
Appendix L

Bushfire Impact Assessment



Marinus Link - Tasmanian Bushfire Impact Assessment

Marinus Link Pty Ltd

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Template 2.8.1

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Executive Summary

Marinus Link Pty. Ltd. proposes to construct a high voltage direct current electricity interconnector between Tasmania and Victoria, including a subsea cable and onshore cable (comprised of dual transmission lines) and converter facilities.

The aim of this report is to address the Environmental Impact Statement (EIS) Guidelines of both the *Environmental Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) and as prepared by the Environmental Protection Authority (EPA) Tasmania under the *Environmental Management and Pollution Control Act 1994* (the EMPC Act) for the Tasmanian components of the Marinus Link Project. The scope of the report is limited to the Heybridge Converter Station, being the only above ground project component within Tasmania.

As the project is proposed to be located within three jurisdictions, the Tasmanian Environment Protection Authority (Tasmanian EPA), Victorian Department of Transport and Planning (DTP), and Australian Department of Climate Change, Energy, Environment and Water (DCCEEW) have agreed to coordinate the administration and documentation of the three assessment processes. Two EISs are being prepared to address the Tasmanian EPA requirements for the Heybridge converter station and shore crossing. A separate EIS/EES is being prepared to address the requirements of DTP and DCCEEW.

The core EIS requirement is to *“gain an understanding of the proposal, the need for the proposal, the alternatives, the environment that it could effect, the positive and negative environmental impacts that may occur and the measures that will be taken to maximise positive outcomes, and minimise any adverse environmental impacts, including specific management measures.”*

This report establishes the bushfire assessment framework for the Tasmanian section of the proposed Marinus Link project. It presents the findings of detailed bushfire investigations and an associated Bushfire Impact Assessment (BIA).

The BIA involved the following steps:

- A desktop assessment to identify bushfire impacts which potentially may occur with the Marius Link project. The assessment identifies the bushfire hazard and assets at risk.
- An analysis of the bushfire risk context of the project site at Heybridge. The bushfire risk assessment covers the construction, operational, and decommissioning phases of the project.
- An analysis of the potential bushfire impacts of the project, undertaken based on a ‘risk assessment’ approach.
- Development of Environmental Performance Requirements (EPR) to mitigate impacts identified during the BIA.
- Identification of mitigation measures to address the identified impacts during the Construction and Operation phase.

From the BIA undertaken of the Heybridge site for the construction, operation, and decommissioning stages of the project, the level of risk was determined as minor or insignificant across all vulnerability risk criteria. This level of risk assigned has taken into consideration the hazard context, fire history and frequency in the landscape, surrounding land use, and the compliance with Environmental Performance Requirements (EPR) that sets out the requirements that need to be achieved to minimise risk impact.

Section 7.8 of this BIA summarises the highest assigned bushfire risk impact for life and property assets at the Heybridge site and at all project stages. The initial risk assessment for the site has determined the overall risk to be minor. With implementation of assigned EPR's to all stages of the project, the highest residual risk was determined to be reduced to insignificant.

Key EPR identified in the BIA in response to the EIS Guidelines identified the need for mitigation measures targeting bushfire ignition management, bulk static water capacity, access, operations maintenance, hazard management and bushfire emergency management planning.

In response to the Commonwealth EIS guidelines and the EPA Tasmanian EIS guideline requirements, the introduction and implementation of EPRs (as identified in Section 7.1 to Section 7.3) will significantly lower the risk of potential impacts from the proposed development to life; property (including human settlement (urban and rural based), and agricultural assets); and environment to be of insignificant risk. This is assessed as an acceptable risk mitigation outcome for the project.

Glossary and Abbreviations

Glossary of Terms

Term	Description
Assets	Anything valued by people which includes houses, infrastructure, crops, forests and, in many cases, the environment.
Asset Protection Zone	A fuel-reduced area surrounding a built asset or structure which provides a buffer zone and defensible space for fire fighting between a bush fire hazard and an asset as well as mitigation of the severity of bushfire attack on the asset.
Bushfire	Unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires both with and without a suppression objective.
Bushfire risk	The chance of a bushfire igniting, spreading and causing damage to the community or assets of value.
Consequence	The outcome or impact of a bushfire event.
Fire break	A fire break is a gap in fuel (vegetation) that reduces the potential for fire to enter or leave an area. Fire breaks may be used for emergency vehicle access.
Fire management	All activities associated with the management of fire prone land, including the use of fire to meet land management goals and objectives.
Fuel Free Area	An area within the development site which contains highly modified / discontinuous vegetation around asset infrastructure adjoining bushfire prone vegetation. It also provides a defensible space for fire fighting operations.
Fuel hazard	Fine fuels in bushland that burn in the continuous flaming zone at the fire's edge. These fuels contribute the most to the fire's rate of spread, flame height and intensity. Typically, they are dead plant material, such as leaves, grass, bark and twigs thinner than 6 mm thick, and live plant material thinner than 3 mm thick.
Intensity	The rate of energy release per unit length of fire front usually expressed in kilowatts per metre (Kw/m).
Likelihood	The probability of a fire igniting and spreading, and how often this may occur.

Most terms are taken from the Bushfire Glossary prepared by the Australasian Fire and Emergency Service Authorities Council Limited (AFAC).

Abbreviations

Abbreviation	Description
APZ	Asset Protection Zone
BIA	Bushfire Impact Assessment
BPA	Bushfire Prone Area
EES	Environmental Effects Statement
EIS	Environmental Impact Statement
ELA	Eco Logical Australia
EMPCA	<i>Environmental Management and Pollution Control Act 1994</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPA	Environmental Protection Authority Tasmania
EPR	Environmental Performance Requirements
FBI	Fire Behaviour Index
FDR	Fire Danger Rating
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternate Current
HVDC	High Voltage Direct Current
LUPA Act	<i>Land Use Planning and Approvals Act 1993</i>
MW	Megawatt
NEM	National Electricity Market
TFS	Tasmanian Fire Service

1. Introduction

Marinus Link (the project) comprises a high voltage direct current (HVDC) electricity interconnector between Tasmania and Victoria, to allow for the continued trading and distribution of electricity within the National Electricity Market (NEM).

The project was referred to the Australian Minister for the Environment on 5 October 2021. On 4 November 2021, a delegate of the Minister for the Environment determined that the proposed action is a controlled action as it has the potential to have a significant impact on the environment and requires assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) before it can proceed. The delegate determined that the appropriate level of assessment under the EPBC Act is an Environmental Impact Statement (EIS).

On 12 December 2021, the former Victorian Minister for Planning under the *Environment Effects Act 1978* (Vic) (EE Act) determined that the project requires an Environment Effects Statement (EES) under the EE Act, to describe the project's effects on the environment to inform statutory decision making.

In July 2022 a delegate of the Director of the Environmental Protection Authority Tasmania determined that the project be subject to environmental impact assessment by the Board of the Environmental Protection Authority (the Board) under the *Environmental Management and Pollution Control Act 1994* (Tas) (EMPCA).

As the project is proposed to be located within three jurisdictions, the Tasmanian Environment Protection Authority (Tasmanian EPA), Victorian Department of Transport and Planning (DTP), and Australian Department of Climate Change, Energy, Environment and Water (DCCEEW) have agreed to coordinate the administration and documentation of the three assessment processes. Two EISs are being prepared to address the Tasmanian EPA requirements for the Heybridge converter station and shore crossing. A separate EIS/EES is being prepared to address the requirements of DTP and DCCEEW.

This report has been prepared by Eco Logical Australia (ELA) for the Tasmanian component of the project, to support the two EISs being prepared for the Heybridge converter station and shore crossing.

1.1 Purpose of this Report

The purpose of this report is to assist in addressing the bushfire specific requirements as part of the preparation of an EIS under the EMPCA (Tas) in accordance with the '*Environmental Impact Statement Guidelines Marinus Link Pty Ltd Converter Station for Marinus Link*' issued by the Director of the Environmental Protection Authority Tasmania (EPA Tasmania 2022).

In addition, this report will be assessed against the bushfire requirements prescribed through Clause C13 of the Tasmanian Planning Scheme Provisions and the *Land Use Planning and Approvals Act 1993* (LUPA Act).

These legislation, policy, and guidelines are further covered in Section 3.

1.2 Project Overview

Marinus Link is proposed to provide a link between the Tasmanian and the Victorian electricity grids, enabling efficient energy trade, transmission and distribution from a diverse range of generation sources

to where it is most needed, and will increase energy capacity and security across the NEM. The project is a proposed 1500 megawatt (MW) HVDC electricity interconnector between Heybridge in northwest Tasmania and the Latrobe Valley in Victoria (Figure 1). Figure 2 presents the project layout for the Heybridge site, which is the only above ground project component within Tasmania.

Marinus Link Pty Ltd is the proponent for the project and is a wholly owned subsidiary of Tasmanian Networks Pty Ltd (TasNetworks). TasNetworks is owned by the State of Tasmania and owns, operates and maintains the electricity transmission and distribution network in Tasmania.

Tasmania has significant renewable energy resource potential, particularly hydroelectric power and wind energy. The potential size of the resource exceeds both the Tasmanian demand and the capacity of the existing Basslink interconnector between Tasmania and Victoria. The growth in renewable energy generation in mainland states and territories participating in the NEM, coupled with the retiring of baseload coal-fired generators, is reducing the availability of dispatchable generation that is available on demand.

Tasmania's existing and potential renewable resources are a valuable source of dispatchable generation that could benefit electricity supply in the NEM. Marinus Link will allow for the continued trading, transmission and distribution of electricity within the NEM. It will also manage the risk to Tasmania of a single interconnector across Bass Strait and complement existing and future interconnectors on mainland Australia. Marinus Link is expected to facilitate the reduction in greenhouse gas emissions at a state and national level.

Interconnectors are a key feature of the future energy landscape. They allow power to flow between different regions to enable the efficient transfer of electricity from renewable energy zones to where the electricity is needed. Interconnectors can increase the resilience of the NEM and make energy more secure, affordable and sustainable for customers. Interconnectors are common around the world including in Australia. They play a critical role in supporting Australia's transition to a clean energy future.

1.3 Assessment Context

Assessment of impacts from bushfire events is a key consideration at all levels of government in Australia. The purpose of this BIA is to understand the risk to the project site from potential bushfire occurrence in the surrounding area and the risk from the proposed project to causing a bushfire or affecting bushfire management. The assessment will identify measures in which these risks can be avoided altogether or minimised.

Overall, the bushfire assets requiring protection in this context include:

- Life (human populations);
- Property (human settlement, commercial / industrial buildings and infrastructure); and
- Environment.



