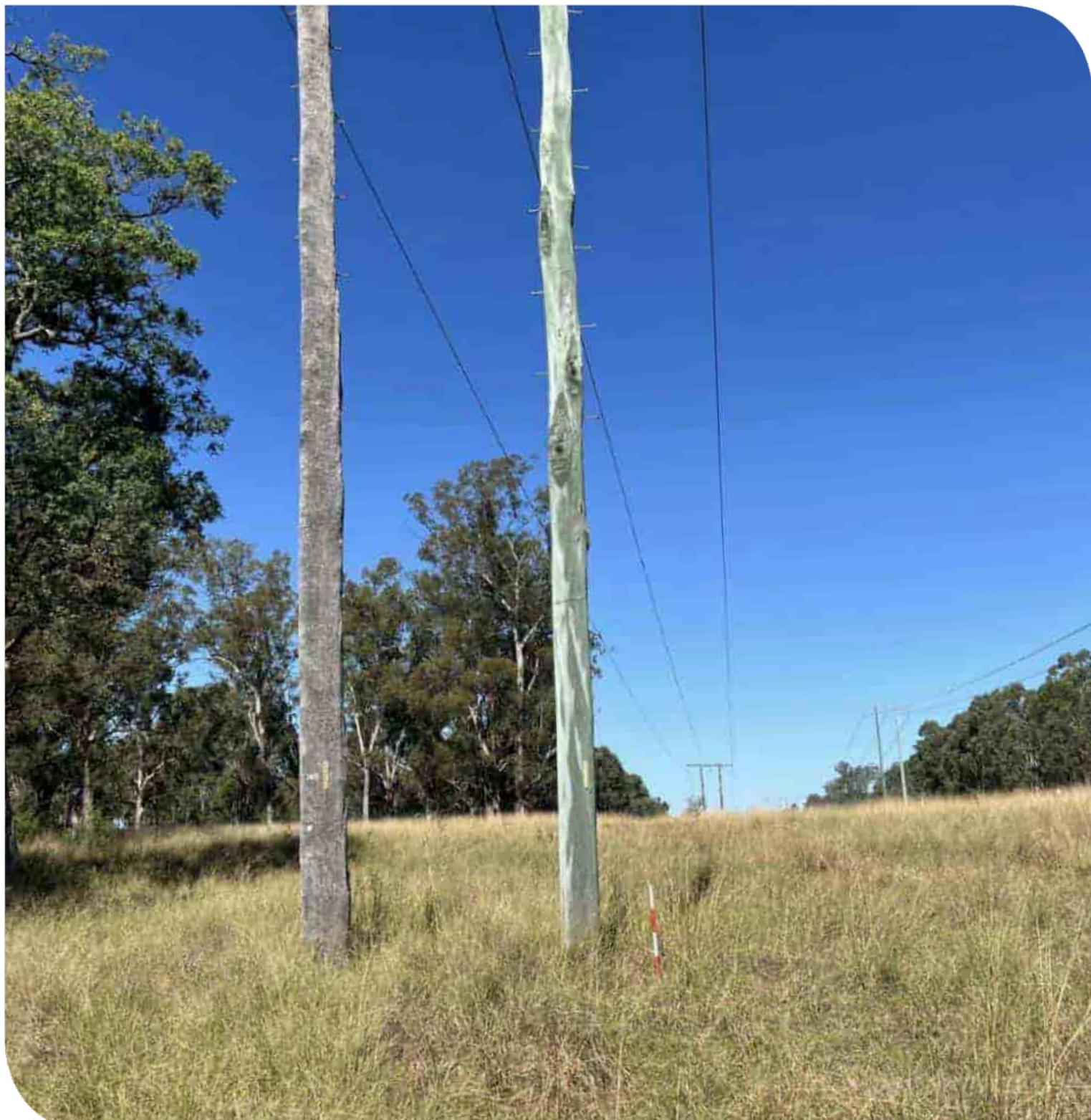


Endeavour Energy Nepean Zone Substation Feeder Upgrade

Review of Environmental Factors

Prepared for Endeavour Energy 26 March 2025



Document control

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Niche Environment and Heritage Pty Ltd (ACN 137 111 721)
Enquiries should be addressed to Niche Environment and Heritage
PO Box 2443, Parramatta NSW 1750, Australia
Email: info@niche-eh.com

Glossary and list of abbreviations

Term or abbreviation	Definition
AHIMS	Aboriginal Heritage Information Management System
ANO	Authorised Network Operator
AoS	Assessment of Significance
Authorised Transactions Act	<i>Electricity Network Assets (Authorised Transactions) Act 2015</i>
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
Biodiversity and Conservation SEPP	State Environmental Planning Policy (Biodiversity and Conservation) 2021
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
CLM Act	<i>Contaminated Land Management Act 1997</i>
Cth DCCEEW	Department of Climate Change, Energy, Environment and Water
DPE	Department of Planning and Environment (formerly DPIE)
NSW	New South Wales
NSW DCCEEW	NSW Department of Climate Change, Energy, Environment and Water (formerly DPE)
EE	Endeavour Energy
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2021</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environmental Protection License
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically Sustainable Development
ha	Hectare/s
Heritage Act	<i>Heritage Act 1979</i>
KMA	Koala Management Area
KMP	Koala Management Plan
kV	Kilovolt
LEP	<i>Local Environmental Plan 2010</i>
LGA	Local Government Area
Locality	The Development site and surrounds, nominally a 10 km radius from the development site.
MNES	Matters of National Environmental Significance (from the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>).
Niche	Niche Environment and Heritage
NorBE	Neutral or Beneficial Effect
NPW Act	<i>National Parks and Wildlife Act 1974</i>
OEH	Office of Environment and Heritage (formerly DPE)
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
POEO Waste Regulation	<i>Protection of the Environment Operations (Waste) Regulation 2014</i>
Project	The proposed works involving the replacement of 28 existing poles, removal of three poles, construction of four poles at new locations, and replacing existing overhead conductors and associated overhead line fittings on the existing Endeavour Energy power supply.
REF	Review of Environmental Factors

Term or abbreviation	Definition
Resilience and Hazards SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP)
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
TEC	Threatened Ecological Community
TfNSW	Transport for NSW
Transport and Infrastructure SEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021

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1. Introduction

1.1 Background and need for the Project

Endeavour Energy (EE) supply electricity to the Greater Macarthur Area and require upgraded feeders within existing transmission lines to meet increasing electricity demand. The proposed works will involve the replacement of existing power poles, removal of old power poles, and establishment of new power poles (hereafter referred to as the Project). The transmission line will also be replaced with a new 66K feeder to support increased supply, following rezoning of the area to establish new homes, and local centres.

The existing feeder is located between Nepean Transmission Substation, 156 Springs Road, Spring Farm NSW 2570, to Menangle Road, Menangle NSW 2568 (Figure 1). The upgrade of the feeder will occur over approximately 7.6 kilometres (km) of existing transmission line. The works will involve:

- Existing substation at 156 Springs Road, Spring Farm to be connected to Power Pole Site 1 (PPS-1) via trenching or underboring. Using an existing feeder bay, new footings may be required.
- Replacement of up to 28 poles, removal of up to three poles, and construction of up to four poles in new locations. All works will be within 20 m of new and existing poles (Figure 2).
- Replacement of existing overhead conductors and associated overhead line fittings.

The Project is located within the existing EE feeder alignment which runs through private landholdings including Elizabeth Macarthur Agricultural Institute (EMAI), Camden South.

Under Clause 2.44 of the State Environmental Planning Policy (Transport and Infrastructure) 2021, 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. It is anticipated that poles would be replaced within approximately 20 metres (m) of the existing poles' position, and new poles within 20 m of proposed pole locations. Once the Project is complete, the feeder will be owned, operated and maintained by EE.

The 20 m radius around the poles and the existing Endeavor Energy overhead alignment used to access the poles are hereafter referred to as the Study Area. While the entire Study Area has the potential to be impacted by the Project, vegetation disturbance will be limited to 20 m from the existing replacement poles and new poles will be avoided wherever practical.

EE have commissioned Niche Environment and Heritage (Niche) to prepare this Review of Environmental Factors (REF) for determination by EE (the Determining Authority) as an activity in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Clause 171 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation).

The purpose of this REF is to examine and consider to the fullest extent possible all matters affecting, or likely to affect, the environment as a result of this Project. This REF identifies mitigating measures to be incorporated into the design and construction to minimise environmental impacts.

2. Description of the Project

2.1 Project overview

The Project includes the connection of an existing substation to feeder poles via trenching or underboring, and the upgrade of the feeder will occur over 7.6 km of existing transmission line, with up to 28 poles replaced, three removed and four constructed at new locations (Figure 2). The existing overhead conductors and associated overhead line fittings will be replaced and re-installed. All works are for overhead lines in existing easements (Annex 2).

All works will be within 20 m of new and existing poles. The existing feeder is located between Nepean Transmission Substation, 156 Springs Road, Spring Farm NSW 2570 in the north, and terminates at Menangle Road, Menangle NSW 2568, in the south (Figure 1).

Disturbance native vegetation would be limited to trimming branches of a select number of canopy trees and slashing of predominantly exotic groundcover vegetation. Ground disturbance for the removal and installation of poles will be required and will include disturbance of groundcover surrounding poles. Eucalypt saplings and Derived Native Grassland (DNG) Threatened Ecological Community (TEC) are at risk of being trampled or driven over, however, impacts are expected to be minimal and temporary with appropriate mitigation measures. Given the traverse of the feeder occurs adjacent to mapped native vegetation and historic heritage places (such as Camden Garden Estate and Camden Park), specialist ecology (Annex 3) and heritage (Annex 4 and Annex 5) assessments have been completed as part of this REF.

2.2 Proponent

EE is the proponent of the Project. EE operates under national electricity laws, statutory instruments and policies which govern networks in the National Electricity Market.

Proponent address: 8 Parramatta Square (Levels 40-42), 10 Darcy Street Parramatta, NSW 2150.

Proponent website link: <https://www.endeavourenergy.com.au/>

2.3 Description of works

To support the new powerlines, 28 poles will need to be replaced, three removed and four constructed at new locations. The poles for the Project will be approximately 20-25 m tall steel poles. Each new pole is placed on a pole stand and in preparation for their installation, the poles are dressed, and the arms installed. The location of the new power poles will have a hole drilled approximately 900-1000 mm in diameter and approximately 4.8 m deep either at the same location as the previous pole, or within 4 m. The poles being replaced in the same location will have the hole size increased if required. The poles are then lifted into position using a crane and concreted into the ground. A 3m radius around existing intermediate poles to facilitate structure replacements, and 4m around corner poles, i.e. up to a 6m and 8m area in all directions will be cleared for installation of intermediate and corner poles respectively. Around these pole locations, heavy-vehicle access and Elevated Work Platforms (EWPs), cranes etc will be required for facilitating structure replacements.

Overhead feeder power lines will be installed in 1.5-2 km sections. To install the feeder, rollers are placed on top of the chosen pole and the rope is lifted on to the rollers. New cables are then spliced on to the rope. At the other end of the chosen section, a large winch winds the rope off, while pulling on the new

cable across the defined section. The rollers are then removed, and the cables are clipped into the power pole.

The connection of PPS-1 to the existing substation at Springs Road would involve trenching and/or underboring for approximately 50 m.

No works are required within 150m of the Nepean River.

Equipment and machinery associated with the construction works include:

- 20 tonne franna crane
- 40-60 tonne slew Crane
- 5/10 crane borer
- 18 – 23 m EWP
- Light, offroad utility vehicles
- Large flatbed truck with hiab
- 14 tonne excavator
- Winch truck
- 8 – 12 tonne tipper truck
- Cable stands.

Stockpiles:

All stockpiles will be within previously disturbed areas within the existing easement.

Access tracks:

The majority of the access tracks and roads to be used to access the replacement pole locations are existing. There is one part of the access track that does require stabilisation works. In this area or in unlikely event that new access tracks are to be installed to allow access to work areas, an addendum to this REF is likely to be required. Stabilisation would be completed with geotextile material overlaid with VENM crushed gravel or similar. All access tracks and roads to be used to access the pole locations/work areas are all within previous disturbed areas.

2.4 Location of works

The location of the works is associated with the existing feeder between Nepean Transmission Substation, 156 Springs Road, Spring Farm NSW 2570 in the north (Lot 47 DP1232874), and terminates at Menangle Road, Menangle NSW 2568, in the south (Lot 20A DP4450) (Figure 1).

The transmission line feeder occurs over 7.6 km and traverses through several different tenures and land uses such as private, Transport for NSW (TfNSW) road reserve, grazing and cropping land as outlined in Table 1 and shown on Figure 2 and Figure 3. All necessary consultation and negotiations will be undertaken by EE to carry out works within each tenure.

Table 1: Land tenure

Power pole site	Lot/DP intersecting pole and 20 m radius buffer
Substation Connection Point	Lot 47 DP1232874
PPS-1	Lot 47 DP1232874
PPS-2	Lot 1 DP368665
PPS-3, PPS-4, PPS-5, PPS-6	Lot 2 DP213696
PPS-7	Lot 2 DP213696 (pole) and Lot 2 DP1050479 (buffer)

Power pole site	Lot/DP intersecting pole and 20 m radius buffer
PPS-8	Lot 2 DP1050479 (pole) and Lot 2 DP213696 (buffer)
PPS-9, PPS-10a, PPS-10b	Lot 2 DP1050479
PPS-11, PPS-12, PPS-13a, PPS-13b, PPS-14, PPS-15, PPS-16, PPS-17, PPS-18, PPS-19, PPS-20, PPS-21, PPS-22, PPS-23, PPS-24, PPS-25	Lot 2 DP1133910
PPS-26, PPS-27, PPS-28, PPS-29, PPS-30, PPS-31, PPS-31b	Lot 100 DP127655
PPS-32	Lot 1242 DP1121129 (pole) and Lot 100 DP127655 (buffer)
PPS-33	1 Lot 242 DP1121129
PPS-34	Lot 20A DP4450

2.5 Project commencement and hours of operation

The Project construction is expected to commence in February 2025, with works expected to be completed by June 2026.

Most of the activities will be undertaken in accordance with the Interim Construction Noise Guideline (Department of Environment and Climate Change [DECC] 2009) and the Draft Construction Noise Guideline (EPA 2020) standard construction working hours of:

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

3. Project justification and alternatives

3.1 Justification for the Project

EE requires an upgrade to the existing feeder between Nepean Transmission Substation and Menangle Road, by replacing the current transmission line with a new 66kV feeder. This Project is part of the broader transmission supply strategy to meet increasing electricity demand in the Greater Macarthur Growth Area and surrounding supporting development. The transmission line will support increased supply, following rezoning of the area to establish new homes and local centres.

The replacement of old poles, the construction of new poles and removal of redundant poles will comprise of the proposed works and are all required to support the new 66kV feeder.

3.2 Alternatives

Various alternatives were considered by EE to address the needs of the project. An Options Screening Report for the Project was prepared in 2024 (*Augmenting Supply to the Southern Macarthur Growth Area Options Screening Report*, Endeavour Energy, 8 April 2024). The report was publicly exhibited by EE in July 2024 and can be accessed here: [Augmenting Supply to the Southern Macarthur Growth Area \(endeavourenergy.com.au\)](https://endeavourenergy.com.au)

EE identified four credible network options for providing secure supply to the Southern Greater Macarthur Growth Area. Three of the four options involved establishing new feeders and one the augmentation of existing feeders. The options considered were:

- Option 1 – Establish new Feeder 85J from Nepean Transmission Substation to Douglas Park Switching Station.
- Option 2 – Establish new Feeder 85J from Nepean Transmission Substation to Douglas Park Switching Station, including deviation to Menangle Park Mobile Zone Substation.
- Option 3 – Establish new Feeder 85J from Macarthur Bulk Supply Point to Douglas Park Switching Station.
- Option 4 – Augment existing 66 kV Feeder 851 from Nepean Transmission Substation to Maldon Zone Substation and Feeder 852 from Macarthur Bulk Supply Point to Douglas Park Switching Station.

Option 1 was determined to be the preferred option by EE to meet the project need from both a cost and feasibility perspective.

3.3 Benefits

Residents, commercial and industrial business operators, and their customers will all benefit from safe, efficient, cost-effective, and continuous electrical supply within the Greater Macarthur Growth Area provided by the Project.

3.4 Consideration of ecologically sustainable development

While there is no universally accepted definition of Ecological Sustainable Development (ESD), in 1992 the Commonwealth Government, in “Australia’s National Strategy for Ecologically Sustainable Development” (1992) suggested the following definition for ESD in Australia:

'Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'.

The Project has been designed with these values in mind and these objectives have been incorporated in the Project through:

- Maximising the use of previously disturbed areas.
- Confining activities to areas that have lower environmental sensitivity where possible – i.e. unnatural environments such as urbanised and industrial areas.
- Minimising the disturbance footprint of the works by using pole designs that are equivalent to existing structures, maintaining consistent span distances and pole locations wherever possible.
- Incorporating environmental safeguards to avoid, minimise and mitigation the potential impact from the Project that could not be avoided during the design process.

4. Statutory and Planning Framework

4.1 Code of Practice for Authorised Network Operators (ANOs)

The Code is approved under Clause 198C of the EP&A Regulation that provides the statutory planning context for environmental assessment and approval of works to be undertaken by an ANO.

The Code requires an ANO to classify its activities and development proposals into one of six possible assessment classes. This Project has been identified as a Class 4 Proposal under the Code, which requires the preparation of an REF. A Class 4 Proposal refers to projects which are expected on a reasonable basis to have impacts which go beyond minor, can be extensive and/or complex and at the discretion of the ANO be a project for which it is deemed appropriate to prepare, such as a project which may generate considerable public interest.

On 14 June 2017 EE was transacted and became an ANO. This means that EE is now a privately managed network business in accordance with the *Electricity Networks Assets (Authorised Transactions) Act 2015* and is subject to The Code gazetted in September 2015 under Clause 198C of the Regulation. The Code is deemed to be in force until it is revoked or varied in accordance with the Regulation.

The NSW Government has prescribed the ANOs as a "prescribed Determining Authorities" for the purposes of Section 5.2 of the EP&A Act and the definition of "public authority" under Part 1 of that Act.

This prescription allows an ANO to be a Part 5 Determining Authority (EP&A Act) for the purposes of an electricity transmission or distribution network. While Part 5 activities do not require development consent under Part 4 of the EP&A Act, consideration of an activity's environmental impact is required under Division 5.1, Section 5.5 of that Act.

The *Electricity Network Assets (Authorised Transactions) Act 2015* (Authorised Transactions Act) inserted Division 9 into Part 14 of the EP&A Regulation. Clause 198C provides that The Code may make provision for or with respect to the exercise by an ANO of its functions under Division 5.1 of the EP&A Act in respect of "*an activity for the purposes of a transacted electricity transmission or distribution network*". These words are defined non-exhaustively in Clause 198C as including: -

The exercise by an authorised network operator of its functions under the Act, section 5.5 in relation to activities, including activities for the following purposes—

- a) *Development for the purposes of the construction, maintenance or operation of a transacted electricity transmission or distribution network*
- b) *Geotechnical investigations relating to a transacted electricity transmission or distribution network*
- c) *Environmental management and pollution control relating to a transacted electricity transmission or distribution network*
- d) *Access for the purposes of the construction, maintenance or operation of a transacted electricity transmission or distribution network*
- e) *Temporary construction sites and storage areas, including batching plants, the storage of plant and equipment and the stockpiling of excavated material.*

As a Determining Authority, an ANO can assess and self-determine activities that are not likely to significantly affect the environment and are conducted for and on behalf of the ANO for the purposes of electricity transmission or distribution.

By virtue of an ANO's status under the State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP), certain activities will be subject to Part 2.3 Division 5 Subdivision 1- *Electricity Transmission or Distribution Networks* of the Transport and Infrastructure SEPP for the purposes of development connected with electricity transmission or distribution.

These are outlined below:

Under "Clause 2.44 Development permitted without consent"

1. *"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" Excluding land reserved under the National Parks and Wildlife Act 1974.*

The Transport and Infrastructure SEPP's definition of an "electricity transmission or distribution network" includes the following components:

- a. *Above or below ground electricity transmission or distribution lines (and related bridges, cables, conductors, conduits, poles, towers, trenches, tunnels, ventilation and access structures)*
- b. *Above or below ground electricity kiosks or electricity substations, feeder pillars or transformer housing, substation yards or substation buildings*

The aim of this Policy is to facilitate the effective delivery of infrastructure across the State through increased regulatory certainty, improved efficiency and flexibility in the location of infrastructure and service facilities, while still providing adequate stakeholder consultation.

The nature of construction impacts of the Project is expected to be regarded as being minor but having some complexity. The Project is not envisaged to be an activity that is likely to significantly affect the environment (including critical habitat) or threatened species, populations or ecological communities or their habitats, an Environmental Impact Statement (EIS) is not expected to be required.

In view of the above, this Project has been assessed as a **Class 4 Proposal** in accordance with the Code.

Since this Project is classified as an activity in accordance with Part 5 of the EP&A Act, it must consider Clause 171 of the EP&A Regulation.

4.2 Environmental Planning and Assessment Act 1979

The EP&A Act and the associated EP&A Reg provides the framework for assessing the potential environmental impacts associated with developments in NSW.

This REF has been prepared on behalf of EE and given that development consent is not required as outlined by the Transport and Infrastructure SEPP, the Project can be undertaken as an activity under Part 5 of the EP&A Act, with EE as the Determining Authority.

An assessment of the Project's impact on threatened species and ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act) and Aboriginal items or places, is required under Part 5 of the EP&A Act and is provided in Annex 3 and Annex 4 respectively.

Section 5.5 of the EP&A Act outlines the primary considerations for any determining authority when determining an application under Part 5 of the EP&A Act. Those matters are outlined below in Table 2.

Table 2: EP&A Act compliance

EP&A Act	Project Compliance
Take into account to the fullest extent possible all matters affecting or likely to affect the environment due to the proposed activity.	This REF addresses relevant environmental matters relating to the development of the Project. The Project would not have a significant environmental impact.
The effect of an activity on any wilderness area in the locality in which the activity is intended to be carried on.	The Project would not affect any wilderness areas.

4.3 Environmental Planning and Assessment Regulation 2021

Section 171 of the EP&A Regulation sets out the factors to consider when assessing impacts on the environment from activities (for the purposes of Part 5 of the EP&A Act). An assessment of the impacts of the activity against each of these is provided in Table 3.

Table 3: Compliance with EP&A Regulation 2021

Environmental factors	Impacts
(a) The environmental impact on the community. Some of the Project Footprint is accessible to the public (roads, footpaths and driveways). The works would only be temporary. Road closures would occur at night to avoid high traffic volumes.	Minor (Temporary)
(b) The transformation of the locality. The Project involves the removal of existing poles and the installation of new poles and feeder upgrade. These aspects are not considered to result in a major transformation of the locality with nil to negligible environmental impact.	Minor
(c) The environmental impact on the ecosystems of the locality. The Project has the potential to negatively impact on biodiversity. However, the areas are largely disturbed areas dominated by weed species and these impacts have been minimised through the mitigation and management safeguards in Section 5.4.	Minor
(d) Reduction of the aesthetic, recreational, scientific or other environmental quality or values of the locality. The Project will not significantly alter any aesthetic, recreational, scientific or other environmental quality or values of the locality.	Minor
(e) The effect on any locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations. The Project is not likely to significantly impact the locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.	Minor
(f) The impact on the habitat of protected fauna, within the meaning of the Biodiversity Conservation Act 2016. An assessment of potential impact to threatened species, populations and ecological communities and their habitats listed under the NSW <i>Biodiversity Conservation Act 2016</i> was undertaken. Results of these assessments are covered in Section 5.4 and Annex 3. Threatened biodiversity will not likely be significantly impacted by the Project.	Negligible
(g) The endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air. The Project will not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air.	Highly unlikely
(h) Long-term effects on the environment. The Project will not lead to any detrimental long-term impacts on the environment.	Negligible
(i) Degradation of the quality of the environment. The Project will not lead to the long-term degradation of the environment.	Negligible

Environmental factors	Impacts
(j) Risk to the safety of the environment. The Project will improve the safety of the environment from its existing state by upgrading the electricity distribution assets.	Long term positive
(k) Reduction in the range of beneficial uses of the environment. The Project will not lead to any reduction in the range of beneficial uses of the environment.	Negligible
(l) Pollution of the environment. The Project has the potential to contribute to pollution of the environment. These impacts have been minimised through the mitigation and management safeguards as outlined in Section 5.11.	Minor
(m) Environmental problems associated with the disposal of waste. The Project will generate waste streams which will be managed appropriately and therefore will not result in any environmental problems.	Negligible
(n) Increased demands on natural or other resources that are, or are likely to become, in short supply. The Project will not result in any increased demand on resources that are, or are likely to become, in short supply.	Negligible
(o) The cumulative environmental effect with other existing or likely future activities. The Project is not expected to have cumulative effects on existing or future activities of the Project Footprints or their surroundings.	Minor
(p) The impact on coastal processes and coastal hazards, including those under projected climate change conditions. The Project will not impact any coastal processes or coastal hazards.	Negligible
(q) Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the ACT, Division 3.1 This Project will not influence any local strategic planning statements, regional strategic plans or district strategic plans made under the ACT, Division 3.1.	Complimentary
(r) other relevant environmental factors. This REF has taken into account all relevant environmental factors.	Negligible to minor

4.4 Camden Local Environmental Plan 2010

The Camden Local Environmental Plan 2010 (CLEP) outlines the key planning controls used to manage the way land is used through zoning and development standards.

The Project is mapped as C2 – Environmental Conservation and SP2 – Infrastructure in the CLEP.

The provisions of Clause 2.44, of the Transport and Infrastructure SEPP, permits development on any land for the purpose of an electricity transmission or distribution network to be carried out by or on behalf of an electricity supply authority without consent. The Project is therefore permissible under the Transport and Infrastructure SEPP and development consent from Council is not required.

The CLEP does not include any provisions for the protection of Koala habitat and therefore no Koala Habitat Map exists within the Camden LGA. The Project does not involve any disturbance to vegetation and therefore will not impact on any Koala feed trees as mature/canopy trees will be avoided.

4.5 Wollondilly Local Environmental Plan 2011

The Wollondilly Local Environmental Plan 2011 (WLEP) outlines the key planning controls used to manage the way land is used through zoning and development standards.

The Project is located within land mapped as RU1 – Primary Production under the WLEP, with the exception of PPS 34 which is located within SP2 - Infrastructure (pole location) and RU2 – Rural Landscape (buffer area) zoned land.

The provisions of Clause 2.44 of the Transport and Infrastructure SEPP permits development on any land for the purpose of an electricity transmission or distribution network to be carried out by or on behalf of an electricity supply authority without consent. The Project is therefore permissible under the Transport and Infrastructure SEPP and development consent from Council is not required.

The WLEP does not include any provisions for the protection of Koala habitat and therefore no Koala Habitat Map exists within the Wollondilly LGA. The Project does not involve any disturbance to vegetation and therefore will not impact on any Koala feed trees as mature/canopy trees will be avoided.

4.6 Other relevant legislation

4.6.1 Camden Development Control Plan 2019

The Camden Development Control Plan 2019 (CDCP) supports the CLEP, providing guidance for development including design, general standards and area-based provisions.

The Project will be compliant with the controls outlined in the CDCP.

4.6.2 Wollondilly Development Control Plan 2016

The Wollondilly Development Control Plan 2016 (WDCP) supports the WLEP, providing guidance for development including design, general standards and area-based provisions.

The Project will be compliant with the controls outlined in the WDCP.

4.6.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) establishes mechanisms for the:

- Management and protection of listed threatened species of native flora and fauna (excluding fish and marine vegetation).
- Listing of threatened species or key threatening processes.
- Development and implementation of recovery and threat abatement plans.
- Declaration of critical habitat.
- Consideration and assessment of threatened species impacts in development assessment process.
- Management and regulation of actions that may damage critical or other habitat or otherwise significantly affect threatened species, populations and ecological communities.

If an activity potentially affects any flora or fauna species, populations or ecological communities listed by the BC Act, a test of significance is required. The Test of Significance, referred to in Section 7.3 of the BC Act, determines whether the Project is likely to have a significant impact. If a significant impact is determined, either a Species Impact Statement is required, or the Biodiversity Offset Scheme would need to be applied.

A Flora and Fauna Assessment was carried out (Annex 3). The Study Area was assessed for the potential presence of threatened species; populations and ecological communities listed under the BC Act and concluded that the Project would not have significant impacts on biodiversity.

4.6.4 NSW Biosecurity Act 2015

The *Biosecurity Act 2015* provides for the management and control of priority and environmental weeds by local control authorities. All private landowners, occupiers, public authorities and councils are required to control weeds on their land under Schedule 1 of the Act.

4.6.5 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) aims to conserve nature, objects, places or features of cultural value within the landscape. The NPW Act is the primary legislation regulating Aboriginal cultural heritage in NSW.

Items of Aboriginal cultural heritage (Aboriginal objects) or Aboriginal places (declared under Section 84) are protected and regulated under the NPW Act. Aboriginal objects are protected under Section 86 of the Act. Under Section 90(1) of the NPW Act, the Secretary may issue an Aboriginal heritage impact permit for an activity that would harm an Aboriginal object.

Further assessment of the potential impacts on Aboriginal cultural heritage is provided in Section 5.9.

4.6.6 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) aims to provide for the identification, registration and conservation of items of State heritage significance. Investigations of the Projects potential to interact with or impact on items of heritage significance are documented in Section 0.

4.6.7 Waste Avoidance and Resource Recovery Act 2001

The main objectives of the *Waste Avoidance and Resource Recovery Act 2001* is to develop and support the implementation of regional and local programs to meet the outcomes of a State-wide strategy for waste avoidance and resource recovery and to minimise the consumption of natural resources and final disposal of waste by encouraging the reuse and recycling of waste.

The recording of waste disposal would be undertaken as part of the Project during the construction phase. Procedures would be implemented during construction in an attempt to promote the objectives of the Act, refer to Section 5.11.

4.6.8 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) establishes the procedures for issuing licences for activities listed in Schedule 1 of the POEO Act to regulate aspects such as waste, air, noise and water pollution. The owner or occupiers of the premises engaged in scheduled activities is required to hold an Environment protection Licence (EPL) and comply with the conditions of that licence.

Under Part 3.2 of the POEO Act, the carrying out of scheduled activities as defined in Schedule 1 requires an EPL. The Project is not listed as a Scheduled activity in Schedule 1 and therefore an EPL is not required.

4.6.9 Contaminated Land Management Act 1997

The *Contaminated Land Management Act 1997* (CLM Act) establishes a process for investigating and remediating land where contamination presents a “significant risk of harm” to human health or the environment. It applies to contamination which occurred before or after its commencement.

A search of the NSW Environment Protection Authority (EPA) Contaminated Land Register has identified no registered contaminated sites within one kilometre of the Study Area (Annex 6).

4.6.10 Electricity Supply Act 1995

The *Electricity Supply Act 1995* provides for network operators such as EE to carry out development and maintenance of electricity works for the purpose of exercising its function to supply electricity.

Section 45 Erection and placement of electricity works provides:

- (1) *This section applies to work connected with the erection, installation, extension, alteration, maintenance and removal of electricity works.*
- (2) *For the purpose of exercising its functions under this or any other Act or law, a network operator:*
 - (a) *may carry out work to which this section applies, and*
 - (b) *in particular, may carry out any such work on a public road or public reserve.*

Section 53 of the Act protects existing “electricity works” and the repairing, modifying or upgrading of these works, where the electricity work is located within land over which the network operator does not own or have the benefit of an easement. Electrical infrastructure is protected under Section 53 where it existed before the commencement of the *Electricity Supply Amendment (Protection of Electricity Works) Act 2006*. The Act also provides for entry to property to operate and maintain network assets, trim and remove trees, as well as duties for notifying landowners. The proposed access routes traverse through four properties identified in Table 1, EE will notify the landowners prior to works. The Act requires that works (other than routine repairs or maintenance works) must not be undertaken unless a minimum of 40 days' notice is provided to the relevant local council. Any submissions received must be considered by EE.

4.6.11 Crown Land Management Act 2016

Crown land is governed by the *Crown Land Management Act 2016* to provide a framework to care, control and manage Crown reserves. A section of the Project is located on Crown land, within EMAI. There is currently no Plan of Management for this Crown reserve and therefore is not relevant to this Project.

4.6.12 Fisheries Management Act 1994

The FM Act protects threatened species, populations, and communities of fish and marine vegetation, as well as commercial and recreational fishing areas, in NSW waters. The Project crosses Nepean River, this listed as Key Fish Habitat; however, the works are terrestrial in nature and do not involve ‘Dredging and reclamation’ as defined in accordance with Part 7 Division 3 of the Act. As such, notification to the Minister in accordance with Section 199 of the *Fisheries Management Act 1994* is not required.

4.6.13 Coal Mine Subsidence Compensation Act 2017 No 37

The object of this Act is to provide for a fair, efficient and sustainable compensation framework for dealing with the impacts of coal mine subsidence. The Subsidence Advisory NSW (SA NSW) is responsible for assessing and approving development applications in subsidence-prone areas, ensuring compliance with building standards and providing compensation for damages caused by subsidence. The Project is within Wilton Mine Subsidence District and notification to the SA NSW is advised prior to work commencing.

4.6.14 Roads Act 1993

The Roads Act 1993 provides the legal framework for the management, construction, and maintenance of roads in New South Wales. The Act outlines responsibilities for road authorities, regulates activities that may impact public roads, and establishes requirements for road closures, works, and access.

Key provisions of the Act relevant to this Project include:

- Section 138 – Requires approval from the relevant roads authority (e.g., TfNSW or local council) for works on or near a public road, including excavation, road openings, or temporary occupation.

- Section 139A – Provides the process for notifying road authorities about works affecting classified roads.
- Section 40 & 40A – Requires approval for permanent or temporary road closures where applicable.

As part of the Project, consultation will be undertaken with TfNSW and the relevant local councils (Camden Council and Wollondilly Shire Council) to ensure compliance with the Roads Act 1993. If works require road closures or modifications, the appropriate approvals will be obtained, and traffic management plans will be prepared and implemented in accordance with the Act.

4.7 State Environmental Planning Policies

4.7.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

The Transport and Infrastructure SEPP aims to facilitate the effective delivery of infrastructure and transport across the State, including for power supply networks. Clause 2.44 of the Transport and Infrastructure SEPP permits development on any land 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, excluding land reserved under the *National Parks and Wildlife Act 1974*. The Project is not located on land reserved under the *National Parks and Wildlife Act 1974*.

As the Project is appropriately characterised as development for the purposes of electricity transmission and is to be carried out by an electricity supply authority, it can be assessed under Part 5 of the EP&A Act. Development consent from Council under Part 4 is not required.

Part 2.2, Division 1 of the Transport and Infrastructure SEPP outlines the consultation requirements for public authorities to consult with local council and other public authorities before the start of certain types of development, the consultation requirements for the Project are further outlined in Section 4.8.

4.7.2 State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP)

The SEPP (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) consolidates, transfers and repeals provisions of the following 11 SEPPS (or deemed SEPPs):

- SEPP (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP)
- SEPP (Koala Habitat Protection) 2020 (Koala SEPP 2020)
- SEPP (Koala Habitat Protection) 2021 (Koala SEPP 2021)
- Murray Regional Environmental Plan No 2—Riverine Land (Murray REP)
- SEPP No 19—Bushland in Urban Areas (SEPP 19)
- SEPP No 50—Canal Estate Development (SEPP 50)
- SEPP (Sydney Drinking Water Catchment) 2011 (Sydney Drinking Water SEPP)
- Sydney Regional Environmental Plan No 20 – Hawkesbury – Nepean River (No 2 – 1997) (Hawkesbury–Nepean River SREP)
- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Sydney Harbour Catchment SREP)
- Greater Metropolitan Regional Environmental Plan No 2 – Georges River Catchment (Georges River REP)
- Willandra Lakes Regional Environmental Plan No 1 – World Heritage Property (Willandra Lakes REP).

The Biodiversity and Conservation SEPP incorporates provisions from these SEPPs.

Koala habitat is not likely to be impacted by the Project as clearing of native mature trees is not proposed. Where further clearing is necessary, additional survey and assessment would be required to determine any

potential impacts to Koala habitat. The Koala is independently considered as a listed species under the BC Act and EPBC Act.

4.7.3 State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP)

The SEPP (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) consolidates, transfers and repeals provisions of the following three (3) SEPPS (or deemed SEPPs):

- SEPP (Coastal Management) 2018
- SEPP 33 – Hazardous and Offensive Development
- SEPP 55 – Remediation of Land

The Resilience and Hazards SEPP incorporates provisions from these former SEPPs.

The Project does not trigger relevant provisions of these SEPPs and the works do not trigger requirements for designated development as stated in Schedule 3 of the EP&A Regulation.

4.8 Commonwealth legislation

4.8.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for the protection of nationally significant natural or cultural values and the regulation of certain nationally significant activities. These values are known as Matters of National Environmental Significance (MNES) and the regulated activities are known as Controlled Actions and include activities, which may impact:

1. World Heritage properties.
2. National Heritage places.
3. Wetlands of international importance.
4. Commonwealth listed threatened species and ecological communities.
5. Commonwealth listed Migratory species.
6. Commonwealth marine or land areas.
7. The Great Barrier Reef Marine Park.
8. Nuclear actions (including uranium mining).
9. A water resource, in relation to coal seam gas development and large coal mining development.

None of the components of the Project would be located within a World Heritage site, a National Heritage place, a wetland of international importance, a Commonwealth Marine or land area, are located in The Great Barrier Reef Marine Park or involve any nuclear actions or impact on water resources.

Section 5.4 of this document considers potential impacts on habitat for threatened species and ecological communities listed under the EPBC Act. The Project is unlikely to significantly impact any MNES.

As the Project is unlikely to have a significant impact on controlled matters or MNES, a referral under the EPBC Act is not required.

4.9 Consultation

This Project is proposed to be assessed as a Class 4 Proposal under the *Code of Practice for Authorised Network Operators* (DPIE 2015) (referred to here as *the Code*). The Code is further discussed in Section 4.1.

As the Project in part lies within multiple land uses and tenures, consultation will be undertaken with the affected residence, EMAI, TfNSW, Camden Council and the Wollondilly Shire Council.

The Code

The Code requires that EE must publish on its website, and in a newspaper which circulates in the region of the location of the proposed works, the proposed activity and its impacts and invite members of the public to make submissions on the Project. This draft REF will be published on the EE website and community feedback will be sought.

Relevant Legislation/Policy	Consultation Requirement	Project-Specific Consultation Actions
Electricity Supply Act 1995 – Section 45(4)	Local councils must be given at least 40 days to make submissions.	Camden and Wollondilly Shire Councils should be notified of the Project.
State Environmental Planning Policy (Transport and Infrastructure) 2021 – Clause 2.10	Consultation with Council is required if the development impacts stormwater management, local roads, council-owned utilities, or public spaces.	A written notice with a scope of works should be provided to Camden and Wollondilly Shire Councils regarding potential impacts on local roads and stormwater management. Any responses received within 21 days will be considered. The Project does not involve significant sewerage, water supply, or public place disruptions.
State Environmental Planning Policy (Transport and Infrastructure) 2021 – Clause 2.11	Consultation is required if the works affect a local heritage item or heritage conservation area.	The Project passes within a State Heritage-listed item. Consultation with Heritage NSW will be initiated, and a SoHI has been prepared.
State Environmental Planning Policy (Transport and Infrastructure) 2021 – Clause 2.15 & Roads Act 1993	Consultation with public authorities other than Council is required in certain circumstances.	Consultation should be undertaken with TfNSW regarding potential impacts on road networks. Traffic management plans will be prepared where required.
State Environmental Planning Policy (Transport and Infrastructure) 2021 – Clause 2.45	Notification must be given to Councils and adjacent land occupiers if an electricity substation is being developed.	The Project does not involve the development of a new electricity substation; however, it includes a connection to an existing substation. Adjoining land occupiers will be notified in accordance with the SEPP.

Heritage Act 1977 & Environmental Planning & Assessment Act 1979	Consultation is required if works are near a State Heritage-listed site.	The Project passes within a State Heritage-listed item. Consultation with Heritage NSW will be initiated, and a SoHI has been prepared.
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5. Existing environment, potential impacts, and environmental safeguards

This section discusses the potential impacts of the Project on the environment, as well as discussing safeguards that may help reduce or eliminate these potential impacts. A constraints figure (Figure 11Error! Reference source not found.) has been provided for this Project which shows the main constraints within the Study Area and surrounds. A summary of all the safeguards discussed in the section is provided in Annex 8.

5.1 Land use

5.1.1 Existing environment

The Study Area is primarily located within RU1 – Primary Production zoned land under the WLEP, situated within the southern portion of the Study Area (Figure 3). This section is identified as Elizabeth Macarthur Agricultural Institute, Camden South. This institute is a world renowned, premier biosecurity facility which seeks to enhance food and fibre production and help protect the environment.

The Study Area also passes through C2 – Environmental Conservation and SP2 – Infrastructure zoned land under the CLEP in the northern extent of the Study Area (Figure 3). The Nepean Transmission Substation is located at the most northern point of the Study Area, with C2 – Environmental Conservation land situated south of this (Figure 3). The Nepean River divides C2 – Environmental Conservation to the north and RU1 – Primary Production land to the south (Figure 3).

A portion of the Project occurs within previously cleared areas such as agricultural land, however there are two (2) vegetation community types present along the transmission zone, which are further discussed in the Flora and Fauna Assessment (Annex 3).

5.1.2 Potential impacts

5.1.2.1 Construction

The Project predominately lies within areas previously disturbed and will avoid disturbance of native vegetation wherever possible. The scale of this Project would be commensurate with a small to moderate scale construction project; temporary and short-term. Land use within the alignment would not be significantly altered by the construction of the Project.

5.1.2.2 Operation

The Project is not expected to cause any significant changes or impact to any land uses within the general area.

5.1.3 Environmental safeguards

The following safeguards would be implemented to minimise land use impacts:

- All impacted sensitive receivers and landowners within or adjacent to the works will be notified in writing 7 to 14 days prior to the commencement of construction works. Notification will include:
 - Proposed commencement date
 - Brief of scope of works
 - Anticipated duration of the works
 - 24-hour contact details of the Project Manager or other appropriate contact person in the event of any complaints
 - Details on proposed blocking or impairing access to driveways and/or residences/businesses (if any)

Evidence of this notification should be stored in the Project file. This notification will be required in addition to any notification carried out during the preparation of this REF.

- On completion of the work disturbed areas shall be stabilised and returned to as close to original condition or as otherwise agreed with the landowner.

5.2 Geology and soils

5.2.1 Existing environment

The Study Area lies on alluvial floodplain deposits and foothills of the Illawarra Escarpment. The surface geology that occurs within the footprint of the Project includes alluvial floodplain deposits and the Pheasants Nest Formation (interbedded lithic sandstone, coal, claystone, siltstone) (Figure 4). The main soil groups are Theresa Park soil (tp) and Blacktown soil (bt) (Figure 5).

Theresa Park soil (tp) is characterised by localised flooding, seasonal waterlogging and very high soil erosion, located on undulating slopes mostly <5%. It is associated with almost completely cleared, low open woodland.

Blacktown soil (bt) is shallow to moderately deep (<150 cm) and is located on local relief to 30 m. It is associated with almost completely cleared eucalypt woodland, open-forest and tall open-forest.

5.2.2 Potential impacts

5.2.2.1 Construction

During construction, the Project has the potential to impact the soils and/or water quality of the area in the following ways:

- Ground disturbance and specifically excavation has the potential to lead to local erosion and downstream water quality impacts.
- Compaction of soils due to vehicular movement.
- Contamination of soils or waterways from hydrocarbon spills.
- Entrainment of sediments from spoil stockpiles and placement of crushed rock or gravel only where required for the new access tracks.

Erosion generated from the movement of vehicles along existing access tracks and exposed surfaces is not expected to be significant given the low volume of vehicles required to service the Project. Providing the mitigation measures below are implemented, the risk of erosion and sedimentation can be effectively managed.

Soil contamination has the potential to occur during construction works due to any accidental spills or leaks of fuels, oils and other chemicals from plant, equipment and vehicles during construction works. Any unplanned release is expected to be minor and can be effectively managed through the implementation of the mitigation measures in Section 5.2.3.

The Study Area is predominately located on flat or low-grade sloping land which will reduce the erosion potential of rain events during construction.

5.2.2.2 Operation

The Project is not expected to contribute to any additional impacts on geology and soils during operation.

5.2.3 Environmental safeguards

The following safeguards will be employed to protect and minimise geology and soil impacts to waterbodies:

- An Erosion and Sediment Control Plan (ESCP) shall be prepared as part of the CEMP. All erosion and sediment control measures shall be designed, implemented and maintained in general accordance with *Managing Urban Stormwater: Soil and Construction Volume 1* (Landcom 2004) ('the Blue Book') (particularly Section 2.2). The ESCP shall include stockpiles, stormwater run-off, trees, site boundaries, site access and storage areas. Exposed surfaces shall be kept to a minimum to limit the potential for erosion and dust generation.
- Inspections of the erosion and sediment controls will be on a periodic basis and at opportunistic times such as following rainfall events that cause run-off. The inspection program will record the following:
 - Condition of rehabilitation areas (including records of any slumping)
 - Condition of sediment and erosion control structures
 - Whether sediment or other pollutants are leaving the site or have the potential to do so
 - Maintenance requirements Location(s) where sediment is disposed.
 - Pre-rainfall inspection to ensure that the controls are in place and working.
- Vegetation disturbance is to be minimised. Activities will be preferentially undertaken in cleared or weedy areas or in areas that have been subject to previous disturbance or are themselves existing access tracks.
- Soil compaction will be minimised by utilising existing access tracks where possible and minimising vehicle movements along access tracks to only that required.
- Sites which are subject to levelling will be re-contoured to match the surrounding topography post development.
- All chemicals or other hazardous substances shall be stored in bunded and weatherproof facilities away from drainage lines. The capacity of the bunded area shall be at least 110% of the largest chemical volume contained within the bunded area.
- A spill kit will be located at each site to manage hydrocarbon spills (if there are any) and be used in the event of a spill.
- Any imported fill shall be certified at source location as pathogen and weed free Excavated Natural Material (ENM) or Virgin Excavated Natural Material (VENM) in accordance with the POEO Act and the *Protection of the Environment (Waste) Regulation 2014* (POEO Waste Regulation).
- Any material or soil suspected of showing evidence of contamination shall be sampled and analysed by a NATA Registered laboratory and managed in accordance with the *Waste Classification Guidelines* (EPA 2014), the Guidelines on the *Duty to Report Contamination* (EPA 2015) and the *Contaminated Land Management Act 1997*.
- Spoil management and dewatering of worksites will be managed in accordance with the following EE Standards and the Environmental Guidelines Handbook:
 - EMS 0007 – Waste Management
 - EMS 0008 - Environmental Incidents Response and Management
 - EMS 0013 - Spoil Management
 - EMS 0014 – Dewatering worksites.
- Existing roads, access tracks and rail corridor are to be used for vehicles and equipment to gain access to the sites.
- No new access tracks have been included within this REF however any maintenance of existing access tracks would be constructed with erosion and sediment controls.

5.3 Hydrology and water quality

5.3.1 Existing environment

The Nepean River is a 7th order major perennial river that flows between PPS-2 and PPS-3 beneath the overhead transmission line (Figure 2 and Figure 6). Foot Onslow Creek is a 3rd order perennial watercourse that intersects the Study Area at PPS-31 and PPS-32. At the time of surveys (23 April 2024), water within

water Foot Onslow Creek was turbid with low-moderate flow and shallow-moderate depth. The northern bank was steep and highly eroded at PPS-31.

A natural drainage channel occurs at PPS-24, however, it was dry at the time of surveys and did not contain any emergent vegetation. A man-made dam is located partially within the Study Area at PPS-10a and two larger man-made waterbodies are located near the Study Area at PPS-15, PPS-19 and PPS-20. These waterbodies are likely to increase in extent during periods of heavy rain.

The Nepean River is mapped as a high potential aquatic Groundwater Dependent Ecosystem (GDE), with adjacent native vegetation at the northern extent of the Study Area mapped as high potential terrestrial GDEs (Bureau of Meteorology 2024).

5.3.2 Potential impacts

5.3.2.1 Construction

This risk of impacts on the water quality of surrounding watercourses is increased where ground disturbance work is carried out in close proximity (particularly within 40 m) of watercourses and during periods of high rainfall where exposed areas are more susceptible to sediment runoff.

Replacement of poles, PPS-31 and PPS-32, within 40 m of Foot Onslow Creek, and the use of the access tracks by site vehicles and equipment could lead to increased erosion and sedimentation, if uncontrolled. This has the potential to increase turbidity and result in a decline in water quality.

Water quality impacts also have the potential to occur during construction if fuel or chemical spills from construction vehicles enter waterways. If not managed appropriately, the introduction of pollutants could result in the following potential impacts to the quality of the watercourses:

- Changes to pH, electrical conductivity, dissolved oxygen and temperature.
- Reduced light penetration due to increased turbidity.
- Increased sediment load, organic matter and turbidity of water.
- Increase in gross pollutants.
- Introduction of toxic pollutants such as construction fuels, oils and grease and chemicals.

Potential chemical or oil leaks and accidental spills associated with construction machinery could also result in localised contamination of soils. However, with the implementation of the mitigation measures in Section 5.3.3, the risk of contaminating nearby watercourses would be adequately managed.

There is potential that groundwater may be encountered during augering for the replacement pole locations and where there is underground works proposed. Should groundwater be encountered during the Project, is unlikely for any aquifer interference activities to take more than 3 megalitres (ML) of groundwater per year and therefore the Project would not require a Water Access Licence.

No drainage lines or waterbodies would be directly impacted by the Project. Mitigation measures will be implemented where impacts to the aquatic environment are likely to occur.

The Project would not significantly alter the shape and contour of the land within the Study Area. As such, the flood regime of the Study Area is not expected to be affected.

5.3.2.2 Operation

No ongoing adverse impacts to water quality and hydrology are anticipated once proposed activity works have been completed.

5.3.3 Environmental safeguards

The following safeguards would be implemented to minimise hydrology and water quality impacts:

- Spoil shall be stockpiled in a manner so as to avoid the possibility of sediments entering watercourses or migrating off-site.
- Any bulk fuel or hazardous material transport vehicles shall be parked on level ground a minimum of 40 m away from watercourses (including drainage lines).
- Any groundwater encountered would be dewatered, collected and disposed of appropriately. If minor dewatering is required, the management of discharge water shall be documented in the CEMP and be in accordance with EE Procedure EMS0014. Discharge water should be limited to vegetated, grassed areas, away from waterways, and within the feeder line overhead alignment. If the discharge water is highly turbid, dewatering through a filter sock (or similar) shall be considered, where appropriate, to minimise sedimentation.

5.4 Flora and fauna

A detailed Flora and Fauna Assessment was prepared by Niche (2024a) to identify and assess the likely impacts to flora and fauna arising from the Project. Preparation of the Flora and Fauna Assessment involved desktop research and field surveys, which were undertaken on 23 April and 3 May 2024. A summary of the Flora and Fauna Assessment is provided below and within the full report included in Annex 3.

5.4.1 Vegetation and Threatened Ecological Communities

The majority of vegetation within the Study Area is highly modified and consisted mainly of cleared land used for exotic pasture and cropping. Previous mapping (DCCEEW 2022) identified patches of native vegetation adjacent to the Study Area (Figure 7).

The presence of the following Plant Community Types (PCTs) were confirmed within the Study Area (Figure 12Error! Reference source not found.):

- PCT 3319 *Cumberland Shale Hills Woodland* (approximately 0.1 ha); and
- PCT 3320 *Cumberland Shale Plains Woodland* (intact woodland (approximately 0.2 ha) and DNG (approximately 0.3 ha).

PCTs 3319 and 3320 are associated with the Critically Endangered Ecological Community (CEEC) *Cumberland Plain Woodland in the Sydney Basin Bioregion* (hereafter referred to as Cumberland Plain Woodland), listed under the BC Act. However, to be considered a **Threatened Ecological Community (TEC) under the EPBC Act**, the vegetation must meet specific condition thresholds. Based on field observations, the vegetation within the Study Area; generally had heavy exotic weed encroachment, was previously cleared, had low native diversity and low to no native canopy cover, the vegetation within the Study Area does not meet the condition criteria to be classified as a TEC.

Disturbance native vegetation would be limited to trimming branches of a select number of canopy trees and slashing of predominantly exotic groundcover vegetation. Ground disturbance for the removal and installation of poles will be required and will include disturbance of groundcover surrounding poles. Eucalypt saplings and Derived Native Grassland (DNG) Threatened Ecological Community (TEC) are at risk of being trampled or driven over, however, impacts are expected to be minimal and temporary with appropriate mitigation measures.

The majority of vegetation within the Study Area is highly modified and consisted mainly of cleared land used for exotic pasture and cropping (Plate 1 and Plate 2). Weed species were prevalent and included Patterson's Curse (*Echium plantagineum*), African Lovegrass (*Eragrostis curvula*), Cobbler's Peg (*Bidens*

Pilosa) and Blackberry (*Rubus fruticosus subspecies aggregate*). The base of existing poles were all generally surrounded by exotic species. Exotic shrub species found within the Study Area consisted mainly of African Boxthorn (*Lycium ferocissimum*) and Sweet Briar (*Rosa rubiginosa*). Exotic canopy species within the Study Area were mostly found near riparian areas and included Broad-leaf Privet (*Ligustrum lucidum*), Pepper Tree (*Schinus molle*) and Common Olive (*Olea Africana*).

A significant impact to the CEEC Cumberland Plain Woodland is not likely to occur as a result of the Project.

5.4.2 Threatened species

No threatened flora or fauna species were recorded within the Study Area during surveys. Two threatened flora species and one fauna species were previously recorded near the Study Area (Figure 8 and Figure 9) and were assessed as having a moderate or high likelihood of occurrence with potential for impact from the Project. These species were the Spiked Rice-flower (*Pimelea spicata*) (listed as Endangered under the BC and EPBC Act), Sydney Plains Greenhood (*Pterostylis saxicola*) (listed as Endangered under the BC and EPBC Act), and the Cumberland Plain Land Snail (*Meridolum corneovirens*) (listed as Endangered under the BC Act).

Assessment of significance under the BC and the EPBC Acts determined that impacts to threatened flora species are unlikely as the Study Area has been previously disturbed. Impacts can be further avoided by undertaking pre-clearance surveys immediately prior to commencing works.

Assessment of significance under the BC and the EPBC Acts determined that the Cumberland Plain Land Snail is unlikely to be significantly impacted by the Project as suitable habitat features for the species (dense leaf litter and detritus) will not be removed and protective fencing would be installed around potential habitat.

Koala habitat is not likely to be impacted by the Project as clearing of native mature trees is not proposed. Where further clearing is necessary, additional survey and assessment would be required to determine any potential impacts to Koala habitat.

5.4.3 Potential impacts

5.4.3.1 Construction

The Project has the potential to impact vegetation and threatened fauna in the following ways:

- Modification of native/exotic vegetation via trimming select branches of some native canopy trees, slashing predominantly exotic groundcover vegetation and trampling/driving over native eucalypt saplings and DNG TEC, ground disturbance from pole installation/removal.
- Modification of threatened species habitat
- Sedimentation and erosion.
- Causing hydrological changes.
- Weed invasion.
- Spread of pests and pathogens.

Potential impacts on biodiversity are expected to be minor. There is not expected to be any significant impacts on biodiversity resulting from the construction phase of the Project. These impacts will be mitigated through the safeguards in Section 5.4.4.

5.4.3.2 Operation

No ongoing adverse impacts to biodiversity are anticipated once the Project construction is completed.

The Flora and Fauna Assessment concluded that the Project would not have significant impacts on biodiversity.

5.4.4 Environmental safeguards

The following recommendations are to be implemented to minimise disturbance to flora and fauna:

- Vegetation removal will be limited to minor pruning of selected branches and slashing groundcover species (which are predominantly exotic). No ground refugia or other habitat features will be removed.
- It is recommended that the Project avoids trampling of regenerating eucalypt species within the Study Area (as they are likely part of Cumberland Plain Woodland). Eucalypt saplings within the Study Area would be flagged and avoided, and slashing works would be undertaken manually using hand-held tools rather than large machinery.
- Pre-clearance surveys will be undertaken by a qualified ecologist to any identify threatened biodiversity which may require protection during the proposed construction works.
- Exclusion fencing will be installed around intact woodland with no-go zones established around potential Cumberland Plain Land Snail habitat (i.e. logs, leaf litter, bases of trees). Temporary protective fencing should be installed prior to works around no-go areas and are to remain in place until all works are completed.
- Avoid driving through areas of DNG where practical, the shortest/ best route should be taken with the minimum number of vehicles when the ground is dry to minimise impacts to the DNG TEC.
- Should any threatened species be discovered on site prior to or during construction, works will cease immediately, and the Project ecologist is to be notified. Works will not proceed until further advice is provided by the Project ecologist.
- Sediment and erosion controls (e.g. silt fencing) will be implemented during construction works to ensure no indirect impacts to surrounding biodiversity.
- To prevent the spread of weed seed and pathogens, all machinery should be clean of external weed material and on-site plant will be washed prior to moving to a new location. Existing weeds should be left undisturbed wherever possible to avoid spread.
- Soil disturbance for pole replacement/removal/installation should be minimised and soil that is disturbed should be replaced according to the natural profile of the soil (i.e. topsoil reinstated) to expedite rehabilitation.

5.5 Noise and vibration

The likelihood of noise impact from the Project was reviewed against risk factors outlined in the EPA's 2020 Draft Construction Noise Guideline. The review indicated that the construction noise impact would be low, with few sensitive receivers in proximity to the Project.

