Moorebank Logistics Park
33 Kv Connection UIL5922

Review of Environmental Factors

June 2022

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ABBREVIATIONS AND DEFINITIONS

Term	Description
AHIMS	Aboriginal Heritage Information Management System
ANO	Authorised Network Operator
BDAR	Biodiversity Development Assessment Report
CEMP	Construction Environmental Management Plan
DBYD	Dial Before You Dig
DECC	NSW Department of Energy and Climate Change
EMF	Electromagnetic field
ESD	Ecologically sustainable development
HV	High voltage
ICNIRP	International Commission on Non-Ionizing Radiation Protection
Liverpool LEP	*Liverpool Local Environmental Plan* 2008
LV	Low voltage
MAAI	Moorebank Avenue – Anzac Road intersection
MLP	Moorebank Logistics Park
RMS	NSW Roads and Maritime Services
SERs	Summary Environmental Reports
SSD	State significant development
TfNSW	Transport for NSW
The Junction Road alignment	The proposed upgrade works generally along Junction Road and Heathcote Road, between the Heathcote Road/Seton Road and Junction Road/Nuwarra Road intersections
The Anzac Road alignment	The proposed upgrade works along Anzac Road, generally between the Anzac Village substation and the new proposed substation within Moorebank Precinct West.
TMP	Traffic Management Plan

EXECUTIVE SUMMARY

A new 33 kV Endeavour Energy connection at Moorebank is required to improve and extend power infrastructure within the Moorebank area and meet load requirements for the ongoing operation of the Moorebank Logistics Park. As part of the Moorebank Precinct West Stage 2 (MPW2) consent (SSD 7709), a switching station is to be constructed to deliver power to the broader Precinct. Network upgrade works are therefore required to deliver power to the switching station. These works have been confirmed in Endeavour Energy's *Connection Offer – Supply Offer* (Ref: UIL 5922; 5 November, 2020).

This Review of Environmental Factors has been prepared to identify and assess the potential impacts that may occur as a result of the network augmentation and upgrade works. It provides an outline and description of the proposed works associated with the Project, including an assessment of the various supply options.

For the purposes of Part 5 of the *Environmental Planning and Assessment Act 1979*, Endeavour Energy is the Proponent and the Determining Authority for the Project. Assessment against relevant environmental legislation has not identified any constraints to the Project being undertaken. Further road opening approvals will be required to be obtained, in accordance with the *Roads Act 1993*, from Liverpool City Council – being the relevant road authority.

Consultation with the community and residents, Liverpool City Council and Endeavour Energy has commenced to identify key concerns and matters for consideration – which have been identified and discussed in Section 3. Consultation is ongoing and further opportunity for feedback will be available to the community and relevant stakeholders during the exhibition period.

This document assessed the scale, nature and extent of potential environmental impacts associated with the works against key environmental aspects and concluded that subject to implementation of the mitigation measures, detailed in Section 7 of this REF, the proposed works would have negligible adverse environmental impact and no long-term environmental impact. Preparation of a Construction Environmental Management Plan, informed by this REF and detailed design to follow, be prepared prior to construction works.

This REF concludes that an Environmental Impact Statement (EIS) is not required, and Endeavour Energy determine the Project based on the outcomes of this REF.

1 INTRODUCTION

1.1 Background

The Moorebank Logistics Park (MLP), located in Moorebank NSW, is Australia's largest freight infrastructure project providing rail terminals and warehousing across a 243 ha site. The MLP is partially under operation and partially under construction under several State significant development (SSD) consents, issued by the NSW Department of Planning Industry and Environment (DPIE).

A new 33 kV Endeavour Energy connection at Moorebank is required to improve and extend power infrastructure within the Moorebank area and meet load requirements for the ongoing operation of the MLP. As part of the Moorebank Precinct West Stage 2 (MPW2) consent (SSD 7709), a switching station is to be constructed to deliver power to the broader Precinct. Network augmentation and upgrade works are required to deliver power to the MLP switching station, as confirmed in Endeavour Energy's *Connection Offer – Supply Offer* (Ref: UIL 5922; 5 November, 2020). These works are required predominantly along Junction Road and Anzac Road.

This Review of Environmental Factors (REF) has been prepared to identify and assess the potential impacts that may occur as a result of the network augmentation and upgrade works (the 'proposed development').

The following sections provide and describe the location of the proposed development. Section 4 provides a detailed outline of all works included in the proposed scope of works, that form part of Endeavour Energy's connection offer.

1.2 Location of the Study Area

The location of the proposed works is shown in Figure 1 below.

Figure 1: Proposed works location, Moorebank NSW (Source: SixMaps, 2021)

1.3 Existing Environment

1.3.1 General

As shown in Figure 1, the study area for the proposed development is located in Moorebank, south-western Sydney, and consists of two main works areas being:

- the 'Junction Road alignment' – that runs the length of Junction Road from the intersection with Nuwarra Road to Heathcote Road at the intersection with Seton Road; and
- the 'Anzac Road alignment' – that runs along Anzac Road from the intersection with Greenhills Avenue to the MLP switching station (approved under SSD 7709) at the MPW site.

Additionally, there are minor ancillary works required in the vicinity of the above two areas – which are required to redirect power to the MLP Site and close redundant distribution pathways. A detailed outline of the complete Project scope of works is provided in Section 4.

1.3.2 Junction Road Alignment

The land use along the Junction Road alignment is predominantly residential, with some open space, including the Moorebank Liverpool District Hockey Club and Anzac Creek corridor. Towards the Heathcote Road intersection and along Heathcote Road, landuse is light industrial and commercial.

Junction Road is a local road operated and maintained by Liverpool City Council (LCC). The proposed alignment is generally along the grassed verge to the northern side of Junction Road, and the eastern side of Heathcote Road (a State arterial road operated by TfNSW). Several of the existing electricity poles are located within one metre of the roadway.

In addition to the existing above-ground 11kV lines, there are a number of other utilities and services located within the proposed works area, inclusive of LCC infrastructure assets comprising bus stops, stormwater pits, footpaths and cycleways, and a bridge and headwall over Anzac Creek.

1.3.3 Anzac Road Alignment

The predominant land uses along the Anzac Road alignment are commercial and industrial.

The proposed alignment is in the eastbound carriageway of Anzac Road, a local road operated by Council, and would terminate at a new switching station in the MPW site, west of Moorebank Avenue (Figure 1).

In addition to the existing electricity poles located on the southern side of Anzac Road, there are a number of other utilities and services located within the proposed works area, including the Endeavour Energy Anzac Village Zone Substation, along with LCC infrastructure assets. Only one new feeder is required along Junction Road to replace the feeder 501 that is to be diverted into the Anzac Village zone substation. The proposed 33kV lines will be placed under-ground to align with utilities and services corridors presently in place.

2 PROJECT JUSTIFICATION AND ASSESSMENT OF FEASIBLE SUPPLY OPTIONS

2.1 Project Need

The MLP is currently partially under operation and partially under construction and has interim 11kV supplies from the Endeavour Energy Anzac Village Zone Substation to meet the existing energy requirements. The Utilities Summary Report (AECOM, 2016), prepared for the MPW Stage 2 (SSD 7709) Environmental Impact Statement (Arcadis, 2017), identified that augmentation of the Endeavour Energy network would be required to provide sufficient load capacity to the Precinct during operations.

An existing 33kV network configuration within the Moorebank – Liverpool area extends to the Anzac Village and Defence Joint Logistics Unit stores, near the northern boundaries of the MLP. Power to the MLP site is currently provided by Endeavour Energy and enhanced by onsite (rooftop) solar power infrastructure. The existing infrastructure consists of an Endeavour Energy zone substation (Substation No. 9633 Anzac Village) located on Anzac Road.

There are currently three 11kV feeders situated at Anzac Road originating from the substation. The feeders between the Anzac Village zone station and the MPW Site traverse the Moorebank Avenue/Anzac Road intersection (MAAI), which has also been assessed under SSD 7709 before turning south to the Endeavour Energy switching stations located off Moorebank Ave.

The establishment of a new 33 kV Endeavour Energy connection is required to improve and extend power infrastructure within the Moorebank area and meet load requirements for the operation of the MLP.

The MLP switching station has been assessed and approved as part of MPW Stage 2 consent (SSD 7709). Augmentation and supply of 33 kV power to this switching station is required to deliver power to the broader MLP.

2.2 Route Options Assessment

Prior to preparation of the concept design and this REF, the Applicant commissioned a route options and feasibility assessment to be undertaken, to ascertain the most practical, efficient and cost-effective route for the network augmentation, to the Moorebank substation, that would generate the lowest impact on the environment and community. The options and outcomes of the assessment are shown in Figure 1 and detailed below.

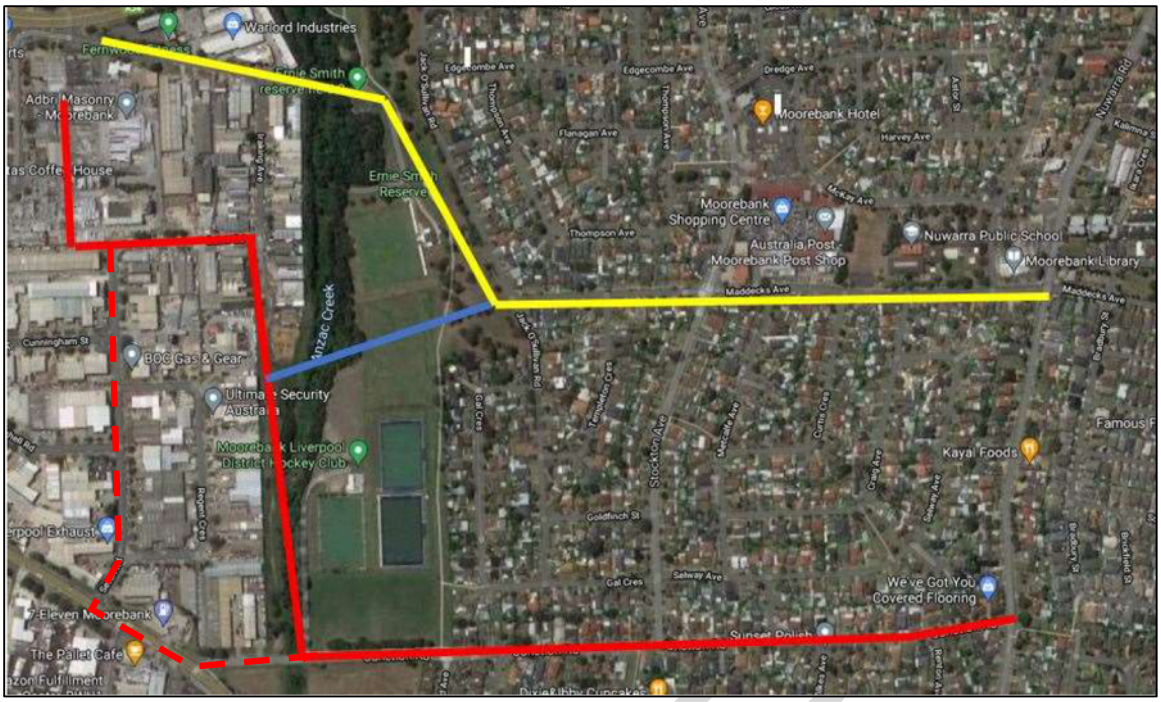


***Figure 2*:** Options assessment: Routes considered

Route 1 (Yellow)

Route exits Moorebank Zone Substation (northern side onto Kelso Cresent), runs east along Kelso Cresent into Ernie Smith Reserve, crosses Ernie Smith Reserve in a south easterly direction to Maddecks Avenue. It then continues east along Maddecks Ave to Nuwarra Road where it joins onto an existing 33kV overhead line that is run over an existing 11kV line.

Route 1 presented a number of technical issues. The exit out of the north side of Moorebank ZS is extremely congested with 4 existing 33kV lines/cables and 13 x 11kV overhead lines and cables. Critically, it would require new easements across Ernie Smith Reserve that would limit the allowable land use for this reserve and hence impact on the community. There is an existing 11kV overhead line along this route but the easement width is insufficient for a 33kV overhead line. Easement adjustment (blow out) would likely be required impacting on residential land use.

The route down Maddeck Ave has an 11kV overhead line on the southern side, which also passes a main shopping complex. This also would generate complexity in construction and installation.

Route 2 (Red)

This route exits Moorebank ZS on the southern side utilising an existing overhead line and runs south down an existing easement until reaching Seaton Road. A new section of overhead line would then run east along Seaton Road until Iraking Ave where it turns south, continuing along an existing 11kV route. When it meets Junction Road it would turn east and run along Junction Road until Nuwarra Road. This route does not generate the same adverse impacts as Route 1, however, makes less use of existing assets requiring the introduction of additional new infrastructure to the existing streetscape. The options assessment concluded that this option was, as a result, expensive and less practical with the likelihood of introducing new visual, amenity and land use impacts.

Route 3 (Red to Blue to Yellow) –

Route 3 is a combination of Routes 1 and 2 utilising the southern exit from Moorebank ZS but turning east after the end of Iraking Ave to cut across Ernie Smith Reserve

before heading east down Maddecks Avenue to Nuwarra Road. The route again utilises Ernie Smith Reserve which would require new easements, and so would adversely impact the community and their ongoing use of this reserve, as identified in the assessment for Route 1.

Route 4 (Red & Red Dash) –

Route 4 is similar to Route 2, however runs south along Seton Road to Heathcote Road and then east on Heathcote and Junction Road, over Anzac Creek to Nuwarra Road where it would connect into the existing 33kV overhead feeder. This route has the benefit of utilising existing assets and overhead supply infrastructure.

There would be only minor works required on existing substations and no easement adjustment or adjustment negotiations required with residents.

The route does not impact on Ernie Smith Reserve and therefore has no impact on ongoing or future use of this reserve for the community. Utilising the existing overhead infrastructure would minimise potential construction risks and reduce approval requirements and subsequent construction lag and costs.

Based on the outcomes of the route options and feasibility assessment, Route 4 (the 'Junction Road alignment') was identified as the preferred route option.

The following sections provide an options assessment for the method of supply (overhead or underground) for both the Junction Road and Anzac Road alignments.

2.3 Assessment of Feasible Supply Options

The following supply options were considered to identify the most appropriate to meet the needs of the MLP:

- Option 1 – Do nothing
- Option 2 – Overhead supply
- Option 3 – Underground supply
- Option 4 – Combination overhead/underground supply

The options are summarised below.

2.3.1 Option 1 - Do nothing

Endeavour Energy currently supplies power to the MLP site, however, as development progresses and energy requirements for warehouse operations rise, insufficient power capacity would be available to the MLP to fully meet the site's operational energy requirements. Augmentation of the existing power supply network would be required to account for the shortfall and avoid any interruption of energy services to the MLP. Undertaking these works at a later time would disrupt the supply to the 24/7 MLP operations.

The MPW Stage 2 approval (SSD 7709) includes the construction and operation of the MLP switching station, as the need for additional power supply to accommodate the demand generated by the Precinct during operations has been previously identified. Augmentation of the existing network to deliver power to this switching station is, therefore, required at an early stage of the MPW development to avoid the need to disrupt 24/7 operations once the precinct is operational.

Option 1 has nil costs, as no network upgrades would be required, however, given the need to meet the future energy requirements of the MLP's 24/7 operations, this option is considered unsuitable and is not considered further.

2.3.2 Option 2 - Overhead supply

Utilising overhead supply would involve replacing selected existing poles to accommodate a new 33kV overhead transmission line along the two proposed alignments:

1. The Junction Road alignment – between the Nuwarra Road/Junction Road intersection and the Heathcote Road/Seton Road intersection; and
2. The Anzac Road alignment – along the western portion of Anzac Road between the Anzac Village Zone substation and the MLP switching station.

Provision of power via overhead supply is considered to be the most cost-effective option. It does, however, generate several risks, including works within close vicinity of high-voltage electricity lines, or temporary outages, during construction activities, proximity to adjacent traffic lanes, and construction within the presence of existing underground utilities and services.

2.3.2.1 Option 2a - Augmentation of existing supply

The current supply method of both of the proposed alignments is overhead. The augmentation of the existing overhead supply across the two proposed alignments would require the replacement of a number of existing power poles with taller poles to elevate the 33kV conductors. Along the Junction Road alignment, to replace the feeder 501 that is to be diverted into the Anzac Village Zone Substation, twenty existing 11kV poles would be replaced with taller timber poles to accommodate the new 33kV line, and the existing 11kV overhead line transferred to the new poles where applicable. Typically, every second or third existing pole would be replaced. A new pole would be installed at the corner of Junction Road and Heathcote Road.

Given the nature of the augmentation works and surrounding land uses of the two alignments it is unlikely that this option result in any significant or long-term disturbance for stakeholders from the inclusion of the 33kV infrastructure and asset. This form and configuration of overhead power supply is characteristic of, and consistent with, augmentation works undertaken in the local area (Figure 3) and not uncommon within this residential setting. Importantly, it is also consistent with the power configuration and design at the proposed tie-in points at Nuwarra and Heathcote Road (Attachment A). It is therefore unlikely to result in significant adverse amenity impacts.

***Figure 3*:** Local residential examples of overhead power supply configuration proposed along Junction Road (above: Nuwarra Road, Moorebank, below: Hoxton Park Road, Liverpool).

Construction costing analysis undertaken to support supply options assessment has estimated that overhead supply via augmentation of the existing infrastructure would be $1.2 million (for the alignment running from Heathcote / Seton Road intersection to the Junction Nuwarra Road intersection).

Adequate clear spacing around the poles to accommodate the larger 33kV line would be required. Detailed design refinements would be utilised to eliminate the occurrence of clearance blow-out, so no adjustment to existing easement areas would be necessary. The physical works footprint is likely to encroach onto the roadway, pedestrian footpaths, and driveway accesses, and in some areas impact existing streetscape vegetation.

Along the Junction Road alignment, this option would result in temporary impacts to pedestrian footpaths, road infrastructure, and access driveways to residential and commercial properties, and to public space, Ernie Smith Reserve, and some restoration or relocation works may be required following completion of works. Planned power outages and night-time construction activities may be required to accommodate the project construction works and minimise disturbance to residential and commercial premises. This option represents the smallest disturbance footprint and timeframe for all stakeholders along this alignment.

Along the Anzac Road alignment, this option would require either relocation of some services and utilities, or management of construction works around the existing underground services. Three new feeders would be required along Anzac Road, including the use of one existing feeder that is currently disconnected. Road realignment works associated with the Moorebank Avenue – Anzac Road intersection have impacted the ability to utilise the existing overhead line and the ability to place new poles for the three new feeders. There is insufficient space in the road corridor for three overhead lines and the only alternative route would be across Department of Defence land south of Anzac Road, which is unlikely to be supported by the Department of Defence. This option is therefore not considered feasible in this location.

Night-time construction works would be undertaken, where practicable, to reduce potential traffic, access and electricity outage impacts to residents and business owners.

The height of the overhead 33kV supply over the existing 11kV provides better buffering against long-term EMF exposure than a stand-alone 33kV line, making it a more suitable supply option for high-trafficked areas, such as the residential areas along the Junction Road alignment.

2.3.2.2 Option 2b – New overhead lines

Rather than using existing poles and lines, new overhead poles and lines located along the alternate verge was considered on an alternative alignment. This alternative option is likely to be a cheaper option in terms of construction cost, estimated at $1.05 million, as existing services would not need to be relocated. This option would generally have a faster construction period since there would be no requirement to transfer existing 11kV low voltage line, street lights and Telstra services on to the new poles and therefore construction works would be less complicated.

The number of required poles would be approximately the same (as the construction methodology described in Section 2.3.2.1 to replace some existing poles). However, there is likely to be a lag in the ability to commence and complete the option due to the need to investigate services on the new route..

This alternative alignment along Junction Road introduces a new overhead line on the southern verge (which is currently absent of any poles or distribution infrastructure) – whilst infrastructure on the northern verge would remain in place. New poles would be required to be established along the frontage of residential properties – resulting in Junction Road having 11 kV lines along one side, and HV 33 kV lines along the other. The resulting impact on streetscape and aesthetics would be significant – as would the subsequent impacts on the community.

This supply method would also require consideration of any adjustment, relocation or earthing requirements for existing built forms within the EMF management zone.

The installation of new overhead lines is, therefore, considered unsuitable as it represents an unnecessary duplication of utilities infrastructure (that is, there would be overhead power infrastructure on both sides of the road) and would result in an entire new suite of impacts to stakeholders, along with additional operation and maintenance requirements for Endeavour Energy.

2.3.3 Option 3 - Underground supply

This option involves placing some or all of the new 33kV feeder underground within the Junction Road and the Anzac Road carriageways. Existing underground services would be exposed along the route to avoid underground clashes with the installation of the feeder lines. This option may also include either relocation of some services and utilities, or management of construction works around the existing underground services.

This option is the most intrusive in the short term, requiring trenching within the road and road reserves area (and associated *Roads Act* 1993 approvals), vegetation removal, disruption to traffic flow and driveway/access arrangements and temporary closure of pedestrian and footpath areas. Heathcote Road is a major arterial road and under the jurisdiction of Transport for NSW (TfNSW). Underground supply along Heathcote Road is, therefore, high risk and will likely result in delays to program as a result of consultation withTfNSW. Discussions with TfNSW to date as part of the MLP development has indicated that placing HV cables within major arterial roadways is unlikely to be supported.

Planned power outages and night-time construction activities would be required to accommodate the project construction works. It would also subsequently require restoration and rehabilitation works to re-establish the road and road reserve areas. There are potential conflicts with other underground services if the feeder is placed underground along the Junction Road alignment, in particular a gas main, which runs along Junction Road for approximately 400m. This may trigger additional installation measures and approval requirements with this utility provider.

Trenching may require street tree and/or root pruning or removal to accommodate the installation of the underground feeder lines and removal of existing poles. Some pedestrian footpaths and road infrastructure would be impacted, and access driveways to residential and commercial properties, or public space would require some restoration or relocation works. Additionally, the alignment will cross Anzac Creek along Junction Road – which would require investigation of available conduits in the existing bridge, or consideration of an alternate pathway. Riparian vegetation along Anzac Creek may be impacted as a result of trenching.

Ongoing operations and maintenance of underground systems would require periodic opening of the road surface and have short-term implications for pedestrians and road users. Emergency response situations can lead to significant interference and disruption for the duration of rectification maintenance until service is reinstated. Resultant ongoing costs associated with management and maintenance of underground systems also exceeds overhead supply.

Placing power underground minimises long term visual impacts, provides for a more reliable power supply network which is not impacted by weather events, and generates positive safety outcomes for road users (via the removal of power poles from the roadside), however, it results in greater potential EMF exposure over time than overhead supply.

Overall this option is a highly intrusive, and is not considered suitable for residential areas where the existing supply network is aboveground, there would be conflicts with existing underground services, the number of sensitive receivers in the vicinity of the proposed works is high, and the potential for long-term EMF exposure can be reduced through overhead supply. Cost analysis of this supply method along Junction Road estimates construction and installation would be of the order of 2.5 times more than overhead supply along the same alignment. On balance this costly approach is not justified due to the identified likely adverse impacts on the community, traffic and other services.

Underground supply is, however a more suitable option for commercial/light industrial areas with minimal sensitive receivers, particularly given that the Anzac Road alignment has minimal pedestrian activity. The requirement for three feeders along Anzac Road results in underground being the only alternative for this road despite the increased construction cost.

2.3.4 Option 4 – Combination Overhead/Underground Supply

This option involves the combination of supply options 3 and 4, based on the outcomes of the review of those supply options. The provision of overhead supply for the augmentation works along the Junction Road alignment, where this mode of supply would minimise the disturbance footprint and timeframe for the sensitive receivers and reduce the potential for long-term EMF exposure; and underground supply for the Anzac Road alignment, where this supply method would integrate in best with the existing energy supply framework.

2.4 Preferred Option

The construction (short-term), operation (long-term) and projected costs of the various supply options are summarised in Table 2-1.

Table 2-1: Summary – Supply Options Assessment

Considerations	Option 1	Option 2a	Option 2b	Option 3		Option 4
				Junction Rd	Anzac Rd	
Construction / Short-term	None	Minimal traffic disruptions Short term impacts on driveways, pedestrian pathways Minor street vegetation impacts Adjustment of every 2nd – 3rd pole Anzac Road – insufficient space for infrastructure	Faster construction Simpler construction Some lag associated with materials Additional vegetation, driveway and pedestrian pathway impacts Anzac Road – insufficient space for infrastructure	Relocation and management of existing services Conflicts with some services (gas) Highly intrusive Traffic impacts Vegetation removal Temporary driveway reconfiguration Temporary pedestrian pathway closure TfNSW support concerns Night-time works and power outages	Intrusive Fewer impacts on pedestrians (industrial area) Minimal vegetation impacts Reduced conflicts with existing services Outages / night time works have reduced impacts	Utilises existing infrastructure on Junction Road Minimises disturbance footprint Minimal traffic disruptions Short term impacts on driveways, pedestrian pathways Minimises street vegetation impacts Avoids conflicts with existing services
Operation / Long-term	Insufficient power capacity available to the MLP to fully meet energy requirements	No easement blowout Minimal visual impact Consolidates power infrastructure	Unnecessary duplication of infrastructure High visual impact Duplication of operation and maintenance costs	Periodic road opening for management and maintenance Ongoing costs associated with management and maintenance Delays in response to emergency situations EMF exposure concerns for pedestrians Less impacted by weather Positive safety impacts for road users Negligible visual impact		Minimises visual impact Consolidates power infrastructure Reduces ongoing management and maintenance costs Minimises EMF exposure Integrates new supply in best with the existing energy supply framework along each alignment
Cost Estimate	$0	$1.2 million (Junction Rd) NA Anzac Road	$1.05 million (Junction Rd) NA Anzac Road	$2.94 million (Junction) Anzac TBC		$1.2 million (Junction Road) Anzac TBC

Given the existing supply network that leads into each of the two proposed alignments, the preferred option to meet the future operational energy requirements of the MLP is Option 4, the combination of overhead supply (augmentation of the existing supply) for the Junction Road alignment and underground supply for the Anzac Road alignment.

Overhead supply via augmentation of the existing supply (Option 2a) is considered to be the most suitable and cost-effective option for the proposed Junction Road alignment. These works would include replacement of a number of existing power poles with new taller poles, the installation of the new 33kV line and transfer of the HV, LV and other services from the existing poles to the new taller poles. Although not the cheapest option, it represents the smallest disturbance footprint and timeframe for all stakeholders along this alignment. This form of supply is characteristic of, and consistent with, infrastructure augmentation in the local area, would avoid the need to acquire or adjust additional easements or existing easement 'blow out', allow traffic and resident / community impacts to be minimised and avoid unnecessary duplication of infrastructure. It also minimises potential impacts on streetscape and visual amenity compared with Option 2b.

Underground supply is the preferred supply option for the proposed augmentation works along the Anzac Road alignment. This option, including removal of existing lines and installation of new 33kV lines underground, would generate less traffic related impacts on the community given it's industrial setting. Additional benefits include minimising potential visual and safety impacts (potential conflicts of overhead lines with heavy vehicles and other industrial-related plant and equipment), and maintain reliability of the electricity network.

This REF assesses the proposed 33kV feeder supply upgrade works.

Once this project has been commissioned, it would become part of Endeavour Energy's supply network and would be operated and maintained in accordance with Endeavour Energy's operating and maintenance standards and procedures.

3 STAKEHOLDER CONSULTATION

3.1 Community Consultation

3.1.1 Process

A community consultation process has been undertaken as part of preparation of this REF and assessment of the impacts of the Project. This engagement will continue to be undertaken throughout the REF notification and exhibition period via a number of media (including local newspapers, online, email, hotline and letter box drop).

This process to date has included:

- a letter box drop to residents and businesses along the Junction Road alignment and the Anzac Road alignment on 1 December, 2021. A copy of the letter provided is included in Attachment D. The letter included high level details of the works proposed, when works are proposed to be undertaken and likely impacts (including expected outages). The letter was also used to provide residents with notice of a door-knocking exercise that would occur in January – February, 2022 once the Christmas holiday period was finished.

  The SIMTA contact details were also provided for any comments/queries people may have ahead of the door knocking exercise;

- a door knocking exercise was completed on the 31 January – 1 February, 2022 along Nuwarra Road and Junction Road. Residents and business owners were provided the opportunity to express any concerns or queries they may have in relation to the Project; and

- the continued use of the SIMTA email and contact number to field any comments or queries from the community.

3.1.2 Outcomes

<u>Door Knocking</u>

Responses from the door knocking exercise (Attachment D) were collated and the results assessed to identify key trends within the feedback provided. Results are summarised below.

- Contact was made with 53 residents / occupiers out of the 112 properties (47%) involved in the door knocking exercise.
- Of these, 8 provided feedback in relation to the Project, which could be grouped into 7 categorises as follows:
    - Cabling Location: 3 comments were received querying why cabling could not be placed underground along the Junction Road alignment, or indicating their preference that the power lines along this alignment all be placed underground.
    - Infrastructure: 2 queries were in relation to the scale of the infrastructure (pole height, dimensions, location on the road).
    - Vegetation: 2 comments were made raising concern in relation to the impact of the works on existing vegetation or private gardens.
    - Aesthetic: 1 occupant raised concern in relation to the impacts of the Project on the aesthetic of Nuwarra Road.
    - EMF / Voltage: 1 occupant was concerned about the potential impacts of taller poles and high voltage lines in close proximity to the dwelling.

- Scope: 1 resident had general queries relating to the overall scope and extent of the Project.
- Consultation: one resident was dissatisfied with the level of consultation provided to residents.

In response to this feedback:

- a rigorous options assessment was undertaken (Section 2) to examine the various construction methodologies and supply options, including both above ground and underground options.
- conceptual design, scope and layout (Attachment B) and detailed Project and works description has been provided. Specific comments in relation to infrastructure placement, bulk and scale has been noted to be considered during detailed design phase.
- removal / disturbance of vegetation will be avoided and minimised where possible, in accordance with Endeavour Energy's vegetation management protocols.
- Section 7 of this REF includes a Visual Impact Assessment that considers the aesthetic impact of the Project along various viewpoints of each alignment. In the existing visual environment, the additional pole height and lines are not expected to be significantly more visually dominant, and restorative landscaping post construction would ameliorate most visual impacts.
- an EMF assessment has been undertaken (Section 7.11) which concludes the exposure risk generated by the Project to health and safety of the general public is low and within the typical range of that within urbanised areas of Sydney and commercial areas.
- the consultation process with the community has provided a suitable level of opportunity and mechanisms for engagement. Further opportunity will be made available when the REF on exhibition during the notification phase (Section 3.3).

Additional Feedback

Additional comments and feedback on the Project has been received via the SIMTA email and contact phone number.

One resident requested that the placement of a specific pole (#606398) be relocated during these works, either slightly north or south, and placed on the property boundary – rather than where it currently is which generates a visual impact. A response was provided to this resident outlining that this request would be noted and considered at detailed design stage, when pole location was confirmed.

Another resident, who also participated in the door knocking exercise, provided feedback and concerns in relation to the Junction Road alignment utilising overhead supply. Concerns were in relation to potential impacts relating to EMF exposure, safety, future development potential and property values, vegetation and public open space. An environmental impact assessment has been undertaken as part of the preparation of this REF and has found that with appropriate management in place, no adverse environmental or health and safety impacts are anticipated. An options assessment has also been undertaken to inform the construction methodology and supply options for the Project.

3.2 Liverpool City Council Consultation

Given Junction Road and Anzac Road are both public (Council owned) roads, and in order to meet consultation requirements under SEPP (Infrastructure) 2007, consultation with Liverpool City Council was undertaken throughout the preparation of this REF.

A meeting was held on 11 February, 2022 and attended by representatives of the Applicant, the construction contractor and Council's Traffic and Transport engineers and Project Delivery team. Outcomes of this consultation are summarised below.

- Council noted the importance of ongoing consultation with the Transport team and Project Delivery team during detailed design phase of the Project, to manage the interfacing and integration of these works with forecast Council works (including both road and utilities upgrade works).
- Smooth interface between these works and those planned by Council will help to reduce any adverse impacts on the community related to outages and traffic, and avoid any unnecessary duplication of works.
- Various supply and construction options were discussed. It was agreed that supply along Junction Road via overhead cables was the preferred option, as undergrounding would result in disruption and impacts to residents and road users. The presence of underground gas main infrastructure also generates conflicts with placing high voltage cables underground. The preferred option would, instead, utilise existing infrastructure, reduce visual impacts on the street and have no implications on future development.
- Council noted that design and works would need to consider and be undertaken in accordance with Liverpool City Council Specification 306U *Road Openings and Restorations* (July, 2000).

As outlined throughout this REF, Council will continue to be consulted with and notified as required prior to and during the construction phase. Council will also be provided the opportunity to review and comment on the REF during the 21 day exhibition period.

Minutes taken during the 11 February Council meeting are provided in Attachment E.

3.3 REF Notification and Exhibition

Endeavour Energy have advised that a 21-day notification and exhibition period is required for the REF to be made available for stakeholder and community review and feedback. This will include:

- advertising in the local papers;
- letterbox drop notifying affected / nearby residents of the proposal and availability of the REF for review and comment;
- uploading the REF online;
- community access to a feedback / comments email and hotline; and
- provision of a copy of the REF to Council.

Following the exhibition period, submissions will be collated and a Response to Submissions prepared.

4 PROJECT DESCRIPTION

4.1 Description of Work

As part of the utilities augmentation and installation works at the MLP, a new 33 kV Endeavour Energy connection is required. Network augmentation and upgrade works are required to improve and extend power infrastructure within the Moorebank area, and enable the approved MLP development.

Specifically, the augmentation and upgrade works forming the scope of this REF (i.e. the 'proposed development'), as outlined by Endeavour Energy in their *Connection Offer – Supply Offer* (5 November, 2020) include:

1. establishing a new Endeavour 33 kV switching station (the 'MLP SS') at the MLP site, in the vicinity of the Loop Road, in the northern part of Moorebank Precinct West (MPW). This switching station has already been approved as part of the MPW Stage 2 development SSD 7709 (Figure 4) and so although forming part of the scope of works, does not require further impact assessment or approval;
2. diversion of existing 33 kV Feeder 500 ('FDR 500') and 528 ('FDR528') from the existing Anzac Village ZS (substation), located northeast of Moorebank Precinct East (MPE) and adjoining the Defence Joint Logistics Unit (DJLU) site;
3. diversion of the existing Feeder 501 ('FDR501') to the Anzac Village ZS;
4. installation of a new 33 kV Feeder ('FDR 518') using existing overhead feeder and new 33 kV cable tails from the MLP SS and Anzac ZS to restore the 'N-1' supply to Anzac Village Zs and Defence No. 1;
5. installation of a new 33 kV feeder ('50C') between Seton Road to Nuwarra Road, along Junction Road. Specifically, the works would take place between Moorebank ZS to Tee to Chipping Norton ZS. Works would possibly utilise either 2 x 19/3.25 or 1 x 19/4.75 overhead conductors along Heathcote Rd and Junction Rd from existing out of service overhead line in Seton Rd to existing overhead line in Nuwarra Rd to restore N-1 supply to Chipping Norton ZS and Defence No.2;
6. connection of the FDR 50C at the Moorebank ZS; and
7. relocation of the Feeder 516 (FDR 516) Chipping Norton 33 kV cable at Liverpool TS from CB LP3277 Section 4 to spare CB LP3260 on Section 1 to maintain supply security for the affected network

Figure 5 provides general concept design details for the proposed development.

