SECTION 6 - POTENTIAL IMPACTS AND THEIR MANAGEMENT

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6. Potential impacts and their management

This section outlines the assessment approach for the EIS, identifies and assesses the potential impacts of the proposal, and outlines the proposed mitigation, management and monitoring measures that would be implemented.

Identifying and assessing impacts

The impacts assessed for the proposal consider a suite of environmental and social aspects. The EPA Board identified these aspects in the EIS guidelines it published for the Heybridge Converter Station. A copy of the EIS guidelines for the proposal, and where the requirements have been addressed is provided in full in Appendix A, with relevant EIS guidelines for each environmental and social aspect summarised within that section. Where there is cross-over between sections to address related issues (i.e., water quality is addressed in more than one section, as is contaminated materials), this is identified at the start of each section.

Whilst the steps required for the identification and assessment of issues is broadly the same across the technical disciplines, the approach to the impact assessment and the cumulative impact assessment is discussed in more detail below. A detailed assessment methodology for each technical assessment is explained in the relevant technical Appendix.

Methodology

The preparation of this EIS has involved technical specialists assessing aspects across various environmental and social disciplines. Four different impact assessment methods have been used to assess direct and indirect impacts, depending on the technical discipline, environmental, cultural and social context, and statutory requirements. These methods are:

- **Significance assessment.**
- **Risk assessment.**
- **Compliance assessment.**
- **Discipline specific methods.**

A *significance assessment* evaluates the sensitivity of a value to change and the magnitude of an impact on the value. This method assumes an impact would occur, with mitigation focussing on reducing the magnitude of an impact.

The benefit of using the *significance method* is that it requires an explicit assessment of the sensitivity of the value which is useful where there is uncertainty about the sensitivity of a value or how it would respond to a change.

A *risk assessment* considers the likelihood of environmental harm occurring (i.e., the likelihood of an event, mechanism, or pathway existing and, when considered together with the hazard, resulting in harm to the

environment) and the consequences of this harm, considering the sensitivity of the value to change, to determine the risk of environmental harm.

A *risk assessment* is beneficial when there is more certainty about the sensitivity of values and how they would respond to change, and where there is an ability to manage the likelihood of environmental harm occurring, for example by avoiding the event or pathway.

The *compliance assessment method* is adopted where the study approach relies on compliance with a statutory guideline or policy, e.g., water and air quality guidelines.

Some studies adopt *discipline specific methods* where they are standards or technical guidelines. Examples are GHG estimates and bushfire assessments, which are done in accordance with national reporting standards and guidelines, emanating from inquiries and reviews into bushfire disasters.

The method used in each technical study was determined by the technical specialists considering the context, environmental values, proposed activities, statutory requirements and guidelines.

The key steps for the impact assessments are:

- Assessing existing conditions and identifying relevant values.
- Reviewing the project description and identifying credible impact pathways – where project activities could result in an impact on the value.
- Assessing the potential impacts of activities undertaken for the project on the values.
- Where a need is identified to reduce impacts, developing management measures that reduce the impacts.
- Assessing the residual impacts on values.

Further explanation of each method and when and how they are applied in the technical studies are provided below.

Identifying values

The basis of an impact assessment is identifying the values potentially affected by a project. Values encompass the qualities, characteristics and conditions of the physical, biological, social, cultural and economic environments. This forms the basis of the characterisation of the existing environment or ‘existing conditions’. A value is:

- A quality or physical characteristic of the environment that is important to ecological health; public benefit (or amenity), safety or health.
- A quality of the environment identified and declared to be a value under environmental legislation.

Changes due to the construction, operation or decommissioning of the project that affect these values are the impacts assessed in this EIS. Impacts can be both positive and negative, and the technical studies have considered if both could occur.

Impact pathways

For harm to values to occur, an impact pathway must exist between the proposal and the value. This considers the following:

- **Hazardous activity**: The proposal could cause harm or damage (an impact) to an identified value.
- **Mechanism**: The event that enables or triggers the hazard to cause harm or damage to an identified value.
- **Pathway**: The physical route from the hazard to the value such as through the ground, air or water.

Once the impact pathway has been identified, the impact would be assessed by a significance or risk assessment.

A risk is a hazardous event, situation or activity that poses a threat to a value. A risk assessment considers the likelihood and the consequence of the hazardous event occurring.

An impact is the effect of an action or hazardous event. An impact assessment considers the mitigation measures required to avoid, minimise, offset or manage an impact together with the sensitivity of the value and the magnitude of the impact.

Further explanation on the application of significance, discipline specific, compliance and risk assessments is discussed below.

Impact assessment methods

Table 6-1 sets out the impact assessment method applied for each technical study. Further details of how the method has been applied and why it is appropriate for the technical study is provided in the respective appendices to this EIS.

Table 6-1 Application of assessment method by technical study

Technical study	Assessment method
Contaminated land and acid sulfate soils	Risk
Terrestrial ecology	Significance
Noise and vibration	Risk
Surface water	Risk
Groundwater	Significance
Air quality	Risk
Electromagnetic fields (EMF) and electromagnetic interference (EMI)	Compliance
Greenhouse gas	Discipline specific
Social	Significance
Economic	Discipline specific
Bushfire	Discipline specific
Traffic and transport	Significance and risk

Significance assessment

This method considers the significance of an impact on the value by evaluating the magnitude of an impact, and the sensitivity of the value to change. This approach assumes the impact would occur due to the actions taken for the proposal (i.e., a hazard, event or mechanism and pathway exist and are credible) and mitigation focuses on reducing the magnitude of an impact.

The sensitivity of a value is determined with respect to its protection status, intactness, uniqueness or rarity, resilience to change, replacement potential and community value. These contributing factors are described below:

- **Protection status** is assigned to a value by governments (including statutory and regulatory authorities) or recognised international organisations (e.g., United Nations Educational, Scientific and Cultural Organization) through legislation, regulations and international conventions.
- **Intactness** is an assessment of how intact a value is. It is a measure (with respect to its characteristics or properties) of its existing condition, particularly its representativeness.
- **Uniqueness** or rarity of a value is an assessment of its occurrence, abundance and distribution within and beyond its reference area (e.g., bioregion/biosphere).
- **Resilience** to change is determined by the extent to which a value can cope with change including that posed by threatening processes. This factor is an assessment of the ability of a value to adapt to change without adversely affecting its conservation status, intactness, uniqueness or rarity.
- **Replacement potential** is the potential for a representative or equivalent example of the environmental value to be found to replace any losses.
- **Community value** is the community infrastructure, assets, places and values of importance and concern to the community in which a project is proposed to be located. This factor also considers what is currently provided for the community (e.g., road capacity, community facilities, open space areas, etc.) and how it could be affected by a project.

The model criteria for determining sensitivity are set out in Table 6-2. These criteria were amended to be specific for each of the technical studies.

Table 6-2 Model sensitivity criteria

Sensitivity level	Criteria
Extremely sensitive	The value is listed on a recognised or statutory state, national or international register, or is protected under legislation, regulations or guidelines as being of very high significance (e.g., critically endangered). The value is intact and retains its intrinsic value.
	It is unique. It is isolated to the affected system/area which is poorly represented in the broader region, territory, country or the world.
	It is fragile and predominantly unaffected by existing threatening processes. Small changes would lead to substantial changes to the prescribed value.
	It is not widely distributed throughout the system/area and consequently would be difficult or impossible to replace.

Sensitivity level	Criteria
Very sensitive	The value is listed on a recognised or statutory state, national or international register, or is protected under legislation, regulations or guidelines as being of high significance (e.g., endangered).
	The value is relatively intact and retains most of its intrinsic value.
	It is locally unique to the environment or community in which it occurs, with few regionally available alternatives.
	It is predominantly unaffected by existing threatening processes. Small changes would lead to changes to the prescribed value.
	It is not widely distributed throughout the system/area and consequently recovery potential would be limited.
Sensitive	The value is listed on a recognised or statutory state, national or international register, or is protected under legislation, regulations or guidelines as being of moderate significance (e.g., vulnerable).
	The environmental value is in a moderate to good condition despite it being exposed to threatening processes. It retains many of its intrinsic characteristics and structural elements.
	It is relatively well represented in the systems/areas in which it occurs, but its abundance and distribution are limited by threatening processes.
	Threatening processes have reduced the environmental or social value's resilience to change. Consequently, changes resulting from project activities may lead to degradation of the prescribed value.
	Replacement of unavoidable losses is possible due to its abundance and distribution.
Not very sensitive	The value is not listed on a recognised or statutory state, national or international register, or is protected under legislation, regulations or guidelines as being of significance.
	It is in a poor to moderate condition as a result of existing threatening processes which have degraded its intrinsic value.
	It is not unique or rare and numerous representative examples exist throughout the system/area.
	It is less widely distributed throughout the host systems/areas.
	There is slight detectable response to change of the value but can quickly recover.
	The abundance and wide distribution of the value ensures replacement of unavoidable losses is assured.
Not sensitive	The value is not listed on any recognised or statutory register. It is not recognised locally by relevant suitably qualified experts or organisations e.g., historical societies.
	It is in a poor condition as a result of existing threatening processes which have degraded its intrinsic value.
	It is not unique or rare and representative examples exist abundantly throughout the system/area.
	It is abundant and widely distributed throughout the host systems/areas.
	There is no detectable response to change, or change does not result in further degradation of the value.

The magnitude of an impact on a value is assessed by considering:

- **Geographical extent**: Assessment of the spatial extent of the impact where the extent is defined as site, local, regional or widespread (meaning state-wide or national or international).
- **Duration of the impact**: The timescale of the effect i.e., if it is short, medium or long term.
- **Severity of the impact**: Assessment of the scale or degree of change from the existing condition, as a result of the impact. This could be positive or negative.

The magnitude of impact was assessed for all credible impact pathways i.e., where a project activity may lead to an impact on a value.

The model criteria for determining severe, high, moderate and low impacts are set out in Table 6.3. These criteria were amended to be specific for each of the technical studies.

Table 6-3 Model magnitude criteria

Magnitude level	Criteria
Severe	• An impact that causes permanent changes to the physical, ecological, or social environment and irreversible harm to values or consequences of the impact are unknown and management controls are untested. • Causes major public outrage, sustained widespread community complaints. Prosecution by regulatory authorities. Avoidance through appropriate design responses is required to address the impact.
Major	• An impact that is widespread, long lasting and results in substantial change to the value either temporary or permanent. • Can only be partially rehabilitated or uncertain if it can successfully be rehabilitated. • Causes major public outrage, possible prosecution by regulatory authorities. • Appropriate design responses are required to address the impact. • Receives widespread local community complaints and lasting effects on the social fabric of a community.
Moderate	• An impact that extends beyond the operational area to the surrounding area but is contained within the region where the project is being developed. • The impacts are short term and result in changes that can be ameliorated with specific management controls. • May receive local community complaint.
Minor	• A localised impact that is short term and could be effectively mitigated through standard management controls. • Remediation work and follow-up required.
Negligible	• A localised impact that is temporary and does not extend beyond operational area. Either unlikely to be detectable or could be effectively mitigated through standard management controls. • Full recovery expected.

The significance level of an impact is determined by the sensitivity of the value and the magnitude of the change it would experience. Table 6-4 shows how, using the criteria described above, the significance level of impacts is determined having regard to the sensitivity of the value and the magnitude of the expected change.

Table 6-4 Significance assessment matrix

Magnitude of impact	Sensitivity of value				
	Extremely sensitive	Very sensitive	Sensitive	Not very sensitive	Not sensitive
Severe	**Major**	**Major**	**Major**	**High**	**Moderate**
Major	**Major**	**Major**	**High**	**Moderate**	**Low**
Moderate	**High**	**High**	**Moderate**	**Low**	**Low**
Minor	**Moderate**	**Moderate**	**Low**	**Low**	**Very low**
Negligible	**Moderate**	**Low**	**Low**	**Very low**	**Very low**

Table 6.5 outlines the model significance criteria that are amended to be specific for each technical study.

Table 6-5 Model impact significance criteria

Significance of impact	Description
Major impact	Occurs when impacts would potentially cause irreversible or widespread harm to a value that is irreplaceable because of its uniqueness or rarity. Avoidance through appropriate design responses is the only effective mitigation.
High impact	Occurs when the proposed activities are likely to exacerbate threatening processes affecting the intrinsic characteristics and structural elements of the value. While replacement of unavoidable losses is possible, avoidance through appropriate design responses is preferred to preserve its intactness or conservation status.
Moderate impact	Occurs where, although reasonably resilient to change, the value would be further degraded due to the scale of the impacts or its susceptibility to further change. The abundance of the value ensures it is adequately represented in the region, and that replacement, if required, is achievable.
Low impact	Occurs where a value is of local importance and temporary and transient changes would not adversely affect its viability provided standard environmental controls and management measures are implemented.
Very low impact	A degraded (very low sensitivity) value exposed to minor changes (negligible magnitude impact) would not result in any noticeable change in its intrinsic value and hence the proposed activities would have negligible or no effects. This typically occurs where the activities occur in industrial or highly disturbed areas.

Risk assessment

A risk assessment considers the likelihood of environmental harm occurring from an event and the consequence of this harm considering the sensitivity of the value to change. The risk method involves assessing the likelihood of an event, mechanism or pathway existing and, when considered together with the hazard, resulting in harm to the environment. The relationship between likelihood and consequence provides the level of risk of harm to the value. The residual risk of harm is the level of remaining risk of harm to the environment following the implementation of industry standard measures or possible mitigation measures.

The principles of risk management described in *AS ISO 31000:2018 Risk management – guidelines* have been adopted for technical studies adopting a risk assessment method.

The assessment of risk of harm to identified values (prior to implementation of proposed standard mitigation measures to avoid, minimise, offset and manage impacts) was conducted by examining the likelihood of harm occurring and the potential consequences (i.e., a measure of severity of environmental impact) should the harm occur.

Qualitative risk assessment was used to assess the likelihood of harm to the relevant values from construction, operation and maintenance, and decommissioning activities.

Model qualitative criteria developed for the likelihood of potential risks are set in out in Table 6.6. These criteria are amended to be specific for each of the technical studies.

Table 6-6 Qualitative criteria for likelihood

Criteria	Likelihood description
Almost certain	A hazard, event and pathway exist, and harm has occurred in similar environments and circumstances elsewhere and is expected to occur more than once over the duration of the project activity, project phase or project life.
Likely	A hazard, event and pathway exist, and harm has occurred in similar environments and circumstances elsewhere and is likely to occur at least once over the duration of the project activity, project phase or project life.
Possible	A hazard, event and pathway exist, and harm has occurred in similar environments and circumstances elsewhere and may occur over the duration of the project activity, project phase or project life.
Unlikely	A hazard, event and pathway exist, and harm has occurred in similar environments and circumstances elsewhere but is unlikely to occur over the duration of the project activity, project phase or project life.
Rare	A hazard, event and pathway are theoretically possible on this project and has occurred once elsewhere, but not anticipated over the duration of the project activity, project phase or project life.

Source: Adapted from AS ISO 3100:2018.

Following the assessment of likelihood of harm occurring, the potential consequences (i.e., a measure of severity of impact), should the harm occur, were considered.

Qualitative risk assessment was used to assess the consequence of impacts on the environment deemed likely to occur from construction, operation and decommissioning activities.

Model qualitative criteria developed for the consequence of potential risks are set in out in Table 6-7. The consequence criteria are amended to be specific for each technical study. Statutory, nationally or internationally accepted guidelines have been incorporated into the consequence criteria where available.

Table 6-7 Qualitative criteria for consequence

Criteria	Consequence description
Severe	• An effect that causes permanent changes to the environment and irreversible harm to physical, ecological, or social environmental values, or consequences of the impact are unknown and management controls are untested. • Causes major public outrage, sustained widespread community complaints. • Prosecution by regulatory authorities. • Avoidance through appropriate design responses is required to address the impact.
Major	• An effect that is widespread, long lasting and results in substantial change to the value either temporary or permanent. • Can only be partially rehabilitated or uncertain if it can successfully be rehabilitated. • Appropriate design responses are required to address the impact. • Causes major public outrage, possible prosecution by regulatory authorities. • Receives widespread local community complaints.
Moderate	• An effect that extends beyond the operational area to the surrounding area but is contained within the region where the project is being developed. • The harm is short term and result in changes that can be ameliorated with specific management controls.
Minor	• A localised effect that is short term and could be effectively mitigated through standard management controls. • Remediation work and follow-up required.

Criteria	Consequence description
Negligible	• A localised effect that is temporary and does not extend beyond operational area. Either unlikely to be detectable or could be effectively mitigated through standard management controls. • Full recovery expected.

The risk of harm was determined by combining likelihood and consequence using the matrix in Table 6.8. The initial risk was determined with consideration of controls and commitments inherent in the design and project description. The residual risk was then assessed considering the application of industry standard measures or possible mitigation measures that could be applied.

The risk assessment guides the identification and development of mitigation measures to avoid, minimise, offset and manage risks. Higher identified risks require specific controls or management, whereas lower risks can be managed using standard controls.

Table 6-8 Risk evaluation matrix

Consequence	Likelihood				
	Almost certain	Likely	Possible	Unlikely	Rare
Severe	**Very high**	**Very high**	**Very high**	**High**	**Moderate**
Major	**Very high**	**Very high**	**High**	**Moderate**	**Low**
Moderate	**High**	**High**	**Moderate**	**Low**	**Low**
Minor	**Moderate**	**Moderate**	**Low**	**Low**	**Very low**
Negligible	**Moderate**	**Low**	**Very low**	**Very low**	**Very low**

Compliance assessment

This approach considers whether impacts from the project would comply with the requirements of a statutory guideline or policy.

Where statutory guidelines are provided (e.g., within Tasmanian planning provisions), the assessment of significance and magnitude, or likelihood and consequence, is not required. In this instance, an assessment of compliance for the project against statutory guidelines has been undertaken. The results of modelling or other predictive techniques are also used to indicate whether published limits would or would not be exceeded (i.e., the assessment is binary and not subjective).

Statutory guidelines set out in regulatory documents are designed to protect the relevant values. The guidelines include an implicit assessment of the vulnerability of the value through the setting of limits or thresholds.

Discipline specific methods

There are some technical disciplines that adopt discipline specific methods to assess impacts, estimate emissions or conditions for the project. This includes technical disciplines such as GHG emissions, electromagnetic fields, climate change, and bushfire risk. In some instances, these methods may also be implemented and apply the significance assessment.

Management and mitigation measures

Following identification of the potential risk or potential impact, technical specialists have identified measures to avoid, mitigate and/or manage the potential impacts of the proposal.

Where technical studies have informed this Tasmanian EIS, as well as the Commonwealth/Victoria EIS/EES, the technical studies may refer to these mitigation approaches as ‘environmental performance requirements’ (EPRs). EPRs set the environmental outcomes that must be achieved during construction, operation and decommissioning of the project. This approach has been applied for the Commonwealth and Victorian components of the project. In applying this approach, technical specialists considered possible mitigation measures that would achieve the EPRs. For the Tasmanian assessment, these mitigation measures have been specified and would be implemented instead of the EPRs, to meet the requirements of the EIS guidelines.

This EIS refers to all mitigation and management measures proposed for the Heybridge Converter Station as ‘mitigation measures’ (or 'MM' where a cross-reference to a specific mitigation measure has been provided). These measures and the undertakings made by MLPL in this EIS represent the environmental management commitments for the proposal. Section 8 includes a consolidated list of all the mitigation measures to be implemented for the proposal.

Cumulative impact assessment

The EIS guidelines for this proposal require an assessment of cumulative impacts. Cumulative impacts result from incremental impacts caused by multiple projects occurring at similar times and within proximity to each other.

For this proposal, this includes the Heybridge Shore Crossing, which is subject to a separate EIS, but is a related component of the project. Many of the technical studies appended to this EIS combine the assessment of the impacts of the Heybridge Shore Crossing and the Heybridge Converter Station proposals, meaning that any cumulative impacts between these proposals are assessed together as the Tasmanian components of the project. Refer to Section 6.14 for an overview of how each technical specialist has approached the assessment of cumulative impacts of the proposal and the Heybridge Shore Crossing.

Additional projects have been identified for consideration in the cumulative impact assessment, due to the shared regional geography with the proposal, including the NWTD project, which would occur nearby, approximately at the same time, and have some similar impacts as the proposal particularly during construction.

The general assessment methodology, list of identified projects and a summary of potential cumulative impacts is discussed further in Section 6.14. The specific methodology for each technical assessment is described further in the relevant Appendix.

6.1 Potentially contaminated material

This section provides a summary of Contaminated Land and Acid Sulfate Soils Impact Assessment provided in Appendix B.

This technical assessment informs other technical studies concerning surface and groundwater, which are summarised in Section 6.4. The purpose of this section is to explain the current state of contamination and the pathways for contamination to present risks to the local environment. The mitigation measures in this section are directed towards avoiding or minimising the risk of contamination. The mitigation measures in Section 6.4, are about protecting aspects of water environment from contamination.

6.1.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.1-1.

Table 6.1-1 Relevant EIS guidelines

Potentially contaminated material – EIS guidelines	Section
An assessment of site contamination, which must be conducted in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 1999* by a consultant who holds Site Contamination Specialist certification under the Certified Environmental Practitioner Scheme (CEnvP(SC)).	Section 6.1.2, 6.1.3
Detail of proposed construction methodology, footprint, extent of disturbance and how this may interact with contaminated material.	Section 6.1.5.1, 6.1.3.4
Analysis of receptors and risk to receptors due to disturbing potentially contaminated material, during and after construction (e.g., from scouring of sediment due to altered flow patterns).	Section 6.1.3.5, 6.1.5.1, 6.1.5.2, 6.1.5.3
Potential consequences of disturbance (i.e., potential impact/risks), and evaluation of their significance.	Section 6.1.5, 6.1.5.3
Potential cumulative impact with works being undertaken for the Heybridge shore crossing.	Section 6.1.5.4
Describe proposed management and mitigation measures for minimising impacts of contaminated material during construction and long-term use/operation, including storage, monitoring and disposal as relevant.	Section 6.1.6
Legislative and policy requirements	
National Environment Protection (Assessment of Site Contamination) Measure 1999 (the ASC NEPM), *Environmental Management and Pollution Control (Waste Management) Regulations 2020*.	Section 6.1.4

6.1.2 Methodology

National Environment Protection Measures (NEPMs) are statutory instruments that establish national standards various environmental issues. The Contaminated Land and Acid Sulfate Soils Impact Assessment (Appendix B) was carried out in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (Assessment of Site Contamination NEPM) by a suitably qualified site contamination specialist who holds certification under Certified Environmental Practitioner Scheme (CEnvP-SC).

The impact assessment adopted a **risk assessment** approach and identified the potential source of existing contamination of concern, which has the potential to impact on soil, surface water and groundwater at the proposal site.

The initial desktop assessment included review of publicly available information (including aerial photographs, maps, plans, registers and other information) to establish the potential sources (including nature and extent) of contamination within the study area and identify areas where additional sampling and analysis was required.

Following this, a targeted assessment of specific sources of contamination within the proposal site was undertaken. This included:

- A site walkover of the targeted areas to confirm the presence or absence of contamination or contaminating activities.
- Targeted soil assessment of areas that had not previously been investigated and had a potential to contain contamination or ASS, including the collection and analysis of soil samples.
- Targeted surface water sampling from onsite stormwater detention ponds and drains.

Soil sampling was completed at eight test-pit locations along the northern boundary of the proposal site to assess for the presence of ASS. These test-pit locations were considered more likely to contain undisturbed soil profiles. Test-pits were limited to an excavation depth of 1.5 m below the ground surface (to avoid soil instability and risk of test-pit collapse).

Several stockpiles of soils are present on the site (refer to Figure 6.1-1) and samples from the six larger stockpiles were collected to provide a preliminary indication of the contamination status of the soils in them. Some smaller mounds of soils (generally less than 1 m^3) were present in areas to assist with water drainage, or from onsite road forming, and were not sampled.

The contamination status of surface water at the proposal site has not previously been assessed. It was considered that sampling the current surface water drainage system would provide an indication of the current baseline condition of surface water on the site. Surface water sampling was completed at two surface water locations; from the stormwater drain within the proposal site, and at the stormwater drain outlet on Tioxide Beach. The effluent tunnel that emerges on the eastern end of Tioxide Beach was blocked and did not appear to be flowing.

Outcomes of the desktop and field data were used to develop a conceptual site model to identify the nature and extent of contamination and ASS within the study area (the sources of contamination), the potential receptors that may be exposed to or impacted by disturbance of the contamination/ASS, and the pathways by which receptors may be exposed.

The full detailed methodology, including any relevant assumptions and limitations, is included in Appendix B.

6.1.3 Existing conditions

6.1.3.1 Soils

Soil contamination associated with the previous land use (refer to Section 5.1.3) has largely been remediated and validated as being below the adopted industrial land-use screening criteria. However, there are isolated locations of contamination remaining including metals in fill with concentrations of copper (location SP2_02), nickel (locations SP2_01-03, SP8-02 and SP10_03), and zinc (location SP10-03) above adopted NEPM-EILs, and one location with lead above the adopted NEPM-HIL-D.

Key findings of reports into previous land use identified that the site contains various thickness of fill soils ranging from 0.3 m to >1.5 m, with an average thickness is 0.7 m based on geotechnical testing since demolition of the tioxide plant. The extent of fill has not been well characterised within the proposal site. where buried footings and building rubble remain in-situ and have limited the ability to extend borehole depth.

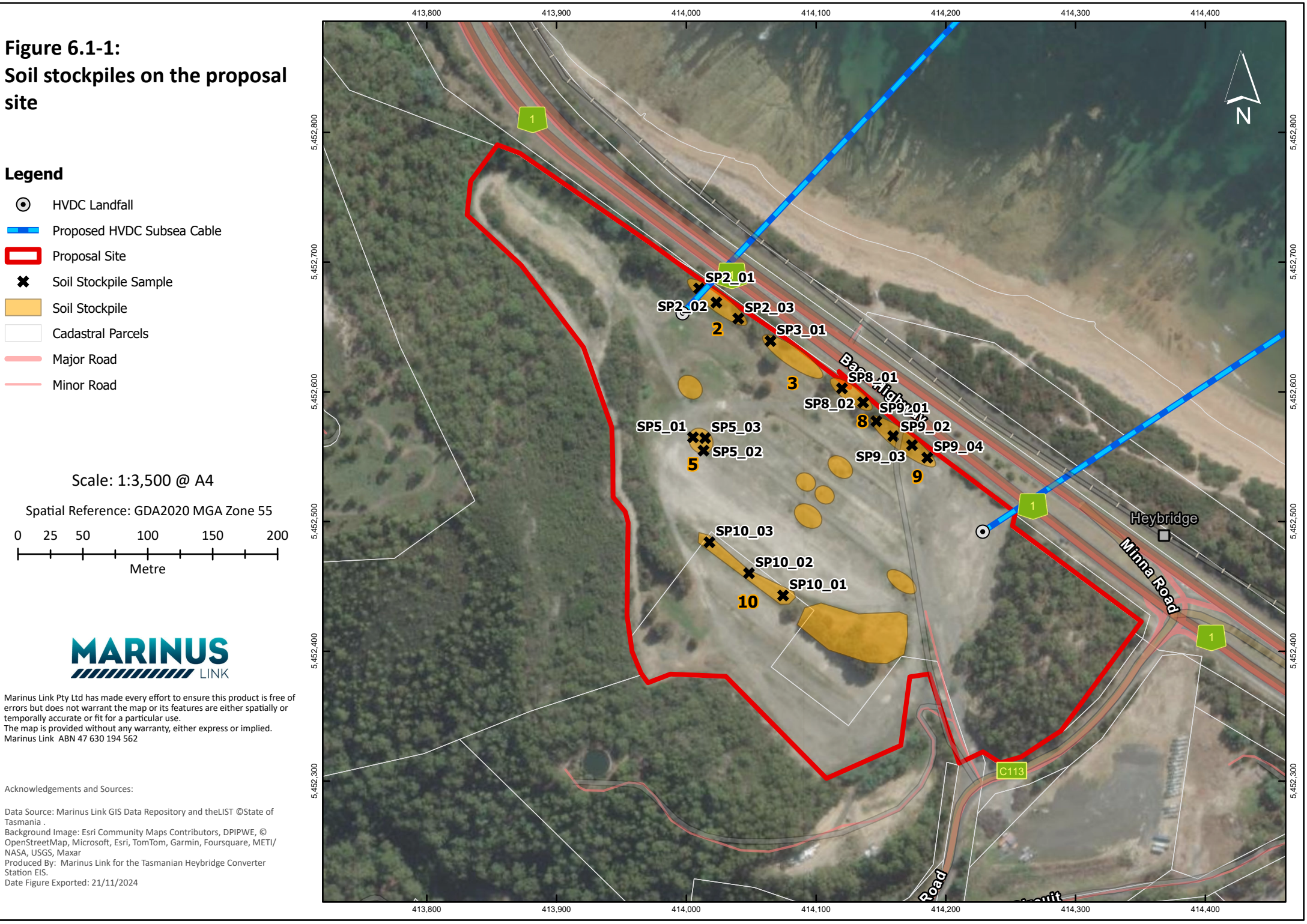
The demolition of factory buildings on site was undertaken in the mid-1990s, however remnants of footings (such as concrete blocks and bricks) are present in some areas, which have limited the sampling of soils in some isolated locations. Given this uncertainty, there is potential that areas of contamination that are present in soils at depth, including hydrocarbon contamination, metal contamination, acidic soils and ACM, and all at concentrations that could pose a potential impact to human health and environment.

There is potential for hydrocarbons contamination to still be present at levels above NEPM management limits or health screening levels, however recent testing has not identified any locations with concentrations above the adopted screening criteria. Soil stockpiles, presented in Figure 6.1-1, are unlikely to present a risk to health, unless they contain residual asbestos.

ACM debris had been identified on the ground surface at the proposal site. The ACM, where identified, were removed, however no further sampling of the residual soils on the proposal site has been undertaken. There is potential for residual fragments of ACM to be present within fill soils on the site.

The location of the asbestos contamination present on the proposal site is shown in Figure 6.1-2. Low pH soils are present where acid leakages from former plant and machinery have resulted in reduced pH in the central section of the proposal site. Radioactivity testing indicates that the measured radioactivity was within background levels, and poly-fluoroalkyl substances (PFAS) testing did not report any concentrations above adopted screening criteria.

Figure 6.1-1:
Soil stockpiles on the proposal site



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Acknowledgements and Sources:

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Figure 6.1-2: Areas of known asbestos contamination

Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Areas where ACM Debris was Identified and Removed from Site (Approximate Locations Only)
- Cadastral Parcels
- Major Road
- Minor Road

Scale: 1:3,500 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 25 50 100 150 200

Metre

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Acknowledgements and Sources:

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Date Figure Exported: 21/11/2024

6.1.3.2 Surface water

Surface water at the proposal site is managed through a built drain and detention basin, which discharges directly into the marine environment. Testing of the surface water has shown:

- Concentrations of copper and zinc exceed the adopted screening criteria for protection of fresh and marine water (ANZG 2018 – Default guideline values (DGVs) for 95% species protection).
- Concentrations of potential contaminants are below the screening criteria for protection of human health (primary contact recreation and potable water supply).

Given the direct discharge to the marine environment, the 95% marine criteria have been used to assess the potential for impact to marine water quality (refer to Section 6.4 of the EIS for the Heybridge Shore Crossing). The concentrations of copper and zinc are marginally above the adopted screening criteria and could present a potential risk to marine receptors. However, since the surface water flowing from the proposal site is ephemeral (in that it only flows during rainfall events), the impacts to marine receptors are likely to be minimal. This is because the exposure duration for assessing impacts to aquatic biota is based on continual exposure, and not periodic exposure. Therefore, the surface water quality within the study area is not considered to impact on ecological receptors within the marine environment.

6.1.3.3 Groundwater

Groundwater at the proposal site is present at depths ranging between approximately 0.5 m to 3 m below the ground surface.

Previous soil and groundwater assessments (refer to Section 6.4.3 and Appendix F) across the proposal site indicate that:

- Analytes for the five groundwater samples collected by Jacobs (2022) were reported to be below adopted criteria with the exception of cobalt (all samples), copper (three samples) and zinc (all samples).
- PFAS concentrations were reported in three wells but were below the adopted screening criteria for marine ecosystems (95% species protection) and other water uses.
- Field parameters recorded by Jacobs (2022) indicated that the groundwater was mildly acidic with an oxidising potential.
- WCC (2007) reported that shallow groundwater encountered during test pit excavation was locally contaminated, with TPH (>C10) and traces of volatiles at two locations (and not widespread across the proposal site).

Groundwater contaminant testing has shown that groundwater is generally not impacted by contamination originating from the proposal site. Groundwater beneath the proposal site discharges to the ocean at Tioxide Beach and there is a potential that the concentrations of metals in groundwater may impact on marine receivers under existing conditions.

6.1.3.4 Summary of conceptual site model

Potential sources of contamination that may impact receptors were identified through a review of previous environmental site investigations and publicly available environmental and historical information. The key contamination issues associated with the proposal are:

- **Diversely distributed contamination**: This includes metals (lead, copper, nickel, chromium and zinc), petroleum hydrocarbons and ACM within fill soils. These contaminates have the potential to impact upon human health or ecological receptors if disturbed or if surplus soils are not managed appropriately.
- **Historical contamination**: Due to the long history of mineral processing, the demolition undertaken and the highly diverse distribution of contamination in soils at the proposal site, contamination may be encountered outside of areas previously identified or remediated.
- **Contaminated groundwater**: Discharging to surface water (onsite and to the marine environment) may result in impacts to sensitive ecological receptors.
- **Potential ASS**: If disturbed or dewatered, these soils may result in generation of acid that has the potential to impact upon on human health, built structures, terrestrial and aquatic biota, and buried cultural heritage artefacts.

These key contamination issues in the context of the proposal are discussed further in Section 6.1.5. A plan of the conceptual site model is presented in Figure 6.1-3. Potential impacts of ASS are discussed in Section 6.4.

6.1.3.5 Exposure pathways and receptors

Human health and ecological receptors specific to the proposal site have been identified to assess the potential risk from existing contamination. The identification of receptors was carried out through a preliminary conceptual site model, which characterises the potential for contamination or ASS to impact receptors by identifying the present exposure pathways. This model also guides the development of potential management and mitigation measures.

Based on review of previous environmental site investigations, publicly available information, site inspection and targeted sampling, the contaminants of potential concern that may have impacted the soil, surface water and groundwater on the proposal site are summarised in Table 6.1-2.

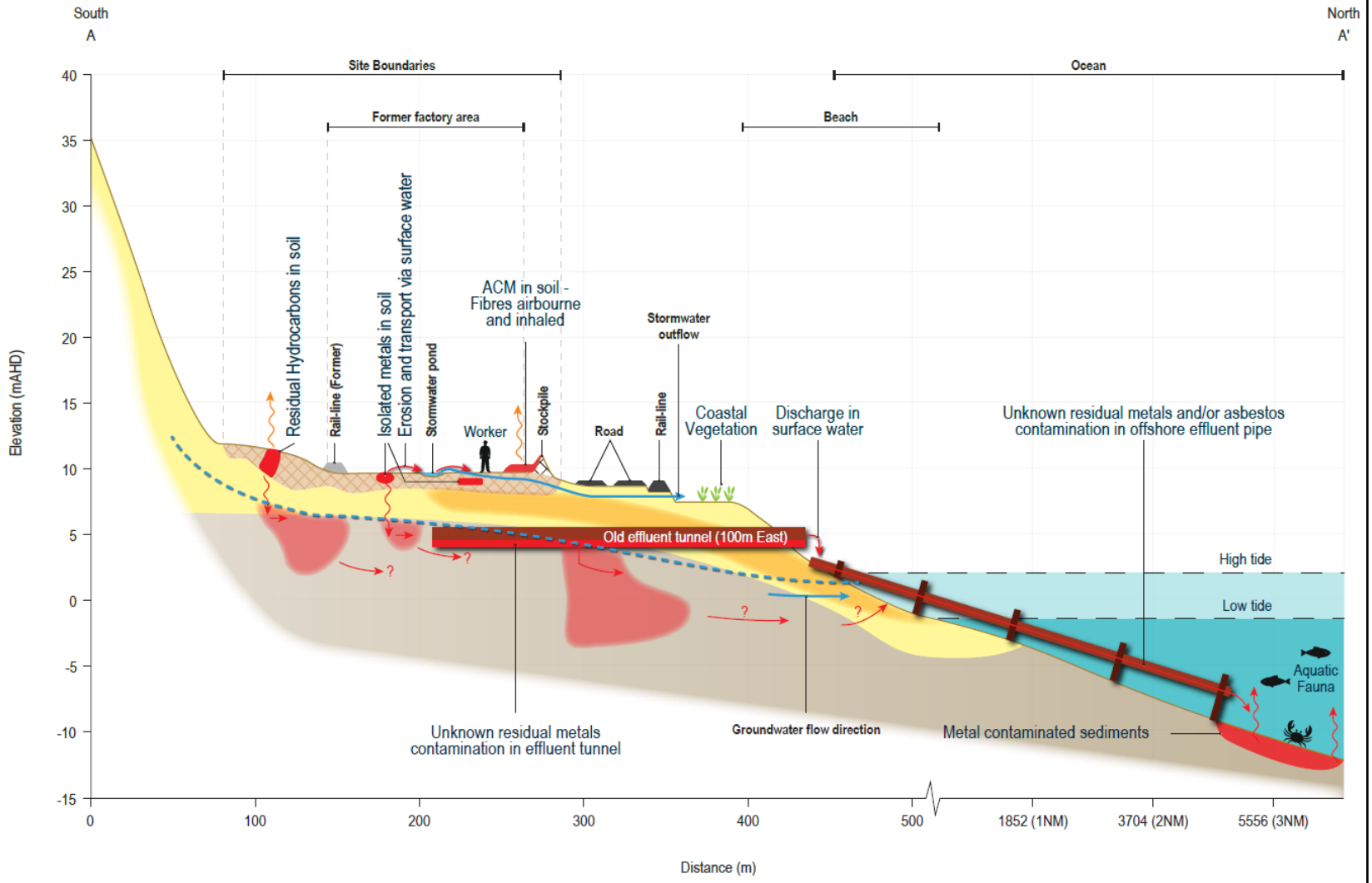
Table 6.1-2 Potential sources of contamination

Source of contamination	Associated contaminants of potential concern
Former tioxide plant	Metals, petroleum hydrocarbons, asbestos, low pH, NORM
Lumber yard	Petroleum hydrocarbons
Potential ASS	Acid generation (low pH), metals

Figure 6.1-3:
Conceptual site model

Legend

- Fill
- Sand
- Potential acid sulfate soils
- Quartz-wacke
- Effluent piping
- Leaching/groundwater transport plume
- Volatilisation
- Leaching
- Potential Migration
- Groundwater



Acknowledgements and Sources:

Produced for the Tasmanian Heybridge Converter Station EIS.
Date Figure Exported: 21/11/2024

6.1.4 Applicable legislation

6.1.4.1 Environmental Management and Pollution Control (Waste Management) Regulations 2020

The Waste Management Regulations are administered under the EMPC Act. The Waste Management Regulations are used to regulate and manage controlled waste and some aspects of the general waste disposal within Tasmania. As per the Waste Management Regulations, the proposal site cannot pose a known or potential unacceptable risk to human health and/or the environment. Any controlled waste potentially generated by the proposal would be managed in accordance with the regulations.

6.1.4.2 National Environment Protection (Assessment of Site Contamination) Measure 1999

NEPMs are statutory instruments that establish national standards for various environmental issues. In Tasmania, the *National Environment Protection Council (Tasmania) Act 1995* references the National Environment Protection (Assessment of Site Contamination) Measure 1999. NEPMs are considered State Policies in accordance with section 12A of the *State Policies and Projects Act 1993*. The adopted screening criteria levels are detailed in the Contaminated Land and Acid Sulfate Soil Impact Assessment (Appendix B). All analytical results have been compared to the NEPM to determine potential for reuse in a commercial/industrial land use.

6.1.4.3 EPA Tasmania (2018) Information Bulletin No. 105, Classification and Management of Contaminated Soil for Disposal

EPA Tasmania (2018) I*nformation Bulletin No. 105, Classification and Management of Contaminated Soil for Disposal* (Information Bulletin 105) defines the criteria for the classification of contaminated soil that requires treatment and/or off-site disposal and provides guidelines for managing each classification. Analytical results have been compared to the Information Bulletin 105 to determine potential for reuse in a commercial or industrial land use.

Soils present on the proposal site have preliminary classification of Low Level Contaminated Soil (Level 2) for the top 0.5 m of soils, and a preliminary classification Fill Material (Level 1) for the deeper soils (below 0.5 m) with isolated locations containing deeper contamination (up to 1 m below ground level) that would classify these isolated locations as Low Level Contaminated Soil (Level 2).

Estimates of approximate volumes of soils to be disturbed have been provided in Table 6.1-3. Surplus soils generated during construction of the proposal that require offsite disposal would be classified and managed in accordance with Information Bulletin 105.

Table 6.1-3 Estimates of waste soil categories for disposal

Soil category	Estimated volume (m^3)
Level 1 (fill material)	37,200
Level 2 (low level contaminated soil)	34,300
Level 3 (contaminated soil)	0
Level 4 (contaminated soil for remediation)	0
Total	**62,200**

6.1.5 Potential impacts

Based on the outcomes of the conceptual site model and the existing conditions, potential hazards have been identified as having a risk of causing impacts for unmitigated impacts to the environment. They include:

- Management of excavated soils.
- Disturbance of ASS (addressed in Section 6.4).
- ACM debris.
- Management of routine construction and operational impacts.

The results of the conceptual site model and contamination assessment collectively shape the overall risk assessment. This includes a detailed evaluation of potential risks to environmental values (both human and ecological receptors) from existing contamination (whether natural or anthropogenic) identified at the proposal site. It also covers potential risks that may arise during the construction, operation, and decommissioning phases of the proposal, as detailed in the sections below.

6.1.5.1 Construction

The following sections detail the potential impacts of contamination on human health and ecological receptors during the construction phase of the proposal.

6.1.5.1.1 Impacts associated with existing contamination

The construction of the proposal involves bulk earthworks, which may disturb existing contaminated soil or interact with contaminated groundwater or surface water. This could potentially result in harm to human health and ecological receptors through exposure pathways, including:

- Disturbance of existing contamination/wastes (natural or anthropogenic).
- Stockpiling and handling of contaminated material.
- Removal of contaminated in-situ infrastructure.

During construction of the proposal, there is a potential to encounter contaminants such as metals and hydrocarbons at concentrations that could impact human health or the environment if not appropriately managed. However, the extent of contaminated soil exceeding the adopted criteria at the proposal site is limited, so the potential impact to human health and ecological receptors is considered **low**.

Based on the risk assessment (refer to Table 6.1-4), without the implementation of mitigation measures, these potential impacts have a risk rating of **moderate.**

6.1.5.1.2 Potentially contaminating construction activities

The construction of the proposal has the potential to cause contamination to soil, surface water and groundwater if unmitigated. This could occur due to:

- Localised leaks of oils, fuels and chemicals from plant and equipment.

- Improper handling of potentially contaminated material (exposure to workers, human and ecological receptors).
- Removal of in-situ infrastructure (including pipes, footings).

Improper handling and stockpiling of excavated contaminated soils can impact air quality through dust emissions or surface water quality via stormwater run-off and sedimentation. Contaminated material stockpiles would be contained using standard procedures to limit the potential for contamination migration through dust dispersion, leaching, or stormwater run-off.

All other parts of the construction footprint were assessed as low in risk. Given the proposed land use, they are considered to pose a low risk to human health, and potential environmental impacts can be managed by standard erosion and sediment control procedures.

Prior to mitigation, the risk rating of these construction impacts are **low**. Refer to the risk assessment in Table 6.1-4.

6.1.5.1.3 Asbestos

ACM debris had been identified on the ground surface at the proposal site. The ACM, where identified, has since been removed. There is potential for fragments of ACM to be present within fill soils on the site. ACM is susceptible to degradation and fibre release, which has the potential to cause impact on human health (construction workers) and ecological receptors if the asbestos fibres become airborne and respirable. To manage potential exposure to asbestos fibres by human health receptors, an unexpected finds protocol will be developed and implemented. This protocol is detailed further in Table 6.1-5.

Prior to the implementation of mitigation measures, the potential exposure of ACM during construction has a risk rating of **moderate**.

6.1.5.2 Operation

Ground-disturbing works are not anticipated during the operational stage of the proposal. However, there has still been a consideration for accidental spills or leaks of fuels, oils or chemicals during operational activities, as well as the potential management of contaminated surplus construction material.

6.1.5.2.1 Waste, spills and leaks

Potential impacts associated with operational activities required for the proposal include accidental spills and leaks of transformer oil, chemicals, battery fluids, or diesel fuel. If not contained, spills and leaks may cause a risk to human health or ecological receptors, causing environmental degradation or health hazards. However, standard industry practice for managing hazards associated with handling chemicals, wastes and other dangerous goods would be implemented during operation. Therefore, the risk rating prior to mitigation is **low**.

6.1.5.2.2 Excavated and surplus soils

Ground-disturbing works are not anticipated during the operational stage of the proposal, as such impacts to human health and ecological receptors associated with the disturbance of contaminated material are

expected to be minimal. However, if surplus soils generated during construction are contaminated and retained on the proposal site, the potentially contaminated surplus soils would require management during operation of the proposal. The management of contaminated surplus soil prior to mitigation has a risk rating of **moderate**.

6.1.5.3 Risk assessment

A risk assessment evaluation undertaken for the proposal is presented in Table 6.1-4. The evaluation assesses the potential risk to human health and/or ecological receptors prior to the implementation of mitigation measures. Further details on the methodology for the assessment is provided in Appendix B.

Table 6.1-4 Risk assessment of potentially contaminated material

Impacted value	Potential risk of harm	Proposal stage	Risk
Human health/ ecological receptors	Excavated soils (including contaminated soils) may present a risk to human or ecological receptors if not contained causing degradation of environment or hazards to health.	Construction, Operation	**Moderate**
Human health/ ecological receptors	Construction/operational activities lead to generation of contaminated wastes, spills or leaks that may cause a risk to human or ecological receptors if not contained causing degradation of environment or hazards to health.	Construction, Operation	**Low**
Human health receptors	Exposure of asbestos fibres from ACM in soil to human receptors during construction, operation or decommissioning.	Construction, Operation	**Moderate**

6.1.5.4 Cumulative impacts

The study area for the assessment of contaminated land impacts included the area for the Heybridge Shore Crossing, making the assessment of impacts a combined assessment for the proposal and the Heybridge Shore Crossing.

Beyond the Heybridge Shore Crossing, cumulative impacts from contamination or ASS associated with nearby projects would be highly localised to the areas where the individual projects disturb potential contamination. It is unlikely that contamination that may be disturbed associated with the nearby projects would result in impacts that may overlap with the potential impacts from this proposal, with the exception of parts of the NWTD project that interfaces with the proposal site.

Cumulative impacts relevant to the proposal site that may occur include local residential or commercial redevelopments, or upgrades to Bass Highway or the rail line in the vicinity of the site. However, the magnitude of impacts from these potential projects would be minor due to their limited footprints and the low potential for contamination being present being disturbed. This is because the risks of contamination from the proposal are temporary and localised.

6.1.6 Management, mitigation and monitoring

Proposed measures to minimise potential impacts associated with potentially contaminated material are presented in Table 6.1-5. Mitigation measures in other sections that are relevant to the management of potentially contaminated material include:

- Section 6.4 (Water quality), specifically measures which address the management of surface and groundwater quality, and ASS.
- Section 6.5 (Air quality), specifically measures which address the management of odours associated with contaminated soils.
- Section 6.6 (Waste management), specifically measures which address appropriate classification, handling and disposal of waste materials, including contaminated waste.
- Section 6.7 (Dangerous goods and environmentally hazardous materials), specifically measures which address appropriate handling and management of hazardous materials.
- Section 8.2 (Mitigation measures), specifically measures which address emergency response and incident management (MM Gen05).

Together, these measures will minimise the potential contamination impacts.

Table 6.1-5 Potentially contaminated material – mitigation measures

Ref	Mitigation measure	Proposal stage
CL01	**Manage excavated soil, contaminated soils and potential risks to the environment due to contamination during construction.**	Construction
CL01-1	Undertake a detailed site investigation prior to disturbance (in accordance with guidance from the Assessment of Site Contamination NEPM – including as a minimum schedules B1 and B2) to define the nature and extent of potential contamination in soils (including asbestos and ASS).	
CL01-2	Identify options to manage surplus soils in accordance with the waste hierarchy.	
CL01-3	Sample and classify all soils surplus to project requirements in accordance with EPA Tasmania's Information Bulletin 105 – Classification and Management of Contaminated Soil for Disposal, Australian Standards AS4482.1 (2005) and AS4482.2 (1999), and *Tasmanian Acid Sulfate Soil Management Guidelines* (DPIPWE 2009) to identify the waste classification of the soils.	
CL01-4	Any waste soils that are classified as Level 1 (fill material), must be responsibly managed and disposed to a site where the soils do not result in impacts to the environment, or result in pollution (as defined in the EMPC Act), which may include disposal to a Solid Inert (Category A) Landfill. Level 1 soils may be reused on the site.	
CL01-5	Any waste soils that are classified as Level 2 (low level contaminated soil) and surplus to project requirements are likely to be Controlled Wastes (depending on contaminants) and require disposal to a Category B (Putrescible Landfill). There are opportunities for Level 2 soils to be reused on the site, depending on the nature of the contamination and how they are proposed to be used. The reuse of Level 2 soils on the site will be assessed on a case-by-case basis in consultation with EPA.	
CL01-6	All transport of contaminated soils must be undertaken by a licensed waste transporter.	
CL01-7	Any temporary storage of soils must:	

Ref	Mitigation measure	Proposal stage
	• Be stored in appropriately sited stockpiles away from surface drainage lines with bunding. • Depending on the nature of the contamination in the material to be stockpiled, on a lined or impermeable surface. • Have surface covering if odorous. • Be sprayed during periods of dry weather with water or suitable dust suppressant.	
CL01-8	Any asbestos containing materials to be disturbed must be removed from the site by an appropriately qualified and licensed removalist.	
CL01-9	Develop an unexpected finds protocol for contamination, asbestos and odour management of excavated soils.	
CL01-10	Develop and implement contingency and emergency response procedures to manage fuel, chemical or contamination spills.	
CL01-11	Manage all contaminated materials, chemicals, fuels and hazardous materials to mitigate potential environmental harm via: • All dangerous goods or environmentally hazardous materials will be stored in appropriately bunded containers within the proposal site, in accordance with relevant Australian Standards and state regulations. • Fuel storage on site during construction will be via tankers (between 20,000 L and 50,000 L in size) that will be parked in bunded hardstands within the proposal site, or temporary containerised, self-bunded, above-ground fuel storage systems. Machinery and equipment will then either be refuelled within the site or in-situ via a refuelling truck, which will have on board spill kits and temporary bunding equipment. • Hydrocarbon and chemical spill kits will be stored within the proposal site and wherever dangerous goods and environmentally hazardous materials are used throughout the site.	
CL01-12	The construction contractor will maintain records of waste soil volumes generated, disposal locations, and disposal facility receipts.	
CL02	***Refer to Section 6.4 Water quality (surface and groundwater) for MM CL02.***	
CL03	**Develop and implement measures to manage potential contamination impacts in operation.**	Operation
CL03-1	Fuel storage on site during operation will be in above-ground fuel storage tanks on an impermeable concrete surface (with bunding) designed in accordance with Australian Standard AS1940 *The storage and handling of flammable and combustible liquids*. Fuel deliveries will be via tankers that will be parked in designated refuelling areas designed to contain any potential spills. The fuel storage areas and refuelling areas will contain spill kits and temporary bunding equipment.	
CL03-2	Develop and implement contingency and emergency response procedures to manage fuel, chemical or contamination spills.	
CL03-3	Manage all contaminated materials, chemicals, fuels and hazardous materials to mitigate potential environmental harm via: • All dangerous goods, environmentally hazardous materials or fuels will be stored in appropriately bunded containers at the site, in accordance with relevant Australian Standards and state regulations. • Fuel and chemical spill kits will be maintained within close proximity to dangerous goods, hazardous materials or fuel storage areas.	

6.1.7 Residual impacts

With the implementation of the mitigation measures outlined in Section 6.1.6, the risk of impacts to human health and ecological receptors as a result of the proposal are reduced to **low** and **very low** (refer to Table 6.1-6). Further details on the methodology for the assessment is provided in Appendix B.

Table 6.1-6 Potentially contaminated material – residual risk assessment summary

Impacted value	Potential risk of harm	Proposal stage	Mitigation measure	Residual risk
Human/ecological receptors	Excavated soils (including contaminated soils) may present a risk to human health or ecological receptors if not contained causing degradation of environment or hazards to health.	Construction, Operation	CL01, CL02 and CL03	Low
Human/ecological receptors	Construction/operational activities lead to generation of contaminated wastes, spills or leaks that may cause a risk to human health or ecological receptors if not contained causing degradation of environment or hazards to health.	Construction, Operation	CL01, CL02 and CL03	Very low
Human health	Exposure of asbestos fibres from ACM in soil to human receptors during construction, operation or decommissioning.	Construction, Operation	CL01	Low

6.2 Terrestrial natural values

This section provides a summary of the findings of the Terrestrial Ecology Impact Assessment provided in Appendix C.

6.2.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in the EIS, are outlined in Table 6.2-1.