5.5.1 Existing environment

The surrounding environments consist of predominantly rural, open areas with some remnant vegetation remaining along the majority of the Study Area. The noise emissions surrounding the Study Area consists of noise from the Nepean Transmission Substation, localised traffic, and general residential noise. The majority of the Study Area has are minimal levels of background noise. The nearest sensitive residential receivers are located approximately 120 m west of the Study Area in the northern extent. These residential receivers would be exposed to existing noise associated with the substation and traffic along Springs Road.

The Project occurs within the EMAI property which is an intensive agricultural operation. EE will notify the EMAI of any activity in proximity to the livestock sheds where the livestock are housed and in proximity to where pasturing is actively occurring.

Noise impacts are anticipated to be minor and temporary.

5.5.2 Potential impacts

The primary sources of construction noise and vibration will be the operation of standard construction machinery, including a Franna crane, slew crane, crane borer, excavator, and tipper truck. These plant items are consistent with typical small-scale construction activities and are expected to operate within standard construction hours, minimizing impacts to the limited number of sensitive receivers in the vicinity.

Activities associated with the Project are likely to lead to increased noise levels for residents as the work sites are located within close proximity to residential dwellings. Construction hours will be limited to the standard construction hours outlined in Section 2.5.

Vibrational outputs are to be managed in accordance with *Assessing Vibration: a technical guideline* (Department of Environment and Conservation [DEC] 2006). Vibrational sources are likely to be during the construction phase of the Project and from borers. This machinery will be typical plant items consistent with Section 2.1. The activities producing vibrational output can be described as continuous, impulsive and intermittent vibration (DEC 2006).

Noise and vibrational emissions during construction would be commensurate with a typical small to moderate scale construction project. The impacts are assessed as relatively minor and temporary (short term).

5.5.3 Environmental safeguards

The following safeguards will be employed to reduce noise and vibration:

- Construction hours must be limited to standard construction working hours (Monday to Friday: 7 am to 6 pm, Saturday: 8 am to 1 pm, No work on Sundays or public holidays), unless otherwise approved. Any out-of-hours-works must be conducted in accordance with the requirements of EE's Environmental Guidelines Handbook.
- All vehicles and other equipment will be switched off when not in use. Vehicles must adhere to speed limits.
- Limit concurrent use of machinery where possible.
- Minimising noisy activities in proximity to the residential premises where feasible.
- Where maximum vibration values in DEC (2006) cannot be met after all feasible and reasonable measures have been applied, any unacceptable impacts may be dealt with between the operator and the affected community. Negotiation should be made available to those people whose amenity is potentially affected by non-achievement of the relevant vibration criteria.
- Where minimum distances outlined in BS 7385 (1993) cannot be maintained, a dilapidation assessment will be required to manage the risk of cosmetic damages within the Study Area.

5.6 Air quality

5.6.1 Existing environment

The surrounding environments consist of predominantly open areas with some remnant vegetation remaining, along the majority of the Study Area. The surrounding area to the north consists of residential and industrial land use areas. The air quality is expected to be typical of the Sydney airshed.

The Project occurs within the EMAI property which is an intensive agricultural operation. EE will notify the EMAI of any activity in proximity to the livestock sheds where the livestock are housed and in proximity to where pasturing is actively occurring.

5.6.2 Potential impacts

5.6.2.1 Construction

Activities associated with the Project have the potential to impact air quality in the following ways:

- Increased vehicular movements and construction activities (Section 2.3) leading to the generation of dust.
- Increased machinery/vehicular exhaust and fuel combustion related particulate and greenhouse gas emissions.

Air emissions during construction would be commensurate with a typical small to moderate construction project. The impacts are assessed as relatively minor and short term.

5.6.2.2 Operation

Negligible air emissions are expected from the construction and operation and therefore air quality impacts during operation would be negligible.

5.6.3 Environmental safeguards

The following safeguards will be employed to protect air quality and reduce noise:

- Minimise soil disturbance. Water carts to be used if necessary.
- Weather conditions to be monitored. Works are not to take place in extreme wind conditions (> 40 km/h).
- All vehicles, plant and equipment are modern, well maintained and fit for purpose. Emissions from these items will be regulated by their standard exhaust systems.
- All vehicles and other equipment will be switched off when not in use. Vehicles must adhere to speed limits.
- Limit concurrent use of machinery where possible.
- An ESCP shall be prepared as part of the CEMP. All erosion and sediment control measures shall be designed, implemented and maintained in accordance with Managing Urban Stormwater: Soil and Construction Volume 1 (Landcom 2004) ('the Blue Book') (particularly Section 2.1). The ESCP shall include stockpiles, stormwater run-off, trees, site boundaries, site access and storage areas. Exposed surfaces shall be kept to a minimum to limit the potential for dust generation.

5.7 Traffic and accessibility

5.7.1 Existing environment

For most of the poles that require replacing, removing or establishing, the access to them is away from major public roads on open agricultural paddocks. Two roads are transgressed in the southern portion of the Study Area, including Woodbridge Road and Menangle Road.

5.7.2 Potential impacts

5.7.2.1 Construction

During construction, vehicles would be used to transport personnel, materials, waste and equipment to and from the work locations within the Study Area via the existing roads and access tracks. The overhead transmission cables cross over public roads at two locations along Woodbridge Road and Menangle Road, which would temporarily impact vehicular traffic levels.

The Project may require sections of impacted roads to be closed for overhead cable replacement. A Traffic Management Plan would be prepared in accordance with the Roads Act 1993, and road occupancy permits would be obtained from TfNSW and Councils as required.

There will be no restrictions to emergency service accessibility as public transport companies and emergency services would be contacted directly, at least 14 days prior to any traffic alterations, to allow for sufficient time to alter routes if required.

The impacts of construction are assessed as relatively moderate/high but temporary. It is not anticipated that the increase in traffic due to the works would affect the safety and function of the surrounding road network.

5.7.2.2 Operation

After the completion of the proposed activity, traffic conditions would return back to the existing state.

5.7.3 Environmental safeguards

The following safeguards will be employed to minimise traffic impacts:

- Ensure that a Traffic Management Plan is prepared and followed.
- Traffic control is to be used to maintain continued traffic access where feasible.
- The temporary modification to traffic will be as minimal as possible.
- Any TfNSW permits and/or Council permits required for lane closures will be obtained prior to the commencements of the works and affected residents notified.
- Emergency services and public transport companies will be notified.
- Vehicles will not block access to residents' properties at any time.
- After significant rainfall of < 10 mm/24 hours, undertake inspection of the access tracks to determine if use of tracks at this time would potentially result in a detrimental effect, and if required allow for the road to sufficiently dry out.
- Traffic, transportation and access mitigation and management strategies shall be documented and implemented in accordance with the CEMP and updated as required. This shall include:
 - The management of the delivery of equipment and materials.
 - Access to and from the site including nominated roads and site access tracks.
 - Traffic management to be implemented for conductor and wire road crossings
 - Parking.
 - Speed limits.
 - Road occupancy licence conditions.

The Project will impact the traffic on public roads. However, these impacts are expected to be temporary.

5.8 Visual amenity

5.8.1 Existing environment

The Study Area does not offer very high visual amenity, mostly consisting of industrial, residential and semi-rural areas and includes an existing easement.

5.8.2 Potential impacts

5.8.2.1 Construction

Activities associated with the Project have the potential to impact visual amenity in the following way:

- Vegetation and soil disturbance associated with set up for new poles.
- Soil disturbance associated with localised excavations.

Construction works would move progressively along the feeder line (existing easement) and as such, visual impacts associated with the construction activities would be temporary and considered minor in nature.

Visual amenity associated with the construction is unlikely to impact the surrounding visual environment, due to previous disturbances in the location, and minimal residential dwellings within proximity.

With the implementation of the mitigation measures below, visual impacts during construction are anticipated to be minor and unlikely to be significant.

5.8.2.2 Operation

Endeavour Energy have modelled the change in heights of the proposed poles at two locations to provide a visual representation of the visual impact. See Image Plate 2 below. The increase in height and change in type of poles will cause a minor increase to the visibility of this power line, and its intrusion into the rural landscape.

The upgrade to this infrastructure item will not involve an intrusion of a new visual element to the rural landscape, as the existing power line already follows this route and predates the listing of each of the SHR items and conservation area. Overhead and non-residential powerlines are common within the local region, and this powerline feeds the local powerlines connected to some sites within the current Camden Park estate and EMAL properties. The feeder has reached its usable lifespan, requiring an upgrade to continue servicing the area including the heritage properties.

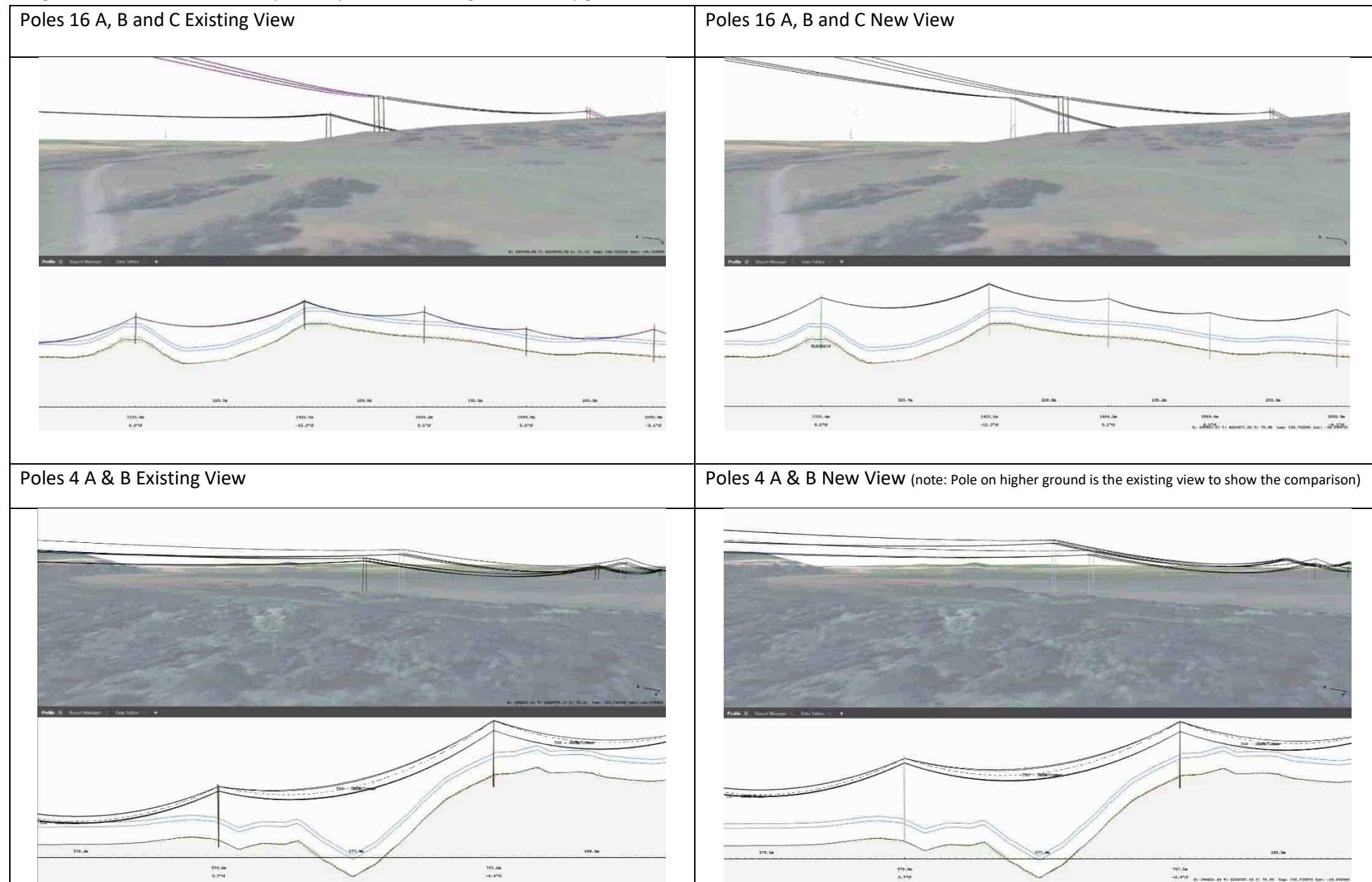
Pole types have been selected to use existing pole locations as much as possible and minimise the number of additional poles. Only one additional pole location and two pole relocations are proposed. Endeavour Energy has adjusted the design to mimic the existing structures as much as possible with different materials (steel replacing wood – see Image Plate 1 below). This is due to lack of availability of replacement wooden power poles, and limitations to the design of alternate smaller poles.

The proposed design will result in far less overall change when considered against the alternative of more frequent but smaller power poles, which would result in a greater degree of visual disturbance.

Image Plate 1:

Image of existing wooden power poles.	View of steel power poles proposed to be installed.
	

Image Plate 2: NEARA Visual Impact Nepean to Menangle Feeder Upgrade



5.8.3 Environmental safeguards

The following safeguards will be implemented to reduce or eliminate impacts to visual amenity:

- The canopy trees within the TEC will be avoided except for minor trimming at some locations.
- All actions should be in accordance with the best practice weed management guidelines (DPI 2021).
- All construction plant, equipment, waste and excess materials shall be contained within the designated boundaries of the work site and shall be removed from the site following the completion of construction.
- Disturbed areas would be left to rehabilitate to previous conditions if feasible.
- Materials used for the Project would be consistent with the existing materials where possible.

5.9 Aboriginal cultural heritage and archaeology

An Aboriginal Objects Due Diligence Assessment (AODDA) was prepared by Niche (2024b) to assess whether Aboriginal objects and/or Aboriginal places were present or were likely to occur within, or in close proximity to, the Study Area (Annex 4). April and 3 May 2024, which consisted of a walkover of the Study Area surveying for Aboriginal cultural heritage sites.

5.9.1 Existing environment

An extensive Aboriginal Heritage Information Management System (AHIMS) search was completed on 22 April 2024 (Service ID # 885942) centred over the Study Area. The AHIMS search identified 66 Aboriginal sites and no Aboriginal places (Figure 10). Details of the search and findings are provided in Annex 4.

5.9.2 Potential impacts and safeguards

For the most part, the pole replacements do not occur within areas that are identified as Aboriginal Cultural Heritage sensitivity. It was identified during the site assessment that Pole 31 occurs within an Aboriginal Cultural Heritage sensitive area (Figure 10). As discussed in the Niche (2024b) AODDA, an alternative location has been proposed to avoid potential impacts (referred to as Pole 31b).

The following recommendations have been developed as a result of this AODDA report:

1. *With respect to ACH, works can proceed with caution except at PPS 31.*

Apart from Power Pole Site 31, and associated AHIMS site #52-2-4675 boundaries, works can proceed with caution at the other PPS sites described in this report with respect to Aboriginal Cultural Heritage.

2. *Action needed regarding potential impacts to AHIMS site #52-2-4675 at PPS 31 before works at this location can commence.*

Unless ground disturbance can be avoided with regard to AHIMS site #52-2-4675, works at PPS 31 cannot proceed until further investigation in the form of an ACHA which informs an AHIP is completed. An AHIP providing permission must be in place before any works which will cause ground disturbance are undertaken at this location, or within this AHIMS site boundary.

3. *Record keeping*

The site location for #52-2-3247 (Camden Park 7-ST / CP-ST-07) should be updated in the AHIMS system with the ground-truthed location identified during the field survey.

4. *Record Keeping*

This due diligence assessment must be kept by Endeavour Energy so that it can be presented, if needed, as a defence from prosecution under Section 86(2) of the NPW Act.

5. Unexpected finds procedure, Aboriginal object/s

If suspected Aboriginal objects are identified during construction the following procedures must be followed:

- Immediately cease all activity at the location.
- Ensure no further harm occurs and secure the area.
- Notify Environment Protection Authority's Enviro Line on 131 555 and a suitably qualified archaeologist.
- No further action to be undertaken until Heritage NSW provides written consent.

6. Unexpected finds procedure, Suspected Human Remains

In the unlikely event that suspected human remains are encountered during works, all work in the area that may cause further impact must cease immediately and:

- The location, including a 20 m curtilage, should be secured using barrier fencing to avoid further harm.
- The NSW Police must be contacted immediately.
- No further action is to be undertaken until the NSW Police provide written notification.
- If the skeletal remains are identified as Aboriginal, Endeavour Energy or their agent must contact:
 - Heritage NSW's Enviroline on 131 555; and representatives of the RAPs.
- No works are to continue until Heritage NSW provides written notification to the proponent or their Agent.

PPS31 will be cut down to 1 m - avoiding ground disturbance within AHIMS site #52-2-4675. Access will be driving in with EWP and Franna for removal of top section of pole.

5.10 Historical heritage

A Statement of Heritage Impacts (SoHI) was prepared by Niche (2024c) to assess potential impacts on heritage values within the Study Area and suggest measures to mitigate or avoid harm to this value (Annex 5). April and 3 May 2024, which consisted of a walkover of the Study Area, noting any features of historical fabric, archaeological evidence, or significant landscape features.

5.10.1 Existing environment

The SoHI has identified that the Project occurs within an area that contains items listed under the State Heritage Register (

Table 4, Figure 10). The Study Area is located mostly within the boundary of the former Camden Park Estate, which extends from the Nepean River to the north to Woodbridge Road to the south.

Table 4: Historical heritage items within the Study Area

Item #	Item Name	Location	Level of Significance	Relationship to the Study Area
SHR #00341	Camden Park	Elizabeth Macarthur Avenue, Camden Park	State	Study Area partially transects
SHR #01697	Camden Park Estate and Belgenny Farm	Elizabeth Macarthur Avenue, Camden Park	State	Study Area partially transects
LEP #154	Camden Park Estate - Dairy No.8, Cottages and Orchard Sites	445 Remembrance Driveway, Camden Park (Lot 2, DP 1050479)	Local	Study Area partially transects
LEP #184	Dairy No.4 (EMAI Cottage 29)	60 Woodbridge Road, Menangle (Lot 2, DP 1133910)	Local	Study Area partially transects

Item #	Item Name	Location	Level of Significance	Relationship to the Study Area
LEP #I99	Menangle Gate Lodge (Former)	60 Woodbridge Road, Menangle (Lot 2, DP 1133910)	Local	Study Area partially transects
C6	Menangle Landscape Conservation Area	Menangle	Local	Study Area partially transects

5.10.2 Potential impacts and safeguards

The Project would have minor visual impacts to heritage items (listed above) within the Study Area.

It is recommended that prior to construction within the Study Area:

- A Section 60 Approval permit must be obtained for the proposed works in accordance with the Heritage Act 1977. Prior to works commencing, an application must be submitted to Heritage NSW with the SoHI (Annex 5) attached, and the conditions in the S.60 permit approval letter from Heritage NSW followed when received.
- Stop work in case of unexpected archaeological finds. The following procedure must be implemented as part of the normal work methods, and then followed in the event of the unexpected find of suspected archaeological material during the works:
 - Stop work in a 20 m area around the unexpected find and secure this area using barrier fencing (or similar) to avoid further harm.
 - Notify a suitably qualified archaeologist and engage them to assess the suspected material to determine the historical significance of the find.
 - If assessed to be not culturally significant or a relic, proceed with works with caution.
 - If assessed to be of cultural value or a relic, works must cease in this portion of the site (within 100 m of the find) and the NSW Heritage Council and Local Government Council must be contacted as per S.146 of the Heritage Act 1977. Any directions or responses from these organisations should be considered. Additional works of this type could include salvage excavation, testing, further monitoring, and archival recording.

5.11 Generation of waste and hazardous materials

5.11.1 Existing environment

A search of the Environmental Protection Authority (EPA) Contaminated Sites Register resulted in one site within the Wollondilly LGA (Blue Circle Southern Cement Ltd - Lot 2 Wilton Park Roald Maldon), however, this site is not located within 1 km of the Project (Annex 6).

5.11.2 Potential impacts

5.11.2.1 Construction

Activities associated with the Project are unlikely to generate hazardous materials. The Project has the potential to increase the generation of waste via the inappropriate discarding of packaging of consumables and other general site rubbish.

Anticipated waste streams generated during construction works would include:

- General construction waste such as off-cuts, packaging and excess construction material (such as wood, concrete, plastic and metal).
- Excess spoil. The excess spoil will be tested and classified and disposed of off-site at a licensed waste facility in accordance with its waste classification.

- Redundant cables, wooden pole structures, steel members, steel structures, conductors, earth wires and fittings.
- Waste oils, greases and lubricants from maintenance of construction plant and equipment.
- Domestic and putrescible waste (including food scraps, bottles, cans and paper).
- Invasive weed material.

All waste generated during construction would be reused or recycled if appropriate, or removed, transported and lawfully disposed from the site in accordance with the *Waste Classification Guidelines* (NSW EPA 2014), *Protection of the Environment Operations Act 1997* (POEO Act) and POEO (Waste) Regulation 2005.

5.11.2.2 Operation

Minimal waste is generated from the current operation of Feeder 7097. Maintenance activities may generate waste associated with any damaged components of the line that require replacement (e.g. earth wire, insulators and fittings). Routine vegetation maintenance also results in the generation of green waste, in addition to domestic waste generated during line inspections.

With the implementation of the mitigation measures described below, waste-related impacts are considered to be minor.

5.11.3 Environmental safeguards

The following safeguards will be employed to reduce or eliminate impacts due to waste or hazardous materials generation:

- Any sediment removed from the site that is potential acid sulphate soil is to be tested and treated to ensure compliance with waste classification guidelines for offsite disposal (EPA 2014).
- Re-fuelling will not be undertaken on waterfront land (not within 40 m of a watercourse).
- SDS sheet for Trichloroethylene (TCE) should be revised and considered as a potential hazard in the CEMP.
- A final inspection of the site will be undertaken at completion to remove any remaining waste.
- Waste mitigation and management strategies shall be documented in the Work Instructions.
- All waste, including surplus soils, which cannot be reused shall be classified in accordance with the Waste Classification Guidelines (EPA 2014), removed from the site and disposed of at a facility that can lawfully accept the waste in accordance with the POEO Act and POEO Waste Regulation.
- Concrete trucks shall be permitted to flick wet wipe their discharge chutes with the effluent discharged into prepared bored holes, prepared excavations/formwork or a watertight receptacle for recycling or disposal. No concrete washout or agitators is permitted.
- Wooden poles, including pole butts, shall be disposed of in accordance with OEH's Protocols for recycling redundant utility poles and bridge timbers in New South Wales (2011).
- Invasive weed material to be disposed of or treated appropriately as per Best Practice Management Guide for Environmental Weeds (Department of Primary Industries [DPI] 2008).

5.12 Cumulative impacts

Cumulative impacts are incremental environmental impacts caused by the combination of past, present and reasonably foreseeable future actions (or projects). Cumulative impacts accumulate over time, from one or more sources. Whilst impacts may be insignificant in isolation, significant impacts may occur when individual effects are considered in combination.

Wherever possible, the existing access tracks would be utilised to provide at least partial access, thereby minimising any cumulative vegetation trimming/slashing and associated impacts.

The assessment of cumulative impacts also focused on the proposed activity's interaction with other projects in the vicinity of the Project, and where construction and/or operational timeframes are likely to be concurrent.

A search of the NSW Department of Planning and Environment (DPE) Major Projects website was conducted on the 20th of March 2024. This concluded that there are no upcoming Projects within the vicinity that would result in cumulative impacts when combined with this Project.

5.12.1 Environmental Safeguards

The safeguards listed throughout this REF will be employed to reduce cumulative impacts and are consolidated in Annex 8.

6. Conclusion

The Project is required to support the increasing electricity demand within the Greater Macarthur Growth Area and surrounding supporting development.

Given the careful design of the Project and mitigation measures proposed, this Project has been identified as a Class 4 Proposal under the Code and is unlikely to have a significant impact on the environment. Preparation of an EIS is therefore not required.

The works are unlikely to result in a significant impact to TECs or threatened flora and fauna listed under the BC Act or EPBC Act. A number of recommendations have been provided to further avoid and mitigate the potential impact the Project may have on biodiversity.

As the determining authority, EE should prepare a Decision Statement and make a formal determination in relation to the Project.

All works should be undertaken in accordance with this REF, including the mitigation measures provided in Annex 8, any Decision Statement issued in relation to this REF, the associated CEMP and any other specific mitigation measures that are developed for this Project.

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Annex 1. Figures

Figure 1. Locality

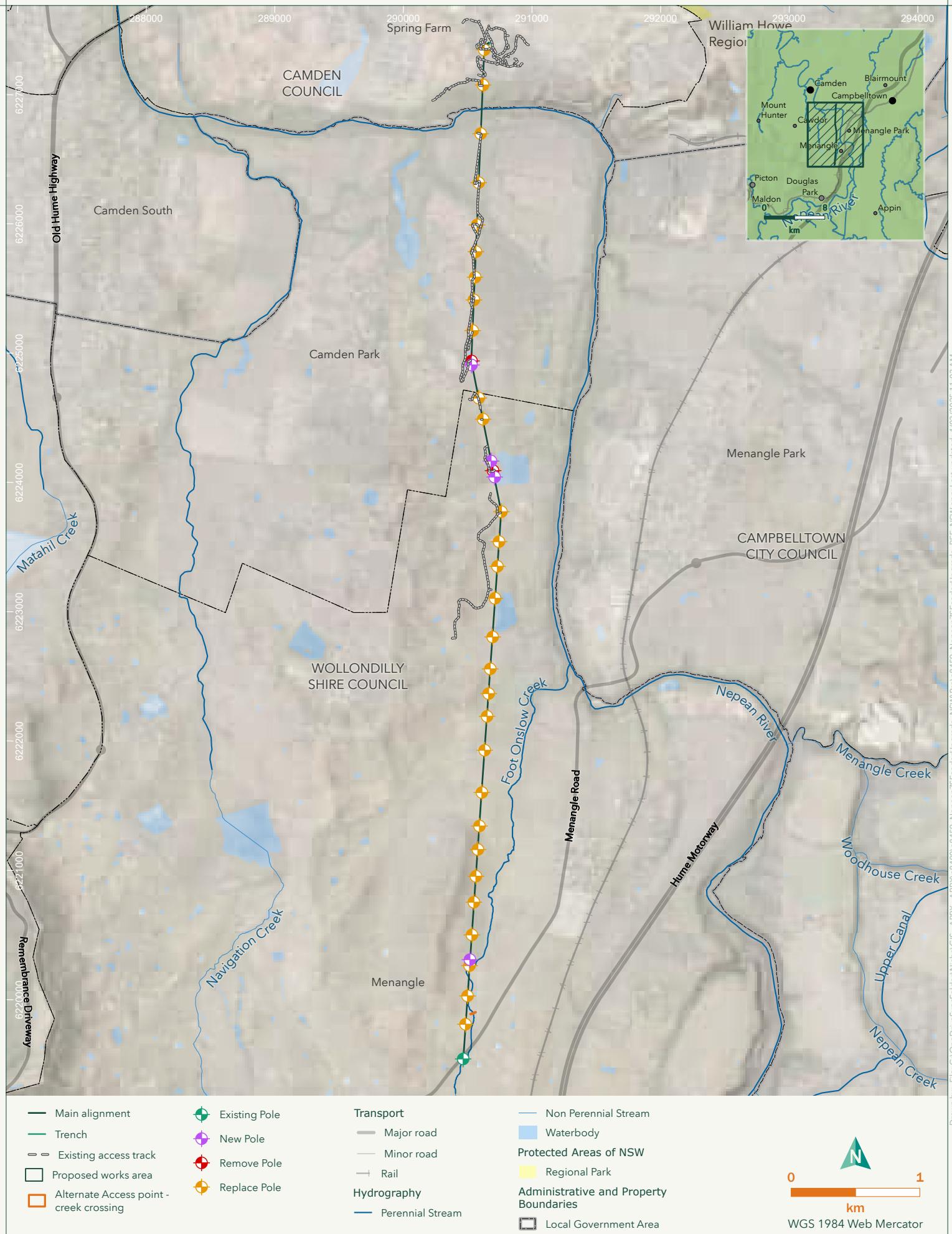


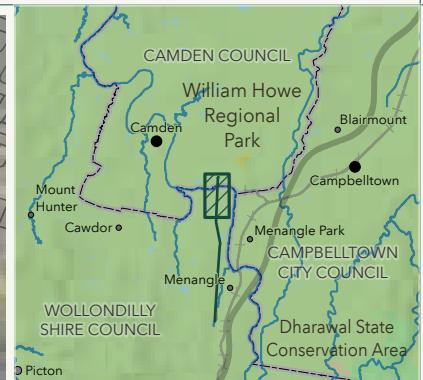
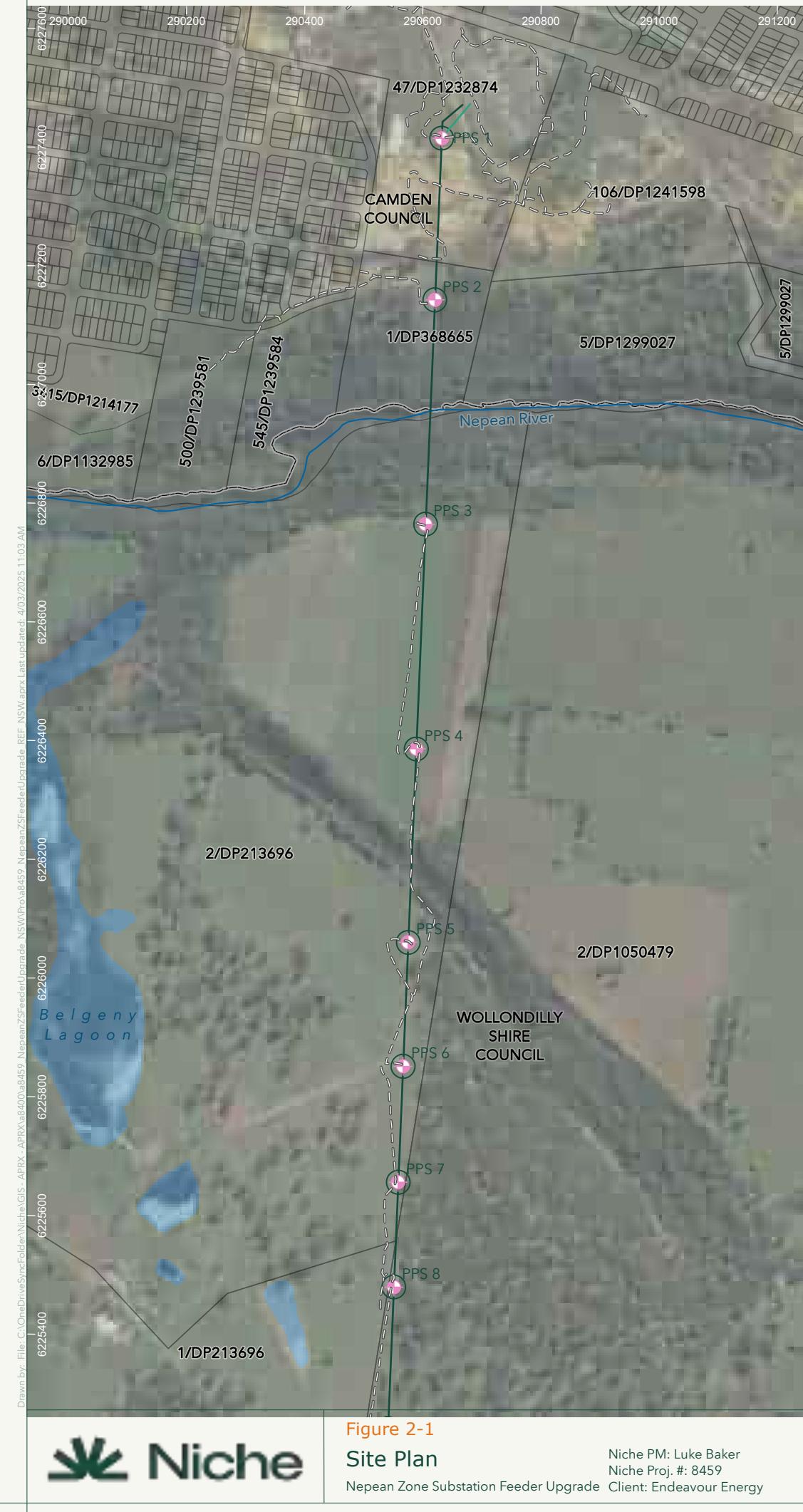
Figure 1

Locality Map

Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

Figure 2. Site Plan



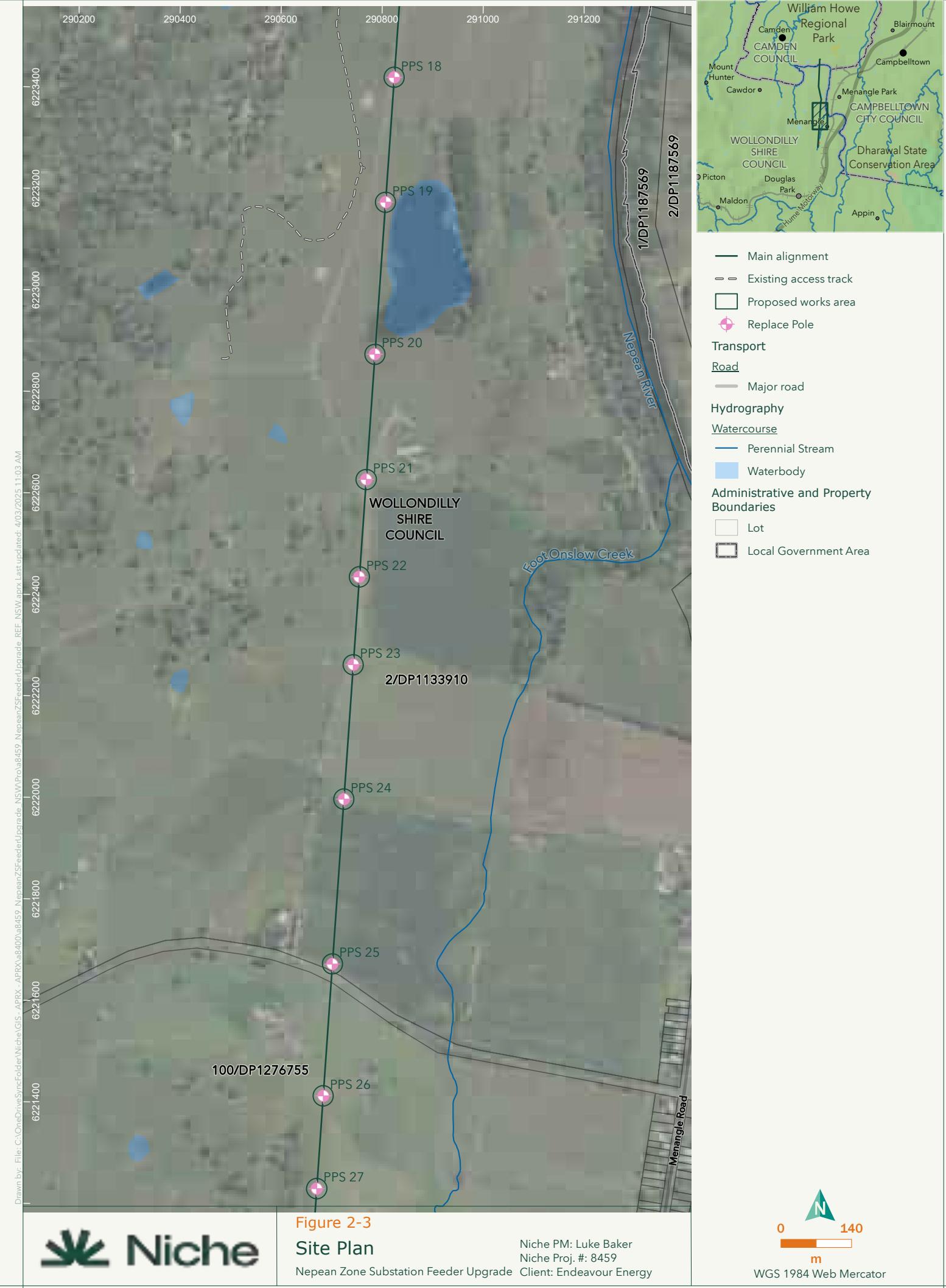


Figure 2-3

Site Plan

NICHE Proj. #. 8439

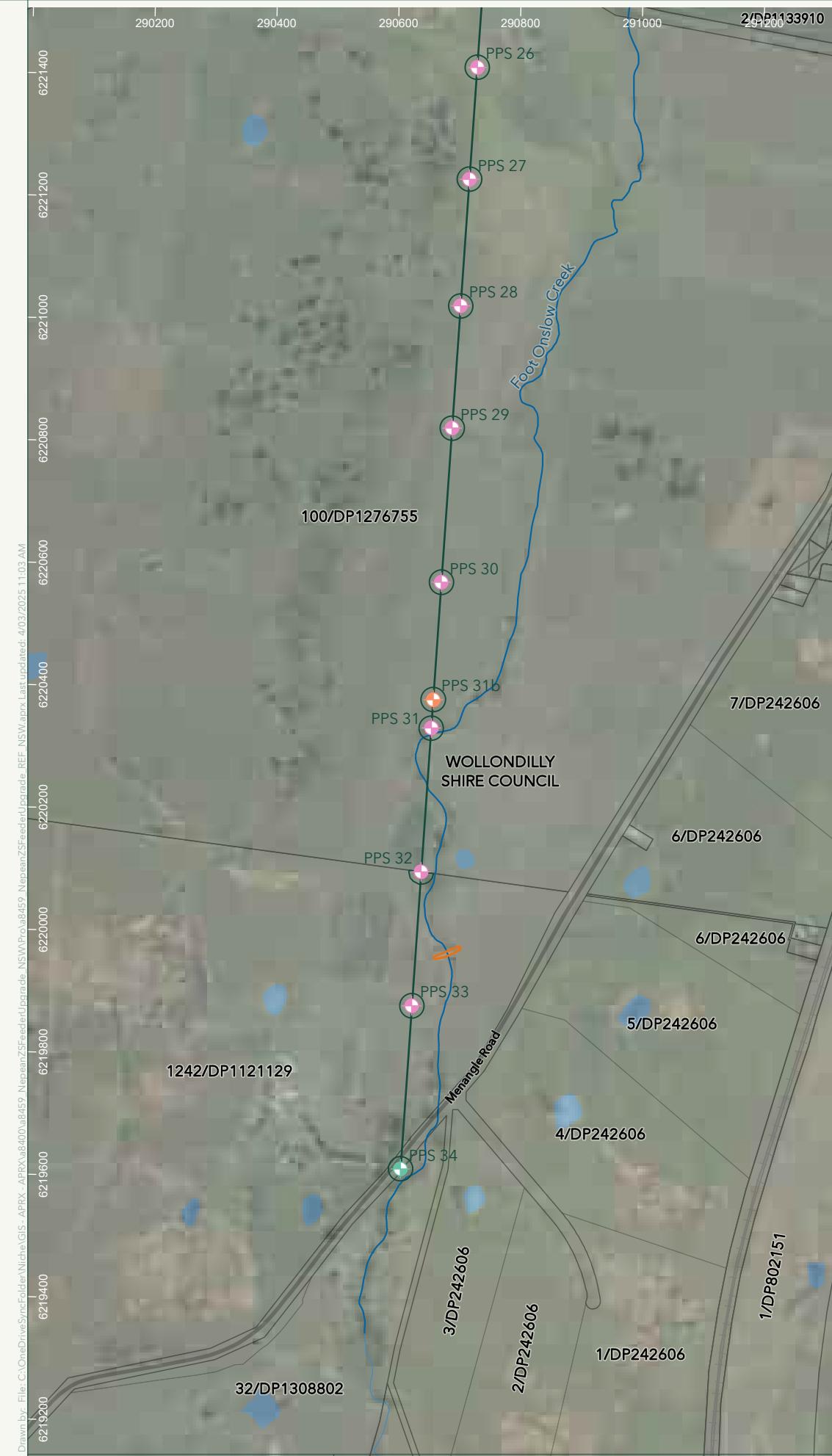
Niche PM: Luke Baker

Niche Proj. #: 8459

Client: Endeavour Energy

WGS 1984 Web Mercator

NWIS Office of Environment and Heritage's BioNet Atlas, which holds the data from a number of custodians. Data Obtained 13/12/2023. | World Hillshade: Esri, CGIAR/World Bank: Esri, Geoscience Australia, NASA, NGDC, USGS/World Ocean, Base: NWIS, GeosciencesAustralia, Esri, GEBCO, Garmin, NaturalVue/ public/NSW_Imagery: © Department of Customer Service 2020 | Watercourses, Waterbodies, Road and Rail alignments, Protected areas of NSW © Spatial Services 2021 | Nature uses GDA2020 as the standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are presented in GDA2020, using the relevant MGA zone.



Main alignment (dark green line)

Proposed works area (light green box)

Alternate Access point - creek crossing (orange box)

Existing Pole (green circle)

New Pole (orange circle)

Replace Pole (pink diamond)

Transport

Road

- Major road (dark grey line)
- Rail (light grey line)

Hydrography

Watercourse

- Perennial Stream (dark blue line)
- Non Perennial Stream (light blue line)
- Waterbody (light blue area)

Administrative and Property Boundaries

- Lot (white area)
- Local Government Area (black box)



Figure 3. Land use



— Main alignment	1.3.0 Other minimal use	5.1.0 Intensive horticulture	6.2.0 Reservoir/dam
— Trench	2.1.0 Grazing native vegetation	5.2.0 Intensive animal production	6.3.0 River
— Existing access track	3.2.0 Grazing modified pastures	5.3.0 Manufacturing and industrial	6.4.0 Channel/aqueduct
— Proposed works area	3.3.0 Cropping	5.4.0 Residential and farm infrastructure	6.5.0 Marsh/wetland
— Alternate Access point - creek crossing	3.4.0 Perennial horticulture	5.5.0 Services	
Existing Pole	3.6.0 Land in transition	5.6.0 Utilities	
New Pole	4.2.0 Grazing irrigated modified pastures	5.7.0 Transport and communication	
Remove Pole	4.3.0 Irrigated cropping	5.8.0 Mining	
Replace Pole	4.4.0 Irrigated perennial horticulture	5.9.0 Waste treatment and disposal	
NSW Landuse 2017 v1.2	4.5.0 Irrigated seasonal horticulture	6.1.0 Lake	
1.1.0 Nature conservation			
1.2.0 Managed resource protection			



Figure 3
Land Tenure and Leases
 Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
 Niche Proj. #: 8459
 Client: Endeavour Energy

Figure 4. Geology

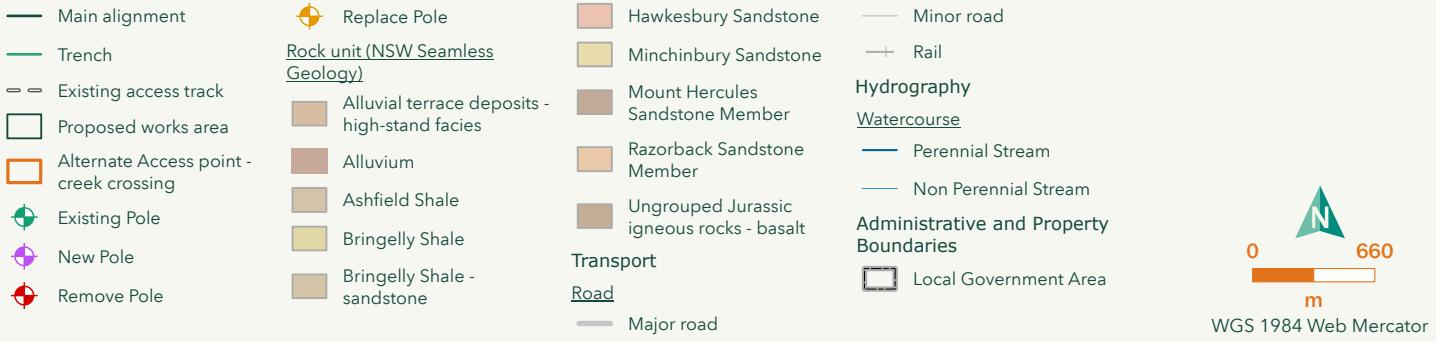
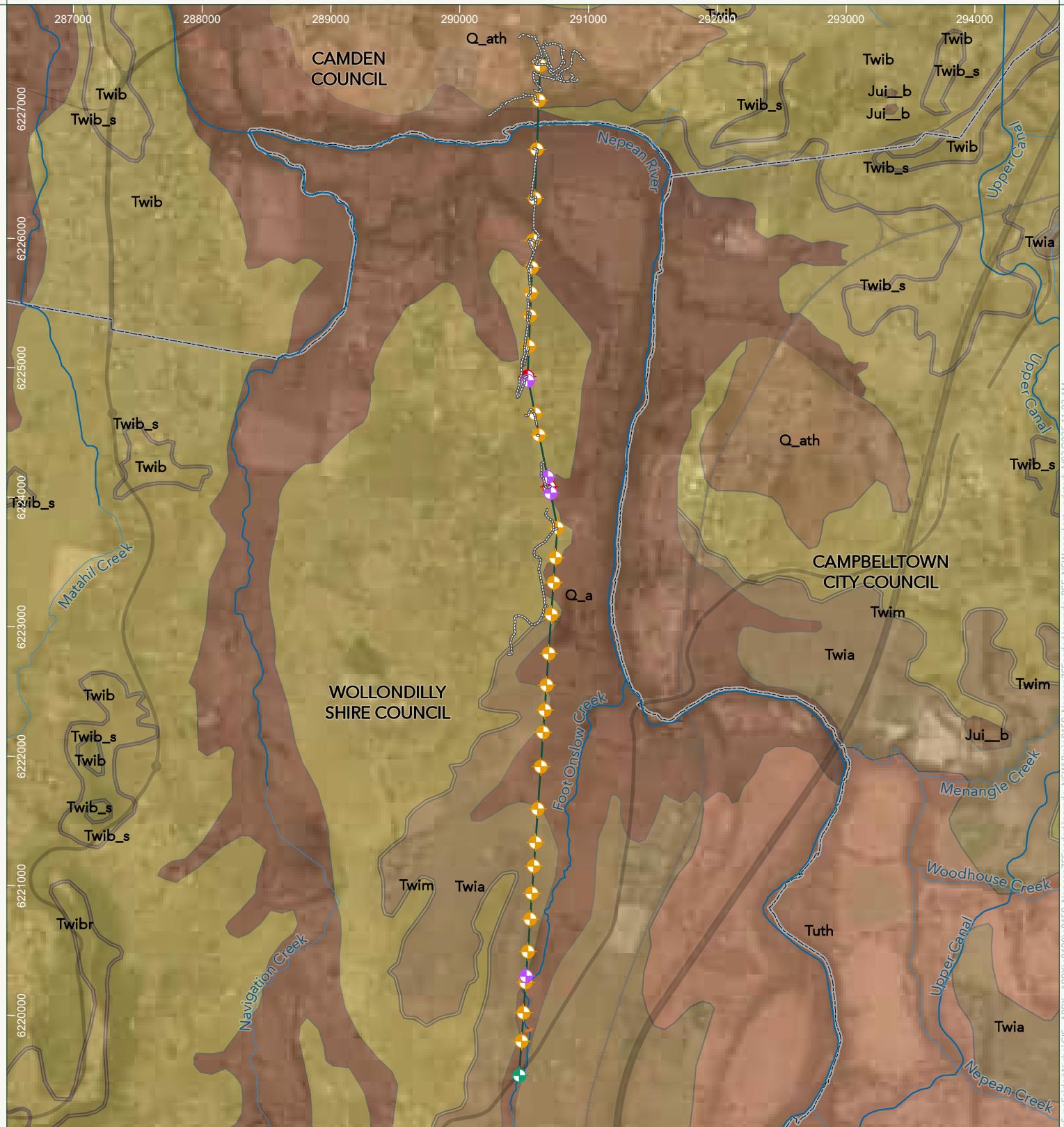


Figure 4

Surface Geology

Nepean Zone Substation Feeder Upgrade

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Client: Endeavour Energy

Figure 5. Soil landscapes

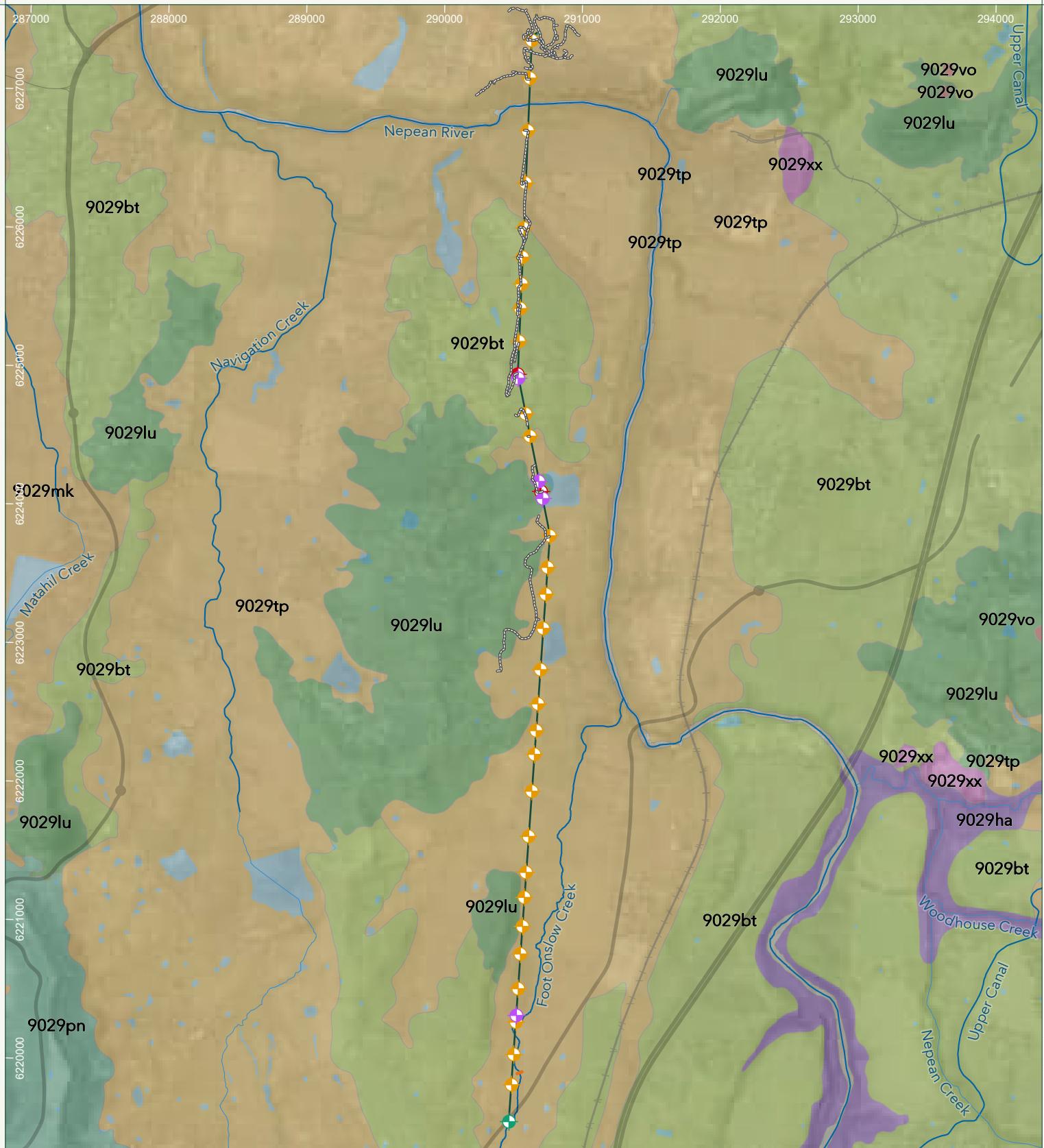
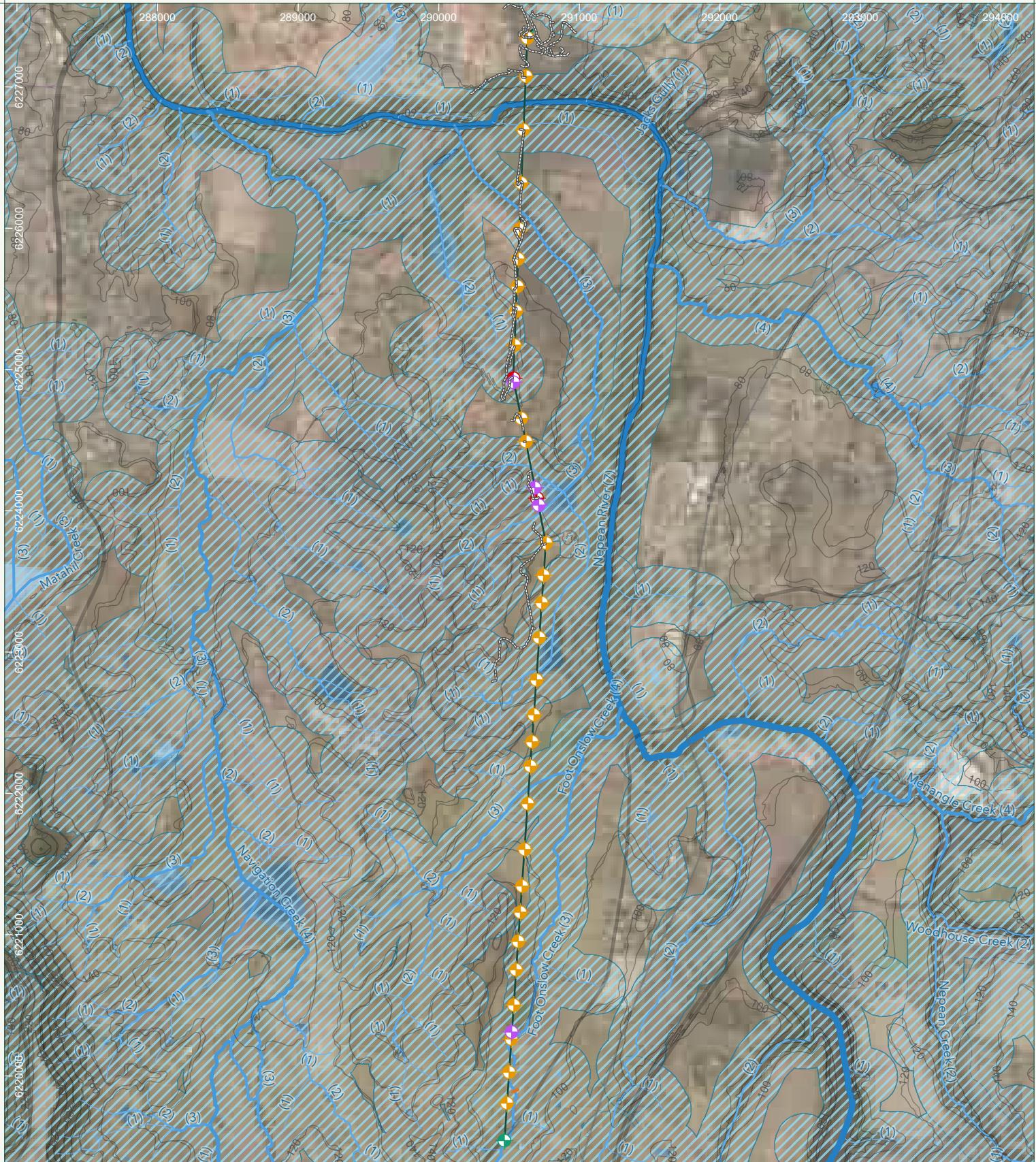


Figure 5
Soil Landscapes
 Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
 Niche Proj. #: 8459
 Client: Endeavour Energy

Figure 6. Hydrology



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 Niche Proj. #: 8459
 Client: Endeavour Energy