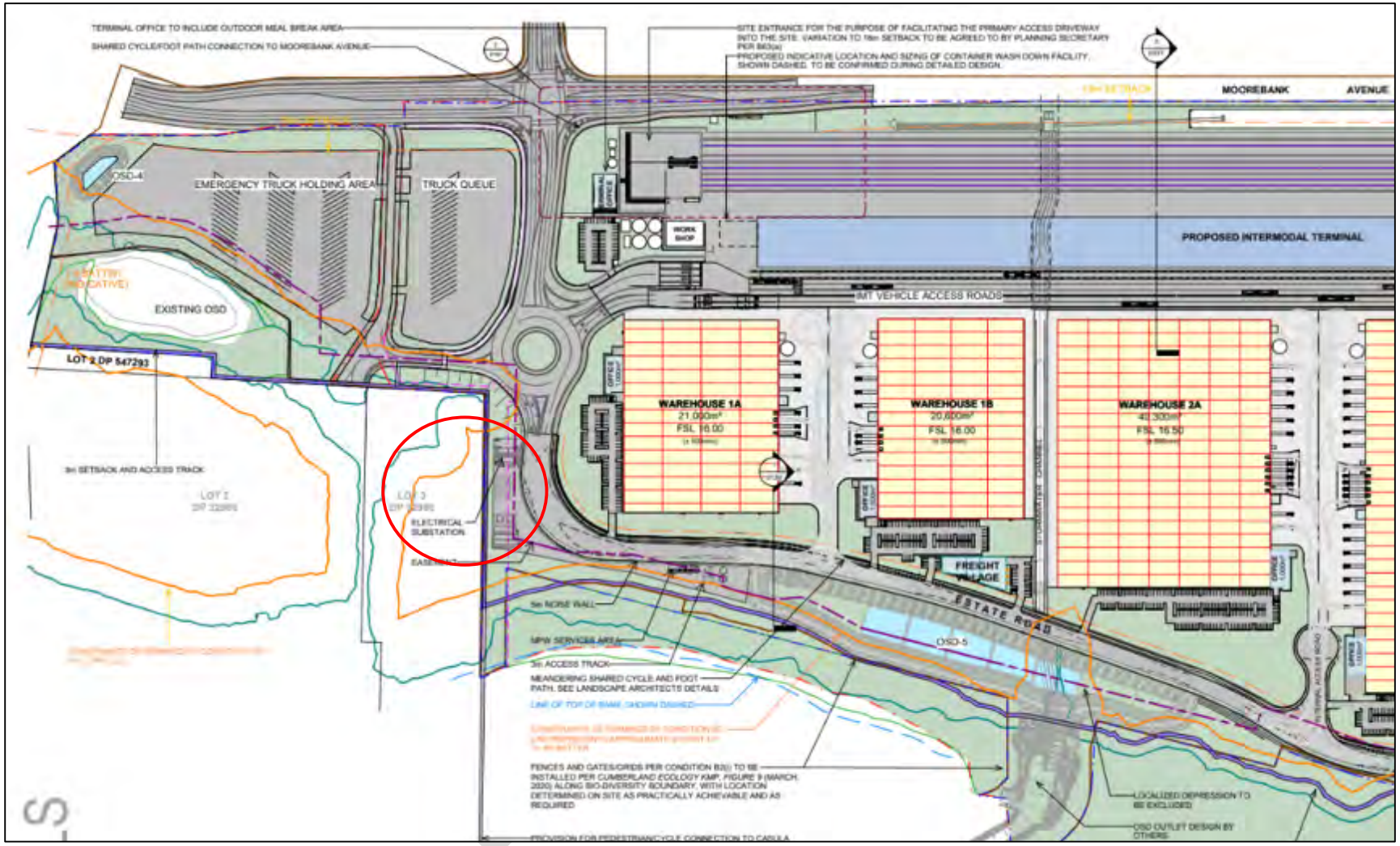


Figure 4: Excerpt from SSD 7709 approved MPW Masterplan (MLP switching station circled in red) (SIMTA, 2021)

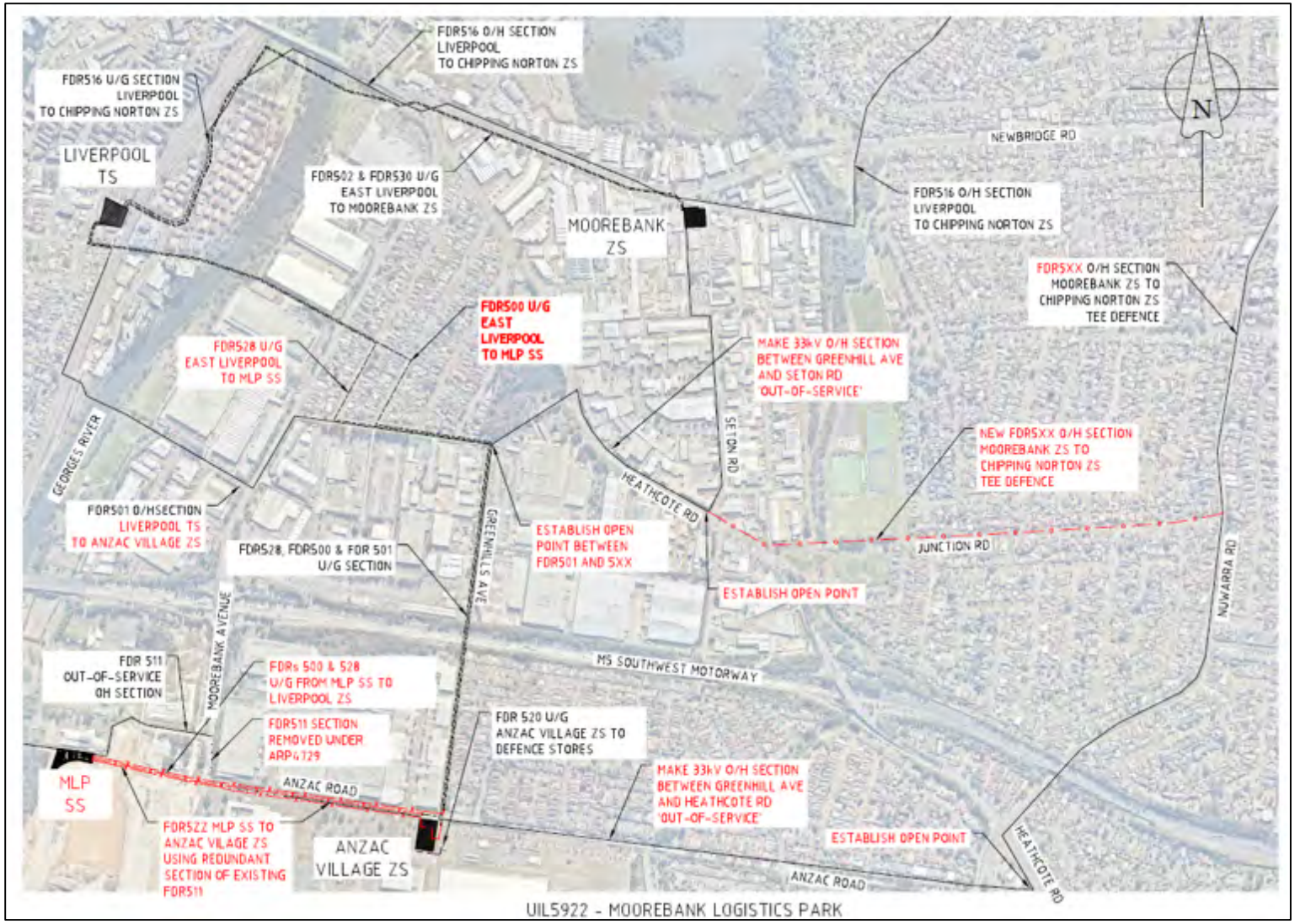


Figure 5: *Proposed Development concept design (works shown in red) (Ausconnex, 2021)*

4.2 Timing, Duration, Hours of Work

The augmentation works for the Junction Road alignment would involve a 9 – 12 month construction program, however, this depends on Endeavour Energy's ability to provide for the outages required (see Section 6.3). Similarly, works for the Anzac Road alignment are anticipated to take between 10 and 12 months, however, the construction of this package, along with other elements of the greater scope of works, may be undertaken concurrently with those along Junction Road.

Preliminary construction schedules for the proposed works have them being undertaken generally between Q4 2022 and Q4 2023. Schedules depend on the detailed design process, certification, consultation and notification of works and the availability of contractors completing the works and may be revised.

Given the proposed works location and that they would involve a number of power outages for nearby residents and local businesses, it is anticipated that they would be predominately undertaken outside peak periods and at night. A number of interim measures would be investigated during the detailed design phase in order to reduce the number of anticipated outages.

Proposed works timing and duration is to be confirmed during detailed design and certification phase.

4.3 General Construction Details

The sections below provide a high-level outline of proposed construction process, requirements and methodology. Details are to be confirmed during the detailed design and certification phase. Refer to Figure 5 for location of various works packages / elements outlined in the following subsections. Concept designs for each element of the proposed scope of works is provided in Attachment B.

Variations to the general construction sequences may vary between individual poles, depending on location, surrounding sensitivities and associated construction requirements. Prior to works being undertaken, a Construction Environmental Management Plan (CEMP) is to be prepared with further details on construction sequencing and requirements; and confirmation of relevant environmental controls.

4.3.1 Divert FDR 500 & 528 (33 kV) from Anzac ZS to MLP SS

Once the approved 33 kV Switching Station (SS) is established at the MLP site, the 33 kV feeders 500 and 528 would be diverted from the Anzac village ZS to the MLP SS. The following methodology and construction sequence would generally apply to these works (as taken from AusConnex correspondence, dated 24 September, 2021).

1. Trench/install new 3 x 150 mm and 2 x 100 mm HD ducts within the eastbound kerb-side lane of Anzac Rd between Greenhills Ave and 33kV ducts proposed under CAP project ARP4728.
2. Trench/install new 3 x 150 mm and 2 x 100 mm HD ducts within the eastbound kerb-side lane of Anzac Rd between Anzac Village ZS and 33kV ducts proposed under CAP project ARP4728.
3. Establish 2 x new 33kV Joint Bays (1.5m x 6m) at suitable locations to cut and extend existing 33kV feeder 500 and 528 to MLP SS.
4. Cut existing Feeder 500 at the joint bay and make STJ with new 3 x 33kV 1200mm^2 CU 1C XLPE/PVC/HDPE Screened U/G cable. Extend new 33kV

cables in proposed ducts under this project and project CAPs ARP4511, ARP4728 and terminate at MLP SS.

5. Cut existing Feeder 528 at the joint bay and make STJ with new 3 x 33kV 1200mm^2 CU 1C XLPE/PVC/HDPE Screened U/G cable. Extend new 33kV cables in proposed ducts under this project and project CAPs ARP4511, ARP4728 and terminate at MLP SS.

Construction sequencing and methodology would be confirmed during detailed design and certification phase, in consultation with Endeavour Energy.

4.3.2 Divert existing FDR 501 to Anzac Village

The existing FDR 501 would be diverted to the Anzac Village substation as follows:

1. Trench/install 3 x 150 mm and 2 x 100 mm HD ducts between existing 33kV direct buried cable and Anzac Village ZS.
2. Establish new 33kV Joint Bay (1.5m x 6m) at suitable locations to cut and extend existing 33kV feeder 501 to Anzac Village ZS.
3. Cut existing Feeder 501 at proposed joint bay, make STJ with new 3 x 33kV 630mm^2 CU 1C XLPE/PVC/HDPE Screened U/G cable and extend into Anzac Village ZS via proposed ducts under this project (33kV sealing end terminations at Anzac Village ZS to be performed by EE).
4. Proposal to remove redundant 33kV cables between joint bay and UGOH pole 881900.
5. Remove bonds at existing 33kV through-strain pole # 604810 located near the corner of Anzac Rd and Brallos Ave, thus making the existing 33kV OH section between PL881900 and PL604810 'Out-of-Service'.

Construction sequencing and methodology would be confirmed during detailed design and certification phase, in consultation with Endeavour Energy.

4.3.3 Establish new 33 kV FDR 518

A new 33 kV feeder (FDR 518) is to be installed underground between the proposed MLP SS and the existing Anzac Village ZS along Anzac Road. The following general construction sequence and methodology would apply (as taken from AusConnex correspondence, dated 24 September, 2021):

1. Trench/install new 3 x 150 mm and 2x100 mm HD ducts in a dedicated easement (to be acquired by EE) between Anzac Village ZS and 33kV ducts proposed under CAP project ARP4728.
2. Locate existing bank of spare ducts between 'E1' and 'E2' and replace with new 3 x 150 mm and 2 x 100 mm HD ducts.
3. Install new Feeder 518 between MLP SS and Anzac Village ZS using 3 x 1200mm^2 CU 1C XLPE/PVC/HDPE Screened U/G cables in proposed ducts under this project and project CAPs ARP4511, ARP4728.
4. 33kV sealing end terminations at Anzac Village ZS (performed by EE).

Construction sequencing and methodology would be confirmed during detailed design and certification phase, in consultation with Endeavour Energy.

4.3.4 33 kV FDR 50C – Heathcote Rd to Nuwarra Rd (along Junction Rd)

This scope of works generally seeks to replace existing timber transmission poles with new poles, that would cater for the existing low voltage (LV) and high voltage (HV) transmission lines, plus installation of an additional 33 kV HV line that would sit above the existing lines. It is anticipated that approximately every second pole would be replaced, increasing its height to accommodate the new wires above the existing ('interpoling'). Structure height above the existing is anticipated to be 20 – 21 m.

In summary, construction works would generally involve the steps below.

1. Pre-drill the new pole hole, adjacent to existing pole location.
2. Stand new pole adjacent to the existing.
3. Install 33kV mains to the new pole and complete the new feeder construction. New 33kV conductors would be placed in a vertical configuration. The arrangement is called a 62T 'Vertical Line Post' to Endeavour Energy Standards (Figure 7).

   In addition to the 33kV conductors an overhead earth wire is to be installed above the three 33kV conductors.
4. A total of 4 new wires would be added to the existing arrangement
5. Transfer the existing LV and HV mains to the new pole.
6. Remove the redundant pole below ground level, utilising a transmission crew and a 40-tonne crane.
7. Rehabilitate area where redundant pole has been removed.
8. Disposal or re-use (where possible) of redundant pole. Section 7.10 provides further details on management of pole waste.

Construction sequencing and methodology would be confirmed during detailed design and certification phase, in consultation with Endeavour Energy. Figure 6 provides an example of typical power pole and conductor configurations that would result following the 518 scope of works, and Figure 7 provides the standard Endeavour Energy drawing for the 62T Vertical Line Post arrangement – which would be above the existing 11 kV lines.

Figure 6: Typical power pole arrangement following proposed FDR 50C works.

Figure 7: 62T Vertical Line Post arrangement (Supplied by JWP from Endeavour Energy Standards, drawing number 398024).

4.3.5 Connect Feeder 50C at Moorebank ZS

The final element of the overall project would involve connecting the new 33kV FDR 50C to the Moorebank ZS, located northeast of the MLP. Scope of works for this element is outlined below.

1. Install new droppers at the landing span (works to be completed by Endeavour Energy) to establish new 33kV Feeder 50C 'Moorebank ZS to Chipping Norton Tee to Defence'.
2. Isolate existing feeder 501 overhead section between PL863907 (corner of Church Road and Greenhills Avenue) and PL 606181 (corner of Heathcote Road and Seton Road) by removing the bonds at either end.

Construction sequencing and methodology would be confirmed during detailed design and certification phase, in consultation with Endeavour Energy.

4.4 Outages

Given the proposed works involves transmission pole replacement (either with a new pole or, in the case of Anzac Road, replacement with underground power), transfer of existing LV and HV lines, and installation of new 33 kV mains (above and below ground), a number of power outages are expected during construction works.

The Feasibility Report completed by Ausconnex (2021) has identified that an estimated 14 outages would be required throughout the construction phase for the Junction Road (FDR 50C) works. This would impact on the service and delivery of power to nearby residences and businesses during this time.

Works would likely predominately be undertaken at night, in an effort to minimise any traffic, nuisance and adverse impacts to nearby residents and businesses. Prior to any scheduled outage, impacted residents and businesses would be notified in accordance with Endeavour Energy's standard practice and procedures. Notifications would include details of works to be undertaken, anticipated duration of works, timing of works and contact details, should further information be required.

5 EASEMENT REQUIREMENTS

5.1 General Easement Requirements

Electricity easements contain powerlines, transformers and other network equipment and are created to provide a clear access for Endeavour Energy to operate, maintain, and upgrade networks and to control safety related matters for workers and residents. Property owners/residents are required to provide access to easements on their property, at all times, and easements should not be obstructed as infrastructure contained within these areas may need to be accessed for upgrade works and during planned and unplanned outages.

Property owners/residents have limitations on land use and activities within easements:

- Planting trees, shrubs and plants that would not exceed three metres in height when fully grown in overhead easements.
- Carrying out normal farming, grazing and cropping activities, that do not impact the electrical assets.
- Operating mobile plant and equipment that does not exceed a maximum height of four metres when fully extended.
- Storing non-combustible materials up to a maximum height of 4.3 metres if not climbable or 2.5 metres if climbable.

The following activities are not permitted within an easement:

- Constructing permanent buildings or fixed plant and equipment.
- Storing combustible materials, garbage or fallen timber.
- Planting large trees that grow more than three metres.
- Driving fence posts or stakes in easements with underground electricity cables.
- Installing unapproved third-party utilities such as telecommunications, gas, water or sewerage services.

Easements are in place for all existing electricity infrastructure and assets along Junction Road and Anzac Road.

5.2 Project Requirements

The proposed development would be undertaken within the existing Endeavour Energy easements, established to accommodate the existing power poles and HV and LV lines along Junction Road and Anzac Road. Where power supply is to be extended into the MLP and connected to the MLP switching station, easements would need to be established, in consultation with Endeavour Energy.

The Feasibility Study (Ausconnex, 2021) prepared for the Junction Road alignment indicates that due to the installation of a new 33kV transmission line (and associated infrastructure), ‘blowout encroachments’ would be controlled by additional pole replacement so there is no ‘blowout’ and no increase in easement requirements. The detailed design process (undertaken prior to the commencement of construction) would refine design elements to eliminate any easement blow out and avoid any changes to existing easement configurations. This approach would maintain access and safety clearances to Endeavour Energy assets and the ongoing safety of residents and the community.

It is also worth noting that the proposed development is being undertaken within an area where there are other utilities and services in place, which are likely to have their own easements and associated works requirements. Consultation with other key service providers may therefore also be required.

Section 7.2 provides further details on potential impacts on utilities and services, and their management.

6 ENVIRONMENTAL LEGISLATION

6.1 Status of Endeavour Energy under Environmental Legislation

The environmental planning instrument that applies to the proposed development is the State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP) (formerly ISEPP). Chapter 2 of the Transport and Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across NSW by identifying whether certain types of infrastructure require consent, can be carried out without consent or are exempt development.

Pursuant to Clause 2.44, *'development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without consent on any land'*.

Development is defined under Clause 2.44 (2)(a) as (emphasis added in **bold**):

> *(a) construction works (whether or not in a heritage conservation area), including—*
>
> > ***(i) laying and installation of cables and cable pits, co-location of cabling and erection of ventilation and access structures, bridges and tunnel adits, and construction of a tunnel or conduit for an underground cable, and***
> >
> > *(ii) alteration, demolition or relocation of a local heritage item, and*
> >
> > *(iii) alteration or relocation of a State heritage item, and*
> >
> > ***(iv) installation of overhead wires and associated component parts, including support structures**, and*
> >
> > *(v) construction of access tunnels or access tracks,*

The proposed development constitutes 'construction works' under Clause 2.44 (2) (a) (i) and (iv). Endeavour Energy is an electricity supply authority and so is authorised to complete these works, without requiring consent under Part 4 of the *Environmental Planning and Assessment Act* (EP&A Act) 1979. The construction works would be assessed for potential environmental impacts under Part 5.

It is noted that construction and operation of the MLP switching station has previously been approved under Part 4 of the EP&A Act 1979 (specifically as part of SSD 7709). Although it forms part of the proposed scope of works that is subject to this REF, it does not require assessment or approval under Part 5 of the Act.

In assessing the scale, nature and extent of likely impact and determining the proposal, Endeavour has considered sections 5.5, 5.6 and 5.7 of the EP&A Act and the requirements of Clause 171 of the EP&A Regulation 2021 (see Section 7).

This REF is intended to satisfy Endeavour Energy's obligations under the EP&A Act and the requirements of Clause 171 of the EP&A Regulation 2021.

Environmental planning instruments relevant to this assessment are addressed below.

6.2 Land Use Zoning

The Liverpool LEP (LEP) 2008 establishes the local planning provisions and development standards required within the various land use zones, in the Liverpool local government area. The plan permits and prohibits the occurrence of certain activities or works depending on the zoning of the land parcel.

The area surrounding the Junction Road alignment is largely zoned as Medium Density Residential (R3) and Public Recreation (RE1). Under the LEP, works occurring within R3 land zoning that do not include home based childcare or home occupations require consent. RE1 land zoning requires consent for works that do not include environmental protection works or home occupation.

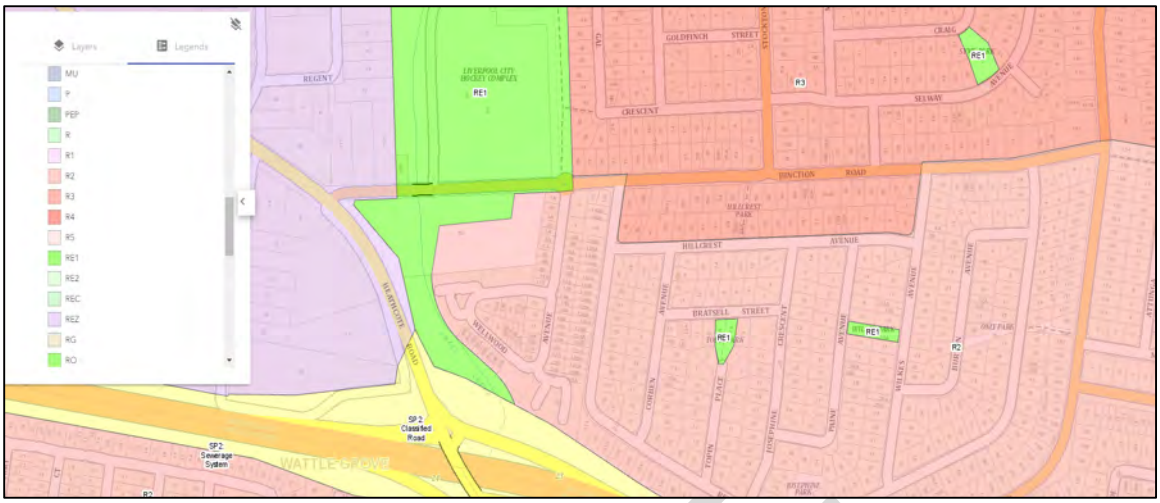


Figure 8: Junction Road land use zoning (eplanning, NSW 2021)

The area in proximity to the Anzac Road alignment is classified primarily as General Industrial (IN1), Infrastructure (SP2) and Low density residential (R2). Under the LEP, any works occurring in within general industrial infrastructure land zoning requires consent.

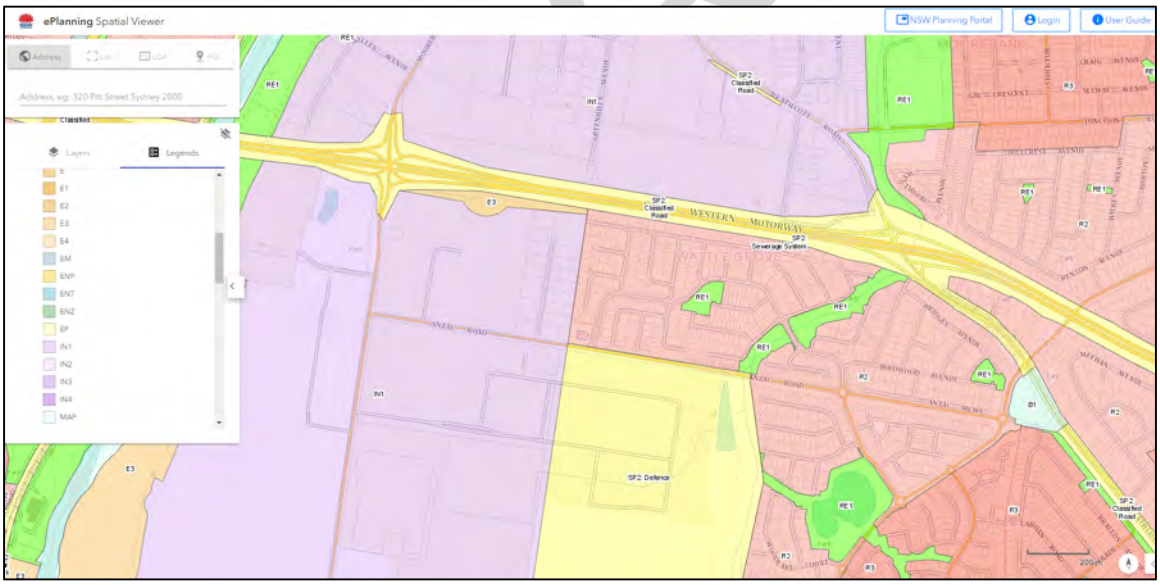


Figure 9: Anzac Road land use zoning (eplanning, NSW 2021)

Despite the land use requirements within these zones, given the Proponent (Endeavour Energy) is a network operator, the provisions of SEPP (Transport and Infrastructure) apply and takes precedence over the requirements of an LEP. As outlined in Section 6.1, the Proposed Development can proceed without requiring development consent.

6.3 EPBC Act & Consideration of MNES

The *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) protects Matters of National Environmental Significance (MNES), including but not limited to migratory species, nationally threatened species and ecological communities, and National Heritage places. Proposed actions that would or are likely to result in significant impacts to MNES or Commonwealth Land, or that are undertaken by Commonwealth agencies, require referral and potential approval from the Federal Environment Minister.

A search of the EPBC Protected Matters Search Tool on 22 November 2021, identified no MNES within, or in proximity to, the site. Referral to the Commonwealth Department of Environment is not required for the proposed development.

6.4 Electricity Supply Act 1995

The *Electricity Supply Act* 1995 (ES Act) is the framework that allows for network operators to complete maintenance on electricity works for the purpose of electricity supply.

Section 45 of the Act allows maintenance works to be carried out on public roads or reserves, as would be required by the Proposed Development.

> ***S 45 Erection and Placement of Electricity Works***
>
> *(1) For the purpose of exercising its functions under this or any other Act or law, a network operator may carry out any of the following work—*
>
> *(a) work comprising the erection, installation or extension of electricity works on public land,*
>
> *(b) work on any land comprising or connected with the alteration, maintenance or removal of existing electricity works on any land,*
>
> *(c) work on public land that is connected with the erection, installation, extension, alteration, maintenance or removal of electricity works on any land*

Section 53 of the *ES Act* provides for the repair, modification and upgrade of electricity works where the works are located on land that is not owned by the network operator and there is no existing easement. The Act allows necessary entry onto property for the purposes of operating or maintaining works (s54) (residential property s62), provides entry notification requirements (s55) and identifies the required care to be taken by entrants (s58).

6.5 Protection of the Environment Operations Act 1997 (POEO Act)

The POEO Act is the primary statute for environmental protection and pollution prevention. It is administered by the EPA and establishes a licensing regime for waste, air, water, and pollution resulting from approved development and operational activity. Work potentially resulting in pollution must comply with the requirements of the POEO Act.

The Proposed Development would not involve potential polluting discharge and consequently no activity is identified as requiring an environment protection licence (EPL). Any works that have the potential to create noise, land pollution and waste would be managed in accordance with the Proponent's standard construction environmental

management documentation. Endeavour Energy's 'Excavation' procedure (GSY 1015, 2016) would be referenced as part of the CEMP.

6.6 Roads Act 1993

The Proposed Development may require temporary lane closures resulting in disruptions to normal parking and traffic flow along the following roads as classified under the *Roads Act* 1993:

- Junction Road, an RMS classified Local Road;
- Nuwarra Road, an RMS classified Regional Road;
- Heathcote Road, an RMS classified State Road;
- Anzac Road, an RMS classified Local Road; and
- Moorebank Avenue, a Commonwealth private road opened to public access, currently operating as Moorebank Avenue Diversion Road operating as a public road under easement to RMS.

A ***road*** is defined under the *Roads Act* 1993 as including:

> *(a) the airspace above the surface of the road, and*
> *(b) the soil beneath the surface of the road, and*
> *(c) any bridge, tunnel, causeway, road-ferry, ford or other work or structure forming part of the road.*

Section 75 of the Roads Act 1993 allows a public authority, such as Endeavour Energy, to carry out road works, where approval by TfNSW has been received.

> *A **public authority** may not carry out road work on a classified road, being work that involves:*
> *(a) the deviation or alteration of the road, or*
> *(b) the construction of a bridge, tunnel or level crossing in the road, **unless the plans and specifications for the proposed work have been approved by TfNSW***

A Road Occupancy Licence (ROL) and an RMS approved Traffic Management Plan (TMP) would be required to support the proposed development where road opening is required. This is further discussed in Section 7.3.

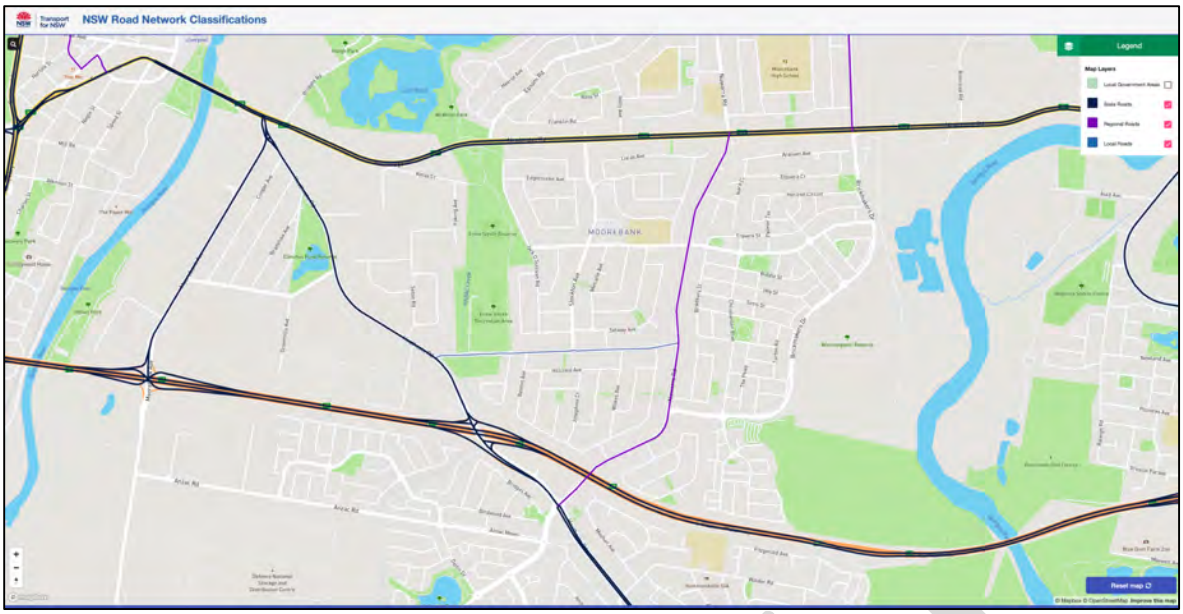


Figure 10: Road network classification (TfNSW, 2021)

6.7 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act (BC Act)* provides for the conservation of the State's biodiversity values by providing environmental assessment requirements (Part 7) for activities being assessed under Part 5 of the EP&A Act, and by enabling offset of impacts via a framework of biodiversity credit retirement. Where significant impact to biodiversity values is likely, REFs are to be accompanied by a Species Impact Statement (SIS) or Biodiversity Development Assessment Report (BDAR).

No areas of Biodiversity Value are mapped along or in the vicinity of the Junction Road alignment.

Biodiversity values have been identified adjacent to the Anzac Road alignment as shown in Figure 11. This vegetation is located on the southern side of Anzac Road and within the adjacent DJLU site. Given proposed works are within the Anzac roadway (within the eastern carriageway), no impact on this vegetation is anticipated. Prior to works being undertaken, exclusion zones around vegetation in this area would be established.

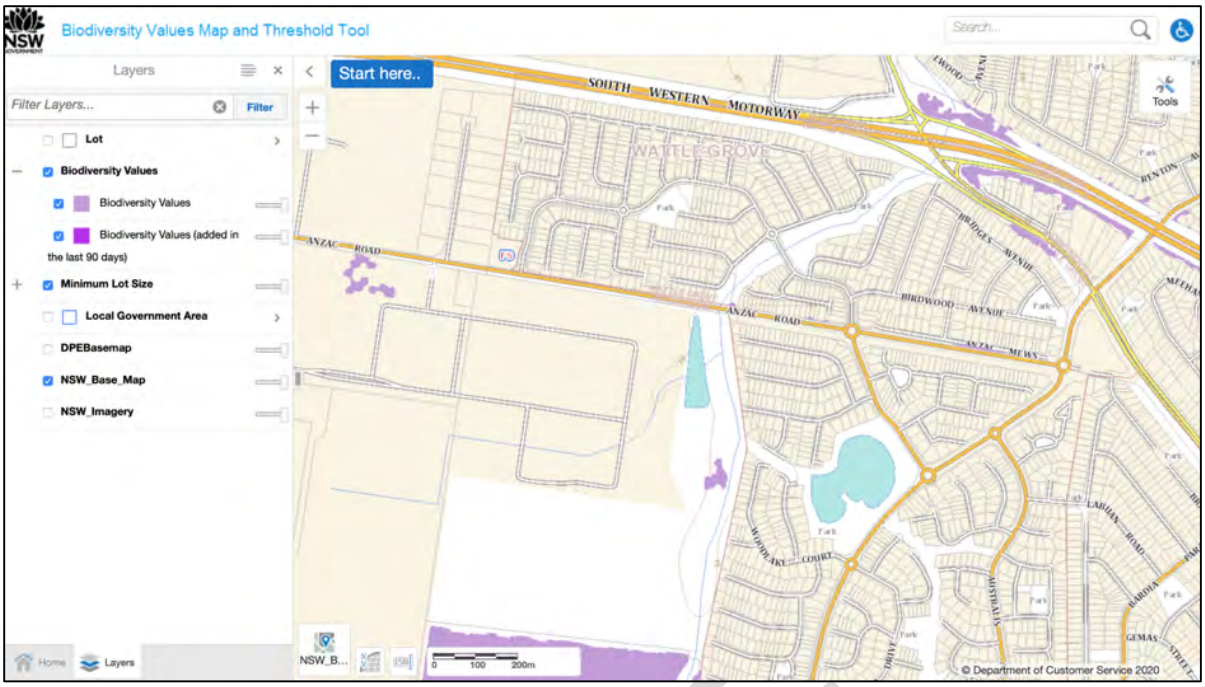


Figure 11: Biodiversity Value Mapping (NSW DPI, 2021)

6.8 Summary of Other Legislative Requirements

Table 6-1 summarises other legislative requirements applicable to the Site, but not triggered by the Proposed Development.

