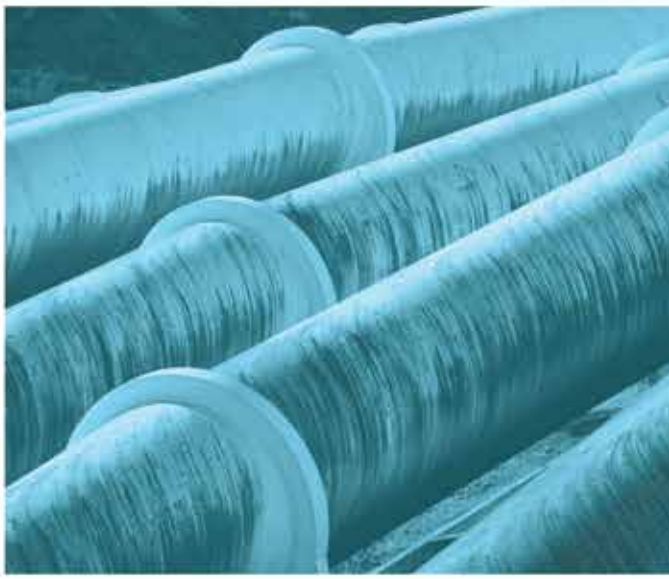
Planning Permit Application

Mornington Battery Energy Storage System

Prepared for Maoneng Australia Pty Limited
July 2021



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Planning Permit Application

Mornington Battery Energy Storage System

Report Number

S200257 RP 8

Client

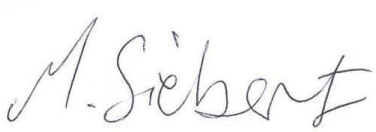
Maoneng Australia Pty Limited

Date

9 July 2021

Version

Final

Prepared by	**Approved by**
	
Mary-Anne Siebert	**Paul Gibbons**
Senior Environmental Consultant	Associate Director
9 July 2021	9 July 2021

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Executive Summary

Maoneng Australia Pty Limited (Maoneng) propose to develop the Mornington battery energy storage system (BESS) (the project) at Tyabb, Victoria. Tyabb is located on the Mornington Peninsula, approximately 67 kilometres (km) from the Melbourne central business district.

The proposed BESS would be located at 17 Thornells Road, Tyabb and an associated overhead transmission line would traverse into a portion of the adjoining allotment at 21 Thornells Road (the site), which is the existing Tyabb substation (Figure 1.1 and Figure 1.2).

EMM Consulting Pty Limited (EMM) has been engaged by Maoneng to prepare the planning permit application for the project under the Victorian *Planning and Environment Act 1987* (P&E Act) (this document).

The Mornington BESS aims to improve electricity grid reliability and network stability by drawing energy from the electricity grid during off-peak periods for battery storage and dispatching energy to the grid during peak periods.

The project broadly comprises the following key components:

- Batteries housed within fully enclosed battery containers, with associated inverters and transformers and an underground cable network.
- Medium voltage (MV) switchroom.
- Control and operation room.
- Onsite 220/33 kilovolt (kV) substation.
- An overhead transmission line (comprising up to 7 lattice towers, 40 m high) connecting the substation to the adjacent Tyabb substation.
- Internal 4 m noise (acoustic) barriers.
- Widening of site entrance.
- Internal access roads and carparking.
- Temporary construction laydown area.
- Boundary fencing and other security infrastructure.

Fire safety equipment. Mornington Peninsula is subject to fluctuations in demand for electricity, primarily as a result of seasonal tourism. Battery storage is one form of demand response and while this project cannot guarantee outage prevention alone, it will contribute to improving regional electricity reliability. The Mornington BESS power rating is 240 MW.

To assess potential environmental impacts of the project, a number of specialist technical assessments were undertaken, including ecological (terrestrial flora and fauna) assessment, traffic impact assessment, noise and vibration impact assessment, preliminary hazard assessment, landscape character and visual impact assessment and surface water quality assessment.

Appropriate control and management measures to mitigate against potential environmental impacts have been developed and are described in this planning permit application.

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The technical assessments concluded that with appropriate mitigation and management measures there will be no significant environmental impact as a result of the operation of the project, while a construction environmental management plan will be developed specifically to manage the potential impacts associated with the construction phase of the project.

The proposed BESS will support the Victorian Government's objectives to improve electricity network reliability and to support renewable energy projects and is considered consistent with the provisions of the Mornington Shire Planning Scheme (MPPS) for the following reasons:

- The proposed land use as a Utility Installation is a considered form of development requiring a permit within the Special Use Zone (SUZ) 1 (Port Related Uses).
- Requirements of Schedule 1 have been met in this application.
- The project will have minimal environmental impacts.
- The application demonstrates a significant benefit to improve electricity network reliability in the area.
- The project will generate employment and economic activity during construction and 30-year operational life of the project.

The proposed development is considered appropriate for the site and is not deemed at variance with the relevant MPPS provisions. The assessment of the project against the relevant provisions of the MPPS demonstrates its compliance with the land use activities and form of development considered appropriate for the site, and location more generally, in accordance with requirements of the SUZ1.

In summary, the proposed BESS, when considered on its merits, warrants the granting of planning permit consent.

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1 Introduction

Maoneng Australia Pty Limited (Maoneng) is proposing to develop the Mornington battery energy storage system (BESS) (the project) at Tyabb, Victoria. Tyabb is located on the Mornington Peninsula (Victoria), approximately 67 kilometres (km) from the Melbourne central business district.

The proposed BESS would be located at 17 Thornells Road, Tyabb and an associated overhead transmission line would traverse into a portion of the adjoining allotment at 21 Thornells Road (the site), which is the Tyabb substation (Figure 1.1 and Figure 1.2)[1].

EMM Consulting Pty Limited (EMM) has been engaged by Maoneng to prepare the planning permit application for the project under Section 47 of the Victorian *Planning and Environment Act 1987* (P&E Act) (this document).

The project aims to improve electricity grid reliability and network stability by drawing energy from the electricity grid during off-peak periods for battery storage and dispatching energy to the grid during peak periods. The project will have a power rating of 240 megawatts (MW) of energy.

The project will connect into the electricity network via the existing AusNet Services Limited (AusNet) Tyabb substation, located at 21 Thornells Road, Tyabb which is immediately west of the site (Figure 1.2).

[1] Throughout this document, the term 'the site' refers to 17 Thornells Road and the small portion of 21 Thornells Road that will accommodate the overhead transmission line.

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KEY

- Subject site
- Existing 200 kV transmission line
- Major road
- Minor road
- Named watercourse
- Local government area

INSET KEY

- Major road
- National park/reserve
- State forest

Source: EMM (2021); Maoneng (2020); DELWP (2019); GA (2011); ASGC (2006)

0 1 2 km

GDA 1994 MGA Zone 55

N

Site location - regional context

Maoneng Australia Pty Limited
Mornington BESS
Planning permit application
Figure 1.1

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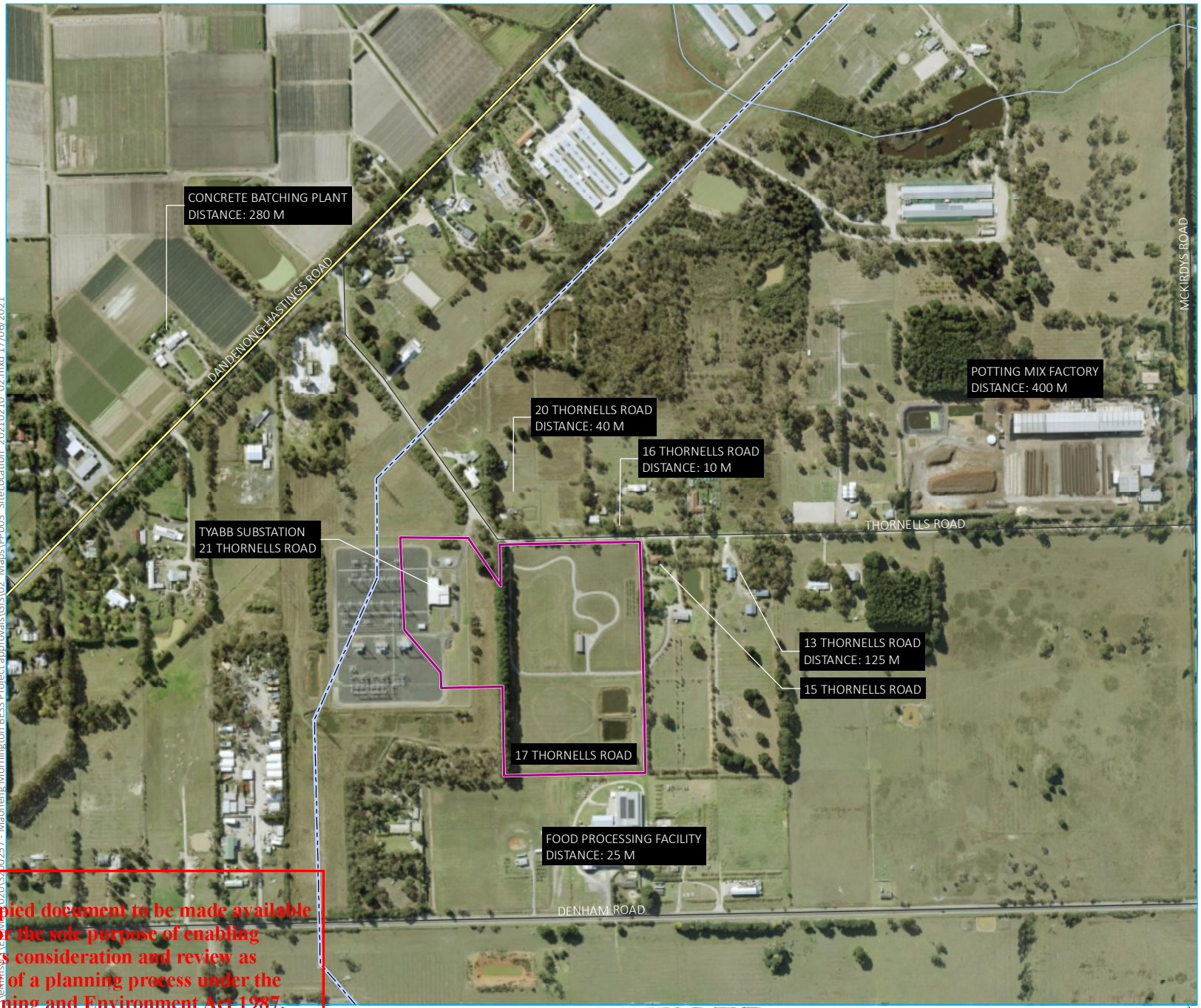

KEY

- Subject site
- Existing 200 kV transmission line
- Major road
- Minor road
- Watercourse/drainage line

Source: EMM (2021); Metromap (2021); Maoneng (2020); DELWP (2019); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

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Site location - local context

Maoneng Australia Pty Limited
Mornington BESS
Planning permit application
Figure 1.2

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1.1 Purpose of this document

This document supports a planning permit application for the project. This document also includes the completed '*Application for a Planning Permit*' form provided by Department of Land, Water Environment and Planning (DELWP) (Appendix A).

The following technical assessments have been undertaken to inform the planning permit application, the results of which are summarised in this document:

- Ecological (terrestrial flora and fauna) assessment.
- Traffic impact assessment.
- Surface water quality assessment.
- Noise and vibration impact assessment.
- Landscape character and visual impact assessment.
- Preliminary hazard assessment.

1.2 Summary of planning permit application details

A summary of the planning permit application is provided in Table 1.1.

Table 1.1 Planning permit application details

Project name	Mornington BESS project
Site location	17 Thornells Road and a portion of 21 Thornells Road, Tyabb, Victoria 3913
Site size	The BESS will be located at 17 Thornells Road, which is approximately 6.6 hectares (ha). The overhead transmission line will traverse a small portion of the adjoining allotment at 21 Thornells Road. The transmission line footprint is approximately 2.71 ha. **Total:** 9.31 ha
Applicant	Maoneng Australia Pty Limited Level 9, Avaya House, 123 Epping Road Macquarie Park, New South Wales 2113 Note: Mornington BESS Project Pty Limited is developed by Maoneng Australia Pty Limited
Applicant contact	Allison Hawke Director of Development Maoneng Australia Pty Limited allison.hawke@maoneng.co +61 431 381 875
Certificate of title	BESS: 17 Thornells Road: Certificate of Title Volume 10194 Folio 708 identifies the site as Crown Allotment 60A in the Parish of Tyabb (60A\PP3666) Overhead transmission line: Portion of 21 Thornells Road: Certificate of Title Volume 9105 Folio 805 identifies the site as Crown Allotment 60 (PARTS) in the Parish of Tyabb (Lot 1 TP568319)
Zoning	Special Use Zone 1 (Port Related Uses)

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Table 1.1 Planning permit application details

Permit triggers	Clause 37.01-1, Schedule 1, Section 2 – Permit required for construction of Utility Installation Clause 52.17, the removal, destruction or lopping of native vegetation
Overlays	None
Particular provisions	Clause 52.17 Native vegetation

1.3 About the applicant

The Mornington BESS project is proposed to be developed by Maoneng Australia Pty Ltd (Maoneng).

Maoneng is an Australian-founded and owned company that is pioneering Australia's transition to 100% renewable energy through cutting-edge solar, battery and other utility-scale energy projects. Maoneng partners with Australia's largest utilities and organisations to build and operate these projects. Maoneng's portfolio includes nearly 300 MW of generation power from the Sunraysia Solar Farm in NSW and the Mugga Lane Solar Park in the ACT, which is enough to power over 50,000 homes across Australia.

Maoneng is in the process of building more than 600 megawatt-hours (MWh) of utility-scale battery projects and has an Energy Storage Development Agreement with AGL Energy. Under this agreement, Maoneng will develop large-scale batteries to provide 200 MW/400 MWh of dispatchable capacity to AGL in NSW between 2023 and 2038. Power generated under this agreement is capable of powering 30,000 homes at times of higher demand or low renewable energy supply.

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2 Project description

This chapter provides a description of the project in terms of the objectives, benefits, project site layout, key infrastructure components, operating hours, employment, capital investment value, site closure and rehabilitation.

2.1 Objective of the project

The integration of energy storage is one of the key actions outlined in the Victorian Government's *Renewable energy action plan*, released in July 2017. The Mornington BESS project is one such project which, once constructed, will help to improve the reliability of the Victorian electricity supply system and support the development of clean technologies, boosting the local economy.

Mornington Peninsula is subject to fluctuations in demand for electricity, primarily as a result of seasonal tourism. Battery storage is one form of demand response and while this project cannot guarantee outage prevention alone, it will contribute to improving regional electricity reliability.

Specifically, the project aims to improve electricity grid reliability and network stability by drawing energy from the electricity grid during off-peak periods for battery storage and dispatching energy to the grid during peak periods.

The Mornington BESS power rating is 240 MW.

2.2 Project benefits

The project offers a number of benefits, including but not limited to:

- improvement of electricity network reliability;
- generation of up to 150 full time equivalent (FTE) jobs during the nine-month construction phase;
- generation of up to 1 FTE jobs during the 30-year operational life; and
- generation of indirect jobs on a local and regional scale from increased economic activity and spending at businesses that may provide goods and services to support construction activities.

The project will support Australia's commitment to the International Paris Agreement. It will also support the Victorian Government's Victorian renewable energy target (VRET) of 50% by 2030. BESS technology is one of the three commercialised technologies available to provide demand response to enable higher penetration of intermittent renewables into our national network (the other technologies are gas and pumped hydro).

The project is also consistent with the MPS's goal to support investigation of alternative and renewable energy technologies that are consistent with achieving carbon neutrality goals, as outlined in the *Mornington Peninsula Green Wedge Management Plan* (MPS 2019). This plan highlights the importance of a reliable electricity supply network.

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2.3 Key components

2.3.1 Project footprint

The BESS will be located at 17 Thornells Road, which is approximately 6.6 ha, and the BESS development footprint will be up to approximately 4.3 ha (Figure 2.1).

The overhead transmission line will traverse a small portion of the adjoining allotment at 21 Thornells Road to enable connection to the existing AusNet Tyabb substation, which is approximately 2.71 ha.

2.3.2 Project infrastructure

The proposed site layout is shown in Figure 2.1 and comprises the following key components:

- Batteries housed within fully enclosed battery containers, with associated inverters and transformers and an underground cable network.
- Medium voltage (MV) switchroom.
- A control and operation room.
- Onsite 220/33 kilovolt (kV) substation.
- An operations and maintenance building.
- An overhead transmission line (comprising up to 7 lattice towers, 40 m high) connecting the substation to the adjacent Tyabb substation.
- Internal 4 m noise (acoustic) barriers.
- Widening of site entrance.
- Internal access roads and carparking.
- Temporary construction laydown area.
- Boundary fencing and other security infrastructure.
- Fire safety equipment.

Three existing dams will remain onsite in their current form and will not be used by the project.

MPS have advised Maoneng that Council will require a minimum 300 mm freeboard above the mapped 1 in 100-year flood event for the proposed storage batteries and buildings.

Approximate elevations for the key components are discussed below and are summarised in Appendix K.

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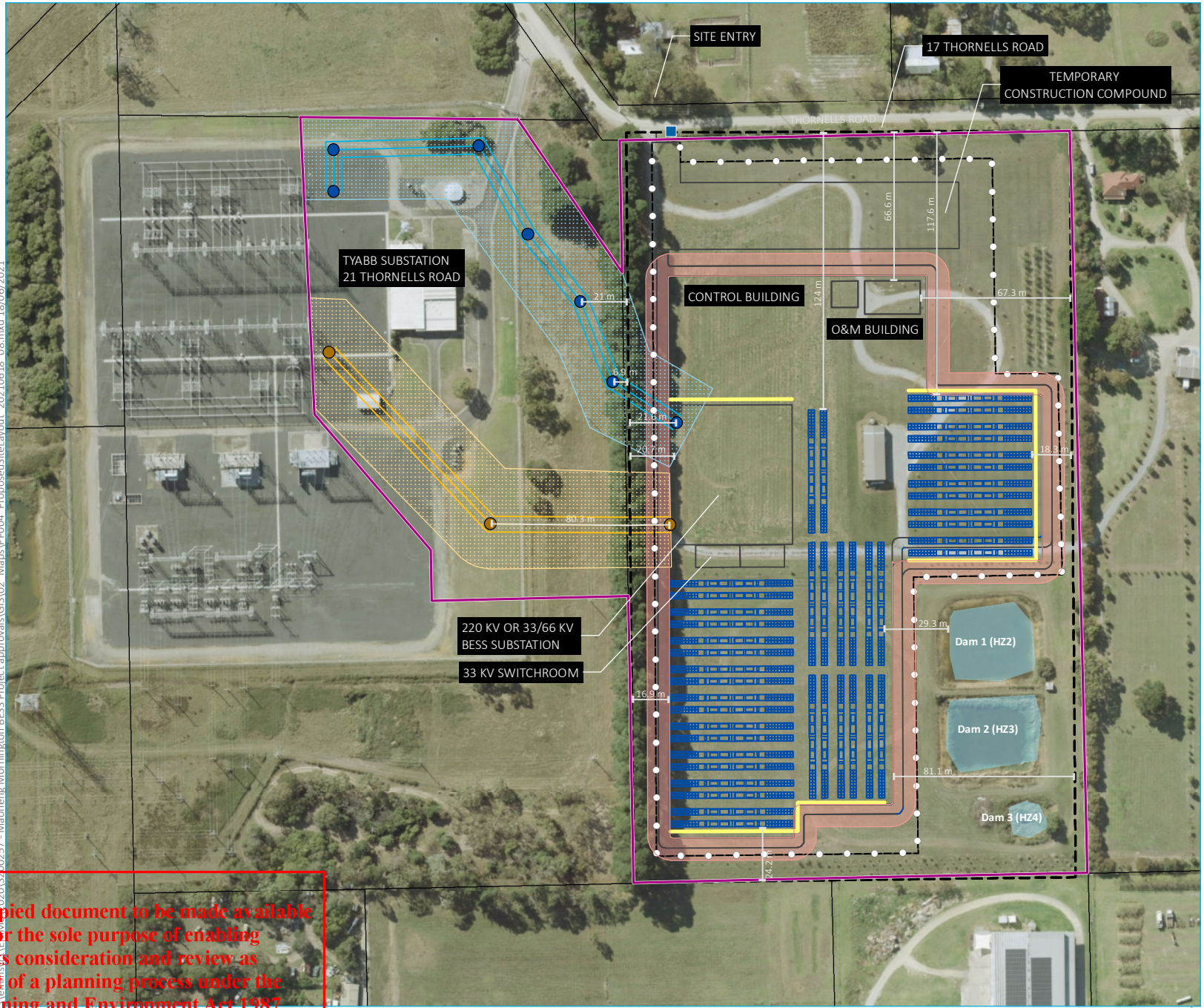

KEY

- Subject site
- Proposed transmission pole
- Proposed transmission tower
- Coast Tea-tree
- Battery
- Site boundary
- Acoustic barrier
- Fence
- Distance to site boundary
- Firebreak (10 m)
- Dam
- Cadastral boundary

Transmission line

- Option 1 - 66 kV transmission line
- Option 2 - 220 kV transmission line
- Option 1 - 66 kV transmission line easement
- Option 2 - 220 kV transmission line easement

Source: EMM (2021); Metromap (2021); Maoneng (2020); LCrowfoot (2020); DELWP (2019); GA (2011)

0 50 100 m

GDA 1994 MGA Zone 55

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Proposed site layout

Maoneng Australia Pty Limited
Mornington BESS
Planning permit application
Figure 2.1

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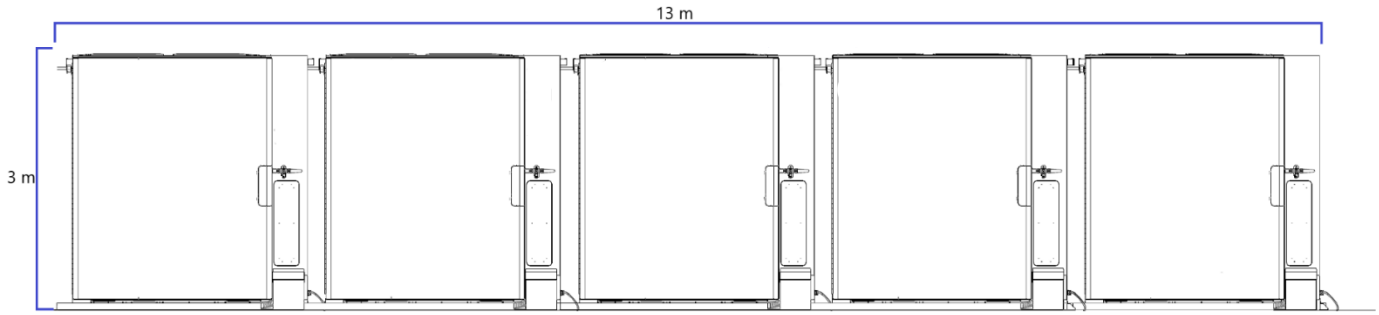
i Battery storage containers

Batteries will be stored in fully enclosed battery storage containers. The battery storage will be within shipping or modular containers.

Each battery bank will be approximately 13 m long, 3 m wide and 3 m high, similar to a typical 40-foot shipping container (Plate 2.1). The battery banks will be placed in rows and will be separated by a gravel surface.

Each battery storage bank will have a storage capacity of up to 2 – 4 MWh, depending on the final battery type selected.

The height of footings for the battery storage containers will be raised 300 mm above the mapped 1 in 100-year flood event, with a total height not exceeding 3.3 m above natural ground level.



Note: Not to scale. Images show indicative elevations.

Source: Maoneng

Plate 2.1 Battery storge container dimensions (indicative)

ii Batteries

The batteries will be lithium-ion batteries, comprising lithium-ion phosphate (LFP), lithium nickel manganese cobalt oxide (NMC) or lithium manganese oxide (LMO). Battery rack dimensions are approximately 1 m wide, 1.2 m long and 2.3 m high (Plate 2.6), with a total height not exceeding 2.6 m above natural ground level.

Note: Not to scale. Images show indicative elevations.

Source: Maoneng

Plate 2.2 Battery rack (indicative)

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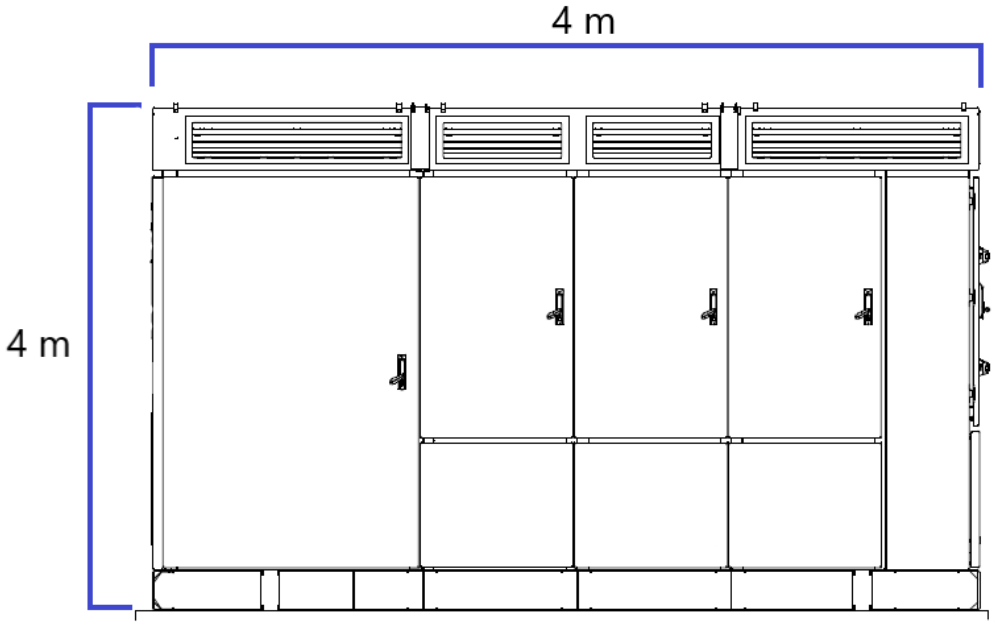
iii Inverters and transformers

There will be an inverter and a MV transformer assigned to and located adjacent to each battery storage container. The inverters are required to convert direct current (DC) to alternating current (AC) and the transformers are required to step up the voltage to 33 kV. The inverters and transformers will be housed in modular containers adjacent to each battery storage container and will be mounted on concrete hardstands and raised 300 mm above the mapped 1 in 100-year flood event.

Each modular inverter container will be approximately 4 m long, 2.5 m wide and 4 m high (Plate 2.3), with a total height not exceeding 4.3 m above natural ground level. Each MV transformer will be approximately 6 m long, 4 m wide and 4 m high (Plate 2.4), with a total height not exceeding 4.3 m above natural ground level. The concrete footings will be approximately 400 mm beneath the ground floor level.



Note: Not to scale. Images show indicative elevations.

Source: Maoneng

Plate 2.3 Inverter dimensions (indicative)

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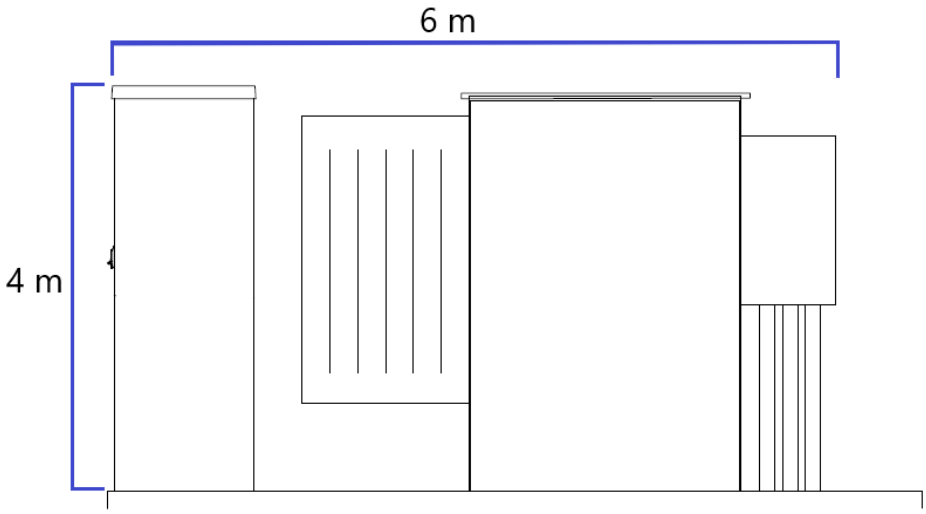
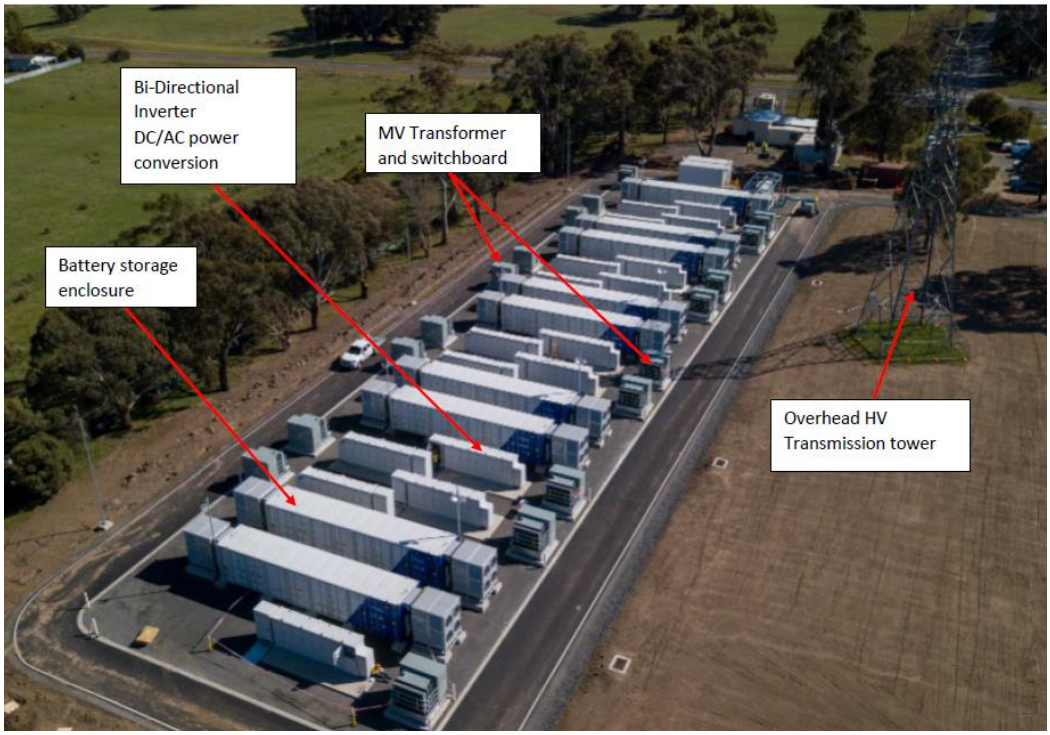


Note: Not to scale. Images show indicative elevations.

Source: Maoneng

Plate 2.4 Transformer dimensions (indicative)

A typical inverter, transformer and battery storage containers are shown in Plate 2.5, with each bay being approximately 60 m in length comprising 2 x 13 m battery storage containers, 2 x 4 m inverter and 2 x 6 m transformers with adequate separation for maintenance and operational purposes.



