
Volume 3

Chapter 5

Summary of environmental effects in the marine environment

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This chapter provides a summary of the anticipated effects of the project's construction, operation and decommissioning on the marine environment in Victorian and Commonwealth waters. This includes anticipated impacts on MNES in Tasmanian, Commonwealth and Victorian waters. It also addresses underwater cultural heritage values protected by the *Underwater Cultural Heritage Act 2018* (Cwlth) in Tasmanian waters. Values protected by Tasmanian legislation are addressed in the separate EIS document prepared for the shore crossing.

5.1 Project activities

In the marine environment, the project components consist of subsea cables spanning approximately 255 km from the Tasmanian shore crossing to the Victorian shore crossing. Construction of the project in the marine environment will involve activities to install the subsea cables. The project will be delivered in two stages for the subsea cables. Stage 1 will involve all civil works and laying of the stage 1 cables. Stage 2 will involve laying of the stage 2 cables, and testing and commissioning. The cables will be buried in shallow trenches across Bass Strait and will connect to the land cables in both Tasmania (at Heybridge) and Victoria (at Waratah Bay). They will be connected to the land cables via boreholes drilled using HDD.

The subsea cables will be laid by a cable lay vessel that is accompanied by guard vessels enforcing a mobile exclusion zone around the cable lay vessel. The subsea cables will be buried to a nominal depth of 1 m (ranging from 0.5 m to 1.5 m), mostly via jet-trenching. Rock mattresses or armouring may be required for crossing preexisting cable infrastructure and where hard seabed would prevent jet-trenching reaching the nominal cable depth of 1 m.

The project is intended to operate 24 hours per day, 365 days per year over an anticipated minimum 40 year operational lifespan. Cable monitoring systems will be installed to identify the location of any subsea cable faults and seabed inspections using an ROV will occur periodically. No permanent exclusion zones will be established over the subsea cables.

At the end of its operation, the project will either be decommissioned or upgraded to extend its operation. Requirements at the time will determine the scope of decommissioning activities and management of resulting impacts. Decommissioning activities will be minimal if the project is left in situ. If the subsea cables are removed, decommissioning activities will be similar to those during construction, although with lesser physical disturbances expected.

5.2 Method

Detailed technical studies were undertaken to assess the impacts of the project during construction, operation and decommissioning, and are provided as appendices to this EIS/EES. The technical studies adopted a range of methods to assess the project's potential impacts and opportunities. Applicable legislation, policy, guidelines, and community consultation informed studies in addressing the EIS assessment guidelines and EES scoping requirements.

Technical studies were informed by characterising the existing conditions to identify values that could be impacted. Technical specialists completed a range of activities including field inspections, targeted surveys, modelling, research, and stakeholder and community engagement, and drew on their experience to assess project impacts and identify opportunities.

Avoidance of impacts has been maximised through route selection and project design, particularly in relation to avoiding rocky outcrops that could provide habitat for marine communities. Potential impacts of the project were then assessed based on the proposed design and construction method. Where the impact assessment has identified the need to reduce impacts, the project is applying an outcomes-based approach through the preparation of EPRs. EPRs set out the environmental outcomes that must be achieved through implementing mitigation measures during construction, operation and decommissioning of the project, regardless of the final design adopted.

5.3 Existing environment

Bass Strait extends from Heybridge to Waratah Bay, with weak tidal currents in the nearshore regions, complex large-scale currents offshore, a high wave climate, and temporal and spatial ranges in water temperature. Surface water currents move eastward from the Great Australian Bight into Bass Strait in winter where a northward current directs it towards Victoria. The average depth of Bass Strait is 50 m and the maximum depth is 90 m.

There is similar seasonal variability in water quality for both offshore Bass Strait and nearshore Victoria. In both areas, water temperature and salinity were higher in summer, whereas turbidity and chlorophyll-a concentration were higher in winter. These conditions support low-level activity of primary and secondary plankton species across Bass Strait.

The seabed comprises fine sands and coarse to very coarse silts in offshore Bass Strait, and coarse and fine sands in Waratah Bay. The benthic environment in Waratah Bay also includes small patches of gravel and isolated, low-profile reefs. These conditions support sparse to moderate coverage of seagrass, including Tasman grass-wrack (*Heterozostera tasmanica*), which is the only threatened flora species identified in the marine study area. At the proposed landfall in Waratah Bay, the seabed is primarily sandy. The benthic environment in offshore Bass Strait supports sparse patches of flora as well as evidence of epibiota activity.