Table 6-1: Other applicable legislation

Act	Purpose	Applicability
National Parks and Wildlife Act 1974 (NPW Act)	The NPW Act provides for the protection of Aboriginal objects, places, land, activity or persons. Where impacts on such items are identified, an Aboriginal Heritage Impact Permit may be necessary.	A search of the State heritage register indicated no items for consideration under the *NPW Act* within the works area but did identify items within the vicinity of the proposed development area. A permit for the works under the NPW is subsequently not required. Protection zones around identified items would nevertheless be established and maintained during construction. Any unexpected finds encountered during works would be managed in accordance with Proponent's management documentation.
Heritage Act 1977	The NSW Heritage Act provides for the conservation of the State's environmental heritage. Where impacts on such items are identified and potentially impacted, a permit may be required.	A search of the State heritage register indicated that no items of environmental heritage importance are located in proximity to the site. The Heritage Act is subsequently not applicable to the proposed development.
Contaminated Land Management Act 1997 (CLM ACT)	The CLM Act establishes processes for the investigation, management and remediation of contaminated land within NSW. Under the CLM Act the EPA is granted authority to assess and regulated identified contaminated land.	A search of the Contaminated Land Register indicated no identified areas of contaminated land within or in proximity to the proposed development site. Notification and regulation under the CLM Act is not required.
Water Management Act 2000 (NSW) 2000 (WM Act)	The WM Act provides for the protection, conservation and ecologically sustainable development of NSW's water resources. Controlled Activity Approvals are required for works occurring within 40m of a mapped watercourse.	Under Clause 43 of the WM Act network operators are exempt from this requirement. Subsequently a Controlled Activity Approval would not be required for the proposed development.

7 ENVIRONMENTAL IMPACT ASSESSMENT

For this activity, Endeavour's Environmental Management Standard - Endeavour Energy Environmental Impact Assessment and Environmental Management Plans; Document EMS 0001; 25 January 2019 is applicable and requires approval of the activity under Part 5 of the EP&A Act. For a Part 5 approval, Endeavour Energy as the Authorised Network Operator (ANO) is the determining authority for Class 4 or 5 activities.

An REF must assess the environmental impacts of the activity and involves a consideration of environmental aspects not only within the actual work area, but also access pathways and any additional areas (for example clearance around poles, vegetation clearance required and areas for laydown or storage compounds), which are likely to be affected by the activity, either directly or indirectly.

Summary Environmental Reports (SERs) were prepared by Northrup Consulting Engineers (2021) for the asset relocation works at Anzac Road, Moorebank (SERs ARP4511 and 4728), and were reviewed as part of this REF.

Part 5 of the EP&A Act does not apply where development consent under Part 4 of the Act has been obtained (s 5.1). The conduits approved and installed as part of the Moorebank Avenue-Anzac Road (MAAI) intersection works under the SER ARP4511 design would be utilised by the section of feeders from Secombe Road through to the new switching substation site, to facilitate the Anzac Road augmentation activities. These conduit works have therefore already been environmentally assessed and approved under SSD 7709.

Further, the new switching substation required for the Anzac Road works has also been assessed and approved under SSD 7709. No further environmental assessments in relation to these conduits or switching substation are required, and so have not been included in the following environmental impact assessment sections.

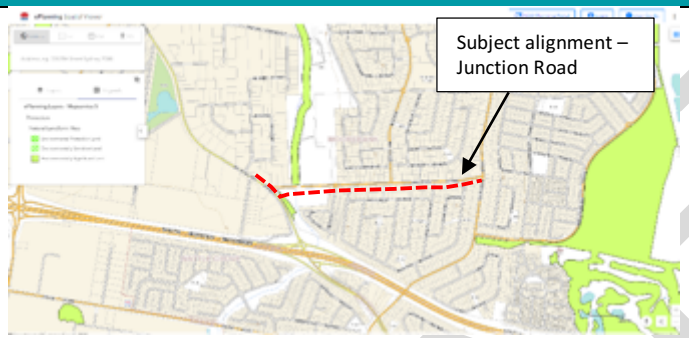
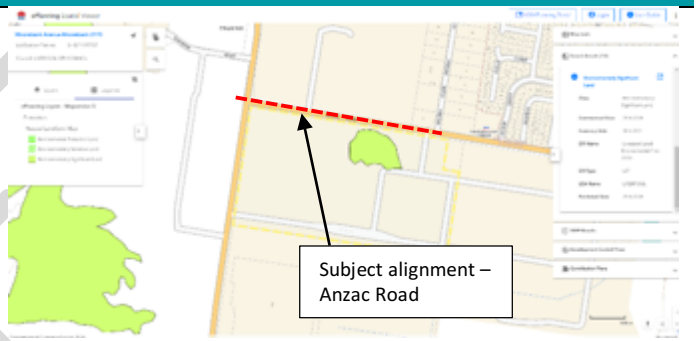
The following sections provide a summary of the key environmental issues relating to the proposed network upgrade works for both the Junction Road alignment and the Anzac Road alignment. Table 7-1 provides a summary of environmental aspects and an assessment of the relevance to this proposed development. Environmental aspects considered to be relevant (for the purposes of this REF) are considered key environmental issues and are discussed in further detail throughout Section 7. Comment in relation to environmental issues which are either not considered relevant to the proposed development or have been identified as being neutrally impacted is provided in Table 7-1.

Table 7-1: Summary of environmental aspects.

Aspect	Relevant to Proposed Development (Yes/No)	Comment / Impact Assessment – Junction Road Alignment (FDR 50C)	Comment / Impact Assessment – Anzac Road Alignment (FDR 518)
Utilities and Services	Yes	The proposed works involve alterations to existing utilities and services, and installation and connection of new 33kV lines and existing 11kV lines to new poles between the Heathcote Road/Seton Road and Junction Road/Nuwarra Road intersections.	Establish a new 33kV switching station at MLP site, and divert existing feeders and new 33 kV feeder into trenches within the roadway for underground installation.
Roads, traffic and access	Yes	The proposed development would affect local roads, traffic and access during construction works for residents and industrial/commercial properties.	The proposed development would affect local roads, traffic and access during construction works for the local community and industrial/commercial properties.
Land Use	No	There is no change to land use associated with the proposed development. All upgrade works would be undertaken within existing easements, with potential for temporary use of adjacent areas for access and storage and temporary road diversions, where required.	There is no change to land use associated with the proposed development. Upgrade works would be undertaken within existing easements, except where power supply is to be extended into the MLP and connected to the MLP switching station, with potential for temporary use of adjacent areas for access and storage and temporary road diversions, where required.
Landscape and Visual Assessment	Yes	The proposed works would result in some changes to the visual character of the surrounding area, as pole height of selected poles would be increased to accommodate the additional 33kV line. Additional conductors would also be installed along the alignment. Given the existing environmental setting, the additional pole height and lines are not expected to generate unacceptable impact the visual character of the area.	The removal of the existing electricity poles and installation of lines underground would have a positive visual outcome for affected property owners and users of the Anzac Road alignment. Construction works would however generate temporary adverse impacts due to the presence of machinery and intrusive road works. Given the commercial / industrial setting, however, impact to the characteristic of the area would be minimal.
		A detailed visual and impact assessment has been prepared for the proposed works along both the Junction Road and Anzac Road alignments and is provided in Section 7.4.3.	

Aspect	Relevant to Proposed Development (Yes/No)	Comment / Impact Assessment – Junction Road Alignment (FDR 50C)	Comment / Impact Assessment – Anzac Road Alignment (FDR 518)
Hydrology, surface water quality, and flooding	No	The existing electrical transmission alignment crosses Anzac Creek (a first order minor stream) near the driveway access to the Liverpool City Hockey Complex and therefore works would be undertaken on waterfront land (i.e. within 40 m of a watercourse). Under Clause 43 of the WM Act, as a network operator, Endeavour Energy is exempt from the requirement for a Controlled Activity Approval that would otherwise be required for works on waterfront land. No areas within the vicinity (more than 1 km) of the subject alignment are mapped on Council's flood planning maps. Ground levels are expected to be restored generally to what they were prior to the commencement of construction, and so works are not expected to impact or alter the creek's hydrological function, including flood storage capacity. Appropriate erosion and sediment control (ESC) is to be installed in works areas to mitigate the transportation of sediment into drainage lines and stormwater management systems. ESC measures are to be installed and maintained in accordance with Landcom (2004) *Soils and Construction Handbook* (i.e. the Blue Book).	No watercourses are located within proximity of the proposed works. No areas within the vicinity (more than 1 km) of the subject alignment are mapped on Council's flood planning maps. Appropriate erosion and sediment control (ESC) is to be installed in works areas to mitigate the transportation of sediment into stormwater management systems. ESC measures are to be installed and maintained in accordance with Landcom (2004) Soils and Construction Handbook (i.e. the Blue Book).
		The proposed development would require appropriate management to protect against direct and indirect impacts related to surface water, hydrology and flooding. A site-specific CEMP would be prepared, incorporating a soil and water management plan and an ESC plan. • Appropriate sediment and erosion control measures shall be installed prior to the commencement of works to prevent material from being transported into a waterway. • Vehicles and machinery would be maintained and regularly checked for leaks. • A spill kit would be onsite at all times.	

Aspect	Relevant to Proposed Development (Yes/No)	Comment / Impact Assessment – Junction Road Alignment (FDR 50C)	Comment / Impact Assessment – Anzac Road Alignment (FDR 518)
		• Any land disturbed during works would be restored to pre-construction quality as soon as practicable. • All fuels and chemicals would be stored away from drainage lines and in a suitable bunded area or container. • Any refuelling of machinery would be carried out at least 100 m from the nearest watercourse. • Any water accumulated in open trenches or pits would be managed in accordance with dewatering procedures provided in Endeavour Energy's Environmental Guidelines Handbook.	
Flora and fauna	No	Vegetation adjacent to the poles and within the road verge areas is generally limited to turf and street landscaping consisting of shrubs and trees. During site inspection it was evident that street vegetation in the vicinity of existing power infrastructure has been previously managed in accordance with Endeavour Energy's vegetation management protocols. The proposed development may require further pruning and / or removal of vegetation within the vicinity of new replacement poles and trenching excavation works. Where feasible and reasonable, landscaping would be reinstated following completion of the works. No areas within the vicinity (more than 1 km) of the subject alignments are mapped on Council's Terrestrial Biodiversity, Riparian Lands and Watercourses, Natural Resources – Water, Natural Resources – Biodiversity, Scenic Protection or Wetlands maps. Similarly, the proposed development area is not mapped on the NSW Biodiversity Values Map. An approximately 40 m wide corridor to the north of Junction Road including Anzac Creek, and a small portion of land near the intersection of Heathcote Road and Junction Road is mapped on the Natural Landform map as Environmentally Significant Land (Liverpool LEP 2008). The proposed works would be undertaken approximately 20 m to the west of the (eastern) creek bank. No stands of vegetation areas or habitat were noted within the vicinity of the proposed works, and the impact on the watercourse area is expected to be negligible, being outside the 10 m riparian zone allowance for first order streams. The proposed works would not impact the conservation values or significance of the nearby bushland, wetland or wildlife corridors.	A portion of land immediately to the south of Anzac Road is mapped on the Natural Landform map as Environmentally Significant Land (Liverpool LEP 2008). The proposed works would be undertaken adjacent to the identified area, which corresponds to a vegetated area on the ground. The proposed works would be undertaken within the roadway, and outside of this vegetated area, and so the impact on the mapped land is expected to be negligible. The proposed works would not impact the conservation values or significance of the mapped environmentally significant land.

Aspect	Relevant to Proposed Development (Yes/No)	Comment / Impact Assessment – Junction Road Alignment (FDR 50C)	Comment / Impact Assessment – Anzac Road Alignment (FDR 518)
			
		Impacts on flora and fauna as a result of the proposed development would be minimised through implementation of management measures including: • implementation of Endeavour Energy's vegetation management procedure during construction works; • notification of any damage to vegetation outside of the nominated work area to the Project Manager so that appropriate remediation strategies can be developed and implemented; and • appropriate landscaping of the proposed development area after completion of the works, where appropriate.	
Aboriginal heritage	No	An Aboriginal Heritage Information Management System (AHIMS) search did not identify any registered Aboriginal sites or places along the Junction Road alignment, or within the immediate vicinity of the proposed works. No Aboriginal heritage sites within the vicinity of the proposed works were mapped by Council or identified on the NSW ePlanning website. The proposed pole replacement works along the Junction Road alignment are located a sufficient distance from any identified heritage areas and so the proposed works would be unlikely to have any direct adverse impacts on these areas.	An AHIMS search identified 5 Aboriginal sites and no Aboriginal places within the area surrounding Anzac Road. The closest Aboriginal site is located approximately 165 m southeast of the proposed works area and the Anzac Village ZS (located near the intersection of Anzac Road and Greenhills Avenue). An Aboriginal site is also identified approximately 270 m northwest of the new 33kV MLP switching station (near the intersection of Anzac Road and Moorebank Avenue). No Aboriginal heritage sites within the vicinity of the proposed works were mapped by Council or identified on the NSW ePlanning website.

Aspect	Relevant to Proposed Development (Yes/No)	Comment / Impact Assessment – Junction Road Alignment (FDR 50C)	Comment / Impact Assessment – Anzac Road Alignment (FDR 518)
			The proposed trench excavation works along the Anzac Road alignment may have a temporary minor impact on the views and setting of the closest identified Aboriginal heritage sites, but would not have a significant long-term impact on the overall significance of the Aboriginal heritage sites.
		Given the proposed development is being undertaken within an area of former disturbance, no impacts on known or unknown Aboriginal sites or deposits are anticipated. If unexpected Aboriginal sites or deposits are uncovered during construction, works must stop in the vicinity of the find, and a qualified archaeologist and Heritage NSW should be notified. Further archaeological work and/or an Aboriginal Heritage Impact Permit may then be required before works can recommence on the site.	
Non-indigenous heritage	No	No State or local heritage sites within the vicinity of the proposed works were mapped by Council or identified on the NSW ePlanning website. As the proposed works along the Junction Road alignment are generally limited to the northern verge of Junction Road and the eastern verge of Heathcote Road, the proposed works are unlikely to have any impact on any identified State heritage items.	The Liverpool Fire Station (former Australian Army Engineers Group) is a locally significant heritage item, as identified under Liverpool LEP 2008 (Item 57), and is located near to the southern side of Anzac Road. The trench excavation works along the Anzac Road alignment would be undertaken within the existing roadway and immediate verge areas, and so no significant impact to identified heritage areas is expected. The proposed trench excavation works along the Anzac Road alignment may have a temporary minor impact on the views and setting of the closest identified European heritage sites, but would not have a significant long-term impact on the overall significance of the identified European heritage sites.
		Given the proposed development is being undertaken within an area of former disturbance, no impacts on known or unknown European sites or deposits are anticipated. If unexpected European sites or deposits are uncovered during construction, works must stop in the vicinity of the find, and a qualified archaeologist and Heritage NSW should be notified. Further archaeological work may be required along with exemptions or consents to be granted by Heritage NSW before works can recommence on the site.	

Aspect	Relevant to Proposed Development (Yes/No)	Comment / Impact Assessment – Junction Road Alignment (FDR 50C)	Comment / Impact Assessment – Anzac Road Alignment (FDR 518)
Socio-economic	Yes	The proposed works would directly benefit the progressive development and operational activities of the MLP, which would in turn benefit the surrounding local communities through increased employment opportunities, increased demand for local goods and services, and ultimately, improvements to the local road network through freight transport efficiencies and progressive roadworks upgrades associated with the intermodal development.	
Noise and Vibration	Yes	The proposed development is likely to generate localised temporary elevated noise emissions and vibration impacts, during construction works. Furthermore, a portion of these works are likely to be undertaken overnight to minimise the impacts of outages, access and traffic on the community. Overnight works would have the potential to generate noise that impacts on the sleep of nearby residents. Appropriate mitigation measures would be required to be implemented to manage construction noise and vibration.	
Air quality and dust suppression	Yes	The existing air quality is typical of an urbanised catchment and is predominately impacted by vehicle emissions or regional wind conditions. Appropriate measures would be implemented as part of the proposed development to mitigate dust and other air emissions (for example exhaust fumes) which may be generated from construction activities that will be localised and temporary in nature.	
Landform, geology, soils and contamination	Yes	The proposed development would have a localised impact on site soils as a result of intrusive works to install power supply infrastructure. Appropriate sedimentation and erosion controls, as per the 'Blue Book' (Landcom, 2004) would be implemented throughout construction works. The proposed works for the Anzac Road alignment are within the vicinity of mapped Class 5 potential acid sulfate soils (NSW ePlanning Spatial viewer). An Acid Sulfate Soil Management Plan would be included within the proposed development CEMP, to manage any potential impacts that may result from excavation and exposure of impacted soils. No significant or long-term effects associated with soil erosion, sedimentation or impacts to water quality resulting from the proposed development are expected.	
Safety and hazards	Yes	Appropriate safety measures would be implemented throughout construction works to manage worker and visitor safety. No hazardous or dangerous goods would be stored on site, with small volumes be transported to and from site in construction vehicles.	
Waste generation, storage, handling and disposal	Yes	The proposed development is likely to generate waste, including soil, vegetation, redundant power poles, asphalt and concrete material.	

Aspect	Relevant to Proposed Development (Yes/No)	Comment / Impact Assessment – Junction Road Alignment (FDR 50C)	Comment / Impact Assessment – Anzac Road Alignment (FDR 518)
		All waste materials generated from the construction works would be managed in accordance with appropriate waste management protocols. Where reuse or recycling opportunities are not available or viable, waste materials would be disposed of in an appropriately licensed landfill.	
Bushfire	No	The proposed works alignments are not located within any bushfire affected areas. The nearest mapped bushfire areas are located more than 500 m to the east of Junction Road, and 175 m west of Anzac Road. No bushfire assessment is required to support this REF; however, emergency and evacuation management measures would form part of the proposed development CEMP.	
Electric and Magnetic Fields (EMF)	Yes	The predicted maximum average and maximum magnetic fields at 0 m AGL (above ground level), directly above the proposed underground feeders at Anzac Road are 85 µT and 170 µT respectively.	The predicted maximum average and maximum magnetic fields at 1 m AGL, below the proposed overhead feeders at Heathcote/Junction Road are 0.66 µT and 1.32 µT respectively.
		All of the measured and predicted magnetic field levels are below the ICNIRP 200 µT limit applicable to the health and safety of the General Public that applies in Australia as has been adopted by ARPANSA. There should be low concern of risk of interference to general electronic equipment used 1 metre or more away from the front of the property boundaries on Junction Road, and similarly at the commercial properties where 7 m or more away from the power cabling on Anzac Road, as the maximum measured and predicted magnetic field levels do not exceed the AS/NZS 61000.6.1 interference limit of 3.77 µT applicable to general electronic equipment Therefore there is no significant EMF impact from the upgrade to the 33kV lines in relation to either the Junction Road or Anzac Road alignments.	
Cumulative	Yes	The cumulative impacts of construction activities are expected to be localised and temporary disturbances and occupation of land within and adjacent to the existing distribution easement. Operational impacts would be restricted to visual impacts and intermittent impacts associated with maintenance activities.	
Climate change	No	Given the scope and nature of the proposed works, the impacts of the proposed works on climate change are expected to be negligible. Mitigation measures to reduce GHG emissions and promote resilience to climate change would be implemented where practicable and feasible. Climate change and Greenhouse Gas Emissions are further discussed in Section 7.13.	

7.1 Clause 171(2) Considerations

Clause 171 of the EP&A Regulation 2021 provides the factors to be taken into account in considering the likely impact of an activity on the environment. These factors include ecosystems, aesthetics, communities, protected species, waste management and pollution. The Regulations Clause 171 assessment is provided in Table 7-2.

Table 7-2*:* Regulations Clause 171 Assessment

	Relevant Clause	Impact
1	Any environmental impact on a community?	Moderate (temporary) (refer to Section7)
2	Any transformation of a locality?	N/A
3	Any environmental impact on the ecosystems of the locality?	Neutral
4	Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Minor (refer to Section 7.4)
5	Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	Negligible (temporary) (refer to Section7)
6	Any impact on the habitat of protected animals (within the meaning of the Biodiversity Conservation Act 2016)?	Neutral
7	Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	Neutral
8	Any long-term effects on the environment?	Neutral
9	Any degradation of the quality of the environment?	Neutral
10	Any risk to the safety of the environment?	Neutral
11	Any reduction in the range of beneficial uses of the environment?	Neutral
12	Any pollution of the environment?	Negligible (temporary) (Refer to Section7)
13	Any environmental problems associated with the disposal of waste?	Minor (refer to Section7.10)
14	Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?	N/A
15	Any cumulative environmental effect with other existing or likely future activities?	Neutral
16	Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	N/A
17	Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1?	N/A
18	Other relevant environmental factors?	N/A

7.2 Utilities and Services

7.2.1 Existing Environment – Junction Road

In addition to Endeavour Energy assets, a Dial Before You Dig (DBYD) search was undertaken along the Junction Road alignment which located a number of above and underground utilities and services within the proposed works area including:

- high pressure Jemena gas lines;
- Telstra, Optus/Uecomm, AARNet and TPG telecommunications lines/fibre optic cable assets;
- Sydney Water assets;
- NBN infrastructure; and
- Transport for NSW (TfNSW) infrastructure.

Liverpool City Council identified infrastructure assets including bus stops, stormwater pits, kerb and guttering, pipes, footpaths and cycleways, and a bridge and headwall near Anzac Creek.

7.2.2 Existing Environment – Anzac Road

In addition to Endeavour Energy assets, a Dial Before You Dig (DBYD) search was undertaken along the Anzac Road alignment which located a number of above and underground utilities and services within the proposed works area including:

- medium pressure Jemena gas lines;
- Telstra, Optus, and TPG telecommunications lines/fibre optic cable assets and pipes;
- Sydney Water assets;
- NBN infrastructure; and
- Transport for NSW (TfNSW) infrastructure.

Liverpool City Council identified infrastructure assets including bus stops, stormwater pits, kerb and guttering, pipes, and footpaths and cycleways. LCC also noted environmentally sensitive land potentially within the proposed works area.

7.2.3 Impact Assessment

The proposed works could temporarily impact existing utilities and services within the locality, including stormwater drains, water pipes, telecommunications, power and gas services. Along Junction Road and Heathcote Road, overhead services (i.e. primarily power and telecommunications infrastructure) would be relocated onto the new poles. For safety reasons, outages to these services would occur during the construction process to transfer the lines.

Along Anzac Road, existing services (including power and telecommunications infrastructure) would be relocated in excavated trenches within the Anzac Road roadway. Existing underground services and utilities may require relocation or outages to accommodate excavation works.

7.2.4 Mitigation Measures

Measures to mitigate potential utilities and services impacts are identified and summarised in the following points.

- Prior to any excavation activities within the proposed works area, appropriate surveys to locate existing infrastructure, and consultation with affected service and utilities providers and Council would be undertaken.
- The Endeavour Energy website advises that the affected community would be notified at least four business days before a planned outage unless there is an electrical emergency (https://www.endeavourenergy.com.au/outages/how-we-respond-to-storms2/power-outages).
- Appropriate work health and safety practices and safety clearances would be implemented throughout the entire construction process, in accordance with relevant Endeavour and Safe Work Australia and SafeWork NSW Codes of Practice including
    - General Guide for Working in the Vicinity of Overhead and Underground Electric Lines
    - Work Near Overhead Powerlines Code of Practice 2006
    - Work Near Underground Assets Guide 2007
- The work site is to be appropriately secured at night time and/or outside regular works hours.
- All affected properties and businesses would be advised as part of the early consultation process about the proposed works.
- The affected community would be notified a minimum of four business days before any planned outages.

Construction procedures would include management and mitigation measures which would be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

7.3 Road, Traffic and Access

7.3.1 Existing Environment – Junction Road

The proposed alignment is immediately adjacent to the northern side of Junction Road and the eastern side of Heathcote Road, with some of the poles located within 1 m of the roadway. Parking for residents is generally located the full length of the Junction Road proposed works area. No parking is available on Heathcote Road adjacent to the proposed works area. Pedestrian access is available via footpath along the entire alignment.

A roundabout is located at the intersection of Wellwood Avenue and Junction Road, and traffic lights are located at the intersection of Heathcote Road and Seton Road. A left-turning slip lane is located on Heathcote Road, turning into Junction Road.

Heathcote Road is identified as a State road and is under the responsibility of RMS. Junction Road, as a local road, is under Council's responsibility.

7.3.2 Existing Environment -Anzac Road

The proposed alignment is within the Anzac Road carriageway. Existing electricity poles located on the southern side of Anzac Road would be removed and the existing distribution lines would be relocated into trenches excavated within the roadway, along

with the new 33kV lines. The new lines would terminate in a new switching station, to be located on the western side of Moorebank Avenue, within Moorebank Precinct West.

The existing poles are located in the road verge, with some of the poles located within 1 m of the roadway. Parking is available along some of the subject alignment. Pedestrian access is available via footpath along the entire alignment.

Traffic lights are located at the intersection of Anzac Road and Moorebank Avenue. Although most of the subject alignment is single lane, some portions of the roadway are double lane to allow for access into adjacent properties.

Anzac Road is a local road and is under Council's responsibility.

7.3.3 Impact Assessment

The proposed construction works for both subject alignments would require temporary localised road closures and/or traffic diversions which may disrupt the regular flow of traffic in the area. Furthermore, it is likely that temporary blocking and diversion of pedestrian access would be required to maintain pedestrian safety and work site access. Traffic flow and pedestrian diversions may generate some inconvenience, delays and confusion for the local community and road users.

7.3.4 Mitigation Measures

Measures to mitigate potential roads, traffic and access impacts have been identified and are summarised below.

- Where possible, works are to be undertaken outside peak traffic periods and at night, when the impact on traffic, parking and access can be minimised.
- An RMS approved Traffic Management Plan (TMP) and approvals from the relevant road authority would be in place prior to commencement of works.
- Appropriate permits for the road closure and occupancy, including a Section 138 application (under the *Roads Act* 1993), would be required to be submitted to Council. A Traffic Management Plan, including a Traffic Control Plan, would be required to be prepared for the proposed (partial) road closures and submitted to Council, and notification provided to local residents and businesses as required.
- Temporary signage to be erected to alert pedestrians to the footpath alterations during construction works and illustrate the site safety requirements and the restricted nature of the proposed works area, along with a phone number for enquiries.
- Adequate signage to warn motorists or works and changes to access arrangements to be installed prior to the commencement of works.
- LCC to be notified in advance of the temporary footpath closure and the works duration.
- Parking of construction vehicles is to be at the nearest accessible public carpark. LCC is to be notified of construction vehicles utilising public parking spaces.
- Construction workers are to be encouraged to car-pool where convenient to minimise parking and traffic demand.
- The work site is to be appropriately secured at night time and outside regular works hours and construction periods.

Construction procedures would include management and mitigation measures which would be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

7.4 Landscape and Visual Impacts

Visual impacts relate to changes in landscape views resulting from potential development, and the effects that those changes would have on the community. A visual assessment has been prepared for the proposed development to assist in determining visual impact changes resulting from the works.

7.4.1 Existing Environment

The proposed works along the Junction Road alignment would be undertaken in proximity to residential and commercial/industrial, and open space areas. Both Junction Road and Anzac Road alignments presently have overhead power poles and lines running along their length within existing easements.

Junction Road is a low density residential area that has Ernie Smith Reserve at its western end on the northern side of the road.

A detailed visual and impact assessment has been prepared for the proposed works along both the Junction Road and Anzac Road alignments. The assessment is provided in in the following sections.

7.4.2 Assessment Methodology

The proposed works involve replacement of existing poles with new higher poles, and additional 33kV wiring which would be consistent with the existing contextual setting.

Proposed works along the Anzac Road alignment involve removal of the electricity poles along the southern verge, and installation of services and utilities underground.

This quantitative visual assessment is based on the NSW Roads and Maritime Services (RMS) *Environmental Impact Assessment (EIA) Guidance Note: Guidelines for landscape character and visual impact assessment* (2013). The RMS guideline outlines the process for defining the change to a visual landscape as a result of the proposed development based on the following criteria:

Sensitivity: being 'the sensitivity of a landscape character zone or view and its capacity to absorb change'. Views with a high sensitivity are considered to be those which would be seen for longer, by a higher number of viewers and where the visual amenity is important or significant to those viewers.

Magnitude: being 'the measurement of the scale, form and character of a development proposal when compared to the existing condition'. Magnitude is a measurement of the degree of contrast between the existing landscape and the proposed development.

The combined assessment of sensitivity and magnitude provides a risk assessment style rating for the visual impact of the proposed development (Figure 12).

Sensitivity \ Magnitude	High	Moderate	Low	Negligible
High	High	High-Moderate	Moderate	Negligible
Moderate	High-Moderate	Moderate	Moderate-low	Negligible
Low	Moderate	Moderate-low	Low	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Figure 12: Landscape character and visual impact rating matrix (Source: RMS (2013) *Guidelines for landscape character and visual impact assessment*)

The criteria for determining the sensitivity and magnitude of the change resulting from the proposed development is provided in **Error! Reference source not found.**.

Table 7-3*:* Sensitivity and Magnitude Criteria

Table 7-3*:* Sensitivity and Magnitude Criteria

Sensitivity	Criteria
Very high	Landscape with a high and recognised conservation value or heritage value and no existing obstruction. View that is recognised and protected by policy. Views that include heritage assets and are publicly accessible.
High	Valued landscape with distinctive or unique characteristics and little view obstruction. Views available to the public that are frequently used by a high number of people or private views that are close in proximity. Recreational receptors where the landscape has a high visual value.
Moderate	Landscape has some distinctive characteristics and a few obstructions. Views available to the public that are moderately used by a moderate number of people or private views that are close in proximity. Recreational receptors where the landscape has some visual value.
Low	Landscape that has few distinctive characteristics and landscape obstructions. Views that are available to the public but have little visual value and are infrequently used. Views that are mostly available to road users in vehicles or people in transit, people in their workplace or views from commercial buildings.
Very Low	Landscape has no distinctive characteristics and many obstructions. Available to the public but no visual value and only a limited number of users that are not in close proximity.
Magnitude	**Criteria**
Very high	Total loss of major change to the visual landscape. The development would form a significant part of the viewshed and significantly contrasts the character of the view. The change is severely detrimental to the visual quality and aesthetics.
High	A notable change to the visual landscape. The development would now dominate the character of the view and noticeable contrasts the character of the view. The change reduces the visual quality and aesthetics.
Moderate	A partial change to the visual landscape. The development forms a new part of the character of the view and is relatively compatible or consistent with the existing character and existing composition of the viewshed. The change may reduce the visual quality and aesthetics.
Low	Minor change to the visual landscape. The development is only a minor part of the character of the view and is compatible with the existing character and existing composition of the viewshed.
Very Low	Limited or no change to the visual landscape. The development is only a minor part of the character of the view and is likely to be overlooked by a viewer. The development has no adverse impacts on the visual quality of the viewshed.
Negligible	No change

7.4.3 Viewpoint Assessment

Seven pole Viewpoints have been selected along the Junction Road (Viewpoints 1 to 5) and Anzac Road (Viewpoints 6 and 7) proposed alignments, for the purpose of a visual impact assessment from the surrounding area toward the pole. Points have been selected to represent the potential visual impacts within residential and industrial settings, open space zones and adjacent to the watercourse.

Each Viewpoint includes existing view figures and a visual assessment.

Viewpoint 1- Residential Zone (Pole 605992)

Figure 13: Viewpoint 1- residential zone/ public view from Nuwarra Rd & Junction Rd (November 2021)

Description and Aim

- This Viewpoint, located on the western corner of Nuwarra Road and Junction Road, provides views to the pole from the footpath, and the intersection of Nuwarra Road and Junction Road.
- The Viewpoint represents the pole within a residential setting.
- Receptors are most likely to be residents with long-term views, and motorists and pedestrians with short-term views.

Sensitivity

The sensitivity of Viewpoint 1 is considered low as:

- The proposed development would involve the replacement of an existing pole with a higher pole, which would be unlikely to have significant detrimental impacts on the visual views of residents and motorists.
- This Viewpoint is adjacent to the road and footpath, and motorists and pedestrians travelling through the area would have short term views and are therefore unlikely to significantly value or consider views.

Magnitude

The view toward Viewpoint 1 is considered very low magnitude as:

- There would be limited change to key characteristics and visual quality between the existing pole and a replacement pole.
- There is no substantial change to the existing view characteristics from this Viewpoint location. The new 33kV lines would be placed at the top of the replacement pole above the existing level of 11kV lines, and within the setting context, would not be substantially different from existing views.
- The new 33kV lines would be outside the typical line of sight for pedestrians
- Motorists are unlikely to notice a significant change to their views during their passage through this area.

Assessment

Considering the predicted view toward this Viewpoint location, the visual impact has been assessed to be negligible.

This Viewpoint is considered 'typical' of the residential area along Junction Road.

Viewpoint 2- Residential Zone (Pole 751561)

Figure 14: Viewpoint 2- residential zone/ public view from Junction Rd (November 2021)

Description and Aim

- This Viewpoint, located on Junction Road, provides views to the pole from the verge adjacent to the footpath and road along Junction Road.
- This view is representative of private views from residential properties, from their front boundaries towards the pole.
- It is located adjacent to Jemena gas utilities.
- Receptors are most likely to be residents with long-term views, and motorists and pedestrians with short-term views.

Sensitivity

The sensitivity of Viewpoint 2 is considered low as:

- Residential receptors are more likely to be critical of the visual setting, with long term exposure to the views.
- The Viewpoint is adjacent to the road, and motorists and pedestrians travelling through the area would have short term views and are unlikely to significantly value or consider views.
- The residential properties along Junction Road are not topographically elevated, and the additional height of the new poles would not be significantly noticeable to residents.