Table 6.2-1 Relevant EIS guidelines

Terrestrial natural values – EIS guidelines	Section
Existing environment	
Specify and map known records of species and their habitat, with particular reference to rare and threatened species, communities, and habitats, including those listed under the relevant Schedules of the Commonwealth EPBC Act and the *Tasmanian Threatened Species Protection Act 1995* (TSP Act) and *Tasmanian Nature Conservation Act 2002* (NC Act).	Section 6.2.3
Undertake and provide the results of a current natural values survey for the site.	Section 6.2.2, 6.2.3
White-bellied sea-eagle (*Haliaeetus leucogaster*) and Tasmanian wedge-tailed eagle (*Aquila audax* subsp. *fleayi*) have been recorded in the area and an eagle nest has been recorded 1.8 km from the impact site. As eagle pairs often have several nests in their territory, an eagle nest search must be undertaken within 500 m direct distance and 1 km line-of-sight of the development to determine if any unknown nests are present. As eagles can be sensitive to disturbance during the eagle nesting/breeding season (July to January).	Section 6.2.3.4, 6.2.6
Identify areas or habitats of conservation significance, including designated conservation areas, areas relating to the requirements of international treaties (e.g., Japan-Australia and China-Australia Migratory Bird Agreements (JAMBA/CAMBA) and Ramsar (wetlands) Convention).	Section 6.2.3.6
Specify and map known sites of geoconservation significance or natural processes (such as fluvial or coastal features), including sites of geoconservation significance listed on the Tasmanian Geoconservation Database.	Section 6.2.3.6
Demonstrate that any surveys comply with requirements in Guidelines for Terrestrial Natural Values Surveys.	Section 6.2.2
Identify any environmental weed species present on or near the site.	Section 6.2.3.5
Describe natural processes of particular importance for the maintenance of the existing environment (e.g., fire, flooding, etc).	Section 6.2.3
Provide all results in a natural values assessment, undertaken by a suitably qualified person.	Section 6.2.3
Potential impacts	
Describe potential impacts of construction and operation of the proposal on flora, vegetation communities and habitat, with particular reference to rare and threatened species, communities, and habitats, including those listed under the relevant Schedules of the TSP Act and NC Act.	Section 6.2.5
In discussion of impacts on flora and fauna, including consideration of: • Habitat clearance and disturbance. • Activity causing potential disturbance (e.g., movement). • Noise and vibration emissions. • Lighting.	Section 6.2.5

Terrestrial natural values – EIS guidelines	Section
• Vehicle movements (including roadkill). • Mobilised contaminated material or sediment.	
Discuss impacts on existing conservation reserves which may be affected by the proposal, with reference to the management objectives of the reserve(s) and the reserve management plan(s) (if any).	N/A (refer to Section 6.2.3.6)
Discuss impacts on other species, sites or areas of special conservation significance, including areas of wilderness or scientific value.	N/A (refer to Section 6.2.3.6)
Discuss the potential introduction or spread of pests, weeds and plant and animal diseases as a result of construction and operation of the proposal. Information about controlling the introduction and spread of weeds and the development of weed and disease management plans can be found in Section 4 of the NRE (2015) Weed and Disease Planning and Hygiene Guidelines - Preventing the spread of weeds and diseases in Tasmania.	Section 6.2.5, 6.2.6
Discuss impacts on sites of geoconservation significance or natural processes (such as fluvial or coastal features), including sites of geoconservation significance listed on the Tasmanian Geoconservation Database.	N/A (refer to Section 6.2.3.6)
In consideration of all issues, discuss any potential for cumulative impact with the proposed Heybridge Shore Crossing for Marinus Link.	Section 6.2.5.4
Avoidance and mitigation measures	
Describe management measures to mitigate adverse impacts to threatened fauna, flora and vegetation communities and other natural values where they cannot be avoided.	Section 6.2.6
Where impacts cannot be avoided, present proposed measures to mitigate and/or compensate adverse impacts on biodiversity and nature conservation values.	Section 6.2.6
Develop a plan to control the spread of weeds, pests and diseases and ensure that weeds present at the impact site are properly managed	Section 6.2.6
Discuss rehabilitation of disturbed areas following the completion of construction activities and cessation of the activity, including any proposed seed collection and progressive rehabilitation programme.	Section 6.2.6, Section 7
Provide a conclusion regarding the significance of likely impacts on natural values.	Section 6.2.7
Requirements for surveys	
Any flora and fauna surveys must, as a minimum, comply with the requirements of the document *Guidelines for Terrestrial Natural Values Surveys* published by the NRE. The methodology for surveys should be developed in consultation with the Department.	Section 6.2.2
Legislative and policy requirements	
Tasmanian *Threatened Species Protection Act 1995* and associated regulations, *Nature Conservation Act 2002* and associated regulations, including the *Nature Conservation (Wildlife) Regulations 2021*, *Forest Practices Act 1985* and associated regulations and codes (as relevant), *Commonwealth National Light Pollution Guidelines for Wildlife, Tasmanian Weed Management Act 1999*.	Section 6.2.4

6.2.2 Methodology

In order to assess the existing terrestrial natural values, present at the proposal site, a 'proposal survey area' has been established. The proposal survey area is presented in Figure 6.2-1 and comprises of:

- **The Converter Station survey area**: An approximately 10 ha area defined by the property boundary of the proposal site (which includes the HDD launch pads for the Shore Crossing).
- **The Shore Crossing survey area**: A 6.5 ha area extending from the proposal site, under Bass Highway and Western Line Railway, and across the shore to Bass Strait.

A broader 'study area' was also considered as follows:

- A 5 km radius around the survey areas used to identify which ecological values are likely to occur based on the Commonwealth Protected Matters Search Tool (PMST) and Tasmanian Natural Values Atlas (NVA).
- The aerial eagle nest survey completed for the NWTD considered a 2 km radius study area around the proposal site.

Existing ecological values that may occur within the proposal survey area, or broader study area, were identified through a review of database and literature sources as well as field surveys.

A desktop review was completed to identify ecological values that may occur within the study area and to gather associated supporting information. Database and literature sources reviewed as part of this work were:

- NVA.
- EPBC Act PMST.
- TASVEG 4 mapping.
- Threatened Native Vegetation Communities (TNVC 2020) mapping (NRE 2021) derived from TASVEG 3, TASVEG 4 and previous TNVC 2014 maps.
- Tasmanian Geoconservation database.
- Publicly available aerial imagery, including current and historical images from Google Earth™ and Environmental Systems Research Institute.

A field survey of the proposal survey area was undertaken on 17 and 18 January 2023 to identify vegetation communities, fauna habitats and flora species present. Previously, there had been a terrestrial ecology survey undertaken of the Converter Station survey area on 12 February 2021 and two previous surveys of the Shore Crossing survey area targeting Little penguins between 21 and 23 November 2018, on 3 February 2022, and in January 2023.

The field surveys involved:

- The verification and mapping of the vegetation communities present on the proposal survey area.
- The identification of vegetation communities listed as threatened under the *Nature Conservation Act 1992* (NC Act) and ecological communities listed under the EPBC Act.
- Searching for flora species listed under the TSP Act and EPBC Act in potential habitat and in the vicinity of known locations that were identified in the desktop survey.
- The identification and assessment of potential habitat for fauna species listed as threatened under the TSP Act and EPBC Act.
- The identification of declared weeds listed under the *Weed Management Act 1999*, and now declared as pests under the *Biosecurity Act 2019*.

- The identification of potential eagle nest within a 2 km radius of the proposal site.

Flora surveys used a systematic method, which involves walking over the survey area in a random manner and recording all flora species encountered. This method was adequate to confirm absence of species and suitable habitat. The flora survey targeted habitats and vegetation communities that were likely to support threatened species. Mapped TASVEG communities within the proposal survey area were verified during the flora survey.

Important fauna habitat components were also recorded during the survey where encountered (e.g., important habitat trees, rock outcrops suitable for Tasmanian devil and spotted-tailed quolls). Indirect evidence of the presence of threatened fauna was also recorded (e.g., scats, diggings, burrows, shelters). A targeted search for Tasmanian devil and spotted-tailed quoll dens within the survey area was also undertaken, which included searching for scats.

An eagle nest survey was undertaken by North Barker in April 2022 for the NWTD project (North Barker 2022) in accordance with the EPA *Guide to Eagle Nest Searches and Activity Checks*. Raptor nest identification was based on a database search within a 1 km search radius and subsequent February 2023 aerial surveys (by helicopter) within a 1 km and 2 km radius of the NWTD route's operational area, which also included the proposal survey area. This information has been used to inform this assessment.

Previous surveys (21-23 November 2018 and 3 February 2022) were undertaken by Entura to target Little penguins (*Eudyptula minor*), as colonies are known to be scattered along the north coast. The 2018 surveys included a search for penguin burrows at the crossing point west of the Blythe River mouth, as well as evening surveys at the shore crossing area, to identify if any Little penguins returned to their burrows at dusk. Subsequent searches for burrows and evidence of penguins were also undertaken on 3 February 2022 and 18 January 2023.

The vegetation, flora and fauna surveys were undertaken in a manner that is consistent with the *Guidelines for Natural Values Surveys – Terrestrial Development Proposals* (DPIPWE 2015a).

A likelihood of occurrence assessment was carried out to determine which ecological values are considered likely to occur within 5 km of the study area. This was further refined with consideration of those species habitats requirements, and where these significantly different from those in the proposal survey area no further consideration was required.

The *Survey Guidelines and Management Advice for Development Proposals that may Impact on the Tasmanian Devil* (DPIPWE 2015c) propose that where there is increased night-time road use that a traffic impact assessment is undertaken and is used in conjunction with assessments of the local Tasmanian devil population information from both desktop and survey data to determine if there is a potential for a substantial impact (i.e., predicted >10% increase in deaths due to roadkill). The results of the assessment of potential impacts on fauna as a result of increased traffic movements is provided in Section 6.2.5.1.

The assessment adopted a **significance assessment approach**. The significance assessment methodology was adopted in order to assess the significance of impacts on ecological values in the absence of statutory, nationally, internationally or industry accepted criteria for assessing significance.

A detailed methodology, including any relevant assumptions and limitations, is included Appendix C.

6.2.3 Existing conditions

The ecological impact assessment first determined the proposal survey area and a study area (as explained in Section 6.2.2), both of which are larger and encompass the proposal site. The proposal survey area consists of an area of previously cleared industrial land with small patches of remnant vegetation, as well as beach and coastal vegetation between Bass Highway and Bass Strait.

Terrestrial natural values relevant to the proposal survey area include native vegetation communities, protected flora and protected fauna. The presence of native vegetation communities and the likelihood of protected flora and fauna were identified through available data resources and through field surveys. There are no known records of threatened species within the proposal survey area.

6.2.3.1 Vegetation communities

The proposal site is comprised of 1.5 ha of native vegetation and 9.3 ha of modified land (that includes 8.2 ha of cleared land, 0.6 ha of tree plantings, and 0.5 ha of weeds). The 6.5 ha of Shore Crossing survey area present between Bass Highway and Bass Strait, comprises 2 ha of native forest, 3 ha of native coastal scrub and 1.5 ha of sandy beach. Vegetation communities present at the proposal survey area are mapped in Figure 6.2-1. There are three native vegetation communities identified within the proposal survey area, as described in Table 6.2-2.

Table 6.2-2 Native vegetation communities identified within the proposal survey area

Native vegetation communities	Area (ha)	Location
Eucalyptus amygdalina coastal forest and woodland (DAC)	1.5	Present on the proposal site
Coastal scrub (SSC)	3	Not present on the proposal site
Eucalyptus viminalis–Eucalyptus globulus coastal forest and woodland (DVC)	2	Not present on the proposal site

The *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC) (not within the proposal site) is listed under the NC Act.

The wet scrub (*Banksia marginata*) and silver tussock (*Poa labillardierei*) species, which are part of the non-threatened Coastal scrub (SSC) vegetation community present within the proposal survey area, are also listed under the NC Act.

Figure 6.2-1: Vegetation mapped within the proposal survey area

Legend

Dry Eucalypt Forest and Woodland

- [DAC] Eucalyptus amygdalina coastal forest and woodland
- [DOB] Eucalyptus obliqua dry forest
- [DVC] Eucalyptus viminalis - Eucalyptus globulus coastal forest and woodland

Scrub, Heathland and Coastal Complexes

- [SSC] Coastal scrub

Agricultural, Urban and Exotic Vegetation

- [FUM] Extra-urban miscellaneous
- [FPU] Unverified plantations for silviculture
- [FWU] Weed infestation

Other Natural Environments

- [OSM] Sand, mud
- Watercourse
- Major Road
- Minor Road

Scale: 1:7,500 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400

Metre

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Acknowledgements and Sources:

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6.2.3.2 Threatened ecological communities

Eucalyptus viminalis–Eucalyptus globulus coastal forest and woodland (DVC), listed under the NC Act is present at the south-eastern end of the proposal survey area, but is not present on the proposal site.

The DVC community occurs as small remnants across eastern and northern Tasmania, and is considered important for the conservation of the community. The DVC community is considered to have variable or moderate susceptibility to the plant pathogen Phytophthora.

Two other EPBC Act listed threatened ecological communities' distributions were identified as potentially overlapping the proposal survey area, however no records of these ecological communities were present in the proposal survey area. These species are:

- Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata / E. brookeriana*) (critically endangered).
- Tasmanian white gum (*Eucalyptus viminalis*) wet forest.

6.2.3.3 Flora

6.2.3.3.1 EPBC Act listed species

No threatened flora species listed under the EPBC Act were recorded within the proposal survey area.

Three EPBC Act listed flora species distributions were identified as potentially overlapping the proposal survey area, however a review of the range and habitat requirements of each species determined that they are either absent or unlikely to occur due to the absence of suitable habitat within the proposal survey area. These three flora species are listed in Table 6.2-3.

There are NVA historic records of tiny fingers (*Caladenia pusilla*) and Paterson's spider orchid (*Caladenia patersonii*) within the surrounding Heybridge area, however there is no suitable habitat for either species within the proposal survey area and these two species are therefore unlikely to occur.

6.2.3.3.2 TSP Act listed species

No threatened flora species listed under the TSP Act are within the proposal survey area.

Eight TSP Act listed flora species distributions were identified as potentially overlapping the proposal survey area, however a review of the range and habitat requirements of each species determined that they were either absent or unlikely to occur due to the absence of suitable habitat. Table 6.2-3 presents the likelihood of occurrence of all threatened flora species listed under the EPBC Act and TSP Act identified within a 5 km search radius of the proposal survey area on the PMST and NVA databases.

Table 6.2-3 Likelihood of occurrence of EPBC Act and TSP Act listed flora within the proposal survey area

Scientific name	Common name	TSP Act	EPBC Act	Source	Likelihood of occurrence
Baumea gunnii	Slender twigsedge	r		NVA	Does not occur or absent
Caladenia caudata	Tailed spider-orchid	vu	VU	PMST	Does not occur or absent

Scientific name	Common name	TSP Act	EPBC Act	Source	Likelihood of occurrence
Caladenia patersonii	Paterson's spider orchid	vu		NVA	Unlikely to occur
Caladenia pusilla	Tiny fingers	r		NVA	Unlikely to occur
Leucochrysum albicans var. *tricolor*	Hoary sunray	en	EN	PMST	Does not occur or absent
Persicaria decipiens	Slender waterpepper	vu		NVA	Does not occur or absent
Senecio psilocarpus	Swamp fireweed	en	VU	PMST	Does not occur or absent
Tetratheca ciliata	Northern pinkbells	r		NVA	Does not occur or absent

Unlikely to occur: the species/ecological community has not been recorded in the study area and/or suitable species habitat does not exist in or adjacent to the survey area.
Does not occur or absent: the species/community potential distribution includes the study area but has never been recorded in or adjacent to the study area.
r: listed as Rare under the TSP Act
vu: listed as Vulnerable under the TSP Act
en: listed as Endangered under the TSP Act
VU: listed as Vulnerable under the EPBC Act
EN: listed as Endangered under the EPBC Act

6.2.3.4 Fauna

6.2.3.4.1 EPBC Act listed species

The following EPBC Act listed species **may** potentially occur within the proposal survey area:

- Tasmanian devil (*Sarcophilus harrisii*) (endangered).
- Spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*) (endangered).
- Tasmanian wedge-tailed eagle (*Aquila audax* subsp. *fleayi*) (endangered).
- White-throated needletail (*Hirundapus caudacutus*) (migratory, vulnerable).
- Fork-tailed swift (*Apus pacificus*) (migratory).

The Tasmanian devil and the spotted-tailed quoll have previously been recorded adjacent to the proposal survey area, as incidences of roadkill on Bass Highway and Minna Road. These incidences of roadkill are presented in Figure 6.2-2. The existing population of devils and quolls in the vicinity of the proposal site is relatively small, this is based on the NVA database's records, landscape context and on-ground surveys. These species may forage over the proposal survey area, however there is no suitable denning habitat for either species, as there is limited habitat for prey species, and a lack of denning features such as rocky outcrops, large hollow logs and old wombat burrows.

The Tasmanian wedge-tailed eagle may occasionally overfly the proposal survey area given the species large home ranges. The nearest eagle nest of an indeterminate eagle species (either Tasmanian wedge-tailed eagle or White-bellied sea-eagle) was recorded 1.6 km (ID: 1323) from the proposal study area but has not been verified as present since 2006. The location of this eagle nest in relation to the proposal site is presented in Figure 6.2-2.

Figure 6.2-2:
Fauna within the vicinity of the proposal site

Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Raptor Nest
- Spotted-tailed Quoll (Carcass NVA)
- Tasmanian Devil (Carcass NVA)
- Major Road
- Minor Road

Scale: 1:15,000 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 125 250 500 750

Metre

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Acknowledgements and Sources:

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The White-throated needletail visits the north Tasmanian region from its breeding grounds in Asia during the Australian summer, however it is almost exclusively aerial within its distribution and is not expected to land in the proposal survey area.

The Fork-tailed swift may potentially occur within the proposal survey area, however similar to the White-throated needletail, the Fork-tailed swift is a migratory species which visits Tasmania during the Australian summer months and is not expected to land within the proposal survey area.

The Little penguin (*Eudyptula minor*) is listed as a marine species under the EPBC Act. No penguin burrows nor individuals have been recorded as occurring within the proposal survey area despite targeted surveys.

6.2.3.4.2 TSP Act listed species

The TSP Act listed White-bellied sea-eagle may potentially occur within the proposal survey area. The nearest eagle nest of an indeterminate eagle species (either the Tasmanian wedge-tailed eagle or White-bellied sea-eagle) was recorded 1.6 km (ID: 1323) from the proposal survey area (refer to Figure 6.2-2) but has not been verified as being present since 2006.

Table 6.2-4 presents the threatened fauna that have been identified as being likely to occur listed under the EPBC Act and TSP Act within a 5 km search radius of the proposal survey area.

Table 6.2-4 Likelihood of occurrence of EPBC Act and TSP Act listed fauna within the proposal survey area

Listed fauna	TSP Act	EPBC Act	EPBC migratory /marine	Likelihood of occurrence	Rationale
Fork-tailed swift (*Apus pacificus*)			Migratory	May occur	No NVA records within 5 km of proposal survey area. Aerial species which could occur over the proposal survey area.
Tasmanian wedge-tailed eagle (*Aquila audax* subsp. *Fleayi*)	En	EN		May occur	There are no known nests within 1 km of the proposal survey area. The proposal survey area contains no suitable nesting habitat. Aerial species which could occur over the proposal survey area.
Spotted-tailed quoll (*Dasyurus maculatus* subsp. *Maculatus*)	R	VU		May occur	No suitable habitat within the proposal survey area. There is a NVA record of a roadkill carcass on Minna Road near the intersection with Bass Highway dated 11 February 2020.
White-bellied sea-eagle (*Haliaeetus leucogaster*)	Vu		Marine	May occur	There are no known nests within 1 km of the proposal survey area. No suitable nesting habitat within the proposal study area. Aerial species which could occur over the proposal study area
White-throated needletail (*Hirundapus caudacutus*)		VU	Migratory	May occur	There are no NVA records within 5 km of proposal survey area. Aerial species which could occur over the proposal survey area.

Listed fauna	TSP Act	EPBC Act	EPBC migratory /marine	Likelihood of occurrence	Rationale
Tasmanian devil (*Sarcophilus harrisii)*	En	EN		May occur	There is no suitable habitat within the proposal survey area. There are NVA records of a roadkill carcass on Minna Road dated 17 February 2017 and a carcass on Bass Highway dated 26 December 2018.

May occur: the species/ecological community has been recorded in the study area and suitable species habitat exists or could exist in the survey area following detailed ecological studies.
r: listed as Rare under the TSP Act
vu: listed as Vulnerable under the TSP Act
en: listed as Endangered under the TSP Act
VU: listed as Vulnerable under the EPBC Act
EN: listed as Endangered under the EPBC Act

6.2.3.5 Weeds

Seven declared weed species under the *Weed Management Act 1999*, and now declared as pests under the *Biosecurity Act 2019*, were identified within the proposal survey area:

- Californian thistle (*Cirsium arvense* var. *arvense*): a number of small patches were observed across the proposal survey area.
- Pampas grass (*Cortaderia species*): five plants were recorded along the southern boundary of the proposal survey area, however they were not flowering at the time of the survey so the species could not be confirmed.
- Spanish heath (*Erica lusitanica*): 10 plants were recorded.
- Boneseed (*Chrysanthemoides monilifera* subsp. *monilifera*): Two plants were recorded in the coastal scrub community.
- Blackberry (*Rubus fruticosus aggregate*): was recorded across the coastal scrub community.
- Ragwort (*Senecio jacobaea*): One plant recorded within the coastal scrub community.
- Gorse (*Ulex europaeus*): Three plants recorded within the coastal scrub community.

Boneseed, blackberry, and gorse are listed on the *Weeds of National Significance* index. The *Weeds of National Significance* is a list of weeds identified as a threat to Australian environments based on their potential for spread, invasiveness and socioeconomic impacts.

The full list of introduced flora species is provided in Appendix C.

6.2.3.6 Sites of Geoconservation Significance

The Tasmanian Geoconservation Database is an inventory of geodiversity features, processes, and systems of conservation significance. There are no geoconservation features within the proposal survey area. The closest geoconservation site identified in the Tasmanian Geoconservation Database, is Blythe Heads Folding. This site is located approximately 400 m to the north-west of the proposal site. The significance statement notes that it is a ‘Notable example of type'.

6.2.4 Applicable legislation

6.2.4.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is Commonwealth legislation that protects MNES. The EPBC Act provides for Commonwealth involvement in the assessment and approval of proposed actions that could have an impact on MNES.

The project is considered a 'controlled action' under the EPBC Act, as it has the potential to have a significant impact on the following MNES:

- Listed threatened species and communities (sections 18 & 18A).
- Listed migratory species (sections 20 & 20A).
- The environment of the Commonwealth marine area (sections 23 & 24A).

While the project is considered a 'controlled action' under the EPBC Act, the controlled action decision relates to the whole project. The Commonwealth and Victorian components of the project are being assessed as part of the combined EIS/EES assessment process (refer to Section 1.3).

Where migratory species, threatened flora, fauna and ecological species and communities listed under the EPBC Act interact with listed species under the TSP Act, the potential for impacts associated with construction and operation of the proposal are discussed in Section 6.2.5.

6.2.4.2 Threatened Species Protection Act 1995

Under the TSP Act a person must not knowingly kill, injure or collect a listed species without a permit. Similarly, a person must not disturb a listed species on land subject to an interim protection order or subject to a land management agreement without a permit.

Threatened flora and fauna listed under the TSP Act present within the proposal survey area are discussed in Section 6.2.3. Mitigation measures have been developed to ensure compliance with the TSP Act.

6.2.4.3 Biosecurity Act 2019

The Tasmanian *Weed Management Act 1999* identified declared weeds for the state of Tasmania. In 2023, the Act was replaced by the *Biosecurity Act 2019* and supported by the *Biosecurity Regulations 2022*. Under previous and current regulations, 'declared weeds' and declared 'pests' are subject to management and compliance requirements. The *Biosecurity Regulations 2022* confirm that any declared weed within the meaning of the *Weed Management Act 1999* is a declared pest under the *Biosecurity Act 2019*.

It is essential that weeds and pests within the proposal site are identified and measures are implemented to prevent their spread during construction and operation of the proposal to comply with the general biosecurity duty under the *Biosecurity Act 2019*. This duty requires all people to take all reasonable and practicable measures to prevent, eliminate or minimise, biosecurity risk when dealing with biosecurity matter.

Declared weeds and pests identified in the proposal survey area are presented in Section 6.2.3.5 and proposed mitigation measures to minimise potential impacts are outlined in Section 6.2.6.

6.2.4.4 Nature Conservation Act 2002

The NC Act and *Nature Conservation (Wildlife) Regulations 2021* provide for the conservation and protection of the fauna, flora and geological diversity in Tasmania and for the declaration of national parks and other reserved land. NC Act listed species relevant to the proposal have been identified and discussed in Section 6.2.3.

Schedule 3A of the NC Act lists the native vegetation communities in Tasmania that are threatened. Communities listed under the NC Act are protected from clearance and conversion under the *Forest Practices Act 1985* and are also afforded higher levels of protection under some local government planning schemes.

The clearing or conversion of listed threatened vegetation communities generally requires the preparation and certification of a Forest Practices Plan. However, Regulation 4 (l) of the *Forest Practices Regulations 2017* describes the circumstances in which a Forest Practices Plan is not required and at 4(j) and 4(l) includes the following relevant circumstances:

'Regulation 4 (j)

> *The harvesting of timber or the clearing of trees on any land, or the clearance and conversation of a threatened native vegetation community, for the purpose of enabling –*
>
> *i. The construction of a building within the meaning of the Land Use Planning and Approvals Act 1993 or of a group of such buildings; or*
>
> *ii. The carrying out of any associated development –*
>
> *If the construction of the buildings or carrying out of the associated development is authorised by a permit issued under that Act.*

Regulation 4(l)

> *i. The harvesting of timber or the clearing of trees on any land, or the clearance and conversion of a threatened native vegetation community on any land, to enable the construction and maintenance of electricity infrastructure, if –*
>
> *ii. there is an easement on the land that enables the electricity infrastructure to be constructed or used, or, if there is no such easement, if the owner of the land consents to the construction or maintenance of the electricity infrastructure on the land; and the clearance and conversion is undertaken in accordance with an environmental management system endorsed by the Forest Practices Authority.'*

A Forest Practices Plan would not be required as threatened communities would not be impacted by the proposal.

6.2.4.5 Forest Practices Authority

The Forest Practices Authority (FPA) manages the Tasmanian forest practices system on both public and private land, based on the *Forest Practices Act 1985*. The FPA operates independently, alongside

government and private businesses to regulate all the activities that are defined as ‘forest practices’. The Fauna Technical Note Series (further detailed in Section 6.2.4.5.1) provides information for fauna management in production forests.

6.2.4.5.1 Fauna Technical Note No. 1: Eagle nest searching, activity checking and nest management

Fauna Technical Note 1 provides guidance for the management of eagle species under the Tasmanian forest practices system, focusing on managing the risk of disturbance to breeding birds and associated nest sites. As identified in Section 6.2.3.4, the Tasmanian wedge-tailed eagle and White-bellied sea-eagle may potentially occur within the proposal survey area, and an eagle nest (ID: 1323) was recorded 1.6 km away from the proposal survey area in 2006.

Due to the potential presence of eagle species and nests within the vicinity of the study area, MLPL would undertake eagle nest searches and nest activity checks prior to and during construction in accordance with FPA Fauna Technical Note No. 1 (refer to MM EC03 for further details).

The *National Light Pollution Guidelines for Wildlife* (National Light Pollution Guidelines for Wildlife) (DCCEEW 2023) provides a framework to assess and manage the light pollution impacts on protected wildlife. Construction of the proposal may require occasional night time works to facilitate delivery or oversized plant and equipment, or activities that need to continue without a break (such as concrete pouring). Any required night-time lighting associated with these construction works must adhere to guidance principles outlined in the *National Light Pollution Guidelines for Wildlife* to minimise potential disorientation of seabirds and shorebirds.

6.2.4.5.2 Guide to Eagle Nest Searches and Activity Checks

The EPA *Guide to Eagle Nest Searches and Activity Checks* provides direction to proponents where there is a requirement to undertake eagle nest searches and nest activity checks for the TSP listed wedge-tailed eagle and the White-bellied sea-eagle as part of an environmental impact assessment (such as this EIS). The guidance note is based on the FPA Fauna Technical Note No. 1.

6.2.5 Potential impacts

6.2.5.1 Construction

It is anticipated that 0.75 ha of vegetation on the proposal site, comprising ‘Weed Infestation’ and ‘Unverified plantations’ for silviculture, is to be cleared during construction. There would be no direct impacts to protected vegetation communities, flora and fauna from the construction of the proposal. However, the following construction activities have the potential to cause indirect impacts to natural terrestrial values identified in Section 6.2.3:

- Bulk earthworks and civil works associated with the proposal.
- Increased traffic movements on the surrounding road network.

Indirect impacts from the proposal could include the following:

- Potential spread of weeds, pests, and diseases.
- Roadkill of protected fauna species (such as the Tasmanian devil and Spotted-tailed quoll) as a result of proposal generated road traffic between dawn and dusk.
- Potential injury or death of protected eagle species (Tasmanian wedge-tailed eagle or White-bellied sea-eagle) as a result of traffic movements and/or disorientation to light pollution.
- Disturbance of protected eagle species breeding seasons.

6.2.5.1.1 Vegetation communities

Only one native vegetation community, *Eucalyptus amygdalina* coastal forest and woodland (DAC) was identified within the proposal site. Disturbance to this community has been avoided as part of the design layout and construction methodology. The impact to the native vegetation communities within the proposal survey area are outlined in Table 6.2-5.

Table 6.2-5 Disturbance to native vegetation communities relevant to the proposal

Native vegetation community	Area (ha)	Location	Disturbance
Eucalyptus amygdalina coastal forest and woodland (DAC)	1.5	Present on the proposal site	No disturbance. DAC community would be avoided as part of the construction methodology and establishment of a no-go zone.
Coastal scrub (SSC)	3	Not present on the proposal site	No disturbance. Construction footprint would be confined to the proposal site.
Eucalyptus viminalis–*Eucalyptus globulus* coastal forest and woodland (DVC)	2	Not present on the proposal site	No disturbance. Construction footprint would be confined to the proposal site.

The potential introduction of weeds, pests and diseases may pose a risk to the native vegetation communities present within the proposal survey area and would require ongoing management. The impact significance is considered to be **low**. The low impact significance rating is due to the proposal site being largely cleared, construction vehicles would be confined to internal access roads and any waste being collected or removed from the proposal site would be managed accordingly.

6.2.5.1.2 Threatened fauna

The TSP Act listed mammals Tasmanian devil and Spotted-tailed quoll **may** occasionally pass through the proposal survey area. Whilst there are no previous records or observations of the species or suitable habitat (dens) within the proposal survey area, there are records of roadkill of both species on Minna Road and Bass Highway. There is the possibility of increased mortality as a result of proposal construction generated traffic between dusk and dawn.

Traffic movements associated with the construction of the proposal are planned to occur at the beginning and end of each working day, which would be at 7:00 am and 6:00 pm. Permissible hours for construction works are outlined in Section 2.3.5. The majority of heavy vehicle and worker traffic movements would occur in these times. Traffic movements occurring in periods one hour after sunrise or one hour before sunset

would be considered as night-time movements. The majority of night-time movements would occur in the morning transit to the proposal site with 288 days annually having sunrises after 6 am.

The length of Minna Road from Bass Highway to the proposal site access is less than 200 m. There would be an approximate 204% increase in night time traffic on Minna Road between Bass Highway intersection and the entrance to the proposal site, whilst the busier Bass Highway would have an approximate increase night-time traffic of 4%. Refer to Section 6.13 for further information on traffic generated by the proposal.

The impact significance to Tasmanian devils and Spotted-tailed quolls from construction generated traffic is considered to be **moderate**.

The risk of vehicle strikes to Tasmanian devils and spotted-tailed quolls within the proposal site is negligible, as internal site traffic speeds at night would be less than 15 km per hour.

The TSP Act listed Tasmanian wedge-tailed eagle and the White-bellied sea-eagle have no known nest sites within 1 km of the proposal survey area. The nearest eagle nest has been recorded 1.6 km from the proposal survey area (ID: 1323) but has not been verified as being present since 2006. Both species may overfly the proposal survey area as they have large home ranges. If a nest is observed within 500 m or 1 km line-of-sight prior to construction, there is potential for the disturbance of eagle breeding cycles from construction activities. Overall, both species are unlikely to be impacted by the construction of the proposal and impact significance is considered to be **low**.

The TSP Act listed White-throated needletail may fly over the proposal survey area but would not use the proposal site as they do not come to land. This aerial bird species has low sensitivity to disturbance from the activities associated with the construction of the proposal, and such is unlikely to be impacted. Due to the small amount of vegetation to be cleared, the potential for the White-throated needletail roosting trees to be affected is minimal, and are unlikely to be impacted. The impact significance is considered to be **low**.

6.2.5.2 Operation

Operation of the proposal would involve the following activities which have the potential to cause indirect impacts to natural terrestrial values identified in Section 6.2.3:

- Servicing, testing and repair of proposal equipment and infrastructure including scheduled minor and major outages.

Potential indirect impacts to protected vegetation communities, flora, and fauna as a result of the operational activities above include:

- Disturbance of protected eagle species breeding seasons.
- Management of the potential spread of introduced weeds, pests and diseases.

6.2.5.2.1 Vegetation communities

There would be no direct impacts to vegetation communities during operation of the proposal. The maintenance of weeds would be required to minimise potential indirect impacts to native vegetation from the introduction of weeds, pests and diseases. The impact significance is considered to be **low**. The low impact

significance rating is due to the proposal site being largely cleared, vehicles would be confined to internal access roads and any waste being stored appropriately, and removed from the proposal site regularly.

6.2.5.2.2 Threatened fauna

The TSP Act listed mammals Tasmanian devil and spotted-tailed quoll **may** occasionally pass the proposal survey area. Proposal generated traffic movements are likely to be minimal during operation, therefore there is no expected impact from roadkill to these species.

The TSP Act listed Tasmanian wedge-tailed eagle and the White-bellied sea-eagle have no known nest sites within 1 km of the proposal site, with the nearest eagle nest is over 1.6 km (ID: 1323) but has not been verified as being present since 2006. Both species may occasionally overfly the site as they have large home ranges. If a nest is constructed within 500 m or 1 km line-of-sight, there is potential for the disturbance of eagle breeding cycles from operational activities. Overall, both species are unlikely to be impacted by the operation of the proposal. The impact significance is considered to be **low**.

6.2.5.3 Significance impact assessment

A significance impact assessment of potential impacts to terrestrial natural values during construction and operation prior to the implementation of mitigation measures is presented in Table 6.2-6.

Table 6.2-6 Terrestrial natural values – initial significance impact assessment

Impacted value	Proposal stage	Impact assessment		
		Sensitivity	**Magnitude**	**Significance**
Remnant patch *E. amygdalina* coastal forest and woodland 1.5 ha on the proposal site	Construction, Operation	Low	Negligible	**Low**
Coastal scrub vegetation community 3 ha at proposal survey area	Construction, Operation	Low	Negligible	**Low**
E. viminalis - E. globulus coastal forest and woodland (NC Act listed) 2 ha at proposal survey area adjacent to Blythe River mouth	Construction, Operation	High	Negligible	**Low**
Tasmanian devil and Spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*)	Construction	High	Minor	**Moderate**
Tasmanian wedge-tailed eagle (*Aquila audax* subsp. *fleayi*)	Construction, Operation	High	Negligible	**Low**
White-bellied sea-eagle (*Haliaeetus leucogaster*)	Construction, Operation	High	Negligible	**Low**
White-throated needletail (*Hirundapus caudacutus*)	Construction, Operation	High	Negligible	**Low**
Fork-tailed swift (*Apus pacificus*)	Construction	High	Negligible	**Low**

6.2.5.4 Cumulative Impacts

Out of the nearby proposed and foreseeable projects identified for consideration, construction activities for NWTD may occur in close proximity and in similar timeframes to the proposal. All other projects were

considered unlikely to contribute to the potential impacts of the proposal, and are therefore not expected to have a cumulative impact to terrestrial natural values. This includes fauna species that have large home ranges and move extensively throughout the vicinity surrounding the proposal site.

Twilight and night traffic movements on Minna Road would increase by at least 10% at times due to construction activities associated with the proposal and the Heybridge Shore Crossing and the NWTD combined and may approach a 10% increase of traffic on Bass Highway. Therefore, there is a possibility for cumulative impacts to Tasmanian devils and Spotted-tailed quolls, related to roadkill from twilight and night-time traffic movements from construction of both the project and the NWTD corridor works. The application of the mitigation measures outlined in Table 6.2-7 would ensure that the additional 10% of traffic on a limited extant of road, is unlikely to result in a significant impact or decrease in population of Tasmanian devil and Spotted-tailed quoll.

The construction of the NWTD project corridor would involve the removal of potential impacts of native species. However, this is not an impact of Marinus Link. The proposal and the Heybridge Shore Crossing would not remove any potential habitat of any terrestrial native species.

The construction of the NWTD project corridor would also encounter Tasmanian wedge-tailed eagle nests at much greater number and at closer distance than works associated with the proposal. However, there are mitigation measures that would be adopted that require both inspection of nests and work stoppages (refer to Table 6.2-7) that are considered effective to avoid risks to raptors.

Given the limited extent of roads where the proposal may contribute to roadkill (Bass Highway and Minna Road), and with the application of mitigation measures (refer to Table 6.2-7), the proposal is unlikely to contribute to a significant decrease in the population of Tasmanian devil and Spotted-tailed quolls when combined with the impacts from the NWTD project.

6.2.6 Management, mitigation and monitoring

Proposed mitigation measures to minimise potential impacts on terrestrial natural values are presented in Table 6.2-7. Mitigation measures in other sections that are relevant to the management of terrestrial natural values include:

- Section 6.4 (Water quality) specifically measures which address impacts to surface and groundwater quality or groundwater drawdown.
- Section 6.5 (Air quality) measures managing dust impacts reducing potential impacts on surrounding ecological receptors.
- Section 6.13 (Infrastructure and off-site ancillary facilities), specifically measures for site inductions and driver awareness to minimise instances of roadkill.

Together, these measures would minimise potential impacts to terrestrial natural values.

Table 6.2-7 Terrestrial natural values – mitigation measures

Ref	Mitigation measure	Proposal stage
EC01	Develop and implement measures to protect the area of *Eucalyptus amygdalina*, coastal forest and woodland, present on the proposal site primarily by implementing a no-go zone.	Construction Operation
EC02	Prior to construction commencing, prepare a biodiversity management plan. Measures will include as a minimum: • Pre-works inspection of proposal site for presence of threatened fauna species, undertaken by a suitably qualified ecologist. • Salvage and re-location of fauna, if required, prior to construction. • Procedures for the management of injured fauna. • Procedures if unexpected threatened species are identified. • Measures detailing the identification and management of weeds, developed in accordance with the *Weed and disease Planning and Hygiene Guidelines* (DPIPWE 2015b), the relevant Statutory Weed Management plans associated with the declared weeds on site, and the Tasmanian *Biosecurity Act 2019*. • Adopt measures to minimise roadkill in MM T01, as appropriate. The biodiversity management plan will be implemented for the duration of construction.	Construction
EC03	Prior to construction commencing and every year during construction, confirm that there are no active Tasmanian wedge-tailed eagle nor White-bellied sea-eagle nests within a distance of 500 m of the site boundary, or within 1 km line-of-sight of the site boundary, using eagle nest search data collected within one year of construction commencing. At any time prior to or during construction, if an eagle nest is observed within 500 m, or within 1 km line-of-sight, works will cease until activity checks and other measures have been implemented in accordance with the Tasmanian Forest Practices Authority's *Fauna Technical Note No. 1 Eagle nest searching, activity checking and nest management* (FPA 2023), the *Threatened Tasmanian Eagles Recovery Plan 2006-2010,* and the EPA *Guide to Eagle Nest Searches and Activity Checks*. If activity checks are required, the following measures will be implemented: • Activity checks are to be conducted between mid-October and the end of December by a suitably qualified, FPA/NRE accredited assessor. • Activity checks are considered likely to disturb a breeding pair, potentially leading to breeding failure and would only be conducted under exceptional circumstances following consultation with NRE Tasmania and EPA Tasmania. Construction will be deferred until outside of the eagle nest management constraint period if a nest within 500 m, or within 1 km line-of-sight is determined to be active as per FPA *Fauna Technical Note No. 1*.	Construction
EC04	Prepare and implement an eagle nest management strategy if a new eagle nest is identified within 500 m or 1 km line-of-sight of the site boundary during construction, in accordance with FPA *Fauna Technical Note No. 1*, the *Threatened Tasmanian Eagles Recovery Plan 2006-2010,* and the EPA *Guide to Eagle Nest Searches and Activity Checks*. This strategy will be prepared in consultation with NRE Tasmania and EPA Tasmania.	Construction

6.2.7 Residual impacts

A significance impact assessment on the residual impacts to terrestrial natural values following the implementation of mitigation measures are presented in Table 6.2-8.

Following the implementation of the mitigation measures outlined in Section 6.2.6, the impact significance of potential impacts to terrestrial natural values have been reduced to **low**.

Table 6.2-8 Terrestrial natural values – residual impact significance assessment

Impacted value	Proposal stage	Initial impact significance	Mitigation measures	Residual impact significance
Remnant patch *E. amygdalina* coastal forest and woodland 1.5 ha on proposal site	Construction, Operation	Low	EC01 and EC02	**Low**
Coastal scrub vegetation community 3 ha at proposal study area	Construction, Operation	Low	EC02	**Low**
E. viminalis - E. globulus coastal forest and woodland (NC Act listed) 2 ha at proposal study area adjacent to Blythe River mouth	Construction, Operation	Low	EC02	**Low**
Tasmanian devil (*Sarcophilus harrisii*) and Spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*)	Construction	Moderate	EC02	**Low**
Tasmanian wedge-tailed eagle (*Aquila audax* subsp. *fleayi*)	Construction, Operation	Low	EC03 and EC04	**Low**
White-bellied sea-eagle (*Haliaeetus leucogaster*)	Construction, Operation,	Low	EC03 and EC04	**Low**
Fork-tailed swift (Apus pacificus)	Construction, Operation	Low	None required	**Low**
White-throated needletail (*Hirundapus caudacutus*)	Construction, Operation	Low	None required	**Low**

6.3 Noise and vibration emissions

This section provides a summary of the findings of the Noise and Vibration Impact Assessment provided in Appendix D.

6.3.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.3-1.

Table 6.3-1 Relevant EIS guidelines

Noise and vibration emissions – EIS guidelines	Section
Discuss impacts on human sensitive receptors of the proposal on ambient (surrounding) noise levels during both the construction and operational phases, including:	
Identifying and describing all sources of noise with the potential to cause nuisance, including vehicle movements	Section 6.3.5.1, 6.3.5.2
A map of the location of all such sources of noise	Figure 2-3
Considering the potential for noise emissions during both the construction and operational phases to cause nuisance for nearby land users, particularly at noise sensitive premises, including:	
Establishing the baseline (pre-existing) noise in the area with particular focus on sensitive receptors likely to be influenced by the proposal	Section 6.3.3
Establishing noise level criteria for the operational phases of the proposal	Section 6.3.2.4
Predicting noise levels at noise sensitive premises	Section 6.3.5
Consideration of timing and duration of noise	Section 2.3.5, 6.3.5
Consideration of existing noise levels to determine whether predicted noise levels are likely to result in nuisance for sensitive premises	Section 6.3.5
Consideration of the potential for cumulative noise impact from the Heybridge shore crossing works	Section 6.3.5.3.1
Development of a construction noise and vibration management plan, including management of noise complaints and options for noise and vibration monitoring, if required	Section 6.3.6
Discussion of proposed mitigation measures for operational noise	Section 6.3.6
Legislative and policy requirements	
Consideration should be given to the requirements of the *Tasmanian Environment Protection Policy (Noise) 2009*	Section 6.3.4.2

6.3.2 Methodology

The method to assess noise and vibration emissions associated with the construction and operation of the proposal includes:

- Identifying sensitive receptors, including existing and potential future dwellings.
- Characterising the existing noise environment.
- Determining noise and vibration management levels in accordance with relevant guidelines.
- Modelling to quantify the potential construction and operational noise and vibration impacts.
- Risk assessment.

- Identifying mitigation measures that are like to be required to minimise construction noise and vibration impacts.
- Consideration of residual impacts, after the application of mitigation measures.

The method is described further in the following sections, with a detailed methodology, including any relevant assumptions and limitations, included in Appendix D.

6.3.2.1 Study area

Sensitive receptors, which include existing and potential future residential dwellings, were identified through review of aerial imagery and cadastral parcels.

A total of 151 existing receptors in the vicinity proposal site were identified. Due to the large number of receptors identified, a subset of receptors was selected to represent the distribution of existing residential dwellings and future residential dwellings in the area, to provide the basis for the assessment of noise and vibration (refer to Figure 6.3-1). Refer to Section 6.3.3 for further discussion on the existing conditions.

6.3.2.2 Baseline characterisation

The baseline noise environment is relevant to the assessment of both construction and operational stages of the proposal and provides context to the predicted noise levels associated with the proposal. The baseline noise levels also inform the selection of management levels for the assessment of construction noise and design targets for the assessment of operational noise.

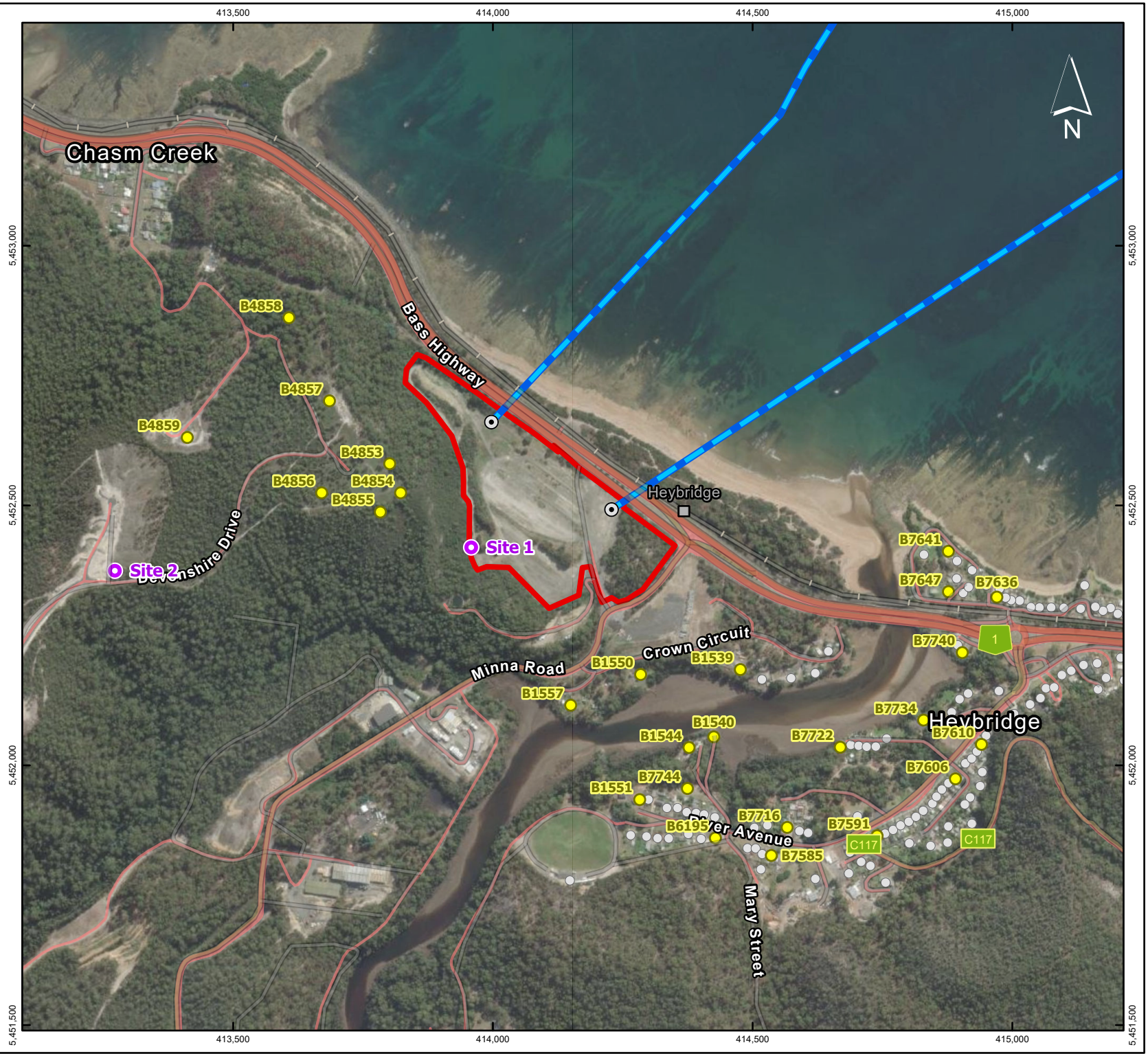
Baseline noise conditions vary due to factors such as the presence of localised background sources. To characterise the baseline noise environment at the proposal site, the following noise monitoring locations were monitored continuously during the day, evening and night over a period between 6 May and 25 May 2022:

- Within the proposal site.
- At the residential nature reserve.

The location of these monitoring sites is shown in Figure 6.3-1.

Baseline vibration levels at human sensitive receptors near the proposal site are expected to be very low, due to the few residential properties and largely vacant land comprising of native forest and bushland surrounding the proposal site. Given this, and that background vibration levels are not used to set the criteria values when assessing potential vibration impacts from construction, an assessment of the existing vibration levels at the proposal site has not been conducted.

Figure 6.3-1:
Noise monitoring locations and sensitive receptors near the proposal site



Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Noise Monitoring Location
- Noise Receptor Location
- Sensitive Receptor Location
- Major Road
- Minor Road

Scale: 1:10,000 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400 500

Metre

MARINUS LINK

Acknowledgements and Sources:

Data Source: Marinus Link GIS Data Repository and theLIST ©State of Tasmania .
Background Image: Esri Community Maps Contributors, DPIPWE, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Maxar
Produced By: Marinus Link for the Tasmanian Heybridge Converter Station EIS.
Date Figure Exported: 21/11/2024

6.3.2.3 Construction assessment

Tasmanian environmental noise legislation and guidelines do not set mandatory noise level requirements for construction activities which are proposed to occur during the day-time (i.e. outside of the time periods specified as prohibited hours by the EMPC Noise Regulations). The New South Wales *Interim Construction Noise Guideline* (NSW ICNG) (NSW DECC 2009), which sets out the application of noise management levels for noise at residences was used, in agreement with EPA Tasmania. The NSW ICNG requires the development of noise management levels and a comparison of predicted construction noise levels with the noise management levels.

A 'rating background level' (RBL) was established for the assessment of the proposal, which is the overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period. The RBL is the level used for assessment purposes (NSW EPA 2017). The 'worst case' noise levels from construction are predicted and then compared to the noise management levels in a 15-minute assessment period to determine the likely impact of construction noise. Refer to Table 6.3-2 for the NSW ICNG noise management levels for residential receptors. Section 6.3.5.1 provides further detail on the noise management levels established for the proposal.

In addition to noise management levels, the NSW ICNG refers to recommended standard working hours which are broadly equivalent to the permissible working hours defined under EMPC Regulations, with the main difference being that the NSW ICNG defines more restrictive standard working hours for weekend works (i.e. standard working hours under the NSW ICNG do not include Saturday afternoons or Sundays).

To further support adoption of this proposed approach, a recent Tasmanian approval included project-specific standard working hours which retained work on Saturday afternoons, consistent with the EMPC Regulations, but excluded construction work on Sundays, consistent with the NSW ICNG. For consistency, the same modified standard working hours have been adopted for assessment of construction noise, as outlined in Table 6.3-2 (referred to hereafter as standard working hours).

Table 6.3-2 NSW ICNG noise management levels

Time of day	Noise management level, dBA $L_{eq,15\ min}$	Application
Standard working hours Monday to Friday 0700 to 1800 hrs Saturday 0800 to 1800 hrs No work on Sundays or public holidays	RBL + 10 dB	Above this level, locations are categorised as 'noise affected' and the NSW ICNG guidance notes that all feasible and reasonable work practices to minimise noise should be applied. In addition, all potentially impacted residents should be informed of the nature of the works to be carried out, the expected noise levels and duration, as well as contact details. As the noise management level is based on the RBL, different levels apply to different receivers.
	75 dB	Corresponds to the NSW ICNG definition for 'highly noise affected' locations. Above this level, the NSW ICNG guidance indicates there may be strong community reaction to noise, and additional noise controls are warranted (such as respite periods, and consultation with the community around the times of day when the work would be least disruptive and possible changes to the duration of work).

Time of day	Noise management level, dBA $L_{eq,15\ min}$	Application
Outside standard working hours	RBL + 5 dB	Corresponds to the NSW ICNG noise management level outside recommended standard hours. The NSW ICNG guidance notes that all feasible and reasonable work practices should be applied to meet the noise management level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB above the noise affected level, the proponent should consult with the community.

Additionally, the assessment of noise levels during the night period also referred to the Tasmanian *Environment Protection Policy (Noise) 2009* (Noise EPP) acoustic environment indication, based on guidance from the WHO publication *Guidelines for Community Noise 1999*. which is commonly used to inform an assessment of the risk of sleep disturbance (the WHO publication details the relationship between the definition of health and the effects of community noise exposure). The Noise EPP and WHO guidelines set a value of 45 dB at a façade location which includes the noise reflected from the dwelling. This is broadly equivalent to 42 dB measured at a location away from the façade.

A subset of the noisiest construction activities was identified for prediction and assessment of construction noise levels, and representative noise emission data for major equipment was compiled using standards (AS 2436, BS 5228-1), project contractors, and historical data. Noise modelling was then conducted to predict the highest noise levels at each assessment receiver for each construction activity, which were compared against NSW ICNG noise management levels and reference level for evaluating the risk of sleep disturbance. The results of the assessments were used to identify the types of mitigation and management measures that are likely to be required.

Due to the limitations of the standards AS 2436 and BS 5228-1, which tend to overestimate noise levels at distant locations, and the complex terrain profile of the area around the proposal, noise predictions were also calculated using ISO 9613-2:1996 *Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO 9613-2).* SoundPLAN version 9.0 noise modelling software was used, with adjustments made for terrain and ground effects. Conservative assumptions were adopted including construction equipment operating continuously and simultaneously at maximum operating duty, and atmospheric conditions with low levels of atmospheric absorption of sound.

The assessment considered the cumulative noise impacts of HDD works associated with the Heybridge Shore Crossing and if these were to occur at the same time as the noisiest phases of the earthworks, civil works, or infrastructure works for the proposal (refer to Section 6.3.5.3).

6.3.2.4 Operational assessment

The predicted noise levels for the operation of the proposal are measured in the unit of A-weighted, equivalent continuous sound levels (L_{Aeq}) and have been compared to adopted reference levels provided in Table 6.3-3, which have been sourced from the following:

- The acoustic environment indicator levels defined by the Noise EPP.

- The fixed plant noise limits outlined in the EMPC Noise Regulations.
- Design targets sourced from guidance in the Victorian Noise Protocol, corresponding to the base noise limits for noise sources located in major urban areas.

Table 6.3-3 Noise reference levels – operation

Legislation/Policy	Time of day	Reference levels
Noise EPP acoustic environment indicator levels	Day (0700 – 2200 hours)	55 dB $L_{Aeq,16h}$
	Night (2200 – 0700 hours)	45 dB $L_{Aeq,8h}$
EMPC Noise Regulations fixed plant limits	Day (0700 – 2200 hours)	42 dB L_{Aeq}
	Night (2200 – 0700 hours)	37 dB L_{Aeq}
Victorian Noise Protocol design targets	Day (Monday to Saturday 0700 – 1800 hours)	45 dB $L_{Aeq,30-min}$
	Evening (1800 – 2200 hours, and 0700 – 2200 hours on Sundays and public holidays)	40 dB $L_{Aeq,30-min}$
	Night (Monday to Sunday 2200 – 0700 hours)	35 dB $L_{Aeq,30-min}$

Whist the above documents and reference levels in Table 6.3-3 provide context to the predicted noise levels, the design targets sourced from the Victorian Noise Protocol were used as the criteria for assessing typical operations under normal conditions, excluding emergency or overload situations. These targets were selected based on consultation with EPA Tasmania, use in the concept deign assessment, and the more stringent criteria being appropriate with consideration of low background noise levels, and the protection of external and internal amenity at residential locations, including with consideration of sleep disturbance.

For consistency with the design targets used for normal operation, the Victorian Noise Protocol provisions for emergency plants were referenced for the emergency standby generators (55 dB $L_{Aeq,30-min}$).

For the operational noise assessment, noise emission data for the converter station plant was used to create a 3D digital model of the site using SoundPLAN noise modelling software, predicting and comparing environmental noise levels with reference values, including Tasmanian legislative guidance and design targets discussed with EPA Tasmania during the assessment process.

Predicted noise levels were calculated using the octave band method from ISO 9613-2, consistent with the construction noise modelling, and based on full-power operating conditions for stages one and two of the proposal.

6.3.2.5 Risk assessment

The assessment adopted a **risk assessment approach**. Given that noise and vibration is an inevitable consequence during construction and operation of a major infrastructure project, it is the risk of potential community disturbance which is assessed. The risk rating is determined by considering the consequence (having regard to of the noise level, character and duration) and likelihood, with the objective being to determine appropriate risk controls. The risk rating matrix adopted for the assessment is provided in Table 6.3-4 below.

Table 6.3-4 Noise and vibration – risk rating matrix

Consequence	Likelihood				
	Certain	Likely	Possible	Unlikely	Rare
Severe	**Extreme**	**Extreme**	**High**	**High**	**Medium**
Major	**Extreme**	**High**	**High**	**Medium**	**Medium**
Moderate	**High**	**High**	**Medium**	**Medium**	**Low**
Minor	**High**	**Medium**	**Medium**	**Low**	**Low**
Low	**Medium**	**Medium**	**Low**	**Low**	**Low**

6.3.3 Existing conditions

The areas adjoining the proposal site consist of a residential area to the east and south-east, existing commercial uses to the south, and conservation areas to the west and further south beyond the adjoining commercial uses. Human sensitive receptors identified in proximity to the proposal site are shown in Figure 6.3-1 and include:

- Existing residential dwellings to the east of the proposal site, with the locations ranging in distance from 138 m (B1550) to 693 m (B7610) from the proposal site boundary.
- Future residential dwellings to the west and south-west including the Heybridge Residential Nature Reserve hamlets (which consists of six hamlets for residential subdivision the nearest being the Devonshire Drive Hamlet which would comprise 15 residential lots), with six locations ranging in distance from 123 m (B4854) to 267 m (B4856) from the proposal site boundary.
- A future residential dwelling located north of the Heybridge Residential Nature Reserve on George Street, located 436 m (B4859) from the proposal site boundary.