Figure 1: Project Overview

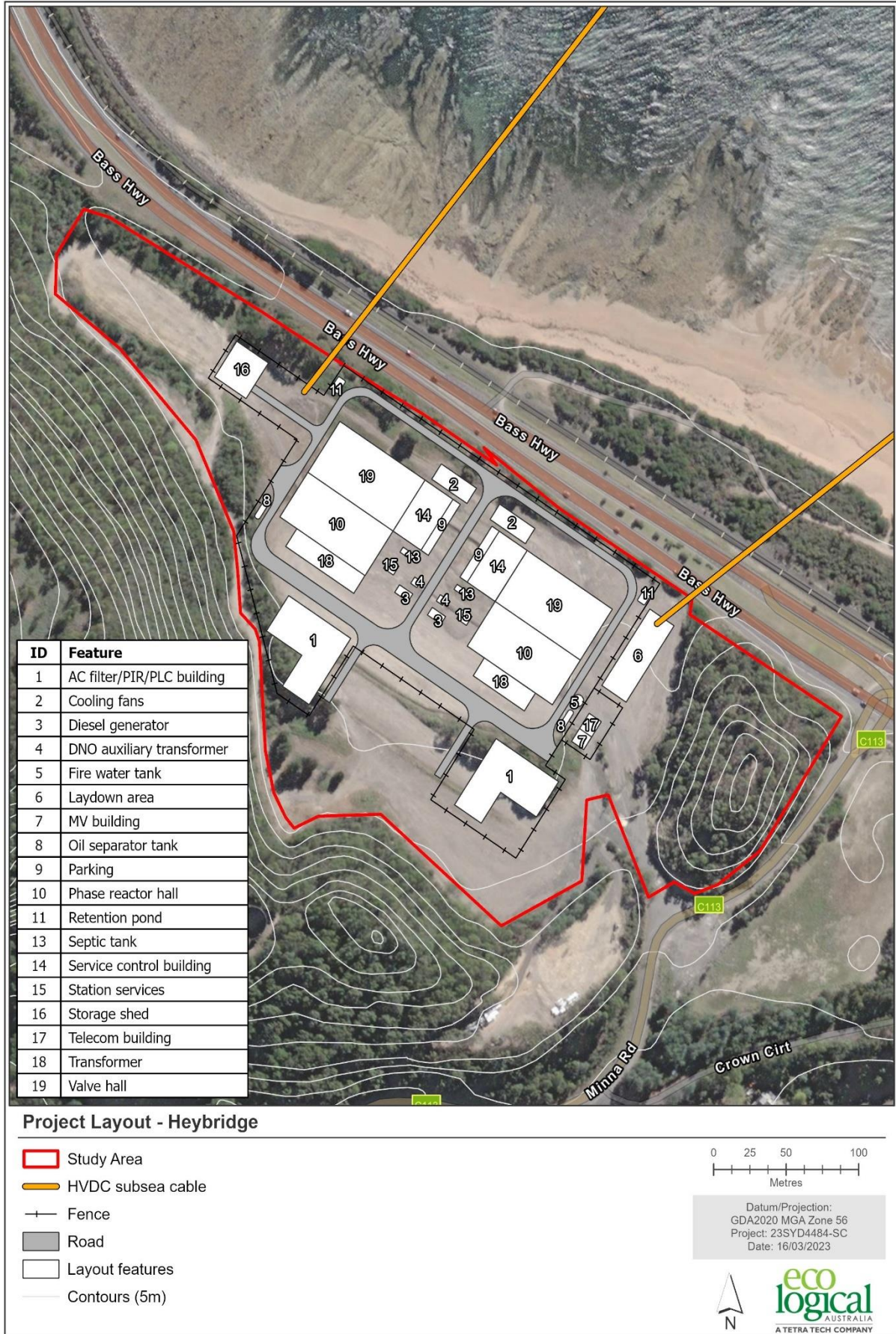


Figure 2: Proposed Project Layout of the Heybridge Site

2. Assessment Guidelines

Marinus Link triggers the need for assessment and approvals across three jurisdictions: Commonwealth, Victoria and Tasmania. This section outlines the assessment guidelines relevant to bushfire requirements and the linkages to other technical assessments completed for the project.

This Tasmanian BIA addresses the fire risk assessment requirements associated with the project at both the Commonwealth and Tasmanian levels. The report assesses the fire impact of the project using risk and impact assessment methodology as defined in Section 5 and addresses the requirements of the Commonwealth EIS Guidelines (Section 2.1) and the Tasmanian EPA EIS Guidelines (Section 2.2.2 Table 1).

2.1 Commonwealth

DCCEEW have published the following EIS guidelines: *'Guidelines for the Content of a Draft Environmental Impact Statement – Environment Protection and Biodiversity Conservation Act 1999 – Marinus Link underground and subsea electricity interconnector cable (EPBC 2021/9053)'*.

The sections of the Commonwealth EIS Guidelines relevant to the bushfire assessment for the project study area include:

- Section 5.1 General Impacts:
 - *In discussing potential impacts, consider how the interaction of extreme environmental events and any related safety response may impact on the environment.*

2.2 Tasmania

The EPA Tasmania has published two sets of EIS guidelines for the preparation of an EIS for the Marinus Link, one for the converter station and the other for the shore crossing. This report has been prepared using the converter station EIS guidelines as they are more relevant for BIA of the above ground component of the project, being the Heybridge Converter Station.

The converter station EIS guidelines issued by EPA Tasmania (September 2022) outline the specific matters to be assessed across a number of planning, environmental and social disciplines relevant to the project, and to be documented in the EIS for the project.

The EIS guidelines inform the scope of the EIS technical studies and define the EIS evaluation objectives. The EIS evaluation objectives identify the desired outcomes to be achieved and provide a framework for an integrated assessment of the environmental effects of a proposed project.

2.2.1 Environmental Impact Statement Evaluation Objective

The EIS evaluation objective contained within the converter station guidelines that is most relevant to this bushfire assessment is:

“to gain an understanding of the proposal, the need for the proposal, the alternatives, the environment that it could effect, the positive and negative environmental impacts that may occur and the measures that will be taken to maximise positive outcomes, and minimise any adverse environmental impacts, including specific management measures.”

2.2.2 Environmental Impact Statement Guidelines

The EIS guideline requires an assessment of the “*fire risk associated with the project*”. The relevant sections of the EIS guideline that this BIA has directly addressed are summarised in Table 1.

Table 1: EIS guideline requirements (Section 6.13*) as relevant to bushfire assessment**

Aspects to be assessed	Guideline Requirements	Report Section
Fire Escape and Impact	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 and Section 7
Hazardous chemicals	Whether any hazardous chemicals proposed to be stored or used on site pose a fire risk.	Section 6.1 and Section 7
Fire prevention and response	The objectives and management principles to be adopted to prevent and respond to potential fire events.	Section 7.2 to Section 7.4
Fire response plan	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 Wildlife Service Fire Action Plan for relevant districts.	Section 7.5

***-Refers to the report section contained within the EIS Guideline Requirements.

2.2.3 Linkage To Other Reports

This report is informed by or informs the technical assessments outlined in Table 2.

Table 2: Linkage of Tasmanian BIA to Other Reports

Technical Assessment	Relevance to this assessment
Entura Marinus Link Heybridge Converter Station Terrestrial Ecology Baseline and Impact Assessment 2023.	Informs the terrestrial ecology impact assessment outcome of the southern extent of the Marinus Link project at Heybridge as a technical report component of EIS assessment.
Katestone-Marinus Link: Climate and Climate Change Assessment 2023.	Informs the bushfire impact assessment outcomes of the Marinus Link project based on key climate issues that have the potential to influence the bushfire risk context.

3. Legislation, Policy and Guidelines

3.1 Tasmania

3.1.1 Land Use and Planning Approvals Act 1993

The *Land Use and Planning Approvals Act 1993* (LUPA Act) establishes a system under which planning schemes are provided as a regulatory framework in the regulation of land use, development, protection and conservation of land over local government areas within Tasmania.

Planning schemes assist to regulate development and land use by segregating land into specific zones and providing specific objectives and development control standards.

The purpose of this BIA relating to the LUPA Act is to identify the specific bushfire effects on the environment from the proposed development and measures to minimise these impacts. This BIA also identifies the impacts to the Heybridge project site from bushfire and measures to mitigate impact.

3.1.2 Tasmanian Planning Scheme Clause C13

Clause C13 of the Tasmanian Planning Scheme being the Bushfire-Prone Areas Code for the State of Tasmania is to ensure that proposed developments are appropriate within bushfire prone areas through provision of appropriate design, siting, utility services, and constructed to reduce the impact of bushfires on human life and property, and cost to the community.

Specifically, Clause 13.5.2 of the Scheme applies to the proposed development in relation to “hazardous chemicals of manifest quantity” given the storage of 5,000 litres of diesel fuel on the site during the construction phase called up in the Tasmanian Work Health and Safety Regulations 2012 (Schedule 11). Compliance requirements for addressing the acceptable solutions and performance criteria of Clause 13.5.2 are presented in Appendix A. Appendix A illustrates the specific requirements to be addressed under Clause 13.5.2 including the preparation of both an emergency management plan and bushfire hazard management plan. These requirements are addressed through EPR’s which are covered in Section 7.2.2, Section 7.3.2 and mitigation measures detailed in Section 7.5.

The proposed temporary 5,000L diesel fuel for construction, and any other flammable liquids required during the operation of the converter station, should be stored in a secure area away from work areas, buildings, and electrical infrastructure in accordance with Australian Standard AS1940:2017 – The storage and handling of flammable and combustible liquids (SA 2017). Where stored and handled correctly in accordance with these regulations the risk of fire or explosion impacting off site is low.

This BIA aims to address these legislative and policy requirements to ensure design compliance; is suitably situated in a low risk fire environment; is appropriately supported by EPRs; and does not contribute to an increased level of fire risk to life, property, and the environment.

3.1.3 Burnie Local Provisions Schedule

The Burnie Local Provisions Schedule (BLPS) applies to the Burnie Council area including the Heybridge site. The BLPS does not call up any specific bushfire requirements therefore Clause 13.5.2 of the Tasmanian Planning Scheme is applied as per above.

4. Project Description

This section discusses the key component and details of the Project Description and activities that are relevant to the BIA.

4.1 Overview

Marinus Link is proposed to be implemented as two 750 MW circuits to meet transmission network operation requirements in Tasmania and Victoria. Each 750 MW circuit will comprise two power cables and a fibre-optic communications cable bundled together in Bass Strait and laid in a horizontal arrangement on land. The two 750MW circuits will be installed in two stages with the western circuit being laid first as part of stage one, and the eastern cable in stage two.

The key project components for each 750 MW circuit, from south to north are:

- HVAC switching station and HVAC-HVDC converter station at Heybridge in Tasmania. This is where the project will connect to the North West Tasmania transmission network being augmented and upgraded by the North West Transmission Developments (NWTD).
- Shore crossing in Tasmania adjacent to the converter station.
- Subsea cable across Bass Strait from Heybridge in Tasmania to Waratah Bay in Victoria.