Figure 7. Vegetation

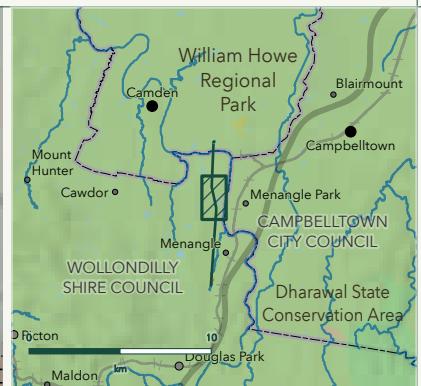
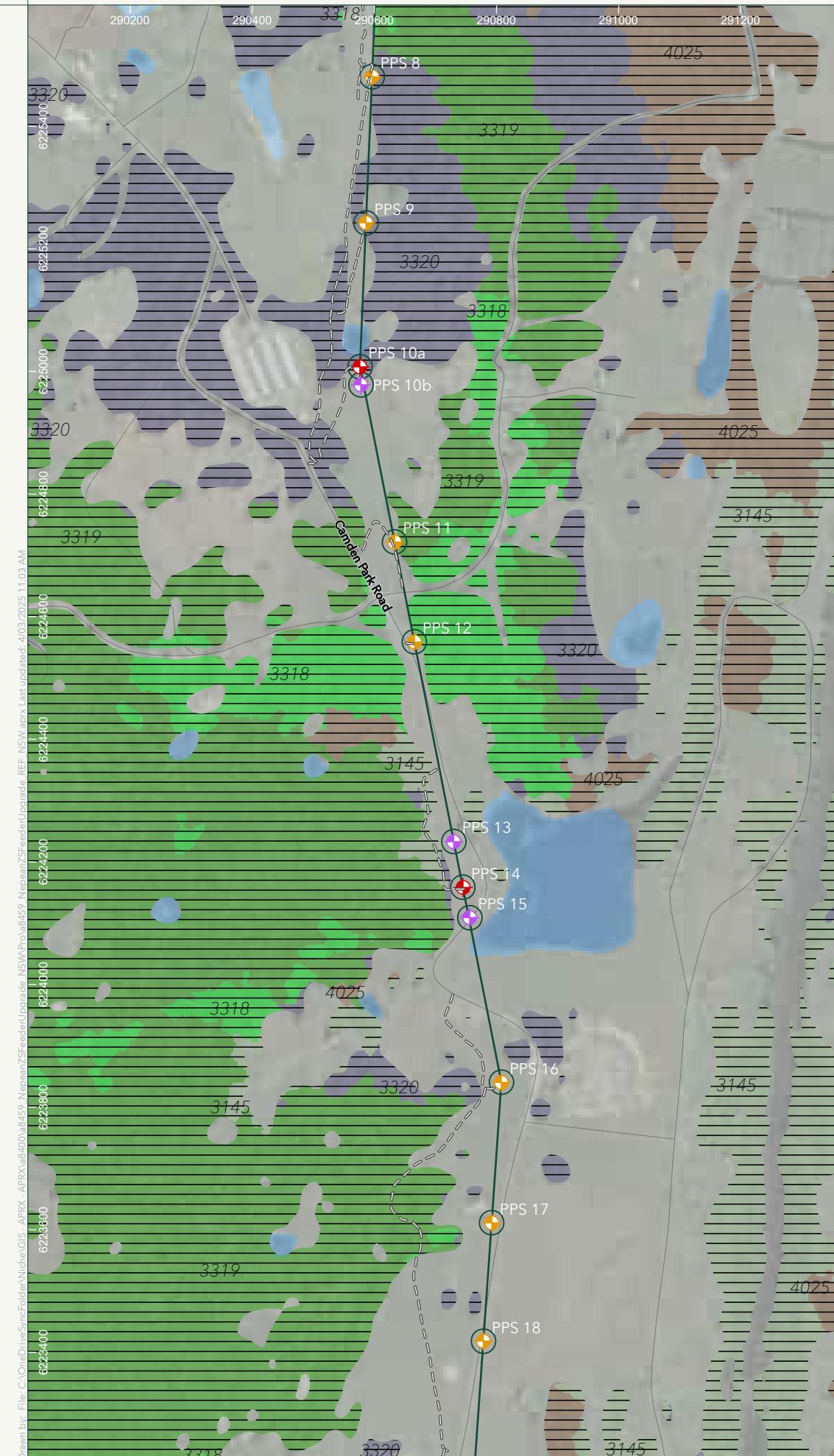


Figure 7-2
Vegetation Mapping
Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

0 140
m
WGS 1984 Web Mercator



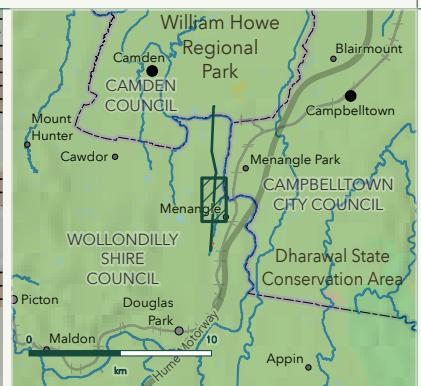


Figure 7-3
Vegetation Mapping
Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

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m
WGS 1984 Web Mercator

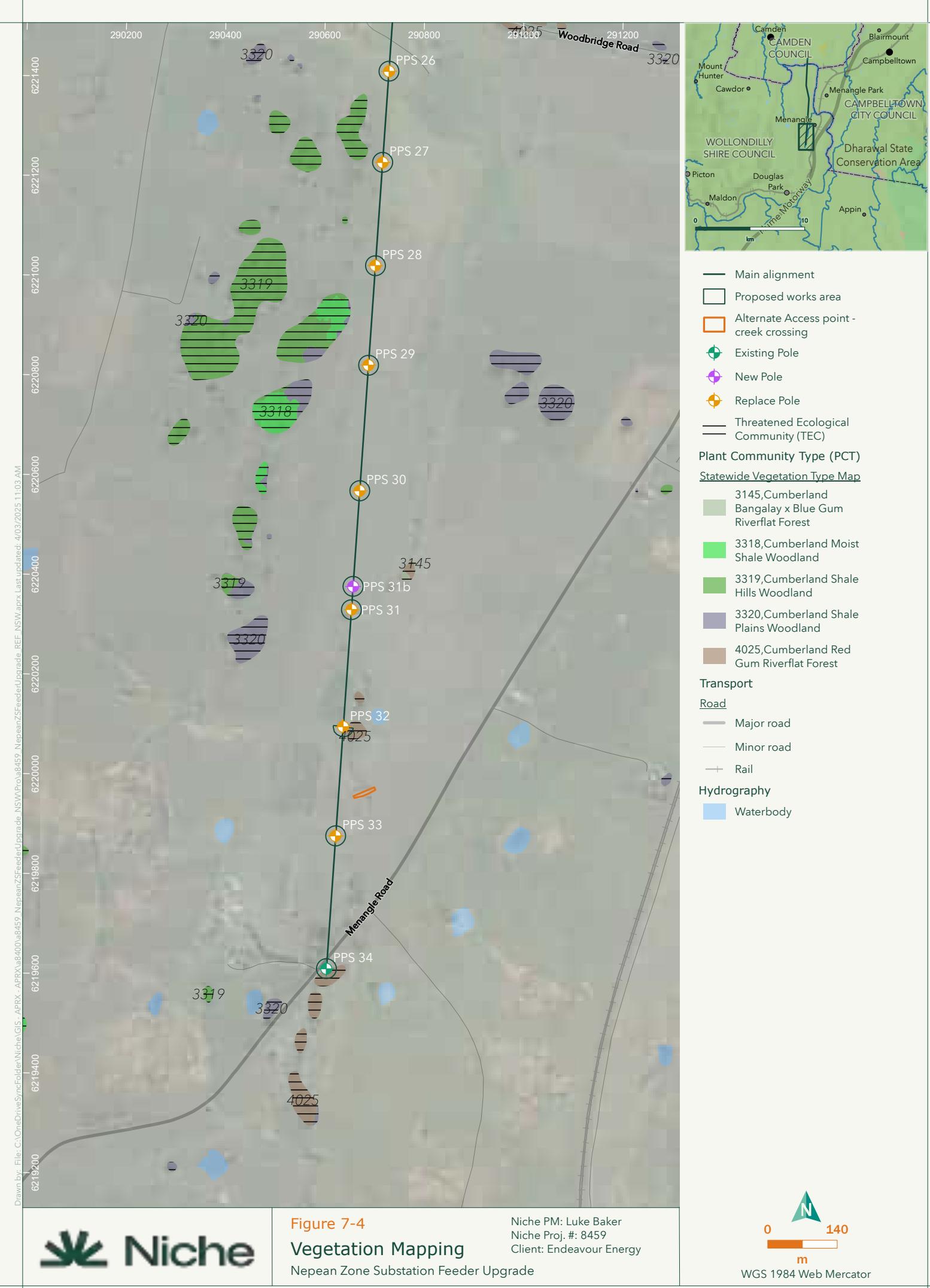
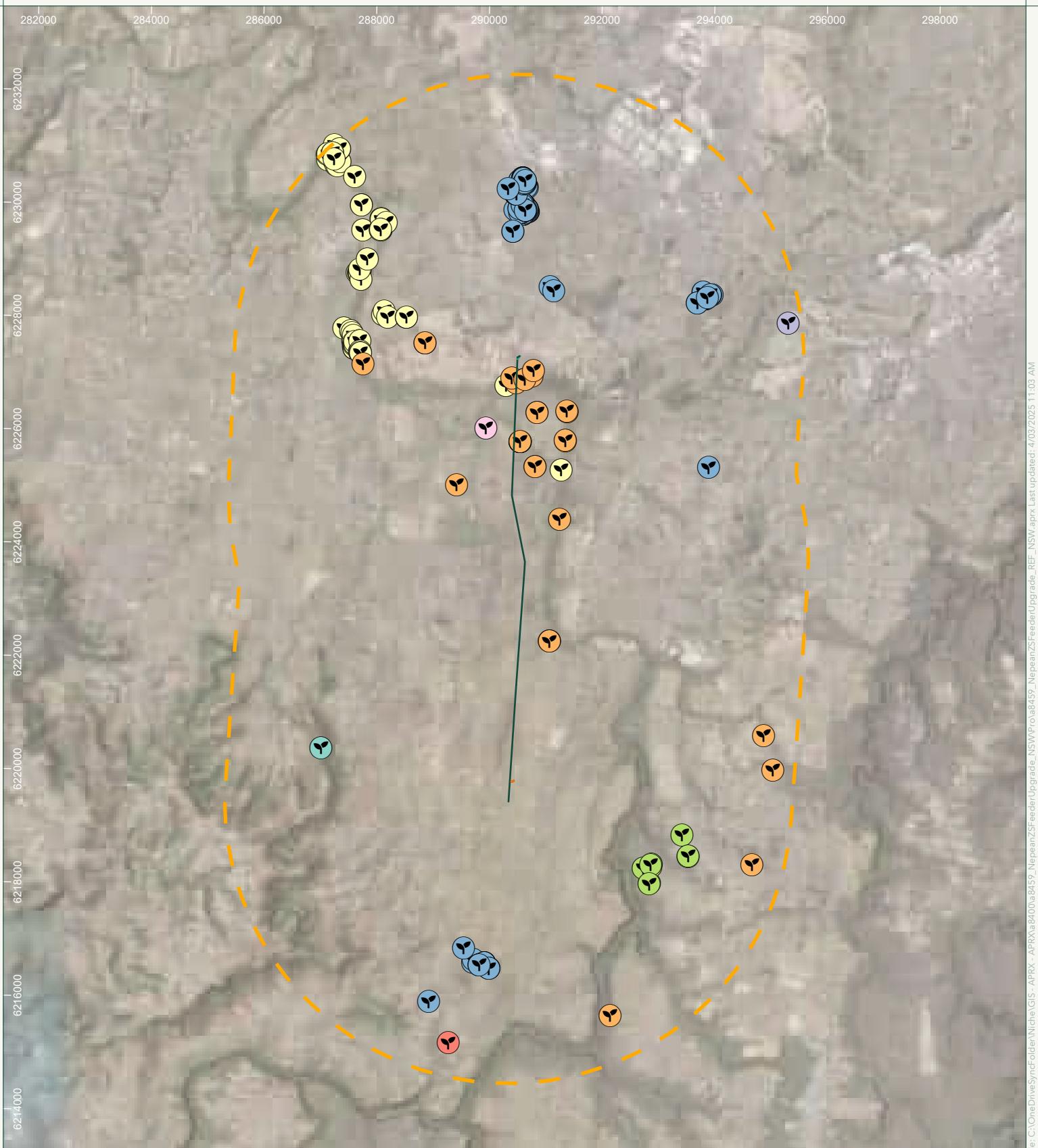


Figure 8. Threatened flora



Main alignment

Trench

Alternate Access point - creek crossing

5 km buffer

Threatened Flora (BioNet, 2024)

Flora

Cynanchum elegans

Eucalyptus benthamii

Marsdenia viridiflora subsp. viridiflora

Persoonia bargoensis

Pimelea spicata

Pomaderris brunnea

Pultenaea pedunculata

Thesium australis

* Sensitive species not displayed

Callistemon linearifolius

Gyrostemon thesioides

Prostanthera marifolia

Pterostylis saxicola

0 2
km
WGS 1984 Web Mercator

Drawn by: File:C:\OneDrive\Sync\Folded\Niche\GIS\ABRK-A9XX-84000a8459_NepeanZoneSubstationFeederUpgrado_BEE_NSWarks Last updated: 03/03/2025 11:03 AM

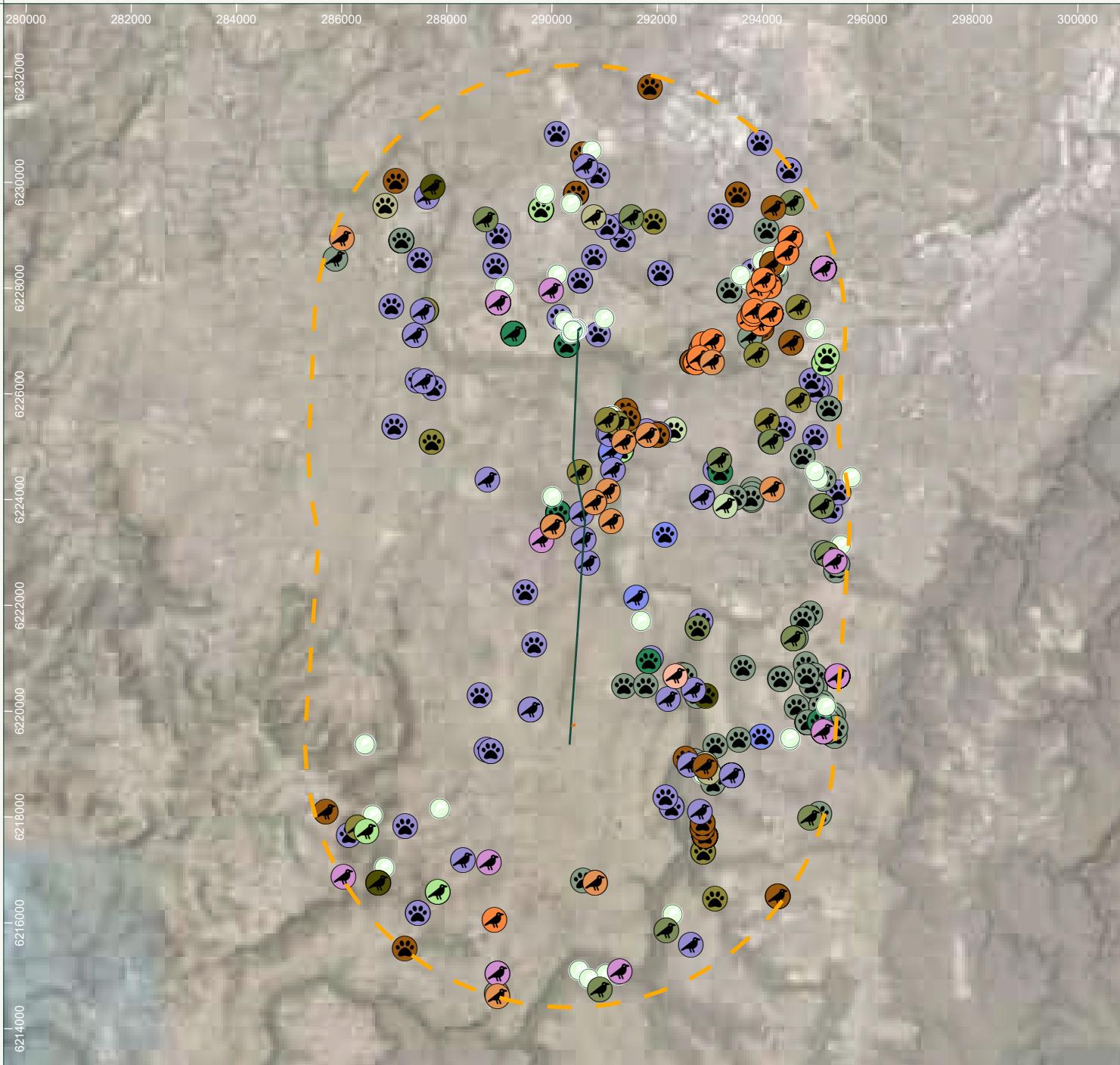
Figure 8

Threatened Flora recorded within 5km of the study area
Nepean Zone Substation Feeder Upgrade



Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

Figure 9. Threatened fauna



Main alignment

Trench

Alternate Access point - creek crossing

5 km buffer

Threatened Fauna (BioNet, 2024)

Aves

- Black-necked Stork
- Brown Treecreeper (eastern subspecies)
- Diamond Firetail
- Dusky Woodswallow
- Freckled Duck
- Little Eagle
- Little Lorikeet
- Red Knot
- Scarlet Robin
- South-eastern Hooded Robin
- Speckled Warbler
- Spotted Harrier
- Swift Parrot
- Varied Sittella
- White-bellied Sea-Eagle

Little Eagle

Little Lorikeet

Red Knot

Scarlet Robin

South-eastern Hooded Robin

Speckled Warbler

Spotted Harrier

Swift Parrot

Varied Sittella

White-bellied Sea-Eagle

Gastropoda

Cumberland Plain Land Snail

Mammalia

Eastern Coastal Free-tailed Bat

Eastern False Pipistrelle

Greater Broad-nosed Bat

Grey-headed Flying-fox

Koala

Large Bent-winged Bat

Large-eared Pied Bat

Little Bent-winged Bat

Southern Myotis

Spotted-tailed Quoll

Yellow-bellied Sheathtail-bat

* Sensitive species not displayed

Barking Owl

Gang-gang Cockatoo

Masked Owl

Powerful Owl

Regent Honeyeater

South-eastern Glossy Black-Cockatoo

Turquoise Parrot



WGS 1984 Web Mercator

Figure 9

Threatened Fauna recorded within 5km of the study area

Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy



Figure 10. Cultural Heritage including AHIMS

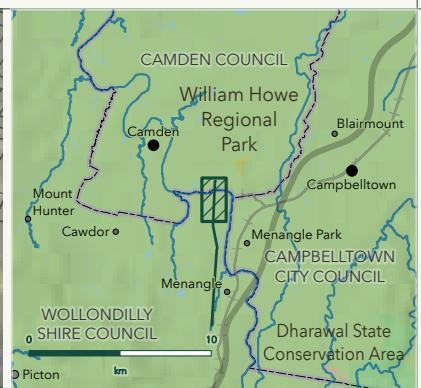
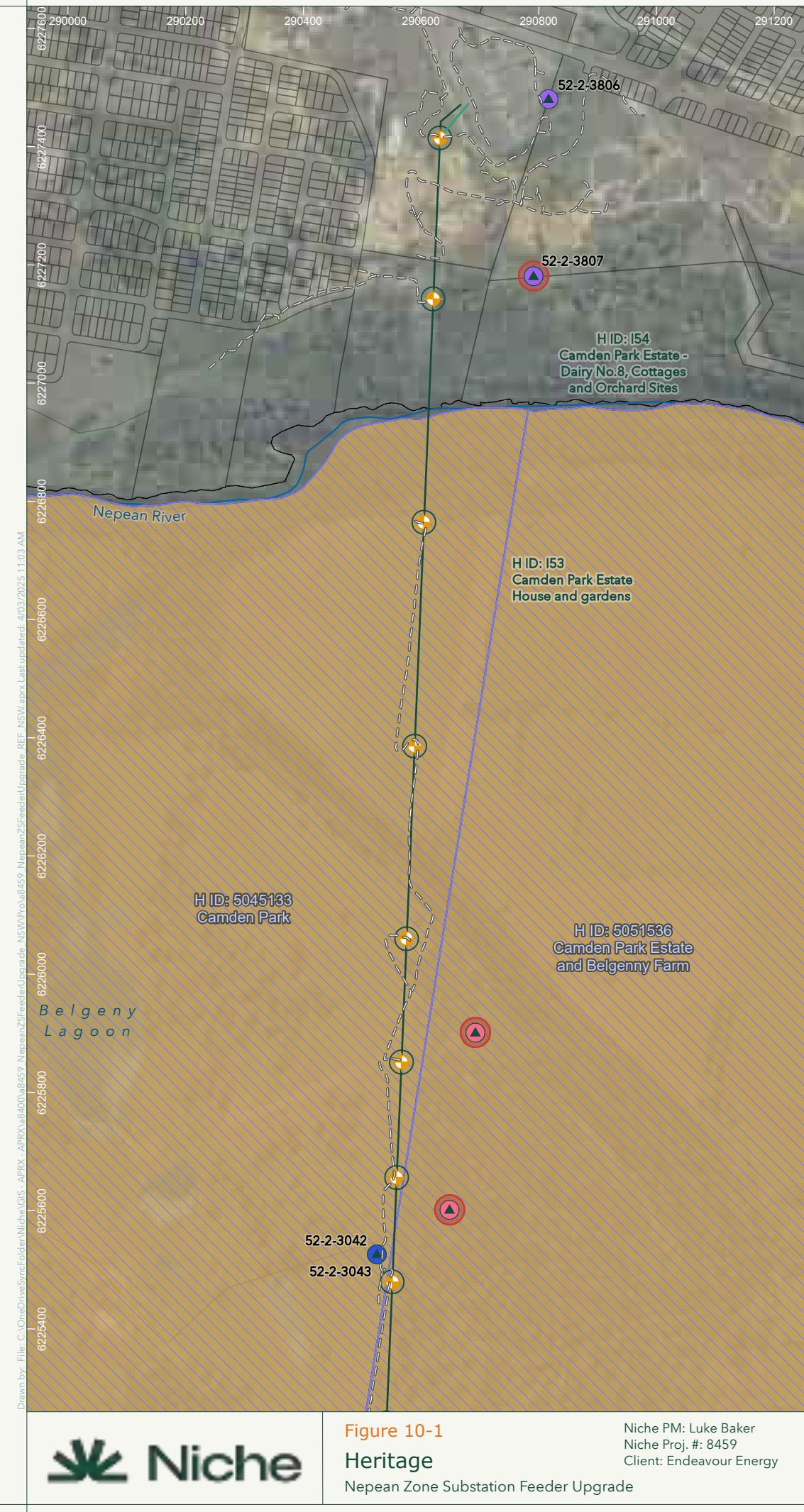


Figure 10-1 Heritage Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

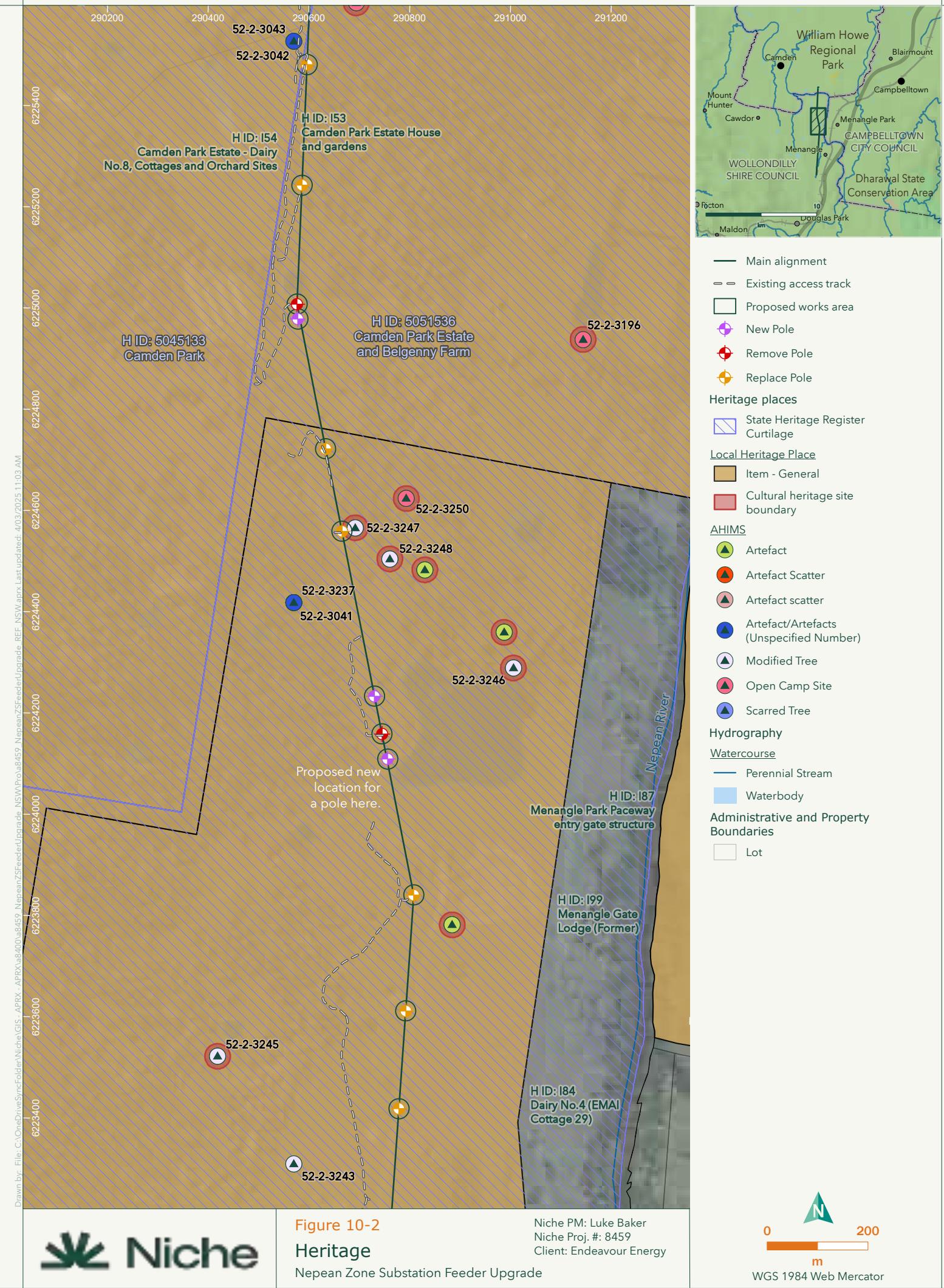
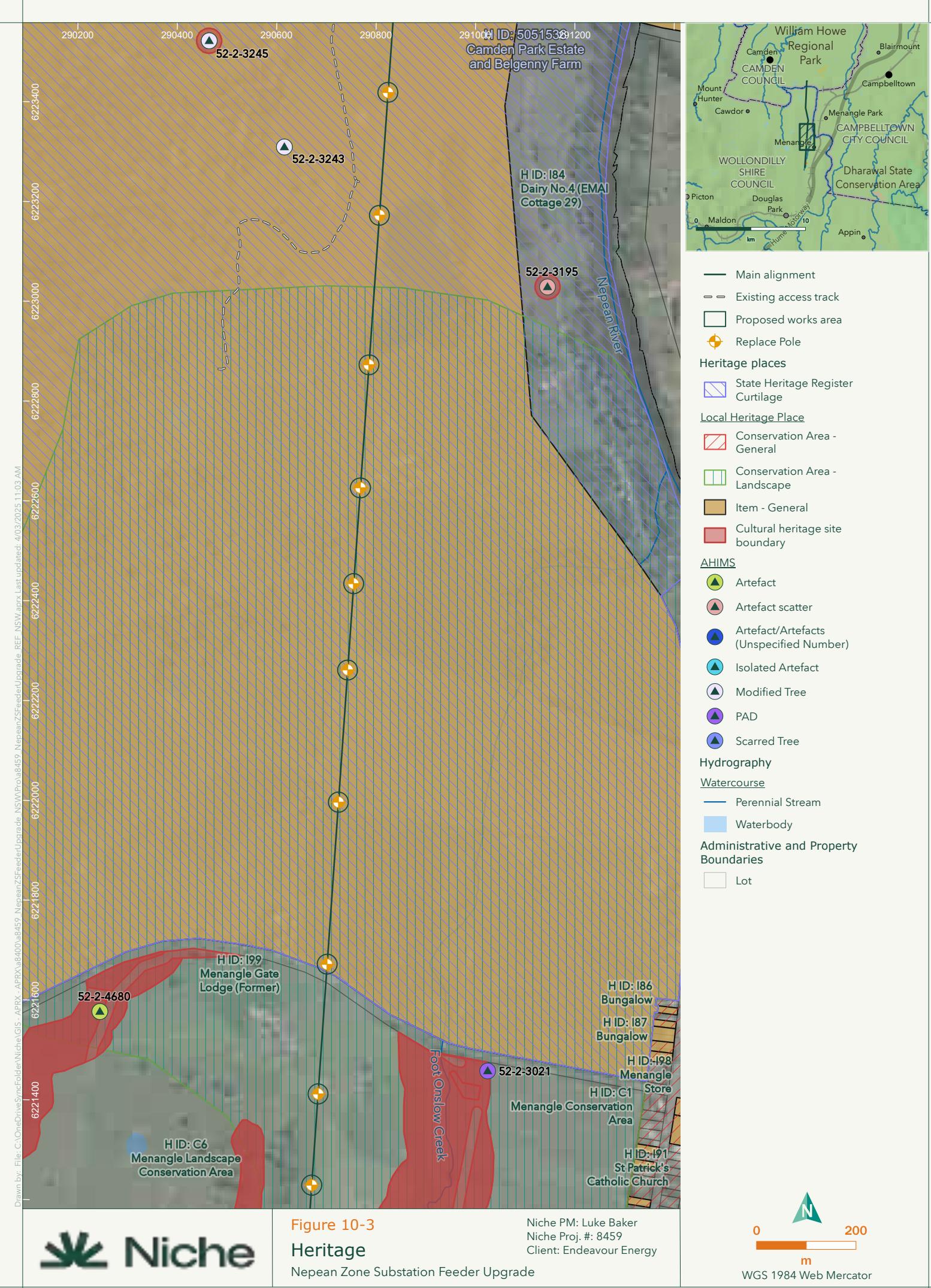


Figure 10-2 Heritage Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

WGS 1984 Web Mercator



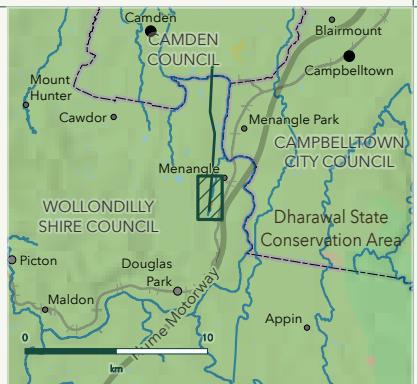
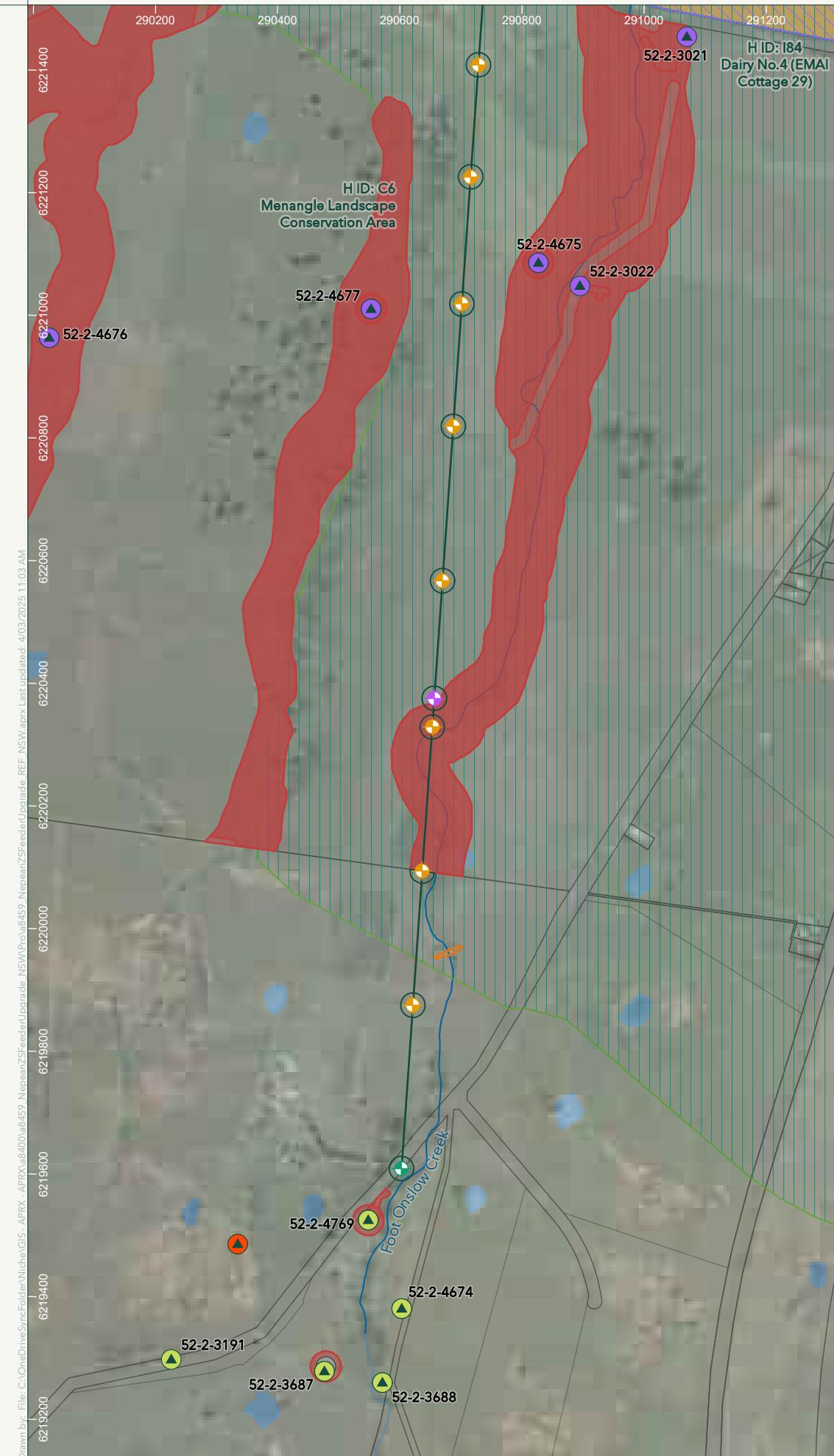


Figure 10-4
Heritage
 Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
 Niche Proj. #: 8459
 Client: Endeavour Energy

0 200
 m
 WGS 1984 Web Mercator

Figure 11. Constraints

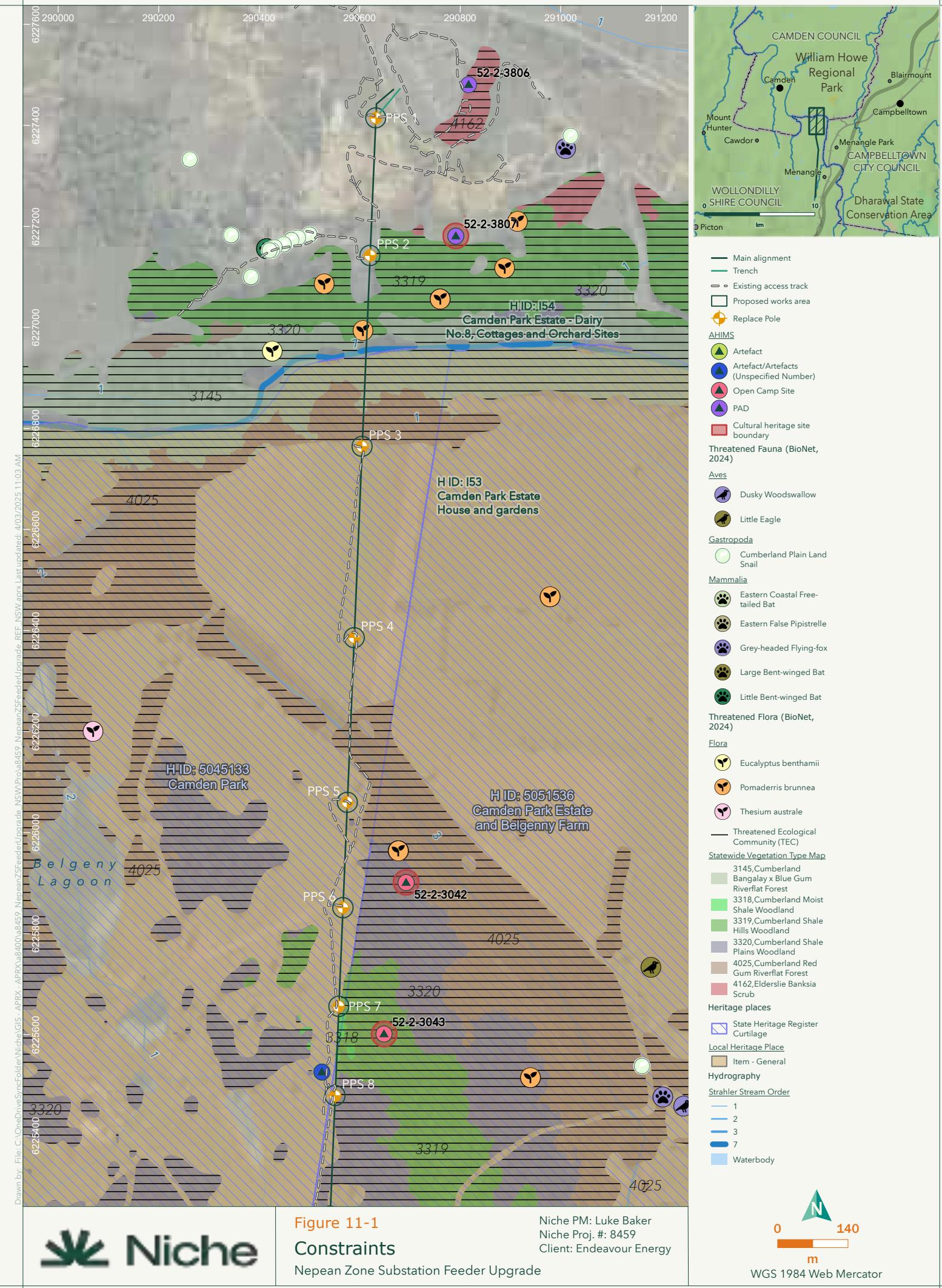


Figure 11-1 Constraints

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

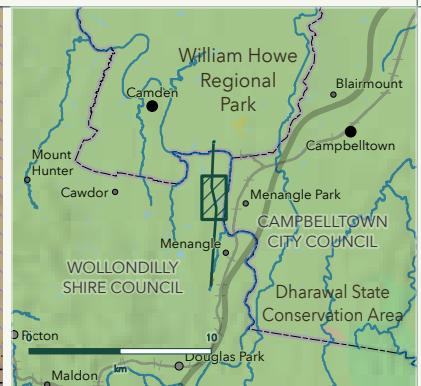
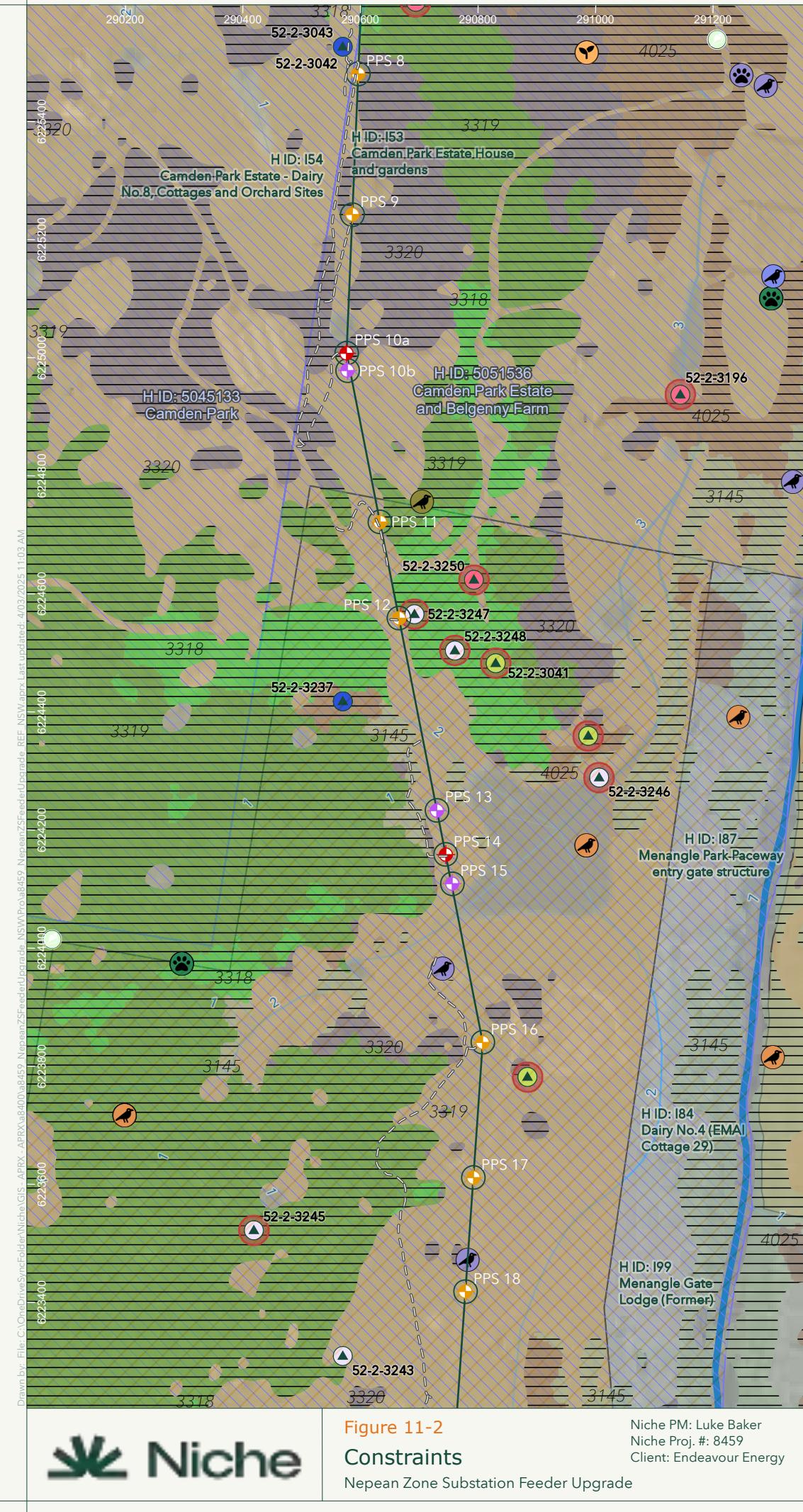
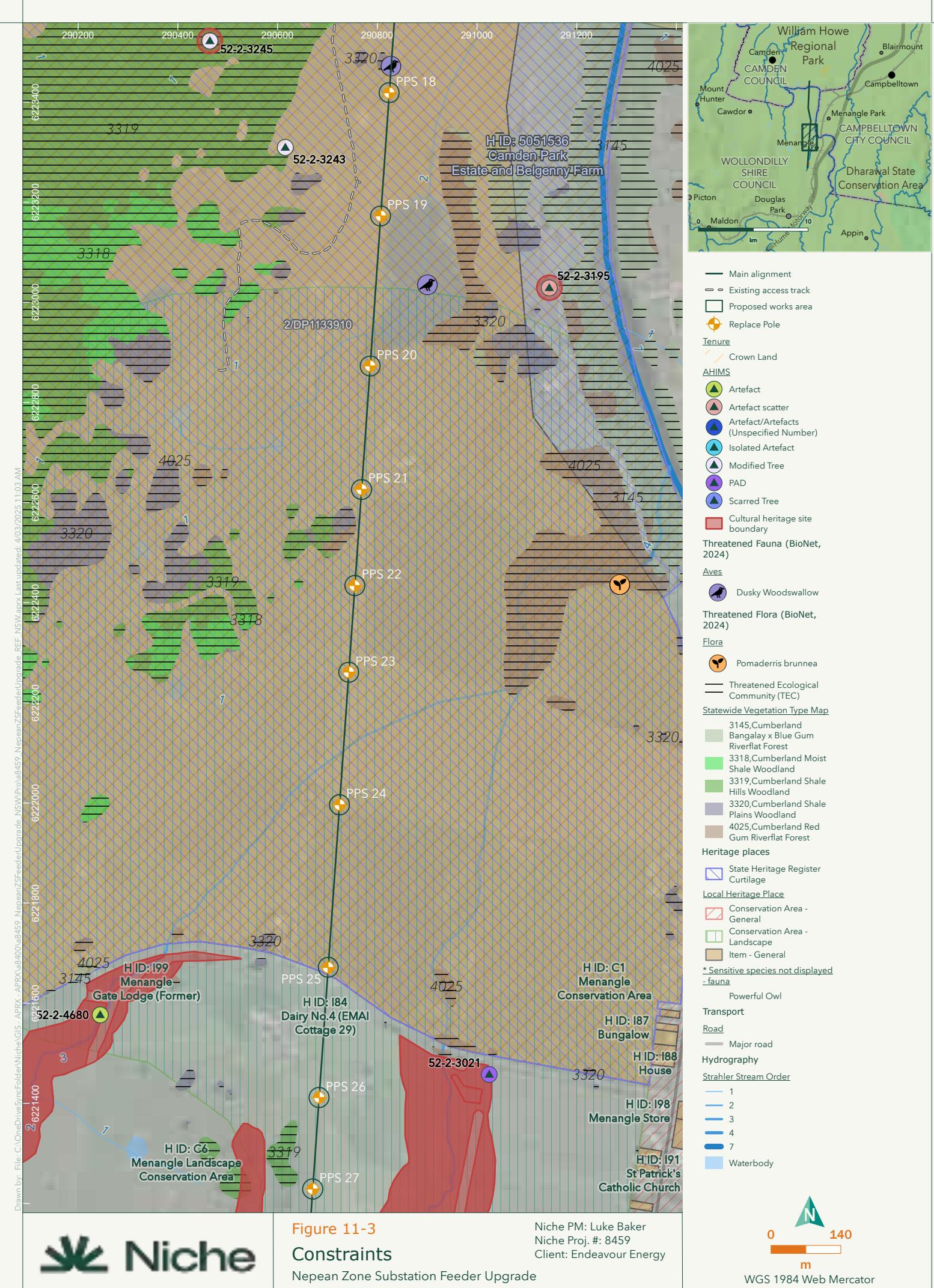


Figure 11-2 Constraints

Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy



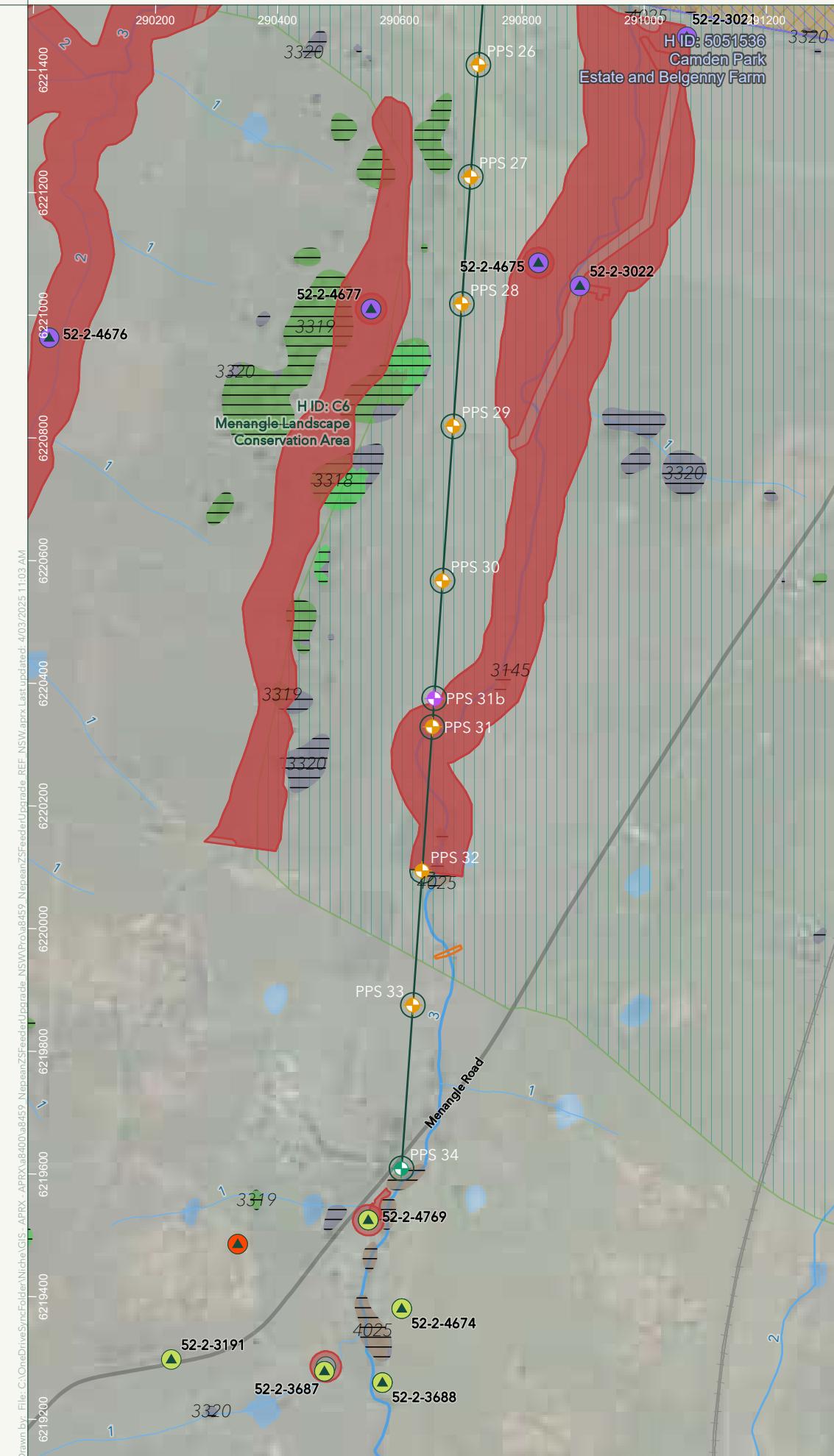


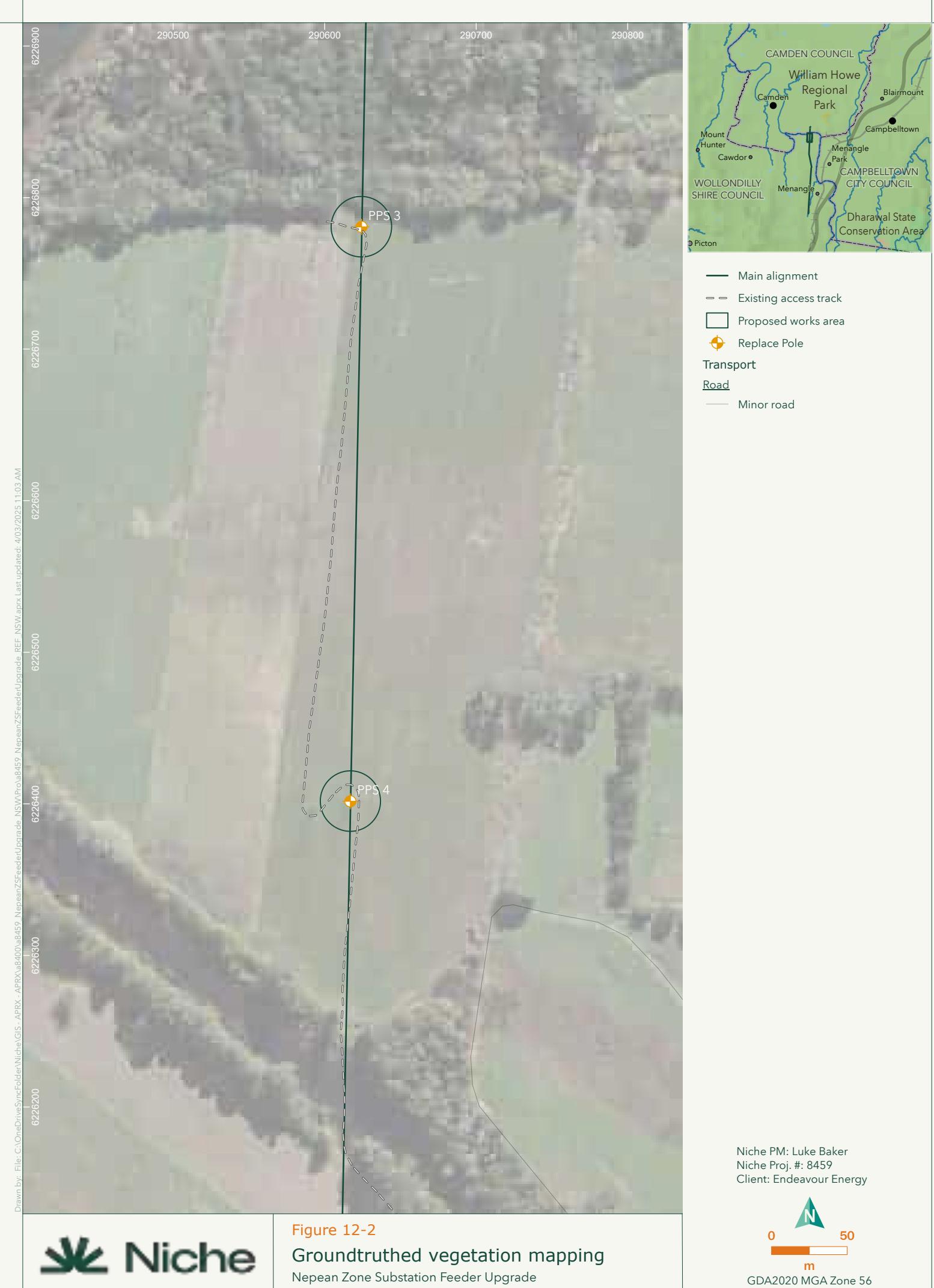
Figure 11-4
Constraints
 Nepean Zone Substation Feeder Upgrade

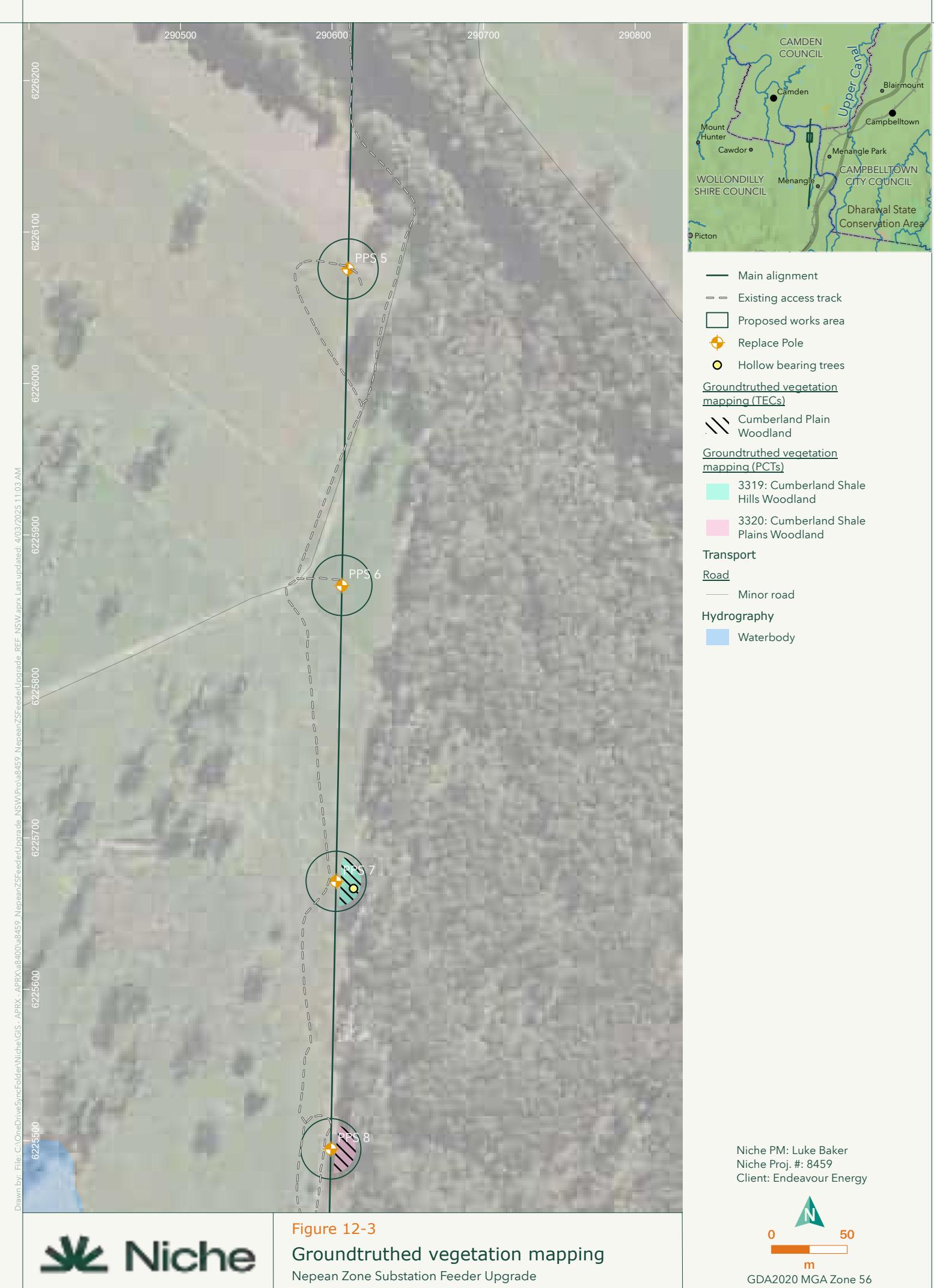
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 Niche Proj. #: 8459
 Client: Endeavour Energy

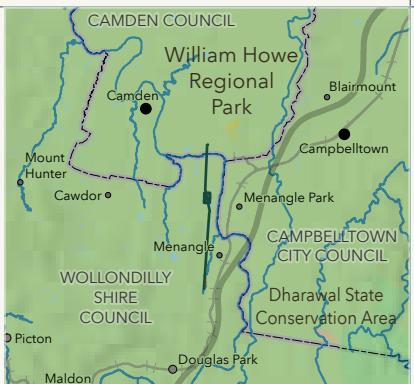


WGS 1984 Web Mercator

Figure 12. Ground-truthed vegetation







- Main alignment
- Existing access track
- Proposed works area
- ◆ Replace Pole
- Hollow bearing trees
- Groundtruthed vegetation mapping (TECs)
-  Cumberland Plain Woodland
- Groundtruthed vegetation mapping (PCTs)
- 3319: Cumberland Shale Hills Woodland
- 3320: Cumberland Shale Plains Woodland
- Transport
- Road
- Minor road
- Hydrography
- Waterbody