Magnitude

The view toward Viewpoint 2 is considered very low magnitude as:

- There would likely be no significant difference to the perspective distant views.
- There would not be significant changes to the existing view characteristics toward this Viewpoint location, within the setting context.

Assessment

Considering the predicted view toward this Viewpoint location, the visual impact has been assessed to be negligible.

This Viewpoint is considered 'typical' of the residential area along Junction Road.

Viewpoint 3- Open Space Zone (Pole 727732)

***Figure 15**:* Viewpoint 3- open space zone/ public view from Junction Rd (November 2021)

Description and Aim

- Ernie Smith Reserve is used for recreational and sporting activities.
- The Liverpool City Hockey Complex, which is within Ernie Smith Reserve, is accessible to the public community.
- This Viewpoint was selected to consider the potential visual impact of the proposed development from a general public open space toward the pole.
- Receptors are most likely to be park users, residents with long-term views, and motorists and pedestrians with short-term views.

Sensitivity

The sensitivity of Viewpoint 3 is considered low as:

- Landscape visual amenity enjoyment is important to the park's recreational users. However, being located outside the park boundaries, the new pole and additional wiring is unlikely to significantly impact the views of park users, and is within the context of the existing views from the park.
- The area is adjacent to the road and motorists travelling through the area would have short term views and are unlikely to significantly value or consider views.

Magnitude

The view toward Viewpoint 3 is considered very low magnitude as:

- The proposed development is almost screened by existing trees along the park boundary.
- There would likely be no significant difference to the perspective distant views from park users.
- There would be no significant changes to the existing view characteristics toward this viewpoint location from motorists or pedestrian users and who would likely naturally be drawn to the visual aspects of the park environment rather than the pole.

Assessment

Considering the predicted view toward this Viewpoint location, the visual impact has been assessed to be negligible.

Viewpoint 4- Watercourse (Anzac Creek) (Pole 606097)

***Figure 16**:* Viewpoint 4- proximity to watercourse (Anzac Creek) (November 2021)

Description and Aim

- This Viewpoint is located in close proximately to Anzac Creek.
- The creek is publicly open for passive riverside activities.
- This Viewpoint was selected to consider the potential visual impact of the proposed development from a watercourse environment.
- Receptors are most likely to be park users, residents with long-term views, and motorists and pedestrians with short-term views.

Sensitivity

The sensitivity of Viewpoint 4 is considered low as:

- Landscape visual amenity enjoyment is important to the creek's passive recreational users. However, within the context of the locality, the viewpoint to the proposed development is unlikely to be significantly different from existing as the new poles would be replacements for existing poles.
- The area is adjacent to the road, and motorists and pedestrians travelling through the area would have short term views and are unlikely to significantly value or consider views.

Magnitude

The view from Viewpoint 4 is considered very low magnitude as:

- There would likely be no significant difference to the perspective distant views to the creek from adjacent park users or local residents.
- There would be no significant changes to the existing view characteristics from this Viewpoint location. Motorists or pedestrian users would likely naturally be drawn to the visual aspects of the park environment rather than the pole.

Assessment

Considering the predicted view toward this Viewpoint location, the visual impact has been assessed to be negligible.

Viewpoint 5- Industrial Zone (Pole 606081)

***Figure 17**: Viewpoint 5- proximity to watercourse (Anzac Creek) (November 2021)*

Description and Aim

- This Viewpoint is located on the main road (Heathcote Road), and adjacent to the road and footpath.
- It is adjacent to a petrol station and car wash.
- It is adjacent to a gas main (Jemena).
- It is located in an industrial zone (IN1).
- Receptors are most likely to be business owners and visitors, local residents, motorists and pedestrians.

Sensitivity

The sensitivity of Viewpoint 5 is considered low as:

- The area is in an industrial setting and transitioning into higher poles would have limited visual impact to the public.
- Given the operational nature of a business, local business owners and visitors would likely not notice or be significantly affected by the increase in pole height or additional lines.
- Motorists travelling through the area would only have short term views and are unlikely to significantly value or consider views.

Magnitude

The view toward Viewpoint 5 is considered very low magnitude as:

- There would likely be no significant difference to the perspective views to the pole from local business owners, motorists or the public.

Assessment

Considering the predicted view toward this Viewpoint location, the visual impact has been assessed to be negligible.

Viewpoint 6- Anzac Road (Pole 607504)

***Figure 18**:* Viewpoint 6- Along Anzac Road (November 2021)

Description and Aim

- This Viewpoint is located on the main road (Anzac Road).
- It is located within an industrial area.
- Receptors are most likely to be business owners and visitors, local residents, motorists and pedestrians.

Sensitivity

The sensitivity of Viewpoint 6 is considered low as:

- The existing poles would be removed and new 33kv feeder would be diverted underground, which would result in a positive outcome for affected users.
- As the area is in surrounded by industrial facilities, localised construction works to relocate existing above ground electricity services underground would have temporary and limited visual impact to the community.
- Given the context of the construction works within an industrial location, local business owners and visitors would likely not notice or be significantly affected by temporary localised visual impacts including equipment and machinery.
- Motorists travelling through the area would only have short term views and are unlikely to significantly value or consider views either during construction or post development.
- Post development works, the diversion of services and utilities underground would have a positive impact on business owners and visitors, local residents, motorists and pedestrians.

Magnitude

The view toward Viewpoint 6 is considered very low magnitude as:

- Diversion of services and utilities underground would have a positive impact, as perspective views to existing poles from local business owners, motorists or the public would be removed.

Assessment

Considering the predicted view toward this Viewpoint location, the visual impact has been assessed to be negligible, and post development, would have a positive visual outcome.

Viewpoint 7- Anzac Road, near the Anzac Village Zone Substation (Poles 605114 and 881901)

Figure 19: *Viewpoint 7 – along Anzac Road, with Anzac Village Zone Substation in the background (November 2021)*

Description and Aim

- This Viewpoint is located on the main road (Anzac Road).
- It is located within an industrial area.
- Receptors are most likely to be business owners and visitors, local residents, motorists and pedestrians.

Sensitivity

The sensitivity of Viewpoint 7 is considered low as:

- The existing poles would be removed and new 33kv feeder would be diverted underground, which would result in a positive outcome for affected users.
- As the area is in surrounded by industrial facilities, localised construction works to divert existing above ground electricity services underground would have temporary and limited visual impact to the community.
- Given the context of the construction works within an industrial location, local business owners and visitors would likely not notice or be significantly affected by temporary localised visual impacts including equipment and machinery.

- Motorists travelling through the area would only have short term views and are unlikely to significantly value or consider views, either during construction or post-development.

Magnitude

The view toward Viewpoint 7 is considered very low magnitude as:

- Diversion of services and utilities underground would have a positive impact, as perspective views to existing poles from local business owners, motorists or the public would be removed.

Assessment

Considering the predicted view toward this Viewpoint location, the visual impact has been assessed to be negligible and post development, would have a positive visual outcome.

7.4.4 Impact Assessment Conclusions

Construction works along both works alignment alignments would result in temporary localised impacts to adjacent properties, as works progress along the alignments.

The proposed works would result in some changes to the visual character of the area along Junction Road and Heathcote Road, which would be visible to local residents, business owners, motorists and pedestrians. Temporary localised visual impacts including equipment, machinery, site workers, and traffic and security measures would be associated with construction works.

Permanent visual changes to the Junction Road alignment would result from the increase in pole height, installation of additional lines, and potential removal of some vegetation, shrubs and trees. However, in the existing visual environment, the additional pole height and lines are not expected to be significantly more visually dominant, and restorative landscaping post construction would ameliorate most visual impacts.

The proposed works to relocate the electricity services underground would result in a positive outcome for affected properties and users of the specified Anzac Road alignment, with the removal of poles and lines currently located along the southern verge. Temporary localised visual impacts including equipment, machinery, site workers, and traffic and security measures would be associated with construction works along Anzac Road. Restorative landscaping post construction, where required, would also mitigate potential visual impacts resulting from the works.

7.4.5 Conclusion and Mitigation Measures

Measures to mitigate potential landscape and visual assessment impacts are summarised in the following points.

- All residents and business owners within the vicinity of the proposed works would be notified in writing of the works, including the locations of new (replacement) poles.
- Flood lights used for night works would be directed to reduce light spill to sensitive receivers / residents
- All work equipment and materials and sedimentation and erosion control measures would be contained within the designated boundaries of the work site.
- Old poles would be removed from the site as soon as practically possible.

- All construction waste would be removed from the site on a regular basis.
- Once works are completed in any given location, disturbed ground surfaces would be reinstated and landscaping restored, where practical, as soon as possible.
- Any damage to neighbouring properties during the construction and restoration works would be fixed as soon as possible, or at the completion of works in that area.
- Clearing, excavation, backfill and restoration works are to be undertaken in accordance with Liverpool City Council Specification 306U *Road Openings and Restoration* (July, 2000).

Construction procedures would include management and mitigation measures which would be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

7.5 Socio Economic Impacts

7.5.1 Existing Environment

The local population is expected to grow significantly over the next decade, consistent with population growth throughout Sydney. Employment levels in the locality are consistent with the Greater Sydney region. Most of the construction and operation workforce for the MLP is sourced locally, which is consistent with commitments from SIMTA and their contractors.

7.5.2 Impact Assessment

Upgrade works would provide a safe and reliable supply of electricity to the local communities to meet ongoing supply demands, which is critical in maintaining the socio-economic needs of the community.

The local community including residents, business owners and community groups may have concerns regarding disruptions to traffic, generation of noise, vibration and dust, visual amenity, impacts to local heritage items, construction hours, and EMF. Planned outages to enable the upgrade works may have a temporary impact on businesses, residents, and people working from home.

7.5.3 Mitigation Measures

Measures to mitigate potential socio-economic impacts include:

- Potential traffic and transport impacts to the surrounding road network, and noise and air quality impacts to sensitive receivers would be managed through implementation of appropriate mitigation measures.
- Once works are completed in any given location, disturbed ground surfaces would be reinstated and landscaping restored as soon as possible.
- Consultation with residents, community groups and relevant stakeholders would be undertaken, and a complaints procedure implemented throughout the construction process.

Construction procedures would include management and mitigation measures which would be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

7.6 Noise and Vibration

7.6.1 Existing Environment

The proposed development would be in proximity to both residential and commercial/industrial properties.

Background ambient noise and vibration levels are typical of an urbanised and industrial catchment. Noise and vibration generating activities that occur within the general surrounding areas are:

- typical residential and commercial noise and vibration;
- commuter, residential and commercial vehicle movement along Junction Road, Heathcote Road and Anzac Road; and
- public recreational use of the nearby pedestrian pathways, and park area (Ernie Smith Reserve).

Some existing audible noise or vibration may be associated with electricity lines, although generally they do not contribute significantly to background ambient noise or vibration levels.

7.6.2 Impact Assessment

The proposed works, including pole replacement (generally via vertical directional drilling) and trench excavation activities, are likely to result in temporary localised construction noise impacts. Typical construction noises may be associated with:

- auguring and drilling machinery;
- Excavation, cable loader and compactor machinery;
- cranes;
- power tools, concrete saws and jackhammers;
- heavy vehicle movements; and
- communications between onsite personnel.

Construction methodology would be selected based on proximity to residences and other buildings and infrastructure. Vibration impacts are subsequently unlikely to occur.

Typical construction hours as specified in NSW EPA's Interim Construction Noise Guideline (DECC, 2009) are:

- Monday to Friday 7am to 6pm
- Saturday 8am to 1 pm
- No work on Sundays or public holidays

To mitigate potential traffic and outage impacts, construction may also be carried out outside of these hours. Where this is required, LCC and affected residents would be notified prior to works commencing.

7.6.3 Mitigation Measures

Measures to mitigate potential noise and vibration impacts are identified and summarised in the following points.

- The noisiest activities would preferentially be conducted during least sensitive periods of the day, as far as is reasonably practicable.

- Site induction would include information that raises workers awareness of noise and vibration issues and sensitive receivers.
- Site diary would include record of activities, so any complaints received can be checked against the type of activity that was being carried out.
- Plant, equipment and vehicles shall be serviced regularly and not be left idling for extended periods of time.
- Where active construction periods have been lengthy, periods of respite from noise and vibration generating equipment may be implemented.
- Local residents and business owners in close proximity would be informed 2 weeks prior to the commencement of the proposed works and the planned of out of hours (night-time) works.

For any proposed out of hours works (night shifts) a Work Method Statement would be prepared, reviewed and approved by the Project Manager and/ or the Environmental Advisor. The Work Method Statement would form part of the CEMP, and would include:

- a description of works required to be undertaken out of hours;
- duration of works, including start times and dates;
- notification requirements (2 weeks prior to the commencement of the proposed night works) to local residents and business owners in close proximity; and
- additional noise, light and/ or traffic mitigative measures as required.

Construction procedures would document management and mitigation measures to be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

7.7 Air Quality and Dust Suppression

7.7.1 Existing Environment

The existing air quality is typical of an urbanised catchment and is predominately impacted by vehicle emissions.

7.7.2 Impact Assessment

Dust and other emissions may be generated from construction activities, typically resulting from excavation and installation activities, and vehicle and machinery emissions.

Exhaust emissions from equipment and vehicle movements to and from the proposed development site would occur intermittently during the works. It is estimated that the works would be carried out over a period of approximately 9 to 12 months. Accordingly, air quality impacts due to exhaust emissions are expected to be minor, and unlikely to alter the local and/or regional air quality, nor contribute significantly to greenhouse gas emissions.

Along the Junction Road alignment, the benefit of localised pole installation via vertical directional drilling is that ground disturbance, and hence dust generation, is minimised. Dust may be generated during excavation works but would be temporary in nature and unlikely to cause any significant or long-term impact to the local air quality.

Trenching excavation works along the Anzac Road alignment have the potential to generate dust, however, works would be temporary and, with mitigation measures (outlined in Section 7.7.3) in place, unlikely to cause any significant or long-term impact to the local air quality.

7.7.3 Mitigation Measures

Measures to mitigate potential air quality and dust impacts have been identified and are summarised in the following points.

- Excavation and intrusive works would be avoided during periods of high wind.
- All construction equipment and vehicles would be regularly services and maintained.
- Vehicles and machinery would not be left idling (when not directly required for construction works) to reduce exhaust emissions.
- The proposed works area is to be kept neat and tidy, and free of unmanaged stockpiles. Any spilt materials or materials tracked onto road ways would be removed (via shovelling or sweeping) immediately to minimise the risk of vehicles driving over the area or transfer of airborne dust particles to nearby residents or business premises.
- All loads would be covered when travelling to and from the site to prevent airborne dust.
- Any disturbed areas would be revegetated or resurfaced as soon as possible after works have been completed in that area.

Construction procedures would include management and mitigation measures which would be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

7.8 Landform, Geology, Soils and Contamination

7.8.1 Existing Environment

Given the urbanised locality, the local terrain has been previously disturbed by human activity and development, and landform elements include embankments, driveway accesses, and road, services and pedestrian infrastructure. These areas are likely to have been previously filled (for the purposes of road and infrastructure construction) and so contamination of soils is considered unlikely.

The Junction Road alignment is not mapped by the NSW ePlanning Spatial Viewer, NSW eSPADE or by Council as containing acid sulfate soils. The proposed works for the Anzac Road alignment are within the vicinity of mapped Class 5 potential acid sulfate soils (NSW ePlanning Spatial viewer).

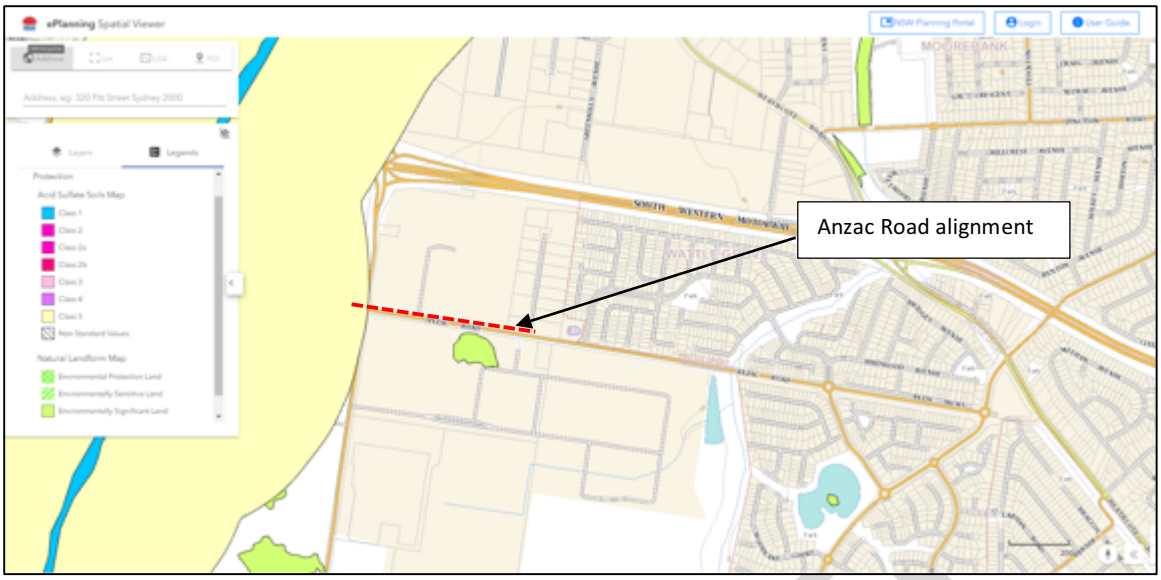


Figure 20: *Acid sulfate soils mapping along Anzac Road (ePlanning Spatial Viewer, 2021)*

7.8.2 Impact Assessment

The proposed works for the Junction Road alignment include localised excavation for location confirmation of underground services, and where required, the installation of new poles, and removal of poles identified for replacement. Works may also include removal and reconstruction of the pedestrian footpath in some areas, and where impacted, the removal and reconstruction of access driveways.

The proposed works for the Anzac Road alignment include localised excavation for location confirmation of existing underground services, removal of road surface (where required), and trenching/installation of new ducts under the road carriageway to accommodate the new Feeder 518 33kV cables. Works may also include removal and reconstruction of the pedestrian footpath in some areas, and where impacted, the removal and reconstruction of access driveways.

If not appropriately managed, excavation works may result in localised sedimentation, exposure of potential acid sulfate soils and water quality impacts.

7.8.3 Mitigation Measures

Measures to mitigate potential landform, geology, soils and contamination impacts have been identified and are discussed in the following points.

- All property and easement boundaries are to be pegged, final levels established, and permanent survey marks to be located by a surveyor prior to commencement of work.
- All services searches would be completed prior to construction.
- ESC measures would be implemented, where appropriate, in accordance with Landcom's *Managing Urban Stormwater: Soils and construction – Volume 1* (2004) (the 'Blue Book') prior to any disturbance works. Typical sedimentation and erosion control measures are provided in Figure 21*:* and Figure 22**:**.

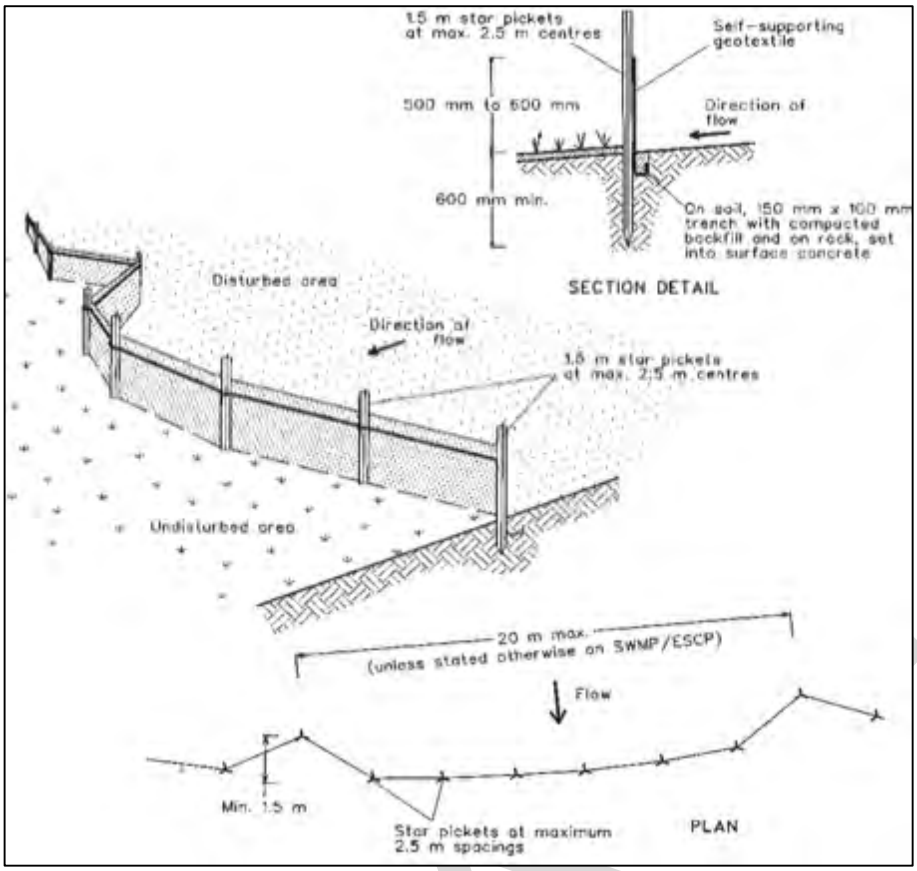


***Figure 21*:** Figure SD-6-8 Sediment Fence - Landcom's Managing Urban Stormwater: Soils and construction – Volume 1 (2004)

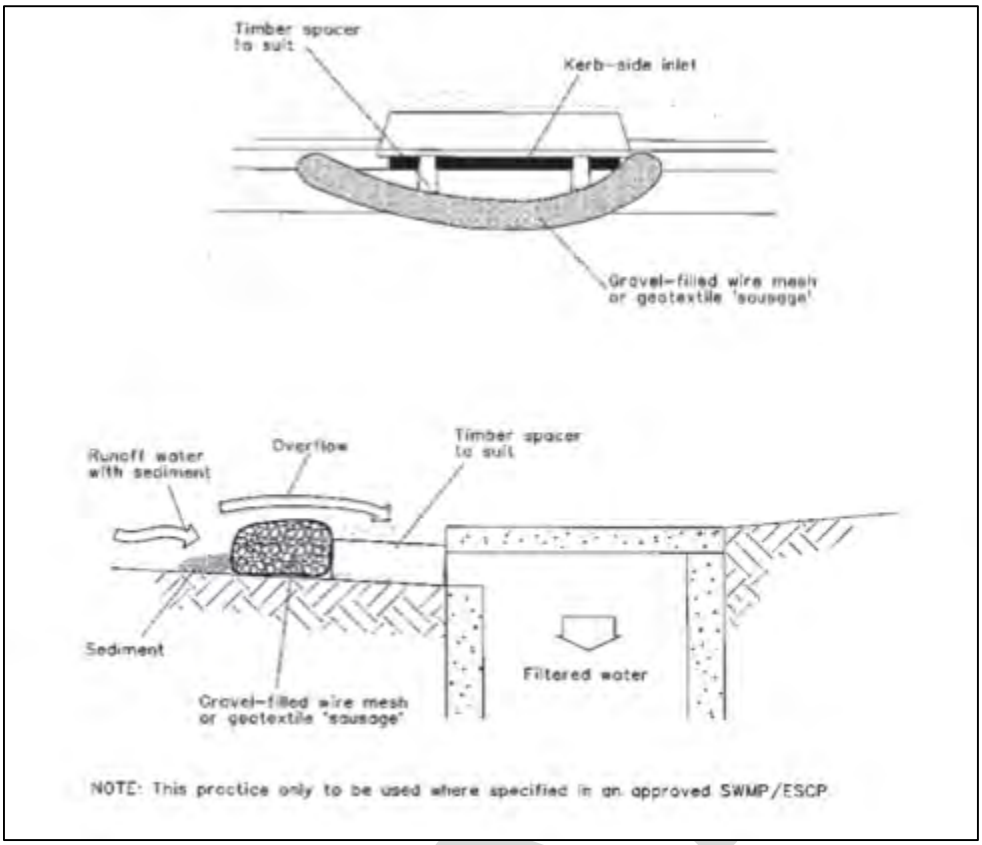


***Figure 22*:** Figure SD-6-11 Mesh and Gravel Inlet Filter - Landcom's Managing Urban Stormwater: Soils and construction – Volume 1 (2004)

- Sedimentation and erosion control measures would be routinely inspected and maintained.
- Works would not be undertaken during periods of high rainfall or high wind.
- Vehicles and machinery would be regularly checked for leaks and an appropriate spill kit would be available onsite at all times.
- Any sediment/soil transferred from the work site to the adjacent roadway and/or footpaths would be swept as required, and prior to the onset of rainfall.
- All chemicals and fuels shall be stored in accordance with Australian standards.
- Endeavour Energy's 'Excavation' procedure (GSY 1015, 2016) would be referenced as part of the CEMP.
- If during works any items which are indicative of contamination are discovered, the unexpected finds procedures as provided in the CEMP, and in accordance with Endeavour Energy's Environmental Guidelines Handbook, would be implemented.
- All excavation and backfill works are to be undertaken in accordance with Liverpool City Council Specification 306U *Road Openings and Restoration* (Juy, 2000).

Construction procedures would include management and mitigation measures which would be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

7.9 Safety and Hazards

7.9.1 Existing Environment

The existing Endeavour Energy assets are managed and maintained to maintain line integrity and community safety. The road carriageways and verge areas are maintained by LCC, and the traffic management infrastructure including traffic lights are maintained by TfNSW.

7.9.2 Impact Assessment

Appropriate safety measures would be incorporated into the CEMP and implemented throughout the construction works for the protection of the general community, the construction workforce, road users and pedestrians, and local residents and visitors. Hazards which may arise include open holes in footpaths, vehicle and machinery movements, and alterations to road and traffic conditions.

Signage, reduced speed limit zones and safety barriers would be installed around each work area as a warning to the community including pedestrians and persons in motor vehicles, and to protect site workers. Open holes would not be left unattended, and would be covered appropriately and barriers installed, as required.

Appropriate traffic safety measures would be implemented in accordance with the traffic Management Plans, and traffic controllers used, as required, to manage and direct traffic and pedestrians, as well as manage site deliveries.

Hazardous materials and dangerous goods would not be stored on site, other than minor volumes transported to and from site in construction vehicles each day. There is not a significant impact expected form the presence on site of hazardous and dangerous goods.

7.9.3 Mitigation Measures

Measures to mitigate potential safety and hazard impacts include:

- Completion of site inductions for workers and visitors; Safe Work Methods Statements and toolbox talks for site start-up would be undertaken daily. This would include discussion and consideration of live lines, out of service lines, safety clearances and managing the general public and traffic in proximity to the work site.
- All necessary safety measures, including signage, barriers, lighting, fencing etc would be used in each work area. These would be checked on a daily basis to make sure that they are in good working condition and fit for purpose.
- Works would be undertaken in accordance with relevant NSW WorkCover requirements, Endeavour Energy's standards and protocols, and any other applicable guidelines
- Traffic Management Plan recommendations would be implemented throughout the construction works.
- Open holes would be covered and fenced as necessary.
- All hazardous and dangerous goods would be kept in appropriate labelled containers with relevant bunding and/or spill containment.
- Materials Safety Data Sheets would be retained in any vehicle where hazardous or dangerous goods are held.

- Each vehicle will carry its own spill kit and a general site spill kit would be available on site.

Construction procedures would include management and mitigation measures which would be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

7.10 Waste Generation, Storage, Handling and Disposal

7.10.1 Existing Environment

Endeavour Energy does not currently store any wastes on or near the proposed development site.

7.10.2 Impact Assessment

Construction activities have the potential to generate waste materials such as surplus construction materials, old conductors and timber poles, packaging, general wastes and excess spoil. Ongoing waste associated with the proposed works is expected to be minimal, and would likely be in relation to maintenance works.

7.10.3 Mitigation Measures

Management of waste during construction works would mitigate potential impacts on the environment including visual amenity and site aesthetics, water quality of local stormwater systems and waterways, and health and safety of local residents, businesses and road users. Measures to mitigate potential waste management impacts are summarised below.

- Where possible, Endeavour Energy recycles old timber poles, metals, oils, chemicals and general office waste. Old timber poles are repurposed into timber for re-use.
- Waste resulting from the work would be removed from site and disposed of by a licensed contractor to an appropriate waste management facility. Residential or local bins would not be used to dispose of any waste.
- Any excavated material and green waste shall be stockpiled in a designated stockpile area, approved during detailed design phase, and reused onsite where possible in site re-establishment and rehabilitation works.
- Where possible, vegetation/green waste shall be mulched and reused onsite.
- The work site would be maintained free of rubbish and cleaned up at the end of each working day.
- No waste material would be left on site once the works have been completed.
- Waste must be classified in accordance with the NSW EPA Waste Classification Guidelines (2014) prior to offsite disposal/transfer.

Construction procedures would include management and mitigation measures which would be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

7.11 Electric and Magnetic Fields (EMF)

7.11.1 Assessment Methodology

An Electromagnetic Field Assessment (EMF Assessment) has been undertaken by EMC Services (December 2021) to:

- Assess the baseline EMF conditions in the vicinity of the proposed development.
- Predict the combined emissions resulting from the proposed and existing sources of EMF, utilising theoretical modelling.
- Assess the compliance of the measurements and predictions with electromagnetic health and safety and interference requirements.
- Provide suitable recommendations.

The considerations of the EMF Assessment have been incorporated into this REF and are considered in this section.

7.11.2 Baseline Conditions

Power-frequency magnetic and electric field measurements were conducted at the proposed powerline development site along Anzac Road and Junction Road. Magnetic field measurements were conducted at a height of 1 m above ground level (AGL) at the northern and southern sides of Anzac Road under the existing overhead powerlines, and under the existing 11 kV powerlines on the north-eastern side of Heathcote Road and northern side of Junction Road. Electric field measurements were taken at selected locations along both Anzac and Junction Road at 1 m AGL midway between powerline poles and directly under powerlines where the conductors are lowest.

Results of baseline modelling are provided in Table 7 and Table 8 of the EMF Assessment (Attachment C).

The EMF Assessment found that the maximum measured power-frequency magnetic fields of 4.3 µT at Anzac Road and 5.5 µT at Junction Road are well below the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guideline reference values of 200 µT. The measured maximum electric field level of 45 V/m is also well below the guideline value of 5 kV/m (applicable to the health and safety of the General Public). The assessment concluded that existing conditions are typical of what can be expected from typical street HV and LV powerlines.

7.11.3 Predicted Impacts and Conclusions

Based on the outcomes of theoretical modelling, the EMF Assessment makes the following assessments of the potential impacts of the proposed development in relation to health and safety and interference:

- The predicted maximum average and maximum magnetic fields at 0 m AGL, directly above the proposed underground feeders at Anzac Road are 85 µT and 170 µT, respectively.
- The predicted maximum average and maximum magnetic fields at 1 m AGL, below the proposed overhead feeders at Junction Road are 0.66 µT and 1.32 µT, respectively.
- All of the measured and predicted magnetic field levels are below the ICNIRP guideline 200 µT limit applicable to the health and safety of the General Public that applies in Australia.

- the Precautionary Principle could be applied to children where there is significant concern of potential long-term effects of EMF exposure, by limiting exposure to low level magnetic fields. During the survey of the proposed development area, no facilities such as childcare centres or schools (where there would normally be significant concern) were identified.
- Considering that residential dwellings along Junction Road are up to two-stories high and typically setback from the front boundary by a minimum 4 metres, the predicted maximum average magnetic field level of 0.86 µT is less than 1 µT and reduces with increased distance away from the powerline. It is not uncommon for established residential properties in urbanised areas of Sydney, that are adjacent to HV transmission powerlines to have field levels in the order of 1 – 1.5 µT.
- On Anzac Road, where commercial properties were observed with buildings typically setback 15 metres from the property boundary, the predicted maximum average magnetic field level was 0.33 µT which is much less than 1 µT which is widely accepted in the workplace as industry best practice.
- Anticipated risk of interference to general electronic equipment used 1 metre or more away from the front of the property boundaries on Junction Road is low. Similarly on Anzac Road, the maximum measured and predicted magnetic field levels do not exceed the Australian Standard (AS/NZS 61000.6.1) interference limit of 3.77 µT applicable to general electronic equipment.
- The predicted maximum average and maximum magnetic fields at 1 m AGL, below the proposed underground feeders at Anzac Road are 85 µT and 170 µT respectively. Directly above the proposed underground 33 kV feeders on Anzac Road at heights less than 0.5 m AGL, there is some risk of interference to pacemakers, however, it would need to be positioned abnormally near to the ground and when the powerline is operating at more than half its rated capacity and a magnetic field level of 100 µT is exceeded.
- Along Anzac Road there were no commercial properties identified of concern that may be sensitive to low levels of electromagnetic fields such as medical and research facilities.

The EMF Assessment demonstrates that the EMF exposure risk generated by the proposed development to health and safety of the general public is low and within the typical range of that within urbanised areas of Sydney and commercial areas. Similarly, the risk of interference from the new 33 kV conductors (above and below ground) is low.

7.11.4 Mitigation Measures

While compliant with relevant guidelines and Australian Standards, the EMF Assessment identifies a number of measures which may be implemented as part of the proposed development in order to further reduce the risk generated by exposure to EMF. These measures are summarised below.

- To mitigate this possible risk of interference of the 33 kV underground feeders on pacemakers, the 33 kV cabling could be located an additional 0.5m deeper underground, and the field level could be reduced by a limited extent by decreasing the powerline conductor separation distance.
- During commissioning of the new 33 kV powerlines, an electromagnetic field survey is recommended for health & safety and interference compliance and assurance purposes.

The EMF Assessment identifies that, in general, the effects of high magnetic fields produced may be reduced by:

- increasing the distance between the source and the affected area, as the effect of a magnetic field diminishes as the separation distance increases;
- introducing a shielding between the source and affected area;
- utilising equipment which is less sensitive; and
- reducing the time of exposure.

The EMF Assessment has not identified that high magnetic fields are anticipated as a result of the proposed development. General principles have been identified for consideration in the design and construction of the proposal.

7.12 Cumulative Impacts

7.12.1 Existing Environment

Cumulative impacts are a consideration of the proposed development's incremental impacts on the environment, combined with the effects of other relevant past, present or reasonably foreseeable future projects. In this context, potential cumulative impacts may arise as a result of the construction, as well as the operation of the development works.

Relevant major projects within the vicinity of the proposed development were identified, considering the proximate location, the timing and scale of the project works, and are identified in Table 7-4.

Table 7-4 Other major projects in the vicinity of the development works

Project and Location	Description of Works	Status
Moorebank Precinct East (MPE)	Intermodal Precinct that, when combined, make up the MLP.	Development works across the Precinct are well progressed in accordance with current MPW and MPE consents. Some early stages of MPE in operation.
Moorebank Precinct West (MPW)		
Local road rehabilitation works	Road reconstruction and resurfacing to be undertaken along Junction Road between Culvert Road and Heathcote Road, and construction of a roundabout at the intersection of Junction Road and Stockton Avenue.	These capital works were scheduled for construction during 2020 – 2021.
	Upgrade works along Anzac Road	Discussions underway between NSW DPE, Department of Defence and Liverpool City Council.

