section 8.5 have been designed to minimise impacts as far as practicable and ensure residual effects remain within acceptable limits.

A Construction Environmental Management Plan (CEMP) will set out strategies to avoid, minimise and mitigate impacts. The CEMP will detail how commitments in this EIS and conditions of regulatory approvals will be implemented. It will be developed and implemented by an EPC Contractor appointed by Hydro Tasmania, who will oversee compliance through its Environmental Management System (EMS) and relevant approvals, licences and permits.

Social and economic benefits for the local community will be delivered through a Local Benefit Sharing Strategy and a Local Content Framework, aimed at creating jobs and business opportunities both regionally and across Tasmania. Details are provided in Section 5.9 and Section 5.16.

At the broader state and national level, the Project will provide an additional 200 Gigawatt hours (GWh) of renewable energy to the National Electricity Market (NEM), supporting Tasmania's energy security and contributing to a cleaner energy future for Australia.

9.2 Objectives of the RMPS and EMPC Act

Based on the information presented in this EIS, the Project has been assessed against the objectives of the Tasmanian *Environmental Management and Pollution Control Act 1994* (EMPC Act), as governed by the Tasmanian Resource Management and Planning System (RMPS). As detailed in Table 1.1, this assessment concludes that the Project is consistent with the following objectives.

Table 9.1: Compliance with EMPC Act objectives

Objectives (EMPC Act, Schedule 1)	Comment
Part 1 – Objectives of RMPS	
To promote the sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity	The Project will facilitate generation of hydropower to promote renewable energy development in a sustainable manner. Hydro Tasmania is managed in accordance with its ISO 14001 certified EMS as well as its Environmental Policy and Sustainability Principles. Environment and Social Governance (ESG) Objectives have been developed for the Project (refer to Table 1.1). The Project will be constructed in accordance with Hydro Tasmania's appointed EPC Contractor's EMS including the preparation and implementation of a CEMP and Sustainability Management Plan (SMP) (refer Sections8.1 to 8.3).
To provide for the fair, orderly and sustainable use and development of air, land and water	The Project provides for the sustainable use of land and water by redeveloping the existing Tarraleah hydropower scheme to increase its capacity as well as operational flexibility and efficiency to meet the future needs of the NEM. A number of alternatives, including the re-use of existing infrastructure were assessed but found not to effectively address the reliability and inflexibility risks associate with the operation of the existing scheme (refer Chapter 3). The Project will use water and other resources sustainably to promote renewable energy generation.

Objectives (EMPC Act, Schedule 1)	Comment
To encourage public involvement in resource management and planning	The public has been and will continue to be involved in the Project development process. A comprehensive stakeholder consultation and engagement program has been undertaken by Hydro Tasmania as an integral part of the Project's development. The engagement program included consultation with neighbouring landowners, local government, community groups and other interested parties. Concerns, opportunities and expectations of Hydro Tasmania associated with the Project have been addressed in this EIS and associated plans. Planned future engagement encourages public involvement in the Project and will include continued communication across various media, including a dedicated project webpage, as well as targeted and broad engagement activities (refer Chapter 4).
To facilitate economic development in accordance with the objectives set out above (objectives (a), (b) and (c))	The Project will facilitate economic development by generating economic activity throughout both its construction and operation contributing to the local, regional and Tasmanian economy. The direct and indirect effects of the Project across all Project stages is anticipated to contribute $2.98 million to the total value of all goods and services in the region and 515 full-time-equivalent (FTE) job-years to the regional economy. The overall economic impact of the Project is anticipated to be positive (refer to Section 5.16). The Project is expected to provide a range of other economic opportunities including providing skills, training and procurement opportunities. These will generate additional dispatchable capacity which will increase the opportunity to export electricity (increased revenue for Government Business Enterprise [GBE] Hydro Tasmania), exert downward pressure on wholesale electricity prices and support the development of other renewable energy development projects. Hydro Tasmania has also developed a Local Benefits Sharing Strategy support local and regional community-initiated initiatives.
To promote the sharing of responsibility for resource management and planning between the different spheres of government, the community and industry in the state	The Project is being developed by Tasmanian GBE Hydro Tasmania, which is Australia's leading clean energy business, largest water manager, and largest generator of renewable energy. The Project will be assessed by the Tasmanian EPA and Central Highlands Council (CHC). The assessment process includes engagement with relevant statutory authorities and provides opportunity for community input. If approved, the Project will be operated in accordance with Hydro Tasmania's special licence under the Tasmanian *Water Management Act 1999* (WM Act). A special licence allows Hydro Tasmania to use water resources in Tasmania for electricity generation.
Part 2 – Objectives of EMPC Act	
To protect and enhance the quality of the Tasmanian environment	The Project has been designed to avoid environmental impacts where possible. Where avoidance is not possible, potential adverse impacts from the construction and operation of the Project have been mitigated (refer Chapter 8). Residual environmental impacts (that cannot be avoided or mitigated) are proposed to be minimised by adaptive management (water quality, roadkill) or offsetting (*Sphagnum* peatland).