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Niche Proj. #: 8459
Client: Endeavour Energy



GDA2020 MGA Zone 56



Figure 12-5
Groundtruthed vegetation mapping
Nepean Zone Substation Feeder Upgrade

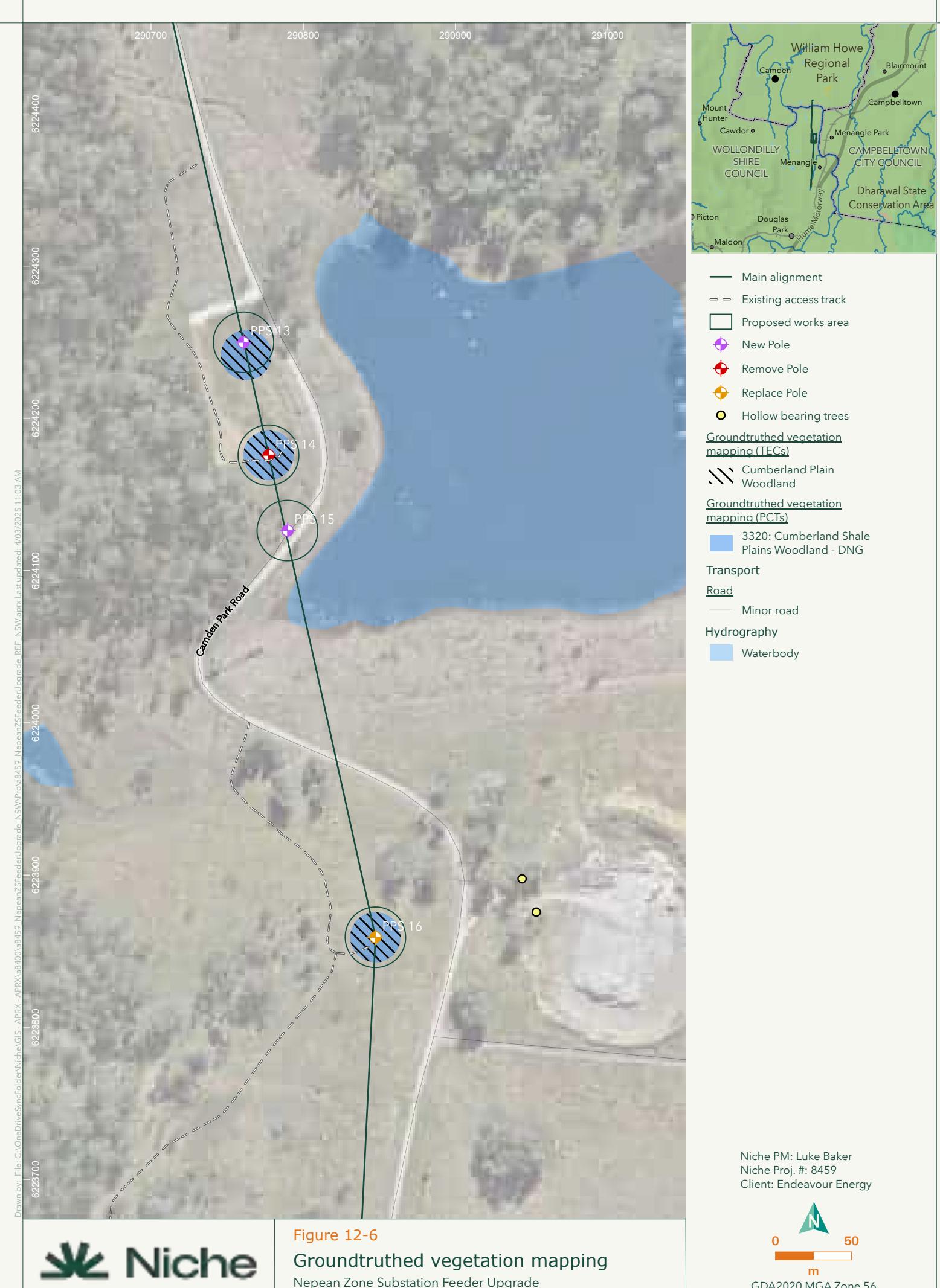
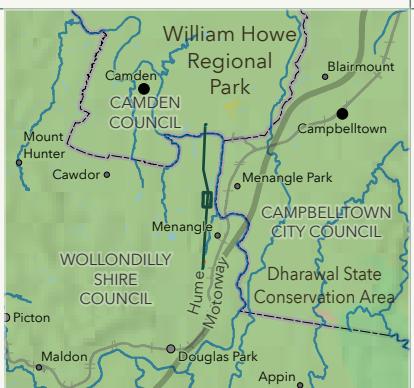


Figure 12-6
Groundtruthed vegetation mapping
Nepean Zone Substation Feeder Upgrade





- Main alignment
- - Existing access track
-  Proposed works area
-  Replace Pole
-  Aquatic assessment

Transport

Road

— Minor road

Hydrography

Waterbody

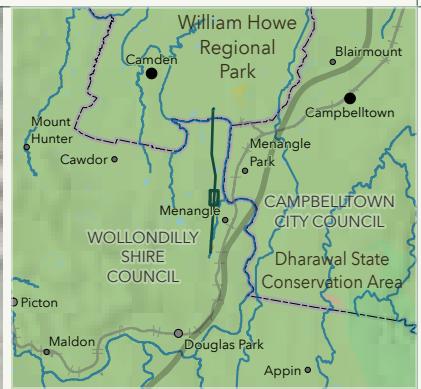
Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy



Figure 12-7
Groundtruthed vegetation mapping
Nepean Zone Substation Feeder Upgrade

Niche

NSW Office of Environment and Heritage's BioNet Atlas, which holds the data from a number of custodians. Data Obtained 13/12/2023. | World Hillshade: Esri, CGIAR/ Hillshade: Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatistyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community| World_Ocean_Base: NIWA, GeosciencesAustralia, Esri, GEBCO, Garmin, NaturalVue/public/NSW_Imagery: © Department of Customer Service 2020 | Watercourses, Waterbodies, Road and Rail Alignments, Protected areas of NSW © Spatial Services 2021. | Niche uses GDA2020 as standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to GDA2020 MGA Zone 56 is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are presented in GDA2020 MGA Zone 56



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 Niche Proj. #: 8459
 Client: Endeavour Energy



GDA2020 MGA Zone 56

Figure 12-8
Groundtruthed vegetation mapping
 Nepean Zone Substation Feeder Upgrade



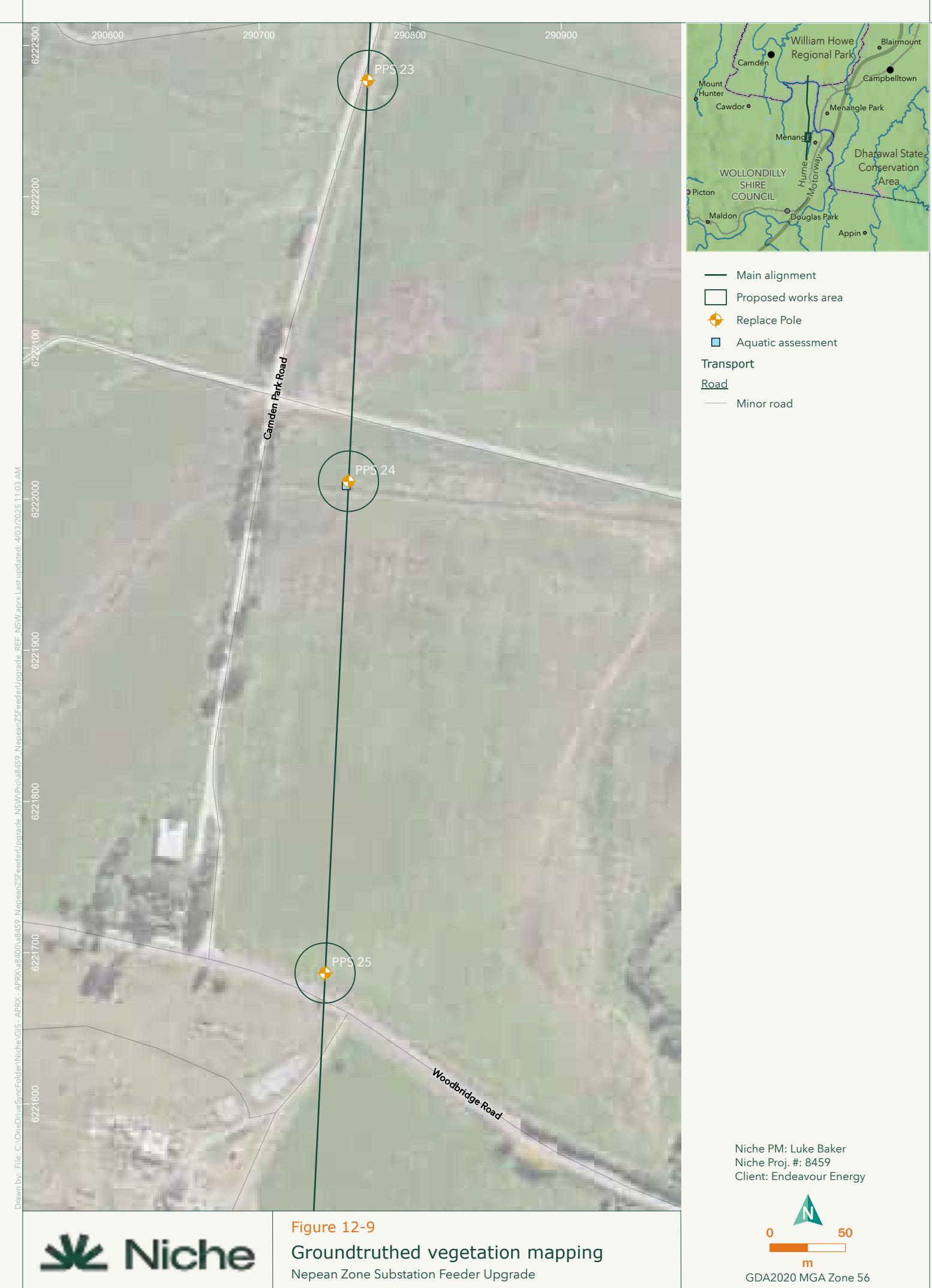
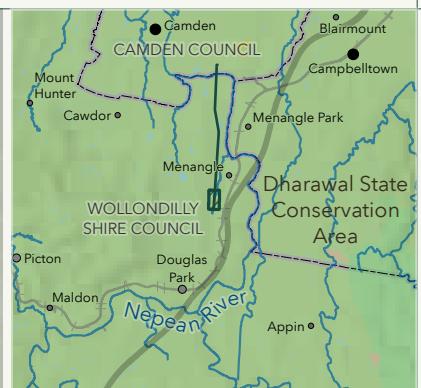
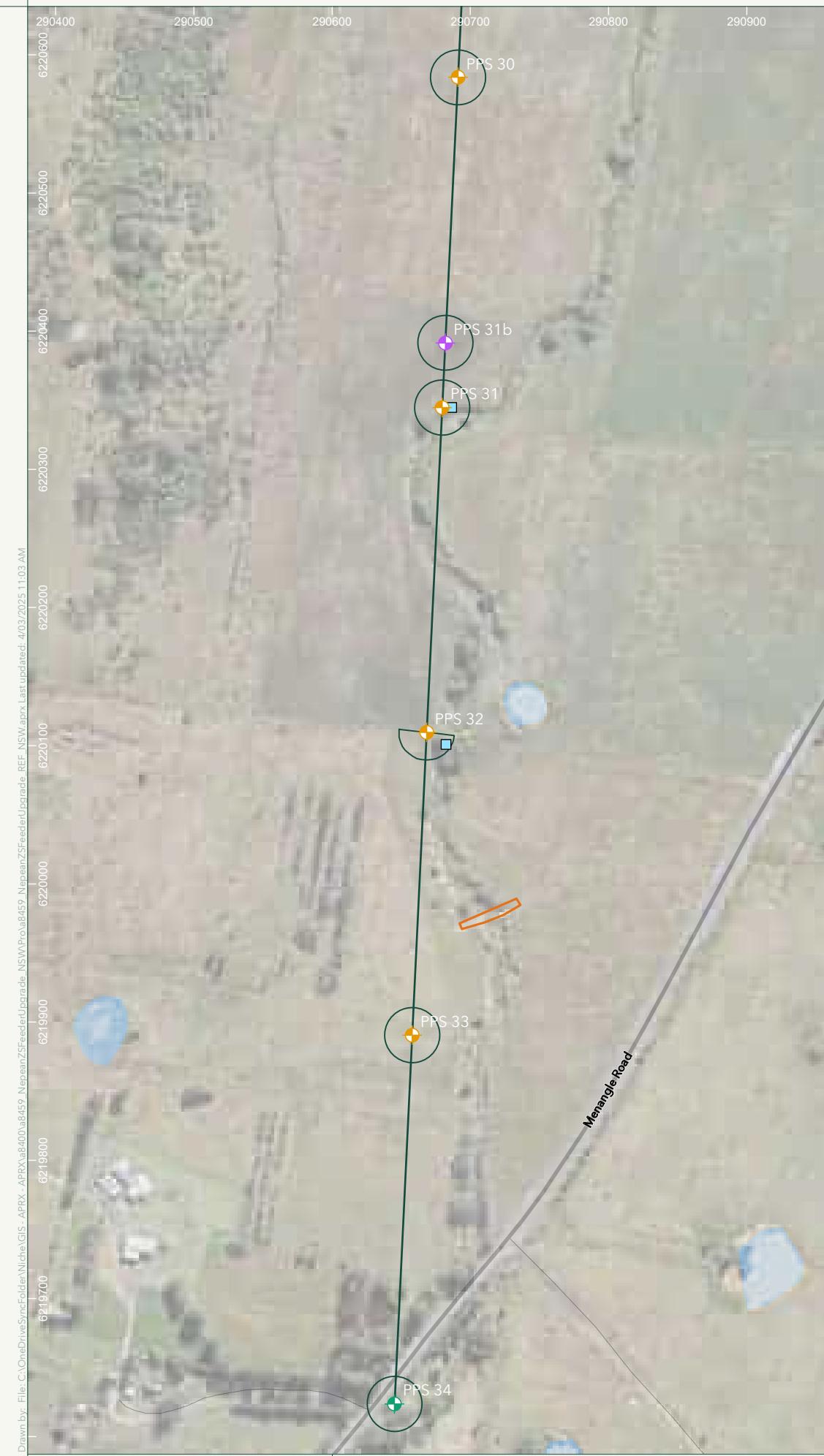




Figure 12-10
Groundtruthed vegetation mapping
Nepean Zone Substation Feeder Upgrade





- Main alignment
- Proposed works area
- Alternate Access point - creek crossing
- Existing Pole
- New Pole
- Replace Pole
- Aquatic assessment

Transport

Road

- Major road
- Minor road

Hydrography

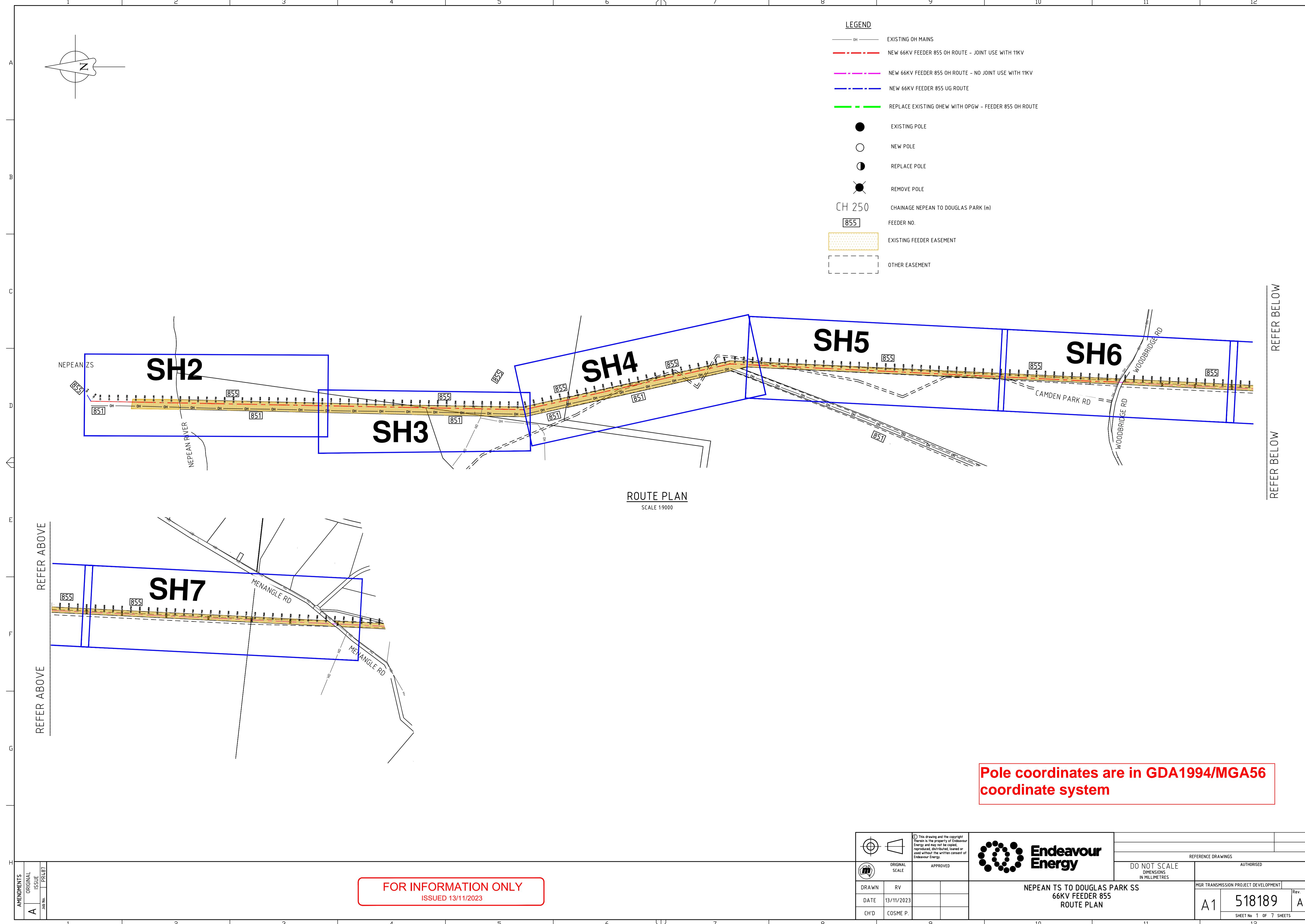
Waterbody

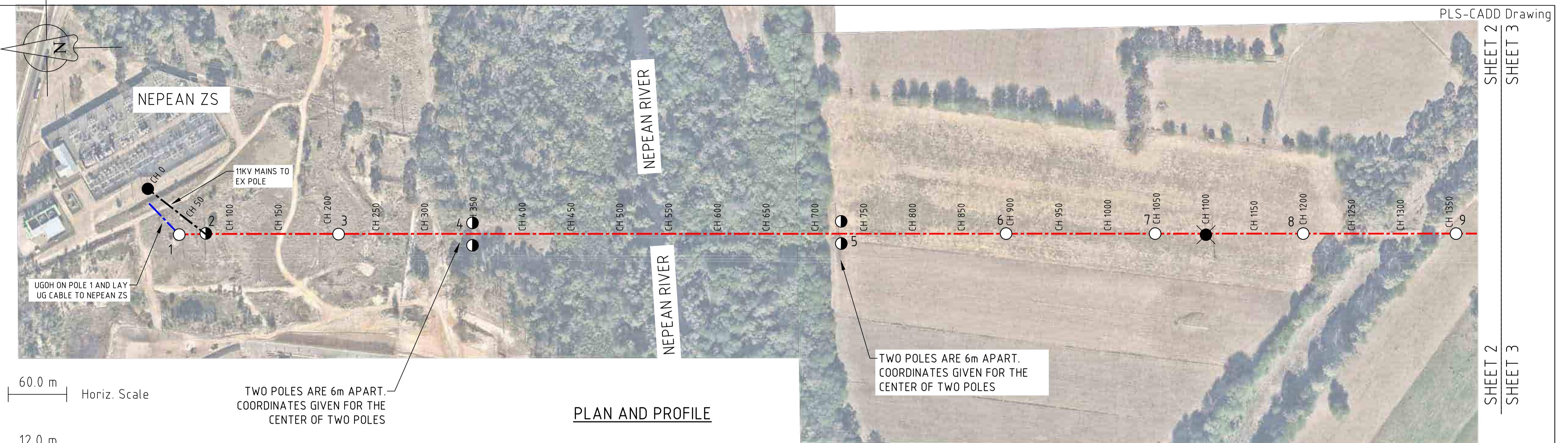
Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy



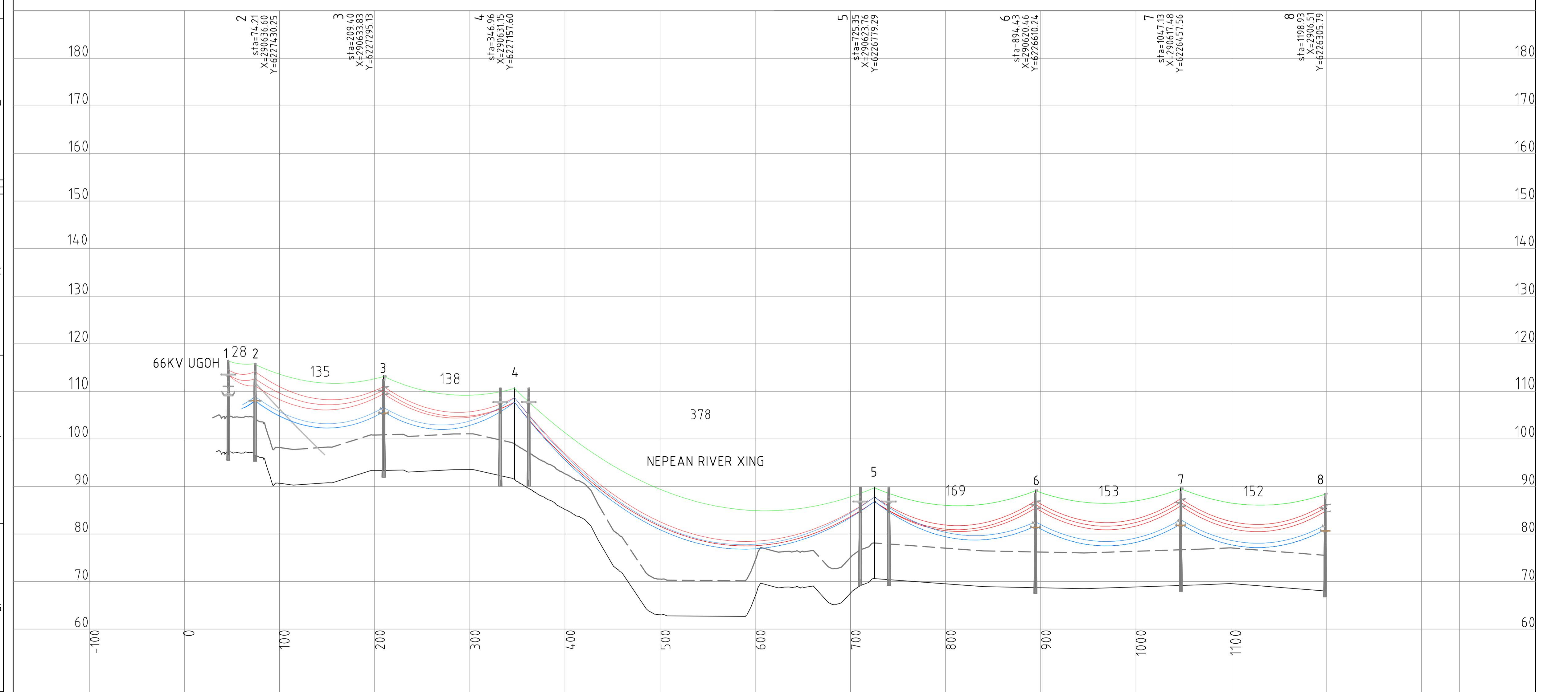
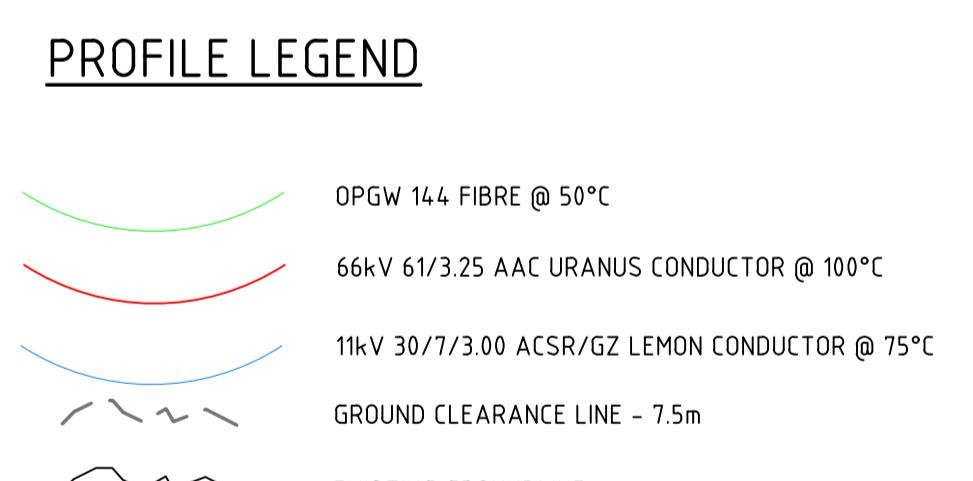
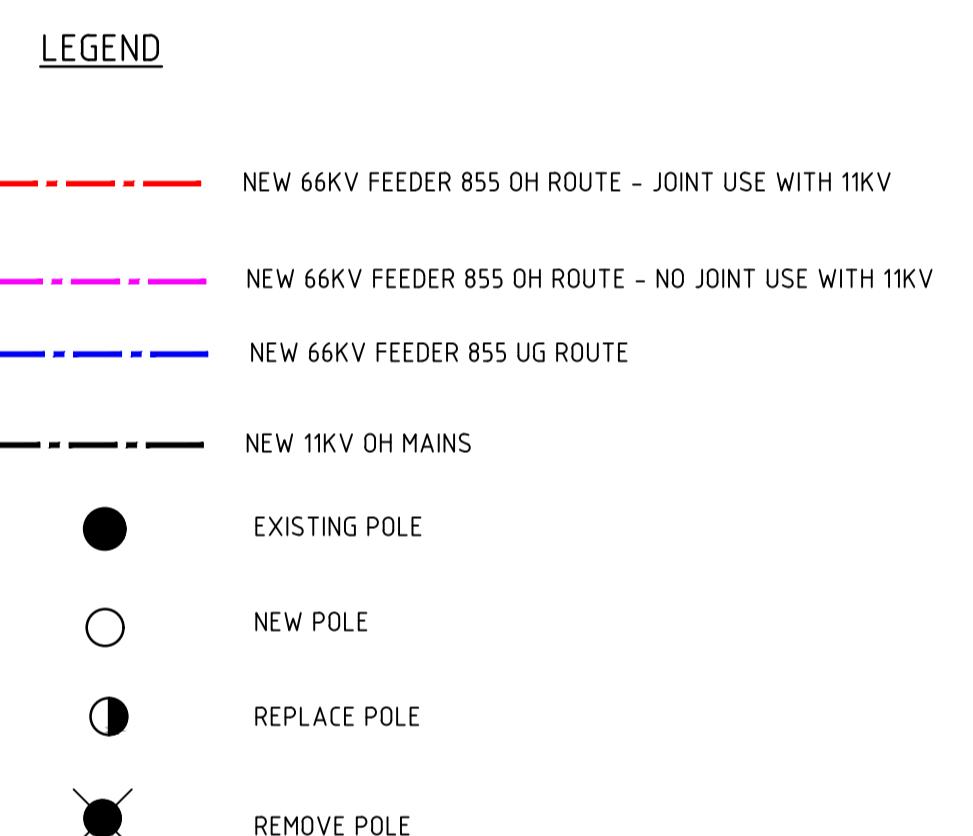
Figure 12-11
Groundtruthed vegetation mapping
Nepean Zone Substation Feeder Upgrade

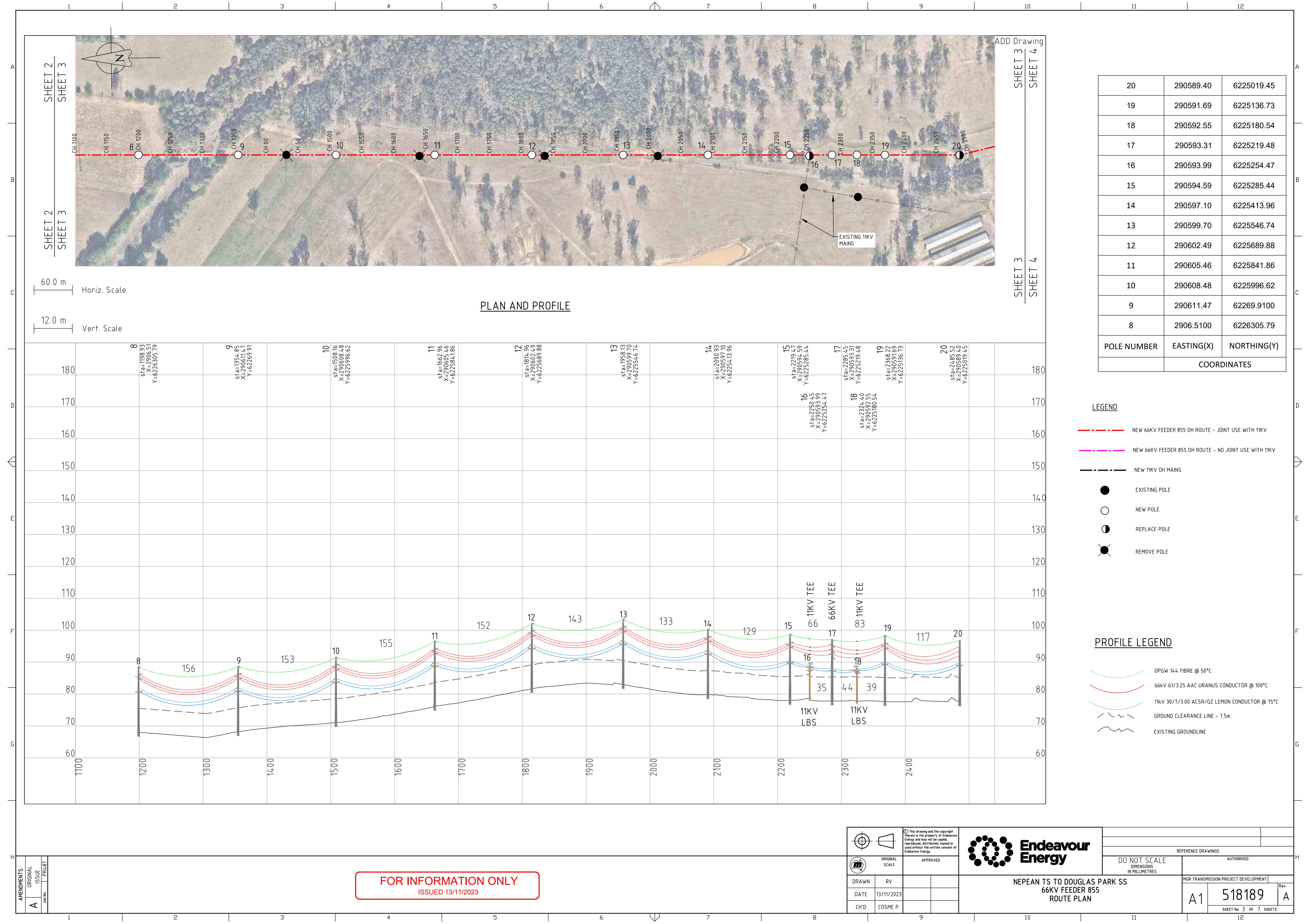
Annex 2. Design plans

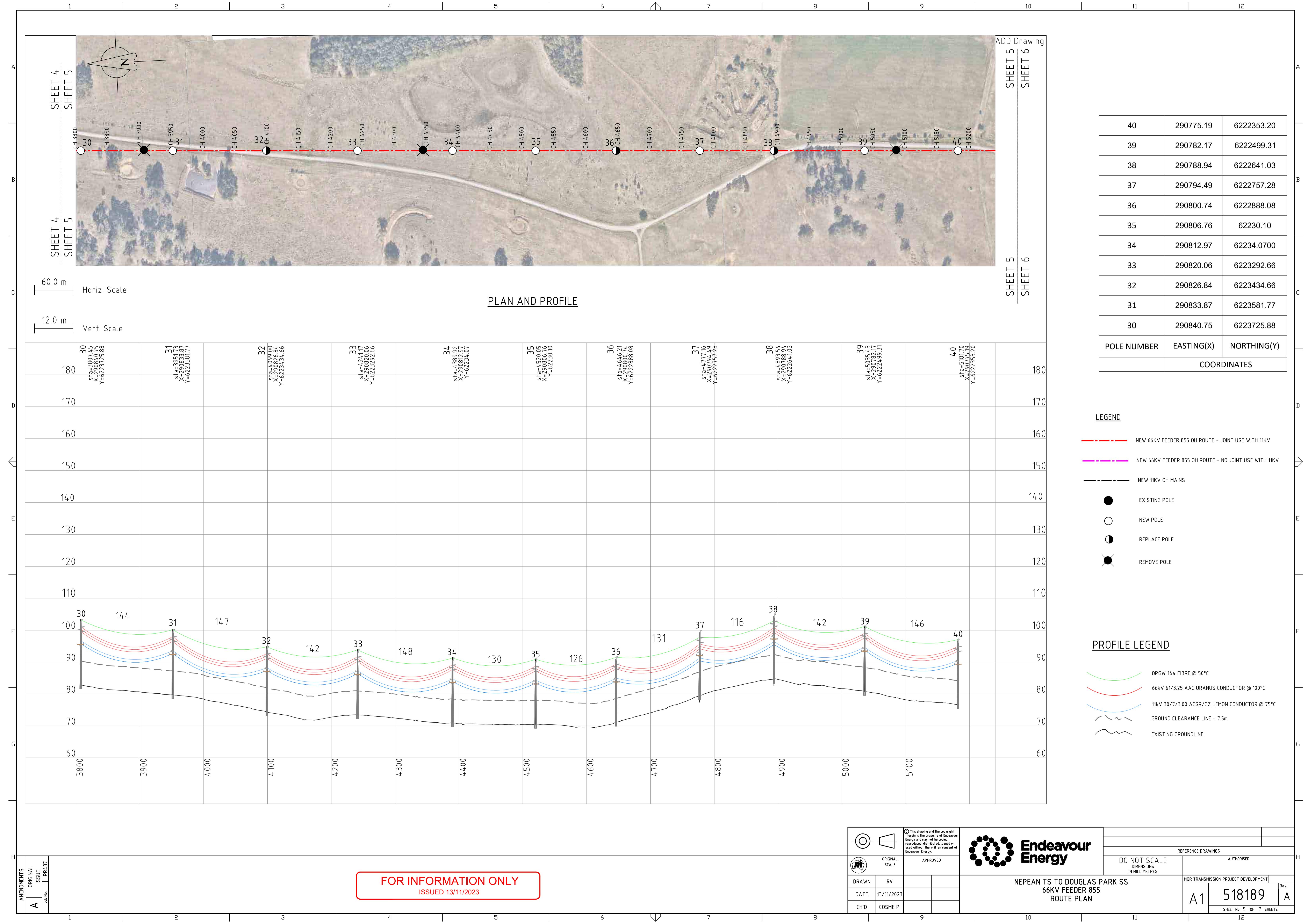


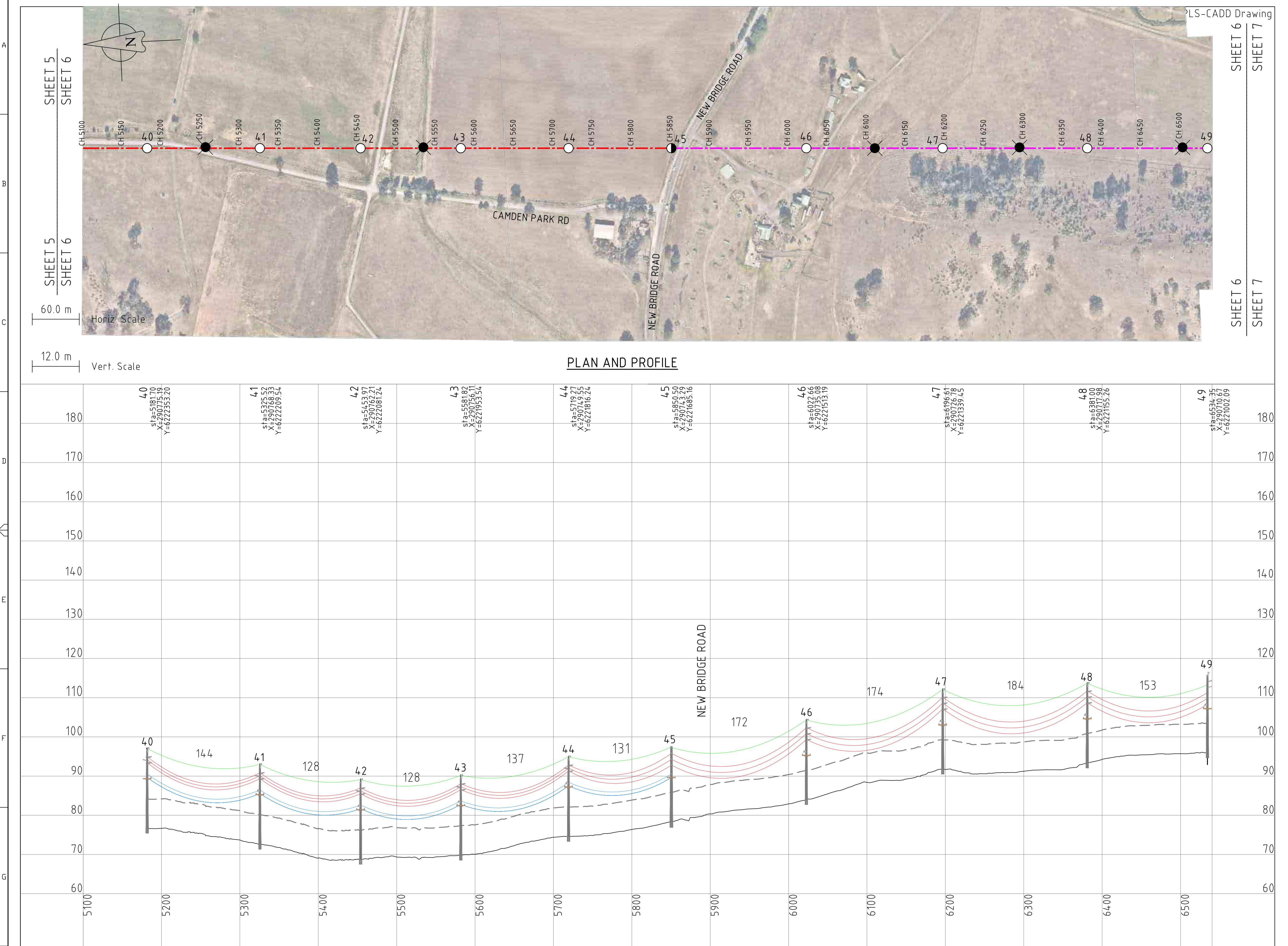


POLE NUMBER	EASTING(X)	NORTHING(Y)
8	2906.5100	6226305.79
7	290617.48	6226457.56
6	290620.46	6226610.24
5 (COORDINATES FOR CENTER OF TWO POLES)	290623.76	6226779.29
4 (COORDINATES FOR CENTER OF TWO POLES)	290631.15	6227157.60
3	290633.83	6227295.13
2	290636.60	6227430.25
1	290637.28	6227458.29
COORDINATES		









POLE NUMBER	EASTING(X)	NORTHING(Y)
49	290710.67	6221002.09
48	290717.98	6221155.26
47	290726.78	6221339.45
46	290735.08	6221513.19
45	290743.29	6221685.16
44	290749.55	6221816.24
43	290756.11	6221953.54
42	290762.21	6222081.24
41	290768.33	6222209.54
40	290775.19	6222353.20
COORDINATES		

LEGEND

- NEW 66KV FEEDER 855 OH ROUTE - JOINT USE WITH 11KV
- NEW 66KV FEEDER 855 OH ROUTE - NO JOINT USE WITH 11KV
- NEW 11KV OH MAINS
- EXISTING POLE
- NEW POLE
- ◐ REPLACE POLE
- ☒ REMOVE POLE

POEIL E LEGEND

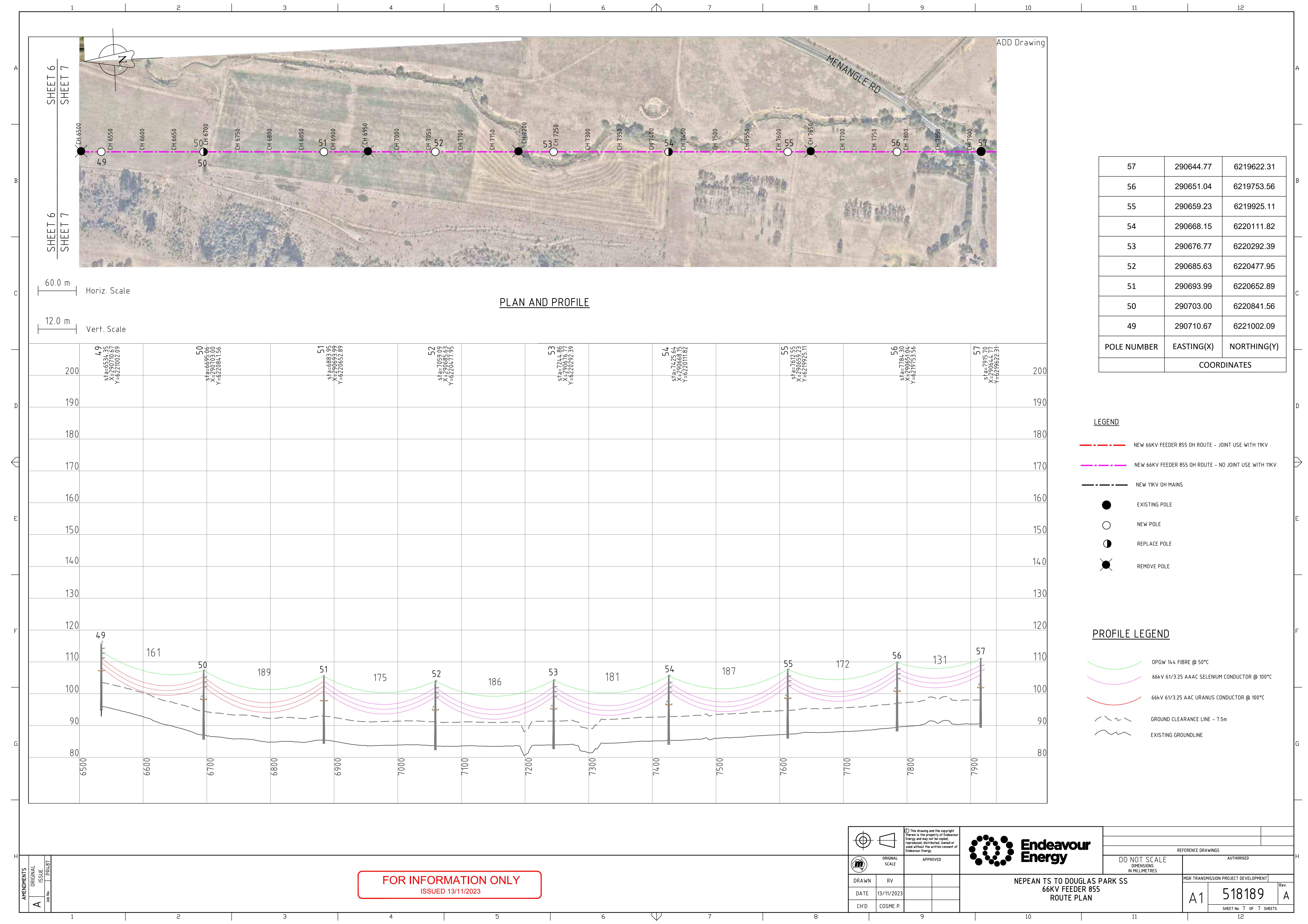


- OPGW 144 FIBRE @ 50°C
- 66kV 61/3.25 AAC URANUS CONDUCTOR @ 100°C
- 11kV 30/7/3.00 ACSR/GZ LEMON CONDUCTOR @ 75°C
- GROUND CLEARANCE LINE - 7.5m
- EXISTING GROUNDLINE

		<p>© This drawing and the copyright therein is the property of Endeavour Energy and may not be copied, reproduced, distributed, loaned or used without the written consent of Endeavour Energy.</p>	 <p>Endeavour Energy</p>		
				REFERENCE DRAWINGS	
 <p>ORIGINAL SCALE</p>	APPROVED		<p>DO NOT SCALE DIMENSIONS IN MILLIMETRES</p>	AUTHORISED	
	DRAWN	RV			MGR TRANSMISSION PROJECT DEVELOPMENT
DATE	13/11/2023			<p>A1</p> <p>518189</p>	Rev. A
CH'D	COSME P.				SHEET No 6 OF 7 SHEETS

FOR INFORMATION ONLY

ISSUED 13/11/2023



Annex 3. Flora and Fauna Assessment



Endeavour Energy Nepean Zone Substation Feeder Upgrade



Flora and Fauna Impact Assessment

Prepared for Endeavour Energy | 24/10/2024



FFA

Document control

Project number	Client	Project manager	LGA
8459	Endeavour Energy	Justin Merdith	Camden LGA, Wollondilly LGA

Version	Author	Review	Status	Comments	Date
D1	Mandy Melvaine	Kayla McGregor	Draft	Issued as D2	28 May 2024
R1	Mandy Melvaine	Justin Merdith	Final		24 October 2024

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Executive Summary

Background

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by Endeavour Energy to undertake a terrestrial Flora and Fauna Assessment (FFA) for the proposed Nepean Zone Substation Feeder Upgrade (hereafter referred to as the Project) within the Wollondilly and Camden Local Government Area in the suburb of Spring Farm to Menangle, NSW.

Endeavour Energy supply electricity to the Greater Macarthur Area and require upgraded feeders within existing transmission lines to meet increasing electricity demand. The Project will involve the establishment of new power poles, removal of old power poles, and replacement of existing power poles. The transmission line will also be replaced with a new 66K feeder to support increased supply, following rezoning of the area to establish new homes, and local centres.

The existing feeder is located between Nepean Transmission Substation, 156 Springs Road, Spring Farm NSW 2570 in the north, and terminates at Menangle Road, Menangle NSW 2568, in the south (Figure 1). New poles and pole replacements are required as part of the feeder upgrade. All works are for overhead lines in existing easements. For the purpose of this report, all vegetation and habitats present within a 20 m radius of each pole to be replaced and potential new pole locations was assessed (the Study Area). The proposed Study Area is approximately 4.3 hectares (ha) in total.

Further detailed regarding the Project are included within the Review of Environmental Factors (REF) (Niche 2024) which this FFA report accompanies.

Aim of assessment

The primary aim of this Project was to undertake field surveys to assess any potential ecological impacts associated with the Project as required under State and Federal legislation.

Key results and impacts

The presence of the following Plant Community Types (PCTs) were confirmed within the Study Area:

- *PCT 3319 Cumberland Shale Hills Woodland* (approximately 0.1 ha)
- *PCT 3320 Cumberland Shale Plains Woodland* (woodland (approximately 0.2 ha) and Derived Native Grassland (DNG) (approximately 0.3 ha) formations).

PCTs 3319 and 3320 are associated with the following Threatened Ecological Communities (TECs):

- Critically Endangered Ecological Community (CEEC) *Cumberland Plain Woodland in the Sydney Basin Bioregion*, listed under the NSW Biodiversity Conservation Act 2016 (BC Act)
- CEEC *Cumberland Plain Shale Woodlands and Endangered Ecological Community (EEC) Shale-Gravel Transition Forest*, listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

All areas of PCT 3319 and 3320 align with the BC Act TEC (approximately 0.6 ha within Study Area). Areas of BC Act TEC are unlikely to meet the condition criteria thresholds for the EPBC Act TEC as vegetation within the Study Area generally had heavy exotic weed encroachment, were previously cleared, low native diversity and low to no native canopy cover.

Disturbance to native vegetation would be limited to trimming branches of a select number of canopy trees and slashing of predominantly exotic groundcover vegetation. Eucalypt saplings and DNG TEC are at risk of being



trampled or driven over, however, impacts are expected to be minimal and temporary with appropriate mitigation measures.

No threatened flora or fauna species were recorded within the Study Area. Two threatened flora species and one fauna species were assessed as having a moderate or high likelihood of occurrence with potential for impact from the Project:

- Spiked Rice-flower (*Pimelea spicata*) (listed as Endangered under the BC and EPBC Act)
- Sydney Plains Greenhood (*Pterostylis saxicola*) (listed as Endangered under the BC and EPBC Act)
- Cumberland Plain Land Snail (*Meridolum corneovirens*) (listed as Endangered under the BC Act).

Impacts to threatened flora species are unlikely as the Study Area has been previously disturbed. Impacts can be avoided by undertaking pre-clearance surveys immediately prior to commencing works. The Cumberland Plain Land Snail is unlikely to be significantly impacted by the Project as suitable habitat features for the species (dense leaf litter and detritus) will not be removed and protective fencing will be installed around potential habitat.

Recommendations

The Project will avoid impacts to biodiversity in the following ways:

- No permanent removal of native vegetation or habitat. Vegetation removal will be limited to pruning select branches of canopy trees and slashing predominantly exotic groundcover species. No logs or other habitat features will be removed.
- Avoid trampling of eucalypt saplings. Eucalypt saplings within the impact area would be flagged and avoided, and slashing works would be undertaken manually using hand-held tools rather than large plant.

The following recommendations should be implemented to minimise impacts to flora, fauna, and their habitats:

- Pre-clearance surveys will be undertaken by a qualified ecologist to any identify threatened biodiversity which may require protection during the proposed construction works.
- Exclusion fencing will be installed around intact woodland with no-go zones established around potential Cumberland Plain Land Snail habitat (i.e. logs, leaf litter, bases of trees). Temporary protective fencing should be installed prior to works around no-go areas and are to remain in place until all works are completed.
- Avoid driving through areas of DNG where practical, the shortest/ best route should be taken with the minimum number of vehicles when the ground is dry to minimise impacts to the DNG TEC.
- Should any threatened species be discovered on site prior to or during construction, works will cease immediately, and the project Ecologist is to be notified. Works will not proceed until further advice is provided by the project Ecologist.
- Sediment and erosion controls (e.g. silt fencing) will be implemented during construction works to ensure no indirect impacts to surrounding biodiversity.
- To prevent the spread of weed seed and pathogens, all machinery should be clean of external weed material and on-site plant will be washed prior to moving to a new location. Existing weeds should be left undisturbed wherever possible to avoid spread.
- Soil disturbance for pole removal/replacement/installation should be minimised and soil that is disturbed should be replaced according to the natural profile of the soil (i.e. topsoil reinstated) to expedite rehabilitation.

Conclusion

Given the project consists minor works (replacement of existing, and/or installation of new power poles) within the existing services footprint, the proposed works are unlikely to have significant impacts to TECs or threatened species listed under the BC Act or EPBC Act. As such, further assessment under the BC Act, and Referral under the EPBC Act is not required for the Project. Offsetting is not required under the BC or EPBC Act.



Glossary and list of abbreviations

Term or abbreviation	Definition
BOS	Biodiversity Offsets Scheme
CEEC	Critically Endangered Ecological Community
CPCP	Cumberland Plain Conservation Plan
Cth DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
EEC	Endangered Ecological Community
FFA	Flora and Fauna Assessment
KTP	Key Threatening Processes
km	Kilometre
LGA	Local Government Area
m	Metre
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
PCT	Plant Community Type
RDP	Rapid Data Point
REF	Review of Environmental Factors
SIS	Species Impact Statement
TEC	Threatened Ecological Community



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1 Introduction

1.1 Background and need for the Project

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by Endeavour Energy to undertake a terrestrial Flora and Fauna Assessment (FFA) for the proposed Endeavour Energy Nepean Zone Substation Feeder Upgrade (hereafter referred to as the Project) within the Wollondilly and Camden Local Government Area in the suburb of Spring Farm to Menangle, NSW (Figure 1).

1.2 The Project

Details of the Project are included within the *Nepean Zone Substation Feeder Upgrade Review of Environmental Factors* (REF) (Niche 2022) which this document accompanies. The REF includes a description of the equipment used to undertake the Project.

All figures referenced in this report are to those provided in the associated REF.

Endeavour Energy supply electricity to the Greater Macarthur Area and require upgraded feeders within existing transmission lines to meet increasing electricity demand. The Project will involve the establishment of new power poles, removal of old power poles, and replacement of existing power poles. The transmission line will also be replaced with a new 66K feeder to support increased supply, following rezoning of the area to establish new homes, and local centres.

The existing feeder is located between Nepean Transmission Substation, 156 Springs Road, Spring Farm NSW 2570 in the north, and terminates at Menangle Road, Menangle NSW 2568, in the south (Figure 1). New poles and pole replacements are required as part of the feeder upgrade. All works are for overhead lines in existing easements. For the purpose of this report, all vegetation and habitats present within a 20 m radius of each pole to be replaced and potential new pole locations was assessed (hereafter referred to as the Study Area) (Figure 2). The proposed Study Area is approximately 4.3 hectares (ha) in total. For the most part, the Study Area is comprised of previously disturbed areas (Figure 12). While the entire Study Area has the potential to be impacted by the Project, vegetation disturbance will be avoided wherever practical.

1.3 Project location

The Project is located in Spring Farm, Camden and Menangle, NSW, in the Wollondilly and Camden Local Government Area (LGA) (Figure 1).

A summary of the major geophysical features of the Study Area is presented in Table 1 below.

Table 1: Geophysical context of the Study Area

Geographical Feature	Description
Bioregion	Sydney Basin Bioregion
LLS region	Southeast
Local government area	Wollondilly LGA and Camden LGA



Geographical Feature	Description
Watercourses	Nepean River (outside of Study Area but flows underneath transmission line overhead conductors) and Foot Onslow Creek
Nearby conservation areas	Dharawal State Conservation Area (approximately 6.5 km southeast of the Study Area), Upper Nepean State Conservation Area (approximately 11.6 km southwest of the Study Area)

1.4 Report objectives

The primary objective of this report is to assess potential impacts on ecological values within the Study Area and provide management and mitigation measures to reduce these impacts.

The approach to this assessment includes:

- Undertaking a background review of relevant literature, mapping, and databases
- Describing the ecological values of the Study Area in regard to flora, fauna and vegetation communities (biota)
- Describe the potential ecological impacts associated with the Project
- Assess impacts on threatened biodiversity as listed on the BC Act and the EPBC Act
- Provide advice on measures to avoid or mitigate direct/ indirect impacts of the Project on threatened biota.

1.5 Legislative context

This section provides details of the relevant Commonwealth, State and local planning provisions and a discussion of their application to the Project.

1.5.1 Environment Protection and Biodiversity Conservation Act 1999

The purpose of the EPBC Act is to ensure that actions likely to cause a significant impact on Matters of National Significance (MNES) undergo an assessment and approval process. Under the EPBC Act, an action includes a project, undertaking, development or activity. An action that 'has, will have or is likely to have a significant impact on MNES' is deemed to be a controlled action and may not be undertaken without prior approval from the Commonwealth Minister for the Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW).

The EPBC Act identifies MNES as:

- World Heritage properties
- National Heritage places
- Wetlands of international importance
- Commonwealth listed threatened species and ecological communities
- Commonwealth listed Migratory species
- Commonwealth marine or land areas
- Nuclear actions (including uranium mining)
- The Great Barrier Reef Marine Park
- A water resource in relation to coal seam gas development and large coal mining development.

Listings deemed relevant to the Project are to be assessed in accordance with relevant guidelines.



1.5.2 Biodiversity Conservation Act 2016

The BC Act establishes a framework for assessing and offsetting biodiversity impacts from proposed development. The purpose of the BC Act is to *"maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development"*. It provides guidance in relation to:

- Threatened species and TECs
- AOBV
- Key Threatening Processes (KTPs)
- Private land conservation agreements
- The Biodiversity Offsets Scheme (BOS)
- Biodiversity assessment requirements
- Biodiversity certification of land.

Listings deemed relevant to the Project have been assessed in accordance with relevant guidelines.

1.5.3 NSW Biosecurity Act 2015

The *Biosecurity Act 2015* provides for the management and control of priority and environmental weeds by local control authorities. All private landowners, occupiers, public authorities, and councils are required to control weeds on their land under Schedule 1 of the Act.

Mitigation against the spread of weeds has been addressed in Section 4

1.5.4 NSW Environmental Planning and Assessment Act 1979

The *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) provides an assessment framework for threatened species, populations, ecological communities, and their habitats. The Project will be assessed under Part 5 of the EP&A Act. Section 7.3 of the BC Act, the test of significance, sets the criteria for determining whether a Project is likely to have a significant impact on threatened biodiversity.

For an activity under Part 5 of the EP&A Act an activity will be likely to significantly affect a threatened species if:

- It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test of significance (section 7.3 of the BC Act)
- It is carried out in a declared area of outstanding biodiversity value (AOBV).