The distance of each of the representative receptors to the proposal site is provided in Table 6.3-10. The measured background noise levels for the day, evening, and night periods are summarised in Table 6.3-5. The ambient noise levels at both noise monitoring locations were in the range of 40-50 dB L_{Aeq},10min, except on days when noise levels are elevated by high winds and rains. The existing noise levels at the proposal site are below the Noise EPP indicator noise levels presented in Table 6.3-6.

Table 6.3-5 Measured background noise levels, dB L_{A90} per period

Noise monitoring location	Day (0700 – 1800 hrs)	Evening (1800 – 2200 hrs)	Night (2200 – 0700 hrs)
Site 1: Within the proposal site	42	36	32
Site 2: At the Residential nature reserve	38	35	32

As discussed in Section 6.3.2, the baseline vibration levels at human sensitive receptors near the proposal site are expected to be very low. As such, an assessment of the existing vibration levels at the proposal site has not been conducted.

6.3.4 Applicable legislation

6.3.4.1 Environmental Management and Pollution Control (Noise) Regulations 2016

The EMPC Noise Regulations, made pursuant to the EMPC Act, is the primary mechanism for managing and controlling construction noise. The regulations define the hours that equipment and machinery used on construction and demolition sites can be heard in neighbouring residential properties. Construction works that result in audible noise to the proposal site's neighbouring residential properties must not occur during the prohibited hours outlined in Section 2.3.5. However, audible construction works may occur during the prohibited hours where there are established dedicated noise requirements via an approved instrument (such as any instrument granted following this EIS).

6.3.4.2 Environment Protection Policy (Noise) 2009

The Noise EPP is strategic framework document that defines overarching principles and objectives for reducing health risks and amenity impacts associated with environmental noise.

The Noise EPP identifies a range of factors that need to be considered when setting appropriate noise controls, including the protection of amenity and the wider economic and social benefits of a new project. The Noise EPP acknowledges that specific requirements relating to noise levels and hours of operation are to be primarily covered by the EMPC Noise Regulations.

The Noise EPP provides the acoustic environment indicator levels which provide a reference when considering the acoustic environment and the effectiveness of implemented noise control measures and strategies (refer to Table 6.3-6).

Table 6.3-6 Noise EPP acoustic environment indicator levels

Specific environment	Health effects	Average noise levels and time base (hours) levels	Maximum noise levels
Outdoor living area	Serious annoyance, daytime and evening	55 dB $L_{Aeq,16h}$	-
	Moderate annoyance, daytime and evening	50 dB $L_{Aeq,16h}$	-
Outside bedrooms	Sleep disturbance, window open	45 dB $L_{Aeq,16h}$	60 dB L_{AFmax}

6.3.4.3 EPA Victoria Publication 1826.4

EPA Victoria Publication 1826.4 Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues (Victorian Noise Protocol) provides guidance for determining noise limits for new and existing commercial, industrial and trade premises, and entertainment venues.

The Victorian Noise Protocol provides more stringent operational noise criteria than the reference levels sourced from Tasmanian legislation and guidelines. The adopted Victorian Noise Protocol reference levels are presented in Table 6.3-3.

6.3.4.4 Tasmanian State Road Traffic Noise Management Guidelines

The *Tasmanian State Road Traffic Noise Management Guidelines* provides target noise levels for public roads as outlined in Table 6.3-7.

However, the criteria represent targets for normal traffic flows and does not address temporary noise increases associated with construction generated traffic. The target noise levels can be used as a conservative reference for contextualising predicted construction traffic noise levels. An assessment of noise levels associated with construction traffic is provided in Section 6.3.5.

Table 6.3-7 Reference levels for traffic noise

Description	Target criteria
Public roads	63 - 68 dB $L_{A10,18h}$

6.3.4.5 AS 2436 – Guide to noise and vibration control on construction, demolition and maintenance sites

AS 2436 provides the Australian Standard and guidance on noise and vibration control in respect to construction, demolition, and maintenance sites. Noise levels of construction equipment used for the proposal are to be obtained from the AS 2436.

6.3.4.6 NSW Construction Noise and Vibration Guidelines

The *NSW Construction Noise and Vibration Guidelines* (CNVG) sets out minimum working distances from human sensitive receptors for typical items of vibration intensive plant. The minimum working distances outlined in the CNVG are indicative and would vary depending on the particular item of plant and the local geotechnical conditions.

As there is no standard or regulation that specifies criteria for the control of construction vibration levels in Tasmania, the following minimum working distances (as outlined in the CNVG) have been adopted for the assessment of the proposal:

- To avoid cosmetic building damage: up to 25 m.
- For human comfort: up to 100 m (greatest distance relates to vibratory rollers).

The CNVG would be used to determine site-specific safe working distances for vibration generating activities during construction.

6.3.4.7 NSW Interim Construction Noise Guideline

The NSW ICNG provides guidance on the management of noise from construction sites. In the absence of mandatory noise requirements for construction activities during the day in Tasmania, the NSW ICNG has been used in assessing construction noise generated from the proposal. The NSW ICNG requires the development of noise management levels and a comparison of predicted construction noise levels with the noise management levels. This can then be used to inform the extent of noise controls required for construction activities.

During consultations with EPA Tasmania during the EIS preparation, the NSW ICNG noise management levels were agreed as a suitable basis for assessing construction activity noise. Refer to Table 6.3-9 for the noise management levels, based on the NSW ICNG, adopted for the construction of the proposal.

6.3.5 Potential impacts

6.3.5.1 Construction

Construction of the proposal would involve the following noise and vibration generating activities:

- Site preparation, surveying and vegetation clearing as needed.
- Works to construct the converter station bench (bulk earthworks).
- Civil works including construction of the access road and internal roads, stormwater drainage system, foundations, and transformer bays.
- Infrastructure works including structural steelwork for buildings and installation of electrical apparatus and infrastructure such as the DVDC converter equipment, HVAC switchgear and auxiliary transformers.
- Testing and commissioning of the converter stations, switching station and ancillary site systems.
- Heavy construction vehicles using the public road network surrounding the proposal site.

6.3.5.1.1 Noise emission data

Table 6.3-8 presents an indicative selection of plant and machinery required for construction of the proposal and associated noise emissions (sound power levels).

Table 6.3-8 Sound power levels of construction plant/equipment

Noise source/construction activity	Plant/equipment	Sound power level, dB L_{WA}	Approximate overall sound power level, dB L_{WA}
Earthworks and civil works	Concrete agitator	109	120
	Concrete saw	117	
	Dozer	108	
	Dump truck	117	
	Excavator	107	
	Light vehicles	100	
	Roller	108	
	Tipper	107	
	Wheeled loader	113	
Infrastructure works	Hand tools	116	125
	Light vehicles	100	
	Mobile crane	113	
	Non-slewing crane	104	

6.3.5.1.2 Noise management levels

A set of noise management levels have been adopted to assess the predicted construction noise levels and are outlined in Table 6.3-9. The noise management levels referred to in the NSW ICNG (refer to Section 6.3.2) are based on a measure of the background noise environment (refer to Section 6.3.3) referred to as the RBL.

In recognition of the night-time being the critical period for the assessment of construction outside standard working hours, the noise management levels are defined for the proposed standard working hours and the night-time only. Updated background noise data obtained in the future may be used to separately define noise management levels for the evening and Sundays. Noise management levels based on Site 1 data are primarily relevant to existing receptors to the south-east and east of the proposal site, and Site 2 data is primarily relevant to potential future receptors to the west.

Table 6.3-9 Adopted noise management levels – construction

Time of day	Noise management level, dB $L_{Aeq,15min}$		Description
	Site 1	Site 2	
Standard working hours	52	48	Above this level, locations are categorised as 'noise affected'. Feasible and reasonable work practices to minimise noise should be applied. Potentially impacted residents should be informed of the works, the expected noise levels and duration, and contact details.
	75	75	Corresponds to the NSW ICNG definition for 'highly noise affected'. Above this level, there may be strong community reaction to noise, and additional noise controls are warranted.
Night	37	37	Corresponds to the NSW ICNG noise management level outside recommended standard hours. The NSW ICNG guidance notes that all feasible and reasonable work practices should be applied to meet the noise management level.

6.3.5.1.3 Predicted noise levels and assessment

Construction of the proposal is predicted to generate elevated noise levels at nearby human sensitive receptors. The primary sources of noise associated with the construction of the proposal are the converter station earthworks and infrastructure construction. Construction would predominantly occur during the day-time hours.

The level of noise at each identified human sensitive receptor from construction activities would vary significantly throughout construction depending on the construction activities being carried out, proximity to works, the types of equipment being used, and the duration of operation of each equipment item. As such, assumptions made in the construction noise assessment represent a conservative approach. For example, noise modelling predicts the highest noise level at each identified sensitive receptor for each construction activity based on a minimum separation distance between the construction activity and receptor. Additionally, the predicted noise levels are based on a conservative approach of combined simultaneous operation of all relevant plant/equipment associated with earthworks, civil works and infrastructure works for the proposal.

Predicted noise levels generated from the construction of the proposal were assessed against the noise management levels outlined in Table 6.3-9. Table 6.3-10 presents the predicted noise levels at nearby residential receptors during the construction of the proposal, with modelled noise contours presented in Figure 6.3-2 and Figure 6.3-3.

Table 6.3-10 Predicted construction noise levels – standard working hours

Receptor no.	Distance to proposal site (m)	Earthworks and civil works (dB L_{Aeq})	Infrastructure works (dB L_{Aeq})
Existing residential dwellings			
B1539	233	45	50
B1540	305	43	48
B1544	302	44	49
B1550	138	42	48
B1551	375	45	50
B1557	186	41	47
B6195	482	44	49
B7585	558	43	48
B7591	645	41	46
B7606	691	40	45
B7610	693	39	44
B7636	618	33	38
B7641	518	38	43
B7647	525	39	44
B7716	526	43	48
B7722	477	42	47
B7734	575	38	43
B7740	581	37	42
B7744	374	45	50
Future residential dwellings – Heybridge Residential Nature Reserve – Devonshire Drive Hamlet			
B4853	131	**58**	**64**
B4854	123	**56**	**61**
B4855	164	**53**	**59**
B4856	267	46	**51**
B4857	154	37	43
B4858	252	38	43
Future residential dwellings – George Street residential development			
B4859	436	30	35
Range – Existing residential dwellings		**33 – 45**	**38 – 50**
Range – Future residential dwellings		**30 – 58**	**35 – 64**

Orange shaded cell indicate exceedance of adopted noise management level for standard working hours (48 L_{Aeq} /52 dB L_{Aeq}).

The predicted noise levels for construction activities required for the proposal are above the daytime background levels presented in Table 6.3-5 (i.e., 38-42 dB L_{A90} during the day) for the majority of identified human sensitive receptor locations. This indicates that construction noise would be audible at most human sensitive receptor locations during the day.

In relation to existing residential receptor locations, the predicted noise levels for earthworks and infrastructure construction activities are below the adopted noise management level of 52 dB L_{Aeq} for standard working hours. At the nearest existing receptors to the south-east, the predicted noise levels are within 5 dB of the noise management level for infrastructure works. Infrastructure works could attract adjustments for noise character, such as impulsive noise from metal impacts/contact and tonal noise from grinding and saws. While the prediction is conservative, there is a risk of noise levels above the noise management levels for these locations.

For the nearest future residential receptor locations within Devonshire Drive Hamlet (B4853, B4854, B485 and B4856), the predicted noise levels would exceed the noise management level of 48 dB L_{Aeq} for all activities. In all cases, the predicted noise levels are below the highly affected noise management level of 75 dB L_{Aeq}.

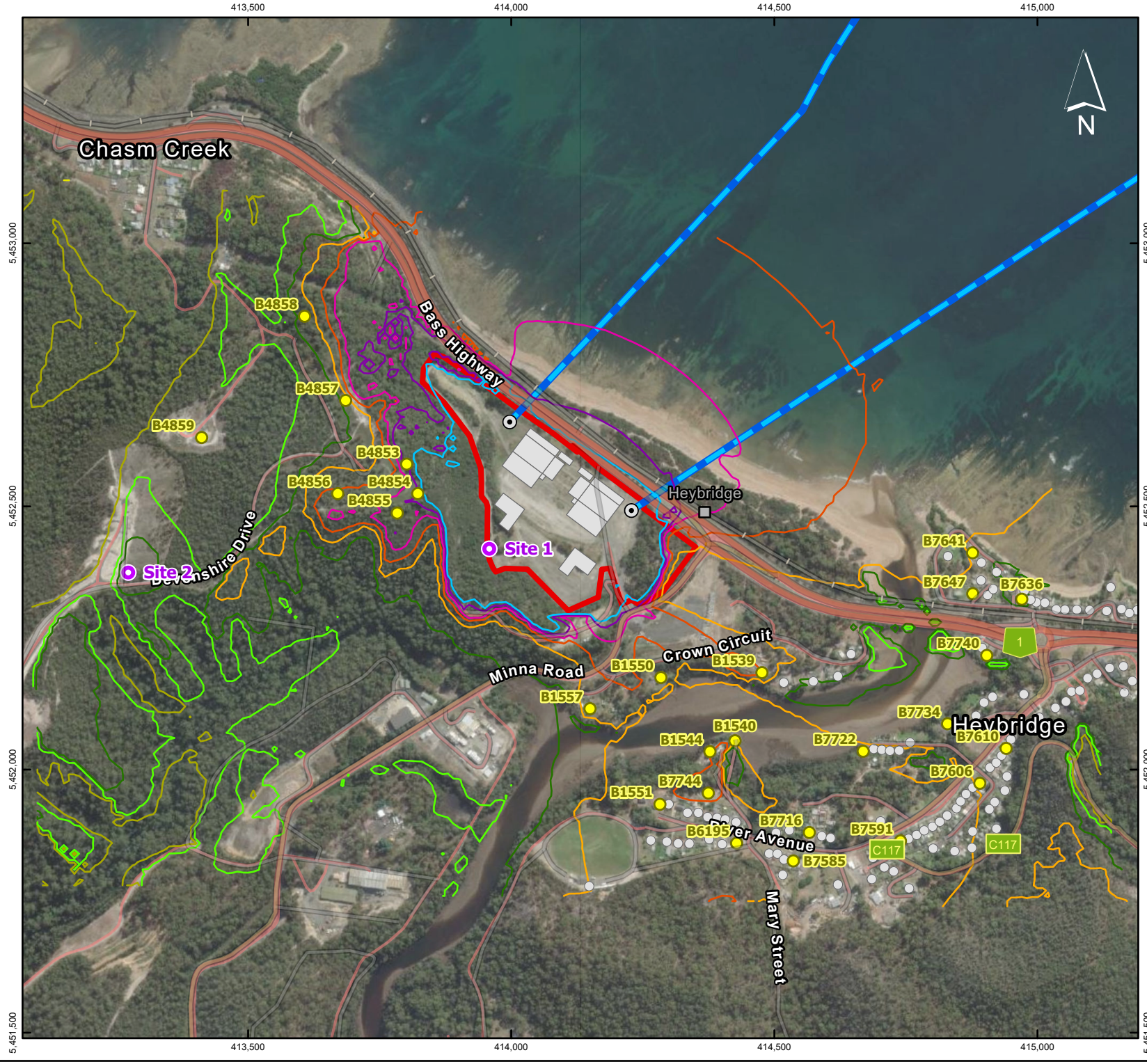
At the George Street residential development (B4859), the predicted noise levels are below the noise management level of 48 dB L_{Aeq}.

Overall, the predicted noise levels for construction during standard working hours indicate an exceedance of noise management levels. As such, disturbance from noise generated from construction activities prior to mitigation has an overall risk rating of **medium** (refer to Table 6.3-11). It is however important to note that the predictions represent the upper noise levels of construction activities based on worst-case scenarios. In practice, noise levels are likely to be lower than predicted in most instances.

Table 6.3-11 Construction during standard working hours – risk assessment

Item	Rating	Description
Risk consequence	Low to moderate	Predicted noise levels are typical of the range expected for construction of a major infrastructure project in a semi-urban area. However, some construction activities could result in noise levels above the noise management level at the nearest existing receptors, and predicted noise levels at the nearest receptor locations of Devonshire Drive Hamlet are well above the noise management level, and are sufficient to represent a risk of disturbance to future residents in this area, particularly given the duration of construction works.
Likelihood	Possible	The predicted noise levels are based on conservative assumptions. Noise levels in practice are expected to be lower than predicted for most of the time. Further, the highest noise impacts relate to the Devonshire Drive Hamlet which remains undeveloped and it is presently unclear whether dwellings would be established at the time of the proposed construction works.
Overall risk	**Low to medium**	The applicable guidance for this rating is that the risk can be acceptable if controls are in place, and attempts should be made to reduce the risk to low.

Figure 6.3-2:
Predicted noise contours for earthworks and civil works during construction



Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Noise Monitoring Location
- Noise Receptor Location
- Sensitive Receptor Location
- Indicative Site Buildings
- Major Road
- Minor Road

Noise Contours - Civil Works (dB)

- 20
- 25
- 30
- 35
- 40
- 45
- 50
- 55
- 60

Scale: 1:10,000 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400 500

Metre

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Acknowledgements and Sources:

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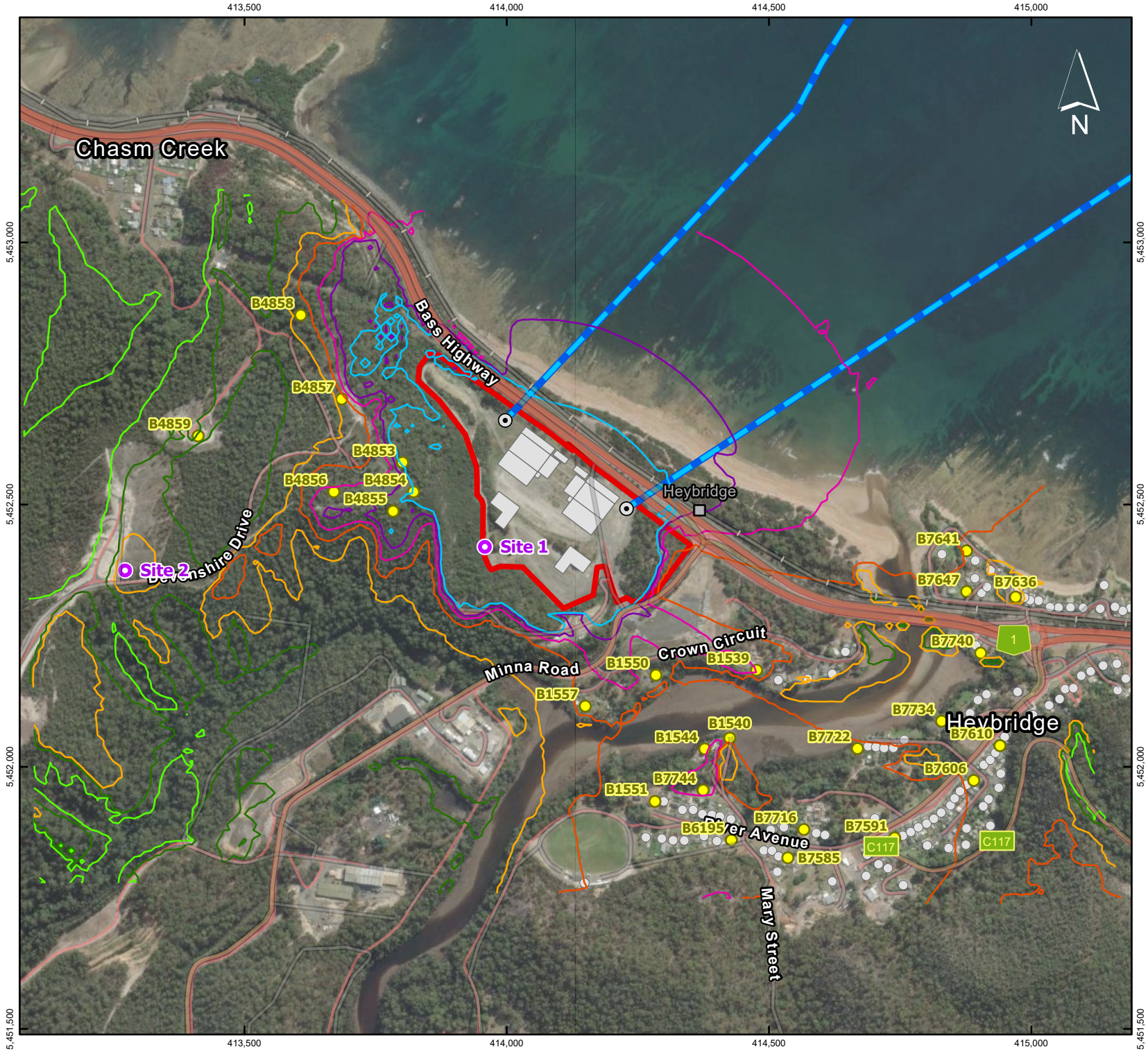
Figure 6.3-3:
Predicted noise contours for infrastructure works during construction



Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Noise Monitoring Location
- Noise Receptor Location
- Sensitive Receptor Location
- Indicative Site Buildings
- Major Road
- Minor Road

Noise Contours - Infrastructure Works (dB)

- 30
- 35
- 40
- 45
- 50
- 55
- 60

Scale: 1:10,000 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400 500

Metre

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Off-site traffic noise

Off-site construction noise generated by traffic associated with the proposal has the potential to impact human sensitive receptors along the transport routes to the proposal site.

The majority of the routes to the proposal site are along Bass Highway from either Burnie (to the west of the proposal site), Devonport or Launceston (to the east of the proposal site). Vehicles would turn off Bass Highway into the proposal site at the Minna Road intersection. Heavy construction vehicles required for the proposal would be restricted to standard working hours, with exception for instances of required oversized deliveries. Refer to Section 6.13 for further discussion of construction traffic generated by the proposal.

Noise levels generated by the passing of heavy vehicles have been estimated to assess the noise levels along the route. These estimations of traffic noise are intended as an indication of the potential contribution of construction related vehicle movements to total road traffic noise levels along the routes. The predicted off-site construction traffic noise levels at various distances are presented in Table 6.3-12.

Table 6.3-12 Estimated heavy vehicle noise levels at varying distances

Distance from road (m)	15 m	25 m	50 m	100 m
Average noise level, dB $L_{Aeq,1hr}$	55	53	50	47

The *Tasmanian State Road Traffic Noise Management Guidelines* provides target noise levels for public roads at normal traffic flows and does not address temporary increases associated with construction generated traffic, however target criteria can be used as a conservative reference for contextualising predicted construction traffic noise levels. The predicted noise contribution for off-site construction traffic is well below the 63 – 68 dB $L_{A10,\ 18\text{-hour}}$ targets which apply to permanent road traffic noise levels.

Due to the temporary nature of construction, the disturbance from noise generated construction traffic has an overall risk rating of **low**.

6.3.5.1.4 Vibration

The nearest buildings and human sensitive receptors to the proposal site are beyond the minimum working distances set by the NSW CNVG for both cosmetic building damage (up to 25 m) and human comfort (up to 100 m). The nearest existing residential dwelling (B4854) is located 123 m from the proposal site and would therefore be beyond the indicative minimum working distances provided by the NSW CNVG for both cosmetic building damage and human comfort.

The nearest proposed residential lot boundaries (Devonshire Drive Hamlet) are located about 90 m from the proposal site boundary. The exact dwelling locations are not known at this stage, but are likely to be located further away, accounting for setback from the property boundaries. Whist vibration may be perceptible at receptors less than 100 m from vibration intensive construction boundaries, the brief periods vibration may be perceived are expected to be acceptable, and manageable through equipment selection, consultation and monitoring if required. As such, impacts associated with vibration generated from construction activities are considered unlikely to occur, with an overall risk rating of **low** (refer to Table 6.3-13).

Table 6.3-13 Construction vibration – risk assessment

Item	Rating	Methodology
Risk consequence	Low	All sensitive receptors are located well beyond the indicative distance where there is a risk of cosmetic building damage as a result of vibration intensive construction plant. However, some of the proposed future sensitive receptors may be close enough for there to be the potential for disturbance of human comfort.
Likelihood	Unlikely	Given that the sensitive receptors are significantly further than the distances for cosmetic building damage, vibration impacts are unlikely.
Overall risk	**Low**	The applicable guidance for this rating (the lowest risk rating under the Victorian EPA Publication 1695.1 guidance) is that the level of risk is acceptable. Attempts to eliminate the risk should be made, but higher risk levels take priority.

6.3.5.2 Operation

Operational noise levels from the proposal site have been assessed based on the concept design. The primary sources of operational noise associated with the proposal are the converter transformers and valve coolers, each of which would be housed in a separate building. The sound power levels nominated for the assessment generally range from 70 dB L_{WA} for auxiliary transformers through to 87 dB L_{WA} for the valve coolers.

The operational noise levels associated with the converter station are predicted for:

- **Typical operations**: representative of normal full-power operation of two converter stations during the day, evening and night, accounting for temperatures up to 40°C during the day and evening and up to 35°C at night.
- **Emergency standby generator operation**: normal full-power typical operations of the converter stations with simultaneous maintenance testing of the two emergency standby generators.

The predicted noise levels for the operation of the converter station under typical day and night operations, are outlined in Table 6.3-14, with modelled noise contours presented in Figure 6.3-4, Figure 6.3-5 and Figure 6.3-6. These predicted noise levels are based on simultaneous operation of two converter stations including all relevant plant which represents a conservative assessment approach.

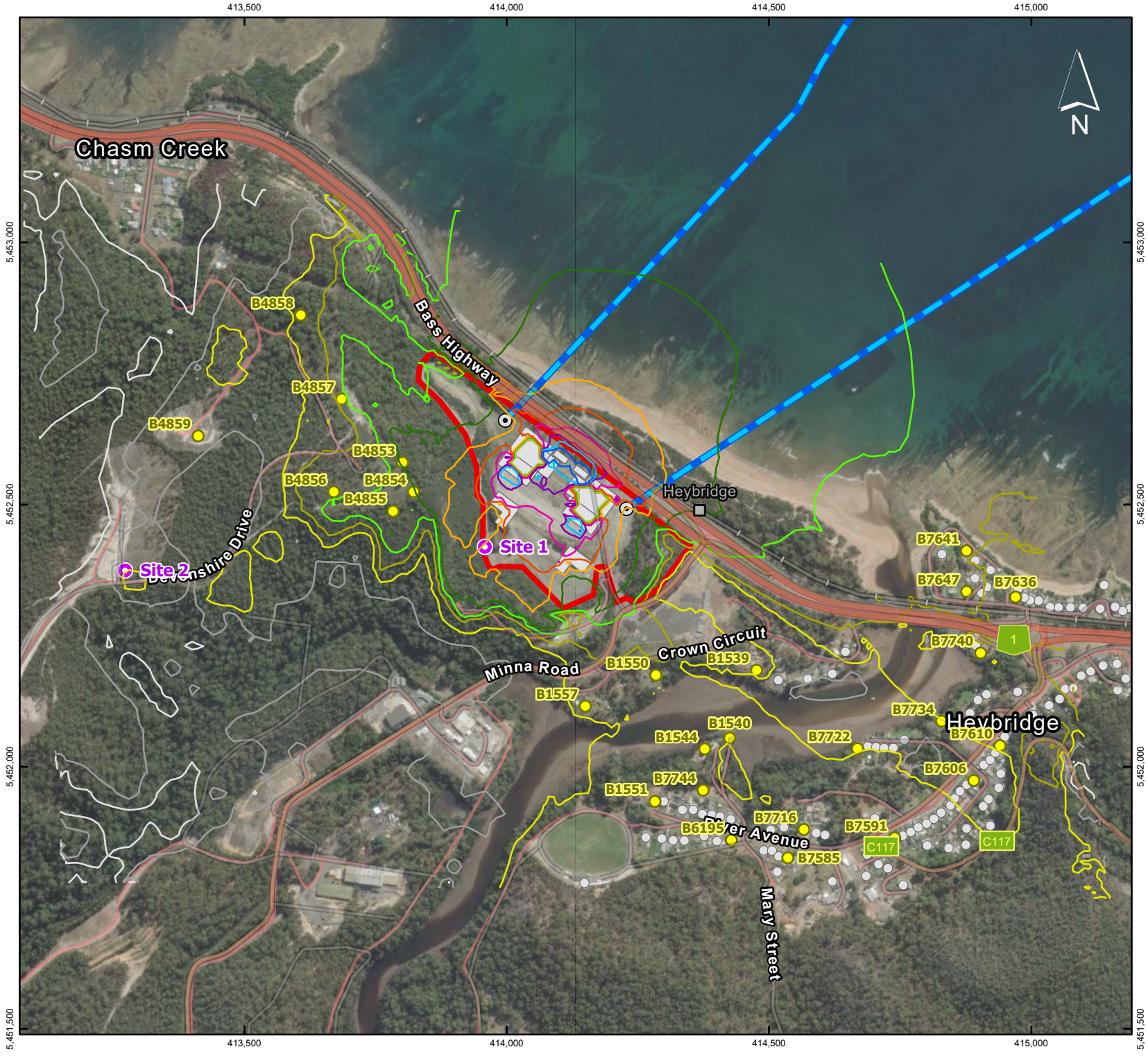
The emergency standby generators are proposed to be tested for one hour every three months during the daytime on a weekday. The assessment criterion adopted for the emergency standby generator plant testing periods is 55 dB L_{Aeq},30-min (based on the Victorian Noise Protocol).

Table 6.3-14 Predicted operational noise levels, dB L_{Aeq}

Receptor no.	Typical operations		Emergency standby generator operation
	Day/evening	**Night**	**Day (1 hour every 3 months)**
Existing residential dwellings			
B1539	22	19	31
B1540	23	22	35
B1544	24	23	34
B1550	24	23	32

Receptor no.	Typical operations		Emergency standby generator operation
	Day/evening	Night	Day (1 hour every 3 months)
B1551	24	22	35
B1557	22	21	32
B6195	23	21	34
B7585	22	20	33
B7591	21	18	32
B7606	18	14	29
B7610	20	15	28
B7636	23	16	25
B7641	25	18	29
B7647	28	20	31
B7716	22	20	34
B7722	20	17	29
B7734	20	15	26
B7740	23	17	29
B7744	24	23	35
Future residential dwellings – Heybridge Residential Nature Reserve – Devonshire Drive Hamlet			
B4853	37	35	51
B4854	34	31	45
B4855	33	30	45
B4856	29	25	38
B4857	27	22	35
B4858	22	17	31
Future residential dwellings – George Street residential development			
B4859	18	12	24

Figure 6.3-4:
Predicted noise contours for typical day operation



Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Noise Monitoring Location
- Noise Receptor Location
- Sensitive Receptor Location
- Indicative Site Buildings
- Major Road
- Minor Road

Noise Contours - Day (dB)

- 10
- 15
- 20
- 25
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65

Scale: 1:10,000 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400 500

Metre

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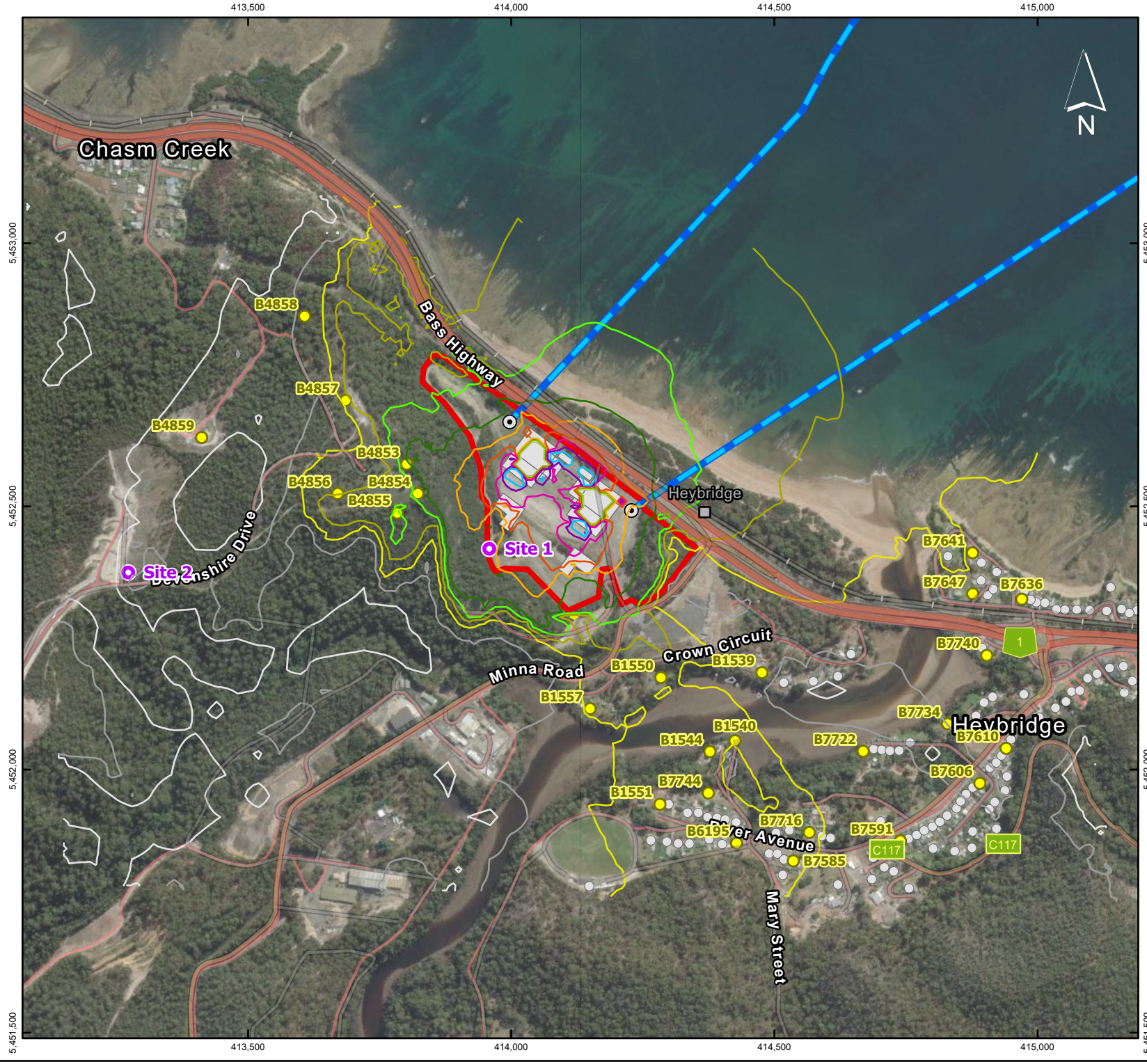
Figure 6.3-5:
Predicted noise contours for typical night operation



Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Noise Monitoring Location
- Noise Receptor Location
- Sensitive Receptor Location
- Indicative Site Buildings
- Major Road
- Minor Road

Noise Contours - Night (dB)

- 10
- 15
- 20
- 25
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65

Scale: 1:10,000 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400 500

Metre

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Figure 6.3-6:
Predicted noise contours for atypical day operation

(Normal operations plus emergency standby generator testing)

Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Noise Monitoring Location
- Noise Receptor Location
- Sensitive Receptor Location
- Indicative Site Buildings
- Major Road
- Minor Road

Noise Contours - Atypical Day (dB)

- 15
- 20
- 25
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65

Scale: 1:10,000 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400 500

Metre

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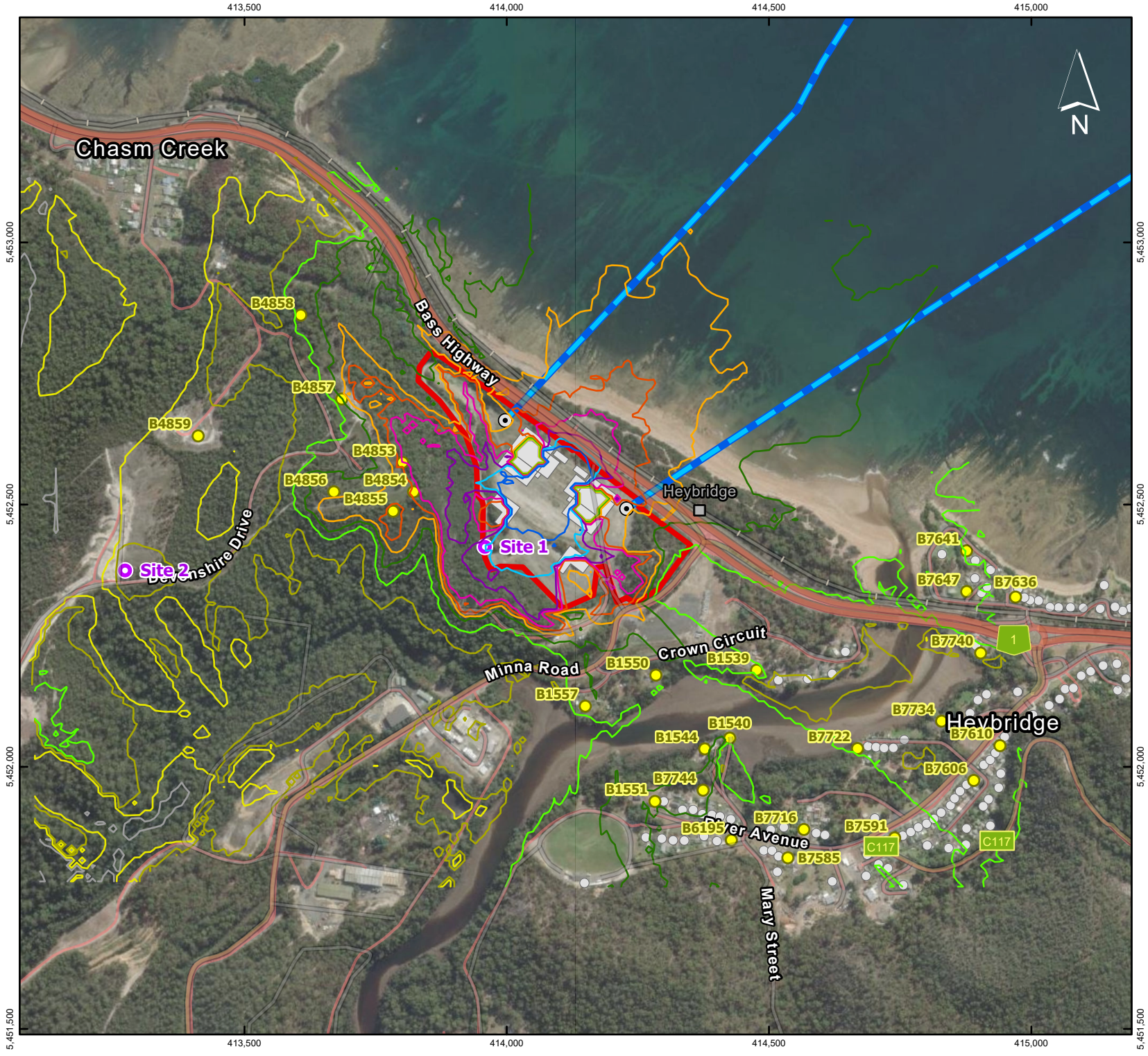

The predicted noise levels for the operation of the proposal are well below all adopted reference levels and achieve the proposed assessment criteria at all residential receptors (refer to Table 6.3-3). The highest predicted noise levels at an existing dwelling are 28 and 23 dB L_{Aeq} for the day/evening and night periods respectively, these represent relatively low noise levels which would be comparable to or below the background noise levels in most instances. The highest predicted noise levels at the boundary of a proposed future residential area are 37 and 35 dB L_{Aeq} for the day/evening and night periods respectively. These levels are within the range of background noise levels but would likely be audible during quiet periods (particularly at night).

The predicted operational noise levels are lower than the Noise EPP acoustic environment indicator levels (refer to Table 6.3-3) for both day and night periods.

The predicted operational noise levels for typical operations are well below the adopted reference levels, however, in recognition of the extent of noise control measures required to achieve the design targets, and the uncertainty about the imposition of noise limits or restrictions by EPA Tasmania, the risk of operational noise impacts prior to mitigation has been assessed as **medium** (refer to Table 6.3-15).

Table 6.3-15 Predicted operational noise – risk assessment

Item	Rating	Methodology
Risk consequence	Minor to moderate	The predicted noise levels are below the reference levels of the Noise EPP and the EMPC Noise Regulations, and below the design targets determined from the Victorian Noise Protocol.
Likelihood	Possible	The assessment is based on the selection of low noise emission plant and site-specific noise attenuation. While the predicted noise levels are well below the reference levels and the design targets in most instances, the night-time predicted noise level at one of the future residential development sites is equal to the design target. Attention to noise emissions would be essential during subsequent design and equipment procurement to achieve outcomes that are consistent with the assessment findings.
Overall risk	**Medium**	The applicable EPA Victoria Publication 1695.1 guidance for this rating is that the risk can be acceptable if controls are in place, and attempts should be made to reduce the risk to low.

6.3.5.3 Cumulative impacts

6.3.5.3.1 Cumulative impacts with the Heybridge Shore Crossing proposal

If construction of the Heybridge Shore Crossing occurs at the same time as the noisiest phases of the earthworks, civil works or infrastructure works for the proposal, the cumulative construction noise may be higher than indicated. Specifically, cumulative construction noise levels during noisier stages of construction may be approximately 1-3 dB higher than indicated for civil works, infrastructure works or shore crossing if the works occur at the same time.

However, it is important to note that the existing sensitive receptor locations with the potential for the greatest cumulative increase in noise are the receptor locations with lowest predicted noise levels. At all locations where the predicted cumulative noise increase is more than 1 dB, the highest predicted noise levels of each construction activity are at least 5 dB lower than the applicable noise management level (refer to Table 6.3-9). In relation to potential future residential sensitive receptors to the west of the proposal site, cumulative

noise with the Heybridge Shore Crossing works would increase the number of sensitive receptors where noise levels are predicted to be above the noise management level of 48 dB L_{Aeq}. The increase in noise levels at these receptor locations would be managed by the mitigation measures outlined in Table 6.3-17 (specifically MM NV02).

It is also important to note that the predictions represent the upper noise levels of construction activities based on worst-case scenarios for each activity. In practice, noise levels are likely to be lower than predicted in most instances. Cumulative construction noise impacts are not anticipated to occur in the evening and night-time periods as simultaneous night works are not expected to occur.

6.3.5.3.2 Cumulative impacts with the nearby projects

Of the nearby proposed and foreseeable projects identified for consideration, only the NWTD is within close proximity to the proposal. All other projects are located over 5 km away and therefore do not cause a significant impact to noise and vibration emissions at the proposal site. Heavy vehicle traffic when multiple projects are constructed at the same time could result in cumulative noise increases, however for this to occur the projects must use the same construction traffic routes, and peak traffic generating phases of the projects must overlap. Based on these considerations, the risk of cumulative construction noise impacts is **low**.

The primary cumulative consideration that is relevant to the proposal is the potential for cumulative operational noise with the NWTD, however, the operational noise sources associated with the remaining NWTD are limited, and therefore the risk of cumulative operational noise impacts is **low**.

6.3.5.4 Risk assessment

Potential risks associated with the elevated noise levels and vibration emissions generated by the construction and operation of the proposal have been summarised in Table 6.3-16. Potential risks have been assessed prior to the implementation of mitigation measures. The methodology used for this risk assessment is detailed in Appendix D.

Table 6.3-16 Noise and vibration emissions – risk assessment

Affected value	Potential risk	Proposal stage	Initial risk (without mitigation)
Ambient noise environment	Airborne noise generated by construction activities associated with the converter station during standard working hours impacting noise sensitive areas.	Construction	**Medium**
Ambient noise environment	Airborne noise generated by heavy construction vehicles using the public road network during standard working hours affecting noise sensitive areas.	Construction	**Low**
Ambient vibration environment	Ground borne vibration generated by construction activities resulting in perceptible vibration in sensitive (habited) areas or building damage.	Construction	**Low**
Ambient noise environment	Airborne noise generated by operation of the converter station affecting noise sensitive areas.	Operation	**Medium**

6.3.6 Management, mitigation and monitoring

Proposed measures to minimise potential impacts associated with noise and vibration impacts are presented in Table 6.3-17. Mitigation measures in other sections that are relevant to the management of noise and vibration include:

- Section 6.13 (Infrastructure and off-site ancillary facilities), specifically measures which address construction traffic management.
- Section 8.2 (Mitigation measures), specifically general measures which address consultation with relevant stakeholders to manage the interface of nearby projects under construction at the same time (MM Gen06).

Together, these measures will minimise the potential noise and vibration impacts.

Table 6.3-17 Noise and vibration emissions – mitigation measures

Ref	Mitigation measure	Proposal stage
NV01	Prior to construction commencing, conduct additional background noise monitoring at noise affected sensitive receptors in the vicinity of the proposal site. The background noise monitoring data will: • Inform the assessment of construction noise (MM NV02 and MM NV03) and operational noise (MMs NV04, NV05 and NV06). • Be conducted at a selection of locations which are representative of the receptors that could be impacted by construction and operation of the proposal. The background noise monitoring and results analysis will be conducted, where relevant, in accordance with procedural guidance detailed in: • *Noise Measurement and Procedures Manual 2008*. • Australian Standard 1055:2018 *Acoustics - Description and measurement of environmental noise.*	Construction
NV02	Prior to commencement of construction, develop a construction noise and vibration management plan in consultation with EPA Tasmania. The construction noise and vibration management plan will document: • A description of all noise generating construction activities and their locations. This must include a schedule of equipment types and numbers for each activity and location. • A description of the construction program including timing and duration of construction activities. • The results of additional background monitoring conducted under MM NV01. • Detail the reasonable and feasible work practices and mitigation measures to be applied to minimise noise and vibration associated with both on-site and off-site sources of construction activities (including heavy vehicle movements on local roads), including: - Requirement for the selection major plant items with low noise emissions, characterised by sound power levels that are equivalent to, or lower than, the values/ranges indicated in AS 2436 *Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites (Reconfirmed 2016)*, unless it can be demonstrated that adhering to these values would not be reasonably practicable. - Measures for the control of potentially annoying characteristics such as tonality, impulsive and low-frequency.	Construction

Ref	Mitigation measure	Proposal stage
	- Scheduling protocols for minimising the potential disruption caused by high noise levels as a result of transient construction activities which occur near to receivers for brief periods. - Details of any locations where temporary screens or enclosures are identified as a reasonably practicable control measure, informed by updated construction noise modelling. • Requirements for monitoring including verification noise testing (if warranted) to assess the effectiveness of the noise controls before commencing continuous night works. • Communication protocols for notifying affected receivers in advance of the works occurring. • Protocols for providing respite in circumstances where residents are affected by prolonged exposure to elevated noise levels as a result of construction works out of hours. • Complaint handling and response protocols. The construction noise and vibration management plan will address the requirements of: • *Environmental Management and Pollution Control (Noise) Regulations 2016*. • *Environment Protection Policy (Noise) 2009*. • Australian Standard AS 2436. The construction noise and vibration management plan will be a sub plan to the CEMP and implemented for the duration of construction.	
NV03	Conduct construction noise monitoring in accordance with the requirements of the construction noise and vibration management plan prepared in accordance with MM NV02. The results of the construction noise monitoring must be documented in accordance with the timeframe and reporting requirements established in the construction noise and vibration management plan. The report must identify if changes to the construction noise mitigation and management measures are warranted to minimise the impact of noise as far as reasonably practicable.	Construction
NV04	Prior to installing the converter station and any enclosing structures, prepare a design noise assessment report for the final converter station design. The report will: • Include predicted noise levels based on the final design of the converter station and representative noise emission data for the final equipment selections for the proposal. • Provide a schedule of the measures that have been incorporated into the design for the control of environmental noise levels, demonstrating that all reasonable and practical measures would be implemented to minimise the impact of operational noise. • Present the results of updated background noise monitoring conducted to for the nearest receptors to the proposal site (MM NV01). • Provide details of the noise frequency characteristics of key items of plant such as the transformers and valve coolers, and assessment of whether character adjustments are warranted. • Demonstrate that noise levels for the final design and equipment selections during typical operations (normal full-power operation during elevated temperatures, excluding emergency standby generators and overload conditions), when assessed in accordance with the procedures of the *Tasmanian Noise Measurements Procedures Manual*, Second Edition dated 2008, are predicted to comply with: - Day (Monday to Saturday 0700 – 1800 hrs): 45 dB $L_{Aeq,30\text{-}min}$ - Evening (Monday to Saturday 1800 – 2200 hrs, and 0700 – 2200 hrs on Sundays and public holidays): 40 dB $L_{Aeq,30\text{-}min}$	Construction

Ref	Mitigation measure	Proposal stage
	- Night (Monday to Sunday 2200 – 0700 hrs): 35 dB $L_{Aeq,30\text{-}min}$ • Demonstrate that noise levels for the final design and equipment selections during testing of the emergency standby generators, when assessed in accordance with the procedures of the *Tasmanian Noise Measurements Procedures Manual*, Second Edition dated 2008, are predicted to comply with a level of 55 dB $L_{Aeq,30\text{-}min}$ (testing to occur during the day on weekdays for a period of not more than one hour every three months). The design noise assessment report will be made available to EPA Tasmania on request.	
NV05	As part of the Operational Environmental Management Plan (OEMP), develop an operational noise management plan for the converter station in consultation with EPA Tasmania. The operational noise management plan will: • Document the noise mitigation and management measures developed in design (MM NV04) that apply to the operation and maintenance of the converter station. • Procedures for, and timing of, noise monitoring to be carried out to assess compliance with the applicable noise limits when the converter station commences operation. • Details and timing of noise compliance reporting to be submitted to the EPA. • Details of any maintenance and monitoring measures that are required to maintain ongoing compliance. • Procedures for routine operational testing of plant that is used solely for emergencies (e.g. regularity, days, and times of testing). • Procedures to investigate noise complaints or suspected noise compliance issues. The operational noise management plan will be made available to EPA Tasmania on request. The operational noise management plan will be a sub plan to the OEMP and implemented during operation.	Operation
NV06	Prepare an operational noise compliance assessment report based on: • An inspection of the converter station to confirm that the noise mitigation and management measures documented in the operational noise management plan (MM NV05) have been fully implemented. • The results of noise monitoring conducted in accordance with the operational noise management plan (MM NV05), to assess compliance with the applicable noise limits. The report will be submitted to EPA Tasmania within six months of each stage of the converter station becoming fully operational.	Operation

6.3.7 Residual impacts

An assessment of residual noise and vibration risks associated with the proposal was undertaken following the implementation of the noise and vibration mitigation measures. The results of this assessment are presented in Table 6.3-18. The methodology used for the residual risk assessment is detailed in Appendix D.

Table 6.3-18 Noise and vibration emissions – residual risk assessment summary

Affected value	Potential risk	Proposal stage	Initial risk	Mitigation measures	Residual risk
Ambient noise environment	Airborne noise generated by construction activities associated with the converter station during standard working hours	Construction	Medium	NV02	Low

Affected value	Potential risk	Proposal stage	Initial risk	Mitigation measures	Residual risk
	impacting noise sensitive areas.				
Ambient noise environment	Airborne noise generated by heavy construction vehicles using the public road network during standard working hours affecting noise sensitive areas.	Construction	Low	NV02	**Low**
Ambient vibration environment	Ground borne vibration generated by construction activities resulting in perceptible vibration in sensitive (habited) areas or building damage.	Construction	Low	NV02	**Low**
Ambient noise environment	Airborne noise generated by operation of the converter station affecting noise sensitive areas.	Operation	Medium	NV04, NV05, and NV06	**Medium**

The implementation of the mitigation measures outlined in Section 6.3.6 is considered to effectively manage the identified noise and vibration risks associated with the proposal to an acceptable level, with all residual impacts assessed as **medium** to **low**.

6.4 Water quality (surface and groundwater)

This section provides a summary of the findings of the Surface Water Impact Assessment provided in Appendix E and the Groundwater Impact Assessment provided in Appendix F. It also provides a summary of potential ASS risk based on the findings of the Contaminated Land and Acid Sulfate Soils Impact Assessment provided in Appendix B. Contamination risks where relevant are addressed in Section 6.1.

6.4.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.4-1.

Table 6.4-1 Relevant EIS guidelines

Water quality (surface and groundwater) – EIS guidelines	Section
Results of any baseline water quality, biological and sediment monitoring undertaken of potentially impacted waterways	Section 6.4.3
Consideration of Protected Environmental Values (PEVs) under the State Policy on *Water Quality Management 1997*	Section 6.4.4.2
Identify any freshwater ecosystems of high conservation management priority using the Conservation of Freshwater Ecosystem Values (CFEV) database, including values in the vicinity of the proposal. The specific CFEV information should include Conservation Management Priority Potential	Section 6.4.3.1.1, 6.4.3.2.3
Details of potential stormwater management (including during reasonably foreseeable flood events). A map of the indicative locations of stormwater collection systems and details of drainage control measures such as cut-off drains and sediment settling ponds.	Section 6.4.6
Consideration of construction and operational impacts on water quality, including: • Works undertaken in and near waterways. • The potential for pollutants to become entrained in stormwater. • Specific consideration of the potential for contaminated material or ASS to be disturbed. • Any proposed point source liquid emissions (wastewater or stormwater). • Cumulative impact with proposed shoreline crossing works.	Section 6.4.5.1, 6.4.5.2
Discuss proposed avoidance and mitigation measures to minimise potential impacts on surface water quality. In regard to potential ASS, the risk should be managed and monitored in accordance with applicable *Australian Government ASS Guidelines and Tasmanian ASS Management Guidelines*. The national guidelines indicate that a management plan is required for an activity if >100m³ ASS materials is likely to be disturbed during the construction phase. This management plan should clearly describe and detail construction techniques, include a risk assessment and describe management and monitoring activities.	Section 6.4.6
Provide justification for any proposed emission of pollutants to surface water in accordance with the principles under the *State Policy on Water Quality Management 1997* and with application of a 'weight of evidence approach' consistent with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Reference should be made to published or determined (site specific) water quality guideline values for receiving environments.	Section 6.4.4.2
Where any subsurface works are proposed: • Provide a map showing the location of any groundwater bores (refer to the Groundwater Information Portal), a conceptual groundwater model for regional and local aquifer flows and details of any baseline groundwater quality monitoring undertaken.	Section 6.4.3.2

Water quality (surface and groundwater) – EIS guidelines	Section
• Identify any surface water and groundwater dependant ecosystems that may receive groundwater from areas impacted by the proposal.	
Discuss potential impacts of the proposal on groundwater (quality and quantity), including interruption of flow and release of sediment, and cumulative impact with proposed shoreline crossing works.	Section 6.4.5
Discuss proposed avoidance and mitigation measures to minimise potential impacts on surface and groundwater quality.	Section 6.4.6
Provide justification for any potential impact to groundwater in accordance with the principles under the *State Policy on Water Quality Management 1997* and with reference to likely groundwater community values, associated guideline values and guideline values for receiving surface waters. For information regarding the water quality management framework and evaluation criteria in Tasmania refer to *Technical Guidance for Water Quality Objectives* (WQOs) Setting for Tasmania, August 2020	Section 6.4.4.2
Dangerous goods and environmentally hazardous materials	
Provide a quantitative analysis of any identified risk of impact to groundwaters or surface water quality and aquatic ecosystems as a result of a major hazard event and detail relevant mitigation measures. The analysis should systematically identify all potential major environmental hazards (internal and external) to people and the environment associated with the construction, operation, maintenance and decommissioning of the proposal. It is expected that risks to receiving aquatic waterbodies and ecosystems will be considered through Hazard and Operability Study and emergency management planning and that environmental impact mitigation measures will be incorporated into emergency response plans as appropriate.	Section 6.4.5 and 6.7.5.
Legislative and policy requirements	
It must be demonstrated that the proposal is consistent with the objectives and requirements of relevant water management policies and legislation including the *Water Management Act 1999*, the *State Policy on Water Quality Management 1997*, and the *Tasmanian State Coastal Policy 1996*. In particular, it must be demonstrated that the proposal will not prejudice the achievement of any water quality objectives set for water bodies under the State Policy on *Water Quality Management 1997*. Where water quality objectives have not yet been set, EPA should be consulted to identify the baseline water quality data required to enable the water quality objectives to be determined. For information regarding the water quality management framework and evaluation criteria in Tasmania refer to WQOs Setting for Tasmania, August 2020.	Section 6.4.4

6.4.2 Methodology

Groundwater and surface water existing conditions and impacts for the proposal site (including the Heybridge Shore Crossing proposal site) have been assessed together, providing an assessment of the cumulative impacts of the two proposals. For the purposes of this EIS, existing conditions and impacts have been discussed separately where feasible.