While the project alignment does not intersect any marine protected areas, the following are in the vicinity:

- Shallow Inlet Coastal Reserve
- Wilsons Promontory marine park
- Corner Inlet Marine National Park
- Nooramunga Marine & Coastal Park
- Beagle Commonwealth Marine Reserve.

The project alignment will intersect biologically important areas for five threatened and listed species including Southern right whale, pygmy blue whale, short-tailed shearwater, shy albatross and great white shark.

The marine ecology technical study determined a likelihood of occurrence, in the study area, of 'possible or greater' for 46 species protected under the EPBC Act, 22 of which are also protected under the FFG Act. An additional nine species are protected only under the FFG Act (see Table 2-1 of Volume 3, Chapter 2 – Marine ecology for a full list of species). These protected species comprise birds, cetaceans, fish, pinnipeds and turtles.

Seven invasive marine species have a 'possible' or higher likelihood of occurring in the study area. These are:

- yellowfin goby
- Asian date mussel
- European clam
- East Asian bivalve
- Northern Pacific sea star
- rough sea star
- European shore crab.

Several shipping routes will intersect the project alignment. These are made up of merchant ships, commercial fishing vessels and passenger ferries.

Eight commercial fisheries have been active in the study area during the last 10 years, as well as recreational fishing of various fish species.

Other recreational activities occur in the study area including boating and swimming. These are expected to be more prominent in summer months and concentrated at key locations including Shallow Inlet Marine and Coastal Park east of the project landfall in Waratah Bay.

The study area has existing subsea infrastructure consisting of an HVDC cable and two telecommunications cables.

The underwater cultural heritage technical study included dive surveys at selected locations in both Tasmanian and Victorian nearshore sections in water depths up to 30 m. The locations for diving were identified by the review of geophysical data, maps and relevant literature. No cultural heritage sites were identified at the dive locations. The Victorian shore crossing alignment changed locations after dive surveys were complete however the alignment has been located to avoid anomalies identified through the geophysical surveys. In deeper water the anomalies have not been inspected or verified to be cultural heritage, however the alignment has been selected to also avoid these locations.

The assessment also identified two submerged landscape features (an estuarine channel and beach ridge landforms) in the offshore section of the study area that have the potential to hold Aboriginal cultural heritage artefacts and intangible heritage value. An additional submerged landscape feature with potential Aboriginal cultural heritage value, a beach ridge strandplain, was identified approximately 3 km from the Victorian shoreline. The beach ridge strandplain is between 17 and 22 m water depth and approximately 1.5 km wide.

5.4 Effects of construction

Construction activities in the marine environment will disturb the upper seabed layers of sediment along the project alignment. Physical disturbance of the seabed will not materially impact (i.e., no impact level greater than moderate) marine resource use, marine ecology or marine cultural heritage values as the area of disturbance is relatively small and the impacts temporary. The physical disturbance and changes in water quality generated by construction in the nearshore and offshore environment will impact a small area and be short-term. The seabed is expected to recover, as observed on other subsea cable projects, such as Basslink. Project vessels will cause temporary noise disturbance to marine fauna.

Project construction impacts to marine resources are mostly attributed to the mobile exclusion zone formed around the cable lay vessel, meaning that marine users cannot pass through or use these areas during construction. The exclusion zone will be temporary and move transiently across Bass Strait. Any resultant disruption to marine users will be mitigated by implementing a marine communication plan and keeping fisheries and other marine users informed with location and timing of works.

The project's subsea cables will cross the Alcatel Submarine Networks Indigo Central and Telstra's Bass Strait 1 subsea telecommunication cables. MLPL will develop a cable crossing management plan in consultation with owners of the third-party infrastructure.

The cable will also cross the disused tiioxide pipeline from the former Tioxide Australia Plant that was located on the Heybridge converter station site. Measures will be implemented to minimise disturbance to contaminated sediments associated with the disused tiioxide pipeline.