Source: Maoneng (via Energy Australia)

Plate 2.5 Typical inverter, transformer and battery storage container

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iv Underground cable network

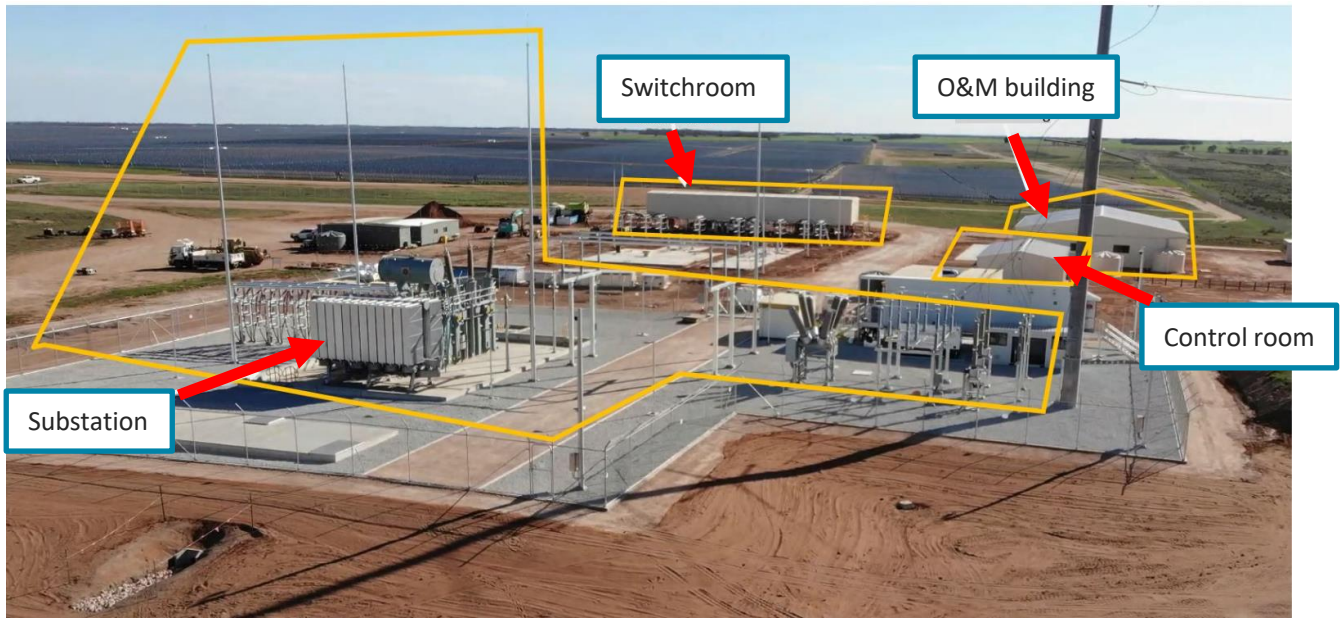
Electrical cabling connecting the onsite infrastructure (eg electrical cabling connecting the batteries, inverters and transformers) will be located underground in accordance with relevant Australian Standards.

v Switch room

A 33 kV switch room is required to control the delivery of electricity to and from the adjacent Tyabb substation and will be approximately 8 m wide, 12 m long and up to 6 m high.

The switch room will be mounted on concrete hardstand and will be raised 300 mm above the mapped 1 in 100-year flood event, with a total height not exceeding 8.3 m above natural ground level. The switch room will have footings approximately 600 mm to 2,000 mm wide.

A typical switch room is shown in Plate 2.6.



Source: Maoneng

Plate 2.6 Typical substation, switch room, O&M building and control room

vi Control room

The entire facility will be controlled remotely via a supervisory control and data acquisition (SCADA) system housed in the control room. The control room will be approximately 8 m wide, 12 m long and up to 6 m high.

The control room will be mounted on concrete hardstand and will be raised 300 mm above the mapped 1 in 100-year flood event, with a total height not exceeding 6.3 m above natural ground level.

A typical control room is also shown in Plate 2.6.

vii Onsite substation

An onsite substation is required to transform medium voltage (MV) to high voltage (HV), and vice versa. The substation will have a capacity of 33 kV/220 kV and will have a footprint of approximately 50 m wide, 50 m long and 10m high.

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The substation will be mounted on concrete hardstand and will be raised 300 mm above the mapped 1 in 100-year flood event, with a total height not exceeding 10.3 m above natural ground level. The concrete footings will be approximately 1,000 mm wide.

A typical substation is also shown in Plate 2.6.

viii Operations and maintenance building

The operations and maintenance (O&M) building will be used for undertaking plant and equipment maintenance, storage and for staff amenities. The O&M building will be approximately 8 m wide, 12 m long and up to 6 m high with a typical building shown in Plate 2.7.

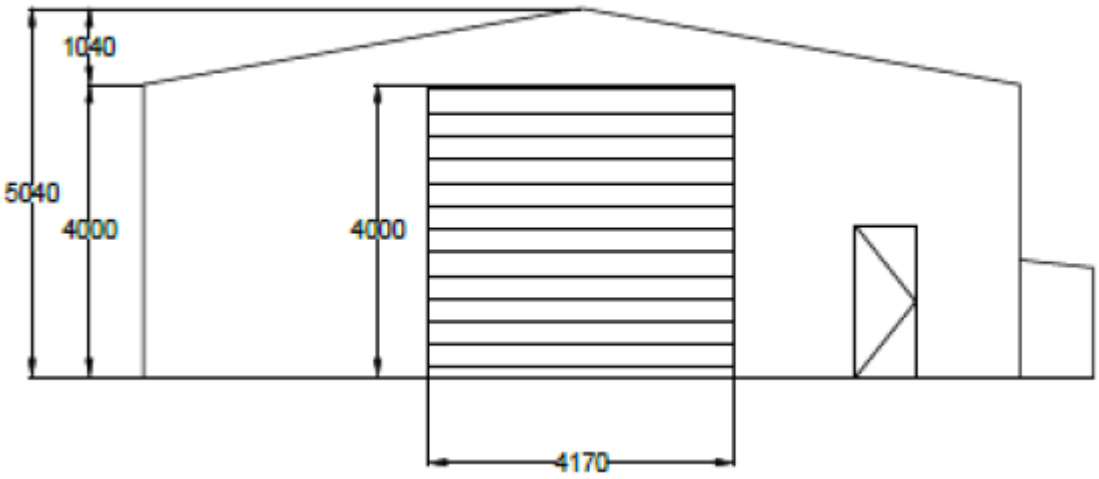

Plate 2.7 O&M building elevation (indicative)

The O&M building will be mounted on concrete hardstand and will be raised 300 mm above the mapped 1 in 100-year flood event, with a total height not exceeding 5.4 m above natural ground level.

ix Acoustic barriers

To attenuate potential noise impacts during the operational phase of the project derived from battery cubicles, power conversion systems (PCS) and high voltage transformers acoustic barriers (4 m in height) are proposed to be established within the site layout (refer Section 6.4).

The acoustic barriers will be pre-cast concrete panels with a smooth neutral tone finish to blend into the surrounding landscape. A typical acoustic barrier is shown in Plate 2.8 and Appendix K.

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Plate 2.8 Typical acoustic barrier - precast concrete panels (indicative)

x Transmission line

Electricity will be delivered to and from the onsite substation to the adjacent Tyabb substation via a new overhead 220 kV (or 66 kV) transmission line (supported by up to 7 lattice towers). The transmission line will be approximately 100 m in length and up to 40 m high[2] (Plate 2.9). The exact location of the transmission line however is being determined in consultation with AusNet with two connection point options shown in Figure 2.1.

The Australian Energy Market Operator has confirmed the Tyabb substation has capacity to accept the project (Appendix C).

2 The 40 m transmission tower height is a worst-case scenario for Maoneng's 220kV design option, noting that agreement with AusNet on an alternative 66kV design would reduce the tower numbers and heights to three (3) and 30 m respectively (Figure 2.1, Plate 2.6). The final design will be negotiated between Maoneng and AusNet in accordance with the AusNet guidelines.

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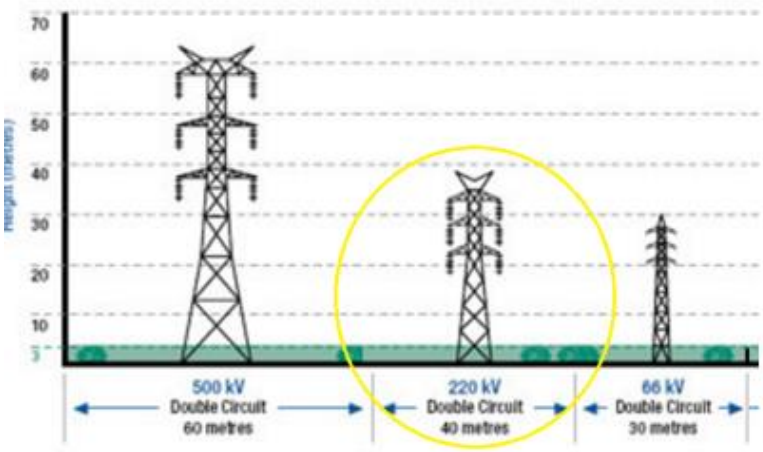

Plate 2.9 Transmission tower elevation (indicative)

xi Site entrance

Site access will be via the existing Thornells Road site entrance which is proposed to be widened to improve sight distance and enable access for 26 m B-doubles (being the largest vehicle needing to access the site) to enter and exit the development site.

xii Internal access roads

Site access will be via the existing site access driveway off Thornells Road. Internal access roads will surround the battery storage containers and ancillary infrastructure as shown in Figure 2.1 with sufficient hardstand area established to enable swept path turning circle for 26 m B-doubles to enter and exit the development site in a forward direction (refer Appendix K).

Internal access roads will be gravelled and will be approximately 4 m to 6 m in width. All internal access road will be located within the Country Fire Authority's (CFA) 10 m fire safety buffer that will surround the proposed BESS infrastructure.

xiii Temporary construction laydown area

During construction, a temporary, secured, gravelled compound will be located on the northern portion of the site (Figure). This will be used for temporary storage of plant, equipment, waste material, construction site office and amenities, and laydown area for equipment delivery and material handling.

xiv Car parking

During operations, carparking will be in the northern portion of the site (Figure 2.1). The carparking area will be gravelled and will have capacity for three light vehicles.

xv Fencing and security

The site will be secured with chain mesh fencing approximately 2.2 m high and a locked access gate. Above the chain mesh fencing will be an electrified fence, bringing the boundary fence height to a total of 2.4 m – 2.7 m (Plate 2.10) and Appendix K.

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Plate 2.10 Boundary fence elevations (indicative)

xvi Fire infrastructure

Fire infrastructure will comply with *Guidelines for Renewable Energy Installations* (CFA 2019) and will include a water tank, fire access road and fire-fighting equipment. Fire infrastructure is detailed in Chapter 12.

xvii Lighting

Motion-detected tower-mounted security lights and security cameras will be installed in the hard stand area. All lighting will be positioned to minimise light spill to nearby residents and will only be activated for security purposes.

xviii Landscaping and vegetation

The project site has been largely cleared of remnant vegetation with the highest biodiversity values associated with the existing dams and the large trees along the boundaries, all of which will be retained.

Removal of patches and scattered Trees has been avoided within the BESS site and Thornells Road road reserve, with the exception of the Coastal Teatree at the site entrance to improve sight distance and enable access for 26 m B-doubles. The Coastal Teatree at the development site entrance did not qualify as a part or scattered tree (ie not a canopy tree) and therefore was excluded from the DELWP Native Vegetation Removal Report. Removal of modified patches of Damp Sands Herb-rich Woodland will be required for the transmission line alignment.

Maoneng propose to develop a landscape concept plan as a condition of consent to further screen the BESS site perimeter and enhance the surrounding environment.

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xix Stormwater management

Key aspects of the proposed stormwater management approach are presented conceptually in the surface water assessment report (Appendix F). Key aspects of the approach include:

- an assumed legal point of discharge from the site on 'Watercourse A';
- proposed catchment areas draining to points of discharge from the site; and
- a proposed stormwater detention basin (if necessary) in the north-east corner of the site that could provide additional attenuation of stormwater to achieve both flow management and water quality control objectives.

The fenced project area at the site will be less than 4.5 ha, of which not more than 3.5 ha will be impermeable (hardstand) concrete surfaces, including the substation, switch room, control and O&M buildings. Other areas of the project footprint between pieces of key infrastructure will be semi-permeable gravel aggregate (or similar), including access tracks and construction laydowns. Remaining areas of the site which sit outside of the designated project footprint will be permeable consisting of existing grassed/vegetated areas. The proposed extent of hardstand and semi-permeable surface treatments is shown conceptually in Appendix K.

Average annual rainfall for the site is approximately 720 mm/year and average annual pan evaporation rates are approximately 1000–1200 mm/year (BoM 2020a; BoM 2020b).

Preliminary hydrologic modelling was undertaken by EMM using the XP-RAFTS software platform, in accordance with *Australian Rainfall and Runoff* (ARR) *2019* guidelines, to assess potential changes in peak flow rates leaving the site and to provide indicative detention basin size requirements to attenuate flows to no higher than existing conditions.

The post developed conditions were modelled conservatively by assuming the semi-permeable areas of the development effectively contribute to runoff hydrologically the same as the hardstand areas. Modelling results for the 100-year average recurrence interval (ARI) event indicate that peak flow rates leaving the southern boundary of the site would be no higher than existing conditions due to a reasonable reduction in catchment area draining to this location. Peak flow rates for the 100-year ARI event leaving the northern boundary of the site were shown to increase by up to four times the existing condition flow rates without consideration of mitigation measures. A detention basin was included in the model to attenuate the 100-year ARI event peak flow. The basin was configured as an open storage of maximum one metre depth, with a piped low flow outlet and a high flow spillway. Modelling results indicate that a basin volume of 1,300 cubic metres (m^3) would be required to attenuate the 100-year ARI event peak flow rates back to existing conditions. The indicative location and footprint presented in Figure 4.1 of the surface water assessment (Appendix F) is sufficient to provide for a basin of this size. Due to the conservate assumptions applied to this stormwater quantity assessment, it is noted that the basin size can possibly be reduced during detailed design with more detailed assessment.

Stormwater management will be further refined and finalised during the detailed design phase. The water management objectives and approach (WM_1 to WM_10) outlined in the surface water assessment report (Appendix F) will be applied during detailed design, including consideration of any additional development consent requirements and advice from Council in relation to the submitted *Flood Prone Land Application*.

Water quantity controls will be applied during detailed design to ensure peak flow rates discharging from site are not increased for all events up to and including the 100-year ARI. This design approach includes:

- Where feasible, the following measures implemented to minimise changes to peak flow rates:
  - Maximise retention of grassed areas and minimise increase in imperviousness.

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- Grassed swale drainage systems promoting physical screening of mobilised sediments and infiltration of stormwater into soils.
- Infiltration of stormwater.
- Use of localised depression storages in site grading to attenuate flows.

- If necessary, additional stormwater detention provided in the form of an onsite stormwater detention (OSD) basin in the north-east corner of site to attenuate flows for events up to the 100-year ARI. The need for a basin, and associated sizing, will be further confirmed during detailed design.

2.4 Operating hours and operational life

The project will operate 24 hours a day, seven days a week and has an expected operational life of 30 years.

2.5 Employment

The construction period will take approximately nine months and will provide up to 150 FTE jobs during peak construction periods.

During the first two months (stage 1), the project will require approximately 60 FTE employees. During the final seven months of construction (stages 2 and 3) the project will require an additional 80 FTE employees.

As the site will be operated remotely during operations, no permanent staff will be required onsite. Maintenance staff and contractors (up to 1 FTE jobs) will access the site on occasion during the 30-year operational life.

2.6 Capital investment value

The capital investment value of the project is estimated at $120 million (Australian dollars).

2.7 Site closure and rehabilitation

At the end of the operational life all aboveground infrastructure, including the connecting overhead transmission line will be removed, and the site will be rehabilitated to be safe, stable and non-polluting.

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3 Construction and commissioning

This chapter provides a description of the construction and commissioning phase of the project in terms of the contractor, construction hours and duration, key construction activities and types of plant and equipment to be used during construction of the project.

3.1 Contractor

Maoeneg will undertake a competitive tender process to select an appropriately qualified and experienced contractor. At the time of preparing this planning permit application the construction contractor has not been determined.

3.2 Construction hours and duration

Construction activities will nominally be undertaken Monday to Friday, 7 am to 6 pm, and Saturday 8 am to 1 pm. Maoneng proposes to complete certain light construction and assembly activities outside of standard construction hours, subject to these activities having no amenity impacts on surrounding residents. Example activities may include cable termination, system assembly and testing, script testing (on computer) and SCADA testing.

The construction period will last for approximately nine months followed by the commissioning and joint testing period which will last for approximately three months.

The construction period will comprise three key stages, as outlined in Table 3.1.

Table 3.1 Construction stages

Stage	Duration	Key activities	Construction jobs
1	2 months	Site establishment: • demolition of existing shed; • earthworks; and • civil works.	60
2	3 months	Delivery of infrastructure.	80
3	4 months	Installation of infrastructure and electrical works.	80

3.3 Key construction activities

Key construction activities will comprise:

- demolition of existing infrastructure (one shed);
- bulk earthworks, filling, compaction and drainage;
- delivery of modular infrastructure and construction materials;
- installation of foundations for battery modules, inverters and transformers;

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- installation of modular batteries, inverters and transformers; and
- construction of control building, switch room, O&M building, substation and overhead transmission line.

3.4 Typical plant and equipment

A summary of the likely construction plant and equipment is provided in Table 6.4 as it pertains to the noise and vibration impact assessment.

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4 Site description

This chapter provides a description of the project in terms of the proposed BESS location, land tenure, zoning, land use, existing environment and site selection.

4.1 Site location

The site comprises the whole of 17 Thornells Road and a portion of 21 Thornells Road, Tyabb, Victoria.

The site is approximately 67 km south-east of the Melbourne central business district, in the Mornington Peninsula. The township of Tyabb is approximately 2 km to the north-west of the site (Figure 1.1).

4.1.1 Land tenure

i 17 Thornells Road

The 17 Thornells Road the site comprises one land parcel, identified as Parish of Tyabb Allotment 60A (60A\PP3666).

This lot is privately owned with Maoneng having entered into a land access agreement to purchase the site for the project.

The site owner also owns 15 Thornells Road, identified as Lot 2, PS434238 (2\PS434238), located immediately east of the site.

ii 21 Thornells Road

The 21 Thornells Road site comprises four land parcels and is approximately 16.8 hectares (ha) in area.

The 21 Thornells Road portion of the site forming part of the project is included in one land parcel, identified as Parish of Tyabb Allotment 60 (Lot 1 TP568319). This lot is owned by AusNet (GPU Powernet PTY LTD) with Maoneng finalising land access negotiations to connect the BESS to the grid.

4.1.2 Zoning

The site is located within the Mornington Peninsula Shire Local Government Area (LGA) and is zoned as Special Use Zone (SUZ) 1 (Port Related Uses) under the Mornington Peninsula Planning Scheme (MPPS), as shown in Figure 4.1.

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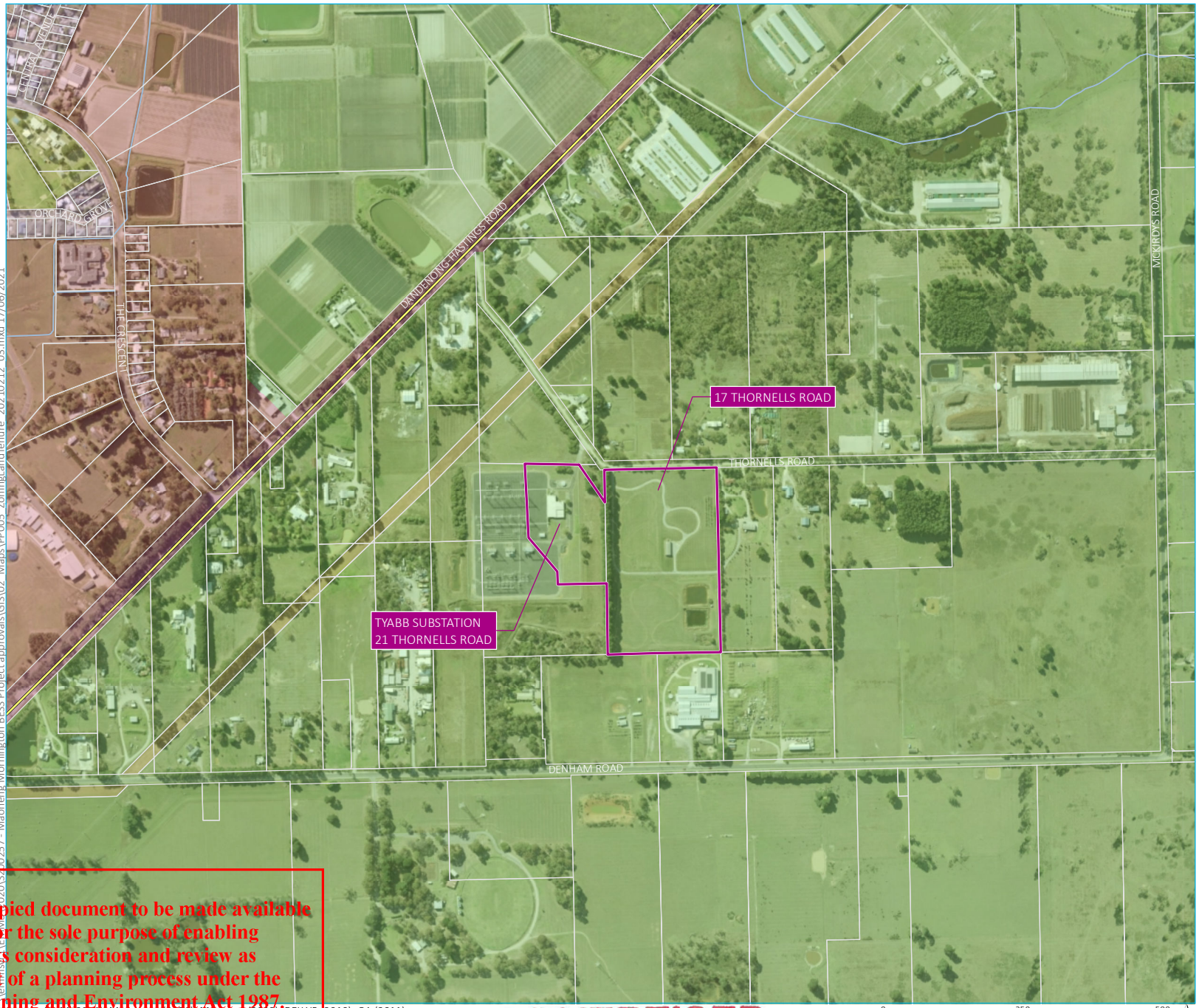

KEY

- Subject site
- Major road
- Cadastral boundary
- Watercourse/drainage line

Land zone

- GRZ - General residential
- LDRZ - Low density residential
- PUZ - Public use
- RDZ1 - Road category 1
- SUZ - Special use

Source: EMM (2021); Metromap (2021); Maoneng (2020); DELWP (2019); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Zoning and land tenure

Maoneng Australia Pty Limited
Mornington BESS
Planning permit application
Figure 4.1

EMM
creating opportunities

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4.1.3 Current and previous land use

17 Thornells Road is currently used by the owner for the occasional production of hay. The site has been historically used for semi-rural/market gardening purposes (namely an apple orchard).

21 Thornells Road is currently used as a substation (known as the Tyabb substation) which supplies electricity to the Mornington Peninsula region via 220/66kV transmission lines. Whilst the site is used for the transmission and distribution of electricity, surrounding semi-rural land uses suggest it has historically been used for agricultural purposes.

4.2 Local context

The regional and local landscape is characterised by flat, cleared agricultural land, rural residential dwellings on large allotments and commercial enterprises. Key land uses within an approximate 1 km radius of the site are shown in Figure 1.2 and include:

- To the north - the northern boundary adjoins Thornells Road. On the opposite side of Thornells Road are two rural residential properties on large allotments. Views to the site from these properties are screened by established vegetation. Further to the north-west of the site is a campervan business and industrial concrete batching plant.
- To the east - the eastern boundary adjoins a single-story rural residential dwelling on a large allotment, namely 15 Thornells Road[3]. Further to the north-east is a potting mix manufacturing facility and the Tyabb resource recovery centre.
- To the south - the southern boundary adjoins a commercial food processing facility. Further south is a public park and a motor-cross facility (Blue Scope Steel Recreation Centre).
- To the west - the western boundary of 17 Thornells Road is adjoining the Tyabb substation and associated network of overhead 220 kV and 66 kV transmission lines which are partially screened by mature pine trees. South of the Tyabb substation site is a residential property (66 Denham Road, Tyabb).

4.3 Site infrastructure

Existing site infrastructure on 17 Thornells Road is shown in the drone imagery (oblique view) of Figure 4.2 and comprises:

- a shed clad with galvanised iron;
- a gravelled internal access road system;
- three water storage dams and an associated pump shed; and
- post and wire fencing around the perimeter.

There are no habitable buildings located on the site.

[3] The owner/occupier of this site is the landowner of the project site.

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The 21 Thornells Road portion includes the Tyabb substation, gravelled access roads, small buildings associated with the substation and 220 kV and 66 kV overhead transmission lines. A cyclone fence separates the substation from the rest of the property.

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Figure 4.2 Drone image of proposed BESS site at 17 Thornells Road

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4.4 Existing environment

4.4.1 Climate

The Mornington Peninsula is described as having mild summers and cool winters, with mean temperatures ranging throughout the year from approximately 12.8°C to 25.0°C (BoM 2020a).

Average annual rainfall is high (approximately 720 mm/year) and average annual pan evaporation rates are low (approximately 1,000–1,200 mm/year) (BoM 2020a; BoM 2020b).

Mean monthly rainfall ranges throughout the year from 43.0 mm to 71.6 mm.

Average monthly 9 am windspeeds generally range between 10–20 kilometres per hour (km/h) and average monthly 3 pm windspeeds between 15–25 km/h.

4.4.2 Topography

The topography of the site is generally flat.

The Mornington Peninsula is host to the Southern Uplands (SU) geomorphological unit (per the Victorian Geomorphological Framework; VGF) with very low relief. Relevant to the project site, the northern Mornington Peninsula consists of plateau and broad ridges described as being weakly dissected by drainage lines resulting in a landform of low relief with very gentle (1–3%) to gentle (3–10%) slopes and gently undulating plain (Agriculture Victoria 2020).

The site has an average elevation of 22 metres relative to Australian Height Datum (mAHD) (MPS 2020a). Site relief is generally west to east/north-east, with the south-west corner of the site tending east to west/south-west. The surrounding area is similarly flat with hillslopes of approximately 1% with no distinguishing paths for concentrated water flow.

The three existing onsite dams are surrounded by embankments (approximately 24 mAHD) with no passive inflow from and outflow to the surrounding land.

4.4.3 Vegetation

i 17 Thornells Road

The western boundary of the site (adjoining the Tyabb substation) is lined with large pine trees (*Pinus radiata*).

The eastern boundary of the site is also lined with mature trees, most of which are eucalypts that are rooted in the adjoining property (15 Thornells Road).

The majority of the site supports pasture. Plantings of immature indigenous and non-indigenous trees and shrubs are located along the northern, eastern and southern boundaries, as well as an internal access road in the mid-section of the property.

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ii 21 Thornells Road

The substation occupies the majority of the parcel that will support the connecting power transmission corridor. Land between the BESS site (17 Thornells Road) and the substation has largely been cleared of trees and now dominated by exotic and native grasses. Some remnant trees are located adjoining the substation perimeter (cyclone) fence and one tree is located inside the cyclone fence. An 'L' shaped shelter belt of Cypress pines is located in the northern portion of the parcel and join up with the pine trees that form the boundary of 17 Thornells Road.

Chapter 6 provides further detail on the site vegetation.

4.4.4 Soils

The soil mapping unit for the project site (based on 1:100,000 soil/landform mapping for the Mornington Peninsula; Agriculture Victoria 2020) is Toomuc with Cranbourne (To/Cr) which is a complex SMU between the Toomuc (To) and Cranbourne (Cr) SMUs which indicates that two or more soil types are present and cannot be distinguished at the survey mapping scale (eg 1:100,000) used.

Based on acid sulfate soils (ASS) distribution mapping (Agriculture Victoria 2019) the project site is unlikely to host ASS, with prospective ASS distribution limited to the immediate coastline and shoreline of Western Port bay further to the east.

4.4.5 Hydrology

i Site hydrology

- 17 Thornells Road

No creeks or drainage lines intersect the site. Surface water features are limited to the three onsite dams located in the south-western portion of the site. These dams were previously used for orchard irrigation. These dams are bordered on all sides by embankments with no passive points of inflow from or outflow to the surrounding land. The two larger dams are approximately 40 m x 40 m each, and up to 3 m deep. The dams are filled by rainfall and/or groundwater sourced and pumped from a bore located on the adjoining property at 15 Thornells Road.

Flood impacts are considered low with the height of buildings and storage batteries proposed to above the MPS mapped 1 in 100-year flood event to mitigate any associated risk.

- 21 Thornells Road

The eastern portion of the parcel where the proposed overhead transmission lines are located falls generally to the west towards the existing substation. A narrow artificial drainage line (approximately 50 cm wide) is located west and south of the cyclone fence. It is anticipated that an existing stormwater drainage system would control overland flow approaching and within the substation and discharge generally to the west.

The majority of this parcel is gravelled/bitumen.

ii Catchments and creeks

- 17 Thornells Road

The site falls within the Bunyip River basin and the Olivers Creek sub-catchment (36 km^2 area), with the closest receiving creeks and drainage lines being McKirdys Road Drain (approximately 700 m north of site) and Olivers Creek (approximately 1.3 km south-west of site).

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McKirdys Road Drain is a minor ephemeral drainage line which runs from north-west to south-east before terminating into Western Port Bay. The drain is fed by two lesser upstream drainage lines, one originating near the suburb of Somerville and the other from adjacent semi-rural areas. The drain consists of both natural and constructed channels (WBM 2000) and is intersected by several roads and in-stream rural farm dams along its length (MPS 2020a).

Based upon site and local contour data it is expected that overland runoff from the site would report to McKirdys Road Drain. Overland flow to the east toward Western Port Bay may occur but is considered unlikely given the very low to flat relief in the area. Overland runoff originating from the south-west corner of the site is expected to report to Olivers Creek, which is fed by Olivers Creek West and a lesser un-named drainage line.

Olivers Creek West and Olivers Creek both consist of remnant natural and constructed drainage channels/swales along their length and are intersected by several roads (WBM 2000). Olivers Creek reports into Western Port Bay via the Hastings Coastal Reserve in Old Tyabb (MPS 2020a).

- 21 Thornells Road

The site falls within the Bunyip River basin and the Olivers Creek sub-catchment with runoff from flowing via un-named drainage line towards Olivers Creek and ultimately into Western Port Bay.

4.5 Site selection

Several options in the local and regional area were considered for the project site. The proposed site was selected for the following key reasons:

- The site is immediately adjacent and able to be connected to the existing Tyabb substation which has capacity to accept up to 240 MW of energy from the BESS project.
- The site is located within an area of growing population and high seasonal demand with an influx of visitors during summer (ie an area with a growing and fluctuating energy demand).
- The site has minimal environmental constraints.
- The site is not subject to any MPS planning overlays.
- The site has good access to the road network.

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5 Legislative framework

This chapter provides an outline of the MPPS planning policies and legislation relevant to the assessment of this application for development of the project.

5.1 Planning and Environment Act 1987

The *Planning and Environment Act 1987* (P&E Act) establishes a framework for planning the use, development and protection of land in Victoria.

The P&E Act enables subsidiary instruments which provide the specific direction and rules for planning decisions in Victoria, principally the Victorian Planning Provisions (VPP), local government planning schemes and Ministerial directions.

Pursuant to the P&E Act, planning requirements for the project fall under the Mornington Peninsula Planning Scheme (MPPS).

It is noted that a recent amendment to VPP (clause 72.01-1) makes the Minister for Planning the responsible authority for all large energy generation facilities and utility installations, including this project.

It is understood that the amendment does not change the requirements for a planning permit application to be lodged with the relevant Council, however the assessment will now be undertaken by DELWP on behalf of the Minister of Planning.

5.2 Mornington peninsula planning scheme

The purpose of the MPPS seeks:

- to provide a clear and consistent framework within which decisions about the use and development of land can be made;
- to express state, regional, local and community expectations for areas and land uses; and
- to provide for the implementation of State, regional and local policies affecting land use and development.

Under the MPSS for the SUZ1, a planning permit application is required on the basis that:

- the project is classified as a 'utility installation' (land used to transmit, distribute or store power, including battery storage – Clause 73.03); and
- utility installations require a planning permit under Schedule 1 (Section 1.0).

In accordance with Schedule 1 (Section 2.0 – Use of Land), the planning application must include the likely effects (if any) on emissions to land and water and also consider the impacts on soil stability (erosion hazard) arising from the clearing of native vegetation (Clause 37.01 of the MPPS).