6.4.2.1 Surface water

The assessment adopted a **risk assessment approach** and relied on existing data, contamination sampling conducted for the contamination assessment, and proposal-specific modelling. The assessment considered the potential for the construction and operation of the proposal to influence the key surface water values, including water quality, geomorphology and flooding. From these key surface water values, a range of potential risks associated, including their respective hazards and impact pathways for these risks were

identified, with a risk assessment approach adopted for the purposes of determining these potential effects of the proposal.

Three main aspects relating to surface water and their impact pathways have been considered:

- **Flooding**: the potential for the proposal and the Heybridge Shore Crossing proposal to affect waterways and hydrology with respect to flooding and future climate change scenarios.
- **Water quality**: the potential for contaminated runoff or sediment to be transported into surface waters.
- **Geomorphology**: the study of landforms and their origin. The assessment focused on the banks and beds of waterways, for example, the potential for the proposal and the Heybridge Shore Crossing proposal to contribute to or initiate erosion.

Baseline conditions, based on available data and literature, as well as baseline flood modelling, included:

- **Flooding**: flood mapping of existing conditions in the 0.5% AEP event indicated that the Blythe River is largely confined to its floodplain and does not interact with the proposal site. Surface flows follow well defined valleys before joining the Blythe River. The proposal is situated outside the Blythe River floodplain, adjacent to Bass Highway. The existing conditions model highlighted significant ponding of water in the northern extent of the proposal footprint, with depths up to 1.6 m at the entrance to the outfall culvert that passes beneath Bass Highway.
- **Water quality**: monitoring data for the site and Blythe River estuary is lacking. Known factors influencing existing water quality in the Blythe catchment, river and estuary include:
  - Forestry, cropping, dairy, and other agricultural activities.
  - Industrial activities such as:
    - The paint pigment factory (tioxide Australia) at the proposal site that historically released an iron-rich acid solution into the water until it was closed in 1996.
    - Mineral processing operations with significant discharges of silica sand to the Lower Blythe River.
- **Geomorphology**: the shear stress analysis for the 0.5% AEP and climate change events indicate that the areas of higher shear stress are concentrated in the confined valleys with surface flows coalescing before joining the low energy, Blythe River. Given the existing land use of the area, the bed material is predominately bare land and sand at the former tioxide plant, erosion is typically expected under the current and climate change scenarios as the values through these areas are subject to 10-20 N/m^2. The methodology used for the flooding impact assessment differed to those used for the water quality and geomorphology impact assessment, the impact assessment approaches are described separately. The flood impact assessment for the proposal was based on site specific developed flood models used to undertake a comparison of flood levels and shear stress in the existing and proposal post-development conditions.

Existing geomorphic conditions and relative erosion potential at the site have been established through hydraulic modelling. The adopted hydrologic and hydraulic modelling approach assess the relevant

catchment area for the proposal, with its immediate catchment considered for the purposes of assessing the potential impact.

Once the risk pathway was identified, the risk of harm rating was assessed. The impact assessment considered the potential for the construction and operation of the proposal to influence the key surface water values, including water quality, geomorphology and flooding. From these key surface water values, a range of potential risks, including their respective hazards and impact pathways for these risks were identified, with a risk assessment approach adopted for the purposes of determining these potential effects of the proposal.

A detailed methodology, including any relevant assumptions and limitations, is included in the Surface Water Impact Assessment (Appendix E).

6.4.2.2 Groundwater

A **significance assessment approach** was used as the groundwater assessment benefits from a sensitivity analysis, as it is dealing with groundwater dependent ecosystems (GDEs), springs and shallow and perched aquifers, which have different sensitivities to change. Understanding the sensitivity provides a robust assessment of impacts.

The first step of the groundwater assessment methodology was the desktop review to support the evaluation of the baseline conditions, to identify environmental values and potential of impacts. This included:

- Baseline characterisation of groundwater quality, uses, levels and influences from factors such as climate, hydrology, existing land uses and geological conditions.
- Understanding the geology and nature of aquifers within and surrounding the proposal area.
- Developing a conceptual model of groundwater levels and flows.

Data sources reviewed during the baseline characterisation included:

- Bureau of Meteorology (BoM):
  - Climate data.
  - Groundwater Dependent Ecosystem Atlas.
- Publicly available reports and mapping products commissioned by State (i.e., Mineral Resources Tasmania), NRE and Federal agencies (i.e., Commonwealth Scientific and Industrial Research Organisation (CSIRO), BoM, Department of Agriculture, Water and the Environment).
- NRE LIST Map geospatial datasets including:
  - River catchments, rivers, creeks and water bodies.
  - Water management plan areas.
  - CFEV wetlands, waterbodies, karsts and GDEs.
  - Sites currently regulated by EPA Tasmania under the EMPC Act.
  - Geological mapping information including 1:25,000 and 1:250,000 scale geological maps.

  - NRE Groundwater Information Access Portal.
  - CFEV spatial database tool and project database
- Site geotechnical and contamination investigation reports prepared for the site.

In addition to the desktop assessment, four groundwater monitoring wells were installed in the study area. Groundwater levels as well as groundwater quality was measured in these wells. This information has informed the impact assessment.

The information obtained by the desktop literature and groundwater data review was considered sufficiently detailed to characterise baseline groundwater conditions to a level that is proportionate to the risk of adverse effects posed by the proposal.

The second step was to assess the possible range of changes to groundwater level or quality in response to proposed construction methods, such as groundwater dewatering.

The third step was the assessment of the sensitivity of groundwater values and aquifers to change, the assessment of the magnitude of potential impacts, and the significance of those impacts. This step also included considering possible mitigation measures to reduce the impact and assess a residual impact significance after application of further controls.

A detailed methodology, including any relevant assumptions and limitations, is included in Groundwater Impact Assessment (Appendix F).

6.4.2.3 Acid sulfate soils

The impact assessment adopted a **risk assessment approach** which identifies the potential source of existing contamination of concern, which has the potential to impact on soil, surface water and groundwater within the proposal site.

The initial desktop assessment included review of publicly available information (including aerial photographs, maps, plans, registers and other information) to establish the potential sources (including nature and extent) of contamination within the study area and identify areas where additional sampling and analysis was required.

Following this, a targeted assessment of specific sources of contamination within the proposal site was undertaken. This included:

- A site walkover of the targeted areas to confirm the presence or absence of contamination or contaminating activities.
- Targeted soil assessment of areas that had not previously been investigated and had a potential to contain contamination or ASS, including the collection and analysis of soil samples.
- Targeted surface water sampling from onsite stormwater detention ponds and drains.

The detailed methodology pertaining to ASS, including any relevant assumptions and limitations, is included in Contaminated Land and Acid Sulfate Soils Impact Assessment (Appendix B).

6.4.3 Existing conditions

6.4.3.1 Surface water

Surface water includes any natural water on land that has not infiltrated below the ground, including runoff from rainfall, and waterways and wetlands.

The existing surface water conditions of the proposal site were established based on a review of the following:

- Aerial photography.
- CFEV spatial database tool.
- Topographic light detection and ranging data sourced from Land Information System Tasmania (The LIST).
- Publicly available reports and mapping, including waterway mapping from The LIST and state-wide land use, soil and geomorphological mapping.
- Australian Rainfall and Runoff data hub, rainfall depth and storm temporal patterns.

6.4.3.1.1 Waterways and water bodies

The proposal site is located within the Blythe catchment, approximately 100 m inland from the coast of Bass Strait at Heybridge. The Blythe River estuary is located around 240 m south and east of the proposal site. The tidally influenced Blythe River estuary wraps partly around the southern side of the proposal site, where the smaller Minna Creek discharges. The Blythe River discharges into Bass Strait, approximately 380 m to the east of the proposal site. There are no wetlands located within the proposal site.

Previous local investigations of the Blythe River estuary determined that the estuary is rated as being of low conservation significance and of a moderately degraded nature (DPIWE 2001). The Conservation of Freshwater Ecosystem Values (CFEV) database identifies the Blythe River estuary as having an Integrated Conservation Value of High and a Conservation Management Priority – Potential of Very High, and Moderate. Wetland no.12601 on the south side of the estuary, within 300 m of the proposal site, is also listed in the CFEV database as having an Integrated Conservation Value of Very High and a Conservation Management Priority – Potential of High, and Minna Creek (river no.180445) is listed as having an Integrated Conservation Value of Low and a Conservation Management Priority of Moderate.

6.4.3.1.2 Surface water quality

Surface water quality includes consideration of parameters such as temperature, dissolved oxygen, pollutants, nutrients, and turbidity. There is a lack of water quality monitoring for the Blythe River estuary, with monitoring stations predominately located further up the catchment. Historical or current factors known to influence water quality in the Blythe catchment, river and estuary include:

- Forestry, cropping, dairy, and other agricultural activities (Crawford & White 2007).
- Industrial activities such as:

- Former tioxide plant, which historically released an iron-rich acid solution from the proposal site into Bass Strait until the plant was closed in 1996 (Crawford & White 2007).
- Mineral processing operations, which included significant discharges of silica sand to the Lower Blythe River (Green 2001).

6.4.3.1.3 Potential acid sulfate soils

ASS testing undertaken at the proposal site indicates that potential ASS is present at depths from approximately 0.5 m below the ground surface although the presence is not continuous across the proposal site. The probability of occurrence for ASS is shown on Figure 6.4-1.

Figure 6.4-1:
Acid sulfate soils probability of occurrence

Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- ASS Sample Location

Coastal Acid Sulphate Soils (0-20m AHD)

- Low Probability

Marine Acid Sulphate Soils

- High (Intertidal)
- Watercourse
- Major Road
- Minor Road

Scale: 1:10,000 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400 500

Metre

MARINUS LINK

Acknowledgements and Sources:

Data Source: Marinus Link GIS Data Repository and theLIST ©State of Tasmania .
Background Image: Esri Community Maps Contributors, DPIPWE, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Maxar
Produced By: Marinus Link for the Tasmanian Heybridge Converter Station EIS.
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6.4.3.1.4 Flooding

Flood mapping for the 0.5% AEP event indicates that the Blythe River is largely confined to its floodplain and does not interact with the proposal site. A relatively major tributary is located south of the proposal site, which joins the Blythe River around 300 m from the proposal site boundary and does not impact the site.

Under existing conditions, the unnamed access/haul road to the west and south of the proposal site is subject to flood depths up to 0.2 m. Localised flows move across the proposal site from west to east and accumulate in a settling pond. Modelling of existing flood depths for the 0.5% AEP event indicates significant ponding of water in the northern extent of the proposal site, with depths up to 1.6 m at the entrance to the outfall culvert that passes beneath Bass Highway, as shown in Figure 6.4-2.

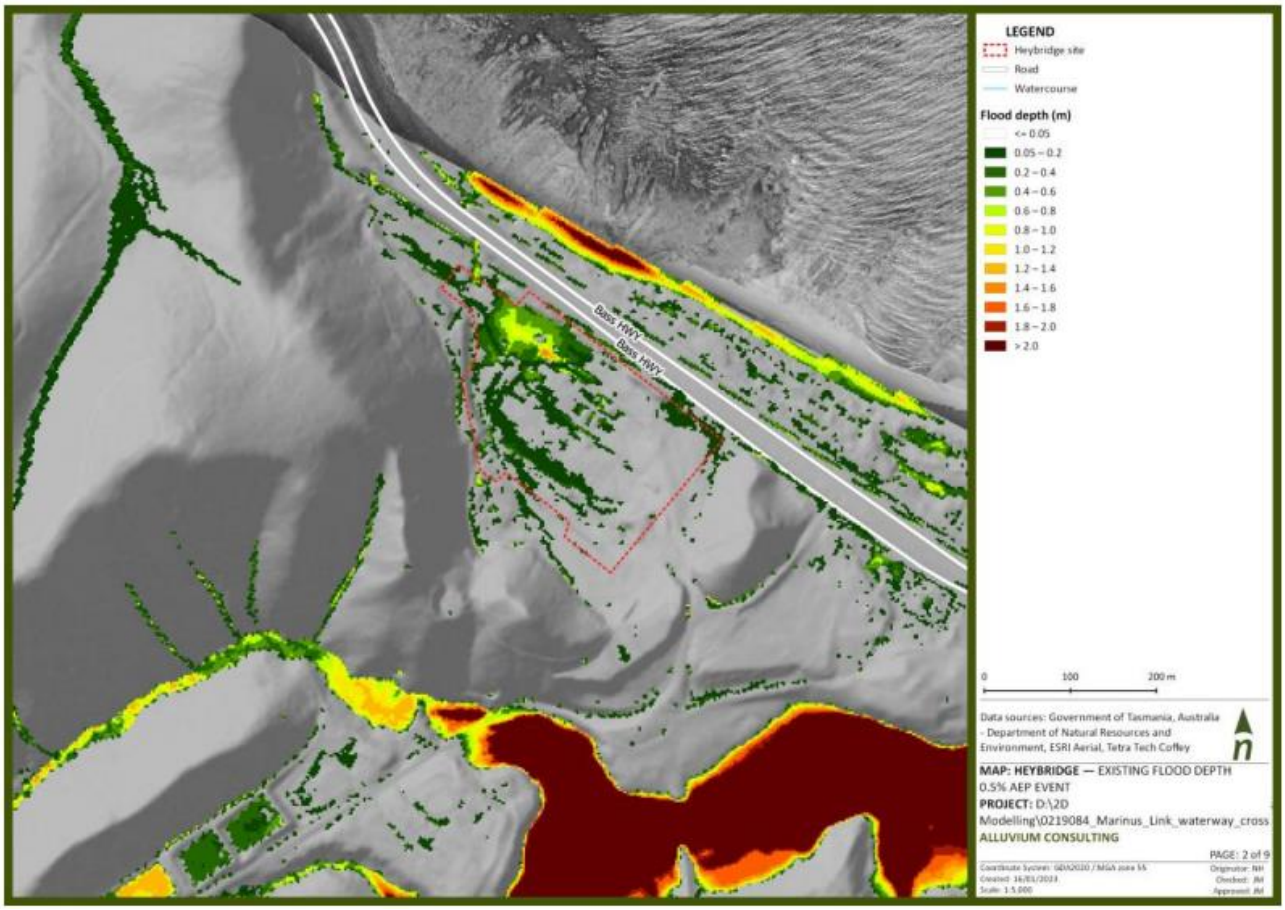

Figure 6.4-2 Baseline characterisation of the 0.5% AEP flood depth of and near the proposal site

6.4.3.2 Groundwater

Groundwater refers to a water resource below the surface of the earth collected within aquifers. For the purpose of the Groundwater Impact Assessment (Appendix F), a study area was defined based on the inferred small groundwater catchment that is likely to interact with the proposal site. This study area includes the proposal site and a 500 m onshore radius.

The existing groundwater conditions of the study area were established based on a review of the following:

- Bureau of Meteorology climate data and Groundwater Dependant Ecosystem Atlas.
- Publicly available reports and mapping.

- The LIST Map geospatial datasets (NRE).
- NRE Groundwater Information Access Portal.
- CFEV spatial database tool and project database.
- Site geotechnical and contamination investigation reports prepared for the proposal site.

The findings of the existing conditions assessment are presented in the following sections.

6.4.3.2.1 Groundwater levels and flow

Based on the geotechnical site investigations, groundwater within the study area is likely to be present within two primary aquifers:

- **Quaternary sand aquifer**: A shallow unconfined porous media aquifer represented by the unconsolidated Quaternary deposits of aeolian sand, and river and marine gravels, sand and clays.
- **Bedrock aquifer:** A fractured rock aquifer formed by the Precambrian aged Burnie and Oonah Formation turbidite sequence, likely to be weathered by the upper horizon, and may be confined or semi confined by the overlying Quaternary sand aquifer at the proposal site and unconfined to the south and west where the bedrock outcrops at surface.

As part of the geotechnical site investigation, four groundwater monitoring wells were installed within the proposal site: HB-BH01-C, HB-BH02-C, HB-BH03-C and HB-BH06-C C (refer to Figure 6.4-2). Groundwater levels were measured in all wells on one occasion. The water table is likely to be shallow across the proposal site, typically less than 1 m below ground level. The relative elevation of groundwater was inferred based on measured levels in the deeper bedrock aquifer. The Quaternary sand aquifer is likely to be recharged by both rainfall infiltration and the upward discharge of groundwater from the underlying bedrock aquifer. The bedrock aquifer is likely to be recharged by rainfall infiltration in areas of higher topography to the west and south where the bedrock outcrops.

The measured hydraulic gradient of the bedrock aquifer shows an inferred northerly groundwater flow towards the coastline, which is likely to represent the main groundwater discharge point. Shallow groundwater in the Quaternary sand aquifer is likely to follow a similar northerly flow direction. Groundwater flow directions and flow velocities are likely to be highly variable and may be based on the presence of fault or fracture zones in the weathered and fresh rock.

6.4.3.2.2 Groundwater quality

Groundwater samples collected from the monitoring wells were analysed to determine groundwater quality. The results from the groundwater samples identified:

- Total dissolved solid (TDS) concentrations ranging from 260 milligrams per litre (mg/L) (HB-BH03-C) to 1,400 mg/L (HB-BH01-C).
- Electrical conductivity values ranging from 370 µs/cm to 1,290 µs/cm.
- Slightly acidic pH (5.49 to 6.55).

- Metals that exceeded the *Australian Water Quality Guidelines for Fresh and Marine Water Quality* (ANZG 2018) Marine Water 95% ecosystem protection criteria at most locations: cobalt (2 to 18 µg/L), copper (3 to 8 µg/L), and zinc (22 to 57 µg/L).
- Concentrations of titanium below the 10 µg/L laboratory limit of report, with the exception of 20 µg/L reported at HB-BH02-C.
- No detectable concentrations of polycyclic aromatic hydrocarbons, monocyclic aromatic hydrocarbons, phenols, phthalates, herbicides, pesticides, explosives, halogenated benzenes and halogenated hydrocarbons, solvents or volatile organic compounds, with the exception of detectable concentrations of chloroform reported at HB-BH01-C (6 ug/L) and HB-BH02-C (13 ug/L).
- Several per- and poly-fluoroalkyl substances (PFAS), including perfluorooctane sulfonate (PFOS) and perfluorohexane sulfonate. Several PFAS were detected in both the Quaternary sand aquifer and the fractured bedrock aquifer. The compounds detected included PFOS and perfluorohexane sulfonate, which represented the highest concentration PFAS (maximum of 0.11 ug/L for both compounds at BH-06 and BH-05(S)), PFOA (maximum of 0.02 ug/L at BH-06), and PFPeA (maximum of 0.04 ug/L at BH-06 and BH-05(S)). PFAS concentrations were generally greatest at HB-BH06-C and C(S), showing comparable results between the shallow and deep wells at this location.

6.4.3.2.3 Groundwater users and groundwater dependent ecosystems

One registered bore (ID: 41789) is located approximately 350 m south of the proposal site on the left bank of the Blythe River (refer to Figure 6.4-4). This bore is listed with an unknown use and ‘capped’ status, suggesting that it is unlikely to remain in active use. As such, it is unlikely that any active groundwater users are present within the study area.

Potential GDEs within the study area were identified based on a review of the Bureau of Meteorology’s (2012) Groundwater Dependent Ecosystem Atlas and the state-wide freshwater ecosystem mapping provided by the CFEV spatial database tool.

No terrestrial GDEs are expected to be present within the study area (refer to Figure 6.4-4). The Blythe River, located approximately 260 m south of the proposal site, is identified as an aquatic GDE with high likelihood for groundwater dependence. The wetlands associated with the Blythe River are likely to have aquatic ecosystems that rely on periodic fresh groundwater input to balance the saline inundations that may occur during tidal fluctuations.

Figure 6.4-3: Groundwater monitoring locations

Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Proposal Site 500m Buffer
- Groundwater Well
- Soil Bore
- Test Pit
- Estuary
- Water Body
- Watercourse
- Major Road
- Minor Road

Scale: 1:7,500 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400

Metre

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Acknowledgements and Sources:

Data Source: Marinus Link GIS Data Repository and theLIST ©State of Tasmania .
Background Image: Esri Community Maps Contributors, DPIPWE, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/ NASA, USGS, Maxar
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Figure 6.4-4: Groundwater dependent ecosystems

Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Proposal Site 500m Buffer
- Groundwater Bore (ID: 41789)

Groundwater Dependent Ecosystem

- Aquatic: High Potential GDE National Assessment
- Terrestrial: Moderate Potential GDE National Assessment
- Water Body
- Watercourse
- Major Road
- Minor Road

Scale: 1:7,500 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400

Metre

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Acknowledgements and Sources:

Data Source: Marinus Link GIS Data Repository and theLIST ©State of Tasmania .
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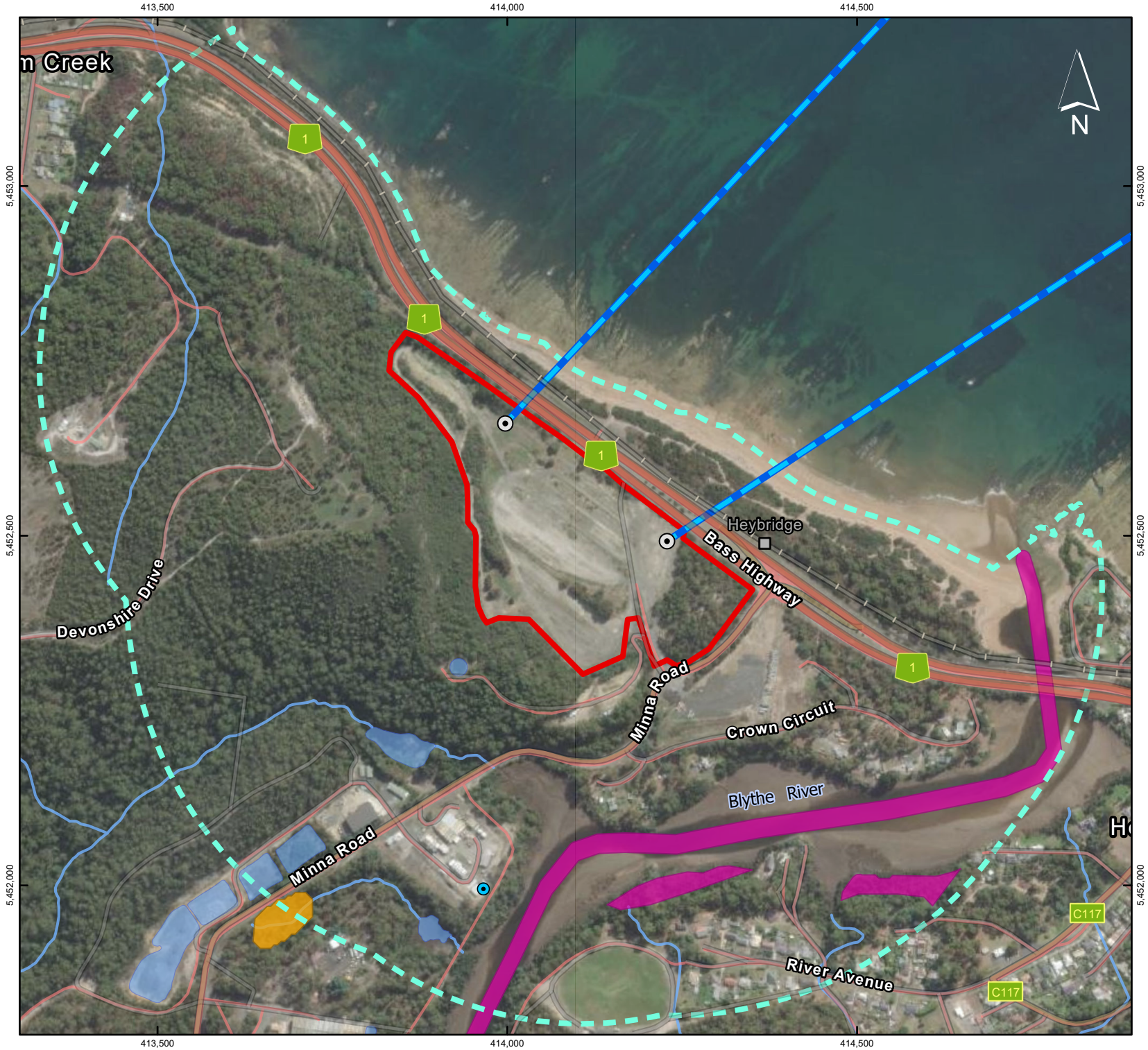


6.4.4 Applicable legislation

6.4.4.1 Water Management Act 1999

The *Water Management Act 1999* provides for the use and management of Tasmania's freshwater resources, including watercourses, dispersed surface water (e.g., from rainfall or surface expression of groundwater) and groundwater. The focus of the Act is on management of water as a resource. As the proposal would not involve the management of water as a resource, this Act has limited relevance to the proposal aside from its water quality management regulations.

6.4.4.2 State Policy on Water Quality Management 1997

The *State Policy on Water Quality Management 1997* provides overarching principles and objectives for surface water and groundwater quality management in Tasmania.

This policy provides a framework for the identification of PEVs of waterbodies, development of water quality guidelines and WQOs, and the management and regulation of point and diffuse sources of emissions to surface waters and groundwater. The WQOs are the most conservative of the water quality guidelines to protect PEVs such as aquatic ecosystems.

6.4.4.2.1 Surface water

For the Blythe River Estuary (DPIWE 2000), the PEVs are:

- Protection of Aquatic Ecosystems:
  - Protection of modified (not pristine) ecosystems from which fish are harvested.
- Recreational Water Quality and Aesthetics:
  - Primary contact water quality (between bridge and estuary mouth).
  - Secondary contact water quality.
  - Aesthetic water quality.

The DGV water quality indicators (e.g., Dissolved Oxygen, pH, Turbidity, Total Phosphorus) for aquatic ecosystems of the Blythe Catchment are outlined in the *Default Guideline Values (DGVs) for Aquatic Ecosystems of the Blythe Catchment* (EPA 2021) and summarised in the Surface Water Impact Assessment (Appendix E).

6.4.4.2.2 Groundwater

The *State Policy on Water Quality Management 1997* sets PEVs for groundwater based on the reported TDS concentrations, as listed in Table 6.4-2.

Table 6.4-2 Protected environmental values of groundwater (reproduced from DPIWE 2000)

Protected environmental value	Category and TDS (mg/L)			
	A **Less than 1,000**	**B** **1,000 – 3,500**	**C** **3,500 – 13,000**	**D** **Greater than 13,000**
Drinking water	✓			
Irrigation	✓	✓		
Industry	✓	✓	✓	
Stock	✓	✓	✓	
Ecosystem protection	✓	✓	✓	✓

Groundwater TDS in the lower bedrock aquifer ranged from 261 mg/L to 1,400 mg/L in the lower aquifer and would likely be assigned to the Category A band (i.e., less than 1,000 mg/L). While TDS concentrations were not reported for the Quaternary aquifer, this aquifer is also likely to be assigned Category A. Category A groundwater requires the protection of the environmental values of drinking water, irrigation, industrial water use, stock watering, and ecosystem protection.

Table 6.4-3 identifies the PEVs of groundwater that may require protection. In addition to the PEVs outlined in Table 6.4-3, the values 'recreational use' and 'Cultural or spiritual values' have been conservatively adopted.

Table 6.4-3 Assessment of environmental values of groundwater requiring protection

Protected environmental value	Existing use	Potential future use	Value requiring protection	Assessment
Drinking water	No	Unlikely	No	The industrial setting of Heybridge and known existing groundwater contamination beneath the proposal site would likely preclude this value from being realised in the immediate vicinity of the site in the future. Reticulated potable water supply is readily available and would be a preferred potable supply.
Irrigation	No	Unlikely	No	Land use zoning in study area includes Rural which may include some limited agricultural activities. Irrigated agriculture for food or fibre production is highly unlikely. Sports fields and public parks are not located within the study area and would be unlikely due to the limited available land.
Industry	No	Possible	Yes	Groundwater is not currently exploited for industrial use and is unlikely to be a preferred future industrial water. However, the presence of readily available surface water and reticulated water alternatives make it possible but unlikely that groundwater would be used for industrial purposes.
Stock	No	Unlikely	No	Land use zoning in the study area includes Rural which may include some limited agricultural activities. The presence of existing groundwater contamination (including PFAS) would likely preclude use for stock water.

Protected environmental value	Existing use	Potential future use	Value requiring protection	Assessment
Ecosystem protection	Yes	Yes	Yes	Groundwater originating from the proposal site is likely to discharge to marine environment of Bass Strait. All marine and freshwater features in the study area require protection of the aquatic ecosystem.

6.4.4.3 Tasmanian Acid Sulfate Soil Management Guidelines

Assessment criteria for the investigation of ASS have been adopted from the *Tasmanian Acid Sulfate Soil Management Guidelines*, which presents the recommended approach to assessment and management of ASS in Tasmania. Should the proposal exceed the threshold for preparation of an ASS management plan, MM CL02 will be implemented in accordance with the *Tasmanian Acid Sulfate Soil Management Guidelines*.

6.4.4.4 Tasmanian State Coastal Policy 1996

The *Tasmanian State Coastal Policy 1996* provides guidance on coastal planning in Tasmania. Its three guiding principles are that natural and cultural values of the coast shall be protected, the coast shall be used and developed in a sustainable manner and integrated management and protection of the coastal zone is a shared responsibility. The design, construction and operation of the proposal would adhere to the guidelines outlined in this policy.

6.4.5 Potential impacts

6.4.5.1 Construction

6.4.5.1.1 Surface water

Works associated with the proposal have the potential to impact surface water due to changes to flooding, water quality and geomorphology, including in the context of a changed climate. Potential impact pathways relevant to the proposal:

- Flooding:
  - Design, construction and temporary activities for the proposal causing the displacement of flood waters, reducing the volume of temporary storage within the floodplain, and/or increased shear stress values and increased scour of adjacent bed and banks, leading to adverse flood impacts to surrounding property, key infrastructure and the environment (construction and operation).
  - Floodwaters inundating the critical proposed infrastructure, resulting in operational safety hazards or failure of system infrastructure (operation).
- Water quality and geomorphology:
  - Increased sediment loads, nutrient loads, addition of metals, hydrocarbons or other potentially polluting chemicals or materials from spills that can lead to degradation in water quality, ecosystem health/reproduction or aesthetics (construction and operation).

- Groundwater emergence at the new ground surface and diversion of stormwater or drainage alignment (construction and operation).
- Altered fluvial geomorphic processes, initiation of bed and bank scour and sediment delivery, resulting in habitat loss and ecosystem decline (construction).
- Alteration of the flow regime resulting in habitat loss and sediment delivery (construction and operation).

Soil washed from the proposal site due to surface water runoff or flood events can deposit as sediment in outfall drainage channels and watercourses. This soil has the potential to include contaminants and ASS. Increased sediments and pollutants from construction activities can increase turbidity, affect aquatic vegetation growth and aesthetic values, and impact surface water users.

Surface water runoff and flood events have the potential to create unstable landforms, degrade soil structure, and change surface flow conditions. Potential unmitigated impacts on geomorphology and soils as a result of cut and fill, slope regrading and alteration to drainage at the proposal site include soil loss, rilling, and possibly gullying and landslides, sedimentation and exposure of ASS.

Potential risks to surface water during construction of the proposal in combination with the Heybridge Shore Crossing construction are summarised in Table 6.4-4 below.

6.4.5.1.2 Potential acid sulfate soils

ASS are naturally occurring soils, sediments or organic substrates that contain iron sulfides. When left undisturbed, ASS do not present any environmental risk. However, when exposed to air, the iron sulfides ASS contain react with oxygen to create sulfuric acid. The disturbance of ASS has the potential to result in oxidation of sulfidic minerals within the soils and create acid, which can then leach metals. The disturbance of ASS can lead to the degradation of constructed proposal elements and can cause degradation to ecological receptors at the proposal site including flora and fauna. The disturbance of ASS may also result in generation of sulfidic odours. Refer to Section 6.5 for further discussion on potential odour impacts.

Prior to mitigation, the potential disturbance of ASS during construction, and their potential impact on ecological receptors (degradation to flora and/or fauna if disturbed), has a risk rating of **moderate** (refer to Table 6.4-4 below).

Table 6.4-4 Assessment of potential surface water risk pathways during construction

Risk pathway	Value(s)	Potential risk without mitigation	Risk rating
Temporary activities (e.g., excavation, stockpiling and alteration of topography or change in impervious surfaces) altering floodplain capacity and/or diversion of flow	Flooding	Increase in flood inundation frequency, velocity or level, which affects users or assets within the floodplain.	**Moderate**
Construction activities on existing flow paths (e.g., excavation and/or filling)	Flooding	Changes in flow conveyance behaviour, direction, velocity or other characteristics	**Moderate**

Risk pathway	Value(s)	Potential risk without mitigation	Risk rating
Direct alteration of watercourses	Flooding, geomorphology	Construction activities causing unintended damage to watercourses, resulting in changed flow behaviour, bed or bank erosion, and/or disrupts physical habitat (e.g., bank disturbance).	Low
Spill of hazardous or potentially polluting chemicals or materials	Surface water quality	Hazardous materials being released into the watercourses and drainage channel (discharging under Bass Highway directly to the beach).	High
Direct or indirect activities damaging drainage lines	Surface water quality, geomorphology	Construction activities (e.g., heavy machinery on channel banks) damaging the bed or bank of drainage lines, such as bank slumping/collapse, resulting in bed or bank erosion and sediment release into the watercourses and drainage channels (discharging under Bass Highway directly to the beach).	Moderate
Inundation of open excavation or exposed soil during a flood event	Surface water quality, geomorphology	A flood event due to overland flows on the proposal site causing inundation of assets and release of sediment into drainage channels (discharging under Bass Highway directly to the beach).	Moderate
Inundation of stockpiled soil during a flood event	Surface water quality, geomorphology	A flood event inundating soil stockpiles, causing release of sediment into drainage channels (discharging under Bass Highway directly to the beach).	Moderate
Ecological receptors (ASS degradation to flora and/or fauna if disturbed)	Surface water and groundwater quality	Prior to ground disturbance, confirm the location and extent of ASS in relation to the planned locations of site infrastructure.	Moderate

6.4.5.1.3 Groundwater

Potential impacts to groundwater during construction considered in the Groundwater Impact Assessment (Appendix F) include:

- Impacts to groundwater levels and quantity from:
  - Temporary dewatering of minor excavations leading to groundwater level drawdown.
  - Temporary dewatering of bored piles leading to groundwater level drawdown.
- Impacts to groundwater quality from:
  - Groundwater acidification due to temporary or permanent groundwater level drawdown.
  - Saline water intrusion to aquifers due to temporary groundwater level drawdown. Temporary dewatering may result in groundwater level drawdown propagating through the aquifer towards the coastline. Drawdown in coastal zones may alter the naturally occurring fresh/saline water interface within the aquifer that runs parallel with the coastline, causing salinisation of the fresh groundwater resource.
  - Mobilisation of existing groundwater contamination towards the proposal due to temporary groundwater level drawdown, affecting groundwater users or GDEs.

- Release of contaminated groundwater generated during dewatering to the environment.
- Accidental spills and leaks of transformer oil, lead acid batteries, and diesel fuel stored in above ground tanks.

The proposal site is underlain by a shallow water table that is likely to be encountered at depths of less than 1 m below the current ground surface. It is assumed that most excavations would extend below the water table, into the Quaternary sand aquifer, and may require temporary or permanent dewatering. The radius of influence of construction dewatering is likely to be in the order of approximately 150 m. Drawdown is assessed as unlikely to extend offsite to the south, east or west due to the presence of outcropping, low permeability bedrock. Groundwater level drawdown and mobilisation of groundwater events have the potential to create unstable landforms and alter groundwater flow dynamics, leading to induced settlement through subsidence.

Whilst groundwater contamination has been detected beneath the proposal site in both the shallow Quaternary sand aquifer and the deeper bedrock aquifer, there are no known discreet plumes of groundwater contamination present which might represent a source of impact to sensitive receptors should they be mobilised by the proposals dewatering activities.

The reported concentration of PFOS may exceed the marine ecosystem protection criteria based on a requirement to achieve either 95% (0.13 ug/L) or 99% (0.00023 ug/L) species protection (National Environmental Management Plan 2020). The reported concentration of PFOS may not be suitable for discharge to surface water without baseline sampling (refer to MM SW04). Approval from the EPA may be required to discharge produced groundwater to surface water or marine environment, should that be a proposed disposal option sought post-approval.

The potential groundwater impact pathways are summarised in Table 6.4-5 below.

Table 6.4-5 Assessment of potential groundwater impact pathways during construction

Impact pathway	Likely impacts without mitigation	Significance of impact
Groundwater levels and quantity		
Temporary impacts to groundwater users	Considering the absence of known groundwater users and the limited extent of groundwater level drawdown that can propagate away from the site based on an assessment of potential drawdown, it is highly unlikely that temporary construction dewatering activities would impact groundwater users.	Very low
Temporary dewatering impacts to GDEs	There are no known terrestrial GDEs within the study area. Groundwater drawdown has been assessed as unlikely to propagate offsite to the south and west where large areas of non-groundwater dependent native vegetation is present. While earthworks may result in some drawdown that may temporarily reduce the freshwater input to the Blythe River aquatic GDE estuarine zone, this ecosystem would be adapted to highly variable salinity and the effect of changes to the freshwater input over a short section of the total catchment would be negligible.	Very low
Groundwater quality		
Groundwater acidification	Where potential ASS are present and is allowed to oxidise, it may result in the acidification of groundwater. Acidic groundwater, if generated,	**Moderate**

Impact pathway	Likely impacts without mitigation	Significance of impact
	would likely discharge to the marine environment, and potentially impact to the aquatic ecosystem and affect various environmental values of the receiving environment, including human health.	
Saline groundwater intrusion	Temporary dewatering may result in groundwater level drawdown propagating towards the coastline. However, there would be limited direct impacts as a result of increased groundwater salinity due to the absence of existing local groundwater users and GDEs between the coastline and the proposal site.	**Low**
Mobilisation of existing groundwater contamination	There are no existing groundwater users within the study area that would experience an increased risk posed by mobilising known or undetected groundwater contamination.	**Low**
Release of contaminated groundwater to the environment	Dewatering activities are likely to generate groundwater that may be contaminated by metals, PFAS and other contaminants that may be unsuitable for discharge to the environment without prior treatment.	**Low**
Groundwater contamination from drilling fluids	While drilling for groundwater monitoring wells is required to be undertaken without chemicals and other drilling fluid additives that could leave a residual toxicity, it is possible that drilling conducted for purposes other than groundwater investigation (such as geotechnical drilling) could use alternative drilling fluid additives that might cause contamination by low concentrations of toxic chemicals.	**Low**
Groundwater contamination from construction chemicals and fuels	Construction activities would require the use of light vehicles, drill rigs, excavators, and other construction machinery for planned construction of the Heybridge Converter Station and ancillary infrastructure. Hydrocarbon based fuels, lubricants and degreasing agents are likely to be required on site to power and maintain machinery. These, and other raw materials may either be hazardous or pose a contamination risk to groundwater if not adequately stored, handled, and used during the construction period. Spills and leaks during storage and use may infiltrate to groundwater and cause contamination.	**Low**

6.4.5.2 Operation

6.4.5.2.1 Surface water

Flood modelling indicates that, as a result of the proposal, flood levels are expected to increase by 0.05-0.1 m at the existing culvert outfall to the west of the proposal site under the current 0.5% AEP scenario (refer to Figure 6.4-5). Under climate change projections, the increase in flood depths is also concentrated at the existing culvert outfall, with increases typically around 0.05-0.1 m (refer to Figure 6.4-6). A reduction in pooling areas in the proposal site was identified under both the design and climate change scenarios due to the proposed contouring (cut and fill) works.

These modelled minor increases in flood depth and extent as a result of the proposal would be contained to the immediate area and are considered to be within acceptable change/impacts to flood behaviour.

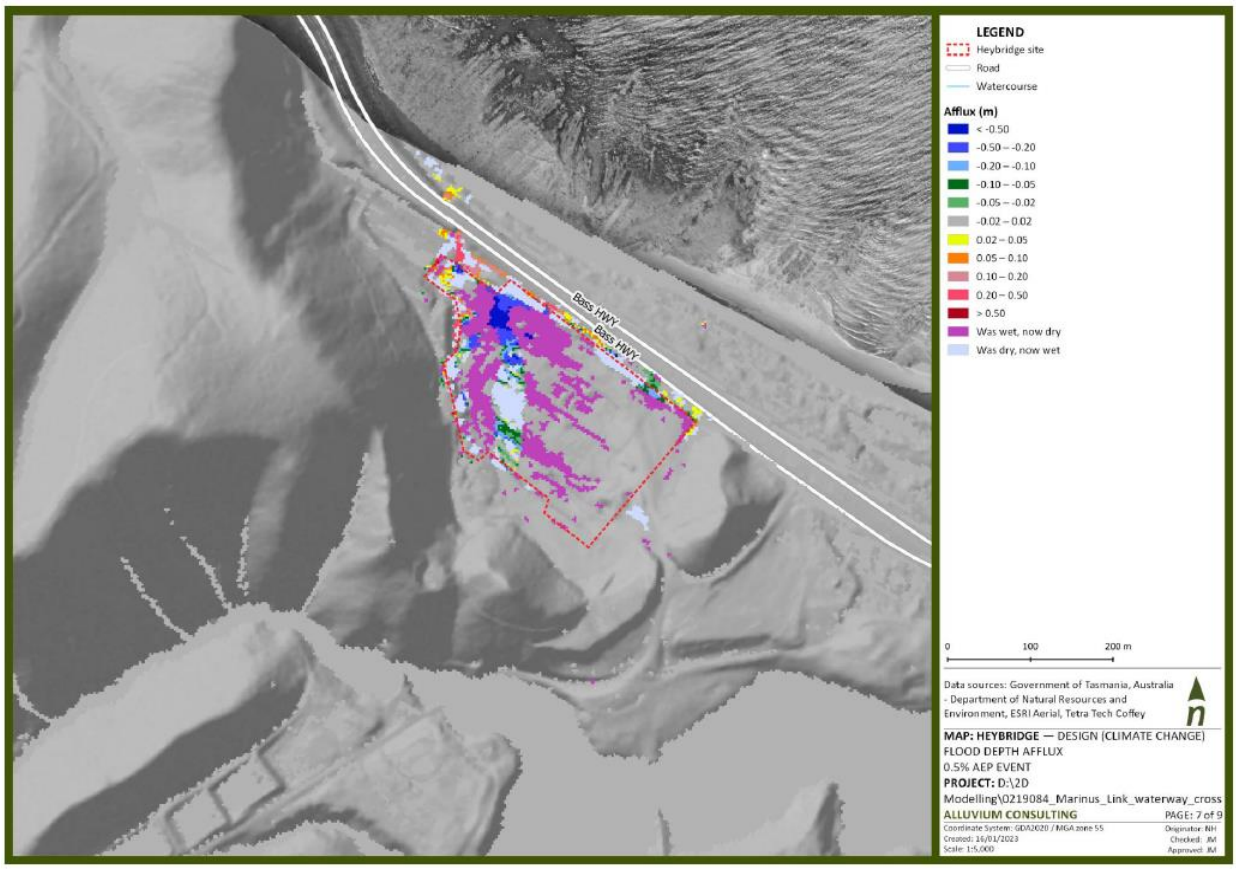


Figure 6.4-5 Heybridge 0.5% AEP afflux

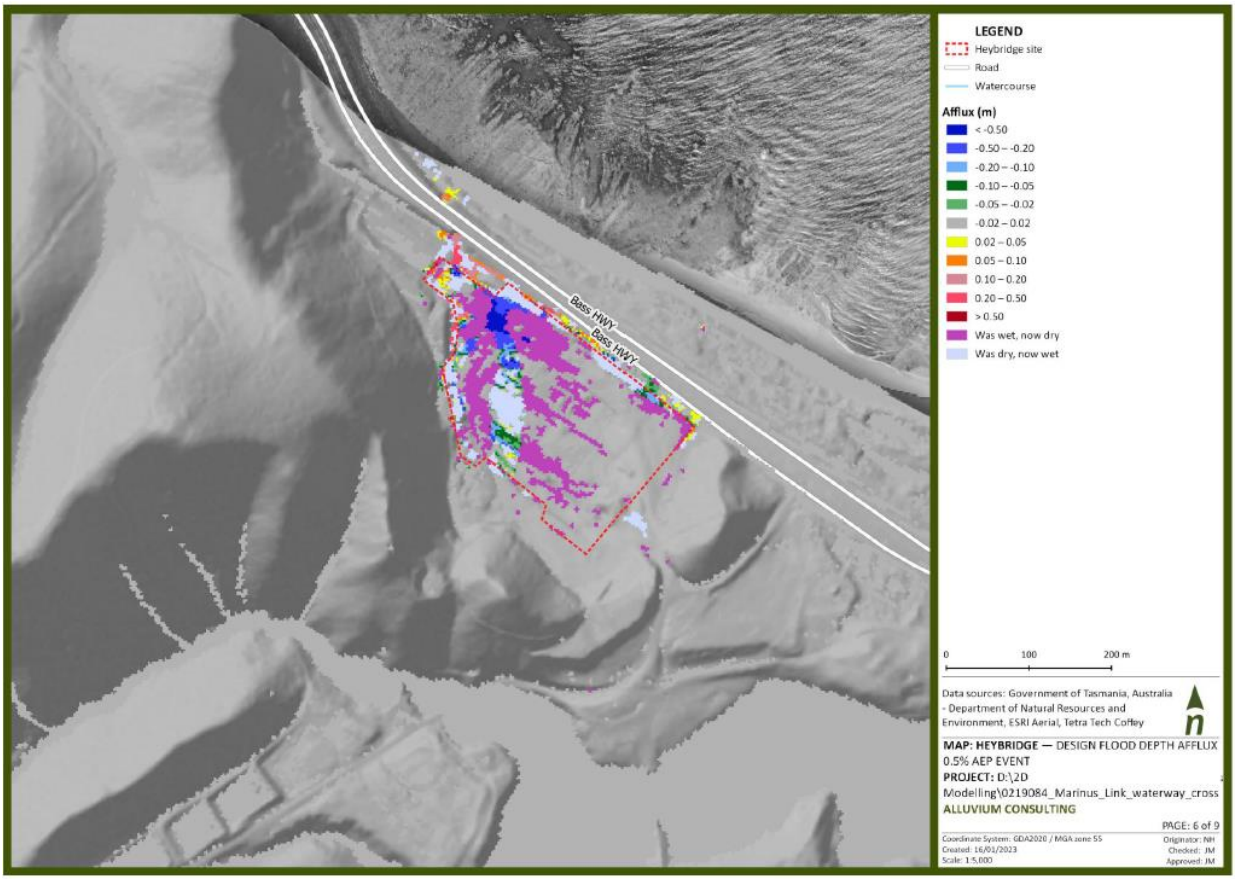


Figure 6.4-6 Heybridge climate change 0.5% AEP afflux

Following construction, exposed soil would be rehabilitated and/or covered. No additional disturbance to the site, outside of routine maintenance, is anticipated. The site is designed to prevent erosion and runoff of sediment entering flow paths and drainage channel through proposed operational drainage and hardstand areas. As such, sediment runoff during the operation phase would likely be minimal and not of a scale that would impact surface water values.

Flood modelling for the proposal indicates that shear stress is expected to increase under both the current (refer to Figure 6.4-7) and climate change (refer to Figure 6.4-8) scenarios, with the magnitude of increases up to 5 newton per metre squared (N/m^2) at the existing culvert outfall to the north-west of the proposal site. The proposed works would also result in some isolated increases in shear stress of up 10 N/m^2 (under both scenarios) to the northern outfall of the existing culvert that passes beneath Bass Highway. Increases of this magnitude have the potential to cause erosion beyond existing conditions.

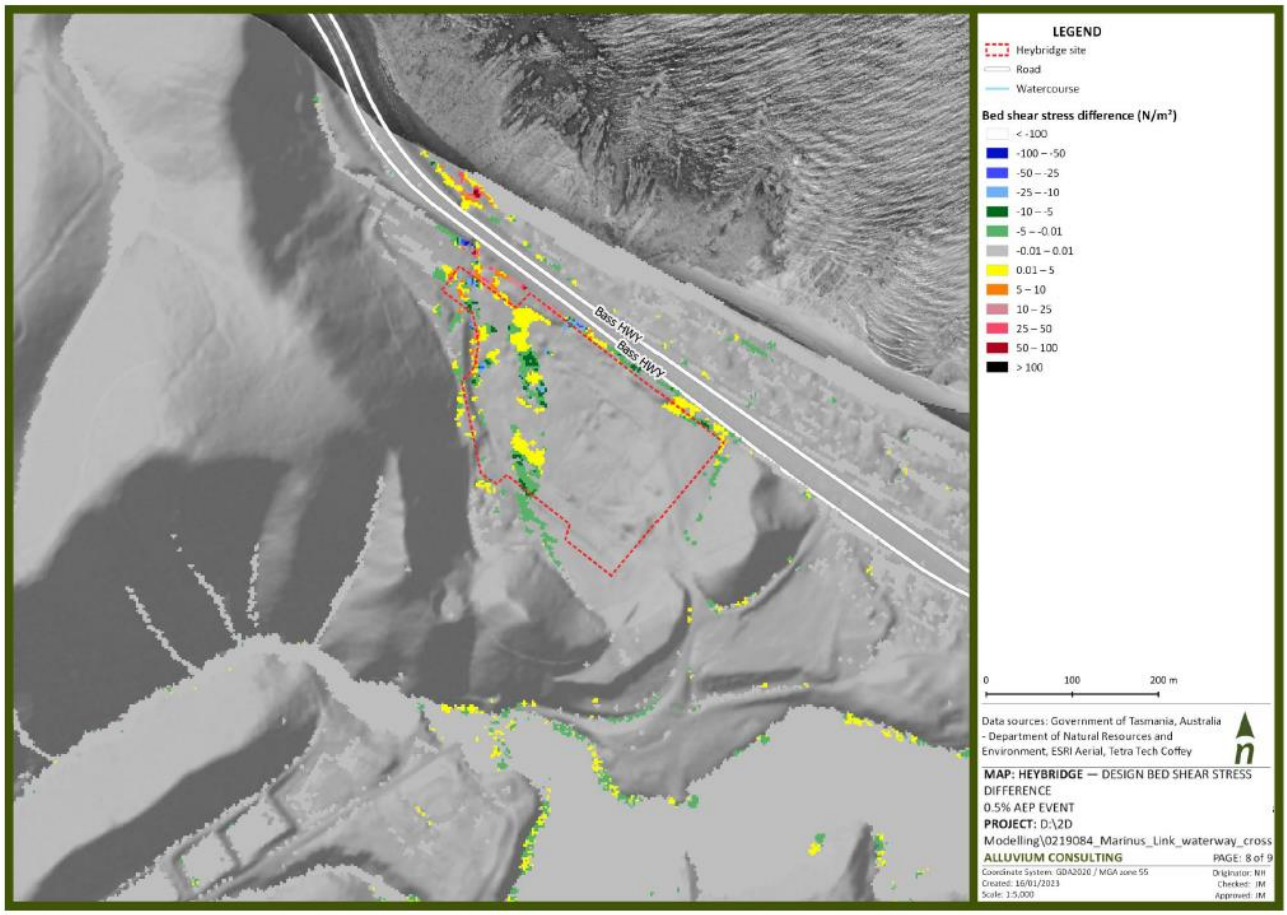


Figure 6.4-7 Heybridge 0.5% AEP shear stress difference

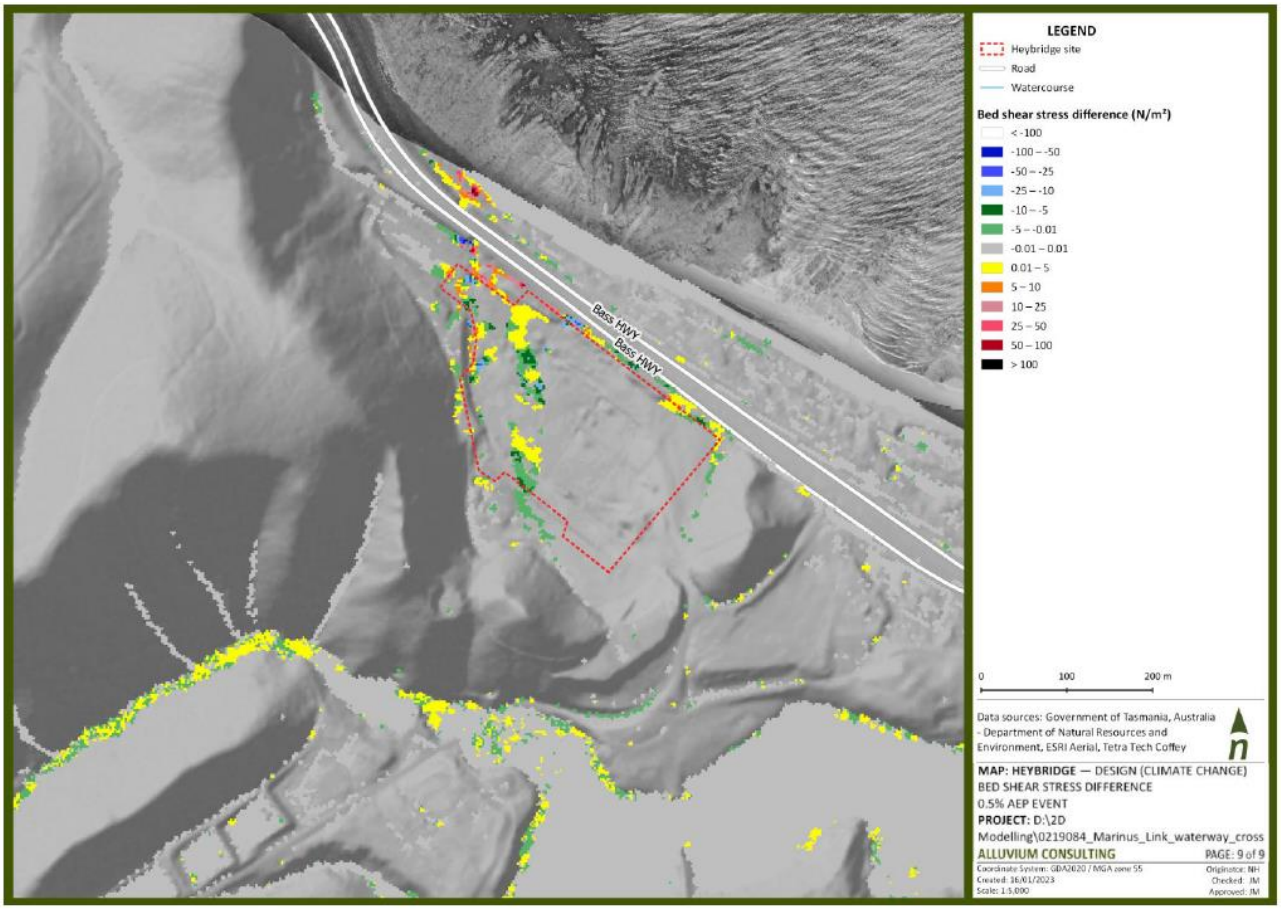


Figure 6.4-8 Heybridge climate change 0.5% AEP shear stress difference

Potential risks to surface water during operation are summarised in Table 6.4-6 below.