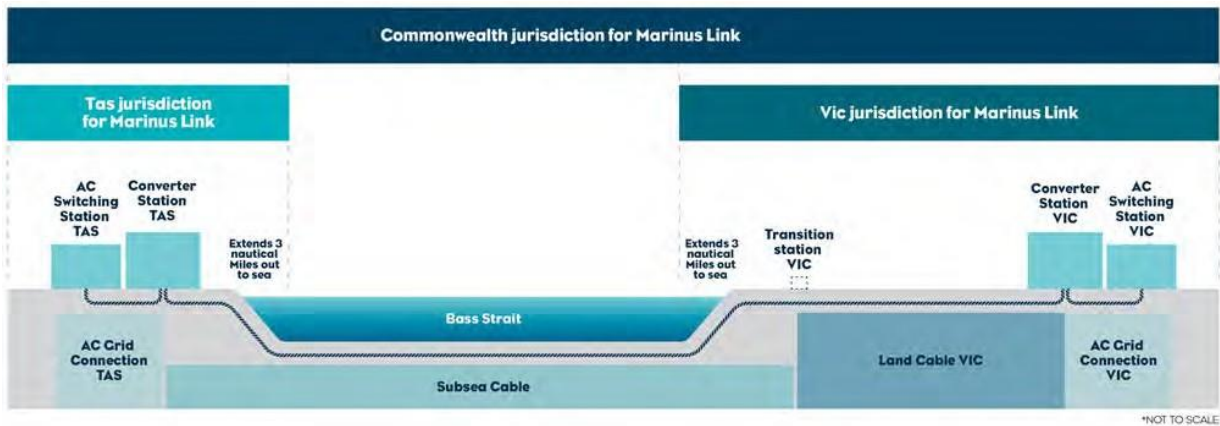
In Tasmania, a converter station is proposed to be located at Heybridge near Burnie. The converter station would facilitate the connection of Marinus Link to the Tasmanian transmission network. There will be two subsea cable landfalls at Heybridge with the cables extending from the converter station across the Bass Strait to Waratah Bay in Victoria. The preferred option for shore crossings is horizontal directional drilling (HDD) to about 10 m water depth where the cables would then be trenched, where geotechnical conditions permit.

Approximately 255 kilometres (km) of subsea HVDC cable would be laid across Bass Strait. The preferred technology for Marinus Link is two 750 megawatt (MW) symmetrical monopoles using ± 320 kV, cross-linked polyethylene insulated cables and voltage source converter technology. Each symmetrical monopole is proposed to comprise two identical size power cables and a fibre-optic communications cable bundled together. The cable bundles for each circuit will transition from approximately 300m apart at the HDD (offshore) exit to 2km apart in offshore waters.

This BIA is focused on the Tasmanian section of the project. This report will inform the two EISs being prepared to assess the project's potential environmental effects in accordance with the legislative requirements of the Commonwealth and Tasmanian governments.

Marinus Link is proposed to be constructed in two stages over approximately five years following the award of works contracts to construct the project. On this basis, stage one of the project is expected to be operational by early 2030 and stage two will follow with final timing to be determined by market demand. The project will be designed for an operational life of at least 40 years.

Diagram 1: Project components considered under applicable jurisdictions (Marinus Link Pty. Ltd. 2022).



4.2 Construction

Construction at the Heybridge site is over approximately 5.5ha and includes two converter stations, a switching station and cabling.

Marinus Link will be constructed in two 750 MW stages, each stage will have three cables bundled together in Bass Strait and laid in a single trench on land. For the land cables, the trench conduits and HDD ducts for both 750 MW links will be installed as part of stage one.

Stage one will involve site establishment and hardstand areas constructed for the HVDC converter station and HVAC switching station sites. It will also involve all site establishment, civil works, trenching and installation of conduits for Marinus Link 1 and Marinus Link 2. The subsea cables will be laid in each stage. This is to ensure that the cable barge is available for any rehabilitation activities that are required throughout the cable testing phase in Stage two.

The works in stage two will primarily be construction of the second HVDC Converter, laying of the subsea Marinus Link 2 cables, completing the testing and commissioning, and any remaining site rehabilitation.

Construction on the Heybridge site includes:

- Site preparation, survey, and vegetation clearing;
- Establishment of construction offices / amenities, and laydown areas;
- Storage of diesel fuel;
- Bulk earthworks for benching of the converter station;
- Civil works for access roads, drainage, building foundations, cable trenches and electrical apparatus and transformer bays;
- Water tank installation;
- Structural steel work for buildings, electrical apparatus and infrastructure;
- Installation of HVDC converter equipment / apparatus;
- Testing of electrical, mechanical and fire fighting systems;
- Commissioning the converter station and switching station; and
- Automated security light installation.

4.3 Operation

Marinus Link will operate 24 hours per day, 365 days per year over an anticipated minimum 40-year operational lifespan.

Operation and maintenance activities relevant to this BIA are limited to the servicing, testing and repair of the cables and converter station equipment and infrastructure including scheduled minor and major outages.

4.4 Decommissioning

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

Decommissioning will be planned and carried out in accordance with regulatory requirements at the time. A decommissioning plan in accordance with approvals conditions will be prepared prior to planned end of service and decommissioning of the project.

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

In the event that Marinus Link is decommissioned, all above-ground infrastructure will be removed, the site rehabilitated.

Decommissioning activities required to meet the objective will include, as a minimum, removal of above ground buildings and structures. Remediation of any contamination and reinstatement and rehabilitation of the site will be undertaken to provide a self-supporting landform suitable for the end land use.

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

Decommissioning activities may include recovery of land and subsea cables. The conduits and shore crossing ducts would be left in-situ as removal may cause significant environmental impact. Subsea cables would be recovered by water jetting or removal of rock mattresses or armouring to free the cables from the seabed.

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

5. Assessment Method

This section describes the method used to assess the potential bushfire impacts associated with the project activities, considering the values present within the study area. This assessment method addresses the requirements outlined in the Commonwealth EIS and Tasmanian EIS assessment guidelines for the project (Section 2).

5.1 Study Area

The study area is defined as the total area needed to be able to sufficiently characterise and assess bushfire impacts to the existing environmental and social values, within a suitable level of spatial context.

The study area for the Tasmanian BIA report includes the single site situated in the locality of Heybridge combined with the two levels of bushfire assessment analysis undertaken, being:

- **Bushfire Hazard Assessment** – assessment of bushfire fuels (vegetation) and topography at a local scale within a 500m buffer of the project layout; and
- **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, and assets at risk at a semi-landscape level within a 5km buffer of the project layout.

5.2 Baseline Characterisation

The baseline characterisation has involved a critical review of both the bushfire risk and management practices across the study area and surrounds via a desktop assessment of available documentation and GIS analysis of Tasmanian and Commonwealth databases.

A spatial analysis and mapping exercise has been undertaken of identified bushfire hazards, potential bushfire spread, and establishing a risk context for the study site as it relates to the project. Spatial datasets used in this desktop analysis include slope, elevation, vegetation, land use, fire history, and project site layouts as provided by Marinus Link Pty Ltd.

5.3 Risk and Impact Assessment

The method of impact assessment adopted for this study is based on a risk assessment approach of likelihood and consequence with regard to potential impacts on life, property and environmental values.

The methodology adopts AS/NZS 31000:2018 'Risk management – Principles and guidelines' whereby a risk classification scheme is developed through qualitative scales of likelihood and of consequence with consideration to the bushfire risk assessment (Section 5.1).

The impact assessment adopted a risk assessment approach. This involved establishing the bushfire risk context to identify values, identification of the hazard, consequence of an event, and the likelihood of impact on values arising from bushfire attack both to and from the project study sites.

This assessment adopted a definition of likelihood based on likelihood of occurrence over the life of the project. The scale of likelihood is shown below and is based on AS/NZS ISO 31000. Values have been

allocated to the likelihood descriptors on a scale of 1 to 5 with 1 being extremely rare (extremely unlikely) and 5 being almost certain, as outlined in Table 3 below.

Table 3: Likelihood Description

Likelihood Descriptor	Description
Almost certain (5)	The event is expected to occur in most circumstances during the currency of the project.
Likely (4)	The event will probably occur in most circumstances during the currency of the project.
Possibly (3)	The event might occur at some time over the currency of the project.
Unlikely (2)	The event could occur at some time over the currency of the project.
Rare (1)	The event may occur only in exceptional circumstances over the currency of the project.

The scale of consequence is shown in Table 4 below and is based on AS/NZS ISO 31000. Values have been allocated to the consequence descriptors on a scale of 1 to 5 as outlined below and are based on the most probable outcome of a fire event(s).

Table 4: Consequence Description

Consequence Descriptor	Description
Catastrophic (5)	Death, huge financial loss, irreversible widespread environmental damage
Major (4)	Extensive injury, major financial loss, irreversible local environmental damage
High (3)	Medical treatment, high financial loss, Long-term environmental damage
Medium (2)	First aid, medium financial loss, Short-term environmental damage
Low (1)	No injuries, low financial loss, minor environmental impact

Rating codes and the level of risk are then calculated by multiplying likelihood and consequence levels with the rating determined as shown in the risk matrix outlined in Table 5 and Table 6 below.

Table 5: Risk Matrix Rating

		Likelihood				
		Rare (1)	Unlikely (2)	Possible (3)	Likely (4)	Almost certain (5)
Consequence	Low (1)	Insignificant	Insignificant	Insignificant	Insignificant	Minor
	Medium (2)	Insignificant	Insignificant	Minor	Minor	Moderate
	High (3)	Insignificant	Minor	Minor	Moderate	Major
	Major (4)	Insignificant	Minor	Moderate	Major	Extreme
	Catastrophic (5)	Minor	Moderate	Major	Extreme	Extreme

Source: Adapted from AS/NZS ISO 3100:2018

Table 6 Level of risk

Level of risk	Risk rating
0 – 4	Insignificant
5 – 9	Minor
10 – 14	Moderate
15 – 19	Major
20 – 25	Extreme

The risk assessment was compiled with consideration of various risk factors and the baseline conditions. Table 7 below provides an analysis of the risk factors. The risk factors presented are taken into careful consideration when assigning likelihood and consequence values to determine of overall risk impact. Also, in the application of risk assessment impacts to life and property, key vulnerability criteria are also assigned and assessed in conjunction with likelihood and consequence factors. Assigned vulnerability criteria are specified below in Table 8, Table 9, Table 11, Table 12, Table 14 and Table 15.

Table 7: Analysis of Risk Factors.

Risk Factor	Analysis of Risk Factor
1. The likelihood of human and natural fire ignitions, as influenced by time, space and demographics.	<p>Natural ignitions adjoining the study area from events such as lightning strikes are possible but at low likelihood given fuel types, fire weather and low incidence of recorded fire history (Heybridge).</p> <p>Human activities within the subject site make ignitions more likely from activities associated with construction, operation/maintenance and decommissioning, including machinery use, hot works (e.g. grinding, welding) and other activities with potential for fire ignition.</p>
2. The potential spread and severity of a bushfire, as determined by fuel, topography and weather conditions.	<p>Weather conditions, fuel and slope are key factors that can be the primary determinants of the potential for and direction of fire spread. The Heybridge site is surrounded by undulating to steep terrain together with high forest and heathland bushfire hazards. These wooded areas are interspersed with roads, urbanised residential and industrial/commercial areas together with natural features such as the Blythe River and Bass Strait. Beyond these wooded areas to the southwest and southeast are largely agricultural land holdings.</p> <p>The potential for ignition and fire spread from the site is low given the development area will be preserved in a fuel free state.</p> <p>Potential bushfire spread to the site is likely to be greatest from the west from human induced ignition sources with fire spread through wooded vegetation towards the site. However, the fire severity directly surrounding the site is likely to be reduced given pronounced downhill runs.</p>
3. The proximity of assets vulnerable to bushfire and likely bushfire paths.	<p>The project site of Heybridge has vulnerable assets within and proximal to the site, as listed in Section 6.2 below. Bushfires have the potential to spread from any direction but are more likely from the west to south-west aspects and potentially impact onsite and offsite assets.</p> <p>Fire spread from the Heybridge site to nearby assets, particularly those in the township of Heybridge, is mitigated by the Blythe River, Minna and other roads, along with fuel removed or reduced areas.</p>
4. The vulnerability of assets, or their capacity to cope with, and recover from bushfire.	<p>On-site electrical infrastructure assets can incorporate measures to withstand bushfire attack and reduce vulnerability. This includes the development of EPR's to mitigate and reduce vulnerability to this key infrastructure in Section 7.</p> <p>The offsite assets in proximity to the sites as listed in Section 6.2 below are considered vulnerable to fire but have capacity to cope with short to medium term recovery possible.</p>

5.3.1 Cumulative Impact Assessment

The EIS guidelines and EES scoping requirements both include requirements for the assessment of cumulative impacts. Cumulative impacts result from incremental impacts caused by multiple projects occurring at similar times and within proximity to each other.