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5.2.1 Land use definition

The site comprises the whole of 17 Thornells Road and a portion of 21 Thornells Road, Tyabb.

- 17 Thornells Road

The current land use of 17 Thornells Road is defined Agriculture by Clause 73.03 of the MPPS as its current use is for the occasional cultivation of hay. The site has previously been used as an orchard.

Development proposed for the site in this planning permit application has been identified by Clause 73.03 of the MPPS as a Utility Installation. Infrastructure defined as Utility Installation is identified to be used for the transmission, distribution, and storage of electricity. The proposed BESS will conduct all these activities on-site.

A Utility Installation is identified in the table of uses in Schedule 1 to the Special Use Zone of the MPPS as requiring a permit for development purposes.

This planning permit application proposes a land use change from Agriculture to Utility Installation for the purpose of the project.

- 21 Thornells Road

The current land use of 21 Thornells Road is defined Utility Installation by Clause 73.03 of the MPPS as its current use is for used for the transmission and distribution of electricity.

Development proposed for the site in this planning permit application has been identified by Clause 73.03 of the MPPS as a Utility Installation. Infrastructure defined as Utility Installation is identified to be used for the transmission, distribution, and storage of electricity. The proposed BESS connection to the existing Tyabb substation at 21 Thornells Road will facilitate these activities on the site.

This planning permit application does not propose to change the existing Utility Installation land use for the purpose of the project.

5.2.2 Clause 12 Environmental and landscape values

The following sub-clauses to Clause 12 of the MPPS are considered relevant for the purpose of assessment:

- Victorian Planning Provision (VPP) 12.01-1S – Protection of biodiversity.

17 Thornells Road has been largely cleared of remnant vegetation. The three existing dams on the site have been identified as having the highest biodiversity values being potentially suitable threatened flora and fauna species and habitat for native macrophyte species. It is intended that the dams will be retained and not used as part of the project. A targeted survey was undertaken for the Commonwealth listed Growling Grass Frog during the breeding season following recommended survey guidelines and this species was not recorded. Based on the results of the targeted surveys, and other surveys in the greater area, the Growling Grass Frog is considered unlikely to occur within the BESS site (refer Ecology report).

Thornells Road reserve adjoining the site supports a patch of remnant vegetation which includes a large tree. This vegetation will not be impacted by the proposed works.

The three scattered large trees within the 21 Thornells Road land parcel containing the Tyabb substation are considered the highest biodiversity values for this site.

No threatened species are considered likely to be significantly impacted by the proposed works. All large trees within and adjoining the works areas will be retained and protected during construction through the use of tree protection fencing.

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Management of high-threat weeds will be undertaken during construction, and within the BESS site during operations.

- VPP 12.02-2S – Native vegetation management.

The three-step approach – avoidance, minimisation and offsetting of the *Guidelines for the removal, destruction or lopping of native vegetation* have been applied to the project.

Patches of native vegetation have been avoided within the BESS site (17 Thornells Road) and adjoining road reserve. Minimisation has been demonstrated within the AusNet site (21 Thornells Road) by reconfiguring the overhead transmission line alignment options to avoid the large remnant trees.

Modified patches of native vegetation within the AusNet site (21 Thornells Road) will be impacted by the installation of the transmission line (refer Section 5.5.1). Native vegetation offsets will therefore be required; once the transmission alignment has been finalised, further opportunities for minimising the loss of native vegetation will be investigated by Maoneng (refer Appendix D).

- VPP 12.05-2S – Landscapes.

Areas being utilised for the project have largely been cleared of remnant trees. Natural features of the surrounding landscape will not be significantly impacted by the project, including a patch of remnant vegetation within the road reserve.

As identified in chapter 6, partial screening of the site is provided by existing vegetation.

5.2.3 Clause 13 Environmental risks and amenity

The following sub-clauses to Clause 13 of the MPPS are considered relevant for the purpose of assessment:

- VPP 13.02-1S – Bushfire planning.

The proposed site is not affected by the bushfire overlay however the BESS will be designed and operated in accordance with the *Guidelines for Renewable Energy Installations* (CFA 2019) as per the advice provided to Maoneng by the CFA via email on 1 October 2020. Further detail is included in Chapter 6.

- VPP 13.07-1S – Land use compatibility.

Specialist technical studies have been undertaken in accordance with requirements of SUZ1 to assess land use compatibility and are listed in Section 5.4.1 with full reports attached as appendices to this planning permit application.

5.2.4 Clause 14 Natural resource management

The following sub-clause to Clause 14 of the MPPS is considered relevant for the purpose of assessment:

- 14.01-2S – Sustainable agricultural land use.

The proposed site is presently used for agricultural purposes, however, under Special Use zoning provisions agricultural use is not the only permitted land use. Existing land uses surrounding the project include the adjacent Tyabb substation to the immediate west, a food processing factory to the south and a concrete batching plant to the north west.

Development of the BESS is not considered to be detrimental to existing land uses, such as agriculture on nearby land, nor will it preclude future agricultural land use following completion of the 30-year operational life and rehabilitation of the site.

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5.2.5 Clause 19 Infrastructure

The following sub-clauses to Clause 19 of the MPPS are considered relevant for the purpose of assessment:

- VPP 19.01-1S – Energy supply.

The objective of this clause is to facilitate development of energy supply infrastructure which is located appropriately, takes advantage of existing infrastructure and supports transition to a low carbon economy.

The proposed site has been identified specifically for its proximity to the existing Tyabb substation infrastructure which provides an existing form of generated energy and distribution network allowing for the BESS to provide electricity grid reliability and network stability by drawing energy from the electricity grid during off-peak periods for battery storage and dispatching energy to the grid during peak periods.

- VPP 19.01-2S – Renewable energy.

Increasing the network capacity through installation of battery storage systems provides network flexibility to encourage further development of renewable energy generation. Battery storage enables greater utilisation within the network of wind and solar energy during periods of high solar and wind productivity and release of stored energy at times when renewable energy is not readily available.

Development of battery storage facilities do not require development of regional renewable energy generation with the proposed BESS simply expanding network capacity to enable utilisation and storage of energy generated within the broader network.

- VPP 19.03-1S – Infrastructure design and provision.

Development of the proposed BESS will provide timely, efficient and cost-effective infrastructure which is of a community, port and industry benefit to meet the increasing regional demand for energy consumption, particularly at peak times.

The provisions of the MPPS and broader Victorian planning provisions encourage the development of battery storage systems and it is considered the proposed BESS meets the needs and requirements to establish such infrastructure in a timely, efficient and cost-effective manner.

5.3 Local Planning Policy Framework

5.3.1 Clause 21 municipal strategic statement

The Municipal Strategic Statement (MSS) is a statement of community values to enable the evaluation of challenges and opportunities faced by the Mornington Peninsula community and provide a basis for setting strategic objectives in response. The MSS is outlined in three parts and details the regional role of the Mornington Peninsula, the MPS Councils corporate plan for the shared vision of the Peninsula, and a summary of the strategic challenges and opportunities.

The proposed site is located within the Port and Port Related Uses Area of the Mornington Peninsula Strategic Framework Plan (MPSFP). The MPSFP aims to maintain the long-term economic, social and environmental values identified within the MSS. The MPSFP specifically highlights a key balance to achieving goals is the promotion of particular strengths of specific locations rather than attempting to accommodate all land uses in all locations. It is considered that the development of a BESS adjacent the existing Tyabb substation in the Port and Port Related Uses Area of the MPSFP achieves this goal of identification of a 'particular strength' in a 'specific location'.

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A key issue identified in Clause 21.10, Managing Port Area Development, is the promotion of major infrastructure that will facilitate the port related development. It is further identified that this should not occur to the detriment of the environment and/or township areas. The proposed site for the BESS has been chosen to minimise potential impacts to ensure its selected location is not detrimental to the environment and/or township areas, whilst providing electricity grid reliability and network stability for the community, port and industry.

The proposed site is not located within any of the Local Area Plans identified in Clause 21.13.

5.3.2 Clause 22 local planning policies

No sites of Aboriginal significance have been identified at the proposed site.

Chapter 8 provides detail of correspondence with the Country Fire Authority and the applicants commitment to adhering to requirements of Clause 22.11, Mornington Peninsula Fire Protection.

5.4 Zones

5.4.1 Clause 37 special purpose zone

- VPP 37.01 – Special Use Zone.

The site identified for the proposed BESS development is located within the Special Use Zone 1 (Port Related Uses) of the Local Planning Policy Framework. As previously stated, a battery storage system is identified as a Utility Installation and therefore is considered a land use that requires a permit for development within the Special Use Zone.

- LPP 37.01 – Schedule 1 to Special Use Zone.

Schedule 1 to the Special Use Zone provides locations within the Special Use Zone for selected port and industrial uses. It is considered that the development of a BESS within the Zone will enable the effective implementation of the Hastings Port Industrial Land Use Structure Plan through provision of a reliable supply of energy to meet the needs of the community, port and industrial requirements.

In accordance with requirements for the use of land specialist studies have been undertaken to satisfy the proposed land use will not adversely affect the amenity of the neighbourhood. These technical studies include:

- Traffic assessment (Section 6.2).

The traffic impact assessment (TIA) identified the operational impact of the project to be negligible with no specific car parking requirements identified for the SUZ1 of the MPPS. A construction traffic management plan (CTMP) has been recommended for the construction phase of the project.

- Noise and vibration impact assessment (Section 6.4).

The noise and vibration impact assessment (NVIA) identified that there will be no adverse impact vibration impact on the surrounding operation of the BESS. Operational noise of the BESS for daytime operation has been confirmed to be compliant with the *Publication 1411, Noise from industry in regional Victoria* (EPA 2011) for all sensitive receptors, while night-time operational noise levels are predicted to produce (marginal) technical exceedances at seven assessment locations. Recommendations for mitigation measures have been proposed for implementation during the detailed design phase of the project.

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- Visual impact assessment (Section 6.5).

The assessment concluded that the project will not adversely affect the visual amenity of the neighbourhood, the locality or wider contextual landscape.

5.4.2 Demonstrated need and significant benefit

The *2018 Port Development Strategy* (PDS) was developed as a legislative requirement according to section 91K of the *Port Management Act 1995*. The PDS provides a comprehensive overview of the Port's current status, constraints and future needs associated with port related development within the SUZ1.

The SUZ1 is identified in the PDS as:

- strategically important land to support the growth of the Port of Hastings;
- providing a sufficient land to cater for the foreseeable planning of the Port at the current time; and
- needing to be flexible and adaptable to accommodate future port scenarios.

As previously stated, the proposed BESS will improve electricity grid reliability and network stability by drawing energy from the electricity grid during off-peak periods for battery storage and dispatching energy to the grid during peak periods for the port, industry and Mornington Peninsula community.

5.5 Particular provisions

5.5.1 Clause 52 Provisions that require, enable or exempt a permit

- VPP 52.17 Native vegetation.

The requirements for the application to remove native title are outlined in Table 5.1, along with Maoneng's response to each requirement.

Table 5.1 Application requirements to remove native vegetation

No.	Application requirement	Response
1	Information about the native vegetation to be removed, including: • the assessment pathway and the reason for the pathway; • a description of the native vegetation to be removed; • maps showing the native vegetation to be removed; and • offset requirement as per the Guidelines (if application approved).	Removal of patch vegetation for the power transmission line is required. The DELWP generated Native Vegetation Removal (NVR) report is attached. In summary vegetation removal as per the *Guidelines for the removal, destruction or lopping of native vegetation* includes: • Basic Assessment pathway – Location category 1, no Large Trees and less than 0.5 ha. Removal of the native vegetation is not determined to have a significant impact on habitat for a rare or threatened species. • 0.279 ha two patches supporting Damp Sands Herb-rich Woodland (vulnerable); no scattered trees. • Strategic Biodiversity Value scores 0.558 and 0.599. • Condition score 0.19 and 0.18 (site assessed scores). • No sensitive wetlands or coastal areas.

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Table 5.1 Application requirements to remove native vegetation

No.	Application requirement	Response
		• Maps showing native vegetation to be cleared are provided in the NVR report and Ecology report. • General offsets required - 0.062 General Habitat Units; to be located in the Port Phillip and Westernport CMA and have a minimum Strategic Biodiversity Value Score 0.449. No large trees. • The above losses present a worst-case scenario for the project and includes both alignment options for the transmission line. Losses can be refined once the alignment of the preferred option is confirmed. • Clearing of scattered native plants will also be required across the areas dominated by exotic vegetation, including one Coast Teatree in the road reserve adjoining the site access to 17 Thornells Road.
2	Topographic and land information relating to the native vegetation to be removed, showing ridges, crests and hilltops, wetlands and waterways, slopes of more than 20 percent, drainage lines, low lying areas, saline discharge areas, and areas of existing erosion, as appropriate.	Both the proposed BESS site (17 Thornells Road) and transmission line connection (21 Thornells Road) are relatively flat with no apparent predisposition to soil erosion in areas where vegetation will be impacted.
3	Recent, dated photographs of the native vegetation to be removed.	Photographs 5.1 – 5.3 provide photographs of the native vegetation proposed to be removed; refer also Flora and Fauna Report (Appendix D).
4	Details of any other native vegetation approved to be removed, or that was removed without the required approvals, on the same property or on contiguous land in the same ownership as the applicant, in the five-year period before the application for a permit is lodged.	Not applicable.
5	An avoid and minimise statement. The statement describes any efforts to avoid the removal of, and minimise the impacts, on the biodiversity and other values of native vegetation, and how these efforts focussed on areas of native vegetation that have the most value.	The land affected by the project has not been subject to any strategic level planning process. The removal of Patches and Scattered Trees has been avoided on the BESS site (17 Thornells Road) and adjoining road reserve. Minimisation has been demonstrated within the AusNet site (21 Thornells Road) by realigning the 220 kV transmission easement alignment to ensure the protection of the three large trees (and associated Tree Protection Zones), which support the highest biodiversity values within the site. Further opportunities to minimise vegetation removal will be investigated once the alignment of the power easement has been finalised.
6	A copy of any Property Vegetation Plan contained within an agreement made pursuant to section 69 of the Conservation, Forests and Lands Act 1987 that applies to the native vegetation to be removed.	No Property Vegetation Plan applies to the project area.
7	Where the removal of native vegetation is to create defendable space, a written statement explaining why the removal of native vegetation is necessary.	No native vegetation requires removal for defendable space.

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Table 5.1 Application requirements to remove native vegetation

No.	Application requirement	Response
8	If the application is under Clause 52.16, a statement that explains how the proposal responds to the Native Vegetation Precinct Plan considerations at decision guideline 8.	Clause 52.16 does not apply to the project.
9	An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured in accordance with the Guidelines.	The offset strategy for the project is to secure offsets from the Native Vegetation Credit Register via an accredited offset broker (third party offsets). A search of the Native Vegetation Credit Register online search tool has shown there are 35 existing offset sites that could potentially satisfy the offset requirements.

Photograph 5.1 Modified (treeless) patch of Damps Sands Herb-rich Woodland within 21 Thornells Road, affected by both power transmission line options (Habitat Zone 6; November 2020)

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Photograph 5.2 Damp Sands Herb-rich Woodland patch (Habitat Zone 8) affected by southern transmission line option - southern boundary comprising a small Swamp Gum *Eucalyptus ovata* and an immature Cherry Ballart *Exocarpos cupressiformis* (November 2020)

Photograph 5.3 Northern boundary of Habitat Zone 8 comprising a Black Wattle *Acacia mearnsii* and an understorey dominated by exotic grasses (December 2020)

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The decision guidelines for the removal of native vegetation and Maoneng's response to each guideline is outlined in Table 5.2.

Table 5.2 Decision guidelines for applications to remove native vegetation

No.	Decision guidelines to be considered	Application response
1	Efforts to avoid the removal of, and minimise the impacts on, native vegetation should be commensurate with the biodiversity and other values of the native vegetation and should focus on areas of native vegetation that have the most value. Taking this into account consider whether: • the site has been subject to a regional or landscape scale strategic planning process that appropriately avoided and minimised impacts on native vegetation; • the proposed use or development has been appropriately sited or designed to avoid and minimise impacts on native vegetation; and/or • feasible opportunities exist to further avoid and minimise impacts on native vegetation without undermining the key objectives of the proposal.	Refer Table 5.1 above.
2	The role of native vegetation to be removed in: • Protecting water quality and waterway and riparian ecosystems, particularly within 30 metres of a wetland or waterway in a special water supply catchment area listed in the Catchment and Land Protection Act 1994. • Preventing land degradation, including soil erosion, salination, acidity, instability and waterlogging particularly: – where ground slopes are more than 20 percent; – on land which is subject to soil erosion or slippage; and – in harsh environments, such as coastal or alpine areas. • Preventing adverse effects on groundwater quality, particularly on land: – where groundwater recharge to saline water tables occurs; – that is in proximity to a discharge area; and – that is a known recharge area.	• On-site dams at 17 Thornells Road will not be impacted by the proposed development and as such the proposed removal of native vegetation does not impact these water bodies. Similarly, the proposed removal of native vegetation to accommodate the proposed development will not have any other broader reaching impacts on any nearby riparian ecosystems, wetlands or waterways. • Both the proposed BESS site (17 Thornells Road) and transmission line connection (21 Thornells Road) are relatively flat land and not affected by erosion or slippage. The project is not located in an area identified as a harsh environment. • Refer to Sections 6 and 8 further information. The Flora and Fauna and Hydrology reports are located in Appendix D and Appendix F.
3	The need to manage native vegetation to preserve identified landscape values.	The project area is not identified as an area of moderate or high biodiversity significance in the Mornington Peninsula Shire Conservation Plan (2019). The native vegetation or land where the native vegetation is to be removed does not have to be managed to preserve identified landscape values. Refer Sections 6 and 10 for further information.
4	Whether any part of the native vegetation to be removed, destroyed or lopped is protected under the *Aboriginal Heritage Act 2006*.	The native vegetation proposed for removal is not listed on the Victorian Aboriginal Heritage Register. The native vegetation has not been identified as important by Aboriginal Victoria. The works and development footprint is not in an area of cultural heritage sensitivity.

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Table 5.2 Decision guidelines for applications to remove native vegetation

No.	Decision guidelines to be considered	Application response
5	The need to remove, destroy or lop native vegetation to create defendable space to reduce the risk of bushfire to life and property, having regard to other available bushfire risk mitigation measures.	There is no requirement to remove any vegetation to provide for defendable space.
6	Whether the native vegetation to be removed is in accordance with any Property Vegetation Plan that applies to the site.	No property vegetation plan applies to the site.
7	Whether an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured in accordance with the Guidelines.	Refer Table 5.1 above.
8	For Clause 52.16 applications, consider in relation to the native vegetation to be removed: • the purpose and objectives of the Native Vegetation Precinct Plan; • the effect on any native vegetation identified for retention in the Native Vegetation Precinct Plan; • the potential for the effectiveness of the Native Vegetation Precinct Plan to be undermined; • the potential for the proposed development to lead to the loss or fragmentation of native vegetation identified for retention in the Native Vegetation Precinct Plan; and • offset requirements in the Native Vegetation Precinct Plan.	Clause 52.16 does not apply.
9	For applications in both the Intermediate and Detailed Assessment Pathway only – consider the impacts on biodiversity based on the following values of the native vegetation to be removed: • The extent. • The condition score. • The strategic biodiversity value score. • The number and circumference of any large trees. • Whether it includes an endangered Ecological Vegetation Class. • Whether it includes sensitive wetlands or coastal areas.	The proposal follows the Basic Assessment pathway; therefore, the Intermediate and Detailed pathways do not apply.

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Table 5.2 Decision guidelines for applications to remove native vegetation

No.	Decision guidelines to be considered	Application response
10	For applications in the Detailed Assessment Pathway only – consider the impacts on habitat for rare or threatened species. Where native vegetation to be removed is habitat for rare or threatened species according to the Habitat importance maps, consider the following: • The total number of species' habitats. • The species habitat(s) that require a species offset(s). • The proportional impact of the native vegetation removal on the total habitat for each species, as calculated in section 5.3.1. • The conservation status of the species (per the Advisory Lists maintained by DELWP). • Whether the habitats are highly localised habitats, dispersed habitats, or important areas of habitat within a dispersed species habitat.	Detailed assessment pathway does not apply.

5.6 Other relevant legislation

Other relevant environmental legislation is summarised in Table 5.3.

Table 5.3 Regulatory framework

Act/instrument	Overview	Relevance
Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)	• The EPBC Act pertains to Matters of National Environmental Significance (MNES). It applies to public and private land, and referral to DAWE is necessary when a proposed action is considered likely to have a significant impact on any MNES.	No EPBC Act-listed ecological communities listed were recorded within the project area. Within 17 Thornells Road potentially suitable habitat for River Swamp Wallaby-grass occurs within the dams and within and adjoining the dams for the Growling Grass Frog. Both species are listed as vulnerable under the EBPC Act. Significant impacts to these species are not anticipated because: • the dams will be retained and not impacted by the proposed works and • the Growling Grass Frog was not recorded during targeted surveys undertaken November and December 2020, and therefore is not expected to occur at the site. The Westernport Ramsar site is located 1.7 km east of the site. Adverse impacts from the proposed development are considered unlikely with the requirements of Clause 37.01 (SUZ1) of the MPPS to be met in terms of adequately managing site run-off during construction and operation.

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Table 5.3 Regulatory framework

Act/instrument	Overview	Relevance
Flora and Fauna Guarantee Act 1988 (VIC)	The FFG Act lists flora and fauna species and ecological communities that are recognised as threatened in Victoria. The FFG Act also identifies threatening processes and flora that require protection. Protected flora includes those species listed as rare or threatened under the FFG Act, plant taxa that belong to listed communities, and plant taxa that are not threatened but requires protection for other reasons (eg over-collection). The FFG Act largely pertains to public land.	No species or ecological communities listed as threatened under the Act were recorded or considered likely to occur within the project area. A protected flora permit will not be required.
Water Act 1989 (VIC)	An application to use and develop land for non-agricultural purposes within a '*Declared Irrigation District*' is required to be referred to the Secretary of the department administering the *Water Act 1989*.	The project site is not located in a declared irrigation district and no approval under the Water Act is considered likely to be required.
Heritage Act 2017 (VIC) ('Heritage Act')	The Heritage Act identifies and protects (non-Aboriginal) heritage places and objects that are of cultural heritage significance to the state of Victoria. Significant sites and objects are listed in the Victorian Heritage Register, and permits are required for any works that will alter or damage a listed place.	The project site does not host any heritage-listed places or objects and no permit is required under the Act.
Environment Protection Act 1970 (VIC)	Provides a legal framework to protect the environment in the State of Victoria. It applies to noise emissions and the air, water and land in Victoria, the territorial sea along the Victorian coast and to the discharge of waste to the Murray River from any premises in Victoria. The Act also establishes Environment Protection Authority's powers, duties and functions. EPA works approvals and licencing requirements apply under the Environment Protection Act 1970 (EP Act) to industrial and waste management activities with the potential for significant environmental impact. The industries and activities for which works approvals and licensing applies are referred to as 'scheduled premises' in Schedule 1 of the Environment Protection (Scheduled Premises) Regulations 2017 (EPSP Regulations). The Act (as amended by the *Environment Protection Amendment Act 2018* (Vic)) is set to commence on 1 December 2021. This Act (as amended) will substantially amend the environment protection framework, including adopting a new general environmental duty and introducing a new permissions scheme including a development licence, operating licence, permits and registrations.	BESS facilities are not a scheduled premise under the EPSP Regulations and no requirements for an EPA works approval or licence applies to the project.
Catchment and Land Protection Act 1994 (VIC) ('CaLP Act')	Developments on land sited within a *Special Water Supply Catchment Area*, as listed in Schedule 5 of the CaLP Act, must be referred to the relevant water board or water supply authority.	The project site is not located in a special water supply catchment area and no approval is required under the Act.

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Table 5.3 Regulatory framework

Act/instrument	Overview	Relevance
Aboriginal Heritage Act 2006 (VIC) *('AH Act')* and *Aboriginal Heritage Regulations 2018* *('AH Regs')*	Under the AH Regulations, the mandatory requirement for a Cultural Heritage Management Plan (CHMP) exists if a proposed development is deemed a 'high impact activity' and will occur wholly or partly in an area of 'cultural heritage sensitivity'.	The Aboriginal Cultural Heritage Register and Information System (ACHRIS) indicates that the proposed BESS site at 17 Thornells Road is not mapped as an area of 'cultural heritage sensitivity' and no separate approval or CHMP is required under the Act. The northernmost boundary of 21 Thornells Road is mapped as an area of Aboriginal cultural heritage sensitivity; however this area does not correspond to, or will be impact by, the proposed transmission line disturbance area (Figure 6.16). No Aboriginal cultural heritage impacts are anticipated as a result of the project and no cultural heritage management plan is required.

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6 Description and management of environmental impacts

This chapter provides a description of the potential environmental impacts and specialist assessments completed in support of the planning permit application.

6.1 Flora and fauna

Maoneng engaged EMM to undertake a flora and fauna impact assessment of the proposed project. The key objectives of the assessments were to:

- describe the biodiversity values within the project area;
- assess the potential impacts of the project on the biodiversity values;
- describe the applicable statutory framework; and
- provide recommendations on minimising and managing potential impacts.

A copy of the flora and fauna assessment is included as Appendix D and the results are outlined below.

6.1.1 Methodology

The assessment comprised a desktop review of aerial photographs and applicable databases followed by a site survey oof 17 Thornells Road on 9 September 2020 and 30 November for areas of 21 Thornells Road affected by the project. These site assessments were conducted by EMM ecologist Lisa Jegathesan (nee Crowfoot). Lisa is a DELWP accredited native vegetation assessor. The survey included an assessment of the ecological values of the site and the adjoining road reserve.

i Flora

Native vegetation was assigned to an Ecological Vegetation Class (EVC; vegetation community) by reference to DELWP's EVC modelling (DELWP 2020b) and EVC benchmarks (DELWP 2020d). A Vegetation Quality Assessment was completed for patches of native vegetation following the Department of Sustainability and Environment's (DSE's) *Vegetation Quality Assessment Manual* (DSE 2004) and the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017; the Guidelines).

ii Fauna

Site surveys were undertaken to determine vertebrate habitats and the associated habitat quality. All vertebrates either directly observed or heard calling (eg frogs) were recorded to compile an inventory of fauna species using the study area during the site survey.

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iii Additional targeted threatened species surveys

Following the initial site survey of the BESS site, habitat within the dams and adjoining terrestrial areas was determined to be potentially suitable for the threatened Growling Grass Frog. The targeted survey consisted of three surveys following methods largely based on those outlined by Heard et al. (2010) and undertaken in accordance with the Significant Impact Guidelines for the Growling Grass Frog (DEWHA 2009). The surveys were conducted as per the guidelines and during the most suitable local conditions to establish presence/absence of the Growling Grass Frog near the study site. The three surveys were undertaken on 22 November, and 1 and 15 December 2020, when the night-time air temperature was >12°C and wind was minimal, as per the requirements for suitable survey conditions. Targeted spotlight (visual encounter) surveys and call-playback were undertaken along the banks of the three wetlands in the study site. These surveys were undertaken by John Harris of Wildlife and Ecology.

6.1.2 Existing environment

The study area for the biodiversity assessment included the BESS site (17 Thornells Road), the adjoining road reserve immediately north of the BESS site, and the AusNet land between the BESS site and the substation (21 Thornells Road).

A map of the vegetation survey results is provided in Figure 6.1.

i Biodiversity values within the BESS site (17 Thornells Road)

As the site has been used historically for agricultural purposes and the majority of the site has been cleared of remnant vegetation. A total of 77 vascular plant taxa were identified on the site, of which only 21 (27%) are indigenous to the Tyabb area. The majority of the indigenous species recorded were located within or adjoining the dams. No rare or threatened flora species were recorded.

Exotic vegetation (predominately exotic grasses) dominates the site, including the proposed project development footprint. A row of established Pine trees (*Pinus radiata*) forms the western boundary with the Tyabb substation site.

A small patch (approximately 0.03 ha) of modified Damp Sands Herb-rich Woodland is located east of the dams along the fenceline with the neighbouring property (Figure 6.1 and Photograph 6.1). The canopy comprises Large-fruit Yellow Gums (*Eucalyptus leucoxylon* ssp. *megalocarpa*)[4] and a Swamp Gum (*Eucalyptus ovata*) rooted in the neighbouring property. The understorey includes Black Wattles (*Acacia mearnsii*), Coast Teatree (*Leptospermum laevigatum*) and Swamp Gum saplings. The ground layer is mown and dominated by exotic herbs. The quality of the vegetation was assessed following DELWP's vegetation assessment guidelines; the Habitat Score was 0.19. This vegetation is not proposed to be affected by onsite works.

The three dams support a diversity of indigenous species. Wetland Formation is a broad EVC that covers a range of freshwater wetland types and best fits artificial waterbodies such as those at the site. The vegetation quality of all three dams was also assessed. There are no benchmarks for Wetland Formation, so the vegetation within the dams have been assessed against the benchmarks for Aquatic Herbland (EVC 653); the closest wetland EVC with benchmarks for the Gippsland Plain Bioregion. Habitat scores ranged from 0.24 to 0.5.

[4] The Yellow Gums are planted (non-indigenous to the area), and it is also possible the Swamp Gum has also been planted. The canopy of these trees extends to the subject site.

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Twenty-seven fauna species were recorded during the site assessments (initial site assessment and targeted surveys. This comprised 21 bird species (four introduced), five amphibians and one introduced mammal. No Growling Grass Frogs were recorded during the targeted surveys and are therefore not expected to occur at the site. No threatened fauna species were recorded during the site surveys.

Three main fauna habitat types were identified onsite: planted trees, exotic pasture and artificial wetlands (dams). Similar habitats are found in the surrounding landscape. The area proposed for the development supports exotic pasture and would largely be utilised by common native and exotic birds. The wetlands provide habitat for amphibians and water birds (mostly waterfowl) and support the highest biodiversity values onsite. The dams will be retained and not impacted by the proposed works.