Project construction impacts at the shore crossing involve physical disturbances and short-term increases in suspended sediments to a relatively small area in the context of the habitat available for marine communities in Bass Strait. Impacts on flora and fauna will be low, and benthic habitats are expected to recover. The project will mitigate its impacts from shore crossing drilling through measures to comply with EPRs that reduce the likelihood of releasing drilling fluid into the environment and extract cuttings before they can be released to the marine environment.

A moderate noise impact from the cable lay vessel may occur to high-frequency cetaceans, as this will involve underwater noise exceeding the threshold for the onset of permanent hearing loss or injury. However, this is highly unlikely to occur as, for this impact to occur, the cetacean must remain within the relatively small noise impact zone (67 m from the vessel) for at least an hour, a highly conservative worst-case scenario assumed in the noise modelling. High-frequency cetaceans can sense the noise gradient created by the cable lay vessel and are expected to avoid the noise. If a high frequency cetacean's response to sensing the noise gradient is to leave the area, the PTS onset distance will be less than 1 metre from the cable lay vessel. In this case the impact is low, which is a more realistic assessment.

Noise and vibration impacts to other marine fauna (i.e., fish, turtles, birds, invertebrates) are very low to low, as impacting noise levels will only be reached close to the cable lay vessel and impacting noise frequencies are mostly outside the frequency range produced by the cable lay vessel. Further, construction noise sources will be transient. Defined precaution zones under EPRs with species-specific management plans will be implemented to mitigate noise and vibration impacts.

The impact from artificial lighting during project night-time construction is very low to low given the temporary and short-term nature of the light source. Impacts to marine birds, fish and invertebrates are expected to be mitigated by directing project vessel lighting inboard and downward (where safe and practicable to do so).

Ballast water and hull fouling of project construction vessels have potential to introduce or translocate IMS to Bass Strait. To avoid the spread of IMS, the project will implement a ballast water management plan in line with Commonwealth and international legislation, guidelines and conventions. The effectiveness of well-established ballast water and hull fouling measures, and the relatively low number of international project vessels results in a very low to low risk of the project spreading IMS.

The Tasman grass-wrack seagrass (listed as endangered under the FFG Act) is the only threatened flora species that the project may intersect. The total potential disturbance area for Tasman grass-wrack from cable trenching and burial construction activities is 3,100 m², which is 0.028% of the 11 km² of total habitat for the species in Waratah Bay. The total potential disturbance area for Tasman grass-wrack from shore crossing construction activities is 18 m² which is 0.0002% of 11 km² of total habitat for the species in Waratah Bay. Overall, the project is not likely to impact the recovery of threatened species or communities and will not have a significant impact on the species. Direct and indirect impacts caused by the project can be avoided or managed through the implementation of measures to comply with EPRs. Project construction impacts to marine ecology are mostly low or very low, including potential impacts to MNES.

Project construction impacts to maritime and Aboriginal cultural heritage may occur due to seabed disturbance. The three assessed submerged landform features in Bass Strait (beach ridges, estuarine channel and beach ridge strandplain) potentially contain Aboriginal cultural heritage artefacts. In the case of the estuarine channel and beach ridges, which are in the offshore section of the study area, any artefacts are expected to be deeper than the 1.5 m maximum impact depth of construction activities. Consequently, impacts to artefacts in the beach ridges are highly improbable, and almost impossible in the estuarine channel, as the estuarine channel is more deeply submerged. Impacts at the beach ridge strandplain are almost impossible, as artefacts at this landform will have been displaced or damaged following inundation. Impacts will be primarily managed through the development and implementation of an unexpected finds

protocol and obtaining sufficiently detailed information about the beach ridges for assessment by a qualified maritime archaeologist.

Most impacts to unverified potential cultural heritage features identified on the seabed will not occur if the project alignment is realigned to avoid them, while impacts from project vessel anchoring will be highly improbable. In instances where realignment is not feasible, impacts to potential maritime cultural heritage values are low and unlikely, as visual inspection and heritage value assessment will be conducted, and mitigation measures to comply with EPR UCH02 will be implemented. Impacts to potential maritime heritage, such as shipwrecks and vessel discards, will be avoided or mitigated by implementing a UCHMP in line with EPR UCH04.