Under Part 5 of the EP&A Act, if it is determined that an activity is likely to significantly affect a threatened species the following would be required:

- The preparation of a Species Impact Statement (SIS), or
- A Biodiversity Development Assessment Report (BDAR) (if the proponent elects to participate in the BOS).

1.5.5 State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP)

The Biodiversity and Conservation SEPP consolidates, transfers and repeals provisions of the following 11 SEPPs (or deemed SEPPs):

- SEPP (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP)
- SEPP (Koala Habitat Protection) 2020 (Koala SEPP 2020)
- SEPP (Koala Habitat Protection) 2021 (Koala SEPP 2021)
- Murray Regional Environmental Plan No 2—Riverine Land (Murray REP)
- SEPP No 19—Bushland in Urban Areas (SEPP 19)
- SEPP No 50—Canal Estate Development (SEPP 50)



- SEPP (Sydney Drinking Water Catchment) 2011 (Sydney Drinking Water SEPP)
- Sydney Regional Environmental Plan No 20 – Hawkesbury – Nepean River (No 2 – 1997) (Hawkesbury-Nepean River SREP)
- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Sydney Harbour Catchment SREP)
- Greater Metropolitan Regional Environmental Plan No 2 – Georges River Catchment (Georges River REP)
- Willandra Lakes Regional Environmental Plan No 1 – World Heritage Property (Willandra Lakes REP).

The Study Area is located within the Camden and Wollondilly LGAs, however, the Project is being assessed under Part 5 of the EP&A Act. As such, the provisions of Koala SEPP 2021 do not apply in relation to the assessment of Koala habitat.

Koala habitat is not likely to be impacted by the Project, as full clearance of native vegetation is not proposed as part of the works (secondary clearing only).

1.5.6 Camden Local Environmental Plan 2010

The *Camden Local Environmental Plan 2010* (CLEP) outlines the key planning controls used to manage the way land is used through zoning and development standards.

The Project will be compliant with the controls outlined in the CLEP.

1.5.7 Wollondilly Local Environmental Plan 2011

The *Wollondilly Local Environmental Plan 2011* (WLEP) outlines the key planning controls used to manage the way land is used through zoning and development standards.

The Project will be compliant with the controls outlined in the WLEP.

1.5.8 Camden Development Control Plan 2019

The *Camden Development Control Plan 2019* (CDCP) supports the CLEP, providing guidance for development including design, general standards, and area-based provisions.

The Project will be compliant with the controls outlined in the CDCP.

1.5.9 Wollondilly Development Control Plan 2016

The *Wollondilly Development Control Plan 2016* (WDCP) supports the WLEP, providing guidance for development including design, general standards, and area-based provisions.

The Project will be compliant with the controls outlined in the WDCP.

1.5.10 Cumberland Plain Conservation Plan

The Study Area falls within the Cumberland Plain Conservation Plan (CPCP) area, which covers approximately 200,000 hectares and extends from north of Windsor to Picton in the south, and from the Hawkesbury-Nepean River in the west to the Georges River near Liverpool in the east (DPE 2022). Existing land use within the CPCP area is mainly freehold rural and residential land, with more than 75% of the remaining native vegetation in the Cumberland subregion in private ownership. The CPCP facilitates the delivery of areas nominated for urban development in Western Sydney.

The Study Area falls partially within a Strategic Conservation Area under the CPCP, defined as an area with strategic biodiversity value that include threatened ecological communities and species and have important connectivity across the landscape and ecological restoration potential.



1.6 Literature review

Database searches for a 5 km radius around the Study Area were conducted in January 2024 to identify threatened biodiversity and migratory species with known occurrences in the locality.

The following databases and literature were used for this purpose:

- NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) BioNet Atlas (NSW DCCEEW 2024a)
- Commonwealth DCCEEW EPBC Act Protected Matters Search Tool (PMST) (Cth DCCEEW 2024a).

The NSW State Vegetation Type Map (SVTM) (NSW DCCEEW 2022) was examined prior to the field survey to determine the Plant Community Types (PCTs) likely to be present in the Study Area (Figure 7).

1.7 Field surveys

A site assessment of the Study Area was undertaken on the 23rd of April and 3rd May 2024 by Niche ecologist Mandy Melvaine. The site assessment was undertaken to verify the existing vegetation mapping (NSW DCCEEW 2022), determine the presence of Threatened Ecological Communities (TECs) and search for any direct or indirect signs of threatened fauna presence or habitat, that might be impacted by the Project.

1.7.1 Rapid data points

Rapid Data Points (RDPs) were collected at pole replacement, removal, and new pole locations to verify existing vegetation community mapping. Data collected at each of these points included:

- Dominant overstorey, midstorey and groundcover species
- Composition and structure
- Landscape features
- Habitat features
- Incidental observations
- Photo points.

1.7.2 Fauna habitat assessment

A habitat assessment was conducted throughout the Study Area. Habitat characteristics and parameters that were assessed included:

- Aspect/slope of the site
- Dominant vegetation, floristic composition, and structure
- Composition of ground layer (bare earth, litter etc.)
- Presence and relative abundance of key habitat features (e.g. tree hollows, large logs, exfoliating rock, flowering resources, aquatic features)
- Direct or indirect signs of presence
- Condition and disturbance factors
- Vegetation age structure.



1.8 Likelihood of occurrence

A list of subject threatened flora and fauna within the locality (5 km radius) was determined from database searches detailed in Section 1.6. The list of potentially impacted species is determined from consideration of this list and is provided in Appendix A.

In order to adequately determine the relevant level of assessment to apply to potentially affected species, further analysis of the likelihood of those species occurring within the Study Area was completed.

Five categories for 'likelihood of occurrence' (Table 4) were attributed to species after consideration of criteria such as known records, presence or absence of important habitat features on the subject site, results of the field surveys and professional judgement. This process was completed on an individual species basis.

Species with a moderate to high likelihood of occurrence, were considered further in formal Assessments of Significance (under the BC Act and/EPBC Act). Species listed as a 'Low' or 'Nil' in the likelihood of occurrence assessment were those species for which are not known to occur in the region, there is habitat limited, or does not occur within the Study Area.

Table 2: Likelihood of occurrence criteria

Likelihood rating	Threatened flora criteria	Threatened and migratory fauna criteria
Known	The species was observed within the Study Area.	The species was observed within the Study Area.
High	It is likely that a species inhabits or utilises habitat within the Study Area.	It is likely that a species inhabits or utilises habitat within the Study Area.
Moderate	Potential habitat for a species occurs on the site. Adequate field survey would determine if there is a 'high' or 'low' likelihood of occurrence for the species within the Study Area.	Potential habitat for a species occurs on the site and the species may occasionally utilise that habitat. Species unlikely to be wholly dependent on the habitat present within the Study Area.
Low	It is unlikely that the species inhabits the Study Area.	It is unlikely that the species inhabits the Study Area. If present at the site, the species would likely be a transient visitor. The site contains only very common habitat for this species which the species would not rely on for its on-going local existence.
Nil	The habitat within the Study Area is unsuitable for the species.	The habitat within the Study Area is unsuitable for the species.



1.9 Limitations

Numerous threatened plant and animal species are cryptic or difficult to detect. Some cryptic plant species are more easily detected at certain times of the year, such as during flowering events.

Some fauna can only be detected during certain seasons (e.g. migration patterns or intra-torpor periods). These limitations are reduced by undertaking a habitat assessment, and assuming cryptic species are present if suitable habitat is present within the Study Area.

For this report, opportunistic fauna surveys were limited to assessment of habitat values, and incidental observations. Habitat assessments are conservative and default to an assumed presence where there is insufficient knowledge to determine otherwise. Assumed presence of a species requires the impact of the development/activity on that species to be assessed. However, in this survey it was noted that no significant fauna habitat was present within the Study Area (e.g. hollows, nests etc.).



2 Results

2.1 Vegetation communities

The following Plant Community Types (PCTs) were previously mapped (NSW DCCEEW 2022) within the Study Area (Figure 7):

- PCT 3318 Cumberland Moist Shale Woodland
- PCT 3319 Cumberland Shale Hills Woodland
- PCT 3320 Cumberland Shale Plains Woodland
- PCT 4025 Cumberland Red Gum Riverflat Forest.

Field surveys confirmed the presence of PCT 3319 (approximately 0.10 ha) and PCT 3320 (approximately 0.2 ha intact woodland and 0.3 ha Derived Native Grassland (DNG)) within the Study Area (Figure 12).

The majority of vegetation within the Study Area is highly modified and consisted mainly of cleared land used for exotic pasture and cropping (Plate 1 and Plate 2). Weed species were prevalent and included Patterson's Curse (*Echium plantagineum*), African Lovegrass (*Eragrostis curvula*), Cobbler's Peg (*Bidens Pilosa*) and Blackberry (*Rubus fruticosus* subspecies aggregate). The base of existing poles were all generally surrounded by exotic species. Exotic shrub species found within the Study Area consisted mainly of African Boxthorn (*Lycium ferocissimum*) and Sweet Briar (*Rosa rubiginosa*) (Plate 3). Exotic canopy species within the Study Area were mostly found near riparian areas and included Broad-leaf Privet (*Ligustrum lucidum*), Pepper Tree (*Schinus molle*) (Plate 4) and Common Olive (*Olea Africana*).



Plate 1: Pole location adjacent to crop field (PPS-3)



Plate 2: Pole location on exotic grazing land (PPS-30)



Plate 3: Exotic groundcover and midstorey species (PPS-31a)



Plate 4: Exotic Pepper Trees along Foot Onslow Creek (PPS-32)

Patches of native woodland (PCTs 3319 and 3320) contained canopy tree species Grey Box (*Eucalyptus moluccana*), Narrow-leaved Ironbark (*Eucalyptus crebra*) and Forest Red Gum (*Eucalyptus tereticornis*) (Plate 5), with regenerating eucalypt species (species not determined during field surveys), observed at several pole locations. The shrub layer was typically absent or sparse with Native Blackthorn (*Bursaria spinosa*) at multiple locations and Parramatta Wattle (*Acacia parramattensis*) recorded at one pole location (Plate 6). The ground layer was generally highly disturbed with native species present including Common Couch (*Cynodon dactylon*), Weeping Grass (*Microlaena stipoides*) and Kangaroo Grass (*Themeda triandra*). Areas of DNG were dominated by *Themeda australis* (Plate 7). One pole location contained planted native *Acacia* sp. with exotic groundcover (Plate 8).



Plate 5: Pole location adjacent to native woodland, nearest branches likely to require pruning (PPS-11)



Plate 6: Native Blackthorn and Parramatta Wattle located at the base of existing power poles (PPS-10a)



Plate 7: DNG upslope of pole location (PPS-13)



Plate 8: Planted *Acacia spp.* and exotic Rhodes Grass (*Chloris gayana*) (PPS-22)

2.2 Threatened ecological communities

PCTs 3319 and 3320 are associated with the following TEC listings:

- BC listed CEEC *Cumberland Plain Woodland* in the *Sydney Basin Bioregion*
- EPBC listed CEEC *Cumberland Plain Shale Woodlands* and EEC *Shale-Gravel Transition Forest*.

Both BC and EPBC listings are hereafter referred to as Cumberland Plain Woodland. All vegetation mapped as PCTs 3319 and 3320 meets the criteria for BC listed Cumberland Plain Woodland (approximately 0.6 ha) due to the landscape positioning of the Study Area on the Cumberland Plain and the presence of characteristic canopy species such as Grey Box, Narrow-leaved Ironbark and Forest Red Gum (Plate 9, Figure 12).

To be regarded as part of EPBC listed TEC, minimum condition thresholds must be met. Some areas of PCT 3319 and 3320 within the Study Area may be part of a patch that meets these criteria; however, more detailed vegetation survey methods would be required to rule this out (e.g. conducting floristic Biodiversity Assessment Method (BAM) plots to determine the condition class of the TEC in the locality). The vegetation within the Study Area generally had heavy exotic weed encroachment, were previously cleared, low native diversity and low to no native canopy cover, and therefore would not meet condition criteria of the TEC under the EPBC Act.



Plate 9: Cumberland Plain Woodland TEC adjacent to PPS-2 (left) and PPS-12 (right)

2.3 Threatened flora

Database searches found 30 threatened flora species previously recorded within 5 km or predicted to occur within the Study Area. Of these, two species were assessed as having a moderate likelihood of occurrence in the Study Area within intact woodland habitat:

- Spiked Rice-flower (*Pimelea spicata*) (listed as Endangered under the BC and EPBC Acts)
- Sydney Plains Greenhood (*Pterostylis saxicola*) (listed as Endangered under the BC and EPBC Acts).

No threatened flora species were recorded within the Study Area during field surveys; however, field surveys were conducted outside of the Sydney Plains Greenhood flowering time and the Spiked Rice-flower has unpredictable flowering times that are dependent on rain events. These species are unlikely to occur within highly degraded habitat and potential impacts to these species can be avoided if pre-clearing surveys are carried out to rule out their presence. Therefore, the Spiked Rice-flower and Sydney Plains Greenhood are unlikely to be significantly impacted by the Project (Appendix D).

A list of flora species recorded during field surveys are provided in Appendix B.

2.4 Fauna

2.4.1 Fauna habitat

The Study Area supported limited woodland and aquatic habitat. Most of the Study Area is within disturbed agricultural lands that have been previously cleared/ managed. As such, the Study Area is unlikely to provide important habitat for threatened fauna species.

The following habitat features were identified within woodland habitats:

- Two hollow-bearing trees/stags with hollows of various sizes (<5 cm, 5-10 cm, 15-20 cm, >30 cm diameter) (Plate 10)
- Flowering trees and shrubs (*Eucalyptus spp.* and *Acacia spp.*)
- Fallen logs (Plate 11)
- Debris around bases of trees.

A wombat burrow was recorded within the northern extent of the Study Area.



Plate 10: Stag with hollows visible within the red circle, to the left of existing poles (PPS-7)



Plate 11: Logs and fallen debris at base of tree (PPS-7)

Foot Onslow Creek (within the southern portion of the study area), is a perennial watercourse, that runs adjacent to and intersects the Study Area (Plate 12). At the time of field surveys, Foot Onslow Creek had low (PPS-31a) to moderate (PPS-32) flow and water levels. The banks were steep and highly eroded at PPS-31a and contained pooling habitat and instream vegetation, including Common Couch, *Juncus sp.* and *Cyperus sp.* Foot Onslow Creek was wider at PPS-32 and contained emergent vegetation.

Farm dams were also observed within the Study Area, providing habitat for Common Eastern Froglet (*Crinia signifera*) and non-threatened wading birds including Australian Wood Duck (*Chenonetta jubata*). Common Eastern Froglet were also heard calling from ephemeral natural drainage lines that were dry at the time of field surveys (Plate 13).



Plate 12: Foot Onslow Creek (PPS-31a)

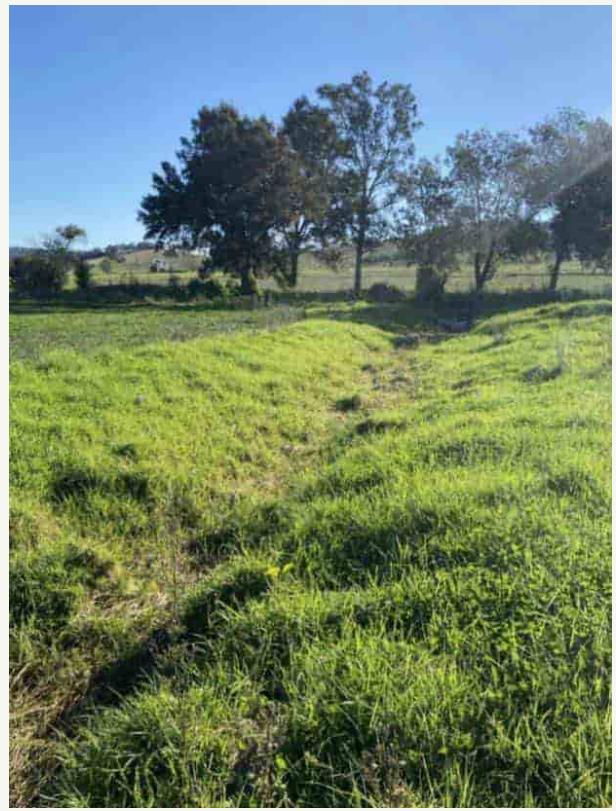


Plate 13: Natural drainage line (PPS-24)



2.4.2 Threatened fauna

Database searches found 61 threatened fauna species were previously recorded within 5 km or predicted to occur. Of these, one species is considered to have a high chance of occurring, 17 are considered to have a moderate chance of occurring, 34 are considered to have a low chance of occurring, and nine are considered to have no chance of occurring. No threatened fauna species were previously recorded within the Study Area or recorded during field surveys. A list of fauna species recorded on site are provided in Appendix C.

The 17 species with a moderate or high chance of occurring in the Study Area are the Cumberland Plain Land Snail (*Meridolum corneovirens*), Dusky Woodswallow (*Artamus cyanopterus*), Spotted Harrier (*Circus assimilis*), Varied Sittella (*Daphoenositta chrysopetra*), Little Lorikeet (*Glossopsitta pusilla*), Little Eagle (*Hieraetus morphnoides*), Swift Parrot (*Lathamus discolor*), Scarlet Robin (*Petroica boodang*), Diamond Firetail (*Stagonopleura guttata*), Large-eared Pied Bat (*Chalinolobus dwyeri*), Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*), Little Bent-winged Bat (*Miniopterus australis*), Large Bent-winged Bat (*Miniopterus orianae oceanensis*), Koala (*Phascolarctos cinereus*), Grey-headed Flying-fox (*Pteropus poliocephalus*) and Greater Broad-nosed Bat (*Scoteanax rueppellii*).

As no trees will be cleared as part of the Project and the Study Area provides limited foraging or breeding habitat for the above species, the potential for the Project to impact threatened fauna was considered low for all species except the Cumberland Plain Land Snail (listed as Endangered under the BC Act). Potential habitat features such as logs, leaf litter and the bases of trees within Cumberland Plain Woodland would be avoided, therefore the Cumberland Plain Land Snail is unlikely to be significantly impacted by the Project (Appendix D).



3 Impact assessment

3.1 Impacts of the Project

3.1.1 Direct impacts

3.1.1.1 Native vegetation

The Project would not involve the removal of any native canopy trees. Some trees will require pruning of select branches, none of which contained any hollows or nests. Pole installation will involve augering a hole up to 1 m in diameter and concreting new steel poles adjacent to the existing poles, which is generally within highly disturbed and exotic vegetation. Slashing of predominantly exotic groundcover species would be required within the impact areas immediately surrounding the poles and for access tracks at some locations. Most pole locations have pre-existing access tracks and will be within areas that are already highly disturbed. Areas of DNG that do not have pre-existing access tracks may be driven over by vehicles and machinery. There is the potential for some groundcover species and eucalypt saplings to be trampled (though not permanently removed), however this will be avoided where practical via adaptive management and mitigation measures.

3.1.1.2 Threatened Ecological Communities

Disturbance to *Cumberland Plain Woodland* TEC would be limited to minor pruning of some canopy trees on the edge of the existing powerline corridor, and slashing groundcover species (consisting of predominantly exotic species). Eucalypt saplings and DNG TEC are at risk of being trampled or driven over, however, impacts are expected to be minimal and temporary with appropriate mitigation measures. Overall, impacts to *Cumberland Plain Woodland* are unlikely to be significant (Appendix D). Further assessment would be required if any additional direct impacts (e.g. clearing) of *Cumberland Plain Woodland* is required.

3.1.1.3 Threatened flora

No threatened flora species were detected during field surveys; however, field surveys were conducted outside of the Sydney Plains Greenhood flowering time and the Spiked Rice-flower has unpredictable flowering times (reliant on specific rainfall events). However, based on the known ecology and habitat preferences of these species, it is considered unlikely that these species would occur within the disturbed areas of the Study Area. Despite this, and as a precautionary approach, appropriate mitigation measures are recommended to minimise potential impacts to these species. As a result, impacts to threatened flora species are not expected to be significant (Appendix D).

3.1.1.4 Fauna habitat

No canopy trees or hollows would be cleared and impacts to threatened fauna habitat would be largely avoided. Potential *Cumberland Plain Land Snail* habitat such as leaf litter, logs and in the immediate vicinity of the bases of canopy species will also be avoided by the Project. As a result, impacts to the *Cumberland Plain Land Snail* are not expected to be significant (Appendix D).

3.1.2 Indirect impacts

As can be seen in Table 3 below, indirect impacts such as changes to hydrology, sedimentation and erosion, weed invasion, and spread of pests and pathogens are considered unlikely due to the mitigation measures that would be implemented during the Project (see Section 4).



Table 3: Direct and indirect impacts associated with the Project

Impact	Likelihood of impact as a result of the Project
Direct impacts	
Removal or modification of native vegetation	Some native canopy trees will require pruning, native groundcover species around pole and some access tracks will be slashed. Trampling of groundcover species and eucalypt saplings and driving through areas of DNG TEC may occur, however impacts will be minimised with appropriate mitigation measures.
Loss of individuals of a threatened species	Unlikely (mitigated)
Removal or modification of threatened species habitat other than native vegetation	Unlikely
Death through trampling	Unlikely (mitigated)
Death through poisoning	Unlikely
Loss of individuals through starvation	Unlikely
Loss of individuals through exposure	Unlikely
Predation by domestic and/or feral animals	Unlikely
Loss of breeding opportunities	Unlikely
Loss of shade/shelter	Unlikely
Indirect impacts	
Edge effects	Unlikely
Deleterious hydrological changes	Unlikely (mitigated)
Increased soil salinity	Unlikely
Sedimentation and erosion	Unlikely (mitigated)
Inhibition of nitrogen fixation	Unlikely



Impact	Likelihood of impact as a result of the Project
Weed invasion	Unlikely (mitigated)
Spread of pests and pathogens	Unlikely (mitigated)
Fertiliser drift	Unlikely
Increased human activity within or directly adjacent to sensitive habitat areas	Unlikely (mitigated)

3.2 Key threatening processes

As part of an assessment of impacts under the BC and EPBC Acts, consideration must be given to whether the action proposed constitutes, or is part of, a Key Threatening Process (KTP) or is likely to result in the operation of or increase the impact of a KTP on threatened biodiversity. The KTPs listed in Table 4 have the potential to be exacerbated by the Project. These KTPs constitute threats to biodiversity that may require management at the site.

Table 4: Key threatening processes considered in the Study Area

Key Threatening Process	BC Act	EPBC Act equivalent	Impact of KTP
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Yes	No	Mitigation measures would be in place to prevent erosion and sedimentation along Foot Onslow Creek.
Bushrock removal	Yes	No	No bushrock removal has been proposed.
Clearing of native vegetation	Yes	Yes	No native vegetation is proposed to be cleared, groundcover species will be slashed, and some trees will require pruning of select branches. Eucalypt saplings and DNG TEC are at risk of being trampled or driven over, however impacts are expected to be temporary with appropriate mitigation measures.



Key Threatening Process	BC Act	EPBC Act equivalent	Impact of KTP
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	Yes	Yes	Mitigation measures would be in place to prevent infection.
Infection of native plants by <i>Phytophthora cinnamomi</i>	Yes	Yes	Mitigation measures would be in place to prevent infection.
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	Yes	Yes	Mitigation measures would be in place to prevent introduction/establishment.
Invasion and establishment of exotic vines and scramblers	Yes	Yes	Mitigation measures would be in place to prevent invasion.
Invasion, establishment and spread of Lantana (<i>Lantana camara</i>)	Yes	Yes	Mitigation measures would be in place to prevent invasion.
Invasion of native plant communities by African Olive <i>Olea europaea</i> subsp. <i>cuspidata</i>	Yes	Yes	Mitigation measures would be in place to prevent invasion.
Invasion of native plant communities by <i>Chrysanthemoides monilifera</i>	Yes	Yes	Mitigation measures would be in place to prevent invasion.
Invasion of native plant communities by exotic perennial grasses	Yes	Yes	Mitigation measures would be in place to prevent invasion.
Loss of hollow-bearing trees	Yes	No	No hollow bearing trees are proposed to be removed.
Removal of dead wood and dead trees	Yes	No	No dead wood is proposed to be removed.



4 Impact avoidance and minimisation

This section details how the proposal would, in the first instance, avoid impacts to biodiversity, then apply mitigation measures where avoidance is not possible.

4.1 Avoid

The Project will avoid impacts to biodiversity in the following ways:

- There will be no permanent removal of native vegetation or associated habitats. Vegetation removal will be limited to minor pruning of selected branches and slashing groundcover species (which are predominantly exotic). No ground refugia or other habitat features will be removed.
- It is recommended that the proposed works avoid trampling of regenerating eucalypt species within the Study Area (as they are likely part of Cumberland Plain Woodland). Eucalypt saplings within the Study Area would be flagged and avoided, and slashing works would be undertaken manually using hand-held tools rather than large machinery.

4.2 Minimise and mitigate

The following recommendations should be implemented to minimise impacts to flora, fauna, and their habitats:

- Pre-clearance surveys will be undertaken by a qualified ecologist to any identify threatened biodiversity which may require protection during the proposed construction works.
- Exclusion fencing will be installed around intact woodland with no-go zones established around potential Cumberland Plain Land Snail habitat (i.e. logs, leaf litter, bases of trees). Temporary protective fencing should be installed prior to works around no-go areas and are to remain in place until all works are completed.
- Avoid driving through areas of DNG where practical, the shortest/ best route should be taken with the minimum number of vehicles when the ground is dry to minimise impacts to the DNG TEC.
- Should any threatened species be discovered on site prior to or during construction, works will cease immediately, and the Project ecologist is to be notified. Works will not proceed until further advice is provided by the Project ecologist.
- Sediment and erosion controls (e.g. silt fencing) will be implemented during construction works to ensure no indirect impacts to surrounding biodiversity.
- To prevent the spread of weed seed and pathogens, all machinery should be clean of external weed material and on-site plant will be washed prior to moving to a new location. Existing weeds should be left undisturbed wherever possible to avoid spread.
- Soil disturbance for pole replacement/removal /installation should be minimised and soil that is disturbed should be replaced according to the natural profile of the soil (i.e. topsoil reinstated) to expedite rehabilitation.



5 Conclusion

The Project would not require the permanent removal of native vegetation across the Study Area. Impacts to native vegetation will be limited to the pruning of select overhanging branches of canopy trees, slashing of predominantly exotic groundcover species, and potential wheel rut disturbance from vehicles and machinery. All native canopy species will be retained.

The presence of PCTs 3319 and 3320 were confirmed within the Study Area during field surveys. Both PCTs align with the BC listed Cumberland Plain Woodland CEEC. Cumberland Plain Woodland occurred within the Study Area in the form of intact woodland and DNG.

Two threatened flora species (Spiked Rice-flower and Sydney Plains Greenhood) were considered to have a moderate likelihood of occurring within native woodland habitats in the Study Area. No threatened flora species were recorded during field surveys; however, surveys were conducted outside of the flowering time for Sydney Plains Greenhood and flowering for Spiked Rice-flower is unpredictable. Provided appropriate mitigations are implemented (such as pre-clearance surveys), the Project is unlikely to be significantly impact threatened flora species.

No threatened fauna species were recorded during field surveys. Seventeen threatened fauna species were considered to have a moderate or high likelihood of occurring within the Study Area, of which, the Cumberland Plain Land Snail was considered the only species to potentially be impacted by the project. As such, further assessment was required (Appendix D). Potential habitat features suitable for Cumberland Plain Land Snail (e.g. fallen logs, and moderate and dense patches of leaf litter will be avoided. Provided appropriate mitigations are adopted to avoid potential Cumberland Plain Land Snail habitat, the Project is unlikely to be significantly impact the species.

The Project is unlikely to significantly impact on any TECs, or threatened species listed under the BC Act or EPBC Act. As such, the preparation of a Species Impact Statement (SIS) or entry into the BOS is not required.



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Appendix A. Likelihood of occurrence table

CE = Critically Endangered; E = Endangered; V = Vulnerable; C = Listed on China Australia Migratory Bird Agreement; J = Listed on Japan Australia Migratory Bird Agreement; K = Listed on Republic of Korea Australia Migratory Bird Agreement

Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
FAUNA							
Birds							
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	1 record within 5km, last recorded 2019 (DPE 2023a); Foraging, feeding or related behaviour likely to occur within area (5km) (DCCEEW 2024a)	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on	Low	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					flowering coastal woodlands and forests. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.		
<i>Aphelocephala leucopsis</i>	Southern Whiteface	V	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Inhabits open woodlands from near arid habitats, such as Acacia scrub and hummock grassland, through to the wetter grassy woodlands of south-eastern Australia, where Eucalypts dominate (Blakers et al. 1984). In the AMLR, small populations occur in mallee, box, and native pine woodlands at the margins of the region, preferring open understoreys (G. Carpenter pers. comm.).	Low	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V	-	17 records within 5km, last recorded 2021 (DPE 2023a)	The Dusky Woodswallow is widespread from the coast to inland, including the western slopes of the Great Dividing Range and farther west. It is often recorded in woodlands and dry open sclerophyll forests, and has also been recorded in shrublands, heathlands regenerating forests and very occasionally in moist forests or rainforests. The understorey is typically open with sparse eucalypt saplings, acacias, and other shrubs, often with coarse	Moderate	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					<p>woody debris. It is also recorded in farmland, usually at the edges of forest or woodland or in roadside remnants or wind breaks with dead timber. The nest is an open shallow untidy cup frequently built in an open hollow, crevice, or stump. Although Dusky Woodswallows have large home ranges, individuals may spend most of their time in about a 2-ha range and defend an area about 50 m around the nest. Dusky Woodswallows prefer larger remnants over smaller remnants. Competitive exclusion by Noisy Miners (<i>Manorina melanocephala</i>) is a significant threat to this species.</p>		
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	<p>Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. The species favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha spp.</i>) and spikerushes (<i>Eleocharis spp.</i>), it hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects, and snails. The species may construct feeding platforms over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.</p>	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	C,J,K	1 record within 5km, last recorded 2013 (DPE 2023a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	Spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. In Australasia, prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, or other low vegetation. Breeds in northern Siberia.	Nil	Nil – no habitat occurs within the Study Area.
<i>Calidris canutus</i>	Red Knot	-	E,C,J,K	8 records within 5km, last recorded 2009 (DPE 2023a)	Breeds in northern hemisphere. Occurs in coastal areas around Australia, with important sites in VIC, SA, WA, NT and Qld. Mainly inhabits intertidal mudflats, sandflats, and sandy beaches. Occasionally seen in terrestrial saline wetlands but rarely in freshwater wetlands. Forage in soft substrates in intertidal areas.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	The Curlew Sandpiper is distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. The Curlew Sandpiper	Nil	Nil – no habitat occurs within the Study Area.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					<p>breeds in Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving in Australia between August and November, and departing between March and mid-April. It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes, and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.</p>		
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	E	<p>1 record within 5km, last recorded 2018 (DPE 2023a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)</p>	<p>In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer, the species is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark</p>	Low	<p>Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.</p>



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					assemblages, or in dry forest in coastal areas and often found in urban areas.		
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black-Cockatoo	V	V	1 record within 5km, last recorded 2012 (DPE 2023a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of she oak occur. Black She oak (<i>Allocasuarina littoralis</i>) and Forest She oak (<i>A. torulosa</i>) are important foods. Dependent on large hollow-bearing eucalypts for nest sites.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Chthonicola sagittata</i>	Speckled Warbler	V	-	1 record within 5km, last recorded 2006 (DPE 2023a)	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100ha survive. The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies, typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth, and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
<i>Circus assimilis</i>	Spotted Harrier	V	-	1 record within 5km, last recorded 1991 (DPE 2023a)	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. The species occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland, and shrub steppe. It is found most in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Moderate	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V	-	3 records within 5km, last recorded 2006 (DPE 2023a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	The western boundary of the range of the Brown Treecreeper runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo, and Inverell and along this line the subspecies intergrades with the arid zone subspecies of Brown Treecreeper which then occupies the remaining parts of the state. The species is often found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (<i>Eucalyptus camaldulensis</i>) Forest bordering wetlands with an open	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.		
<i>Cuculus optatus</i>	Oriental Cuckoo	-	C,J,K	2 records within 5km, last recorded 2001 (DPE 2023a)	This species migrates to northern and eastern Australia in the warmer months. Occurs south to the Shoalhaven area. Occurs in a range of habitats, including monsoon forest, rainforest edges, leafy trees in paddocks, river flats, roadsides, and mangroves.	Low	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	3 records within 5km, last recorded 2006 (DPE 2023a)	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The species inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee, and Acacia woodland.	Moderate	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E	-	1 record within 5km, last recorded 2005 (DPE 2023a)	In Australia, Black-necked Storks are widespread in coastal and subcoastal northern and eastern Australia, as far south as central NSW (although vagrants may occur further south or inland, well away from breeding)	Low	Low - unlikely to affect abundance or quality of potential



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					areas). In NSW, the species becomes increasingly uncommon south of the Clarence Valley, and rarely occurs south of Sydney. Since 1995, breeding has been recorded as far south as Buladelah. Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries.		foraging habitat in the locality.
<i>Erythrotriorchis radiatus</i>	Red Goshawk	CE	E	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	The species is very rare in NSW, extending south to about 30°S, with most records north of this, in the Clarence River Catchment, and a few around the lower Richmond and Tweed Rivers. Formerly, it was at least occasionally reported as far south as Port Stephens. Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus Forest of coastal rivers.	Low	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Falco hypoleucus</i>	Grey Falcon	E	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The species is usually restricted to shrubland, grassland and wooded	Low	Low - unlikely to affect abundance or quality of potential



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. It also occurs near wetlands where surface water attracts prey.		foraging habitat in the locality.
<i>Gallinago hardwickii</i>	Latham's Snipe	-	J,K	5 records within 5km, last recorded 2014 (DPE 2023a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	Latham's Snipe is a non-breeding migrant to the southeast of Australia including Tasmania, passing through the north and New Guinea on passage. Latham's Snipe breed in Japan and on the east Asian mainland. Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and in saltmarsh and creek edges on migration. They also use crops and pasture.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	4 records within 5km, last recorded 2019 (DPE 2023a)	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pairs. The species forages primarily in the canopy of open Eucalyptus Forest and woodland, yet also finds food in Angophora,	Moderate	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.		
<i>Grantiella picta</i>	Painted Honeyeater	V	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria, and southern Queensland. During the winter it is more likely to be found in the north of its distribution. The species inhabits Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) and Box-Gum Woodlands and Box-Ironbark Forests. It is a specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	-	12 records within 5km, last recorded 2020 (DPE 2023a)	The White-bellied Sea-eagle is widespread along the New South Wales coast, and along all major inland rivers and waterways. The species habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. It occurs at sites near the sea or seashore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. The terrestrial habitats the species has been recorded in,	Moderate – has confirmed breeding sites along the Nepean River riparian corridor and may on occasion occupy the airspace above the Study Area.	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest).		
<i>Hieraetus morphnoides</i>	Little Eagle	V	-	11 records within 5km, last recorded 2020 (DPE 2023a)	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. The species occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. It nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Moderate	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	V	Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	White-throated Needletails often occur in large numbers over eastern and northern Australia. White-throated Needletails are aerial birds and for a time it was commonly believed that they did not land while in Australia. It has now been observed that birds will roost in trees, and radio-tracking has since confirmed that this is a regular activity.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Lathamus discolor</i>	Swift Parrot	E	CE	161 records within 5km, last recorded 2021 (DPE 2023a); Species or species habitat known to occur within area	The Swift Parrot breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and southwest slopes. On the mainland the species occur in	Moderate – along the Nepean River corridor (to the north of the Study Area), areas are	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
				(5km) (DCCEEW 2024a)	areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Their favoured feed trees include winter flowering species such as Swamp Mahogany <i>Eucalyptus robusta</i> , Spotted Gum <i>Corymbia maculata</i> , Red Bloodwood <i>C. gummiifera</i> , Forest Red Gum <i>E. tereticornis</i> , Mugga Ironbark <i>E. sideroxylon</i> , and White Box <i>E. albens</i> .	mapped within the Important Area Mapping (IAM) for the species.	more than a negligible amount.
<i>Melanodryas cucullata cucullata</i>	South-eastern Hooded Robin, Hooded Robin (south-eastern)	V	E	Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern form (subspecies <i>cucullata</i>) is found from Brisbane to Adelaide and throughout much of inland NSW, except for the extreme north-west, where it is replaced by subspecies <i>picata</i> . The species prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. It also requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
<i>Neophema chrysostoma</i>	Blue-winged Parrot	V	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	The main populations of Blue-winged Parrots are in Tasmania and Victoria, particularly in southern Victoria and the midlands and eastern areas of Tasmania. The species is occasionally found in New South Wales. The species inhabits a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones. Throughout their range they favour grasslands and grassy woodlands. They are often found near wetlands both near the coast and in semi-arid zones. Blue-winged Parrots can also be seen in altered environments such as airfields, golf-courses and paddocks.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Ninox strenua</i>	Powerful Owl	V	-	10 records within 5km (DPIE 2022a)	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains suggesting occupancy prior to land clearing. Now at low densities throughout most of its eastern range, rare along the Murray River and former inland populations may never recover. The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can	Low - species has confirmed breeding sites along the Nepean River riparian corridor, however, unlikely to occur within the Study Area.	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine Syncarpia glomulifera, Black She-oak Allocasuarina littoralis, Blackwood Acacia melanoxylon, Rough-barked Apple Angophora floribunda, Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species.		
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	-	CE	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	The Eastern Curlew is widespread in coastal regions in the north-east and south of Australia, including Tasmania, and scattered in other coastal areas. It is rarely seen inland. It breeds in Russia and north-eastern China. On passage, they are commonly seen in Japan, Korea, and Borneo. Small numbers visit New Zealand. The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours, and lagoons.	Nil	Nil - no habitat occurs within the Study Area.
<i>Petroica boodang</i>	Scarlet Robin	V	-	1 record within 5km, last recorded 2009 (DPE 2023a)	In NSW, the Scarlet Robin from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet	Moderate (foraging)	Low - unlikely to affect abundance or quality of potential



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. The species habitat usually contains abundant logs and fallen timber: these are important components of its habitat.		foraging habitat in the locality.
<i>Pycnoptilus floccosus</i>	Pilotbird	-	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	Pilotbirds are strictly terrestrial, living on the ground in dense forests with heavy undergrowth. They are typically seen in pairs or occasionally in family parties, occupying small territories all year round. Birds forage mostly in pairs for insects, and occasionally eat seeds and fruits. Breeding takes places between August and January. Adults build a domed nest on or near the ground in which they usually lay two eggs.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	In NSW many records of the Australian Painted Snipe are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. The species prefers fringes of swamps, dams and nearby marshy areas where	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					there is a cover of grasses, lignum, low scrub or open timber.		
<i>Stagonopleura guttata</i>	Diamond Firetail	V	-	2 records within 5km, last recorded 2009 (DPE 2023a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River. The species is found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. It also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities, and often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	Moderate	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Stictonetta naevosa</i>	Freckled Duck	V	-	2 records within 5km, last recorded 2019 (DPE 2023a)	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-	Low	Low - unlikely to affect abundance or quality of potential



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. The species prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.		foraging habitat in the locality.
<i>Tringa nebularia</i>	Common Greenshank, Greenshank	-	E	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	The Common Greenshank breeds in the Palaearctic regions and is widespread in Africa, Coastal Asia, the Indian subcontinent, the Philippines and southern New Guinea. They are common throughout Australia in the summer. Common Greenshanks are found both on the coast and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.

Fish

<i>Macquaria australasica</i>	Macquarie Perch	-	E	Species or species habitat may occur	The Macquarie Perch is known only from scattered localities in the cool upper reaches of the Murray-Darling system of New South Wales,	Nil	Nil – no habitat occurs within the Study Area.
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Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
				within area (5km) (DCCEEW 2024a)	including the Hawkesbury-Nepean and Shoalhaven catchments, Victoria and the Australian Capital Territory. Also found in man-made lakes on the NSW coast. The species inhabits cool, clear freshwaters of rivers with deep holes and shallow riffles. They are also found in lakes and reservoirs, where adults aggregate in small shoals during the spawning season.		
<i>Prototroctes maraena</i>	Australian Grayling	-	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	The Australian Grayling occurs in streams and rivers on the eastern and southern flanks of the Great Dividing Range, from Sydney, southwards to the Otway Ranges of Victoria and in Tasmania. The species is found in fresh and brackish waters of coastal lagoons, from Shoalhaven River in NSW to Ewan Ponds in South Australia	Nil	Nil – no habitat occurs within the Study Area.

Frogs

<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	The Giant Burrowing Frog is distributed in south eastern NSW and Victoria, and appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. It is found in heath, woodland and open dry sclerophyll	Low	Nil – no habitat occurs within the Study Area.
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Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					forest on a variety of soil types except those that are clay based.		
<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Since 1990 there have been approximately 50 recorded locations of Green and Golden Bell Frog in NSW, most of which are small, coastal, or near coastal populations. These locations occur over the species' former range; however they are widely separated and isolated. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven, and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands. The species inhabits marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha</i> spp.) or spikerushes (<i>Eleocharis</i> spp.). Optimal habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (<i>Gambusia holbrooki</i>), have a grassy area nearby and diurnal sheltering sites available. Some sites the species has been recorded in, occur in highly disturbed areas.	Low	Low - potential habitat within the Study Area (streams and dams) would be avoided by the Project.
<i>Litoria watsoni</i>	Southern Heath Frog, Watson's Tree Frog	E	E	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	<i>Litoria watsoni</i> distribution is highly fragmented in NSW. This species is known to breed in the upper reaches of permanent streams and in perched swamps, and non-breeding habitat is heath-based forests and woodlands where it shelters under leaf litter and low vegetation,	Nil	Nil - no habitat occurs within the Study Area.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					and hunts for invertebrate prey either in shrubs or on the ground.		

Gastropods

<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	E	-	40 records within 5km, last recorded 2020 (DPE 2023a)	Lives in small areas on the Cumberland Plain west of Sydney, from Richmond and Windsor south to Picton and from Liverpool west to the Hawkesbury and Nepean Rivers at the base of the Blue Mountains. The species primarily inhabits Cumberland Plain Woodland (a critically endangered ecological community). This community is a grassy, open woodland with occasional dense patches of shrubs. It is also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands, and the margins of River-flat Eucalypt Forest, which are also listed communities. It lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish.	High	Moderate - further assessment required (Appendix D).
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Insects

<i>Austrocordulia leonardi</i>	Sydney Hawk Dragonfly	-	E	Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	The Sydney hawk dragonfly has a very restricted distribution. The known distribution of the species includes three locations in a small area south of Sydney, from Audley to Picton. The species is known from the Hawkesbury-Nepean, Georges River, Port	Low	Low - aquatic habitat would not be impacted by the Project.
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Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					Hacking and Karuah drainages. The Sydney hawk dragonfly has specific habitat requirements and has only ever been collected from deep and shady riverine pools with cooler water. Larvae are found under rocks where they co-exist with <i>Austrocordulia refracta</i> .		

Mammals

<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	5 records within 5km, last recorded 2014 (DPE 2023a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	The Large-eared Pied Bat is found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. The species roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. It is found in well-timbered areas containing gullies.	Moderate (foraging)	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	1 record within 5km, last recorded 2019	The range of the Spotted-tailed Quoll has contracted considerably since European	Low	Low – unlikely to affect



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
				(DPE 2023a); Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	settlement. It is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Only in Tasmania is it still considered relatively common. The species has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath, and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares. Are known to traverse their home ranges along densely vegetated creek lines.		abundance or quality of potential foraging habitat in the locality.
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	-	7 records within 5km, last recorded 2020 (DPE 2023a)	The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. The species prefer moist habitats, with trees taller than 20 m.	Moderate	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern)	E	E	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	The Southern Brown Bandicoot has a patchy distribution. It is found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River, southern coastal Victoria and the Grampian Ranges, south-eastern South Australia, south-west Western Australia and the	Low	Low - unlikely to affect abundance or quality of potential



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					northern tip of Queensland. Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. Males have a home range of approximately 5-20 hectares whilst females forage over smaller areas of about 2-3 hectares.		foraging habitat in the locality.
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V	-	23 records within 5km, last recorded 2020 (DPE 2023a)	The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. The species typically inhabit dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. It roosts mainly in tree hollows but will also roost under bark or in man-made structures.	Moderate	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Miniopterus australis</i>	Little Bent-winged Bat	V	-	10 records within 5km, last recorded 2021 (DPE 2023a)	The Little Bentwing-bat occurs along the east coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. It prefers moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests, and banksia scrub. Generally found in well-timbered areas. The species roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small	Moderate	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					insects beneath the canopy of densely vegetated habitats.		
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	-	17 records within 5km, last recorded 2020 (DPE 2023a)	Large Bentwing-bats occur along the east and north-west coasts of Australia. The species use caves as the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings, and other man-made structures.	Moderate (foraging)	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Myotis macropus</i>	Southern Myotis	V	-	156 records within 5km, last recorded 2020 (DPE 2023a)	The Southern Myotis is mainly coastal but may occur inland along large river systems. Usually associated with permanent waterways at low elevations in flat/undulating country, usually in vegetated areas. Forages over streams and watercourses feeding on fish and insects from the water surface. Roosts in a variety of habitats including caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges and in dense foliage, typically near water.	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Notamacropus parma</i>	Parma Wallaby	V	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	The Parma Wallaby range is now confined to the coast and ranges of central and northern NSW from the Gosford district to the Queensland border. The species preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy	Nil	Nil – no habitat occurs within the Study Area.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					areas, rainforest margins and occasionally drier eucalypt forest.		
<i>Petauroides volans</i>	Greater Glider (southern and central)	-	E	Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1200 m above sea level. It prefers taller montane, moist eucalypt forest with relatively old trees and abundant hollows.	Nil	Nil - no habitat occurs within the Study Area.
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)	V	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.	Low	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	In NSW the Brush-tailed Rock-wallaby occurs from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. The species occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. It typically shelters or basks during the day in rock crevices, caves	Nil	Nil - no habitat occurs within the Study Area.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					and overhangs and are most active at night when foraging.		
<i>Phascolarctos cinereus</i>	Koala	E	E	45 records within 5km (DPIE 2022a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range. The species inhabit eucalypt woodlands and forests, and feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	Moderate	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Pseudomys novaehollandiae</i>	New Holland Mouse, Pookila	-	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales, and Queensland. The species is known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes	Low	Low – unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	54 records within 5km (DPIE 2022a); Foraging, feeding or related behaviour known to occur within	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual	Moderate	Low – unlikely to affect abundance or quality of potential



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
				area (5km) (DCCEEW 2024a)	locations. The species occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.		foraging habitat in the locality.
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	V	-	1 record within 5km, last recorded 2013 (DPE 2023a)	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and Northwest Slopes. It forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Low	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	-	9 records within 5km, last recorded 2020 (DPE 2023a)	The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however, does not occur at altitudes above 500 m. The species utilises a variety of habitats from woodland through to moist and dry eucalypt	Moderate	Low - unlikely to affect abundance or quality of potential foraging habitat in the locality.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					forest and rainforest, though it is most commonly found in tall wet forest.		

Reptiles

<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard, Pink-tailed Legless Lizard	V	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the Southwestern Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the Australian Capital Territory. It's found to inhabit sloping, open woodland areas with predominantly native grassy ground layers, particularly those dominated by Kangaroo Grass (<i>Themeda australis</i>). The sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. They are commonly found beneath small, partially embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites.	Low	Low - no rocky habitat within Study Area.
<i>Delma impar</i>	Striped Legless Lizard, Striped Snake-lizard	V	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass,	Low	Low - not known or predicted to occur within



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					Queanbeyan, Cooma, Muswellbrook and Tumut areas. Individuals are found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. They are also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland.		locality, Study Area is unlikely to provide habitat for this species.
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	E	E	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. The species shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring.	Low	Low - no rocky habitat within Study Area.
FLORA							
<i>Acacia bynoeana</i>	Bynoe's Wattle, Tiny Wattle	E	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Endemic to central eastern NSW, known a limited number of locations, often comprising populations of few plants. Grows mainly in heath/ dry sclerophyll forest on sandy soils, prefers open, sometimes slightly disturbed sites such as trail margins, road edges, and in recently burnt open patches. Flowers September to March, and fruit matures in November.	Low	Low – Study Area is unlikely to provide habitat for this species.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
<i>Acacia pubescens</i>	Downy Wattle, Hairy Stemmed Wattle	V	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	Occurs mainly in Bankstown-Fairfield-Rookwood and Pitt Town areas, with outliers at Barden Ridge, Oakdale and Mountain Lagoon. Grows on alluviums, shales and shale/sandstone intergrades. Soils characteristically gravely, often with ironstone. Occurs in open woodland and forest, in communities including Cooks River/Castlereagh Ironbark Forest, Shale/ Gravel Transition Forest and Cumberland Plain Woodland. Flowers from August to October.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Allocasuarina glareicola</i>		E	E	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	Primarily found in Richmond district; although outlier populations exist in Voyager Point, Liverpool. Found in open castlereagh woodland on lateritic soil. The species is associated with the following species: Parramatta Red Gum, Red Ironbark, Narrow-leaved Apple, Hard-leaved Scribbly Gum, and Melaleuca decora. Common associated understorey species include Prickly-leaved Paperbark, Finger Hakea, Needlebush, Dillwynia tenuifolia, Micromyrtus minutiflora, Swamp Wattle, Acacia brownei, Themeda australis and Xanthorrhoea minor.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid	E	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	Occurs from Central Coast NSW to southern Victoria. Mostly coastal but extends inland to Braidwood in southern NSW. In NSW grows in grassy dry sclerophyll woodland on clay loam	Low	Low – Study Area is unlikely to provide



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					or sandy soils, and less commonly in heathland on sandy loam soils. Flowers between September and November.		habitat for this species.
<i>Callistemon linearifolius</i>	Netted Bottle Brush	V	-	1 record within 5km, last recorded 2021 (DPE 2023a)	Recorded from the Georges to Hawkesbury Rivers in Sydney, and north to Nelson Bay. There is also a recent record from the northern Illawarra. Grows in dry sclerophyll forest on the coast and adjacent ranges. Flowers from spring to summer	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Commersonia prostrata</i>	Dwarf Kerrawang	E	E	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	In NSW occurs as individual plants at Penrose State Forest and Tallong with populations at Rowes Lagoon near the Corang and the Thirlmere lakes area, and at the Tomago sand beds near Newcastle. Grows on sandy, sometimes peaty soils in a variety of habitats.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	Occurs in coastal areas from East Gippsland to southern Queensland. Habitat preferences not well defined. Grows mostly in coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest. Prefers open areas in the understorey and is often found in association with Large Tongue Orchid and the Bonnet Orchid. Soils include moist sands, moist to dry clay loam and occasionally in accumulated eucalypt leaves. Flowers November-February.	Low	Low – Study Area is unlikely to provide habitat for this species.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
<i>Cynanchum elegans</i>	White-flowered Wax Plant	E	E	1 record within 5km, last recorded 1987 (DPE 2023a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	Occurs from Gerroa (Illawarra) to Brunswick Heads and west to Merriwa in the upper Hunter. Most common near Kempsey. Usually occurs on the edge of dry rainforest or littoral rainforest, but also occurs in Coastal Banksia Scrub, open forest and woodland, and Melaleuca scrub. Soil and geology types are not limiting. Flowering occurs between August and May, with the peak in November.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Eucalyptus benthamii</i>	Camden White Gum	CE	V	26 records within 5km (DPIE 2022a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	Occurs on the alluvial flats of the Nepean River and its tributaries. Known distribution from The Oaks (south) to Grose Wold (north) and Kedumba Valley (west). Two major subpopulations in Kedumba Valley and Bents Basin State Recreation Area. Occurs in wet open forest on alluvial flats, in well drained alluvial sands and gravels to 1 m deep. Requires a combination of deep alluvial sands and a flooding regime that permits seedling establishment.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Genoplesium baueri</i>	Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid	E	E	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Occurs from Ulladulla to Port Stephens, with only 13 known extant populations. Grows in sparse sclerophyll forest and moss gardens over sandstone. Flowers from February to March.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea	V	V	Species or species habitat known to	Occurs between Moss Vale/Bargo and lower Hunter Valley, with most occurrences in Appin,	Low	Low – Study Area is unlikely



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
				occur within area (5km) (DCCEEW 2024a)	Wedderburn, Picton and Bargo. Broad habitat range including heath, shrubby woodland and open forest on light clay or sandy soils, and often in disturbed areas such as on the fringes of tracks.		to provide habitat for this species.
<i>Haloragis exalata</i> subsp. <i>exalata</i>	Wingless Raspwort, Square Raspwort	V	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	Square Raspwort occurs in 4 widely scattered localities in eastern NSW. It is disjunctly distributed in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Requires protected and shaded damp situations in riparian habitats.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Leucopogon exolasius</i>	Woronora Beard-heath	V	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Occurs along the upper Georges River and in Heathcote NP, Royal NP and is also known from the Blue Mountains along the Grose River. Grows in woodland on sandstone and prefers rocky hillsides along creek banks up to 100 m altitude. Associated species include Sydney Peppermint and Silvertop Ash and Graceful Bush-pea, Flaky-barked Tea-tree and Dillwynia retorta.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Melaleuca deanei</i>	Deane's Melaleuca	V	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Occurs from Nowra to St Albans and west to the Blue Mountains, with most records in Ku-ring-gai/Berowra and Horseworthy/Wedderburn areas. Mostly grows on broad flat ridgetops, dry ridges and slopes and strongly associated with low nutrient sandy loam soils, sometimes with ironstone. Grows in heath- open forest,	Low	Low – Study Area is unlikely to provide habitat for this species.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					often in sandstone ridgeline woodland communities.		
<i>Persicaria elatior</i>	Knotweed, Tall Knotweed	V	V	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Tall Knotweed has been recorded in south-eastern NSW from Ulladulla to the Victorian border. In northern NSW it is known from Raymond Terrace and the Grafton area. This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Persoonia bargoensis</i>	Bargo Geebung	E	E	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Restricted to the western edge of the Woronora Plateau and the northern edge of the Southern Highlands, bounded by Picton, Douglas Park, Yanderra and the Cataract River. Occurs in woodland or dry sclerophyll forest on sandstone and clayey laterite on heavier, well drained, loamy, gravelly soils of Hawkesbury Sandstone and Wianamatta Shale. Tends to occur in disturbed areas e.g. roadsides and trail margins.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Persoonia hirsuta</i>	Hairy Geebung, Hairy Persoonia	E	E	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Occurs within the Blue Mountains, Southern Highlands and Sydney coastal regions from Hilltop to Glen Davis and Royal NP to Gosford. Population within the Hills Shire particularly important due to high density of plants. Grows on sandy soils in dry sclerophyll open forest,	Low	Low – Study Area is unlikely to provide habitat for this species.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
					woodland and heath on sandstone up to 600 m above sea level.		
<i>Persoonia nutans</i>	Nodding Geebung	E	E	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	Occurs from Richmond to Macquarie Fields on the Cumberland Plain. Grows only on aeolian and alluvial sediments in sclerophyll forest and woodland vegetation communities. Largest populations occur in Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Pimelea spicata</i>	Spiked Rice-flower	E	E	33 records within 5km (DPIE 2022a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	Disjunct populations within the Cumberland Plain ((Marayong and Prospect Reservoir south to Narellan and Douglas Park) and Illawarra (Landsdowne to Shellharbour to northern Kiama). In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils. On the Cumberland Plain sites it is associated with Grey Box communities. In the coastal Illawarra it occurs commonly in Coast Banksia open woodland.	Moderate	Low to moderate – further assessment required (Appendix D).
<i>Pomaderris brunnea</i>	Brown Pomaderris	E	V	33 records within 5km (DPIE 2022a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	Brown Pomaderris is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Pomaderris cotoneaster</i>	Cotoneaster Pomaderris	E	E	Species or species habitat may occur	Disjunct distribution including the Nungatta area, Tumut, the Tantawangalo area, near Tallong, the Yerranderie area, the Canyonleigh	Low	Low – Study Area is unlikely to provide



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
				within area (5km) (DCCEEW 2024a)	area and Ettrema Gorge. Found in wide range of habitats, including forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs.		habitat for this species.
<i>Prostanthera marifolia</i>	Seaforth Mintbush	CE	CE	1 record within 5km, last recorded 2017 (DPE 2023a)	Only known from a 2 x 2 km area in Seaforth, northern Sydney. Associated with the endangered Duffys Forest ecological community. Located on deeply weathered clay-loam soils associated with ironstone and scattered shale lenses, a soil type which only occurs on ridge tops and has been extensively urbanised.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Pterostylis saxicola</i>	Sydney Plains Greenhood	E	E	34 records within 5km, last recorded 2020 (DPE 2023a); Species or species habitat known to occur within area (5km) (DCCEEW 2024a)	Occurs in western Sydney between Picton and Freemans Reach. Grows in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. Associated vegetation above these rock shelves is sclerophyll forest or woodland on shale or shale/sandstone transition soils.	Moderate	Low to moderate – further assessment required (Appendix D).
<i>Pultenaea aristata</i>	null	V	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	Restricted to the Woronora Plateau, a small area between Helensburgh, south of Sydney, and Mt Kiera above Wollongong. Occurs in either dry sclerophyll woodland or wet heath on sandstone.	Low	Low – Study Area is unlikely to provide habitat for this species.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
<i>Pultenaea pedunculata</i>	Matted Bush-pea	E	-	9 records within 5km, last recorded 2006 (DPE 2023a)	In NSW there are three disjunct populations in the Cumberland Plains in Sydney, the coast between Tathra and Bermagui and the Windellama area south of Goulburn. NSW populations typically among woodland vegetation but also found on road batters and coastal cliffs. In Windellama it is largely confined to loamy soils in dry gullies.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Rhizanthella slateri</i>	Eastern Underground Orchid	V	E	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	Currently known only from 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. The species grows in eucalypt forest but no informative assessment of the likely preferred habitat for the species is available. Flowers September and November.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Rhodamnia rubescens</i>	Scrub Turpentine, Brown Malletwood	CE	CE	Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Occurs in coastal districts north from Batemans Bay in New South Wales to areas inland of Bundaberg in Queensland. Populations of <i>R. rubescens</i> typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000 -1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Low	Low – Study Area is unlikely to provide habitat for this species.