To identify possible projects that could result in cumulative impacts, the International Finance Corporation (IFC) guidelines on cumulative impacts have been adopted. The IFC guidelines (IFC, 2013) define cumulative impacts as those that 'result from the successive, incremental, and/or combined

effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones.’

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 Marinus Link.

Spatial boundary: the location, scale and nature of the other approved or committed projects expected to occur in the same area of influence as Marinus Link. The area of influence is defined at the spatial extent of the impacts a project is expected to have.

Proposed and reasonably foreseeable projects were identified based on their potential to credibly contribute to cumulative impacts due to their temporal and spatial boundaries. Projects were identified based on publicly available information at the time of assessment. The projects considered for cumulative impact assessment in Tasmania are:

- Remaining North West Transmission Developments
- Guilford Windfarm
- Robbins Island Renewable Energy Park
- Jim’s Plain Renewable Energy Park
- Robbins Island Road to Hampshire Transmission Line
- Bass Highway upgrades between Deloraine and Devonport
- Bass Highway upgrades between Cooee and Wynard
- Hellyer Windfarm
- Table Cape Luxury Resort
- Youngmans Road Quarry
- Port Latta Windfarm
- Port of Burnie Shiploader Upgrade
- Quaylink – Devonport East Redevelopment.

In assessing other relevant projects within the region that could trigger cumulative impacts, that in combination with required EPRs and associated mitigation measures for each project, there is an extremely low risk of significantly increased impact from bushfire. As such the cumulative impacts are considered to be insignificant and warrant no further consideration within the context of this assessment.

5.4 Assumptions and Limitations

For the assessment undertaken, the following assumptions and limitations are recognised:

- The BIA is a desktop analysis utilising all available relevant GIS data available from State and Commonwealth data bases. A desktop assessment is considered sufficient for assessing the risk of bushfire in the region where the project is proposed.
- The BIA is based on the identified study area site and works proposed but does not preclude flexibility to modify site layout or construction or operational approaches.

- The residual risk of bushfire impacts is assumed to be attained whereby all recommended Environmental Performance Requirements (EPR) are effectively implemented at the construction, operational, and decommissioning stages till project termination.

6. Baseline Characterisation

This section describes the baseline characterisation of existing features and aspects relevant to the BIA.

6.1 Hazards and Risks

This baseline characterisation seeks to identify the assets that are potentially at risk from various fire ignition sources related to the proposed development, the potential bushfire hazards, and the factors that contribute to affecting the overall risk exposure.

Fire sources for consideration include bushfires impacting on the subject site as well as fires originating from within the site caused by anthropogenic sources such as smoking, machinery, vehicles, equipment (e.g. welders, grinders), electrical infrastructure, liquid fuels (e.g. diesel fuel), and other combustible materials.

Factors that effect the level of risk exposure include climate, fuel hazards, topography, fire behaviour potential, fire ignition factors, potential fire spread and fire history. These factors are explored further in following sections.

The perceived worst case bushfire scenarios have been considered adopting these risk factors for the purpose of understanding the level of bushfire risk exposure. Two scenarios are outlined below. They assume bushfire risk EPRs have been implemented for the development.

Heybridge Site

Scenario 1

A large landscape scale forest fire starts outside of the project site to the west and escapes into the Blythe River Conservation Area with winds from the west to southwest, with very low fuel moisture content in forest fuels. The fire progresses to the east and the head fire impacts on the subject site assets and infrastructure. The likelihood of such a fire occurrence is low, given the low incidence of recorded wildfire history (See Section 6.5.4), and disruptions to fire progression from both adjoining areas of interspersed urban development and also existing road network infrastructure. However, it is still possible for significant fire behaviour and attack on the site. Despite the low likelihood of bushfire impact, the risk warrants mitigation.

Scenario 2

An anthropogenic ignition occurs on or adjoining the site and leads to fire development and spread in unmanaged forest and heath vegetation on a day, with a gusting northwest wind and at a time when ground and aerial fuels have a low fuel moisture content. The fire spreads to the southeast and jumps the Blythe River, impacting on the residential and other built assets within Heybridge as well as environmental and cultural assets within the adjoining Blythe River Conservation Area.

The risk of a major fire spreading from the study site is very low, based on the low likelihood of ignition given the management of fuel within the site and ignition mitigation strategies, good suppression opportunities (i.e. onsite fire suppression resources and fire station located in nearby Heybridge township), impedances to fire development and spread (i.e. fuel breaks and reduced fuel areas). Despite the low likelihood of bushfire impact, the risk warrants mitigation.

6.2 Assets at Risk

The following assets for the study site at Heybridge are located on site or surrounding the proposed development and could be at risk from bushfire:

- **Heybridge Site:**
 - HVAC 220kV Switching Station
 - HVAC 220kV 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
 - Fire fighting water tank
 - Station security fencing and gates
 - Two 1500 kVA diesel generators with above ground fuel storage of 5,000L

- **Adjoining Heybridge Site and Surrounds:**
 - Human settlements 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

All of these assets could potentially be at risk from a bushfire that may propagate from within the site, or from an external fire threat.

6.3 Fire Fighter and Public Safety

The uses of the general area surrounding the site are vacant forested areas, dispersed residential holdings, commercial / industrial facilities, tourism facilities, and some agricultural lands. There will be no public access permitted to the site.

The fire-fighters likely to respond to a bushfire within the site would be from the Heybridge Tasmanian Fire Service (TFS) Station being approximately 1 km from the site. Other TFS stations in adjoining areas are located within the townships of Burnie, Penguin, and Sheffield.

The bushfire risks to fire-fighter safety when attending a fire in forest and / or heath fuels applies both on and off the site respectively including exposure to smoke, embers, radiant heat, and direct flame contact.

The additional risks to fire-fighter safety associated with a fire burning within the site are:

- Electrocution from physical contact with energised electrical infrastructure or from conduction through air, water or materials in contact with the infrastructure;
- Inhalation of potentially toxic fumes and smoke from any plastic or rubber components such as cables or other building / structure components on site involved in fire; and
- Fire and explosion from the storage of onsite diesel fuels.

6.4 Fire Ignition Risks

The main potential sources of fire ignition in off-site locations to potentially impact on the site include:

- farm machinery;
- lightning strikes;
- escape from legal and illegal burning operations; and
- other anthropogenic causes (arson, cigarettes, motor vehicle accidents, slashing machinery, earthmoving plant, angle grinders, and welders).

Construction and maintenance activities on the site and operational use of the onsite infrastructure and decommissioning activities could also present potential sources of ignition from the site, including:

- Fires as a result of electrical or mechanical faults;
- The use of or inappropriate storage of flammable fuels;
- Utilisation of machinery and equipment;
- Land management activities (e.g. fire break maintenance, vegetation management);
- Construction or maintenance activities (e.g. welding, grinding and other ignition generating works); and
- Other anthropogenic sources (e.g. from discarded cigarette butts, cooking fires, fire starts from vehicles or accidents, arson etc.).

6.5 Bushfire Risk Factors

6.5.1 Fire Weather and Climate

Fire weather strongly influences the likelihood of ignition and how often fires that are ignited will be uncontrollable. The bushfire season is declared annually by the Tasmanian Fire Service Chief Officer and generally commences on the 1 October and concludes on the 31 March the following year, however these dates can be modified depending on the season and conditions.

The Heybridge study site experiences mild to warm summers with average maximum temperatures of 20.2 to 21.7°C and with winter months having an average maximum temperature range of 12.8 to 13.5°C. The average long term annual rainfall for Heybridge is 979.1 mm (Elders Weather 2023). 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.

Fire weather is generally considered in terms of fire behaviour and reported as a Fire Danger Rating (FDR). The new Australian Fire Danger Rating System adopted on the 1st September 2022 calculates, forecasts and reports fire danger using up-to-date fuel state data, spatial and satellite data, weather data, science, and technology (AFAC 2022). It uses decades of research incorporated into eight fire behaviour models to calculate the Fire Behaviour Index (FBI) which adopts values between 0 to 100. The FBI is used to identify potential fire behaviour in finer detail and assist in better decision making within the four Fire Danger Ratings. The higher the FBI the more dangerous the fire behaviour and therefore fire danger risk. The four FDR categories are displayed in Diagram 2. Forecast FDR are determined by the Bureau of Meteorology (<http://www.bom.gov.au/tas/forecasts/fire-danger-ratings.shtml>) and are displayed by FDR signs, typically near roadsides.

Diagram 2: Fire Danger Ratings



6.5.2 Fuel Hazard

The area surrounding the Heybridge site is largely used for rural land uses that include forest, agricultural landholdings, isolated dwellings together with dispersed industrial / commercial development. To the north of the site has a limited fuel corridor that adjoins directly onto non-hazard areas of Tioxide Beach and Bass Strait. The subject site itself is mostly cleared (Figure 3). The fuel hazard around the site is largely a mixture of forest and heathland, interspersed with cleared or fuel reduced areas (Figure 4). Much of the forest adjoining the site has been fragmented by surrounding areas of intensive human settlement and road networks together with natural features including the Blythe River. These manmade and natural features have the capacity to disrupt continuous potential fire runs, especially on days of milder FDR, as well as to increase available fire suppression and containment options for fire fighting authorities.

Further, Figure 5 depicts the vegetation types in reference to the TASVEG 4.0 fire attributes layer from LIST map (Tasmanian Government 2018). This shows the majority of surrounding area within 500 m of the subject land with forest and woodland vegetation being of a high flammability and a low ecological sensitivity.