7.12.2 Impact Assessment

Previous cumulative impact assessments undertaken for MPE and MPW have considered key cumulative construction and operational environmental impacts in relation to traffic, dust, noise, visual, greenhouse gas, and biodiversity, including the location of the new MLP switching substation required for the Anzac Road works and approved under MPW Stage 2 (SSD 7709).

The conduits approved and installed as part of the MAAI works under the SER ARP4511 design would be utilised by the section of feeders from Secombe Road through to the new MLP switching substation site, to facilitate the Anzac Road augmentation activities.

These conduit works have therefore already been environmentally assessed and approved.

Key potential cumulative environmental impacts associated with the proposed electricity upgrade works are summarised in the following sections.

Traffic

Temporary progressive/localised partial road closure and/or temporary traffic diversions would be required for construction of both subject alignments, which may disrupt the regular flow of traffic and pedestrian access in the area of works. Road reconstruction and resurfacing works (planned capital works or emergency works) within the vicinity of the proposed alignments would further contribute to local traffic disruptions.

Traffic impact assessments have been prepared and approved for potential traffic and access impacts in relation to the MLP development.

Given the proposed development works would be short term and only generate localised impacts on traffic and no significant cumulative traffic impacts are anticipated, with consideration of other ongoing and forecast projects in the area.

Ongoing consultation with Council will be undertaken during detailed design and construction phase, to allow a smooth interface between Project works and Council – planned works, minimise traffic impacts, and avoid any unnecessary duplication of works.

Noise and Vibration

Construction noise management and mitigation measures for the proposed development as well as other nearby major project works would be implemented to mitigate potential noise levels at nearby sensitive receivers, including local residents along Junction Road. Anticipated noise and vibration emissions are likely to be minimal and, particularly along Anzac Road, within the context of the area.

Construction noise and vibration management plans, which would include complaints management procedures would be implemented to mitigate potential construction noise and vibration impacts.

Visual Impacts

Where construction works for the Endeavour electricity network upgrades would be undertaken at the same time as other local road rehabilitation works, visual impacts from sensitive receivers would be increased. These impacts, however, are minimal, considering the construction works are short term and localised. Furthermore, appropriate mitigation measures would be implemented to manage impacts.

Post construction, road rehabilitation works would benefit the local community and would be unlikely to be significantly more visually dominant. Restorative landscaping post construction would ameliorate some visual impacts. Mitigation measures to manage visual impacts resulting from the MLP development have already been implemented.

Biodiversity

In the vicinity of the proposed development, no significant biodiversity values have been identified. The cumulative construction works are therefore not expected to have a cumulative impact to threatened species or ecological communities.

Weed management and vegetation restoration works would be undertaken, where required, to minimise impacts on biodiversity during construction and/or operation.

A detailed biodiversity strategy has been implemented for the MLP development and would apply to the scope of works that occurs within the boundaries of the Precinct.

Hydrology and Soils:

Appropriate water and soil management procedures to manage water quality and sedimentation would be implemented for all development construction works, generally in accordance with Landcom's 'Blue Book' (2004).

Appropriate hydrological and soil management procedures are already in place to mitigate potential impacts resulting from the MLP development and would continue to apply to the scope of works which is proposed within the MLP boundaries.

No cumulative adverse hydrology or soils impacts are expected resulting from the projects, that cannot be appropriately managed.

Socio-economic

The local community may have concerns regarding the cumulative impacts of the identified projects, in relation to disruptions to traffic, generation of noise, vibration and dust, visual amenity, impacts to local heritage items, construction hours, and EMF.

The proposed development is short term and localised, and so is unlikely to significantly increased the cumulative effect of the various projects occurring within the area.

Community consultation and notification would assist in managing cumulative socio-economic impacts of the identified projects. Overall, these combined projects are considered to be beneficial to the community – by providing a safe and reliable supply of electricity, a safer and more efficient road system and greater employment opportunities.

Ongoing consultation with Council will be undertaken during detailed design and construction phase to interface Project works and Council – planned works, thereby minimising impacts on the community and residents.

Given the temporary nature of the works, cumulative impacts are expected to be able to be effectively managed through implementation of appropriate mitigation measures.

7.13 Climate Change and Greenhouse Gas Emissions

7.13.1 Impact Assessment

Climate Change

Climate change is likely to impact average global climate conditions, and the frequency and severity of extreme events. On a local scale, climate change is predicted to increase risks for people, economies and ecosystems, including extreme weather events (storms and extreme precipitation), coastal and inland flooding, reduced water supplies, drought, heat stress and sea-level rise.

Temperature is agreed to be the most reliable indicator of climate change. Given climate change predictions, where possible, climate change risks need to be practically understood and managed.

The proposed works were considered against potential natural hazard risks in relation to the local climate regime:

- Flooding – Climate change may exacerbate site flooding risks through changes to rainfall frequency and/or intensity, which may affect the capacity and efficiency of stormwater infrastructure. The proposed works lie outside of the flood affected areas, and are not expected to impact or be impacted by the local flooding regime.
- Bushfire – The proposed works area is not mapped as bushfire prone land. The proposed works are not likely to increase bushfire risks to the locality.

- Hail, lightening and wind from severe storms - Risks due to hail, lightening and wind from severe storms may include damage to infrastructure, machinery and construction materials, damage to electrical equipment and overhead lines and signals, and health and safety to site workers and the local community.
- Heat waves – Excessively high (or cold) temperatures may increase heat-related stress to onsite workers, overheat machinery and equipment, and delay overall project works.

Greenhouse Gas Emissions

The predominant sources of greenhouse gas emissions for the proposed construction works may include:

- transportation of materials (vie heavy vehicles);
- light vehicles for staff use;
- use of fuel-powered construction equipment, such as excavation vehicles, heavy duty trucks, welders, cranes and/or diesel onsite generator(s);
- vegetation clearing, resulting in loss of carbon sequestration; and
- consumption of energy from the grid.

The proposed works are not expected to have a significant impact on local greenhouse gas emissions.

Assessment

Given the scope and nature of the proposed works, the impacts of the proposed works on climate change are expected to be negligible. Practicable and feasible mitigation measures to reduce GHG emissions and promote resilience to climate change, predominantly through selection of resources and vehicle emissions management would be implemented to reduce the potential for adverse impacts to occur.

7.13.2 Mitigation Measures

Climate Change

Measures to mitigate potential climate change impacts are summarised below.

- Infrastructure and equipment would be designed for long-term use, and to meet appropriate standards to withstand extreme temperatures, rainfall, storms, bushfire, hail, or other extreme events.
- Electrical systems would be designed to withstand loss of structural component integrity and reduced functionality, to minimise climate change risks.
- Management procedures for stop work events would be included within the CEMP.
- Where possible, structures would be designed to be fire resistant to minimise risks from bushfires.
- Construction procedures would include management and mitigation measures which would be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

Greenhouse Gas Emissions

Measures to mitigate potential climate change impacts are summarised in the following points.

- Energy efficient guidelines for work practices would be implemented including regular machinery maintenance, minimising machinery idling time, using bio-fuels, where possible, and using machinery with more efficient emissions ratings.
- Endeavour Energy's vegetation management policies would be implemented to minimise vegetation removal.
- Removed poles would be diverted from landfill and re-purposed into high-quality timber for reuse, where possible.
- Construction waste would be recycled, where possible
- Where possible, locally sourced materials would be used to minimise emissions associated with transport.

Construction procedures would include management and mitigation measures which would be implemented to avoid or minimise any potential adverse impacts on the surrounding environment.

7.14 Ecological Sustainable Development

7.14.1 Precautionary Principle

The Precautionary Principle has been applied to the proposed works, as documented by this REF. Where potential environmental impacts have been identified, mitigation measures have been addressed and recommended for implementation. Subject to the implementation of these mitigation measures, the environmental assessment in Sections **Error! Reference source not found.** to **Error! Reference source not found.** did not identify any potential impacts that may cause serious and irreversible environmental damage as a result of the proposed works. The proposed development is, therefore, consistent with the Precautionary Principle.

7.14.2 Inter-generational Equality

The proposed development has been designed to benefit present and future generations without irreversibly compromising the health, diversity and productivity of the environment for present and future generations. The proposed works would contribute to a more stable electricity network, which would enable the MLP to progress intermodal development which would ultimately result in an increase in local employment opportunities. Additionally, regional ESD benefits are associated with the shift toward rail freight over current road transport.

Specific mitigation measures have been developed not only to reduce potential environmental impacts, but where possible, to enable direct and flow-on economic, social and wider environmental benefits to the community.

The proposed works would facilitate the delivery of the greater MLP Project and is therefore considered consistent with the principle of inter-generational equity.

7.14.3 Biodiversity

The biodiversity value within the proposed works area is limited, and the proposed works would have minimal impact on the local ecological habitat. Appropriate biodiversity assessments (including arboricultural reports) would be undertaken prior to removal of

any vegetation (should it be required) to assess potential environmental impacts on local biodiversity, and to provide specific mitigation measures and strategies.

There is limited scope for the retention of directly affected grasses, shrubs and trees to be removed to accommodate the proposed works for either alignment. However, this would not significantly affect the site's ecological habitat and values, biological diversity or ecological integrity. No impact to Anzac Creek resulting from the Junction Road alignment works is likely.

Where possible, opportunities for beneficial impacts from energy and water conservation, waste minimisation and resource recovery have been adopted as part of the Project design to further promote conservation of site biodiversity and ecological integrity.

7.14.4 Improved Valuation of Resources

Environmental assessments provided in Sections 7 have investigated the overall residual, environmental and social costs of the proposed works. Best practice design, management and mitigation measures would be applied to the construction activities. Mitigation measures to facilitate positive environmental and sustainability outcomes have been considered, including avoidance and prevention of potential impacts to traffic, noise, air quality and biodiversity. Environmental assessments also considered intangible environmental, cultural and social impacts of the Project.

7.15 Summary Impacts and Mitigation

Providing the mitigation measure identified in **Table 7-5** are implemented, the proposed works are considered unlikely to have any significant long-term impacts that cannot be managed.

***Table 7-5**:* Summary of aspects, impacts and mitigation measures.

Impact On	Mitigation Measures	Responsibility
General	• LCC would be notified at least 40 days prior to works commencing onsite. • A CEMP would be prepared prior to any construction works commencing. • The CEMP would include a complaints handling procedure and register. • As part of the site induction all workers are to be made aware of the site environmental sensitivities.	Project Manager
Utilities and Services	• Prior to any excavation activities within the proposed works area, appropriate surveys to locate existing infrastructure, and consultation with affected service and utilities providers and Council would be undertaken. • The Endeavour Energy website advises that the affected community would be notified at least four business days before a planned outage unless there is an electrical emergency (https://www.endeavourenergy.com.au/outages/how-we-respond-to-storms2/power-outages). • Appropriate work health and safety practices would be implemented throughout the entire construction process, in accordance with relevant CEMP procedures. • The work site is to be appropriately secured at night time and/or outside regular works hours. • All affected properties and businesses would be advised as part of the early consultation process about the proposed works. • The affected community would be notified a minimum of four business days before any planned outages.	Project Manager Site workers
Roads, Traffic and Access	• Where possible, works are to be undertaken outside peak traffic periods and at night, when the impact on traffic, parking and access can be minimised. • An RMS approved Traffic Management Plan (TMP) and approvals from the relevant road authority would be in place prior to commencement of works. • Appropriate permits for the road closure, including a Section 138 application (under the Roads Act 1993), would be required to be submitted to Council. A Traffic Management Plan, including a Traffic Control Plan, would be required to be prepared for the proposed (partial) road closures and submitted to Council/RMS, and notification provided to local residents and businesses as required.	Project Manager

Impact On	Mitigation Measures	Responsibility
	• Temporary signage to be erected to alert pedestrians to the footpath alterations during construction works and illustrate the site safety requirements and the restricted nature of the proposed works area, along with a phone number for enquiries. • Adequate signage to warn motorists or works and changes to access arrangements to be installed prior to the commencement of works. • LCC to be notified of the temporary footpath closure and the works duration. • Parking of construction vehicles is to be at the nearest accessible public carpark. LCC is to be notified on construction vehicles utilising public parking spaces. • Construction workers are to be encouraged to car-pool where convenient to minimise parking and traffic demand. • The work site is to be appropriately secured at night time and outside regular works hours and construction periods.	
Landscape and Visual Assessment	• All residents and business owners within the vicinity of the proposed works would be notified in writing of the works, including the locations of new (replacement) poles. • Flood lights used for night works would be directed to reduce light spill to sensitive receivers / residents • All work equipment and materials and sedimentation and erosion control measures would be contained within the designated boundaries of the work site. • Old poles would be removed from the site as soon as practically possible. • All construction waste would be removed from the site on a regular basis. • Once works are completed in any given location, disturbed ground surfaces would be reinstated and landscaping restored, where practical, as soon as possible. • Any damage to neighbouring properties during the construction and restoration works would be fixed as soon as possible, or at the completion of works in that area.	Project Manager Site workers
Socio Economic Impacts	• Potential traffic and transport impacts to the surrounding road network, and noise and air quality impacts to sensitive receivers would be managed through implementation of appropriate mitigation measures.	Project Manager Site workers

Impact On	Mitigation Measures	Responsibility
	• Once works are completed in any given location, disturbed ground surfaces would be reinstated and landscaping restored as soon as possible. • Consultation with residents, community groups and relevant stakeholders would be undertaken, and a complaints procedure implemented throughout the construction process.	
Noise and Vibration	• The noisiest activities would preferentially be conducted during least sensitive periods of the day, as far as is reasonably practicable. • Site induction would include information that raises workers awareness of noise and vibration issues and sensitive receivers. • Site diary would include record of activities, so any complaints received can be checked against the type of activity that was being carried out. • Plant, equipment and vehicles shall be serviced regularly and not be left idling for extended periods of time. • Where active construction periods have been lengthy, periods of respite from noise and vibration may be implemented. • Local residents and business owners in close proximity would be informed 2 weeks prior to the commencement of the proposed works and the planned of out of hours (night-time) works. For any proposed out of hours works (night shifts) a Work Method Statement/Out of Hours Protocol would be prepared, reviewed and approved by the Project Manager and/ or the Environmental Advisor. The Work Method Statement would form part of the CEMP, and would include: • a description of works and justification for out of hours work; • duration of works, including start times and dates; • notification requirements (2 weeks prior to the commencement of the proposed night works) to local residents and business owners in close proximity; and • additional noise, light and/ or traffic mitigative measures as required.	Project Manager Site workers
Air Quality and Dust Suppression	• Excavation and intrusive works would be avoided during periods of high wind. • All construction equipment and vehicles would be regularly services and maintained.	Project Manager Site workers

Impact On	Mitigation Measures	Responsibility
	• Vehicles and machinery would not be left idling (when not directly required for construction works) to reduce exhaust emissions. • The proposed works area is to be kept neat and tidy, and free of unmanaged stockpiles. Any spilt materials or materials tracked onto roadways would be removed (via shovelling or sweeping) immediately to minimise the risk of vehicles driving over the area or transfer of airborne dust particles to nearby residents or business premises. • All loads would be covered when travelling to and from the site to prevent airborne dust. • Any disturbed areas would be revegetated or resurfaced as soon as possible after works have been completed in that area.	
Landform, Geology, Soils and Contamination	• All property and easement boundaries are to be pegged, final levels established, and permanent survey marks to be located by a surveyor prior to commencement of work. • All services searches would be completed prior to construction. • ESC measures would be implemented, where appropriate, in accordance with Landcom's *Managing Urban Stormwater: Soils and construction – Volume 1* (2004) (the 'Blue Book') prior to any disturbance works. • Sedimentation and erosion control measures would be routinely inspected and maintained. • Works would not be undertaken during periods of high rainfall or wind. • Vehicles and machinery would be regularly checked for leaks and an appropriate spill kit would be available onsite at all times. • Any sediment/soil transferred from the work site to the adjacent roadway and/or footpaths would be swept as required, and prior to the onset of rainfall. • All chemicals and fuels shall be stored in accordance with Australian standards. • Endeavour Energy's 'Excavation' procedure (GSY 1015, 2016) to form part of the CEMP. • If during works any items which are indicative of contamination are discovered, appropriate procedures as provided in the CEMP, and in accordance with Endeavour Energy's Environmental Guidelines Handbook would be implemented.	Project Manager Site workers

Impact On	Mitigation Measures	Responsibility
Safety and Hazards	• All necessary safety measures, including signage, barriers, lighting, fencing etc would be used within each work area. These would be checked on a daily basis to make sure that they are in good working condition and fit for purpose. • Works would be undertaken in accordance with relevant NSW WorkCover requirements, Endeavour Energy's standards and protocols, and any other applicable guidelines. • Traffic Management Plan recommendations would be implemented throughout the construction works. • Open holes would be covered and fenced as necessary.	Project Manager Site workers
Waste Generation, Storage, Handling and Disposal	• Where possible, Endeavour Energy recycles old timber poles, metals, oils, chemicals and general office waste. Old timber poles are repurposed into timber for re-use. • Waste resulting from the work would be removed from site and disposed of by a licensed contractor to an appropriate waste management facility. Residential or local bins would not be used to dispose of any waste. • Any excavated material and green waste shall be stockpiled in a designated stockpile area, approved during detailed design phase, and reused onsite where possible in site re-establishment and rehabilitation works. • Where possible, vegetation/green waste shall be mulched and reused onsite. • The work site would be maintained free of rubbish and cleaned up at the end of each working day. • No waste material would be left on site once the works have been completed. • Waste must be classified in accordance with the NSW EPA Waste Classification Guidelines (2014) prior to offsite disposal/transfer.	Project Manager Site workers
Electric and Magnetic Fields (EMF)	• To mitigate this possible risk of interference of the 33 kV underground feeders on pacemakers, the 33kV cabling could be located an additional 0.5m deeper underground, and the field level could be reduced by a limited extent by decreasing the powerline conductor separation distance. • During commissioning of the new 33kV powerlines, an electromagnetic field survey is recommended for health & safety and interference compliance and assurance purposes. • The general principles for reducing the effects of high magnetic fields should be considered and implemented in the design and construction of the proposed development.	Project Manager

Impact On	Mitigation Measures	Responsibility
Climate Change and Greenhouse Gas Emissions	• Infrastructure and equipment would be designed for long-term use, and to meet appropriate standards to withstand extreme temperatures, rainfall, storms, bushfire, hail, or other extreme events. • Electrical systems would be designed to withstand loss of structural component integrity and reduced functionality, to minimise climate change risks. • Management procedures for stop work events would be included within the CEMP. • Where possible, structures would be designed to be fire resistant to minimise risks from bushfires. • Energy efficient guidelines for work practices would be implemented including regular machinery maintenance, minimising machinery idling time, using bio-fuels where possible, and using machinery with more efficient emissions ratings. • Endeavour Energy's vegetation management policies would be implemented to minimise vegetation removal. • Removed poles would be diverted from landfill and re-purposed into high-quality timber for reuse. • Construction waste would be recycled, where possible • Where possible, locally sourced materials would be used to minimise emissions associated with transport.	Project Manager Site workers

7.16 Environmental Management

7.16.1 CEMP

A CEMP would be prepared in accordance with Endeavour Energy guidelines, and works would be completed in accordance with relevant procedures and recommendations.

The CEMP would include reference to legislation relevant to the construction activities including associated regulations and standards; specific measures to achieve conformance with the relevant provisions from legislation; and specific measures to achieve conformance with any relevant consent conditions.

The CEMP must establish and maintain:

- Environmental; objectives and targets relevant to the potential impacts arising from the activity under the contract;
- Programs and written procedures to achieve the objectives and targets
- The role, responsibility and reporting requirements of personnel relevant to the CEMP
- Protocol and process for communication with the Principal regarding performance under the CEMP
- Relevant raining and equipment needs of the contractor or their sub-contractors
- Procedures for preventing and responding to incidents and emergencies; and
- Initiatives to monitor and measure implementation of the CEMP

An Environmental Work Method Statement (EWMP) would be prepared for high risk environmental activities, as required by the CEMP. A Work Method Statement would be prepared for the proposed out of hours works (night shifts).

7.16.2 Monitoring and Review

Activities that have been determined by the company under the EP&A Act must undergo periodic inspections to check for compliance to the conditions of the REF for Class 5 activities, including whether environmental incidents if any, have been managed effectively and corrective actions have been sufficiently completed in a timely manner.

Environmental inspections for Class 5 activities are conducted by NEA at start-up, at completion (close out inspection) and periodically during works for activities being carried out in environmentally sensitive areas or where the activity duration exceeds six months. The frequency of these periodic inspections is determined at the commencement of the construction phase of the works by the Project Manager or the NEA Manager or the Environment Specialist who prepared the REF.

Corrective actions to address any non-conformances identified from the inspections must be carried out, as agreed with the Project Manager and/or the Site Supervisor, and recorded as required. Compliance with the CoP is a condition of an ANO's license and is audited by IPART.

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

This REF has been prepared to identify and assess the potential impacts that may occur as a result of the network augmentation and upgrade works, required to deliver power to the MLP switching station, as confirmed in Endeavour Energy's *Connection Offer – Supply Offer* (Ref: UIL 5922; 5 November 2020). Pursuant to SEPP (Transport and Infrastructure), Clause 2.44, *'development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without consent on any land'*. Endeavour Energy is an electricity supply authority and so is authorised to complete these works, without requiring consent under Part 4 of the *Environmental Planning and Assessment Act* (EP&A Act) 1979. The construction works would be assessed for potential environmental impacts under Part 5.

Works are required predominantly along Junction Road and Anzac Road. Given the existing supply network that leads into each of the two proposed alignments, the preferred option to meet the future operational energy requirements of the MLP is the combination of overhead supply for the Junction Road alignment and underground supply for the Anzac Road alignment.

The augmentation works for the Junction Road alignment would involve a 9 – 12 month construction program. Similarly, works for the Anzac Road alignment are anticipated to take between 10 and 12 months, however, the construction of this package, along with other elements of the greater scope of works, may be undertaken concurrently with those along Junction Road. Section 4 of this REF provides a detailed project description and construction details, as detailed within Endeavour Energy's Supply Offer.

Council and community consultation in relation to the Project has been undertaken, and key messaging and concerns raised incorporated and assessed as part of the preparation of this REF. This REF will be placed on public exhibition, to further provide the community and other stakeholders the opportunity to comment on the Project.

Assessment of the Project against environmental legislation concludes the works are permissible and consistent with relevant policy provisions. Under the *Roads Act* 1993, a ROL and an RMS approved TMP would be required where road opening is required. Under the *Biodiversity Conservation Act* 2016, section 7.18, the assessment identifies no impact on threatened species, communities or their habitat and that neither a species impact statement or biodiversity development assessment report is required to accompany this assessment.

This environmental impact assessment indicates that no adverse impacts are anticipated to be generated as a result of the Project provided mitigation measures, as identified within Section 7.15, are implemented as recommended. A CEMP would be prepared in accordance with Endeavour Energy guidelines, and works would be completed in accordance with relevant procedures and recommendations.

8.2 Recommendations

In accordance with Part 5 of the EP&A Act, Endeavour Energy is responsible for determining the Project, as described and assessed within this REF.

This REF concludes and recommends:

- that an Environmental Impact Statement (EIS) is not required to support the Project; and

- Endeavour Energy may determine the Project based on the outcomes of this REF.

9 REFERENCES

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NSW Department of Planning, Industry & Environment, eSPADE, https://www.environment.nsw.gov.au/eSpade2WebApp; accessed 22 November 2021.

NSW EPA Waste Classification Guidelines – Part 1: Classifying waste (2014), https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines, accessed 22 November 2021.

10 ATTACHMENT A – SITE INSPECTION PHOTO LOGS

Junction Road Alignment

Pole 605992	
 	CNR Nuwarra Rd & Junction Rd (eastern extent) Sensitivities and Potential Constraints: • Proximity to Telstra utilities • Proximity to footpath, residential allotment • Very close to road – construction considerations

Pole 605982	
	Junction Road (eastern extent) Sensitivities and Potential Constraints • Adjacent to residential development, footpath, road • Services
	

Pole 695953	
	Junction Road (east) Sensitivities and Potential Constraints • Proximity to high pressure Jemena gas main • Proximity to medium density residential development
  	

Pole 739229

Junction Road (east)
Cnr Renton & Junction
Sensitivities and Potential Constraints

- Includes Light pole
- Proximity to residential development and footpath

Pole 606450

Junction Road (east)

Sensitivities and Potential Constraints

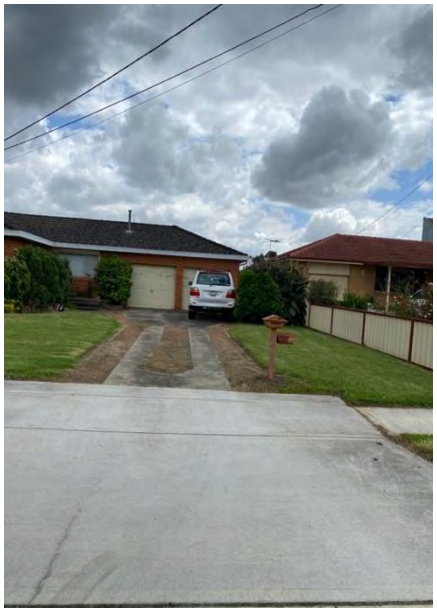
- Attached private pole
- Proximity to residential development and footpath

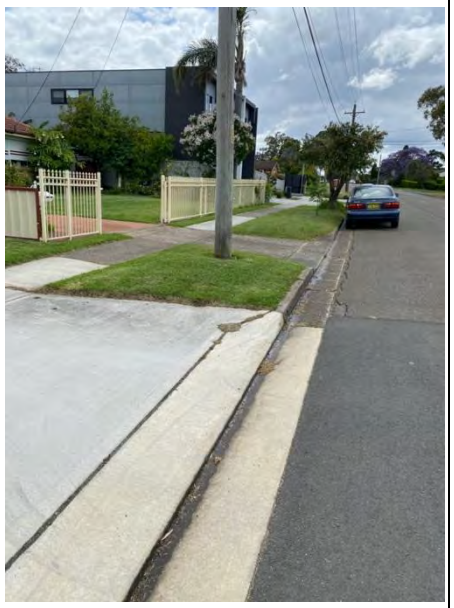
Pole 606449

Junction Road (east)

Sensitivities and Potential Constraints

- Proximity to residential development
- Proximity to residential access/driveway





Pole 606448

Junction Road (east)

Sensitivities and Potential Constraints

- Proximity to residential
- Street sign
- Street landscaping / tree

Pole 606502

Junction Road (east)

Sensitivities and Potential Constraints

- Services
- Proximity to residential
- Street tree / landscaping nearby

Pole 727761

Junction Road (east)

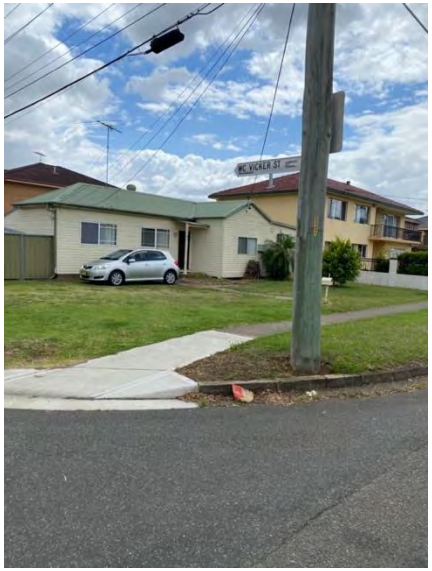
Sensitivities and Potential Constraints

- Proximity to residential
- Residential driveways either side of the pole, construction considerations

Pole 606444

Junction Road (east)
Cnr McVicker St & Junction
Sensitivities and Potential Constraints

- Proximity to road (corner splay),
- Proximity to footpath



Pole 606438

Junction Road (east)

Sensitivities and Potential Constraints

- Street tree in proximity
- Telstra services
- Private poles (x 2) attached

Pole 606437

Junction Road (east)

Sensitivities and Potential Constraints

- Street sign
- Street tree in proximity
- Private pole attached
- Proximity to residential driveway

Pole 977587

Junction Road (east)

Sensitivities and Potential Constraints

- Proximity to residential
- Private pole attached

Pole 606394

Junction Road (east)
Sensitivities and Potential Constraints
Cnr Junction & Stockton Ave

- Proximity to Jemena gas main
- Proximity to road, adjacent to roundabout – TCP considerations
- Street tree in proximity
- Proximity to services

Pole 606395

Junction Road (middle)
Cnr of Junction & Stockton Ave
Sensitivities and Potential Constraints

- Proximity to street tree
- Proximity to residential, residential driveways
- Proximity to roundabout

Pole 606396

Junction Road (middle)

Sensitivities and Potential Constraints

- Proximity to driveway
- Adjacent to a tree (likely require removal)
- Private pole attached

Pole 289417

Junction Road (middle)

Sensitivities and Potential Constraints

- Substantial space for works
- Substation / transformer on the pole
- Private pole attached

Pole 751561	
	Junction Road (middle) Sensitivities and Potential Constraints • Gas utilities require consideration • Proximity to residential, and residential driveway • Private pole attached
	

Pole 606398	
	Junction Road (middle) Sensitivities and Potential Constraints • Proximity to NBN services • Street tree in proximity • Proximity to residential driveway • Proximity to road / chicane
	

Pole 606399

Junction Road (middle)
Cnr Junction & Renton
Sensitivities and Potential Constraints

- Proximity to driveway and footpath

Pole 303749

Junction Road (middle)
Cnr Junction & Renton
Sensitivities and Potential Constraints

- Proximity to residential driveway
- Bus stop across the road – may require relocation during works?
- Pole located adjacent to pedestrian crossing (to access bus stop). May require relocation during works?

Pole 606096

Junction Road (middle)
Close to Wellwood Ave
Sensitivities and Potential Constraints

- Located on a roundabout
- Proximity to residential and footpath
- Proximity to private open space Ernie Smith Reserve
- Proximity to services

Pole 606095	
	Junction Road (middle) Cnr Wellwood Ave Sensitivities and Potential Constraints • Proximity to Ernie Smith Reserve (public open space) • Proximity to footpath • Located adjacent to a roundabout
	

Pole 606102	
	Junction Road (west) Sensitivities and Potential Constraints • Proximity to Optus services • Proximity to Ernie Smith Reserve (public open space) • Proximity to footpath • Nearby row of trees within reserve may require consideration
	

Pole 727732	
	Junction Road (west) Sensitivities and Potential Constraints • Proximity to Ernie Smith Reserve (public open space) • Proximity to footpath • Nearby row of trees within reserve may require consideration
	

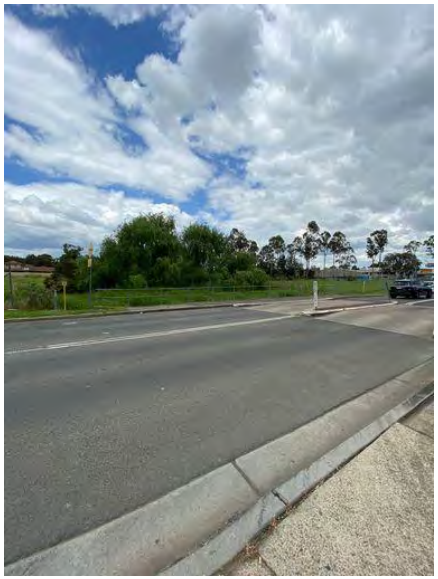
Pole 606110	
	Junction Road (west) Sensitivities and Potential Constraints • Proximity to Ernie Smith Reserve (public open space) • Bus stop at the pole (will need to consider relocation of bus stop during active works) • Proximity to footpath
	

Pole 606097

Junction Road (west)

Sensitivities and Potential Constraints

- Proximity to Ernie Smith Reserve (public open space)
- Adjacent to driveway access to Liverpool City Hockey Complex
- Proximity to watercourse (Anzac Creek) (mapped 'blue line' on topographic map)



Pole 606108

Junction Road (west)

Sensitivities and Potential Constraints

- Adjacent to watercourse Anzac Creek (mapped 'blue line' on topographic map)
- Adjacent to easement/council land
- The start of industrial area (IN1)

Pole 606107

Junction Road (west)

Sensitivities and Potential Constraints

- Proximity to industrial zone (IN1)
- Adjacent to industrial driveway access
- Private pole attached
- Services proximity for consideration.

