Appendix A

Transmission Line Options Assessment

KENTBRUCK GREEN POWER HUB

Acknowledgement of Country

Neoen Australia acknowledges the traditional custodians of the land in which we live, and pays its respects to their elders, past and present. The Gunditjmara are the original custodians of the Country on which the Project is located and we acknowledge them as the original custodians. We are committed to Aboriginal engagement and reconciliation and aim to bring Aboriginal and Torres Strait Islander people, local communities and the councils along for the journey to strengthen relationships and enhance local community outcomes.

Disclaimer

Executive Summary

Overview

This transmission line options assessment report presents the outcome of many surveys and other assessments undertaken to define a preferred option for the dedicated transmission line for the Kentbruck Green Power Hub. Umwelt, in consultation with Neoen and the technical specialists responsible for preparing studies for the Environment Effects Statement (EES) have developed a multi-criteria analysis (MCA) methodology to assess the feasible options and applied this to four potential transmission routes and configurations.

The Kentbruck Green Power Hub (the Project) is proposed as a response to the urgent need for a transition to cleaner sources of electricity generation in Victoria. The Project comprises up to 105 wind turbines capable of producing approximately 2,000 gigawatt-hours (GWh) of electricity per year, which is the equivalent of removing 600,000 cars from the road or planting 15.8 million trees. The Project also involves a dedicated transmission line to connect the Project into the National Electricity Market (NEM).

This assessment addresses the *Scoping Requirements for Kentbruck Green Power Hub Environment Effects Statement* (the Scoping Requirements), which requires the EES to identify feasible alternatives considered and evaluated for the Project and to provide an explanation of how the Project's design has been revised in response to constraints identified throughout the EES process. These design revisions minimise or avoid environmental effects whilst meeting the objectives of the Project. This options assessment will also inform decision makers responsible for deciding on primary approvals and consents for the Project.

Transmission line objectives

Neoen has developed specific objectives for the transmission line component of the Project. These objectives have been used to help determine the preferred option in conjunction with the outcomes of the multi-criteria analysis. The objectives for the transmission line are:

- Deliver renewable electricity from the Project to the National Electricity Market (NEM)
- Seek opportunities to co-locate infrastructure with existing compatible land uses such as existing easements and transport routes.
- Avoid or minimise potential adverse impacts on the natural environment.
- Avoid or minimise potential impacts on public land and associated public land management activities.
- Avoid or minimise potential adverse impacts on Aboriginal and historical heritage.
- Avoid or minimise potential adverse impacts on nearby residents and other sensitive receptors associated with visual amenity, noise, traffic, and air quality.
- Avoid impacts to business and commercial operations.
- Avoid or minimise potential impacts on productive agricultural land.

- Avoid or minimise the risk of bushfire.
- Ensure an appropriate land use outcome by avoiding areas of sensitivity and potential land use conflicts.
- Obtain necessary agreements with landowners and land managers to install and operate infrastructure.
- Obtain planning and environmental approvals from all necessary authorities.
- Provide a constructable and cost-effective grid connection.

Options identification

Understanding the physical and socio-economic environment of an area potentially affected by a transmission line is a key foundation to identifying a suitable transmission line route. Existing physical and socio-economic factors require consideration in the development of transmission lines to minimise potential impacts and avoid the need for complex approvals. A range of landscape, environmental, social, engineering and design related factors have been considered in this options assessment.

Neoen identified a set of preliminary transmission line options based on potential grid connection locations in both Victoria and South Australia. An initial assessment for each option was undertaken by Neoen to determine their potential viability, with consideration of Project design, electrical requirements, existing network capacity, engineering capabilities and cost constraints. Following these assessments, four feasible transmission line options were identified by Neoen which have been taken forward as part of the multi-criteria options assessment:

- **Heywood Option 1A**: The transmission line would extend underground from the main wind farm substation and traverse Cobboboonee National Park and Cobboboonee Forest Park beneath an existing road, and then extend overhead once it exits the Forest Park through freehold rural landholdings to reach Heywood Terminal Station. The total length of underground line is 18.8 km, with 7.8 km of overhead line. The total length of transmission line is 26.6 km
- **Heywood Option 1B**: The transmission line would follow the same route as Option 1A but would be entirely underground. The total length of underground line is 26.6 km.
- **Portland Option 2A**: The transmission line would extend overhead from the main wind farm substation to the south-east and traverse several freehold rural landholdings before connecting to the existing 500 kV line north of Portland. This option would require a new electrical terminal station adjacent to the cut-in point to the existing electricity network. The total length of overhead line is 26 km.
- **Portland Option 2B**: The transmission line would follow the same route as Option 2A but would be entirely underground. It would also require a new electrical terminal station at the cut-in point. The total length of underground line is 26 km.

Options assessment

Umwelt, in consultation with Neoen and the technical specialists responsible for preparing studies for the EES, developed a detailed multi-criteria analysis (MCA) methodology to assess the feasible options. The purpose of the MCA was to determine which option would best meet the objectives. The feasible transmission line options were assessed against a set of criteria that was developed with consideration of

the transmission line Project objectives, and the relevant environmental, social, land use, and heritage factors that would affect the siting of a transmission line. Criteria associated with design, constructability, operability, safety, planning, and commercial factors were also considered. These criteria were grouped into 10 parameters to inform the assignment of scores for each option (see **ES Table 1)**.

The transmission line options were scored against each criterion, with the scores summed for each parameter and divided by the number of criteria to provide a parameter score. The parameter scores were then multiplied by the weighting assigned to the corresponding parameter, with weightings emphasising the importance of environmental, social, heritage, and land use factors. The weighted scores were then summed to produce a final score for each option (see **ES Table 1**).

ES Table 1 Scoring summary

Parameter	Weighting		Weighted parameter score			
			Option 1A	Option 1B	Option 2A	Option 2B
Environment	25%	60%	0.52	0.45	0.27	0.18
Community / social	15%		0.23	0.15	0.40	0.30
Land	10%		0.15	0.15	0.30	0.25
Heritage	10%		0.12	0.10	0.14	0.12
Technical and design	5%	25%	0.08	0.08	0.15	0.15
Constructability	5%		0.12	0.12	0.10	0.10
Operability	5%		0.10	0.08	0.10	0.08
Safety	5%		0.05	0.05	0.08	0.08
Infrastructure	5%		0.00	0.00	0.15	0.00
Cost	15%	15%	0.15	0.30	0.15	0.45
Final score			**1.51**	**1.47**	**1.84**	**1.70**
Rank			2	1	4	3

Based on the assessment and weighted scoring, Option 1B has the lowest weighted final score, followed by Option 1A, Option 2B and Option 2A. This is due to the specific strengths of Option 1B in several of the criterion and broader parameter groups, which makes this option the most favourable in terms of meeting the objectives. Option 1B scored well in the community/social, land, and infrastructure parameter groups. Option 1B also scored equivalent to other options in the technical and design, operability, safety, constructability, and heritage parameter groups (plus/minus 0.1).

However, while Option 1B had the lowest weighted final score, Option 1B scored comparatively less well in the cost parameter group, and for some criterion in the environment parameter group.

Neoen recognises that cost effectiveness needs to be balanced with other, sometimes competing objectives, including avoiding and minimising potential environmental and social impacts. The higher capital cost for Option 1B compared to Option 1A and Option 2A is mostly due to constructing the whole alignment underground. This underground option is preferred even with a higher capital cost because it avoids building an overhead line that birds could collide with, or that could interfere with aerial firefighting operations, and that might cause visual amenity impacts for local community members. It is also the preferred design solution of local communities that have been surveyed on this topic by Neoen.

Option 1A and Option 1B scored comparatively higher (worse) for the environment criteria, mainly due to these alignments being proposed partially within a roadway that bisects Cobboboonee National Park and Cobboboonee Forest Park (the Parks). The Cobboboonee National Park is protected under legislation focused on conservation (*National Parks Act 1975*). Several criteria have been used to jointly assess the potential for impacts on biodiversity values within a protected area (national park) and within the adjoining Cobboboonee Forest Park.

Neoen has worked closely with potential host landholders and the community to understand the community sentiment and their preferred option for a transmission line for the Project. Option 2A is so strongly opposed by the community that proceeding with it would generate a negative sentiment towards the Project within the community and reduce the level of trust the community has in the overall decision-making process and in Neoen.

Option 1B is the preferred alignment and best meets the Project objectives as it:

- Directly connects the Project to the existing Heywood Terminal Station, and in turn to a transmission line that has sufficient capacity to transport the electricity generated by the Project to where it can be used.
- Is a constructable and cost-effective design solution that utilises an existing infrastructure corridor (Boiler Swamp Road), providing opportunities to minimise potential impacts relating to social and cultural considerations, visual amenity, existing land uses and the environment.
- Removes the potential for collision risk with threatened avifauna species (including Brolga).
- Aligns with strong community preference for the underground transmission line through Cobboboonee National Park and Cobboboonee Forest Park.
- Aligns with the preference of the Gunditj Mirring Traditional Owners Aboriginal Corporation (GMTOAC), which is that the transmission line should be in areas of significant ground disturbance.
- Is in an area with less intangible cultural heritage value and reduced archaeological sensitivity along Boiler Swamp Road due to past disturbance associated with road grading and maintenance activities through the area.
- Minimises potential visual amenity impacts on nearby residents with the entire transmission line located underground.
- Avoids potential noise impacts on nearby residents by removing the need for a new terminal station.
- Avoids areas with a higher density of dwellings, particularly around Gorae West and areas north of Portland, as well as landscapes of significance closer to the Discovery Bay and Bridgewater coastlines.
- Avoids potential aviation impacts associated with proximity to the Portland Aerodrome.
- Minimises potential impacts on, and disruption to, continued operation of productive agricultural land.
- Avoids potential interference with aerial firefighting operations and removes additional bushfire risk associated with a new terminal station.

Option 1B has been adopted by the Project and has been assessed within the EES. As part of the EES process, further work is being done by Neoen to avoid and minimise potential impacts of this transmission line option as much as practicable.

Upon completing the MCA and selecting the preferred alignment, Neoen has done extensive work to develop a construction methodology that would avoid and minimise potential impacts on native vegetation within these areas. This includes restricting the construction footprint to the road formation and proposing high pressure water excavation and horizontal directional drilling to avoid and minimise potential impacts on tree roots of listed species. Potential impacts of the preferred option are assessed in detail within the EES that is being prepared for the Project.

As part of that assessment, a comprehensive investigation of potential impacts on natural, cultural, social, and economic factors and receptors is being undertaken, to ensure that the preferred route can be constructed and operated without causing significant or long-term harm. Neoen has and will continue to consult with Traditional Owners, landowners, land managers, stakeholders, and communities in the vicinity of the preferred option as these investigations are progressed. Formal opportunities to make submissions will be available through the regulatory EES, planning, and cultural heritage impact assessment processes.

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List of abbreviations

Abbreviation	Description
CHS	Cultural heritage sensitivity
DIWA	Directory of Important Wetlands
EES	Environment Effects Statement
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological vegetation class
FFG Act	Victorian *Flora and Fauna Guarantee Act 1988*
Forests Act	Victorian *Forests Act 1958*
FZ	Farming Zone
Glenelg LGA	Glenelg Local Government Area
GDE	Groundwater dependent ecosystem
GWh	Gigawatt-hour
HDD	Horizontal directional drilling
HVP	Hancock Victorian Plantation
ILUA	Indigenous Land Use Agreement
km	Kilometre
m	Metre
Minister	Victorian Minister for Planning
mm	Millimetre
MW	Megawatt
NEM	National Electricity Market
Neoen	Neoen Australia Pty Ltd
NP Act	Victorian *National Parks Act 1975*
OLS	Obstacle Limitation Surface
PCRZ	Public Conservation and Resource Zone
PPRZ	Public Park and Recreation Zone
Project	Kentbruck Green Power Hub
QGIS	Quantum Geographic Information System
Ramsar site	Glenelg Estuary and Discovery Bay Ramsar site
RCZ	Rural Conservation Zone
SA-VIC Interconnector	South Australian – Victoria Interconnector
TEC	Threatened ecological community
Umwelt	Umwelt (Australia) Pty Limited
VAHR	Victorian Aboriginal Heritage Register
VHI	Victorian Heritage Inventory
VHR	Victorian Heritage Register

Glossary

Term	Description
Assessment criteria	The criteria used to assess the feasible options. A total of 34 criteria were identified, divided into 10 parameter groupings. Each criterion was assigned a specific metric against which each transmission line option was scored.
High-level corridors	Four high-level transmission line corridors were identified by Neoen based on four potential grid connection points identified early in the Project's development: • Heywood Route: Connection into the Heywood Terminal Station. • Portland Route: Connection into the Heywood-Portland 500 kV transmission line. • SA-VIC Interconnector Route: Connection into the SA-VIC Interconnector. • Mount Gambier Route: Connection into the South East Terminal Station near Mount Gambier, South Australia. The viability of these corridors was investigated to determine whether they would be suitable for further assessment.
Feasible options	A feasible option for a transmission line is one that is geographically practical, the technical design and constructability are achievable, it is economically viable, and existing environmental and social values have been appropriately considered. Four transmission line options were deemed feasible (Option 1A, 1B, 2A, 2B) and assessed in this transmission line options assessment.
Metrics	The metrics assigned to each assessment criterion against which each transmission line option was scored. Rankings of high, medium, low, and N/A were assigned for each metric with corresponding scores of 3, 2,1, and 0, where low scores indicate a more favourable outcome than high scores.
Option 1A	One of the four feasible options. The transmission line extends underground for 18.8 km from the main wind farm substation, through Cobboboonee National Park and Forest Park beneath an existing road, then extends overhead for 7.8 km through freehold agricultural land to Heywood Terminal Station
Option 1B	One of the four feasible options. The transmission line extends underground for 26.6 km from the main wind farm substation through Cobboboonee National Park and Cobboboonee Forest Park beneath an existing road, and continues underground through freehold agricultural land to the Heywood Terminal Station.
Option 2A	One of the four feasible options. The transmission line extends overhead for 26 km from the main wind farm substation through several freehold agricultural landholdings, where it would connect into the existing Heywood-Portland 500 kV transmission line via a new terminal station.
Option 2B	One of the four feasible options. The transmission line extends underground for 26 km from the main wind farm substation through several freehold agricultural landholdings, where it would connect into the existing Heywood-Portland 500 kV transmission line via a new terminal station.
Parameters	The 10 groupings of assessment criteria used to assess the feasible options.
Parameter scores	The sum of each criterion score within a parameter, divided by the number of criteria within the parameter grouping.

Term	Description
Preliminary routes	Four preliminary routes were identified by Neoen (Routes 1, 2, 3 and 4) based on the two viable high-level routes previously identified, using broad-scale desktop mapping to identify prominent environmental, social and land use constraints to avoid, and with consideration of design, constructability and commercial factors.
Project	The Kentbruck Green Power Hub. The Project includes the construction, operation and decommissioning of a wind farm with nameplate capacity of up to 600 MW and a 275 kV transmission line with associated infrastructure.
QGIS	QGIS is a desktop geographic information system application that supports viewing, editing, printing, and analysis of geospatial data.
Route 1	One of the four preliminary routes. The transmission line extends east from the wind farm through Cobboboonee National Park, Cobboboonee Forest Park and freehold agricultural land, and connects to the existing Heywood Terminal Station.
Route 2	One of the four preliminary routes. The transmission line extends south-east from the wind farm through freehold agricultural land, to cut-in to the 500 kV Heywood-Portland transmission line.
Route 3	One of the four preliminary routes. The transmission line extends north from the wind farm through the HVP plantation and Lower Glenelg National Park, using the existing easement of the SA-VIC Interconnector to connect into the Heywood Terminal Station.
Route 4	One of the four preliminary routes. The transmission line extends east from the wind farm through Gorae West, Cobboboonee Forest Park and freehold agricultural land, and connects to the existing Heywood Terminal Station.
Viable routes	Two viable transmission line routes (the Heywood Route and Portland Route) were identified based on the four high-level routes identified early in the Project's development. The viability of these routes was evaluated with consideration of Project design; electrical requirements; existing network capacity; engineering capabilities; cost constraints; and key environmental, land use, and planning permissibility constraints. A transmission line route was considered viable if it is geographically practical, the technical design and constructability are achievable, it is economically viable, and existing environmental and social values have been appropriately considered.
Weighted parameter scores	The parameter score for each transmission line option, multiplied by the weighting assigned to the corresponding parameter. The weightings emphasise the importance of environmental, social, heritage and land use factors relative to commercial, engineering and planning considerations. The weighted parameter scores were summed to provide a final score for each option. These final scores were used to inform selection of the preferred transmission line option for the Project.

1.0 Introduction

This transmission line options assessment has been undertaken by Umwelt (Australia) Pty Limited (Umwelt) for Neoen Australia Pty Ltd (Neoen) to support the Environment Effects Statement (EES) and associated consent applications for the proposed Kentbruck Green Power Hub (the Project). This report identifies feasible transmission line route and configuration options considered by the Project and provides an assessment of each option against a set of criteria relating to environmental, heritage, social, technical, and commercial factors.

1.1 Background

Neoen is proposing a renewable energy development comprising a wind energy facility (wind farm) and associated infrastructure, including collector substations and powerlines, and a new transmission line connecting the wind farm to the existing electricity network. The wind farm would be mostly located in an actively managed and harvested pine plantation in southwest Victoria, between Portland and Nelson, in the Glenelg Local Government Area (Glenelg LGA).

The Project would involve two main components:

- A wind farm of up to 600 megawatts (MW) comprising up to 105 wind turbines with a maximum tip height of 270 metres (m) above ground level.
- A new transmission line, which would connect the Project to the existing electricity network.

The Project is anticipated to deliver more than 2,000 gigawatt-hours (GWh) of renewable electricity to the National Electricity Market (NEM). Establishing a feasible connection into the Victorian electricity grid is therefore a critical component of the Project.

The potential environmental, heritage and social impacts of the Project are being assessed through an EES, as determined by the Victorian Minister for Planning (the Minister) under the *Environment Effects Act 1978* (EE Act). Following the Minister's assessment of the EES, the Project would seek the relevant approvals for the use and development of the Project.

The Project has been developed through an iterative design process with consideration of technical and commercial requirements in conjunction with environmental, heritage, and social values. The design has been revised as findings of technical studies and investigations undertaken for the EES have become available. The Project has undergone several major design changes in response to various constraints being identified through these assessments, such as a substantial reduction in the number of turbines proposed and changes to the turbine layout. These changes ensure the Project avoids potential impacts on the Glenelg Estuary and Discovery Bay Ramsar site (the Ramsar site) and Brolga (*Antigone rubicunda*) breeding habitat. The changes also help to mitigate potential visual impacts from sensitive visual receptors.

This options assessment was undertaken to inform Neoen's decision making on the least constrained and most suitable transmission line route(s) and configuration(s) to assess as part of the EES process. The viability of a range of high-level transmission line options was considered early in the Project's development. This initial evaluation resulted in the identification of four feasible options requiring more

detailed assessment to identify the preferred option(s) to progress with in the EES. This evaluation of high-level options and detailed assessment of feasible options are documented in this report.

1.2 Transmission line project objectives

The objectives of the transmission line component of the Project are to:

- Deliver renewable electricity from the Project to the NEM
- Seek opportunities to co-locate infrastructure with existing compatible land uses such as existing easements and transport routes.
- Avoid or minimise potential adverse impacts on the natural environment.
- Avoid or minimise potential impacts on public land and associated public land management activities.
- Avoid or minimise potential adverse impacts on Aboriginal and historical heritage.
- Avoid or minimise potential adverse impacts on nearby residents and other sensitive receptors associated with visual amenity, noise, traffic, and air quality.
- Avoid impacts to business and commercial operations.
- Avoid or minimise potential impacts on productive agricultural land.
- Avoid or minimise the risk of bushfire.
- Ensure an appropriate land use outcome by avoiding areas of sensitivity and potential land use conflicts.
- Be able to obtain necessary agreements with landowners and land managers to install and operate infrastructure.
- Be able to obtain planning and environmental approvals from all necessary authorities.
- Provide a constructable and cost-effective grid connection.

1.3 Understanding and purpose

Understanding the physical and socio-economic environment of an area potentially affected by a transmission line is a key foundation to establish in the early stages of a route options assessment process. Existing environmental, physical, and socio-economic factors can constrain the viability and development of transmission lines. For example, steep and undulating terrain can often present technical and design complexities in developing transmission lines; locating a transmission line through a highly developed and densely populated area can result in social and amenity impacts on local communities; and locating a transmission line through sensitive landscapes such as wetlands and high-quality native vegetation can result in ecological impacts.

Where a possible alignment is not constrained and various route options exist, other factors and complexities require consideration to minimise potential impacts, including engineering and design related

factors. For example, consideration can be made to construct transmission lines underground. The cost of constructing an underground line is considerably higher than an overhead line, however, this additional cost might be offset by minimising the length of the transmission line or by avoiding the need for other grid connection assets. Consideration can also be made for more costly or complex designs that allow for potential environmental and social impacts to be avoided or minimised.

Existing overhead transmission line easements, roads, and road reserves can also provide opportunities to minimise potential impacts by co-locating a possible alignment in disturbed land or beneath existing assets (such as roads).

The purpose of this options assessment is to identify and assess feasible transmission line route and configuration options to assist in identifying a 'preferred option'. The multi-criteria analysis (MCA) undertaken in this options assessment aims to inform decision-making.

Deciding on a preferred option for the transmission line route includes accounting for, and considering on balance, the array of issues and opportunities identified for each option. Based on several technical assessments and ongoing optioneering work, Neoen selected a preferred option to progress as part of the EES.

The options assessment has been an iterative process with consideration of technical and commercial requirements in conjunction with environmental, heritage, and social values. The preferred option is the option that has been assessed and reported on in the Project's EES.

1.3.1 Scoping requirements

The *Scoping Requirements for Kentbruck Green Power Hub Environment Effects Statement* (the Scoping Requirements) requires the EES to identify feasible alternatives considered for the Project and provide an explanation of how the Project design has been revised in response to constraints identified throughout the EES process.

Section 3.4 of the Scoping Requirements states:

The EES should canvass the proponent's consideration of feasible alternatives and include an explanation of how specific alternatives were shortlisted for evaluation within the EES. The EES should document the likely environmental effects of the feasible project design alternatives, particularly where these offer a potential to minimise and/or avoid environmental effects whilst meeting the objectives of the project, including external transmission line routes and configurations.

To satisfy the Scoping Requirements and demonstrate a thorough assessment of feasible transmission line routes and configurations in the EES, this transmission line route options assessment has been undertaken. The findings of this assessment have been used to inform the Project development chapter of the EES (Chapter 4).

1.4 Scope

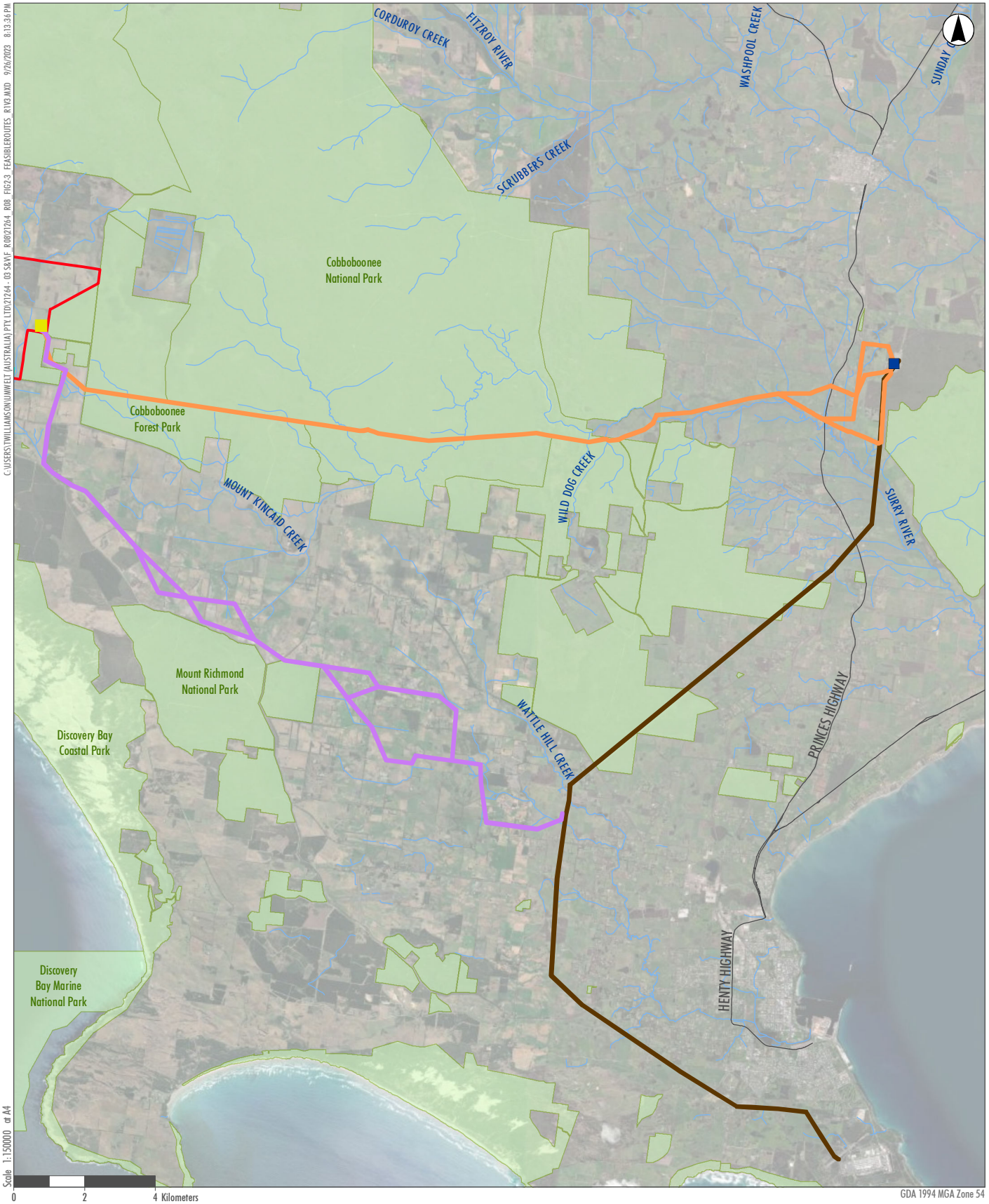
Figure 1.1 outlines the scope of works and methodology used in the transmission line options assessment.