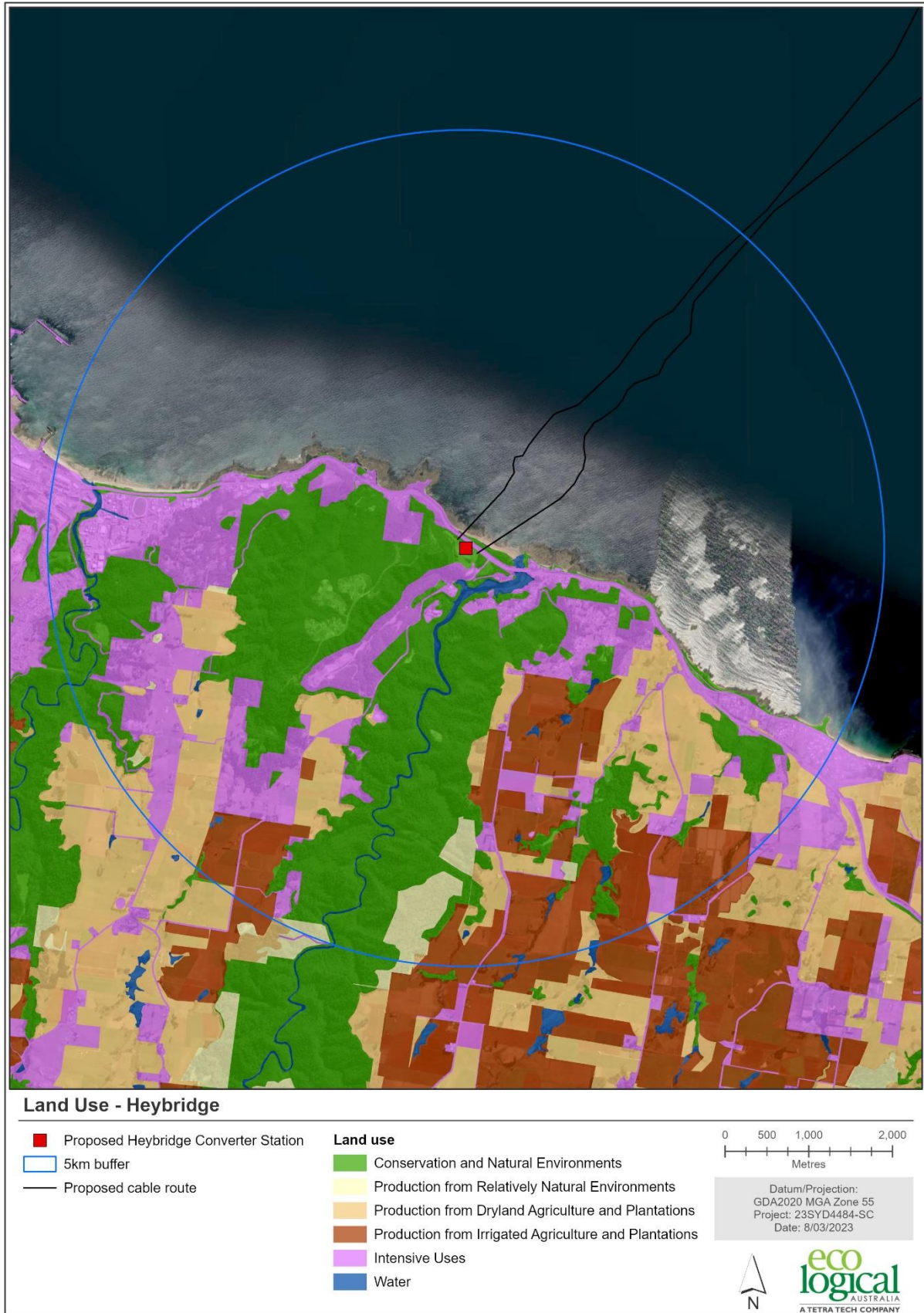


Figure 3: Land Use Surrounding the Heybridge Site (DNR&E 2022)

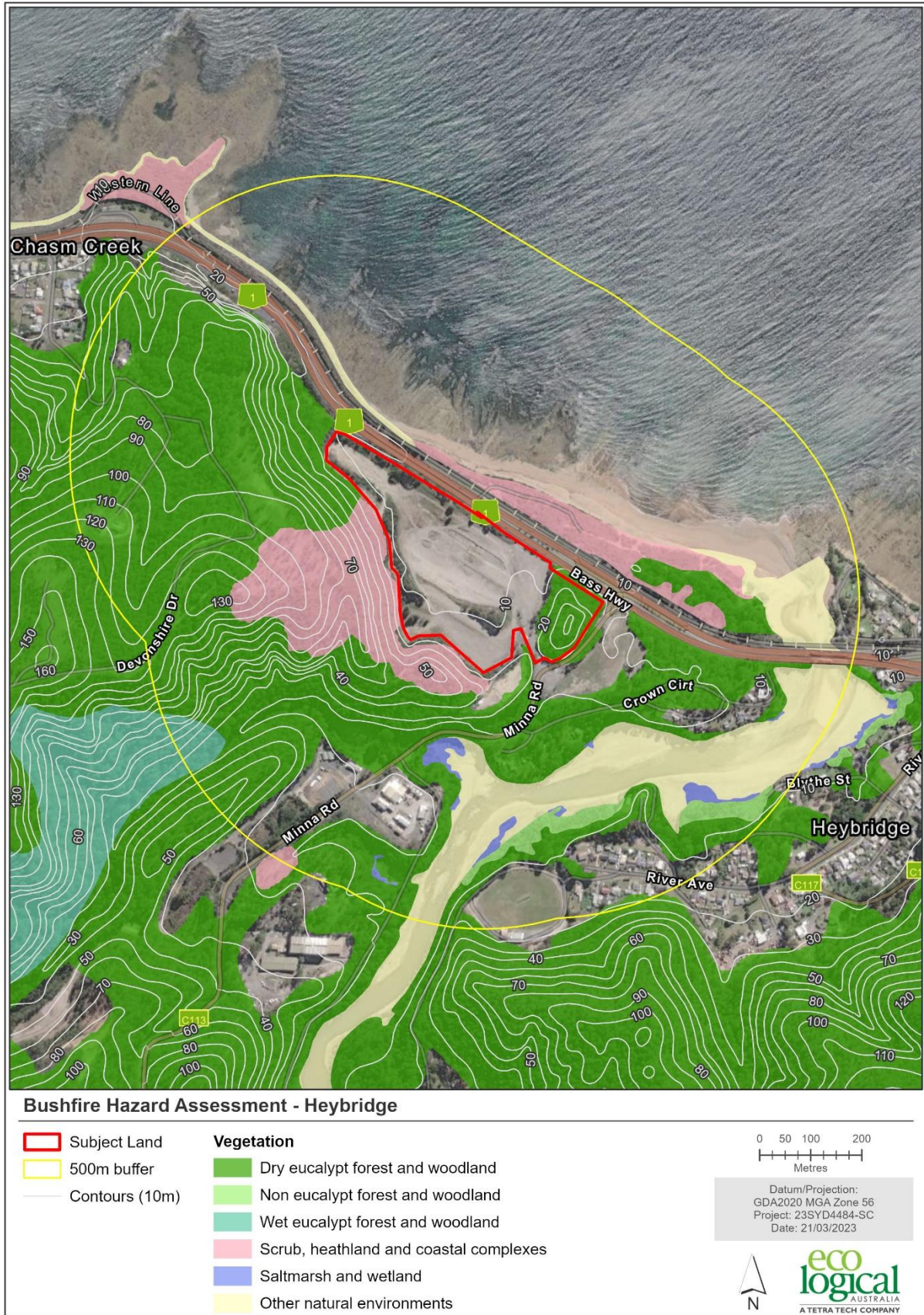


Figure 4: Bushfire Hazard Assessment Heybridge Site

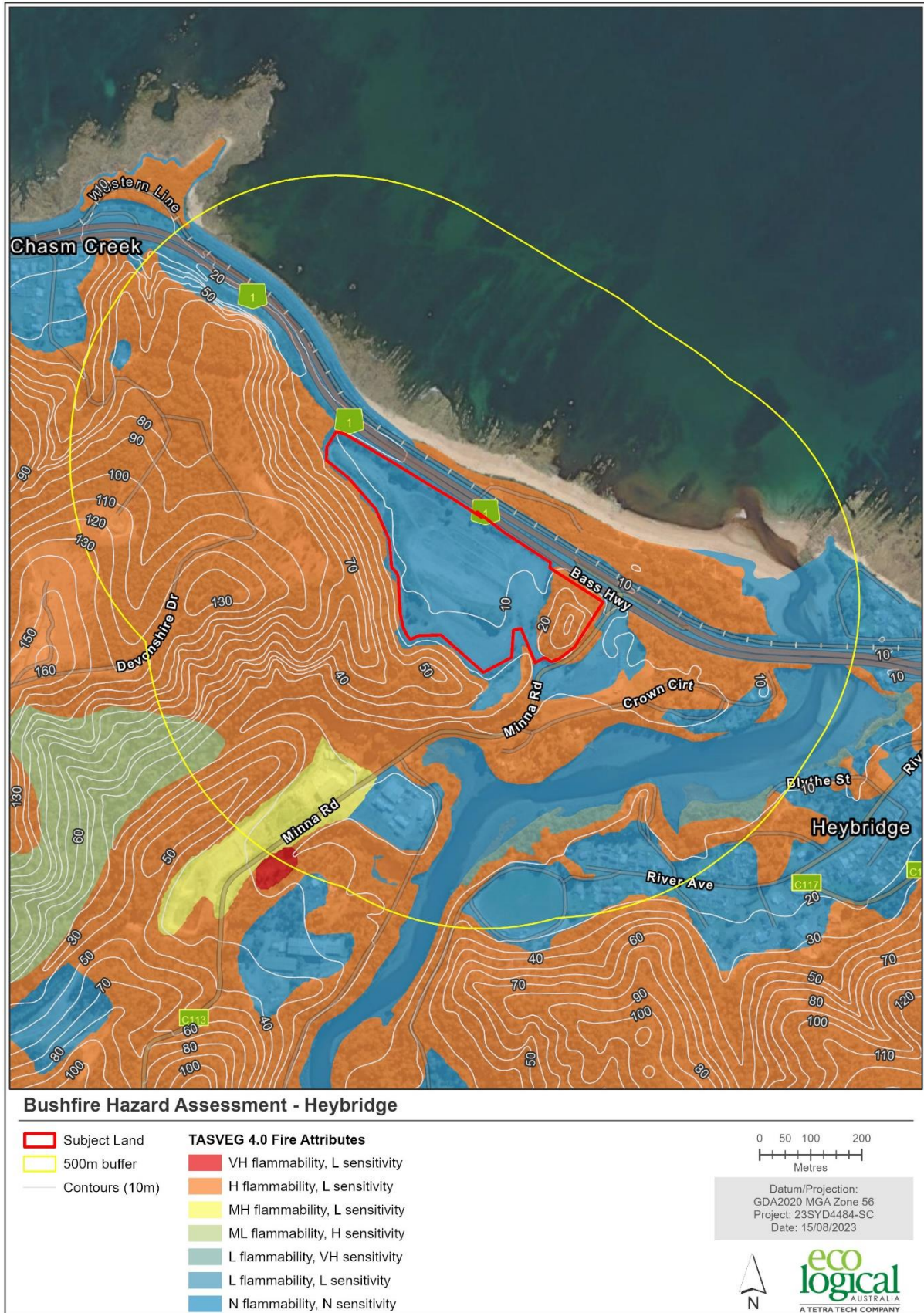


Figure 5: Bushfire Hazard Assessment using TASVEG 4.0 Fire Attributes

6.5.3 Topography

The slope of the land within 5km of the site is shown in Figure 6 and is identified as undulating to steep terrain. The elevation of the site for Heybridge is 10 m above sea level as shown in Figure 4 above. Terrain surrounding the site is mostly flat to the north, and undulating to the west, south, and east. Fire spread and the severity of impact on the site is likely to be largely reduced due to downhill fire runs surrounding the site to built assets.