Pole 606073

Junction Road (west)
Cnr Junction & Heathcote
Sensitivities and Potential Constraints

- Proximity to industrial zone (IN1)
- Proximity to industrial access driveway
- Street tree in proximity
- Proximity to petrol station and associated car wash

Pole 606074

Junction Road (west)
Cnr Junction & Heathcote
Sensitivities and Potential Constraints

- Proximity to industrial zone (IN1)
- Services in proximity
- Proximity to petrol station and associated car wash
- Located on main road (Heathcote Road), and adjacent to turning land into Junction Rd (will need to consider timing of works and likely traffic management)

Pole 606078	
	Junction Road (west) Sensitivities and Potential Constraints • Proximity to gas meters outside of petrol station • Adjacent to petrol station access driveway • Located on main road (Heathcote Road), and adjacent to turning land into Junction Rd (will need to consider timing of works and likely traffic management)
	

Pole 606077	
	Junction Road (west) Sensitivities and Potential Constraints • Located on main road (Heathcote Road) • Adjacent to petrol station • Proximity to footpath

Pole 975259	
	Junction Road (west) Sensitivities and Potential Constraints • Proximity to petrol station • Close to petrol station access driveway • Located on main road (Heathcote Road) • Proximity to footpath
	

Pole 606066

Junction Road (west)

Sensitivities and Potential Constraints

- Located on main road (Heathcote Road)
- Close to petrol station access driveway
- Optus services
- Proximity to footpath

Pole 606163

Junction Road (west)
Cnr Heathcote Rd & Seton Rd
Sensitivities and Potential Constraints

- Located on main road (Heathcote Road)
- Proximity to road, footpath, pedestrian crossing
- Services
- Proximity to industrial zone (IN1)

Pole 606181

Junction Road (west)

Sensitivities and Potential Constraints

- Located on main road (Heathcote Road)
- Close to road, footpath, pedestrian crossings
- Services
- 'gas' sign located on the pole services adjacent
- Next Adjacent to traffic lights
- I industrial zone (IN1) area

Anzac Road Alignment

Pole 881900	
	Anzac Road WB (eastern extent of alignment) Sensitivities and potential constraints: • Anzac Village Substation accessway • Driveway access into Defence facility • Communication services • Underground stormwater drain • Small tree/shrubs • Pedestrian footpath

Pole 881901

Anzac Road WB in front of Anzac Village Substation
Sensitivities and potential constraints:

- Anzac Village Substation
- Communication services
- Underground stormwater drain
- Water main
- Small tree/shrubs
- Pedestrian footpath

Pole 605114

Anzac Road WB in front of Anzac Village Substation
Sensitivities and potential constraints:

- Anzac Village Substation
- Communication services
- Underground stormwater drain
- Water main
- Potential underground Sewer (SV = Sewer valve?)
- Small tree/shrubs
- Pedestrian footpath
- Includes light pole

Pole 605115

Anzac Road WB east of Yulong Cl intersection

Sensitivities and potential constraints:

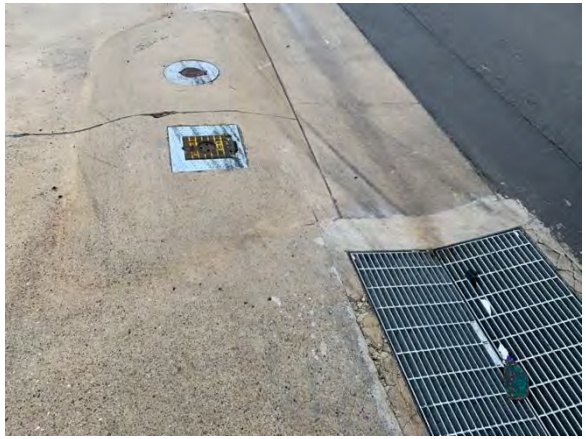
- Communication services
- Underground stormwater drain
- Gas main
- Water main
- Small tree/shrubs
- Pedestrian footpath

Pole 269522

Anzac Road WB opposite Yulong Cl intersection

Sensitivities and potential constraints:

- Underground stormwater drain
- Water main
- Potential underground Sewer (SV = Sewer valve?)
- Pedestrian footpath
- Includes light pole
- Large Defence (DJLU) access driveway



Pole 607512

Anzac Road WB west of Yulong Cl intersection

Sensitivities and potential constraints:

- Underground stormwater drain
- Pedestrian footpath
- Includes light pole
- Hydrants/service checking area inside DJLU boundary

Pole 607504

Anzac Road WB approx. 75m west of Yulong Cl intersection
Sensitivities and potential constraints:

- Communication services
- Pedestrian footpath

Pole 607511	
	Anzac Road WB approx. 130m west of Yulong Cl intersection Sensitivities and potential constraints: • Pedestrian footpath
	

Pole 605110

Anzac Road WB approx. 175m west of Yulong Cl intersection
Sensitivities and potential constraints:

- Communication services
- Pedestrian footpath

Pole 607510

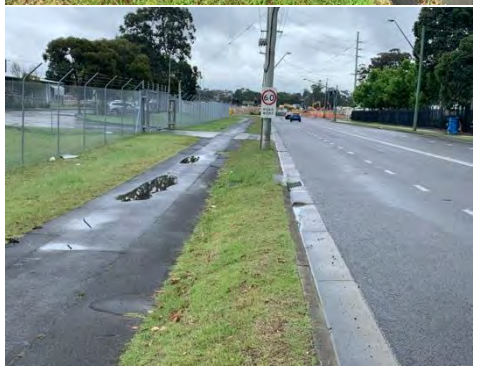
Anzac Road WB approx. 220m west of Yulong Cl intersection
Sensitivities and potential constraints:

- Bus Stop
- Pedestrian footpath
- Various spray paint markings indicating underground services possibly:
  - Gas
  - Water
  - comms

Pole 74690

Anzac Road WB approx. 45m east of Secombe Pl intersection
Sensitivities and potential constraints:

- Communication services
- Underground stormwater drain
- Pedestrian footpath
- Various spray paint markings indicating underground services



Pole 607423

Anzac Road WB approx. 10m west of Secombe Pl intersection
Sensitivities and potential constraints:

- Communication services
- Underground stormwater drain
- Pedestrian footpath
- Various spray paint markings indicating underground services
- DJLU access driveway

Pole 797677

Anzac Road WB approx. 65m west of Secombe Pl intersection
Sensitivities and potential constraints:

- Underground stormwater drain
- Pedestrian footpath
- Various spray paint markings indicating underground services

Pole 770866

Anzac Road WB approx. 10m east of Moorebank Ave Intersection
Sensitivities and potential constraints:

- Communication services
- Underground stormwater drain
- Pedestrian footpath
- Various spray paint markings indicating underground services
- Traffic lights and associated infrastructure
- Flood sign
- Includes light pole

Pole 772149	
	Moorebank Ave (SB – looking north) approx. 5m North of Anzac Rd intersection Sensitivities and potential constraints: • Communication services • Underground stormwater drain • Pedestrian footpath • Various spray paint markings indicating underground services • Water main • Includes light pole
	

Pole 335876

Anzac Rd EB 25m east of Moorebank Ave intersection
Sensitivities and potential constraints:

- Communication services
- Pedestrian footpath
- Various spray paint markings indicating underground services
- Includes light pole
- Monitoring well location
- Underground stormwater drain
- Electric meter box (potentially out of service as it was wrapped in blue tarp) (note this is 5m west of next pole)

Pole 772156

Anzac Rd EB 90m east of Moorebank Ave intersection
Sensitivities and potential constraints:

- Communication services
- Pedestrian footpath
- Includes light pole
- Underground stormwater drain
- Electric meter boxes
- Sewer valve (assuming SV = Sewer valve)

Anzac Rd EB on eastern side of Secombe Pl intersection
Sensitivities and potential constraints:

- Communication services
- Pedestrian footpath
- Includes light pole
- Underground stormwater drain
- Water main
- Water hydrant booster
- Bus stop
- Industrial warehouse/offices accessways

Pole 772158

Anzac Rd EB 82m east of Secombe Pl intersection
Sensitivities and potential constraints:

- Pedestrian footpath
- Includes light pole
- Underground stormwater drain
- Sewer valve (assuming SV = Sewer valve)
- Watermain
- Industrial warehouse/offices accessway

Pole 772159

Anzac Rd EB 180m west of Yulong Cl intersection
Sensitivities and potential constraints:

- Pedestrian footpath
- Sewer valve (assuming SV = Sewer valve)
- Industrial warehouse/offices accessway (pedestrian and vehicle)
- Booster hydrant
- Electric meter box

Pole 772160

Anzac Rd EB 40m west of Yulong Cl intersection (photos include Yulong inersection)

Sensitivities and potential constraints:

- Pedestrian footpath
- Underground stormwater drain
- Sewer valve (assuming SV = Sewer valve)
- Watermain
- Industrial warehouse/offices accessway
- Communications services

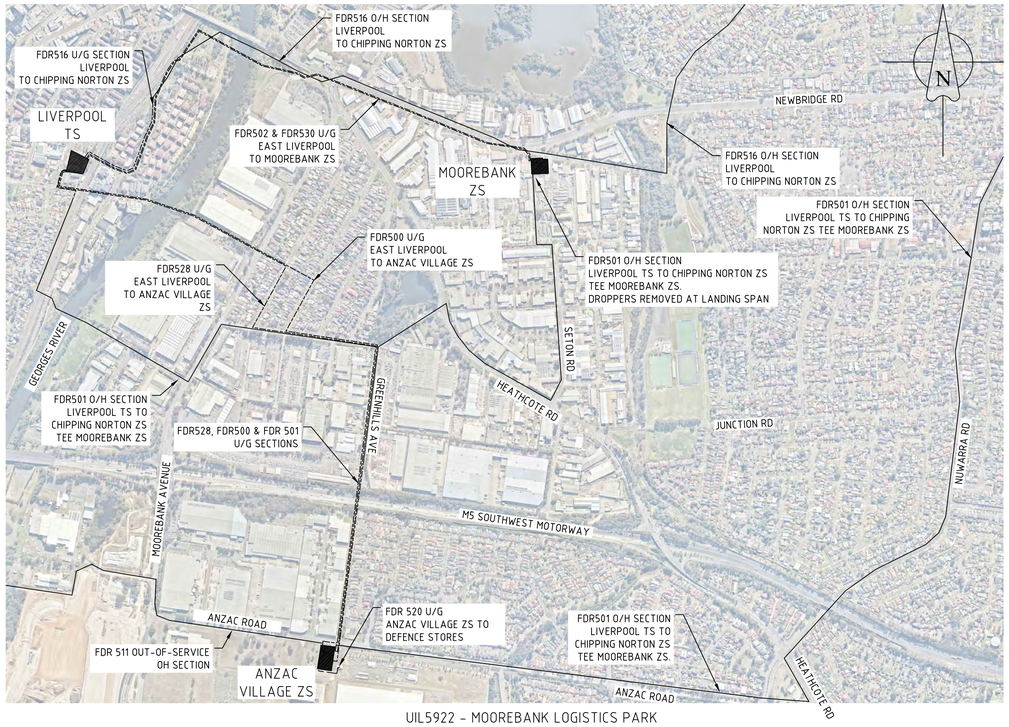
Pole 772161

Anzac Rd EB – eastern extent of allignment. Including photo of laneway that overhead powerlines continue along – connecting with greenhills ave.

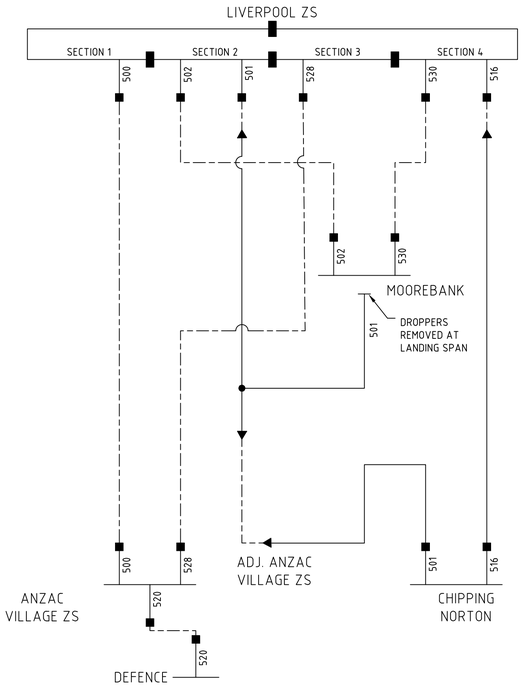
Sensitivities and potential constraints:

- Pedestrian footpath
- Nearby Fire Station and associated infastructure
- Includes light pole
- Underground stormwater drain

11 ATTACHMENT B – CONCEPT CIVIL DESIGN



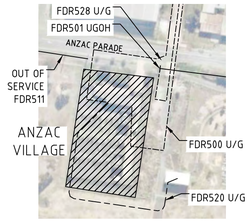
UIL5922 - MOOREBANK LOGISTICS PARK
EXISTING 33KV NETWORK CONFIGURATION (N.T.S)



UIL5922 - MOOREBANK LOGISTICS PARK
EXISTING 33KV SINGLE LINE DIAGRAM

SITE PLAN LEGEND

- EXISTING POLE
- BUS CIRCUIT BREAKER
- LINE CIRCUIT BREAKER
- U/G JOINT
- UG/OH TERMINATION
- EXISTING 33kV O/H MAINS
- EXISTING 33kV U/G MAINS
- NEW 33kV O/H MAINS
- NEW 33kV U/G MAINS



EXISTING ARRANGEMENT
ANZAC VILLAGE

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ENDEAVOUR ENERGY NETWORK STANDARDS AND CONNECTION POLICY.
2. ENDEAVOUR ENERGY CONTACT PHONE: 131081
3. DESIGN CERTIFICATION SHALL LAPSE WHERE:

   (i) NOTICE OF INTENT HAS NOT BEEN RECEIVED WITHIN SIX (6) MONTHS OF THIS CERTIFICATION, OR (ii) CONSTRUCTION HAS BEEN INTERRUPTED FOR MORE THAN SIX (6) MONTHS.

   WHERE DESIGN CERTIFICATION HAS LAPSED, THE DESIGN MUST BE RESUBMITTED FOR CERTIFICATION BY THE ACCREDITED DESIGNER.
4. ATTENTION: PERMANENT SURVEY MARKS MAY EXIST IN THIS AREA. THESE ARE TO BE LOCATED BY A SURVEYOR PRIOR TO COMMENCEMENT OF WORK.
5. ATTENTION: ALL SERVICES SEARCHES MUST BE CHECKED BEFORE CONSTRUCTION. PLEASE CONTACT DIAL BEFORE YOU DIG ON TELEPHONE: 1100 FOR SEARCHES AT LEAST TWO DAYS PRIOR TO EXCAVATION. IT IS RECOMMENDED THAT ALL SERVICES SHOULD BE LOCATED USING NON-DESTRUCTIVE TECHNIQUES BEFORE WORKS BEGIN.
6. ATTENTION: SERVICE PROVIDER TO NOTIFY ENDEAVOUR ENERGY'S ASSET DATA CUSTOMER DEPT DAILY WHEN CABLE WORKS ARE IN PROGRESS. TELEPHONE 131081
7. OPERATIONAL LIMITS:

   UNLESS APPROVED OTHERWISE, INTERRUPTION TO ANY CUSTOMER'S SUPPLY MUST BE AVOIDED. THE FOLLOWING ALTERNATIVES SHOULD BE CONSIDERED:

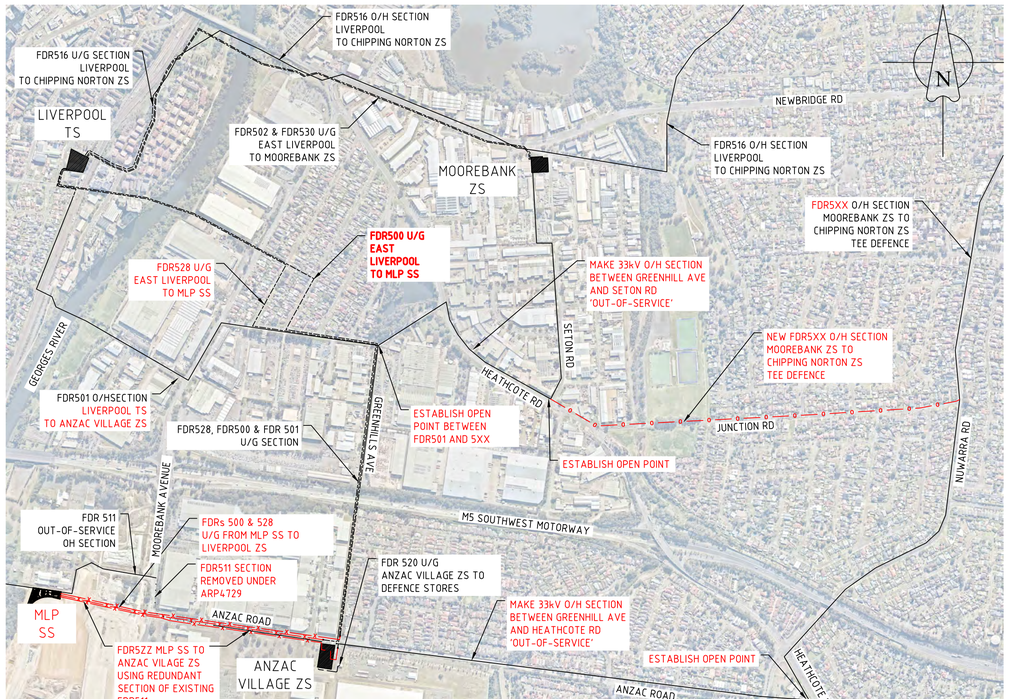
   MOBILE GENERATORS AND SUBSTATIONS, LIVE LINE WORK, DESIGN ALTERNATIVES, LOW VOLTAGE PARALLELS, WORK PRACTICES/STANDARDS.

   THE COST IS TO BE FUNDED BY THE CUSTOMER/DEVELOPER.
8. HAVE ALL THE EXISTING ASSETS BEEN FIELD CHECKED AND ARE ACCURATE AT THE TIME OF DESIGN? YES
9. ENVIRONMENTAL MANAGEMENT PLAN: EMS0001 IS PART OF THIS DESIGN.

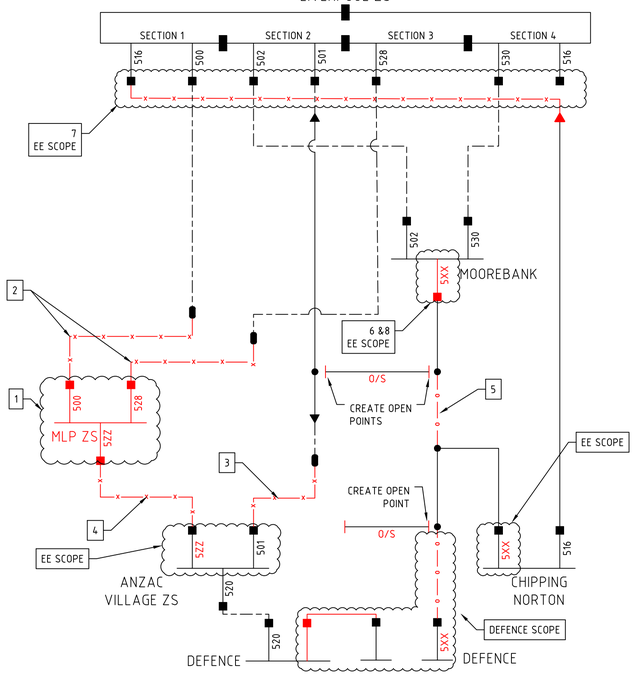
UIL5922 - MLP 33kV CONNECTION - ROLES AND RESPONSIBILITIES

NO.	DESCRIPTION	DESIGN	CONSTRUCTION	FUNDING	COMMENTS
1	ENDEAVOUR ENERGY(EE)'S MLP SS	ASP/3	ASP/1	CUSTOMER	EXISTING FDR511 WILL BE UNDERGROUNDED UNDER ARP4686 BY OTHER ASP/3 TO ACCOMMODATE SWITCHING STATION SITE.
2	DIVERT EXISTING 33kV U/G FDRS 500 & 528 FROM ANZAC VILLAGE ZS TO MLP SS	ASP/3	ASP/1	CUSTOMER	PARTIAL 33KV DUCTS WORKS ARE COVERED IN ARP4511 AND ARP4768 (TO BE DONE BY OTHER ASP/3)
3	DIVERT FDR 501 TO ANZAC VILLAGE ZS	ASP/3	ASP/1	CUSTOMER	EE WILL ONLY PERFORM CABLE TERMINATION AT AVZS (UIL5922K)
4	INSTALL NEW 33kV U/G FDR 5ZZ BETWEEN MLP SS AND ANZAC VILLAGE ZS	ASP/3	ASP/1	CUSTOMER	PARTIAL 33KV DUCTS WORKS ARE COVERED IN ARP4511 AND ARP4768 (TO BE DONE BY OTHER ASP/3). EE WILL ONLY PERFORM CABLE TERMINATION AT AVZS (UIL5922K)
5	INSTALL O/H FDR 5XX BETWEEN MOOREBANK ZS TO TEE TO CHIPPING NORTON ZS	ASP/3	ASP/1	CUSTOMER	
6	CONNECT FDR 5XX AT MOOREBANK ZS	N/A	EE	CUSTOMER	EE WILL ONLY PERFORM CABLE TERMINATION OR O/H DROPPER CONNECTION WITHIN MOOREBANK ZS (UIL5922K)
7	RELOCATE FDR 516 CHIPPING NORTON 33KV CABLE AT LIVERPOOL TS FROM CB LP3277 SECTION 4 TO SPARE CB LP3260 ON SECTION 1	EE	EE	EE	UIL5922Q
8	MOOREBANK ZS FDR WORKS: A) DISCONNECT TX2 B) ESTABLISH NEW FDR BAY	EE	EE	EE	UIL5922Q
9	WORKS ASSOCIATED WITH TESTING AND COMMISSIONING OF TRANSMISSION NETWORK AT COMPLETION OF THE CONSTRUCTION	N/A	EE	CUSTOMER	UIL5922K

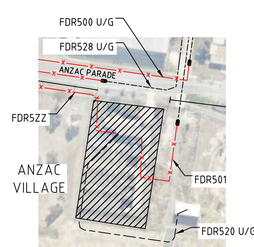
NOTES:
NON-CONTESTABLE WORKS FUNDED BY ENDEAVOUR ENERGY IS REFERENCED AS Q PROJECT (UIL5922Q)
NON-CONTESTABLE WORKS FUNDED BY CONNECTION CUSTOMER IS REFERENCED AS K PROJECT (UIL5922K)
ALL OTHER WORKS ARE CONTESTABLE
APPLICABLE ANCILLARY NETWORK SERVICES ARE NOT INCLUDED IN THE TABLE. (E.G. NETWORK ACCESS, INSPECTION, ETC)



UIL5922 - MOOREBANK LOGISTICS PARK
PROPOSED 33KV NETWORK CONFIGURATION (N.T.S)



UIL5922 - MOOREBANK LOGISTICS PARK
PROPOSED 33KV SINGLE LINE DIAGRAM



PROPOSED ARRANGEMENT
AT ANZAC VILLAGE

DESIGN COMPLIANCE AND INDEMNITY

This design complies with Endeavour Energy's relevant standards as current at this time and as listed on the Endeavour Energy Accredited Service Provider's Internet site. These standards include, but are not limited to:

CP:	Connection Policy
EMS:	Environmental Management Standard
MCI:	Mains Construction Instruction
MDI:	Mains Design Instruction
PDI:	Protection Design Instruction
SDI:	Substation Design Instruction
SAD 0001:	Design Drawing Standard
MMI:	Mains Maintenance Instruction
SMI:	Substation Maintenance Instruction
LDI 0001:	Public lighting Electrical Design Element

Additionally, where relevant, the design complies with AS/NZS 7000 "Overhead Line Design - Detailed Procedures" published by The Australian Standards.

AUSCONNEX indemnifies Endeavour Energy for any loss or damage resulting from non-compliance of the design with the above standards.

Signed: _____

Name: SHUBH SINGH

Service Provider Number: 4863 Date: 23/09/2021

AMENDMENTS: ORIGINAL ISSUE — DRAFT No. 01 — A

PRELIMINARY ONLY

NOT FOR CONSTRUCTION

PRE-CERTIFICATION DRAWING ISSUES

DATE	DESCRIPTION	REV.
30/08/21	INITIAL ISSUE FOR ROLES AND RESPONSIBILITIES CONFIRMATION	01
23/09/21	MOS SUBMISSION	02

AUSCONNEX
49 GLENDENNING ROAD, GLENDENNING NSW 2761
www.ausconnex.com.au
ENABLING COMMUNITIES THROUGH INFRASTRUCTURE

TEMPLATE VERSION No.5.20

REFERENCE DRAWING'S

WORK ORDERS

GENERAL		CAMS File No.	UIL5922
OVERHEAD		AM PROJ. No.	
UNDERGROUND		HV SWITCHING	
SUBSTATIONS		EE DEPOT	HOXTON PARK
		EE REGION	CENTRAL
		HV OP DIAG	
		LOCAL GOV AREA	LIVERPOOL

ORIGINAL SCALE N.T.S.

DRAWN	SHUBH
DATE	23/09/2021
CH'D	
DESIGN	SHUBH

DO NOT SCALE DIMENSIONS IN METRES

MOOREBANK AVENUE
MOOREBANK
UIL5922
MOOREBANK LOGISTICS PARK 33kV CONNECTION
OVERALL SCOPE FOR 33kV NETWORK AUGMENTATION
METHOD OF SUPPLY

Endeavour Energy

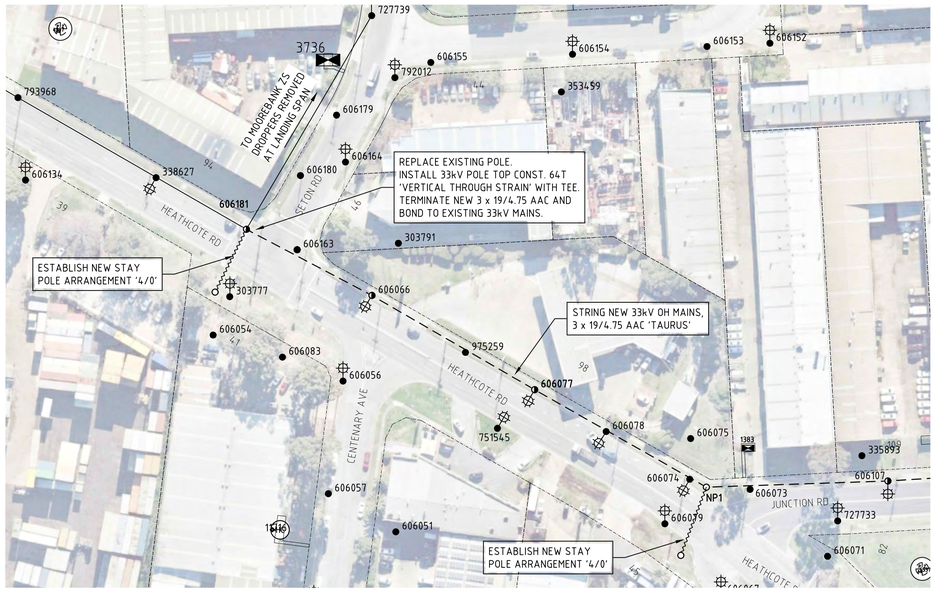
A1 | EL-001 | 02

SHEET No 1 OF 1 SHEETS

SITE PLAN LEGEND

- EXISTING POLE
- REMOVE POLE
- NEW POLE
- REPLACE POLE (UPGRADE TO A 33kV SHARED POLE)
- EXISTING PM SUB
- EXISTING POLE SUB
- EXISTING LANTERN
- EXISTING 33kV O/H MAINS
- STRING NEW 33kV O/H MAINS (3 x 19/4.75 AAC 'TAURUS')
- CADASTRE

0 10 20 30 40 50 METRES
SCALE 1:1000



SITE PLAN 'A'
SCALE 1:1000

KEY DOCUMENTS TABLE
THE CERTIFICATION OF THIS PROJECT IS SUPPORTED BY THE FOLLOWING KEY DOCUMENTS

DOCUMENT NAME	NOTATION DATE
PROJECT DEFINITION	TBA
SUMMARY ENVIRONMENTAL REPORT (SER) - FAT0038 PART OF EMS0001	TBA
LIST ANY KEY DOCUMENTS SUPPORTING THE CERTIFICATION:	
1) DESIGN SAFETY REPORT	TBA
2) EARTHING REPORT	TBA

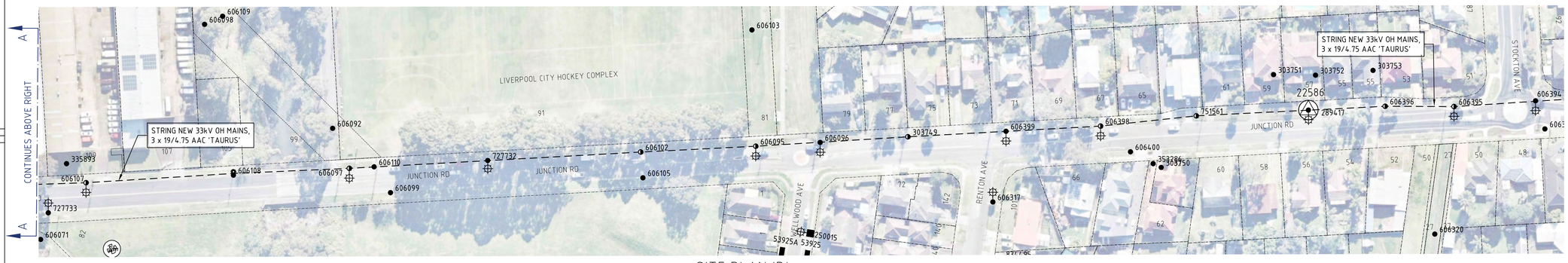
DIAL BEFORE YOU DIG www.1100.com.au

ATTENTION:

- PRELIM DBYD SEARCHES INDICATE THE PRESENCE OF UNDERGROUND ELECTRICITY, TELSTRA, GAS & WATER ASSETS IN THE VICINITY OF WORKS.
- CURRENT DBYD SEARCHES MUST BE ACQUIRED AND CHECKED PRIOR TO CONSTRUCTION WORKS.
- DAMAGE TO UNDERGROUND ASSETS MUST BE REPORTED TO THE RELEVENT ASSET OWNER IMMEDIATELY.
- ASSET OWNER CONTACT DETAILS TO BE OBTAINED FROM CURRENT DBYD DOCUMENTATION.

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ENDEAVOUR ENERGY NETWORK STANDARDS AND CONNECTION POLICY.
2. ACCREDITED DESIGNER IS TO BE CONTACTED REGARDING ISSUES RAISED WITH THIS DESIGN.
3. ENDEAVOUR ENERGY CONTACT PHONE: 131081
4. DESIGN CERTIFICATION SHALL LAPSE WHERE:
   (i) NOTICE OF INTENT HAS NOT BEEN RECEIVED WITHIN SIX (6) MONTHS OF THIS CERTIFICATION, OR
   (ii) CONSTRUCTION HAS BEEN INTERRUPTED FOR MORE THAN SIX (6) MONTHS.
   WHERE DESIGN CERTIFICATION HAS LAPSED THE DESIGN MUST BE RESUBMITTED FOR CERTIFICATION BY THE ACCREDITED DESIGNER.
5. DEVELOPER SHALL PEG ALL PROPERTY AND EASEMENT BOUNDARIES, AND ESTABLISH FINAL LEVELS PRIOR TO COMMENCEMENT OF WORKS.
6. ATTENTION: PERMANENT SURVEY MARKS MAY EXIST IN THIS AREA. THESE ARE TO BE LOCATED BY A SURVEYOR PRIOR TO COMMENCEMENT OF WORK.
7. ATTENTION: ALL SERVICES SEARCHES MUST BE CHECKED BEFORE CONSTRUCTION.
8. WARNING: LIVE ENDEAVOUR ENERGY CABLES & OTHER SERVICES IN THIS AREA. PLEASE CONTACT DIAL BEFORE YOU DIG ON TELEPHONE: 1100 FOR SEARCHES TWO DAYS PRIOR TO EXCAVATION.
9. ATTENTION: SERVICE PROVIDER TO NOTIFY ENDEAVOUR ENERGY'S ASSET DATA CUSTOMER DEPT DAILY WHEN CABLE WORKS ARE IN PROGRESS. TELEPHONE 131081
10. OPERATIONAL LIMITS:
    UNLESS APPROVED OTHERWISE, INTERRUPTION TO ANY CUSTOMER'S SUPPLY MUST BE AVOIDED. THE FOLLOWING ALTERNATIVES SHOULD BE CONSIDERED:
    - MOBILE GENERATORS AND SUBSTATIONS,
    - LIVE LINE WORK,
    - DESIGN ALTERNATIVES,
    - LOW VOLTAGE PARALLELS,
    - WORK PRACTICES/STANDARDS.
    THE COST IS TO BE FUNDED BY THE CUSTOMER/DEVELOPER.
11. HAVE ALL THE EXISTING ASSETS BEEN FIELD CHECKED AND ARE ACCURATE AT THE TIME OF DESIGN? YES/ NO
12. ENVIRONMENTAL MANAGEMENT PLAN: EMS0001 IS PART OF THIS DESIGN.
13. DBYD SEARCH INDICATES THERE ARE THIRD PARTY UTILITIES IN THE DIRECT VICINITY OF THE WORKS. IT IS RECOMMENDED THAT ALL SERVICES SHOULD BE LOCATED USING NON-DESTRUCTIVE TECHNIQUES BEFORE WORKS BEGIN.



SITE PLAN 'B'
SCALE 1:1000

SITE PLAN 'C'
SCALE 1:1000

DESIGN COMPLIANCE AND INDEMNITY

This design complies with Endeavour Energy's relevant standards as current at this time and as listed on the Endeavour Energy Accredited Service Provider's Internet site. These standards include, but are not limited to:

CP:	Connection Policy
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SDI:	Substation Design Instruction
SAD 0001:	Design Drawing Standard
MMI:	Mains Maintenance Instruction
SMI:	Substation Maintenance Instruction
LDI 0001:	Public lighting Electrical Design Element

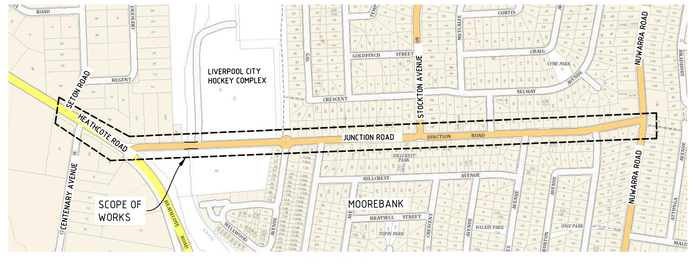
Additionally, where relevant, the design complies with AS/NZS 7000 "Overhead Line Design - Detailed Procedures" published by SAI Global Ltd and other relevant Australian Standards

AUSCONNEX indemnifies Endeavour Energy for any loss or damage resulting from non-compliance of the design with the above standards.