Figure 1.1 Scope and methodology

1.4.1 Assumptions and limitations

The following assumptions and limitations have been identified in the preparation of this transmission line options assessment:

- The assessment of feasible transmission line options has been undertaken with publicly available datasets, technical assessments prepared for the EES, and for some aspects field studies. An overview of the datasets used is provided in **Appendix A**. Technical information was also obtained from Neoen relating to constructability, operability, and commercial factors.
- Each technical assessment undertaken for the EES has prepared a specific options assessment for their discipline that considers each of the four feasible options identified in this report. The findings of these assessments have informed the options assessment investigations within this report.
- A precautionary approach has been adopted where the information available for each option differs.



Legend

- Wind Farm Site
- Previous Substation Location
- Heywood Terminal Station
- Roads
- Drainage Line
- Heywood-Portland 500kV Transmission Line
- Option 1 - Heywood
- Option 2 - Portland

FIGURE 2.3

Feasible Route Options

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)

2.1.1 Heywood corridor

The most direct route for a transmission line to connect the Project into the Heywood Terminal Station is due east from the wind farm site boundary. A transmission line route within this corridor would involve traversing Cobboboonee National Park and Cobboboonee Forest Park (the Parks), located to the east of the wind farm site, which represent a key environmental constraint. This could result in potential environmental and amenity effects, such as impacts on native vegetation, Aboriginal cultural heritage, land use changes, and changes to the landscape and visual amenity. Locating the transmission line within a national park also adds a degree of complexity in terms of approval requirements. However, this corridor was selected for further assessment as there was scope for design, siting and constructability optimisation that could minimise impacts.

2.1.2 Portland corridor

The Portland Route would involve connecting into the existing Heywood-Portland 500 kV transmission line. This is a less direct route than the Heywood Route and would involve locating the transmission line within private landholdings throughout Mount Richmond and Gorae West. While a route within this corridor avoids national parks and other public land, it would require new infrastructure to be built at the cut-in point, including a new terminal station. This corridor was selected for further assessment as it was deemed to be viable based on the initial assessments.

2.1.3 SA-VIC interconnector corridor

The SA-VIC Interconnector is a 275 kV overhead dual circuit transmission line which connects the South East Terminal Station in South Australia to the Heywood Terminal Station in Victoria. Developing a transmission line within this corridor that extends north from the wind farm site and connects into the SA-VIC Interconnector was considered as a potential route for the Project. This corridor would traverse the Hancock Victorian Plantation (HVP) pine plantation and Lower Glenelg National Park which are both located to the north of the wind farm site.

A key limitation to progressing this corridor further, aside from the length and sensitive landscape, was the ability to connect into this transmission line. The National Energy Rules (NER) govern the operation of the NEM and stipulate that a generator cannot connect into an interconnector. This route was therefore not considered viable.

While connecting into the SA-VIC Interconnector directly was ruled out as an unviable route within this corridor, the potential to use the existing SA-VIC Interconnector easement and co-locate a transmission line alongside the SA-VIC Interconnector into Heywood Terminal Station was considered. This route is discussed further in **Section 2.2.**

2.1.4 Mount Gambier corridor

Neoen also considered a route that would extend west of the wind farm site into South Australia.. The most practical connection point for this route would have been into the Mount Gambier Substation (see **Figure 2.1)**, however there is no available capacity at this substation to allow the Project to be connected and unconstrained. Mount Gambier Substation has a maximum voltage of 66 kV which can only hold up to 100 MW of power generation.

Alternatively, South East Terminal Station to the north of Mount Gambier has a maximum voltage of 275 kV which would allow unconstrained connection of the proposed 600 MW wind farm. However, this would result in a transmission line length of approximately 40 kilometres (km), which would need to span the Glenelg River and would require planning approval in two states (Victoria and South Australia). It would also require intersecting with a high number of private host landholdings which would be required to enter into an agreement with Neoen. An alignment of this distance would also result in higher costs, compared to a more proximate connection option in Victoria. Connecting the Project directly to South Australia was ultimately deemed to not be commercially viable.

This corridor was therefore not considered viable and was not progressed for further assessment.

2.2 Preliminary routes

Of the initial corridors identified, the Heywood and Portland options were considered by Neoen as viable options warranting further investigation, with a variation on the SA-VIC Interconnector Route also considered (co-location of the transmission line within the SA-VIC Interconnector easement instead of a cut-in to the SA-VIC Interconnector).

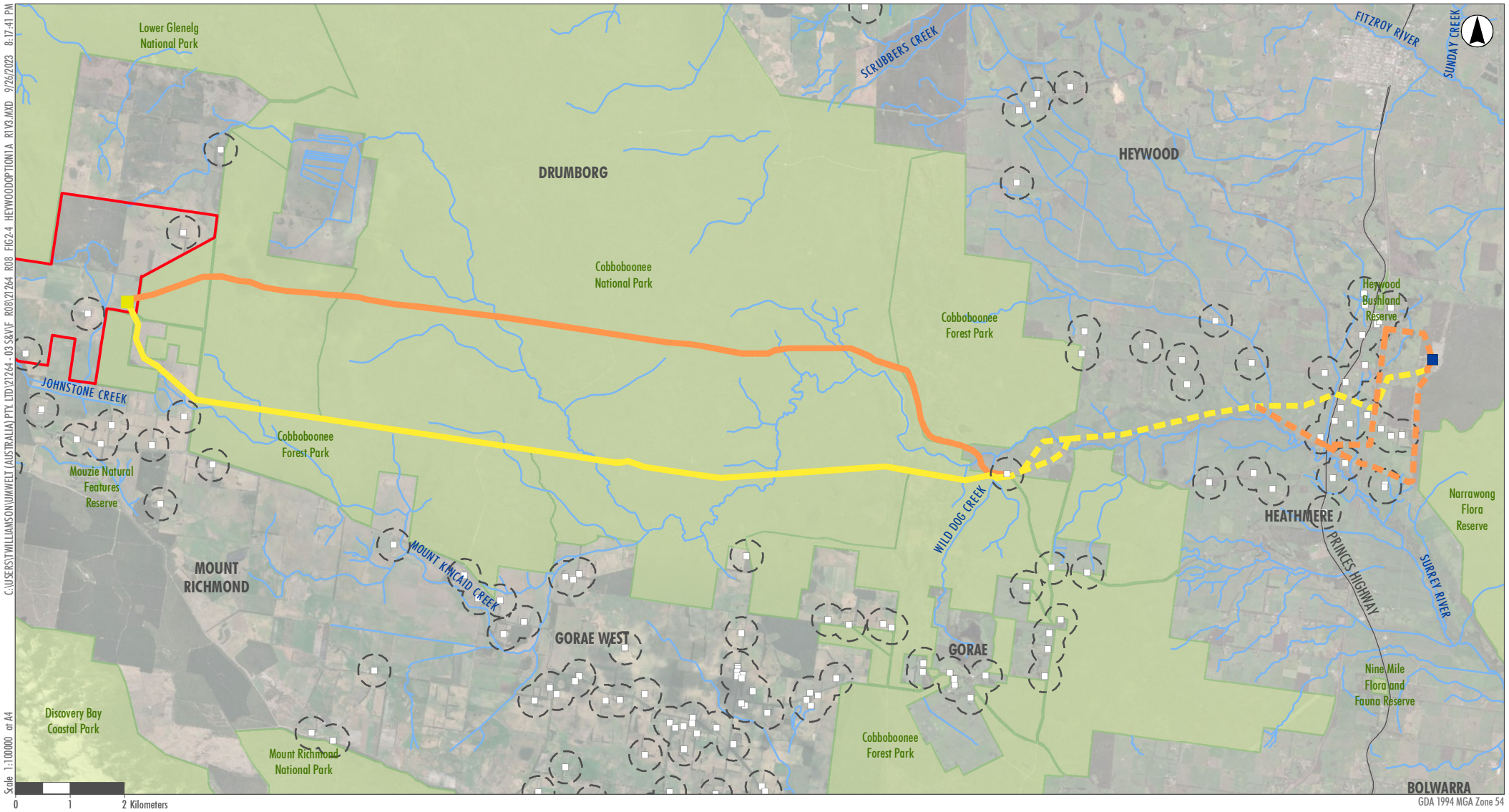
Further evaluation was undertaken by Neoen to refine these routes and identify feasible options. This involved undertaking broad-scale desktop mapping to identify prominent environmental, social and land use constraints to avoid, such as more densely populated areas and sensitive landscapes. Design and constructability factors were also considered, including the length of the transmission line, and whether the transmission line would be located underground or overhead. Commercial factors were also considered during this preliminary route options phase, including the costs of constructing and operating the infrastructure and to secure landowner agreements to install infrastructure on freehold land.

Four preliminary routes were identified by Neoen from the initial corridors considered, as shown on **Figure 2.2.** Three of the four preliminary routes would connect into the Heywood Terminal Station:

- Route 1: Extending east from the wind farm through Cobboboonee National Park, Cobboboonee Forest Park and freehold agricultural land.
- Route 3: Extending north from the wind farm through the HVP plantation and Lower Glenelg National Park, using the existing easement of the SA-VIC Interconnector to connect into the Heywood Terminal Station.
- Route 4: Extending east from the wind farm through Gorae West, Cobboboonee Forest Park and freehold agricultural land.

The fourth preliminary route considered (Route 2) would join the existing Heywood-Portland transmission line, requiring electrical infrastructure to be built to enable the connection.

An overview of these preliminary route options is provided in **Table 2.1**, including a summary of the key environmental, social, technical, design, and commercial factors relevant to each option. The second column in **Table 2.1** indicates whether each preliminary route option was deemed feasible by Neoen having regard to these factors. Each feasible option was subsequently assessed in more detail (see **Section 2.3**).



Legend

- Wind Farm Site
- Dwellings
- Heywood Terminal Station
- Previous Substation Location
- Residential Dwellings 300m Buffer
- Option 1A.1 Boiler Swamp Road
- Option 1A.2 Cut Out Dam Road
- Feasible overhead component of Option 1A
- Unfeasible overhead component of Option 1A (route options not assessed in detail)
- Roads
- Drainage Line

FIGURE 2.4

Heywood Option 1A Feasible Options

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021); Biosis (2022)

Table 2.1 Preliminary route options

Routes	Description	Summary assessment against Project objectives	Feasible
Route 1	The proposed route would exit the wind farm site and traverse Cobboboonee National Park and Forest Park beneath Boiler Swamp Road for a significant portion of the transmission line. The remainder of the route would consist of an overhead line that would traverse farming land before it connects into Heywood Terminal Station. This route would be the most direct for connecting the Project to the Heywood Terminal Station.	This route was deemed feasible as it would avoid large extents of productive agricultural and residential land and the associated amenity impacts. This route also provided scope for design, siting, and constructability optimisation, including locating the transmission line beneath an existing road, which could minimise potential impacts. While potential indirect impacts on native vegetation within Cobboboonee National Park would be likely to occur, locating the transmission line beneath an existing road was deemed a significant advantage for this option and was considered a feasible option for further assessment.	**Yes**
Route 2	This route involved an overhead line that would run south-east from the wind farm and connect into the existing Heywood-Portland 500 kV transmission line at a cut-in point north of Portland. This route would be primarily on agricultural land within private property. New utility infrastructure including a terminal station would also need to be built at the cut-in point.	Despite the potential for impacts on productive agricultural land and amenity, this route was deemed feasible and suitable for further assessment as it is a cost-effective option and would avoid Cobboboonee National Park and Forest Park and any potential associated environmental impacts. The existing Heywood Portland 500 kV transmission line would have capacity to take on the Project and connect into Heywood Terminal Station.	**Yes**
Route 3	This route involves co-locating a transmission line within the SA-VIC Interconnector easement into the Heywood Terminal Station. This route involved a short underground section through the HVP pine plantation and Lower Glenelg National Park, with the remainder being overhead. This route was identified as an alternate possibility when it was determined that connecting directly into the SA-VIC Interconnector was not feasible.	The benefit of this route was the use of an existing transmission line easement. However, this route was ultimately not considered feasible due to the significant distance and complexity of the line, associated costs, and land tenure challenges.	No
Route 4	This route would exit the wind farm site and run south-east through Gorae West as an overhead transmission line. It would then transition underground through Cobboboonee Forest Park, before it turned into an overhead line again through farm land and directly connect into Heywood Terminal Station. While this route avoids much of the national park, it is longer than the more direct option (Route 1) and crosses several private properties.	This route would require native vegetation clearance within Cobboboonee Forest Park, three highway crossings and would utilise Fish Hole Road through Cobboboonee National Park, which is a narrow road (narrower than Boiler Swamp Road proposed for Route 1) that has several turns and bends. These turns and bends mean undergrounding a transmission line could not easily be done. Additional clearing of native vegetation within Cobboboonee Forest Park would be required along the narrow roadsides of Fish Hole Road. Locating the overhead sections on farming land	No

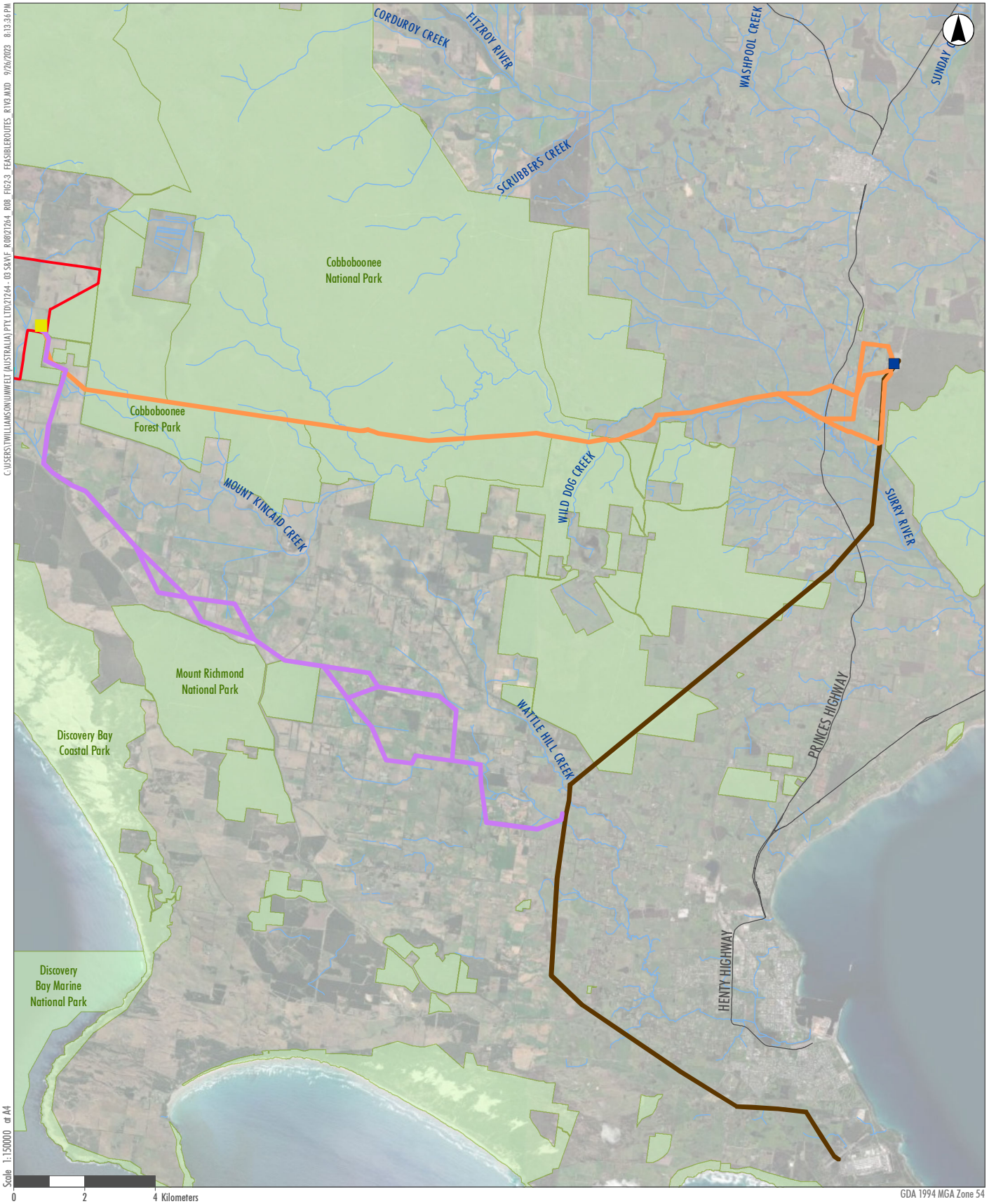
Routes	Description	Summary assessment against Project objectives	Feasible
		adjacent to the Cobboboonee Forest Park would also be a significant fire safety risk due to the proximity to the park if a bushfire were to occur. The number of proximate residential dwellings also represented a constraint in pursuing this route further. The potential social and amenity impacts associated with an overhead transmission line located through Gorae West were considered to be greater than an overhead transmission running south-east towards the Heywood-Portland 500 kV transmission line (Route 2).	

2.3 Feasible routes

From the preliminary routes identified, Neoen determined that Route 1 (Option 1) and Route 2 (Option 2) were feasible transmission line options requiring further consideration. Both options were included in the Project's referral under the EE Act, as they were subject to ongoing design development at the time. Additional desktop assessments were undertaken by Neoen to refine each option to ensure consistency with the objectives stated in **Section 1.2**, including configurations of overhead and underground components and micro siting of segments to avoid key constraints that were identified in the early development phase**.**

An overview of the development of each feasible option is provided in the following sections. **Figure 2.3** shows the transmission line route options identified as being feasible.

These feasible options were taken forward for assessment by Umwelt using the methodology and assessment criteria outlined in **Section 3.0**, to determine the preferred transmission line option for the Project.



Legend

- Wind Farm Site
- Previous Substation Location
- Heywood Terminal Station
- Roads
- Drainage Line
- Heywood-Portland 500kV Transmission Line
- Option 1 - Heywood
- Option 2 - Portland

FIGURE 2.3

Feasible Route Options

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)

2.3.1 Option 1 – Heywood

As outlined in **Section 2.2**, Option 1 is the most direct route to connect the Project into the Heywood Terminal Station. The preliminary configuration of Option 1 contained both underground and overhead components, with a total length of approximately 26.6 km (hereon in referred to as Option 1A). In Option 1A, the transmission line would extend underground from the main wind farm substation, traversing Cobboboonee National Park and Forest Park beneath an existing road before transitioning to overhead after exiting the Forest Park. It would continue overhead through freehold farming land to reach the Heywood Terminal Station. The overhead line section would consist of a double-circuit arrangement on single poles spaced at approximately 300 m intervals. A transition station would be required as part of this option to transition the underground cable to an overhead powerline once the cable has exited Cobboboonee Forest Park.

A potential option was also explored that would involve underground cabling for the entire transmission line route, with no overhead components (Option 1B). Construction of underground transmission lines is more expensive than overhead lines and involves more ground disturbance. However, there are benefits associated with underground lines, including reduced social and visual impacts, removing potential collision risks for birds including Brolga, and in some cases, less impact on vegetation with the implementation of horizontal directional drilling (HDD). Trees above a certain height need to be trimmed or removed within the easement of an overhead line, thus the development footprint of an overhead line can be substantially larger than an underground line depending on the extent of surrounding vegetation.

Choosing to install transmission lines overhead, underground or a combination of both is a key consideration when developing new electrical connections. It is often an 'on-balance' decision, where all factors need to be considered, including environmental, heritage and social constraints, as well as technical, constructability and commercial considerations, to inform a decision.

Both the combined configuration (Option 1A) and underground configuration (Option 1B) of the Heywood option were considered feasible routes to take forward for assessment. The design development of these options is discussed below.

2.3.1.1 Option 1A – Heywood combined configuration

Underground component

Two potential routes were identified for the underground component of Option 1A (see **Figure 2.4**):

- **Option 1A.1 – Boiler Swamp Road**: Underground cabling located beneath Boiler Swamp Road through Cobboboonee National Park and Forest Park
- **Option 1A.2 – Cut Out Dam Road**: Underground cabling located beneath Cut Out Dam Road through Cobboboonee National Park and Forest Park.

These two potential routes were included in the Project's referral under the EE Act as Option 1 was still subject to ongoing design development at the time. The Scoping Requirements for the Project also refer to both potential underground alignment options for the Option 1A transmission line.

Both options would exit the main wind farm substation as underground cabling and traverse the Parks beneath the road, before transitioning to an overhead line within freehold land on the eastern side of the Forest Park. Boiler Swamp Road and Cut Out Dam Road are both unsealed roads. Consent would be required under Section 27 of the NP Act to construct the transmission line through Cobboboonee National Park, and a lease under Section 52(1C)(f) of the Forests Act would be required for the section of transmission line located within Cobboboonee Forest Park.

AusNet conducted an initial assessment in 2018 to investigate the feasibility of the high-level Heywood and Portland transmission line options described in **Section 2.2**. A conservative construction envelope with width and height of 8 m was assumed to be sufficient for the purpose of building the underground lines using a standard construction methodology (open cut trenching). This construction envelope was used to provide a conservative estimate of potential impacts on native vegetation. The initial analysis concluded that no vegetation would need to be removed, but some vegetation may need to be trimmed during construction. It should be noted this information has now been superseded through additional assessments of Boiler Swamp Road, however it played an important role in the decision to proceed with Boiler Swamp Road over Cut Out Dam Road.

The Boiler Swamp Road formation is between 5 m and 6 m wide with 1–1.5 m wide shoulders, while Cut Out Dam Road is 4.5 m-wide on average with 1.2–2.5 m-wide shoulders. The wider road formation along Boiler Swamp Road means that there is less potential for native vegetation impacts during transmission line construction. Vegetation along Cut Out Dam Road was also observed to have a thicker tree canopy compared to vegetation along Boiler Swamp Road.

Australian Standard *AS 4970:2009 Protection of trees on development sites* considers that impacts on 10% or more of a tree protection zone result in the loss of the tree. Although the initial advice from AusNet was that no vegetation would need to be removed for construction of the transmission line through the Parks, adherence to AS 4970 means that there would likely be a greater native vegetation loss along Cut Out Dam Road due to the greater density of vegetation than Boiler Swamp Road.

Boiler Swamp Road is relatively straight, with some wide bends in the road. In contrast, Cut Out Dam Road has several relatively tight bends near its eastern end. Cable installation along Cut Out Dam Road would therefore be more complex than for Boiler Swamp Road, requiring additional construction time and cost. The design and narrow width of Cut Out Dam Road would also not easily allow for emergency services and other traffic to pass around construction works, whereas there would be more allowance for emergency vehicles along Boiler Swamp Road during construction. Site inspections of Cut Out Dam Road showed evidence of the road being washed out in some sections over winter months, which suggests that it is not as much of an all-weather road as Boiler Swamp Road is.

The Boiler Swamp Road option was therefore considered to be a more feasible route than the Cut Out Dam Road option.

Following selection of the Boiler Swamp Road option, more detailed design work was undertaken for the construction methodology, construction footprint, and operational and maintenance requirements of the underground component. A basis of concept design was undertaken by Downer in 2022 with input from Tesmec, a potential trenching machine supplier. The design involved three trenches for three separate cables, to be constructed using a specialised machine that excavates, lays the cable and backfills the trench in a single pass. This approach would minimise the associated construction footprint through small trench

widths and minimal spoil generation. A maximum construction corridor width of 6.5 m would be required, involving a 2.9 m-wide cable corridor and 3–3.2 m-wide construction access bypass that would allow emergency vehicles to pass the machinery during construction.

The construction methodology described above necessitates the placement of the electrical cabling beneath the existing road formation. This has a consequential effect of avoiding and minimising potential impacts on native vegetation that would otherwise occur if the cable was to be placed in the road formation shoulder, outside of the road formation, or on poles above the ground (which could require vegetation management underneath the cables for the life of the operation of the transmission line).

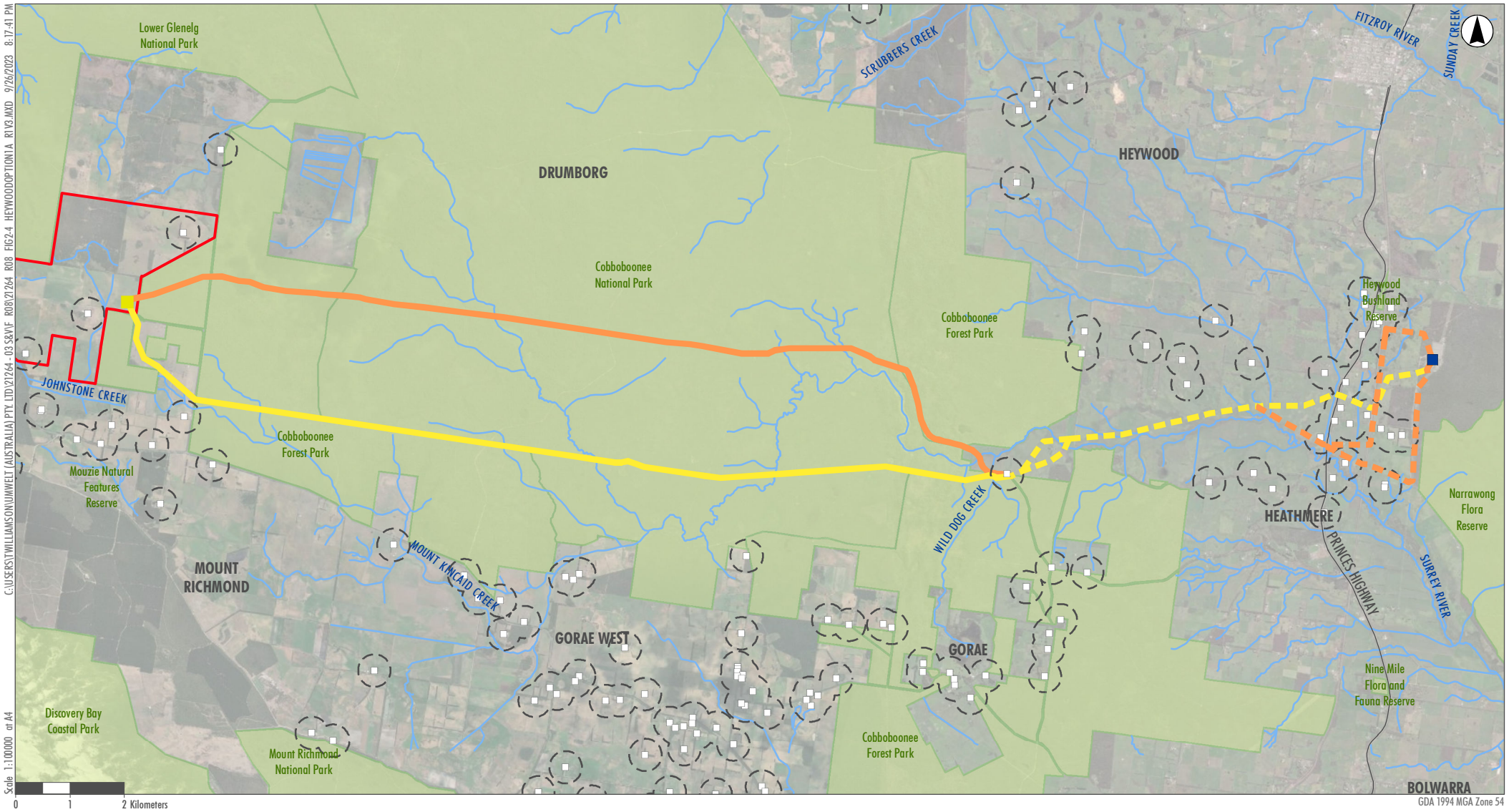
Overhead component

Option 1A would transition from underground to overhead at a transition station located on freehold land approximately 2.4 km east of Cobboboonee Forest Park. From there, the overhead line would run generally parallel to the Surrey River for approximately 3.5 km. As shown on **Figure 2.4**, three different route options were initially identified to connect the overhead line into the Heywood Terminal Station. Two of the options were deemed unfeasible by Neoen following discussions with AusNet, so only the option which connects into the Heywood Terminal Station from the south-west has been assessed in detail.