Objectives (EMPC Act, Schedule 1)	Comment
To prevent environmental degradation and adverse risks to human and ecosystem health by promoting pollution prevention, clean production technology, reuse and recycling of materials and waste minimisation programs.	The management measures outlined in Chapter 8 have been designed to prevent pollution and minimise harm, therefore limiting adverse impacts to human and ecosystem health. Potential waste sources from the construction and operation of the Project have been identified, and mitigation measures developed in accordance with the waste management hierarchy of avoid, reuse, treatment, recycle, recovery and disposal (refer Section 5.10). Hydro Tasmania has developed the *Major Projects Circular Economy Framework* that will be implemented for the Project. The objective of the framework is "*to minimise waste, maximise resource efficiency, and support an emerging circular economy industry in Tasmania by adopting and demonstrating the value of circular economy principles in major construction projects*". The operation of the Project promotes the clean production of electricity through hydropower generation.
To regulate, reduce or eliminate the discharge of pollutants and hazardous substances to air, land or water consistent with maintaining environmental quality	Potential pollution of local waterways has been identified as a potential impact from the construction of the Project and will be mitigated through the development and implementation of a comprehensive Water Management Plan (WMP) (refer Section 5.1.3.1) Construction of the Project has potential to discharge pollutants into local waterways and generate dust and noise. The potential discharge of pollutants will be mitigated through the development and implementation of a comprehensive WMP and Groundwater Management Plan (GMP) (refer Sections 5.1.3.1 and 5.2.3.1) The generation of dust and noise will only occur over the course of construction and hence will only generate temporary impacts. There are no modelled impacts from dust or noise to receptors in other ownership and dust and noise mitigation measures have been developed to manage localised impacts (refer Sections 5.5 and 5.6).
To allocate the costs of environmental protection and restoration equitably and in a manner that encourages responsible use of, and reduces harm to, the environment, with polluters bearing the appropriate share of the costs that arise from their activities	Hydro Tasmania will be responsible for the cost of environmental management and monitoring throughout all of the Project's development phases. Hydro Tasmania will pay for and manage an offset to mitigate potential residual impacts to the patch of *Sphagnum* peatland (a Threatened Ecological Community (TEC)) near Mossy Marsh. In the event that any pollutants are released into local waterways as a result of the Project, Hydro Tasmania will bear the cost of remediation in line with the polluter pays principle. An Emergency Response Plan (ERP) will be prepared prior to the commencement of construction to manage accidental release of pollutants (refer Section 5.7.2.1).
To require persons engaging in polluting activities to make progressive environmental improvements, including reductions of pollution at source, as such improvements become practicable through technological and economic development	There are no potentially polluting activities associated with the operation of the Project. Management measures are proposed to avoid potential polluting activities associated with the construction of the Project. These measures will be refined prior to and during construction (if required) and will reflect best practice environmental management. Project construction will result in both direct and indirect greenhouse gas emissions; however, over the lifetime of the Project the emissions avoided by the additional hydroelectricity generated will be 13 times greater than the emissions created during the construction, maintenance and operation (Refer Section 5.8).