5.5 Effects of operation

During operation, the subsea cables will be buried below the seabed, except where hard substrate necessitates rock mattresses or armouring. Project operation is expected to cause low level environmental impacts.

Project operation will generate electromagnetic fields, which will have a low impact on vessels using magnetic compass navigation in Bass Strait. Electromagnetic field interference with magnetic compass would occur only in very shallow waters, where vessels are likely to use visual means for navigation. Compass disturbance would occur briefly as the vessel crosses the cables.

Adopting a modern HVDC cable design, which is mostly buried about 1 m under the seabed, will minimise the electromagnetic and thermal fields generated. Impacts to magnetosensitive fauna, including cetaceans, sea turtles, seals, fish and invertebrates were all found to be very low to low, due to the low magnetic flux above the cables, and the ability of these fauna to pass over the cables unimpeded as observed in studies for other HVDC interconnectors.

Underwater noise impacts will be lower during operations than construction, as only periodic cable inspections and maintenance will occur with ROVs and support vessels, with fewer vessel movements than the construction period.

Where rock armour or rock mattresses are installed to protect the subsea cable, it is possible that seabed scouring may occur along the toe of the armour or mattress. The loss of sediment could expose underwater cultural heritage features or bury adjacent features. It is highly unlikely that scouring will impact any underwater cultural heritage as rock armour and mattresses will only be installed in small rocky sections of the alignment that are likely to be resistant to scouring.

5.6 Effects of decommissioning

The operational lifespan of the project is a minimum 40 years. At this time the project will be either decommissioned or upgraded to extend its operational lifespan.

Decommissioning will be planned and carried out in accordance with regulatory requirements at the time. A decommissioning management plan will be prepared prior to planned end of service and decommissioning of the project that outlines how activities will be undertaken and impacts will be managed.

Requirements at the time will determine the scope of decommissioning activities and impacts. The key objective of decommissioning is to leave a safe, stable and non-polluting environment, and minimise impacts during the removal of infrastructure.

Decommissioning of project infrastructure will implement the waste management hierarchy principles of avoid, minimise, reuse, recycle and appropriately dispose. Waste management will be in accordance with applicable legislation at the time.

Decommissioning activities may include recovery of subsea cables and removal of rock armouring or mattresses. Alternatively, the subsea cables may be left in situ. The conduits and shore crossing ducts would be left in-situ as removal would cause significant environmental impact.

A decommissioning management plan will be prepared to outline how activities will be undertaken and potential impacts managed.

5.7 Conclusion

Construction activities in the marine environment will be short term and transient as the cable laying process progresses across Bass Strait. Avoidance of impacts has been maximised through selection of the route and design of the project. The project commissioned several technical studies to understand the local environmental conditions and explore further potential impacts, which include both desktop and field assessments.

During construction, activities to facilitate cable laying are the main potential impact source. Impact pathways include marine sediment disturbance, mobile exclusion zones and noise pollution. The resultant disturbance areas are mostly temporary and in small areas.

Project operation has fewer impact pathways than during construction. Those that may occur include electromagnetic and thermal fields generated by the cable, and scouring from rock armour or concrete mattresses installed where jet trenching is not feasible. The resultant impacts are not expected to be significant as modern HVDC cable design minimises the electromagnetic and thermal fields produced. The predicted magnetic flux and heat above the cables is predicted to be low.

Impacts during decommissioning will be less than during construction. Decommissioning activities will be planned and carried out in accordance with regulatory requirements at the time of decommissioning with the

key objective of leaving a safe, stable and non-polluting environment. A decommissioning plan will be prepared and approved under the relevant legislation at the time.

Impact pathways during decommissioning will depend on whether the subsea cables are removed or left in-situ after its expected operation period. If the cables are left in situ no impacts are expected to occur, however the location of the cable will need to continue be communicated to marine users to avoid anchoring in that area. If the cables are removed, impact pathways will reflect those during construction.

To avoid and minimise impacts that may occur during construction, operation and decommissioning of the project, a series of EPRs were developed. The EPRs establish the environmental outcomes that must be achieved and promote the implementation of site-specific design solutions and mitigation measures.

Following successful implementation of measures to comply with EPRs, impacts from construction, operation, and decommissioning of the project to marine environment values (including MNES) are expected to be avoided, or reduced to manageable levels.