Landholdings between Cobboboonee Forest Park and the Heywood Terminal Station, and associated agricultural activities, have the potential to be impacted by ground disturbance and clearing activities to establish the 40 m-wide easement for the overhead line and associated access tracks.

2.3.1.2 Option 1B – Heywood underground

Option 1B follows the same route as Option 1A but would be entirely underground. This would involve the installation of additional underground cabling through freehold agricultural land between Cobboboonee Forest Park and the Heywood Terminal Station, which would require trenching through these landholdings and likely HDD under the Henty Highway and railway line. There is potential for impact on these properties and associated agricultural activities from ground disturbance works during construction of the underground line and access tracks.



Legend

- Wind Farm Site
- Dwellings
- Heywood Terminal Station
- Previous Substation Location
- Residential Dwellings 300m Buffer
- Option 1A.1 Boiler Swamp Road
- Option 1A.2 Cut Out Dam Road
- Feasible overhead component of Option 1A
- Unfeasible overhead component of Option 1A (route options not assessed in detail)
- Roads
- Drainage Line

FIGURE 2.4

Heywood Option 1A Feasible Options

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021); Biosis (2022)

2.3.2 Option 2 – Portland

The preliminary route identified for Option 2, as described in **Section 2.2**, would connect into the existing Heywood-Portland 500 kV transmission line. This option would extend from the main wind farm substation for 26 km across several freehold rural landholdings used primarily for grazing and would require development and construction of a new terminal station adjacent to the existing 500 kV line at the cut-in location. Option 2 was included in the Project's referral under the EE Act as an overhead transmission line, however, was presented as a development envelope at the time as it was subject to ongoing design development. The development envelope was established to show the area within which the route for the transmission line will be located. Using a development envelope for the transmission line provided flexibility for the selection of the preferred route.

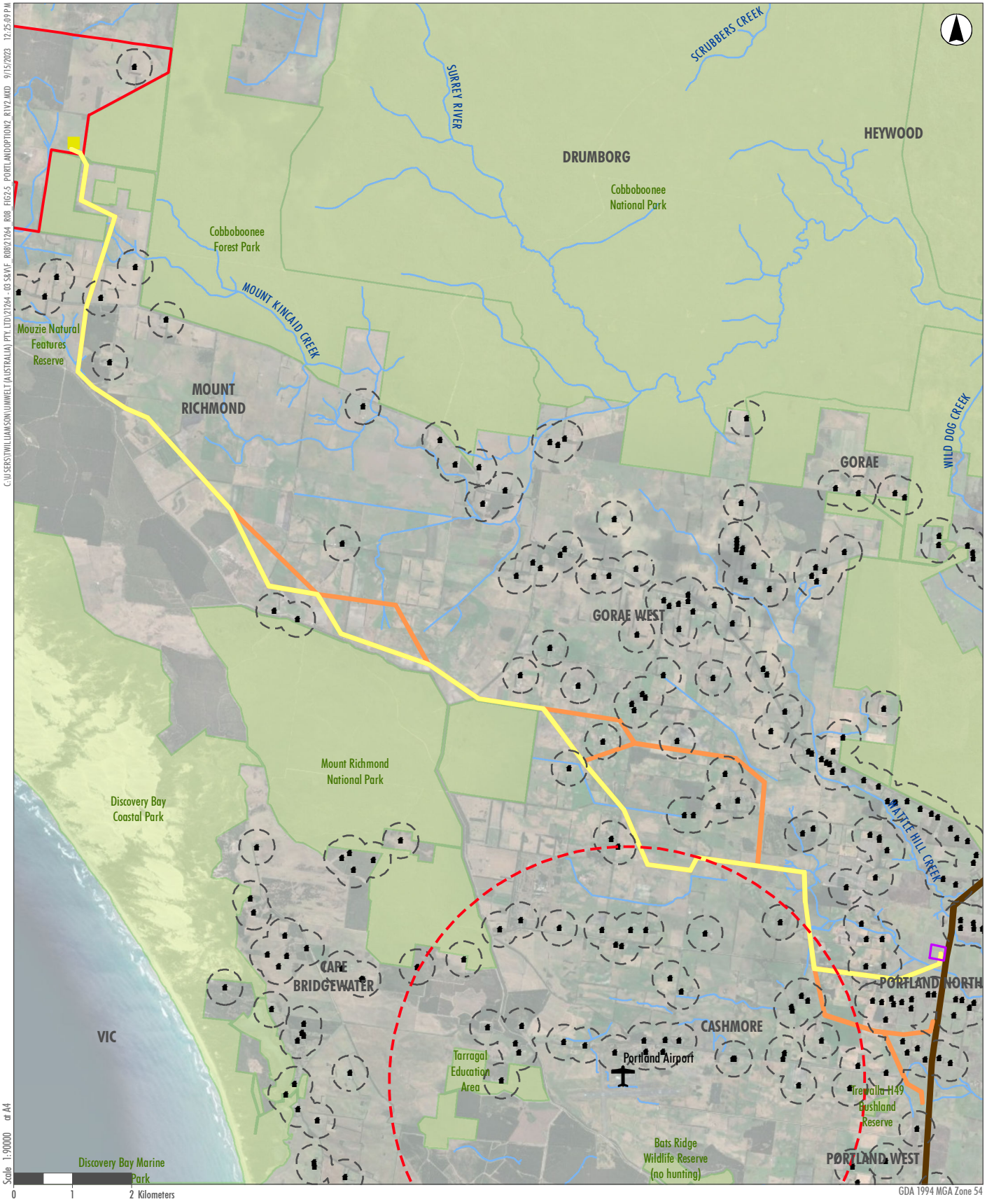
The chosen route for Option 2, as shown on **Figure 2.2**, was refined to consider a range of route options, primarily due to social and amenity constraints associated with nearby dwellings and potential impacts on agricultural land. Discussions with potential host landholders largely informed selection of the transmission line route, as several landholders along the preliminary route were opposed to the overhead transmission line. No final route for Option 2 could be determined as landowner agreements were unable to be secured for the entire length of the transmission line route, however for the purpose of the Options Assessment a single route has been selected and assessed (see **Figure 2.3**).

Neoen has also considered an underground configuration for this option to mitigate potential social and amenity impacts. Two different configurations were therefore considered in this transmission line options assessment: Overhead along the entire length (Option 2A) and underground (Option 2B). The options would follow the same route.

Several connection options were identified to connect Option 2 to the existing Heywood-Portland 500 kV transmission line (see **Figure 2.5**). These were predominantly identified with consideration of key constraints present in the surrounding area, including residential dwellings, the Portland Aerodrome and potential locations for the new terminal station to cut-in to the existing transmission line. The two southern options were ruled out as the overhead line (for Option 2A) would infringe on the Inner Horizontal Surface of the Portland Aerodrome Obstacle Limitation Surface (OLS). Both options would also infringe upon the Instrument Approach Surface as they cross the runway centreline. These two options are identified and discussed in Appendix J of the Aeronautical Impact Assessment (Appendix T of the EES)**.**

It is more expensive to construct underground cabling of transmission lines than overhead lines. Construction works to install the underground cabling through various landholdings could result in significant ground disturbance to productive agricultural land and disruption to agricultural practices. However, there are benefits associated with underground lines including reduced social and visual impacts on private landholdings during operation, and no risk of avifauna collisions with the transmission line.

Both the overhead configuration (Option 2A) and underground configuration (Option 2B) were considered feasible options to take forward for further assessment.



Legend

- Wind Farm Site
- Proposed Terminal Station Location
- Heywood Terminal Station
- Previous Substation Location
- Residential Dwellings
- Residential Dwellings 300m Buffer
- Inner Horizontal Surface for Portland Airport
- Option 2 (Portland) Feasible Options
- Unfeasible Connection Options
- Heywood-Portland 500kV Transmission Line
- Roads
- Drainage Line

FIGURE 2.5

Option 2 (Portland) Feasible Options

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)

2.4 Summary

An overview of the options identification process is shown in **Figure 2.6.** This flowchart outlines the steps taken by Neoen to identify the feasible transmission line options to be taken forward for assessment. A summary of the feasible options to be assessed is provided in **Table 2.2** and shown in **Figure 2.7.**

Table 2.2 Summary of feasible route options taken forward for assessment

Heywood Option		Portland Option	
Option 1A	**Option 1B**	**Option 2A**	**Option 2B**
Underground (18.8 km) Overhead (7.8 km)	Underground (26.6 km)	Overhead (26 km)	Underground (26 km)
The transmission line would extend underground from the main wind farm substation and traverse Cobboboonee National Park and Forest Park beneath an existing road, and then extend overhead once it exits the Forest Park through freehold rural landholdings to reach the Heywood Terminal Station.	The underground transmission line would extend from the main wind farm substation and traverse Cobboboonee National Park and Forest Park beneath an existing road, and then continue through freehold rural landholdings to reach the Heywood Terminal Station.	The overhead transmission line would extend from the main wind farm substation and traverse several freehold rural landholdings used primarily for grazing. This option would require development and construction of a new terminal station adjacent to the existing Heywood-Portland 500 kV line north of Portland.	The underground transmission line would extend from the main wind farm substation and traverse several freehold rural landholdings used primarily for grazing. This option would require development and construction of a new terminal station adjacent to the existing Heywood-Portland 500 kV line north of Portland.

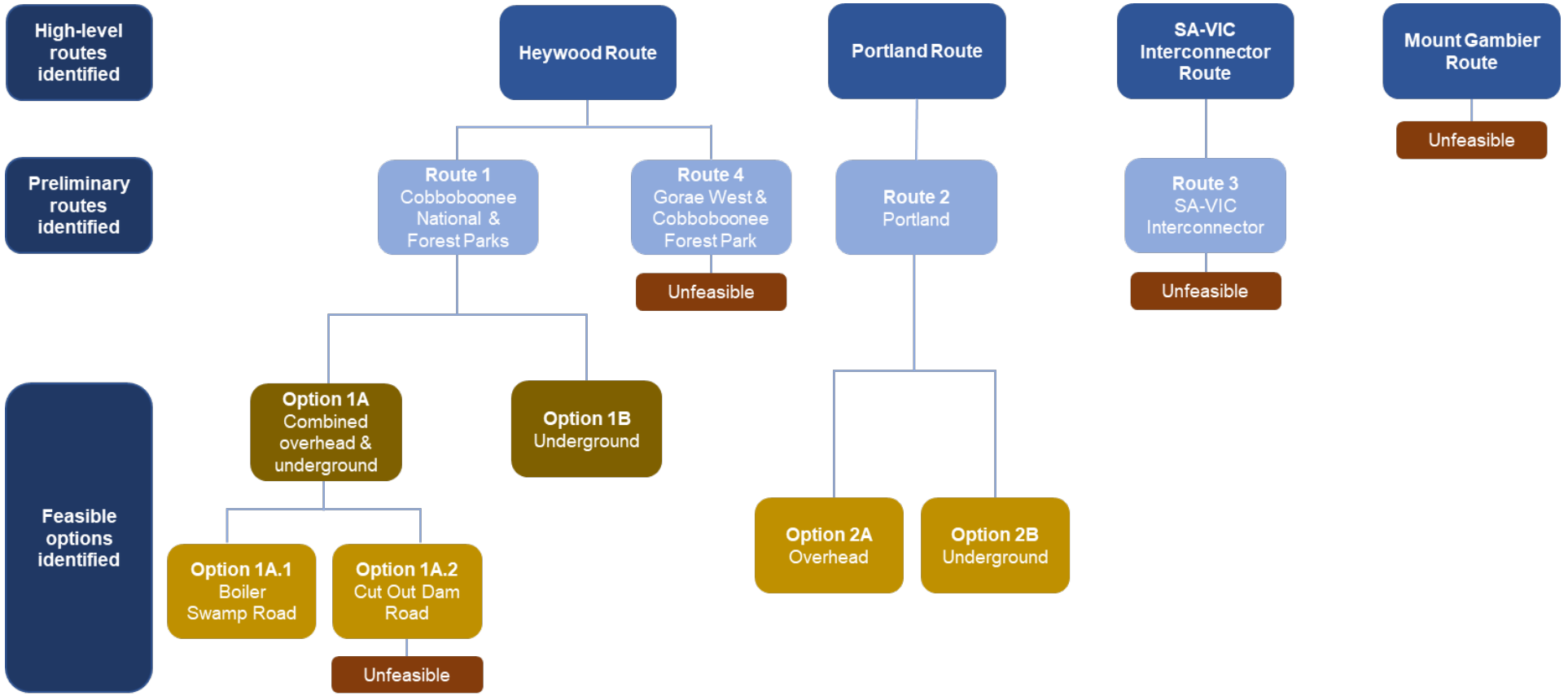
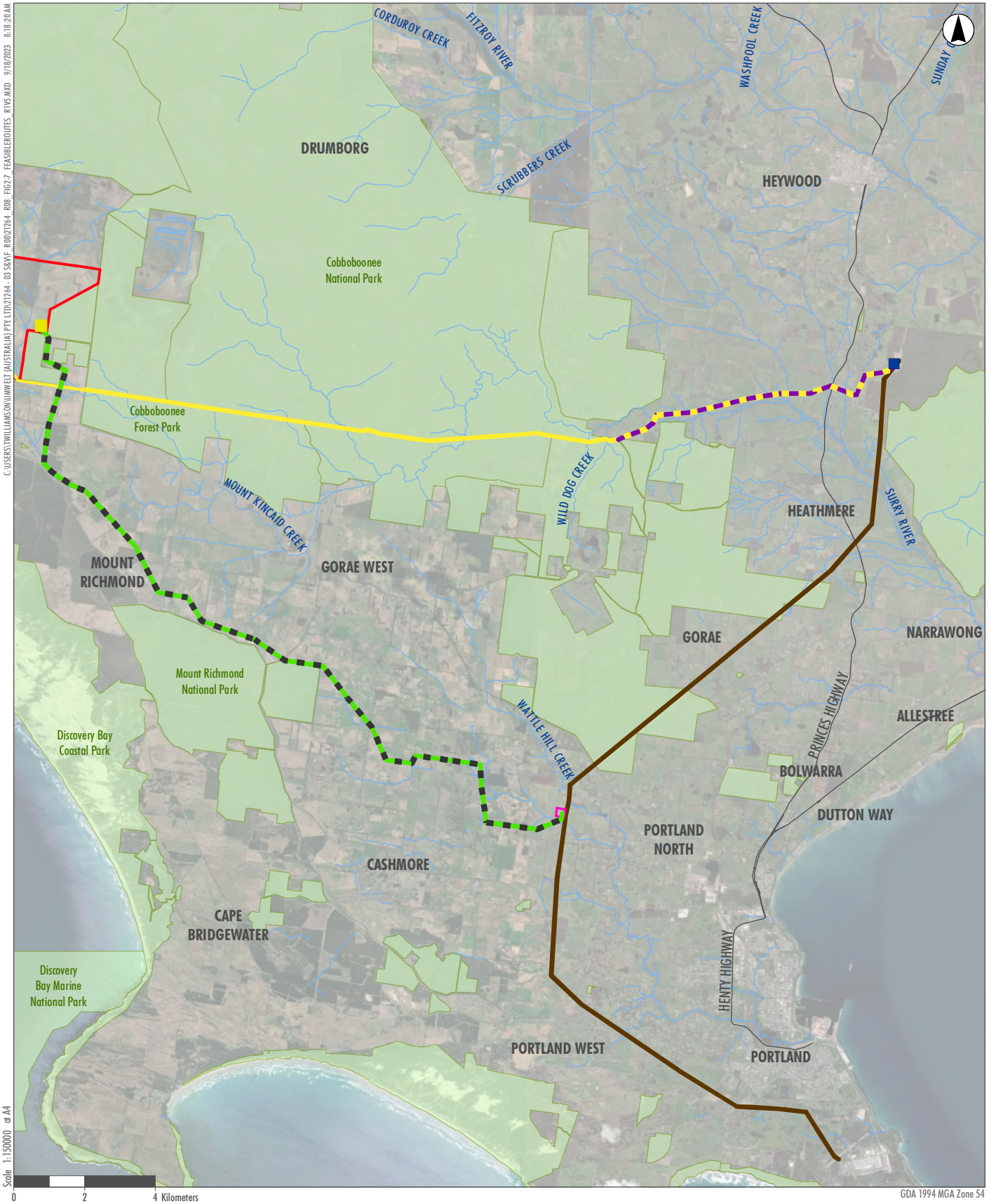


Figure 2.6 Options identification process



Legend

- Wind Farm Site
- Proposed Terminal Station Location
- Main Wind Farm Substation
- Previous Substation Location
- Heywood Terminal Station
- Roads
- Drainage Line
- Heywood-Portland 500kV Transmission Line
- Overhead component of Option 1A
- Underground component of Option 1A and 1B
- Underground component for Option 1B
- Option 2A
- Option 2B

FIGURE 2.7

Feasible Options Taken Forward for Assessment

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)

3.0 Options assessment

Umwelt assessed feasible transmission line options identified by Neoen to assist in identifying a preferred transmission line option for the Project. The assessment was based on a set of criteria with metrics assigned to each criterion. Each feasible transmission line option was assessed against these criteria based on a range of data sources, including:

- Cost, design, constructability, operability, and consultation information supplied to Umwelt by Neoen.
- Technical information and spatial data from relevant EES specialists.
- Publicly available spatial data.

The spatial data were mapped in a QGIS portal to identify which options intersect with the assessment criteria and to what degree. An overview of the data used to inform the assessment is provided in **Appendix A**.

The assessment involved the following steps:

1. Identification of relevant assessment criteria and appropriate metrics (see **Table 3.1**)
2. Collection of relevant information and spatial data applicable to each assessment criteria (e.g. community feedback, location of Ramsar wetlands and airports), including information provided in EES technical assessments.
3. Collation of spatial datasets into a QGIS portal to inform the assessment of each option against relevant criteria.
4. Assessment of the feasible options against each of the assessment criteria, using the QGIS portal and technical, cultural, and social information provided by Neoen and the EES specialists. A score was then assigned to each option based on the assigned metrics and corresponding ranking (high, medium, low, or N/A)
5. Weigh the scores according to the relative importance of each criterion for determining the preferred option, with an emphasis on environmental, social, heritage and land use factors.
6. Established an overall score for each option, based on the weighted assessment criteria scores, to identify a preferred option for the Project.

The purpose of this options assessment was to assess each feasible transmission line option against a range of relevant criteria to determine which option would be the least constrained and most aligned with the transmission line Project objectives (see **Section 1.2**).

3.1 Assessment criteria

3.1.1 Development

Umwelt, in consultation with Neoen and the technical specialists responsible for preparing studies for the EES, developed a detailed MCA methodology to assess the feasible options. The purpose of the MCA was to determine which option would best meet the objectives (see **Section 1.2**).

Project site-specific concerns and any nuances have also been considered in the development of these criteria, such as the known occurrence of Brolga within the area. While environmental, social, and heritage factors are key in the siting of transmission lines, criteria associated with design, constructability, operability, safety, land use, planning and commercial factors have also considered as these can significantly affect the viability of a transmission line. A mix of qualitative and quantitative criteria have been used in this assessment.

The criteria selected for the options assessment have been informed by key issues identified in the technical studies undertaken for the Project, as well as through feedback received from the Project's Technical Reference Group (TRG). For example, the Flora and Fauna Impact Assessment (Biosis, 2023) identified issues with threatened flora and native vegetation, and so criteria relating to each of these have been included. Many of the criteria have been updated and refined over time to reflect key issues that arose during the EES and TRG process. Criteria have been selected that would allow for comparison and a fair assessment between all options.

The development and selection of criteria to be used in this assessment have been informed by previous options assessments conducted within Victoria for linear infrastructure, as well as existing environmental, social, heritage, and land use values present within the alignments of each feasible transmission line option that have potential to be impacted. Consideration has also been given to the Victorian Transmission Investment Framework Final Design Paper (VTIF) (DEECA 2023). The VTIF provides a framework of new planning tools to facilitate the planning and development of transmission lines, including the siting and design of transmission lines. The VTIF seeks to improve the integration of land use and environmental impact considerations and community views into the planning process for transmission lines.

The VTIF proposes a strategic land use assessment (SLUA) and a MCA as tools to facilitate the planning process. The objective of a SLUA is to consider key land use, environmental and community issues to allow planners to identify the most appropriate areas for development, accounting for a range of relevant social, environmental, cultural, and economic considerations. As noted in the VTIF, "*blending technical and social elements supports the SLUA's objectives of identifying the most suitable corridors for transmission and areas for generation development, providing a process that meets stakeholder needs and fosters a greater level of social acceptance of outcomes*.". The objective of the MCA is to incorporate broader qualitative, economic, social, cultural and environmental factors into determining where, when and how Victoria's network should develop.

The criteria developed for this options assessment has considered the objectives of the VTIF, by incorporating a range of criteria that give effect to social, environmental, land use, cultural, economic, and technical considerations.

3.1.2 Scoring process

As shown in **Table 3.1**, each criterion has been categorised into a broader parameter group that represents the overall theme/value of the criteria within it. Ten parameter groups were developed for the Project's transmission line (e.g. constructability, land, environment). A set of specific metrics have been identified for each criterion against which each transmission line option was scored. An example criterion for the environment parameter relates to groundwater dependent ecosystems (GDEs) located near the transmission line option.

Each criterion was ranked as either low, medium, or high for each option based on metrics designed for that criterion (see **Table 3.1**). Scores of 0, 1, 2 or 3 were applied to the N/A, low, medium, and high rankings, respectively, where low scores indicate a more favourable outcome than high scores. Where an option does not intersect with a criterion and is considered not applicable to that transmission line option, a score of 0 has been assigned. For example, a score of 0 would be applied to a transmission line option that does not intersect with any potential GDEs, a score of 3 would be assigned to transmission line options that intersect with a potential GDE.

Once each criterion was scored for a transmission line option, the scores were summed for each parameter and divided by the number of criteria to provide a parameter score. The parameter scores were then multiplied by the weighting assigned to the corresponding parameter. The weightings assigned for each parameter are discussed in **Section 3.2**. Finally, the weighted scores were summed to produce a final score for the option.

Once the final scores were determined for all transmission line options, the preferred option was identified from the lowest final score.