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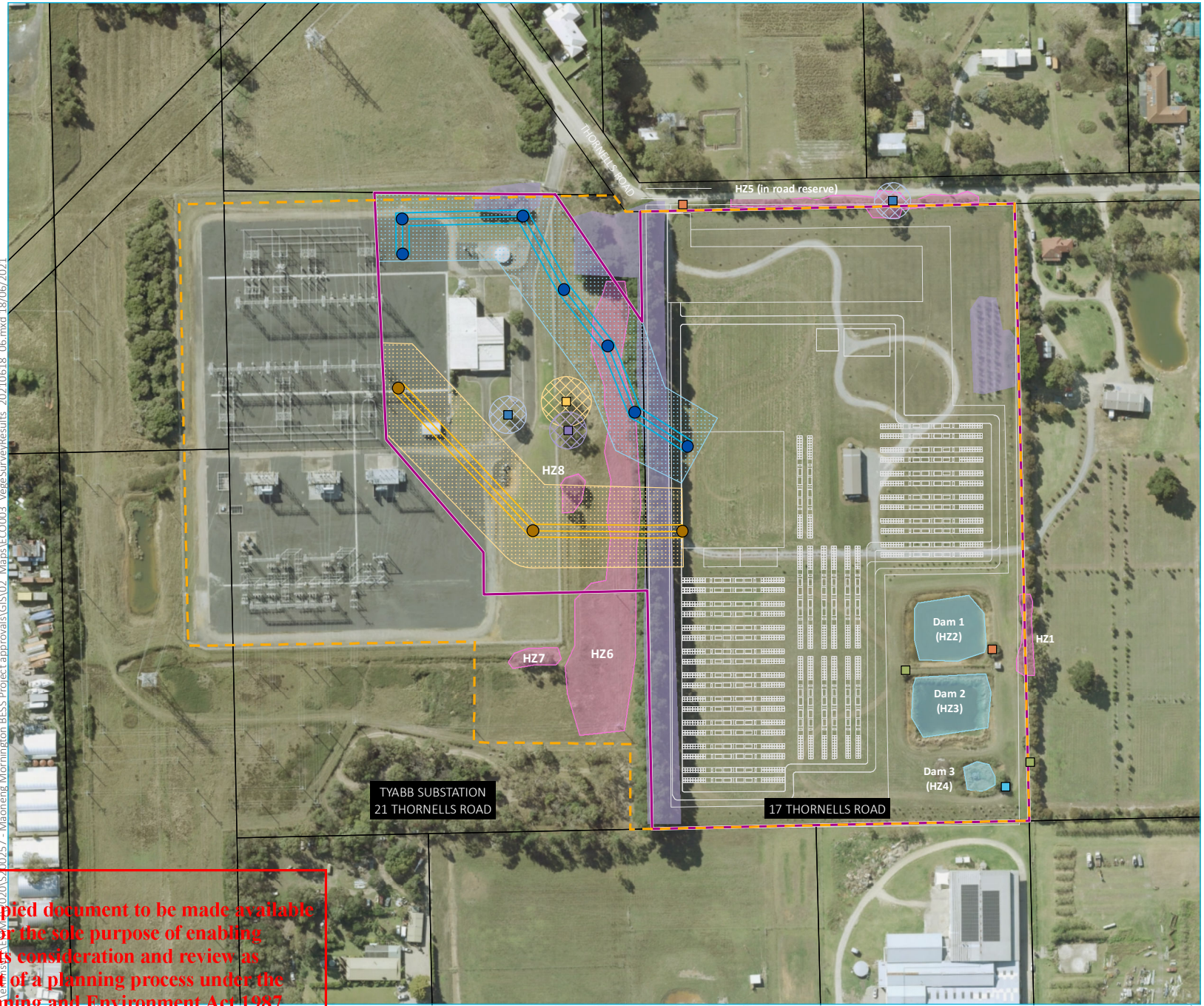

KEY

- Subject site
- Ecology study area
- Proposed transmission pole
- Proposed transmission tower
- Site layout
- Cadastral boundary
- Damp Sands Herb-rich Woodland
- Dam
- Planted vegetation

Canopy trees with associated TPZ

- Manna gum
- Narrow-leaf peppermint
- Swamp gum

Tree Protection Zone (TPZ)

- Manna gum
- Narrow-leaf peppermint
- Swamp gum

Understorey trees

- Blackwood
- Coast tea-tree
- Black wattle

Transmission line

- Option 1 - 66 kV transmission line
- Option 2 - 220 kV transmission line
- Option 1 - 66 kV transmission line easement
- Option 2 - 220 kV transmission line easement

Source: EMM (2021); Metromap (2021); LCrowfoot (2020); Maoneng (2020); DELWP (2019)

0 50 100 m

GDA 1994 MGA Zone 55

N

Vegetation survey results

Maoneng Australia Pty Limited
Mornington BESS
Planning permit application
Figure 6.1a

EMM
creating opportunities

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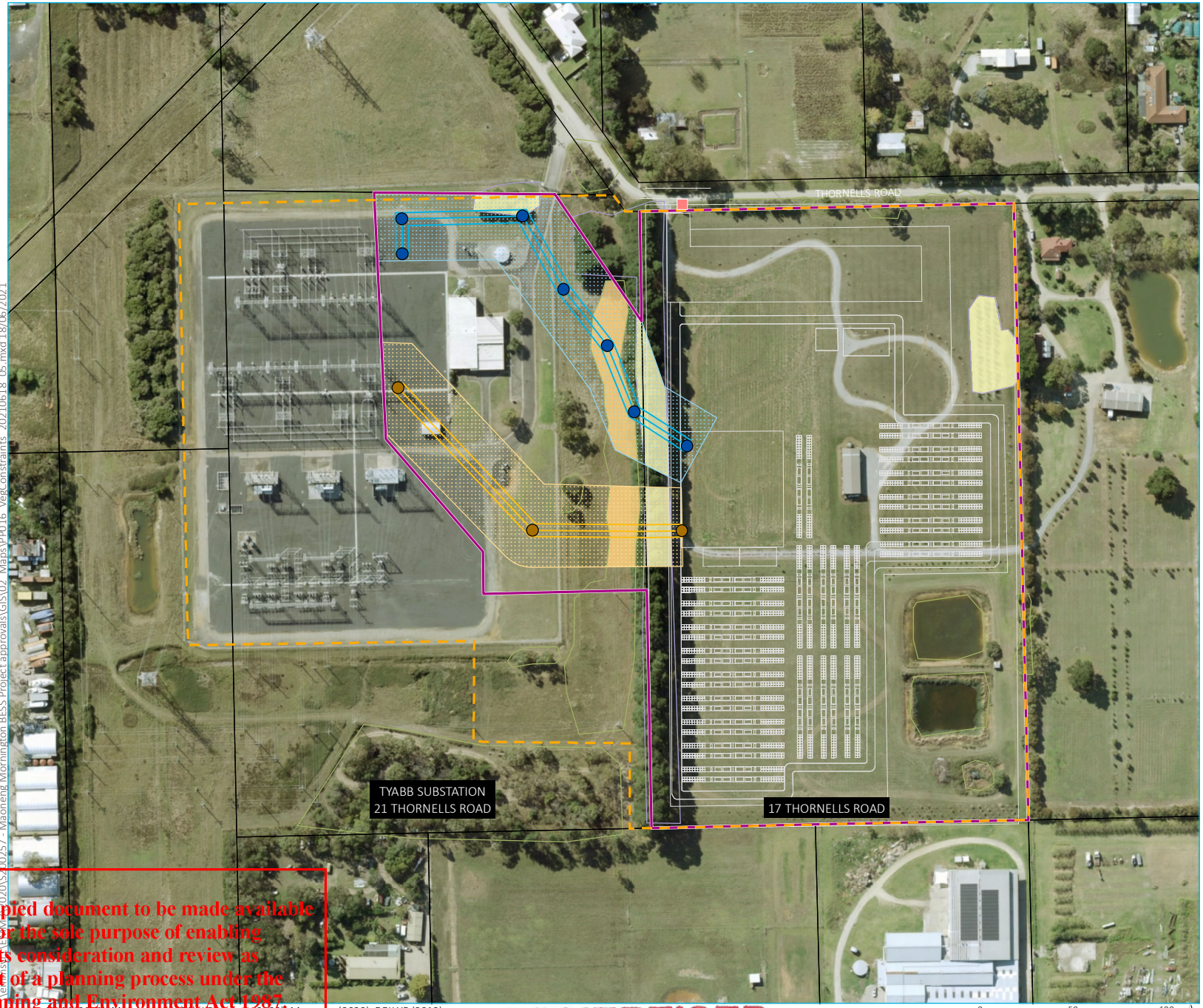

KEY

- Subject site
- Ecology study area
- Proposed transmission pole
- Proposed transmission tower
- Site layout
- Cadastral boundary

Vegetation removal

- Coast Tea-tree
- Planted vegetation
- Remnant vegetation

Transmission line

- Option 1 - 66 kV transmission line
- Option 2 - 220 kV transmission line
- Option 1 - 66 kV transmission line easement
- Option 2 - 220 kV transmission line easement

Source: EMM (2021); Metromap (2021); LCrowfoot (2020); Maoneng (2020); DELWP (2019)

0 50 100 m

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Vegetation removal

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Figure 6.1b

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ii Thornells Road reserve adjoining the BESS site

A total of 29 vascular plant taxa were recorded within the Thornells Road road reserve, of which only 12 (41%) are indigenous to the Tyabb area. Some of these species have been planted.

The road reserve also supports a modified patch of Damp Sands Herb-rich Woodland (vegetation quality score 0.27). This patch supports understory trees and some plantings of native trees and shrubs. The ground layer is dominated by exotic species. The most notable feature of the road reserve is the large Coast Manna Gum (*Eucalyptus viminalis* ssp. pontica). Removal of some scattered native plants and a Coast Tee-tree will be required to accommodate the widening of the site access (which is required for traffic manoeuvrability and improving sight lines). An emergency access (second) driveway may be required for Country Fire Authority (CFA) vehicles. The patch of native vegetative within the road reserve can be avoided to accommodate the two driveways, if required.

iii AusNet site (21 Thornells Road)

Fifty-three (53) plant taxa were recorded within the study area of the AusNet site, of which 35 species are exotic and 18 indigenous. Three patches of modified Damp Sands Herb-rich Woodland and three Large Scattered Trees were recorded within this site. The largest patch (0.5 ha) is treeless and dominated by native and exotic grasses. It has a Habitat Score of 0.19. The two smaller patches (both around 0.02 ha) largely comprise remnant canopy and understorey tree species and an understorey dominated by exotic vegetation. The canopy trees are small and are relatively young. Some of the remnant patches will be impacted by the installation of the new transmission line, the three large trees can be avoided.

Two habitat types are recognised within the AusNet site, remnant trees and grassland. The remnant trees support the most valuable fauna habitat within this site, particularly the large eucalypts. These trees provide perching and nesting sites for a diversity of native birds, as well as food resources for insectivorous and nectar-feeding birds and the bats. The native and exotic grassy areas would be utilised by fauna species similar to those species utilising the pasture of the BESS site. The ephemeral artificial drain around the permitter of the cyclone fence is likely to be occasionally utilised by locally abundant frogs.

iv Significant flora and fauna species

A total of 13 rare or threatened vascular plant taxa and 55 threatened fauna species have been recorded within 5 km of the site of the project area. Of these, four have a low-moderate or moderate likelihood of occurrence within the dams of the BESS site (17 Thornells Road): River Swamp Wallaby-grass (*Amphibromus fluitans*), Eastern Snake-necked Turtle *Chelodina longicollis*, Nankeen Night Heron *Nycticorax caledonicus* and Royal Spoonbill *Platalea regia.*

The River Swamp Wallaby-grass which is listed as Vulnerable under the EPBC Act. River Swamp Wallaby-grass is not listed under Victoria's FFG Act or on DELWP's advisory list. This species is associated with freshwater permanent and ephemeral wetlands and waterways, including artificial wetlands and channels.

The Eastern Snake-necked Turtle is considered a moderate likelihood of occurrence in habitats associated with the dams on the BESS site. The Nankeen Night Heron and the Royal Spoonbill are considered a low to moderate likelihood of occurrence and may forage along the margins of the dams within the BESS site and in the adjoining pasture when it is wet; this habitat is not limited in the surrounding landscape.

As the dams onsite will be retained, significant impacts to these species are not anticipated. In addition, the Eastern Snake-necked Turtle is considered introduced to the Peninsula.

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Habitat for an additional 42 EPBC Act-listed flora and fauna species have been identified as potentially occurring within 5 km of the site on the Protected Matters Search Tool. With the exception of the Grey Headed Flying-fox, none of these additional species are considered likely to occur within the project area as the habitat onsite is either too modified or never supported suitable habitat for these species. The Grey-headed Flying-fox may occasionally feed on apples from the remaining apple trees within the BESS site and also nectar from eucalypt trees within the AusNet site and adjoining properties.

6.1.3 Summary

The project area has been largely cleared of remnant vegetation. The highest biodiversity values for the site are associated with the dams and the large trees, all of which will be retained. Removal of Patches and Scattered Trees can be avoided within the BESS site and road reserve. Removal of modified patches of Damp Sands Herb-rich Woodland will be required for the transmission line; the largest patch is treeless.

A native vegetation removal figure is shown in Figure 6b and the DELWP Native Vegetation Removal Report (refer Appendix F of the Flora and Fauna Assessment) which is considered satisfactory for a Basic Pathway Assessment permit application. The extent of patch vegetation mapped within Figure 6b and the DELWP generated Native Vegetation Removal report is considered to be a worst-case scenario and includes both alignment options for the power easement; only one easement is required to connect the BESS to the substation (refer also Table 5.1 above).

6.1.4 Recommendations

The following recommendations are made for mitigation and management measures to be included as part of the construction environmental management plan (CEMP):

- To avoid impacts to the large trees, erect temporary exclusion fencing around Tree Protection Zone of all large remnant trees adjoining the works areas.
- To avoid impacts to the dams, erect temporary exclusion fencing around the dams during construction.
- To reduce harbour for rabbits, remove green and hard waste from around the dams before construction works commence. Ensure any rabbit warrens onsite are backfilled.
- Ensure weeds are adequately managed during construction works (and ongoing during operations), particularly woody weeds. Management of noxious weeds is required under the *Catchment and Land Protection Act 1994*.
- If approved, native vegetation offsets will need to be secured after the planning permit is issued and before clearing of the native vegetation (refer Table 5.1 above).

6.2 Traffic

Maoneng engaged EMM to undertake a traffic impact assessment of the proposed project. The key objectives of the assessment were to:

- describe the existing traffic and transport environment in the locality;
- assess proposed internal site traffic circulation and car parking;
- forecast project-related traffic;

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- assess the potential impacts of the project on the external road network and intersections;
- assess the potential impacts of the project on traffic safety, public transport, pedestrian and cycling facilities; and
- provide recommendations on minimising and managing potential impacts.

EMM conducted a site visit on 8 and 16 September 2020 to inspect the road network and site access and to undertake the intersection survey. A copy of the traffic impact assessment is included as Appendix E and the results are outlined below.

6.2.1 Existing traffic conditions

The local road network consists of the following roads:

- Thornells Road.
- Dandenong-Hastings Road (A780) also now known as Westernport Highway.
- Frankston-Flinders Road.
- Mornington-Tyabb Road.

The local road network is shown in Table 6.3.

Existing traffic conditions in the local road network are described in Appendix E.

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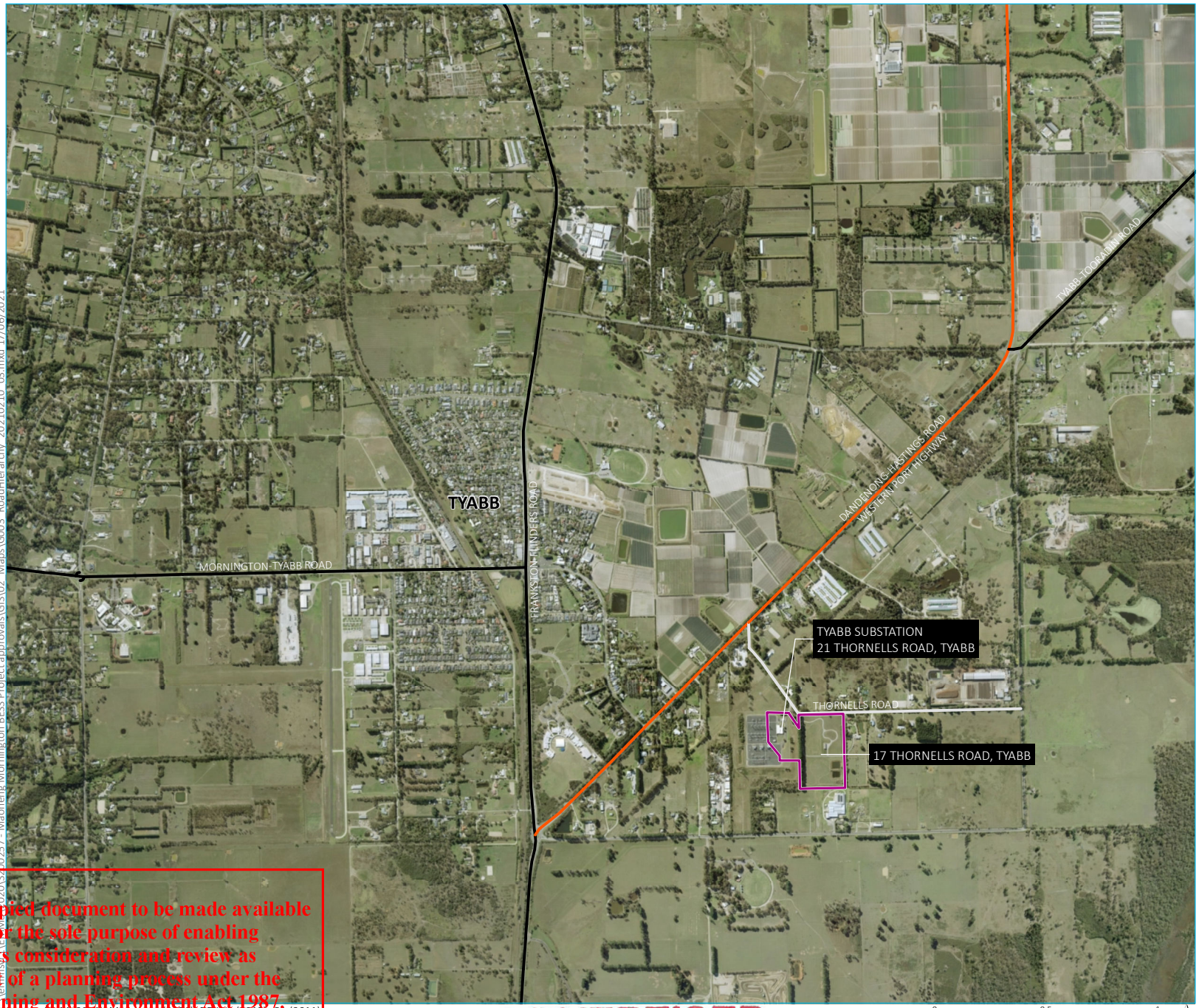

KEY

- Subject site
- Arterial road (named highway)
- Arterial road
- Municipal road

Local road network

Source: EMM (2021); Metromap (2021); DELWP (2019); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 55

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i Volumes

A traffic survey was undertaken at the Dandenong-Hastings Road/Thornells Road intersection on 8 September 2020 by EMM field staff from 6 am to 9 am and from 3 pm to 6 pm. Results indicated that peak traffic hours are as follows:

- AM peak is 6 am to 7 am.
- PM peak is 3.45 pm to 4.45 pm.

The Dandenong-Hastings Road/Thornells Road intersection currently operates at Level of Service B during the peak hours, with minimal delays and queueing. Dandenong-Hastings Road carried over 600 vehicles (two-way) in both the peak hours, however, the traffic volumes were very low in Thornells Road, as shown in Table 6.3[5].

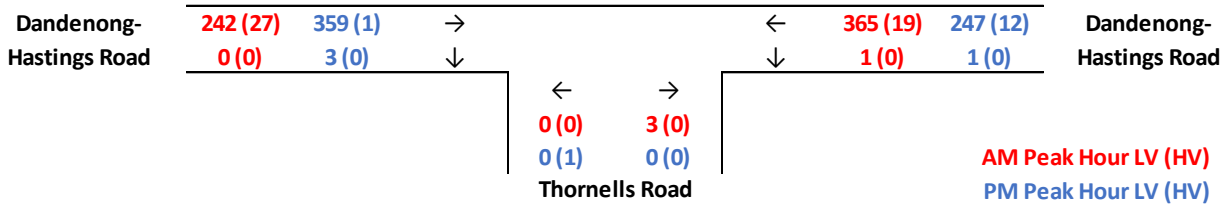

Figure 6.4 Existing traffic volumes

ii Crash data

The crash history data shows there were no crashes on Thornells Road or at the Dandenong-Hastings Road/Thornells Road intersection over the six-year period 2014-2019.

Within 500 m of the Dandenong-Hastings Road/Thornells Road intersection, there was only one recorded crash, which is considered to be a low crash rate for a six-year period. This crash history does not indicate any major road safety issues for the Dandenong-Hastings Road in the vicinity of the site access to Thornells Road currently.

6.2.2 Construction traffic

i Route

Project infrastructure and construction materials will be shipped to the Port of Melbourne and then trucked to site via the Monash Freeway, South Gippsland Freeway, Dandenong-Hastings Road/Western Port Highway and Thornells Road.

Based on the likely haulage routes, the Dandenong-Hastings Road/Thornells Road intersection is identified as the key intersection for the proposed development (Table 6.3).

ii Volumes and types

The largest heavy vehicles that will regularly access the site during construction will be 26 m B-doubles. Access by approximately ten over size over mass (OSOM) vehicles will also be required. There will be approximately 130 movements per day during peak construction. Estimated volumes and types of construction traffic are outlined in Table 6.1.

Note: LV = light vehicles and HV = heavy vehicles.

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OSOM access will require a permit application to be made by the vehicle operator to the National Heavy Vehicle Regulator (NHVR).

It is expected that light vehicles will arrive during AM/PM peak times (6 am to 7 am and 3. 45 pm to 4.45 pm) and that heavy vehicle deliveries will be spaced out over the day.

Table 6.1 Estimated construction traffic vehicle trips

Stage	Duration	Key activities	Light vehicles (per day one-way)	Heavy vehicles (per day one-way)	OSOM vehicles (total one-way)
1	2 months	Site establishment	40	7	5
2	3 months	Delivery of BESS infrastructure	60	5	5
3	4 months	Installation of BESS infrastructure	60	5	0
Total	**9 months**				

It is assumed that peak hourly heavy vehicle traffic will comprise approximately 10% of the daily heavy vehicle traffic. Assuming an 11-hour working day, there will typically be 1 heavy vehicle trip (1 inbound and 1 outbound movement) in each of the peak hours.

The primary heavy vehicle haulage route is expected to be via the Dandenong-Hastings Road and Thornells Road intersection. Construction-related traffic volumes at this intersection are outlined in Figure 6.5.

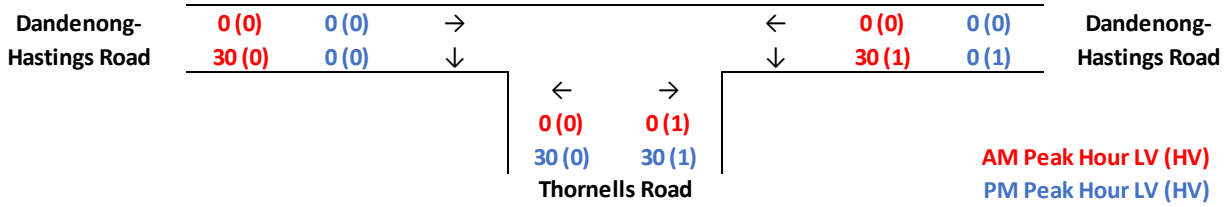

Figure 6.5 Construction-related traffic volumes during construction

"Development" traffic is calculated by combining the surveyed traffic volumes (Figure 6.3) and the additional construction-related traffic. Development traffic is shown in Figure 6.6.

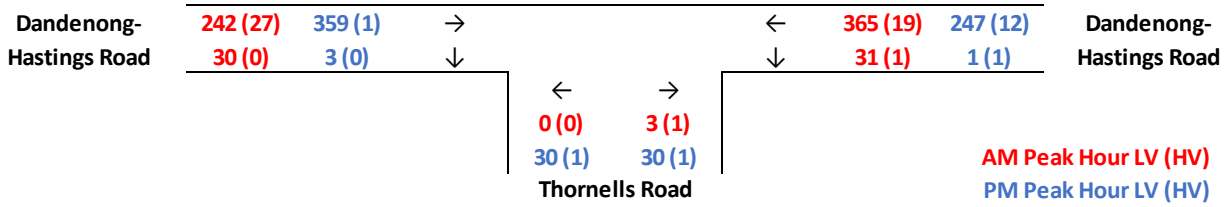

Figure 6.6 Development traffic generation during construction

iii Manoeuvrability

The results of a swept path assessment indicate the site access entrance will need to be widened to the east as proposed to improve manoeuvrability for 26 m B-doubles accessing the site and will subject to detailed engineering design.

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iv Traffic increase on Thornells Road

The survey results showed that Thornells Road carried 10 vehicles during the AM period and 12 during the PM period, totalling 22 vehicles over a six-hour window. Assuming this peak 6-hour comprises approximately one third of the total daily traffic volume, there are approximately 66 daily vehicle movements on Thornells Road currently.

However, at the time of the survey the concrete batching plant (CBP) owned by Holcim was not in operation. Operational traffic associated with the CBP uses Thornells Road. Based upon CBP's use of a similar size typical vehicle movements of 22 and 30 vehicles in the AM and PM 3-hour peak periods along Thornells Road are anticipated. Assuming this represent 50% of daily CBP traffic (with 12 operational hours per day), the daily CBP traffic will potentially be 104 daily vehicle movements, using Thornells Road, over the short section between Dandenong-Hastings Road and the Holcim Tyabb CBP access.

Taking the CBP traffic into account, the additional project-related traffic on Thornells Road in the peak construction period will be 65 trips (130 daily vehicle movements), as shown in Figure 6.6[6].

According to *Austroads Guide to road design part 3: Geometric design* refers to Australian Road Research Board (ARRB) *Best practice guide for unsealed roads* (ARRB, 2009), Thornells Road is classified as Road Class 4B (minor road with a daily traffic between 50 to 150).

The forecast daily traffic volume during construction for the section on Thornells Road between Dandenong-Hastings Road and the CBP access is 150 vehicle trips (300 daily traffic movements comprising 66 existing traffic plus 104 CBP traffic plus 130 construction traffic).

The forecast daily traffic volume over the remainder of Thornells Road, between the CBP access and the BESS site access is lower, at 98 vehicle trips (196 traffic movements.

At both locations, the forecast daily traffic exceeds the daily 150 vehicle movements threshold for the requirement to seal a rural road. However, this threshold typically applies when traffic volumes are sustained over a long-term period. As the traffic volumes will be limited to the nine-month construction period, sealing of the road is not warranted.

Instead, a recommendation is made that the surface of Thornells Road is maintained at a safe and serviceable standard during construction period, in accordance with the ARRB guide. It is also recommended that the use of traffic controllers during the construction period is considered to ensure public safety. These recommendations are further outlined below.

v Sight distance

The minimum required sight distance at the BESS site's Thornells Road access point is 97 m in both directions, this is achieved to the left of the site access with sight distance of 106 m. Sight distance to the right is hindered approximately 81 m from site access (Figure 6.7) by a Coast Teatree in the road reserve (Photograph 6.1 and Figure 2.1). This is proposed to be addressed by the removal of the tree and widening of the site entrance (Section 6.1.2 and Appendix K).

Sight distance at the Dandenong-Hastings Road/Thornells Road intersection is satisfactory. To the left, sight distance is 351 m and to the right it is 1,040 m (Figure 6.8). Required sight distance from the intersection is 285 m.

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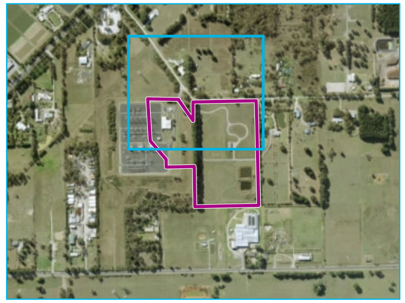

KEY

- Subject site
- Site exit
- Sight distance to the left (106 m)*
- Sight distance to the right (81 m)*
- Cadastral boundary

* Required site distance: 97 m

Source: EMM (2021); Metromap (2021); DELWP (2019); GA (2011)

0 50 100 m
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Sight distance at site access

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Figure 6.7

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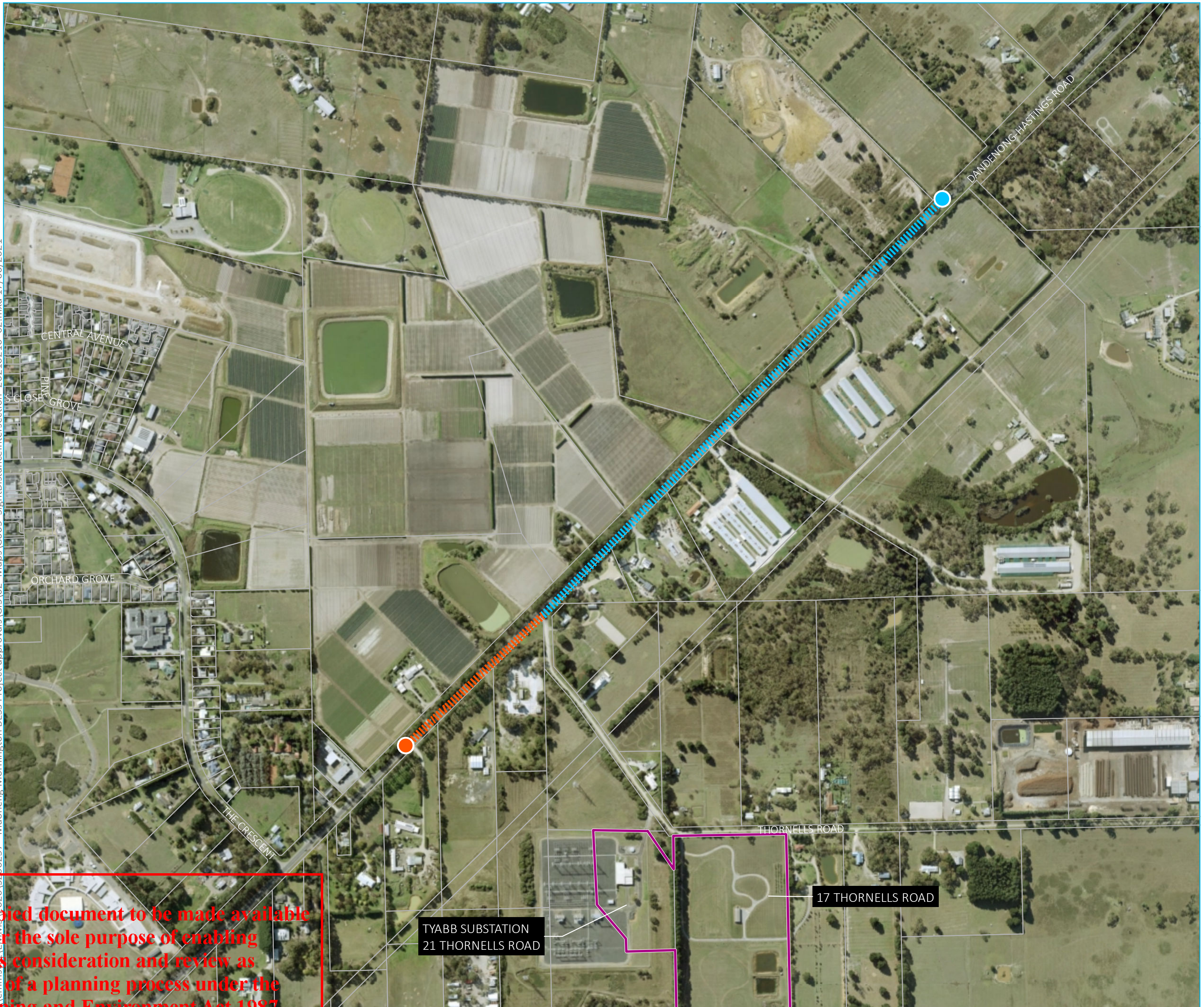

Source: EMM (2021); Metromap (2021); DELWP (2019); GA (2011)

KEY

- Subject site
- Sight distance to the left (351 m)*
- Sight distance to the right (1,040 m)*
- Cadastral boundary

* Required site distance: 285 m

Sight distance at intersection

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Figure 6.8

EMM creating opportunities

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Photograph 6.1 Coast Teatree requiring removal on Thornells Road

vi Impact on intersection delays

The Dandenong-Hastings Road/Thornells Road intersection currently operates at Level of Service (LOS) B during the peak hours with ample spare capacity (over 75%) to accommodate additional traffic. The minor road approach (Thornells Road) experiences an average vehicle delay of less than 15 seconds in the peak hours.

With development and cumulative traffic, the intersection will operate at LOS C in the AM peak hour while keeping the same LOS in the PM peak hour. The intersection will still have over 75% spare capacity. The delays and queueing will only increase marginally but unlikely to be noticeable to the general road users and limited for the duration of the construction phase (ie nine months).

6.2.3 Public transport services, pedestrian and cycling infrastructure

The nearest public transport bus stop is approximately 2.7 km away from the site.

There is no pedestrian or cycling infrastructure on either side of the road along Dandenong-Hastings Road or Thornells Road due to the rural nature of the precinct.

As the project site will be operated remotely, the proposed site workforce is not anticipated to create a high demand for either pedestrian or cyclist access or public transport services within the Tyabb area.

6.2.4 Car parking

During construction, a temporary gravelled laydown and carparking area will be located in the northern portion of the project site (Figure 2.1).

During operations, carparking will be in the northern portion of the site (Figure 2.1). The carparking area will be gravelled and will have capacity for three passenger vehicles. No overnight parking will be required.

The MPPS does not specify any car parking rates for the SUZ1 land use.

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6.2.5 Operational traffic

i Volumes and types

As the project site will be operated remotely, operational traffic will be limited to the occasional maintenance vehicle (light vehicle), a maximum of 2 vehicles per day, but an average of approximately 10 vehicles to the site per month. Accordingly, operational traffic impacts have not been assessed in detail.

6.2.6 Summary

Operational traffic impacts will be negligible.

Traffic impacts associated with the construction phase will be limited to a nine-month period.