Scientific name	Common name	BC Act	EPBC Act	Records/source	Habitat description	Likelihood of occurrence	Likelihood of impact
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry	E	V	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	Occurs in narrow coastal strip from Upper Lansdowne to Conjola State Forest. Grows in rainforest on sandy soils or stabilised Quaternary sand dunes at low altitudes in coastal areas, often in remnant littoral or gallery rainforests.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Thelymitra kangaloonica</i>	Kangaloon Sun Orchid	CE	CE	Species or species habitat may occur within area (5km) (DCCEEW 2024a)	The Kangaloon Sun-orchid is only known to occur on the southern tablelands of NSW in the Moss Vale / Kangaloon / Fitzroy Falls area at 550-700 m above sea level. It is found in swamps in sedgelands over grey silty grey loam soils.	Low	Low – Study Area is unlikely to provide habitat for this species.
<i>Thesium australe</i>	Austral Toadflax	V	V	1 record within 5km, last recorded 1803 (DPE 2023a); Species or species habitat likely to occur within area (5km) (DCCEEW 2024a)	Found in small, scattered populations along the east coast, northern and southern tablelands. Occurs in grassland or grassy woodland, and is often found in association with Kangaroo Grass.	Low	Low – Study Area is unlikely to provide habitat for this species.



Appendix B. RDP flora species list

Scientific name	Common name
<i>Acacia parramattensis</i>	Parramatta Wattle
<i>Acacia spp.</i>	Wattle
<i>Acetosella vulgaris*</i>	Sheep Sorrel
<i>Amaranthus spp.*</i>	Amaranth
<i>Aristida ramosa</i>	Purple Wiregrass
<i>Aster spp.*</i>	
<i>Bidens pilosa*</i>	Cobbler's Pegs
<i>Bursaria spinosa</i>	Native Blackthorn
<i>Chloris gayana*</i>	Rhodes Grass
<i>Chloris truncata</i>	Windmill Grass
<i>Cirsium vulgare*</i>	Spear Thistle
<i>Conyza albida*</i>	Tall Fleabane
<i>Cynodon dactylon</i>	Common Couch
<i>Cyperus spp.*</i>	
<i>Diplotaxis tenuifolia*</i>	Sand Rocket
<i>Echium plantagineum*</i>	Patterson's Curse
<i>Eragrostis curvula*</i>	African Lovegrass
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
<i>Eucalyptus moluccana</i>	Grey Box
<i>Eucalyptus tereticornis</i>	Forest Red Gum
<i>Gahnia spp.</i>	
<i>Hypochaeris radicata*</i>	Catsear
<i>Juncus spp.</i>	
<i>Kunzea ambigua</i>	Tick Bush
<i>Lantana camara*</i>	Lantana
<i>Ligustrum lucidum*</i>	Large-leaved Privet



Scientific name	Common name
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
<i>Lycium ferocissimum*</i>	African Boxthorn
<i>Malva spp.*</i>	Mallow
<i>Microlaena stipoides</i>	Weeping Grass
<i>Olea europaea*</i>	Common Olive
<i>Paspalum dilatatum*</i>	Paspalum
<i>Pennisetum clandestinum*</i>	Kikuyu Grass
<i>Phalaris aquatica*</i>	Phalaris
<i>Plantago lanceolata*</i>	Lamb's Tongues
<i>Pteridium esculentum</i>	Bracken
<i>Rosa rubiginosa*</i>	Sweet Briar
<i>Rubus fruticosus sp. agg.*</i>	Blackberry complex
<i>Rumex spp.*</i>	Dock
<i>Rytidosperma spp.</i>	
<i>Schinus molle*</i>	Pepper Tree
<i>Senecio madagascariensis*</i>	Fireweed
<i>Setaria parviflora*</i>	
<i>Sonchus asper*</i>	Prickly Sowthistle
<i>Sporobolus africanus*</i>	Parramatta Grass
<i>Sporobolus fertilis*</i>	Giant Parramatta Grass
<i>Themeda australis</i>	Kangaroo Grass
<i>Trifolium repens*</i>	White Clover
<i>Wahlenbergia communis</i>	Tufted Bluebell

* denotes an exotic species



Appendix C. Fauna species list

Scientific name	Common name
<i>Anthochaera carunculata</i>	Red Wattlebird
<i>Aquila audax</i>	Wedge-tailed Eagle
<i>Chenonetta jubata</i>	Australian Wood Duck
<i>Corvus coronoides</i>	Australian Raven
<i>Coturnix sp.</i>	Unidentified Quail
<i>Crinia signifera</i>	Common Eastern Froglet
<i>Egretta novaehollandiae</i>	White-faced Heron
<i>Eolophus roseicapilla</i>	Galah
<i>Falco cenchroides cenchroides</i>	Nankeen Kestrel
<i>Grallina cyanoleuca</i>	Magpie-lark
<i>Gymnorhina tibicen</i>	Australian Magpie
<i>Hirundo neoxena</i>	Welcome Swallow
<i>Macropus giganteus</i>	Eastern Grey Kangaroo
<i>Manorina melanocephala</i>	Noisy Miner
<i>Ocyphaps lophotes</i>	Crested Pigeon
<i>Platycercus elegans</i>	Crimson Rosella
<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake
<i>Psophodes olivaceus</i>	Eastern Whipbird
<i>Rhipidura leucophrys</i>	Willie Wagtail
<i>Vanellus miles</i>	Masked Lapwing



Appendix D. Assessments of Significance (Five Part Test) BC Act

The following threatened biodiversity listed on the BC Act are known to occur or considered likely to occur in the Study Area and have the potential to be impacted by the Project:

- Threatened ecological communities:
 - Cumberland Plain Woodland in the Sydney Basin Bioregion
- Threatened flora species:
 - Spiked Rice-flower (*Pimelea spicata*)
 - Sydney Plains Greenhood (*Pterostylis saxicola*)
- Threatened fauna species:
 - Cumberland Plain Land Snail (*Meridolum corneovirens*).

The potential impact of the Project on this TEC and threatened species and their habitats have been assessed via the application of the Five Part Test under the BC Act.



Cumberland Plain Woodland

Cumberland Plain Woodland - Critically Endangered Ecological Community	
a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	N/A
b) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: i. Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or ii. Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	i. The proposed construction will not have an adverse effect on either the extent or composition of Cumberland Plain Woodland in the locality, such that the TEC is adversely modified, or its local occurrence is placed at risk of extinction as: – No areas of woody Cumberland Plain Woodland will be completely removed – Up to 0.6 ha of Cumberland Plain Woodland will be temporarily disturbed (via selected trimming of branches, slashing of ground stratum, and temporary trampling during the proposed construction works). – The pole replacement/removal sites are proposed in areas that have been previously disturbed.
c) In relation to the habitat of a threatened species, population, or ecological community:	Extent of impact on habitat No areas of Cumberland Plain Woodland will be permanently removed as part of the Project. Potential temporary disturbance will occur within 20 m of pole sites (up to approximately 0.6 ha of TEC),



Cumberland Plain Woodland – Critically Endangered Ecological Community

<p>i. The extent to which habitat is likely to be removed or modified as a result of the action proposed, and</p> <p>ii. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and</p> <p>iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.</p>	<p>however, this will be limited to pruning select branches of some mature canopy trees and slashing of groundcover vegetation where plant access is required. Areas of DNG that do not have pre-existing access tracks may be temporarily impacted by wheel rut disturbance from vehicles and machinery, however this impact is expected to be minimal in extent and temporary in nature if appropriate mitigation measures are followed.</p> <p>Habitat fragmentation</p> <p>No habitat fragmentation would occur as no mature vegetation will be removed within the locality. The Project would not increase the fragmentation of any areas of Cumberland Plain Woodland.</p> <p>Importance of habitat to be impacted</p> <p>The areas of Cumberland Plain Woodland to be impacted are minimal (minor pruning and slashing of groundcover vegetation within up to 0.6 ha of habitat) compared with intact habitats in the locality, which reduces the overall importance of the impacts associated with the Project. Therefore, the minor trimming and slashing impacts as described above are unlikely to have long-term negative consequences for the local occurrence of Cumberland Plain Woodland.</p>
<p>d) Whether the action proposed is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)</p>	<p>No areas of outstanding biodiversity value would be affected by the proposed works either directly or indirectly.</p>
<p>e) Whether the action proposed constitutes or is part of a Key Threatening Process (KTP) or is likely to result in the operation of, or increase the impact of, a KTP</p>	<p>The Project has the potential to increase the impact of the following KTP listed in NSW:</p> <ul style="list-style-type: none">– Removal of native vegetation – predominantly exotic groundcover vegetation would require some slashing and there is potential for the temporary disturbance of native grass species within Cumberland Plain Woodland DNG. Potential impacts would be minimised with appropriate mitigation measures outlined in Section 4 of this report.



Cumberland Plain Woodland – Critically Endangered Ecological Community

	<ul style="list-style-type: none">– Invasion of native plant communities by exotic weeds (e.g., perennial grasses) – without appropriate hygiene protocols, there is a risk that weeds may be introduced into the community during the Project. The Project is not likely to exacerbate the occurrence of exotic weeds, provided weed mitigation measures are adhered to in accordance with Section 4 of this report.
Conclusion	<p>The local occurrence of Cumberland Plain Woodland is unlikely to be significantly affected by the Project as:</p> <ul style="list-style-type: none">– No areas of intact Cumberland Plain Woodland would be permanently removed and disturbance to understorey would be temporary in nature (conclusion from C above)– No important habitat will be affected (conclusion from D above)– Pre-clearance surveys and supervision during construction will mitigate potential impacts. <p>Given the impacts proposed are to relatively minor, and the adoption of avoidance, and minimisation mitigation measures, the Project is unlikely to result in a significant impact to Cumberland Plain Woodland TEC. As such, the preparation of a Species Impact Statement (SIS) or entry into the BOS is not required.</p>



Spiked Rice-flower and Sydney Plains Greenhood

	Spiked Rice-flower (<i>Pimelea spicata</i>) - Endangered	Sydney Plains Greenhood (<i>Pterostylis saxicola</i>) - Endangered
a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	<p>The Spiked Rice-flower occurs within open woodland and grasslands of Grey Box (<i>Eucalyptus moluccana</i>), Narrow-leaved Ironbark (<i>E. crebra</i>), Forest Redgum (<i>E. tereticornis</i>), Blackthorn (<i>Bursaria spinosa</i>) and Kangaroo Grass (<i>Themeda triandra</i>) (Groves & Willis 1999; Leigh & Briggs 1992; Nash & Matthes 1993; NSW NPWS 2000).</p> <p>The Project will avoid the clearance of native vegetation. Areas of DNG TEC may be temporarily driven over by vehicles; however, preclearance surveys will be conducted to search for the species within the Study Area prior to construction. Further, the Project is located within previously disturbed areas, with low quality habitat. Therefore, the Project is unlikely to significantly impact the habitat of Spiked Rice-flower or impact the life cycle of the species such that the species is at risk of extinction.</p>	<p>The Sydney Plains Greenhood occurs in heathy forest, sclerophyll forest or woodland.</p> <p>The Project will avoid the clearance of native vegetation and will avoid areas of woody vegetation except for pruning select branches in some locations. Preclearance surveys will be conducted to search for the species within the Study Area prior to construction. Further, the Project is located within previously disturbed areas, with low quality habitat. Therefore, the Project is unlikely to significantly impact the habitat of Sydney Plains Greenhood or impact the life cycle of the species such that the species is at risk of extinction.</p>
b) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:	<p>i. Is likely to have an adverse effect on the extent of the ecological community such that its local</p> <p>N/A</p>	<p>N/A</p>



	Spiked Rice-flower (<i>Pimelea spicata</i>) - Endangered	Sydney Plains Greenhood (<i>Pterostylis saxicola</i>) - Endangered
ii. occurrence is likely to be placed at risk of extinction, or ii. Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction		
c) In relation to the habitat of a threatened species, population or ecological community: i. The extent to which habitat is likely to be removed or modified as a result of the action proposed, and ii. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	Extent of impact on habitat No areas of habitat will be permanently removed as part of the Project. Potential temporary disturbance will occur within 20 m of pole sites (up to approximately 0.6 ha of habitat), however, this will be limited to pruning select branches of some mature trees and slashing groundcover vegetation where required for access. Aside from pruning, areas of intact woodland will be excluded with protective fencing and avoided. Areas of DNG that do not have pre-existing access tracks may be impacted by wheel rut disturbance from vehicles and machinery, however, preclearance surveys will be conducted to search for the species within the Study Area and the Project will be located within previously disturbed areas. Therefore, the Project is unlikely to significantly impact the habitat of Spiked Rice-flower.	Extent of impact on habitat No areas of habitat will be permanently removed as part of the Project. Potential temporary disturbance will occur within 20 m of pole sites (up to approximately 0.3 ha of habitat), however, this will be limited to pruning select branches of some mature trees and slashing groundcover vegetation where required for access. Aside from pruning, areas of intact woodland will be excluded with protective fencing and avoided. Pre-clearance surveys will be conducted to search for the species within the Study Area and the Project will be located within previously disturbed areas. Therefore, the Project is unlikely to significantly impact the habitat of the Sydney Plains Greenhood. Habitat fragmentation



	Spiked Rice-flower (<i>Pimelea spicata</i>) - Endangered	Sydney Plains Greenhood (<i>Pterostylis saxicola</i>) - Endangered
	<p>Habitat fragmentation</p> <p>No habitat fragmentation would occur as no mature vegetation will be removed within the locality and impact areas are within previously disturbed areas.</p> <p>Importance of habitat to be impacted</p> <p>The area of habitat to be impacted is minimal (pruning of select branches and slashing groundcover at some locations) compared with good condition habitat available in the broader locality, which reduces the overall importance of the vegetation impacted by this Project. Therefore, the impacts on Spiked Rice-flower as described above are unlikely to have long-term negative consequences for the local occurrence.</p>	<p>No habitat fragmentation would occur as no mature vegetation will be removed within the locality and impact areas are within previously disturbed areas.</p> <p>Importance of habitat to be impacted</p> <p>The area of habitat to be impacted is minimal (pruning of select branches and slashing groundcover at some locations) compared with good condition habitat available in the broader locality, which reduces the overall importance of the vegetation impacted by this Project. Therefore, the impacts on the Sydney Plains Greenhood as described above are unlikely to have long-term negative consequences for the local occurrence.</p>
d) Whether the action proposed is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)	<p>No areas of outstanding biodiversity value would be affected by the proposed works either directly or indirectly. No areas identified as priority conservation lands. The removal of these trees will not subvert the Cumberland Plain Recovery Plan occur in the Study Area (NSW DECCW 2010).</p>	<p>No areas of outstanding biodiversity value would be affected by the proposed works either directly or indirectly. No areas identified as priority conservation lands. The removal of these trees will not subvert the Cumberland Plain Recovery Plan occur in the Study Area (NSW DECCW 2010).</p>
e) Whether the action proposed constitutes or is part of a Key Threatening Process (KTP) or is likely to result in the operation of, or increase the impact of, a KTP	<p>The Project has the potential to increase the impact of the following KTPs listed in NSW:</p> <ul style="list-style-type: none">– Invasion of native plant communities by exotic weeds (e.g., perennial grasses) – there is a risk that	<p>The Project has the potential to increase the impact of the following KTPs listed in NSW:</p> <p>Invasion of native plant communities by exotic weeds (e.g., perennial grasses) – there is a risk that weeds</p>



	Spiked Rice-flower (<i>Pimelea spicata</i>) - Endangered	Sydney Plains Greenhood (<i>Pterostylis saxicola</i>) - Endangered
	<p>weeds may be introduced into the community during construction. The Project is not likely to exacerbate the occurrence of exotic weeds, provided weed mitigation measures are adhered to in accordance with Section 4 of this report.</p>	<p>may be introduced into the community during construction. The Project is not likely to exacerbate the occurrence of exotic weeds, provided weed mitigation measures are adhered to in accordance with Section 4 of this report.</p>
Conclusion	<p>The local occurrence of Spiked Rice-flower is unlikely to be significantly affected by the Project as:</p> <ul style="list-style-type: none">– Impact on extent and composition of local occurrence will not occur (conclusion from C above)– No important habitat will be affected (conclusion from D above)– Pre-clearance surveys will rule out presence prior to construction. <p>Given the impacts proposed are relatively minor, and the adoption of avoidance, and minimisation mitigation measures, the Project is unlikely to result in a significant impact to Spiked Rice-flower. As such, the preparation of a Species Impact Statement (SIS) or entry into the BOS is not required.</p>	<p>The local occurrence of the Sydney Plains Greenhood is unlikely to be significantly affected by the Project as:</p> <ul style="list-style-type: none">– Impact on extent and composition of local occurrence will not occur (conclusion from C above)– No important habitat will be affected (conclusion from D above)– Pre-clearance surveys will rule out presence prior to construction.. <p>Given the impacts proposed are relatively minor, and the adoption of avoidance, and minimisation mitigation measures, the Project is unlikely to result in a significant impact to Spiked Rice-flower. As such, the preparation of a Species Impact Statement (SIS) or entry into the BOS is not required.</p>



Cumberland Plain Land Snail

Cumberland Plain Land Snail (*Meridolum corneovirens*) - Endangered

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	<p>The Cumberland Plain Land Snail is only found on the Cumberland Plain and is associated with Cumberland Plain Woodland (a CEEC). This community is a grassy, open woodland vegetation type, with occasional dense patches of shrubs. The Cumberland Plain Land Snail occupies moderate to highly dense leaf litter microhabitats at the base of host Cumberland Plain Woodland canopy trees, fallen woody debris, or shelters in loose soil around grass clumps. Occasionally shelters under dumped rubbish within Cumberland Plain Woodland.</p> <p>The Project will avoid the removal of fallen debris, such as logs, detritus or leaf litter. Areas of DNG TEC may be temporarily driven over by vehicles; however, preclearance surveys will be conducted to search for the species within the Study Area prior to construction. Further, the Project is located within previously disturbed areas, with low quality habitat, and is therefore unlikely to significantly impact the habitat of Cumberland Plain Land Snail.</p>
b) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: <ol style="list-style-type: none">Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, orIs likely to substantially and adversely modify the composition of the ecological community such that its	N/A



Cumberland Plain Land Snail (*Meridolum corneovirens*) - Endangered

local occurrence is likely to be placed at risk of extinction	
c) In relation to the habitat of a threatened species, population or ecological community: iv. The extent to which habitat is likely to be removed or modified as a result of the action proposed, and v. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and vi. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	<p>Extent of impact on habitat</p> <p>No areas of Cumberland Plain Woodland will be permanently removed as part of the Project. Potential temporary disturbance will occur within 20 m of pole sites; however, this will be limited to pruning select branches of some mature trees and slashing groundcover vegetation where required for access. Aside from pruning, areas of intact Cumberland Plain Woodland will be excluded with protective fencing and avoided. No leaf litter, logs, or bases of trees will be disturbed or removed for the Project. Areas of DNG that do not have pre-existing access tracks may be impacted by wheel rut disturbance from vehicles and machinery, however, preclearance surveys will be conducted to search for the species within the Study Area and the Project will be located within previously disturbed areas. Therefore, the Project is unlikely to significantly impact the habitat of Cumberland Plain Land Snail.</p> <p>Habitat fragmentation</p> <p>No habitat fragmentation would occur as no mature vegetation will be removed within the locality. The Project would not increase the fragmentation of any areas of Cumberland Plain Woodland.</p> <p>Importance of habitat to be impacted</p> <p>Potential habitat for the Cumberland Plain Land Snail within the Study Area includes leaf litter, logs, or bases of trees in woodland habitat. None of these habitat features will be disturbed or removed for the Project. The area of Cumberland Plain Woodland to be impacted is minimal (pruning of select branches and slashing groundcover at some locations) compared with good condition habitat available in the broader locality, which reduces the overall importance of the vegetation impacted by this Project. Therefore, the impacts on Cumberland Plain Land Snail as described above are unlikely to have long-term negative consequences for the local occurrence.</p>



Cumberland Plain Land Snail (*Meridolum corneovirens*) - Endangered

d) Whether the action proposed is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)	No areas of outstanding biodiversity value would be affected by the proposed works either directly or indirectly. No areas identified as priority conservation lands. The removal of these trees will not subvert the Cumberland Plain Recovery Plan occur in the Study Area (NSW DECCW 2010).
e) Whether the action proposed constitutes or is part of a Key Threatening Process (KTP) or is likely to result in the operation of, or increase the impact of, a KTP	<p>The Project has the potential to increase the impact of the following KTPs listed in NSW:</p> <ul style="list-style-type: none">– Invasion of native plant communities by exotic weeds (e.g., perennial grasses) – there is a risk that weeds may be introduced into the community during construction. The Project is not likely to exacerbate the occurrence of exotic weeds, provided weed mitigation measures are adhered to in accordance with Section 4 of this report.
Conclusion	<p>The local occurrence of Cumberland Plain Land Snail is unlikely to be significantly affected by the Project as:</p> <ul style="list-style-type: none">– Impact on extent and composition of local occurrence will not occur (conclusion from C above)– No important habitat will be affected (conclusion from D above)– Pre-clearance surveys will rule out presence prior to construction. <p>Given the impacts proposed are relatively minor, and the adoption of avoidance, and minimisation mitigation measures, the Project is unlikely to result in a significant impact to Cumberland Plain Land Snail. As such, the preparation of a Species Impact Statement (SIS) or entry into the BOS is not required.</p>



Contact us

info@niche-eh.com
niche-eh.com

NSW Office

Sydney: Dharug Country
02 9630 5658
L3, 93 George St
Parramatta NSW 2150

QLD Office

Brisbane:
Turrbal and Jagera Country
07 2104 8594 Ground Floor,
Suite 3 North Tower
527 Gregory Terrace
Fortitude Valley QLD 4006

VIC Office

Melbourne:
Wurundjeri Country
0488 224 036
Level 3, 162 Collins Street
Melbourne VIC 3000

Our Expertise



Natural capital
and offsetting



Ecology



Heritage
management

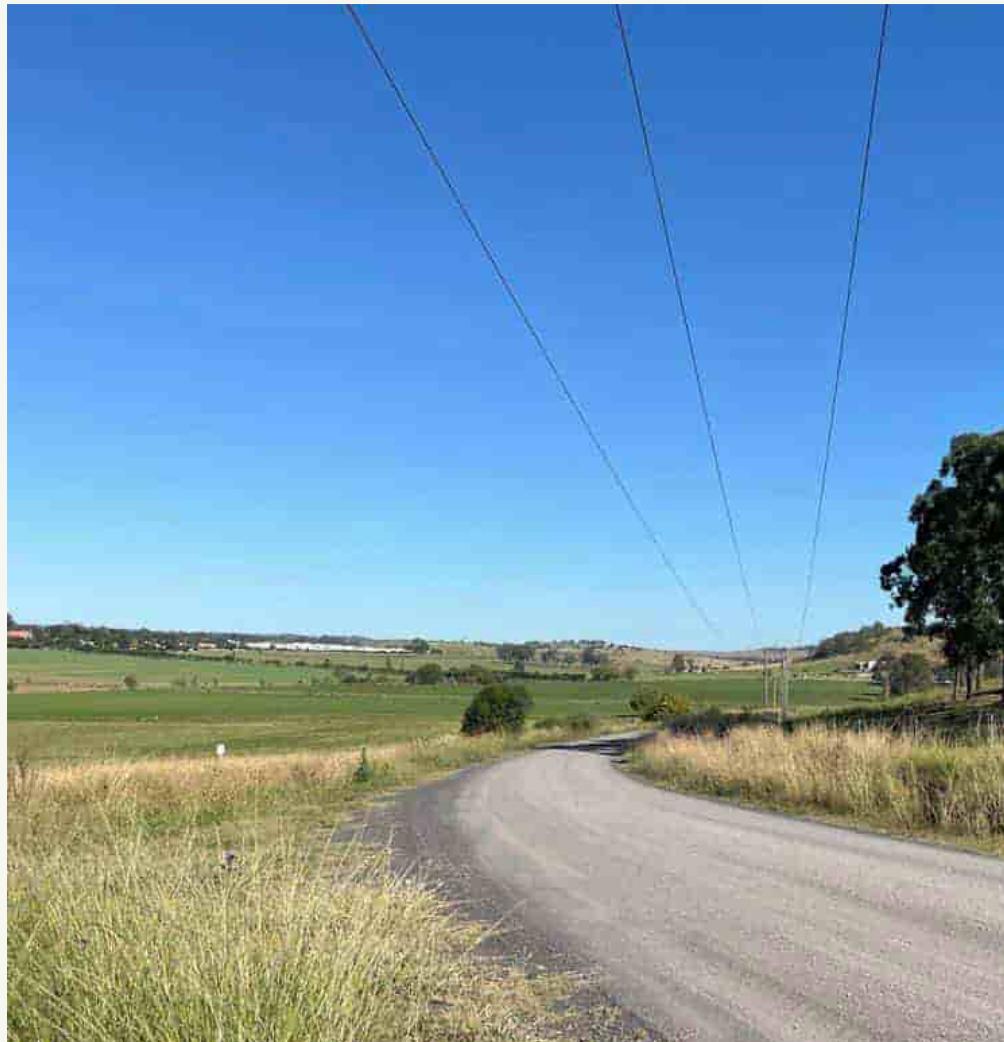


Environmental
planning, approvals
and management



Spatial Services

Annex 4. Aboriginal Objects Due Diligence



Nepean Zone Substation Feeder Upgrade

Aboriginal Objects Due Diligence Assessment

Prepared for Endeavour Energy | 7/06/2024





Nepean Zone Substation Feeder Upgrade AODDA

Document control

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Glossary and list of abbreviations

Term or abbreviation	Definition
Aboriginal cultural heritage	The tangible (objects) and intangible (dreaming stories, legends and places) cultural practices and traditions associated with past and present-day Aboriginal communities.
Aboriginal object(s)	The legal definition for material Aboriginal cultural heritage under the <i>NSW National Parks and Wildlife Act 1974</i> .
Aboriginal stakeholders	Members of a local Aboriginal land council, registered holders of Native Title, Aboriginal groups or other Aboriginal people who may have an interest in the Project.
ACHA	Aboriginal Cultural Heritage Assessment.
Activity	A project, development, or work; general activities to be undertaken in addition to as defined by Part 5 EPA Act 1979
AHIMS	Aboriginal Heritage Information Management System.
AHIP	Aboriginal Heritage Impact Permit.
AR	Archaeological Report.
Archaeology	The scientific study of material traces of human history, particularly the relics and cultural remains of past human activities.
Archaeological deposit	A layer of soil material containing archaeological objects and/or human remains.
Archaeological investigation	The process of assessing the archaeological potential of an impact area by a qualified archaeologist.
Archaeological site	An area that contains surface or sub-surface material evidence of past human activity in which material evidence (artefacts) of past activity is preserved.
Artefact	An object made by human agency (e.g. stone artefacts).
Assemblage	A group of artefacts found in close association with one another. Any group of items designated for analysis that exist in spatial and/or vertical context – without any assumptions of chronological or spatial relatedness.



Term or abbreviation	Definition
Avoidance	A management strategy which protects Aboriginal sites within an impact area by avoiding them totally in development.
BCD	The Biodiversity and Conservation Division (formerly the Office of Environment and Heritage and now Heritage NSW of the NSW Department of Planning and Environment).
Code of Practice	<i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales.</i>
DCCEEW	Department of Climate Change, Energy, the Environment and Water. Formerly Department of Conservation, Climate Change and Water (DECCW), Biodiversity and Conservation Division (BCD) of the Department of Planning, Industry and Environment (DPIE) and now Heritage NSW of the Department of Premier and Cabinet (DPC).
DD/AODDA	Aboriginal Objects Due Diligence Assessment
Due Diligence Code	<i>The Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW.</i>
EP&A Act	<i>NSW Environmental Planning and Assessment Act 1979.</i>
Flake	A piece of stone detached from a core, displaying a bulb of percussion and striking platform.
Harm	With regard to Aboriginal objects this has the same meaning as the <i>NSW National Parks and Wildlife Act 1974</i> .
Heritage NSW	Aboriginal cultural heritage regulator in the NSW Department of Planning and Environment for the management of Aboriginal Cultural Heritage (ACH) regulation functions under the <i>National Parks and Wildlife Act 1974</i> . Formerly BCD of DPIE.
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
Impact area	An area that requires archaeological investigation and management assessment.
<i>In situ</i>	Latin term meaning 'on the spot, undisturbed'.
Isolated artefact / find	A single artefact found in an isolated context.



Term or abbreviation	Definition
LALC	Local Aboriginal Land Council.
LEP	Local Environmental Plan.
LGA	Local Government Area.
Management plans	Conservation plans which identify short- and long-term management strategies for all known sites recorded within a (usually approved) Subject Area.
Methodology	The procedures used to undertake an archaeological investigation.
Mitigation	To address the problem of conflict between land use and site conservation.
NPW Act	<i>National Parks and Wildlife Act 1974.</i>
NPW Regulation	<i>National Parks and Wildlife Regulation 2019.</i>
OEH	Office of Environment and Heritage, replaced by the Biodiversity and Conservation Division (BCD) of the Department of Planning, Industry and Environment (DPIE) and now Heritage NSW of the Department of Premier and Cabinet.
Open camp site	An archaeological site situated within an open space (e.g. archaeological material located on a creek bank, in a forest, on a hill, etc.).
PAD	Potential Archaeological Deposit. A location considered to have a potential for subsurface archaeological material.
RAP	Registered Aboriginal Party.
Site recording	The systematic process of collecting archaeological data for an archaeological investigation.
Site	A place where past human activity is identifiable.



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1 Introduction

1.1 Background

Endeavour Energy (the Proponent) are proposing to undertake maintenance and upgrade works for the Nepean Feeder Power Line which extends from the substation at 156 Spring Road Spring Farm south through the former Camden Park estate to a connection point with existing infrastructure at Menangle Road, New South Wales (NSW).

This assessment has been completed in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW, ('the Code of Practice') as developed in association with Part 6 of the *National Parks and Wildlife Act 1974* (NPW Act), which outlines the specific protection for Aboriginal objects and declared Aboriginal places by establishing offences of harm. The assessment will be used to support a Review of Environmental Factors (REF) which assesses the proposed maintenance and upgrade works.

1.2 The Proponent and the Proposed Works Area

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by the Proponent, to undertake an Aboriginal Objects Due Diligence Assessment (DD) for proposed electricity line maintenance and upgrade works.

1.3 Site location and context

The Proposed Works Area encompasses approximately 8 kilometres (km) of the existing feeder transmission line located between Nepean Transmission Substation, 156 Springs Rd, Spring Farm NSW 2570, to the southern connection point at Menangle Road, Menangle NSW 2568. The individual sites where maintenance and upgrade works will take place along this feeder line are identified as the Proposed works area in this report and are referred to as Power Pole Sites (or PPS) within this assessment. The locations of the Proposed Works Area and each PPS which comprise it is shown on (Figure 1 and Figure 2). The Proposed Works Area is located in Camden Parish, in Camden County, within the boundaries of both the Camden Local Government Area (LGA) and the Wollondilly LGA. It is located within the Tharawal Local Aboriginal Land Council (LALC) area. The Proposed Works Area is partially within the NSW-government run Elizabeth Macarthur Agricultural Institute (EMAI) which is a research facility run by the NSW Department of Primary Industries (DPI).

1.4 The proposed activity

The proposed works involve replacing up to 28 existing poles, removing up to three poles, constructing up to four new poles, and replacing existing overhead conductors and associated overhead line fittings. New poles are of a steel type and design which is up to 30 metres (m) high, which replaces smaller existing wooden power poles. Removal of vegetation within 20 m of replaced, removed and new poles is expected. The proposal works will be within the previously disturbed existing powerline from the Nepean Zone Substation, and involve vehicle movements to access these areas via established tracks and one creek crossing point. The northernmost pole site will be connected to the Spring Farm Substation via trenching/under-boring of approximately 60 m. The proposed works will include maintenance and upgrades that involve ground surface disturbance activities.



1.5 Statutory controls

1.5.1 *National Parks and Wildlife Act 1974 (NPW Act)*

The NPW Act, administered by Heritage NSW of the Department of Planning, Housing and Infrastructure is the primary legislation for the protection of some aspects of Aboriginal cultural heritage in NSW. Part 6 of the NPW Act provides specific protection for Aboriginal objects and declared Aboriginal Places by establishing offences of harm.

The NPW Act provides that a person who exercises due diligence in determining that their actions will not harm Aboriginal objects has a defence against prosecution if they later unknowingly harm an object without an Aboriginal Heritage Impact Permit (AHIP).

Anyone proposing to carry out an activity that may harm an Aboriginal object or a declared Aboriginal place must investigate, assess, and report on the harm that may be caused by the activity they propose.

The Due Diligence Code of Practice for the Protection of Aboriginal Objects (DECCW, 2010) sets out a process for individuals and organisations to follow to determine whether an Aboriginal object will be harmed by an activity, whether further investigation is needed, and whether that harm requires an AHIP.

This report was undertaken in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW, 2010).

1.5.2 *The Environmental Planning & Assessment Act, 1979*

The NSW *Environmental Planning and Assessment Act 1979* (The EPA Act) establishes the framework for cultural heritage values to be formally assessed in the land use planning and development consent process and requires that environmental impacts are considered prior to land development; this includes impacts on heritage items. The EPA Act also requires that local governments prepare planning instruments (such as Local Environmental Plans) in accordance with the principles of the legislation to provide guidance on the level of environmental assessment required.

1.5.3 *Camden Local Environmental Plan (LEP) 2010 and Wollondilly LEP 2011*

Clause 5.10 of both the Camden Local Environmental Plan (LEP) (2010) and the Wollondilly LEP (2011) outlines the controls for heritage conservation including the conservation of Aboriginal objects and Aboriginal places of heritage significance. Section 8 Aboriginal Places of heritage significance states:

The consent authority must, before granting consent under this clause to the carrying out of development in an Aboriginal place of heritage significance—

- (a) consider the effect of the proposed development on the heritage significance of the place and any Aboriginal object known or reasonably likely to be located at the place by means of an adequate investigation and assessment (which may involve consideration of a heritage impact statement), and*
- (b) notify the local Aboriginal communities, in writing or in such other manner as may be appropriate, about the application and take into consideration any response received within 28 days after the notice is sent.*

1.6 Objectives

The aim of this DD is to assess whether Aboriginal objects and/or places are present and/or are likely to occur within or in close proximity to the Proposed Works Area and, if present, whether they may be harmed by the proposed works.



1.7 Authorship and acknowledgements

This SoHI has been written by Samuel Ward (Heritage Consultant, Niche), with document review and quality control provided by Chelsea Jones (Associate - Heritage, Niche). Technical assistance was provided by Harrison Binks (GIS Consultant, Niche). Unless otherwise attributed, images used in this report are produced by Niche.

1.8 Assessment methodology

This DD follows the process outlined in Plate 1.

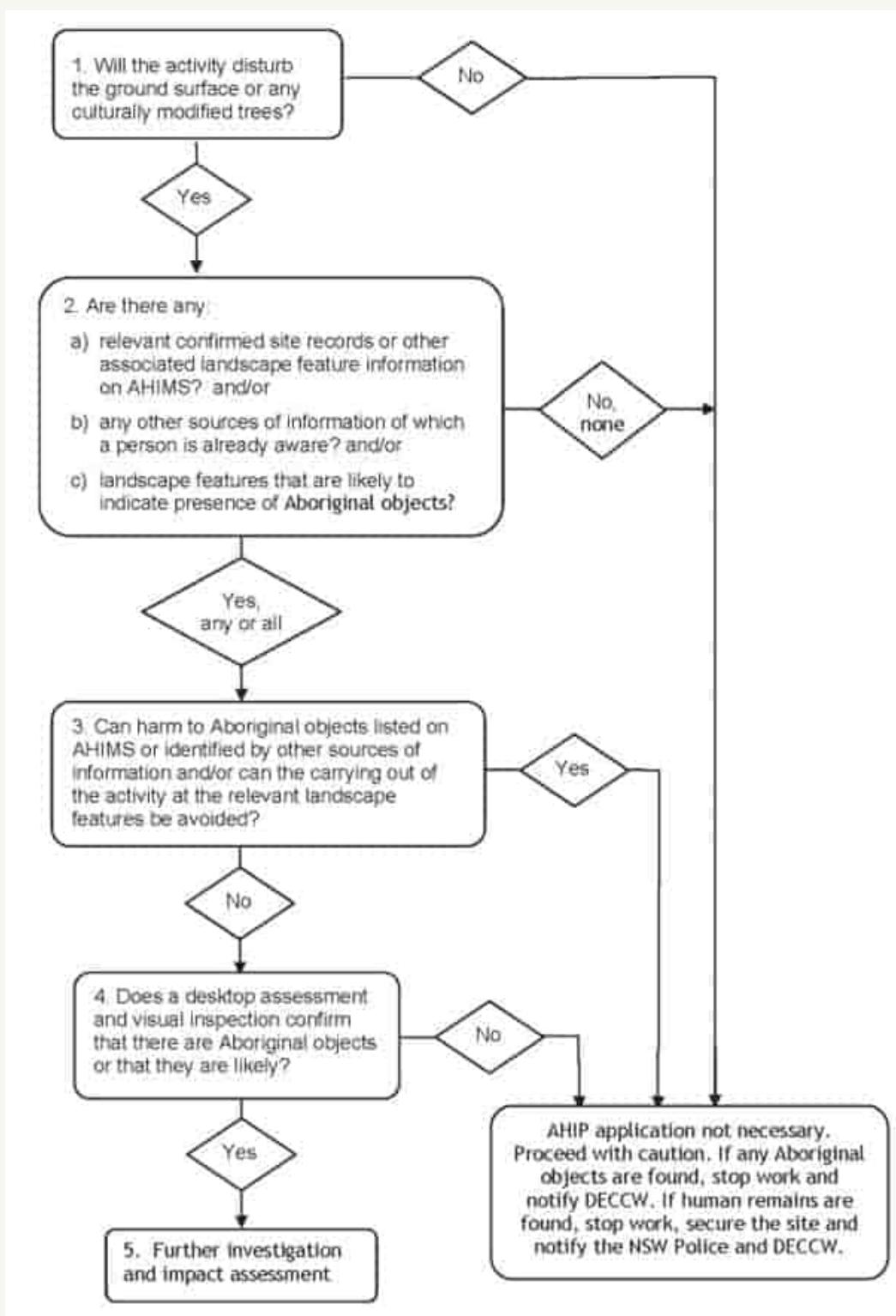
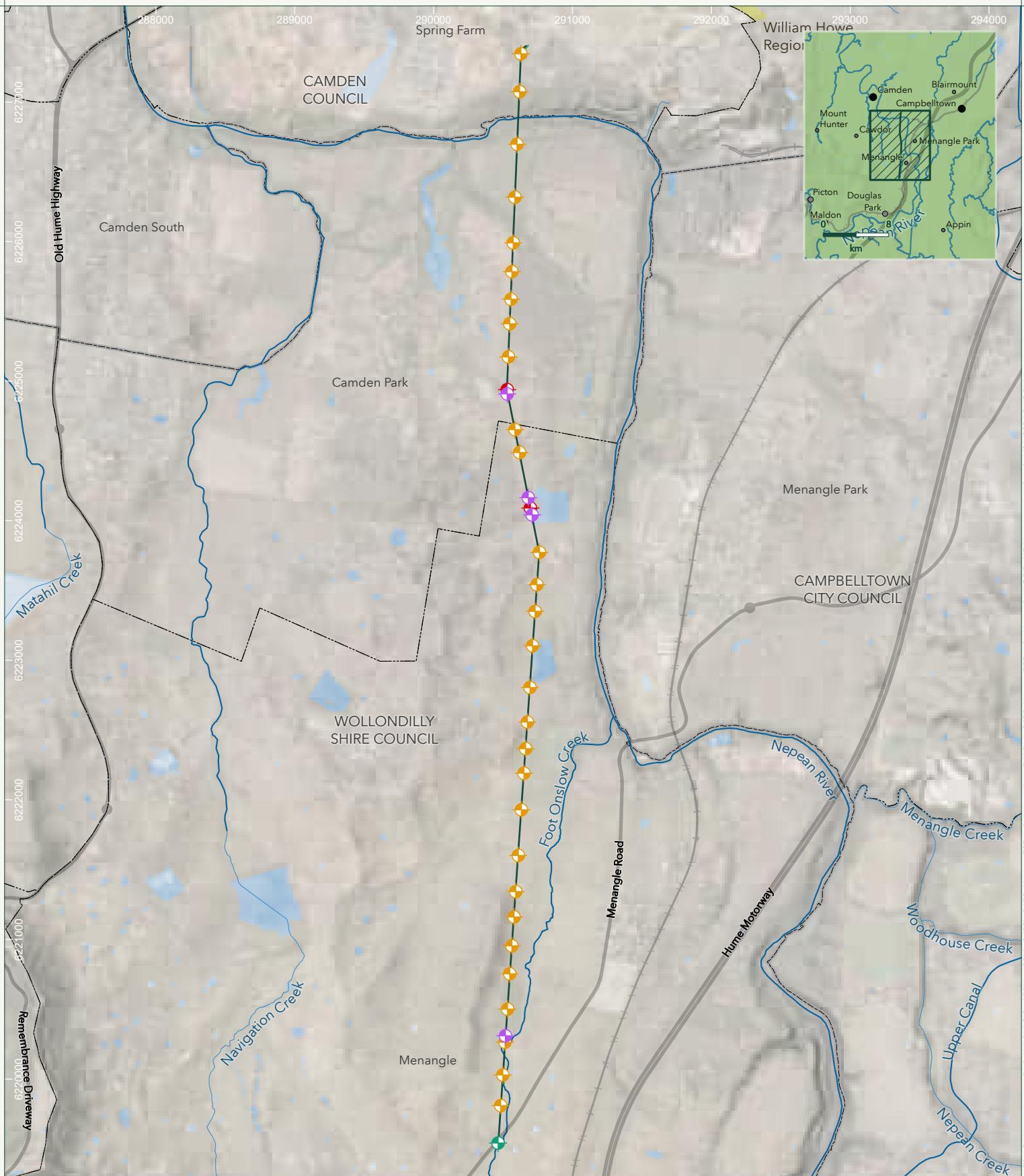


Plate 1: The Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW



Figure 1: Location Map (Niche, Proponent)



Proposed works point

- Existing Pole
- New Pole
- Remove Pole
- Replace Pole

Main alignment

- Trench
- Proposed works area
- Transport
- Major road
- Minor road

Rail

- Hydrography
- Perennial Stream
- Non Perennial Stream
- Waterbody

Protected Areas of NSW

- Regional Park
- Administrative and Property Boundaries
- Local Government Area
- Suburb

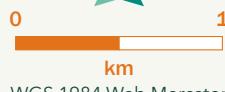
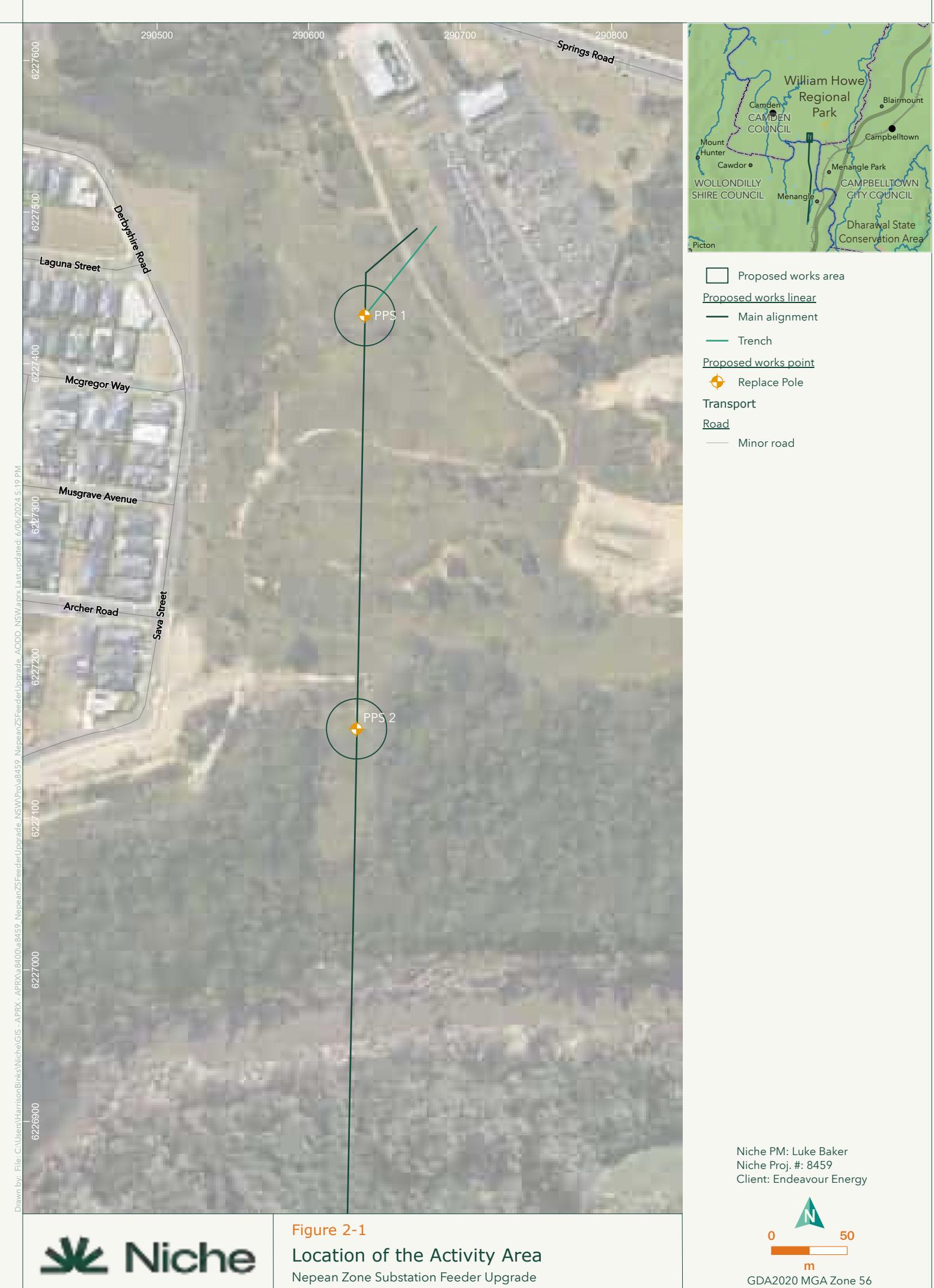


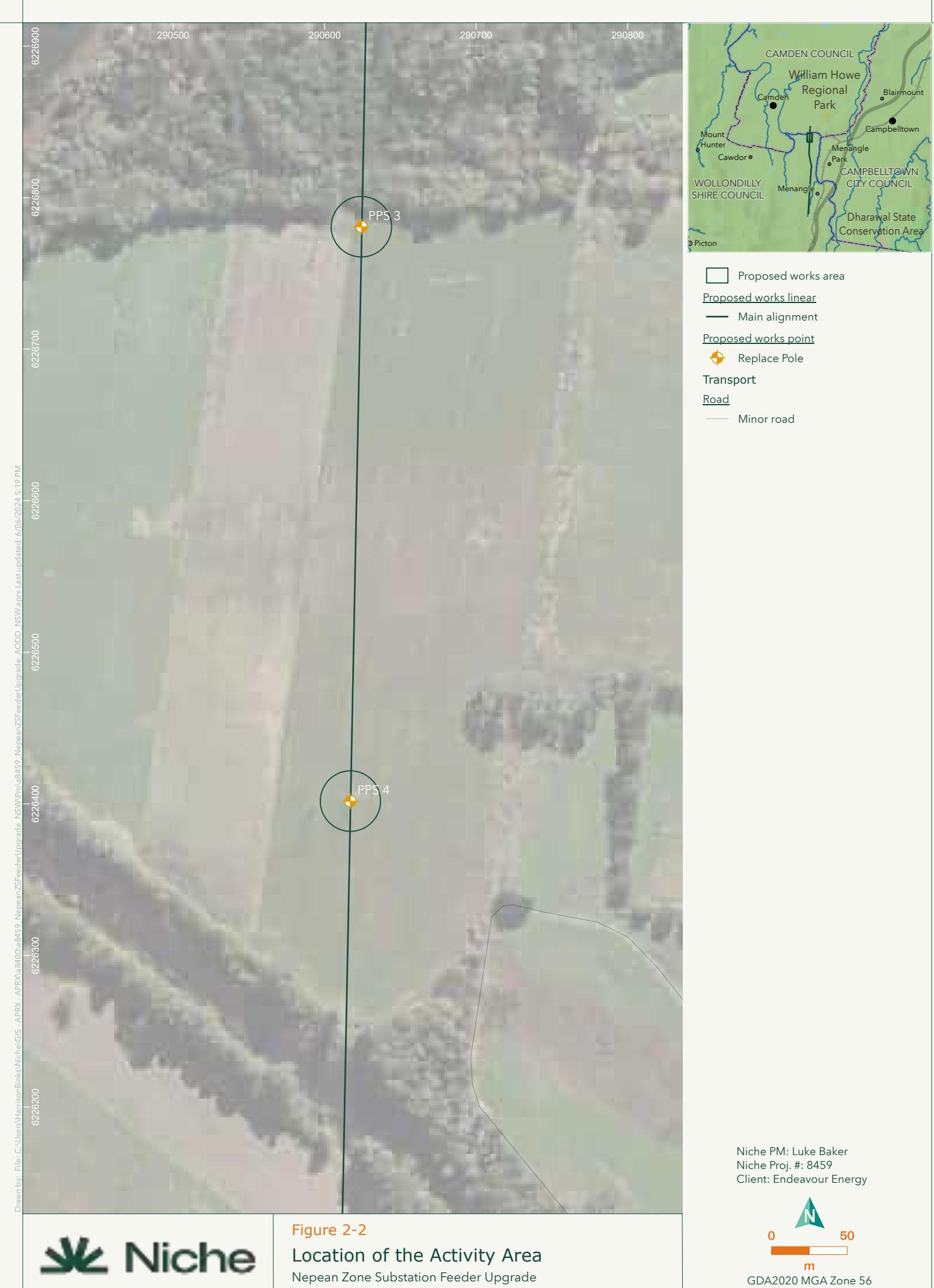
Figure 1
Location Map
Nepean Zone Substation Feeder Upgrade

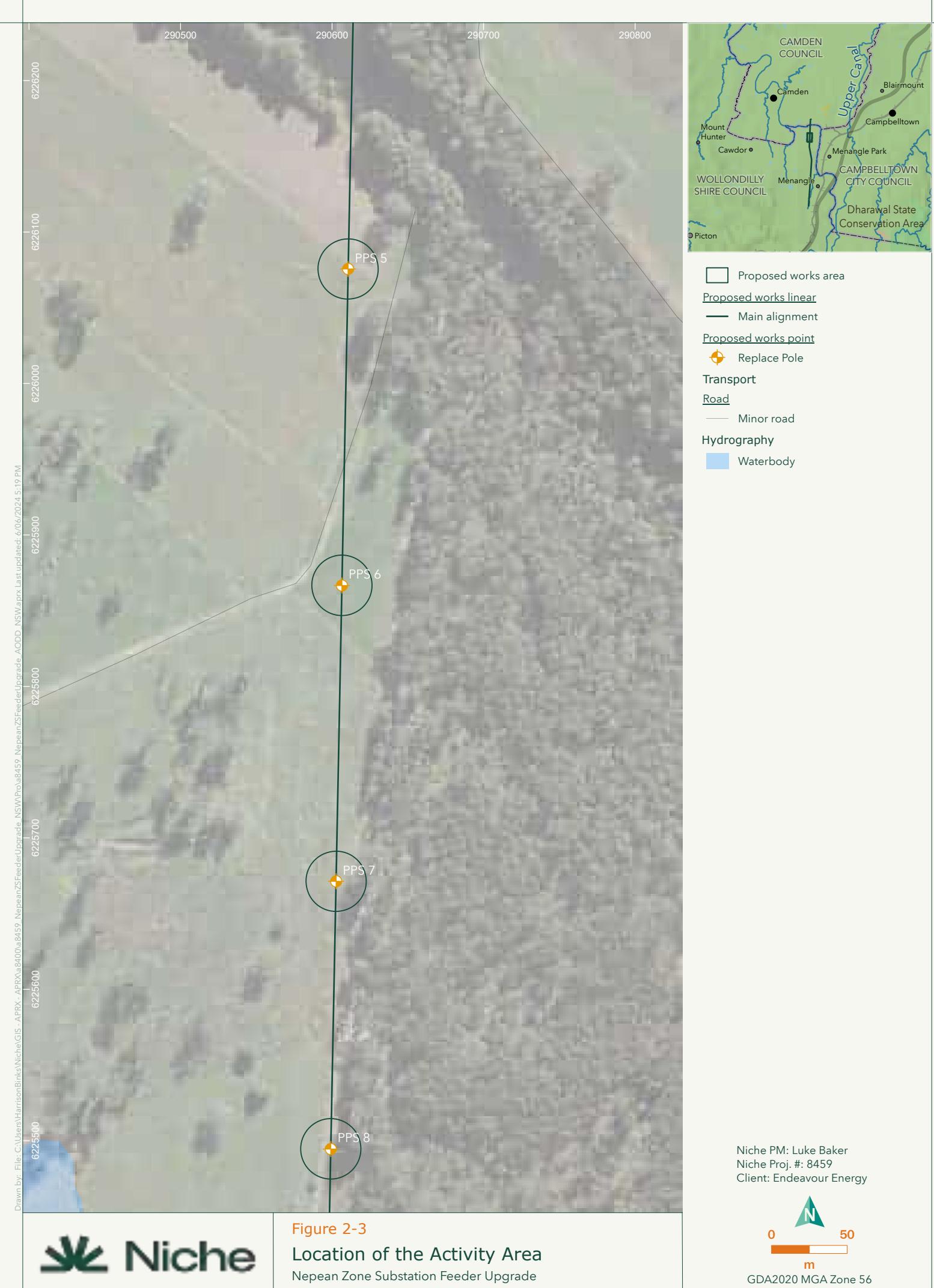
Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

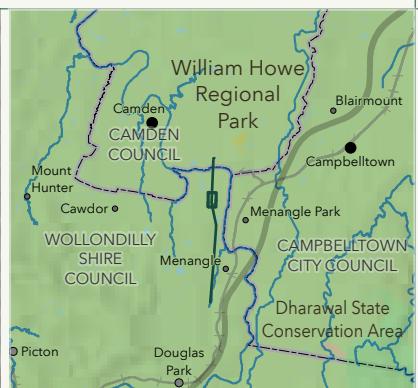
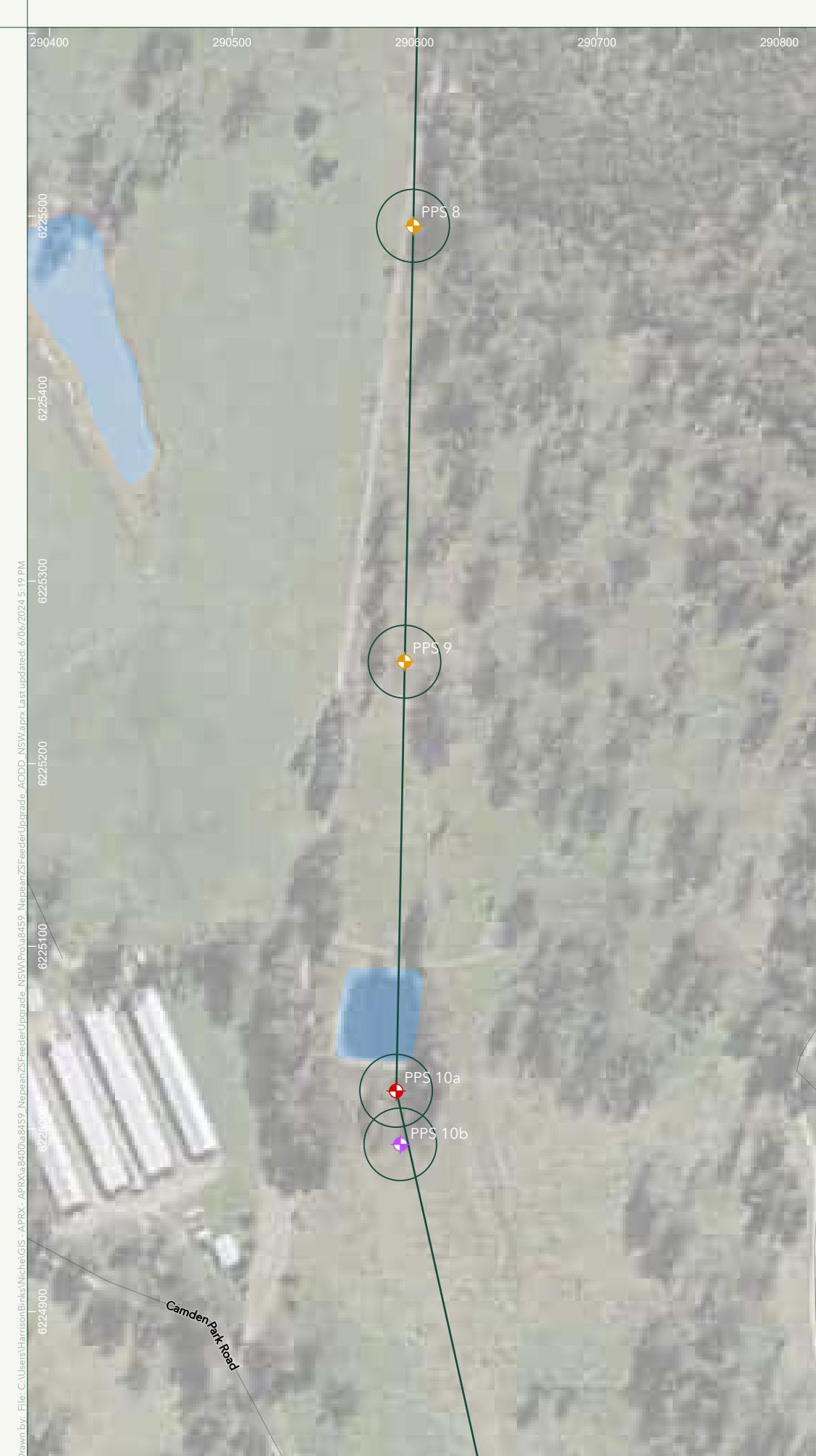