Table 3.1 Assessment criteria and metrics

Parameter	Criterion	Metric			
		High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)
Environment	Intersects with protected areas (National Parks, State Parks, Ramsar wetlands)	Intersects with a National Park, State Park, or Ramsar wetland			Does not intersect with a National Park, State Park, or Ramsar wetland
	Native vegetation classified as an ecological vegetation class (EVC)	Direct impacts on 10 ha or more of native vegetation	Direct impacts on between 5 ha and 10 ha of native vegetation	Direct impacts on 5 ha or less of native vegetation	No impacts on native vegetation or potential impacts not able to be determined using available information
	Strategic biodiversity value (weighted average) for entire route, regardless of the extent of native vegetation	66-100	33-65	0-32	0
	Threatened fauna - impacts to individuals or habitat due to construction - potential loss of a genetically important population of an endangered or threatened species	High likelihood of population impacts	Medium likelihood, including some direct or indirect impacts to individuals	Low likelihood of direct or indirect impacts to threatened fauna	-
	Threatened flora - potential loss of a genetically important population of an endangered or threatened species	High likelihood of population impacts	Medium likelihood, including some direct or indirect impacts to individuals	Low likelihood of direct or indirect impacts to threatened flora	No impacts on threatened flora or potential impacts not able to be determined using available information
	Transmission line presents collision risk to avifauna species (excluding Brolga)	66–100% of the transmission line is overhead and presents a greater collision risk	33–65% of the transmission line is overhead and presents some level of collision risk	1–32% of the transmission line is overhead and presents some level of collision risk	Transmission line is entirely underground

Parameter	Criterion	Metric			
		High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)
	Mapped threatened ecological communities (TECs) listed under the FFG Act or EPBC Act	Intersects with a mapped TEC			Does not intersect with a mapped TEC
	Brolga	Transmission line is within 3.2 km of potential brolga breeding habitat. Potential for disturbance to breeding. Transmission line is overhead and presents risk of collision	Transmission line is within 3.2 km of potential brolga breeding habitat. Potential for disturbance to breeding. No risk of collision due to transmission line being underground.	Overhead transmission line is more than 3.2 km from potential brolga breeding habitat, or transmission line is underground and avoids impact on breeding habitat	No potential for impact on Brolga breeding habitat or risk of collision
	Groundwater dependent ecosystems (GDEs) (terrestrial and aquatic)	Intersects with a potential GDE			Does not intersect with any potential GDEs
	Victorian Department of Energy, Environment and Climate Action (DEECA) current wetlands	Intersects with a DEECA current wetland			Does not intersect with any DEECA current wetlands
	Major waterways	Transmission intersects with 3 or more major waterway crossings	Transmission intersects with less than 3 major waterway crossings	N/A	Does not intersect with any major waterways
Community / Social	Sensitive receptors potentially affected by operational noise from electrical infrastructure	Operational noise predicted to exceed the applicable noise limits determined in accordance with the Noise Protocol.	-	-	Operational noise predicted to comply with applicable noise limit determined in accordance with the Noise Protocol

Parameter	Criterion	Metric			
		High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)
	Sensitive receptors potentially affected by visual amenity impacts once Project is operational	Significant visual impacts likely at sensitive receptors during operation	Moderate visual impacts likely at sensitive receptors during operation	Low to negligible visual impacts anticipated at sensitive receptors during operation	-
	Sensitive receptors potentially affected by amenity impacts during construction (noise, visual, dust etc.)	Potentially significant amenity impacts at sensitive receptors during construction	Potential amenity impacts at sensitive receptors during construction but not significant	Negligible amenity impacts anticipated at sensitive receptors during construction	-
	Agricultural operations / enterprises (including property access and biosecurity risks)	Significant impact/disruption to agricultural operations during project operation	Some impact/disruption to agricultural operations during project operation	Minor impact/disruption to agricultural operations during project operation	-
	Community acceptance of transmission line option	Lack of community acceptance/strong community opposition	Moderate level of community acceptance/some concerns within the community	High level of community acceptance and strong support from community	-
	Actual or perceived property devaluation associated with a transmission line	Significant actual or perceived impact on property devaluation	Moderate actual or perceived impact on property devaluation	Negligible actual or perceived impact on property devaluation	-
Land	Availability of suitable land at grid connection point for electrical infrastructure	Suitable land at grid connection point is not available / landowner consent is unlikely to be obtainable	Suitable land at grid connection location is available but is constrained / landowner consent may be obtainable	Suitable land is available at grid connection point / landowner consent is likely to be obtainable	-

Parameter	Criterion	Metric			
		High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)
	Availability of suitable land along transmission line alignment	Suitable land along alignment not available / landowner consent is unlikely to be obtainable	Suitable land along alignment is available but is constrained / landowner consent may be obtainable	Suitable land along alignment is available at / landowner consent is likely to be obtainable	-
	Extractive sites (existing mines / quarries and Work Authorities for future extractive activities)	Intersects with existing mine / quarry or Work Authority	-	-	Does not intersect with any existing mines / quarries or Work Authorities
Heritage	Registered historic heritage sites (listed on the Victorian Heritage Inventory (VHI), Victorian Heritage Register (VHR), and/or Heritage Overlay of the Glenelg Planning Scheme)	Intersects with listed VHR sites of State or National significance	Intersects with listed VHI sites of higher than local significance	Intersects with listed VHI and or HO sites of local significance	Does not intersect with any listed heritage sites or sites have been destroyed/ in an areas of significant ground disturbance (SGD)
	Aboriginal places listed on the Victorian Aboriginal Heritage Register (VAHR) or identified through Project investigations	Intersects with known Aboriginal places of high significance (nature or preservation – e.g. scarred trees, large intact/complex subsurface artefact scatters)	Intersects with known Aboriginal places of moderate significance (nature or preservation – e.g. surface scatters subject to some level of disturbance/ turbation)	Intersects with known Aboriginal places of low significance (nature or preservation – e.g. Isolated occurrences or places which have been subject to high levels of disturbance)	Does not intersect with any known Aboriginal places or intersects with delisted or salvaged places where no further potential exists

Parameter	Criterion	Metric			
		High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)
	Intangible cultural heritage values present or likely to be present within the transmission line alignment that have identified through Project investigations	Significant intangible cultural values occur within the alignment (e.g. - trauma lines or Aboriginal historic places associated with Cultural Values Assessment (CVA))	Some intangible cultural values occur within the alignment (e.g. - physical aspects or places highlighted in the CVA)	Few or no intangible values occur within the alignment (general in nature)	-
	Length of alignment within areas that have a high likelihood of containing unidentified Aboriginal cultural heritage material[1] and/or within areas previously subject to significant ground disturbance (indicating a low likelihood of containing material)	40% or more of the alignment length overlaps with an area of cultural heritage sensitivity (CHS) with no known SGD	Between 20% and 40% of the alignment length overlaps with an area of CHS and/or has 20% or less of the alignment in areas of SGD	20% or less of the alignment length overlaps with an area of CHS and/or 40% or more of the alignment is in areas of SGD	Not associated with an area of CHS; or CHS has been demonstrably destroyed/removed by SGD
	Native Title land requiring provision under an Indigenous Land Use Agreement (ILUA) with the GMTOAC.	Intersects with Native Title land	N/A	N/A	Does not intersect with any Native Title land
Technical and Design	Electrical system design complexity (to facilitate connection to the grid and maintain existing levels of power system security, reliability, and power transfer capacity)	Complex electrical system design	Conventional electrical system design	Simple electrical system design	-
	Length of alignment located within an existing compatible infrastructure corridor	20% or less of the alignment length is within an existing compatible infrastructure corridor	Between 20% and 50% of the alignment length is within an existing compatible infrastructure corridor	50% or more of the alignment length is within an existing compatible infrastructure corridor	-

[1] Areas mapped as areas of cultural heritage sensitivity (CHS) under the *Aboriginal Heritage Act 2006.*

Parameter	Criterion	Metric			
		High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)
Constructability	Construction logistics and access requirements, such as availability of laydown areas and movement of equipment and materials	Significant logistics requirements and/or access constraints for the alignment or grid connection point	Above standard logistics requirements and/or access constraints for the alignment or grid connection point	Standard logistics requirements and/or access constraints for the alignment or grid connection point	-
	Construction complexity	Complex	Conventional	Simple	-
	Construction timeframe	Construction timeframe of 12 or more months	Construction timeframe of between six and 12 months	Construction timeframe of six or less months	-
Operability	Complexity of maintenance activities and requirements	Significant complexities with maintenance	Above standard complexities with maintenance	Standard complexities with maintenance	-
	Risk of third-party damage to transmission line and associated infrastructure	N/A	Above standard third party damage risk	Standard third party damage risk	-
Safety	Risk to worker safety during construction and operation	Significant safety risks	Above standard safety risk	Standard safety risk	-
	Elevated bushfire risks during operation (considers increased risk of transmission infrastructure causing a bushfire, and/or transmission infrastructure affecting bushfire suppression)	Significant elevation of bushfire risks	Moderate elevation of bushfire risks	Low elevation of bushfire risks	Negligible elevation of bushfire risks
Infrastructure	Airports and aerodromes	Overhead transmission line intersects with the Inner Horizontal Surface of an airport's OLS			Overhead transmission line does not intersect with the Inner Horizontal Surface of any airport's OLS, or the transmission line is underground

Parameter	Criterion	Metric			
		High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)
	Difference in capital expenditure between options	Ratio of capital expenditure of the option to the lowest cost option is greater than 1.4	Ratio of capital expenditure of the option to the lowest cost option is between 1.2 and 1.4	Ratio of capital expenditure of the option to the lowest cost option is between 1 and 1.2	-

3.2 Parameter weightings

Weightings have been developed to emphasise the relative importance of parameters when assessing the transmission line options. Environmental, social, land use and heritage parameters were assigned a higher weighting than other parameters. This reflects the environmental and social setting for the transmission line options and the value placed on these by the community, host and nearby landowners, First Nations people, public land managers, and regulatory authorities. These parameters collectively have an overall weighting of 60 %.

Cost is a key determinant in Project viability. However, while the shortest and/or simplest alignment to design and construct might have the lowest cost, in some instances it would also have detrimental environmental or social outcomes or technical constraints. To ensure that cost was appropriately weighted against outcomes for other parameters, a weighting of 15 % was applied.

For engineering, design, and constructability considerations there are often alternative solutions to issues that arise which allow for improved environmental, social, land use and/or heritage outcomes. These parameters were therefore considered to be the least critical and were assigned weightings of 5 %, with an overall weighting of 25 %.

Table 3.2 Parameter weightings

Parameter	Weighting	
Environment	25%	60%
Community / social	15%	
Land	10%	
Heritage	10%	
Technical and design	5%	25%
Constructability	5%	
Operability	5%	
Safety	5%	
Infrastructure	5%	
Cost	15%	15%

3.3 Assessment results

Using the metrics defined in **Table 3.1,** each transmission line option was assigned a score of 0, 1, 2 or 3 for each criterion. The results of the assessment for each feasible transmission line option are shown in **Table 3.3.**

Maps have been prepared for relevant criteria to illustrate the GIS data that has been used to inform the assessment outcomes (see **Figure 3.1** and **Figure 3.10**).

Table 3.3 Assessment results

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
Environment	25%	Intersects with protected areas (National Parks, State Parks, Ramsar wetlands)	Intersects with a National Park, State Park, or Ramsar wetland			Does not intersect with a National Park, State Park, or Ramsar wetland	3	3	0	0
		Native vegetation classified as an EVC	Direct impacts on 10 ha or more of native vegetation	Direct impacts on between 5 ha and 10 ha of native vegetation	Direct impacts on 5 ha or less of native vegetation	No impacts on native vegetation or potential impacts not able to be determined using available information	2 (8 ha)	2 (8 ha)	0	0
		Strategic biodiversity value (weighted average) for entire route, regardless of the extent of native vegetation.	66-100	33-65	0-32	0	3 (67.3)	3 (67.3)	2 (33.2)	2 (33.2)
		Threatened fauna - impacts to individuals or habitat due to construction - potential loss of a genetically important population of an endangered or threatened species	High likelihood of population impacts	Medium likelihood, including some direct or indirect impacts to individuals	Low likelihood of direct or indirect impacts to threatened fauna	N/A	2	2	1	1

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
		Threatened flora - potential loss of a genetically important population of an endangered or threatened species	High likelihood of population impacts	Medium likelihood, including some direct or indirect impacts to individuals	Low likelihood of direct or indirect impacts to threatened flora	No impacts or potential impacts not able to be determined using available information	2	2	0	0
		Transmission line presents collision risk to avifauna species (excluding Brolga)	66-100% of the transmission line is overhead and presents a greater collision risk	33-65% of the transmission line is overhead and presents some level of collision risk	1-32% of the transmission line is overhead and presents some level of collision risk	Transmission line is entirely underground	2 (33.8%)	0	3 (100%)	0
		Mapped TECs listed under the FFG Act or EPBC Act	Intersects with a mapped TEC	-	-	Does not intersect with a mapped TEC	0	0	0	0
		Brolga	Transmission line is within 3.2 km of potential brolga breeding habitat. Potential for disturbance to breeding. Transmission line is overhead and presents risk of collision	Transmission line is within 3.2 km of potential brolga breeding habitat. Potential for disturbance to breeding. No risk of collision due to transmission line being underground	Overhead transmission line is more than 3.2 km from potential brolga breeding habitat, or transmission line is underground and avoids impact on breeding habitat	No potential for impact on Brolga breeding habitat or risk of collision	3	2	3	2
		Groundwater dependent ecosystems (terrestrial and aquatic)	Intersects with a potential GDE	-	-	Does not intersect with any potential GDEs	3	3	3	3

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
		DEECA current wetlands	Intersects with a DEECA current wetland	-	-	Does not intersect with any DEECA current wetlands	0	0	0	0
		Major waterways	Transmission intersects with 3 or more major waterway crossings	Transmission intersects with less than 3 major waterway crossings	N/A	Does not intersect with any major waterways	3	3	0	0
Community / Social	15%	Sensitive receptors potentially affected by operational noise amenity impacts	Operational noise predicted to exceed the applicable noise limits determined in accordance with the Noise Protocol.	-	-	Operational noise predicted to comply with applicable noise limit determined in accordance with the Noise Protocol	0	0	3	3
		Sensitive receptors potentially affected by visual amenity impacts once Project is operational	Significant visual impacts likely at sensitive receptors during operation	Moderate visual impacts likely at sensitive receptors during operation	Low to negligible visual impacts anticipated at sensitive receptors during operation	-	2	1	3	3
		Sensitive receptors potentially affected by amenity impacts during construction (noise, visual, dust etc.)	Potentially significant amenity impacts at sensitive receptors during construction	Potential amenity impacts at sensitive receptors during construction but not significant	Negligible amenity impacts anticipated at sensitive receptors during construction		2	2	2	2

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
		Agricultural operations / enterprises (including property access and biosecurity risks)	Significant impact/disruption to agricultural operations during project operation	Moderate impact/disruption to agricultural operations during project operation	Minor impact/disruption to agricultural operations during project operation	-	2	1	3	1
		Community acceptance of transmission line options	Lack of community acceptance/strong community opposition	Moderate level of community acceptance/some concerns within the community	High level of community acceptance and strong support from community	-	1	1	3	2
		Actual or perceived property devaluation associated with a transmission line	Significant actual or perceived impact on property devaluation	Moderate actual or perceived impact on property devaluation	Negligible actual or perceived impact on property devaluation	-	2	1	2	1
Land	10%	Availability of suitable land at grid connection point for electrical infrastructure	Suitable land at grid connection point is not available / landowner consent is unlikely to be obtainable	Suitable land at grid connection location is available but is constrained / landowner consent may be obtainable	Suitable land is available at grid connection point / landowner consent is likely to be obtainable	-	1	1	3	3
		Availability of suitable land along transmission line alignment	Suitable land along alignment not available / landowner consent is unlikely to be obtainable	Suitable land along alignment is available but is constrained / landowner consent may be obtainable	Suitable land along alignment is available at / landowner consent is likely to be obtainable	-	2	2	3	2

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
		Extractive sites (existing mines / quarries and Work Authorities for future extractive activities)	Intersects with existing mine / quarry or Work Authority	-	-	Does not intersect with any existing mines / quarries or Work Authorities	0	0	0	0
Heritage	15%	Registered historic heritage sites (listed on the VHI, VHR, and/or Heritage Overlay of the Glenelg Planning Scheme)	Intersects with listed VHR sites of State or National significance	Intersects with listed VHI sites of higher than local significance	Intersects with listed VHI and or HO sites of local significance	Does not intersect with any listed heritage sites or sites have been destroyed/ in an areas of significant ground disturbance (SGD)	0	0	0	0
		Aboriginal places listed on the VAHR or identified through Project investigations	Intersects with known Aboriginal places of high significance (nature or preservation – e.g. scarred trees, large intact/complex subsurface artefact scatters)	Intersects with known Aboriginal places of moderate significance (nature or preservation – e.g. surface scatters subject to some level of disturbance/ turbation)	Intersects with known Aboriginal places of low significance (nature or preservation – e.g. Isolated occurrences or places which have been subject to high levels of disturbance)	Does not intersect with any known Aboriginal places or intersects with delisted or salvaged places where no further potential exists	0	0	0	0

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
		Intangible cultural values	Significant intangible cultural values occur within the alignment (e.g. - trauma lines or Aboriginal historic places associated with CVA)	Some intangible cultural values occur within the alignment (e.g. - physical aspects or places highlighted in the CVA)	Few or no intangible values occur within the alignment (general in nature)	-	2	1	2	1
		Length of alignment within areas that have a high likelihood of containing unidentified Aboriginal cultural heritage material[2] and/or within areas previously subject to significant ground disturbance (indicating a low likelihood of containing material)	40% or more of the alignment length overlaps with an area of CHS with no known SGD	Between 20% and 40% of the alignment length overlaps with an area of CHS and/or has 20% or less of the alignment in areas of SGD	20% or less of the alignment length overlaps with an area of CHS and/or 40% or more of the alignment is in areas of SGD	Not associated with an area of CHS; or CHS has been demonstrably destroyed/removed by SGD.	1	1	2	2
		Native Title land requiring provision under an Indigenous Land Use Agreement (ILUA) with the Gunditj Mirring Traditional Owners Aboriginal Corporation	Intersects with Native Title land	N/A	N/A	Does not intersect with any Native Title land	3	3	3	3

[2] Areas mapped as areas of cultural heritage sensitivity (CHS) under the *Aboriginal Heritage Act 2006.*

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
Technical and Design	5%	Electrical system design complexity (to facilitate connection to the grid and maintain existing levels of power system security, reliability, and power transfer capacity)	Complex electrical system design	Conventional electrical system design	Simple electrical system design	-	2	2	3	3
		Length of alignment located within an existing compatible infrastructure corridor	20% or less of the alignment length is within an existing compatible infrastructure corridor	Between 20% and 50% of the alignment length is within an existing compatible infrastructure corridor	50% or more of the alignment length is within an existing compatible infrastructure corridor	-	1 (56.8%)	1 (56.8%)	3 (0%)	3 (0%)
Constructability	5%	Construction logistics and access requirements, such as availability of laydown areas and movement of equipment and materials	Significant logistics requirements and/or access constraints for the alignment or grid connection point	Above standard logistics requirements and/or access constraints for the alignment or grid connection point	Standard logistics requirements and/or access constraints for the alignment or grid connection point	-	3	3	1	1
		Construction complexity	Complex	Conventional	Simple	-	3	3	2	2
		Construction timeframe (months)	Construction timeframe of 12 or more months	Construction timeframe of between six and 12 months	Construction timeframe of six or less months	-	1 (5)	1 (5)	3 (12)	3 (12)

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
Operability	5%	Complexity of maintenance activities and requirements	Significant complexities with maintenance	Above standard complexities with maintenance	Standard complexities with maintenance	-	2	2	2	2
		Risk of third-party damage to transmission line and associated infrastructure	N/A	Above standard third party damage risk	Standard third party damage risk	-	2	1	2	1
Safety	5%	Risk to worker safety during construction and operation	Significant safety risks	Above standard safety risk	Standard safety risk	-	1	1	1	2
		Elevated bushfire risks during operation (considers increased risk of transmission infrastructure causing a bushfire, and/or transmission infrastructure affecting bushfire suppression)	Significant elevation of bushfire risks	Moderate elevation of bushfire risks	Low elevation of bushfire risks	Negligible elevation of bushfire risk	1	1	2	1
Infrastructure	5%	Airports and aerodromes	Overhead transmission line intersects with the Inner Horizontal Surface of an airport's OLS			Overhead transmission line does not intersect with the Inner Horizontal Surface of any airport's OLS, or the transmission line is underground	0	0	3	0

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
		Threatened flora - potential loss of a genetically important population of an endangered or threatened species	High likelihood of population impacts	Medium likelihood, including some direct or indirect impacts to individuals	Low likelihood of direct or indirect impacts to threatened flora	No impacts or potential impacts not able to be determined using available information	2	2	0	0
		Transmission line presents collision risk to avifauna species (excluding Brolga)	66-100% of the transmission line is overhead and presents a greater collision risk	33-65% of the transmission line is overhead and presents some level of collision risk	1-32% of the transmission line is overhead and presents some level of collision risk	Transmission line is entirely underground	2 (33.8%)	0	3 (100%)	0
		Mapped TECs listed under the FFG Act or EPBC Act	Intersects with a mapped TEC	-	-	Does not intersect with a mapped TEC	0	0	0	0
		Brolga	Transmission line is within 3.2 km of potential brolga breeding habitat. Potential for disturbance to breeding. Transmission line is overhead and presents risk of collision	Transmission line is within 3.2 km of potential brolga breeding habitat. Potential for disturbance to breeding. No risk of collision due to transmission line being underground	Overhead transmission line is more than 3.2 km from potential brolga breeding habitat, or transmission line is underground and avoids impact on breeding habitat	No potential for impact on Brolga breeding habitat or risk of collision	3	2	3	2
		Groundwater dependent ecosystems (terrestrial and aquatic)	Intersects with a potential GDE	-	-	Does not intersect with any potential GDEs	3	3	3	3

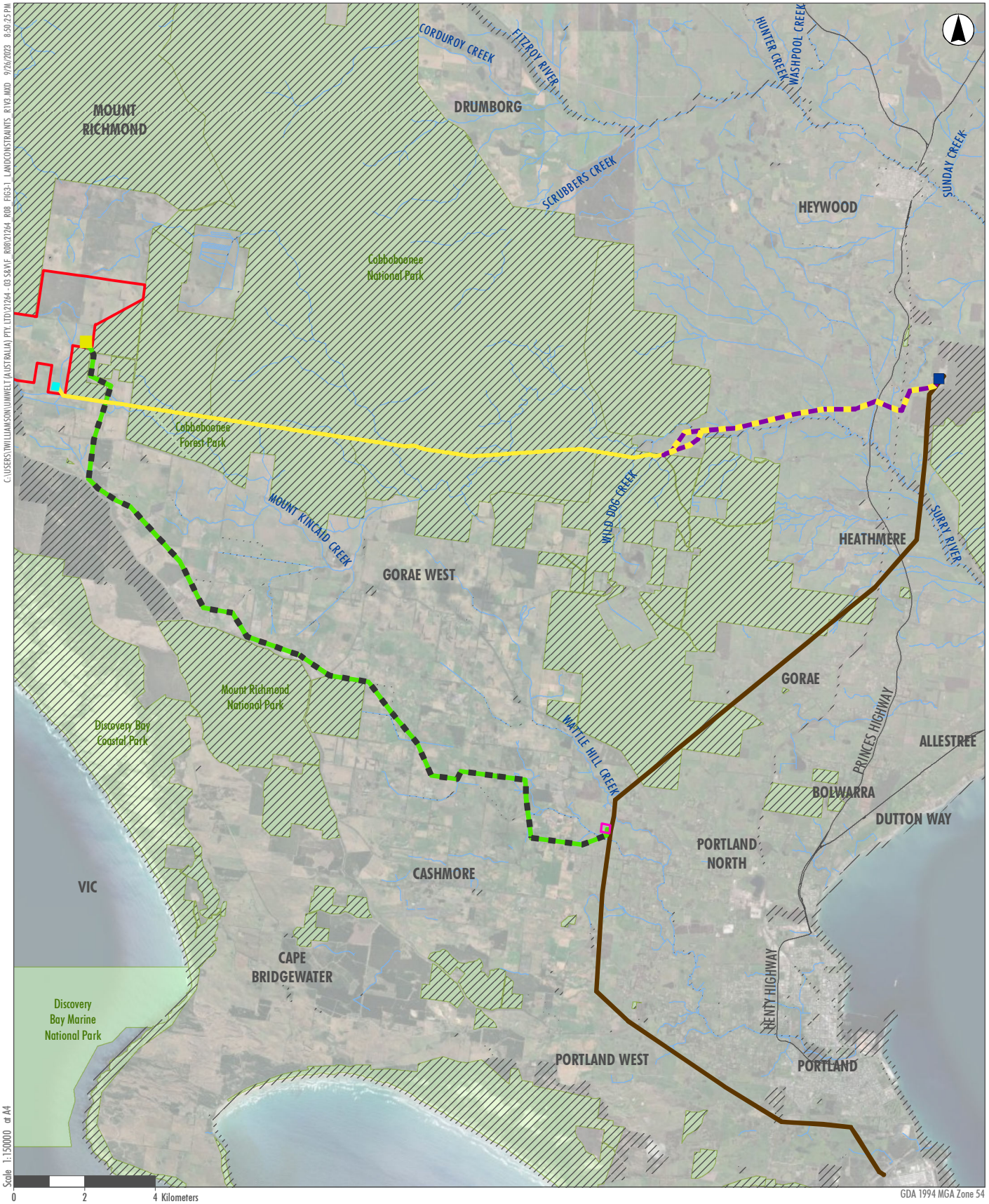
Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
		Agricultural operations / enterprises (including property access and biosecurity risks)	Significant impact/disruption to agricultural operations during project operation	Moderate impact/disruption to agricultural operations during project operation	Minor impact/disruption to agricultural operations during project operation	-	2	1	3	1
		Community acceptance of transmission line options	Lack of community acceptance/strong community opposition	Moderate level of community acceptance/some concerns within the community	High level of community acceptance and strong support from community	-	1	1	3	2
		Actual or perceived property devaluation associated with a transmission line	Significant actual or perceived impact on property devaluation	Moderate actual or perceived impact on property devaluation	Negligible actual or perceived impact on property devaluation	-	2	1	2	1
Land	10%	Availability of suitable land at grid connection point for electrical infrastructure	Suitable land at grid connection point is not available / landowner consent is unlikely to be obtainable	Suitable land at grid connection location is available but is constrained / landowner consent may be obtainable	Suitable land is available at grid connection point / landowner consent is likely to be obtainable	-	1	1	3	3
		Availability of suitable land along transmission line alignment	Suitable land along alignment not available / landowner consent is unlikely to be obtainable	Suitable land along alignment is available but is constrained / landowner consent may be obtainable	Suitable land along alignment is available at / landowner consent is likely to be obtainable	-	2	2	3	2

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
		Intangible cultural values	Significant intangible cultural values occur within the alignment (e.g. - trauma lines or Aboriginal historic places associated with CVA)	Some intangible cultural values occur within the alignment (e.g. - physical aspects or places highlighted in the CVA)	Few or no intangible values occur within the alignment (general in nature)	-	2	1	2	1
		Length of alignment within areas that have a high likelihood of containing unidentified Aboriginal cultural heritage material[2] and/or within areas previously subject to significant ground disturbance (indicating a low likelihood of containing material)	40% or more of the alignment length overlaps with an area of CHS with no known SGD	Between 20% and 40% of the alignment length overlaps with an area of CHS and/or has 20% or less of the alignment in areas of SGD	20% or less of the alignment length overlaps with an area of CHS and/or 40% or more of the alignment is in areas of SGD	Not associated with an area of CHS; or CHS has been demonstrably destroyed/removed by SGD.	1	1	2	2
		Native Title land requiring provision under an Indigenous Land Use Agreement (ILUA) with the Gunditj Mirring Traditional Owners Aboriginal Corporation	Intersects with Native Title land	N/A	N/A	Does not intersect with any Native Title land	3	3	3	3

[2] Areas mapped as areas of cultural heritage sensitivity (CHS) under the *Aboriginal Heritage Act 2006.*

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
Operability	5%	Complexity of maintenance activities and requirements	Significant complexities with maintenance	Above standard complexities with maintenance	Standard complexities with maintenance	-	2	2	2	2
		Risk of third-party damage to transmission line and associated infrastructure	N/A	Above standard third party damage risk	Standard third party damage risk	-	2	1	2	1
Safety	5%	Risk to worker safety during construction and operation	Significant safety risks	Above standard safety risk	Standard safety risk	-	1	1	1	2
		Elevated bushfire risks during operation (considers increased risk of transmission infrastructure causing a bushfire, and/or transmission infrastructure affecting bushfire suppression)	Significant elevation of bushfire risks	Moderate elevation of bushfire risks	Low elevation of bushfire risks	Negligible elevation of bushfire risk	1	1	2	1
Infrastructure	5%	Airports and aerodromes	Overhead transmission line intersects with the Inner Horizontal Surface of an airport's OLS			Overhead transmission line does not intersect with the Inner Horizontal Surface of any airport's OLS, or the transmission line is underground	0	0	3	0

Parameter	Weighting	Criteria	Metrics				Transmission Line Options			
			High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	1A	1B	2A	2B
Cost	15%	Difference in capital expenditure between options ($M)	Ratio of capital expenditure of the option to the lowest cost option is greater than 1.4	Ratio of capital expenditure of the option to the lowest cost option is between 1.2 and 1.4	Ratio of capital expenditure of the option to the lowest cost option is between 1 and 1.2	-	1 ($118)	2 ($141)	1 ($100)	3 ($188)