Construction traffic will peak at approximately 60 light vehicle trips and 5 heavy vehicle trips to the site per day (approximately 130 movements per day during peak construction).

The Dandenong-Hastings Road/Thornells Road intersection currently operates at Level of Service B during the peak hours, with minimal delays and queueing. With the proposed development and cumulative traffic, the Dandenong-Hastings Road/Thornells Road intersection will operate at LOS C and B in the AM and PM peak hour, with marginal increases in delays and queue lengths.

Public transport services, pedestrian and cycling infrastructure will not be significantly impacted.

Car parking spaces provided during the site construction and operation stages will be adequate and meet the forecast demand.

6.2.7 Recommendations

Based on the outcomes of the traffic impact assessment, a construction traffic management plan (CTMP) should be prepared with recommendations for key components outlined below.

i Turning movements at Dandenong-Hastings Road/Thornells Road intersection

As traffic impacts will be short-term (nine months), the construction of a new turning lane at the Dandenong-Hastings Road/Thornells Road intersection is not warranted. To ensure safety, the CTMP should instead require that the number of left and right turning movements during the construction phase at the Dandenong-Hastings Road/Thornells Road intersection during peak hours (6 am – 7 am and 3.45 pm – 4.45 pm) is limited to five vehicles per hour (from both the left and the right). The CTMP should also consider applying a temporary speed reduction on Dandenong-Hastings Road, subject to approval from relevant authorities.

ii Road maintenance

As traffic impacts on Thornells Road will be limited to the 650 m stretch between Dandenong-Hastings Road and the site access and will be short-term (nine months), sealing of the 650 m affected section of Thornells Road is not warranted. The CTMP should require the surface of Thornells Road is maintained at a safe and serviceable standard during construction period, in accordance with the ARRB guide. It should also require consideration for the use of traffic controllers during the construction period is also considered, to ensure public safety.

iii Sight distance

The CTMP should require that the Coast Teatree shown in Photograph 6.1 be removed to improve the sight distance (for visibility to the right).

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6.3 Surface water quality

Maoneng engaged EMM to undertake a surface water quality assessment of the proposed BESS site at 17 Thornells Road.

The scope of the surface water quality assessment did not specifically include the adjoining substation site at 21 Thornells Road, as the Tyabb substation has been operational since at least 2009 and the proposed BESS will not impact, alter or result in any additional surface water drainage to the existing substation site through the establishment of transmission line towers.

The key objectives of the assessment were to:

- characterise the existing BESS site environment;
- assess potential surface water impacts resulting from the project (qualitative assessment); and
- provide recommendations to prevent or minimise any impacts.

It is noted that parts of the project site are identified as a designated flood prone area (MPS 2017) and that flooding was not specifically considered in surface water assessment.

On 27 October 2020, Maoneng lodged an application with Council for consent to build on flood prone land (FL1818/20), pursuant to the *Building Regulations 2018, Regulations 153*. It is anticipated that this matter can be resolved in consultation with Council and during DELWP's assessment of the proposed BESS project.

A copy of the surface water quality assessment is provided as Appendix F and the results are summarised below.

6.3.1 Methodology

The assessment approach comprised:

- desktop review of existing available information and spatial data, site survey data and other relevant online resources to summarise the regulatory context and characterise existing surface water resources;
- site inspection of the BESS site undertaken on 8 and 16 September 2020 by EMM field staff to ground-truth the existing site topography and drainage arrangements, and consult with the existing landowner regarding the use of the three onsite dams;
- identification of potential surface water impact mechanisms associated with project construction and operation;
- development of a water management approach; and
- review and assessment of residual impacts to surface water resources on a qualitative basis to understand the potential significance of impacts and consider the need for any further mitigation or management.

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6.3.2 Existing environment

i Hydrology

The majority of the BESS site drains towards the north-east corner adjacent to Thornells Road. An unnamed drainage line (herein referred to as Watercourse A) runs along the eastern boundary of the site grading from south to north and directs runoff into a roadside drain along the southern side of Thornells Road. Watercourse A also receives runoff from the adjacent property to the east. A smaller portion of the BESS site drains generally to a vegetated depression that runs the length of the western site boundary. This depression would appear to first spill from the BESS site in its south-west corner, discharging into the adjacent property to the south. There are three existing dams located in the south-eastern portion of the site, which will not be impacted by the project.

The project site is located within the Olivers Creek catchment, which ultimately drains to Western Port (WBM 2000) which is located approximately 1.7 km east of the BESS site. Western Port contains a wetland that is listed under the Convention of Wetlands of International Importance (Ramsar Convention).

Key site constraints relevant to water management include the low topographic relief, potentially shallow depth to groundwater and soils that are potentially dispersive and prone to waterlogging.

The existing catchments and local waterways are provided on Figure 6.9.

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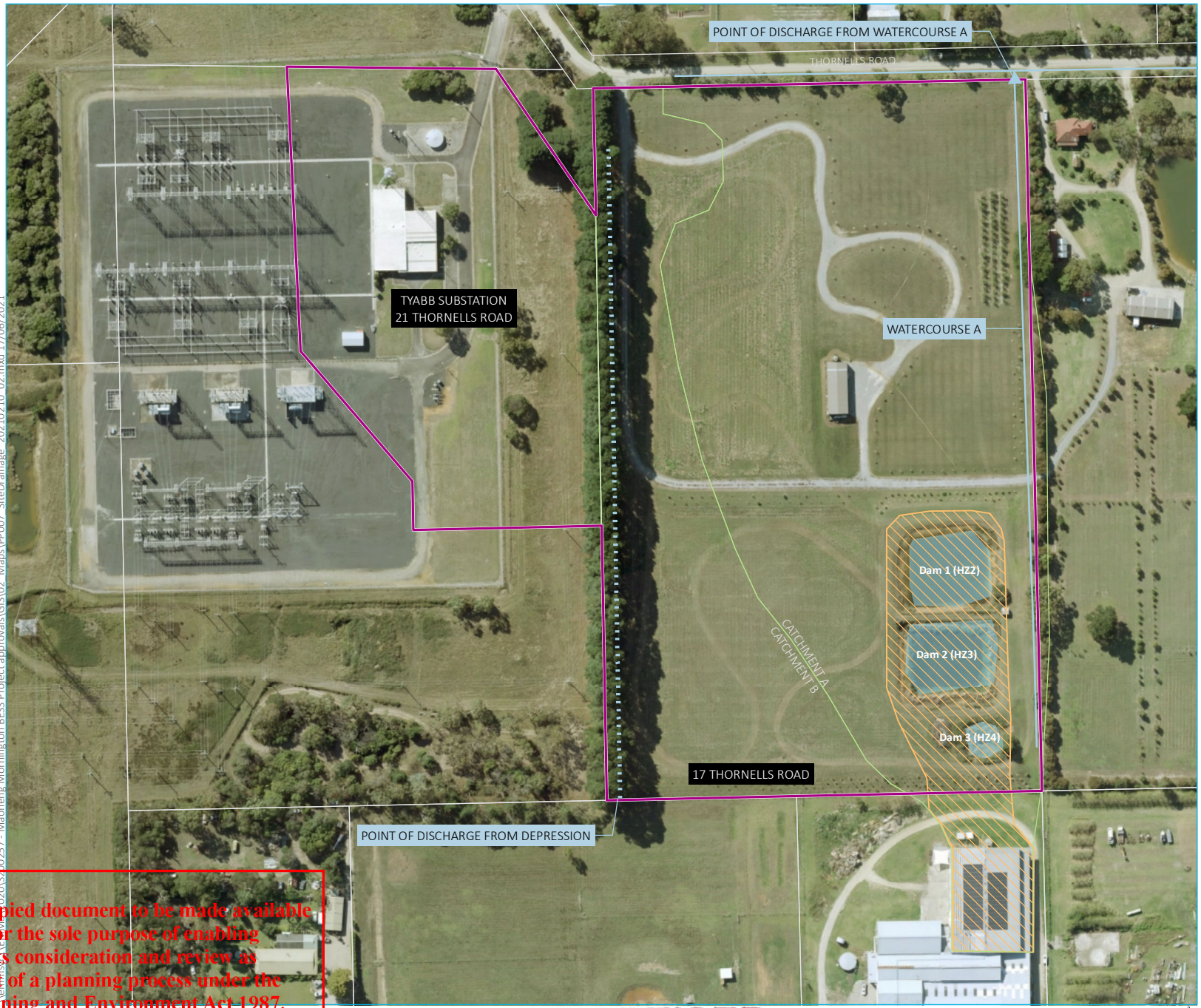

KEY

- Subject site
- Existing watercourse
- Depression along western boundary
- Dam
- Existing catchment
- Catchments controlled by existing dams
- Cadastral boundary

Existing catchments and local waterways

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Figure 6.9

EMM creating opportunities

Source: EMM (2021); Metromap (2021); Maoneng (2020); LCrowfoot (2020); DELWP (2019)

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ii Water quality

No known water quality monitoring data is available for surface water runoff generated within the BESS site. Whilst some limited analysis of water quality has been undertaken on samples taken from within the existing dams, this is unlikely to be representative of general site runoff.

The condition of Olivers Creek is consistent with the characterisation of local waterways as highly modified (WBM 2000) and is likely representative of general background water quality in McKirdys Drain given the similar environmental setting.

iii Groundwater

The project site falls within the Western Port groundwater catchment, with a local depth to groundwater of approximately 5–10 m below ground level (mBGL) and low-to-moderate groundwater salinity (measured as total dissolved solids; TDS) ranging from 1,001–3,500 mg/L (DELWP 2019a). This TDS range places the groundwater in beneficial use segments A2 to C per the SEPP (Waters) with groundwater uses generally suitable for most uses other than for potable (drinking) water supply.

6.3.3 Summary

The project has potential to impact surface water quality, however the recommendations outlined below to be implemented during detailed design will ensure the residual risks to stormwater as a result of the project are minor.

6.3.4 Recommendations

A conceptual approach to water management has been developed to inform the recommendations outlined in Table 6.2. This will be subject to further review as part of Maoneng's future detailed design and form an approval condition of consent.

The proposed water management approach has been developed with consideration of several key objectives consistent with best practice approaches and methods for stormwater management. The proposed approaches are widely adopted for site water management and will be integrated with the proposed site infrastructure during detailed design.

Table 6.2 Water management objectives and approach – detailed design parameters

Water management objectives		Approach
WM_1	Site stormwater will discharge from the site at a legal point of connection.	• The legal point of connection is assumed to be along the northern boundary of the BESS site at the location where Watercourse A discharges from the site. This will be confirmed with MPS Council as part of detailed design.
WM_2	Avoid uncontrolled discharge from site of stormwater generated on developed areas.	• Adopt a site grading that falls generally to the north-east towards the assumed legal point of connection for the BESS site (refer WM_1). • Avoid concentration of stormwater runoff draining across southern and western site boundaries of the BESS site.
WM_3	Retain the existing dams in their present form and function.	• No proposed works that will impact on the existing dam structures, contributing catchment area and discharge arrangements.

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Table 6.2 Water management objectives and approach – detailed design parameters

Water management objectives		Approach
WM_4	Minimise the extent of new hardstand/impervious areas to reduce the additional volume of stormwater generated on site.	• Maximise retention of existing grassed/vegetated areas. • Maximise use of gravel and/or other more permeable surfaces in lieu of hardstand/impervious treatments (eg for access road and areas surrounding battery infrastructure). • Minimise surface disturbance to transmission line tower establishment only on the existing Tyabb substation site (21 Thornells Road).
WM_5	Provide stormwater collection and conveyance systems to control stormwater generated on developed areas.	• All drainage systems to direct runoff to the assumed legal point of connection for the BESS site (refer WM_1) and the existing Tyabb substation connection for the transmission line. • Grassed swale drains to be used within the BESS site to the extent practicable. • Piped drainage systems and/or concrete lined open drains to be used only where necessary.
WM_6	Promote on-site infiltration of stormwater where feasible and practical, to minimise the need for flow and water quality management measures.	• Feasibility of stormwater infiltration at the BESS site to be confirmed based on further soil investigation/testing during detailed design stage.
WM_7	Provide water quantity controls to ensure peak flow rates discharging from site are not increased for all events up to and including 100 year average occurrence interval (ARI).	• Where feasible, the following measures should be implemented to minimise changes to peak flow rates: – Maximise retention of grassed areas and minimise increase in imperviousness (WM_4). – Grassed swale drainage systems promoting physical screening of mobilised sediments and infiltration of stormwater into soils (WM_5). – Infiltration of stormwater (WM_6). – Use of localised depression storages in site grading to attenuate flows. • If necessary, additional stormwater detention at the BESS site could be provided in the form of an onsite stormwater detention (OSD) basin in the north-east corner of site to attenuate flows for events up to 100 year ARI. The need for a basin, and associated sizing, will be confirmed during detailed design.
WM_8	Provide water quality controls that collectively meet industry standard pollutant load reductions as follows: • 70% reduction in gross pollutants. • 80% reduction in total suspended solids. • 45% reduction in total phosphorous. • 45% reduction in total nitrogen.	• The following measures will be implemented to work towards pollutant load reduction targets: – Maximise retention of grassed areas and minimise increase in imperviousness (WM_4). – Grassed swale drains to be used to the extent practicable (WM_5). – Infiltration of stormwater (WM_6). • If necessary, a bioretention basin could be provided in the north-east corner of the BESS site to achieve further pollutant load reductions. This could be configured as a dual-purpose basin (ie combined with OSD functionality per WM_7) if required. The need for a basin, and associated sizing supported by MUSIC modelling, will be confirmed during detailed design.

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Table 6.2 Water management objectives and approach – detailed design parameters

Water management objectives		Approach
WM_9	Specific stormwater management measures will be provided for the substation area.	• Measures, based on relevant EPA Victoria guidelines (EPA Publication 1698 and 1700), will include: – diversion of clean runoff away from potentially oil-contaminated areas; – bunding of potentially oil contaminated areas; and – provision of appropriate stormwater treatment devices to remove oil/grease, hydrocarbons and sediment from runoff prior to discharge.
WM_10	Minimise site water requirements. Maximise reuse of stormwater and other water sensitive strategies to lower demand from external sources.	• Water demand for operational purposes is negligible. Potable connection to mains supply is assumed for minor/incidental use. • Stormwater harvesting for reuse is therefore not practical and will not be considered.

Water management will be further refined by Maoneng during detailed design, including consideration of any additional planning permit requirements and advice in relation to the *Flood Prone Land Application*.

The following recommendations are made for mitigation and management measures to be included as part of the CEMP, inclusive of a stormwater management plan:

- Address land disturbance activities, soil erosion hazard and subsequent risks to downstream water quality.
- Apply best practice erosion and sediment controls as defined in IECA (2008) and relevant EPA Victoria guidelines.
- Aim to minimise the extent of disturbance and soil exposure at any time.
- Encourage progressive revegetation or stabilisation of disturbed areas.
- Consider methods for topsoil management to assist revegetation.
- Implement procedures for hazardous material storage and spill management as defined in relevant EPA Victoria guidelines.
- Consider weather preparedness and response planning.
- Identify requirements for monitoring and maintenance of water management and drainage systems.

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6.4 Noise and vibration

Maoneng engaged EMM to undertake a noise and vibration assessment of the proposed project[7]. The key objectives of the assessments were to:

- characterise the existing noise environment;
- assess potential noise and vibration impacts resulting from the BESS site; and
- provide recommendations to prevent or minimise any impacts.

A copy of the noise and vibration assessment is provided as Appendix G and the results are summarised below.

6.4.1 Methodology

The methodology is described in detail in Appendix G and is summarised below. The noise and vibration assessment has been prepared in accordance with the guidelines and the assessment criteria specified in the following:

- Construction noise:
  - *EPA publication 1254 - Noise control guidelines* (NCG) (EPA 2008).
- Construction vibration:
  - *EPA publication 1834 – Civil construction, building and demolition guide (CCBDG)* (EPA 2020).
  - *German Standard DIN 4150 Part 2 1999*.
  - *British Standard 6472 – 2008, Evaluation of human exposure to vibration in buildings (1-80Hz).*
  - *Australian and New Zealand Environment Council, Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC 1990).
- Operations noise:
  - *State Environment Protection Policy – Control of Noise from Commerce, Industry and Trade No. N-1 (SEPP N-1) (Victorian Government, 1989); and*
  - *Noise from Industry in Regional Victoria (NIRV): Recommended maximum noise levels from commerce, industry and trade premises in regional Victoria (EPA publication 1411) (EPA Victoria, 2011).*
- Road traffic noise:
  - Vic Roads, *Traffic noise reduction policy* (TNRP), (VR 2005).

[7] The scope of the noise and vibration impact assessment was limited to the proposed BESS site (17 Thornells Road) with the associated transmission line connection to the existing Tyabb substation (21 Thornells Road) not changing the results of the assessment, given the low operating noise emissions associated with a transmission line.

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6.4.2 Existing environment

The nearest representative noise sensitive locations to the proposed BESS site are shown in Table 6.3 and in Table 6.9. They are referred to in this report as assessment locations.

Table 6.3 Noise assessment locations

ID	Address	Classification	Easting	Northing
R1	20 Thornells Road, Tyabb	Residential	342863	5763009
R2	22-26 Thornells Road, Tyabb	Residential	342806	5763059
R3	15 Dandenong-Hastings Road, Tyabb	Residential	342526	5763147
R4	11 Dandenong-Hastings Road, Tyabb	Residential	342328	5762887
R5	94 Denham Road, Tyabb	Residential	342297	5762543
R6	90 Denham Road, Tyabb	Residential	342479	5762517
R7	66 Denham Road, Tyabb	Residential	342734	5762589
IN1	3/36 Denham Road, Tyabb	Industrial	343013	5762647
R8	36 Denham Road, Tyabb	Residential	343050	5762521
R9	15 Thornells Road, Tyabb	Residential	343053	5762950
R10	13 Thornells Road, Tyabb	Residential	343152	5762938
R11	14 Thornells Road, Tyabb	Residential	343115	5763015
R12	16 Thornells Road, Tyabb	Residential	343026	5763046

Note: GDA 94 MGA Zone 55

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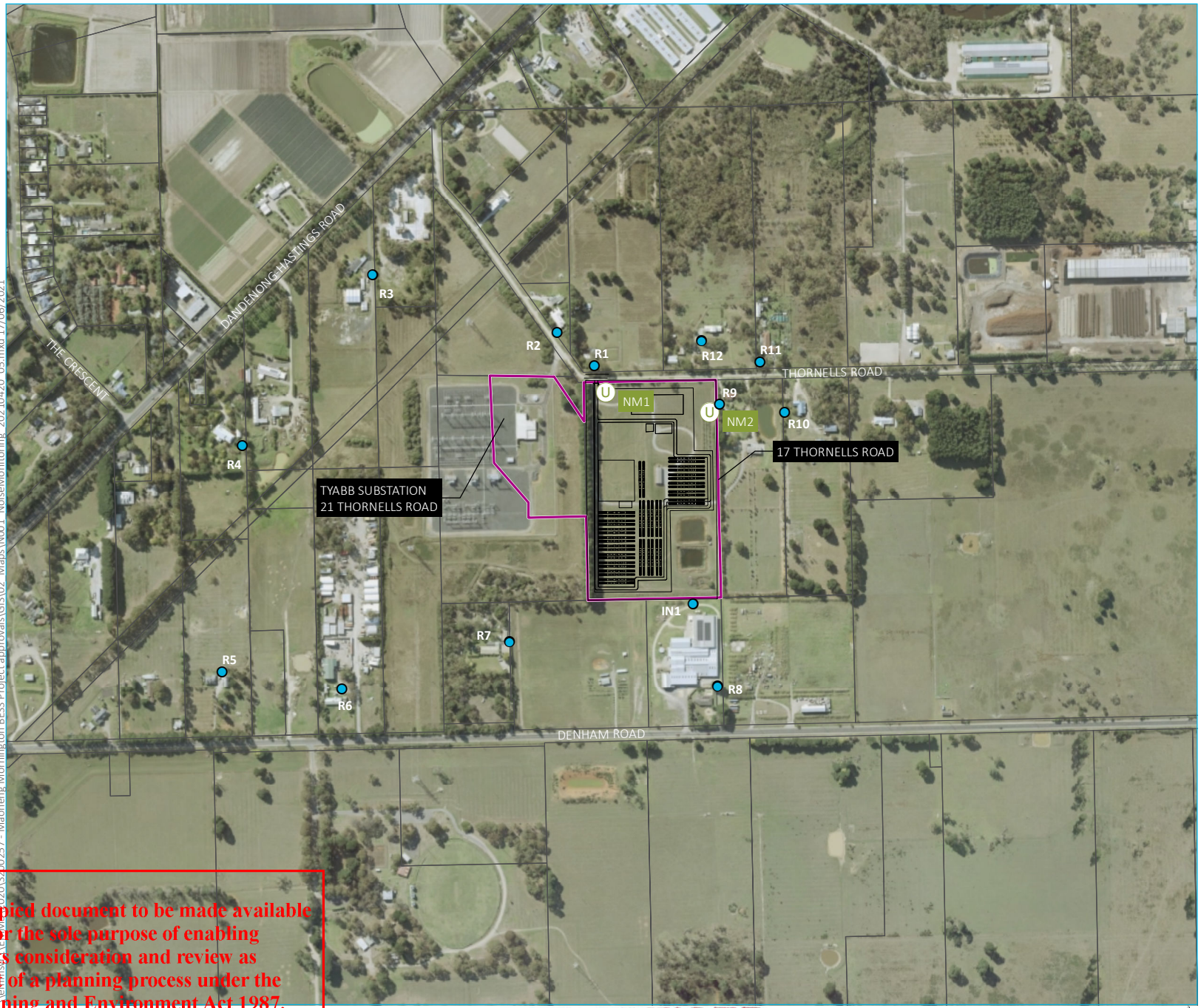

KEY

- Subject site
- Site layout
- Noise assessment location
- Noise monitoring location - unattended
- Cadastral boundary

Source: EMM (2021); Metromap (2021); Maoneng (2021); DELWP (2019); GA (2011)

0 150 300 m

GDA 1994 MGA Zone 55

N

Noise monitoring and assessment locations

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Mornington BESS
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Figure 6.10

EMM creating opportunities

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6.4.3 Construction phase impacts

Construction phase traffic is outlined in Table 6.1 in relation to the traffic impact assessment. Typical construction plant and equipment and their associated noise levels are detailed in Table 6.4.

Table 6.4 Typical construction plant and equipment

Description	Equipment	Quantity	Item $L_{Aeq,15min}$ [8]	Overall $L_{Aeq,15min}$
Stage 1 – Site establishment	Dozer	2	110	119
	Grader	1	104	
	Excavator	2	107	
	Roller	1	116	
	Bobcat	2	103	
	Front End Loader	1	107	
	Road truck (deliveries)	2	106	
	Concrete truck	2	106	
	Drilling Rig SM 14	1	106	
	Light vehicle	4	76	
Stage 2 – Delivery of BESS and transmission line infrastructure	Road truck (deliveries)	2	106	113
	Light vehicle	4	76	
	Crane	2	106	
	Forklift	2	106	
	Hand tools	2	80	
Stage 3 – Installation of BESS and transmission line infrastructure	Road truck (deliveries)	2	106	111
	Light vehicle	4	76	
	Crane	2	106	
	Hand tools	2	80	

1. Standard hours: Monday to Friday 7 am to 6 pm, Saturday 7 am to 1 pm and no construction work on Sundays or public holidays.
2. Plant and equipment items have been assumed to operate continuously in any 15-minute period unless otherwise specified.
3. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am Monday to Saturday; 10 pm to 8 am Sundays and public holidays.

i Vibration

As the closest residence (R1 and R9) are located approximately 70 m away from construction activities, vibration impacts associated with the construction phase are considered unlikely.

Assuming the recommendations outlined in Section 6.4.6 below are implemented, damage associated with vibration impacts from construction is considered unlikely.

8 Equivalent average noise energy over 15 minutes. Measured in dB decibels

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ii Noise

Assuming the recommendations outlined in Section 6.4.6 below are implemented, no adverse noise impacts are expected at any of the assessment locations during construction (Figure 6.11).

Construction is to be conducted during normal hours of 7am to 6pm Monday to Friday and 7am to 1pm Saturday.

Where works outside of normal hours are unavoidable, noise would be managed in accordance with the noise limits of the NCG Section 2. Works outside of normal hours would typically require approval from the relevant regulatory authority and be justified with specialist acoustic assessment of the proposed works to be undertaken.

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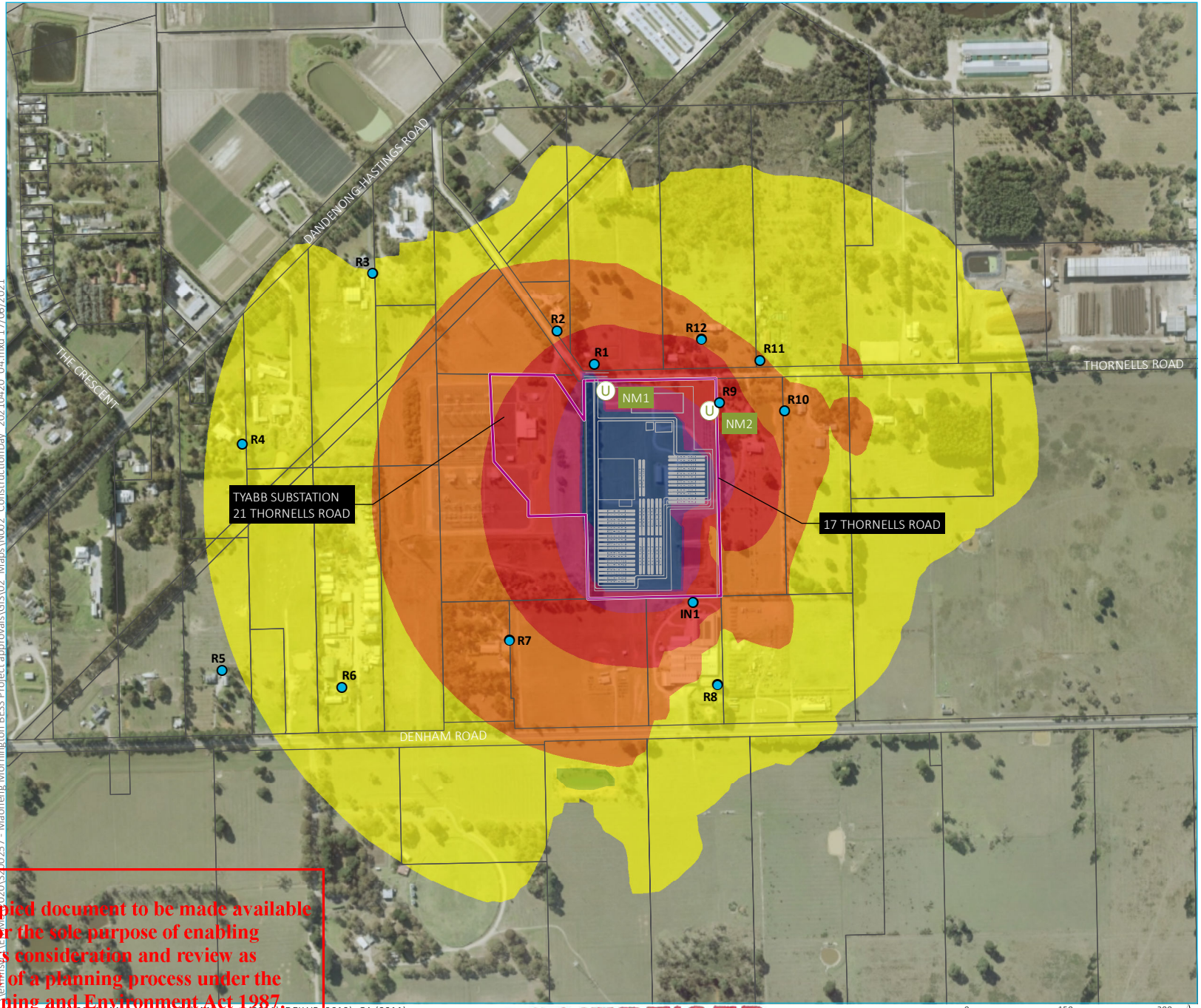

KEY

- Subject site
- Site layout
- Cadastral boundary
- Noise assessment location
- Noise monitoring location - unattended

Day period noise level contour range ($dB_{LAeq,15min}$)

- < 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- > 75

Source: EMM (2021); Metromap (2021); Meoneng (2021); DELWP (2019); GA (2011)

0 150 300 m

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N

Construction noise contours, day, ISO 9613

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Figure 6.11

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iii Road traffic

Assessment of day ($L_{A10,18hour}$) [9] construction traffic predictions confirm compliance with the $L_{A10,18hr}$ criterion of 63 decibels (dB) for road segments to be used by construction vehicles associated with the BESS. The assessment also confirmed that existing road traffic noise levels on Thornells Road will not increase by 12 dB or more.

6.4.4 Operations phase impacts

i Noise

Prediction of single point operational noise levels are provided in Table 6.5, Figure 6.12 and Figure 6.13. The levels presented for each assessment location represents the energy-average noise level over a 15-minute period and assumes all plant operating concurrently under ISO9613 [10] noise enhancing conditions.

The inputs for this assessment layers worst case scenario design inputs, worst case scenario operating procedures and worst-case environmental conditions. It therefore models a scenario of the largest system size using equipment with the highest noise emissions, charging at the fastest rate in a downwind event.

Noise modelling been undertaken in accordance with the *Publication 1411, Noise from industry in regional Victoria* (EPA 2011) (NIRV).

NIRV noise levels are satisfied at all assessment locations during day.

Notwithstanding the selection of plant and equipment on acoustic performance and the provision of strategically located absorptive faced acoustic barriers on the site surrounding the battery cubicles, during the evening noise exceedances of up to 2 dB are predicted for R9. Whilst during the night exceedances are predicted at a R9 (+3 dB) and marginally at R12 (+1 dB).

During Maoneng's detailed design phase all plant and equipment will be reviewed to ensure NIRV noise levels can be achieved through either:

- selection of plant and equipment;
- site layout and orientation of equipment;
- provision of acoustic barrier four metres in height;
- utilisation and operational procedures consistent with the assumptions in this NVIA; or
- a combination of the above measures.