Objectives (EMPC Act, Schedule 1)	Comment
To provide for the monitoring and reporting of environmental quality on a regular basis	Monitoring of proposed management measures is outlined in Chapter 6 and are designed to measure the effectiveness of management measures and controls implemented throughout the Project. The results of monitoring will be regularly reported as outlined in Chapter 6. In addition, the Project's CEMP and sub-plans will contain monitoring, reporting and auditing requirements for environmental performance and quality.
To control the generation, storage, collection, transportation, treatment and disposal of waste with a view to reducing, minimising and, where practicable, eliminating harm to the environment	The Project has identified strategies to effectively collect, store, transport, treat and dispose of waste generated throughout construction. Waste management is described in Section 5.10.
To adopt a precautionary approach when assessing environmental risk to ensure that all aspects of environmental quality, including ecosystem sustainability and integrity and beneficial uses of the environment, are considered in assessing, and making decisions in relation to, the environment	In the preparation of this EIS, a precautionary approach has been adopted in assessing the potential for environmental and social impacts. Detailed site investigations have informed the management measures, many of which include preventative actions with the intent of reducing future risks, ultimately helping focus decision-making frameworks where risks may cause uncertainties in future. Examples include, offsetting potential impacts to a *Sphagnum* peatland vegetation community (refer Section 5.3.3.3), establishing flow mitigation to maintain environmental values in the Tasmanian Wilderness World Heritage Area (TWWHA) (refer Section 5.4.3), implementing bushfire hazard protection zones (refer Section 5.11), establishing exclusion zones for threatened flora (refer Section 5.3.3.4).
To facilitate the adoption and implementation of standards agreed upon by the state under inter-governmental arrangements for greater uniformity in environmental regulation	National, state and local strategic objectives and plans to support renewable energy development throughout Australia have been considered in the preparation of this EIS. The strategic context, relevant regulatory obligations and the approvals status of this Project are detailed in Section 1.4. Specific regulatory standards and guidelines have been applied to relevant technical areas throughout this EIS and used to support methods for assessing impacts.
To promote public education about the protection, restoration and enhancement of the environment	The implementation of comprehensive stakeholder consultation and engagement programs are an integral part of the Project development process. Engagement to date has included project socialisation and issue scoping in which awareness has been raised amongst the public, educating them on the Project and its benefits for Tasmania's energy future. This EIS will be placed on public exhibition in line with the requirements of the EMPC Act and the RMPS. As such, the public will have access to the technical surveys and studies completed for the Project and understand how Hydro Tasmania will minimise adverse impacts to protect the Tasmanian environment. Hydro Tasmania is committed to maintaining ongoing open communication with local communities and the general public to ensure they are provided with the opportunity to openly voice their concerns and opinions. Public consultation completed to date and planned is described in Chapter 4.

Objectives (EMPC Act, Schedule 1)	Comment
To co-ordinate all activities as are necessary to protect, restore or improve the Tasmanian environment	Technical specialists across a range of disciplines have been engaged throughout the preparation of this EIS. Through their collaboration, co-ordination and knowledge sharing, a comprehensive set of management and monitoring measures has been developed that reflect best practice environmental management principles which aim to protect and promote the Tasmanian environment.

9.3 Concluding statement

The Tarraleah hydropower scheme was a visionary project built in the 1930s. For more than 85 years, it has generated clean energy and today supplies around 7.3% of Tasmania's electricity.

The scheme is now nearing the end of its operational life. Planning for its future provides Hydro Tasmania with the opportunity to transform the scheme—ready to deliver clean, reliable energy for another generation and return even greater value to Tasmania.

As the NEM continues to transition to renewable generation, greater flexibility and firming capacity will be essential. The Project supports this transition by redeveloping the Tarraleah scheme to increase peak capacity and improve operational flexibility and efficiency, while continuing to deliver reliable, clean energy for Tasmanians.

The Project will be assessed by the EPA under the requirements of the EMPC Act. This EIS has been prepared in accordance with the Act and the Project-specific EIS Guidelines issued by the EPA. Hydro Tasmania has, to the best of its ability, assessed all matters that may affect the natural environment and local communities during both construction and operation. The Project is expected to have an operational life of 80–85 years. Before decommissioning, a Decommissioning and Rehabilitation Plan will be prepared to ensure the site is left safe, stable and non-polluting.

Technical experts have provided recommendations to avoid adverse impacts where possible, and where unavoidable, comprehensive management measures have been developed. These will be implemented through a CEMP, ensuring impacts are reduced to acceptable levels and that legislative requirements, Hydro Tasmania's Environmental Policy, Sustainability Principles and Major Projects ESG Framework are met.

Potential environmental and social impacts will be avoided where possible, and managed and monitored where avoidance is not feasible.

Overall, the Project is expected to deliver a net environmental benefit to Tasmania by expanding long-term renewable energy capacity and contributing to national efforts to reduce energy-related carbon emissions.

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