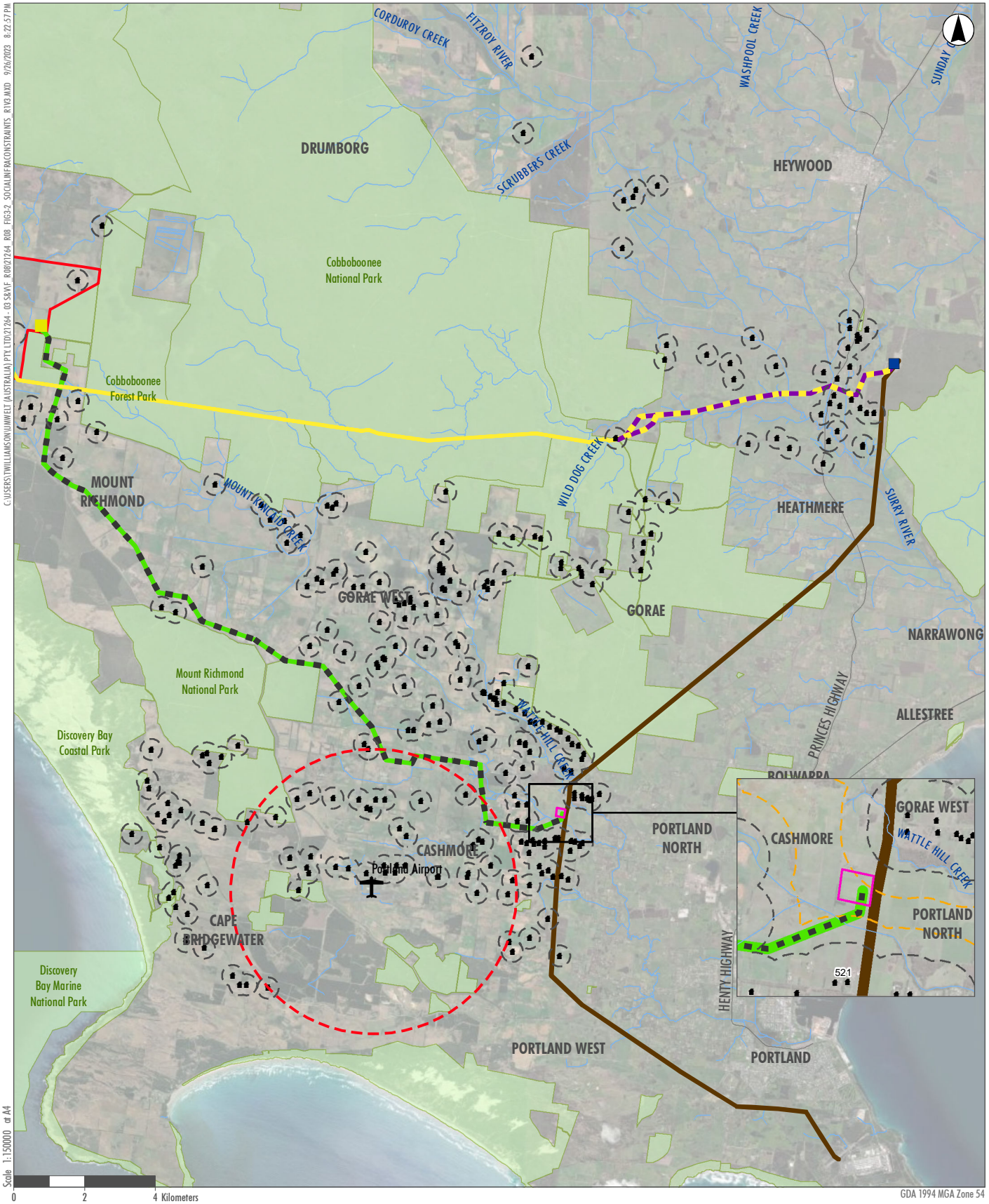
Legend

- Wind Farm Site
- Proposed Terminal Station Location
- Native Title
- Main Wind Farm Substation
- Previous Substation Location
- Heywood Terminal Station
- Roads
- Drainage Line
- Heywood-Portland 500kV Transmission Line
- Overhead component of Option 1A
- Underground component of Option 1A and 1B
- Underground component for Option 1B
- Option 2A
- Option 2B

FIGURE 3.1

Land Constraints

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)



Legend

- Wind Farm Site
- Proposed Terminal Station Location
- Residential Dwellings 300m Buffer
- Residential Dwellings
- Main Wind Farm Substation
- Previous Substation Location
- Heywood Terminal Station
- Roads
- Drainage Line
- Heywood-Portland 500kV Transmission Line
- Overhead component of Option 1A
- Underground component of Option 1A and 1B
- Underground component for Option 1B
- Option 2A
- Option 2B
- Inner Horizontal Surface for Portland Airport
- Portland Airport

FIGURE 3.2

Social and Infrastructure Constraints

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)

Legend

- Wind Farm Site
- Proposed Terminal Station Location
- Main Wind Farm Substation
- Previous Substation Location
- Heywood Terminal Station
- Roads
- Drainage Line
- Heywood-Portland 500kV Transmission Line
- Overhead component of Option 1A
- Underground component of Option 1A and 1B
- Underground component for Option 1B
- Option 2A
- Option 2B

EVC Categories

- Least Concern
- Rare
- Depleted
- Vulnerable
- Endangered

FIGURE 3.3

Ecological Vegetation Classes

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)

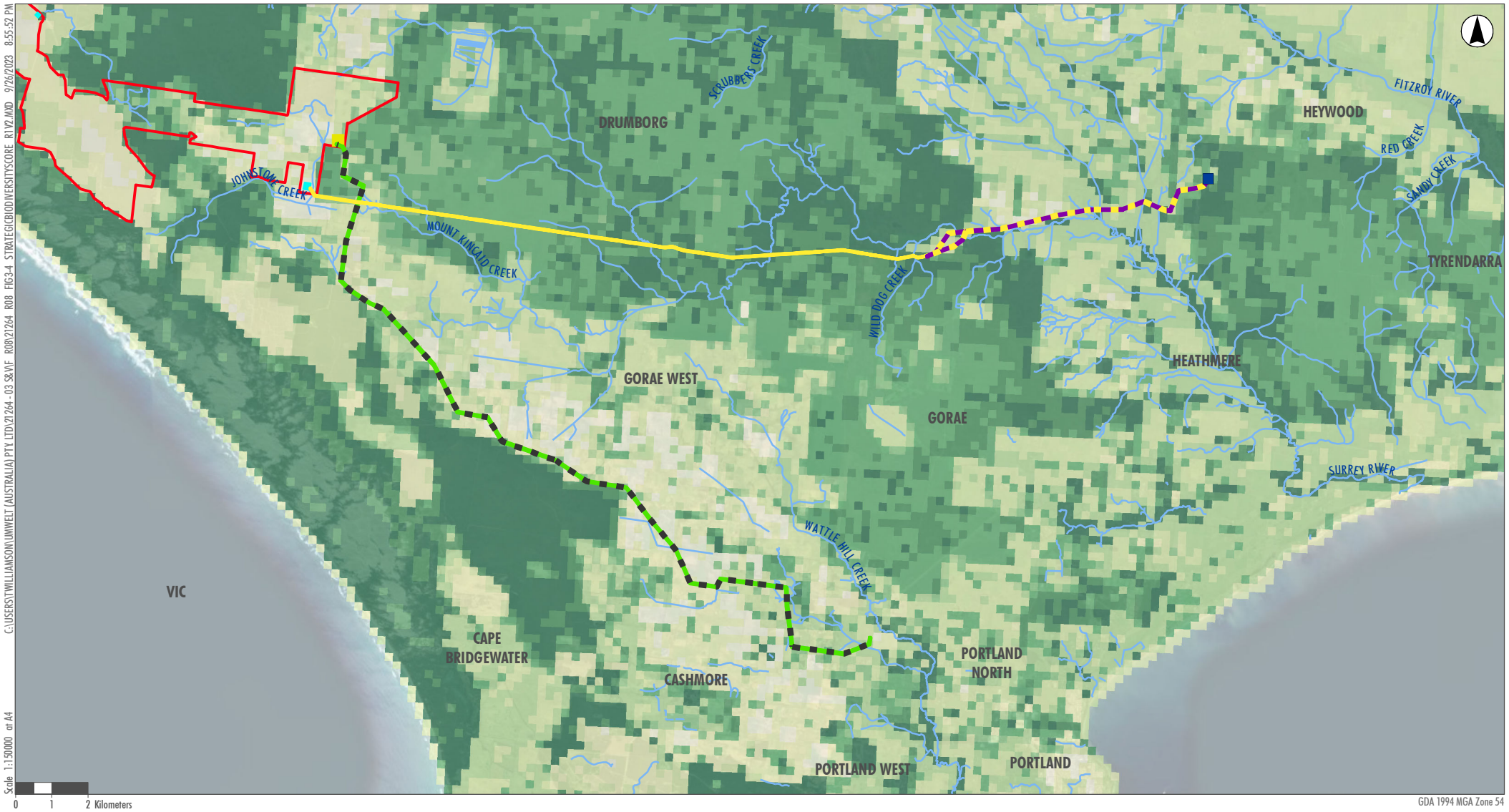
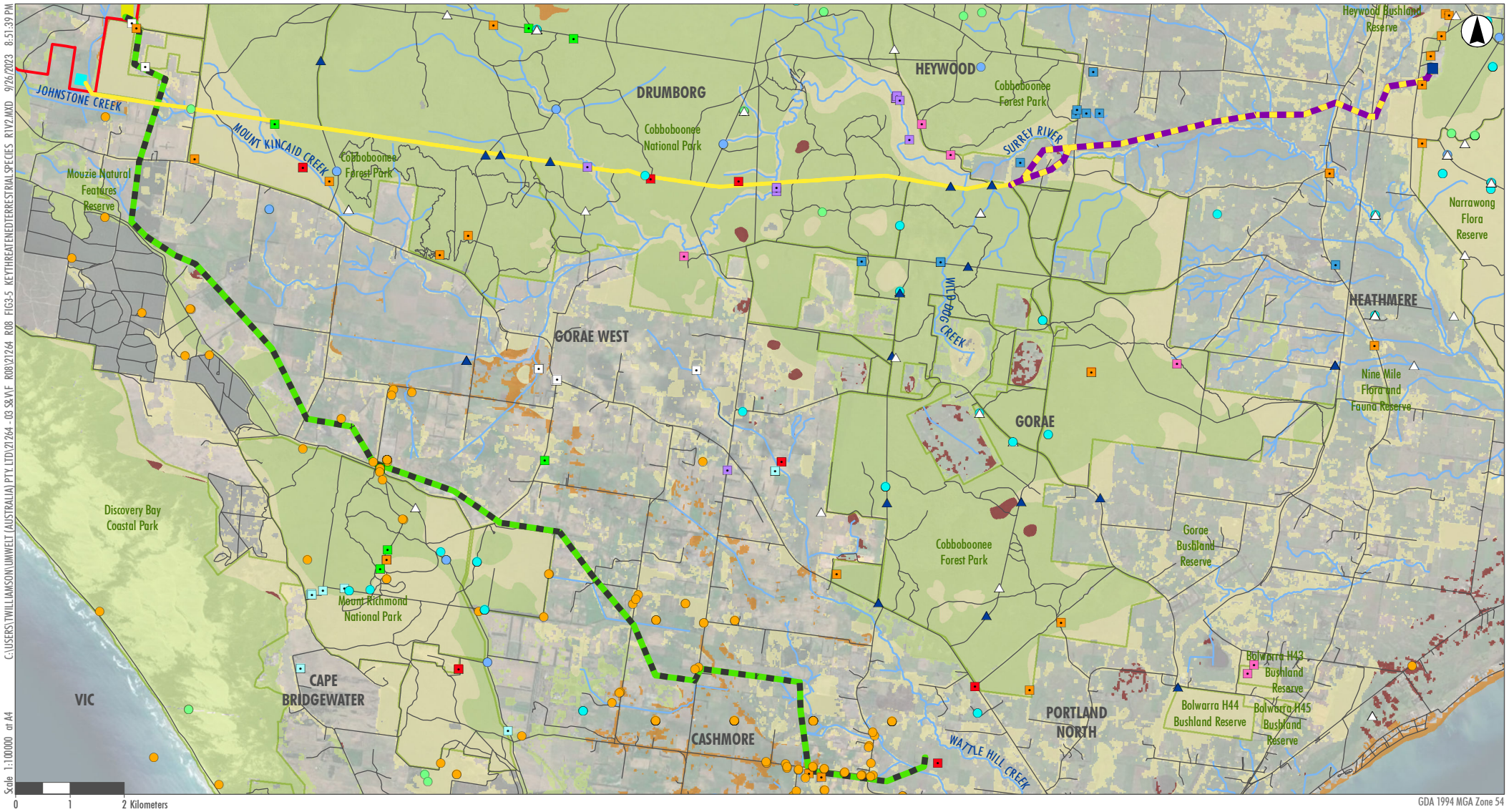


FIGURE 3.4

Strategic Biodiversity Score

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)



Legend

- Wind Farm Site
- Heywood Terminal Station
- Main Wind Farm Substation
- Previous Substation Location
- Roads
- Drainage Line
- Overhead component of Option 1A
- Underground component for Option 1B
- Underground component of Option 1A and 1B
- Option 2A
- Option 2B

EVC Categories

- Depleted
- Endangered
- Least Concern
- Vulnerable

Threatened Fauna Species

- Heath Mouse
- Long-nosed Potoroo
- Rufous Bristlebird
- Southern Brown Bandicoot
- Southern Toadlet
- Swamp Antechinus

Threatened Flora Species

- *Boronia pilosa* subsp. *torquata* (Hairy Boronia)
- *Caladenia fragrantissima* (Scented Spider-orchid)
- *Cassinia rugata* (Wrinkled Cassinia)
- *Eucalyptus falciformis* (Western Peppermint)
- *Eucalyptus splendens* (Apple Jack)
- *Olearia asterotricha* (Rough Daisy-bush)
- *Pterostylis lustra* (Small Sickle Greenhood)
- *Wurmbea uniflora* (One-flower Early Nancy)

FIGURE 3.5

Key Threatened Terrestrial Species

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)

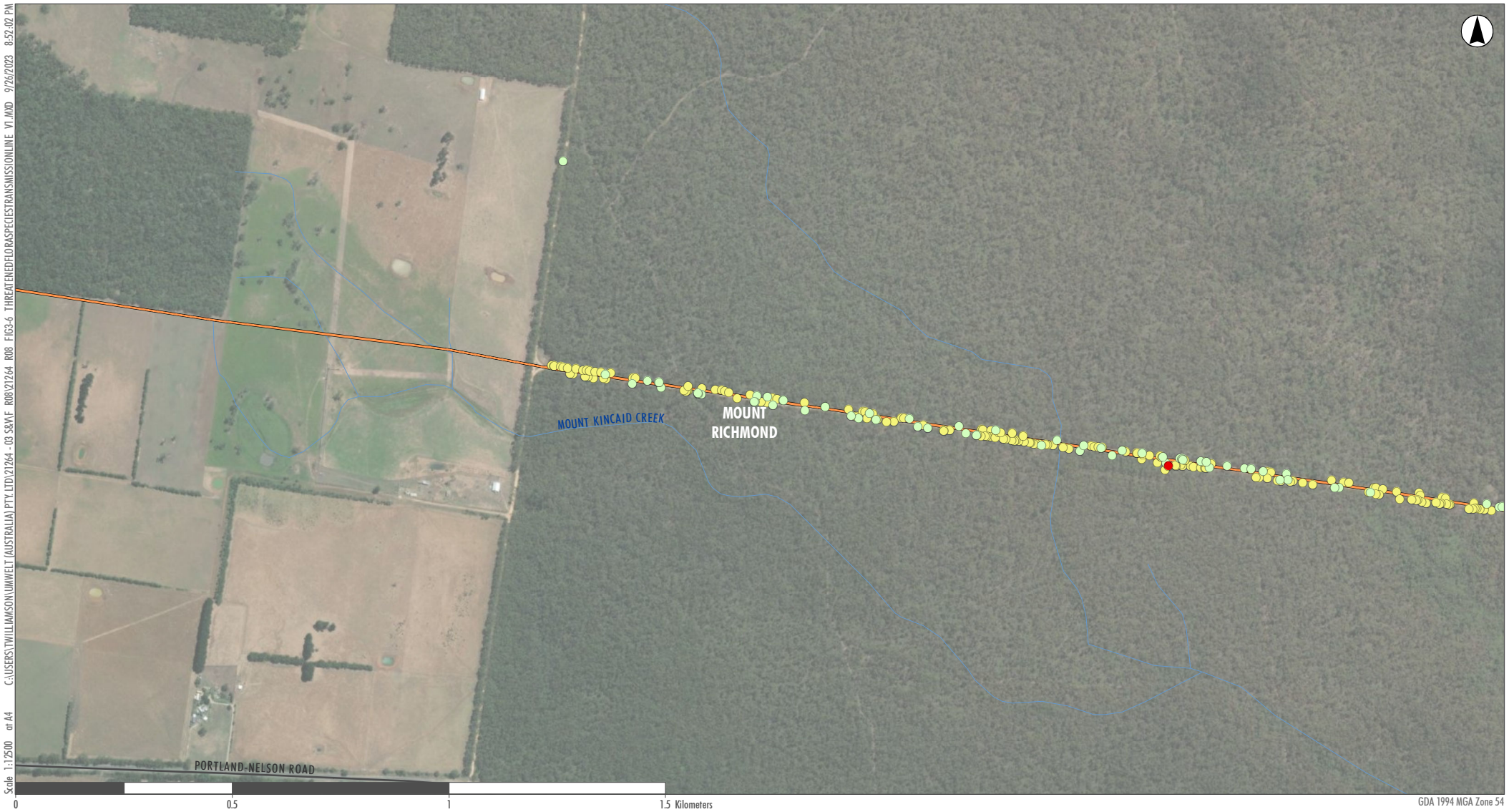
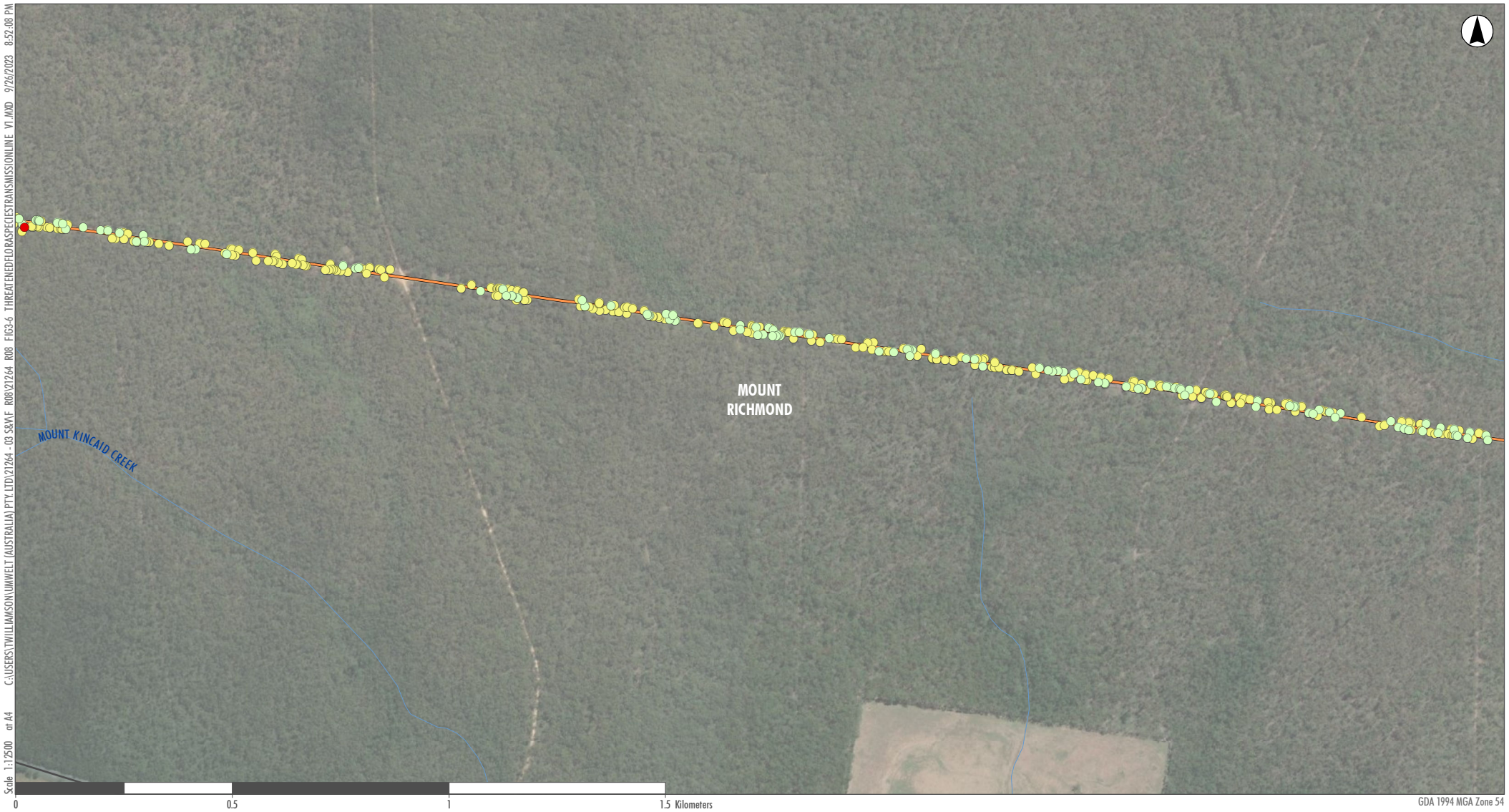


FIGURE 3.6A

Threatened Flora Species Along the Transmission Line

Image Source: ESRI Basemap (2021) Data source: DELWP (2021); Biosis (2022)



Legend

- Underground Transmission Line
- Roads
- Watercourses

Flora Records (Biosis)

- Boronia pilosa subsp. torquata - Hairy Boronia (1)
- Eucalyptus falciformis - Western Peppermint (254)
- Eucalyptus splendens - Apple Jack (114)

FIGURE 3.6B

Threatened Flora Species Along the Transmission Line

Image Source: ESRI Basemap (2021) Data source: DELWP (2021); Biosis (2022)

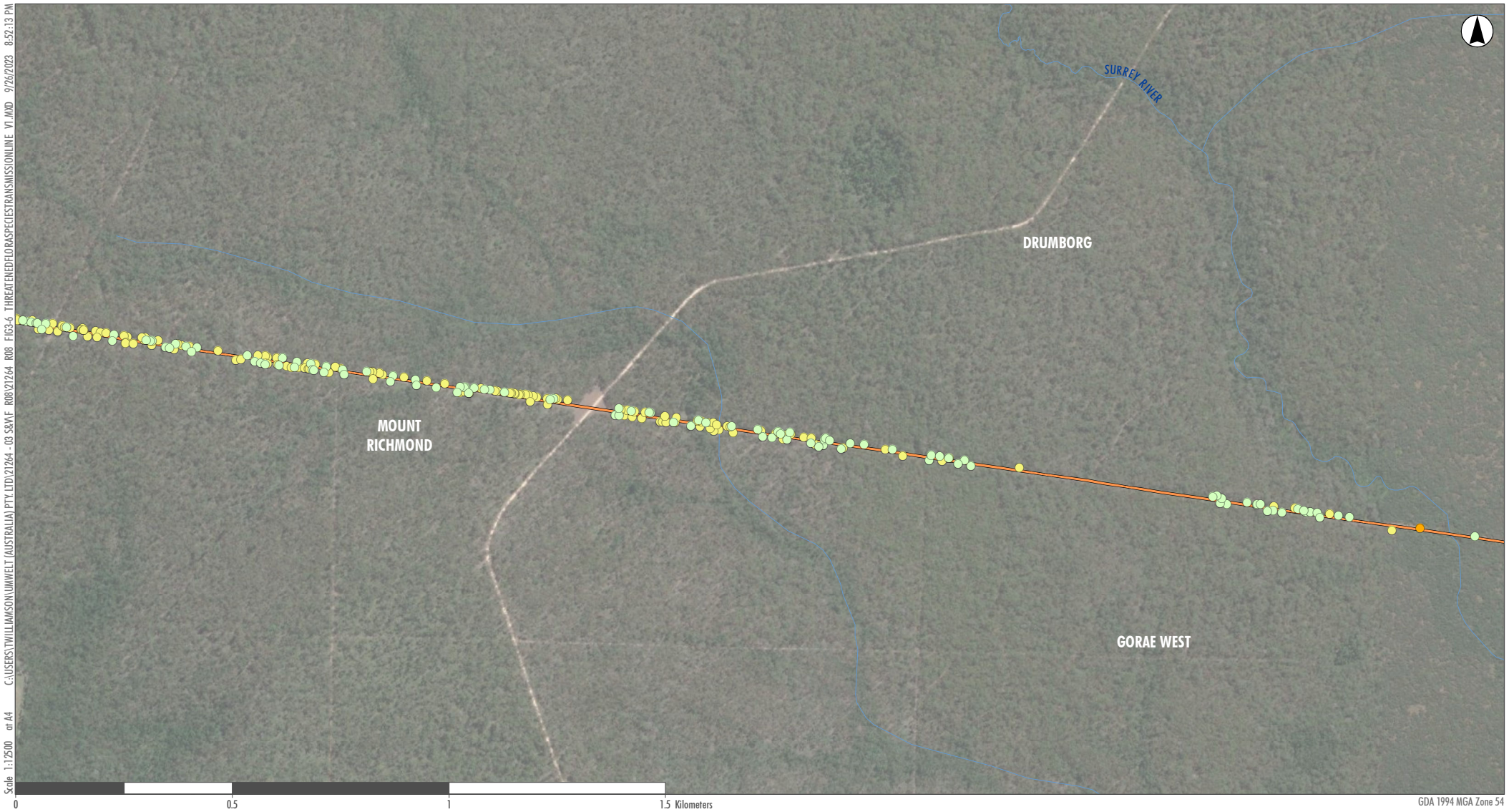


FIGURE 3.6C

Threatened Flora Species Along the Transmission Line

Image Source: ESRI Basemap (2021) Data source: DELWP (2021); Biosis (2022)