9 LA10 is a weighted noise level exceeded for 10% of the measurement/assessment time, 18hrs in this instance

10 ISO 9613-1:1993 Acoustics – Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere.

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Table 6.5 Predicted operational noise levels – ISO9613

Assessment location	Classification	Period	NIRV NL, dB	Predicted noise level, dB $L_{Aeq,15min}$	Satisfies NIRV NL Y/N (dB)
R1	Residential	Day	53	45	Y
		Evening	48	45	Y
		Night	44	42	Y
R2	Residential	Day	53	43	Y
		Evening	48	43	Y
		Night	44	40	Y
R3	Residential	Day	53	37	Y
		Evening	48	37	Y
		Night	43	34	Y
R4	Residential	Day	53	37	Y
		Evening	48	37	Y
		Night	43	34	Y
R5	Residential	Day	53	33	Y
		Evening	48	33	Y
		Night	43	31	Y
R6	Residential	Day	53	36	Y
		Evening	48	36	Y
		Night	43	33	Y
R7	Residential	Day	53	42	Y
		Evening	48	42	Y
		Night	43	39	Y
IN1	Industrial	Day	56	51	Y
		Evening	51	51	Y
		Night	46	47	n/a
R8	Residential	Day	53	41	Y
		Evening	48	41	Y
		Night	43	38	Y
R9	Residential	Day	53	47	Y
		Evening	48	47	Y
		Night	43	**44**	N (+1)
R10	Residential	Day	53	43	Y
		Evening	48	43	Y
		Night	43	40	Y
R11	Residential	Day	53	42	Y
		Evening	48	42	Y
		Night	43	39	Y
R12	Residential	Day	53	45	Y
		Evening	48	45	Y

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Table 6.5 Predicted operational noise levels – ISO9613

Assessment location	Classification	Period	NIRV NL, dB	Predicted noise level, dB $L_{Aeq,15min}$	Satisfies NIRV NL Y/N (dB)
		Night	43	42	**Y**

Note: Exceedances of NIRV NL shown in **bold**.
Day/Evening – 100% capacity utilisation
Night – 60% capacity utilisation

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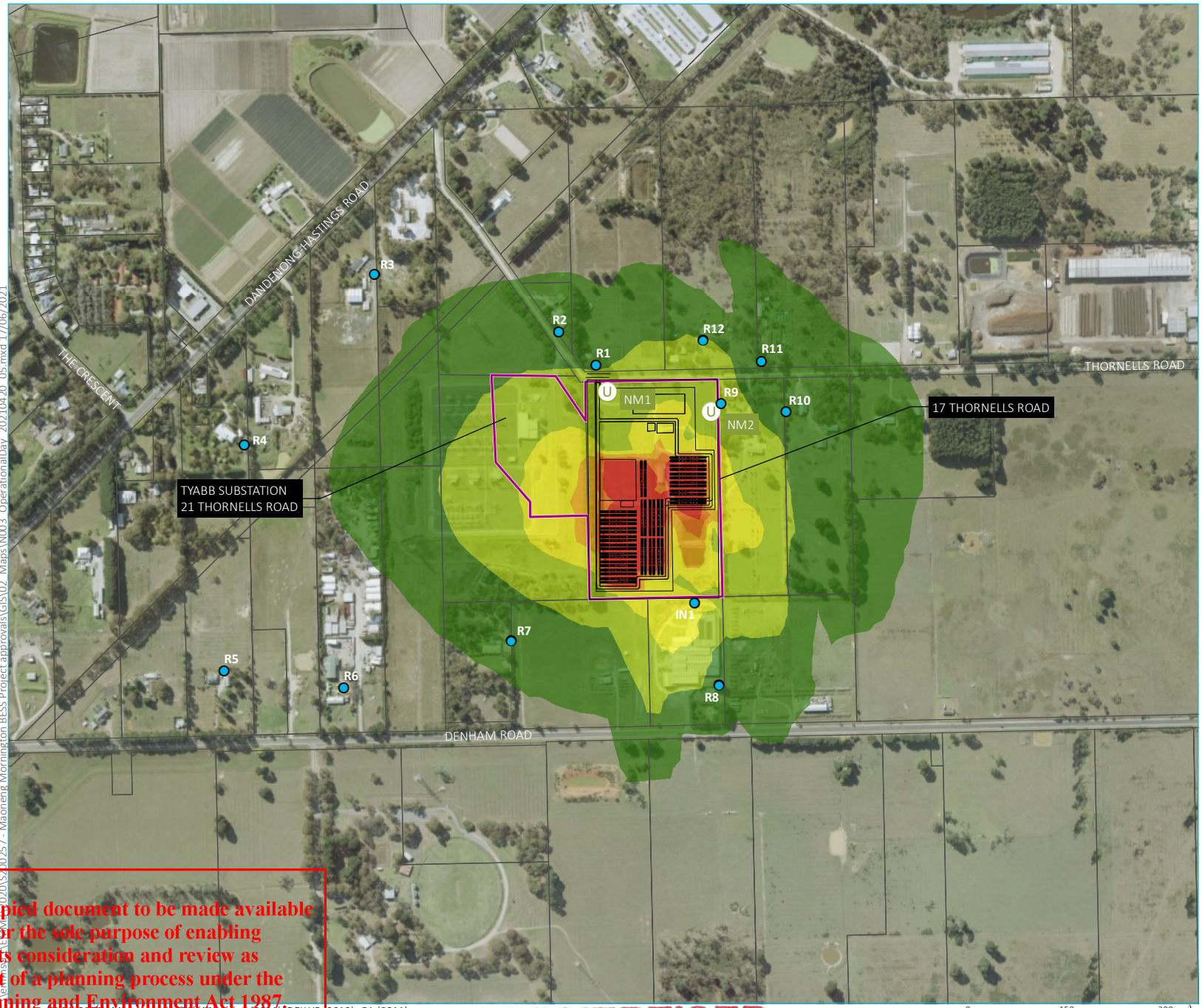

KEY

- Subject site
- Site layout
- Cadastral boundary
- Noise assessment location
- Noise monitoring location - unattended

Day period noise level contour range ($dB_{LAeq,15min}$)

- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

Source: EMM (2021); Metromap (2021); Maoneng (2021); DELWP (2019); GA (2011)

0 150 300 m

GDA 1994 MGA Zone 55

N

Operational noise contours, day/evening, ISO 9613

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Figure 6.12

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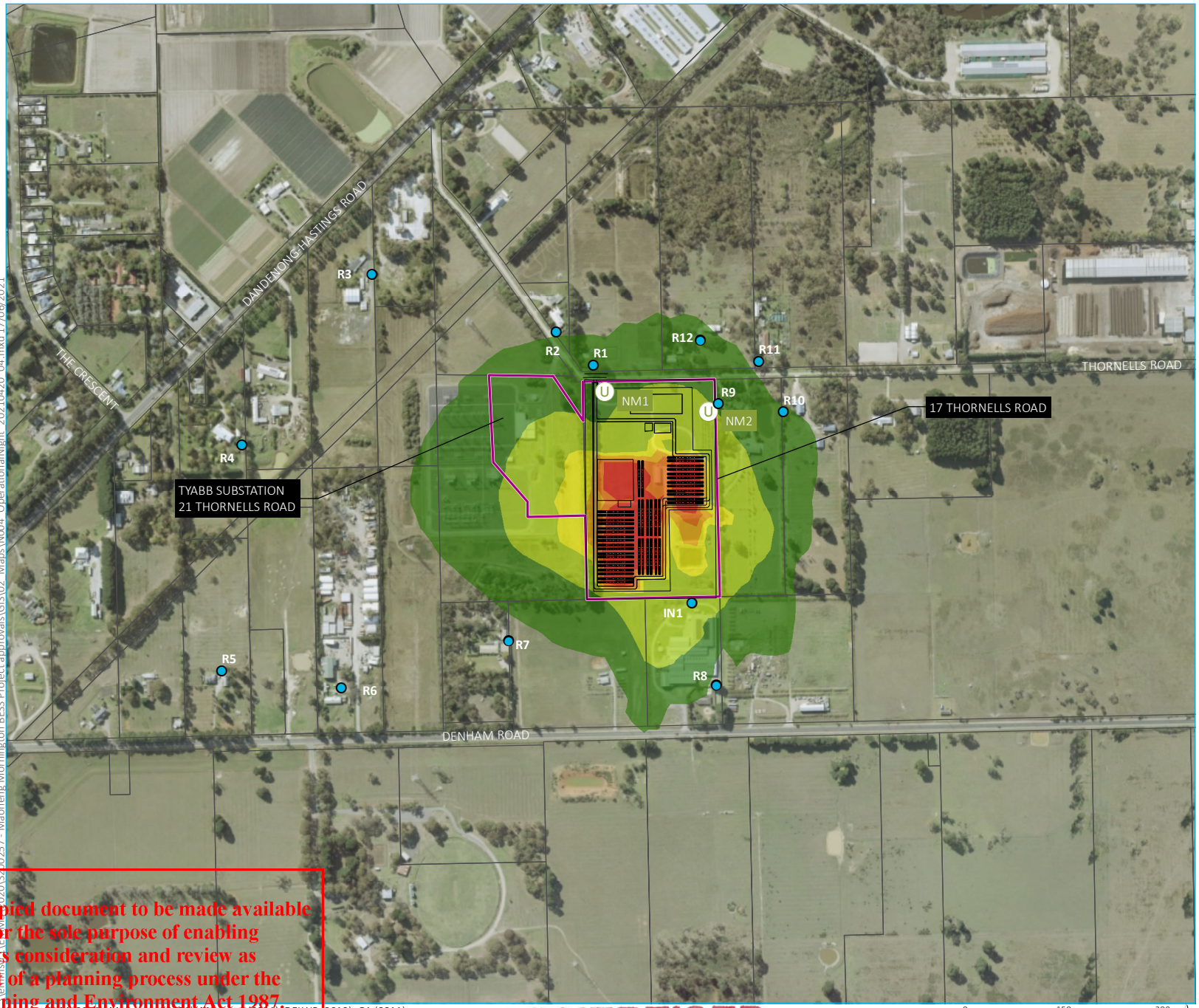

KEY

- Subject site
- Site layout
- Cadastral boundary
- Noise assessment location
- Noise monitoring location - unattended

Night period noise level contour range ($dB_{LAeq,15min}$)

- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

Source: EMM (2021); Metromap (2021); Maoneng (2021); DELWP (2019); GA (2011)

0 150 300 m

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N

Operational noise contours, night, ISO 9613

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Figure 6.13

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6.4.5 Summary

i Vibration

As the closest residences are more than 70 m away from construction activities, vibration impacts associated with the construction phase are considered unlikely.

Assuming the recommendations outlined below are implemented, damage associated with vibration impacts from construction is considered unlikely.

No significant vibration impact will be associated with the operations phase.

ii Noise

Assuming the applicable recommendations are implemented, no adverse noise impacts are expected at any of the assessment locations during construction.

Operational noise associated with the BESS has confirmed compliance with NIRV requirements for all sensitive receiver locations during the daytime and evening. Notwithstanding the selection of plant and equipment on acoustic performance and the provision of strategically located acoustic barriers on the site surrounding the battery cubicles, during the night a negligible noise exceedance of 1 dB is predicted for R9. Assessment location R9 forms part of the project and an agreement between the proponent and the owner of R9 would be sought to address the residual noise impacts.

The data provided for this assessment layers worst case scenario design inputs with worst case scenario operating procedures (100% and 60% based on validated utilisation data from similar facilities at Ballarat and Hornsdale) under worst case environmental conditions. This is to say it models a scenario of the largest system size using equipment with the highest noise emissions charging at the fastest rate in a downwind event.

The resultant noise modelling has predicted the potential for a negligible technical 1 dB exceedance at R9 at night during 60% utilisation, at 50% utilisation compliance is predicted for R9. Assessment location R9 forms part of the project and an agreement between the proponent and the owner of R9 would be sought to address the residual noise impacts.

During the detailed design phase of the project all plant and equipment will be reviewed to ensure noise levels predicted in this NVIA can be achieved through either:

- selection of plant and equipment;
- site layout and orientation of equipment;
- provision of acoustic barrier four metres in height;
- utilisation and operational procedures consistent with the assumptions in this NVIA; or
- a combination of the above measures.

Project-related road traffic noise levels are predicted to satisfy TRNP assessment requirements for Dandenong Hastings Road and Thornells Road for peak site traffic movements during the construction period.

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6.4.6 Recommendations

i Construction phase

The following recommendations are made for mitigation and management measures to be included as part of the CEMP:

- Measure construction noise levels at early stages to validate the predicted construction noise levels.
- Re-evaluate the predicted construction noise levels at assessment locations, and where required review noise management and mitigation measures to reduce levels where practical. This may include (but is not limited to):
  - use of the lowest-noise work practices and equipment that meet the requirements of the job;
  - positioning site buildings, access roads and plant such that the minimum disturbance occurs to the locality. Barriers such as hoardings or temporary enclosures should be used. The site should be planned to minimise the need for reversing of vehicles;
  - ensuring all mechanical plant is silenced using the best practical means using current technology. Mechanical plant, including noise-suppression devices, should be maintained to the manufacturer's specifications. Internal combustion engines are to be fitted with a suitable muffler in good repair;
  - fitting all pneumatic tools operated near a residential area with an effective silencer on their air exhaust port;
  - installing less noisy movement/reversing warning systems for equipment and vehicles that will operate for extended periods, during sensitive times or in close proximity to sensitive sites. Occupational health and safety requirements for use of warning systems must be followed;
  - turning off plant when not being used;
  - ensuring all vehicular movements to and from the site to only occur during the scheduled normal working hours, unless approval has been granted by the relevant authority;
  - where possible, no truck associated with the work should be left standing with its engine operating in a street adjacent to a residential area;
  - special assessment of vibration risks that may be needed, such as for pile-driving or works structurally connected to sensitive premises; and
  - ensuring noise from the site complies with the requirements of the schedule, except for:
    - unavoidable works; and
    - night period low-noise or managed-impact works approved by the local authority.

ii Operations phase

It is recommended that a noise and vibration management plan (NVMP) be prepared to manage impacts during the operational phase of the project.

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The NVMP would describe how operational noise levels would be managed where predicted noise levels above the NIRV noise levels have been identified. The NVMP would address noise mitigation and management to reduce operational noise levels at the potentially most affected assessment location based on the findings of the noise assessment as a minimum.

The NVMP would outline a procedure to:

- measure operational noise levels at early stages during commissioning or within 3 months of operation to validate the predicted operational noise levels; and
- re-evaluate the predicted operational noise levels at assessment locations, and where required review noise management, mitigation measures and site management to reduce levels where required. This may include (but is not limited to):
  - provision of additional acoustic barriers;
  - selecting quieter equipment; and
  - measuring operational noise levels at assessment locations, especially during the evening and night-time period, if relevant, and implementing further noise management and mitigation measures where an exceedance of NIRV noise levels is identified.

Affected landholders should be consulted prior to commencement of operation where an exceedance of NIRV noise levels has been predicted and should be notified of proposed mitigation measures that will be used to manage operational noise levels.

With effective implementation of plant and equipment selection, acoustic barriers and battery utilisation strategies, operational noise can be managed to meet the NIRV noise level requirements for all sensitive assessment locations.

6.5 Landscape character and visual impact

EMM engaged Hemisphere Design to undertake a landscape character and visual impact assessment. The purpose of the assessment was to:

- characterise the existing landscape character;
- assess the existing landscape character's sensitivity to visual change;
- identify potentially sensitive receptors;
- assess potential impacts to landscape character and visual amenity; and
- provide recommendations for minimising visual impacts.

A copy of the landscape and visual impact assessment is provided as Appendix H and the results are outlined below.

6.5.1 Methodology

The assessment was undertaken in accordance with the Landscape Institute and Institute of Environmental Management and Assessment *Guidelines for Landscape and Visual Impact Assessment (Third Edition)* (2018).

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i Overview

A desktop study was undertaken using Google Earth, onsite photography and drone photography captured on 7 September 2020 to identify the zone of theoretical visual influence (ZTVI). A ZTVI is defined as the geographical area that project-related visual impacts could potentially be discerned. A two-kilometre radius from the proposed site was considered an appropriate ZTVI for this assessment.

Within the ZTVI seven publicly accessible viewpoints were identified, namely VP 01 to VP 07 (Chapter 6.5.3).

The assessment then established the areas within the ZTVI where the project is not likely to be visible, due to existing topography, built form and other physical barriers. This area is referred to as the 'visibility shadow' (Figure 6.15).

Subsequent onsite photography was taken from the seven viewpoints to substantiate and corroborate the initial findings of the desktop study.

The assessment then identified sensitive receptors and assessed the likely visual impact from each of these receptors.

Note, impacts to visual amenity during the construction phase will comprise the presence of construction equipment in the northern portion of the site, earthworks, and an increase in light and heavy traffic. These impacts are considered to be minor and as they will be temporary (nine months), have not been assessed in detail.

ii Rating definitions

Ratings relating to visual impact are outlined in Table 6.7.

Table 6.6 Visual impact rating definitions

Rating	Definition
Substantial adverse impact	Where the BESS will cause a significant deterioration in the existing view.
Moderate adverse impact	Where the BESS will cause a noticeable deterioration in the existing view.
Slight adverse impact	Where the BESS will cause a barely perceptible deterioration in the existing view.
Slight beneficial impact	Where the BESS will cause a barely perceptible improvement in the existing view.
Moderate beneficial impact	Where the BESS will cause a noticeable improvement in the existing view.
Substantial beneficial impact	Where the BESS will cause a significant improvement in the existing view.
No change	No discernible deterioration or improvement in the existing view.

Ratings relating to scenic quality are outlined in Table 6.7.

Table 6.7 Scenic quality rating definitions

Rating	Definition
High scenic quality	Areas and localities which exhibit an exceptionally strong positive character with valued features which combine to give an experience of unity, richness and harmony. Within this definition 'exceptional' could apply where an area is also deemed to be worthy of a legislative designation, for example a national park.
Moderate scenic quality	Areas which exhibit a strong positive character with valued features with evidence of a visually acceptable level of alteration/degradation/erosion resulting in a location of more mixed character.

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Table 6.7 Scenic quality rating definitions

Rating	Definition
Low scenic quality	Areas with a generally positive character with fewer valued features with evidence of a visually acceptable level of alteration/degradation/erosion resulting in a location of more mixed character.
No scenic quality	Areas with a little or no positive character with few or no valued features with evidence of a visually unacceptable level of alteration/degradation/erosion resulting in a highly modified location of little character.

The following definitions have been applied to determine the landscape's sensitivity to change:

- High.
- Medium.
- Low.
- Negligible.

By way of explanation, a landscape that displayed a high sensitivity to change would not be able to absorb a development of this nature without irreparable consequences and impacts on the inherent character and visual amenity.

iii Assumptions

The assessment was undertaken based on the following assumptions:

- The battery containers and all ancillary infrastructure and buildings will be finished in a material and muted colour appropriate to the setting.
- The boundary security will be open mesh style fencing, similar to the adjacent Tyabb substation security fence.
- The acoustic barrier will be erected using precast concrete panels with a likely smooth finish and grey appearance and installed to a height of approximately 4 m.
- Height of modular container infrastructure would be approximately 13 m long, 3 m wide and 3 m high, inverters and transformers housed in modular containers up to 4 m in height, plus 300 mm – 400 mm to account for 1:100-year flooding, if required.
- Electricity will be delivered to and from the onsite BESS HV substation to the adjacent Tyabb substation via a 'worse case' visual scenario which likely comprises of seven 40 m high latticed transmission towers carrying overhead 220 kV transmission lines. The towers will be similar in height and appearance to existing transmission towers connecting to the Tyabb Substation which are prominent within the wider contextual landscape.

6.5.2 Existing landscape

The regional and local landscape is characterised by flat, cleared agricultural land, residential dwellings on large allotments, commercial enterprises, highways and roads (sealed and unsealed).

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The presence of the Tyabb substation is a prominent visual feature in the wider contextual landscape, including the associated transmission towers and network of poles and overhead powerlines (Photograph 6.2).

Photograph 6.2 Tyabb substation (looking north west)

The key visual features within a 2 km radius of the site are outlined below and are shown in Figure 6.14.

The existing landscape is assessed as having low to moderate scenic quality and having low to moderate sensitivity to change.

6.5.3 Viewpoints

Within the ZTVI seven publicly accessible viewpoints were identified, namely VP 01 to VP 07 (Figure 6.14). These viewpoints include views from nearby residential dwellings, views along Thornells Road and Denham Road and from public land. These viewpoints are considered to be representative of the locality.

The landscape character of the locality was assessed based on these seven viewpoints.

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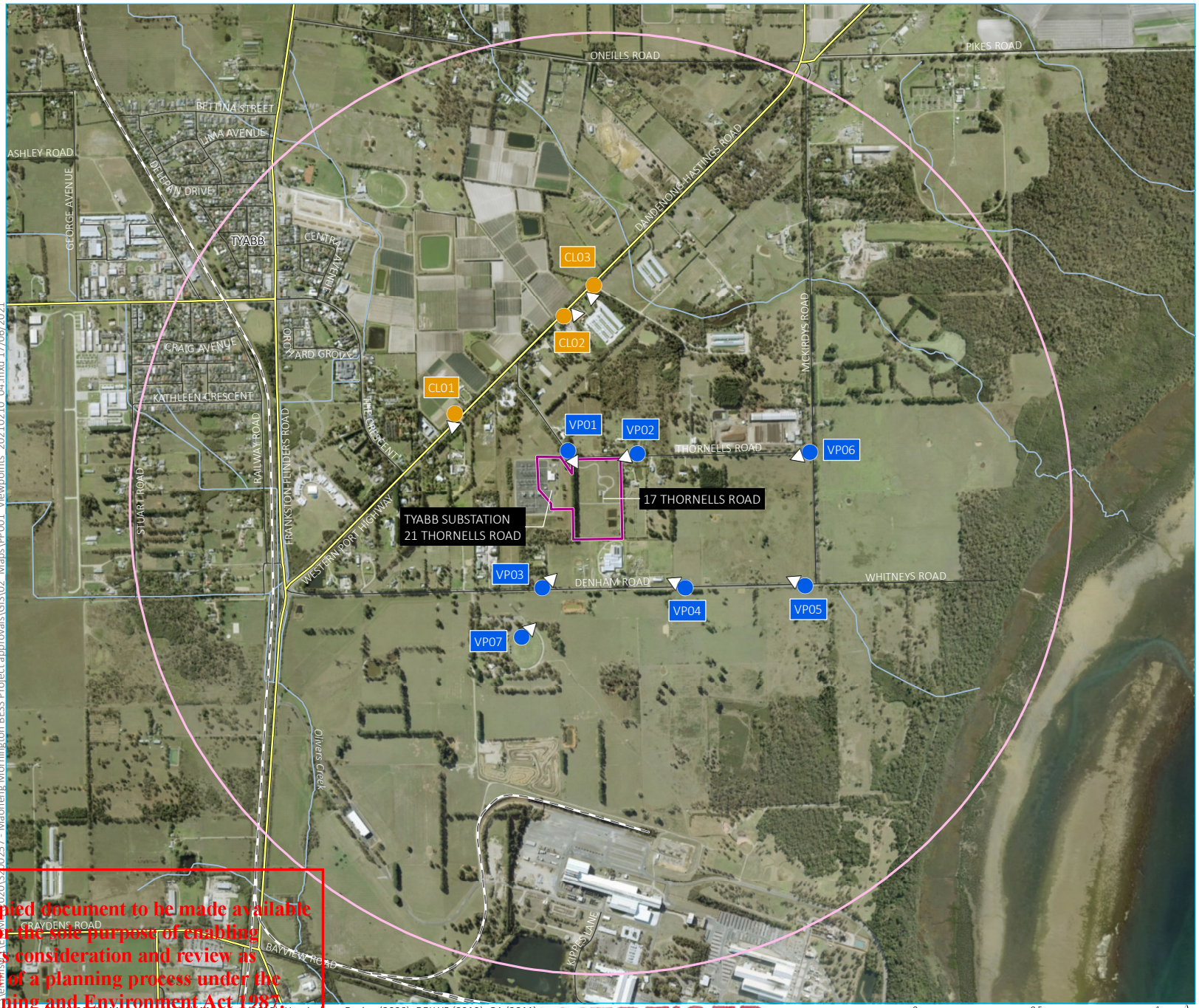

Source: EMM (2021); Metromap (2021); Maoneng (2020); Hemisphere Design (2020); DELWP (2019); GA (2011)

Viewpoints map

Maoneng Australia Pty Limited
Mornington BESS
Planning permit application
Figure 6.14

EMM
creating opportunities

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6.5.4 Sensitive receptors

The seven viewpoints were assessed to identify the presence of sensitive receptors. The following factors were considered when assessing the likely visual impact:

- The visual qualities of the view and the duration and angle of the view in relation to the main activity of the viewer.
- The distance of the viewpoint from the proposed BESS.
- The extent of the area over which the changes will be visible and the scale of the change in the view (loss or addition of features, changes in composition, proportion of view affected).
- The degree of contrast in form, scale, mass, line, height, colour and texture introduced into the view by the proposed BESS.
- The duration and nature of the effect (temporary, permanent, intermittent); which is particularly relevant in this appraisal where the majority of viewers are travellers journeying through the landscape.
- The numbers and types of viewers affected.

The assessment identified the following sensitive receptors/receptor locations (Figure 6.15):

- Sensitive receptor 01 (SR 01), namely a single-storey residential property at 20 Thornells Road within VP 01.
- Sensitive receptor locality 02 (SRL 02), namely the two adjacent single-storey residential properties (15 and 13 Thornells Road) within VP 02.
- SRL 03, namely the entrance to 66 Denham Road (a single-storey residential property) and a number of adjacent locations to the south west of the site along Denham Road within VP 03.

The likely impacts to SR 01, SRL 02 and SRL 03 are described in Table 6.7 and are based on the definitions outlined in Table 6.6 and Table 6.7.

Figure 6.15 also shows that residential property numbers 9, 12, 13, 14, 16, 36 and 66 are within the visibility shadow, meaning the proposed BESS will not be visible from these properties due to topography and/or the other physical barries including but not limited to vegetation and built form.

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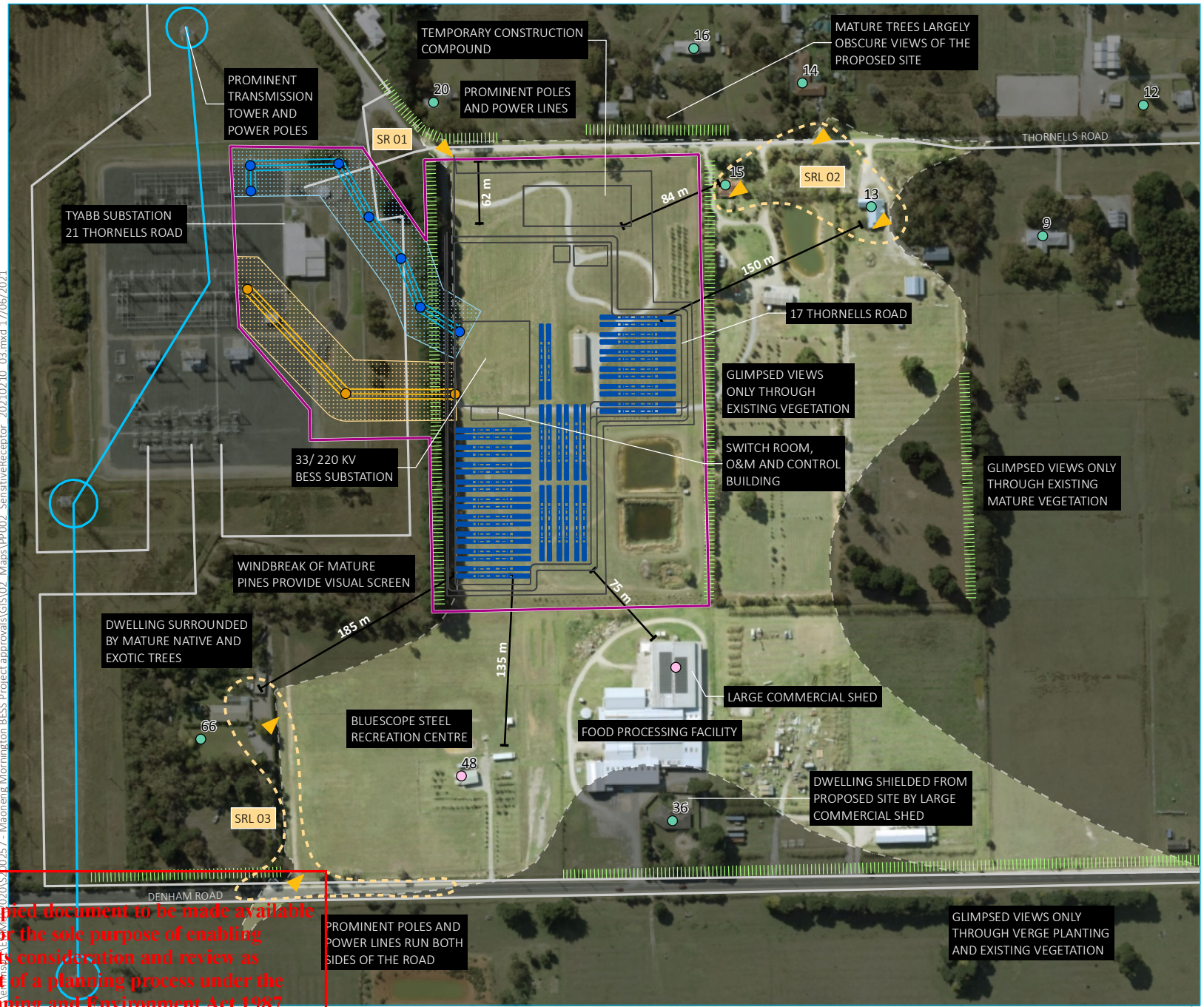

KEY

- Subject site
- Proposed transmission pole
- Proposed transmission tower
- Commercial property
- Residential property
- Sensitive receptor (SR)
- Proposed battery
- Existing 220 kV transmission tower and power line
- Existing 66 kV transmission line and power pole
- Distance to residence
- Sensitive receptor locality (SRL)
- Existing vegetation
- Visibility shadow within 2 km ZTVI

Transmission line

- Option 1 - 66 kV transmission line
- Option 2 - 220 kV transmission line
- Option 1 - 66 kV transmission line easement
- Option 2 - 220 kV transmission line easement

Source: EMM (2021); Metromap (2021); Meoneng (2020); Hemisphere Design (2020); DELWP (2019); GA (2011)

0 150 300 m

GDA 1994 MGA Zone 55

N

Sensitive receptor map

Maoneng Australia Pty Limited
Mornington BESS
Planning permit application
Figure 6.15

EMM creating opportunities

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Table 6.8 Impacts to sensitive receivers

Viewpoint	SR or SRL number	Receiver	Distance to nearest site boundary	Existing scenic quality	Existing mitigating factors	Description of likely impact	Rating of predicted impact	Plates
VP 01	SR 01	Single-storey residential property at 20 Thornells Road	20 m (82 m to nearest project infrastructure)	Low to moderate	The boundary between SR 01 and the site is largely screened with mature trees and shrubs (native and exotic) on the northern side of Thornells Road. Views can be glimpsed through intermittent planting breaks from SR 01 of the Tyabb substation and associated transmission towers, poles and overhead powerlines. Views of the site and further afield to the commercial food processing facility can also be seen.	The site will remain largely screened by the existing vegetation on the northern side of Thornells Road. Where glimpsed views are afforded through the vegetation, it is likely that only the first row of battery containers and one of the new 40 m transmission line towers will be partially visible from SR 01 given the relatively flat north-south orientation of the site and the approximate 60 m buffer between the site boundary and the infrastructure. Glimpsed views of both the proposed control room and operational and maintenance buildings, located forwarded of the acoustic barrier will be visible from Thornells Road through intermittent gaps in planting along the property boundary, as single storey buildings they have a low profile and sit somewhat inconsequentially below the horizon and backdrop of mature tree canopies. The arrangement of 'containers' and associated infrastructure will be largely concealed behind the acoustic barrier, which will be an obvious visual addition to the locality at this receptor, however within the wider contextual landscape views of the BESS will remain largely insignificant where the Tyabb Substation and other large commercial warehouse buildings and structures are generally accepted visual features.	Singularly the likely visual impact will be 'slight adverse to moderate adverse'. When considered as an addition to the modified locality where Tyabb substation is a dominant visual feature the likely cumulative visual impact will be 'no change'.	Plate 6.1 (existing environment) Plate 6.2 (predicted environment)
VP 02	SRL 02	Single-storey residential property at 13 Thornells Road	100 m (150 m to nearest project infrastructure)	Low to moderate	The presence of 15 Thornells Road and two windbreaks comprising mature vegetation forms a visual screen between 13 Thornells Road and the site, allowing only glimpsed views through the vegetation.	As an addition to the modified wider contextual landscape where the existing Tyabb substation is a notable visual feature, the project will be a discernible but inconsequential feature for SRL 02 at 13 Thornells Road. Whilst the proposed 60kV and much larger 220 kV transmission towers will be obvious their presence will be no more notable than the existing 220 kV powerline transmission towers to and from the Tyabb Substation within the locality.	No change to slight adverse.	Plate 6.3 (existing environment) Plate 6.4 (predicted environment) Plate 6.5 (predicted viewshed)
	SRL 02	Single-storey residential property at 15 Thornells Road	15 m (84 m to nearest project infrastructure)	Low to moderate	A windbreak of mature vegetation forms a visual screen between 15 Thornells Road and the site, allowing only glimpsed views through the vegetation. The dwelling does not face the site. The current landowner of 15 Thornells Road is also associated with the development.	The proposed BESS will be a discernible but inconsequential feature within the fore to mid- ground vista sitting below the horizon. As an addition to the modified wider contextual landscape where the existing Tyabb Substation and existing 220 kV transmission towers are notable and incongruous visual features, when viewed from 15 Thornells Drive (the adjacent property) the likely visual impact of the proposed BESS and the upper most latticed framework of three of the proposed 40 m high transmission towers which protrude above the acoustic wall will be moderate adverse. Whilst the proposed control room and operational and maintenance building, located forwarded of the acoustic barrier will be conspicuous and highly visible additions to the locality, as single storey buildings they have a low profile and sit somewhat inconsequentially below the horizon and backdrop of mature tree canopies.	Moderate adverse.	