Table 6.4-6 Assessment of potential surface water risk pathways during operation

Risk pathway	Value(s)	Potential risk without mitigation	Risk rating
Introduction of permanent features associated with the proposal (e.g., bunds, access roads, drains and modification to surface levels), altering flows	Flooding	Diversion of stormwater, drainage alignment or flow pathways causing a change downstream to flow behaviour, direction, velocity, or other characteristics.	**Moderate**
Introduction of permanent features associated with the proposal (e.g., access tracks and hardstand areas), decreasing water infiltration	Flooding, surface water quality, geomorphology	Increase in impervious area resulting in an increase in surface runoff, changes to flow discharge, and/or bed and bank erosion, increasing sediment supply to the drainage channel (discharging under Bass Highway directly to the beach).	**Moderate**
Road/access track drainage capacity reduced during increased rain intensities as a result of climate change.	Flooding, surface water quality, geomorphology	Insufficient capacity of maintenance access road drainage design due to increased rainfall intensities from climate change resulting in an impact to flooding (with diversion of water/flooding elsewhere), erosion of watercourses and sediment runoff.	**Moderate**
Introduction of permanent features associated with the proposal (e.g., access tracks, bunds, joint pits, or other modified areas), reducing	Flooding, geomorphology	Diversion of stormwater, drainage alignment or flow pathways leading to bed or bank erosion, causing instability	**Moderate**

Risk pathway	Value(s)	Potential risk without mitigation	Risk rating
floodplain storage capacity and/or diverts flow.		of assets adjacent to the watercourse and/or increased sediment loads.	
Introduction of permanent features associated with the proposal (e.g., access tracks, bunds, joint pits, or other modified areas), diverting runoff routes or flow pathways	Surface water quality	Diversion of stormwater, drainage alignment or flow pathways leading to bed or bank erosion causing instability of assets adjacent to the watercourse and drainage channels (discharging under Bass Highway directly to Bass Strait) and/or increased sediment loads.	Low
Spill of hazardous or potentially polluting chemicals or materials	Surface water quality	Hazardous materials being released into the drainage channels (discharging under Bass Highway directly to Bass Strait)	High

6.4.5.2.2 Acid sulfate soils

There are no anticipated impacts of ASS during operation of the proposal.

6.4.5.2.3 Groundwater

The operation of the proposal would include ongoing maintenance activities that have potential to cause groundwater contamination, affecting groundwater quality. This includes:

- Accidental spills and leaks of transformer oil, lead acid batteries, and diesel fuel stored in above ground tanks.
- Discharge from the proposed septic tank system causing groundwater contamination from nutrients and pathogens.
- Herbicide application migrating to groundwater.

The potential groundwater impact pathways are summarised in Table 6.4-7 below.

Table 6.4-7 Assessment of potential groundwater impact pathways during operation

Impact pathway	Likely impacts without mitigation	Significance of impact
Groundwater quality		
Accidental spills and leaks of transformer oil, the contents of lead acid batteries, and diesel fuel stored in above ground tanks	Larger volumes of transformer oils and fuels that may be handled at the proposal site may pose a risk to the environmental values of groundwater if accidental releases occurred.	Low
Discharge from the proposed septic tank system causing groundwater contamination from nutrients and pathogens	The design and operation of the septic tank would be consistent with regulatory requirements and manufacturer's guidance.	Low
Herbicide application migrating to groundwater	The application of herbicides would be consistent with regulatory requirements and manufacturer's guidance.	Low

6.4.5.3 Cumulative impacts

6.4.5.3.1 Surface water

Construction and operational activities required for the proposal and other nearby projects (such as site establishment, ground improvement or site levelling work) have the potential to cause cumulative adverse flooding impacts. These include potential impact pathways such as:

- Displacement of flood waters/volume that lead to adverse flood impacts to surrounding property, key infrastructure, and the environment.
- Constricting the passage of flows passing through the site along the river channel or flow path that leads to increased shear stress values and increased scour of adjacent bed and banks.
- Altered fluvial geomorphic processes, initiation of bed and bank scour and sediment delivery, which can result in habitat loss and ecosystem decline.
- Disturbance to the bed or banks of waterways through ground disturbance activities (excavation, trenching clearing, vehicular traffic) within the riparian zone or instream.
- Changes to water quality, such as increased sediment loads, nutrient loads, addition of metals, hydrocarbons or other chemicals from spills that can lead to degradation in water quality, ecosystem health/reproduction or aesthetics.
- Alteration of the flow regime, such as diversion, duration, frequency, duration, and timing of high and/or low.
- Flow events, which have potential to initiate bed and bank scour, resulting in habitat loss, sediment delivery and possible ecological and physical form consequences.

Through the proposal's implementation of mitigation measures outlined in Section 6.4.6, impacts to water quality and flow regime from the proposal and Heybridge Shore Crossing are unlikely to accumulate with any impacts from other projects.

6.4.5.3.2 Acid sulfate soils

The study area for the assessment of ASS impacts included the area for the Heybridge Shore Crossing, making the assessment of impacts above a combined assessment for the proposal and the Heybridge Shore Crossing.

Beyond the Heybridge Shore Crossing, cumulative impacts from ASS associated with nearby projects would be highly localised to the areas where the individual projects disturb potential ASS. It is unlikely that ASS that may be disturbed associated with the nearby projects would result in impacts that may overlap with the potential impacts from this proposal, with the exception of parts of the NWTD project that interfaces with the proposal site.

Cumulative impacts relevant to the proposal site that may occur include local residential or commercial redevelopments, or upgrades to Bass Highway or the rail line in the vicinity of the site. However, the magnitude of impacts from these potential projects would be minor due to their limited footprints and the low

potential ASS being disturbed. This is because the risks of ASS from the proposal are temporary and localised.

6.4.5.3.3 Groundwater

Potential impacts to groundwater of the proposal together with the Heybridge Shore Crossing have been assessed together as discussed above. No other known proposed or foreseeable projects, other than the Heybridge Shore Crossing, would interact spatially with the groundwater impacts from the proposal. Therefore, no cumulative impacts are expected to arise from these other projects.

6.4.6 Management, mitigation and monitoring

Proposed mitigation measures to minimise potential impacts on surface water and groundwater quality are presented in Table 6.4-8. Mitigation measures in other sections that are relevant to the management of water quality include:

- Section 6.1 (Potentially contaminated material), specifically measures which address the management of potential contamination and the storage of dangerous goods or environmentally hazardous materials.
- Section 6.7 (Dangerous goods and environmentally hazardous materials), specifically measures which address spill prevention and clean up and transport of dangerous goods.
- Section 8.2 (Mitigation measures), specifically measures which address emergency response and incident management (MM Gen05).

Together, these measures would minimise the potential water quality impacts.

Table 6.4-8 Water quality – mitigation measures

Ref	Mitigation measure	Proposal stage
SW01	Minimise flood risk due to permanent infrastructure by applying the following key design measures to the proposal, which will be fully documented in the final Design Report, to be submitted to the EPA for review and approval prior to construction: • All permanent infrastructure will be designed to take flood risk into account, the requirements outlined in the *Floodplain Risk Assessment Guidelines for Municipal Councils in Tasmania* (White 2019). • Roads/access ways will be designed with suitable drainage, including appropriate camber and natural drainage swales, and any concentrated discharges will pass through water mitigation infrastructure such as rock filters. • All permanent infrastructure will be designed to take storage locations of all environmentally hazardous materials into account, as is required by the building code.	Design
SW02	Prior to construction commencing, a progressive sediment and erosion control plan for the proposal will be developed (either as a standalone document or part of the CEMP) and submitted to the EPA for approval. The plan will: • Be implemented throughout construction. • Identify all major drainage lines and waterways and site-specific management and mitigation to be implemented, including controls such as sandbags, sediment fences, sediment traps and diffusion paths to	Construction

Ref	Mitigation measure	Proposal stage
	ensure stormwater is suitably contained, managed and released to avoid and minimise sediment release, pollution and erosion. The plan must describe sediment and erosion controls and monitoring requirements in accordance with: • EPA Tasmania fact sheets: Soil and Water Management on Large Building and Construction Site; Erosion Control Matts and Blankets; Scour Protection – Stormwater Pipe Outfalls and Check Dams; Stabilised Access and Sediment Fences and Fibre Rolls. • IECA *Best Practice Erosion and Sediment Control Guidelines 2008*. • EPA Tasmania *Bunding and Spill Management Guidelines 2015*.	
SW03	Prior to construction commencing, a flood risk management plan for the proposal will be developed (either as a standalone document or part of the CEMP) in line with the requirements outlined in the *Floodplain Risk Assessment Guidelines for Municipal Councils in Tasmania* (White 2019).	Construction
SW04	Prior to construction commencing, a surface water monitoring program will be developed in consultation with EPA Tasmania and must include, as a minimum: • Parameters, frequency, durations of water quality monitoring, and flow paths and drainage channels condition inspections. • Monitoring locations at suitable distances both upstream and downstream of works to establish baseline conditions prior to construction, where required. • Requirements for daily visual monitoring of active construction areas for visible water quality issues including high sediment loads or erosion.	Construction
SW05	As part of the OEMP, develop and implement measures to avoid or minimise impacts to surface water during the operation in accordance with requirements from EPA Tasmania. These measures must include: • Controls for management of sites and materials to prevent erosion, runoff of contamination and sediments entering flow paths and drainage channels. • Ongoing surface water quality monitoring program requirements, as outlined in the surface water monitoring program (MM SW04).	Operation
CL02	Develop and implement ASS management controls during construction.	Construction
CL02-1	Design excavation and soil disturbance works to avoid ASS where practicable.	
CL02-2	ASS risk and management will be addressed through the development of an ASS Management Plan in accordance with the *Tasmanian Acid Sulfate Soil Management Guidelines* (DPIPWE 2009). The ASS Management Plan will be developed in consultation with EPA Tasmania.	
CL02-3	Where disturbance of ASS cannot be avoided, develop management measures to reduce the potential impact from ASS in accordance with the *Tasmanian Acid Sulfate Soil Management Guidelines* (DPIPWE 2009) and the *National Acid Sulfate Soils Guidance* (Sullivan et al., 2018) as follows: • Design and appropriately locate ASS stockpile areas to avoid and otherwise minimise impacts from acid generation including lining, covering and runoff collection to prevent release of acid. • Where ASS is identified and disturbed, it must be treated to ensure neutralisation of potential acid generation. Treatment (via liming) is to be at the rates identified during the further ASS assessment to be undertaken in the proposed detailed site investigations for MM CL01. • Any treatment must be designed with consideration of Tasmanian regulations and guidance and include sufficient neutralising capacity to mitigate acid generation.	

Ref	Mitigation measure	Proposal stage
	• Manage any odours that may be generated during handling of potential ASS. • Prevent oxidation of disturbed ASS so far as reasonably practicable via: - Scheduling works to limit exposure of ASS to oxidising conditions. - Ensuring ASS or acid sulfate rock is not retained in on-site stockpiles for long periods (i.e. greater than 48 hours) without treatment. - Designing and implementing ASS treatment to neutralise ASS prior to other management measures applied. • Identify suitable sites for re-use, management or disposal of ASS and acid sulfate rock that may be generated by the proposal.	
GW01	Conduct a pre-construction hydrogeological assessment at the proposal site to inform appropriate detailed design and construction methods. The hydrogeological assessment must include: • Installing additional groundwater monitoring wells. • Performing aquifer hydraulic testing. • Monitoring groundwater levels and quality to address identified data gaps and be sufficient to support development of further mitigation measures for MMs GW02, GW04, and GW05. It should include a preliminary groundwater dewatering and drawdown assessment for areas where dewatering is anticipated, based on the engineering design and anticipated earthworks available at the time, using a revised hydrogeological conceptual model. The assessment should be completed by a suitably qualified hydrogeologist, and it should review whether the predicted impacts of the proposal on groundwater may be greater than those originally assessed. The assessment results should be documented in a hydrogeological interpretive report that is made available prior to detailed design, and be suitable to support development of other management and mitigation measures. Relevant conclusions should be presented as part of the groundwater management plan, which will be prepared prior to, and implemented during construction.	Design
GW02	Minimise groundwater inflow into excavations, limit groundwater level drawdown, avoid mobilising contaminated or saline groundwater, and prevent groundwater acidification. Consider scheduling earthworks to reduce the duration of dewatering, so far as reasonably practicable, and assess the need for engineering controls such as sheet pile walls, aquifer injection, and decommissioning infrastructure, to ensure potential impacts to groundwater are avoided, and perform hydrogeological assessments to ensure the effectiveness of these controls. These measures must be informed by the ASS management procedure (MM CL02) and consider acidification risk in areas of predicted groundwater level drawdown defined by MM GW01. These measures must be documented in a groundwater management plan that includes design specifications, monitoring requirements, and contingency plans.	Construction
GW03	*Not relevant to this proposal*	
GW04	Develop and implement a groundwater management plan to manage, monitor, reuse, treat, and dispose of groundwater during construction dewatering. The groundwater management plan will: • Prioritise groundwater reuse (such as for construction water supply, dust suppression, or reinjection for hydraulic control, where feasible). • Specify approved disposal options (e.g., discharge to surface water, sewer, or stormwater).	Construction

Ref	Mitigation measure	Proposal stage
	• Document agreed water quality discharge criteria and action trigger levels. • Outline suitable treatment technologies that will be implemented or reserved as contingency measures should unforeseen contamination be encountered.	
GW05	Develop and implement a construction groundwater monitoring plan to establish baseline and background groundwater conditions prior to construction and monitor potential proposal impacts during construction. The construction groundwater monitoring plan should: • Include an initial review of the groundwater monitoring network (developed for MM GW01). • Assess its suitability to establish baseline and background conditions prior to construction. Adequate monitoring should be completed prior to construction commencing to characterise groundwater quality and levels, including seasonal changes. The plan should recognise the potential requirement for the monitoring network to change over time in response to the proposal's progress through design and construction. For construction impact monitoring, the plan should include: • Groundwater quality and level triggers. • Mitigation measures to be implemented in response to a trigger exceedance to prevent impacts to groundwater values during construction. The monitoring plan must be developed in consultation with EPA Tasmania and be documented in a groundwater management plan.	Construction
GW06	Develop and implement an operational groundwater management plan to detect and minimise potential contamination impacts during the proposal's operation. The operational groundwater monitoring plan should: • Include an initial review of the adequacy of the available groundwater monitoring network remaining at the end of construction to monitor and validate the effectiveness of mitigation measures to detect and respond to proposal-related groundwater contamination that may occur during operation. • Recognise the potential requirement new wells to be installed that are suitable to detect groundwater contamination from project operational activities. • Include groundwater quality and level triggers and actions to be taken in response to a trigger exceedance to prevent impacts to groundwater values during construction and operation. • Include ongoing groundwater monitoring requirements and verification of groundwater level (and quality if relevant) recovery post-construction. The operational groundwater monitoring plan must be developed in consultation with EPA Tasmania and be documented in a groundwater management plan as part of the OEMP.	Operation

6.4.7 Residual impacts

6.4.7.1 Surface water

An assessment of residual surface water risks associated with the construction and operation of the proposal was undertaken following the incorporation of the surface water mitigation measures outlined in Section

6.4.6. The results of this assessment are presented in Table 6.4-9. The methodology used for the residual risk assessment is provided in Appendix E.

Table 6.4-9 Surface water – residual risk assessment summary

Impact pathway	Proposal stage	Initial risk (without mitigation)	Mitigation measures	Residual risk
Temporary activities (e.g., excavation, stockpiling and alteration of topography or change in impervious surfaces) altering floodplain capacity and/or diversion of flow	Construction	Moderate	SW02, SW03	Low
Construction activities on existing flow paths (e.g., excavation and/or filling)	Construction	Moderate	SW02, SW03	Low
Direct alteration of watercourses	Construction	Low	SW02, SW03	Low
Spill of hazardous or potentially polluting chemicals or materials	Construction	High	SW02, SW04, DG01, CL01, DG02	Low
Direct or indirect activities damaging drainage lines	Construction	Moderate	SW02, SW04	Low
Inundation of open excavation or exposed soil during a flood event	Construction	Moderate	SW02, SW03, SW04	Low
Inundation of stockpiled soil during a flood event	Construction	Moderate	SW02, SW03, SW04	Low
Introduction of permanent features associated with the proposal (e.g., bunds, access roads, drains and modification to surface levels), altering flows	Operation	Moderate	SW01, SW04, SW05	Low
Introduction of permanent features associated with the proposal (e.g., access tracks and hardstand areas), decreasing water infiltration	Operation	Moderate	SW01, SW04, SW05	Low
Road/access track drainage capacity reduced during increased rain intensities as a result of climate change.	Operation	Moderate	SW01, SW04, SW05	Low
Introduction of permanent features associated with the proposal (e.g., access tracks, bunds, joint pits, or other modified areas), reducing floodplain storage capacity and/or diverts flow.	Operation	Moderate	SW01, SW05	Low
Introduction of permanent features associated with the proposal (e.g., access tracks, bunds, joint pits, or other modified areas), diverting runoff routes or flow pathways.	Operation	Low	SW01, SW04, SW05	Low
Spill of hazardous or potentially polluting chemicals or materials (used during operation)	Operation	High	SW01, SW04, SW05	Low
Degradation to flora and/or fauna due to disturbance of ASS.	Construction and operation	Moderate	CL01	Low

The implementation of the mitigation measures proposed in Section 6.4.6 is considered to effectively manage the identified surface water risks associated with the construction and operation phases to an acceptable level. As such, the proposal is not expected to impact surface water quality, flows or bed and bank stability within local waterways, or create adverse flood impacts.

6.4.7.2 Groundwater

An assessment of residual groundwater impacts associated with the construction and operation of the proposal was undertaken following the incorporation of the groundwater mitigation measures outlined in Section 6.4.6. The results of this assessment are presented in Table 6.4-10. The methodology used for the residual impact assessment is provided in Appendix F.

Table 6.4-10 Groundwater – residual impact significance assessment summary

Proposal stage	Impact pathway	Significance of impact (without mitigation)	Mitigation measures	Significance of residual effect
Groundwater levels and volume				
Construction	Temporary dewatering impacts to groundwater users	Very low	No mitigation measures are proposed or required for this potential impact.	Very low
	Temporary dewatering impacts to GDEs	Very low		Very low
Groundwater quality				
Design and construction	Groundwater acidification	Moderate	GW02	**Low**
Design and construction	Saline groundwater intrusion	Low	GW01, GW02	**Low**
Design and construction	Mobilisation of existing groundwater contamination	Low	CL01, GW02, GW04, GW06	**Low**
Design and construction	Release of contaminated groundwater to the environment	Low	CL01 and GW04	**Low**
Construction	Groundwater contamination from drilling fluids	Low	CL01 and GW02	**Low**
Construction	Groundwater contamination from construction chemicals and fuels	Low	CL01 and GW02	**Low**
Operation	Accidental spills and leaks of transformer oil, the contents of lead acid batteries, and diesel fuel stored in above ground tanks	Low	CL01, DG01 and DG02	**Low**
Operation	Discharge from the proposed septic tank system causing groundwater contamination from nutrients and pathogens	Low	No mitigation measures are proposed or required for this potential impact.	**Low**
Operation	Herbicide application migrating to groundwater	Low		**Low**

The implementation of the mitigation measures proposed in Section 6.4.6 is considered to effectively manage the potential groundwater impacts associated with the construction and operation phases of the proposal, with all residual impacts assessed as **very low** or **low**.

6.5 Air quality

This section provides a summary of the findings of the Air Quality Impact Assessment provided in Appendix G.

6.5.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.5-1.

Table 6.5-1 Relevant EIS guidelines

Air quality – EIS guidelines	Section
Identify, describe, and show on a site map all sensitive receptors that could potentially be affected by dust and particulate matter emissions.	Section 6.5.3, Figure 6.5-1
Identify and map all possible sources of air emissions including dust and particulate matter from the site, particularly that associated with the proposed construction. This includes emissions generated from: • Upgrading/building of roads. • On-site and off-site vehicle and vessel movements. • Use of generators. • Site ground preparation/vegetation clearance/trenching/general disturbance. • Infrastructure construction (e.g., horizontal directional drilling pad construction).	Section 6.5.5
Provide the details of equipment used on the site.	Section 2.3.3
Discuss potential impact of fugitive dust and particulate matter emissions from the proposed activity on the environment and the likelihood for the activity to cause environmental nuisance or harm. The discussion should consider: • Land uses in the vicinity of the activity. • Terrain and local climatic conditions, especially the direction and strength of prevailing winds and rainfall. • Special consideration of the environmental impact of the activity during adverse meteorological conditions. • The potential for cumulative impact with the proposed shore crossing.	Section 5.2.2, 6.5.3, 6.5.5
Provide information about proposed management measures to be implemented to avoid or mitigate potential impact of emissions to air during various phases of the project including construction, commissioning and operation, especially during adverse meteorological conditions. This may include but not be limited to watering or sealing of roads, covering of truck loads, reduced vehicle speed, road surfacing/maintenance details, enclosures, water sprays, windbreaks, and revegetation/stabilisation. Evidence of application of accepted modern technology for reduction of unavoidable emissions to the greatest extent practicable should be provided.	Section 6.5.6
Legislative and policy requirements	
Consideration should be given to the requirements of the *Tasmanian Environment Protection Policy (Air Quality)*	Section 6.5.4.1

6.5.2 Methodology

The Institute of Air Quality Management (IAQM) *Guidance on the assessment of dust from demolition and construction* (Holman et al. 2014) (IAQM Methodology) provides a framework for the assessment of risk associated with dust emissions during construction. This IAQM Methodology has been adopted to assess construction dust impacts and to inform the implementation of appropriate dust management measures.

The IAQM Methodology considers the potential for impacts to 'human receptors' within 350 m of the boundary of construction works, or within 50 m of roads used by construction vehicles within 500 m of the site. The methodology adopts a **risk assessment approach**. Data from the closest EPA air monitoring station (at Emu River, located approximately 8.6 km to the south-west of the proposal site) was used for the assessment. The ambient background levels of particulates at Emu River are considered reasonably representative of air quality conditions at the proposal site due to the similar setting and proximity.

The IAQM Methodology determines the receptor sensitivity by measuring particulate matter (PM), which describes extremely small solid particles and liquid droplets suspended in air. The size of particles affects their potential to cause health problems; particles with a diameter of 10 micrometres or less (PM_{10}) are small enough to pass through the throat and nose and enter the lungs, whilst particles with a diameter of 2.5 micrometres or less ($PM_{2.5}$) have the potential to enter the lungs and into the bloodstream.

The assessment begins with a position of understanding receptor sensitivity. The sensitivity of receptors to dust soiling, human health effects and ecological effects are defined by the general principles outlined in the IAQM and are summarised in Table 6.5-2.

Table 6.5-2 Receptor sensitivity to dust

Receptor category	Dust soiling effects on people and property	Human health effects of PM_{10}	Ecological effects
High	• Users can reasonably expect enjoyment of a high level of amenity; or • The appearance, aesthetics or value of their property would be diminished by soiling; and • The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.	• Locations where members of the public are exposed over a time period relevant to the air quality criteria for PM_{10} (in the case of the 24-hour criteria, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	• Locations with an international or national designation and the designated features may be affected by dust soiling; or • Locations where there is a community of a particular dust sensitive species.
Medium	• Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; • The appearance, aesthetics or value of their property could be diminished by soiling; • The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.	• Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality criteria for PM_{10} (in the case of the 24-hour criteria, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • Locations with a national designation where the features may be affected by dust deposition.
Low	• The enjoyment of amenity would not reasonably be expected; or property would not reasonably be expected to	• Locations where human exposure is transient	• Locations with a local designation where the features may be

Receptor category	Dust soiling effects on people and property	Human health effects of PM_{10}	Ecological effects
	be diminished in appearance, aesthetics or value by soiling; • There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.		affected by dust deposition.

The dust emission magnitude is then determined based on the scale of the anticipated works. The categories of magnitude (large, medium and, small) are defined by reference to multiple factors, including soil type, dryness, equipment being used, and the extent of works (e.g., the volume of soils being disturbed).

The risk impacts for this assessment are determined by the dust emission magnitude combined with the sensitivity of the receptor. A detailed methodology, including any relevant assumptions and limitations, is included in Appendix G.

6.5.3 Existing conditions

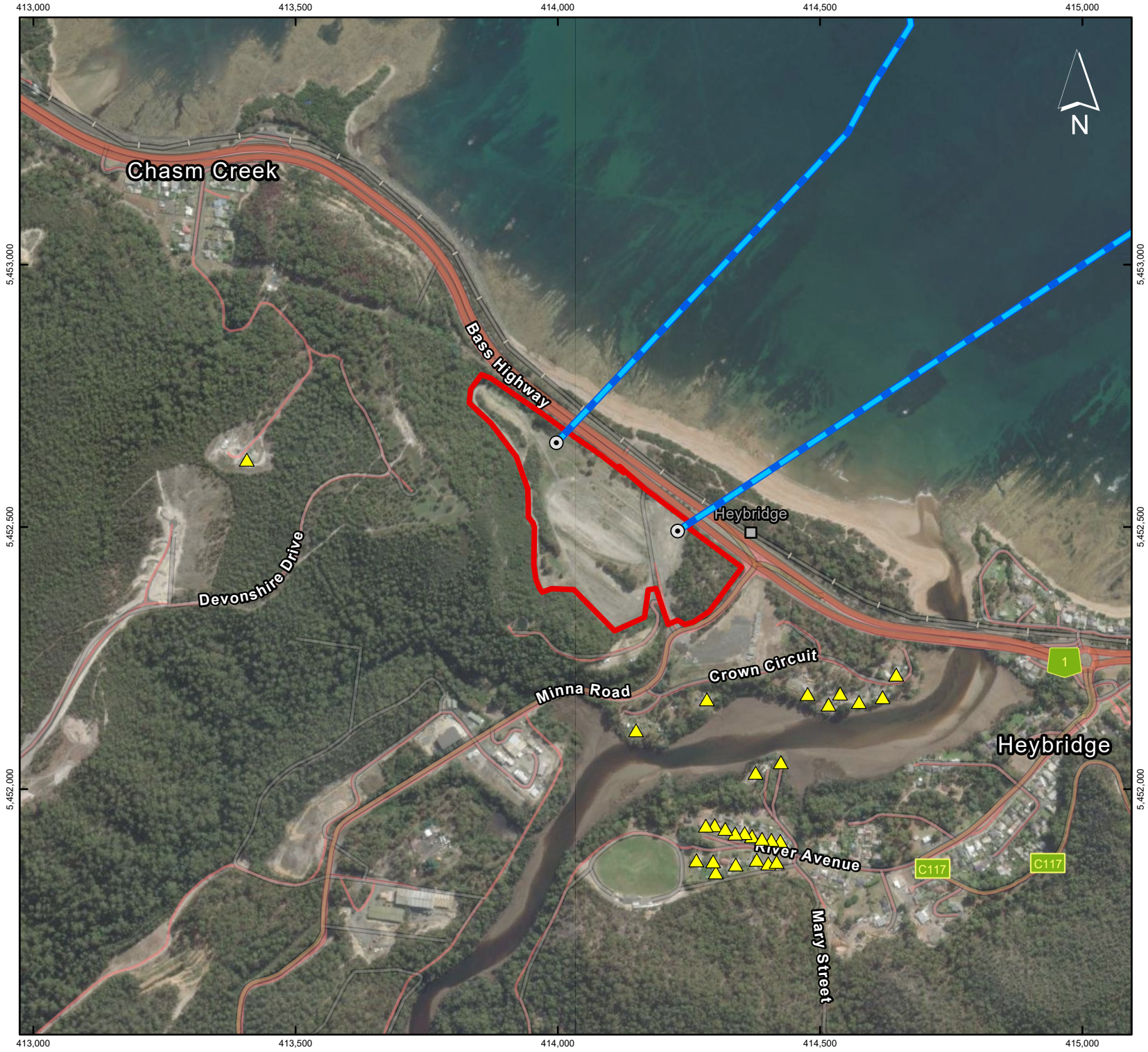
There are some industrial facilities located south-west of the proposal site. Existing waste treatment and disposal facilities near the proposal site include the Heybridge Asbestos Landfill, Heybridge East Waste Depot and the Heybridge Inert Waste Depot, all located between 1.9 and 2.2 km south-west of the proposal site, off from Minna Road and Devonshire Drive. However, there are no significant industrial operations that report to the National Pollutant Inventory within 5 km of the proposal site and the existing potential for dust and odour generation is very limited. The nearest industrial facility to the proposal is the Old Surrey Road Cheese Factory which is located approximately 5.6 km south-west. There may be dust generation on the proposal site through the usage of nearby unsealed roads or from wind. Climatic conditions of the proposal site are described in Section 5.

6.5.3.1 Sensitive receptors

There are 27 sensitive receptors (residential dwellings) within 500 m of the proposal site, located within the Heybridge township (Figure 6.5-1). The nearest sensitive receptor is located approximately 157 m south-east of the proposal site, and there are seven residential properties within 350 m.

For human health impacts, the sensitivity is considered low where the background annual mean PM_{10} concentration is below 15 micrograms per cubic metre (µg/m^3) (a background concentration of 8 µg/m^3 was used in the Air Quality Impact Assessment – see Table 6.5-4).

Figure 6.5-1:
Nearby air quality residential receptors



Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Residential Receptors
- Major Road
- Minor Road

Scale: 1:10,000 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400 500

Metre

MARINUS LINK

Acknowledgements and Sources:

Data Source: Marinus Link GIS Data Repository and theLIST ©State of Tasmania .
Background Image: Esri Community Maps Contributors, DPIPWE, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Maxar
Produced By: Marinus Link for the Tasmanian Heybridge Converter Station EIS.
Date Figure Exported: 21/11/2024

6.5.3.2 Ambient air quality

EPA carries out air quality monitoring to determine its compliance with the National Environment Protection (Ambient Air Quality) Measure. The closest EPA air monitoring station to the proposal site is Emu River, located approximately 8.6 km to the south-west.

The highest 70th percentile and annual average results from Emu River (recorded from January 2015 to October 2020) are presented in Table 6.5-3. These background concentrations were used to inform the assessment of potential health impacts from dust associated with the proposal. EPA air monitoring station data was analysed to understand likely ambient background concentrations of particulates in the vicinity of the proposal site. The ambient background concentrations highlight the low background levels at the proposal site. These ambient backgrounds are used to inform the human health impacts of additional dust.

Table 6.5-3 Ambient background concentrations

Pollutant	Averaging period	Estimated ambient background concentration (µg/m^3)	Source
PM_{10}	24-hour	9.5	EPA Emu River, highest 70th percentile
	Annual	8.0	EPA Emu River, highest Annual Average
$PM_{2.5}$	24-hour	2.7	EPA Emu River, highest 70th percentile
	Annual	2.7	EPA Emu River, highest Annual Average

6.5.4 Applicable legislation

6.5.4.1 Environment Protection Policy (Air Quality) 2004

The *Tasmanian Environment Protection Policy (Air Quality)* (Air Quality EPP) provides the framework for the management and regulation of point and diffuse sources of emissions to air, and for pollution that has the potential to cause environmental harm. The Air Quality EPP defines environmental values to be protected, air quality standards and management requirements for sources of air contaminants.

The National Environment Protection Council defines national ambient air quality standards and goals in the National Environment Protection (Ambient Air Quality) Measure (Air NEPM). The Air NEPM sets national standards for six key air pollutants, including particulates PM_{10} and $PM_{2.5}$.

The Air Quality EPP adopts the Air NEPM standards for ambient air quality. The standards and design criteria for particulate matter adopted for the Air Quality Impact Assessment are presented in Table 6.5-4. Where pollutant concentrations are below the designated standards, the environmental risk can be considered acceptable.

Table 6.5-4 NEPM air quality standards and Air Quality EPP design criteria

Pollutant	Averaging period	Value
PM_{10}	24-hour average	50 µg/m^3
	Annual	25 µg/m^3
$PM_{2.5}$	24-hour average	25 µg/m^3
	Annual	8 µg/m^3

6.5.5 Potential impacts

6.5.5.1 Construction

The key potential emissions to air from construction of the proposal would be in the form of dust (particulate matter). Construction activities associated with the proposal that have the potential to generate dust emissions include:

- Vegetation clearing required for the operational area of the converter station and switching station.
- Bulk earthworks including excavation and stockpiling of topsoil for construction of the converter station and switching station.
- Surface preparation/civil works required for the construction and upgrading of the proposal site access road.

Dust emissions associated with the above construction activities would be generated due to:

- Materials handling associated with excavation and dozing.
- Wheel generated dust from transport.
- Wind erosion from stockpiled material and exposed ground.

The generation of dust emissions can potentially lead to reduced public amenity due to dust soiling, health impacts due to elevated levels of PM_{10} and $PM_{2.5}$, and harm to ecological receptors due to dust deposition in aquatic ecosystems or on vegetation. Dust emissions would be greater when temperatures are highest and rain infrequent, typically in summer months.

The magnitude of dust emissions (small, medium or large) is based on the scale of the anticipated works as outlined in IAQM (2014) and provided in the Air Quality Impact Assessment (Appendix G). The magnitude of emissions associated with earthworks, construction works and trackout during the construction stage of the proposal are presented in Table 6.5-5. No demolition works are proposed.

Table 6.5-5 Construction activities and emissions magnitude

Construction activity	Magnitude of emission	Details
Earthworks	Large	• Total site area of approximately 57,930 m^2, with approximately 54,800 m^3 of aggregate moved for earthworks. • Heavy earth moving vehicles.
Construction works	Medium	• Two converter station buildings with an approximate volume of 180,000 m^3 each and a portal frame switching station building with an approximate volume of 7,850 m^3. • Buildings of standard sheet steel construction, with low potential for dust generation.
Trackout	Medium	• At most 13 heavy duty vehicles are expected per day. • Access track around the switching station is approximately 200 m in length.

As discussed in Section 6.5.3, there is minimal sensitive receptors situated within 350 m of construction works, therefore the sensitivity to dust deposition and any subsequent human health impacts is **low**.

Table 6.5-6 Sensitivity of the area surrounding the proposal site

Potential impact	Earthworks	Construction	Trackout
Dust soiling effects	Low	Low	Low
Human health effects	Low	Low	Low

Without the implementation of mitigation measures, especially during windy or dry conditions, the risk of dust soiling effects and human health impacts due to the construction of the proposal is categorised as **low** for all activities (earthworks, construction and trackout) due to the small number of receptors and the separation distance between the construction areas and surrounding residences (refer to Table 6.5-7). The risk of impacts is determined by the dust emission magnitude combined with the sensitivity of the receptor.

Table 6.5-7 Air quality – risk assessment

Potential impacts	Earthworks	Construction	Trackout
Dust soiling effects	**Low**	**Low**	**Low**
Human health effects	**Low**	**Low**	**Low**

Other construction emissions to air include:

- Exhaust emissions from construction plant and equipment.
- Odours and vapours from contaminated soils or ASS.

The main source of exhaust emissions would be from the combustion of diesel fuel and petrol from heavy vehicles, mobile excavation machinery, and stationary combustion equipment as well as from the handling and/or on-site storage of fuel and other chemicals. Exhaust emissions would involve periodic localised emissions of carbon monoxide, particulate matter (PM_{10} and $PM_{2.5}$), oxides of nitrogen (including nitrogen dioxide), sulfur dioxide, volatile organic compounds, and polycyclic aromatic hydrocarbons associated with the combustion of diesel fuel and petrol. The volume of emissions from construction vehicles and machinery would depend on the type of fuel used, the power output and condition of the engine, and duration of use. Exhaust emissions generated during construction would be temporary and would not significantly contribute to emissions in the local area. These emissions would be adequately managed by the implementation of standard construction mitigation measures, described in Section 6.5.6. No long-term adverse impacts to air quality from these emissions are anticipated.

The risk of mobilising airborne hazardous materials, odours or vapours could occur as a result of uncovering contaminated soils (including asbestos-containing materials) and ASS. As identified in Section 6.1 (Potentially contaminated material) and Section 6.4 (Water quality), potential contamination impacts including management of odours and vapours generated during construction can be managed with the implementation of appropriate mitigation measures (refer to Section 6.5.6).

6.5.5.2 Operation

Assessment of the operational stage of the proposal identified three activities that have the potential to result in air emissions:

- Routine operation of two 1,500 kilo-volt-amperes (kVA) backup diesel generators with above ground fuel storage of 5,000 L. These would only operate in case of emergency and during routine testing and maintenance.
- Routine inspections including scheduled minor and major outages for repairs and servicing, using light vehicles.
- Occasional maintenance of access tracks using light vehicles.

Based on the proposed activities, the operational stage of the proposal would not generate significant emissions to air and would not result in significant dust impacts at nearby sensitive receptors. As such, a detailed assessment of impacts to air quality during the operational stage of the proposal is not required.

6.5.5.3 Cumulative impacts

The preceding impact assessment combines the impacts of the proposal and the Heybridge Shore Crossing, so represents a cumulative impact assessment of the proposal with the Heybridge Shore Crossing.

Out of the nearby proposed and foreseeable projects identified for consideration, only the NWTD is in close proximity to the proposal, with a potential overlap in construction activities. All other projects are located over 5 km away and it is considered unlikely that cumulative air quality impacts would occur.

For NWTD, key activities for dust creation include the construction of the facility and associated infrastructure and occasional vehicle operation along access tracks, with the greatest potential for dust impacts being attributable to the construction phase. The adoption of the mitigation measures identified in Table 6.5-8 are expected to adequately manage dust emissions for the proposal. Potential cumulative air quality impacts would be temporary and/or managed through consultation with the relevant stakeholders and where practicable, coordinating construction programs (refer to MM Gen06).

6.5.6 Management, mitigation and monitoring

Proposed mitigation measures to minimise potential impacts on air quality are presented in Table 6.5-8. Mitigation measures in other sections that are relevant to the management of air quality impacts include:

- Section 6.1 (Potentially contaminated material), specifically measures which address the management of contaminated soils during construction, which would include the assessment and management of vapours and gas. Also measures which address appropriate handling and management of hazardous materials.
- Section 6.4 (Water quality), specifically measures for the management of ASS.
- Section 6.7 (Dangerous goods and environmentally hazardous materials), specifically measures which address spill prevention and clean up.
- Section 6.10 (Greenhouse gas and ozone depleting substances), specifically measures which address use of low emission fuel and maintenance of equipment and vehicles.

- Section 8.2 (Mitigation measures), specifically MM Gen06 which addresses consultation with relevant stakeholders to manage the interface of nearby projects under construction at the same time.

Together, these measures would minimise the potential air quality impacts of the proposal.

Table 6.5-8 Air quality – mitigation measures

Ref	Mitigation measure	Proposal stage
AQ01	The following best-practice dust management measures will be implemented during construction: • Regular wetting down of exposed and disturbed areas including stockpiles, in dry and windy weather. • Adjust the intensity of construction activities based on observed dust levels and weather forecasts (MM AQ02). • Minimise the amount of materials stockpiled and position stockpiles away from proposal site boundary (where practicable). • Regularly inspect dust emissions (MM AQ02) and apply additional controls as necessary.	Construction
AQ02	Conduct construction air quality monitoring including: • Daily monitoring of wind/weather forecasts and temperature and humidity using data from nearby automatic weather station and/or BoM. • Hourly monitoring of rainfall using data from nearby automatic weather station and/or BoM. • Daily monitoring of odour when odour generating works are being carried out, or when a complaint is made. • Daily visual surveillance to confirm effectiveness of dust control mitigation and that there are no visible dust emissions beyond the boundary of the proposal site. • Investigations as required in response to a complaint. This may require review of monitoring data, frequency, and effectiveness of mitigation.	Construction
AQ03	Plant and equipment will be maintained in a proper and efficient manner. Visual inspections of emissions from plant will be carried out as part of pre-acceptance checks.	Construction Operation
AQ04	The following best-practice odour management measures will be implemented during relevant construction works: • The extent of opened and disturbed contaminated soil at any given time will be minimised. • Temporary coverings or odour supressing agents will be applied to excavated areas where appropriate. • Monitoring as outlined in MM AQ02.	Construction

6.5.7 Residual impacts

With appropriate mitigation measures in place, the residual impacts on air quality during construction are not significant, with the overall residual risk reduced to **negligible** (refer to Table 6.5-9). The proposal would pose a minimal risk for human health and, therefore, a quantitative assessment using dispersion modelling is not required to verify Air NEPM compliance for PM_{10}, $PM_{2.5}$ and combustion gases.

During adverse weather conditions, short-term dust annoyance may occur, however, the scale of this would not normally be considered sufficient to change the conclusion that overall, the effects would not be significant.

Table 6.5-9 Air quality – residual risk assessment

Potential impacts	Earthworks	Construction	Trackout
Dust soiling effects	Negligible	Negligible	Negligible
Human health effects	Negligible	Negligible	Negligible

6.6 Waste management

This section provides an assessment of waste generation and waste that would be managed during construction and operation.

6.6.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.6-1.

Table 6.6-1 Relevant EIS guidelines

Waste management – EIS guidelines	Section
Identify the source, nature, and quantities of all wastes, (liquid, atmospheric or solid) including general refuse and by-products from the various stages of the process likely to be generated.	Section 6.6.4
Identify any Controlled Waste which may be generated by the proposal. Note: Controlled Waste is defined in the EMPC Act and associated regulations. This may include extracted sediment.	Section 6.6.4
Identify best practice methods and facilities available to collect, store, reuse, treat or dispose of each waste stream, including maintenance requirements.	Section 6.6.4, 6.6.5
Describe the source, nature, quantity of each controlled waste, and potential best practice methods of treatment, storage and disposal for each controlled waste.	Section 6.6.4, 6.6.5
Legislative and policy requirements	
Waste management measures must be in accordance with the following hierarchy of waste management, arranged in decreasing order of desirability: • Avoidance. • Recycling/reclamation. • Re-use. • Treatment to reduce potentially adverse impacts. • Disposal.	Section 6.6.3, 6.6.5

6.6.2 Methodology

A desktop assessment was carried out and comprised:

- A review of applicable legislation.
- Identification of the likely waste streams.
- Estimates of the quantities of different types of wastes to be generated.
- Development of strategies to avoid, minimise and manage wastes generated during construction and operation.
- Identification of possible disposal facilities for wastes generated.

6.6.3 Applicable legislation

6.6.3.1 Waste and Resource Recovery Act 2022

The *Waste and Resource Recovery Act 2022* enabled the development of the Tasmanian Waste and Resource Recovery Strategy 2023-2026. Under the Act, the strategy is one instrument to identify long term and short-term objectives to divert products and materials from disposal and landfill.

The Tasmanian targets for waste and resource recovery include:

- Reduce waste generated in Tasmania by 5% per person by 2025 and 10% by 2030.
- Achieve a 40% average recovery rate from all waste streams by 2025 and 80% by 2030.

The waste management hierarchy provides an order of preference for implementing waste management options. The primary objective of the waste management hierarchy is to reduce potential hazard to human health and the environment by avoiding or minimising the production of wastes. The waste management hierarchy is illustrated in Figure 6.6-1.

Figure 6.6-1 Waste management hierarchy

The proposal would follow the waste management hierarchy and would aim to avoid waste where possible and explore opportunities for reuse and recycling of waste prior to other disposal or treatment options. The proposal would also implement a waste management plan to establish specific targets for waste reduction and management.

6.6.3.2 Environmental Management and Pollution Control Act 1994

The EMPC Act is the primary piece of legislation governing potentially polluting activities in Tasmania. The Act is administered by Tasmanian EPA and ensures that activities do not have an unacceptable impact on the environment or the community and that measures are taken to protect, restore and enhance the quality of the environment. The focus of the Act is preventing environmental harm from pollution and waste.

Categories of 'controlled waste' are defined under the EMPC Act. Controlled waste is the most hazardous category of waste and requires careful management. Controlled wastes that are potentially generated by the proposal are outlined in Section 6.6.4.1.

The Waste Management Regulations are used to regulate and manage controlled waste and some aspects of the general waste disposal within Tasmania.

6.6.3.3 EPA Tasmania (2018) Information Bulletin No. 105, Classification and Management of Contaminated Soil for Disposal

Information Bulletin No. 105, Classification and Management of Contaminated Soil for Disposal (Information Bulletin 105) defines the criteria used by the EPA for the classification of contaminated soil that requires treatment and/or off-site disposal and outlines the management of each classification in accordance with the Waste Management Regulations. The Contaminated Land and Acid Sulfate Soils Impact Assessment (Appendix B) classified all soil stockpiles present on the proposal site as having a preliminary classification of Low Level Contaminated Soil (Level 2). Refer to Section 6.1 for further discussion on contaminated soils.

Surplus soils generated during construction of the proposal that require offsite disposal would be classified and managed in accordance with Information Bulletin 105.

6.6.4 Waste generation

6.6.4.1 Construction

6.6.4.1.1 Waste streams

During the construction stage of the proposal, the anticipated indicative waste streams, quantity (total for construction) and management strategies are outlined in Table 6.6-2

Table 6.6-2 Indicative waste generation and management

Waste type	Description/source	Quantity	Management
Wood	Pallets and cable drums, timber offcuts, crates, concrete formwork	1000 kg	Separated for reuse or recycling.
Paper and cardboard	General office wastes, packaging materials, packing boxes	1500 kg	Separated for reuse or recycling.
Metal	Offcuts, unused metal sections, cable waste, concrete formwork	2000 kg	Separated for reuse or recycling.
Plastic	Conductor drums, packaging, cable waste	1000 kg	Separated for reuse or recycling.
Green waste	Cleared vegetation	About 0.75 ha of tree plantings and weeds.	Reuse on site where feasible. Weeds would be separated, sprayed and bagged and non-weed vegetation would be mulched for reuse. Any excess green waste would be disposed as appropriate.
Spoil	Surplus spoil from excavations and earthworks	Indicative earthworks quantities indicate that the	On-site or off-site reuse where feasible, or disposal at a licensed facility.

Waste type	Description/source	Quantity	Management
		cut and fill balance would require 27,500 m3 of fill material on site. Final quantities would be determined during detailed design.	Any contaminated soils (that may be encountered) would be tested and treated on-site and disposed at a suitably licensed facility.
General domestic	Food scraps, aluminium cans, glass bottles, plastic and paper containers	100 kg	Waste would be separated and recycled where feasible, and residual waste would be collected by a contractor and disposed off-site at a suitably licensed facility.
Sewage	Biological wastes from on-site septic systems	15000 kg	Waste would be collected by a contractor and disposed off-site at suitably licensed facility or through existing sewage treatment system.
Hydrocarbon	Spills from construction plant, refuelling of equipment, machinery, vehicles, used lubricants and oils	To be determined during further detailed design	Any spills would be cleaned up, with the clean-up material placed in dedicated covered skip bin for collection and off-site disposal at a suitably licensed facility. Used liquids would be collected in tanks and transported to a suitably licensed facility.
Commercial waste	Empty fuel drums, filters, fuel storage containers, herbicide and pesticide storage containers	To be determined during further detailed design	When in use, storage containers would be stored in appropriately bunded areas. Empty containers would be collected by a contractor for off-site disposal at a suitably licensed facility

Existing waste treatment and disposal facilities near the proposal site include the Heybridge Asbestos Landfill, Heybridge East Waste Depot and the Heybridge Inert Waste Depot, all located between 1.9 and 2.2 km south-west of the proposal site from Minna Road and Devonshire Drive. There are also additional waste facilities that are located at Burnie and Ulverstone.

The Burnie Resource Recovery Centre accepts asbestos, concrete, green waste, steel, timber and waste oils, which may be generated during the proposal's construction or operational stages. Burnie City Council currently transports residual waste to the Dulverton, Port Latta or Ulverstone landfills following the extraction of reusable and recyclable products at its Resource Recovery Centre.

Further consultation with councils and various waste facilities would be carried out prior to any proposal waste disposal to understand the capacity at the facilities to accept different types of waste streams.

6.6.4.1.2 Controlled waste

Table 6.6-3 outlines the categories of controlled wastes that may be generated or encountered by the construction of the proposal.

Table 6.6-3 Potential sources of controlled waste and indicative quantity

Code*	Description/source	Quantity
J120	Waste oil/water, hydrocarbons/water mixtures or emulsions	<5,000 litres
N120	Soils contaminated with a controlled waste	To be confirmed in accordance with MM CL01
N100	Containers which are contaminated with residues of substances referred to in this list	25

Notes: *Code of waste as per the EMPC Act

Controlled waste generated by the proposal would be managed in accordance with the EMPC Act and other relevant legislation. This includes, but is not limited to consideration of:

- Appropriate remediation, treatment or re-use options that are beneficial to the environment.
- Sampling and analysis of soil and other materials reasonably suspected to be controlled waste to determine if they are indeed controlled waste before removal from the site.
- Conducting sampling and analysis by a suitably qualified person in accordance with relevant standards when there is suspected potential contamination with controlled waste.
- Determining if a Waste Transporter with relevant approvals is required.

6.6.4.1.3 Contaminated soil

The requirements for the management of contaminated soil and construction waste (for instance, containing heavy metals) is detailed in the Information Bulletin 105. The EPA uses four categories to classify contaminated soil and construction waste. These categories determine where and how the soil and construction waste can be disposed.

Surplus soils generated during construction works that require offsite disposal must be classified and managed in accordance with Information Bulletin 105. Where soils are classified as ‘contaminated soil’ (Level 3) or ‘contaminated soil for remediation’ (Level 4), these soils are to be managed in accordance with the Waste Management Regulations and only transported to a premises authorised by EPA to accept such wastes. Should the soils be classified as ‘low level contaminated soil’ (Level 2), MLPL may apply to EPA for a permit to retain the soils within the proposal site.

6.6.4.2 Operation

During operation of the proposal, the following waste streams would be generated from operation and maintenance activities at the proposal site:

- Approximately 85 tonnes of oil (equivalent to 90,000 L) in each transformer (six in operation).
- Oil leaks, which are expected to be negligible, and any oil would be recycled.
- Lead acid batteries for the emergency power system at the converter stations would need to be replaced every 10 years. There are two 125 V DC battery banks which consist of 58 lead acid cells.
- Approximately five rat bait stations would be required to be replaced every six months.
- Approximately 20 L of herbicide for weed control would be used every three months.

- Packaging from spare parts and consumables (5 kg per week).
- General waste from staff on site (5 kg per week).
- General onsite waste (5 kg per week).

Controlled waste generated by operation of the proposal would be dealt with in accordance with the EMPC Act and other relevant legislation. Where there it is suspected that there is potential for waste to be contaminated with a controlled waste, sampling and analysis would be undertaken by a suitably qualified person in accordance with relevant standards.

6.6.5 Management, mitigation and monitoring

Proposed measures to minimise potential impacts associated with the generation of waste during construction are presented in Table 6.6-4. Mitigation measures in other sections that are relevant to the management of waste materials include:

- Section 6.1 (Potentially contaminated material) specifically measures which address the management of contaminated soils excavated during construction and the appropriate handling and management of hazardous materials.
- Section 6.4 (Water quality) specifically measures which address the management of contaminated surface and groundwater, and ASS.
- Section 6.7 (Dangerous goods and environmentally hazardous materials) specifically measures which address spill prevention and clean up.

Together, these measures will minimise the potential impacts associated with the generation of waste.

Table 6.6-4 Waste management – mitigation measures

Ref	Mitigation measure	Proposal stage
WM01	Prior to construction commencing, develop and implement a waste management plan, for the identification of waste management strategies, in accordance with the waste management hierarchy. The waste management plan will include (at a minimum): • The waste mitigation measures in this EIS. • Identification of a designated waste area on site, where all waste (and recyclables) would be stored or stockpiled. • Responsibilities of the key personnel implementing this plan. • Waste area inspection frequency.	Construction
WM02	All waste will be assessed, classified, managed, transported and disposed of in accordance with the *Environmental Management and Pollution Control (Waste Management) Regulations 2020*.	Construction
WM03	If hazardous waste, controlled waste (e.g., asbestos containing materials) or contaminated soil is encountered, it will be handled and managed in accordance with relevant legislation, codes of practice and Australian standards.	Construction
WM04	Construction waste will be minimised by accurately calculating materials brought to the site and limiting materials packaging, and maximising reuse where feasible and reasonable.	Construction

Ref	Mitigation measure	Proposal stage
WM05	Waste streams will be segregated, using appropriately labelled and managed bins, to avoid cross-contamination of materials and maximise reuse and recycling opportunities.	Construction
WM06	A materials tracking system will be implemented for material transferred between the proposal site and offsite licensed waste management facilities.	Construction
WM07	The generation of waste will be minimised and reused where possible, in accordance with the waste management hierarchy, and the MLPL Sustainability Framework. Waste management in operation would include: • Segregation and storage of waste in designated areas/receptacles. • Waste to be collected by a licensed waste contractor for off-site recycling or disposal at a licensed waste facility. These operation mitigation measures would be incorporated into the OEMP as per MM Gen03.	Operation

6.7 Dangerous goods and environmentally hazardous materials

This section provides an assessment of potential risks associated with dangerous goods and environmentally hazardous materials required for construction and operation of the proposal.

6.7.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.7-1.

Table 6.7-1 Relevant EIS guidelines

Dangerous goods and environmentally hazardous materials – EIS guidelines	Section
Discuss impacts of the proposal in relation to dangerous goods and environmentally hazardous materials, including:	
The nature, quantity and storage location of all environmentally hazardous materials including Dangerous Goods (as defined in the *Australian Code for the Transport of Dangerous Goods by Road and Rail*) that will be used during the construction and operation of the proposal. In particular, the application refers to the use of sulfur hexafluoride, which is not flammable, but cylinders may explode when overheated, and gas leaks may result in asphyxiation if vapours escape in a confined space. Clarify the quantity of this substance that will be stored onsite, and whether this will exceed the manifest quantities prescribed in Schedule 11 of the *Work Health & Safety Regulations 2011*.	Section 6.7.4
A map showing the location of temporary and permanent storage areas for fuels, oils, and other dangerous goods or chemicals.	Figure 2-2, Figure 2-3
The measures (such as bunded areas or spill trays) to be adopted to prevent or control any accidental releases of dangerous goods and environmentally hazardous materials.	Section 6.7.5, 6.1.6, 8.2
Contingency plans for when control measures, equipment breakdowns or accidental releases to the environment occur, including proposed emergency and clean-up measures and notification procedures.	Section 6.7.5, 6.1.6, 8.2
Identify any safety management requirements for the protection of human health and safety affecting the community.	Section 6.7.5, 8.2
Legislative and policy requirements	
Reference the *Australian Code for the Transport of Dangerous Goods by Road and Rail.*	Section 6.7.3.3

6.7.2 Methodology

The purpose of this section is to demonstrate best environmental management of dangerous goods and hazardous materials in a way that minimises environmental risks during the construction and operation of the proposal.

The desktop assessment included:

- Consideration of the relevant regulatory framework and guidelines.
- Identification of dangerous goods and hazardous materials requiring use and storage at, or transport to, the proposal site during construction and operation.
- Potential risks that can arise due to these dangerous goods or hazardous materials.
- Identification of measures to manage the storage, transport, handling and disposal of these materials.

Impacts to surface or groundwaters have been assessed in the Section 6.4. Other work, health and safety hazards are not specifically considered in the EIS. These issues would be addressed by the relevant construction contractor in accordance with relevant guidelines and legislative requirements.

6.7.3 Applicable legislation

6.7.3.1 Work Health and Safety Regulations 2022

The Tasmanian *Work Health and Safety Regulations 2022* provides a framework to protect the health, safety and welfare of all workers at work and the health and safety of all other affected by the work. Schedule 11 of the *Work Health and Safety Regulations 2022* governs the manifest quantities of Schedule 11 hazardous chemicals used, handled or stored, or is to be used, handled or stored, at the workplace.

Under Regulation 34, a duty holder/person conducting a business or undertaking, in managing risks to health and safety must identify reasonably foreseeable hazards that could give rise to risks to health and safety. A duty holder also has responsibility to minimise risks, so far as is reasonably practicable.

6.7.3.2 Dangerous Goods (Road and Rail Transport) Act 2010

The *Dangerous Goods (Road and Rail Transport) Act 2010* provides the framework to regulate the transport of dangerous goods by road and rail in order to promote public safety and protect property and the environment. The Act gives effect to the standards, requirements and procedures of the Australian Code for the Transport of Dangerous Goods by Road and Rail. Refer to Table 6.7-2 for further details of the proposal's compliance to the *Dangerous Goods (Road and Rail Transport) Act 2010*.