Signed: _____

Name: SHUBH SINGH

Service Provider Number: 4863 Date: 23/09/2021



LOCALITY PLAN
NTS

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AMENDMENTS: ORIGINAL ISSUE — DRAFT No. 01 — A

PRELIMINARY ONLY

NOT FOR CONSTRUCTION

PRE-CERTIFICATION DRAWING ISSUES

DATE	DESCRIPTION	REV
23/9/2021	CONCEPT DESIGN - MOS SUBMISSION	01

AUSCONNEX
49 GLENDENNING ROAD, GLENDENNING NSW 2761
www.ausconnex.com.au
ENABLING COMMUNITIES THROUGH INFRASTRUCTURE

TEMPLATE VERSION No.5.20

REFERENCE DRAWING'S

WORK ORDERS

GENERAL		CAMS File No.	UIL5922
OVERHEAD		AM PROJ. No.	
UNDERGROUND		HV SWITCHING	
SUBSTATIONS		EE DEPOT	
		EE REGION	
		HV OP DIAG	
		LOCAL GOV AREA	LIVERPOOL

ORIGINAL SCALE AS SHOWN

DRAWN SHUBH

DATE 23/09/2021

CH'D

DO NOT SCALE DIMENSIONS IN METRES

DESIGN SHUBH

JUNCTION ROAD
MOOREBANK
UIL5922
NEW 33kV FEEDER '5XX'
MOS - CONCEPT DESIGN

Endeavour Energy

A1 | EL-003 | A

SHEET No 1 OF 2 SHEETS

THIS PROJECT ASSUMES COMPLETION OF ARP4511 AND ARP4728

KEY DOCUMENTS TABLE

THE CERTIFICATION OF THIS PROJECT IS SUPPORTED BY THE FOLLOWING KEY DOCUMENTS

DOCUMENT NAME	NOTATION DATE
PROJECT DEFINITION	TBA
SUMMARY ENVIRONMENTAL REPORT (SER) - FAT0038 PART OF EMS0001	TBA
LIST ANY KEY DOCUMENTS SUPPORTING THE CERTIFICATION:	
1) DESIGN SAFETY REPORT	TBA
2) EARTHING REPORT	TBA

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ENDEAVOUR ENERGY NETWORK STANDARDS AND CONNECTION POLICY.
2. ACCREDITED DESIGNER IS TO BE CONTACTED REGARDING ISSUES RAISED WITH THIS DESIGN.
3. ENDEAVOUR ENERGY CONTACT PHONE: 131081
4. DESIGN CERTIFICATION SHALL LAPSE WHERE:
   (i) NOTICE OF INTENT HAS NOT BEEN RECEIVED WITHIN SIX (6) MONTHS OF THIS CERTIFICATION, OR
   (ii) CONSTRUCTION HAS BEEN INTERRUPTED FOR MORE THAN SIX (6) MONTHS.
   WHERE DESIGN CERTIFICATION HAS LAPSED THE DESIGN MUST BE RESUBMITTED FOR CERTIFICATION BY THE ACCREDITED DESIGNER.
5. DEVELOPER SHALL PEG ALL PROPERTY AND EASEMENT BOUNDARIES, AND ESTABLISH FINAL LEVELS PRIOR TO COMMENCEMENT OF WORKS.
6. ATTENTION: PERMANENT SURVEY MARKS MAY EXIST IN THIS AREA. THESE ARE TO BE LOCATED BY A SURVEYOR PRIOR TO COMMENCEMENT OF WORK.
7. ATTENTION: ALL SERVICES SEARCHES MUST BE CHECKED BEFORE CONSTRUCTION.
8. WARNING: LIVE ENDEAVOUR ENERGY CABLES & OTHER SERVICES IN THIS AREA. PLEASE CONTACT DIAL BEFORE YOU DIG ON TELEPHONE: 1100 FOR SEARCHES TWO DAYS PRIOR TO EXCAVATION.
9. ATTENTION: SERVICE PROVIDER TO NOTIFY ENDEAVOUR ENERGY'S ASSET DATA CUSTOMER DEPT DAILY WHEN CABLE WORKS ARE IN PROGRESS. TELEPHONE 131081
10. OPERATIONAL LIMITS:
    UNLESS APPROVED OTHERWISE, INTERRUPTION TO ANY CUSTOMER'S SUPPLY MUST BE AVOIDED. THE FOLLOWING ALTERNATIVES SHOULD BE CONSIDERED:
    - MOBILE GENERATORS AND SUBSTATIONS,
    - LIVE LINE WORK,
    - DESIGN ALTERNATIVES,
    - LOW VOLTAGE PARALLELS,
    - WORK PRACTICES/STANDARDS.
    THE COST IS TO BE FUNDED BY THE CUSTOMER/DEVELOPER.
11. HAVE ALL THE EXISTING ASSETS BEEN FIELD CHECKED AND ARE ACCURATE AT THE TIME OF DESIGN? YES/ NO
12. ENVIRONMENTAL MANAGEMENT PLAN: EMS0001 IS PART OF THIS DESIGN.
13. DBYD SEARCH INDICATES THERE ARE THIRD PARTY UTILITIES IN THE DIRECT VICINITY OF THE WORKS. IT IS RECOMMENDED THAT ALL SERVICES SHOULD BE LOCATED USING NON-DESTRUCTIVE TECHNIQUES BEFORE WORKS BEGIN.

N

SCALE 1:1000
0 10 20 30 40 50 METRES

REFER ARP4511
DRAWING 522604/A

REFER ARP4728
DRAWING 523222/A

PROPOSED MOOREBANK LOGISTICS PARK SWITCHING STATION

INSTALL NEW 33kV CABLES IN DUCTS AND TERMINATE AT THE SWITCHING STATION.

33kV DUCTS BETWEEN A-B TO BE INSTALLED UNDER CAP PROJECT ARP4511.

33kV DUCTS BETWEEN B-C, B-D AND B-E TO BE INSTALLED UNDER CAP PROJECT ARP4728.

END OF DUCTS INSTALLED UNDER ARP4728

CONTINUES ABOVE RIGHT

CONTINUES BELOW LEFT

SITE PLAN 'A'

SCALE 1:1000

TRENCH AND INSTALL 33kV DUCTS BETWEEN C-C1 IN THE KERB-SIDE LANE APPROX. 1.5m FROM BACK OF KERB.

TRENCH AND INSTALL 33kV DUCTS BETWEEN D-D1 IN THE KERB-SIDE LANE APPROX. 1.5m FROM BACK OF KERB.

TRENCH AND INSTALL 33kV DUCTS BETWEEN E-E1 CENTERED WITHIN ENDEAVOUR ENERGY'S 6m WIDE EASEMENT.

INSTALL NEW U/G 33kV FDR. 5ZZ BETWEEN ANZAC VILLAGE ZONE SUBSTATION AND MOOREBANK LOGISTICS PARK SWITCHING STATION THROUGH EXISTING AND PROPOSED DUCTS.

CUT EXISTING U/G FDR. 528 (EAST LIVERPOOL TO ANZAC VILLAGE) MAKE JOINT TO NEW CABLE AT 'D1' CUT EXISITNG U/G FDR 528 (EAST LIVERPOOL TO ANZAC VILLAGE) AND MAKE STJ TO NEW 33kV CABLE. EXTEND NEW 33kV CABLE IN EXISITNG AND PROPOSED DUCTS AND TERMINATE IN MOOREBANK LOGISTIC PARK SWITCHING STATION.

LOCATE EXISTING BANK OF SPARE DUCTS BETWEEN E1-E2 AND REPLACE WITH NEW 33KV TRANSMISSION DUCTS.

TERMINATION OF NEW 33kV CABLES WITHIN ANZAC VILLAGE ZS TO BE PERFORMED BY ENDEAVOUR ENERGY.

EXCAVATE USING NDD METHODS AND LOCATE EXISTING 33kV DUCTS/ CABLES. ESTABLISH NEW 33kV JOINT BAY (15m x 6m) AT 'D1' WITHIN THE KER-SIDE LANE.

EXCAVATE USING NDD METHODS AND LOCATE EXISTING 33kV DUCTS/ CABLES. ESTABLISH NEW 33kV JOINT BAY (15m x 6m) AT 'C2' WITHIN EXISTING EASEMENT.

AT 'C2' CUT EXISITNG U/G FDR 500 (EAST LIVERPOOL TO ANZAC VILLAGE) AND MAKE STJ TO NEW 33kV CABLE EXTEND NEW 33kV CABLE IN EXISITNG AND PROPOSED DUCTS AND TERMINATE IN MOOREBANK LOGISTIC PARK SWITCHING STATION.

MAKE EXISITNG 33kV O/H SECTION BETWEEN GEENHILL AVENUE AND HEATHCOTE ROAD 'OUT-OF-SERVICE'.

REMOVE REDUNDANT 33kV CABLES BETWEEN 'F' AND 33kV UGOH POLE 881900.

AT 'F' CUT EXISITNG U/G FDR 501 (LIVERPOOL TS TO CHIPPING NORTON ZS) AND MAKE STJ TO NEW 33kV CABLE. EXTEND NEW 33kV CABLE IN PROPOSED DUCTS AND TERMINATE IN ANZAC VILLAGE ZS.

EXCAVATE USING NDD METHODS AND LOCATE EXISTING 33kV DIRECT BURIED CABLES. ESTABLISH NEW 33kV JOINT BAY (15m x 6m) AT 'F' WITHIN EXISITNG EASEMENT.

HAND EXCAVATE AND INSTALL NEW 33kV TRANSMISSION DUCTS ADJACENT TO EXISTING DUCTS.

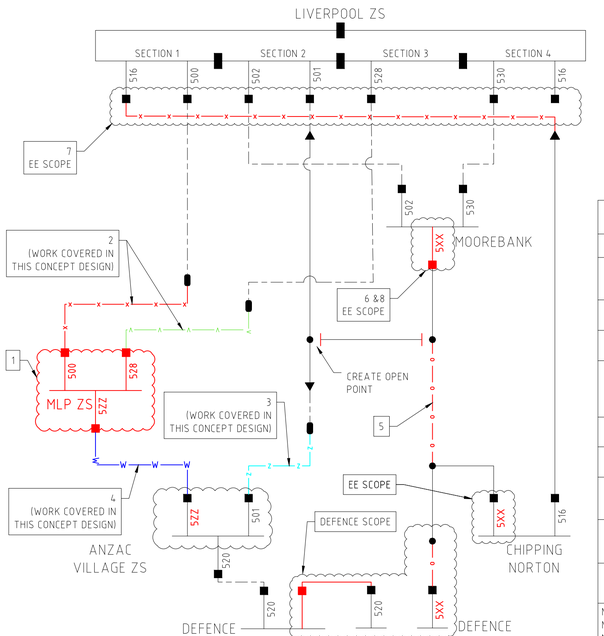
ANZAC VILLAGE ZONE SUBSTATION

SITE PLAN 'B'

SCALE 1:1000

SITE PLAN LEGEND

- EXISTING POLE
- EXISTING PM SUB
- EXISTING POLE SUB
- ZONE SUBSTATION
- 33kV SWITCHING STATION
- LOAD BREAK SWITCH
- EXISTING LANTERN
- EXISTING FLOODLIGHT
- EXISTING LANTERN
- EXISTING COLUMN
- EXISTING O/H MAINS
- EXISTING U/G DUCTS
- REMOVE EXISTING DUCTS
- TRENCH AND INSTALL 3x200mm & 2x100 HD DUCTS
- EASEMENT BOUNDARY

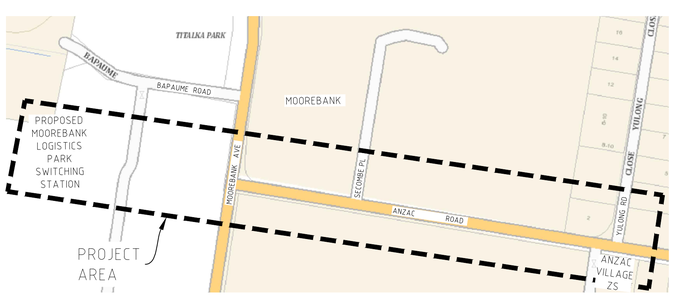


UIL5922 - MOOREBANK LOGISTICS PARK
PROPOSED 33KV SINGLE LINE DIAGRAM

UIL5922 - MLP 33kV CONNECTION - ROLES AND RESPONSIBILITIES

NO.	DESCRIPTION	DESIGN	CONSTRUCTION	FUNDING	COMMENTS
1	ENDEAVOUR ENERGY(EE)'S MLP SS	ASP/3	ASP/1	CUSTOMER	EXISTING FDR511 WILL BE UNDERGROUNDED UNDER ARP4686 BY OTHER ASP/3 TO ACCOMMODATE SWITCHING STATION SITE.
2	DIVERT EXISTING 33kV FDRS 500 & 528 FROM ANZAC VILLAGE ZS TO MLP SS	ASP/3	ASP/1	CUSTOMER	PARTIAL 33KV DUCTS WORKS ARE COVERED IN ARP4511 AND ARP4768 (TO BE DONE BY OTHER ASP/3)
3	DIVERT FDR 501 TO ANZAC VILLAGE ZS	ASP/3	ASP/1	CUSTOMER	EE WILL ONLY PERFORM CABLE TERMINATION AT AVZS (UIL5922K)
4	INSTALL NEW 33KV U/G FDR 5ZZ BETWEEN ANZAC VILLAGE ZS AND MLP SS	ASP/3	ASP/1	CUSTOMER	PARTIAL 33KV DUCTS WORKS ARE COVERED IN ARP4511 AND ARP4768 (TO BE DONE BY OTHER ASP/3). EE WILL ONLY PERFORM CABLE TERMINATION AT AVZS (UIL5922K)
5	INSTALL FDR 5XX BETWEEN MOOREBANK ZS TO TEE TO CHIPPING NORTON ZS	ASP/3	ASP/1	CUSTOMER	
6	CONNECT FDR 5XX AT MOOREBANK ZS	N/A	EE	CUSTOMER	EE WILL ONLY PERFORM CABLE TERMINATION OR O/H DROPPER CONNECTION WITHIN MOOREBANK ZS (UIL5922K)
7	RELOCATE FDR 516 CHIPPING NORTON 33KV CABLE AT LIVERPOOL TS FROM CB LP.3277 SECTION 4 TO SPARE CB LP.3260 ON SECTION 1	EE	EE	EE	UIL5922Q
8	MOOREBANK ZS FDR WORKS: A) DISCONNECT TX2 B) ESTABLISH NEW FDR BAY	EE	EE	EE	UIL5922Q
9	WORKS ASSOCIATED WITH TESTING AND COMMISSIONING OF TRANSMISSION NETWORK AT COMPLETION OF THE CONSTRUCTION	N/A	EE	CUSTOMER	UIL5922K

NOTES:
NON-CONTESTABLE WORKS FUNDED BY ENDEAVOUR ENERGY IS REFERENCED AS Q PROJECT (UIL5922Q)
NON-CONTESTABLE WORKS FUNDED BY CONNECTION CUSTOMER IS REFERENCED AS K PROJECT (UIL5922K)
ALL OTHER WORKS ARE CONTESTABLE
APPLICABLE ANCILLARY NETWORK SERVICES ARE NOT INCLUDED IN THE TABLE. (E.G. NETWORK ACCESS, INSPECTION, ETC)



LOCALITY PLAN
NTS

DESIGN COMPLIANCE AND INDEMNITY

This design complies with Endeavour Energy's relevant standards as current at this time and as listed on the Endeavour Energy Accredited Service Provider's Internet site. These standards include, but are not limited to:

CP: Connection Policy
EMS: Environmental Management Standard
MCI: Mains Construction Instruction
MDI: Mains Design Instruction
PDI: Protection Design Instruction
SDI: Substation Design Instruction
SAD 0001 Design Drawing Standard
MMI: Mains Maintenance Instruction
SMI: Substation Maintenance Instruction
LDI 0001 Public lighting Electrical Design Element

Additionally, where relevant, the design complies with AS/NZS 7000 "Overhead Line Design - Detailed Procedures" published by The Australian Standards.

AUSCONNEX indemnifies Endeavour Energy for any loss or damage resulting from non-compliance of the design with the above standards.

Signed: _____

Name: SHUBH SINGH

Service Provider Number: 4863 Date: 15/10/2021

AMENDMENTS: ORIGINAL ISSUE A DRAFT No 01

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PRE-CERTIFICATION DRAWING ISSUES

DATE	DESCRIPTION	REV.
23/09/2021	CONCEPT DESIGN - MOS SUBMISSION	01

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ENABLING COMMUNITIES THROUGH INFRASTRUCTURE

TEMPLATE VERSION No.5.20

REFERENCE DRAWING'S

WORK ORDERS

GENERAL	
OVERHEAD	
UNDERGROUND	
SUBSTATIONS	

CAMS File No.	
AM PROJ. No.	UIL5922
HV SWITCHING	
EE DEPOT	HOXTON PARK
EE REGION	CENTRAL
HV OP DIAG	
LOCAL GOV AREA	LIVERPOOL

ORIGINAL SCALE 1:1000
DRAWN BVH
DATE 15/10/2021
CH'D H. CALDERA
DESIGN BVH
DO NOT SCALE DIMENSIONS IN METRES

ANZAC ROAD
MOOREBANK
UIL5922
NEW 33kV FEEDER '5ZZ'
MOS - CONCEPT DESIGN

Endeavour Energy

A1 EL-002 A
SHEET No 1 OF 3 SHEETS

90062

12 ATTACHMENT C – EMF ASSESSMENT (EMC SERVICES, DECEMBER 2021)

EMC Services Pty Ltd
ABN 42 072 235 306

12/8 Tilley Lane
Frenchs Forest NSW 2086
AUSTRALIA
Tel: +61 2 9975 4555
Email: info@emc.net.au

Report No. 211107

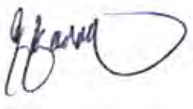
Electromagnetic Field Assessment of Proposed UIL5922 Moorebank Logistics Park 33 kV Supply

for

Aspect Environmental
Suite 117, 25 Solent Circuit, Baulkham Hills NSW 2153

by

Yu Ji
PhD MSc (Elect) SMIEEE



Signed: 20 December 2021
Geoffrey Garrett BE (Elect) Hons.
Signatory of NATA Accredited Reports

Accredited for compliance with ISO/IEC 17025 - Testing

The tests, calibrations or measurements covered by this document are traceable to national standards of measurements

TABLE OF CONTENTS

APPLICABLE DOCUMENTS

[1] International Commission on Non-Ionizing Radiation Protection (ICNIRP): Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz - 100 kHz). Published in: Health Physics 99(6):818-836; 2010.

[2] IEEE 644-1994, IEEE Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Powerlines.

[3] AS/NZS 61000.6.1:2006 Electromagnetic compatibility (EMC) Part 6.1: Generic Standards – Immunity for residential, commercial and light-industrial environments.

[4] Report of the NRPB Advisory Group on Non-Ionising Radiation. "Power Frequency Electromagnetic Fields and the Risk of Cancer" 6 March 2001.

*Note: * The finding by the UK NRPB is of a possible doubling of the risk of leukaemia in children when exposed to a power frequency magnetic field of greater than 0.4 microtesla. The NRPB (Doll) report concluded that from a review of studies conducted in a residential environment "the possibility remains that high and prolonged time-weighted average exposure to power frequency magnetic fields can increase the risk of leukaemia in children". The report considered studies based on residential exposure. This finding has yet to be scientifically replicated and cause and effect established.*

[5] International Agency for Research on Cancer (IARC). IARC Monographs on the Evaluation of Carcinogenic Risks to Humans Volume 80: Static and Extremely Low-Frequency (ELF) Electric and Magnetic Fields. IARC Press, France, 2002.

1 INTRODUCTION

Endeavour Energy has proposed the UIL5922 Moorebank Logistics Park 33 kV supply, which entails:

- Establishment of the new 33 kV Moorebank Logistic Park Switching Substation (MLP SS) at the Moorebank Logistic Park site.
- Diversion of existing 33 kV feeders 500 & 528 from ANZAC Village ZS (Zone Substation) to MLP SS.
- Diversion of existing feeder 501 to ANZAC Village.
- Establishment of a new 33 kV underground feeder 5ZZ between the proposed MLP SS and ANZAC Village ZS.
- Establishment of a new 33 kV overhead feeder 5XX above the existing OH powerline, all to be installed on new poles between the corner of Sefton Road & Heathcote Road to Nuwarra Road.

The proposal includes establishment of a new 33kV switching station at the Moorebank Logistics Park (MLP) site along a section of ANZAC Road, and diversion of existing 33kV feeders to new trenches within the roadway for underground installation.

The MLP SS (Moorebank Logistics Park Switching Substation) building will be a privately owned asset located within a services area within privately owned land and with no access possible by the general public or the community.

A new 33kV feeder is proposed to be installed between Chipping Norton and Moorebank, to support the provision of a high voltage power supply to the Moorebank Precinct West site, in the footprint of the existing overhead line between these locations.

There is an existing 11kV overhead powerline on the northern verge of Junction Road and the proposal is to string the new 33kV overhead powerline on new poles above the existing 11kV overhead powerline.

It is required to undertake an EMF (electromagnetic field) assessment that includes an inspection and survey at the site of the MLP SS and immediate area surrounding, and at selected locations along the routes where the power cabling is to be installed, for baselining the existing environment. The emissions from the powerlines at the site of the proposed electrical supply and from the existing powerline cabling will be predicted by theoretical modelling from the electrical design & specification information for determining the combined emissions resulting from the proposed and existing sources of EMF. Compliance with the relevant Australian health & safety and interference requirements will be determined

This report presents the power-frequency magnetic and electric field measurements recorded during the survey, assesses compliance of the measurements and predictions with electromagnetic health & safety and interference requirements, and provides a recommendation.

2 REQUIREMENT

The requirements of the electromagnetic field exposure assessment are described below:

a) Review the provided drawings and plans for electromagnetic field issues.

b) Inspect and conduct an EMF survey at the site and the immediate area surrounding the Moorebank Logistics Park Switching Substation (MLP SS) and at selected locations along

the routes and with distance away where overhead and/or underground power cabling is to be installed.

c) Measurements will be performed using IEEE Std 644 methodology of the power-frequency magnetic field strength.

d) Measurements will generally be performed at 1 metre above ground level and at height where appropriate.

e) Calculate the average and maximum expected EMF strength values expected from the new powerlines at the MLP SS site, the new street powerlines, and existing street powerlines, by theoretical modelling and/or by extrapolation of the measured values.

f) Establish the boundary and decline of electric and magnetic field strength with distance from the powerlines, and determine the boundaries where the limits may be exceeded.

g) Determine health and safety compliance of the measurements & predictions in terms of the ELF EMF ICNIRP Guideline, now required by ARPANSA (Australian Radiation Protection and Nuclear Safety Agency), and application of the precautionary principle.

h) Establish the margin of compliance of the measured & predicted emissions, with the interference limit applicable to general electronic equipment AS/NZS 61000.6.1 (formerly AS/NZS 4252.1).

i) A recommendation and / or an outline of a plan for mitigating any EMF non-compliance issues.

3 APPLICABLE STANDARDS

3.1 EMF Limits of Human Exposure

Recently ARPANSA has adopted the ICNIRP (International Commission on Non-Ionizing Radiation Protection) guideline [1] within Australia, which has replaced the previous exposure guideline set down in ARPANSA RHS 30 [2]. The power-frequency electric and magnetic field exposure limits set by the ELF EMF ICNIRP guideline which are applicable to human health are summarized in the table below:

Table 1. Human Limits of Exposure to 50/60 Hz Time-Varying Electric & Magnetic Fields

Exposure Type	**Applicable Guideline**	**Electric Field** (kV/m rms)	**Magnetic Field** (μT rms)
Occupational (adequately inducted to access exposure area for whole working day)	ICNIRP	10	1000
General Public (up to 24hrs per day)	ICNIRP	5	200

Note: The Radiation Health Committee (RHC) agreed at its 24 June 2015 meeting that it would withdraw the existing National Health & Medical Research Council 's (NHMRC's) RHS 30 guideline on Extra Low Frequency (ELF) exposure. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has issued Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz -100 kHz) which are aimed at preventing the established health effects resulting from exposure to ELF EMF. The ICNIRP ELF guidelines are consistent with ARPANSA's and the RHC's understanding of the scientific basis for the protection of people from exposure to ELF EMF.

3.2 Limits of Exposure for Implantable Medical Devices

The limits of exposure that are applicable to the medical devices of interest are shown in the table below:

Table 2. Electric & Magnetic Field Limits of Exposure Applicable to Medical Devices

Medical Device	Applicable Guideline/ Specification	Electric Field	Magnetic Field
Implantable Pulse Generator (IPG) Implantable Cardioverter Defibrillator (ICD) Implantable Loop Recorder (ILR)	Medtronic (1)	6 kV/m (50/60Hz) 70 V/m (>= 150kHz)	100 μT (<= 10MHz) and 1.25 μT (> 10MHz) 500 μT DC
Implantable Pulse Generator (IPG) Implantable Cardioverter Defibrillator (ICD)	Boston Scientific (1)	>=6.5 kV/m (50 Hz)	100 μT (50 Hz) >= 1000 μT DC
Implantable Pulse Generator (IPG) Implantable Cardioverter Defibrillator (ICD)	St. Jude (1)	> 6 kV/m (50/60 Hz)	> 100 μT (50/60 Hz) > 500 μT DC
Pacemakers	ARPANSA RHS30	2.5 kV/m (50/60Hz) (2)	100 μT (50/60Hz)
Active Implantable Medical Devices in workplaces (AIMDs)	EN 50527-1-2016 (4)	> 5 kV/m (50 Hz)	> 100 μT (50/60 Hz) > 500 μT DC

Note: 1. Medtronic, Boston Scientific, and St Jude are leading manufacturers of pacemakers & ICDs supplied in Australia.
2. This is not a limit, but rather a minimum level advised by the ARPANSA RHS30 guideline that has been known to cause interference to some older types of pacemakers. The ARPANSA RHS30 guideline has recently been replaced by the ICNIRP Guideline of Exposure to Time-Varying Electric and Magnetic Fields (1 Hz - 100 kHz) which has no interference limits.
3. AC field limits are root mean square (rms) values, unless otherwise specified.
4. Applicable in Europe only. The risk assessment is based on the approach that AIMDs are expected to function in their product standards as long as the General Public Reference levels of the Council recommendation 1999/519/EC (except for static fields) are not exceeded [Directive 2007/47/EC] and where no specific warnings have been issued to the AIMD-Employee. Directive 2013/35/EU states an action level of 500 μT for static magnetic fields reasoned by interference of pacemakers.

3.3 Human Pain Thresholds to Low Frequency Contact Currents (50Hz)

The human pain threshold of steady state contact currents with vehicles due to power-frequency electric and magnetic near fields is summarised in the table below:

Table 3. Exposure Limits Resulting from Steady State Contact Currents with Vehicles from 50/60 Hz Electric Fields

Exposure Incident	Applicable Guideline	E Field (kV/m rms)
Painful shock for children, finger contact, truck	RHS30	8
Median touch perception for men, finger contact, car	RHS30	4-5
Median touch perception for children, finger contact, car	RHS30	2

3.4 Susceptibility of Electronic Equipment

Electronic equipment is manufactured to withstand power-frequency magnetic fields, which may be encountered in everyday situations; the applicable limits are given in Table 4 below. There are no limits applying to static and slow time varying magnetic fields.

Table 4. Operation of General Electronic Equipment in 50 Hz Magnetic Fields

Exposure Activity	**Applicable Standard**	**Magnetic Field**
Operation of Electronic Equipment	AS/NZS 61000.6.1	3.0 A/m or 3.77 μT

These immunity requirements are not mandatory. Although equipment marketed in Australia is expected to comply with the above requirements, it is acknowledged that a more practical limit is 10 mG or 1.0 μT which is widely accepted throughout industry as the level above which interference may be visible on visual display equipment.

4 MEASUREMENT METHODOLOGY & ACCURACY

Magnetic and electric field measurements performed were to IEEE Std 644 (1994) methodology.

All magnetic and electric fields measured are true rms values of the resultant (from the X, Y & Z planes) and recorded in a 5 Hz to 32 kHz bandwidth.

The measurement duration was determined by the time required to obtain a stable repeatable reading indicative of the maximum true rms value at that time.

The uncertainty of the measurements performed is typically ± 3 dB for magnetic fields, with a coverage factor of 2.0 and 95% of confidence level.

The calibration of the electromagnetic field analyser measurement equipment (EMC Services Plant No. 24) was current.

5 RESULTS

Power-frequency magnetic and electric field measurements were conducted on 3 December 2021, from 10:00am to 3:00pm, at the proposed powerline development sites along ANZAC Road and Heathcote/Junction Road at Moorebank. The authorised test officer was Dr. Yu Ji. The weather was fine, and the temperature was around 24°C. An on-site inspection was conducted at the locations of the proposed new 33 kV Moorebank Logistic Park Switching Substation (MLP SS), and the proposed powerlines on ANZAC Road and Heathcote/Junction Road, and there were no electromagnetic field sensitive facilities such as childcare centres, schools, medical practices and scientific research facilities identified there.

The measurement results of the existing environment are summarized in Table 7 for ANZAC Road and Table 8 for Heathcote/Junction Road. The measurements of the magnetic fields were conducted at a height of 1 m AGL (above ground level). Measurements of the magnetic field level were conducted at both the northern and southern sides of ANZAC Road under the existing overhead powerlines and under the existing 11 kV overhead powerlines of the north-eastern side of Heathcote Road and northern side of Junction Road. All measurement locations are shown in Figures 2-1 to 2-5 for ANZAC Road and Figures 3-1 to 3-6 for Heathcote/Junction Road.

The electric field measurements were performed at selected locations along both ANZAC Road and Heathcote/Junction Road at 1 m AGL midway between powerline poles and directly under the powerlines where the conductors are lowest, and did not exceed a level of 45 V/m.

6 ANALYSIS

6.1 Criterion

The assessment of compliance of the measurements, with standards limits or guideline reference values, excludes the tolerance/s due to the measurement uncertainties given in Section 4.

6.2 Analysis of the Proposed New 33 kV Powerlines

The configurations of the proposed 33 kV overhead and underground feeders, existing 11 kV overhead powerlines and LV overhead powerline are summarised in Table 5 below:

Table 5. Feeder Configurations

Feeder Number	Location	Power Rating	Detailed Position	Cable Type
500 (New)	Located eastbound kerb-side lane of ANZAC Rd from ANZAC Village ZS to MLP SS	33 kV /50MVA /874A	Ducts installed in conduits are buried 750mm below the road surface level.	1200mmsq CU 1C XLPE/PVC/HDPE Screened U/G cable in 3 x 150mm and 2 x 100mm HD ducts
528 (New)	Located eastbound kerb-side lane of ANZAC Rd from ANZAC Village ZS to MLP SS	33 kV /50MVA /874A	Ducts installed in conduits are buried 750mm below the road surface level.	1200mmsq CU 1C XLPE/PVC/HDPE Screened U/G cable in 3 x 150mm and 2 x 100mm HD ducts
5ZZ (New)	Between proposed MLP SS and ANZAC Village ZS in a dedicated easement.	33 kV /50MVA /874A	Ducts installed in conduits are buried 750mm below the road surface level.	1200mmsq CU 1C XLPE/PVC/HDPE Screened U/G cable in 3 x 150mm and 2 x 100mm HD ducts
5XX (New)	From Heathcote Rd (pole 606181) and Junction Rd to Nuwarra Rd (pole 605992)	33 kV /50MVA /874A (1)	Replacement of existing 11kV poles (approximately every second or third pole) on the north side of Junction Road with taller poles to accommodate the 33kV line, and string the new 33kV overhead line on new poles above the existing 11kV overhead line. Structure height for 33 kV lines is anticipated 20-21m AGL. Conductor separation distance is assumed to be 1.8 m.	33kV 3 x 19/4.75AAC (Taurus) O/H mains with 337 mm^2 cross section area
B745, B743, 6430, 6423 (existing)	From Heathcote Rd and Junction Rd to Nuwarra Rd	11 kV /3000kV A /157A	On existing 15 m tall 11kV poles. Conductor separation distance is assumed to be 1.2 m.	Mercury 7/4.50 AAC with 111.3 mm^2 cross section area
Existing LV Powerline	From Heathcote Rd and Junction Rd to Nuwarra Rd	415 V /10kVA /14A	On existing poles with a height of 10 m. Conductor separation distance is assumed to be 1.2 m.	Mercury 7/4.50 AAC with 111.3 mm^2 cross section area

Note 1. The ratings of this conductor for Feeder 5XX will be based on Endeavour Energy's standards MDI0042. If we assume the design temperature could be between 75°C and 100°C, which gives the line a prospective rating between 40MVA and 50MVA.

Based on the above listed configurations of the proposed 33 kV powerlines, and existing overhead 11kV and LV powerlines, the predicted maximum and maximum average power frequency magnetic fields are shown in Tables 6-1 to 6-2 below. At ANZAC Road, the predicted magnetic fields are combined contributions from the proposed three underground feeders 500, 528 and 5ZZ. At Heathcote Road/Junction Road, the predicted magnetic fields are combined contributions from the proposed feeder 5XX and existing overhead 11 kV and 415 V powerlines.

Table 6-1 – Predicted Power Frequency Magnetic Fields at ANZAC Road

Description of Measurement Locations	**Horizontal Distance from the new 33 kV cabling (m)**	**Predicted Maximum Magnetic Field (1) (5Hz – 32kHz)** (μT)	**Predicted Maximum Average Magnetic Field (1) (5Hz – 32kHz)** (μT)
ANZAC Road, above the proposed underground 33 kV feeders (2)	0.75 m (0 m AGL)	170.0	85.0
	1.25 m (0.5 m AGL)	72.0	36.0
	1.75 m (1 m AGL)	39.5	19.7
ANZAC Road, starting from the proposed underground 33 kV feeders at 1 m AGL(2)	2.00	36.75	18.38
	3.00	16.33	8.17
	4.00	9.19	4.59
	5.00	5.88	2.94
	6.00	4.08	2.04
	7.00	3.00	1.50
	8.00	2.30	1.15
	9.00	1.81	0.91
	10.00	1.47	0.74
	11.00	1.21	0.61
	12.00	1.02	0.51
	13.00	0.87	0.43
	14.00	0.75	0.38
	15.00	0.65	0.33

Note 1. Maximum and maximum average predicted magnetic fields are based on full and 50% of the rated capacity of the powerline respectively.
2. The maximum separation distance between conductors installed in the underground conduits at ANZAC Road was assumed.
3. A 20% increase due to unbalanced circuits was assumed in the above prediction.

Table 6-2 – Predicted Power Frequency Magnetic Fields at Heathcote Road/Junction Road

Description of Measurement Locations	**Horizontal Distance from the new 33 kV cabling (m)**	**Predicted Maximum Magnetic Field (1) (5Hz – 32kHz)** (μT)	**Predicted Maximum Average Magnetic Field (1) (5Hz – 32kHz)** (μT)
At 1 m AGL	1	1.18	0.59
	2	1.17	0.59
	3	1.16	0.58
	4	1.14	0.57
	5	1.11	0.56
	6	1.08	0.54
	7	1.05	0.53
	8	1.02	0.51
	9	0.98	0.49
	10	0.94	0.47
	11	0.90	0.45
	12	0.87	0.43
	13	0.83	0.41
	14	0.79	0.39
	15	0.75	0.38
At 4 m AGL	1	1.82	0.91
	2	1.80	0.90
	3	1.77	0.88
	4	1.72	0.86
	5	1.66	0.83
	6	1.60	0.80
	7	1.53	0.77
	8	1.46	0.73
	9	1.39	0.69
	10	1.31	0.66
	11	1.24	0.62
	12	1.17	0.58
	13	1.10	0.55
	14	1.03	0.52
	15	0.97	0.49

Note 1. Maximum and maximum average predicted magnetic fields are based on full and 50% of the rated capacity of the powerline respectively.
2. A 20% increase due to unbalanced circuits was assumed in the above prediction.

6.3 General Public Exposure

During the baseline survey, the maximum power-frequency magnetic field recorded at the ANZAC Road development site at 1 m AGL was 4.3 μT at location A12 on the south side of the road, adjacent to an existing 33 kV power pole which has a drop-down cable, and 10 μT at location A15 on the north side of the road adjacent to an existing kiosk substation (32357) LV side (refer Table 7).

The maximum power-frequency magnetic field measured along Heathcote/Junction Road was 5.5 μT at location J12, north of Junction Road, adjacent to an existing 11 kV power pole which has a drop-down cable (refer Table 8). At the existing property boundary which is about 2 m away from the street curb at the north side of ANZAC Road, the measured power-frequency magnetic fields are not more than 0.25 μT. At the existing property boundary which is about 1.8 m away from the existing power poles at the north side of Junction Road, the measured power-frequency magnetic fields are not more than 0.20 μT.