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Table 6.8 Impacts to sensitive receivers

Viewpoint	SR or SRL number	Receiver	Distance to nearest site boundary	Existing scenic quality	Existing mitigating factors	Description of likely impact	Rating of predicted impact	Plates
VP 03	SRL 03	Adjacent to 66 Denham Road	250 m (260 m to nearest project infrastructure)	Low to moderate	Boundary plantings along Denham Road are sparse, thereby allowing distant views from Denham Road to the site. The view from SRL 03 typically comprises power lines along Denham Road and commercial properties, with the exception of the western view which largely comprises a dense screen of mature pines associated with 66 Denham Road. Views to the site from the single-storey residential dwelling at 66 Denham Road are screened by the dense pine tree windbreak. Extensive planting along the eastern boundary of the residential dwelling at 216 Denham Road is likely to screen the proposed BESS from the dwelling curtilage.	Juxtaposed against a foreground of open grazing paddocks and an expansive horizon the BESS will be a notable addition to the visual landscape. Given the set back from Denham Road, a distance of approximately 210 m, the southern boundary acoustic wall will likely appear as grey, contiguous form running parallel to the eye of the observer over half the southern site boundary. The proposed 220 kV transmission towers will not be visible from this receptor.	Slight adverse.	Plate 6.6 (existing environment) Plate 6.7 (predicted environment)
VP 04	NA	This is a transitory viewpoint along Denham Road.	200 m (250 m to nearest project infrastructure)	Low to moderate	This viewpoint has s a transitory viewpoint along Denham Road and therefore has low sensitivity to change as the observer will be travelling through a locality of low to moderate scenic value. The views from this viewpoint are typical of views from VP 03.		No change to slight adverse.	NA
VP 05	NA	This is a transitory viewpoint along McKirdys Road.	800 m (875 m to nearest project infrastructure)	Low to moderate	This viewpoint has s a transitory viewpoint along McKirdys Road and therefore has low sensitivity to change as the observer will be travelling through a locality of low to moderate scenic value.		No change to slight adverse.	NA
VP 06	NA	This is a transitory viewpoint along Denham Road.	800 m (815 m to nearest project infrastructure)	Low to moderate	This viewpoint has s a transitory viewpoint along Denham Road and therefore has low sensitivity to change as the observer will be travelling through a locality of low to moderate scenic value. The views from this viewpoint are typical of views from VP 03.		No change to slight adverse.	NA
VP 07	NA	Bluescope Steel Recreation Centre.	450 m (460 m to nearest project infrastructure)	Low to moderate	Any potential visual impact from VP 07 will be distant and will be concealed by plantings. The views from this viewpoint are typical of views from VP 03.		No change to slight adverse.	NA

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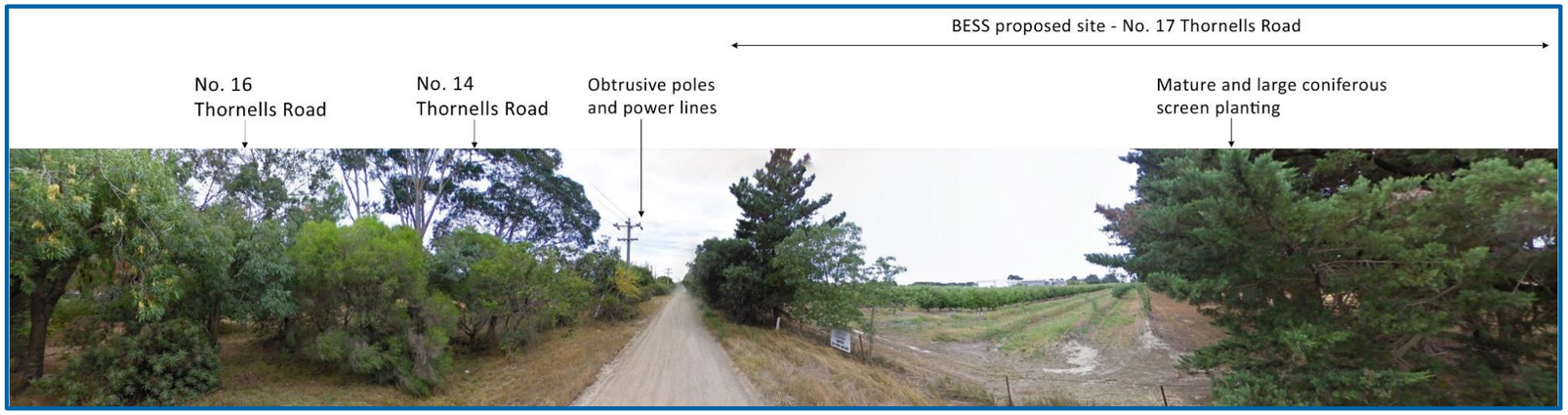

Plate 6.1 Existing environment at SR 01 (20 Thornells Road)

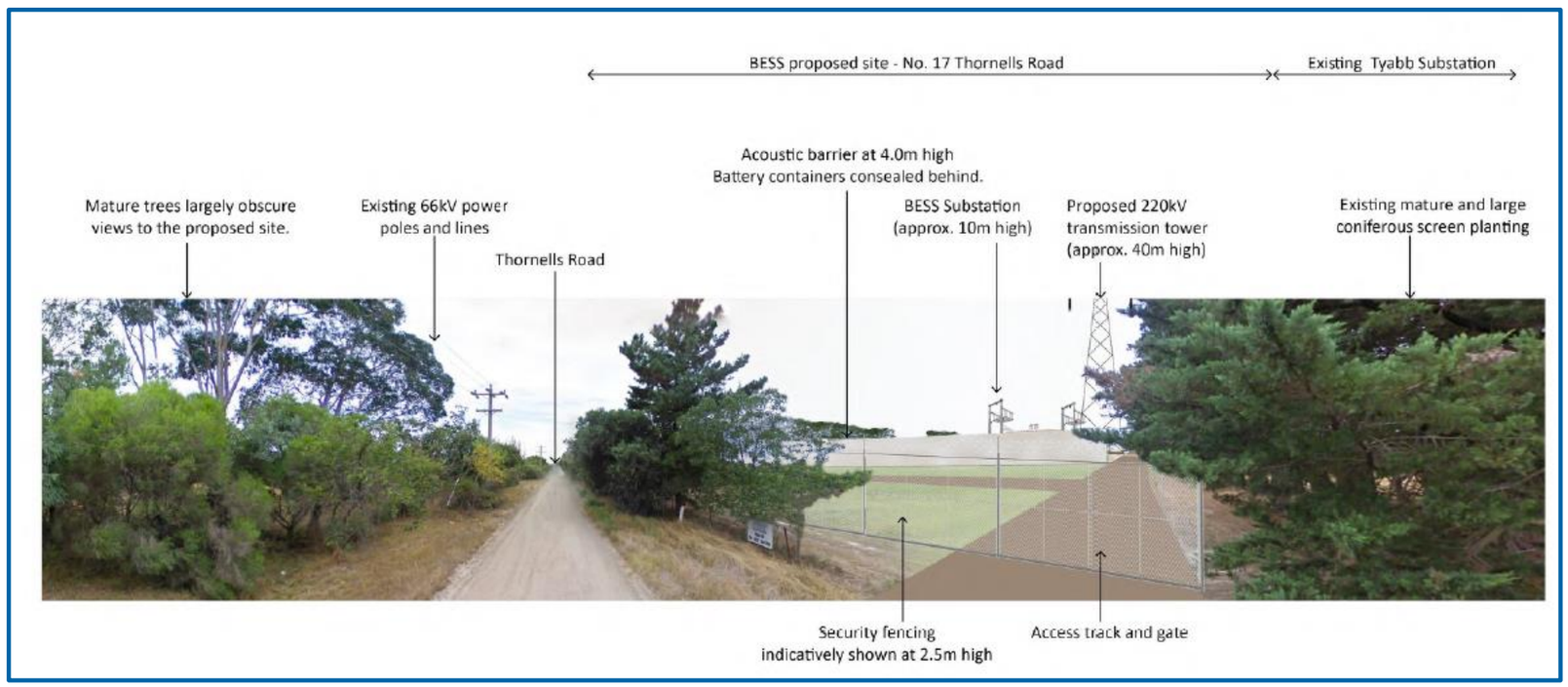

Plate 6.2 Photomontage of predicted environment at SR 01 (20 Thornells Road)

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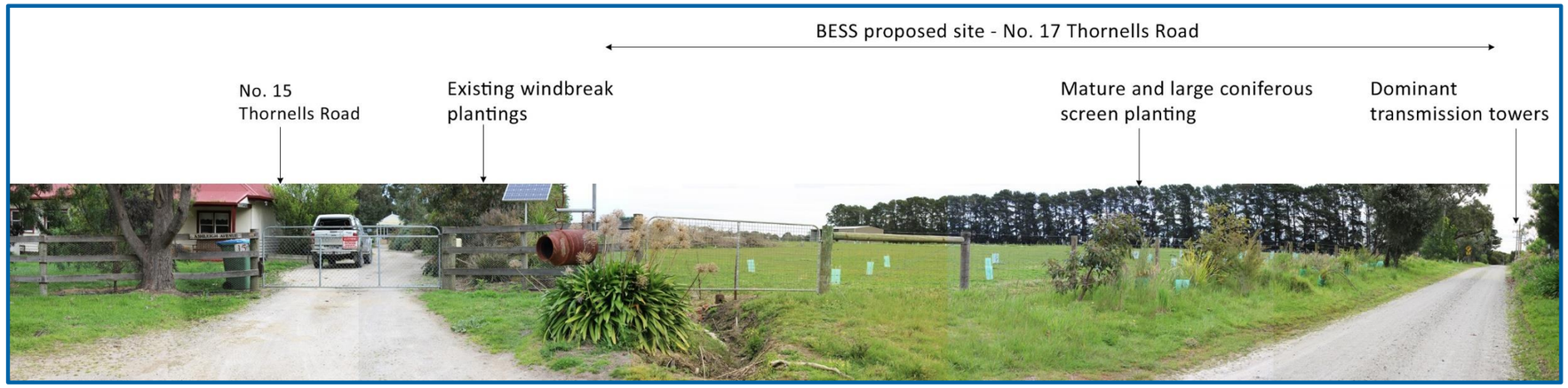

Plate 6.3 Existing environment at SRL 02 (15 Thornells Road)

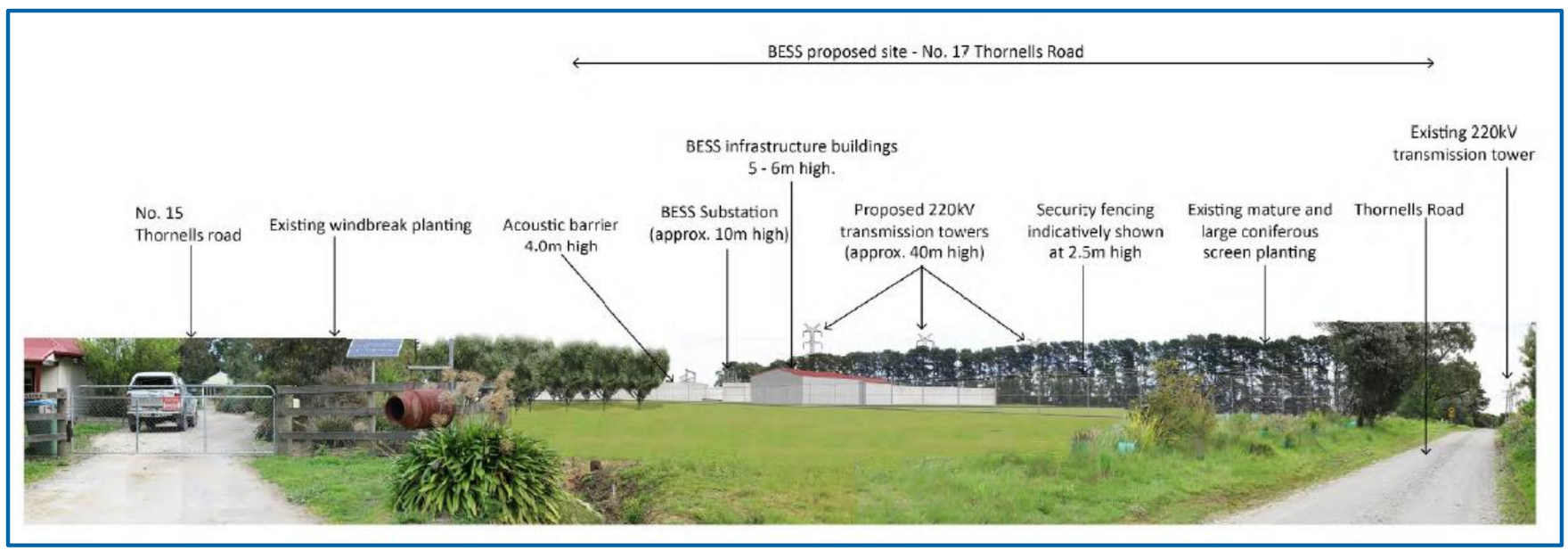

Plate 6.4 Photomontage of predicted environment at SRL 02 (15 Thornells Road)

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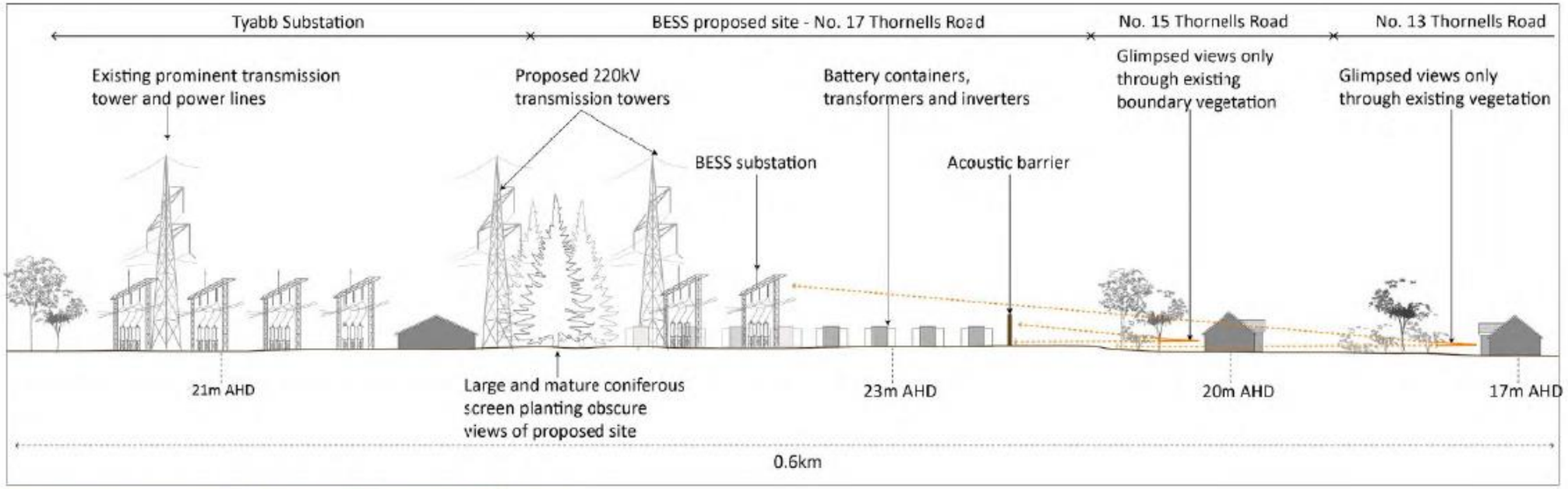

Plate 6.5 Predicted viewshed at SRL 02 (13 and 15 Thornells Road)

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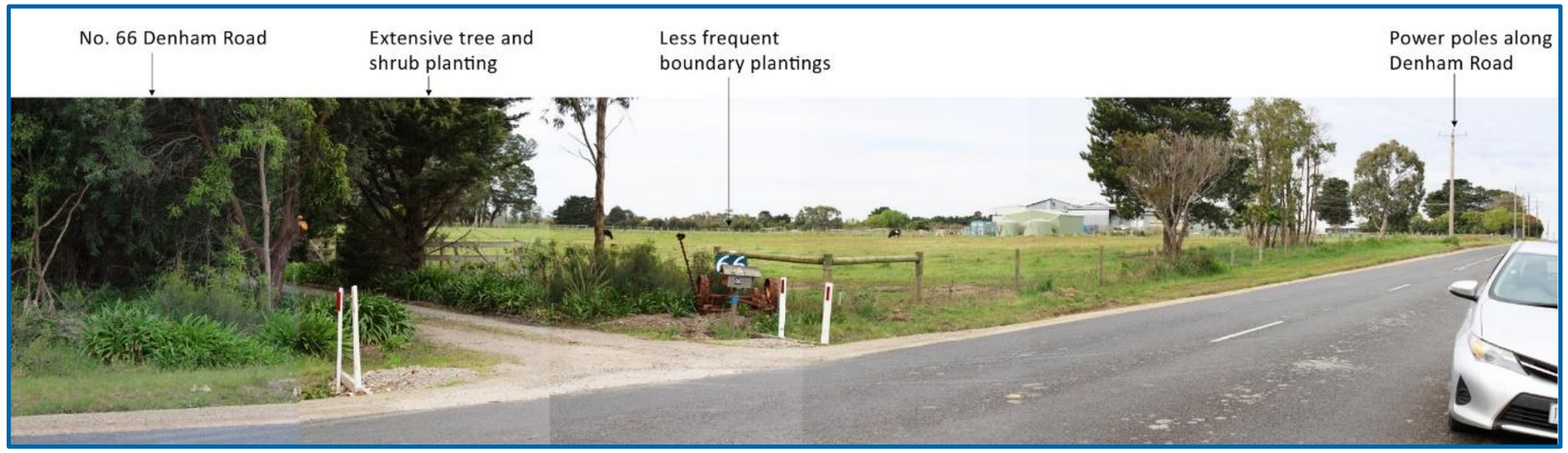

Plate 6.6 Existing environment at SRL 03 (66 Denham Road)

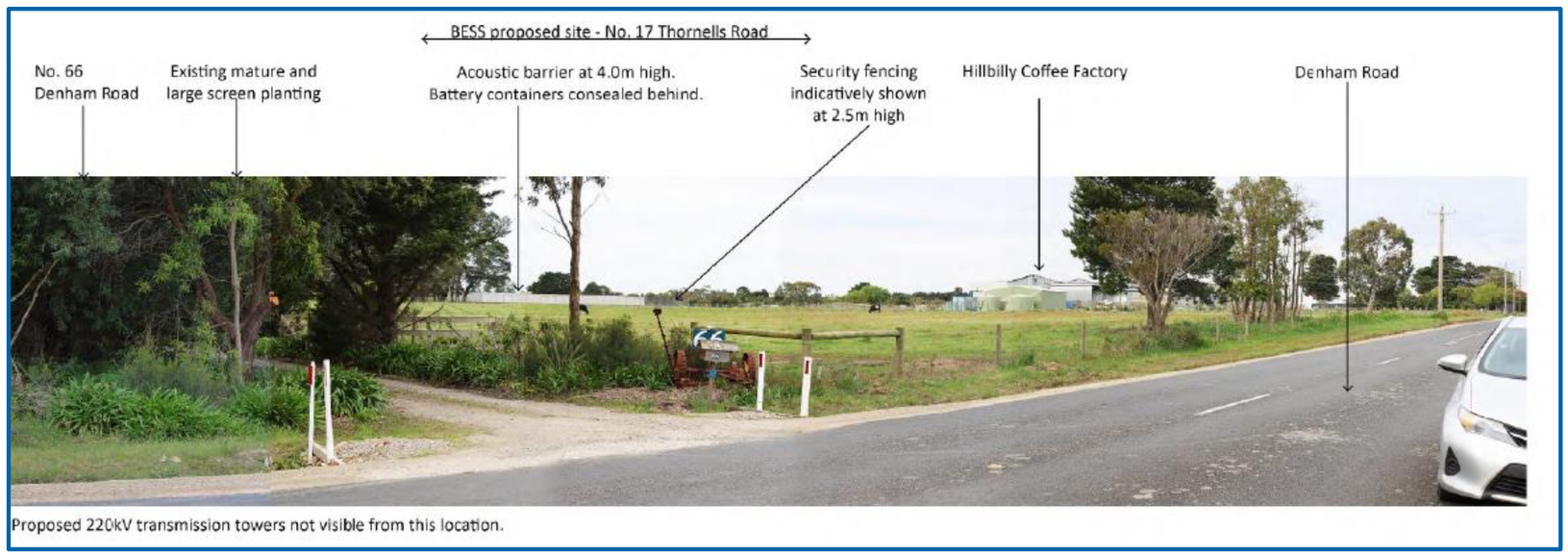

Plate 6.7 Photomontage of predicted environment at SRL 03 (66 Denham Road)

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6.5.5 Summary

The assessment concluded that the proposed project will not adversely affect the amenity of the neighbourhood or have irreparable consequences for the visual amenity of the locality and wider contextual landscape.

The project is not anticipated to have a significant impact on landscape character or visual amenity for the following reasons:

- The existing scenic quality at the sensitive receptor and each of the sensitive receptor locations is low to moderate.
- The likely impacts to the sensitive receptor at 20 Thornells Road is 'slight adverse to moderate adverse'.
- The likely impacts to the sensitive receptor at 13 and 16 Thornells Road is 'no change to slight adverse'.
- The likely impacts to the SRL 03 is 'slight adverse'.
- The likely impacts to the sensitive receptor at 15 Thornells Road is 'moderate adverse' (note that this is the site landowner).
- Residential property numbers 9, 12, 13, 14, 16, 36 and 66 are within the visibility shadow, meaning the proposed BESS will not be visible from these properties.
- The site is immediately adjacent Tyabb substation. The visual impact of the proposed facility will be in keeping with the visual impact of the existing substation.
- The acoustic wall, battery containers and all ancillary infrastructure and buildings will be finished in a material and muted colour appropriate to the setting.
- The site will be secured with chain mesh fencing like that used at the adjacent Tyabb substation.
- Existing vegetation will screen views of the site from most directions.
- The applicant has sought to minimise visual impact by applying buffer zones between infrastructure and the site boundaries.
- Lighting requirements will be minimal and will be installed in accordance with relevant guidelines/Australian Standards. Light spill will be mitigated through appropriate lighting design.
- Outside the ZTVI the project will have no discernible visual impact on easterly orientated vistas including views from the Tyabb town centre and from both principal highways.
- There are approximately seven commercial facilities within a 1 km radius of the site.
- There are no significant landscape overlays associated with the site.

6.5.6 Recommendations

Based on the findings of the assessment, no additional visual screening is proposed as part of the design.

There are also no proposed mitigation and management measures to be included as part of the CEMP.

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6.6 Hazard considerations

EMM engaged RiskCon Engineering to undertake a preliminary hazard analysis (PHA) and a fire protection quantity (FPQ) assessment of the proposed BESS site at 17 Thornells Road[11]. The objectives of the assessment were to:

- to assess compliance with the relevant codes, standards and regulations, in particular the Occupational Health and Safety Regulations 2017;
- review the fire protection quantity (FPQ) under the Dangerous Goods (Storage and Handling) Regulations 2012; and
- provide recommendations for minimising hazards.

A copy of the assessment is provided as Appendix I and the results are outlined below.

6.6.1 Methodology

The assessments were undertaken in accordance with:

- *Hazardous industry planning advisory paper (HIPAP) No. 6 - Guidelines for hazard analysis* (DPIE 2011a);
- *HIPAP No. 4 - Risk criteria for land use planning* (DPIE 2011b); and
- *Multi-level risk assessment* (DPIE 2011c).

6.7 Fire protection quantity assessment

The FPQ assessment considered the quantities of dangerous goods to be stored on site. Due to the quantities of lithium batteries to be stored, the assessment determined that the site will be classified as a FPQ site (Table 6.9).

Table 6.9 FPQ assessment

Class of dangerous good	Description	Maximum quantity to be stored	Placard	Manifest (notifiable quantity)	FPQ	Determination
2.2	Refrigerant (R-134a / R-410a)	1,000 L	5,000 L	10,000 L	20,000 L	NA
9	Lithium batteries	9,000 T [12]	5 T	10 T	20 T	FPQ
C1	Transformer oils	33,000 kg [13]	10,000 L	100,000 L	100,000 L	Placard
C1	Diesel	5,000 L	10,000 L	100,000 L	100,000 L	NA

As a FPQ site, the planning permit application will need to be referred to Fire and Rescue Victoria (FRV) (previously known as CFA). VFR will likely also require a site inspection once the BESS facility has been constructed.

[11] RiskCon Engineering's scope did not specifically include the proposed overhead transmission line over a portion of the adjacent Tyabb substation site at 21 Thornells Road. However, subsequent advice received from RiskCon Engineering confirming that the inclusion of the overhead transmission line would not significantly impact the outcomes of the PHA or FPQ assessment as its only introducing additional lattice towers to the existing Tyabb substation site.

[12] Based on upper estimates provided by Maoneng.

[13] Estimated based on similar switch rooms at other sites.

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It is worth noting that no suitable design guidance exists for the storage of batteries at the proposed facility for the following reasons:

- The design standard for class 9 batteries (AS/NZS 4681:2000 *The storage and handling of class 9 (miscellaneous) dangerous goods and articles*) is dated and only covers dangerous goods stored in buildings (whereas the project will store batteries in outdoor containers, where the risks are less).

- The standard was based on battery designs from 2000 which did not include the protection incorporated in modern batteries such as temperature and voltage monitoring and cooling etc and were based on chemistries more likely to result in thermal decomposition (ie lithium metal).

In the case of the proposed BESS, the risks associated with the storage of batteries are mitigated due to the modern design of the batteries, the availability of fire protection at the site, and the implementation of the following site-specific documentation outlined in Table 6.10.

Table 6.10 FPQ documentation

Document	Description [Applicable clause of the Dangerous Goods (Storage and Handling) Regulations 2012]	Required to be submitted to regulator?
Dangerous goods risk assessment	Documents the risks associated with an activity or storage. [27]	No, this document is only likely to be reviewed by a regulator during a site inspection or audit. The assessment is required to be prepared by the operator as part of their due diligence in ensuring compliance with the regulations.
Register	A summary of the dangerous goods stored on site along with the applicable Safety Data Sheets (SDS). The register also links into the findings of the risk assessment closing the loop from the summary document to the risk assessment. [60]	No. The register is required to be prepared by the operator as part of their due diligence in ensuring compliance with the regulations.
Manifest	A summary document of the types and quantities of dangerous goods stored onsite. [45]	Yes, the manifest needs to be submitted to FRV to enable FRV to respond to potential incidents onsite. It is submitted for information purposes, rather than for approval purposes.
Notification to the regulator	The notification is the driving link between the manifest and the regulator. It is a form which details the specifics of the dangerous goods depots at a site and how they interlink with the manifest. The notification is used to form a database of sites which store dangerous goods exceeding the manifest level. [66]	Yes. While the notification is not typically reviewed by the regulator, the operator will receive an acknowledgement from the regulator which can be used to demonstrate they have notified the Regulator as required by the regulations.
Emergency response plan (ERP)	Outlines potential emergencies including fire, bush fire, natural disaster etc and the associated mitigation and response measures. [55]	Yes, the document must be submitted to FRV for review and approval.
Emergency services information booklet (ESIB)	The ESIB is an accompanying document to the ERP and is essentially a summary document of the ERP.	Yes, the document must be submitted to FRV for review and approval.

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Table 6.10 FPQ documentation

Document	Description [Applicable clause of the Dangerous Goods (Storage and Handling) Regulations 2012]	Required to be submitted to regulator?
Placard schedule	Details where the placards are required to achieve compliance with the regulations. [47]	No, the placard schedule is used to ensure the correct placards have been installed.
Site layout	Accompanies the manifest and the notification. The purpose of the layout is to show where the dangerous goods are stored along with other points of interest to FRV including power isolation points, valve isolation points, drains, etc. to assist with responding to an incident. [8]	Yes, the document must be submitted to FRV for review and approval.

6.7.1 Hazard identification

A hazard identification table was prepared to identify potential hazards associated with the handling or storage of dangerous goods at the BESS site (Table 6.11). The following risks were assessed:

- Fire.
- Explosion.
- Toxicity.
- Property damage and accident propagation.
- Societal risk.

Table 6.11 Hazard identification table

Area/operation	Cause	Consequence	Safeguards
Battery storage	• Failure of lithium ion battery protection systems	• Thermal runaway resulting in fire or explosion • Incident propagation through battery cells	• Batteries are tested by manufacturer prior to sale/installation • Overcharging and electrical circuit protection • Battery monitoring systems • Thermal and smoke detection • Batteries composed of subcomponents (ie battery backup unit cells) reducing risk of substantial component failure • Batteries are not located in areas where damage could easily occur (ie within the fenced property) • Hydrant protection • Electrical systems designed per AS/NZS 3000:2007

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Table 6.11 Hazard identification table

Area/operation	Cause	Consequence	Safeguards
Switch rooms, MMR rooms, communications, data halls, etc.	• Arcing, overheating, sparking, etc. of electrical systems	• Ignition of processors and other combustible material within servers and subsequent fire	• Hydrant protection • Fires tend to smoulder rather than burn • Isolated location • Switch room contained within a structure
Substation	• Arcing within transformer, vaporisation of oil and rupture of oil reservoir	• Transformer oil spill into bund and bund fire	• Bunded • Fire protection (hydrants, extinguishers) • Isolated location
Refrigerant gases	• Failure of flanges, valves, compressors, etc. and release of gas	• Non-flammable, non-toxic gases pose no fire issue • Potential oxygen exclusion and asphyxiation risk	• Relatively low volume of gas used • Robust and commonly used systems which are not prone to large leaks • Open outdoor area provides natural ventilation preventing accumulation of gases
Diesel	• Release of combustible liquid and ignition	• Pool fire at the point of release	• Combustible liquids do not give off flammable vapours at atmospheric conditions • Low ignition probability • Relatively small release of diesel • AS 1940-2017 compliant storages

Based on the identified hazards, scenarios were postulated that may result in an incident with a potential for offsite impacts. Postulated scenarios were discussed qualitatively and any scenarios that will not impact offsite were eliminated from further assessment. Scenarios not eliminated were then carried forward for consequence analysis.

Incidents carried forward for consequence analysis were assessed in detail to estimate the impact distances. Impact distances were developed into scenario contours and overlaid onto the site layout diagram to determine if an offsite impact would occur. The consequence analysis showed that no scenarios would have the potential to impact off site; hence, no incidents were carried forward for detailed frequency analysis.

Notwithstanding this, a frequency assessment was prepared to highlight that the risk at the site boundary would be zero as the consequence contours would not impact over the site boundary. As the risk was calculated to be zero it would be below the acceptable criteria and would be considered a permissible development.

In addition, incidents exceeding 23 kilowatt-hours per square meter (kW/m^2) were reviewed which indicated that the contours from such incidents would not impact over the site boundary and therefore incident propagation would not be expected to occur and would be below the acceptable criteria.

Based on the analysis conducted, it is concluded that the risks at the site boundary are not considered to exceed the acceptable risk criteria. The project is therefore only classified as potentially hazardous and would be permitted within the current land zoning.

6.7.2 Summary

Due to the quantities of lithium batteries to be stored, the BESs site would be classified as a FPQ site and the planning permit application will therefore need to be referred to FRV.

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The preliminary hazard analysis concluded that the risks at the site boundary are not considered to exceed the acceptable risk criteria; hence, the project would only be classified as potentially hazardous and would be permitted within the current land zoning for the site.

6.7.3 Recommendations

The following recommendations are made, noting that these recommendations are simply a reflection of the legislative requirements:

- The documents outlined in Table 6.10 should be prepared and submitted, as applicable.
- To minimise the potential for fire or explosion within the transformers, the transformers shall be designed to comply with the requirements detailed in *AS 1940-2017 The storage and handling of flammable and combustible liquids*.

There are no proposed mitigation and management measures to be included as part of a CEMP.

6.8 Fire risk management

The BESS site is not subject to a bushfire management overlay hence no mandatory trigger exists to assess bushfire hazard and to describe the bushfire protection measures to apply to the proposed development.

The site is located in a bushfire prone area (VicPlan, DELWP 2020). Bushfire prone area zoning requires new residential and other sensitive developments (eg schools, childcare centres, hospitals etc) to meet minimum bushfire protection/construction standards.