6.7.3.3 Australian Code for the Transport of Dangerous Goods by Road & Rail

The relevant authority for the transport of hazardous substances and dangerous goods is WorkSafe Tasmania, which can provide authorisations under the Australian Code for the Transport of Dangerous Goods by Road and Rail in Tasmania. The code outlines the requirements for classification, vehicle transfer and other details for dangerous goods.

The code provides definitions for Class 9 – Dangerous / Environmentally Hazardous Substances. The substances can include asbestos, lithium batteries, solid or liquid substances which are dangerous to the aquatic environment and ammonium nitrate-based fertilisers. Refer to Table 6.7-2 for further details of the proposal's compliance to the code for the transport, use or storage of any substances under the code.

6.7.3.4 National Code of Practice for Storage and Handling of Workplace Dangerous Goods NOHSC: 2017 (2001)

The National Code of Practice for Storage and Handling of Workplace Dangerous Goods NOHSC: 2017 (2001) provides guidance on how to comply with the National Standard for the Storage and Handling of Workplace Dangerous Goods, with consideration of dangerous goods such as gases, flammable liquids and solids, oxidising, toxic and corrosive substances. The code provides that hazard identification involves identifying all physical components, systems and activities which may have the potential to harm the safety and health of a person and/or cause damage to property and the environment. An example of hazards that

should be identified is potential ignition sources. Refer to Table 6.7-2 for further details of the proposal's compliance to the code's guidance.

6.7.4 Potential impacts

6.7.4.1 Construction

During construction of the proposal, potentially dangerous goods and hazardous materials are anticipated to be temporarily used, stored on and transported to and from the proposal site. This involves the following:

- **Use**: The potentially hazardous materials include petrol, diesel, lubricating and hydraulic oils and greases, cement, premix concrete, contaminated waste and paints.
- **Storage**: The method of storage would vary depending on the substances but would include drums of various sizes, small and intermediate bulk containers, bags, pallets and bunded areas where appropriate. Volumes of potentially hazardous materials such as petrol, diesel, lubricants and paints would be stored on-site.
- **Transport**: The volume of potentially hazardous materials required to be transported to and from site would depend on the proposal design and requirements of the proposal construction traffic vehicles. Unexpected finds and potential handling and transport of contaminants, including potential presence of ACM at the proposal site.

Specific proposal components that involve the storage or handling of dangerous goods or hazardous materials include:

- Bulk earthworks to construct the converter station bench, which may involve remediation or disposal of contaminated soils.
- Delivery and installation of HVAC switchgear and auxiliary transformers that are insulted by SF_6.
- Fuel for machinery and vehicles (several thousand litres).
- Hydraulic oil and various lubricants for machinery (several thousand litres).
- Paints and solvents.
- Disinfectants and/or weed control chemicals.

Refuelling and maintenance of equipment would likely occur on site. Dangerous goods and environmentally hazardous materials can present a risk to the environment or human health if these are inadvertently released into the nearby environment as a result of a spill or exposure event, or as a result of incorrect storage or disposal.

Spills of these materials to waterways, drainage lines and wetlands can present risks to aquatic flora and fauna ranging from direct toxicity impacts to smothering effects (e.g., from hydrocarbons). Spills of these materials to ground can present similar risks if the water table is reached by the spilt materials or washed into drainage lines during rains. The key tools for managing this risk are suitable storage, bunding, handling and disposal as outlined in Section 6.7.5. The storage areas for fuels, oils, and other dangerous goods or chemicals would therefore be located in the most appropriate locations to best manage risk for the work that

is being done on the proposal site. Those locations would be identified and varied from time to time as part of the implementation of these mitigation measures.

The SF_6 present on site during construction would be less than the trigger for the use to be deemed a hazardous use. It would not be a 'manifest quantity' for the purpose of *Work Health and Safety Regulations 2022*, and its characteristics mean that it is not a 'hazardous chemical' as defined by the *Work Health and Safety Regulations 2022*.

6.7.4.2 Operation

The different types of dangerous goods and hazardous materials that may be used or stored during the operation of the proposal includes:

- Two 1,500 kVA diesel generators with above ground fuel storage (several thousand litres).
- Oil (several tens of thousands of litres) in each transformer.
- Lead acid batteries within the service and control building for emergency power.
- Transformers, substation, switching station or other electrical infrastructure that would involve insulation with SF_6 gas (several thousand kilograms).

Fuels and oil would be used within the proposal site to operate and maintain machinery and equipment, including vehicles for the operational workforce. A fuel store would be held on-site which is self-bunded. The store would be located in the most appropriate locations to best manage risk. The locations would be identified as part of the implementation of MM CL03 and following detailed design of the converter station facilities. The oil for the transformers would be transported to site in dedicated transformer oil transportation tanks, with no extra oil stored on site.

During the operation or maintenance of the proposal there is potential for accidental spills or leaks of the stored transformer oil and diesel fuel. If not contained, spills or leaks can be released into watercourses and present contamination risks to aquatic ecosystems.

Significantly smaller amounts of dangerous goods or environmentally hazardous materials would be handled or stored during the operational period of the proposal, with some small volumes of fuels, oils, lubricants and paints required on site within the operations facility for maintenance purposes. All other identified materials/substances are built into the design of the proposal and operate within closed-loop systems and would not pose exposure or spill risks in normal operation.

SF_6 would be present on site but not at 'manifest quantities' for the purpose of *Work Health and Safety Regulations 2022*. Electrical components that contain SF_6 would be designed to meet International Electrotechnical Commission standards as a 'closed pressure system', and a building would enclose the equipment. Emissions of SF_6 can occur during the manufacture and filling of electrical switchgear, during operation as very minor leakage, and during maintenance throughout the equipment's lifetime (every 4-6 years). However, maintenance typically does not require internal access to gas compartments ensuring the SF_6 remains within the closed pressure system. Refer to Section 6.10.5 for proposed measures to minimise potential impacts associated with use of SF_6.

6.7.5 Management, mitigation and monitoring

Proposed measures to minimise risks and potential impacts associated with dangerous goods and environmentally hazardous materials are presented in Table 6.7-2. Mitigation measures in other sections that are relevant to the management of dangerous goods and environmentally hazardous materials include:

- Section 6.1 (Potentially contaminated material), specifically measures which address the identification and handling of contaminated materials and the storage of dangerous goods or environmentally hazardous materials.
- Section 6.4 (Water quality), specifically measures which address the management of potentially contaminated water.
- Section 6.6 (Waste management), specifically measures which address appropriate classification, handling and disposal of waste materials, including contaminated waste.
- Section 6.10 (Greenhouse gases and ozone depleting substances), specifically measures which address management of SF_6.
- Section 8.2 (Mitigation measures) specifically measures which address emergency response and incident management (MM Gen05).

Together, these measures would minimise the potential for impacts associated with dangerous goods and environmentally hazardous materials.

Table 6.7-2 Dangerous goods and environmentally hazardous materials – mitigation measures

Ref	Mitigation measure	Proposal stage
DG01	Ensure spill prevention and clean up equipment is readily available and accessible in the vicinity of all plant and machinery, including mobile and fixed fuel storages. Spill prevention and clean up procedures will be in accordance with the following principles: • Adequate training and site induction for personnel for the handling of dangerous goods and environmentally hazardous materials. • Install trays, thick plastic mats or similar beneath stationary machinery and equipment to protect the soil from oil/fuel spills and leaks. • Install spill trays immediately if there is any potential or, evidence of, leakage. • Maintain a supply of oil-absorbent material.	Construction Operation
DG02	The transport of dangerous goods will be in accordance with the *Australian Code for the Transport of Dangerous Goods by Road and Rail*, and the *Dangerous Goods (Road and Rail Transport) Act 2010*, including, but not limited to measures for: • Classification. • Documentation. • Safety equipment and procedures.	Construction Operation

6.7.6 Residual impacts

With the implementation of recommended mitigation measures for managing potential spill or leaks of hazardous materials, the residual risk of impacts to human health and environment is considered to be low.

6.8 Electric and magnetic fields

This section provides a summary of the findings of the EMF and EMI Impact Assessment which is provided in Appendix H.

6.8.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.8-1.

Table 6.8-1 Relevant EIS guidelines

Electric and magnetic fields – EIS guidelines	Section
Discuss the potential risks or impacts of electromagnetic fields associated with the proposal, including:	
A desktop study of the Electromagnetic Fields (EMF) associated with the new converter station, including calculations of the EMF levels likely to be generated at the edge of the site.	Section 6.8.5
A comparison against levels recommended by the Australian Radiation Protection and Nuclear Safety Agency and the general public exposure guideline limits recommended by the International Commission on Non-Ionizing Radiation Protection.	Section 6.8.4, 6.8.5.1

6.8.2 Methodology

In completing the impact assessment of EMF and EMI, the technical specialist adopted a compliance based assessment approach. As explained in more detail in EMF and EMI Impact Assessment (Appendix H), this involved the following steps:

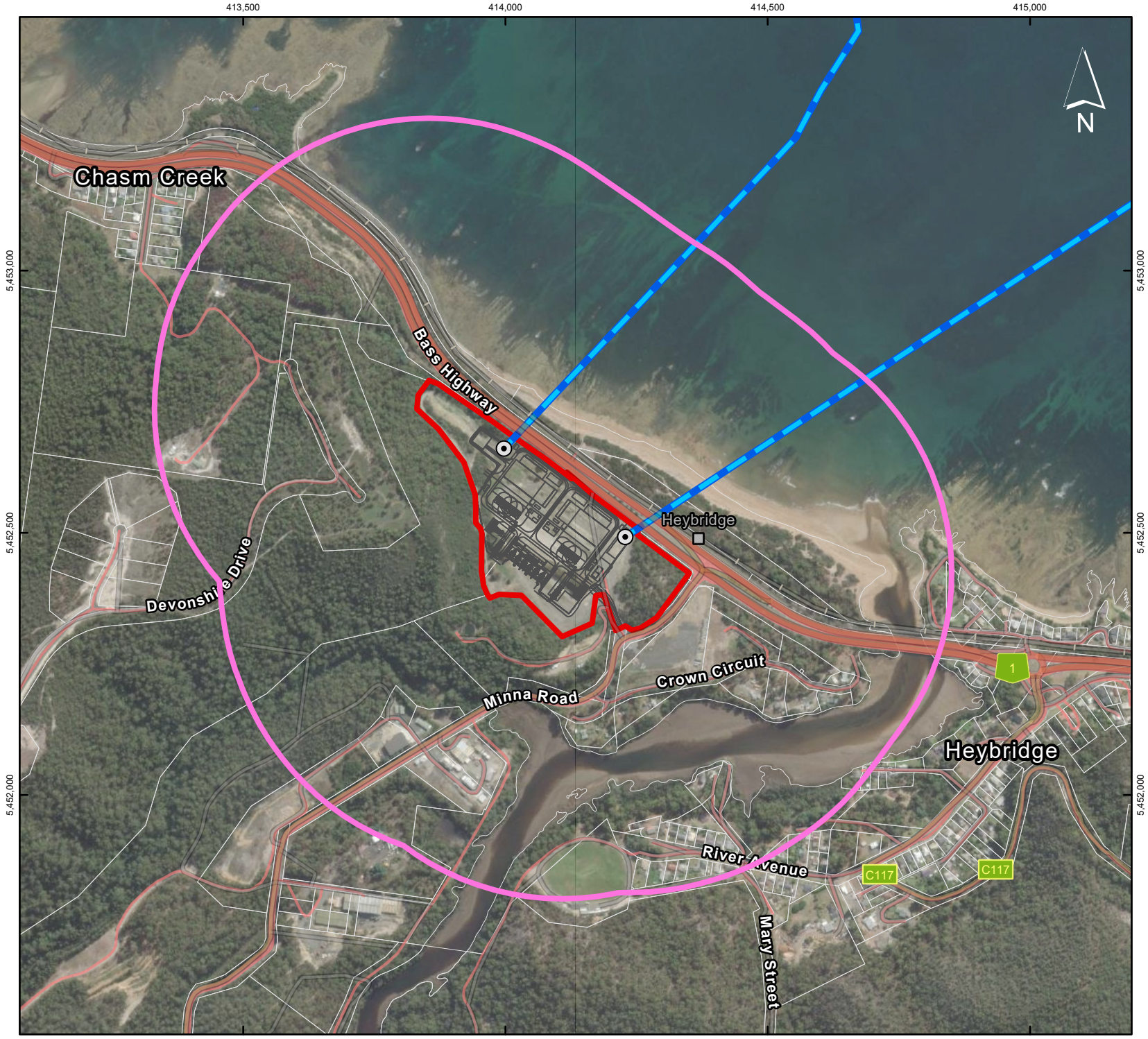
- Defining a study area.
- Characterising existing conditions for EMF, including through desktop assessments, publicly available information about land use and relevant guidelines.
- Using computer modelling to calculate EMF levels generated by the project.
- Conducting an impact assessment, comparing EMF levels generated by the proposal against the reference levels for sensitive receptors, and proposing potential mitigation measures.

6.8.3 Existing conditions

Potential sensitive receptors within the study area (i.e., 500 m radius from the proposal site, refer to Figure 6.8-1) that may be impacted by electric and magnetic fields include:

- Humans.
- Fauna (including livestock, birds, frogs and mammals).
- Flora.
- Electrical and electronic equipment (e.g., farming equipment, television, refrigerator, personal computers).

Figure 6.8-1:
EMF/EMI study area



Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Indicative Site Layout
- Proposal Site
- EMF/EMI 500m Study Area
- Cadastral Parcels
- Major Road
- Minor Road

Scale: 1:10,000 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400 500

Metre

MARINUS LINK

Acknowledgements and Sources:

Data Source: Marinus Link GIS Data Repository and theLIST ©State of Tasmania .
Background Image: Esri Community Maps Contributors, DPIPWE, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Maxar
Produced By: Marinus Link for the Tasmanian Heybridge Converter Station EIS.
Date Figure Exported: 21/11/2024

Sensitive receptors more than 500 m from proposal equipment would not be impacted by EMF and EMI as generated EMF and EMI would most likely be indistinguishable from background ambient levels, and as such are not a part of the study area. No very sensitive receptors (such as medical and scientific research equipment) were identified within the study area.

For humans, fauna, flora, and electrical and electronic equipment, the potential exposure scenarios would involve AC electric and magnetic fields from the operation of the converter station. Electrical and electronic equipment may also be subject to EMI from the proposal.

The only measurable sources of EMF and EMI within the proposal site are the earth's geomagnetic fields and the AC electric and magnetic fields generated by operational high voltage power lines and substation equipment.

6.8.4 Reference levels

EMI immunity limits and reference levels are identified in published standards, guidelines, and research publications. These were adopted in the EMF and EMI Impact Assessment (Appendix H) as the criteria used to assess EMF and EMI that would be generated by the operation of the proposal and are discussed below for all sensitive receptors that may be impacted.

6.8.4.1 AS/NZS 61000-6-1

For electrical and electronic appliances and equipment susceptible to extremely low frequency magnetic fields, exposure to magnetic fields exceeding the immunity limits specified by the manufacturer may cause reduced functionality or malfunction of the equipment (referred to as EMI).

The magnetic field immunity limits for electrical and electronic equipment in a residential, commercial or industrial environment, specified in AS/NZS 61000-6-1 *Electromagnetic compatibility (EMC) - Generic standards - Immunity for residential, commercial and light-industrial environments,* were adopted for the assessment and are outlined in section 6.8.5. An assessment of the proposal's compliance to AS/NZS 61000-6-1 magnetic field immunity limits is provided in Section 6.8.5.1.

6.8.4.2 Australian Radiation Protection and Nuclear Safety Agency

The Australian Radiation Protection and Nuclear Safety Agency is responsible for regulating Commonwealth Government radiation protection practices, recognises that the International Commission on Non-Ionizing Radiation Protection (ICNIRP) 2010 *Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz - 100 kHz)* provide a scientific basis for the protection of people from exposure to extremely low frequency electric and magnetic field. The agency's Radiation Health Committee agreed at its 24 June 2015 meeting that it would withdraw the existing NHMRC RHS30 guidance on extremely low frequency electric and magnetic fields exposure and recognised that the ICNIRP Guidelines are consistent with the agency's and the Radiation Health Committee's understanding of the scientific basis for the protection of people from exposure to electric and magnetic fields. The ICNIRP reference levels for general public exposure to 50 Hz (i.e., extremely low frequency) electric and magnetic fields are outlined in Table 6.8-2.

If a reference level is exceeded, it is necessary to test compliance with the relevant exposure threshold to determine if additional protective measures are required. An assessment of the proposal's compliance to ICNIRP reference levels is provided in Section 6.8.5.1.

6.8.4.3 Interference limits (communication signals)

High electric fields around the sharp edges of converter station fittings can cause corona discharges that radiate high frequency EMF and interfere with radio, television and mobile communication signals.

The limits for EMI from a converter station outdoor switchyard are established in Australian Standard AS 2344 (2016) *Limits of electromagnetic interference from overhead AC powerlines and high voltage equipment installation in the frequency range 0.15 MHz to 3000 MHz*. The converter station fittings would be Radio Interference Voltage (RIV) tested as part of the type of approval process for installation on to the electrical supply network to ensure that the EMI from the fittings is below the applicable limits. As such, the proposal would comply with the Radio Interference limits specified in AS 2344.

6.8.5 Potential impacts

6.8.5.1 Operation

As noted above in Section 6.8.3, sensitive receptors in the study area may be impacted by EMF and EMI that exceed performance requirements, and that are not subsequently managed.

The DC equipment would be located indoors, away from the proposal site boundary. The building enclosure would shield the outside environment from electric fields generated by the indoor power equipment, and the distance from the converter station boundary would minimise the impact of magnetic fields on nearby sensitive receptors.

The primary AC flexible and rigid conductors within the converter station were modelled, based on the reference design layout and standard values of minimum ground clearance, to determine the extremely low frequency EMF levels at the proposal site.

6.8.5.1.1 Human health

For people, the potential impact pathway involves AC electric and magnetic fields generated from the operation of the proposal. ICNIRP defines the 'reference levels', which are the external, measurable field levels that ensure compliance with the exposure thresholds for generic electric and magnetic field exposure scenarios. The ICNIRP reference levels for general public exposure to 50 Hz (i.e., extremely low frequency) electric and magnetic fields are summarised in Table 6.8-2. Kilovolt per metre (kV/m) and microteslas (μT) are used as the units of measurement.

Table 6.8-2 ICNIRP EMF reference levels

Exposure scenario	Electric Field Strength Reference Level (kV/m)		Magnetic Field Strength Reference Level (μT)	
	Static / slowly varying	Extremely low frequency	Static / slowly varying	Extremely low frequency
People – all areas	5	5	400,000	200

Exposure scenario	Electric Field Strength Reference Level (kV/m)		Magnetic Field Strength Reference Level (μT)	
	Static / slowly varying	Extremely low frequency	Static / slowly varying	Extremely low frequency
Active implantable medical devices	5	5	500	200

The modelling identified that the maximum calculated EMF intensities for the operation of the proposal are below the reference levels for people within the study area (refer to Table 6.8-3).

Table 6.8-3 Maximum calculated human health EMF values

EMF	General public reference level	Maximum calculated value
Electric Field Strength (kV/m)	5	3.5
Magnetic Flux Density (μT)	200	14.2

6.8.5.1.2 Fauna and flora

For surrounding flora and fauna, the potential impact pathway involves AC electric and magnetic fields generated from the operation of the converter station.

The EMF reference levels adopted for assessing terrestrial fauna and flora impacts were derived from relevant research (refer to Appendix H) and are presented in Table 6.8-4.

Table 6.8-4 Terrestrial fauna and flora EMF reference levels

Exposure scenario	Electric Field Strength Reference Level (kV/m)		Magnetic Field Strength Reference Level (μT)	
	Static / slowly varying	Extremely low frequency	Static / slowly varying	Extremely low frequency
Radio-frequency identification tags	n/a	n/a	3,000,000	3,000,000
Livestock	5^	5^	400,000^	200^
Apiaries	n/a	4.1	2	100
Wildlife	5^	5^	400,000^	200^

^ Conservative assumed value

The modelling identified that the maximum calculated EMF intensities for the operation of the proposal are below the reference levels for terrestrial fauna and flora within the study area (refer to Table 6.8-5).

Table 6.8-5 Maximum calculated flora and fauna EMF values

Exposure Scenario	Electric Field Strength (kV/m)		Magnetic Field Strength (μT)	
	Reference level	Maximum calculated value	Reference level	Maximum calculated value
Livestock	5^	3.5	200^	14.2
Apiaries	4.1	3.5	100	14.2
Wildlife	5^	3.5	200^	14.2

^ Conservative assumed value

6.8.5.1.3 Electrical and electronic equipment

For electrical and electronic equipment, the potential impact pathways involve AC electric and magnetic fields, and exposure to EMI from the operation of the proposal.

The magnetic field immunity limits for electrical and electronic equipment in a residential, commercial or industrial environment, specified in AS/NZS 61000-6-*1 Electromagnetic compatibility (EMC) - Generic standards - Immunity for residential, commercial and light-industrial environments*, were adopted for the assessment and are outlined in Table 6.8-6.

Table 6.8-6 Typical EMI immunity levels for different equipment and appliances

Equipment	Magnetic Field Strength Reference Level (μT)	
	Static / slowly varying	**Extremely low frequency**
Electrical & electronic equipment in a residential, commercial or light industrial environment	Not defined	3.8
Electrical & electronic equipment in an industrial environment	Not defined	38

The maximum calculated EMI strength would be below the 3.8 μT interference limit for generic household electrical and electronic equipment in all areas outside the proposal site boundary. There are no sensitive electrical or electronic equipment or systems within the study area that could be impacted by the EMI from the operation of the proposal.

Given these assessment findings, the operating impacts of the proposal on nearby sensitive receptors would be **negligible**.

6.8.5.2 Cumulative impacts

A whole-of-project impact assessment for EMF, which covered the entire route of the project from Heybridge, Tasmania to the Latrobe Valley in Victoria concluded that the greatest potential EMF impact from project would be on the seafloor at the shore crossings during operation. EMF would be below reference levels for people in the study area, and not affect marine vessels or ecosystems.

An assessment of the effects of EMF and EMI on marine natural values, in relation to the Heybridge Shore Crossing and two subsea cable landfall at Heybridge, is provided in Section 6.3 of the Heybridge Shore Crossing EIS.

6.8.6 Management, mitigation and monitoring

The proposal would have no impacts that would require mitigation measures.

6.9 Marine and coastal

The proposal site is located onshore at Heybridge, approximately 150 metres south from the coastline, and would not have direct impacts on the marine environment. Potential indirect impacts discussed in Section 6.4 noted that with the implementation of mitigation measures provided, any residual risk to surface water (including water that may flow to the marine environment) is considered to be low.

As the proposal construction, operation and decommissioning activities would not interact with marine flora and fauna, geoconservation or other marine areas, no further assessment of these aspects is required. The Heybridge Shore Crossing EIS has carried out detailed assessments of potential marine and coastal impacts as a result of the Shore Crossing component of the project.

6.9.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.9-1.

Table 6.9-1 Relevant EIS guidelines

Marine and coastal – EIS guidelines	Section
Identify any potential impacts of the proposal on marine and coastal areas not addressed in other sections. It should identify measures to avoid and mitigate any possible adverse impacts and assess the overall impacts on marine and coastal areas following implementation of the proposed avoidance and mitigation measures. Cross referencing should be made to other relevant sections dealing with conservation values (marine flora and fauna, geoconservation) and coastal impacts.	Section 6.9
Legislative and policy requirements	
It must be demonstrated that the proposal is consistent with the objectives and requirements of all relevant marine and coastal policies and legislation, including the *Living Marine Resources Management Act 1995*, *State Policy on Water Quality Management 1997* and the *Tasmanian State Coastal Policy 1996.*	Section 6.9.2

6.9.2 Applicable legislation

6.9.2.1 Living Marine Resources Management Act 1995

The *Living Marine Resources Management Act 1995* is the principal legislation that promotes the sustainable management of living marine resources in Tasmania, which enables protected areas to be declared. The purpose of this Act is to protect vulnerable fish species and their habitats and allows the establishment of scientific reference areas and public education in the resources, protection and use of the marine environment.

Fishing Tasmania manages Tasmania's commercial fisheries and provides regulations for each commercial fishery, for example the Abalone Fishery is regulated under the *Living Marine Resources Management Act 1995* and the Fisheries (Abalone) Rules 2017.

Insofar as the proposal may have an impact on these aspects of the Tasmanian environment those impacts are addressed in the Heybridge Shore Crossing EIS. The proposal is consistent with the objects and

requirements of the Act because it would have no direct impacts on the marine environment and would have no impacts on protected habitats and resources under that Act.

6.9.2.2 State Policy on Water Quality Management 1997

The *State Policy on Water Quality Management 1997* aims to protect marine ecosystem water quality and recreational water quality and aesthetics, and also provides a framework to manage water quality for all Tasmanian surface waters.

Insofar as this policy is relevant to the proposal, it is addressed in Section 6.4. The policy is addressed in greater detail in the Heybridge Shore Crossing EIS.

6.9.2.3 Tasmanian State Coastal Policy 1996

The *Tasmanian State Coastal Policy 1996* provides guidance on coastal planning in Tasmania. Its three guiding principles are that natural and cultural values of the coast shall be protected, the coast shall be used and developed in a sustainable manner and integrated management and protection of the coastal zone is a shared responsibility. The proposal would seek to protect and avoid impacts to the natural and coastal values of the coast at Tasmania nearshore.

6.10 Greenhouse gases and ozone depleting substances

This section provides a summary of the findings of the Greenhouse Gas Assessment provided as Appendix I.

6.10.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.10-1.

Table 6.10-1 Relevant EIS guidelines

Greenhouse gases and ozone depleting substances – EIS guidelines	Section
Discuss the direct and indirect effects of the proposal, including construction, in relation to production, use and reduction of greenhouse gases and ozone depleting substances including:	
Consideration of the evolving national response to climate change and greenhouse gas emissions, and the targets set in the *Tasmanian Climate Change Action Plan 2017-2021* or any updated versions thereof available at the time of preparing the EIS.	Section 6.10.3
Provide an estimate of greenhouse gas emissions, energy production and energy consumption for both construction and operational phases of the proposal, including emissions associated with vegetation removal (as relevant). Calculators are available on the Australian Government Clean Energy Regulator website.	Section 6.10.4
Demonstration that the development will implement cost-effective greenhouse best practice measures to achieve on going minimisation of greenhouse gas emissions. Where less emissions-intensive options are not adopted, justification should be provided and/or mechanisms to offset greenhouse gas emissions identified.	Section 6.10.5
Legislative and policy requirements	
The *Tasmanian Climate Change Action Plan 2017-2021* or any subsequent versions. Proponents will need to determine whether they are required to report to the Commonwealth under the *National Greenhouse and Energy Reporting Act 2007*.	Section 6.10.3.1

6.10.2 Methodology

The Greenhouse Gas Assessment uses a **discipline specific** assessment methodology. The purpose of the impact assessment is to calculate the GHG emissions attributable to the proposal during construction and operation. These emissions have been determined using data and assumptions and the methods described in the following resources:

- The National Greenhouse Accounts, October 2020 (Commonwealth of Australia 2020).
- National Greenhouse and Energy Reporting (Measurement) Determination 2008.
- The Greenhouse Gas Protocol (WRI/WBCSD 2004).

The technical assessment on climate change does not provide an impact assessment, unlike other assessments summarised in Section 6. Rather, using models and climate forecasts, recommends appropriate climate adaptation measures for the proposal.

6.10.3 Applicable legislation

6.10.3.1 National Greenhouse and Energy Reporting Act 2007

The *National Greenhouse and Energy Reporting Act 2007* establishes the national framework for corporations to report GHG emissions and energy consumption. National Greenhouse and Energy Reporting registration and emission reporting are mandatory for corporations or facilities that have energy production, energy use or GHG emissions that exceed specified thresholds:

- 50,000 tonnes of carbon dioxide equivalent (tCO_2-e) per annum per organisation, or 25,000 tCO_2-e per facility.
- 200 terajoules energy usage per annum per organisation, or 100 terajoules per annum for a single facility.

MLPL is required to report their Scope 1 and Scope 2 emissions if the operation of the proposal generates GHG emissions and energy consumption that exceeds the specified thresholds.

While the anticipated emissions from the proposal would not exceed the thresholds, the anticipated emissions of the project as a whole would exceed both the organisation and facility thresholds, such that MLPL would need to report its operating emissions.

6.10.3.2 Rewiring the Nation

The Commonwealth Government's Rewiring the Nation policy highlights Marinus Link as the key Tasmanian project to provide 'new transmission lines to deliver affordable, reliable renewable energy to cities, towns and regional communities' and, in so doing 'help achieve Australia's emissions reduction targets of 43% by 2030 and net zero emissions by 2050'.

Australia's commitment to the renewables transition was demonstrated at the 28th Conference of Parties to the UNFCCC in Dubai. Australia was one of 118 nations that promised to triple global renewable energy capacity by 2030.

6.10.3.3 Climate Change (State Action) Act 2008

Following amendments to the Tasmanian Government's climate change legislation, the *Climate Change (State Action) Act 2008*, Tasmania's net zero GHG emissions target is now legislated.

The Act includes new objectives, including relevantly to the project:

- To identify, promote and support measures to help Tasmania adapt to climate change and to manage the risks and opportunities of a changing climate.
- To facilitate Tasmania's contribution to international, national and local government emissions reduction and adaptation measures to support the transition to a low emissions future.

The legislated target is net zero emissions, or lower, from 2030. Under the Act, the government must prepare a climate change action plan, a climate change risk assessment, and emissions reduction and resilience plans for key sectors. The emissions reduction and resilience plan must support GHG emissions reduction, and the transition to a low emissions economy, amongst other features.

6.10.3.4 Climate Change Action Plan 2023-25

Tasmania's *Climate Change Action Plan 2023-25* was released on 1 June 2023, superseding its earlier Climate Action 21. These plans reflect a long-standing commitment by Tasmanian government to address climate change and contribute to the global response. The 2023-25 plan sets a target to maintain net zero GHG emissions, or lower, from 2030, and a target to double Tasmania's renewable electricity production (from 2020 levels) by 2040, with an interim target of 150% by 2030. One of the actions to meet this target is 'to progress national-scale renewable energy projects such as Marinus Link and the Battery of the Nation'.

6.10.4 Potential impacts

GHG emissions are categorised into three different scopes:

- **Scope 1**: Refers to direct GHG emissions released as a direct result of a company's activities.
- **Scope 2**: Refers to indirect GHG emissions produced to generate the energy used by a company.
- **Scope 3**: Includes all indirect GHG emissions (not included within Scope 2 emissions) that are generated in the wider economy, as a consequence of the project activities but from sources not owned or controlled by the company. These emissions are noted in the cumulative impacts of the proposal with the project as a whole.

GHG emissions associated with the proposal has the potential to contribute to Tasmanian and national GHG inventories. Gases of significance to climate change associated with the proposal and the Heybridge Shore Crossing proposal include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and SF_6.

6.10.4.1 Construction

Construction of the proposal would generate Scope 1 and 2 emissions through the following construction activities:

- Diesel combustion through the use of light vehicles, generators, heavy machinery and various other equipment including rigid trucks, excavators, cranes, drill rigs, front end loader, graders, water trucks and concrete agitators.
- Land disturbance emissions.
- Electricity consumption of site offices during construction.

The anticipated total Scope 1 and Scope 2 GHG emissions generated due to the construction of the proposal, including land disturbance and vegetation removal, is estimated to be 508 tCO_2-e.

The report anticipates the construction period would occur over five years from 2025 to 2030, however not all construction activities would occur in every year. The estimated annual Scope 1 and Scope 2 GHG emissions, and the energy use for the construction of the proposal, are presented in Table 6.10-2.

Table 6.10-2 Summary of estimated annual Scope 1 and Scope 2 GHG emissions (tCO_2-e) and energy use for the construction of the proposal

Scope	Source of GHG	2025	2026	2027	2028	2029	2030	Total
Scope 1	Diesel consumption (vehicles)	179	196	47	-	-	-	422
	Diesel consumption (backup generators)	-	-	-	-	-	-	-
	SF_6 leakage	-	-	-	-	-	-	-
	Land disturbance	43	-	-	-	-	-	43
Scope 2	Electricity (use)	9	18	18	18	18	3	84
	Electricity (transmission loss)	-	-	-	-	-	-	-
Total	Total (excluding LULUCF)	189	215	65	18	18	3	508
	Total (including LULUCF)	189	215	65	18	18	3	508
Energy Use (GJ)		2,566	2,823	698	37	37	6	6167

6.10.4.2 Operation

Operation of the proposal would generate Scope 1 and 2 emissions through the following activities:

- Diesel combustion through the use of light vehicles and generators required for maintenance activities.
- Operation and maintenance of transformers resulting in SF_6 leakage.
- Electricity consumption.
- Transmission losses in electricity due to resistive losses and corona losses.

Annual Scope 1 and Scope 2 GHG emissions during the operation of the proposal are estimated to be 1,431 tCO_2-e per year (refer to Table 6.10-3).

Table 6.10-3 Summary of estimated annual Scope 1 and Scope 2 GHG emissions (tCO_2-e) for the operation of the proposal

Scope	Source of GHG	Ongoing emissions (tCO2-e)
Scope 1	Diesel consumption (vehicles)	16
	Diesel consumption (backup generators)	14
	SF_6 leakage	517
Scope 2	Electricity (use)	858
	Electricity (transmission loss)	26
Total	Total (excluding LULUCF)	1,431
	Total (including LULUCF)	1,431
Energy use (GJ)		2,539

The projected contribution of GHG emissions from the operation of the proposal is presented in Table 6.10-4. The contribution to the national emissions is insignificant, at <0.001%, and is a relatively small contribution to Tasmania's GHG emissions including and excluding LULUCF.

Table 6.10-4 Contribution of the project to Tasmania's GHG emissions during operation

Inventory total	Proposal	Australia[2,3]		Tasmania[2,3]	
	Emissions ($MtCO_2$-e)	**Emissions ($MtCO_2$-e)**	**Proposal %**	**Emissions ($MtCO_2$-e)**	**Proposal %**
Excluding LULUCF	0.001	537[1]	<0.001%	7.9	0.018%
Including LULUCF	0.001	498	<0.001%	-3.7[4]	-0.04%[5]

Notes:

1 Estimated maximum annual GHG emissions at December 2021

2 2020 estimates sourced from National Greenhouse Gas Inventory – Paris Agreement Inventory (https://ageis.climatechange.gov.au/).

3 These emissions are based on the ongoing operations phase, not the construction phase

4 At a state level Tasmania has net negative GHG emissions, as LULUCF sequesters more carbon dioxide than is emitted.

5 A negative value means that these emissions reduce the net negative carbon budget for Tasmania by that fraction

GHG emissions contributions to the Tasmanian GHG emissions inventory would reduce the -3.7 $MtCO_2$-e buffer by approximately -0.04%. Due to the proposal's small contribution to the national and Tasmanian's GHG emission inventory, the potential impacts to GHG are **very low**.

6.10.4.3 Cumulative impacts

A whole-of-project impact assessment for GHG emissions was carried out, which covered the entire route of the project from Heybridge in Tasmania to Hazelwood in Victoria.

The technical assessment provided breakdowns of emissions attributable to the Heybridge Converter Station (this proposal), and separately, emissions attributable to the Heybridge Shore Crossing to the Hazelwood converter station.

When the GHG emissions from the proposal are combined with the remainder of the project to the Hazelwood converter station, they increase as follows:

- The construction of the project would create a further 53,015 tCO_2-e Scope 1 and 2 emissions and a combined 188,508 tCO_2-e Scope 3 emissions.
- The operation of the project is estimated to contribute no more than 0.05% of the national GHG emissions inventory (as of December 2021) on an annual basis.

6.10.5 Management, mitigation and monitoring

Proposed measures to minimise potential impacts associated with GHG and ozone depleting substances are presented in Table 6.10-5. Mitigation measures in other sections that are relevant to the management of GHG and ozone depleting substances include:

- Section 6.5 (Air quality), specifically measures which address the management of emissions from plant and equipment.
- Section 6.6 (Waste management), specifically measures which address minimisation of waste.

Together, these measures would minimise the potential GHG and ozone impacts.

Table 6.10-5 Greenhouse gas and ozone depleting substances – mitigation measures

Ref	Mitigation measures	Proposal stage
GHG01	Identify opportunities to reduce Scope 1 and Scope 2 GHG emissions (as defined in the *National Greenhouse and Energy Reporting Act 2007*) so far as reasonably practicable and in accordance with the Marinus Link Sustainability Framework. Consideration will be given to: • Use of low emission fuels. • Maintenance of equipment and vehicles. • Minimising vegetation clearance. • Purchase of green energy. • Procurement of energy efficient machinery. • Use of low carbon emission concrete. • Use of recycled materials. The design must include measures to avoid SF_6 leakage so far as reasonably practicable. During project design, encourage the selection of materials that reduce Scope 3 GHG emissions where appropriate and reasonably practicable.	Design Construction
GHG02	During operations, identify opportunities to reduce operational Scope 1 and Scope 2 GHG emissions (as defined in the *National Greenhouse and Energy Reporting Act 2007*) so far as reasonably practicable and in accordance with Marinus Link Sustainability Framework. Consideration will be given to: • Management and maintenance of SF_6 insulated equipment in accordance with Australian Standard IEC 62271.4: 2015 – *high-voltage switchgear and control gear – Part 4: Handling procedures for sulphur hexafluoride (SF_6) and its mixtures* and the *Energy Network Australia Industry Guideline for SF_6 Management* (Document 022-2008) and prevention of release of SF_6 by using a closed cycle during installation, maintenance and decommissioning of equipment where practicable. • Use of low emission fuels. • Maintenance of equipment and vehicles. • Purchase of green energy. • Procurement of energy efficient machinery. Scope 1 and Scope 2 emissions from operations will be reported annually on the Marinus Link website.	Operation
CC01	Design the proposal to address potential impacts from climate change across the life of the proposal, considering: • Increased ambient temperatures/soil temperatures/sea temperatures and their potential impact on the operation of high voltage infrastructure. • Sea level rise and coastal erosion and its potential impact on accessibility, and function of coastal infrastructure. The design will be informed by a risk assessment completed to identify climate change risks and management measures based on: • AS/NZS ISO 31000:2018 *Risk management – Principles and guidelines.* • AS 5334-2013 *Climate change adaptation for settlements and infrastructure – A risk-based approach.* • IPCC 2013 *Managing the risks of extreme events and disasters to advance climate change adaptation.*	Design

6.11 Socio-economic issues

This section provides a summary of the findings of the Social Impact Assessment provided in Appendix J and the Economic Impact Assessment provided in Appendix K.

6.11.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.11-1.

Table 6.11-1 Relevant EIS guidelines

Socio-economic issues – EIS guidelines	Section
An estimate of total capital investment for the proposal and where that capital will be expended (particularly in relation to the source of large capital items of processing equipment).	Section 6.11.4.2
Operational expenditures and revenues.	Section 6.11.4.2
The impacts on local and State labour markets for both the construction and operational phases of the proposal. The number and nature of direct and indirect jobs arising from the proposal must be detailed. Skills and training opportunities should also be discussed.	Section 6.11.4
The impacts on upstream/downstream industries, both locally and for the State.	Section 6.11.4
The extent to which raw materials, equipment, goods, and services will be sourced locally.	Section 2.3.4, 6.11.4.2.2
A qualitative assessment of impacts on local social amenity and community infrastructure, including recreational, cultural, health and sporting facilities and services. Any proposals to enhance or provide additional community services or facilities should be described.	Section 6.11.4
Potential interaction of the proposal with existing uses of Bass Strait, and whether the construction or operation of the proposal will impact those uses.	Section 6.11.4.4
Community demographic impacts (changes to cultural background, occupation, incomes).	Section 6.11.4.2, 6.11.4.3
Impacts on land values, and demand for land and housing.	Section 6.11.4.4.1
Impacts on the local, regional, state, and national economies.	Section 6.11.4.2, 6.11.4.4.2
Any publicly funded subsidies or services to be relied upon for the construction or operation of the proposal.	Section 6.11.4
Any impacts on Local, State and Federal Government rate, taxation and royalty revenues.	Section 6.11.4.2, 6.11.4.4.2

6.11.2 Methodology

The key steps in characterising existing social conditions and assessing the values and impacts for the purpose of the Social Impact Assessment for the proposal, reflecting a **significance-based assessment approach**, included:

- Defining a study area.
- Conducting community engagement and Social Impact Assessment consultation to develop an understanding of community values and important places. Section 4 provides details on engagement activities undertaken for the proposal.

- Defining a social wellbeing framework.
- Conducting a literature review including demographic data from the ABS 2021, governmental websites, government plans and strategies, industry news and academic literature, as well as the findings and recommendations of other studies.
- Developing a social baseline to identify those potentially vulnerable to changes from the proposal, and to profile community infrastructure.

The Economic Impact Assessment adopted a **discipline-specific assessment approach**, relying on data about the proposal and the project provided by MLPL. It used modelling methods and various data and publicly available predictions on quantitative and qualitative changes in the economy and society at various scales (from local to national) to compare the positive and adverse economic consequences of the project against a scenario where the project does not proceed.

6.11.3 Existing conditions

6.11.3.1 Study areas

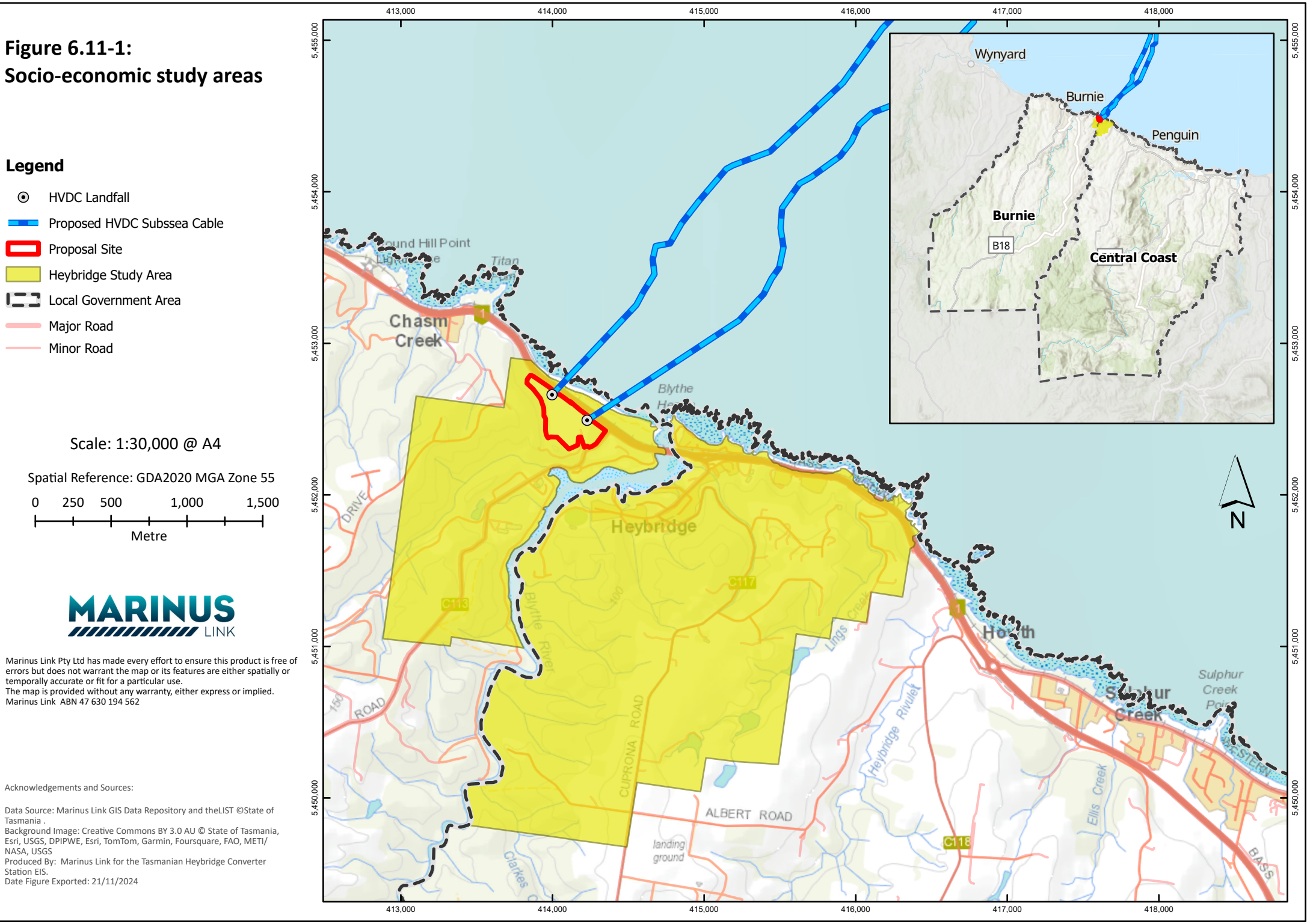
The Social Impact Assessment study area encompasses the communities that may experience the effects of the proposal's construction, operation, and decommissioning in Tasmania. The study areas shown in Figure 6.11-1 are derived from ABS Census Statistical Areas and includes:

- **The local study area** – Heybridge.
- **The regional study area** – Burnie City Council and Central Coast Council LGAs. Broader impacts, including to Tasmania and its regions, are considered where relevant.

The Economic Impact Assessment generally examines the spending and employment impacts at a state level and for regional communities. As such, the Economic Impact Assessment study area includes, relevant to Tasmania:

- North West Tasmania, defined as ABS SA4 areas of West and North West Tasmania.
- The whole of Tasmania.

Figure 6.11-1:
Socio-economic study areas



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6.11.3.2 Social baseline characterisation

The social baseline describes the existing social environment for the study areas, the people within the study areas and their living conditions. The baseline is informed by stakeholder engagement, literature research, and various secondary sources, including:

- ABS Census demographic information.
- Selected Commonwealth Government websites (e.g., My School; Australian Bureau of Agricultural and Resource Economics and Sciences).
- Australian and Tasmanian government agencies, including the Department of Police, Fire and Emergency Services, Tasmania Health Service, and NRE.
- Regional and local government plans and strategies.

6.11.3.2.1 Social wellbeing framework

An important requirement of Social Impact Assessment is to have a framework that allows for identifying potential community issues and concerns and conveying the Social Impact Assessment's outcomes. The Social Impact Assessment identified four social values which are used to understand the social baseline and assess the potential social impacts (positive and negative) of the proposal. A significance-based approach was used to assess potential project impacts on the identified social values. A significance-based approach uses the principles of social sensitivity and magnitude of impact to assess the significance of an impact.

The four social values and the associated attributes and indicators and the sensitivity of those attributed and indicators to the community, which form the social wellbeing framework, are provided in Table 6.11-2.

Table 6.11-2 Social wellbeing framework

Social value	Attributes and indicators	Sensitivity
Community identity Describes how a community defines itself in terms of civic participation, resilience, feelings of trust and safety and a sense of belonging and place.	• Amenity and landscape. • Natural resources and ecology.	Very sensitive
Economy and livelihood Describes how people make a living and the economic structure of the affected community.	• Employment and workforce. • Industry and business. • Housing affordability and availability. • Socio-economic dis/advantage.	Very sensitive to extremely sensitive
Infrastructure and services Describes the infrastructure and services that meet the needs and priorities of the affected community including municipal and social infrastructure and associated services.	• Community infrastructure and services (health and wellbeing). • Community infrastructure (childcare). • Physical infrastructure (connectivity). • Physical infrastructure (safety and capacity).	Sensitive to very sensitive
People's productive capacities Describes the skills, knowledge, and experience that are vital to survival and participation in society and its economy.	• Health – physical and mental. • Education, training, and skills.	Sensitive to very sensitive

6.11.3.3 Population and demography

6.11.3.3.1 Regional context

The proposal site in Heybridge is located in the Burnie City Council LGA, and immediately to the west of the Central Coast LGA, which is where most of the population of Heybridge lives.

Burnie City Council is located on land within the ancestral territory of the Plairhekenillerplue band of the North Peoples Tribe. The Burnie City Council LGA has a total land area of 611 km^2, is located on Tasmania's North West coast and as of 30 June 2021, had an estimated residential population of 19,646 (ABS 2021). Most of the population lives along or close to the coast.

The township of Burnie is served by Bass Highway and Ridgley Highway. It is the primary population centre for the Burnie City Council LGA, the people of Heybridge, and the regional activity centre for the Cradle Coast Region. Burnie City Council LGA provides a range of health, education, cultural, community support and industrial services for the wider region, including the people of Heybridge (Cradle Coast Regional Planning Initiative 2010).

Central Coast Council LGA is located on the land of the Palawa/Pakana of the Punnilerpanner clan. The Central Coast Council LGA has a total land area of 933 km² and is located on Tasmania's north coast between the large townships of Burnie and Devonport. As of 30 June 2021, the LGA had an estimated residential population of 22,176 (ABS 2021). Most of the population lives along or close to the coast.

The estimated resident population for the two LGAs in the regional study area is presented in Table 6.11-3. Population changes between the years 2001 to 2021 for both LGAs were less that of the State of Tasmania, which grew by 19.9% over this period. Central Coast Council shows a larger increase in population in the same period (9.6%) than Burnie City Council (7.1%).

Table 6.11-3 Estimated resident population in the regional study area and Tasmania, 2001 to 2021

Areas	2001	2006	2011	2016	2021	Percentage change	
						Average annual	2001- 2021
Burnie City Council LGA	19,077	19,748	20,164	19,228	20,441	0.3%	7.1%
Central Coast Council LGA	21,242	21,428	22,332	21,736	23,278	0.5%	9.6%
Tasmania	473,668	489,302	511,483	517,514	567,909	0.9%	19.9%

Source: ABS (2022) Estimated Residential Population by LGA 2001 to 2021

Between 2027 and 2042, both LGAs within the regional study area are projected to experience population decline. The population of Burnie City Council LGA is predicted to decrease by -8.5%, and the population of Central Coast Council LGA is predicted to decrease by -3.0%. Over the same period, the Tasmanian state population is projected to grow by 12.5% to 603,470 in 2042.

The regional study areas have an ageing population with generally higher median age compared to Tasmania. The median age is highest in the suburb of Heybridge and the Central Coast Council LGA, at 48 years.

The sex ratio for both LGAs is similar to the sex ratio for Tasmania, with 93 males to every 100 females. However, Heybridge has a less balanced sex ratio, with 118 males for every 100 females.

6.11.3.3.2 Local context

The proposal site is in the Heybridge township, which is a small rural town covering an area of 6.5 km^2 with a population of 442 people (ABS 2021). Locals describe Heybridge as a tight knit community.

Heybridge is partly in the Burnie City Council LGA and partly in the Central Coast Council LGA. Heybridge shares land borders with Chasm Creek, Round Hill, Stowport, Cuprona, and Howth localities. Bass Strait lies to the northern border.

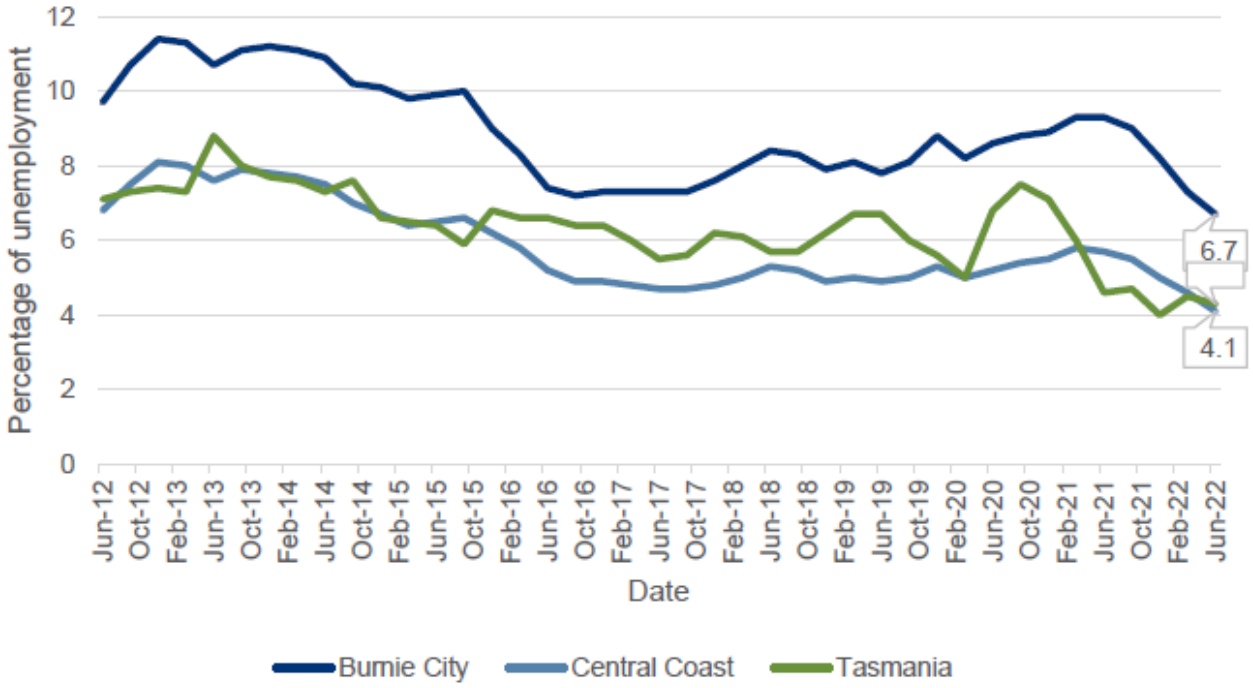
Heybridge's history over the 20th Century is dominated by the construction, operation and eventual closure of the tioxide plant. The factory, at its peak, produced 35,000 tons per annum of tioxide and employed up to 450 people (Summers 2006). At present day, Heybridge is a small coastal retirement town with proximity to waterways including Tioxide Beach and Blythe Creek.

Within the local study area, the top ancestries are English, Australian, and Scottish, with 6.2% of people identifying as Australian Aboriginal (ABS 2021). Overall, there is a high degree of cultural homogeneity in Heybridge, with about 89% of residents who only speak English at home, and more than 80.8% of residents were born in Australia.

6.11.3.4 Workforce and industry

At the ABS 2021 Census, labour force participation for Heybridge (53.7%), Central Coast Council LGA (54.6%) and Burnie City Council LGA (56.9%) was lower than that of the state (58.2%). Lower participation rates may be due to the comparatively aged population in the local and regional study areas.

Figure 6.11-2 below shows the unemployment rate in the regional study area from June 2012 to June 2022. The unemployment rates in Central Coast Council LGA area have generally been below that of the state of Tasmania. Burnie City Council LGA has had unemployment rates consistently higher than that of the state. Both study area LGAs have lower youth unemployment rates than the region and the state.



Source: Department of Education, Skills and Employment (Department of Education, Skills and Employment 2022) Small Area Labour Markets, June Quarter 2022 and ABS (ABS 2022b) 6202.0 Labour Force, Australia

Figure 6.11-2 Unemployment rate in the regional study area, June 2021 to June 2022

The most common levels of educational achievement in the regional study area were year 10 and above (secondary education), and Certificate III.

At the 2021 Census, the top industries of employment in the local and regional study areas are Health Care and Social Assistance, Education and Training, followed by Retail Trade. Nearly one-quarter of the Heybridge local study area works in the Health Care and Social Assistance (22%). The other dominant industries of employment include Agriculture, Forestry and Fishing, Manufacturing, and Construction (ABS 2021).

Approximately 840 tourism businesses (excluding Airbnb hosts) operate across North West Tasmania in the form of accommodation providers (45%), attractions (19%), tours, transport, events, dining and information services.

The workforce availability, including potential workforce shortages, are identified in Table 6.11-4. The *Civil Construction Industry Workforce Plan 2019-2025* (Civil Contractors Federation Tasmania 2019) projected that additional workers required state-wide to 2028 would include roles such as construction managers, engineers, machinery and plant operators and onsite construction workers. In addition to the skills requirements for the construction phase of the proposal and project, the workforce requirements of the operations phase would be focused on electricians.