Figure 2: Location of the Proposed Works Area (Niche, Proponent)









Proposed works area

Proposed works linear

Main alignment

Proposed works point

New Pole

Remove Pole

Replace Pole

Transport

Road

Minor road

Hydrography

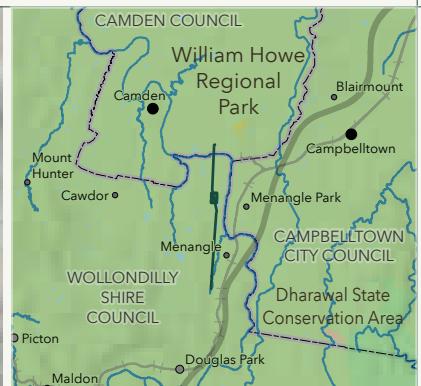
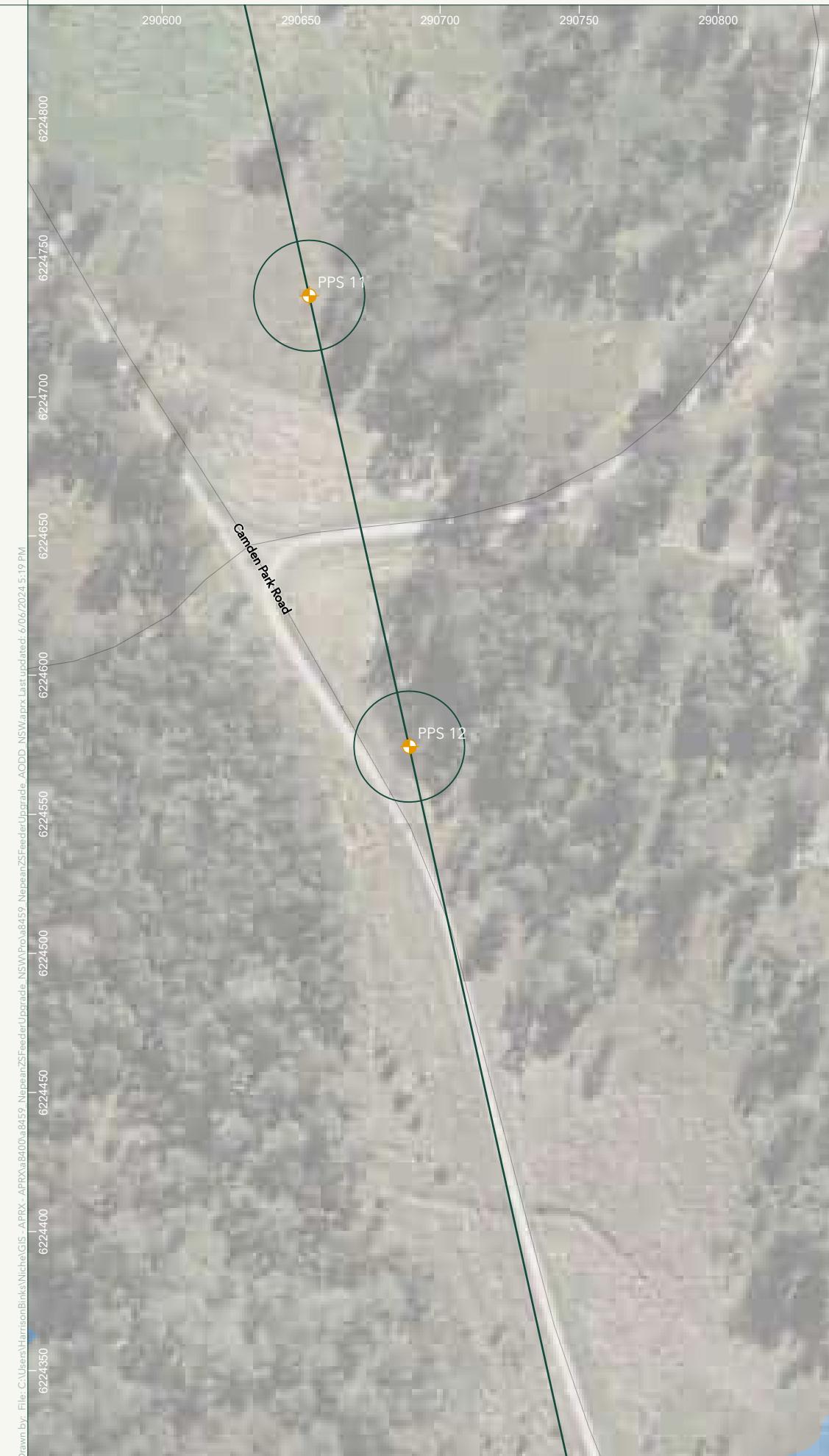
Waterbody

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Niche Proj. #: 8459
Client: Endeavour Energy



Figure 2-4
Location of the Activity Area
Nepean Zone Substation Feeder Upgrade





- Proposed works area
- Proposed works linear
- Main alignment
- Proposed works point
- Replace Pole
- Transport
- Road
- Minor road
- Hydrography
- Waterbody

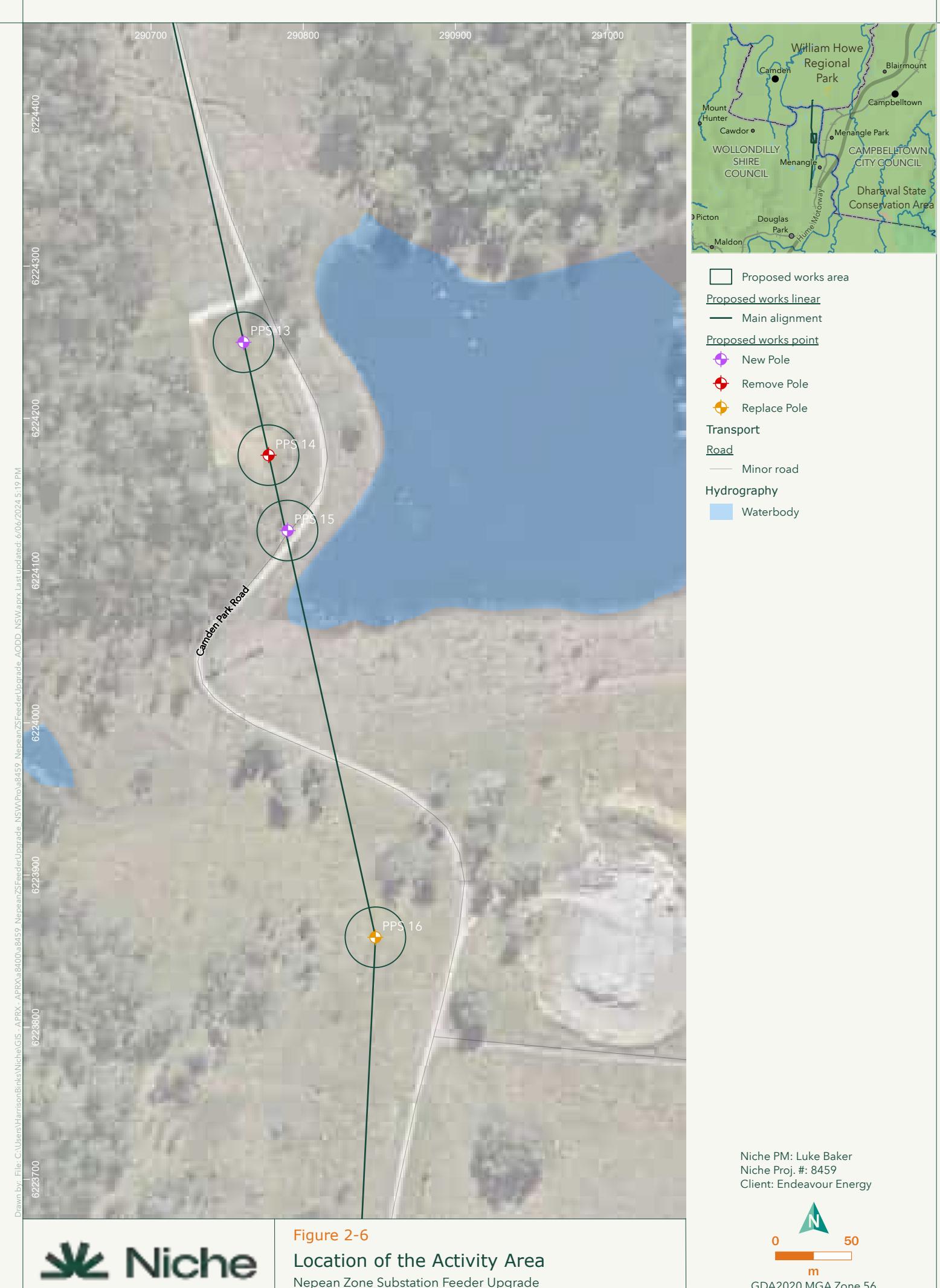
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GDA2020 MGA Zone 56



Figure 2-5
Location of the Activity Area
Nepean Zone Substation Feeder Upgrade



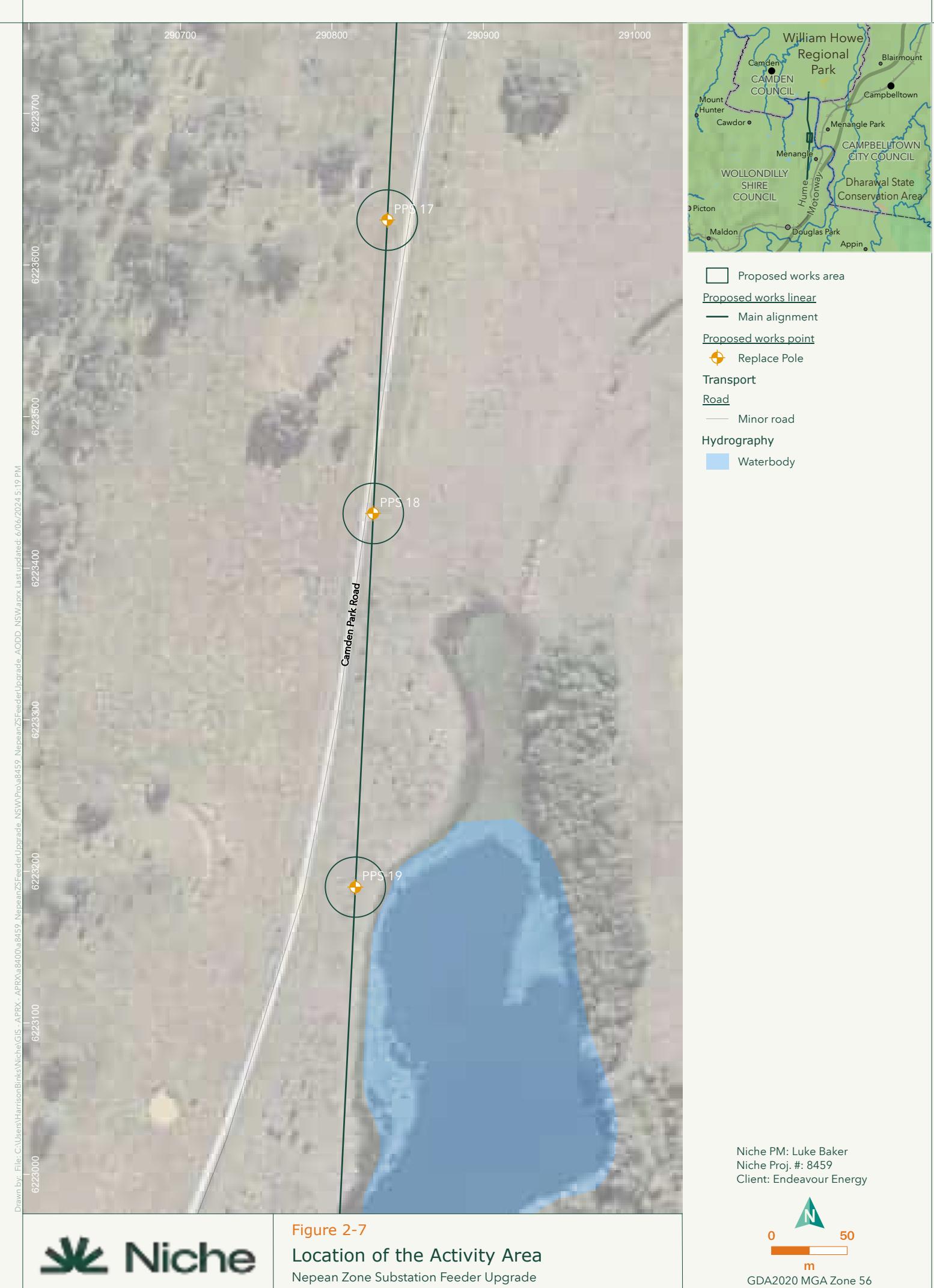
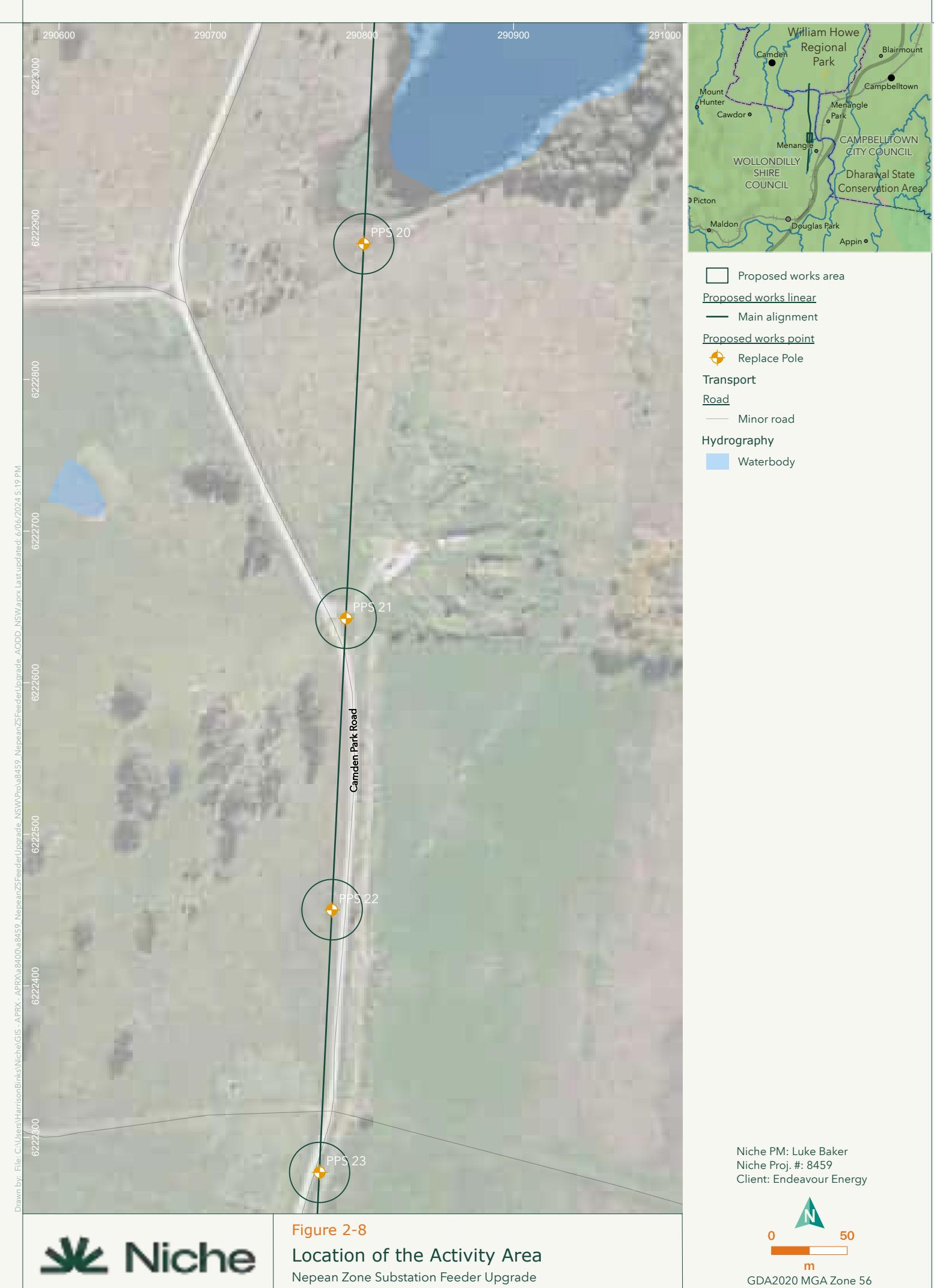
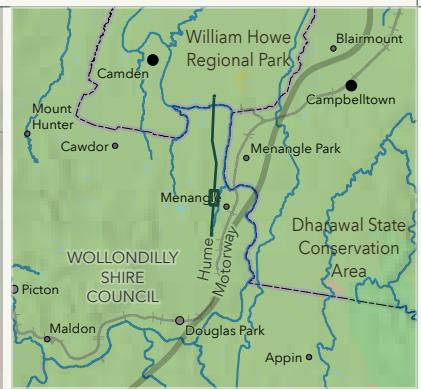
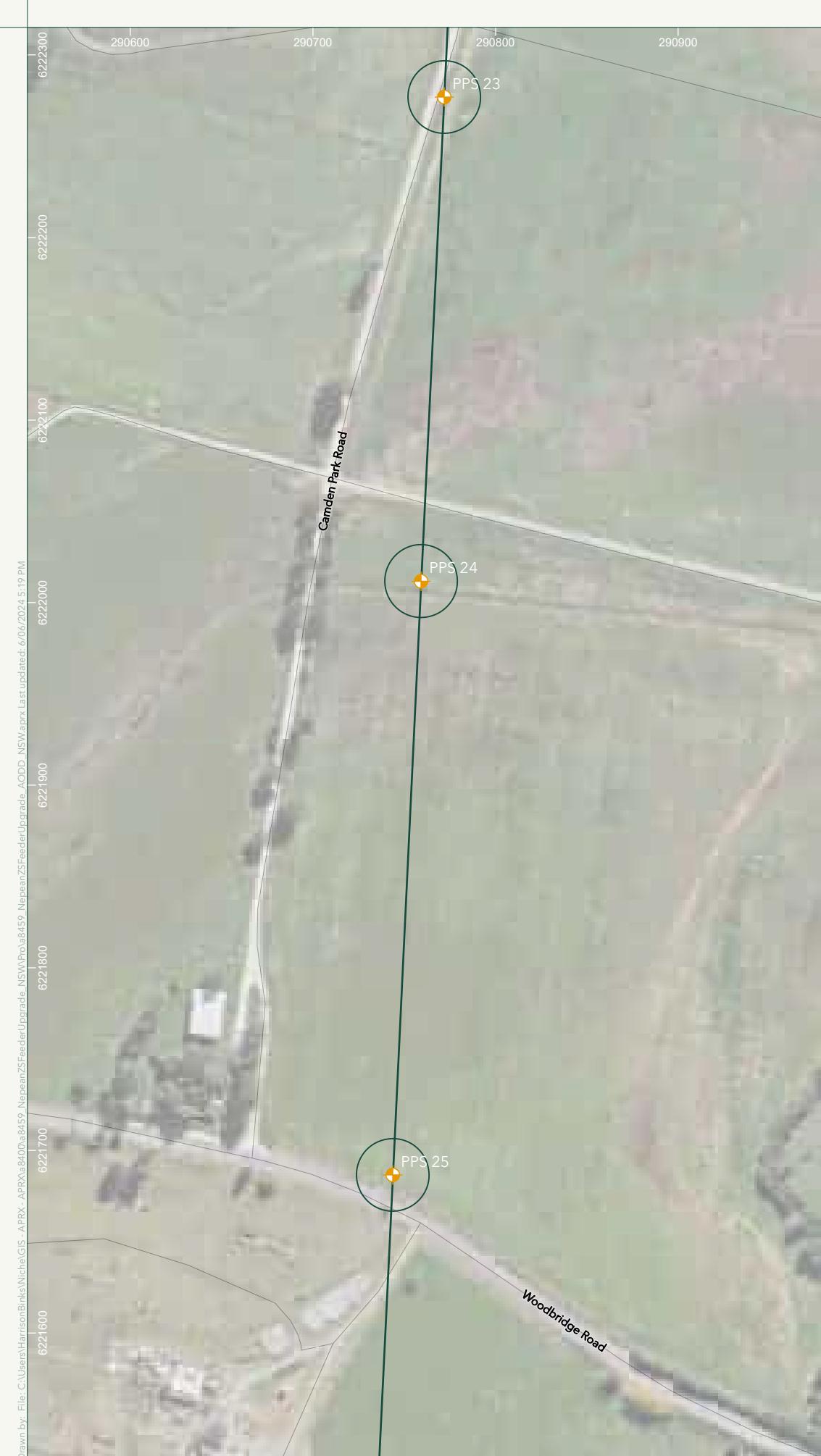


Figure 2-7
Location of the Activity Area
 Nepean Zone Substation Feeder Upgrade



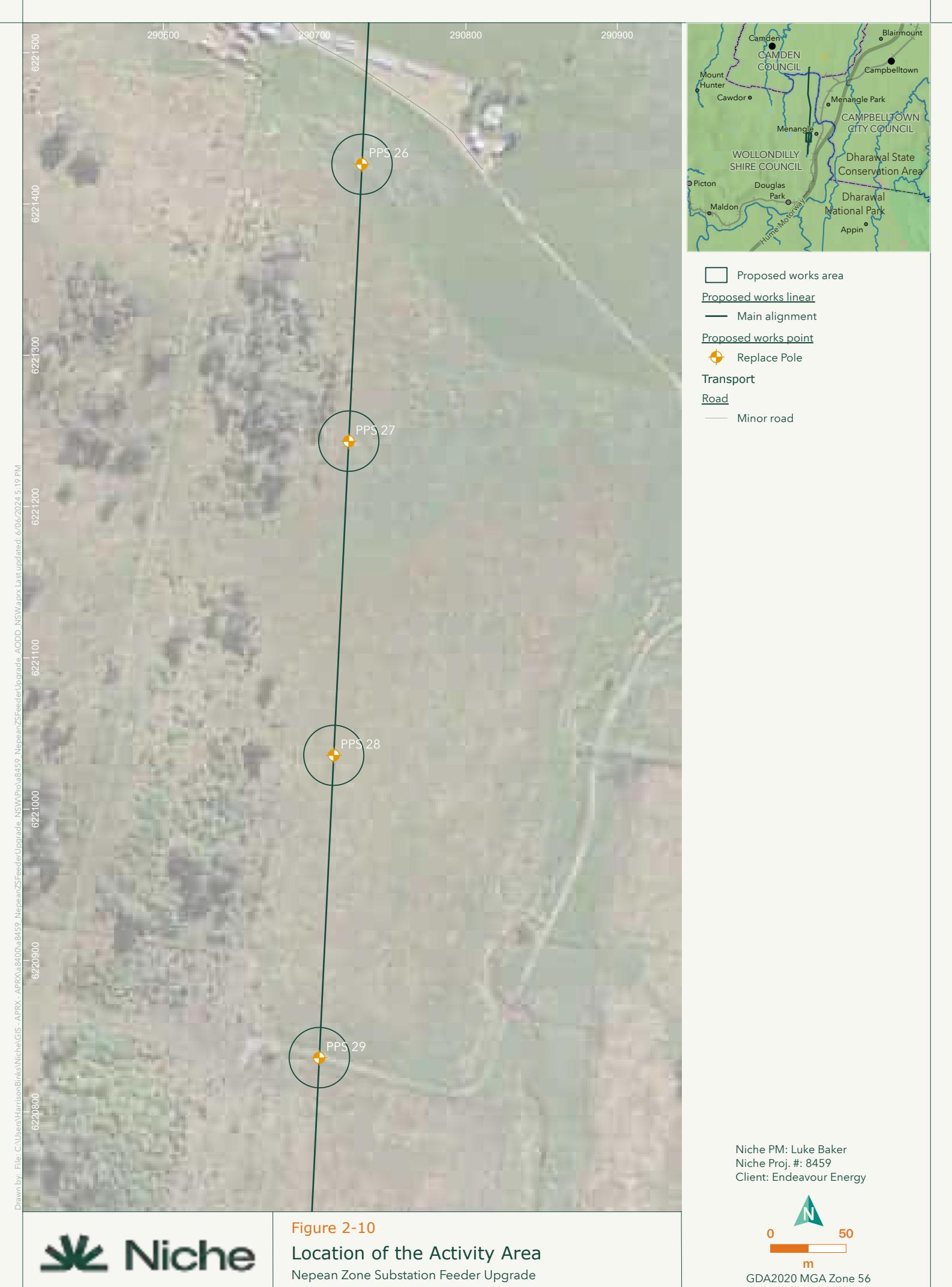




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 Niche Proj. #: 8459
 Client: Endeavour Energy



Figure 2-9
Location of the Activity Area
 Nepean Zone Substation Feeder Upgrade



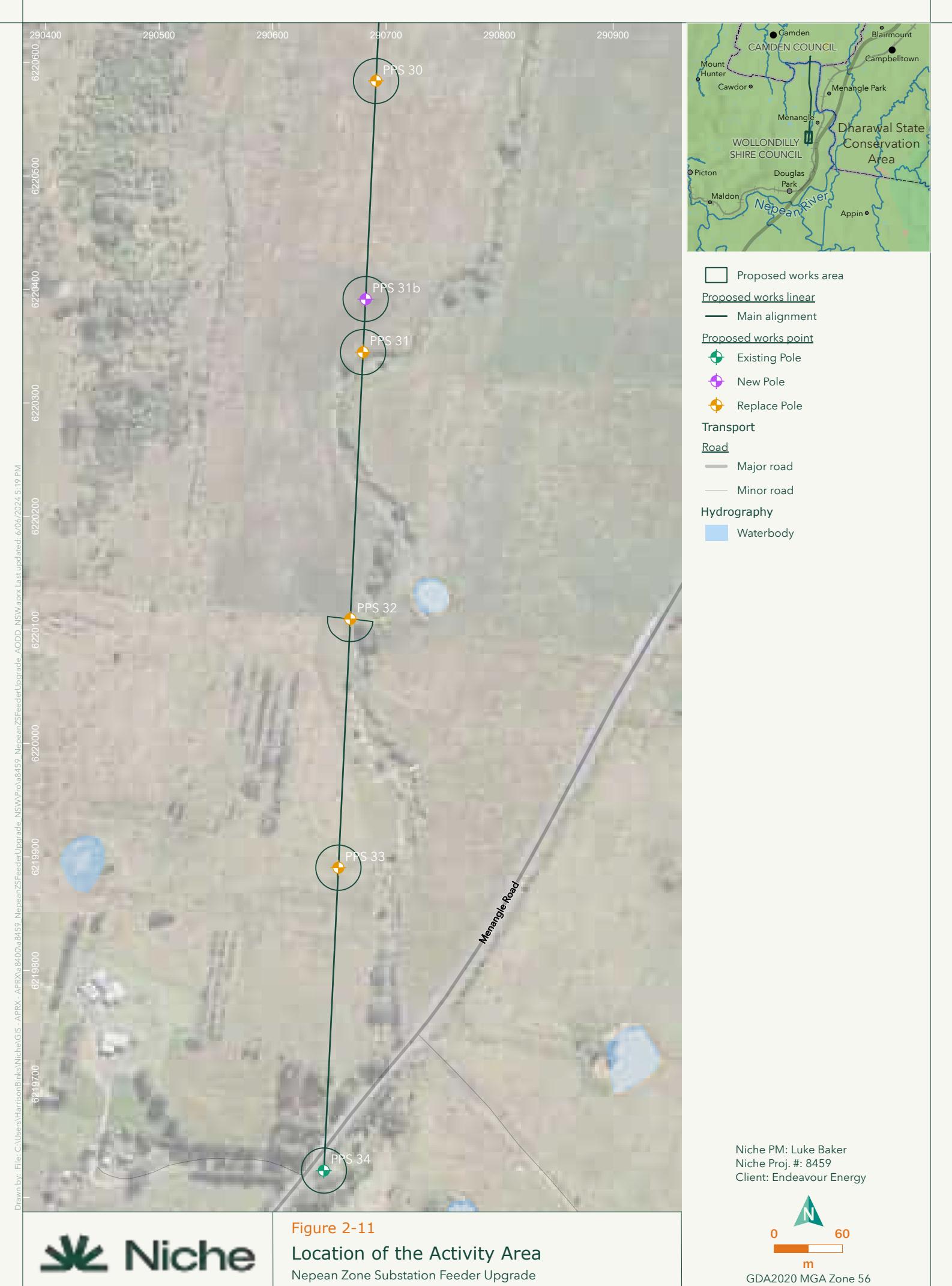


Figure 2-11
Location of the Activity Area
Nepean Zone Substation Feeder Upgrade





2 Environmental context

Understanding the past and present environmental contexts of a Proposed Works Area is requisite in any Aboriginal archaeological and cultural heritage investigation (DECCW 2010a). The landscape context may provide insight as to areas of land that may have been more intensively used by Aboriginal people in the past due to the presence of resources such as water, stone, plants and animals and other raw materials or landscape features associated with sustenance, shelter, tool manufacture, and cultural activities. Furthermore, the landscape provides the context within which the material remains of past Aboriginal occupation may be preserved and detectable due to the movement of soil through geomorphic processes such as erosion or its removal from the landscape through past land use and disturbance (DECCW 2010a: 8). By considering these factors, an Aboriginal cultural heritage investigation may develop a sampling strategy for identifying any tangible Aboriginal heritage values within the Proposed Works Area. It allows for an understanding of what activities would likely have taken place across the Proposed Works Area in the past and the likelihood that any trace of these would have survived below the surface. The following section provides details of the environmental characteristics of the Proposed Works Area.

2.1 Topography and landforms

The Proposed Works Area is located within the Nepean River floodplain southwest of Sydney, approximately 2 km from Camden, NSW. The Proposed Works Area is located within the Cumberland Plain, which is one of 13 different subregions located within the greater Sydney Basin region (NPWS, 2003). The Geology of the Cumberland Plain typically is that of the Triassic age Wianamatta group of shales and sandstones (NPWS, 2003). The Wianamatta group is intruded by a small number of volcanic vents and is partially covered by Tertiary-age river gravels and sands. Quaternary alluvium is also identified along the main streams within the Cumberland Plains (NPWS, 2003).

Within the Proposed Works Area itself, three soil landscapes are present which can further define the potential topography and landforms within the Proposed Works Area. These are the Theresa Park, Blacktown and Luddenham Soil Landscapes.

Topographically, the Cumberland Plains are characterised by low rolling hills and wide valleys which are located within a rain shadow area below the Blue Mountains (Bannerman et al., 2011; DPIE, 2020). Due to gravel splays, at least three terrace levels are evident within this subregion (Bannerman et al., 2011; DPIE, 2020). Swamps and lagoons are commonly present on the floodplain of the Nepean River, with the township of Menangle being named after a small lagoon on the opposite side of the Nepean River (Biosis, 2018:24). The Proposed Works Area is most associated with the floodplain levees and meander scrolls and terraces of the Theresa Park soil landscape, which covers a majority of the Proposed Works Area, however, other topographical features present include gently undulating rises, rolling hills, ridges, crests, drainage depressions and valley flats (Bannerman et al., 2011; DPIE, 2020).

The characteristics of the topography and landforms within the Proposed Works Area limit the potential for the presence of a number of archaeological site types, including rock shelters, and rock art, however, PADs, isolated artefacts, and artefact scatters are common within these landscapes, particularly within deeper alluvial soils, which is supported by the presence of such Aboriginal cultural heritage sites which have been identified within the Proposed Works Area. In addition, the landforms present within the Proposed Works Area, such as ridges and crests suggest potential for vantage points, with the landscape being easily traversable.

A review of the topography and landform of these Soil Landscapes is outlined in Table 1 and can be seen on Figure 3.



Table 1: Soil landscape descriptions (from Bannerman et al., 2011; DPIE,2020)

Soil landscape	Topography
Theresa Park	Tertiary and Quaternary floodplain and terraces of the Nepean River south of Cobbitty Creek. Gently undulating slopes are generally <5% but can range to 10% on high-level terraces.
Blacktown	Broad rounded crests and ridges with gently inclined slopes. Gently undulating rises with local relief to 30 m; slopes are usually <5%.
Luddenham	Narrow ridges, hillcrests and valleys. Rolling to steep low hills with local relief 50-12 m and slopes 5-20%.

2.2 Geology and soils

The Proposed Works Area comprises three main soil landscapes: Theresa Park, Blacktown and Luddenham (see Figure 3). The Theresa Park soil landscape covers the majority of the Proposed Works Area, extending along the mid to low slopes of the Mount Taurus ridgeline, and across the floodplain of the southern watercourses and the Nepean River. The Blacktown soil landscape covers sections within the southwest corner of the Proposed Works Area along the southern half of the Mount Taurus ridgeline and a section in the northern section of the EMAI property. A small section towards the southern section of the Proposed Works Area, as well as a larger section associated with the ridgeline which runs north-south through the EMAI property to the west of the Proposed Works Area, is characterised by the Luddenham soil landscape (DPIE, 2020).

2.2.1 Theresa Park soil landscape (9029tp)

The Theresa Park soil landscape is characterised by Red Earths (Gn2.12) and Red Podzolic Soils (Dr2.82, Dr2.12) that occur on terraces and minimal Prairie Soils (Uc1.21) that occur on the current floodplain. The topsoils comprise a brown sandy loam and a dull reddish brown sandy clay loam (Bannerman et al., 2011; DPIE,2020). The subsoils are reddish-brown sandy clay and brownish grey clay (Bannerman et al., 2011; DPIE,2020).

The high erodibility and low available water-holding capacity of this landscape impact the superimposition of soils and materials which affects the integrity of archaeological deposits.

2.2.2 Blacktown soil landscape (9029bt)

The Blacktown soil landscape is characterised by shallow to moderately deep (<150 cm) Red Podzolic Soils and Brown Podzolic Soils on crests, upper slopes and well-drained areas, and deep (150-300 cm) Yellow Podzolic Soils on lower slopes and in drainage depressions and localised areas of poor drainage. The topsoil comprises a friable greyish-brown loam (Bannerman et al., 2011; DPIE,2020). The subsoils comprise a hard-setting brown clay loam, mottled brown clay and grey mottled clay (Bannerman et al., 2011; DPIE, 2020).

The Blacktown soil landscape is known to preserve Aboriginal objects in association with hill crests, lower slopes and flats associated with good outlooks and/or drainage lines. These site types are more likely to comprise isolated stone artefacts rather than more significant concentrations. This landscape is prone to localised erosion, which may impact the integrity of archaeological deposits.



2.2.3 Luddenham soil landscape (9029lu)

The Luddenham soil landscape is characterised by generally shallow (<100 cm) soils on crests; and moderately deep (<150 cm) soil on upper and lower slopes and drainage lines. The topsoil comprises loose dark brown loam (Bannerman et al., 2011; DPIE, 2020). The subsoils comprise a hard-setting brown clay loam, a brownish black to dark reddish-brown clay, brown sandy clay and a greyish-brown loamy to clayey sand (Bannerman et al., 2011; DPIE, 2020).

The Luddenham soil landscape is also likely to preserve Aboriginal objects in association with hillcrests and valleys with water sources nearby. Erosion may have impacted archaeological deposits, however, particularly in areas that have been cleared or grazed or along drainage lines depending on the speed of flow of water. Site types would likely include Isolated Artefacts, Open Camp Sites where suitable geology occurs, axe grinding grooves, rock engravings and shelters with art, artefacts and/or deposits.

2.3 Hydrology

Water is one of the most important resources for human occupation in a landscape and is considered the primary factor in the prediction of Aboriginal sites in the landscape. Across NSW, there is a strong correlation between the presence, frequency, and density of Aboriginal objects with the abundance and permanency of water sources. Areas within 200 m of water are identified as being frequently associated with the presence of Aboriginal objects.

There are several primary waterways that intersect the Proposed Works Area: the Nepean River, Foot Onslow Creek and a number of unnamed creeks and drainage lines from first-order up to third-order streams, both perennial and non-perennial (see Figure 3). The power line crosses over the Nepean River in the north of the Proposed Works Area and runs parallel to the Nepean River in a north-south direction for the majority of the Proposed Works Area. The Nepean River is within 500 m of the majority of the Proposed Works Area. The Nepean River is a regionally significant perennial river that would have provided freshwater and riverine plant and animal resources. Perennial streams and creeks such as Foot Onslow Creek are often associated with infrequent and low density of artefacts. Areas with more reliable sources of water such as along the Nepean River are more likely to contain evidence of occupation sites due to the increased likelihood of freshwater, food and medicinal resources, as well as sources of stone and timber. The area of the proposed activity is located within 200 m of water; however, the area is subject to localised flooding (Calibri 2021:27 as cited in Extent Heritage, 2021) and has also been previously highly disturbed which significantly lowers the archaeological potential.

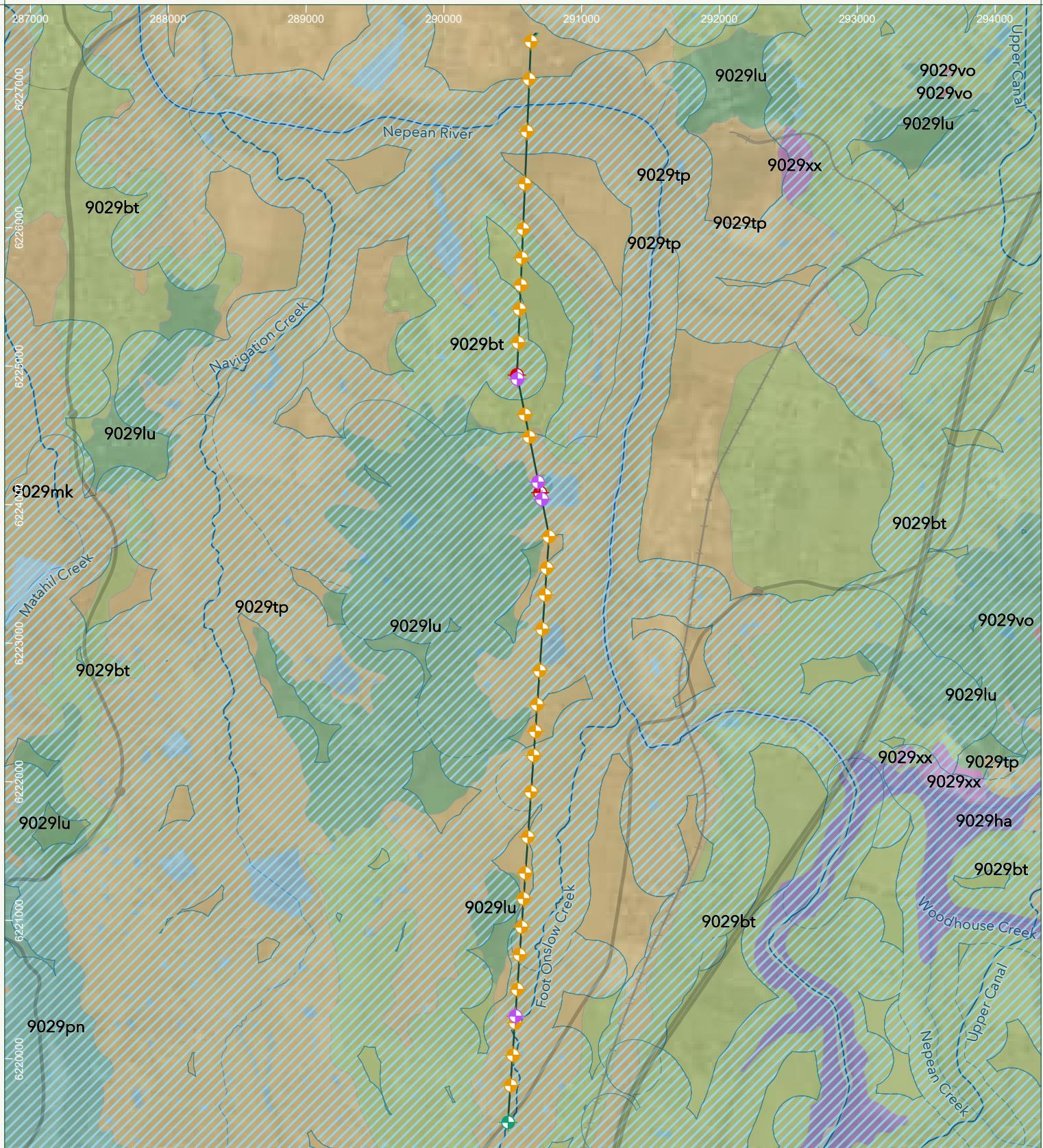
Foot Onslow Creek, a third-order perennial tributary of the Nepean River, transects the southeastern portion of the Proposed Works Area in a north-south alignment. Two pole sites are located within 50 m of this watercourse (PPS 31 and PPS 32).

A second unnamed non-perennial third-order stream runs to the east of the Proposed Works Area within the EMAI property. A couple of east-west branches extend either side of the mainstream alignment of the unnamed stream and several dams have been constructed along these drainage channels.

The availability of reliable sources of water would have made the local environment more suitable for long-term occupation. Not only would the creek lines and river systems present, enable local groups to camp in the area for longer periods to take advantage of the many resources available, but they also attract more animals into the area making it more suitable for hunting. In addition, the creek lines present would have been important as routes for easily navigating the landscape. It is worthy of note, however, that due to historic-period human activity within the Camden Park Estate, some modification to natural drainage lines is likely, with stored sedentary water more prevalent than in the pre-colonial Aboriginal era.



Figure 3: Soil landscapes and hydrology within the Proposed Works Area (Niche, DPIE, E spade)



Proposed works linear

— Main alignment

— Trench

Proposed works point

◆ Existing Pole

● New Pole

● Remove Pole

◆ Replace Pole

Soil Landscapes of Central and Eastern NSW

9029bt, Blacktown

9029ha, Hawkesbury

9029lu, Luddenham

9029mk, Monkey Creek

9029pn, Picton

9029tp, Theresa Park

9029vo, Volcanic

9029xx, Disturbed Terrain

Transport

Road

— Major road

— Minor road

— Rail

Hydrography

Watercourse

— Perennial Stream

— Non Perennial Stream

— Waterbody

— Watercourse buffer (200m)



WGS 1984 Web Mercator



Figure 3
Soil landscapes and hydrology in the local area
Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
 Niche Proj. #: 8459
 Client: Endeavour Energy



2.4 Vegetation

Within the Proposed Works Area, vegetation communities of predominantly tall open forest were present, however, these have largely been cleared within the Proposed Works Area since the European occupation/colonisation in 1788. However, based on soil landscapes present within the Proposed Works Area, the floral species present within the present environment can be determined, and an understanding of what may have been utilised by Aboriginal peoples can be assessed.

Vegetation communities within the soil landscapes of the Proposed Works Area are outlined in Table 2.

Table 2: Vegetation communities identified within the Proposed Works Area (DPIE,2020)

Soil landscape	Vegetation communities
Theresa Park	Almost completely cleared tall open forest, which previously contained cabbage gum (<i>Eucalyptus amplifolia</i>) and broad-leaved apple (<i>Angophora subvelutina</i>).
Blacktown	Almost completely cleared tall open forest (wet sclerophyll), open forest and woodland (dry sclerophyll forest). Traces of tall open forest are inclusive of remnant Sydney blue gum (<i>Eucalyptus saligna</i>) and blackbutt (<i>E. pilularis</i>), present in higher rainfall areas. Original woodlands and open forest in drier areas include forest red gum (<i>E. tereticornis</i>), narrow-leaved iron bark (<i>E. crebra</i>), and grey box (<i>E. microcarpa</i>).
Luddenham	Extensively cleared open forest (dry sclerophyll forest). Common tree species are inclusive of spotted gum (<i>Corymbia maculata</i>), forest red gum (<i>Eucalyptus tereticornis</i>), and grey box (<i>E. microcarpa</i>). Other species that occur less commonly are broad-leaved ironbark (<i>E. fibrosa</i>), narrow-leaved ironbark (<i>E. crebra</i>), woollybutt (<i>E. longifolia</i>) and forest oak (<i>Allocasuarina torulosa</i>). Understorey species are inclusive of species such as blackthorn (<i>Prunus spinosa</i>), coffeebush (<i>Bryenia oblongifolia</i>), hickory (<i>carya</i>) and hairy Clerodendrum (<i>Clerodendrum tomentosum</i>). Grasses are also present, and include wire grass, bordered panic grass, paddock lovegrass and kangaroo grass (<i>Themeda triandra</i>).

These vegetation communities provide a range of food, medicinal, shelter and tool resources. Eucalypt leaves are used medicinally in areas and the bark is utilised in bowls, containers and shields (Cumpston 2020). Further details on the utilisation of the floral species identified within the soil landscapes located within the Proposed Works Area are outlined in Table 3.



Table 3: Traditional uses of resource species identified within the Proposed Works Area (Cumpston, 2020; Gott, 2023)

Resource species	Traditional uses
Kangaroo Grass (<i>Themeda triandra</i>)	Kangaroo grass seeds were gathered, separated and ground in order to produce flour which could be mixed with water, and then cooked to make a damper. Kangaroo grass seeds ripen in the summer.
Eucalypts (<i>Eucalyptus</i> sp.)	Oils from the Eucalyptus family could be used as a decongestant, while bowls and dishes could be made from the heavy bark. The bark could also be used to make canoes, with tools being able to be crafted from the hardwood.
Forest oak (<i>Allocasuarina</i> spp)	The hardwood of oaks has been identified to be used for making boomerangs, shields and clubs. In addition, parts of the tree could be consumed with young cones and shoots being edible.

Further understanding of the use of floral and faunal resources can be extracted from historical accounts and observations by early colonists and settlers. Historical accounts from the early colonial period indicate that floral resources utilised by the Aboriginal peoples within the Camden and Campbelltown region included, but were not limited to yams and other roots, with observations of wild yams being harvested on the riverbanks being recorded (Bradley, 1802:168 in Extent Heritage, 2021: 30). Likely species which may have been harvested are *Dioscorea transversa* or *mesdenia*, which are two species known to grow along the banks, and within the floodplains of the Nepean-Hawkesbury River (Attenbrow, 2010).

Early records also describe the hunting of possums, kangaroos, echidnas and lizards, with the methodology used to hunt kangaroo being described in depth (Bladen et al., 1982:751 in Extent Heritage 2021:30). Possums and kangaroos were also hunted by the Dharawal in order to use the furs to make cloaks further utilising the faunal species outside of being a food resource (Kohen et al., 1987:357). Other faunal species were utilised as food resources as well, including ducks, frogs, yabbies, tortoises, eels, fish and shellfish, with canoes being used for accessing the major waterways and swamps in the Cumberland Plain (Bladen et al., 1972:751 in Extent Heritage 2021:30).

Based on the historical record, and presently recorded environment, it can be determined that within the broader environmental context in which the Proposed Works Area is located, the area would have been suitable as a resource with a range of faunal and floral species which could be utilised.

2.5 Past land use

After the arrival of the European occupation/colonisation, the broader region surrounding and including the Proposed Works Area historically was known as the 'Cow Pasture Plains', based on the escape of two bulls and four cows who escaped the British Camp, and settled in the Campbelltown region, rapidly increasing in population (Karskens, 2020:87; Extent Heritage, 2021:31). The 'Cow pastures' were identified as an area of 'beautiful country' and was determined to be suitable for agricultural activities and development for the colony (Steven, 1967; Extent Heritage, 2021). The Proposed Works Area is associated with two early land grants, firstly to John Macarthur who received an overall 10,000 acres between 1805 and 1824, while the other is associated with



a smaller portion of 2,000 acres, which was allotted to Walter Stevenson Davidson, with the land intended to be used for sheep-grazing and exporting wool (Steven, 1967; Extent Heritage 2021). The Macarthur family would become the largest settlers in the Camden and Campbelltown areas, with the Camden Park Estate being known as the 'first agricultural establishment in the Colony', with the family owning over 60,000 acres of land within the windier region (Biosis, 2018:25; Britannica, 2024).

Based on past reports, the Proposed Works Area continued to be used for agricultural purposes into the 21st Century, with ploughing likely occurring (Steven, 1967; Extent Heritage, 2021:17). It should be noted that while ploughing is identified to be known to impact on soil profiles, the limited depth reached does not remove the potential for Aboriginal or historical archaeological remains to be identified within the Proposed Works Area (Extent Heritage, 2021).

Infrastructure-related disturbances have also been identified to have occurred within the Proposed Works Area, with the implementation of 144 gas wells, and associated low-pressure underground gas gathering pipes having been recorded to have been put in place within the Wollondilly, Camden and Campbelltown LGAs, for the Camden Gas Project (Extent Heritage, 2021: 17; AGL, 2013: 1).

The NSW government purchased the majority of the former Camden Park estate in 1974 and consolidated this land purchase in the period leading up to the 1990s. In 1990 the EMAI facility was opened and utilised lands that correspond to much of the Proposed Works Area. The EMAI also maintains the area as a cultivated and working agricultural station, with cropping and pastoral activities carried out on site. Access routes across the property, as well as fencing, are maintained from the previous tenet properties that used to make up Camden Park Estate.

On review of historic land use within the Proposed Works Area, it can be concluded that the Proposed Works Area has experienced a range of impacts from historic land use, including land clearing, agricultural activities, the construction of coal seam gas extraction wells and pipelines, as well as associated infrastructure development. As a result, of these disturbances, it is likely that moderate impact has occurred on the integrity of soil and potential sites that may be present within the Proposed Works Area, however, it is also noted that portions of the existing lines are aligned under a shale road and original installation of the lines disturbed the ground.

Historical aerial imagery further supports this. The early imagery conveys the agricultural character of the Proposed Works Area, with evidence of past land clearance, cropping and ploughing in many places. The imagery shows a gradual increase in residential settlement in and around Menangle, as well as changing use and the introduction of linear infrastructure across the Proposed Works Area, particularly within the EMAI property.

2.6 Summary of the environmental context

In summary, the majority of the Proposed Works Area is located within disturbed land which has had historical impacts. The environmental context of the Proposed Works Area suggests the local raw materials include silcrete, chert, quartz, basalt and quartzite, which can be used in stone tool manufacture, higher-quality materials were likely traded in and used. The floral and faunal resources and water availability would have provided seasonally rich environments, however, one of the soils present within this environment typically has high erodibility which impacts the potential for intact subsurface deposits.

The existing power lines (and specifically the existing power poles) are located within land portions cleared for agricultural purposes, or within cleared road reserves. The original installation of the power line disturbed the ground. Although the existing line alignment is highly disturbed, there is still some potential for Aboriginal cultural heritage objects to occur, even if this is unlikely.

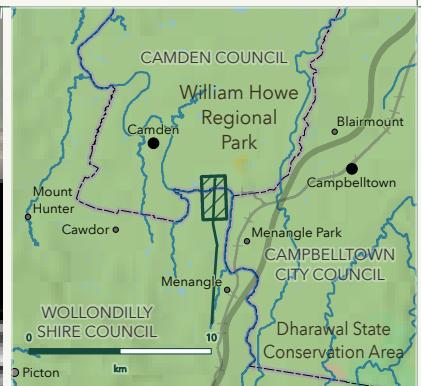


Figure 4: Historic aerial photographs (Source: NSW Gov)

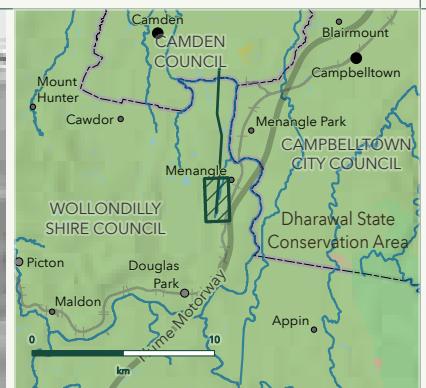


Figure 4-1
Historical Aerial Photographs - 1947
Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy







Proposed works point

Existing Pole

New Pole

Replace Pole

Proposed works linear

Main alignment



Figure 4-4
Historical Aerial Photographs - 1947
Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

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m
WGS 1984 Web Mercator



3 Aboriginal objects due diligence assessment

3.1 Is the proposed activity a low impact activity defined by the regulation?

Yes.

The activity is a low impact activity as defined under Part 5 Division 2 Section 58 of the National Parks and Wildlife Regulation 2019 ('the Regulation') because it:

- (1) (a) was maintenance work of the following kind on land that has been disturbed—
- (ii) maintenance of existing utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines).

The Proposed Works Area is considered to be 'land that has been disturbed' due to several previous activities which were previously undertaken on this land, but most importantly:

- (f) construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure)

3.2 Step 1 – Will the activity disturb the ground surface or any culturally modified trees?

Yes.

The proposed activity will involve ground surface disturbance.

There is one culturally modified tree AHIMS site (CP-ST-07 AHIMS ID# 52-2-3247) indicated to be partially within the Proposed Works Area (located at PPS 12). However, during the field survey, this site was relocated and found to be at least 60 m from the PPS 12 location, and this site would not be impacted by the proposed works.

3.3 Step 2a – Are there any relevant confirmed site records or other associated landscape feature information on AHIMS (or other heritage registers)

Yes.

3.3.1 Heritage registers

3.3.1.1 AHIMS

An extensive Aboriginal Heritage Information Management System (AHIMS) search was conducted by Niche heritage consultant Olivier Rochecoste on 22 April 2024, covering the following area GDA Zone 56, Eastings: 289675.0 - 291641.0, Northings: 6218629.0 - 6228501.0 with a Buffer of 0 m, which was focussed on the Proposed Works Area (Appendix 1).

The AHIMS search identified 66 Aboriginal cultural heritage sites and objects. Two of these sites appeared to intersect with the Proposed Works Area PPS locations (Figure 5). The first site is within proximity to PPS 12 and is a culturally modified tree (CP-ST-07 AHIMS ID# 52-2-3247). Field survey confirmed that this site is located outside 60 m away from PPS 12. The second site (Waterway Corridor: Foot Onslow Creek AHIMS ID# 52-2-4675) is



associated with Foot Onslow Creek and PPS 31 is within the site boundary of this site. Details of these sites are included below.

Within the wider search area, artefact sites were the most common Aboriginal site feature documented on the AHIMS register (n =18) with isolated finds being the next most common (n =12) (Table 4).

Table 4: AHIMS results summary

Site features	Total
Artefact(s) (unspecified number)	18
Isolated find	12
Potential Archaeological Deposit (PAD)	11
Culturally modified tree	7
Isolated find and Potential Archaeological Deposit (PAD)	7
Artefact scatter	6
PAD and Artefact(s)	3
PAD and artefact scatter	1
Scarred tree	1
Total	66

It must be noted that care should be taken when using the AHIMS database to reach conclusions about site prevalence or distribution. The distribution of registered sites does not reflect patterns of occupation but rather is often indicative of survey coverage and conditions.



AHIMS #52-2-3247 (Camden Park 7-ST / CP-ST-07)

This previously recorded site was originally recorded as a Grey Box tree with cultural scar. The site is located within the Elizbeth Macarthur Farm and is located near a junction of several tracks and mentions the proximity to the existing electricity power line. The details of the site are provided in Table 5 below.

During the Niche 2024 survey, the site was relocated and inspected when the survey of PPS 12 was undertaken for this report. The AHIMS location for this site shows the extent to be within 20 m of the electricity poles at PPS 12. However, when the scarred tree was re-located and physically inspected, the actual location was found to be closer to the road junction and at least 60 m away from the PPS 12 location as well as separated from the powerline by a stand of unmarked trees.

Table 5: Site details for Camden Park 7-ST / CP-ST-07 (AHIMS ID #52-2-3247)

Overview					
Site type	Scarred tree	GDA 94 Zone 56 Easting	290610	GDA 94 Zone 56 Northing	6224390
Recording	Glenda Chalker (Cubbatch Barta), Phil Hunt (NPWS).	Date of original recording	11 August 2000.	Date of updated recording	23 April 2024.
Location description					
Landform	Undulating plain and flat	Land use/ disturbance	Pastoral/low- intensity farming	Impacts	Water wash/erosion, fences, ploughing, livestock and establishment of unsealed road
Landscape type	Ridgeline	Tree type	Grey Box	Scar facing	South-west
Tree circumference	262 centimetres (cm)	Scar length	165 cm	Scar width	26 cm
Proximity to water	200 m				
Site details					
	Grey Box tree with scar, on a ridgeline near transmission lines and track junction. Tree is alive, scar is asymmetrical, age uncertain, but large.				