The BESS will be designed and operated to comply with the *Dangerous Goods Act 1985* (as outlined in Chapter 11.6) and in accordance with the *Guidelines for Renewable Energy Installations* (CFA 2019) as per the advice provided to Maoneng by the CFA (now FRV) via email on 1 October 2020 and outlined below in relation to the following project aspects:

- Risk and emergency management.
- Access.
- Water supply.
- Fuel/vegetation management.
- Conditions specific to battery installations.

6.8.1 Advice from FRV

The following advice received from the FRV will be incorporated into the CEMP.

i Risk and emergency management

- The undertaking of a comprehensive risk management process, as per *Guidelines for Renewable Energy Installations* (CFA 2019).
- The development of an Emergency Information Book, provided in an Emergency Information Container at site entrances, as per *Guidelines for Renewable Energy Installations* (CFA 2019).

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- If applicable to the installation, adherence to (DR) AS/NZS 5139-2017: Electrical installations - Safety of battery systems for use with power conversion equipment for any battery installations, and *Guidelines for Renewable Energy Installations* (CFA 2019).

- If applicable to the installation, adherence to dangerous goods storage and handling requirements, as per the dangerous goods regulatory framework and any relevant Australian Standards.

ii BESS access

- A 4 m perimeter road should be constructed within the 10 m perimeter fire break.

- Roads are to be of all-weather construction and capable of accommodating a vehicle of 15 tonnes.

- Constructed roads should be a minimum of 4 m in trafficable width with a 4 m vertical clearance for the width of the formed road surface.

- The average grade should be no more than 1 in 7 (14.4% or 8.1°) with a maximum of no more than 1 in 5 (20% or 11.3°) for no more than 50 m.

- Dips in the road should have no more than a 1 in 8 (12.5% or 7.1°) entry and exit angle. Incorporate passing bays at least every 600 metres which must be at least 20 m long and have a minimum trafficable width of 6 m. Where roads are less than 600 m long, at least one passing bay is to be incorporated.

- Road networks must enable responding emergency services to access all areas of the facility.

- Preferably two access points to the BESS site, to ensure safe and efficient access to and egress from areas that may be impacted or involved in fire. Notwithstanding FRV's advice, the proposed widening of the site entrance and vehicle clearances will facilitate access for 26 m B-doubles (ie larger than a fire truck) to safely enter and exit the development site in a forward direction minimising potential access risk (refer Appendix E).

iii Water supply

Static water storage tank installations are to comply with AS 2419.1 *Fire Hydrant Installations* and the following conditions:

- The static water storage tank shall be of not less than 45,000 litres effective capacity.

- The static water storage tank(s) must be an above-ground water tank constructed of concrete or steel. The location and number of tanks should be determined as part of the site's risk management process and in consultation with a CFA delegated officer. The static storage tanks shall be capable of being completely refilled automatically or manually within 24 hours.

- The hard-suction point shall be provided, with a 150 mm full bore isolation valve equipped with a Storz connection, sized to comply with the required suction hydraulic performance. Adapters that may be required to match the connection are 125 mm, 100 mm, 90 mm, 75 mm, 65 mm Storz tree adapters with a matching blank end cap to be provided.

- The hard-suction point shall be positioned within 4 m to a hardstand area and provide clear access for fire personnel.

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- An all-weather road access and hardstand shall be provided to the hard-suction point. The hardstand shall be maintained to a minimum of 15 tonne gross vehicle mass (GVM), 8 m long and 6 m wide or to the satisfaction of the relevant fire authority.
- The road access and hardstand shall be kept clear at all times.
- The hard-suction point shall be protected from mechanical damage (ie bollards) where necessary.
- Where the access road has one entrance, a 10 m radius-turning circle shall be provided at the tank.
- An external water level indicator is to be provided to the tank and be visible from the hardstand area.
- Signage shall be fixed to each water tank.

iv Fuel/vegetation management

- Grass is to be maintained at below 100 mm in height during the declared fire danger period.
- A fire break area of 10 m width is to be maintained around the perimeter of the facilities, electricity compounds and substations (Figure 2.1). This area is to be of non-combustible mulch or mineral earth:
  - The fire break area must commence from the boundary of the facility or from the vegetation screening (landscape buffer) inside the property boundary.
  - The fire break must be constructed using either mineral earth or non-combustible mulch such as crushed rock.
  - The fire break must be vegetation-free at all times.
  - No obstructions are to be within fire break area (eg no stored materials of any kind).
- Adhere to restrictions and guidance during the fire danger period, days of high fire danger and total fire ban days (refer to www.cfa.vic.gov.au).
- All plant and heavy equipment is to carry at least a 9 L water stored-pressure fire extinguisher with a minimum rating of 3A, or firefighting equipment as a minimum when onsite during the fire danger period.
- There is to be no long grass or deep leaf litter in areas where plant and heavy equipment will be working.

v Conditions specific to battery installations

- Containers/infrastructure for battery installations are to be located so as to be directly accessible to emergency responders (eg provided with a suitable access road).
- Adequate ventilation of the battery container/storage area is to be provided where required under (DR) AS/NZS 5139-2017; the manufacturer's requirements and/or safety data sheets for battery storage.
- Containers/infrastructure for battery installations are to be provided with appropriate spill containment/bunding that includes provision for fire water runoff.

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- Battery installations that contain dangerous goods may have to comply with the requirements of the Dangerous Goods Act 1985; the Dangerous Goods (Storage and Handling) Regulations 2012; and relevant Australian Standards.

- Battery storage manufacturers must provide specifications for safe operating conditions for temperature and the effects on battery storage if involved in fire. This information must be provided within the content of the Emergency Information Book at the main entrance of the facility.

- Battery installations are to be kept free of extraneous materials and combustible materials of all kinds. Regular inspections and housekeeping is to be conducted to ensure materials do not accumulate.

- Battery installations are to be serviced/maintained as per the manufacturer's requirements.

- Containers/infrastructure for battery installations must be clear of vegetation for 10 m on all sides, including grass. CFA requires non-combustible mulch such as stone or mineral earth within this 10 m area.

6.8.2 Fire response procedure

In the event a fire is detected at the BESS and a signal has been sent to the fire suppression system, the following process would typically take place:

- Initial detection of a potential fire (single sensor alarm triggered).

- Audible alarm and strobe lighting are triggered both inside and outside the compromised container (as applicable), and remote monitoring alert triggered. While BESS solutions are typically operated remotely, the local alert offers added protection in the event maintenance works are taking place when the thermal runaway event occurs.

- HVAC units would be disengaged to prevent the fire suppression agent from being expelled from within the container.

- The high voltage electrical contacts can also be automatically disengaged to limit the hazard level across the rest of the site.

- The system detects a second confirmation of fire.

- Fire suppression agent is discharged into the BESS container.

- To control ambient temperatures, forced ventilation may be re-engaged in some instances and would be confirmed by a cell manufacturer at the detailed design phase.

The fire suppression agent will comprise a clean agent such as Novec 1230 (produced by 3M) which:

- is non-ozone depleting;

- is colourless, odourless, electrically non-conductive;

- is stored as a liquid but quickly evaporates into a gaseous state following discharge leaving no residue or requiring clean-up; and

- suppresses fire by removing heat.

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The volume of suppressant would be calculated as part of the engineering design to ensure a suitable volume is installed within each container.

During thermal runaway, the heat generated by the failed cell can result in neighbouring cells being subject to increased thermal loading, compromising their thermal stability. As such, this can result in a module or series of cells failing rapidly or over a longer period of time (hours). To increase safety, modules include containment dividers to protect the failing cell from spreading to neighbouring ones. Similarly, BESS containers are typically rated for two-hour fire rating to minimise risk to neighbouring containers, other equipment and personnel.

The BESS will have multiple automated and manual safety protection systems within each container. These typically incorporate multiple smoke detectors in addition to heat sensors to identify the presence of a fire. The use of a double positive detection system ensures that the fire suppression agent is only released when required to do so to prevent or control a thermal runaway event. This ensures the fire suppression system is not engaged due to a false reading. However, the system alarm and notification system would be triggered should one of the sensors mechanisms be activated to alert operatives.

6.8.3 Summary

The design, maintenance and operation of the BESS must comply with all applicable fire safety legislation and therefore will not pose an undue fire risk.

6.8.4 Recommendations

Implement the fire prevention and fire management requirements as outlined above.

6.9 Other environmental considerations

6.9.1 Airborne emissions

The magnitude and duration of airborne emissions resulting from the project will be low and will be limited to the construction phase. Airborne emissions will comprise dust from earthworks and diesel fumes from construction plant and equipment and will be managed via implementation of the CEMP, using standard dust control measures, such as use of a water cart and reduced earthworks on high-wind days.

No significant airborne emissions are anticipated during the operations phase.

6.9.2 Aboriginal cultural heritage

i 17 Thornells Road

17 Thornells Road has largely been cleared of native vegetation and historically used for semi-rural/residential/market gardening purposes. 17 Thornells Road is not mapped as an area of Aboriginal cultural heritage sensitivity per VicPlan (DELWP 2020) or ACHRIS (Aboriginal Victoria 2020) databases.

17 Thornells Road is not host to any registered Aboriginal places (sites, artefacts or other) (HWL Ebsworth Lawyers 2020).

ii 20 Thornells Road

The northernmost boundary of 21 Thornells Road is mapped at an area of Aboriginal cultural heritage sensitivity (ACHRIS 2021), however this area will not be impacted or correspond with the proposed transmission line disturbance area (Figure 6.16).

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No Aboriginal cultural heritage impacts are anticipated as a result of the project and no cultural heritage management plan is required.

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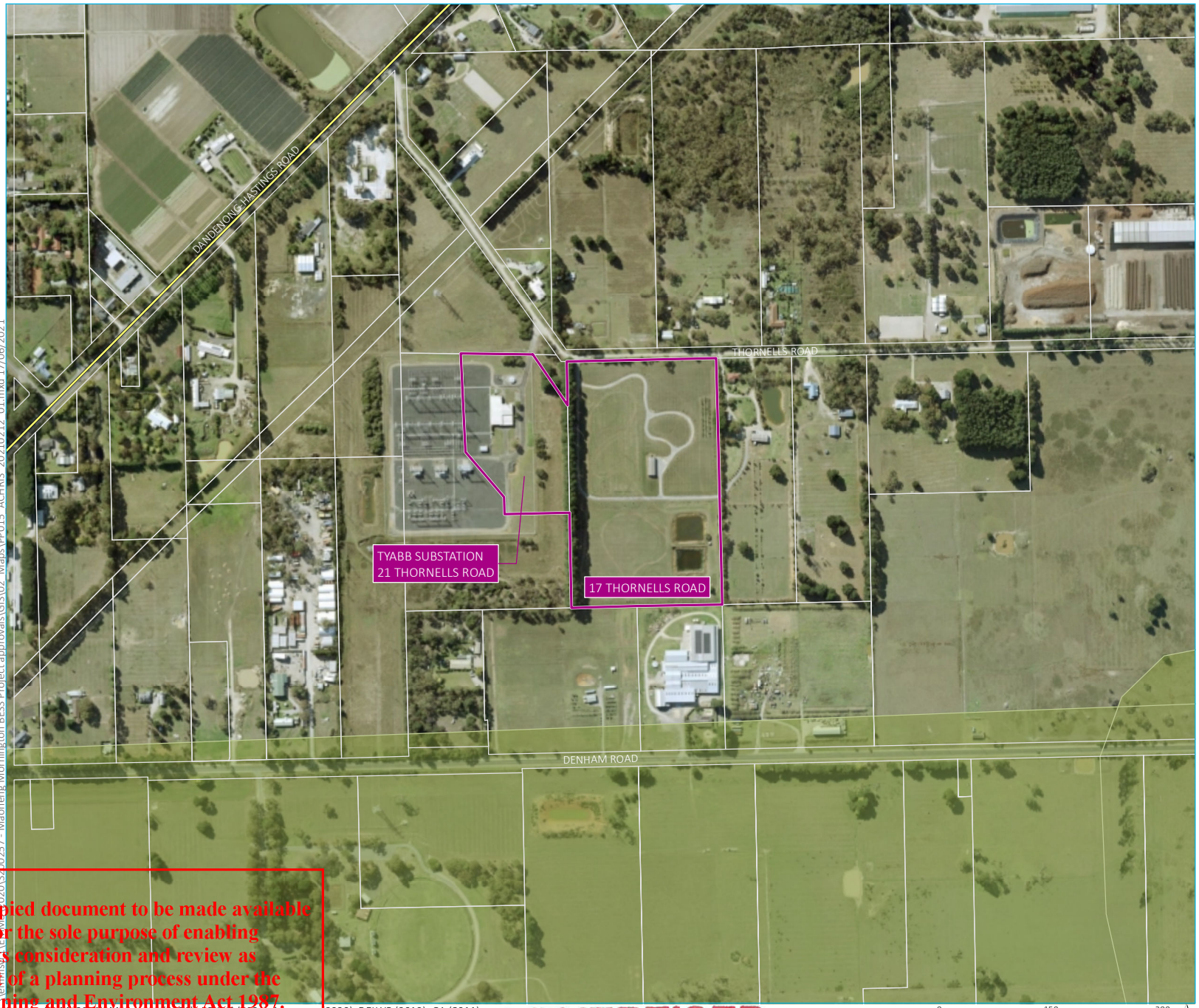

KEY

- Subject site
- Major road
- Cadastral boundary
- Aboriginal cultural heritage sensitivity

Areas of Aboriginal cultural heritage sensitivity

Maoneng Australia Pty Limited
Mornington BESS
Planning permit application
Figure 6.16

EMM
creating opportunities

Source: EMM (2021); Metromap (2021); ACHRIS (2021); Maoneng (2020); DELWP (2019); GA (2011)

0 150 300 m
GDA 1994 MGA Zone 55

N

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6.9.3 European cultural heritage

The site is not subject to any heritage overlay and is not listed on the Victorian heritage database.

As such, no European cultural heritage impacts are anticipated as a result of the project and no cultural heritage management plan is required.

6.9.4 Contamination

i 17 Thornells Road

The 17 Thornells Road site has been historically used for semi-rural/residential/market gardening purposes (namely an apple orchard). These land uses are not recognised as typically associated with 'potentially-contaminated land' as defined in the Ministerial Direction No. 1 - Potentially Contaminated Land as issued under the *Planning and Environment Act 1987*. Similarly, the site is not listed on the EPA Victoria Priority Sites Register as being a contaminated site.

No soil contamination is expected to be associated with the 17 Thornells Road site. However, if any potentially contaminated soil is identified during construction, the soil will be managed in accordance with the State Environment Protection Policy (Prevention and Management of Contamination of Land) 2002. If soil contamination is identified, then appropriate site investigation would be required and the CEMP updated accordingly.

ii 21 Thornells Road

The 21 Thornells Road site is used as a substation (ie Utility Installation), and therefore is considered to be 'potentially contaminated land' in the Ministerial Direction No. 1 - Potentially Contaminated Land as issued under the *Planning and Environment Act 1987*. The site, however, is not listed on the EPA Victoria Priority Sites Register as being a contaminated site.

Given the project only proposes the establishment of lattice towers on the existing Tyabb substation site any potentially contaminated soil is identified during construction will be managed in accordance with the State Environment Protection Policy (Prevention and Management of Contamination of Land) 2002 as part of the CEMP.

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6.9.5 Electromagnetic field

Electrical equipment produces and electromagnetic fields (EMF). EMF produced by transformers, transmission lines and inverters is reduced through performance standards that apply to standard components of this equipment.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) advises that the strength of radiation decreases exponentially with distance from the source, and it will become indistinguishable from background radiation within 50 m of a high voltage power line and within 5 to 10 m of a substation.

There is expected to be a negligible impact on electric fields in public areas as the BESS infrastructure would be setback from the closest surrounding receivers as follows:

- 62 m setback to Thornells Road.
- 84 m setback to the residence at 15 Thornells Road.
- 75 m setback to the food processing factory located south of the site.

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7 Post planning approvals

7.1.1 EPA works approval and licencing

Under the *Environment Protection Act 1970*, BESS facilities do not require an EPA works approval or licence.

7.1.2 Dangerous goods licence

Quantities of dangerous goods to be stored onsite do not meet the notifiable thresholds under the *Dangerous Goods Act 1985* and therefore no dangerous goods licence will be required.

7.1.3 Trade waste permit

As the BESS will not be discharging any wastewater to sewer, no trade waste agreement is required from South East Water. Discharge to sewer will be limited to the ablutions facilities which will comprise toilets and hand washing basins.

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8 Stakeholder consultation

Maoneng has undertaken consultation with a number of stakeholders in relation to the project, including:

- Mornington Peninsula Shire staff;
- Mornington Peninsula Shire councillors;
- CFA;
- FRV;
- Federal and State Members;
- AusNet Transmission Group;
- Holcim concrete batching plant, Tyabb;
- Port of Hastings Development Authority (PHDA); and
- members of the community.

A summary of the stakeholder consultation activities undertaken with each stakeholder is provided in Table 8.1.

Table 8.1 Stakeholder consultation

Stakeholder	Date	Consultation	Purpose
Mornington Peninsula Shire	12 March 2020	Initial teleconference with: • Council: Lucas Gardiner Planning Services Manager and David McPherson, Team Leader and Chris Yorke, Energy and Carbon Management Office, Climate and Energy Team; and • Maoneng: Elle Donnelley, Planning Manager.	Introduce the project and seek advice on the planning pathway and on Council's requirements.
	25 June 2020	Pre-application video meeting with: • Council: Lucas Gardiner, Planning Services Manager and David McPherson, Team Leader; • Maoneng: Peter Pan, Senior Development Manager, Elle Donnelley, Planning Manager and Satya Bhasale, Project Coordinator; and • EMM: Nick Travers, Associate Team Leader, Rehabilitation and Andrew Woidt, Associate - Environment, Community, Approvals and Delivery.	Initiate formal planning process with Council, present project information and discuss potential site constraints, confirm technical study requirements and community/government agency consultation requirements. Note: At the time this meeting was held, Council was the relevant authority for the project.

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Table 8.1 Stakeholder consultation

Stakeholder	Date	Consultation	Purpose
	July 2020 until December 2020	Ongoing discussions with Council.	To discuss planning process, timing for lodgement, the need for Maoneng to assess the worst-case scenario to retain flexibility during the detailed design stage (largest footprint and development envelopment).
	27 October 2020	Maoneng lodged application with Mornington Peninsula Shire Council (FL1818/20) d.	Application lodged.
	30 November 2020		Council issued a request for further information.
	1 December 2020		Maoneng provided all additional information.
Mornington Peninsula Shire councillors	7 December 2020	Site visit with: • Cr Paul Mercurio, Watson Ward; • Cr Lisa Dixon, Cerberus Ward (ward of the proposed project); and • Maoneng: Allison Hawke, Director of Development and Elle Donnelley, Planning Manager.	Introduce the project and seek input from Councillors. The project is in Watson Ward and Cerberus Ward is nearby to the south, however, all Councillors were invited to the site visit.
DELWP	17 December 2020	Pre-lodgement meeting to introduce project and discuss assessment pathway.	
	December 2020 and January 2021	Adequacy review of draft Planning Permit Application.	Obtain feedback from DELWP on adequacy of draft Planning Permit Application. Feedback received from DELWP has been addressed in this final version. See Table 8.2 for a summary of feedback received from DELWP and the location in this report where the feedback has been addressed.
CFA FRV	1 October 2020	Phone and email conversation with Angus Mair, Fire Safety Officer.	Introduce the project and seek advice on CFA's and FRV's requirements.
Landowner	16 September 2020	Ms Hussey and AusNet (see Appendix B).	Request landowner consent to lodge the planning permit application/notification of intent to lodge application.
Federal and State Members	1 December 2020	Email to: • Mr Greg Hunt MP, Federal Member for Flinders | Minister for Health; and • Mr Neale Burgess MP, Member for Hastings	Introduce the project and seek input, offer the opportunity to visit the site and/or have a video meeting. Mr Greg Hunt MP and Mr Neale Burgess MP were unable to attend the scheduled site visit for 7 December 2020. Maoneng intends to continue consultation as the project progresses.
AusNet Transmission Group	8 September 2020 - ongoing	Email and telephone conversations with Melanie Tan, Darren Brown and Luke Clough.	Introduce the project and seek Ausnet's consent to lodge planning permit application. Seek a Preliminary Works Agreement with AusNet. Discussion regarding transmission line connection location, transformer and cable sizing.
PHDA	23 September 2020	Email conversation with Michael Dillon. (Business Development and Strategy Manager).	Introduce the project and seek advice on PHDA's requirements and concerns.
Holcim concrete batching plant, Tyabb	10 December 2020	Email conversation with Stewart Burton (Planning and Approvals Manager).	Request traffic volumes on Thornells Road in relation to the concrete batching plant.

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8.1 DELWP feedback

The draft planning permit application was submitted to DELWP in December 2020 and June 2021 for review. A summary of the feedback provided by DELWP and the location in this report of where the feedback has been addressed is outlined in Table 8.2.

Table 8.2 Location where DELWP feedback has been addressed in this report

Feedback	Where addressed in this report
December 2020	
1. Amended application documents that are updated to include seeking planning permission for the 220 kV powerline proposed on the adjoining lot to the west (Lot 1 TP568319), including but not limited to:	
– the amendment of all plans to show this land as part of the subject site;	Figures amended to include the portion of 21 Thornells Road within this planning permit application and supporting technical reports.
– the planning report amended to discuss the context and circumstances of this land;	Text amended to include the portion of 21 Thornells Road within this planning permit application and supporting technical reports.
– a copy of the title plan and register search statement for this land; and	Refer Appendix A.
– an amended application form including the details of this land.	Refer Appendix A.
2. The outstanding information relating to ecology described within the planning report and ecology reports, specifically relating to targeted surveys for Growling Grass Frogs and the transmission line route.	The revised flora and fauna report is provided as Appendix D and is summarised in section 6.1 of this planning permit application.
3. A complete set of plans provided as a separate .pdf file, amended to include the following additional information:	
– Dimensioning of key setbacks of buildings and works from the site's title boundaries.	Refer Appendix K (Figure 2.1)
– Dimensioned elevations of all buildings and works to show the maximum height of buildings above natural ground level, including any raised footings required for flooding events.	Refer Appendix K
– Dimensioned elevations of the proposed power transmission lines.	Refer Appendix K
– Boundary fences shown on plans and dimensioned elevations.	Refer Appendix K (Figure 2.1)
– Information about the proposed extent of hardstand and semi-permeable surface treatments shown.	Refer Appendix K
– Stormwater management measures corresponding to those recommended by the finalised Surface Water Assessment.	Refer Appendix K

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Table 8.2 Location where DELWP feedback has been addressed in this report

Feedback	Where addressed in this report
4. An amended Flora and Fauna Report that includes the following information: – A report generated by DELWP's Native Vegetation Information Management (NVIM) tool, showing the details and location of the native vegetation proposed to be removed, the assessment pathway, and any offsets that may be required. – Information about the extent of Tree Protection Zones as relevant to trees proximate to the proposed development footprint.	Revised flora and fauna report is provided as Appendix D and is summarised in Section 6.1 of this planning permit application.
5. A finalised Surface Water Assessment confirming the extent of impervious and semi-impervious surface treatments to be constructed on the site, and the necessary stormwater mitigation measures to prevent detrimental off-site impacts.	Revised surface water assessment is provided as Appendix F. A new figure showing impervious and semi-impervious surface treatments is provided in Appendix K of the planning permit application. A new sub-section (Section 2.3.2xix) has been added to the project description, describing the conceptual stormwater management approach for the project, including details of preliminary design calculations of peak flows and the conceptual sizing and location of the onsite detention basin, if necessary.
6. Preliminary comments: – The submitted Noise and Vibration Impact Assessment predicts operational noise from the BESS would exceed NIRV standards by up to 6dB as experienced at neighbouring dwellings, and states that this may be ameliorated through the selection of quieter equipment or the installation of acoustic attenuation screening. More information and/or modelling should be provided to show the potential noise attenuating impacts of such measures, to indicate whether the facility can operate in compliance with NIRV without requiring alteration of its performance.	Revised noise and vibration impact assessment is provided as Appendix G and is summarised in section 6.4 of this planning permit application.
7. The planning report and development plans show the Coast Teatree as being potentially pruned to improve sightlines rather than completely removed. However, this appears to contradict the turning diagrams of the Traffic Impact Assessment that would appear to require the removal of the tree to facilitate construction traffic movements. Please address this matter consistently in all application documents.	Text amended to confirm the Coast Teatree is proposed to be removed to improve sight distance. Refer Table 5.1, sections 6.2.2 and 6.2.7 of this planning permit application; and sections 6.6 and 7.2.3 of the traffic impact assessment (Appendix E).
June 2021	
8. Site plan updates: – DEWLP require a single pdf containing all of the plans. They are currently provided as individual pdfs, as well as distributed through other documents. – Illustrate the minimum setback distance of the BESS units from the northern boundary and transmission line towers. – Confirm battery BESS bank dimensions. – Confirm overall maximum height of buildings and works above natural ground (to present a "worst case" scenario).	Refer Figure 1.2 - site plan and Appendix K (Concept Plans) which have been updated to address DELWP requirements, including setbacks, elevations, schematic illustrations and consolidated PDF of all plans.

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Table 8.2 Location where DELWP feedback has been addressed in this report

Feedback	Where addressed in this report
– Provide an elevation of the switchroom. – Fences and acoustic walls are not shown.	
9. No plan provided showing native vegetation removal.	Refer response to comment 13 below.
10. Provide updated plan showing sensitive receptors.	Refer Figure 6.15 which provides sensitive receptor map
11. Confirm extent of subject land to the north of the substation and nature of development within this area.	Refer Section 2.3 which outlines that the northern portion of the development site is proposed to accommodate the temporary construction compound, carparking, control building and O&M Building during operations.
12. Site layout plan in appendix to the acoustic report is the old layout.	Appendix B of the NIA updated to reflect proposed site layout plan.
13. Flora and fauna report discusses need to remove Coast Teatree at front entrance but this is not included in DELWP native vegetation removal report.	The Coast Teatree at the development site entrance did not qualify as a patch or scattered tree (ie it's not a canopy tree) and therefore was not included in the DELWP Native Vegetation Removal Report. The Coastal Teatree has also been lopped previously with the ground layer dominated by Fraxinus (Ash) saplings and exotic grasses and herbs (eg Sweet Vernal Grass Anthoxanthum ordoratum, Phalaris Phalaris aquatica, Cat's ear Hypochaeris radicata and Panic Veldt Ehrharta erecta). Figure 3.1 of the Flora and Fauna Report illustrates the Coastal Teatree at the site entrance as a point location while the patch in the road reserve is illustrated further to the east. A new native vegetation removal figure is shown in the Section 6.1 (Figure 6.1b) and the DELWP Native Vegetation Removal Report (refer Appendix F of the Flora and Fauna Assessment). This approach is considered satisfactory for a Basic Pathway Assessment permit application. A separate vegetation removal figure is included in the PPA and the DELWP Native Vegetation Removal Report assumes a worse-case scenario (with losses and offsets above what is expected) and is likely to change once the location of the final power transmission easement is confirmed by Maoneng / AUSNet during detailed design.
14. Confirm site entrance / vehicle crossover to accommodate B Doubles, as shown on swept path diagrams.	Refer Section 2.3.2(xi), Figure 2.1 and Appendix K (Hardstand Areas figure) which have been updated to confirm the existing site entrance is proposed to be widened for 26 m B-double with hardstand area to accommodate swept path / turning circle as illustrated in Appendix B of the TIA.

8.2 Community consultation

Community consultation with near neighbours and businesses commenced in late November 2020. Consultation included a letter being sent to near neighbours and local businesses (Appendix J). The letter sought to:

- introduce Maoneng and the Mornington BESS project;
- seek feedback about the project;

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- respond to any concerns;
- provide Maoneng contact details to enable ongoing communication; and
- offer to meet face-to-face at their home (at a safe distance and subject to COVID requirements) or via video conference.

No responses have been received to date from near neighbours and businesses in relation to the letter.

On 7 December 2020, Maoneng also undertook an informal doorknock of all near neighbours and businesses. Where people were not home, a note was left with Maoneng's contact details, inviting contact to discuss the project.

As a result of the doorknock, Maoneng spoke with three residents face-to-face, and received one follow up phone call. Overall, the community and local businesses were supportive of the project.

Questions typically related to the project design and functioning, and the potential for views of the infrastructure, the potential for noise emissions and the need for erosion and sediment control. These matters have been considered and addressed through technical studies that form part of this planning permit application.

Maoneng will facilitate ongoing and open communication with the community throughout the assessment and development of the project. Maoneng is currently establishing a project website to keep the community updated about the project, and to provide another avenue for communication.

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9 Conclusion

Maoneng propose to develop the Mornington BESS at 17 Thornells Road and a portion of 21 Thornells Road, Tyabb, Victoria to improve electricity grid reliability and network stability by drawing energy from the electricity grid during off-peak periods for battery storage and dispatching energy to the grid during peak periods.

The project broadly comprises the following key components:

- Batteries housed within fully enclosed battery containers, with associated inverters and transformers and an underground cable network.
- MV switchroom.
- Control and operation room.
- Onsite 220/33 kV substation.
- An overhead transmission line (comprising up to 7 lattice towers, 40 m high) connecting the substation to the adjacent Tyabb substation.
- Internal 4 m noise (acoustic) barriers.
- Widening of site entrance.
- Internal access roads and carparking.
- Temporary construction laydown area.
- Boundary fencing and other security infrastructure.
- Fire safety equipment.

Mornington Peninsula is subject to fluctuations in demand for electricity, primarily as a result of seasonal tourism. Battery storage is one form of demand response and while this project cannot guarantee outage prevention alone, it will contribute to improving regional electricity reliability. The Mornington BESS power rating is 240 MW.

To assess potential environmental impacts of the project, a number of specialist technical assessments were undertaken, including ecological (terrestrial flora and fauna) assessment, traffic impact assessment, noise and vibration impact assessment, preliminary hazard assessment, landscape character and visual impact assessment and surface water quality assessment.

Appropriate control and management measures to mitigate against potential environmental impacts have been developed and have been outlined in this planning permit application.

The technical assessments concluded that with appropriate mitigation and management measures there will be no significant environmental impact as a result of the operation of the project, while a CEMP will be developed specifically to manage the potential impacts associated with the construction phase of the project.

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The proposed BESS will support the Victorian Government's objectives to improve electricity network reliability and to support renewable energy projects and is considered consistent with the provisions of the Mornington Shire Planning Scheme for the following reasons:

- The proposed land use as a Utility Installation is a considered form of development requiring a permit within the Special Use Zone (SUZ) 1 (Port Related Uses).
- Requirements of Schedule 1 have been met in this application.
- The project will have minimal environmental impacts.
- The application demonstrates a significant benefit to improve electricity network reliability in the area.
- the project will generate employment and economic activity during construction and 30-year operational life of the project.

The proposed development is considered appropriate for the project site and is not deemed at variance with the relevant MPPS provisions. The assessment of the project against the relevant provisions of the MPPS demonstrates its compliance with the land use activities and form of development envisaged for the site and location more generally.

In summary, the proposed BESS, when considered on its merits, warrants the granting of planning consent.

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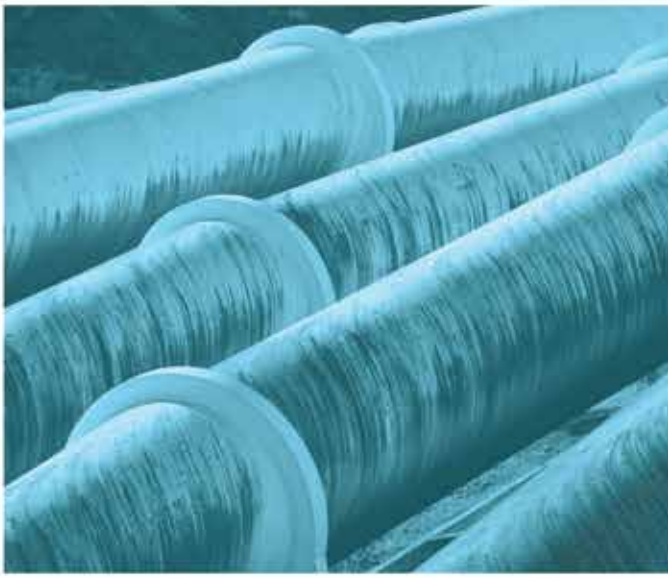

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