Table 6.11-4 Published status of workforce availability for occupations relevant to the proposal

Occupation	Labour market rating	Key findings	Date
Civil engineering professionals (Engineers Australia 2020)	Shortage	The majority of vacancies were located across Tasmania. The majority of vacancies were for civil engineers, geotechnical, structural and transport engineers. Regional vacancies were more difficult to fill than metropolitan vacancies.	February 2019
Electrical engineer (National Skills Commission, Skills priority list)	Shortage	There is a shortage of electrical engineers in Tasmania and nationally with a moderate future demand.	July 2023
Electrician (National Skills Commission, Skills priority list)	Shortage	Shortage in Tasmania and nationally, with strong future demand.	July 2023

Source: Department of Small Jobs and Small Business (2019; 2023)

6.11.3.5 Income and housing

The median household income in the local and regional study areas is lower than the median in Tasmania, with the Central Coast Council LGA median almost $150 per week less than the state median of $1,358 (refer to Table 6.11-5).

Table 6.11-5 Median household income for areas relevant to proposal

Area	Heybridge	Burnie City Council LGA	Central Coast Council LGA	Tasmania
Median household income ($/weekly)	$1,289	$1,225	$1,209	$1,358
Median household income ($/annual)	$67,028	$63,700	$62,868	$70,616

Source: ABS (2021)

Housing in the local and regional study area is predominantly detached or separate houses, making up 96.4% of dwellings in Heybridge and 90.2% across Central Coast Council and Burnie City Council LGAs. Both the local and regional study areas have a higher percentage of detached or separated houses than Tasmania (87.7%).

The rate of home ownership (owned outright or with a mortgage) was higher in Heybridge (78.3%) and Central Coast Council LGA (75.7%) than in Tasmania (70.1%) and Burnie City Council LGA (65.5%).

In terms of housing availability, rental vacancy rates are used to indicate the demand and potential difficulty of securing rental housing. Generally, rates below 1.0% are indicative of a rental shortage, which often results in rent increases and pushes low-income households out of the private rental market (REIQ 2020; UTAS 2019). In the local study area, vacancy rates in April 2023 were 0.7%. The region has experienced a rental shortage since COVID and has not yet recovered. The rental vacancy rate for Burnie City Council LGA was 1.1% and Central Coast Council LGA was 0.5%.

6.11.3.6 Social infrastructures

Social infrastructure is comprised of the spaces, facilities and services that support the quality of life and community wellbeing. Across the study areas, as described in Social Impact Assessment (Appendix J), there are multiple schools, hospitals, medical centres, fire and emergency services, sport and recreation facilities, and conservation areas and public reserves. They are considered important to support the productive capacities and health needs and educational of residents.

Burnie City Council LGA has a higher proportion within their communities who experience a mental health condition (12.7%) than Central Coast Council LGA (10.5%), Heybridge (7.6%) and the Tasmanian average (11.5%). Burnie City Council LGA and Central Coast Council LGA also have a higher need for assistance (7.8% and 7.5% respectively) than the Tasmanian average of 6.8% and Heybridge with 5.0%.

There are three education facilities in the local study area including a primary school and two schools combining primary and secondary at the same location. The regional study area has a number of training and industry development programs, including those that are targeted to the renewable energy sector and the project in particular.

There are five hospitals and two ambulance services to the regional study area. The rate of general practitioners compared to the population is lowest in Central Coast Council LGA, with 108.3 general practitioners per 100,000 people. Burnie City Council LGA has the highest proportion of general practitioners in the regional study area, with 263.9 general practitioners per 100,000 people compared to the state (154.8 general practitioners per 100,000 people).

The Heybridge Fire Station, located in the Central Coast Council LGA, is the only fire station located within 1 km of the project in the regional study area. There are three police stations within the regional study area. The closest police station to the proposal site is in the township of Burnie, 8 km away.

Recreation areas considered sensitive to potential proposal impacts include the Blythe River Conservation Area and Chasm Creek Conservation Area.

6.11.4 Potential impacts

6.11.4.1 Social impacts

A summary of potential positive and negative impacts to social values of the proposal (including the Heybridge Shore Crossing) and project is provided in Table 6.11-6, with detailed assessment, including by reference to state and local policies, provided in Appendix J.

Mitigation measures are proposed to be implemented to minimise the negative impacts (and reduce the impact significance rating) and harness the benefits of the proposal and project, where feasible.

In brief, the anticipated impacts of the proposal across social values include:

- **Community identity**: Construction activities would affect very localised amenity including through noise and dust. Operational activities would alter views which can adversely affect amenity.

- **Economy and livelihood**: While the proposal would contribute positively to employment opportunities, local and regional economic investment and skill development, there would also be adverse impacts to housing availability and affordability due to increased demand from an influx of non-local construction workforce. This effect would be mostly experienced during the construction period and the impact is reduced during operations of the proposal.
- **Community infrastructure and services**: Social infrastructure would potentially be impacted during the construction period, where hospitals and healthcare, childcare services, emergency services and local road traffic would experience some increase in demand that would need to be managed.
- **People's productive capacities**: The local workforce and skillset may require upskilling and additional training to enable their employment pathways to energy-related development in the region and the broader Tasmanian state. Generally, the health and wellbeing of residents near the proposal site would not be significantly impacted by the proposal.

Table 6.11-6 Social value impact assessment summary

Potential impact	Pre-mitigated impact assessment			Mitigation measures	Residual impact significance
	Sensitivity	Magnitude	Impact significance		
Community identity					
Construction					
Amenity impacts for nearby residents from construction activities during standard working hours (noise and vibration impacts).	Very sensitive	Moderate	High (negative)	NV02, S03	**Moderate (negative)**
Amenity impacts for nearby residents from dust from construction activities.	Very sensitive	Minor	Moderate (negative)	AQ01, S03	**Low (negative)**
Noise from construction activities may affect the enjoyment of recreational spaces within the study area.	Very sensitive	Minor	Moderate (negative)	NV02, S03	**Moderate (negative)**
Impact on fauna from potential roadkill as a result of construction vehicle movements.	Very sensitive	Moderate	High (negative)	EC02	**Low (negative)**
Operation					
Ongoing 24/7 operations may result in outside of standard working hours noise concerns for neighbouring residents, including the new residential developments proposed at Devonshire Drive Hamlet in the Heybridge Residential Nature Reserve.	Very sensitive	Moderate	High (negative)	NV05, NV06	**Moderate (negative)**
View of the proposal from the southern edge of Bass Highway and the converter stations would be a dominant view from the exit of the Tioxide Beach foreshore reserve, the only visitor access point and informal parking area.	Very sensitive	Major	Major (negative)	Strategies and design outcomes would be developed to reduce the visual prominence of the converter station. This is being	**High (negative)**

Potential impact	Pre-mitigated impact assessment			Mitigation measures	Residual impact significance
	Sensitivity	Magnitude	Impact significance		
				addressed in the DA.	
Ongoing impacts on flora and fauna in line with operational activities.	Very sensitive	Negligible	Low (negative)	EC05, EC06	**Low (negative)**
Economy and livelihood					
Construction					
The proposal's construction is expected to support the short-term employment of approximately 45% of the total construction workforce within the local and regional study area.	Very sensitive	Minor	Moderate (positive)	S01, S03, S04, S05	**Moderate (positive)**
The proposal's construction is expected to support the short-term employment of approximately 30% of the total construction workforce from the state.	Sensitive	Negligible	Low (positive)		**Low (positive)**
The proposal may contribute to a diversity of longer-term and secure employment opportunities and skills training opportunities for residents across a range of skill levels. There might also be jobs created in related industries who benefit from the economic activity, including retail, administrative services and accommodation and food.	Very sensitive	Minor	Moderate (positive)		**Moderate (positive)**
The proposal's construction would generate demand for construction workers, potentially drawing employees from other construction projects, industry sectors and local businesses. Due to this potential constraint on the workforce, there may be longer lead times for other construction projects and possible workforce shortages in the study area.	Very sensitive	Moderate	High (negative)		**High (negative)**
The proposal's construction may contribute to existing and predicted demand for the construction sector, which may require formalised workforce training and development in the study area.	Very sensitive	Minor	Moderate (positive)		**Moderate (positive)**
The proposal's construction would support local businesses through the goods and services required to support the project's development.	Very sensitive	Minor	Moderate (positive)		**High (positive)**
The proposal's workforce may contribute to the demand for rental housing in the regional study area and exacerbate existing rental availability and affordability issues.	Extremely sensitive	Major	Major (negative)	S01, S02	**High (negative)**
The proposal's workforce may provide job opportunities directly and indirectly that help improve the socio-economic outcomes of the study area.	Very sensitive	Negligible	Low (positive)	S04, S05	**Moderate (positive)**

Potential impact	Pre-mitigated impact assessment			Mitigation measures	Residual impact significance
	Sensitivity	Magnitude	Impact significance		
Operation					
The proposal is expected to result in large taxation receipts ($762 million in today from 2025 to 2050) from the economic activity generated by Marinus Link, which would flow to local, state and the Australian Government	Very sensitive	Moderate	High (positive)	N/A	**High (positive)**
Job creation during operation	Very sensitive	Negligible	Low (positive)	S05	**Low (positive)**
Community infrastructure and service					
Construction					
The proposal's construction workforce may increase demand for health and emergency service providers, compromising service provision to the existing local and regional community.	Sensitive	Moderate	Moderate (negative)	S01	**Low (negative)**
The proposal's construction workforce may increase demand for childcare providers, compromising service provision to the existing local and regional community.	Very sensitive	Moderate	High (negative)	S01	**High (negative)**
The performance and capacity of the road network near the proposal site during construction may decline and create delays for existing road users.	Very sensitive	Minor	Moderate (negative)	T01	**Low (negative)**
Disruption from the movement of the transformer transporter on the road network's condition, design and operation to perform safely.	Very sensitive	Major	Major (negative)	T01, S03	**Low (negative)**
Reduced road safety, including safety for the vulnerable particularly along school bus routes.	Very sensitive	Moderate	High (negative)	T01, S03	**Low (negative)**
General road safety with an increase in construction vehicles and the potential to impact traffic and pedestrian safety.	Very sensitive	Moderate	High (negative)	T01, S03	**Moderate (negative)**
People's productive capacities					
Construction					
Lack of understanding of the proposal's scope, perceived cumulative impacts of other development in the nearby areas, including the NWTD project, and local community not seeing local benefit.	Very sensitive	High	Major (negative)	S03, S04	**High (negative)**
Potential human health impacts from contaminated material exposure from construction disturbance from the former industrial site.	Very sensitive	Moderate	High (negative)	CL01, CL02, CL04	**Moderate (negative)**
Transporting hazardous goods and materials.	Very sensitive	Severe	Major (negative)	T01	**Moderate (negative)**
Employment opportunities for the Tasmanian Aboriginal Community, First Peoples, women, youth and	Very sensitive	Negligible	Low (positive)	S04, S05	**Moderate (positive)**

Potential impact	Pre-mitigated impact assessment			Mitigation measures	Residual impact significance
	Sensitivity	Magnitude	Impact significance		
socially vulnerable groups in the regional construction workforce are made available.					
Operation					
Concern about the project's potential impacts (e.g., EMF, operational noise) may result in feelings of stress, anxiety and frustration for surrounding residents and communities	Very sensitive	Moderate	High (negative)	NV05, S03	**High (negative)**
The proposal may enhance the health and wellbeing of residents in the study area through investments in community infrastructure, the potential for downward pressure to be placed on the market regarding energy prices, as well as greater telecommunication security through expansion of the supply-side infrastructure.	Very sensitive	Moderate	High (positive)	N/A	**High (positive)**

6.11.4.2 Economic impacts

This section provides a summary of potential economic costs, benefits and impacts of the project, with a focus on the proposal. A detailed economic impact assessment and the project scope and assumptions for that assessment is provided in Appendix K.

6.11.4.2.1 Project costs and state support

The estimated capital cost of the proposal combined with the Heybridge Shore Crossing is $1.25 billion, representing 40% of the $3.1 billion cost of the project overall. The project would be fully subsidised by state and federal governments. Refer to Section 1 for a discussion of the ownership of the project, and therefore the likely financial share of the project costs by each of the Commonwealth, Victorian and Tasmanian governments. $352 million would be spent on the local economy during the five years of construction of the proposal and the Heybridge Shore Crossing. This would be to cover the costs of wages, construction activities and environmental management, amongst other expenses.

An average of $13 million per annum would be spent in the local economy during the operation and maintenance of the proposal. This would cover the costs of wages, maintenance, and environmental management, amongst other expenses.

6.11.4.2.2 Local sourcing

For the project components in Tasmania, various equipment, large-scale machinery and materials would be manufactured overseas and anticipated to be transported to the Port of Burnie, before being trucked to the proposal site. Some of the proposal infrastructure that would be delivered this way includes the converter station and switching station electrical components, including the transformers, and the cables for the Heybridge Shore Crossing. These large capital expenditure items or processing equipment could not be locally manufactured as there is no suitable local manufacturing capability.

As discussed in Section 2, and consistent with the *Tasmanian Renewable Energy Action Plan* and affirmed in the proposed industry participation, MLPL would maximise local supply of goods and services and would source raw materials locally where practicable. These materials would include gravel, water and asphalt all of which would be obtained from Tasmania from local suppliers and not require air or sea transportation. Local businesses and service providers, including those operating in the wholesale trade industries, would be engaged during the construction and operation phases of the proposal, with those businesses likely to be within 100 km of the proposal site.

6.11.4.2.3 Investment and employment

Across the lifecycle of the project including the proposal, direct and indirect jobs would be created during construction, operation and decommissioning phases, spanning industries such as construction, professional services, retail, manufacturing and accommodation and food services. Many of the direct jobs would go to local workers. Workers from North West Tasmania are predicted to make up approximately 45% of the construction workforce, with 30% from elsewhere within Tasmania. Interstate resources coming from other locations within Australia may make up approximately 17% of the workforce, with the balance international. The increase in jobs, a diversification of jobs, and the introduction of people from out of the region would change the income and cultural backgrounds of the region for the period of construction. In addition to the labour market changes, the whole project would create economic benefits including the creation of skills and training opportunities, local sourcing of materials, tax and other revenues, as well as potential to reduce electricity costs for the community.

For North West Tasmania, over an assessment period of 25 years from 2025 to 2050, the project would provide:

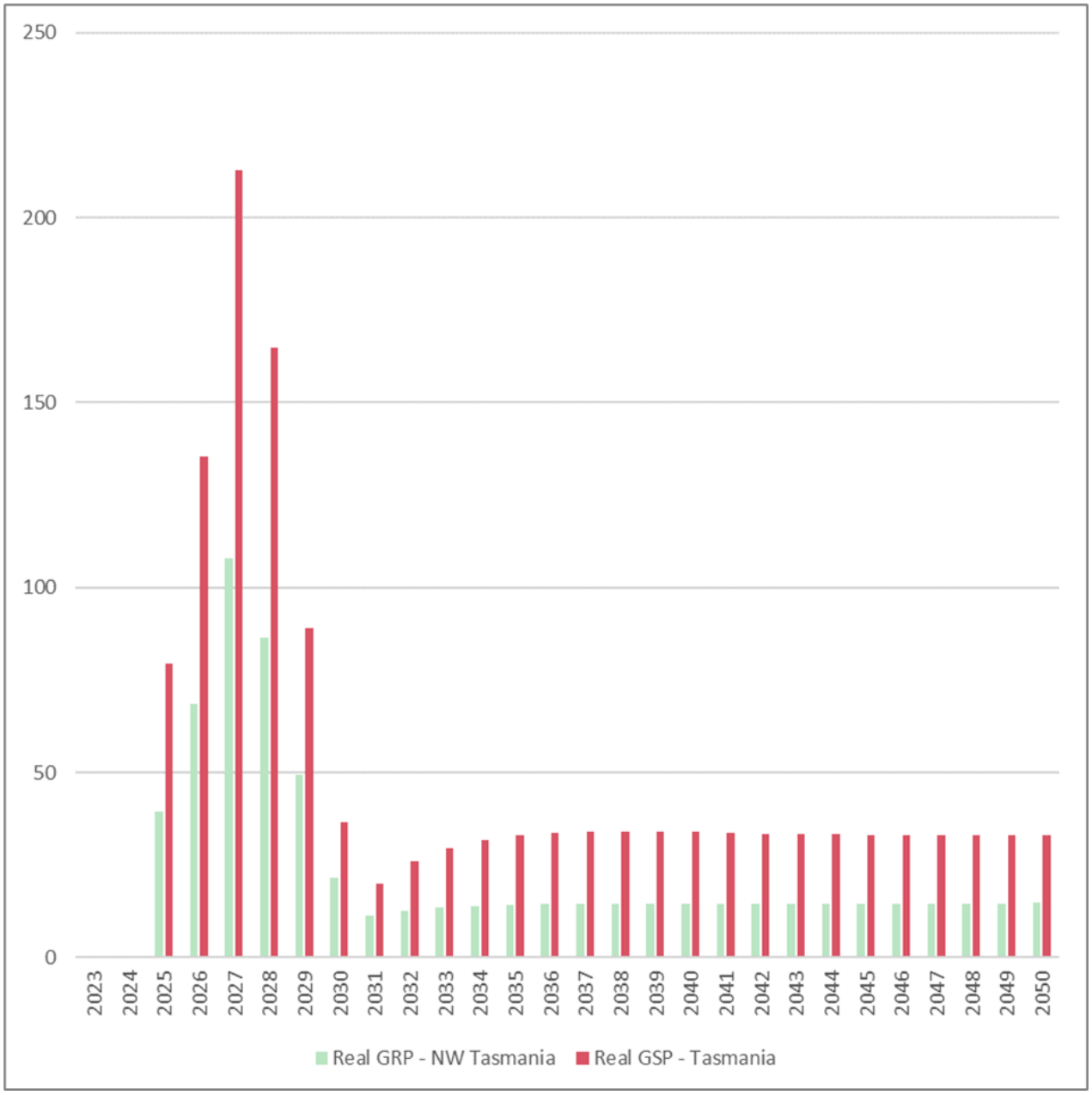
- $352 million to the local economy during five years of construction. The peak annual contribution is almost $108 million.
- $361 million to the regional economy between 2030 and 2050 for operations and maintenance, at an average of $17 million per annum.
- 1,297 full time equivalent (FTE) job-years in the regional economy during five years of construction. The peak number of jobs is 430 FTE job-years.
- 306 FTE job-years in the regional economy between 2030 and 2050 for operations and maintenance, at an average of 15 FTE job-years supported each year.

For the State of Tasmania over the same period, the project would provide:

- $681 million to the state economy during five years of construction, peaking at $213 million.
- $679 million to the state economy between 2030 and 2050 for operations and maintenance, at an average of $32 million per annum.
- 2,661 FTE job-years during five years of construction, with a peak of 895 FTE job-years.
- 306 FTE job-years during operations in the state between 2030 and 2050, at an average of 15 job-years supported annually.

The economic activity from the combined construction and operation of six induced renewable energy projects has been predicated to contribute: $4.4 billion in the Tasmanian economy between 2028 and 2050 (average $190 million per year), including $2.1 billion to the North West Tasmania economy (average $92 million per year). 11,705 FTE job-years to 2050 (average 509 job-years per annum) in the Tasmanian economy, including 5,051 job-years (average 220 job-years per annum) in the North West Tasmania economy.

The economic value-add per annum, regionally and across the state, from construction and operation is shown in Figure 6.11-3.



Source: SGS Economics & Planning; Centre of Policy Studies (2023)

Figure 6.11-3 Economic value-add from construction and operation of Marinus Link ($ millions)

6.11.4.3 Community benefits

The proposal (including the Heybridge Shore Crossing) would benefit local communities through providing employment and training opportunities, with potential job and training opportunities for women, young people, members of the Tasmanian Aboriginal Community, and vulnerable groups.

The proposal (including the Heybridge Shore Crossing) would be targeting opportunities for Tasmanian Aboriginal Community employment and procurement throughout the construction and operational phase, through direct and indirect employment as well as other actions to increase economic opportunities. An industry participation plan would be prepared to identify efforts and actions to increase the economic opportunities for the Tasmanian Aboriginal Community. This would be further investigated as part of ongoing consultation with the Tasmanian Aboriginal Community and stakeholders, and would be implemented as part of the community and stakeholder engagement framework and the industry participation plan (refer to Section 6.11.5).

Investment in renewable energy projects also provides regional communities with economic and social capital growth. Benefits would also accrue for the study areas through the implementation of the project's industry participation plan and the community benefits sharing scheme for the project. The proponent would invest in the local region directly, as it is already committed and doing through grant funding arrangements with Burnie City Council.

6.11.4.3.1 Opportunities for training and skills development

The Tasmanian Government's skills and training initiative, Energising Tasmania (Tasmanian Government 2021), is supporting the expansion of workforce skills in areas such as engineering, project management, civil construction and trades. The program includes a training grants fund, a training market development fund to support training providers, a fund to deliver an industry-led workforce development plan, and the establishment of an industry advisory group. These would all likely be leveraged by training providers to support projects like and including Marinus Link.

The University of Tasmania, TAFE Tasmania, Skills Tasmania, and the Education Department are all looking to the project and the renewable energy projects that would likely follow construction of the project to provide demand for high-quality jobs and career pathways for students. These organisations are planning to shape curriculums and course offerings to create the workforce required and provide opportunities to young Tasmanians.

With respect to the proposal specifically, skills development would be pursued through a social impact management plan with a focus on providing local opportunities.

6.11.4.4 Other industry impacts

The proposal would support jobs across a range of industries. The construction phase of the proposal and the Heybridge Shore Crossing would lead to employment for technicians and trades workers (e.g., electricians, architectural, building and surveying technicians, welders and metal fitters and machinists), labourers and machinery operators. Other opportunities include professionals (e.g., electrical engineers), managers and clerical and administration for operation.

The agriculture, forestry and fishing (in Bass Strait) industry (as defined by the ABS) is a critical economic driver in both North West Tasmania with 3,800 employed in this industry recorded at the 2021 Census. Construction of the proposal and the Heybridge Shore Crossing would indirectly place pressure on the industry through increased competition for labour. During construction of the proposal, employment in the agriculture, forestry and fishing industry may fall by 18-80 FTE job-years per annum but stabilise post-construction.

In addition, the retail trade, accommodation and food services industry would see an increased demand, with the project estimated to generate support for approximately 358 FTE job-years in Tasmania between 2025 and 2050.

The greater the role industry and business in the region can have in supplying goods and services for the construction and operations of the project, the greater the positive and beneficial workforce and economic impacts may be realised. The project would be implementing its industry participation plan to support local businesses, including local sourcing of materials, goods and services. Over the long term, the objective of the project is to leverage local supply chains and spending where feasible in Tasmania.

Recreational business and shipping users of Bass Strait are not predicted to be affected significantly by the project. Tourism operators could see negative impacts if tourism accommodation is used by the construction workforce. Avoiding this impact would feature in the workforce and accommodation strategy.

6.11.4.4.1 Land and housing impacts

While the project would lead to rental housing demand increase as a result of the influx of construction workforce, independently, the North West Tasmania region (despite population decline forecast for the local and regional study areas in the near term) is also projected to require an additional 3,928 dwellings in the longer-term, by 2040. It is considered possible that housing demand pressures could increase during construction of the project, including an upward pressure on housing prices, rents and potentially land values. The provision of temporary housing/accommodation for the construction workforce, a consideration for the workforce and accommodation strategy, may mitigate against this upward pressure.

During construction, the likely effects related to housing demand and land value include:

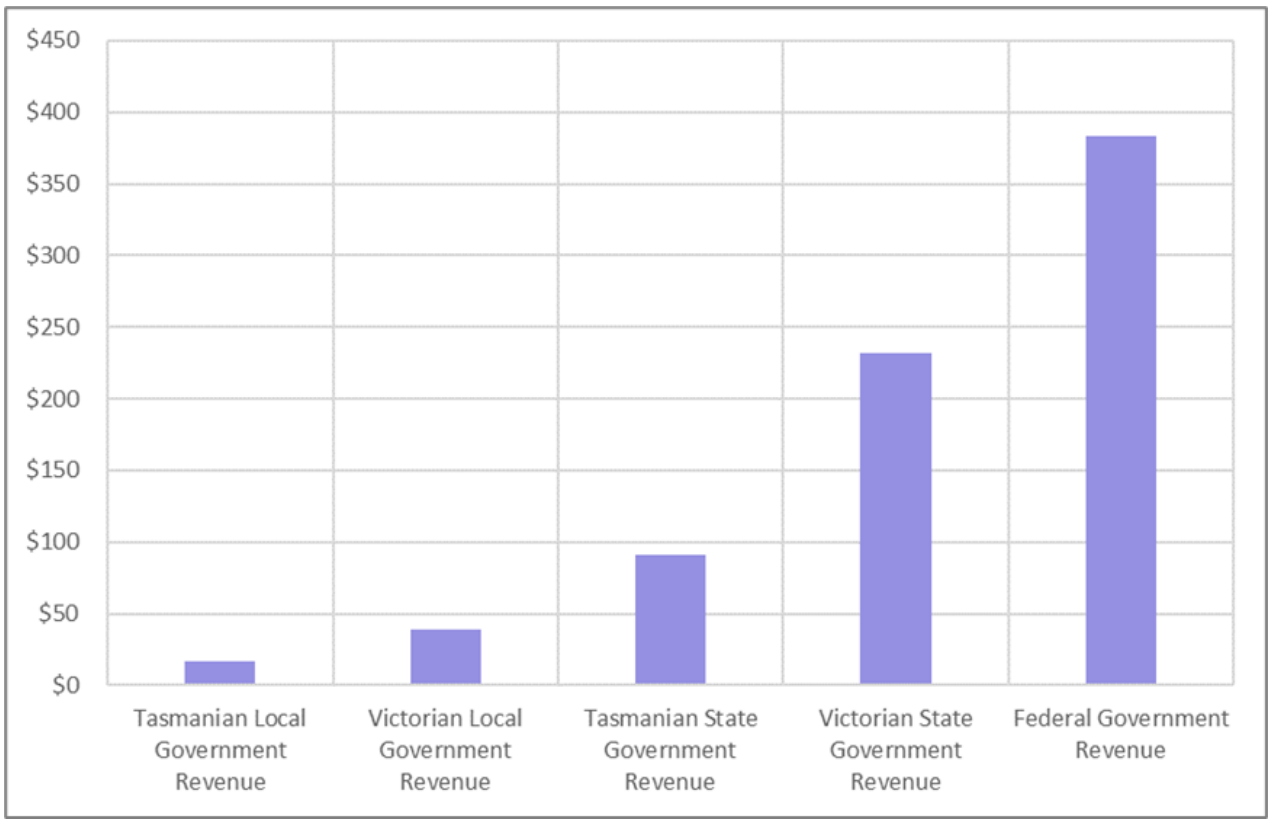
- Employment levels are substantially elevated from a business-as-usual level, which can lead to elevated housing demand levels.
- Households for the locally employed workers may experience an escalation in home values, or alternatively if renting, an escalation in their rental rates.
- Non-local workers from outside the North West Tasmania region may relocate, rent or purchase a home, which represented increased demand for housing supply, with potential to increase prices and rents. This increased pressure may lead to increased land values.
- Further effects could materialise in the form of housing stress, where households spend more than 30% of their gross income on housing.

During the operational phase, upward pressures on housing prices and rents are unlikely to be as strong as the construction phase. Both local and non-local workers would be expected to be employed during the operational phase and a portion of these workers may choose to relocate closer to the proposal or continue to reside non-locally, overall contributing to less pressure on the local housing demand compared to the construction phase. The proponent is exploring opportunities to reduce pressure on local housing markets, including through a workforce and accommodation strategy.

6.11.4.4.2 Local, state and federal tax and revenues

Based on the outputs of the technical modelling, the project is projected also to generate public taxation receipts for various levels of government. Figure 6.11-4 illustrates the following:

- Local governments in Tasmania are expected to collect an additional $17 million from increased rates revenues.
- The Tasmanian Government is expected to collect an estimated $91 million. This tax revenue includes property and payroll taxes and stamp duties.
- The Australian Government is expected to collect an estimated $383 million. This tax revenue largely stems from taxation on the provision of goods and services and income taxes on individuals.



Source: SGS Economics & Planning; Centre of Policy Studies (2023)

Figure 6.11-4 Total added taxation revenue 2025-2050 ($ millions)

6.11.4.5 Cumulative impacts

Each of the Social Impact Assessment and the Economic Impact Assessment assessed the impacts of the proposal together with the impacts of the Heybridge Shore Crossing. The impacts presented here reflect a cumulative impact assessment of the two proposals.

The overlap and interaction between this proposal and the proposed Heybridge Shore Crossing is a necessary requirement to allow the sharing of workforce and skilled labour, local and regional infrastructure and services, and local employment targets across the overall project to enable a coordinated approach to manage social/economic impacts while maximising the benefits. Overall, the overlap of the two proposals in both footprint and schedule would contribute to positive economic outcomes, enhance employment and livelihoods, while potentially impacting on availability of infrastructure and services for the local and regional communities.

The overlap in construction activities may, however, give rise to community concerns about disruption to their amenity. However, the project is not anticipated to result in significant cumulative impacts for noise (refer to Section 6.14), air quality (refer to Section 6.5) and visual amenity, for the sensitive receptors near the proposal site, provided that the proposed mitigation measures are implemented for the proposal to minimise such impacts. The mitigation measures provided in Section 8 considers the various potential impacts to amenity.

The potential cumulative impacts associated with construction of other foreseeable future projects (listed in Section 6.14) are anticipated to place significant demands on construction workforce availability and related issues of workforce accommodation. The management of socio-economic impacts would need to address the peaks in the construction workforce relating to the construction activities in Tasmania in the context of other large-scale infrastructure construction projects in the region.

The residual cumulative social impacts are summarised in Table 6.11-7. The mitigation measures outlined in Section 6.11.5 would be implemented to minimise potential cumulative impacts on the Heybridge and regional communities in Tasmania.

The combined construction of renewable energy projects supported by the proposal and project is predicated to lead to an average of an additional 220 FTE job-years in North West Tasmania and contribute $4.4 billion in the Tasmanian economy between 2028 and 2050 (average $190 million per year), including $2.1 billion to the North West Tasmania economy (average $92 million per year).

Based on the assessment of social and economic impacts, it is anticipated that the proposal would lead to beneficial cumulative impacts on:

- Income levels.
- Cost of goods and services.
- Workforce participation.
- Construction supply chain.
- Government revenue.

In addition, adverse cumulative impacts would be anticipated for:

- Housing availability and affordability.
- Demand for competition for construction workers.
- Demand for health and emergency services.

Mitigation measures to address cumulative impacts listed above include MM S01 and MM S02.

Table 6.11-7 Cumulative impacts summary

Potential impacts	Cumulative residual impact assessment		
	Sensitivity	**Magnitude**	**Impact significance**
Economy and livelihood			
The cumulative impact of the project workforce would contribute to the demand for rental housing in the regional study area and exacerbate existing rental availability and affordability issues, which would affect very low and low-income households disproportionally.	Very sensitive	Major	**Major (negative)**
The demand and competition for skilled labour resources may impact industries requiring similar skill sets and potentially draw from other industries and local businesses within the study area.	Very sensitive	Moderate	**High (negative)**
Infrastructure and services			
The cumulative impact of the project workforce would contribute to the demand for health and emergency service providers, which may compromise the service provided to the existing regional population.	Very sensitive	Moderate	**Moderate (negative)**
The cumulative impact of increased construction workforce on demand for childcare providers, compromising service provision to the existing local and regional community.	Very sensitive	Moderate	**High (negative)**
People's productive capacities			
Employment pathways for Tasmanian Aboriginal Community, women, youth and socially vulnerable groups in the regional construction and operations workforce are made available.	Very sensitive	Minor	**Moderate (positive)**

6.11.5 Management, mitigation and monitoring

Proposed measures to minimise potential impacts associated with socio-economic issues are presented in Table 6.11-8. Mitigation measures in other sections that are relevant to the management of social and economic issues include:

- Section 6.3 (Noise and vibration), specifically measures which address the management of noise emissions on sensitive receptors.
- Section 6.5 (Air quality), specifically measures which address the management of dust and odours associated with contaminated soils.

- Section 6.13 (Infrastructure and off-site ancillary facilities), specifically measures which address construction traffic management.
- Section 8.2 (Mitigation measures), specifically MM Gen06 which addresses consultation with relevant stakeholders to manage the interface of nearby projects under construction at the same time.

Together, these measures will minimise the potential socio-economic impacts.

Table 6.11-8 Socio-economic issues – mitigation measures

Ref	Mitigation measure	Proposal stage
S01	Prior to construction commencing, in preparing the project's worker health and safety plan, include: • Requirements and measures for responding to health, medical and safety incidents of construction personnel during the construction phase. • Strategies for provision of first response medical capabilities on-site for both local and non-local employees and contractors to minimise the impact on local health services.	Construction
S02	Develop a workforce and accommodation strategy to address the potential social impact from the workforce and accommodation requirements during construction. The strategy will: • Be developed in consultation with government, industry and other relevant providers. • Include a protocol for the identification and management of impacts due to accommodation requirements. • Address cumulative impacts on accommodation due to other large-scale construction and infrastructure projects in the identified local study areas. The outcomes of the strategy will be considered during construction planning.	Construction
S03	Prior to construction commencing, develop a community and stakeholder engagement framework for the whole project, which outlines the approach to engagement with community, stakeholders, First Peoples and the Tasmanian Aboriginal Community that will be undertaken for the project, including the proposal, and by all contractors. The community and stakeholder engagement framework must: • Be consistent with IAP2 principles and guidance in the National guidelines Community engagement and benefits for electricity transmission projects (ECMC 2024), and Renewable energy development in Tasmania: A guideline for community engagement, benefit sharing and local procurement (Department of State Growth 2024). • Identify key community and stakeholder groups across the project, including for the proposal, with a likely interest such as property owners, local residents, business owners, business and industry associations road users, and local Council. • Describe the approach for engaging the community, stakeholders, First Peoples and the Tasmanian Aboriginal Community. • Establish communication protocols and tools for communication that provide: - Early and ongoing information and notification to local communities and stakeholders about timing and duration of works, potential impacts and proposed management measures. - Information on issues of community concern and proposed management measures such as project scope, construction noise (including out of hours works), construction air quality, construction traffic, operational noise and EMF). Outline complaints policies and management procedures for recording, managing, and resolving complaints. The complaints management system will be consistent with	Construction

Ref	Mitigation measure	Proposal stage
	Australian Standard AS/NZS 10002: 2014 *Guidelines for Complaints Management in Organisations*. Principal contractors will prepare a community and stakeholder engagement management plan in accordance with the framework for their works package, including tailored to the proposal. The community and stakeholder engagement framework and contractors' community and stakeholder engagement management plan will be updated annually to reflect any project or stakeholder changes and improvements identified. The community and stakeholder engagement framework will be implemented during construction.	
S04	Prior to construction commencing, develop a Tasmanian community benefits sharing scheme in consultation with communities and the Tasmanian Aboriginal Community in the identified local study area. The Tasmanian community benefits sharing scheme will be developed having regard to *Renewable Energy Development in Tasmania: A guideline for community engagement, benefit sharing and local procurement* (Department of State Growth 2024).	Construction
S05	Prior to construction commencing, develop an industry participation plan to integrate First Peoples, the Tasmanian Aboriginal Community, women, youth and socially vulnerable groups into the project workforce. The purpose of the industry participation plan is to stimulate entrepreneurship, business and economic development, providing First Peoples, the Tasmanian Aboriginal Community and vulnerable groups with more opportunities to participate in the economy. The plan will: • Set out an employment and supplier-use participation target within the project's locality. • Outline the project's social procurement policies and local procurement policies considering each component and phase of construction. • Be developed in conjunction with the requirements under the Indigenous Employment and Supplier-use Infrastructure Framework (February 2019). • Identify a range of potential opportunities for job-seekers and businesses to be involved in the project across the construction supply chain. • Set employment targets with reference to local First Peoples or the Tasmanian Aboriginal Community working age population within the project area and consistent with the 'locals first principle'. • Identify opportunities for women, youth and other socially vulnerable groups to be involved in the project workforce.	Construction Operation
S06	Prior to construction commencing, engage with local emergency service providers in the preparation, planning, monitoring and review of the project's emergency response plan and procedures. The project's emergency response plan must outline protocols for: • Ongoing engagement with emergency services about changes to local access and project activities that have potential to cause delay or disruption to emergency response. • Engaging with the community and managing social impacts during an emergency incident. The protocols will form part of the project's emergency response plan and will be implemented during construction.	Construction

6.12 Fire risk

This section provides a summary of the findings of the Bushfire Impact Assessment provided in Appendix L.

6.12.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.12-1

Table 6.12-1 Relevant EIS guidelines

Fire risk – EIS guidelines	Section
Discuss the potential fire risk associated with the proposal, including:	
Consideration of fire within the site, fire escaping from the site and the impact of wildfire originating outside the development and the environmental impacts that could result from such an event.	Section 6.12.3, 6.12.5
Whether any hazardous chemicals proposed to be stored or used on site pose a fire risk.	Section 6.12.3.1, 6.12.3.4, 6.12.4
The objectives and management principles to be adopted to prevent and respond to potential fire events.	Section 6.12.4, 6.12.5, 6.12.7
Where a fire response plan is appropriate, it should be fully integrated with other relevant documents, such as a Tasmania Fire Service Local Area Fire Management Plan, a Forestry Tasmania Fire Management Plan and a Parks and Wildlife Service Fire Action Plan for relevant districts.	Section 6.12.4, 6.12.6, 6.12.7

6.12.2 Methodology

The study area for the impact assessment includes the proposal site situated in the locality of Heybridge combined with the two spatial levels layers of bushfire assessment analysis undertaken, being:

- **Bushfire hazard assessment:** Assessment of bushfire fuels (vegetation) and topography local scale within a 500 m buffer of the project layout.
- **Bushfire risk assessment:** Assessment to inform bushfire risk exposure based on the bushfire hazard in combination with fire history, fire weather, fire behaviour potential, fire paths assets at risk at a semi-landscape level within a 5 km buffer of the proposal.

The proposal study areas for the assessment are defined as:

- Heybridge site (onsite).
- Adjoining Heybridge site and surrounds (offsite).

The method of impact assessment adopted for this study is **discipline specific**. The assessment uses a risk assessment alongside a values assessment which draws from available relevant GIS data from government databases. The risk rating for potential fire risks was calculated by multiplying likelihood and consequence levels with the rating determined, as shown in the risk matrix in Table 6.12-2 below.

Table 6.12-2 Fire risk – risk rating matrix

Consequence	Sensitivity of value				
	Almost certain (5)	Likely (4)	Possible (3)	Unlikely (2)	Rare (1)
Catastrophic (5)	**Extreme**	**Extreme**	**Major**	**Moderate**	**Minor**
Major (4)	**Extreme**	**Major**	**Moderate**	**Minor**	**Insignificant**
High (3)	**Major**	**Moderate**	**Minor**	**Minor**	**Insignificant**
Medium (2)	**Moderate**	**Minor**	**Minor**	**Insignificant**	**Insignificant**
Low (1)	**Minor**	**Insignificant**	**Insignificant**	**Insignificant**	**Insignificant**

Further details, including an explanation of the ratings of values and consequences, together with assumptions and limitations are provided in Appendix L.

6.12.3 Existing conditions

There are two types of potential fire risk existing at the proposal site:

- Bushfire originates outside the proposal site, and progresses onto the proposal site, impacting the existing vegetation and land.
- Fire ignition occurs on the proposal site, leading to fire development and spread into surrounding forest (Blythe River Conservation Area), residential areas and commercial assets within the Heybridge township.

6.12.3.1 Heybridge site (onsite)

The following assets required for the proposal have been identified as being at risk from a bushfire

- HVAC 220 kV switching station.
- HVAC 220 kV filter banks.
- Converter transformers and coolers.
- Main building including reactor hall, valve hall and HVDC hall.
- Two-storey service and control building.
- Spare parts building and workshop.
- Telecoms building.
- Firefighting water tank.
- Station security fencing and gates.
- Two 1500 kVA diesel generators with above ground fuel storage of 5,000 L.

6.12.3.2 Adjoining Heybridge site and surrounds (offsite)

Assets located outside the proposal site that could potentially be at risk from a bushfire that originates from the proposal site, or from an external fire include:

- Residential areas in Wivenhoe, Chasm Creek, Heybridge, and Sulphur Creek.

- Agricultural lands with dispersed rural residential assets, sheds, and boundary fencing.
- Tourist accommodation facilities.
- Blythe River Conservation Area.

The main potential sources of fire ignition in off-site locations to potentially impact the proposal site include:

- Farm machinery.
- Lightning strikes.
- Escape from legal and illegal burning operations.
- Anthropogenic causes such as arson, cigarettes, motor vehicle accidents, slashing machinery, earthmoving plant, angle grinders, and welders.

6.12.3.3 Weather and climate

Weather conditions strongly influence the likelihood of ignition and how often fires that are ignited would be uncontrollable. The proposal site experiences mild to warm summers with average maximum temperature range of 20.2°C to 21.7°C and with winter months having an average maximum temperature range of 12.8°C to 13.5°C. The average long term annual rainfall for the township of Heybridge is 979.1 mm (Elders Weather 2023). The effects of climate change would likely create periods of higher temperatures and drier conditions.

The bushfire season is declared annually by the TFS Chief Officer and generally commences on the 1 October and concludes on the 31 March the following year. The greatest potential for bushfire events is associated with a bushfire season which coincides with strong west to south-west winds, together with low rainfall and drought conditions, which may be exacerbated by climate change. Weather conditions and climate at the proposal site is further discussed in Section 5.

6.12.3.4 Fuel hazards and land use

The area surrounding the proposal site is predominantly utilised for rural land use, including:

- Residential area.
- Agricultural landholdings and commercial uses.
- Forestry and conservation areas.
- Agricultural landholdings.
- Isolated dwellings together with dispersed industrial/commercial development.

Figure 6.12-1 identifies the land use within 5 km of the proposal site. The fuel hazard (vegetation) surrounding the proposal site is largely a mixture of forest and heathland, interspersed with cleared or fuel reduced areas.

Much of the vegetation adjoining the proposal site has been fragmented by surrounding areas of intensive human settlement, property, and road networks together with natural features including the Blythe River. These artificial manmade and natural features have the capacity to disrupt continuous potential fire runs,

especially on days of milder Fire Danger Rating, as well as to increase available fire suppression and containment options for firefighting authorities.

6.12.3.5 Topography

The elevation of the proposal site is 10 m above sea level. Terrain surrounding the proposal site is mostly flat to the north, and undulating to the west, south, and east.

6.12.3.6 Fire history

Mapping of available fire history within 5 km of the proposal site is shown in Figure 6.12-1. There is minimal fire history in the proximity to the proposal site. There are two prescribed burns mapped, one in the 2017/2018 fire season (April 2018) located within the Blythe River Conservation Area and contained by the Blythe River, and the other being a small, prescribed burn in the Chasm Creek area in the 2022/2023 fire season (NRE 2024). The fire occurred within the Blythe River Conservation Area and is not mapped as crossing the Blythe River. The other fires mapped within 5 km of the proposal site were considered inconsequential in size and not significant. Fire history indicates a very low number of large bushfire events surrounding the proposal site.

Overall, there is a low likelihood of a fire starting on the proposal site and spreading to cause significant impact to human life and damage to property or assets.

Figure 6.12-1: Vegetation and fire history surrounding the proposal site

Legend

- Proposed HVDC Subsea Cable
- Proposal Site
- Proposal Site 500m Buffer
- Proposal Site 5Km Buffer
- Elevation Contours (50m Interval)

Vegetation Group

- Dry eucalypt forest and woodland
- Non eucalypt forest and woodland
- Wet eucalypt forest and woodland
- Scrub, heathland and coastal complexes
- Saltmarsh and wetland
- Other natural environments

Last Burnt Fire Season

- 2023
- 2021
- 2018
- 2017
- 2016
- 2014
- 2011
- 2005
- 2004

Scale: 1:57,500 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 0.5 1 2 3

Kilometres

MARINUS LINK

Acknowledgements and Sources:

Data Source: Marinus Link GIS Data Repository and theLIST ©State of Tasmania .
Background Image: Earthstar Geographics
Produced By: Marinus Link for the Tasmanian Heybridge Converter Station EIS.
Date Figure Exported: 21/11/2024

6.12.4 Applicable legislation

6.12.4.1 Tasmanian Planning Scheme

Clause 13 of the Tasmanian Planning Scheme is the Bushfire Prone Areas Code for the State of Tasmania. Clause 13 aims to ensure that proposed developments are suited for bushfire prone areas through appropriate design, siting, utility services, and construction which reduce the impact of bushfires on human life and property, and cost to the community.

Specifically, Clause 13.5.2 of the Scheme does not apply to the proposal because there would not be any fuel substances that meet the definition of "hazardous chemicals of manifest quantity" (as per the applicable definitions in the *Work Health and Safety Regulations 2022*) stored on the proposal site for construction. Notwithstanding, Table 6.12-3 outlines how the proposal has considered the requirements of the planning scheme.

Table 6.12-3 Clause 13.5.2 Tasmanian Planning Scheme Requirements relating to Hazardous Uses

Acceptable solutions	Performance criteria	Compliance
A1 No Acceptable Solution	**P1** A hazardous use must only be located in a bushfire prone area if a tolerable risk from bushfire can be achieved and maintained, having regard to: • The location, characteristics, nature and scale of the use. • Whether there is an overriding benefit to the community. • Whether there is no suitable alternative lower-risk site. • Whether there is an emergency management strategy (hazardous use) and bushfire management plan. • Other advice, if any, from the TFS.	Fuel tanks and associated transformers, generators, and other material stores would be located centrally within the site, separated from bushfire hazards and the proposed onsite buildings and assets. All fuel storage, and containment of the generators and transformers would be in accordance with applicable Australian Standards and other applicable requirements. The proposal would have built-in safety control systems in its design to minimise risks of hazardous materials being stored or used on site. The design of the proposed Converter Station would have operated and control systems in place such as emergency safety shutdown in line with the proposal's CEMP and OEMP, as well as an emergency management plans. The site would facilitate distribution of electricity on the NEM from Tasmania to the Mainland. The current proposal site is required to support the undersea cabling to the mainland and is a previous disused industrial site. This site itself has bushfire protection advantages, with downhill fire runs lessening potential severity of any bushfire attack. Further, there is reduced exposure to bushfire attack on three sides (north, east, and south) lessening the likelihood of fire attack. An emergency management strategy and bushfire management plan to be prepared in accordance with A2 and A3 below. MLPL would work in consultation with the TFS and Burnie City Council in the development of such documents.

Acceptable solutions	Performance criteria	Compliance
A2 An emergency management strategy (hazardous use) endorsed by the TFS or accredited person.	**P2** No performance criterion.	An emergency management strategy for hazardous use would be included in an emergency response plan for the site for endorsement by the TFS or accredited person.
A3 A bushfire hazard management plan that contains appropriate bushfire protection measures that is certified by the TFS or an accredited person.	**P3** No performance criterion.	A bushfire hazard management plan that contains bushfire protection measures would be prepared and certified by the TFS or accredited person.

6.12.5 Potential impacts

6.12.5.1 Construction

Construction of the proposal would involve the following activities which have the potential to cause a fire and could present potential sources of ignition from the proposal site (onsite):

- Electrical or mechanical faults causing ignition of fire.
- The use and of or inappropriate storage of flammable fuels.
- Utilisation of machinery and equipment.
- Land management activities such as fire break maintenance and vegetation management.
- Construction activities including, welding, grinding and other ignition generating works.
- Other anthropogenic sources such as discarded cigarette butts, cooking fires, fire starts from vehicles or accidents, and arson.

If fire were to ignite on the proposal site (onsite), or a bushfire to originate outside the proposal site (offsite), the following impacts to human life and property values may occur:

- Major and minor injuries to, or fatality of, construction workers and nearby residents of Heybridge.
- Extensive and widespread loss of property on the proposal site and in the surrounding Heybridge area. This would result in a major impact across a large part of the community and region with long term external assistance required to recover.
- Localised damage to property on the proposal site and in the surrounding Heybridge area. Short-term external assistance would be required to recover.
- Short-term damage to individual assets on the proposal site and on assets within the surrounding Heybridge area.

Potential risk to life and property are further discussed in the following sections, considering both fire impacts on the surrounding Heybridge area (offsite) and on the proposal site (onsite).

6.12.5.1.1 Offsite impacts

The risk of bushfire impact on human life within the surrounding area during the construction of the proposal ranges from **insignificant** to **minor**. The low risk rating is due to the following factors:

- Fuel free state of the proposal site (being an area that contains highly modified/discontinuous vegetation adjoining bush fire prone vegetation, providing a defendable space for firefighting operations), limiting potential fire ignition and subsequent spread of fire to offsite areas.
- Adoption of ignition management procedures during construction on the proposal site (grinding, welding, smoking, handheld machinery, vehicles etc).
- Low number and geographically dispersed human population within residential, commercial, and industrial areas surrounding the proposal site, limiting potential impact of fatality and injuries.
- Areas of non-hazards surrounding the proposal site, including major road networks, the Blythe River, and Bass Strait, and cleared and fuel reduced areas. These areas would disrupt fire spread.
- Dispersed rural residential settlements within or adjoining low hazard agricultural landholdings.

Similarly, the impact to property assets offsite (including in urban, industrial, and rural areas) due to the construction of the proposal is **insignificant** to **minor**. The likelihood of fire propagating across the landscape is low, due to the location of low hazard and non-hazard areas that adjoin property assets offsite.

6.12.5.1.2 Onsite impacts

The risk of bushfire impact on human life on the proposal site during construction due to fire ranges from **insignificant** to **minor**. The low risk rating is due to the following factors:

- Construction workers on the proposal site would be primarily located within established and maintained area free from fuel hazards.
- Widespread fire is unlikely due to the downhill slope adjoining the proposal site, causing lower intensity fire runs, along with adjoining built and natural features that may disrupt fire spread, such as roads, rivers, and other waterways.

Similarly to the risk of bushfire impact on human life, the risk of impact to property and infrastructure assets on the proposal site ranges from minor to insignificant. The low-risk rating to property is due to the following factors:

- Downhill slope adjoining the proposal site.
- The proposal site is cleared and is a fuel free state.
- Presence of low hazard, non-hazard, and fuel free areas (roads and water) on adjoining properties.

The diesel fuel to be stored and supply fuel on the proposal site meets the definition a dangerous good. The tank is to be stored in a secure area well away from work areas, buildings, and electrical infrastructure in accordance with the *Dangerous Goods (Storage and Handling Regulations 2012*) (refer to Section 6.7). Where stored and handled correctly in accordance with these regulations the risk of fire or explosion impacting off site is low.

A risk assessment has been undertaken on potential construction impacts to life and property on proposal site and surrounds prior to the implementation of mitigation measures. The risk assessment is presented in Table 6.12-4. The methodology used for the assessment is provided in Appendix L.

Table 6.12-4 Bushfire risk assessment – offsite and onsite impacts during construction

Affected value	Vulnerability criteria	Consequence	Likelihood	Level of risk[1]	Risk rating
Life	Populated area where the combination of threat and vulnerability expose a community to a significant likelihood of fatalities and major injuries.	5	1	5	**Minor**
	Less likely to be fatalities or major injuries due to the presence of attributes which afford some protection.	4	1	4	**Insignificant**
	Loss of life or major injury highly unlikely. Medical/hospital treatment may be required.	3	2	6	**Minor**
	Minor injuries only – first aid treatment. No major injuries or fatalities likely.	2	2	4	**Insignificant**
	No injuries or fatalities likely.	1	3	3	**Insignificant**
Property	Extensive and widespread loss of property. Major impact across a large part of the community and region. Long term external assistance required to recover.	5	1	5	**Minor**
	Localised damage to property. Short-term external assistance required to recover.	4	1	4	**Insignificant**
	Short-term damage to individual assets. No external assistance required to recover.	3	2	6	**Minor**
	Inconsequential or no damage to property. Little or no disruptions to the community.	1	2	2	**Insignificant**

1 Level of Risk = Consequence x Likelihood

6.12.5.2 Operation

Operation of the proposal would involve the following activities which have the potential to cause a fire:

- The use and of or inappropriate storage of fuels.
- Servicing, testing and repair of proposal equipment and infrastructure including scheduled minor and major outages.
- Maintenance activities such as welding, grinding and other ignition generating works.

If fire were to ignite on the proposal site, or a bushfire originating outside the proposal site were to occur during operation, the following potential impacts to human life and property values include:

- Fatality of operation and maintenance workers and nearby residents of Heybridge.

- Major and minor injuries to operation and maintenance workers and nearby residents of Heybridge.
- Extensive and widespread loss of property on the proposal site and in the surrounding Heybridge area. This would result in a major impact across a large part of the community and region with long term external assistance required to recover.
- Localised damage to property on the proposal site and in the surrounding Heybridge area. Short-term external assistance would be required to recover.
- Short-term damage to individual assets on the proposal site and on assets within the surrounding Heybridge area.

6.12.5.2.1 Offsite impacts

The bushfire risk of impact to life to offsite areas has been determined to be ranging from **insignificant** to **minor**. The low risk rating is due to the following factors:

- Fuel free state of the proposal site (being that it would be a largely cleared area).
- Adoption of ignition management procedures on site (grinding, welding, smoking, handheld machinery, vehicles).
- Low number and geographically dispersed human population within residential, commercial, and industrial areas in proximity to the proposal site.
- Non-hazard areas adjoining forested vegetation such as major road network and natural geographical features (Blythe River and Bass Strait).
- Dispersed rural residential settlements within or adjoining low hazard agricultural landholdings.

Similarly to the risk of bushfire impact on human life, the impact to property assets offsite (including in urban, industrial and rural areas) due to the operation of the proposal is **insignificant** to **minor**. The low risk rating is due the location of low hazard and non-hazard areas that adjoin property assets offsite reducing the likelihood of widespread fire propagation across the landscape.

6.12.5.2.2 Onsite impacts

The risk of impact to life on the proposal site during operation ranges from **insignificant** to **minor**. The low risk rating is due to the following factors:

- Maintenance workers on the proposal site would be primarily located within established and maintained area free from fuel hazards.
- Widespread fire is unlikely due to the downhill slope adjoining the proposal site, causing lower intensity fire runs, along with adjoining built and natural features that may disrupt fire spread, such as roads, rivers, and other waterways.

Similarly to the risk of bushfire impact on human life, the risk of impact to property and infrastructure assets on the proposal site ranges from **minor** to **insignificant**. The low-risk rating to property is due to the following factors:

- Downhill slope adjoining the proposal site.
- The proposal site is cleared and free of fuel.
- Presence of low hazard, non-hazard, and fuel free areas (roads and water) on adjoining properties.

A risk assessment has been undertaken on potential operational impacts to human life and property on proposal site and surrounds prior to the implementation of mitigation measures. The risk assessment is presented in Table 6.12-5. The methodology used for the assessment is provided in Appendix L.

Table 6.12-5 Bushfire risk assessment – offsite and onsite impacts during operation

Affected value	Vulnerability criteria	Consequence	Likelihood	Level of risk[1]	Risk rating
Life	Populated area where the combination of threat and vulnerability expose a community to a significant likelihood of fatalities and major injuries.	5	1	5	**Minor**
	Less likely to be fatalities or major injuries due to the presence of attributes which afford some protection.	4	1	4	**Insignificant**
	Loss of life or major injury highly unlikely. Medical/hospital treatment may be required.	3	1	3	**Insignificant**
	Minor injuries only – first aid treatment. No major injuries or fatalities likely.	2	1	2	**Insignificant**
	No injuries or fatalities likely.	1	1	1	**Insignificant**
Property	Extensive and widespread loss of property. Major impact across a large part of the community and region. Long term external assistance required to recover.	5	1	5	**Minor**
	Localised damage to property. Short-term external assistance required to recover.	3	1	3	**Insignificant**
	Short-term damage to individual assets. No external assistance required to recover.	2	1	2	**Insignificant**
	Inconsequential or no damage to property. Little or no disruptions to the community.	1	1	1	**Insignificant**

1 Level of Risk = Consequence x Likelihood

6.12.5.3 Decommissioning

Potential bushfire impacts to human life and property during the decommissioning of the proposal include:

- Fatality and major injuries.
- Minor injuries.