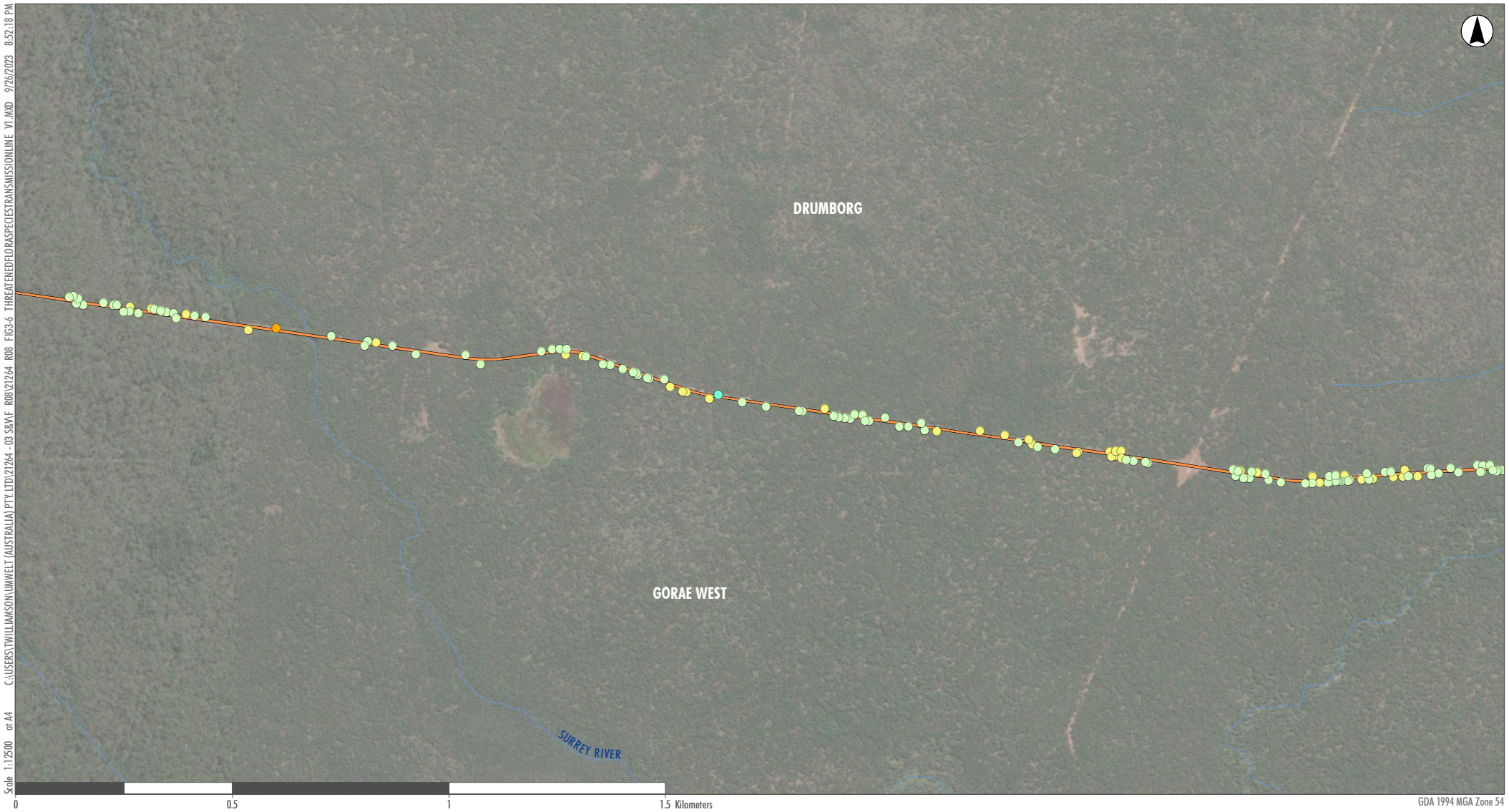
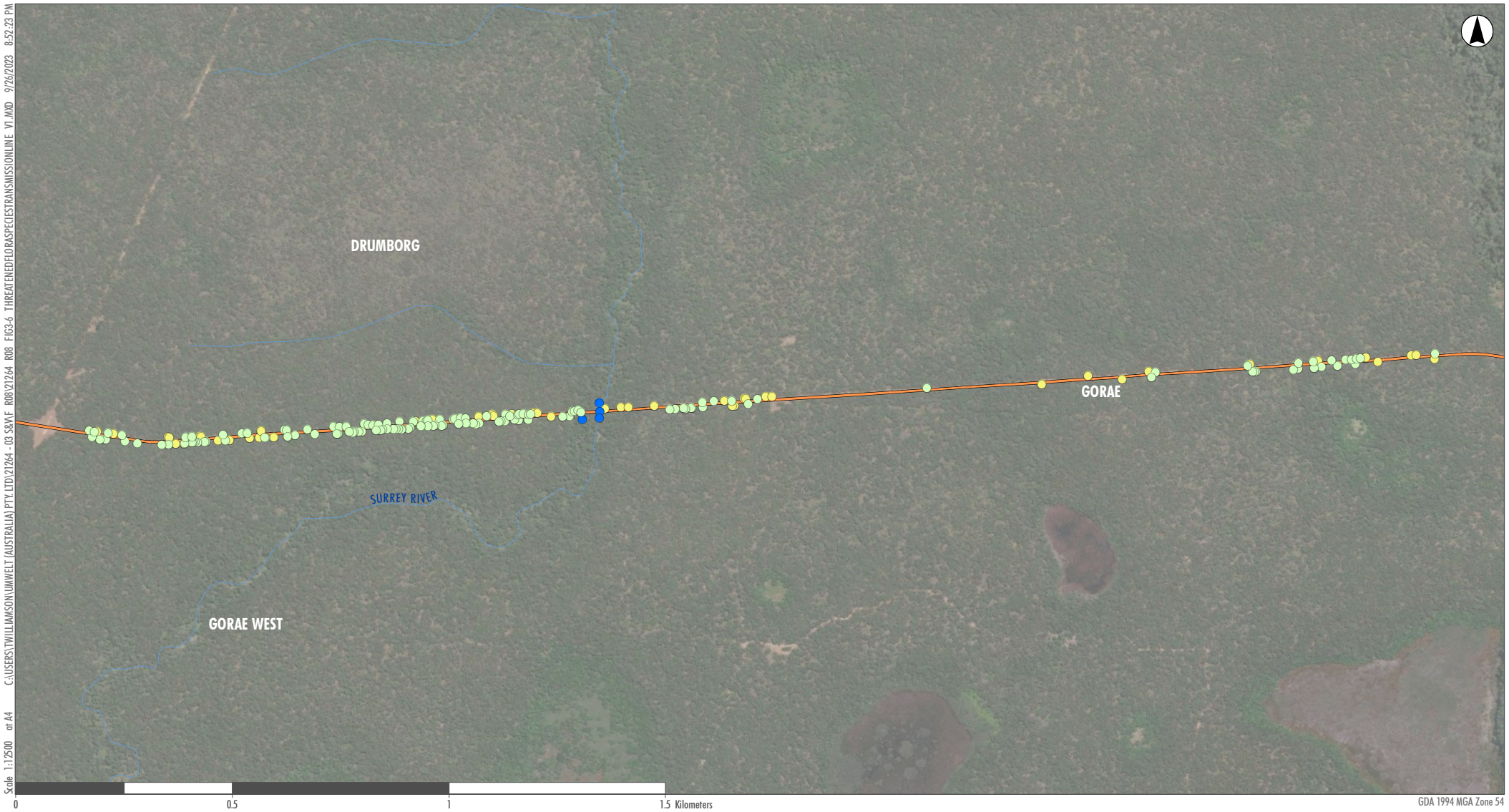


FIGURE 3.6D

Threatened Flora Species Along the Transmission Line

Image Source: ESRI Basemap (2021) Data source: DELWP (2021); Biosis (2022)



Legend

- Underground Transmission Line
- Watercourses

Flora Records (Biosis)

- Eucalyptus falciformis - Western Peppermint (46)
- Eucalyptus splendens - Apple Jack (134)
- Pterostylis lustra - Small Sickle Greenhood (4)

FIGURE 3.6E

Threatened Flora Species Along the Transmission Line

Image Source: ESRI Basemap (2021) Data source: DELWP (2021); Biosis (2022)

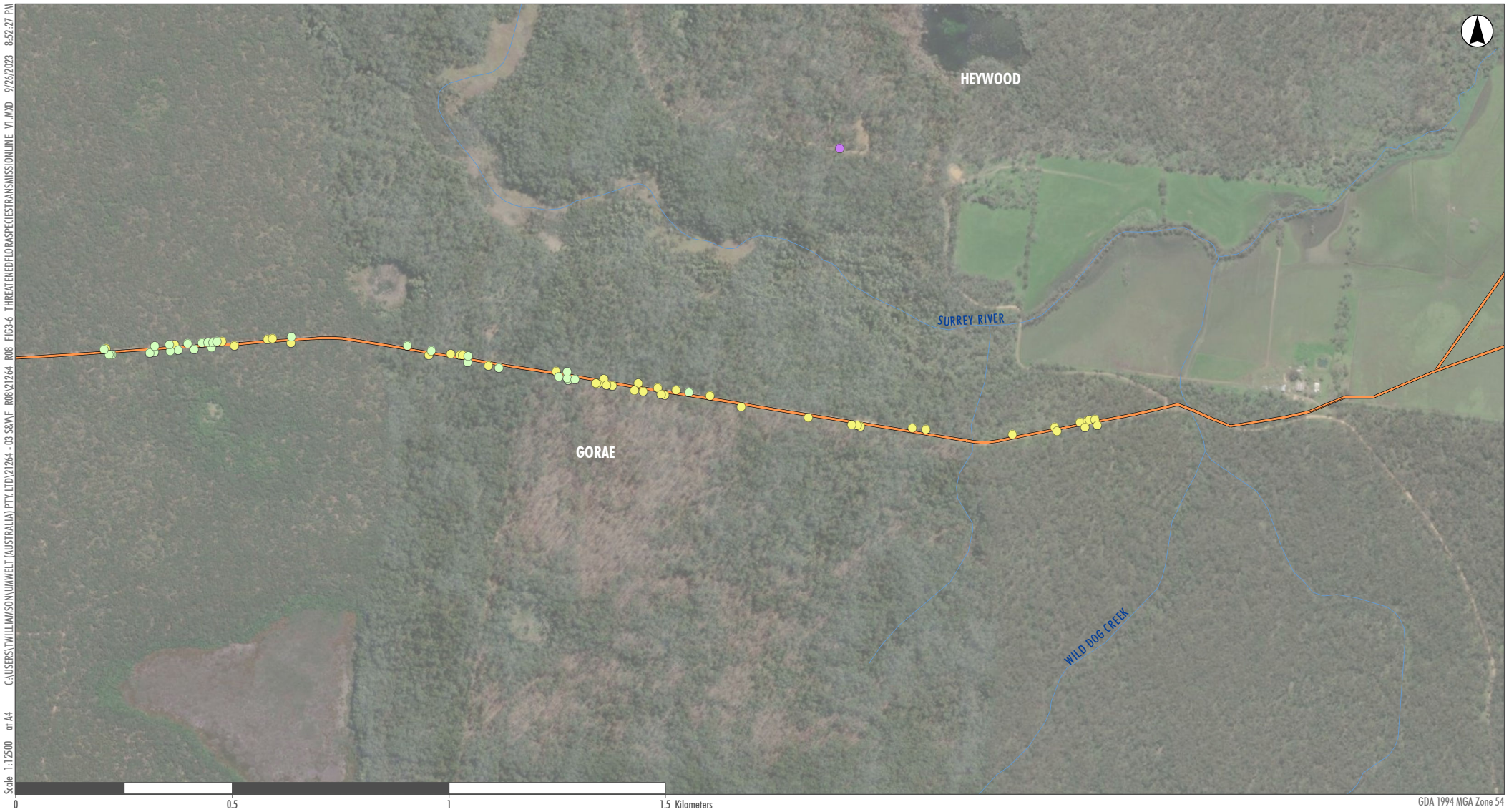
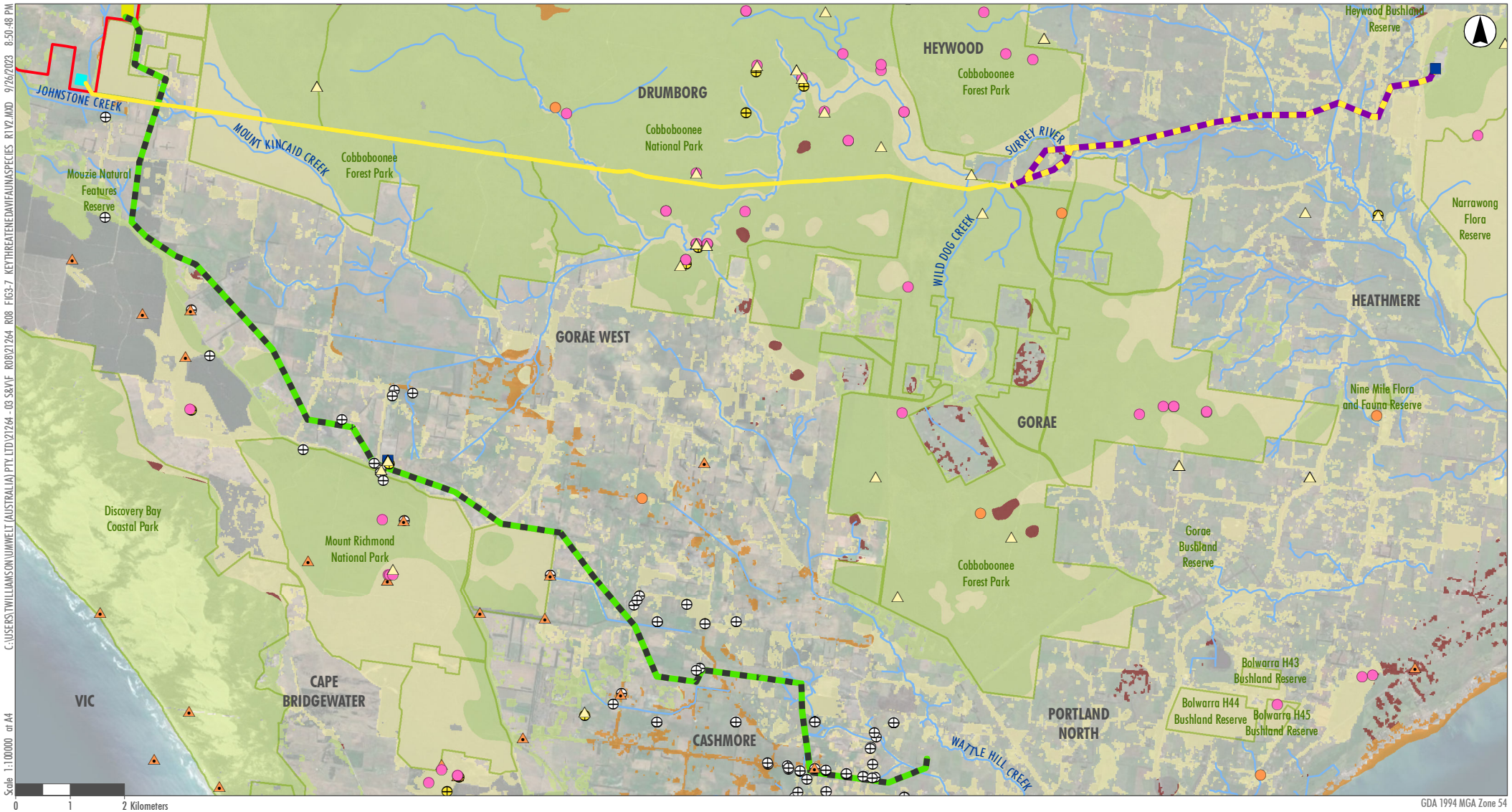


FIGURE 3.6F

Threatened Flora Species Along the Transmission Line

Image Source: ESRI Basemap (2021) Data source: DELWP (2021); Biosis (2022)



Legend

- Wind Farm Site
- Heywood Terminal Station
- Main Wind Farm Substation
- Previous Substation Location
- Drainage Line
- Overhead component of Option 1A
- Underground component for Option 1B
- Underground component of Option 1A and 1B
- Option 2A
- Option 2B

EVC Categories

- Depleted
- Endangered
- Least Concern
- Vulnerable

Threatened Fauna Species

- Rufous Bristlebird
- White-throated Needletail
- Australasian Bittern
- Gang-gang Cockatoo
- Masked Owl
- Powerful Owl
- Rufous Bristlebird (Coorong)

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)

FIGURE 3.7

Key Threatened Avifauna Species

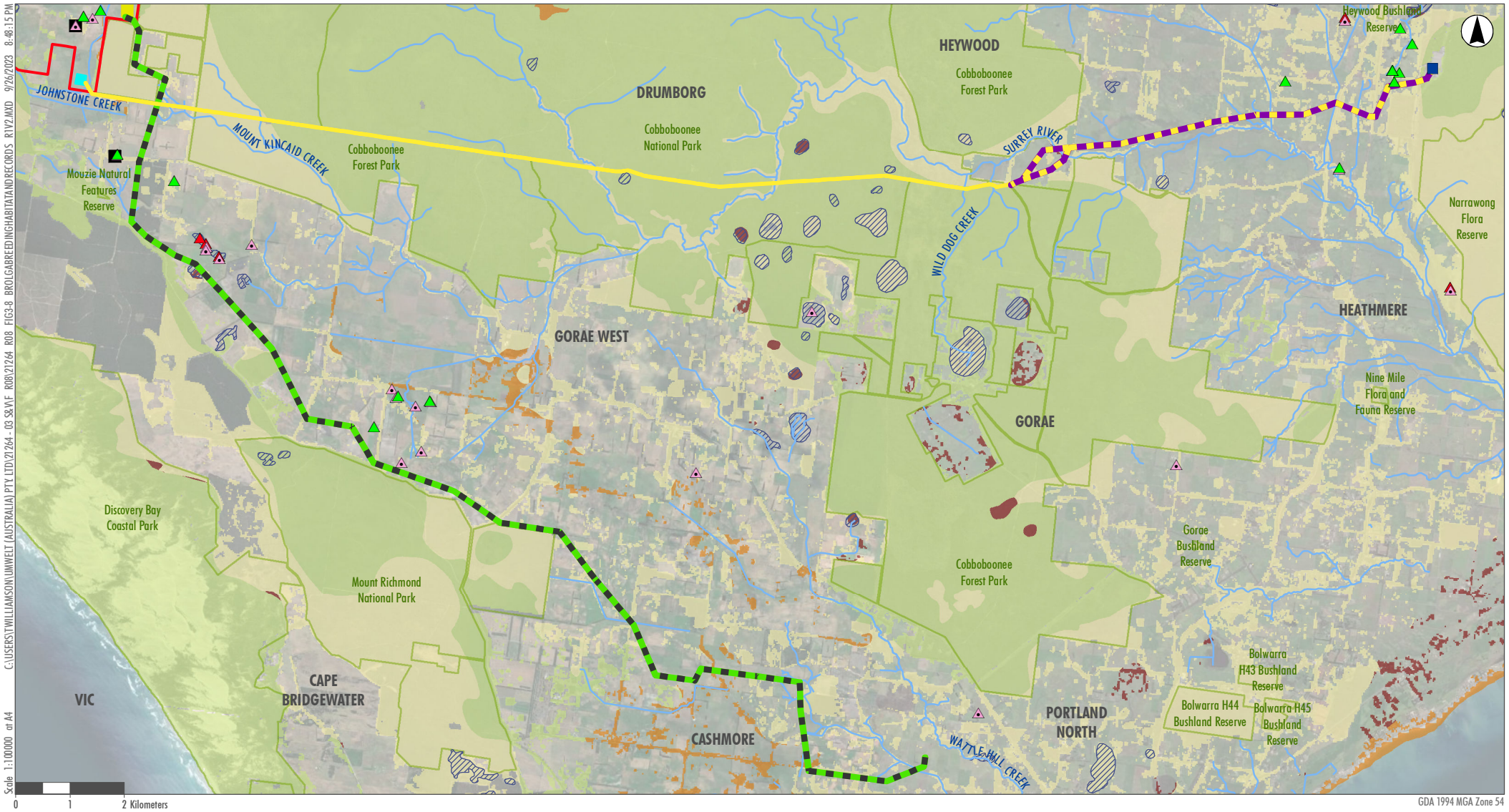
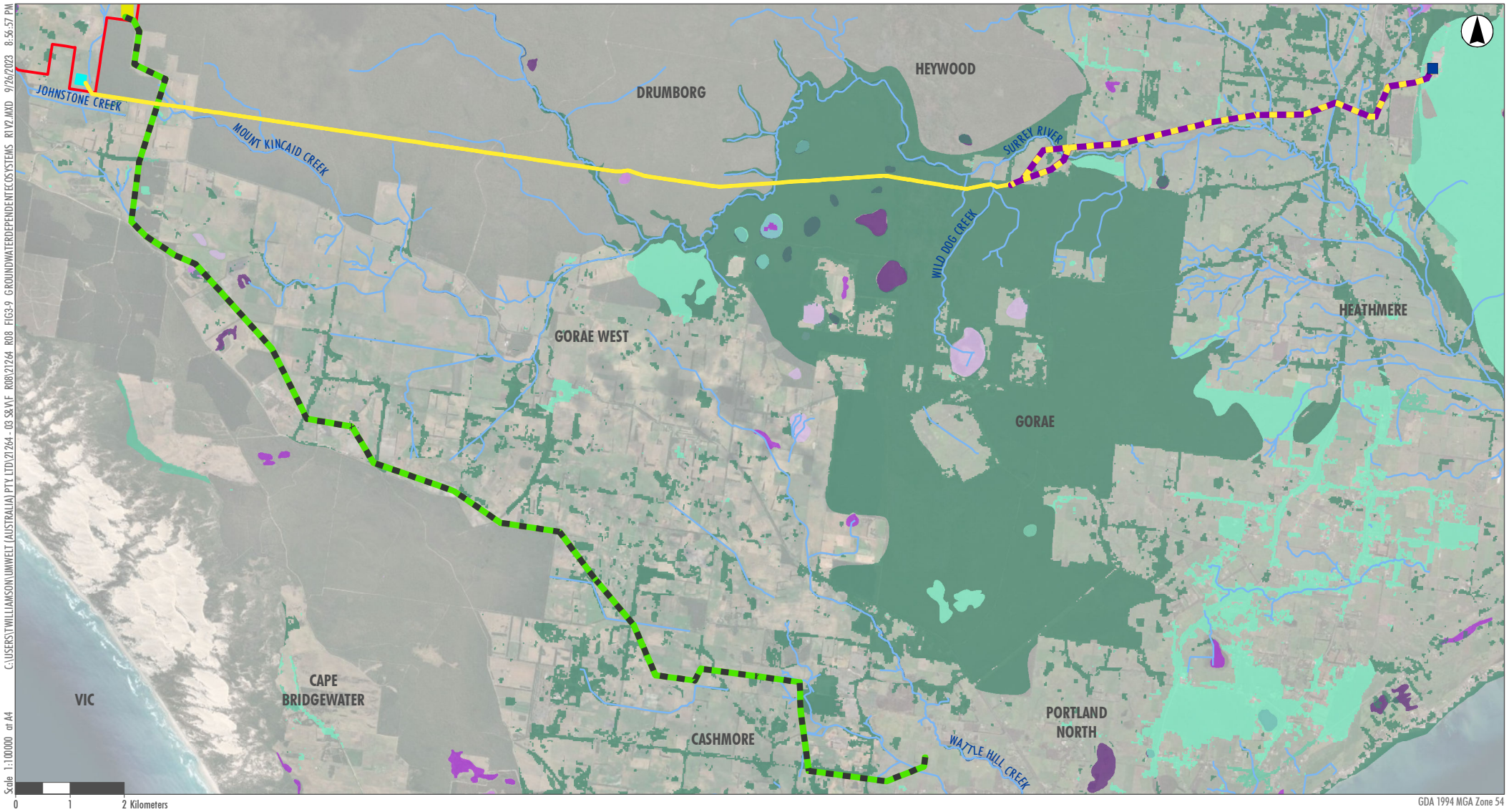


FIGURE 3.8

Brolga Breeding Habitat and Records

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)



Legend

- Wind Farm Site
- Heywood Terminal Station
- Main Wind Farm Substation
- Previous Substation Location
- Drainage Line
- Overhead component of Option 1A
- Underground component for Option 1B
- Underground component of Option 1A and 1B
- Option 2A
- Option 2B

Terrestrial GDE

- High potential GDE - from national assessment
- Moderate potential GDE - from national assessment
- Low potential GDE - from national assessment

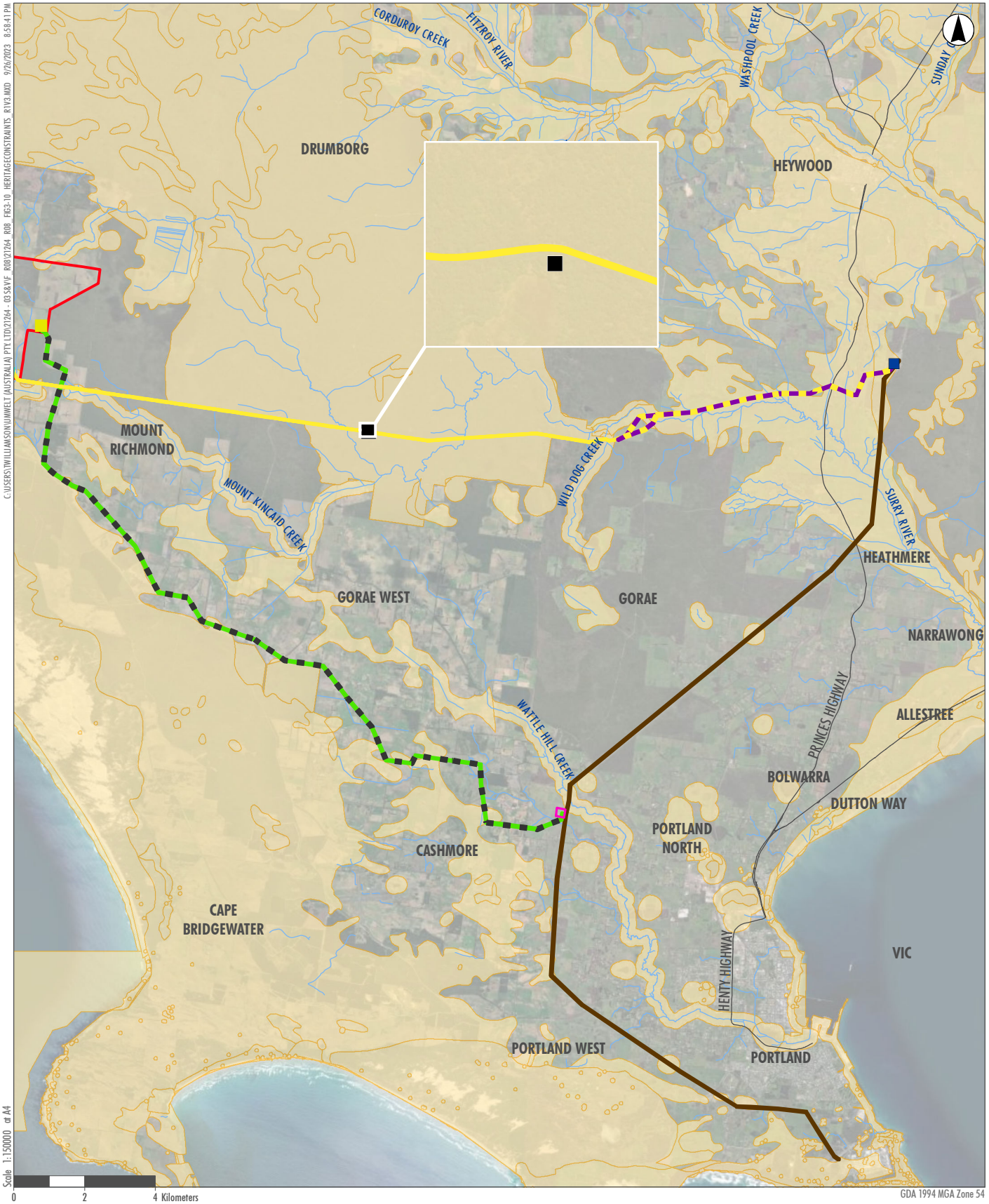
Aquatic GDE

- High potential GDE - from national assessment
- High potential GDE - from regional studies
- Moderate potential GDE - from regional studies
- Low potential GDE - from regional studies
- Unclassified potential GDE - from regional studies

FIGURE 3.9

Groundwater Dependent Ecosystems

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)



Legend

- Wind Farm Site
- Proposed Terminal Station Location
- Areas of Cultural Heritage Sensitivity
- Registered Historic Heritage Site
- Main Wind Farm Substation
- Previous Substation Location
- Heywood Terminal Station
- Roads
- Drainage Line
- Heywood-Portland 500kV Transmission Line
- Overhead component of Option 1A
- Underground component of Option 1A and 1B
- Underground component for Option 1B
- Option 2A
- Option 2B

FIGURE 3.10

Heritage Constraints

Image Source: ESRI Basemap (2021) Data source: Geoscience Australia; DELWP (2021)

3.4 Scoring summary

A weighted score for each parameter group was calculated by:

- Adding the un-weighted scores for each criterion within each parameter group, to produce an overall parameter score.
- Multiplying the parameter score by the weighting, to produce a weighted parameter score.