6.5.4 Fire History

Mapping of available bushfire history within 5 km of the project sites is shown in Figure 7. Overall there is very minimal mapped fire history proximal to the Heybridge site. There is 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 (DNR&E 2024). The mapped record of bushfires within 5 km of the project site is very limited, with only two fires recorded as occurring within the 2004/2005 fire season (2005) and the 2013/2014 fire season (2014) respectively and inconsequential in size.

Whilst the compiled bushfire history mapping would not contain all bushfire occurrences, the collated fire history generally indicates a very low number of large bushfire events in the locality of the Heybridge site.

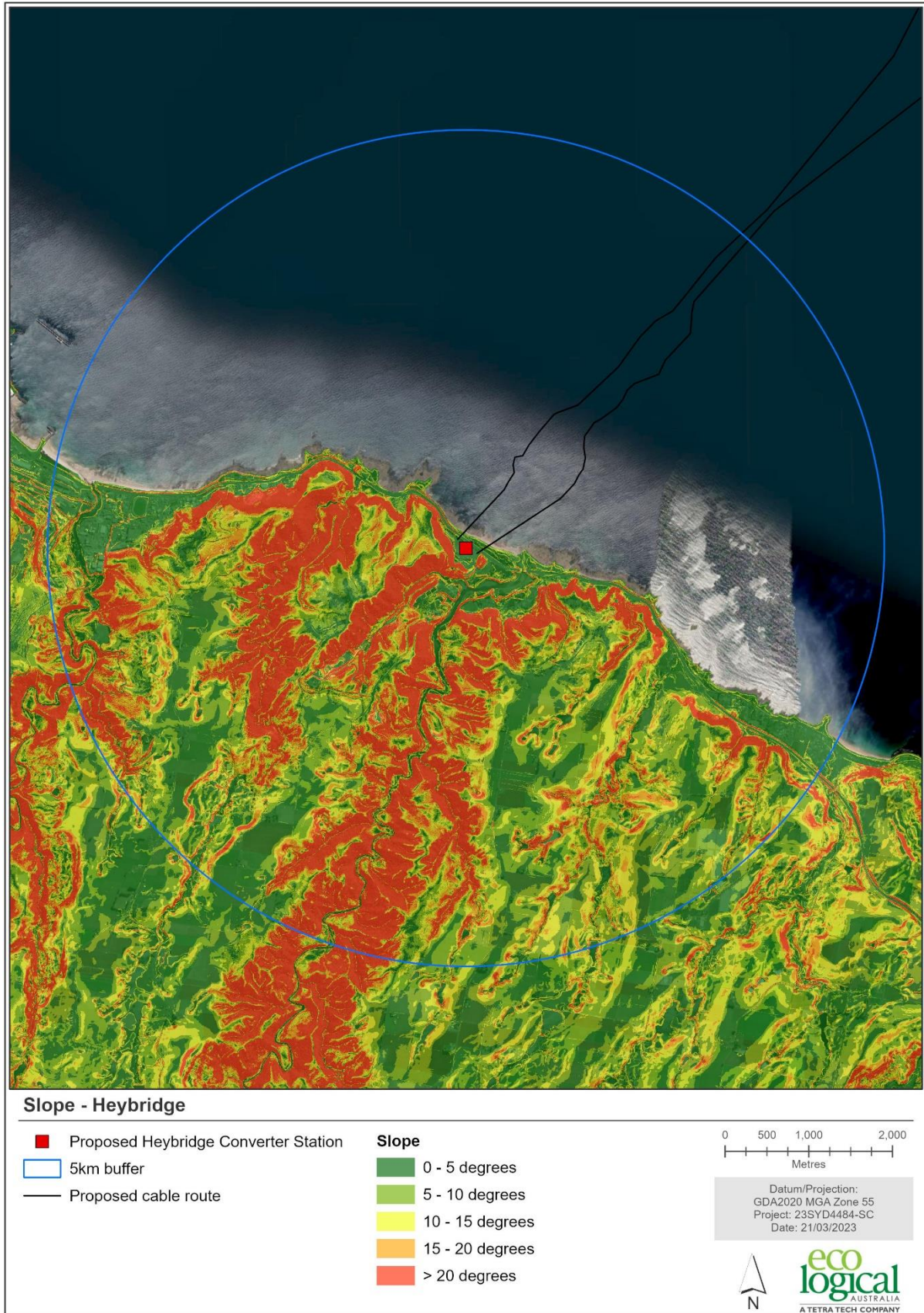


Figure 6: Slope map for Heybridge

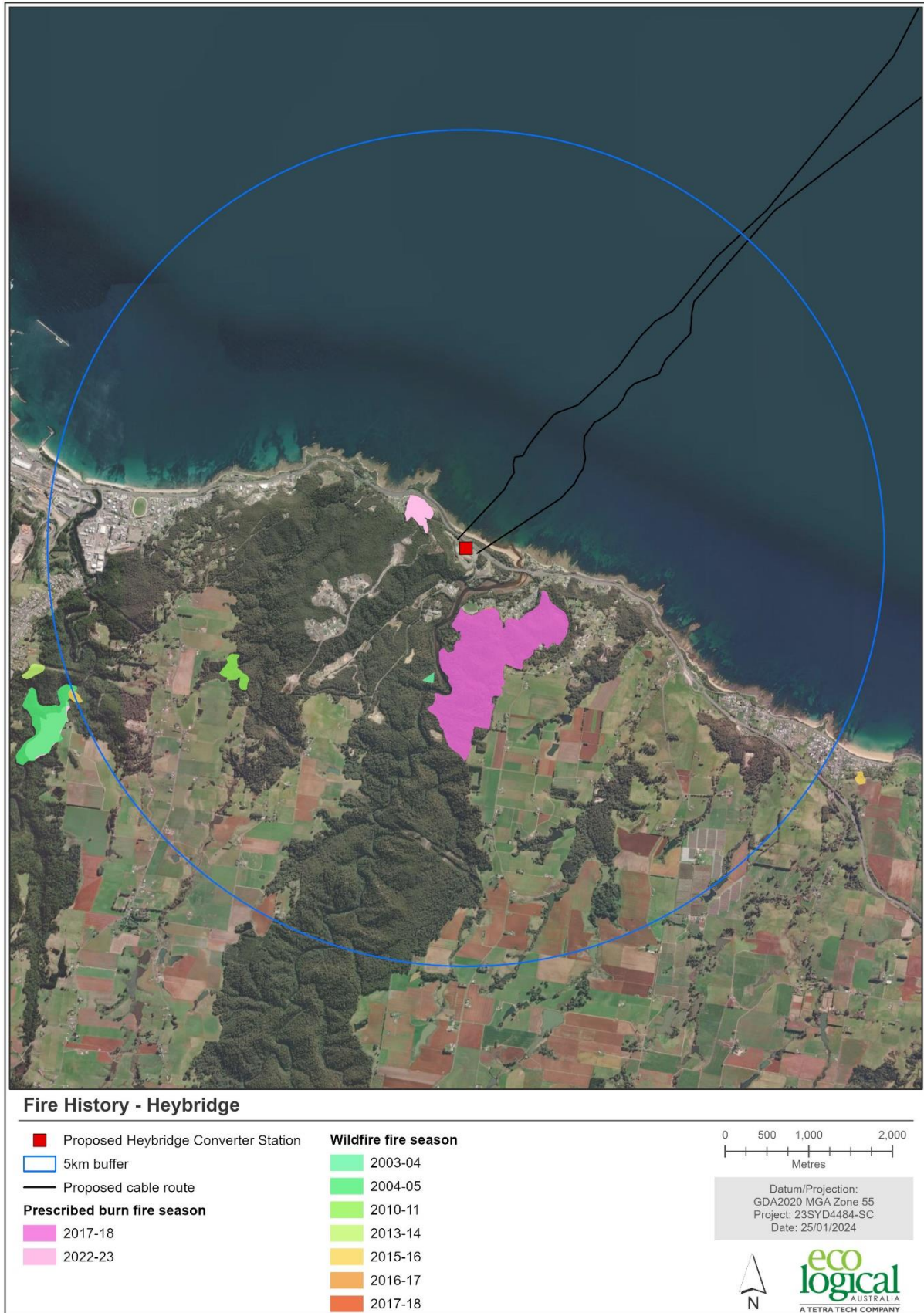


Figure 7: Fire History Heybridge (DNR&E 2024)

6.6 Summary of Bushfire Risk Context

Overall, for the study site of Heybridge, taking into consideration assets at risk, fuel types, terrain, ignition potential, fire weather, fire history, land use, mitigation measures and available fire suppression resources, it is considered that there is a relatively low likelihood of a fire starting on-site and spreading to cause significant impact to life and damage to assets.

The likelihood of fire attack on the subject site itself is also moderated, given the limited number and small scale of the recorded fire history; disruption of potential fire paths; bushfire hazard type, particularly downhill fire runs to the site, which would lessen fire severity from the more likely spread direction of the western sectors; along with the observability and availability of local fire suppression resources from the nearby Heybridge, Burnie, Penguin, and Sheffield Tasmanian Fire Service stations.

7. Impact Assessment

This section presents the results of the risk assessments undertaken for the construction, operational, and decommissioning phases of the project, for the Heybridge site.

7.1 Impact Pathways

The impact pathway determined for the project firstly takes into account the presence of bushfire hazard in close proximity to a potential fire ignition source occurring from the Heybridge site. Secondly, it considers the presence of a bushfire starting externally from a potential ignition source and then impacting on the Heybridge site itself.

Once a fire has developed either from the site or external to the site, consideration is then given to the assessment of the likely fire spread potential under adverse fire weather conditions with subsequent impact on surrounding assets (offsite) or on the Heybridge site as an infrastructure asset (onsite) identified to be at risk from bushfire attack.

7.2 Construction

7.2.1 Potential Bushfire Risk Impacts

The potential bushfire impacts to life and property during the construction phase are outlined in the vulnerability criteria presented in the risk assessment tables below.

7.2.1.1 Heybridge Site

Bushfire risk to life and property during the construction stage of the Heybridge site are shown in Table 8 and Table 9. This bushfire risk to both life and property is assessed considering both fire impacts offsite and onsite impact on the Heybridge site.

7.2.1.1.1 Offsite Impacts

Given the relatively fuel free state of the site, adoption of ignition management procedures on site (grinding, welding, smoking, hand held machinery, vehicles etc), low number and geographically dispersed human population within residential, commercial and industrial areas proximal to the site; along with non-hazard areas such as major road networks, natural geographical features (Blythe River and Bass Strait) and cleared or fuel reduced areas; together with the dispersed rural residential settlements within or adjoining low hazard agricultural landholdings; the likelihood and consequence ratings of the impact to life is much reduced. The risk of impact to life from the Heybridge site has therefore been determined to be ranging from insignificant to minor (Table 9).