- Extensive and widespread loss of property. Major impact across a large part of the community and region. Long term external assistance required to recover.
- Localised damage to property. Short-term external assistance required to recover.
- Short-term damage to individual assets.

Potential impacts onsite and offsite would be similar to the construction phase of the proposal.

A risk assessment has been undertaken on potential decommissioning impacts to human life and property on proposal site and surrounds prior to the implementation of mitigation measures. The risk assessment is presented in Table 6.12-6. The methodology used for the assessment is provided in Appendix L.

Table 6.12-6 Bushfire risk assessment – offsite and onsite impacts during decommissioning

Affected value	Vulnerability criteria	Consequence	Likelihood	Level of risk[1]	Risk rating
Life	Populated area where the combination of threat and vulnerability expose a community to a significant likelihood of fatalities and major injuries.	5	1	5	**Minor**
	Less likely to be fatalities or major injuries due to the presence of attributes which afford some protection.	4	1	4	**Insignificant**
	Loss of life or major injury highly unlikely. Medical/hospital treatment may be required.	3	1	3	**Insignificant**
	Minor injuries only – first aid treatment. No major injuries or fatalities likely.	2	1	3[2]	**Insignificant**
	No injuries or fatalities likely.	1	2	2	**Insignificant**
Property	Extensive and widespread loss of property. Major impact across a large part of the community and region. Long term external assistance required to recover.	5	1	5	**Minor**
	Localised damage to property. Short-term external assistance required to recover.	5	1	5	**Insignificant**
	Short-term damage to individual assets. No external assistance required to recover.	3	1	3	**Insignificant**
	Inconsequential or no damage to property. Little or no disruptions to the community.	1	2	2	**Insignificant**

1 Level of Risk = Consequence x Likelihood
2 Error from Technical Assessment (refer to Appendix L)

6.12.5.4 Cumulative impacts

In assessing other relevant projects within the region that could trigger cumulative impacts, in combination with required mitigation measures for each project, there is an extremely low risk of a significant increase in

impacts from bushfire for the proposal and the associated Heybridge Shore Crossing. As such the cumulative impacts are considered to be insignificant and warrant no further consideration.

6.12.6 Management, mitigation and monitoring

Proposed measures to minimise potential impacts associated with fire risk are presented in Table 6.12-7. Mitigation measures in other sections that are relevant to the management of fire risk include:

- Section 6.1 (Potentially contaminated material), specifically measures which address the storage of dangerous goods or environmentally hazardous materials.
- Section 6.6 (Waste management), specifically measures which address appropriate classification, handling and disposal of waste materials, including contaminated waste.
- Section 6.7 (Dangerous goods and environmentally hazardous materials), specifically measures which address spill prevention and clean up and transport of dangerous goods.

Together, these measures would minimise the potential fire risk impacts.

Table 6.12-7 Fire risk – mitigation measures

Ref	Mitigation measure	Proposal stage
BF01	Prior to construction commencing, develop and implement a bushfire protocol as part of the emergency response plan to: • Provide a description of the site and facility. • Reference all relevant emergency procedures and information, including contact details. • Restrict high risk activities with ignition risk in the open on Total Fire Ban Days. • Ensure activities with ignition risk undertaken in the open on other days are accompanied by a fire extinguisher. • Maintain vegetative fuels and other combustibles to low levels (i.e., grass slashed to <100mm height) within the site prior to and during the bushfire danger periods. • Maintain vehicles, plant and machinery in accordance with relevant specifications to prevent fire ignition from their operation. • Maintain firefighting systems and water tank capacity. • Provide trained personnel and fire suppression equipment. • Mitigate ignition risks from electrical faults infrastructure (e.g., fault management, system monitoring, fire detection and suppression) by ensuring design and construction meets applicable standards and guidelines (e.g., fault management, system monitoring, fire detection and suppression). • Establish and maintain vehicle access to the site and surrounds, including an alternative emergency access for fire suppression activities by firefighting authorities. • Detail bushfire emergency preparedness arrangements and response procedures. • Document control and coordination arrangements for personnel inductions, training, plan review and liaison with external stakeholders. • Detail all shelter in place and offsite evacuation procedures.	Design Construction Operation

Ref	Mitigation measure	Proposal stage
	The protocol should be prepared to be consistent with (to the extent required) the *Bushfire Emergency Planning Guideline* (TFS 2021) and endorsed by the TFS or an accredited person. Operational emergency response requirements will be detailed in the OEMP.	
BF02	As part of the emergency response plan, develop measures for the provision of dedicated onsite water supply tanks or alternative water sources for firefighting in high fire risk areas. The measures will include: • Provision of tanks that are non-combustible tanks and incorporate with appropriate firefighting fittings, for emergency services to access the water supply. • Maintaining clear access to tanks or water sources for fire fighting vehicles. • Providing sufficient water capacity to undertake adequate fire suppression as per the provisions of AS2419.1-2023: *Fire hydrant installations, Table 2.2.5(D) for open yards.*	Construction Operation

6.12.7 Residual impacts

A risk assessment of the potential bushfire impacts to human life and property associated the proposal was undertaken following the incorporation of the mitigation measures outlined in Section 6.12.6. The results of this assessment are presented in Table 6.12-8. The methodology used for the assessment is provided in Appendix L.

With the implementation of the proposed mitigation measures, the residual risk for potential impacts to life and property from fire as a result of the proposal is reduced to **insignificant**.

Table 6.12-8 Fire risk – residual risk assessment

Proposal stage	Affected value	Initial risk rating	Mitigation measure	Residual likelihood rating	Residual consequence rating	Residual risk rating[1]
Construction	Life	Minor	BF01 and BF02.	1	2	**Insignificant**
	Property	Minor		1	2	**Insignificant**
Operation	Life	Minor		1	4	**Insignificant**
	Property	Minor		1	4	**Insignificant**
Decommissioning	Life	Minor	N/A	1	4	**Insignificant**
	Property	Minor	N/A	1	4	**Insignificant**

1 Level of Risk = Consequence x Likelihood

6.13 Infrastructure and off-site ancillary facilities

This section provides a summary of the findings of the Traffic and Transport Impact Assessment provided in Appendix M.

6.13.1 Assessment guidelines

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.13-1.

Table 6.13-1 Relevant EIS guidelines

Infrastructure and off-site ancillary facilities – EIS guidelines	Section
Discuss potential environmental impacts of the proposal on any significant offsite or infrastructure facilities (including increased use of existing infrastructure, such as roads, ports and quarries).	Section 6.13.5
Identify measures to avoid and mitigate any possible adverse impacts and assess the overall impacts following implementation of the proposed avoidance and mitigation measures.	Section 6.13.6
Identify roads and other infrastructure to be used by vehicles for the proposal (during both construction and operation).	Section 6.13.3, 6.13.5
Potential environmental impacts associated with construction and use of such infrastructure should be assessed.	Section 6.13.5, 6.13.7

6.13.2 Methodology

The Traffic and Transport Assessment included:

- **A baseline characterisation of the existing environment:** for the impact assessment to measure the degree of change, and to determine the level of impact associated with the change.
- **An identification of values:** an analysis of the core traffic engineering principles, and knowledge of the proposal to inform the identification of values to be used in the impact assessment. This analysis included:
  - A site inspection of the surrounding road network, comprising photos and videos, measurements of road cross sections, sight distance assessments at key intersections, observational reviews of traffic behaviours, review of site constraints along proposal travel routes, and recording of pavement conditions.
  - Traffic surveys to determine existing traffic volumes at the surrounding road network. These surveys were undertaken over a week between 8 and 14 November 2022 using Automatic Traffic Count tube counts and video cameras.
- **Technical analysis:** to identify the impacts of the proposal.

The assessment considered the significance of potential impacts based on the sensitivity of the value and magnitude of the impact. In so doing, it used both **significance** and **risk assessment approaches**.

For further details about the methods adopted and assumptions and limitations, refer to Appendix M. The description of the significance of an impact adopted for this assessment is outlined in Table 6.13-2.

Table 6.13-2 Significance of impact

Significance of impact	Description
Major	Occurs when impacts will cause irreversible or permanent change to the road and/or active transport networks or creates a significant safety risk. Avoidance through appropriate design responses is the only effective mitigation.
High	Occurs when the proposed activities are likely to cause unmanageable transport volumes on the existing road and/or active transport networks or creates a high safety risk. While management of unavoidable impacts is possible, avoidance through appropriate design responses is preferred to preserve existing levels of capacity or safety.
Moderate	Occurs where, although reasonably resilient to increased transport volumes on the existing road network or impact to the active transport network would be degraded, the value would be degraded due to its scale of impacts or susceptibility to further change. The abundance of the value ensures it is adequately represented in the region, and that replacement, if required, is achievable.
Low	Occurs where a value is of local importance and temporary and transient changes will not adversely affect its viability provided standard controls and management measures are implemented.
Very low	A degraded (very low sensitivity) value exposed to minor changes (negligible magnitude impact) will not result in any noticeable change in its intrinsic value and hence the proposed activities will have negligible or no effects on the road and/or active transport networks. This typically occurs where the activities occur in industrial or highly disturbed areas.

6.13.3 Existing conditions

6.13.3.1 Road network

The existing intersections and road network relevant to the proposal are presented in Table 6.13-3 and Table 6.13-4, respectively.

Table 6.13-3 Existing intersections

Intersection	Intersection arrangement	Sight distance	Intersection characteristics
Minna Road / the proposal site access point	T-intersection.	Curves and topography limits sight distance from minor road.	The intersection is sealed with fading line marking.
Bass Highway / Minna Road	'Seagull' T-intersection. Give way from minor road.	No issues with sight distance.	The intersection is sealed with road markings and signage.
Bass Highway / Edwardes Street	Signalised X-intersection.	No issues with sight distance.	The intersection is sealed with signals and line marking.

Table 6.13-4 Existing road network

Road and classification	Speed limit	Road measurements	Road capacity*	Road characteristics	Vehicles per day**	Heavy vehicle %***
Bass Highway (National / State Highway)	90 km/hr	Total carriageway width = 37 m Total lane width = 7 m one way (2 x 3.5 m) Shoulder width = 3.7 m	>40,000	• State significant highway with two lanes in each direction. • Emergency stopping lane shoulders. • No active transport infrastructure.	19,673	10%
Minna Road, Heybridge (Sub Arterial Road)	100 km/hr	Total carriageway width = 7.8 m Total lane width = 7.8 m (2 x 3.9 m) Shoulder width = 2 m	>3,000	• Sealed road with single lane in each direction. • Gravel shoulder with topographic barriers. • No active transport infrastructure.	798	14%
Edwardes Street, Burnie (Arterial Road)	50 km/hr	Total carriageway width = 20 m Total lane width = 20m (2 x 10m) Shoulder width = 0 m	>3,000	• Access between Bass Highway and Port of Burnie. • Wide lanes for truck turning movements. • Pedestrian infrastructure crossing at traffic lights along Bass Highway.	1,355	25%
Tarleton Street, East Devonport (Arterial Road)	60 km/hr	Total carriageway width = 12m Total lane width = 12m (2 x 6m) Shoulder width = 0m	>3,000	• Sealed road with single lane in each direction. • Footpaths on western frontage.	10,621	7%
Wright Street, East Devonport (Arterial Road)	50 km/hr	Total carriageway width = 8m Total lane width = 8m (2 x 4m) Shoulder width = 0m	>3,000	• Sealed road with single lane in each direction. • Footpaths on western frontage.	5,275	17%

Notes:
* Theoretical capacities based on Austroads guidelines
** Surveyed Annual Average Daily Traffic values at each section of road
*** Percentage of heavy vehicles identified from the traffic surveys

6.13.3.2 Traffic volume

The traffic surveys undertaken are expected to represent typical operating conditions for the roads surveyed. The results of these surveys are summarised in Table 6.13-5.

Table 6.13-5 Summary of traffic surveys undertaken

Road	Location	Average 2-way traffic volumes		
		AM peak hour (7:30-8:30)	PM peak hour (16:00-17:00)	Daily
Bass Highway	Adjacent to the proposal site	460	478	19,673
Minna Road	Adjacent to the proposal site access point	64	71	798
Tarleton Street	Between Riverview Avenue and Bass Highway	766	935	10,621
Wright Street	Between Anchor Drive and Torquay Road	421	467	5,275

6.13.3.3 Public and active transport

The proposal site has minimal access to public transport services, and limited formal pedestrian footpaths and cycle tracks. Public bus services are available in Burnie, a township west of the proposal site. These services run at a low frequency and generally provide access to the centre of the township for the local residents or connect towns. The 708 and 190 bus services operate along Bass Highway, which passes the proposal site. The 190 bus services the Heybridge Bus Stop, which is a short walk from the proposal site. These services operate at a low frequency.

School bus services operate within the surrounding road network however, the route of these services is not known and consultation would be required with local councils to determine these school bus routes, noting that these are subject to change based on the residences of the children being picked up each year.

6.13.4 Applicable legislation

6.13.4.1 Austroads Guide to Road Design

The *Austroads Guide to Road Design* (2022) provides road designers with a framework that promotes efficiency in design and construction, economy, and both consistency and safety for road users.

The guidance is intended to inform the design, construction, maintenance, and operation of the road network in Australia and New Zealand. The design and construction of all road works required for the proposal are to comply with the applicable Austroads guidelines.

6.13.4.1.1 Austroads Guide to Road Design Part 4a: Section 3.2 Sight Distance Requirements for Vehicles at Intersections

The *Austroads Guide to Road Design Part 4a* was used to identify the approach sight distance and the safe intersection sight distance requirements on major and minor arm approaches on Minna Road and the proposal site access point. The results of the sight distance assessment are detailed in Table 6.13-6.

Table 6.13-6 Sight distance assessment results

Intersection	Approach	Sight distance	Existing measures
Minna Road / the proposal site access point	The proposal site access point (minor arm)	Approach sight distance is achieved	There are curves in the road in both directions on the major carriageway which limit the available sight distance as well as vegetation and topography. The intersection currently has appropriate signage to identify the curves in the road and the location of the intersection.

6.13.5 Potential impacts

6.13.5.1 Construction

The proposal would generate increased traffic movements on the surrounding road network, potentially causing impacts to the condition, traffic safety, transport access and capacity of the road network. The increased generation of traffic would be caused by:

- The transportation of construction workers to the proposal site.
- The delivery of materials, plant and machinery to the proposal site.

The proposal would also require works and removal of minor road furniture (all fixtures in the road and road reserve), to enable proposal site access for the transformer transporter at the following locations:

- Port of Burnie.
- Bass Highway/Edwardes Street/Bollard Drive.
- Bass Highway/Minna Road.
- Minna Road/the proposal site access point.

For the construction of the proposal, various equipment, machinery and materials would be manufactured overseas and transported to the Port of Burnie, before being transported via road to the proposal site.

The proposal would utilise arterial roads, minor streets, bridges and intersections surrounding the proposal site for the transport of infrastructure and workforce personnel. Travel routes that would be used by heavy and light vehicles for the construction of the proposal are presented in Figure 6.13-1 and Figure 6.13-2 respectively (with a description of the existing intersections and road network relevant to the proposal provided in Section 6.13.3).

Impacts to traffic and transport may result from increased volumes of traffic, leading to impacts on the condition, safety, performance and capacity of the road network. Potential impacts have been assessed based on the level of traffic anticipated to be generated by the various construction activities and routes that vehicles are anticipated to take to the proposal site.

Figure 6.13-1 Heavy vehicle routes to and from the proposal site

Figure 6.13-2 Light vehicle routes to and from the proposal site

6.13.5.1.1 Traffic generation

It is assumed that workers would generate an average of two vehicle movements per day. The need for construction works to leave the site during their shift is considered low due to the size of the construction activity, the number of workers on-site and the associated amenity which is likely to be provided during construction. Estimated heavy vehicle traffic generated during construction of the proposal is provided in Table 6.13-7. The predicted construction traffic volumes for the proposal are summarised in Table 6.13-8.

Table 6.13-7 Estimated construction traffic movements per quarter

Movements per quarter	2025				2026				2027	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Stage 1	-	353	619	367	540	667	657	564	240	120
Stage 2	-	-	512	512	159	159	169	239	229	209

Table 6.13-8 Estimated traffic volume summary

Time period	Heavy vehicles (construction)	Light vehicles (employees)	Total vehicles
Peak hour (AM 7:30-8:30 / PM 16:00-17:00)	30 movements	180 movements	210 movements
Daily	60 movements	360 movements	420 movements

Worker parking for Heybridge Shore Crossing would be provided within the proposal site. The impact of construction traffic generated by the proposal has therefore been considered together with the Heybridge Shore Crossing estimated construction traffic generated for the Heybridge Shore Crossing, provided in Table 6.13-9.

Table 6.13-9 Estimated traffic volume summary for the Heybridge Shore Crossing

Time period	Heavy vehicles (construction)	Light vehicles (construction)	Light vehicles (employees)	Total vehicles
Peak hour (AM 7:30-8:30 / PM 16:00-17:00)	8 movements	6 movements	20 movements	34 movements
Daily	8 movements	6 movements	60 movements	74 movements

6.13.5.1.2 Road network capacity

The operational performance and capacity of the surrounding road network has the potential to be impacted from the increased generation of traffic to the proposal site.

The Minna Road/the proposal site access point and Bass Highway/Minna Road intersections are the main intersections likely to be impacted by the increased proposal generated traffic. However, modelling undertaken by the Traffic and Transport Assessment (Appendix M) identified that while traffic volumes would increase, these intersections would not exceed their capacity during peak operational periods. The impact significance is considered **low**.

No arterial roads (as outlined in Table 6.13-4) would exceed their theoretical capacity during peak operational time periods, and Minna Road and Bass Highway are expected to operate well below capacity with the addition of proposal-generated traffic during construction. The impact significance is considered **very low**.

The assessment has assumed that the peak hour traffic volumes generated by the proposal would occur at the same time as the road network peak (i.e., worst case scenario). However, it is assumed that most construction-related traffic would arrive to the proposal site at 7:00am, which is before the recorded road network peak hour.

All vehicles entering the proposal site are expected to approach using Bass Highway. No roads are proposed to be closed as a result of construction. However, if road closures are required (due to unforeseen events), the impact significance is considered **moderate** to address the potential for a closure of Bass Highway, given significant detours would occur to the public.

A significance assessment has been undertaken on potential impacts to the road network surrounding the proposal site prior to the implementation of mitigation measures. The significance assessment is presented in Table 6.13-10. The methodology for the assessment is provided in Appendix M.

Table 6.13-10 Road capacity network – initial significance assessment

Attribute	Impact	Description	Significance
Arterial road link capacity	No impact. No arterial roads identified would exceed their capacity	• No arterial roads identified would exceed or approach capacity. • Total traffic generation is small percentage of arterial road capacity.	Very low
Impacted intersections	Intersections not impacted with appropriate intersection treatment existing.	• There are two intersections primarily impacted by site generated traffic to access the proposal site. • The intersections would operate in accordance with industry standards.	Low
Connectivity	Bass Highway is a primary Highway utilised by the Tasmanian north coast.	• No roads are proposed to be closed as a result of the proposal, however if road closures are required due to unforeseen events, significant detours would occur to the public on Bass Highway.	Moderate

6.13.5.1.3 Road safety

The design, condition and safe operation of the surrounding road network has the potential to be impacted by the increased generation of traffic to the proposal site.

6.13.5.1.3.1 Adequate road geometry

Excluding the transformer transporter, it has been assumed that the largest vehicle that would access the proposal site is a 19 m semi-trailer. It is expected that all bridges and turning movement requirements within the study area can accommodate a 19 m semi-trailer as they are all within the approved B-double road network. No additional road works are required for 19 m semi-trailers to gain access to the proposal site. The impact significance is considered **low** for the surrounding road network and **very low** for proposal site access.

6.13.5.1.3.2 Sight distance

Assessment of intersection sight distances were undertaken for Minna Road/the proposal site access point to determine the existing sight distances and further measures that could be installed to improve the safety of Minna Road/the proposal site access point intersection.

The Minna Road/the proposal site access point has existing sight distance constraints, and warning signage is provided. Due to the increased traffic volume generated by the construction of the proposal, there is an increased safety risk at this intersection. The impact significance is considered **very low**.

6.13.5.1.3.3 Crash risk and safe operation of the road network

While there is an inherent risk of increasing the number of crashes by increasing the volume of traffic on a road, given the low values of percentage impact at higher risk locations, there is no material increase in the likelihood of crashes during the construction phase as a result of the proposal. The impact significance is considered **low**.

Pedestrian activity within the study area construction traffic routes is primarily limited to the townships. The heavy movements through townships are primarily constrained to Bass Highway and are therefore operating in line with expectation and existing use. Vehicle movements may occur through smaller townships in the event of a road closure on Bass Highway. When construction vehicles pass through these locations there is a potential for an increased risk of crashes due to the increased number of pedestrians that are present within the townships. The impact significance is considered to be **low**.

There are a number of schools and kindergartens within the townships that construction vehicles would be travelling through to access the proposal site. These paths of travel would remain on Bass Highway, which does not contain direct access points to schools. If any detours are required during construction, a review of schools along the detour route should be conducted. When construction vehicles pass by schools there is potentially an increased risk of crashes, particularly given the high number of children within the road network during pick-up and drop-off time periods. The impact significance is considered **low**.

A significance assessment has been undertaken on potential impacts to the safe performance, road condition, design and operation of the road network surrounding the proposal site prior to the implementation of mitigation measures. The significance assessment is presented in Table 6.13-11.

Table 6.13-11 Safe road performance, condition and design – initial significance assessment

Attribute	Impact	Description	Significance
Safe condition of bridges and culverts	Bridges and culverts may not be in an appropriate condition for the movement of the transformer transporter.	There are several bridges on the path of travel between the Port of Burnie and the proposal site.	**High**
Adequate road geometry	Semi-trailer access via the surrounding road network	The paths of travel to the proposal site are contained on the Department of State Growth approved B-double road network. It is assumed the Department of State Growth approved road network can accommodate the construction vehicles accessing the proposal site.	**Low**
	Semi-trailer access to the proposal site	The existing proposal site access point is designed to be accessible to large vehicles. 19 m semi-trailers can access the proposal site.	**Very low**
	The movement of the transformer transporter generally throughout the road network would travel down the centre of the road and travel at a slow speed.	Roads are not designed for vehicles of this size in standard operation. The transformer transporter would travel down the centre of the road, heavily delaying traffic.	**Major**

Attribute	Impact	Description	Significance
	Works and removal of minor road furniture to access the proposal site at the following locations: • Port of Burnie. • Bass Highway/Edwardes Street/Bollard Drive. • Bass Highway/Minna Road. • Minna Road/the proposal site access point.	The road network at these locations poorly accommodates the transformer transporter. The transformer transporter cannot conduct these movements.	Major
Historic crash safety review	Increased crash risk on the external road network surrounding the proposal site	No noted crash trend. The traffic generated by the proposal is not expected to increase the safety risk.	Low
Provisions of safe sight distance at intersections	Increased safety risk at the Minna Road/ the proposal site access point with sight distance constraints.	Poor sight distance with warning signage provided. Traffic generated at intersection with warning signage.	Very low
Height clearance requirements of transport transporter	Low hanging power lines may present an obstruction on the path of travel of the transformer transporter	Low hanging power lines. The path of travel of the transformer transporter may impact low hanging power lines	Major
Safe operation	Roads may require resurfacing/remediation works.	The road network on the paths of travel to the site are high capacity freight routes, designed to accommodate heavy vehicles. The traffic generated would increase wear and tear on the road network.	Low
	Provision of adequate quality intersection treatments, notably at the Minna Road/ the proposal site access point.	Infrastructure treatments utilised by construction traffic should be up to an appropriate quality as required by the standards. Traffic generated on intersections with poor line marking.	Low
	General driver safety	General driver behaviour and crash risk.	Moderate
	Safety impact of movement of transformer transporter.	Roads are not designed for vehicles of this size in standard operation. The transformer transporter would travel down the centre of the road, heavily delaying traffic.	Major
	Safety risk of pedestrians in townships with increased truck movements	Roads used to access the proposal site travel past townships on Bass Highway. Heavy vehicle movements through townships contained on highways.	Low
	Safety risk around schools	Roads used to access the site are contained to the highway.	Low
	Unforeseen safety risk	Diverted roads should be constructed to the same or better standard than the original.	Low
	Transportation of hazardous goods	Movement of hazardous goods materials to support the construction phase.	Major
	Peak seasonal events	Increase in the number of unfamiliar drivers onto the road network during seasonal holiday periods.	Very low

6.13.5.1.3.4 Transformer transporter vehicle

It is anticipated that the transformer transporter vehicle would be required to transport transformers from the Port of Burnie to the proposal site. The travel paths proposed to be used by the transformer transporter is shown in Figure 6.13-3.

Figure 6.13-3 Travel path for the transformer transporter

Works and removal of minor road furniture along the transformer transporter travel route may be required as outlined in Table 6.13-12. The transformer transporter would travel down the centre of the road at a slow speed and result in traffic delays. Additionally, low hanging power lines may present an obstruction of the path of travel of the transformer transporter. Without the implementation of MM T01 (refer to Table 6.13-14), the impact significance associated with the transformer transporter movement is considered **major**.

This vehicle is classified as an over-dimensional vehicle, with a length of approximately 130 m and weight of approximately 650 tonnes. The transport of the transformer would require permanent traffic management personnel to supervise. This would include operations to block traffic during periods of time when the transformer is travelling down the centre of the carriageway or completing turning movements. Moving warnings would be provided for approaching vehicles that a large, slow-moving vehicle is on the approach. Liaison would occur with relevant agencies with regard to transport of oversize and over mass loads to the proposal site with the aim of ensuring any traffic disruptions associated with the proposal are minimised.

Table 6.13-12 Transformer transport swept path assessment results

Location	Swept path assessed	Works required
Port of Burnie	Internal movement in the Port of Burnie, inbound and outbound.	Works to the roundabout in the Port of Burnie to provide a trafficable surface through the roundabout.
Bass Highway / Edwardes Street / Bollard Drive	Right turn from Bollard Drive into Edwardes Drive, then a left turn into Bass Highway. Bass Highway, right turn into Edwardes Street, left turn into Bollard Drive.	Works to enable the vehicle to drive over the kerb at the slip lane turning left onto Bass Highway. Path would travel over median to right hand side of Bass Highway to travel through slip lane provided from Edwardes Street northern approach. Minor works to drive over kerbing.
Bass Highway / Minna Road	Right turn movement into Minna Road from Bass Highway. Left turn movement from Minna Road onto Bass Highway.	Works to drive over kerbing in median of Bass Highway, and traffic island on Minna Road approach and remove signage. Minor works to drive over grass in median and verges.
Minna Road / the proposal site access point	Right turn movement into the site and left turn movement from the site at Minna Road.	Possible land clearing and excavation works to the hill on the northern frontage of Minna Road.

There are four bridges between the site and the Port of Burnie, to be crossed by the transformer transporter vehicle, that require further assessment as to their structural integrity and capacity to accommodate a vehicle of this size and mass. Without mitigation, impact significance is considered **high**.

6.13.5.1.4 Public and active transport

The movement of the transformers to the proposal site would take up multiple lanes of traffic on roads utilised by public buses, interfering with public bus services. The significance of this impact is considered to be **low**.

Construction of the proposal would likely result in heavy construction vehicles sharing roads that are utilised by school buses (refer to Section 6.13.3.3). School bus routes are subject to change over time, with the current school bus routes likely to differ by the time construction activities commence. Without mitigation, the impact significance is considered **high**.

The proposed works would not impact pedestrian footpaths or cycling infrastructure. The impact significance is considered **very low**.

A significance assessment has been undertaken on potential impacts to public and active transport prior to the implementation of mitigation measures and is presented in Table 6.13-13. Impacts with an initial impact significance of ‘moderate’ and above, would be managed by the mitigation measures outlined in Section 6.13.6.

Table 6.13-13 Public and active transport – initial significance assessment

Attribute	Impact	Description	Significance
Public transport	Impact on train services.	No railway lines utilised for public transport are in the study area.	Very low
	Impact on public bus services.	Low frequency bus routes are in towns along travel routes.	Very low

Attribute	Impact	Description	Significance
	Impact on public bus services by the transformer transporter.	Low frequency bus routes travel along travel routes. The transformer transporter would travel at a low speed and take up multiple lanes of traffic on roads utilised by public buses.	Low
	Impact on school bus routes.	School buses may be present on travel routes by construction vehicles. Construction vehicles may pass school buses and waiting children.	High
Active transport	Impact on dedicated cycling infrastructure.	There is minimal cycling infrastructure present within the study area. Construction vehicles may pass some cycling infrastructure.	Very low
	Impact on footpaths.	There are minimal footpaths present within the study area. Construction vehicles may pass some footpaths.	Very low

6.13.5.2 Operation

There would be limited use of road infrastructure and other off-site facilities during the operation of the proposal, with a maximum of five light vehicles anticipated to enter and exit the site per day during the operation and maintenance phases. Planned outages of up to twice a year would involve 15 to 20 employees for up to two weeks.

The traffic accessibility requirements during operation would be minor and are not expected to compromise the safety, function or operation of the surrounding road network.

6.13.5.3 Cumulative impacts

The above impact assessment incorporates impacts associated with the Heybridge Shore Crossing. Other regional projects would have a minimal cumulative impact alongside the construction of the proposal due to their location. Negligible additional volumes of traffic would intersect on lower order roads throughout the region, with more substantive traffic volumes combining along Bass Highway, which has a high capacity and is therefore considered capable of accommodating the extra temporary traffic.

6.13.6 Management, mitigation and monitoring

Proposed measures to minimise potential impacts to infrastructure and off-site ancillary facilities are presented in Table 6.13-14. Mitigation measures in other sections that are relevant to the management of infrastructure and off-site ancillary facilities include:

- Section 6.1 (Potentially contaminated material), specifically measures for the transport of contaminated materials.
- Section 6.7 (Dangerous goods and environmentally hazardous materials), specifically measures for the transportation of hazardous materials.

Together, these measures would minimise the potential infrastructure impacts.

Table 6.13-14 Infrastructure and off-site ancillary facilities – mitigation measures

Ref	Mitigation measure	Proposal stage
T01	Prior to construction commencing, prepare and implement a transport management plan in consultation with Burnie City Council. The transport management plan will include: • Requirements for maintaining transport capacity and appropriate performance for all travel modes in the peak travel demand periods, particularly at the key intersections of Bass Highway / Minna Road and Minna Road / the proposal site access point. • Management of full or partial traffic lane closures. • Requirements that construction vehicles use identified vehicle routes or nominate alternatives as required, obtaining road authority approvals where necessary. • Containment of construction worker car parking within the proposal site. • Identification of methods to reduce impact of project generated traffic where practicable. • Driver training requirements, with drivers required to undertake project training that addresses site specific road safety risks along haulage routes. • Measures to minimise heavy vehicle movements through designated school zones when these zones are in operation (8:00am to 9:30am, 2:30pm to 4:00pm, school days). • Mitigation measures to minimise potential roadkill risk, developed in accordance with *Tasmanian Devil Survey Guidelines and Management Advice for Development Proposals*, including, but not limited to: - Protection measures for the Tasmanian devil and Spotted-tailed quoll with a focus on construction traffic and awareness regarding roadkill included in site inductions. - Establishing and implementing a recording and reporting process for roadkill on Minna Road between intersection with Bass Highway and the entry to site, where vehicles associated with the proposal will travel, especially for reporting Tasmanian devils and spotted-tail quoll roadkill incidents to NRE. - Construction vehicles to maintain low speeds between dusk and dawn. - Removing roadkill mortalities off the road within a specified distance of the site to reduce attracting carnivorous fauna during the construction period.	Construction
T02	Prior to construction commencing, engage with the Department of State Growth and prepare and implement an oversize and over mass vehicle protocol addressing: • Controls and supervision requirements for the movement of the transformer transporter from the Port of Burnie to the proposal site. • Inspection requirements for bridges and culverts supporting the movement of oversize or over mass loads. • The identification of changes to road or infrastructure, including road furniture, required for the movement of oversize and over mass loads. • Height requirements of overhead powerlines on the transformer transporter path of travel, with particular focus on the movements around Minna Road.	Construction

6.13.7 Residual impacts

Table 6.13-15 presents the findings of the residual impact assessment following implementation of mitigation measures, extracting only the residual impacts with an initial impact significance of moderate or above.

With the implementation of the proposed mitigation measures, the impact significance of traffic and transport impacts have been reduced to **moderate** to **low**, with no high or major residual impacts anticipated.

Table 6.13-15 Traffic and transport – residual impact significance assessment

Value	Attribute	Impact	Impact significance	Mitigation measures	Residual impact	Residual impact significance
Road capacity network	Connectivity	Bass Highway is a primary Highway utilised by the Tasmanian north coast	Moderate	Nil	No roads are proposed to be closed as a result of the proposal. If road closures are required due to unforeseen events, consultation with authorities should be undertaken to minimise disruption.	**Moderate**
Safe road performance, condition & design	Safe condition of bridges and culverts	Bridges and culverts may not be in an appropriate condition for the movement of the transformer transporter	High	T01	Bridges and culverts would require continuous inspections (during transformer movement).	**Low**
	Adequate road geometry	The movement of the transformer transporter generally throughout the road network would travel down the centre of the road and travel at a slow speed.	Major	T01	The dimensions of the transformer transporter should be confirmed prior to the movement. Traffic delays to external road network during movement of transformer transporter.	**Low**
		The transformer transporter may require works and removal of minor road	Major	T01	Clearing of land and vegetation and road furniture in accordance with any	**Moderate**

Value	Attribute	Impact	Impact significance	Mitigation measures	Residual impact	Residual impact significance
		furniture to access the site at the following locations: • Port of Burnie. • Bass Highway/Edwardes Street/Bollard Drive. • Bass Highway/Minna Road. • Minna Road/ the proposal site access point			applicable permit.	
	Height clearance requirements of transport transporter	Low hanging power lines may present an obstruction on the path of travel of the transformer transporter	High	T01 & T02	Works would be undertaken to ensure the transformer transporter can traverse the required path of travel.	**Moderate**
	Safe operation	General driver safety	Moderate	T01	General driver safety.	**Moderate**
		Safety impact of movement of transformer transporter.	Major	T01 & T02	Traffic management in high-speed road environments. Delays to external road network during the movement of the transformer transporter.	**Moderate**
		Transportation of hazardous goods	Major	T01	Compliance with road authority guidelines and material specific management measures	**Moderate**

Value	Attribute	Impact	Impact significance	Mitigation measures	Residual impact	Residual impact significance
					results in a standardised level of risk commensurate with the activity required to be completed.	
Public and active transport	Public transport	Impact on school bus routes.	High	T01	Continuous engagement to ensure any changes to school bus routes is known.	**Low**

6.14 Cumulative and interactive impacts

This section provides a summary of the proposal-level cumulative impacts, based on the findings of technical studies appended to this EIS.

6.14.1 Assessment guidelines

The EIS guidelines for the Heybridge Converter Station require consideration of cumulative impacts across environmental and social aspects. Sections of the EIS where the EIS guidelines have been referenced already include:

- Potentially contaminated material (Section 6.2.1).
- Terrestrial natural values (Section 6.2.1).
- Noise and vibration (Section 6.3.1).
- Water quality (Section 6.4.1).
- Air quality (Section 6.5.1).
- Social and economic (Section 6.11.1).

The relevant sections of the EIS guidelines for the Heybridge Converter Station, and where these have been addressed in this EIS, are outlined in Table 6.14-1.

Table 6.14-1 Relevant EIS guidelines

Cumulative impacts – EIS guidelines	Section
Cumulative and interactive impacts	
Provide an assessment of the potential cumulative impacts of the proposal in the context of existing and approved developments in the region, if such impacts have not been addressed in previous sections, including proposed transmission infrastructure. Other proposals which have been formally proposed, and for which there is sufficient information available to the proponent to allow a meaningful assessment of their impacts, should also be considered in that assessment. Uncertainties about potential impacts in such cases should be identified, and interactions between biophysical, socio-economic, and cultural impacts of the proposal discussed.	Sections 6.14.3, 6.14.4, 6.14.5 and 6.14.6

6.14.2 Approach to cumulative impact assessment

Cumulative impacts can occur when impacts from a project interact or overlap with impacts from other project(s), potentially resulting in a larger overall effect on the environment. The approach for identifying projects for assessment of cumulative impacts considers:

- **Temporal boundary**: the timing of the relative construction, operation, and decommissioning of other existing developments and/or approved developments that coincides (partially or entirely) with the project.
- **Spatial boundary**: the location, scale, and nature of the other approved or committed projects expected to occur in the same area of influence as the project. The area of influence is defined as the spatial extent of the impacts a project is expected to have.

Technical specialists carried out a cumulative impact assessment for their field of expertise, using a methodology and a framework developed by Tetra Tech Coffey for this task. The methodology included an assessment of the combined impacts of the proposal with the Heybridge Shore Crossing (refer to Section 6.14.4), the NWTD project (refer to Section 6.14.5) and foreseen developments in the north of Tasmania (refer to Section 6.14.6).

It is conceivable that other smaller developments would emerge through the life of the approval and development of the proposal that have not been considered in the cumulative impact assessment conducted by the technical specialists. It is not possible to perform a cumulative impact assessment on unknown projects. Nevertheless, where localised developments happen, including for example road upgrades, residential developments, recreation events, vegetation management or commercial developments, there may be temporary or minor additional impacts. Some technical specialists have considered the possibility of these localised impacts and reached the view that any impact would not be significant, and therefore have no cumulative potential.

6.14.3 Cumulative impacts with existing infrastructure

The proposal is not anticipated to interact or create impacts in common with any existing infrastructure in close proximity to the proposal site, and therefore would not result in cumulative impacts with existing infrastructure.

Existing conditions have been considered as part of the impact assessment process. Data gathered in order to establish the baseline conditions is influenced by existing developments. For example, traffic counts, background noise monitoring data and ambient air quality data are influenced by existing projects and developments in the region. As such, existing projects have been considered as part of the existing conditions assessment.

6.14.4 Cumulative impacts with the proposed Heybridge Shore Crossing

The proposal would have overlapping construction and operation location and time frame with the Heybridge Shore Crossing, as both proposals are being developed together as part of the project.

A number of the technical assessments have considered the proposal and Heybridge Shore Crossing together, such that the cumulative impacts of these two elements are clearly identified, as discussed throughout this Section 6.

The overlap in construction activities between this proposal and the Heybridge Shore Crossing are not anticipated to result in significant cumulative impacts for noise, air quality and visual amenity for the sensitive human receptors near the proposal site, provided that the appropriate mitigation measures are implemented for the proposal to minimise such impacts. There is expected to be no cumulative impacts from contamination or to water quality if mitigation measures are implemented for the proposal. The mitigation measures are provided in Section 8 which also address the potential cumulative impacts to amenity.

A summary of cumulative impacts between the proposal and the Heybridge Shore Crossing is provided in Table 6.14-2.

Table 6.14-2 Summary of cumulative impacts between the proposal and the Heybridge Shore Crossing

Aspect	Cumulative potential/interaction	Additional impact or mitigation measures required
Potentially contaminated material	The impacts of the two proposals were assessed collectively as one study area.	None. The impacts requiring management were centred on the proposal site and would be addressed through the management of impacts on the site.
Terrestrial natural values	The Heybridge Shore Crossing would not disturb native vegetation and the impacts of the two proposals on fauna were assessed collectively.	The cumulative increase in traffic on Bass Highway could potentially increase incidents of roadkill from twilight and night-time traffic movements. Specific requirements have been included in MM T01, including roadkill awareness training and recording and reporting of roadkill occurrences.
Noise and vibration	Up to three dBs greater if construction works occur at the same time.	The increase would still result in noise levels being less than reference levels at existing receptors and can be managed through the use of proposed mitigation measures. A monitoring program would be in place during construction to monitor and record noise levels.
EMF	A whole-of-project impact assessment was done with the greatest potential EMF impact on the seafloor at the shore crossings during operation. At the Heybridge Converter Station, EMF will be below reference levels for people in the study area. EMF is anticipated to have very low – low impacts on marine fauna (detailed in the Heybridge Shore Crossing EIS). This constitutes the cumulative impact of the proposal and the Heybridge Shore Crossing.	None. At its most impactful location, EMF would be below reference levels.
Greenhouse	When combined with the impacts of the remainder of the project, including the Heybridge Shore Crossing, GHG emissions increase from 508 to 53,015 tCO_2-e (Scope 1 and 2 emissions) due to the scale of the remainder of the project. This still constitutes a negligible increase to Australia's emissions.	None. The GHG mitigation measures seek to identify opportunities to reduce GHG emissions for both the construction and operational phases of the project.
Groundwater and surface water quality	The impacts of the two proposals were assessed collectively as one study area.	None. The impacts requiring management from across the two proposals were centred on the proposal site, so would be managed through the management of impacts on the site.
Air quality	The impacts of the two proposals were assessed collectively as one study area.	None. The impacts requiring management were centred on the proposal site, so would be managed through the management of impacts on the site.
Traffic	The impacts of the two proposals were assessed collectively.	None. The increase of traffic on Bass Highway is considered to be within its capacity.

Aspect	Cumulative potential/interaction	Additional impact or mitigation measures required
Socio-economic impacts	The impacts of the two proposals were assessed collectively, and would result in positive economic outcomes, enhanced employment opportunities and livelihoods. However, there would also be potential impacts on availability of infrastructure (including housing) and services for the local and regional communities.	None. MM S02 (workforce and accommodation strategy), MM S03 (community and stakeholder engagement framework), MM S04 (community benefits sharing scheme) and MM S05 (industry participation plan) would address these impacts.

6.14.5 Cumulative impacts with North West Transmission Developments project

The NWTD project includes the construction and operation of a switching station that has been assessed as part of this EIS. This means that cumulative impacts of that component of NWTD have already been considered.

The NWTD also includes the proposed construction of overhead powerlines along an alignment within TasNetworks' land interests. Figure 6.14-1 shows the NWTD overhead powerline area of development close to the proposal site.

The NWTD project would have common environmental impacts with the proposal (including the switching station that connects the Marinus Link converter station with the NWTD overhead powerlines) and the Heybridge Shore Crossing in aspects relating to EMF, noise, dust, and terrestrial and natural values.

A summary of the potential cumulative impacts relating to the NWTD is summarised in Table 6.14-3, with further discussion provided below.

Table 6.14-3 Summary of potential cumulative impacts with NWTD

Common impacts with the NWTD project	Impacts from Heybridge Converter Station (including switching station) and Heybridge Shore Crossing	Additional potential impact from the NWTD project
Reduction in housing availability and affordability	Moderate to high – putting stress on local housing and social infrastructure	**Low**
Increase in traffic	Low to very low – the traffic increase is within the road capacity of Bass Highway	**Low**
Roadkill of protected fauna species	Low – higher traffic volumes at twilight and nighttime creates a risk to Tasmanian devil and Spotted-tailed quoll species	**Low**
Eagle nest disturbance	Low – the proposal site is 1.6 km from a Tasmanian wedge-tailed eagle nest	**Low**
Construction noise, including from traffic	Medium – the greatest impacts would be short term from HDD, with all other construction confined to working hours	**Low**
Construction dust	Negligible – the application of standard procedures on the proposal site would be effective to avoid dust becoming a nuisance	**Insignificant**
Land-based EMF interference	Insignificant – the operation of the project would not elevate EMF above reference levels.	**Insignificant**

Figure 6.14-1:
Cumulative area development

Legend

- HVDC Landfall
- Proposed HVDC Subsea Cable
- Proposal Site
- Indicative Site Layout
- Marinus Link Parcel Boundary
- TasNetworks Parcel Boundary
- TasNetworks NWTD Corridor (Indicative)
- Major Road
- Minor Road

Scale: 1:7,500 @ A4

Spatial Reference: GDA2020 MGA Zone 55

0 50 100 200 300 400

Meters

MARINUS LINK

Acknowledgements and Sources:

Data Source: Marinus Link GIS Data Repository and theLIST ©State of Tasmania .
Background Image: Esri Community Maps Contributors, DPIPWE, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/ NASA, USGS, Maxar
Produced By: Marinus Link for the Tasmanian Heybridge Converter Station EIS.
Date Figure Exported: 21/11/2024

Construction of the NWTD overhead corridor is unlikely to contribute significant accumulating adverse **social** impacts with the proposal. This is because the corridor would be completed with much the same labour force involved in the completion of Stage 1 of the project (the first converter station, the switching station and HDD activity). Insofar as the NWTD would have impacts on housing and social infrastructure, those impacts are already accounted for and managed in the assessment of the proposal and the Heybridge Shore Crossing, in particular through MM S02 (workforce and accommodation strategy) and MM S04 (community benefits sharing scheme). The additional impact, if any, is likely to be that the impact lasts for a longer period of time, until the completion of both the NWTD switching station and the overhead corridor.

While additional **traffic** is expected on Bass Highway from the construction in the NWTD corridor, even if the proposal and Heybridge Shore Crossing construction occurs at the same time, the traffic impact assessment concluded that Bass Highway has capacity to accommodate the extra traffic.

The increase in traffic from the construction of all parts of the NWTD, the proposal and Heybridge Shore Crossing would create additional risks of **roadkill of fauna**. Twilight and night traffic movements on Minna Road would increase by at least 10% at times due to construction activities associated with the two projects, and they may approach a 10% increase on Bass Highway. Therefore, there is a possibility for cumulative impacts to Tasmanian devils and spotted-tailed quolls, related to roadkill from twilight and night-time traffic movements from construction of both the project and the NWTD corridor works. The application of standard management measures (including MM T01) means that this extra 10% of traffic on a very limited stretch of road (about 200 m), is unlikely to result in a significant impact or decrease in population of Tasmanian devil and Spotted-tailed quoll.

The construction of the NWTD corridor would involve the removal of potential habitats of **native species**. The proposal and the Heybridge Shore Crossing would not remove any potential habitat of any terrestrial native species.

The construction of the NWTD corridor would also encounter Tasmanian wedge-tailed **eagle nests** at much greater number and at closer distance than works associated with the proposal. However, there are standard measures that must be adopted that require both inspection of nests and work stoppages (MM EC03 and MM EC04) that are considered effective to avoid risks to raptors. Because the two projects would adopt similar management measures to protect raptors, and minimise risks to species from roadkill, a mitigation measure has been developed to co-ordinate with other nearby projects and collaborate on data collection and the alignment of management processes between the two projects (MM Gen06).

Construction of the NWTD overhead corridor is unlikely to contribute any significant additional **dust** impacts. This is because the corridor would be completed after the completion of Stage 1 of the proposal. Should the NWTD project have dust impacts concurrently with the construction of the proposal and the Heybridge Shore Crossing, those impacts are already accounted for and managed in the assessment of the proposal and the switching station, in particular through MM AQ01.

Nevertheless, where there are sites that could have a cumulative impact, the IAQM guidance recommends that the following additional mitigation measure is implemented: "*Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and*

particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes". This liaison and coordination would take place under MM Gen06.

The moderate impacts of construction **noise** from the project are attributable to HDD for the shore crossing. With HDD works occurring as part of Stage 1, these works are expected to be completed before the construction of the NWTD overhead powerlines. Even if the construction of the NWTD overhead powerlines is constructed at the same time as the proposal (including the NWTD switching station), the noise sources associated with the construction of the NWTD overhead powerlines are limited, and are not expected to represent a noise compliance consideration for that project (in isolation or cumulatively with other neighbouring developments). Construction work for the NWTD overhead powerlines would occur during daytime hours.

Heavy vehicle **traffic** is one aspect of construction where the development of multiple projects at the same time can potentially result in cumulative increases in traffic movements on the surrounding road network, with corresponding increases in road traffic noise levels. However, for cumulative construction traffic noise impacts to occur, this would require projects to use the same construction traffic routes, and the construction phases (including peak construction traffic phases) to overlap. The risk of potential cumulative construction traffic noise impacts was considered low due to the construction traffic noise for the proposal being well below the 63 – 68 dB $L_{A10,\ 18\text{-hour}}$ targets which apply to permanent road traffic noise levels. Further, as construction traffic volumes typically vary throughout the construction of a project, this further reduces the likelihood of cumulative construction traffic noise being a material consideration in practice.

The NWTD overhead powerlines would produce EMF, however they would create different fields owing to the use of different technology. The EMF would not accumulate, rather there would be multiple fields generated by Marinus Link (HVDC) and NWTD (AC and DC) on land. All fields created by both projects have been assessed as insignificant, including to electrical and medical devices.

6.14.6 Cumulative impacts with reasonably foreseeable future development

Further proposed and reasonably foreseeable projects have been identified based on their potential to contribute to cumulative impacts by overlapping with the proposal location and timeframes. Projects were identified based on a search of publicly available information carried out in October 2023 (which formed the basis of projects considered in technical assessments). A further review in August 2024 identified some projects that are no longer proceeding or have since been completed. The list of projects considered, and where there is a possibility of cumulative impact on an environmental value assessed under the EIS guidelines, are listed in Table 6.14-4.

The projects listed in Table 6.14-4, taken together, are not anticipated to increase the residual environmental impacts of the proposal or require additional management measures to be applied to the project, except for specific socio-economic impacts.

With respect to noise impacts, there are existing commercial premises to the south of the proposal site. However, at the receivers to the south of the proposal site, the predicted operational noise levels associated with the converter station are low (e.g., less than 25 dB L_{Aeq} at B1550 and B1557) and do not indicate a risk

of cumulative noise considerations (i.e., on account of the predicted noise levels being well below any of the reference levels considered for the assessment of operational noise from commercial premises).

Notwithstanding, a mitigation measure has been included for co-ordination and consultation with nearby projects where required, so that construction activities can be coordinated and understood, and additional mitigation strategies implemented if needed (MM Gen06).

Overall, the overlap in both footprint and schedule of developments would contribute to economic outcomes, enhance employment and livelihoods, while potentially impacting on availability of infrastructure and services for the local and regional communities.

The developments, including the proposal and the Heybridge Shore Crossing, are anticipated to place major demands on construction workforce availability and related issues of workforce accommodation. The management of socio-economic impacts would need to address the peaks in the construction workforce relating to the construction activities in Tasmania in the context of other large-scale infrastructure construction projects in the region. The cumulative socio-economic impacts and residual impacts are summarised in Section 6.11.4.5. Mitigation measures such as the workforce and accommodation strategy (MM S02) and the industry participation plan (MM S05) would minimise these potential cumulative impacts.

Table 6.14-4 Future development identified for cumulative impact assessment

Development/ proponent	Description	Location and location in relation to proposal	Timing	Identified possible cumulative impact on environmental value
Guildford Wind Farm / Epuron Pty Limited	• Wind farm with up to 80 wind turbines. • Generation of up to 450 MW of wind energy. • Estimated capital: $50 million.	• 7 km north-east of Waratah and 15 km south of Hampshire. • 42 km south-west of the proposal.	• Notice of intent submitted in 2020. • Construction to commence from 2024.	Socio-economic.
Robbins Island Renewable Energy Park / ACEN Robbins Island Pty Limited	• Wind farm with up to 122 wind turbines. • Generation of up to 900 MW of wind energy. • Estimated construction value: $1.2 billion. • Construction workforce: 250 personnel.	• Robbins Island, north-west coast of Tasmania. • 87 km north-west of the proposal.	• Approved by the Australian Government and EPA assessment underway. • Project approvals currently under appeal. • Construction proposed to commence between 2023-2025.	Socio-economic.
Jim's Plain Renewable Energy Park / UPC (now	• Wind farm with up to 31 wind turbines and possible solar generation.	• 23 km west of Smithton. • 97 km north-west of the proposal.	• Approved by the Council and State and Commonwealth	Socio-economic.

Development/ proponent	Description	Location and location in relation to proposal	Timing	Identified possible cumulative impact on environmental value
ACEN) Robbins Island Pty Limited	• Generation of up to 200 MW of wind energy and up to 40 MW of solar energy. • Capital investment: $350 million. • Construction workforce: over 150 personnel. • Operations workforce: 15 personnel.		governments in 2020. • Construction to commence from 2023.	
Robbins Island Road to Hampshire Transmission Line / UPC (now ACEN) Robbins Island Pty Limited	• A new 220 kV overhead transmission line spanning 115 km, estimated to have 245 towers. • Connects Jim's Plain and Robbins Island Renewable Energy Parks transmission infrastructure to Tasmanian transmission network. • Construction workforce: up to 100 personnel over 24 months.	• Between Robbins Island Rd at West Montagu and Hampshire. • Closest point at 29 km south-west of the proposal.	• Detailed planning/environmental approvals phase underway. • Commonwealth Government determined the project to be a controlled action under the EPBC Act (Cwlth) in September 2020. • Construction to commence from 2023.	Socio-economic.
Bass Highway targeted upgrades between Deloraine and Devonport / Department of State Growth	• Targeted highway upgrades between Deloraine and Devonport. • Estimated project cost: $50 million.	• Targeted areas along Bass Highway between Deloraine and Devonport. • Closest point at 40 km south-east of the proposal.	• In planning. • Construction expected to commence from 2023. • Expected completion in 2027.	Socio-economic. Traffic and transport.
Hellyer Wind Farm / Epuron Pty Limited	• Wind farm with up to 48 wind turbines. • Generation of up to 300 MW of wind energy.	• 8.5 km south-west of Hampshire. • 35 km south-west of the proposal.	• Design phase. • Notice of intent issued. • Tasmanian EPA EIS guidelines issued in November 2022.	Socio-economic.
Table Cape Luxury Resort / Table Cape Enterprises	• Resort accommodation.	• Table Cape, 4.5 km north of Wynyard.	• Approved by Waratah-Wynyard Council.	Socio-economic.

Development/ proponent	Description	Location and location in relation to proposal	Timing	Identified possible cumulative impact on environmental value
		• 25 km north-west of the proposal.		
Lake Cethana Pumped Hydro / Hydro Tasmania	• Storage and underground pumped hydro power station with associated infrastructure, with up to 600 MW capacity. • Estimated construction cost: $900 million.	• 19 km south-west of Sheffield. • 48 km south-east of the proposal.	• Progressing with the final feasibility stage. • Construction likely to commence in 2027.	None identified.
Port of Burnie Shiploader Upgrade / TasRail	• Minerals shiploader and storage expansion at TasRail's existing Bulk Minerals Export. • Facility Estimated cost: $64 million. • Design and construction workforce: 140 personnel.	• Port of Burnie. • 6 km north-west of the proposal.	• Commissioning has commenced. Expected to be operational by 2025.	Socio-economic. Traffic and transport.
Bass Highway – Cooee to Wynyard / Department of State Growth	• Priority works upgrade along Bass Highway between Cooee and Wynyard to realign and upgrade approximately 3.2 km of road. • Estimated cost: $50 million.	• Bass Highway from the intersection of Brickport Road in Cooee, across the Cam River Bridge, to the intersection of the Old Bass Highway at Doctors Rocks near Wynyard. • 9 km north-west of the proposal.	• Construction commenced late 2021. • Expected completion in 2025.	Socio-economic. Traffic and transport.
Sheffield to Staverton Upgrades: existing electricity transmission line upgrades / TasNetworks	• A component of the NWTD, comprising modifications to two 18.5 km-long sections of existing 220 kV overhead transmission lines between Staverton and Sheffield. • Supports new and existing renewable energy developments in	• Between Staverton and Sheffield. • 40 km south-east of the proposal.	• Planning and approvals phase. • Construction expected to commence in 2025.	None identified.

Development/ proponent	Description	Location and location in relation to proposal	Timing	Identified possible cumulative impact on environmental value
	North West Tasmania, including the project.			
QuayLink – Devonport East Redevelopment / TasPorts	• Port terminal upgrade project to support TasPorts in increasing capacity of both freight and passenger ferry services across Bass Strait. • Estimated cost: $240 million. • Design and construction workforce: 1060 direct and indirect jobs in North West Tasmania, and a further 655 broader Tasmanian jobs during construction.	• Port of Devonport. • 35 km south-east of the proposal.	• Early works/construction commenced 2022, approvals phase ongoing. • Expected completion in 2027.	None identified.