A weighted final score for each option was then calculated by adding the weighted parameter scores together for each option. Each option was then ranked from lowest weighted final score to highest weighted final score. A summary of the scoring for each option is provided in **Table 3.4**.

The assessment identified that Option 1B had the lowest weighted final score.

Table 3.4 Scoring summary

Parameter	Weighting		Weighted parameter score			
			Option 1A	Option 1B	Option 2A	Option 2B
Environment	25%	60%	0.52	0.45	0.27	0.18
Community / social	15%		0.23	0.15	0.40	0.30
Land	10%		0.15	0.15	0.30	0.25
Heritage	10%		0.12	0.10	0.14	0.12
Technical and design	5%	25%	0.08	0.08	0.15	0.15
Constructability	5%		0.12	0.12	0.10	0.10
Operability	5%		0.10	0.08	0.10	0.08
Safety	5%		0.05	0.05	0.08	0.08
Infrastructure	5%		0.00	0.00	0.15	0.00
Cost	15%	15%	0.15	0.30	0.15	0.45
Final score			**1.51**	**1.47**	**1.84**	**1.70**
Rank			**2**	**1**	**4**	**3**

3.4.1 Summary of results

Based on the assessment and weighted scoring, Option 1B has the lowest weighted final score, followed by Option 1A, Option 2B and Option 2A. This is due to the specific strengths of Option 1B in several of the criterion and broader parameter groups, which makes this option the most favourable in terms of meeting the transmission line objectives. Option 1B scored comparably well in the community/social, land, and infrastructure parameter groups. Option 1B also scored equivalent to other options in the technical and design, operability, safety, constructability, and heritage parameter groups (plus/minus 0.1 using the weighted parameter scores).

However, while Option 1B had the lowest weighted final score, Option 1B scored comparatively less well in the cost parameter group (compared to Option 1A and Option 2A), and for some criterion in the environment parameter group.

Option 1A and Option 2A both scored lower for cost, as they are above ground options and overhead transmission is generally cheaper to build than underground. Undergrounding Option 1B is preferred even with a higher capital cost. An overhead line along the Option 1 alignment would present a collision risk for birds and would be visually prominent in the landscape. It would also potentially affect agricultural practices during construction by limiting the types of practices that could occur within the overhead line easement. The construction of the underground line would have lesser effects on agricultural operations during construction. Overhead lines also have the potential to change firefighting practices for low-flying aircraft, however this is not seen as a significant restriction along the Option 1 alignment as there is already smaller electrical distribution lines in the vicinity.

The criterion for Option 1B in the environment parameter group where Option 1B performed less well comparatively related to:

- Intersection with protected areas (National Parks, State Parks, Ramsar wetlands).
- Native vegetation classified as an EVC.
- Strategic biodiversity value (which combines information on biodiversity values with vegetation type and condition to show the relative value of landscapes in Victoria).
- Threatened fauna.
- Threatened flora.
- Intersection with major waterways.

Several environment criteria have been used to jointly assess the potential for impacts on biodiversity values within a protected area (national park) and within the adjoining Cobboboonee Forest Park (intersection with protected areas, native vegetation, strategic biodiversity scores, and threatened fauna and flora). Scoring and weighting for these criteria were developed to ensure that these values are appropriately considered when comparing options.

The higher scores for Option 1B on these criteria are due to the alignment bisecting one protected area, Cobboboonee National Park. Option 1B (and Option 1A) would be installed beneath an existing road that runs through the national park (Boiler Swamp Road). Cobboboonee National Park is protected under the *National Parks Act 1975* and managed cooperatively by Parks Victoria and the Gunditjmara Traditional Owners through the Budj Bim Council for conservation and compatible recreation. The park is recognised for its biodiversity and cultural values. The park provides habitat for small to medium size mammals, and many rare and threatened species. Option 1A and Option 1B were assessed as having moderate potential for impacts on native vegetation (less than 10 ha), moderate potential for impacts on threatened fauna, and moderate potential for impacts on threatened flora, before the implementation of avoidance and mitigation.

The Option 1B alignment also intersects with Cobboboonee Forest Park, with Boiler Swamp Road extending through this forest park. Boiler Swamp Road is managed by DEECA in accordance with the *Road Management Act 2004*. Boiler Swamp Road provides access to visitor sites and park features for recreation and tourism, fire and park management activities, emergency response and transit. Cobboboonee Forest Park is managed under the *Forests Act 1958* by DEECA for conservation, recreation, and sustainable

resource use. Many of the biodiversity and cultural values present in the adjoining Cobboboonee National Park extend into the forest park.

The scoring for all options does not consider potential mitigation. This is to ensure that the MCA objectively compares the options using the established criteria and measures. As the MCA was developed and it became apparent that Option 1B (and Option 1A) scored comparatively better than Option 2A and Option 2B, Neoen progressed investigations into potential mitigation. Mitigation efforts were focused on criterion where Option 1A and Option 1B did not score as well as Option 2A and Option 2B (i.e., environment criterion).

Neoen has developed a construction methodology to install the transmission line underground beneath Boiler Swamp Road to avoid and minimise potential impacts on natural and cultural values in the Parks. The construction methodology has also been developed in consultation with Parks Victoria and DEECA through the Technical Reference Group process (as part of the EES process), to ensure impacts on road users and users of the Great South West Walk are avoided, minimised, and managed. The proposed construction methodology will involve using a combination of in-line trenching, high-pressure water excavation, and horizontal directional drilling. These construction techniques mean there will be no direct impacts on vegetation adjacent to the existing road formation of Boiler Swamp Road.

A total of 3.787 ha of assumed native vegetation losses along Option 1B has been captured in the Project's total impact on native vegetation, due to encroachment on tree protection zones. This includes 214 large trees. However, using high-pressure water excavation and horizontal directional drilling will avoid and minimise impacts on tree roots that might extend below the road formation, with a focus on avoiding impacts on tree roots of listed species, such as Apple Jack *(Eucalyptus splendens)*.

The Option 1A and Option 1B alignments also cross several waterways. Three below ground crossings of a major waterway (Surrey River) would be required. This has the potential to cause direct and indirect effects on aquatic and riparian ecology, as well as water quality. By comparison, the Option 2A and Option 2B alignments do not entail any major waterway crossings.

The scoring for the construction complexity criteria reflects the identified need to develop a fit-for-purpose construction methodology that avoids and minimises potential impacts on the values in adjoining protected areas and public land. A detailed explanation of the proposed construction methodology and associated environmental controls is provided in Appendix AB of the EES (draft Section 27 consent application).

Neoen anticipates that through application of these techniques, the values of these areas can be protected during construction and operation. In addition, Neoen expects that the function of Boiler Swamp Road for fire and park management activities, emergency response, and transit can be maintained by implementing the proposed construction methodology and in collaboration with Parks Victoria and DEECA.

Option 1B is therefore the proposed preferred option.

4.0 Key findings of the assessment

The key findings of the assessment are set out in the following section, using each of the parameter groups as a guide.

Environment

Option 2A and Option 2B performed comparatively well for the environment criteria, with Option 2B scoring the lowest. The performance of these options in the environment criteria is primarily linked to their avoidance of protected areas, comparatively smaller potential impact on native vegetation and threatened flora and fauna, a slightly lower mapped strategic biodiversity score along the alignment, and avoidance of major waterway crossings. Option 2B also scored well for the avifauna collision risk criteria as it is below ground.

Option 1A and Option 1B scored comparatively higher for the environment criteria, mainly due to these alignments being proposed partially within a roadway that bisects a protected area (Cobboboonee National Park). This protected area is set aside for its conservation values and Neoen acknowledges the additional emphasis placed on ensuring that any proposal to use land in these areas avoids impacts on the values that make these areas important and contribute to their protected status. Option 1A and Option 1B were assessed as having moderate potential for impacts on native vegetation (less than 10 ha) and threatened fauna, and moderate potential for impacts on threatened flora, before the implementation of avoidance and mitigation.

A discussion on the avoidance and mitigation approaches Neoen is proposing in response to this assessment for environment criterion along the Option 1A and Option 1B alignments is provided in **Section 3.4**.

Community / Social

The performance of each option against community and social criterion favours the options that would connect to the existing Heywood Terminal Station (Option 1A and Option 1B). The options that are partially or fully underground are also scored more favourably (Option 1A (partial), Option 1B, and Option 2B).

Option 2A and Option 2B would require a new terminal station at the cut-in point to the existing transmission line. Noise predictions prepared for the terminal station at this location indicated that exceedances of operational noise criteria would be likely to occur (6dBA above applicable noise limit); and that these exceedances would be difficult to ameliorate (refer to Appendix O of the Environmental Noise Assessment for further details on noise compliance for each option). This was a concern expressed by landholders and members of the community to Neoen, as was concerns relating to the visual prominence of a new terminal station in the landscape.

Potential visual amenity impacts associated with the transmission line were also one of the main reasons several landowners and members of the community indicated to Neoen that they did not support an overhead transmission line option along the Option 2 alignment.

Broader community acceptance of the options was also tested by Neoen and favoured Option 1A and Option 1B. Neoen's consultation with potential hosts landholders and the broader community identified a strong community preference for the underground transmission line through Cobboboonee National Park / Forest Park, and a strong opposition to Options 2A and 2B through agricultural land. An analysis of engagement records of 13 neighbouring landholders reveals that there was strong opposition to Option 2A and 2B. Many concerns relating to Option 2A were noted regarding visual amenity, property devaluation, disruption to agricultural practices, biosecurity risks, and bushfire risk associated with the new terminal station. Overall, a clear point was made in opposition to Option 2A and 2B, with all participants mentioning a preference for Option 1B.

Several potential host landholders were strongly opposed to Option 2A and 2B and would not agree to host the transmission line on their properties, which largely instigated the community campaign against these options. Glenelg Shire Council has also noted their strong support for Option 1A and 1B as the preferred option over Option 2A and 2B.

Potential construction impacts on nearby receptors was deemed equivalent for all options, and there was not a significant difference in scoring in relation to actual or perceived changes to property values.

All options would affect agricultural operations to varying degrees. The underground options that bisect agricultural land (Option 1A and Option 2A) scored lower comparative to the overhead options. Overhead transmission lines have potential to change the way agricultural land can be used when operational due to requirements imposed as part of the easement. Underground lines would affect agricultural operations during construction (mainly through restricting the use of the construction footprint, changes to access and potential bio-security risks), however most of these changes are temporary and would only occur during construction. Underground lines are less likely to affect agricultural operations once the trench has been reinstated, particularly having regard to the typical use of land that the options bisect (grazing).

Land

Suitable land is available at the grid connection point for Option 1A and Option 1B, as land is available within the existing Heywood Terminal Station to allow for a 275 kV busbar extension for the Project. These options therefore scored well comparative to the other options for these criteria.

Option 2A and 2B would require new electrical infrastructure including a terminal station to facilitate cut-in to the existing 500 kV transmission line. Consultation by Neoen with potential host landholders of the new terminal station location (including the landholder at the connection point assessed in this report) expressed their strong opposition to a new substation being located within proximity to their properties (within 500 m of the nearest dwelling) (refer to **Chapter 6 Community and stakeholder engagement**).

Option 1A and Option 1B scored moderately for the criterion relating to the suitability of freehold land along the transmission line alignment, as all landowner agreement with the freehold land have been secured (noting that one host landholder for the overhead component of Option 1A expressed their preference for an underground line). Consent would be required from the relevant public land managers to install the transmission line below Boiler Swamp Road through Cobboboonee National Park and Forest Park, resulting in Option 1A and Option 1B being scored a 2 for this criterion.

Option 2A was assigned a score of 3 as this option received strong opposition from the majority of the potential host landholders. Several landholders along this alignment were not willing to participate in the Project and host the transmission line, which meant that landowner agreements were unable to be secured for the entire length of Option 2. Some potential host landowners were supportive of an underground line through the properties instead of an overhead line, so Option 2B was assigned a medium score of 2 (refer to the **Social Impact Assessment (Appendix S)** of the EES).

Heritage

Preliminary findings of the Cultural Heritage Assessment indicate there is more intangible evidence of Indigenous populations living along the Option 2A and Option 2B alignments than along the Option 1A and 1B alignments. Although this report cannot speak directly to the potential intangible values for the Project as these are reliant on Gunditj Mirring and the completed CVA, technical advice from cultural heritage advisors suggest that any overground transmission line options will score higher on intangible impacts for the general landscape. While Option 1B intersects with several areas of CHS, there is reduced archaeological sensitivity along Boiler Swamp Road due to past localised disturbance associated with road grading and maintenance activities through the area. As more than 20% of the Option 1B alignment is within areas previously subject to significant ground disturbance, namely Boiler Swamp Road, it was given a score of 1.

All options scored poorly (3) in relation to the native title criterion, as all options would intersect with land for which native title has been determined.

Technical and design

Option 1B and Option 1A scored equal lowest for technical and design. Option 2A and Option 2B scored slightly higher. Option 2A and Option 2B scored higher for electrical system design complexity (complex compared to conventional for Option 1A and Option 1B) because of the need to design and implement a new terminal station and cut-in to the existing 500 kV line, while ensuring existing levels of power system security, reliability, and power transfer capacity. The 'conventional' scoring for Option 1A and Option 1B is due to these options connecting to the existing Heywood Terminal Station via a spare bus bar (connection point).

In addition, about 55 % of the Option 1A and Option 1B alignment is within an existing infrastructure corridor (beneath Boiler Swamp Road). This reduces technical and design considerations as the use of an existing roadway mean no additional access track/roads are required in the unlikely event transmission line equipment needs to be accessed. In addition, the roadway would consist of similar soils and ground conditions, making for a simpler and consistent design along the route.

Constructability

Option 1B is not the lowest scoring option for constructability. This is because Option 1B (and Option 1A) bisect the Parks. Even though these options score lower for operational technical and design complexity (see section above), constructing the options beneath Boiler Swamp Road requires a bespoke approach to ensure potential impacts on environmental values of the adjoining protected area within Cobboboonee National Park are avoided and minimised.

Neoen has identified a narrow footprint construction methodology that combines trenching, high-pressure water excavation, and horizontal directional drilling for constructing the transmission line beneath Boiler Swamp Road.

The proposed solution also ensures that public land managers and emergency vehicles can use Boiler Swamp Road at the same time. This solution is more complex than traditional trenching (Option 2B) and overhead line construction (Option 2A) but achieves several other project objectives in relation to biodiversity conservation, protection of cultural values, and minimisation of amenity impacts such as visual impacts on sensitive receptors.

Operability

Maintenance complexity was considered equal for all options. Underground lines do not require regular field maintenance (Option 1B, part Option 1A and Option 2B). Overhead lines can be affected by environmental conditions such as adverse weather, high humidity, ground stability, vegetation, and flying objects (part Option 1A, Option 2A). For the underground sections of Option 1A, and all of Option 1B and Option 2B, maintenance or rectification would be more complex because the line is underground.

The primary operational reason for selecting Option 1B (which would also apply to Option 2B with all other considerations set aside) is the lower risk of third-party damage, from either environmental or human causes. Option 1B is further differentiated as 56.8 % of the line is below an existing road (Boiler Swamp Road), with works on the road carried out only by the public land manager, as opposed to a private landholder. Neoen would develop a Traffic Management Plan and enter into agreements with the relevant public land managers to ensure road maintenance is achievable, with the road condition, at minimum, to meet the current standard.

Safety

Option 1B was assessed as having a standard risk to worker safety during construction and operation, as was Option 1A and Option 2A. The fully underground, but considerably longer option (Option 2B), was assessed by Neoen as having an above standard safety risk, mainly due to the requirement for a longer distance of open cut trenching.

Option 1A, Option 1B and Option 2B score equivalently (low potential for elevation) for bushfire risk during operation. Option 2A was assessed as having moderate potential to elevate bushfire risks during operation as it involves both a terminal station (which is an additional asset in the landscape that would need to be afforded protection) and overhead transmission lines (which were assessed as having some potential to affect aerial bushfire suppression activities). The proposed construction methodology along Boiler Swamp Road would ensure that emergency vehicles would always have access. In addition, an Emergency Response Plan would be prepared to ensure that the safety of workers and the risk to and from plant and equipment is managed.

Infrastructure

Option 1A, Option 1B and Option 2B scored lower than Option 2A for this parameter group. The lower scoring options would either be underground (Option 1B and Option 2B) or outside the Portland Airport OLS (Option 1A and Option 1B). Option 2B would be above-ground and intersects with the Portland Airport OLS.

Capital cost

The scores for capital cost are derived from Neoen's capital cost estimations for each option.

Option 1B is not the least cost option. Option 1A and Option 2A both scored lower for cost, as they are above ground options and overhead transmission is generally cheaper to build than underground. Option 2B is also entirely underground but has a much higher capital cost, mainly because of the length of the alignment and the need to construct a new terminal station at the cut-in point to the 500 kV line.

Undergrounding Option 1B is preferred even with a higher capital cost. An overhead line in this location would present a collision risk for birds and would be visually prominent in the landscape. It would also potentially affect agricultural practices during construction by limiting the types of practices that could occur within the overhead line easement. The construction of the underground line would have lesser effects on agricultural operations during construction.

5.0 Conclusion

The purpose of this transmission line route options assessment is to identify the best possible transmission line route and configuration for the Kentbruck Green Power Hub. To do this, Umwelt has identified four feasible transmission line options and undertaken a multi-criteria assessment of these options.

Understanding the physical and socio-economic environment of an area potentially affected by a transmission line is a key foundation for identifying a preferred transmission line route. Both physical and socio-economic factors require careful consideration to minimise potential impacts. A range of landscape, environmental, social, engineering and design related factors have been considered in this options assessment.

Based on the assessment and weighted scoring, where the lowest score is the strongest option, Option 1B has the lowest weighted final score, followed by Option 1A, Option 2B and Option 2A. Option 1B is therefore the preferred option.

Option 1B has specific strengths in several of the criterion and broader parameter groups, which makes this option the most favourable in terms of meeting the transmission line objectives. Option 1B scored well in the community/social, land, and infrastructure parameter groups. Option 1B also scored equivalent to other options in the technical and design, operability, safety, constructability, and heritage parameter groups (plus/minus 0.05).

Option 1B scored comparatively less well in the cost parameter group, and for some criterion in the environment parameter group.

Neoen recognises that cost effectiveness needs to be balanced with other, sometimes competing objectives, including avoiding and minimising potential environmental and social impacts. The higher capital cost for Option 1B compared to Option 1A and Option 2A is mostly due to constructing the whole alignment below ground. This underground option is preferred even with a higher capital cost because it avoids building an overhead line that birds could collide with, or that could interfere with aerial firefighting operations, and that might cause visual amenity impacts for local community members. It is also the preferred design solution of local communities that have been surveyed on the topic by Neoen.

Option 1A and Option 1B scored comparatively higher for the environment criteria, mainly due to these alignments being proposed partially within a roadway that bisects the Parks. The Cobboboonee National Park is protected under legislation focused on conservation (*National Parks Act 1975*) and this land is set aside for its environmental and cultural values. The scoring reflects the potential for impacts on biodiversity values within a protected area, and within the adjoining Cobboboonee Forest Park.

Upon completing the MCA, Neoen has done extensive work to develop a construction methodology that would avoid and minimise potential impacts on native vegetation within these areas, including restricting the construction footprint to the road formation, and proposing high pressure water excavation and horizontal directional drilling to avoid impacts on tree roots that might extend beneath the road, with a focus on avoiding potential impacts on listed species.

Neoen has worked closely with potential host landholders and the community to understand the community sentiment and their preferred option for a transmission line for the Project. Option 2A is so strongly opposed by the community that proceeding with it would generate a negative sentiment towards the Project within the community and reduce the level of trust the community has in the overall decision-making process and in Neoen.

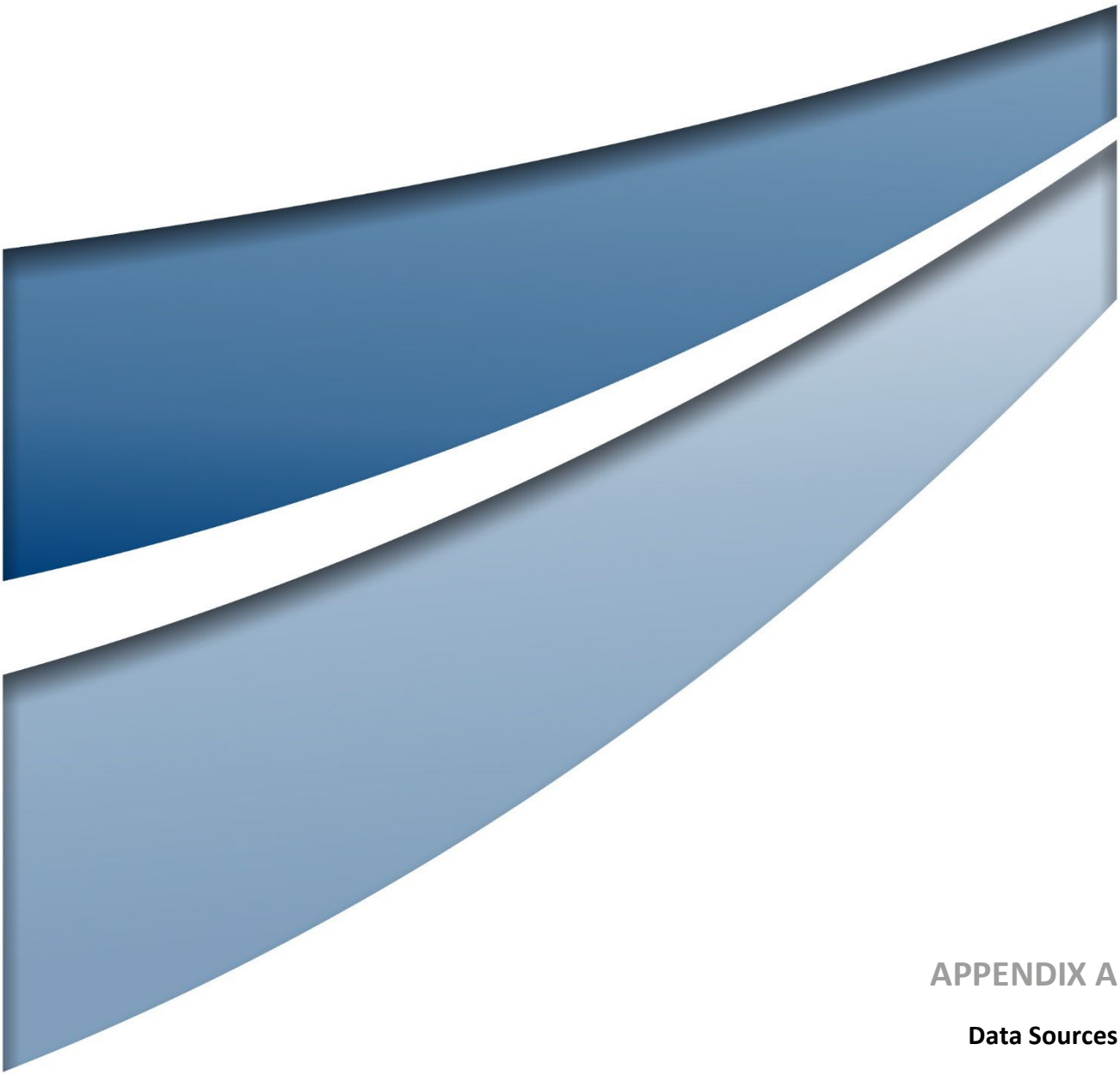
Option 1B is the preferred alignment and best meets the Project objectives as it:

- Directly connects the Project to the existing Heywood Terminal Station, and in turn to a transmission line that has sufficient capacity to transport the electricity generated by the Project to where it can be used.
- Is a constructable and cost-effective design solution that uses an existing infrastructure corridor (Boiler Swamp Road), providing opportunities to minimise potential impacts relating to social and cultural considerations, visual amenity, existing land uses and the environment.
- Removes the potential for collision risk with threatened avifauna species (including Brolga) (compared to overhead line options).
- Aligns with strong community preference for the underground transmission line through the Parks.
- Aligns with the preference of the GMTOAC, which is that the transmission line should be in areas of significant ground disturbance.
- Is in an area with less intangible cultural heritage value and reduced archaeological sensitivity along Boiler Swamp Road due to past disturbance associated with road grading and maintenance activities through the area.
- Minimises potential visual amenity impacts on nearby residents with the entire transmission line located underground.
- Avoids potential operational noise impacts on nearby residents by removing the need for a new terminal station.
- Avoids areas with a higher density of dwellings, particularly around Gorae West and areas north of Portland, as well as landscapes of significance closer to the Discovery Bay and Bridgewater coastlines.
- Avoids potential aviation impacts associated with proximity to the Portland Aerodrome.
- Minimises potential impacts on, and disruption to, continued operation of productive agricultural land.
- Avoids potential interference with aerial firefighting operations and removes additional bushfire risk associated with a new terminal station.