Similarly to the risk to life, given the location of low hazard or non-hazard areas adjoining property assets the likelihood of widespread fire propagation across the landscape and the consequence of significant impact to property is reduced. The risk of impact to property assets (including in urban, industrial and rural areas) from the site of Heybridge has thus been determined as insignificant to minor (Table 10).

7.2.1.1.2 Onsite Impacts

Given that construction workers on site will be largely located within established and maintained fuel free areas, potentially affected by downhill lower intensity fire runs directly adjoining the site, along with adjoining non-hazard areas that may disrupt fire spread, such as major road networks, natural

geographical features (Blythe River and Bass Strait) or other fuel reduced areas, the likelihood and consequence of significant impact to life is much reduced. The risk of life to the Heybridge site has therefore been determined to be ranging from insignificant to minor (Table 8).

Similarly to the risk to life, given downhill fire runs directly to the site, the entire development site being fuel free, the presence of other fuel free areas (roads and water bodies), and the location of low hazard or non-hazard areas on adjoining properties, the likelihood of widespread fire propagation across the landscape and the consequence of significant impact on the Heybridge site infrastructure is reduced. The risk of impact to this infrastructure assets being the Heybridge site has thus been determined as insignificant to minor (Table 11).

There also exists capacity of the local Tasmania Fire Service stations located in Heybridge, Burnie, Penguin, and Sheffield to provide fire response to fire outbreaks to the Marinus Link site of Heybridge to mitigate onsite fire impacts to this infrastructure.

Table 8: Bushfire Risk Assessment-Life (Offsite and Onsite Impacts)

Vulnerability Criteria	Consequence (A)	Likelihood (B)	Level of Risk (A x B)	Risk Rating
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

Table 9: Bushfire Risk Assessment-Property (Offsite and Onsite Impacts)

Vulnerability Criteria	Consequence (A)	Likelihood (B)	Level of Risk (A x B)	Risk Rating
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

7.2.2 Environmental Performance Requirements

The following Environmental Performance Requirements (EPR) in Table 10 are proposed during the construction stage to minimise the level of potential bushfire risks. Mitigation measures associated with these EPRs are discussed in Section 7.5.

Table 10: Bushfire Mitigation Environmental Performance Requirements – Construction Stage

ID	Environmental Performance Requirement	Project Stage
BF01	Develop and implement measures to avoid and manage ignition of fires during construction	Construction
BF02	Provide onsite firefighting water capacity	Construction
BF03	Prepare and implement a Bushfire Emergency Management Plan (BEMP)	Construction
BF04	Prepare a Bushfire Hazard Management Plan	Construction

7.2.3 Residual Impacts

In line with the EPRs, activity or location specific mitigation measures will be required to be developed and incorporated into the design to ensure appropriate mitigation is achieved during the construction phase.

For the Heybridge site, the assessment of residual risk to both life and property following the introduction of EPRs reduces the residual risk from minor to insignificant.

The residual risk reduction is reliant on effective development and implementation of all identified EPR's for the construction phase detailed in Table 10.

7.3 Operation

7.3.1 Potential Bushfire Risk Impacts

The potential bushfire impacts to life and property during the operation phase are outlined in the vulnerability criteria presented in the risk assessment tables below.

7.3.1.1 Heybridge Site

Bushfire risk to life and property for the operation stage of the Heybridge site are shown in Table 11 and Table 12. This bushfire risk to both life and property is assessed considering both fire impacts offsite and onsite impact on the Heybridge site.

7.3.1.1.1 Offsite Impacts

The risk of impact to life for the Heybridge site has been determined to be ranging from insignificant to minor (Table 11) due to:

- the fuel free state of the site;
- adoption of ignition management procedures onsite (covering grinding, welding, smoking, hand held machinery, vehicles, storage of flammable liquids etc);
- relatively low quantity and geographic distribution of human population within residential / commercial / industrial areas
- non hazard areas adjoining forested vegetation such as major road networks; and

- natural geographical features (Blythe River and Bass Strait) together with the other dispersed rural residential human settlements within adjoining low hazard agricultural land holdings.

Considering all these factors the likelihood and consequence ratings impacts on life is much reduced.

The risk of impact to property assets (including urban areas and more rural agricultural areas) for the site of Heybridge has been determined as insignificant to minor (Table 12).

Similarly, as with the above life assets, given the location of low hazard or non-hazard areas adjoining property assets the likelihood of widespread fire propagation across the landscape and the consequence of significant impact to property is reduced.

7.3.1.1.2 Onsite Impacts

Given the presence of maintenance workers on site largely located entirely within established and maintained fuel free areas, downhill lower intensity fire runs directly at the site, along with adjoining non-hazard areas such as major road networks, natural geographical features (Blythe River and Bass Strait) or other fuel reduced areas, the likelihood and consequence of significant impact to life is much reduced. The risk of life to the Heybridge site has therefore been determined to be ranging from insignificant to minor (Table 8).

Similarly to the risk to life, given downhill fire runs directly to the site, the entire development site is fuel free, presence of other fuel free areas (roads and water bodies), and the location of low hazard or non-hazard areas on adjoining property assets, the likelihood of widespread fire propagation across the landscape and the consequence of significant impact on the Heybridge site infrastructure is reduced. The risk of impact to this infrastructure assets being the Heybridge site has thus been determined as insignificant to minor (Table 13).

There also exists capacity of the local Tasmania Fire Service stations located in Heybridge, Burnie, Penguin, and Sheffield to provide fire response to fire outbreaks not only across the Marinus Link site of Heybridge but extending to provide adequate fire coverage to the nearby proposed North West Transmission 220kV Developments project (TasNetworks Pty Ltd 2021) to mitigate on site fire impacts to this infrastructure.

Table 11: Bushfire Risk Assessment-Life (Offsite and Onsite Impacts)

Vulnerability Criteria	Consequence (A)	Likelihood (B)	Level of Risk (A x B)	Risk Rating
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

Table 12: Bushfire Risk Assessment-Property (Offsite and Onsite Impacts)

Vulnerability Criteria	Consequence (A)	Likelihood (B)	Level of Risk (A x B)	Risk Rating
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

7.3.2 Environmental Performance Requirements

The following EPRs in Table 13 are proposed during the operation stage to minimise the level of potential bushfire risks. Mitigation measures associated with these EPRs are discussed in Section 7.5.

Table 13: Bushfire Mitigation Environmental Performance Requirements – Operations Stage

ID	Environmental Performance Requirement	Project Stage
BF02	Provide onsite firefighting water capacity	Operation
BF03	Prepare and implement a Bushfire Emergency Management Plan (BEMP)	Operation
BF04	Prepare a Bushfire Hazard Management Plan	Operation
BF05	Develop and implement measures to avoid and manage ignition risks during operation	Operation

7.3.3 Residual Impacts

In line with the EPRs, activity or location specific mitigation measures will be required to be developed and incorporated into the design to ensure appropriate mitigation is achieved during the operational phase.

For the Heybridge site, the assessment of residual risk to both life and property following the introduction of EPRs reduces the residual risk from minor to insignificant. The residual risk reduction is reliant on effective development and implementation of all identified EPR's for the operations phase in Table 13.

7.4 Decommissioning

7.4.1 Potential Bushfire Risk Impacts

The potential bushfire impacts to life and property during the decommissioning phase are outlined in the vulnerability criteria presented in the risk assessment tables below.

7.4.1.1 Heybridge Site

Bushfire risk to life and property for the decommissioning stage of the Heybridge site are shown in Table 14 and Table 15. This bushfire risk to both life and property is assessed considering both fire impacts offsite and onsite impact on the Heybridge site.

7.4.1.1.1 Offsite Impacts

The risk of impact to life for the Heybridge site has been determined to be ranging from insignificant to minor (Table 14). Given the relatively low geographical distribution of human population within urban based residential /commercial / industrial areas with non-hazard areas adjoining forest such as major road networks, natural geographical features (Blythe River and Bass Strait) together with the other dispersed rural residential human settlements within adjoining low hazard agricultural landholdings; the likelihood and consequence of significant impact to life is much reduced.

The risk of impact to property assets (including urban areas and more rural agricultural areas) for the site of Heybridge has been determined as insignificant to minor (Table 15).

Similarly, as with the above life assets, given the fuel free state of the site, adoption of ignition management procedures on site (grinding, welding, smoking, hand held machinery, vehicles etc), location of low hazard or non-hazard areas adjoining property assets the likelihood of widespread fire propagation across the landscape considered in combination with the consequence, the impact to property is reduced.

7.4.1.1.2 Onsite Impacts

Given the presence of construction workers on site largely located entirely within established and maintained fuel free areas, downhill lower intensity fire runs directly at the site, along with adjoining non-hazard areas such as major road networks, natural geographical features (Blythe River and Bass Strait) or other fuel reduced areas, the likelihood and consequence of significant impact to life is much reduced. The risk of life to the Heybridge site has therefore been determined to be ranging from insignificant to minor (Table 14).

Similarly to the risk to life, given downhill fire runs directly to the site, the entire development site is fuel free, presence of other fuel free areas (roads and water bodies), and the location of low hazard or non-hazard areas on adjoining property assets, the likelihood of widespread fire propagation across the landscape and the consequence of significant impact on the Heybridge site infrastructure is reduced. The risk of impact to this infrastructure assets being the Heybridge site has thus been determined as insignificant to minor (Table 15).

There also exists capacity of the local Tasmania Fire Service stations located in Heybridge, Burnie, Penguin, and Sheffield to provide fire response to fire outbreaks not only across the Marinus Link site of Heybridge but extending to provide adequate fire coverage to the nearby proposed North West Transmission 220kV Developments project (TasNetworks Pty Ltd 2021) to mitigate onsite fire impacts to this infrastructure.

Table 14: Bushfire Risk Assessment-Life (Offsite and Onsite Impacts).

Vulnerability Criteria	Consequence (A)	Likelihood (B)	Level of Risk (A x B)	Risk Rating
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	Insignificant
No injuries or fatalities likely.	1	2	2	Insignificant

Table 15: Bushfire Risk Assessment-Property (Built Assets within Urbanised Areas / Rural Residential & Agricultural Lands) (Offsite and Onsite Impacts).

Vulnerability Criteria	Consequence (A)	Likelihood (B)	Level of Risk (A x B)	Risk Rating
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	Minor
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

7.4.2 Environmental Performance Requirements

A land decommissioning management plan will be prepared to outline how decommissioning activities would be undertaken and the potential impacts managed. This will be located within the EIS documentation.

7.5 Mitigation Measures

The mitigation measures to address the EPRs established in response to the identified impacts during the Construction and Operation phase are set out in Table 16.

The successful implementation of the identified mitigation measures outlined below are reliant on the undertaking of appropriate inspection and review outcomes as identified in Section 7.7.