The predicted maximum average magnetic fields at 0 m and 1 m AGL, above the proposed underground feeders at ANZAC Road are 85 μT and 36 μT respectively. The predicted maximum average magnetic fields at 0 m and 1 m AGL, below the proposed overhead feeders at ANZAC Road are 0.59 μT and 0.66 μT respectively. The predicted maximum average magnetic fields at 1 m AGL at a property boundary and 4 m AGL at a 4 m setback distance (which would be 1m AFL on level 1 of a possible two-story house) at the north side of Junction Road are 0.54 μT and 0.82 μT respectively. All of the measured and predicted maximum average magnetic field levels within the development sites are below the ICNIRP 200 μT limit applicable to the health and safety of the General Public (refer Table 1).

The typical power-frequency electric fields measured at 1 m AGL within the development sites are only expected to vary in the order of +/- 10% as they are largely dependent of the powerline voltage and not the powerline loading. All of the measured electric field levels are well below the ICNIRP 5 kV/m limit applicable to the health and safety of the General Public (refer Table 1).

6.4 Impact on Health and Safety

Although the present guideline reference values are relatively high, long-term exposure to a magnetic field level of 0.4 μT or more, is regarded by some experts to be associated with an increase in the number of recorded cases of childhood leukemia; the UK National Radiological Protection Board (NRPB) Advisory Group on Non-Ionising Radiation (AGNIR) reported their research findings in relation to this in 2001 [4]. However, as these research findings, of the UK NRPB are yet to be proven or adopted in standards, they currently only suggest that quasi-continuous exposure to low level power-frequency magnetic fields, may increase the risk of leukemia in children.

As indicated in the ICNIRP guideline [1], a number of epidemiological studies [5] have consistently found that everyday chronic low-intensity power-frequency magnetic field exposure (to levels above 0.4 μT) is associated with an increased risk of childhood leukemia. The International Agency for Research on Cancer (IARC) has classified such fields as possibly carcinogenic. However, a causal relationship between magnetic fields and childhood leukemia has not been established nor have any other long-term effects been established. The absence of established causality means that this effect cannot be addressed in the ICNIRP basic restrictions (i.e. by limiting exposure within the field levels of Table 1). Considering this and that the Doll Report [4] was inconclusive, the precautionary principle could be applied to children where there is significant concern by limiting exposure to low level magnetic fields. During the survey, an inspection of the areas adjacent to the route of the proposed powerlines did not find any facilities such as childcare centres or schools, where there would normally be significant concern.

It is not uncommon to find established residential properties situated adjacent to HV transmission powerlines with field levels in the order of 1 to 1.5 μT, particularly in urban areas such as Sydney. It is noted that the residential dwellings along Junction Road are up to two-stories high and are typically setback from the front boundary by 4 metres or more, and the predicted maximum average magnetic field level there of 0.86 μT (refer Table 6-2) is less than 1 μT and reduces with increased distance away from the powerline. On ANZAC Road, where only commercial properties were observed with buildings typically setback 15 metres from the property boundary, the predicted maximum average magnetic field level at the commercial buildings is 0.33 μT which is much less than 1 μT which is widely accepted in the workplace as industry best practice.

6.5 Interference

The measured magnetic fields at some locations and the predicted maximum magnetic fields at the development sites exceed the interference immunity limit of 3.77 μT applicable to general electronic equipment (refer Section 3.4), so there could be risk of interference risk to general electronic equipment used there.

The maximum measured and predicted magnetic fields at minimum height of 1 m AGL are below the interference immunity limits of 100 μT applicable to pacemakers and ICDs (refer Table 2). At heights less than 0.5 m AGL directly above the proposed underground power cabling on ANZAC Road, there is some risk of interference to pacemakers and ICDs though only if positioned abnormally near to the ground when the powerline is operating at more than half its rated capacity and a magnetic field level of 100 μT is exceeded (refer Tables 2 and 6-1).

6.6 Mitigation of Magnetic Fields

The affects of high magnetic fields produced may generally be reduced by:

a) Increasing the distance between the source and the affected area, The affect of a magnetic field will diminish rapidly as the separation distance is increased. Normally the decrease will be proportional to the inverse square of the separation distance. For example, if the separation distance is doubled the magnetic field will reduce by a factor of four.

b) Introducing a shielding (screen or metal sheet) between the source and the affected area. Shielding is costly and is most effective when applied to the general (rather than specific) area. Increasing the coverage area, and the thickness of the shielding, improves magnetic field attenuation.

c) Employing equipment which is less sensitive.

d) Reducing the time of exposure.

7 CONCLUSION and RECOMMENDATION

7.1 Health & Safety

During the baseline survey in the area adjacent to the site of the proposed MLP SS (Moorebank Logistics Park Switching Substation) and next to the existing overhead powerlines on ANZAC Road and Heathcote/Junction Road, the maximum measured power-frequency magnetic fields of 4.3 μT at ANZAC Road and 5.5 μT at Heathcote/Junction Road are well below the ICNIRP guideline reference values of 200 μT, and the measured maximum electric field level of 45 V/m is well below the ICNIRP guideline reference value of 5 kV/m, that are applicable to the health and safety of the General Public. The measured levels at these locations are fairly typical of what can be expected from typical street HV and LV powerlines.

The predicted maximum average and maximum magnetic fields at 0 m AGL (above ground level), directly above the proposed underground feeders at ANZAC Road are 85 μT and 170 μT respectively.

The predicted maximum average and maximum magnetic fields at 1 m AGL, below the proposed overhead feeders at Heathcote/Junction Road are 0.66 μT and 1.32 μT respectively.

All of the measured and predicted magnetic field levels are below the ICNIRP 200 μT limit applicable to the health and safety of the General Public that applies in Australia as has been adopted by ARPANSA.

ARPANSA encourages the use of the Precautionary Principle, which can be applied where there is a possible or potential risk of concern that can be mitigated at reasonable cost.

As indicated in the ICNIRP guideline [1], a number of epidemiological studies [5] have consistently found that everyday chronic low-intensity power frequency magnetic field exposure (to levels above 0.4 μT) is associated with an increased risk of childhood leukemia. The International Agency for Research on Cancer (IARC) has classified such fields as possibly carcinogenic. However, a causal relationship between magnetic fields and childhood leukemia has not been established nor have any other long-term effects been established. The absence of established causality means that this effect cannot be addressed in the ICNIRP basic restrictions (i.e. by limiting exposure below the field levels of Table 1). Considering this and that the Doll Report [4] was inconclusive, the precautionary principle could be applied to children where there is significant concern by limiting exposure to low level magnetic fields. During the survey, an inspection of the areas adjacent to the route of the proposed powerlines did not find any facilities such as childcare centres or schools, where there would normally be significant concern.

It is not uncommon to find established residential properties situated adjacent to HV transmission powerlines with field levels in the order of 1 to 1.5 μT, particularly in urban areas such as Sydney. In view of this, precaution could reasonably be applied where field levels are significant enough to raise concern and costs are affordable so consistent with the ALARA (As Low As Reasonably Achievable) precautionary principle. Considering that the residential dwellings along Junction Road are up to two-stories high and are typically setback from the front boundary by 4 metres or more, then the predicted maximum average magnetic field level there of 0.86 μT (refer Table 6-2) is less than 1 μT and reduces with increased distance away from the powerline. On ANZAC Road, where only commercial properties were observed with buildings typically setback 15 metres from the property boundary, the predicted maximum average magnetic field level at the commercial buildings is 0.33 μT which is much less than 1 μT which is widely accepted in the workplace as industry best practice.

7.2 Interference

There should be low concern of risk of interference to general electronic equipment used 1 metre or more away from the front of the property boundaries on Junction Road, and similarly at the commercial properties where 7 m or more away from the power cabling on ANZAC Road, as the maximum measured and predicted magnetic field levels do not exceed the AS/NZS 61000.6.1 interference limit of 3.77 μT applicable to general electronic equipment (refer Tables 4, 6-1 & 6-2).

Directly above the proposed underground 33 kV feeders on ANZAC Road at heights less than 0.5 m AGL, there is some risk of interference to pacemakers and ICDs though only if positioned abnormally near to the ground when the powerline is operating at more than half its rated capacity and a magnetic field level of 100 μT is exceeded (refer Tables 2 and 6-1). To mitigate this possible risk of interference, the 33 kV cabling could be located at a greater depth underground of approximately another 0.5 metres deeper (refer Table 6-1), and the field level could be reduced by a limited extent by decreasing the powerline conductor separation distance.

Along ANZAC Road there were no commercial properties identified of concern that may be sensitive to low levels of electromagnetic fields such as medical and research facilities.

7.3 Future Survey

Should there be significant change to the proposed Moorebank Logistics Park 33 kV supply development, such as increase of the power capacity of the powerlines, or the installation of radio-frequency transmitter stations, then it is recommended to have the electromagnetic environment re-assessed for health & safety and interference compliance and assurance. During commissioning of the new 33 kV powerlines, it is recommended that an electromagnetic field survey be performed for health & safety and interference compliance and assurance purposes.

8 APPENDIX A – MEASUREMENT RESULTS & PHOTOS

Table 7 – Measured Power-frequency Magnetic Fields along ANZAC Road

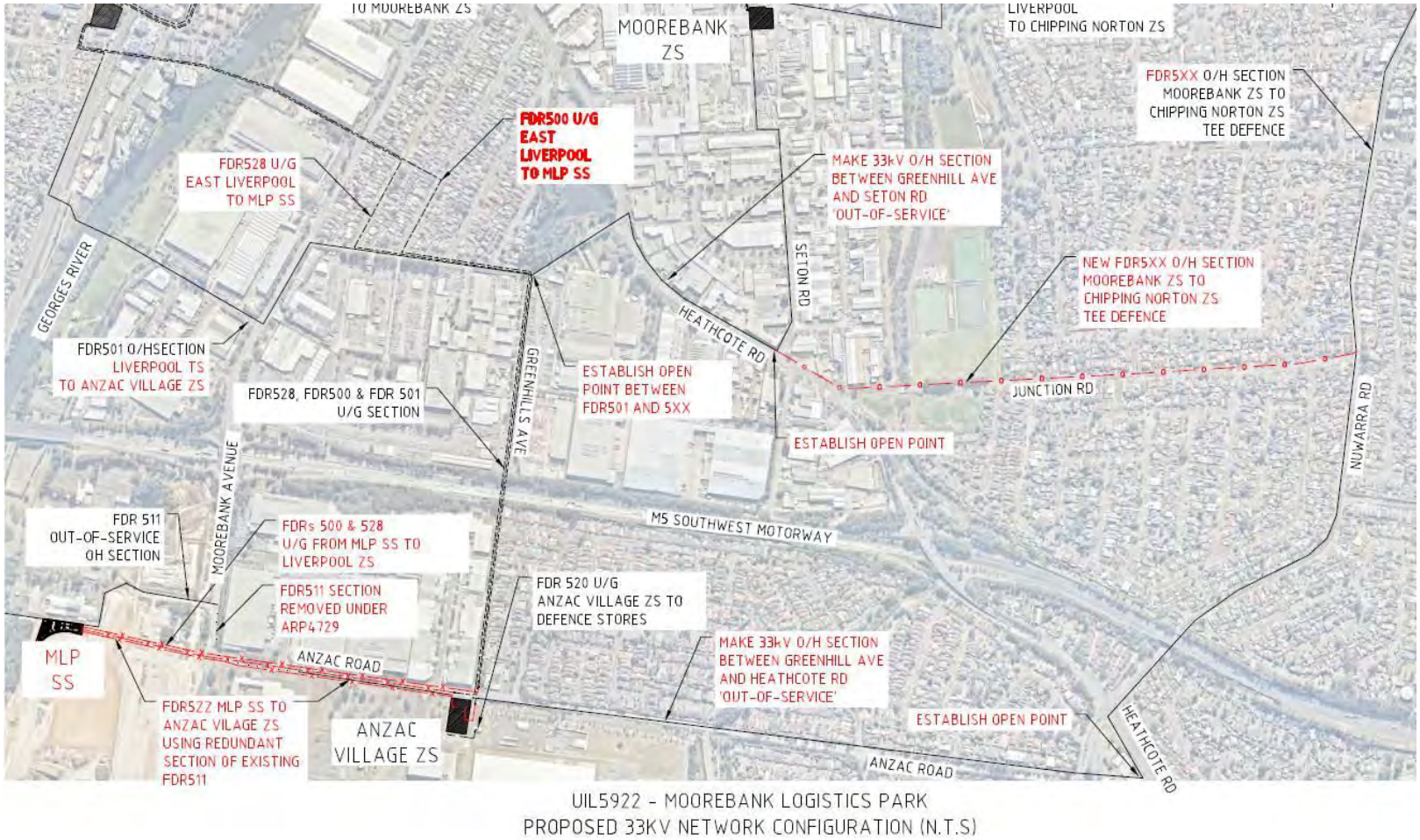
Measurement Locations (refer Figures 2-1 to 2-5)	Location Description	Measured Magnetic Field (μT)
A1	Location of the proposed new 33 kV Moorebank Logistic Park Switching Substation (MLP SS)	0.086
A2	Location of the proposed new 33 kV Moorebank Logistic Park Switching Substation (MLP SS)	0.076
A3	Location of the proposed underground 33kV powerlines	0.062
A4	Location of the proposed underground 33kV powerlines	0.069
A5	Location of the proposed underground 33kV powerlines	0.067
A6	South of the road, adjacent to existing low power pole	0.045
A7	North of the road, adjacent to existing powerline	0.130
A8	South of the road, adjacent to existing tall power pole	0.083
A9	North of the road	0.035
A10	South of the road, adjacent to existing low power pole	0.093
A11	North of the road	0.038
A12	South of the road, adjacent to existing tall power pole	4.3
A12	0.5 m away from the power pole	1.2
A12	1 m away from the power pole	0.130
A13	North of the road	0.068
A14	South of the road, under existing powerline	0.385
A15	North of the road, adjacent to existing kiosk substation (32357), LV side	10.0
A15	North of the road, adjacent to existing kiosk substation (32357), HV side	0.25
A15	North of the road, adjacent to existing kiosk substation (32357), pedestrian walkway	0.96
A16	South of the road, adjacent to existing tall power pole	0.25
A17	North of the road	0.185
A18	South of the road, under existing powerline	0.420
A19	North of the road	0.166
A20	South of the road, adjacent to existing tall power pole	0.24
A21	North of the road	0.165
A22	South of the road, adjacent to existing low power pole	0.26
A23	North of the road	0.21
A24	South of the road, adjacent to existing tall power pole	0.25
A25	North of the road	0.12
A26	South of the road, adjacent to existing low power pole	0.24
A27	North of the road	0.097
A28	South of the road, adjacent to existing tall power pole	0.235
A29	North of the road	0.110
A30	South of the road, adjacent to existing low power pole	0.341
A31	North of the road	0.055
A32	South of the road, adjacent to existing low power pole	1.6
A33	North of the road	0.048
A34	South of the road, adjacent to existing tall power pole	0.418
A35	North of the road	0.067
A36	South of the road, under the existing powerline	0.765
A36	South of the road, in front of ANZAC Village Zone Substation	0.245
A37	North of the road, adjacent to existing tall power pole	0.415
A38	North of the road, under the powerline running perpendicular to ANZAC Road	0.410

Table 8 – Measured Power-frequency Magnetic Fields along Junction Road

Measurement Locations (refer Figures 3-1 to 3-6)	Location Description	Measured Magnetic Field (μT)
J1	Adjacent to existing 11 kV power pole, intersection of Seton Road and Heathcote Road	0.300
J2	North-east of Heathcote Road, under the existing 11 kV powerline	0.210
J3	North-east of Heathcote Road, under the existing 11 kV powerline	0.193
J4	North of Junction Road, under the existing 11 kV powerline	0.210
J5	North of Junction Road, under the existing 11 kV powerline	0.150
J6	North of Junction Road, under the existing 11 kV powerline. Next to Liverpool Hockey Club	0.240
J7	North of Junction Road, under the existing 11 kV powerline. Next to Liverpool Hockey Club	0.253
J8	North of Junction Road, under the existing 11 kV powerline. Next to Liverpool Hockey Club	0.120
J9	North of Junction Road, under the existing 11 kV powerline. Next to Liverpool Hockey Club	0.180
J10	North of Junction Road, under the existing 11 kV powerline. Next to Liverpool Hockey Club	0.160
J11	North of Junction Road, under the existing 11 kV powerline. Next to Liverpool Hockey Club	0.185
J12	North of Junction Road, adjacent to existing 11 kV power pole.	5.5
J12	North of Junction Road, 0.5 m away from existing 11 kV power pole.	1.0
J12	North of Junction Road, 1 m away from existing 11 kV power pole.	0.250
J13	North of Junction Road, under the existing 11 kV powerline.	0.150
J14	North of Junction Road, under the existing 11 kV powerline.	0.165
J15	North of Junction Road, under the existing 11 kV powerline.	0.048
J16	North of Junction Road, under the existing 11 kV powerline.	0.177
J17	North of Junction Road, under the existing 11 kV powerline.	0.180
J18	North of Junction Road, under the existing 11 kV powerline.	0.245
J19	North of Junction Road, under the existing 11 kV powerline. Next to Stockton Ave.	0.265
J20	North of Junction Road, under the existing 11 kV powerline.	0.150
J21	North of Junction Road, under the existing 11 kV powerline.	0.140
J22	North of Junction Road, under the existing 11 kV powerline.	0.110
J23	North of Junction Road, under the existing 11 kV powerline.	0.134
J24	North of Junction Road, under the existing 11 kV powerline.	0.160
J25	North of Junction Road, under the existing 11 kV powerline.	0.175

Measurement Locations (refer Figures 3-1 to 3-6)	Location Description	Measured Magnetic Field (μT)
J26	North of Junction Road, under the existing 11 kV powerline.	0.195
J27	North of Junction Road, under the existing 11 kV powerline.	0.110
J28	North of Junction Road, under the existing 11 kV powerline.	0.140
J29	North of Junction Road, under the existing 11 kV powerline.	0.190
J30	North of Junction Road, under the existing 11 kV powerline.	0.210
J31	North of Junction Road, under the existing 11 kV powerline.	0.270
J32	North of Junction Road, under the existing 11 kV powerline.	0.260
J33	North of Junction Road, under the existing 11 kV powerline.	0.190
J34	North of Junction Road, under the existing 11 kV powerline.	0.160
J35	North of Junction Road, under powerline.	0.150
J36	North of Junction Road, under the existing 11 kV powerline.	0.140
J37	West of Nuwarra Road, adjacent to existing tall 33 kV power pole.	0.180

Figure 1. 33 kV Powerline Development Sites at Moorebank



Note: This figure is based on Aspect Environmental, that has been copied and altered for illustration purposes only, and is not to scale.

Figure 2-1. Measurement Locations along ANZAC Road (Section 1)

Figure 2-2. Measurement Locations along ANZAC Road (Section 2)

Figure 2-3. Measurement Locations along ANZAC Road (Section 3)

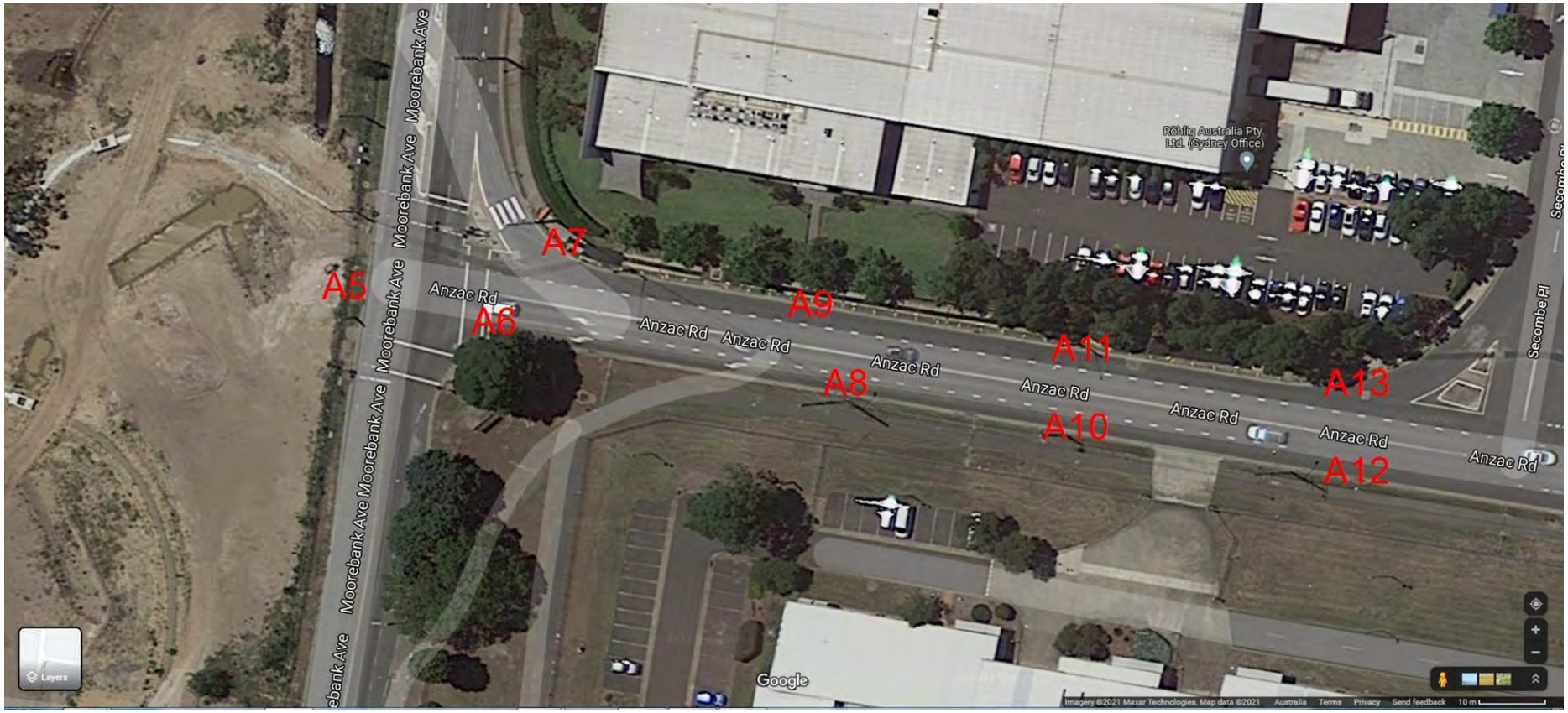


Figure 2-4. Measurement Locations along ANZAC Road (Section 4)

Figure 2-5. Measurement Locations along ANZAC Road (Section 5)

Figure 3-1. Measurement Locations along Junction Road (Section 1)

Figure 3-2. Measurement Locations along Junction Road (Section 2)

Figure 3-3. Measurement Locations along Junction Road (Section 3)

Figure 3-4. Measurement Locations along Junction Road (Section 4)

Figure 3-5. Measurement Locations along Junction Road (Section 5)

Figure 3-6. Measurement Locations along Junction Road (Section 6)

Photo 1. Development Site at ANZAC Road (south side)

Note: Photo taken in the westward direction.

Photo 2 Development Site at ANZAC Road (north side)

Note: Photo taken in the westward direction.

Photo 3. ANZAC Village Zone Substation

Photo 4. Development Site at Heathcote Road

Photo 5. Development Site at Junction Road

13 ATTACHMENT D – COMMUNITY CONSULTATION LETTER AND RESPONSES

Works Notification
Moorebank Intermodal Terminal
Moorebank, NSW

1 December 2021

As part of the delivery of Moorebank Intermodal Terminal and the associated business park, the electricity network in Chipping Norton and Moorebank will be upgraded in coming months.

Where this will take place

Work will take place on Junction Road and Heathcote Road, from Nuwarra Road in the east to Seton Road in the west (see map), as well as on the western end of Anzac Road, between Yulong Close and Moorebank Avenue.

What we are doing

On Junction Road

A range of options was considered, including installing a new network on the opposite (southern) side of the road to the existing 11kV electricity infrastructure, but ultimately the decision was made to locate a new 33kV overhead line along the existing alignment of poles and wires on the north side of the road. This option was selected to minimise visual and other impacts on the community and minimise the construction period.

On Anzac Road

The new 33kV wires and the existing network of wires on the southern side of Anzac Road will be moved underground, remaining on the southern side of the road.

When this is happening

Work is expected to begin closer to mid-2022.

How this affects you

Outages will be required throughout the works period to install the new 33kV lines. Work would generally take place at night to reduce the potential for disruption to homes and businesses. On Anzac Road, we expect this to include some lane closures.

The contractor carrying out the work will provide specific advice of the date and time of any outages close to the time that they will occur.

Have your say

The purpose of this letter is simply to make you aware of this upcoming work.

We will visit all properties in the work area early in 2022 to discuss specific impacts and to understand whether anyone at your address has any individual circumstances or requirements that you would like us to consider in development of our specific work plans.

If you have any questions between now and then, you can call 1800 986 465 or email simta@elton.com.au.

Junction Road electrical works door knocking

Address (odd)	Contact (Y/N)	Comments
1/153-155 Nuwarra Rd	No	
2/153-155 Nuwarra Rd	No	
3/153-155 Nuwarra Rd	No	
4/153-155 Nuwarra Rd	No	
5/153-155 Nuwarra Rd	Yes	
6/153-155 Nuwarra Rd	No	
7/153-155 Nuwarra Rd	Yes	
8/153-155 Nuwarra Rd	No	
9/153-155 Nuwarra Rd	No	
10/153-155 Nuwarra Rd	Yes	• Concern about the aesthetic of the street if bigger poles are erected • Would like to know how high the poles will be? • Wants to know how many tall poles will be installed. • Why can't the poles be done on the south side of the street?
5 Junction Rd	No	
5A Junction Rd	No	
1/7-9 Junction Rd	No	
2/7-9 Junction Rd	Yes	
3/7-9 Junction Rd	Yes	
4/7-9 Junction Rd	No	
5/7-9 Junction Rd	No	
11 Junction Rd	No	
1/13 Junction Rd	No	
2/13 Junction Rd	No	
3/ 13 Junction Rd	Yes	
15 Junction Rd	Yes	
17 Junction Rd	Yes	• Ross McLeay has emailed his concerns to SIMTA from previous notification • Ross thinks it's unfair that MLP gets underground cabling but resident in Junction Rd is getting overhead power lines • Wants more meaningful consultation with residents about the works • Ross used to work for Ausgrid and don't believe the proposed works meet the ASP3 consultation level
19 Junction Rd	No	
21 Junction Rd	No	
23 Junction Rd	No	
25 Junction Rd	No	
27 Junction Rd	Yes	
29 Junction Rd	Yes	
31 Junction Rd	No	

33 Junction Rd	Yes	
35 Junction Rd	Yes	
37 Junction Rd	No	
39A Junction Rd	No	
39B Junction Rd	Yes	• The Resident wants the powerline underground
41 Junction Rd	No	
43 Junction Rd	Yes	
45 Junction Rd	Yes	
51 Junction Rd	No	
53 Junction Rd	No	
55A Junction Rd	No	
55B Junction Rd	No	
57 Junction Rd	Yes	
59 Junction Rd	Yes	
61 Junction Rd	No	
1/63 Junction Rd	No	
2/63 Junction Rd	No	
3/63 Junction Rd	Yes	
65 Junction Rd	No	
67 Junction Rd	Yes	• Concerns about the tall poles and high voltage over their property
69 Junction Rd	No	
71 Junction Rd	No	
73 Junction Rd	Yes	
75 Junction Rd	Yes	• Unhappy that from previous electrical works, Endeavour Energy cut his tree without telling him. Request that if any trees are to be removed or cut is to let him know first before works start.
77 Junction Rd	Yes	
79 Junction Rd	Yes	
107 Junction Rd	Yes	
1/109 Junction Rd	Yes	
2/109 Junction Rd	Yes	
3/109 Junction Rd	No	
4/109 Junction Rd	Yes	
1/111 Junction Rd	No	
2/111 Junction Rd	Yes	
3/111 Junction Rd	Yes	
4/111 Junction Rd	Yes	• Wants to know if the upgrade will affect Nuwarra Rd?
5/111 Junction Rd	Yes	
6/111 Junction Rd	No	
7/111 Junction Rd	No	

Address (even)	Contact (Y/N)	Comments
2 Junction Rd	Yes	
4 Junction Rd	Yes	
6 Junction Rd	Yes	
10 Junction Rd	No	
12 Junction Rd	Yes	• Resident hopes the upgrade won't ruin his garden
14 Junction Rd	No	
16 Junction Rd	Yes	
18A Junction Rd	Yes	
18B Junction Rd	No	
20 Junction Rd	No	
22 Junction Rd	Yes	
26 Junction Rd	No	
28 Junction Rd	Yes	
30 Junction Rd	No	
32 Junction Rd	Yes	
34 Junction Rd	No	
36 Junction Rd	Yes	
1/38-40 Junction Rd	Yes	
2/38-40 Junction Rd	No	
3/38-40 Junction Rd	No	
4/38-40 Junction Rd	Yes	
5/38-40 Junction Rd	Yes	
6/38-40 Junction Rd	No	
42A Junction Rd	No	
42B Junction Rd	Yes	
44 Junction Rd	No	
46 Junction Rd	Yes	• Resident asked why can't the powerline be underground?
48 Junction Rd	Yes	
50 Junction Rd	No	
52 Junction Rd	Yes	
54 Junction Rd	Yes	
56 Junction Rd	Yes	
58 Junction Rd	No	
60 Junction Rd	Yes	
62A Junction Rd	No	
62B Junction Rd	No	
1/64 Junction Rd	No	
2/64 Junction Rd	No	
3/64 Junction Rd	Yes	
4/64 Junction Rd	No	
66 Junction Rd	Yes	
68 Junction Rd	No	
70 Junction Rd	No	
72 Junction Rd	No	

14 ATTACHMENT E – COUNCIL CONSULTATION MEETING MINUTES

Minutes.

Meeting Title:	Moorebank Logistics Park power upgrade briefing – Liverpool City Council (LCC)
Date:	Friday 11 February
Time:	2.30 – 3.30pm
Location:	Teams
Attendees:	Paul Isaac (JW Prince), Andrew Wiltshire (Aspect Environmental), Darryl Smith (LOGOS), Charles Wiafe (LCC), Binod Parajuli (LCC), Duncan Odgers (LCC), Jay Vaidya (LCC), Mahalia Arya (LCC), Stella Qu (LCC), Scott Warren (TSA), Courtney Harrington (TSA - recorder)
Apologies:	Nil.
Distribution:	As above.

» Briefing on upcoming power upgrade works to be undertaken for Moorebank Logistics Park.

Item	Description
1.0	**Introductions and areas of responsibility** Liverpool City Council: » Charles Wiafe – Manager, Traffic and Transport. Responsible for road occupancies, works on public road reserve, minimising traffic and road work implications etc. » Mahavir – Traffic and Transport Engineer » Jay Vaidya – Project delivery for Council's annual works program, responsible for managing roads/dilapidation reports etc. » Duncan Odgers – Field inspector. Responsible for road openings, land notices. » Binod Parajuli – Coordinator, Investigations and Design LOGOS: Darryl Smith – Design Manager, Electrical Infrastructure (was in the same role for Qube prior to the precinct sale end of 2021)
2.0	**Briefing on power upgrade project (DS)** Due to the size of the development at Moorebank and the level of automated infrastructure on site (e.g. cranes), the power supply to the site will require an upgrade. LOGOS approached Endeavour Energy with a proposal for increased load and negotiated the following solution. Two components: - Overhead 33kv line down Junction Road which will link with the existing 33kv line at the Seton Road intersection, with another existing line which runs down Nuwarra Road. - Main supply which will come down Anzac Road, across Moorebank Avenue and down precinct road to the location of what will be a 33kv switching sub-station site - 3 circuits down Anzac Road – the precinct will need 2 circuits, and the 3rd circuit will form a back up to Anzac Village. One is expected to be part of an easement on defence land (which is yet to be created) - There is also contingency for the 3rd circuit to be left in the road - Endeavour Energy has approved the Concept Plan.

Discussion:

- CW enquired about engagement the Department as Council and Defence both own a portion of the land
- The Department has been discussing an upgrade to Anzac Road, in conjunction with Defence and would like clarification of planned works along Anzac Road e.g. are they underground/how deep? What will the impacts be on any Council-planned works?
- DS explained alternative options which were reviewed:
  - Potential to run overhead power line along southern side of Junction Road (which was a cheaper installation) however would create high voltage lines on both sides of the road (11kv and 33kv) and was ruled out due to negative visual impacts on the road
  - Potential to run power line along Maddox Avenue through the new housing estate / shopping centre as there are currently no overhead lines in this area, however this option was considered too disruptive to the community and problematic due to technical issues (number of cables, overhead lines at that point)
  - Discussion around the level of impact of undergrounding which would be significant for residents and also road users.
  - Undergrounding would also be impacted by a gas main which would be problematic with high voltage cables and require a lengthy approvals process.
  - The preferred option can utilise existing infrastructure, reduce visual impacts on the street and there will be no implications on future development.
  - CW queried whether any infrastructure will be removed
  - DS confirmed every second pole will be replaced with a taller pole
- Council owns the section to the fire station, from the fire station east is Defence land
- Discussions are ongoing about transferring this land to Council
- Council would want to ensure the work being undertaken for the power upgrade would not require other relocations
- PI confirmed all work will be in the Council-owned area
- Discussion around stormwater pits which may be up to 2m deep
- DS confirmed it will not be possible to go deeper than 3m
- Trenches would be located 1.5m off the curb and clear of any drainage however this can be adjusted during detailed design
- Stormwater design can be matched with Council's planning – commitment to review any conflicts in detailed design process
- Best contact at Council to work through this will be Binod Parajuli
- PI asked about timing of Council's planned works – design is due to commence shortly and estimated to be carried out within approx. 18 months.
- CW queried what consultation had been undertaken with the community
  - SW confirmed the footprint of the power upgrade had been letterbox dropped in December 2021 and the team undertook a doorknock in January 2022 as a follow up.
  - Residents provided local intel around concerns with EMF (which the team were able to dispel), opportunities for improvements to the area (reducing visual impacts by moving power lines to property boundaries etc).
  - Also met residents with health concerns and requirement for power continuity – project team will ensure generators are available etc.
- SW confirmed the REF will be on exhibition and invite formal submissions around March 2022. Notification will be made through newspaper and directly to properties in the affected area.

3.0	Attendees committed to ongoing discussions to leverage power upgrade work and LCC's planned road works to minimise downtime for community and avoid unnecessary duplication of works.
	Key take-aways:

- Ongoing communication as project progresses and benefit in meeting now in order for any areas of concern to be addressed during detailed design
- Ensure smooth interface between the power upgrade work and LCC's planned road works to minimise downtime for community, avoid unnecessary duplication of works etc.
- Acknowledgement of need to coordinate the design
- Exhibition to commence shortly – anticipated to be March 2022