Option 1B has been adopted by the Project and has been assessed within the EES. As part of the EES process, further work is being done by Neoen to avoid and minimise potential impacts of this transmission line option as much as practicable.

This transmission line options assessment satisfies section 3.4 of the Scoping Requirements, which requires the EES to identify feasible alternatives considered for the Project, including transmission line alternatives

and configurations, and to provide an explanation of how the Project design has been revised in response to constraints identified throughout the EES process.



APPENDIX A

Data Sources

Table A1 Data sources

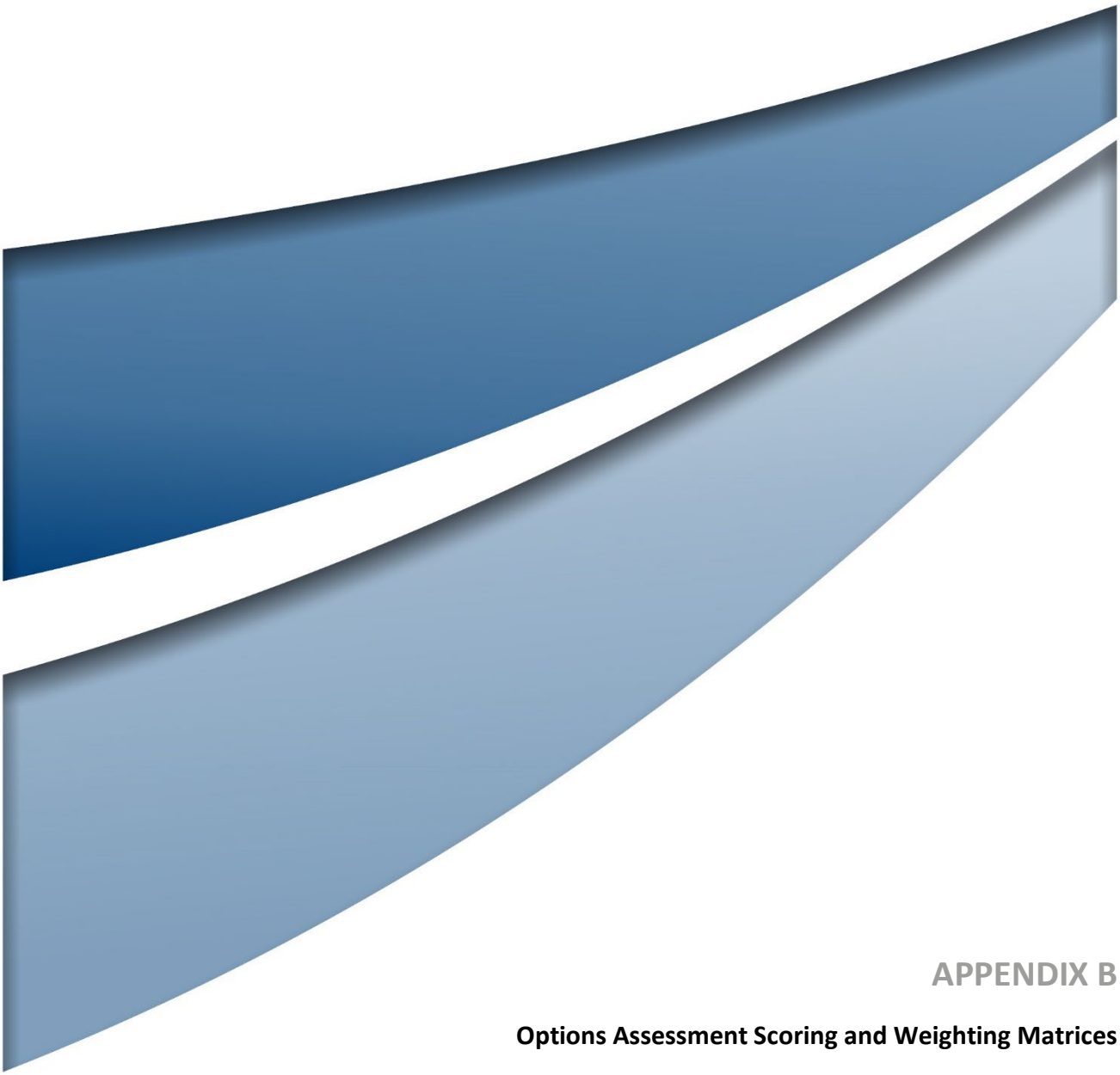
Criteria	Considerations	Data Source
Environment		
Intersects with protected areas (National Parks, State Parks, Ramsar wetlands)	• Ramsar wetlands • National Parks listed under the *National Parks Act 1975* • Public land defined under the Victorian *Crown Land (Reserves) Act 1978*, Forests Act, and *Land Act 1958*, such as State forests, forest parks, conservation reserves, and wildlife reserves.	• Public Land Management (PLM25) Dataset (Data Vic) • Ramsar Wetland Areas in Victoria Dataset (Data Vic)
Native vegetation classed as Ecological Vegetation Class (EVC)	• Mapped EVCs	• DEECA's Native Vegetation – Modelled 2005 Ecological Vegetation Classes (Data Vic) • Flora and Fauna Impact Assessment (Biosis, 2024)
Strategic biodiversity values	• Strategic Biodiversity Values	• DEECA's NaturePrint v4.0 Strategic Biodiversity Values
Threatened Fauna Species	• Records of threatened fauna species listed under the *Flora and Fauna Guarantee Act 1988* • Records of threatened fauna species listed under the *Environment Protection and Biodiversity Conservation Act 1999*	• Flora and Fauna Impact Assessment (Biosis, 2024) • Victorian Biodiversity Atlas (VBA) Threatened Fauna and Flora Species Dataset (Data Vic)
Threatened Flora Species	• Records of threatened flora species listed under the *Flora and Fauna Guarantee Act 1988* • Records of threatened flora species listed under the *Environment Protection and Biodiversity Conservation Act 1999*	• Flora and Fauna Impact Assessment (Biosis, 2024) • Victorian Biodiversity Atlas (VBA) Threatened Fauna and Flora Species Dataset (Data Vic)
Transmission line presents collision risk to avifauna species (excluding Brolga)	• Length of transmission line that is overhead	• Information provided by Neoen • Flora and Fauna Impact Assessment (Biosis, 2024)

Criteria	Considerations	Data Source
Mapped threatened ecological communities (TECs) listed under the FFG Act or EPBC Act	• Threatened ecological communities listed under the *Flora and Fauna Guarantee Act 1988* • Threatened ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999*	• Flora and Fauna Impact Assessment (Biosis, 2024)
Brolga	• Brolga breeding wetland habitat (DEECA mapped wetlands, and wetland identification from Biosis)	• Victorian Wetland Inventory (Current) Dataset (Data Vic) • Brolga Impact Assessment (Biosis, 2024) • Victorian Biodiversity Atlas (VBA) Threatened Fauna and Flora Species Dataset (Data Vic)
Groundwater dependent ecosystems (GDEs) (terrestrial and aquatic)	• Groundwater dependent ecosystems	• Groundwater Dependent Ecosystems Atlas Dataset (Bureau of Meteorology)
DEECA current wetlands	• DEECA mapped wetlands	• Victorian Wetland Inventory (Current) Dataset (Data Vic)
Major waterways	• Major waterways or waterbodies	• Watercourse Network 1:25,000 – Vicmap Hydro (Data Vic) • Surface Water Impact Assessment (AECOM, 2024)
Community / Social		
Sensitive receptors potentially affected by operational noise amenity impacts	• Sensitive receptors potentially affected by noise amenity impacts	• Environmental Noise Assessment (MDA, 2024)
Sensitive receptors potentially affected by visual amenity impacts once Project is operational	• Sensitive receptors potentially affected by visual impacts	• Landscape and Visual Impact Assessment (Green Bean Design, 2024)
Sensitive receptors potentially affected by amenity impacts during construction (noise, visual, dust etc.)	• Sensitive receptors potentially affected by visual, noise, and dust impacts	• Environmental Noise Assessment (MDA, 2024) • Landscape and Visual Impact Assessment (Green Bean Design, 2024) • Air Quality Impact Assessment (AECOM, 2024)

Criteria	Considerations	Data Source
Agricultural operations / enterprises (including property access and biosecurity risks)	• Disruption to agricultural operations	• Social Impact Assessment (Umwelt, 2024) • Information provided by Neoen
Community acceptance of transmission line option	• Community sentiment on the transmission line options and whether there is a social licence	• Information provided by Neoen and its stakeholder engagement team • Social Impact Assessment (Umwelt, 2024)
Actual or perceived property devaluation associated with a transmission line	• Actual or perceived property devaluation by host landholders and/or neighbours	• Social Impact Assessment (Umwelt, 2024)
Land		
Availability of suitable land at grid connection point for electrical infrastructure	• Availability of suitable land at grid connection point for electrical infrastructure	• Information provided by Neoen and its stakeholder engagement team
Availability of suitable land along transmission line alignment	• Availability of suitable land along transmission line alignment	• Information provided by Neoen and its stakeholder engagement team
Extractive sites	• Existing open-cut and underground mines and quarries • Land covered by an existing Work Authority for potential future extractive activities	• Extractive Industries Work Authorities (Data Vic)
Heritage		
Registered historic heritage places	• Registered sites listed on the World Heritage List, National Heritage List, or Commonwealth Heritage List • Historic heritage sites listed on the Victorian Heritage Inventory (VHI) and/or Victorian Heritage Register (VHR) • Heritage places listed in the Heritage Overlay of the Glenelg Planning Scheme	• Historical Heritage Impact Assessment (Biosis, 2024)

Criteria	Considerations	Data Source
Aboriginal places listed on the Victorian Aboriginal Heritage Register (VAHR) or identified through Project investigations	• Aboriginal places listed on the Victorian Aboriginal Heritage Register (VAHR) • New places identified during Project investigations	• Aboriginal Cultural Heritage Impact Assessment (ALA, 2024)
Intangible cultural values	• Intangible cultural values	• Aboriginal Cultural Heritage Impact Assessment (ALA, 2024) • Information provided by Neoen and its stakeholder engagement team from regulatory consultation with Gunditj Mirring
Areas mapped as areas of cultural heritage sensitivity (CHS) under the Aboriginal Heritage Act 2006, which are considered to have a high likelihood of containing unidentified Aboriginal cultural heritage material	• Areas mapped as areas of cultural heritage sensitivity, which are considered to have a high likelihood of containing unidentified Aboriginal cultural heritage material.	• Areas of Cultural Heritage Sensitivity Dataset (Data Vic) • Aboriginal Cultural Heritage Impact Assessment (ALA, 2024) •
Native Title land requiring provision under an Indigenous Land Use Agreement (ILUA) with the Gunditj Mirring Traditional Owners Aboriginal Corporation	• Native Title land requires provision under an Indigenous Land Use Agreement (ILUA) with the Registered Aboriginal Party	• Aboriginal Cultural Heritage Impact Assessment (ALA, 2024) • Native Title Vision
Technical and Design		
Electrical system design complexity (to facilitate connection to the grid and maintain existing levels of power system security, reliability, and power transfer capacity)	• Electrical system design complexity (to facilitate connection to the grid and maintain existing levels of power system security, reliability, and power transfer capacity)	• Information provided by Neoen
Length of alignment located within an existing compatible infrastructure corridor	• Length of alignment located within an existing compatible infrastructure corridor	• Information provided by Neoen
Constructability		
Construction logistics and access requirements, such as availability of laydown areas and movement of equipment and materials	• Construction logistics and access requirements, such as availability of laydown areas and movement of equipment and materials	• Aboriginal Cultural Heritage Impact Assessment (ALA, 2024)
Construction complexity	• Construction complexity	• Information provided by Neoen project team

Criteria	Considerations	Data Source
Construction timeframe	• Construction timeframe	• Information provided by Neoen project team
Operability		
Complexity of maintenance activities and requirements	• Complexity of maintenance activities and requirements	• Information provided by Neoen project team
Risk of third party damage to transmission line and associated infrastructure	• Risk of third party damage to transmission line and associated infrastructure	• Information provided by Neoen project team
Safety		
Risk to worker safety during construction and operation	• Risk to worker safety during construction and operation	• Information provided by Neoen project team
Operational bushfire risk to environment and property	• Operational bushfire risk to environment and property	• Bushfire Risk Assessment and Mitigation Plan (Fire Risk Consultants, 2024)
Infrastructure		
Airports and aerodromes	• Airports and aerodromes OLS	• Aviation Impact Assessment (Chrion Aviation, 2024)
Cost		
Difference in capital expenditure between options	• Difference in capital expenditure between options	• Information provided by Neoen project team



APPENDIX B

Options Assessment Scoring and Weighting Matrices

Options Assessment Scoring Matrix

Parameter	Weighting	Criteria	Metrics: High (score of 3)	Medium (score of 2)	Low (score of 1)	N/A (score of 0)	Transmission line options - metrics: 1A Heywood UG + OH	1B Heywood UG	2A Portland OH	2B Portland UG	Transmission line options - scores: 1A Heywood UG + OH	1B Heywood UG	2A Portland OH	2B Portland UG
Transmission line details	Capital cost						$118M	$141M	$100M	$188M				
	Overall length						26.6km	26.6km	26km	26km				
Environment	25%	Intersects with protected areas (National Parks, State Parks, Ramsar wetlands)	Intersects with a National Park, State Park, or Ramsar wetland	N/A	N/A	Does not intersect with a National Park, State Park, or Ramsar wetland	3	3	0	0	3	3	0	0
	25%	Native vegetation classified as an ecological vegetation class (EVC)	Direct impacts on 10ha or more of native vegetation	Direct impacts on between 5ha and 10ha of native vegetation	Direct impacts on 5ha or less of native vegetation	No impacts on native vegetation or potential impacts not able to be determined using available information	8	8	-	-	2	2	0	0
	25%	Strategic biodiversity value (weighted average) for entire route, regardless of the extent of native vegetation.	66-100	33-65	0-32	0	67.3	67.3	33.2	33.2	3	3	2	2
	25%	Threatened fauna - impacts to individuals or habitat due to construction - potential loss of a genetically important population of an endangered or threatened species	High likelihood of population level impacts	Medium likelihood, including some direct or indirect impacts to individuals	Low likelihood of direct or indirect impacts to threatened fauna	N/A	2	2	1	1	2	2	1	1
	25%	Threatened flora - potential loss of a genetically important population of an endangered or threatened species	High likelihood of population level impacts	Medium likelihood, including some direct or indirect impacts to individuals	Low likelihood of direct or indirect impacts to threatened flora	No impacts or potential impacts not able to be determined using available information	2	2	0	0	2	2	0	0
	25%	Transmission line presents collision risk to avifauna species (excluding Brolga)	66-100% of the transmission line is overhead and presents a greater collision risk	33-65% of the transmission line is overhead and presents some level of collision risk	1-32% of the transmission line is overhead and presents some level of collision risk	Transmission line is entirely underground	33.8	0.0	100	0	2	0	3	0
	25%	Mapped threatened ecological communities (TECs) listed under the FFG Act or EPBC Act	Intersects with a mapped TEC	N/A	N/A	Does not intersect with a mapped TEC	0	0	0	0	0	0	0	0
	25%	Brolga	Transmission line is within 3.2 km of potential brolga breeding habitat. Potential for disturbance to breeding. Transmission line is overhead and presents risk of collision	Transmission line is within 3.2 km of potential brolga breeding habitat. Potential for disturbance to breeding. No risk of collision due to transmission line being underground.	Overhead transmission line is more than 3.2km from potential brolga breeding habitat, or transmission line is underground and avoids impact on breeding habitat	No potential for impact on Brolga breeding habitat or risk of collision	3	2	3	2	3	2	3	2
	25%	Groundwater dependent ecosystems (GDEs) (terrestrial and aquatic)	Intersects with a potential GDE	N/A	N/A	Does not intersect with any potential GDEs	3	3	3	3	3	3	3	3
	25%	DEECA current wetlands	Intersects with a DEECA current wetland	N/A	N/A	Does not intersect with any DEECA current wetlands	0	0	0	0	0	0	0	0
	25%	Major waterways	3 or more crossings	less than 3 crossings	N/A	Does not intersect with any major waterways / transmission line is overhead and pole placement can be avoid waterways	3	3	0	0	3	3	0	0
Community / social	15%	Sensitive receptors potentially affected by operational noise amenity impacts	Operational noise predicted to exceed the applicable noise limits determined in accordance with the Noise Protocol.	N/A	N/A	Operational noise predicted to comply with applicable noise limit determined in accordance with the Noise Protocol	0	0	3	3	0	0	3	3
	15%	Sensitive receptors potentially affected by visual amenity impacts once Project is operational	Significant visual impacts likely at sensitive receptors during operation	Moderate visual impacts likely at sensitive receptors during operation	Low to negligible visual impacts anticipated at sensitive receptors during operation	N/A	2	1	3	3	2	1	3	3
	15%	Sensitive receptors potentially affected by amenity impacts during construction (noise, visual, dust etc.)	Potentially significant amenity impacts at sensitive receptors during construction	Potential amenity impacts at sensitive receptors during construction but not significant	Negligible amenity impacts anticipated at sensitive receptors during construction	NA	2	2	2	2	2	2	2	2
	15%	Agricultural operations / enterprises (including property access and biosecurity risks)	Significant impact/disruption to agricultural operations during project constrution and/or operation	Some impact/disruption to agricultural operations during project construction and/or operation	Minor impact/disruption to agricultural operations during project construction and/or operation	N/A	2	1	3	1	2	1	3	1
	15%	Community acceptance of transmission line option	Lack of community acceptance/strong community opposition	Moderate level of community acceptance/some concerns within the community	High level of community acceptance and strong support from community	N/A	1	1	3	2	1	1	3	2
	15%	Actual or perceived property devaluation associated with a transmission line	Signficant actual or perceived impact on property devaluation	Moderate actual or perceived impact on property devaluation	Negligible actual or perceived impact on property devaluation	N/A	2	1	2	1	2	1	2	1

Land	10%	Availability of suitable land at grid connection point for electrical infrastructure	Suitable land at grid connection point is not available / landowner consent is unlikely to be obtainable	Suitable land at grid connection location is available but is constrained / landowner consent may be obtainable	Suitable land is available at grid connection point / landowner consent is likely to be obtainable	N/A	1	1	3	3	1	1	3	3
	10%	Availability of suitable land along transmission line alignment	Suitable land along alignment not available / landowner consent is unlikely to be obtainable	Suitable land along alignment is available but is constrained / landowner consent may be obtainable	Suitable land along alignment is available / landowner consent is likely to be obtainable	N/A	2	2	3	2	2	2	3	2
	10%	Extractive sites (existing mines / quarries and Work Authorities for future extractive activities)	Intersects with existing mine / quarry or Work Authority	N/A	N/A	Does not intersect with any existing mines / quarries or Work Authorities	0	0	0	0	0	0	0	0
Heritage	10%	Registered historic heritage sites (listed on the Victorian Heritage Inventory (VHI), Victorian Heritage Register (VHR), and/or Heritage Overlay of the Glenelg Planning Scheme)	Intersects with listed VHR sites of State or National significance	Intersects with listed VHI sites of higher than local significance	Intersects with listed VHI and or HO sites of local significance	Does not intersect with any listed heritage sites or sites have been destroyed/ in an area of SGD	0	0	0	0	0	0	0	0
	10%	Aboriginal places listed on the Victorian Aboriginal Heritage Register (VAHR) or identified through Project investigations	Intersects with known Aboriginal places of high significance (nature or preservation – eg scarred trees, large intact/complex subsurface artefact scatters)	Intersects with known Aboriginal places of moderate significance (nature or preservation – eg. surface scatters subject to some level of disturbance/turbation)	Intersects with known Aboriginal places of low significance (nature or preservation – eg. Isolated occurrences or places which have been subject to high levels of disturbance)	Does not intersect with any known Aboriginal places or intersects with delisted or salvaged places where no further potential exists	0	0	0	0	0	0	0	0
	10%	Intangible cultural values	Significant intangible cultural values occur within the alignment (eg. - trauma lines or Aboriginal historic places associated with CVA)	Some intangible cultural values occur within the alignment (eg. - physical aspects or places highlighted in the CVA)	Few or no intangible cultural values occur within the alignment (general in nature)	N/A	2	1	2	1	2	1	2	1
	10%	Areas mapped as areas of cultural heritage sensitivity (CHS) under the *Aboriginal Heritage Act 2006* , which are considered to have a high likelihood of containing unidentified Aboriginal cultural heritage material	40% or more of the alignment length overlaps/Intersects with an area of CHS with no known SGD	Between 20% and 40% of the alignment length overlaps with an area of CHS and/or has 20% or less of the alignemnt in areas of SGD	20% or less of the alignment length overlaps with an area of CHS and/or more than 20% of the alignemnt is in an areas of SGD	Not associated with any area of CHS; or CHS has been demonstrably destroyed/removed completely by SGD	1	1	2	2	1	1	2	2
	10%	Native Title land requiring provision under an Indigenous Land Use Agreement (ILUA) with the Gunditj Mirring Traditional Owners Aboriginal Corporation	Intersects with Native Title land	N/A	N/A	Does not intersect with any Native Title land	3	3	3	3	3	3	3	3
Technical and design	5%	Electrical system design complexity (to facilitate connection to the grid and maintain existing levels of power system security, reliability, and power transfer capacity)	Complex electrical system design	Conventional electrical system design	Simple electrical system design	N/A	2	2	3	3	2	2	3	3
	5%	Length of alignment located within an existing compatible infrastructure corridor	20% or less of the alignment length is within an existing infrastructure corridor	Between 20% and 50% of the alignment length is within an existing infrastructure corridor	50% or more of the alignment length is within an existing infrastructure corridor	N/A	56.8%	56.8%	0.0%	0.0%	1	1	3	3
Constructability	5%	Construction logistics and access requirements, such as availability of laydown areas and movement of equipment and materials	Significant logistics requirements and/or access constraints for the alignment or grid connection point	Above standard logistics requirements and/or access constraints for the alignment or grid connection point	Standard logistics requirements and/or access constraints for the alignment or grid connection point	N/A	3	3	1	1	3	3	1	1
	5%	Construction complexity	Complex	Conventional	Simple	N/A	3	3	2	2	3	3	2	2
	5%	Construction timeframe (months)	Construction timeframe of 12 or more months	Construction timeframe of between six and 12 months	Construction timeframe of six or less months	N/A	5	5	12	12	1	1	3	3
Operability	5%	Complexity of maintenance activities and requirements	Significant complexities with maintenance	Above standard complexities with maintenance	Standard complexities with maintenance	N/A	2	2	2	2	2	2	2	2
	5%	Risk of third party damage to transmission line and associated infrastructure	N/A	Above standard third party damage risk	Standard third party damage risk	N/A	2	1	2	1	2	1	2	1
Safety	5%	Risk to worker safety during construction and operation	Significant safety risks	Above standard safety risk	Standard safety risk	N/A	1	1	1	2	1	1	1	2
	5%	Elevated bushfire risks during operation (considers increased risk of transmission infrastructure causing a bushfire, and/or transmission infrastructure affecting bushfire suppression)	Significant elevation of bushfire risks	Moderate elevation of bushfire risks	Low elevation of bushfire risks	Negligible elevation of bushfire risks	1	1	2	1	1	1	2	1
Infrastructure	5%	Airports and aerodromes	Overhead transmission line intersects with the Inner Horizontal Surface of an airport's OLS	N/A	N/A	Overhead transmission line does not intersect with the Inner Horizontal Surface of any airport's OLS, or the transmission line is underground	0	0	3	0	0	0	3	0

Cost	15%	Difference in capital expenditure between options	Ratio of capital cost of the option to the lowest cost option is greater than 1.4	Ratio of capital cost of the option to the lowest cost option is between 1.2 and 1.4	Ratio of capital cost of the option to the lowest cost option is between 1 and 1.2	N/A	1.2	1.4	1.0	1.9	1	2	1	3

Options Assessment Weighting Matrix

Parameter	Weighting		Transmission line options - parameter scores*				Transmission line options - weighted parameter scores			
			1A Heywood UG + OH	1B Heywood UG	2A Portland OH	2B Portland UG	1A Heywood UG + OH	1B Heywood UG	2A Portland OH	2B Portland UG
Environment	25%	60%	2.1	1.8	1.1	0.7	0.52	0.45	0.27	0.18
Community / social	15%		1.5	1.0	2.7	2.0	0.23	0.15	0.40	0.30
Land	10%		1.5	1.5	3.0	2.5	0.15	0.15	0.30	0.25
Heritage	10%		1.2	1.0	1.4	1.2	0.12	0.10	0.14	0.12
Technical and design	5%	25%	1.5	1.5	3.0	3.0	0.08	0.08	0.15	0.15
Constructability	5%		2.3	2.3	2.0	2.0	0.12	0.12	0.10	0.10
Operability	5%		2.0	1.5	2.0	1.5	0.10	0.08	0.10	0.08
Safety	5%		1.0	1.0	1.5	1.5	0.05	0.05	0.08	0.08
Infrastructure	5%		0.0	0.0	3.0	0.0	0.00	0.00	0.15	0.00
Cost	15%	15%	1.0	2.0	1.0	3.0	0.15	0.30	0.15	0.45
		Final score	**14.1**	**13.7**	**20.7**	**17.4**	**1.51**	**1.47**	**1.84**	**1.70**

NV loss to be updated

**Parameter scores were calculated by summing the scores for each parameter and dividing by the number of criteria in the parameter*

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