Table 16: Bushfire Risk Mitigation Measures

ID	Mitigation Measures	Project Stage
BF01	<p>EPR: Develop and implement measures to avoid and manage ignition of fires during construction</p> <p>Mitigation Measures: Prior to commencement of project works, develop a CEMP to:</p> <ul style="list-style-type: none"> • Restrict 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 period. • Maintain vehicles, plant and machinery in accordance with relevant specifications to prevent fire ignition from their operation. • Mitigate ignition risks from electrical infrastructure by ensuring design and constructions meets applicable standards and guidelines. • Establish and maintain vehicle access to the site and surrounds for fire suppression activities by fire fighting authorities. 	Construction
BF02	<p>EPR: Provide onsite firefighting water capacity</p> <p>Mitigation Measures:</p> <p>Prior to commencement of project works, provide dedicated onsite water supply tanks or alternative water sources for firefighting, including:</p> <ul style="list-style-type: none"> • Sufficient water capacity to undertake adequate fire suppression as per the provisions of AS2419.1-2021: Fire hydrant installations, Table2.2.5(D) for open yards. • Tank(s) that are non-combustible and incorporate appropriate fire fighting fittings, for emergency services to access the water supply. • Maintaining clear access to tanks or water sources for fire fighting vehicles. 	Construction / Operation
BF03	<p>EPR: Prepare and implement a Bushfire Emergency Management Plan (BEMP)</p> <p>Mitigation Measures:</p> <p>As a subplan to the project's Emergency Response Plan, prepare and implement a BEMP that includes, but is not limited to:</p> <ul style="list-style-type: none"> • Description of the site and facility • References all relevant emergency procedures and information, including contact details • Details bushfire emergency preparedness arrangements and response procedures • Documents control and coordination arrangements and responsibilities • Details all shelter in place and offsite evacuation procedures • Documents requirements for personnel induction, training, plan review and liaison with external stakeholders. <p>The BEMP should be prepared to be consistent with (to the extent required) the <i>Bushfire Emergency Planning Guideline</i> (TFS 2021) and endorsed by the TFS or an accredited person.</p>	Construction / Operation

ID	Mitigation Measures	Project Stage
BF04	<p>EPR: Prepare a Bushfire Hazard Management Plan</p> <p>Mitigation Measures:</p> <ul style="list-style-type: none"> • Prepare a Bushfire Hazard Management Plan in accordance with the Tasmanian Planning Scheme, which is certified by the TFS or an accredited person. • All hazardous goods to be stored in accordance with relevant Australian Standards. 	Construction / Operation
BF05	<p>EPR: Develop and implement measures to avoid and manage ignition risks during operation</p> <p>Mitigation Measures:</p> <p>Develop an SEMP to:</p> <ul style="list-style-type: none"> • Restrict activities with ignition risk in the open on Total Fire Ban Days. • Ensure activities with ignition risk undertaken in the open on other days to be accompanied by a fire extinguisher. • Maintain converter station infrastructure according to relevant standards. • Maintain fire fighting systems and water tank capacity at the converter stations. • Ensure storage and use of hazardous material on site is in accordance with relevant Australian Standards and other requirements. • Maintain vehicle access to the site and surrounds for fire suppression activities by fire fighting authorities. • Operate electrical infrastructure to minimise ignition risk and maintain monitoring and management systems (emergencies, fault management, system monitoring, fire detection and suppression). • Train personnel in site procedures and appropriate use of equipment. 	Operation

7.6 Cumulative Impacts

The cumulative impact assessment method is outlined in Section 5.3.1.

The potential bushfire impacts of the project before the implementation of EPRs discussed in Section 7.2 to 7.4 varies from insignificant to minor risk to life and property over the construction, operation and decommissioning stages. With the introduction of EPRs for all stages of the development the residual risk is reduced overall to be insignificant.

There also exists capacity of local TFS brigades to provide fire response to fire outbreaks across the Project site and broader region from the localities of Burnie, Penguin and Sheffield.

In assessing other relevant projects within the region that could trigger cumulative impacts that in combination with required EPRs and associated mitigation measures for each project there is an extremely low risk of simultaneous fire propagation within the landscape. As such the cumulative impacts are considered to be insignificant and warrant no further consideration within the context of this assessment.

7.7 Inspection and Review

The requirements for the inspection and review of residual impacts at each of the construction and operations stages of the project are indicated in Table 17.

Table 17: Inspection and review requirements at various stages of the project for identified EPRs

Project Stage	Inspection or Compliance Requirement	Review Period
Construction	<ul style="list-style-type: none"> Bushfire Ignition Management Plan (BIMP) is prepared. Fuel management establishment and maintenance activities within each of the designated sites. Installation of electrical infrastructure meets Australian Standard requirements to reduce unwanted ignition potential. Installation, testing and certification of water tank, water supply and other suppression resources for fire fighting. Installation of vehicle access roads for fire fighting. Bushfire Emergency Management Plan (BEMP) is prepared. Bushfire Hazard Management Plan (BHMP) is prepared in accordance with the Tasmanian Planning Scheme. Asset Protection Zone separation of infrastructure from bushfire hazard Infrastructure designed to incorporate fire resistant materials and prevent ignitions or damage or failure from fire. Onsite personnel training in fire fighting. 	<ul style="list-style-type: none"> BIMP in place prior to commencement of construction phase and reviewed annually. Fuels managed to required specification prior to commencement of infrastructure construction and maintained throughout. Review quarterly Water supply and suppression resources installed prior to primary construction phase. Access road constructed prior to primary construction phase. BEMP is prepared prior to commencement of construction phase and reviewed annually. BHMP is prepared prior to commencement of the construction phase and reviewed annually. Asset Protection Zone in place prior to infrastructure construction commencing. Infrastructure certified at construction stage. Fire fighting personnel certified prior to construction phase.
Operation	<ul style="list-style-type: none"> Maintain water tank and water supply for fire fighting. Maintain access road in a trafficable condition and free from obstructions. Operations maintenance of onsite facilities. Fuel management on the facility site. Review and update of all bushfire and emergency plans. 	<ul style="list-style-type: none"> Water supply infrastructure inspected monthly during fire season. Access road inspected generally once annually but monthly during fire season. Operational facilities inspected annually or on spot maintenance basis. Fuel management reviewed quarterly and actioned as needed. All bushfire and emergency plans updated annually and given full review every 5 years.

7.8 Summary of Impacts

A summary of the impact assessment from bushfire against the risk assessment criteria is presented in Table 18. The potential risk and risk ratings depicted in Table 18 have been assigned from the highest derived risk level identified in the impact assessment undertaken in Section 7.2 to Section 7.4. This entailed assigning the highest derived initial risk rating obtained in each of the risk impact vulnerability tables across the Heybridge site and for all project stages for life and property assets.

The initial impact assessment of fire impact to and from the site has been determined as minor. This assessment finding was made on the basis of the bushfire risk factors, the baseline hazard and the location, nature, exposure and vulnerability of assets at risk.

With adoption of all the assigned EPR's over all of the project stages this results in a residual risk which is determined to be insignificant. This assessment finding was made after reducing the risk multiplication factor of both the likelihood and consequence ratings each by a factor of 1 in respect of the expected reduction following application of EPRs and associated mitigation measures.

Table 18: Summary of Risk Assessment and Impacts

Affected Value	Potential Risk of Harm	Project Phase	Likelihood Rating	Consequence Rating	Risk Rating	EPRs & Mitigation Measures	Residual Likelihood Rating	Residual Consequence Rating	Residual Risk Rating
Life - Heybridge	Minor	Construction	2	3	Minor (6)	BF01, BF02, BF03, and BF04	1	2	Insignificant (2)
Property - Heybridge	Minor	Construction	2	3	Minor (6)	BF01, BF02, BF03 and BF04	1	2	Insignificant (2)
Life - Heybridge	Minor	Operation	1	5	Minor (5)	BF02, BF03, BF04, and BF05	1	4	Insignificant (4)
Property - Heybridge	Minor	Operation	1	5	Minor (5)	BF02, BF03, BF04, and BF05	1	4	Insignificant (4)
Life - Heybridge	Minor	Decommissioning	1	5	Minor (5)	Land decommissioning plan	1	4	Insignificant (4)
Property -Heybridge	Minor	Decommissioning	1	5	Minor (5)	Land decommissioning plan	1	4	Insignificant (4)

8. Conclusion

The purpose of this report is to address the overall Tasmanian EPA Environmental Impact Statement Guidelines as issued by the Director of the Environmental Protection Authority for the Marinus Link project converter station. Specifically, a Bushfire Impact Assessment has been undertaken for the subject site using a risk assessment approach, together with the identification of EPRs to seek further risk reduction opportunities through the provision of suitable bushfire mitigation measures.

Overall, the potential residual risk to 'at risk assets' of bushfire impacting from the site during the construction, operation and decommissioning stages is considered to be minor to insignificant, given the background bushfire hazard context, landscape profile, siting and EPRs identified.

The EPRs as identified in Section 7.1 to Section 7.3 significantly lower the residual risk of impacts from the proposed development to life and property as summarised in Section 7.8.

Key EPRs identified from this assessment incorporate mitigation measures targeting bushfire ignition management, bulk static water capacity, access, operations maintenance, hazard management and bushfire emergency management planning.

Through adoption of the inspection and review schedule in Section 7.7 (based on the identified mitigation measures in Section 7.5) this should see a reduction of residual risk to be insignificant for the study site of Heybridge.

9. References

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Appendix A - Tasmanian Planning Scheme-Hazardous Uses

The objective that applies in Clause 13.5.2 of the Tasmanian Planning Scheme is that *“hazardous uses can only be located on land within a bushfire -prone area where tolerable risks are achieved through mitigation measures that take into account the specific characteristics of both the hazardous use and the bushfire hazard.”* This is addressed in Table 19 below.

Table 19: Clause 13.5.2 Tasmanian Planning Scheme Requirements relating to Hazardous Uses

Acceptable Solutions	Performance Criteria	Compliance Notes
<p>A1</p> <p>No Acceptable Solution</p>	<p>P1</p> <p>A hazardous use must only be located in a bush-fire prone area if a tolerable risk from bushfire can be achieved and maintained, having regard to:</p> <p>a) the location, characteristics, nature and scale of the use;</p> <p>b) whether there is an overriding benefit to the community;</p> <p>c) whether there is no suitable alternative lower-risk site;</p> <p>d) the emergency management strategy (hazardous use) and bushfire management plan;</p> <p>e) other advice, if any from the TFS.</p>	<p>The hazardous use of the site relates to the proposed storage of 5,000L of diesel fuel. The fuel tank and associated generators are located centrally within the site, separated from bushfire hazards and the proposed onsite buildings and assets. The fuel storage will need to be in accordance with applicable Australian Standards and other applicable requirements.</p> <p>The site will facilitate distribution of electricity on the National Energy Market from Tasmania to the Mainland.</p> <p>The current Heybridge site is required to support the undersea cabling to the mainland and is to be situated on 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.</p> <p>An emergency management strategy and bushfire management plan to be prepared in accordance with A2 and A3 below.</p>
<p>A2</p> <p>An emergency management strategy (hazardous use) endorsed by the TFS or accredited person.</p>	<p>P2</p> <p>No performance criterion.</p>	<p>Inclusion of an emergency management strategy for hazardous use to be included in an Emergency Management Plan for the site for endorsement by the TFS or accredited person.</p>
<p>A3</p> <p>A bushfire hazard management plan that contains appropriate bushfire protection measures that is certified by the TFS or an accredited person.</p>	<p>P3</p> <p>No performance criterion.</p>	<p>Preparation of a bushfire hazard management plan that contains bushfire protection measures that can be certified by the TFS or accredited person.</p>