AHIMS #52-2-4675 (Waterway Corridor: Foot Onslow Creek)

This previously recorded site was originally recorded as a PAD that extends approximately 1426 m in length and 100 m in width. The site is located at 65 Woodbridge Road and is located within farmland that has had historical ploughing undertaken across the site and known past grazing. The PAD covers a 50 m buffer along each side of Foot Onslow Creek and was identified as an area of potential from predictive mapping. Identified during survey works conducted by Extent Heritage in 2021 for the Menangle Planning Proposal.

. The original recording for this site did not find archaeological artefacts or site features associated with this site, although the results of other nearby excavations (for PAD 1 (AHIMS ID# 52-2-3021) and PAD 2 (AHIMS ID# 52-2-3022)) that retrieved artefacts, may indicate the presence of artefacts within the corridor along Foot Onslow Creek. An overview of the site is provided in Table 6 below.

Table 6: Site details for Waterway Corridor: Foot Onslow Creek (AHIMS ID #52-2-4675)

Overview					
Site type	PAD	GDA 94 Zone 56 Easting	290836	GDA 94 Zone 56 Northing	6221104
Recording	Previous recording: Rebekah Hawkins (Extent Heritage). Updated recording: Olivier Rochecouste (Niche) and Glenda Chalker (Cubbitch Barta).	Date of original recording	26 August 2021.	Date of updated recording	23 April 2024.
Location description					
Landform	Undulating plain and flat	Land use/disturbance	Pastoral/low-intensity farming	Impacts	Water wash/erosion, fences, ploughing, livestock and establishment of unsealed road
Landscape type	Eroding on slopes	Visibility	20%	Exposure	20%
Proximity to water	1.03 km southwest of Nepean River; contains the Foot Onslow Creek.				
Site details					
	No artefacts were found. PAD identified based on previous recording.				

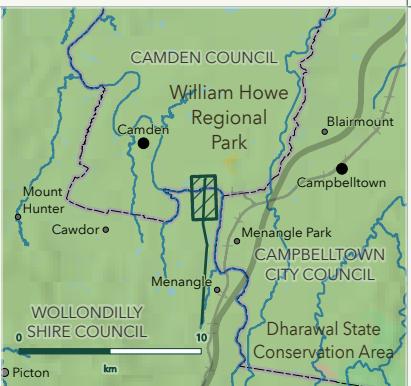


Figure 5: Previously recorded heritage items in or near the Proposed Works Area (Source: AHIMS and Niche)

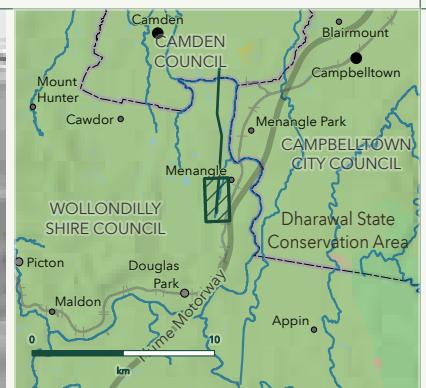


Figure 4-1
Historical Aerial Photographs - 1947
Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy







Proposed works point

Existing Pole

New Pole

Replace Pole

Proposed works linear

Main alignment



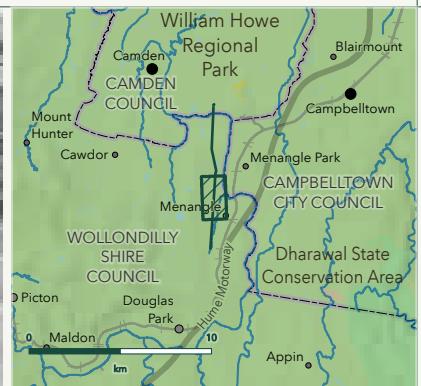
Figure 4-4
Historical Aerial Photographs - 1947
Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

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m
WGS 1984 Web Mercator







Proposed works point



Proposed works linear

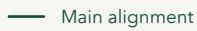


Figure 5-3

Historical Aerial Photographs - 1960

Nepean Zone Substation Feeder U

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy



Proposed works point

Existing Pole

New Pole

Replace Pole

Proposed works linear

Main alignment

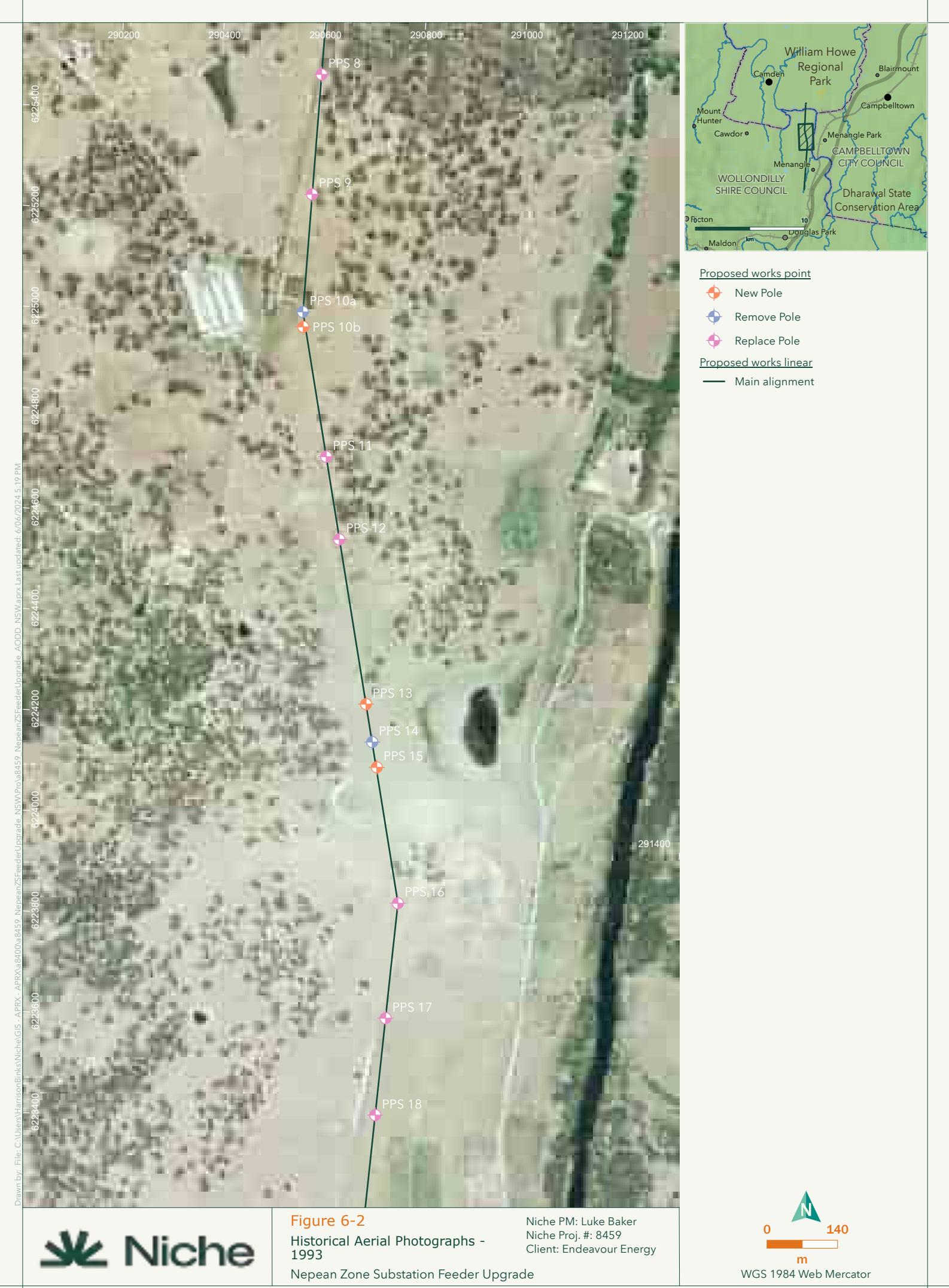


Figure 5-4
Historical Aerial Photographs - 1960
Nepean Zone Substation Feeder Upgrade

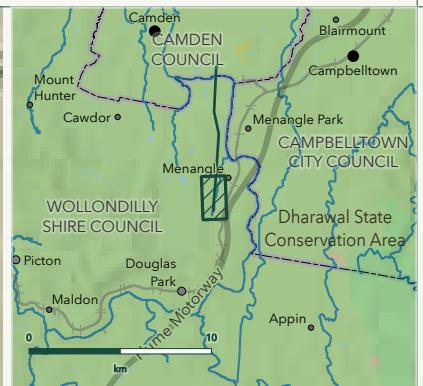
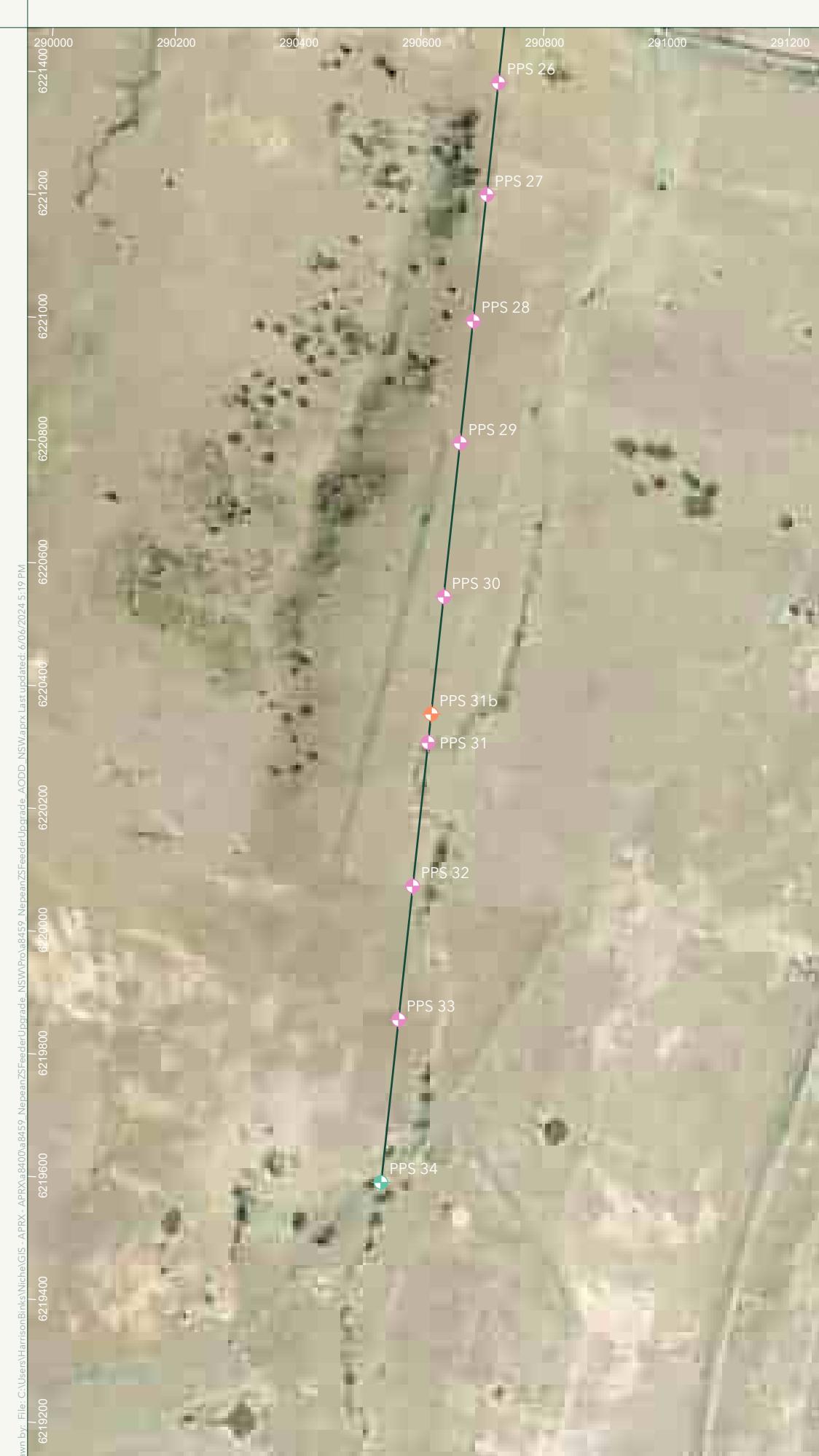
Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

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m
WGS 1984 Web Mercator









Proposed works point

Existing Pole

New Pole

Replace Pole

Proposed works linear

Main alignment



Figure 6-4
Historical Aerial Photographs - 1993
Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

0 140
m
WGS 1984 Web Mercator



3.3.1.1 AHIP register

A search was conducted of the Department of Climate Change, Energy the Environment and Water (DCCEEW) AHIP public register on 15 January 2024, covering the 2010-2024 period.

Two existing AHIPs are in place near the Proposed Works Area. The first was applied on 8 November 2019, at 310 Menangle Road, Menangle, within the Wollondilly LGA at Lot 1242 DP1121129, located 330 m south of the southern extent of the Proposed Works Area, but no AHIP number was provided for the proposed works.

The second application at 310 Menangle Road, Menangle was issued on 28 April 2021, (AHIP #C0005662 (AHIMS AHIP# 4581) for the Wandinong Gas Works: upgrade to access tracks and preparation for decommissioning works (Biosis, 2020; Biosis, 2021). The Duration of the AHIP was for 10 years.

The lot and DP boundary referred to in these AHIMS include the southern extent of the Proposed Works Area, specifically PPS 32 and PPS 33. It is not clear that these AHIPs interact with the Proposed Works Areas, as they refer to works which are outside of the 20 m buffer zones around these two PPS (the Proposed Works Area extent at these locations and within this lot and DP boundary).

3.3.1.2 Other heritage registers

Searches of the Australian World Heritage Database, The Commonwealth Heritage List, the National Heritage List, the State Heritage Register, the State Heritage Inventory and the Camden LEP (2010) and Wollondilly LEP (2011), were conducted on 22 April 2024.

Clause 5.10 of both the Camden LEP (2010) and Wollondilly LEP (2011) outline the controls for heritage conservation, including the conservation of Aboriginal objects and Aboriginal places of significance. Table 7 outlines the results of the searches of the known heritage registers. A proper assessment of these items has been undertaken in the Statement of Heritage Impact report completed by Niche for this project, which also supports the REF (Niche 2024c).

Table 7: Heritage register results

Item number	Item name	Location	Level of significance	Relationship to the Proposed Works Area
SHR #00341	Camden Park	Elizabeth Macarthur Avenue, Camden Park	State	Proposed Works Area partially transects this item's curtilage
SHR#01697	Camden Park Estate and Belgenny Farm	Elizabeth Macarthur Avenue, Camden Park	State	Proposed Works Area partially transects this item's curtilage
LEP #I54	Camden Park Estate - Dairy No.8, Cottages and Orchard Sites	445 Remembrance Driveway, Camden Park (Lot 2, DP 1050479)	Local	Proposed Works Area partially transects this item's curtilage
LEP #I84	Dairy No.4 (EMAI Cottage 29)	60 Woodbridge Road, Menangle (Lot 2, DP 1133910)	Local	Proposed Works Area partially transects this item's curtilage
LEP #I99	Menangle Gate Lodge (Former)	60 Woodbridge Road, Menangle (Lot 2, DP 1133910)	Local	Proposed Works Area partially transects this item's curtilage



Item number	Item name	Location	Level of significance	Relationship to the Proposed Works Area
C6	Menangle Landscape Conservation Area	Menangle	Local	Proposed Works Area partially transects this item's curtilage

3.4 Step 2b – Are there landscape features that are likely to indicate the presence of Aboriginal objects?

Yes

The following landscape features listed in the Due Diligence Code signify high potential for the presence of Aboriginal objects:

- Within 200 m of waters, or
- Located within a sand dune system, or
- Located on a ridge top, ridge line or headland, or
- Located within 200 m below or above a cliff face, or
- Within 20 m of or in a cave, rock shelter, or a cave mouth.

The Proposed Works Area is associated with one of the above-listed landscape features that are classified by the Code of Practice as being archaeologically sensitive, this being:

- Within 200 m of waters

The Proposed Works Area is within 200 m of the Nepean River, which the power line crosses and which most of the PPS are within 500 m of. In addition, the Proposed Works Area PPS are all located within 200 m of the first or third-order streams which are located across this floodplain region. The Foot Onslow Creek is associated with known Aboriginal cultural heritage sites, with the PAD site Waterway Corridor: Foot Onslow Creek (AHIMS ID #52-2-4675) being associated with the Proposed Works Area PPS 31.

3.5 Step 2c – Are there any other sources of information of which a person is already aware?

Yes.

3.5.1 Previous heritage assessments within or relevant to the Proposed Works Area

A number of Aboriginal heritage studies have been conducted within the Wollondilly LGA and within the wider Camden region. A majority of these works have been conducted in association with development, and infrastructure projects, including works associated with the Camden Gas Project, subdivision and rezoning programs for the intent of residential development and investigations into the historic and Aboriginal cultural heritage within the area to characterise heritage values within the broader region, of which some of the studies have overlapped or included the Proposed Works Area.

From these assessments, the data suggests the Aboriginal occupation was prevalent within the region, with a number of Aboriginal cultural heritage sites and areas of archaeological potential being identified within rural contexts during these projects. From these assessments, the disturbance of the Proposed Works Area is also evident, with nearby gas line infrastructure sites showing high levels of disturbance from the installation of this infrastructure and AHIMS sites #52-2-3021 and #52-2-3022 disturbed through subsurface investigation as part of



the Dibden (2004) assessment. A summary of the most relevant heritage assessments and reports undertaken within proximity to, or in the region of the Proposed Works Area is outlined in



Table 8.



Table 8: Previous assessments

Author	Title	Year	Relevance to the Proposed Works Area
Niche	AGL Mt Taurus Gas Gathering Line Removal Heritage Services	2024	<p>Niche has been engaged to undertake an Aboriginal Cultural Heritage Assessment (ACHA) and Archaeological Report (AR) by AGL to investigate potential impacts to Aboriginal Cultural Heritage from the removal of low-pressure gas pipelines in the Mt Taurus region, near the southern portion of the Proposed Works Area for this AODDA.</p> <p>While this report is still under development, it was found that an AHIP was required for the removal of existing gas infrastructure within the site boundary of Waterway Corridor: Foot Onslow Creek (AHIMS ID #52-2-4675) and Waterway Corridor: Unnamed Creek (AHIMS ID# 52-2-4676) PADs. It was also determined that the sites PAD1 Mt Taurus (AHIMS ID #52-2-3021) and PAD 2 (AHIMS ID #52-2-3022) need to be de-listed as sites on AHIMS, as these sites have been destroyed physically. Note that they remain registered sites until removed from the AHIMS system. The AR concluded that while the existing gas line alignment is highly disturbed, the removal of existing gas infrastructure has the potential to harm Aboriginal Objects and required further assessment under the ACHA process.</p>
Extent Heritage Advisors	Menangle Planning Proposal: Aboriginal Archaeological Survey Report	2021	<p>Extent (2021) was asked to undertake an Aboriginal Archaeological Survey report at 65 Woodbridge Road, Menangle, NSW, which has been identified to be directly associated with the Proposed Works Area. Prior to survey works, three AHIMS registered sites were identified within the Assessment Area, IF1 Mt Taurus (AHIMS ID 52-2-3023); PAD1 (AHIMS ID 52-2-3021); and PAD2 Mt Taurus (AHIMS ID 52-2-3022).</p> <p>Conclusions to the assessment determined that an excavation program and Aboriginal Cultural Heritage Assessment Report and AHIP application would be required to understand the extent and scientific value of the three PADs, Waterway Corridor: unnamed creek (AHIMS ID# 52-2-4676), Waterway Corridor: Foot Onslow Creek (AHIMS ID# 52-2-4675), and Mount Taurus crest (AHIMS ID# 52-2-4677) if impacts to the areas could not be avoided.</p> <p>In addition, based on the survey works, and consultation with Aboriginal stakeholder groups, the Assessment area was identified to have the potential to contain contact-period archaeology, which has the potential for archaeology associated with conflict, which was recommended to be considered and investigated in the future stages of testing and community consultation. The overall assessment provides an understanding of known Aboriginal cultural</p>



Author	Title	Year	Relevance to the Proposed Works Area
			heritage sites identified during AHIMS searches for the Proposed Works Area and background to the broader archaeological context.
Biosis	Wanindong Gasworks Aboriginal Cultural Heritage Assessment, Menangle, NSW	2020	Biosis was commissioned by AGL in order to undertake an ACHA for the proposed works at 310 Menangle Road, Menangle, NSW, directly south of the Proposed Works Area. survey work conducted in 2019 identified seven existing Aboriginal cultural heritage sites within the Study Area, however, it was determined that two of the Aboriginal cultural heritage sites AHIMS 52- 2-3056 and AHIMS 52-2-3053 were duplicates of the same site and that the site locations for AHIMS 52- 2-3192, AHIMS 52-2-3056/AHIMS 52-2-3053, and AHIMS 52-2-3194 on AHIMS did not match actual locations in the field or according to an assessment originally undertaken by Dibden (2003). Two more Aboriginal cultural heritage sites were identified during the survey works, with eight being determined to be located within the Study Area. As a part of the assessment, four of the Aboriginal cultural heritage sites: AHIMS ID#52-2-3056/52-2-3053; AHIMS ID# 52-2-4507; AHIMS ID# 52-2-4508; and AHIMS ID# 52-2-3194 were collected under AHIP# C0005662 with an aim to rebury artefacts in a safe location in consultation with Aboriginal parties.
AHMS	Greater Macarthur Investigation Area: Aboriginal and Historic Heritage – Gap Analysis and Future Direction	2017	<p>In 2017, AHMS undertook an investigation into understanding the Gap in Historic and Aboriginal Heritage Analysis within the Greater Macarthur Investigation Area (GMIA), with the aim to identify the need for cultural heritage investigations and characterise heritage values within the GMIA. The Study occurred on the boundary of the Proposed Works Area.</p> <p>Notes were taken during the assessment, that while there is high potential for Aboriginal cultural heritage sites to be present along the river systems within the GMIA, the preservation of sites within close proximity to the Nepean River was likely low, due to the River being identified as being flood-prone, with the potential that historic flood events may have disturbed, removed or eroded the soil profile and consequently, any archaeological features or remains that may have been present.</p> <p>The Study provides an overview of modelling and past assessments that have occurred within the region and provides support to developing predictive models within the region, and in direct association with the Proposed Works Area.</p>
Niche	Menangle Park Subdivision and Infrastructure	2013	In 2013, Niche was requested to develop an Archaeological Report for a proposal to subdivide and deliver infrastructure for the Menangle Park Urban Release Area (MPURA). The Study area encompassed 238 hectares of



Author	Title	Year	Relevance to the Proposed Works Area
	Project: Archaeological Report		<p>the overall MPURA, and the assessment occurred approximately 3 km northeast of the Proposed Works Area and Menangle Township, within similar landscape contexts.</p> <p>During the assessment, it was identified that artefacts were predominantly recovered from slopes less than 3.8 degrees, and alluvial soils demonstrated the highest number of artefacts present, with alluvial terraces and alluvial terraces associated with lower slopes containing the most artefacts and highest densities of artefacts, which supported previously predictive modelling developed by JMCHM in 2010. Ridgelines associated with alluvial terraces tested also produced artefactual material. Overall predictive modelling associated with the Cumberland Plain, inclusive of proximity to water, was supported by the results of the testing program.</p> <p>In conclusion, the study, recommendations included the obtainment of an AHIP which would include allowances for surface collection and an archaeological salvage program to target sample areas of high value and potential, as well as the recommendation of an Aboriginal Cultural Management Plan due to the lifespan of the Project.</p>
Biosis Research	Camden gas project amended northern expansion archaeological report	2012b	An ACHA was undertaken in response to the proposed northern extension of the Camden Gas Project including a study area comprising the proposed surface and subsurface components of the project. The study area extended more than 18 x 16 km including portions of the Camden township in the southwest to Ingleburn in the northeast. Predictive modelling developed for the study suggested a high potential for open campsites containing artefact scatters or isolated finds as well as the potential for scarred trees. Due to the extent of previous ground disturbance throughout much of the study area, Biosis Research (2012b) concluded that archaeological sites are likely to have low integrity. The survey program conducted for the project focused on creeks, drainage lines and prominent rises as well as all previously recorded sites. A total of 28 Aboriginal sites and additional areas of moderate and archaeological sensitivity were identified.
Biosis Research	Wollondilly Shire Council local environment study: Aboriginal and historical heritage assessment	2012a	A regional study of Aboriginal cultural heritage within the Wollondilly Shire LEP was undertaken within six precincts proposed for residential rezoning comprising: West Picton, East Thirlmere, South Thirlmere, East Tahmoor, West Tahmoor and South Tahmoor. The study was undertaken to assess the suitability of the proposed land uses within the study areas and to provide a framework to guide the future development of the areas with respect to Aboriginal and historic heritage. Predictive modelling deployed in the study suggested that open sites containing isolated artefacts or artefact scatters were likely to be the most common. During the survey program, three new sites were identified including two artefact scatters and one isolated find. A further four areas of archaeological sensitivity were identified in the study within drainage lines in East Tahmoor, South Tahmoor, West Tahmoor and East Thirlmere. The



Author	Title	Year	Relevance to the Proposed Works Area
			<p>study concluded that an Aboriginal Cultural Heritage Management Plan (ACHMP) should be developed once the Concept Design has been finalised in consultation with RAPs. The assessment also recommended that all areas containing either known Aboriginal cultural sites or areas of potential should be avoided until further assessment is undertaken.</p>
HLA EnviroScience's Pty Ltd	Camden Gas Project: Spring Farm and Menangle Park	2007	<p>An Aboriginal heritage assessment was undertaken by HLA-ENSR as a part of a broader Environmental Assessment relating to the construction of coal seam gas well fields and infill wells in Spring Farm and Menangle Park as a part of Stage 2 of the Camden Gas Project.</p> <p>The overall assessment provides an awareness of different raw materials presently known to be used within the regional context of the Proposed Works Area and provides support on common site types that may be relevant to the Proposed Works Area itself. The study additionally provides details relevant to developing predictive models within the region and can be used in the modelling for the Proposed Works Area.</p>
Dibden, J. (NSW Archaeology Pty Ltd.)	Sydney Gas Proposed Gas Wells and Gathering Lines at Mt Taurus, Menangle, NSW. Subsurface Test Excavation	2004b	<p>A subsurface test excavation was subsequently undertaken at the PADs (PAD 1 AHIMS ID# 52-2-3021); PAD 2 AHIMS ID# 52-2-3022) associated with Gas Well sites MT3 and MT6 (Dibden 2004a). Both areas are situated within a creek flat landform within the drainage depression of Foot Onslow Creek. Due to low surface visibility at both locations, subsurface testing was recommended to determine whether or not a deposit may be situated within the proposed gas production well sites. Five test pits were excavated at both PAD sites and were sieved using 3 and 5 mm aperture sieves.</p> <p>The study is relevant to the present investigation as it detail the findings of a test excavation program conducted within the current Proposed Works Area. The test excavation report compiled by Dibden (2004b) recommended that no further archaeological investigations were considered necessary in regards to the Sydney Gas Operations proposal in relation to Gas Wells Sites MT3 and MT6 and that the proponent should seek a Section 90 for both sites.</p> <p>Both PADs that were identified were subsequently determined by Extent (2021) to not be valid sites. However, no update to the site status on AHIMs has yet been lodged.</p>
Dibden, J. (NSW	Sydney Gas Proposed Gas Wells and	2004a	<p>An Aboriginal heritage assessment was undertaken by Julie Dibden (NSW Archaeology Pty Ltd) in response to a proposal to drill ten gas wells and install associated gathering lines at Mt Taurus. The assessment was undertaken to support a Statement of Environmental Effects in relation to the proposal.</p>



Author	Title	Year	Relevance to the Proposed Works Area
Archaeology Pty Ltd.)	Gathering Lines at Mt Taurus, Menangle, NSW. Aboriginal Archaeological Assessment		<p>The results of the assessment supported the theory that site occurrence would be directly affected by proximity to reliable freshwater. Given the absence of reliable freshwater within the study area, the low background scatter of occupational evidence suggested that the area was used in a transient manner for hunting and gathering activities with no evidence of prolonged or permanent occupation identified.</p> <p>The study is relevant to the present assessment as it contributes to the regional occupation model and details the results of a survey program conducted within the current Proposed Works Area.</p>
Mary Dallas and Paul Irish	Aboriginal archaeological assessment: Spring Farm Urban Release Area	2001	<p>An Aboriginal archaeological assessment was undertaken in response to the proposed urban development of Spring Farm. The study area extends 500 ha and is situated immediately northwest of the current Proposed Works Area. The study is significant for the development of sensitivity mapping within the study area including areas of known or potential archaeological sites and for the development of management strategies for identified areas of archaeological sensitivity. The majority of the study area is situated in areas of low relief in proximity to the Nepean River. In support of other predictive models developed for the region, open sites containing artefacts were considered to be the most prevalent sites to occur. The study concluded that a program of test excavation should be undertaken within areas of hillslope/minor creek lines and within ridgeline/crest contexts.</p>
Australian Museum Business Services	Cumberland Plain regional archaeological study: Stage 1	1997	<p>A regional archaeological study was undertaken in order to (a) assess the representativeness of Aboriginal sites on the Cumberland Plain, (b) critically examine the planning framework in order to examine how it might better be utilised to achieve the aims of heritage management and (c) to produce guidelines on the recognition of silcrete artefacts in the region. The study determined that previous archaeological investigations on the Cumberland Plain "have not contributed significantly to a well-developed understanding of Aboriginal occupation and settlement strategies in the region." The scope of local assessments conducted prior to the review was found to be limited both in terms of their spatial extent and the complexity of the project aims. The review found that studies had relied too heavily on survey results with limited linkages made between ethnographic, historical, environmental and archaeological evidence. The review acknowledged the intense development pressure within the region and called for more effective ongoing communication between stakeholders.</p>



3.5.2 Predictive modelling

A number of predictive models concerning Aboriginal occupation and settlement of the Cumberland Plains Region and Camden district have been formulated and refined based on archaeological assessments undertaken in the region. Archaeological and ethnographic assessments have indicated that past Aboriginal groups had an established presence within the Cumberland Plains region and within the surrounds of the Proposed Works Area. the surrounding environment had a number of resources that would have been utilised, and a number of dependable waterways were present. From past assessments, the most common Aboriginal cultural heritage sites recorded within the direct context of the Proposed Works Area include artefacts, artefact scatters, PADs and modified trees (scarred or carved), with known Aboriginal cultural heritage sites present within the Proposed Works Area itself. Within the Proposed Works Area, disturbances that have been identified are inclusive of vehicle tracks, dams, implementation of infrastructural development associated with the Camden Gas Project, and land clearing, with some archaeological assessments occurring within and in close proximity to the Proposed Works Area (Extent 2021; Biosis 2020; AHMS, 2017). Based on assessments within the direct and regional context of the Proposed Works Area, the following predictive models have been developed:

- Smith (1989)
- McDonald & White (2010)

Early modelling developed by Smith (1989) predicted that Aboriginal cultural heritage sites within the Cumberland Plain would be identified on all topographic units, including ridgetops, slopes, creek banks and flats, with the prediction stating that half of all known sites would be clustered within 50 m of water (McDonald & White, 2010:30). Smith's (1989) assessment additionally noted that artefact density would be higher when the area was in proximity to stone sources and to permanent water, with increased presence where both factors were present (McDonald & White, 2010:30). It also posited that vegetative communities associated with sedge or open forest would also more likely have larger density Aboriginal cultural heritage sites (McDonald & White, 2010:30). The model is based on good ground visibility and was predominantly developed on the results of visual survey works, with a majority of survey works occurring pre-1990 within the Cumberland Plain reporting Aboriginal cultural heritage sites with less than 50 artefacts present (McDonald & White, 2010:30). However, during the 1990s with further test excavation occurrences within the Cumberland Plains, the model was amended, with studies demonstrating the presence of large numbers of stone artefacts in areas where no surface artefactual material had been identified during survey works (McDonald & White, 2010:30).

The McDonald & White (2010) study is established as the Cumberland Plains Predictive Model and has been used and supported by archaeological assessments completed within closer proximity to the Proposed Works Area (Niche, 2013; AHMS, 2017; Biosis 2020; Extent, 2021). Developed in 2010, the model expands on Smith's (1989) assessment and provides a more in-depth analysis of the impact of landform, stream order and stone resources on artefact densities and distribution. The Cumberland Plains Predictive Model proposes the following:

- In any landscape location within the Cumberland Plain, there exists the possibility that a background scatter of Aboriginal artefacts will exist.
- Fewer artefacts are found on upper slopes and ridge tops, and if present, they tend to be sparse, discontinuous scatters. Artefact densities increase toward lower positions in valleys. Lower slopes associated with higher-order streams produce the highest artefact densities. Elevated terraces, especially those overlooking higher-order watercourses, tend to contain high artefact densities that indicate evidence of more permanent or repeated occupation in these areas. Creek flats tend to show low artefact densities. As creek flats flood, artefacts may have been lost by erosion or not a preferred location for occupation.
- First-order creeks may have been able to support only small numbers of people, while more permanent water sources may have supported larger communities of people.
- First-order streams tend to have a lower average artefact density and artefact distribution and will likely appear as background. Second-order streams have a more continuous artefact distribution, with there being potential for evidence of one-off camp locations or single-event knapping. Third-order streams may indicate more continuous distribution, with evidence indicating frequent or repeated occupation by smaller groups of



people. Fourth-order streams are most likely to have higher densities of artefacts, with the most potential for complex or stratified Aboriginal cultural heritage sites. Creek junctions may be a focal spot for activity, with an increased likelihood of denser sites with higher-order streams

- The highest artefact density sites were within 50 to 100 m of water
- On lower slopes associated with fourth-order streams, artefact densities tend to be higher on slopes facing north and northeast, than on slopes facing west, however on upper slopes no distinction has been made in distribution.

Based on past assessments and predictive modelling within the region, the following predictive statements can be made:

- Areas within the Proposed Works Area associated with main waterways have a high potential for Aboriginal cultural heritage sites away from creek flats, with the presence of one second-order creek (unnamed) and third-order waterway (Foot Onslow Creek), and the Nepean River.
- The presence of intact archaeological deposits is possible; however, their location will be dependent on levels of disturbance.
- There is potential for open sites such as isolated artefacts and artefact scatters, however their location will be dependent on levels of disturbance.
- Site and artefact distribution similar to the Cumberland Plain predictive model and modelling developed by Extent (2021) is anticipated (McDonald & White, 2010).
- The potential for the presence of scarred or carved trees is low within the Proposed Works Area, due to moderate levels of disturbance associated with historic land clearing.
- Rock shelters are not present due to the absence of sandstone overhangs and platforms necessary for such site types, with there being a low likelihood of grinding grooves present for similar factors.
- Post-contact sites with shared values are possible within the Proposed Works Area, based on past community consultation in past archaeological assessments, and historical research, with the potential for archaeology associated with conflict to be present.
- Due to the presence of suitable soil landscapes (deep, soft sediments such as aeolian or alluvial deposits), there is potential for Aboriginal burials.

Areas of low disturbance, within the Theresa Park soil landscape, on terraced or mid-slope are the most likely landforms to contain Aboriginal archaeological sites and artefact densities or types that may have moderate to high scientific significance, in areas of minimal disturbance.



3.6 Step 3 – Can the harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?

For all sites except at PPS 31: Yes

Specifically for PPS 31: No.

Many of the power poles have reached or extended beyond their useful life and require replacement. The activity involves replacing poles (removing existing wooden power poles and installing new steel power poles at this same location). At some of the pole sites the location of new poles have been moved from the original location in order to avoid further environmental impacts, and in one location one existing pole is to be replaced by two new poles instead. Most power poles are not located within the site boundary of AHIMS sites or relevant landscape features.

The PPS 12 is near to the AHIMS location of Scarred Tree site #52-2-3247 (Camden Park 7-ST / CP-ST-07), however it was confirmed that the Proposed Works Area is separated from this AHIMS site by up to 60 m. This site can be avoided by the proposed works.

The PPS 31 is located within the site boundary of PAD site AHIMS #52-2-4675 (Waterway Corridor: Foot Onslow Creek). Even if the new power pole was to be installed outside of the site boundary of #52-2-4675, the existing poles within this site boundary still require removal. This removal activity would result in ground disturbance and would be within the site boundary of this AHIMS PAD site. Should it be possible to relocate the new pole for PPS 31 outside of the AHIMS #52-2-4675 site boundary, as well as developing a method to make the existing poles safe without causing ground disturbance, then harm to this site may be avoided. It is expected that methods of removal of existing poles would require some part of the poles remain in situ, and that no heavy machinery, vehicles or plant could operate within the site boundary of this item in order to accomplish this.

3.7 Step 4 – Does a desktop assessment and site inspection confirm that there are Aboriginal Objects or that they are likely?

No, for the majority of PPS.

Yes, specifically for PPS 31.

The desktop portion of the assessment indicates that the Proposed Works Area is within 200 m of watercourses, including the Nepean River and two third-order perennial streams. However, the Proposed Works Area was found to present evidence of a high level of past disturbance, with previous activity severely reducing the potential for Aboriginal objects to remain at the majority of the PPS. The previous activity involved with the installation of the Nepean Feeder electricity line, which often involved significant ground disturbance and remodelling of the landscape (as at PPS 14), is a key factor demonstrating disturbance, and which is present at all of the PPS. Furthermore, at the majority of PPS evidence of historical ploughing and land clearance also was observed, with this activity predating the installation of the existing Nepean Feeder electricity line.

Apart from the two sites identified to be within proximity to the Proposed Works Area, identified AHIMS sites are not located within the Proposed Works Areas at the PPS locations. A field inspection was undertaken on 23 April 2024 and 3 May 2024 which identified nil additional Aboriginal Cultural Heritage sites or objects. Trees were inspected for cultural modifications; however, no new sites of this type were noted, and no scarred trees or culturally modified trees were located within the buffer zone of the PPS locations that make up the Proposed Works Area.

The AHIMS site #52-2-3247 (Camden Park 7-ST / CP-ST-07), as mentioned above, was identified to be adjacent to PPS 12 during the desktop assessment, but during the field inspection was re-located and found to be over 60 m away from this PPS. The field inspection found no Aboriginal sites or objects to be present at the PPS 12 proposed works area.



The PPS 31 power pole was determined, as listed above, to be within the site boundary of AHIMS site #52-2-4675 (Waterway Corridor: Foot Onslow Creek), which is a PAD site. The location around PPS 31 was inspected during the field survey and no sign of aboriginal objects were found. There was severe erosion observed which has revealed the local stratigraphy and provides a cross section of the embankment where the poles are installed. No Aboriginal Objects were in evidence in the cut/exposed stratigraphy. This site exhibited river-rolled pebbles of standard non-artefact materials, and some shale/slate eroding out of the cross-section. The site inspection also looked for evidence of marked trees and grinding grooves associated with the river, but there was no evidence of these present. There were no outcroppings observed in the river course, and only scrub-level trees in evidence. However, this PPS is located within a previously listed PAD site. Previous archaeological testing in the northern part of this long site boundary has uncovered some evidence of Aboriginal Objects, even though the site card mentions that no Aboriginal Objects were discovered at the time that this site was listed. Given this fact, further research and testing is necessary in order to understand whether there are Aboriginal Objects at this PPS – given the totality of evidence, it must be considered that they are likely to be found within this PAD site boundary. An AHIP will be necessary in order to manage any works within this AHIMS site.

The ground surface visibility (GSV) varied across the length of the Proposed Works Area, with some ground surface exposures (GSE) present along road verges, in ploughed fields, or in eroded sections of embankments. Some grassed areas were well-maintained with better GSV than over-grown areas. Exposures revealed some areas of reddish brown and light yellowish brown clay subsoils where topsoil had been washed away, areas of land modification such as embankments for dams and a large number of locations revealing imported gravels. Outside of the specific interaction between AHIMS site #52-2-4675 and PPS 31, across the rest of the Proposed Works Areas it is concluded that it is not likely to find Aboriginal Objects.

The results of the site inspection are presented in Table 9 below. This table provides an overview of all the PPS and the Proposed Works Area in general, as well as observations specific to each of the PPS.



Table 9: Observations from the site inspection of the Proposed Works Area/Power Pole Sites (PPS)

PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
Spring Farm Substation	Trenching/ Under-boring between substation and PPS1	<p>The northern-most connection point related to the proposed works.</p> <p>Varying levels of GSV and exposures are present.</p> <p>Images presented of this site show the existing electrical infrastructure at this location.</p>	 <p>Plate 2: View of the substation at Spring Farm</p>	<p>No Aboriginal cultural heritage sites were identified at this location.</p>



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 3: View of the various connection points at the Substation, looking southwest towards other power infrastructure surrounding PPS 1. Trenching or under boring will be used to connect PPS 1 with the substation near to this connection point.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 1	Replace Pole	<p>To the south of these H poles, there is a depression which looks like a dam catchment area. Access tracks to this pole will utilise existing ones and clear a path with slashing.</p>	 <p>Plate 4: View of PPS 1 with the infrastructure to be replaced in the foreground. Note that the poles in the background are not involved in this project.</p>	No Aboriginal cultural heritage sites were identified at this location.

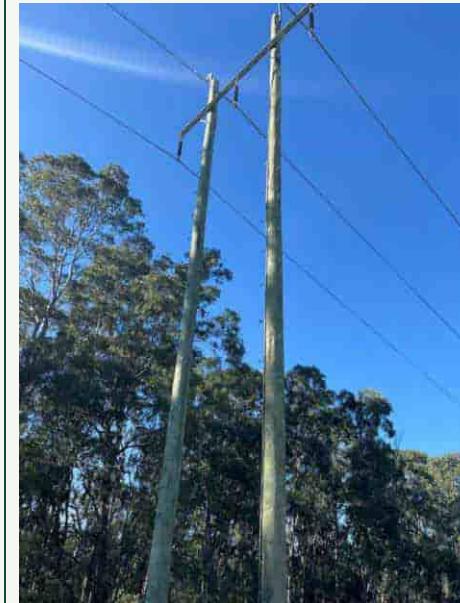


Plate 5: View looking northeast back towards the substation from PPS 1 along the route to be under bored/trenched.



Plate 6: View looking south from this PPS, showing the multiple lines which cross this unused land north of the



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			Nepean River, and near to the substation. Only one set of wires are under modification as part of this project.	
PPS 2	Replace Pole	<p>Area has long grass covering a sandy base, most likely brought into stabilise area for the easement and installation of the poles. Access tracks will use existing access tracks leading to pole with a laydown area just to the northeast of the pole. Surrounding area will be slashed. Sandy base has been disturbed so potential for artefacts is low in this area.</p>	 <p data-bbox="1035 1049 1686 1175">Plate 7: View of the pole infrastructure located at this PPS. Note that the height of these poles are almost as high as the replacement steel versions. This is not usual, as most wooden poles on this power line are much shorter.</p>	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 8: View looking south from this site, showing the wires crossing the Nepean River.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 3	Replace Pole	Low visibility due to grass coverage and crops. Possible high disturbance due to farming activities and the previous power pole installation. Access track will follow the existing one.		No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 10: View looking south over the cropped field which this pole site is immediately to the north of the pole site.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 4	Replace Pole	Low visibility and limited exposures due to being in a crop field. Access track may run through field from the south or from the east.	 Plate 11: View looking south of PPS 4 which is located within a cropped field.	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 12: View looking north from the PPS 4 location showing the cropped field and multiple wire routes at this site. The wires to the west are not part of this proposed works activity.</p>	

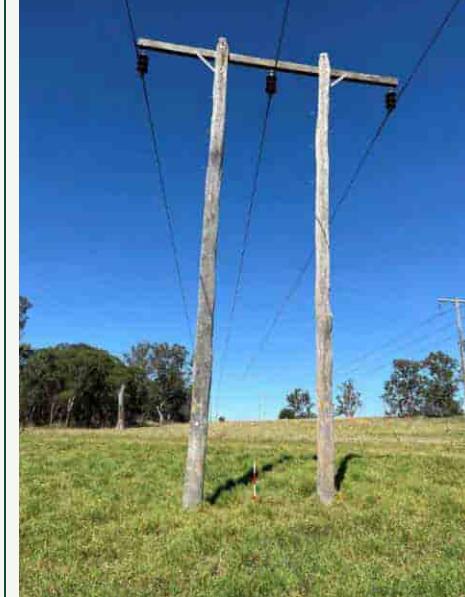


PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 5	Replace Pole	<p>Area heavily disturbed by ploughing. Evidence of topsoil has been removed from the area. Access track heading to this site would come from the east.</p>		<p>No Aboriginal cultural heritage sites were identified at this location.</p>



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 6	Replace Pole	Low visibility and no exposures present. Access track to follow existing one adjacent to site.	 Plate 15: View looking south of the infrastructure located at PPS 6.	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 7	Replace Pole	Low visibility and minimal exposures present. Access track will go through paddock.	 Plate 16: View looking south of the infrastructure located at PPS 7.	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 Plate 17: View looking north from PPS 7.	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 8	Replace Pole	Low visibility, adjacent to access track. Some exposures to the south east of the pole beside fence line but no artefacts found.		No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				<p>Plate 19: View looking north showing the rural gravel road near to this site.</p>



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 9	Replace Pole	Low visibility and no exposures due to surrounding long grass. Area will have to be slashed for an access track to be made.	 Plate 20: View looking south of infrastructure located at PPS 9.	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 21: View looking north at the open overgrown pasture at this location.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 10a	Remove Pole	<p>Low visibility due to surrounding long grass. Some exposures present but no artefacts. To the north of this site is a local dam with red algae. An exposed area is found to the south side of the dam, but no artefacts, disturbance by ant nest.</p>	 <p>Plate 22: View looking south from the dam's embankment of PPS 10a power poles. Note that these poles are to be relocated to PPS 10b near to where the vehicles are located in this picture.</p>	<p>No Aboriginal cultural heritage sites were identified at this location.</p>



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 23: View across the dam looking north from the PPS 10a site. Note that proximity to this dam is the reason for relocating this pole.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 10b	New Pole	<p>Suggested new location for nearby pole. Other area is deemed to be too tight for machinery and would require more vegetation removal. This location is more open and would not deviate from the power line above. Visibility is low and no exposures. An area to the west of this location contains a dam spillage area.</p>		<p>No Aboriginal cultural heritage sites were identified at this location.</p>



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 25: View of the existing power pole at PPS 10a - the camera is located at the new alternate location for these poles at PPS 10b.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 11	Replace Pole	Low visibility and no exposures in surrounding area. Nearby existing access track will be used. Are around will be slashed.	 Plate 26: View of the power pole at PPS 11, which will be moved slightly to the west (up to 4 m distance), in order to avoid impacts from overhanging tree branches.	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 27: View looking north from PPS 11, showing the overhanging tree branches to be avoided for ecological reasons.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 12	Replace Pole	<p>Low visibility no exposures.</p> <p>AHIMS Site #52-2-3247 (scarred tree) is close to this location, but outside of proximity.</p>		<p>The AHIMS Site #52-2-3247 was identified to be within proximity to this site, however it is located further than 60 m away to the northeast near an existing roadway.</p> <p>This scarred tree site was relocated and checked for potential harm from the proposed works, and it was determined that it would not be affected.</p>



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 13	New Pole	<p>New Pole location selected as one of two to replace PPS 14 (this existing pole is to be replaced by two poles on either side of the local ridgeline).</p> <p>This general region has had significant grading and land transformation as part of previous power line works. Evidence of flattening and road creation on this local hill.</p>		No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				Plate 30: View of the existing infrastructure south of this location at PPS 14.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 14	Remove Pole	<p>Existing PPS which will be removed and replaced with two new pole sites.</p> <p>This general region has had significant grading and land transformation as part of previous power line works. Evidence of flattening and road creation on this local hill.</p>	 Plate 31: View of the infrastructure to be removed at PPS 14.	No Aboriginal cultural heritage sites were identified at this location.



Plate 32: view looking north from the existing PPS 14 site. Note the additional power line to the west of the Nepean Feeder line – this other power line is not part of the proposed works.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				Plate 33: View looking south of the landscape surrounding PPS 14.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 15	New Pole	<p>Low visibility and no exposures present.</p> <p>This general region has had significant grading and land transformation as part of previous power line works. Evidence of flattening and road creation on this local hill.</p>		No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				Plate 35: View looking north from the location of the new pole, showing the existing infrastructure location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 16	Replace Pole	Low visibility and no exposures. Adjacent to existing access track.	 Plate 36: View of PPS 16 showing the infrastructure at this location.	No Aboriginal cultural heritage sites were identified at this location.



Plate 37: View looking north from PPS 16 showing the rolling open pastureland at this point in the power route.



Plate 38: View looking south from PPS 16 showing the open pasture at this location.



Plate 39: View towards a former quarry site from PPS 16.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 17	Replace Pole	Some exposure present due to access track. Low visibility due to grass coverage. Adjacent to existing access track in separate paddock. Surrounding area to be slashed.	 Plate 40: View of PPS 17 looking south, showing the open pasture at this location.	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 18	Replace Pole	Poles adjacent to existing access track. Exposure present due to road. Low visibility near poles and disturbed terrain with nearby fence line.	 Plate 41: View of PPS 18 looking south	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 42: View of the road reserve at PPS 18 looking north from this site.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 19	Replace Pole	Low visibility due to grass coverage. No exposures. Located north west of nearby dam.	 Plate 43: View looking south from PPS 19, showing the open grassy landscape at this location.	No Aboriginal cultural heritage sites were identified at this location.



Plate 44: View looking southeast from PPS 19 of the standing water in the drainage line to the east of the powerline route at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				Plate 45: View of the route looking north from PPS 19.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 20	Replace Pole	Low visibility no exposures. Just south of local dam.	 Plate 46: View looking south of PPS 20.	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				Plate 47: View of PPS 20 looking northeast towards the standing water to the east of the powerline route.



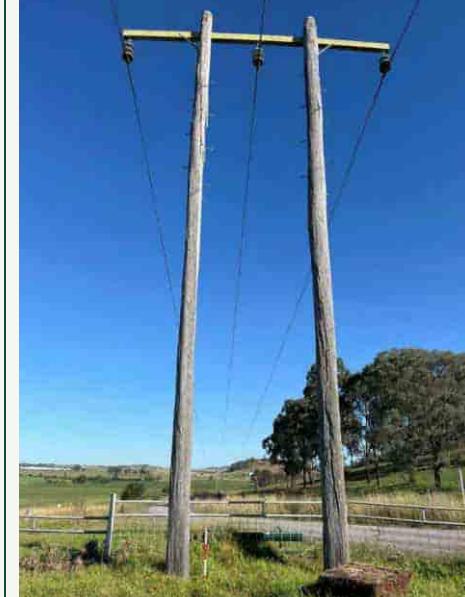
PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 21	Replace Pole	Low visibility, adjacent to existing access track. Heavily disturbed due to farming activities.	 Plate 48: View of PPS 21 looking south showing the agricultural infrastructure at this location.	No Aboriginal cultural heritage sites were identified at this location.



Plate 49: View looking north from PPS 21 showing recent agricultural infrastructure near to this site.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 50: View of recently constructed cattle loading site, and cattle grate near to PPS 21.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 22	Replace Pole	Low visibility around pole due to high grass. No exposures. Adjacent to road. Works will require a road closure.		No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				<p>Plate 52: View looking south towards the rural landscape around Menangle Village from PPS 22.</p>



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 23	Replace Pole	Low visibility, some exposure due to nearby gravel road. Pole beside road.		No Aboriginal cultural heritage sites were identified at this location.



Plate 54: View looking southeast towards the village of Menangle showing the open, rural setting of this section of the EMAI property.



Plate 55: View looking northeast from PPS 23 showing ridgeline to the west of the powerline route.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 56: View looking northeast from PPS 23 showing the modified landscape of the road reserve at this location.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 24	Replace Pole	<p>Low visibility due to grass coverage. No exposures. There is a drainage line that is located to the south of the pole. Due to this feature the pole may be relocated to a new location 4 m north at least.</p>		<p>No Aboriginal cultural heritage sites were identified at this location.</p>



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 Plate 58: View looking north from PPS 24.	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 25	Replace Pole	Pole located just north of Woodbridge road. Low visibility and no exposures nearby. Also near disturbed earth due to the construction of the road.		No Aboriginal cultural heritage sites were identified at this location.



Plate 60: View looking west from the PPS 25 showing local power infrastructure present at this location.



Plate 61: View looking north from PPS 25 showing the rural open vista at this location.



Plate 62: View looking northeast across fields towards Menangle from PPS 25.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
			 <p>Plate 63: View looking east from PPS 25 to Menangle.</p>	



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 26	Replace Pole	Low visibility and no exposures nearby, within rural property which shows signs of landscape modification.		No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				Plate 65: View looking north towards EMAI from PPS 26, showing the rural landscape.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 27	Replace Pole	Low visibility and no exposures nearby, within cleared pasture.		No Aboriginal cultural heritage sites were identified at this location.



Plate 67: View looking southwest of PPS 27 and the ridgeline to the west of the power line route.



Plate 68: View looking north from PPS 27.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 28	Replace Pole	Low visibility and no exposures nearby, within cleared pasture.		No Aboriginal cultural heritage sites were identified at this location.



Plate 70: View looking south from this PPS, showing the open pasture that is present at this location.



Plate 71: View looking north from PPS 28.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 29	Replace Pole	<p>Low visibility and single exposure nearby, within small laneway between cleared pasture fields. Exposure shows introduced gravel, possibly from nearby gravel quarry.</p>		<p>No Aboriginal cultural heritage sites were identified at this location.</p>



Plate 73: View from PPS 29 looking north.



Plate 74: View of introduced gravel surface at this laneway at PPS 29.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 30	Replace Pole	Low visibility and no exposures nearby, within cleared pasture.	 Plate 75: View of PPS 30 looking south, showing the location of this site within open pasture.	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				Plate 76: View of ground surface at PPS 30 looking north.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 31	Remove Pole	<p>Pole located on eroding northern river bank of Foot Onslow Creek, within AHIMS site #52-2-4675.</p> <p>Severe erosion has revealed the local stratigraphy and provides a cross section of the embankment where the poles are installed. Images show the cut and no Aboriginal Objects were in evidence. This site exhibited rolled river pebbles of standard non-artefact materials, and some shale/slate eroding out of the cross-section. The site inspection also looked for evidence of marked trees and grinding grooves associated with the river, but there was no evidence of these present. There were no outcroppings observed in the river course, and only scrub-level trees in evidence.</p> <p>Past clearing for agricultural purposes has significantly modified this landscape and increased the level of local erosion, evidenced by the encroachment of the eroded embankment on the poles, with their stability currently in jeopardy.</p>		<p>This location is within the AHIMS site #52-2-4675. While this is a PAD site, exposure sections did not reveal any signs of Aboriginal Objects present at this location.</p> <p>Ongoing flooding erosion has removed material from the northern river embankment up to the base of these power poles.</p>



Plate 78: View of PPS 31 looking south. Note that Foot Onslow Creek is immediately south of these poles.



Plate 79: View looking east at PPS 31 showing the creek bank in relation to this site.



Plate 80: View of PPS 31 showing the proximity of eroded terrain to the footings of these power poles.



Plate 81: View across the creek bed looking north towards PPS 31. The severe amount of erosion at the creek bank is clear from this image.



Plate 82: Cross-section of the stratigraphy present in the embankment close to PPS 31. There were no artifacts present and material not conducive to creation of stone tools (slate, river pebbles).



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				<p>Plate 83: another cross-section exposure of the stratigraphy in the embankment where the PPS 31 poles are installed currently.</p>



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 32	Replace Pole	<p>Low visibility and limited exposures nearby, within cleared pasture/roadway.</p> <p>This pole is not within an AHIMS site boundary, but is close to Foot Onslow Creek, although not in this watercourse's riverbank, unlike PPS 31.</p> <p>There is significant evidence of local disturbance at this site, with a agricultural waste dump site in close proximity to the pole in an eroded section of riverbank.</p> <p>The riverbank closest to this site was searched for evidence of Aboriginal Objects however none were found.</p>		No Aboriginal cultural heritage sites were identified at this location.



Plate 85: View of PPS 32 looking east towards Foot Onslow Creek.



Plate 86: View of agricultural waste dump near to this PPS in a section of creek bank.



Plate 87: View looking northwest through trees towards PPS 32



Plate 88: View of exposure area on the creek bank near to PPS 32.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 33	Replace Pole	Low visibility and no exposures nearby, within cleared pasture/grass laneway on the side of a ploughed field.	 Plate 89: View looking south towards the southern connection point at PPS 34.	No Aboriginal cultural heritage sites were identified at this location.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
				Plate 90: View looking north at this power pole site, showing the placing of this site within open pasture.



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
PPS 34	Existing Pole	<p>This site is the final southern connection point of the Nepean Feeder Line – it has a newly installed steel power stanchion of the design planned to be used for all the new/replacement poles in the Subject Area. No assessment required at this location.</p>		<p>No works planned for this PPS – this is the connection with the existing newly installed powerlines at the southern extent of the Nepean Feeder Line.</p>



PPS name	Nature of works at PPS	Observations and description of physical features	Photo record	Management controls (if any)
Alternate Access point - Foot Onslow Creek crossing	Reinforcement of this crossing point with steel plates	<p>This point is located outside of the site boundary of AHIMS site #52-2-4675 and is not a new crossing. There is evidence of previous farming activity, with concrete and corrugated Iron located in the creek at this location.</p> <p>Examination of the eroded cross section of the stratigraphy did not reveal any artefacts or suitable material.</p>		No Aboriginal cultural heritage sites were identified at this location.



3.8 Step 5 – Further investigations and impact assessment

Yes.

The site inspection confirmed that encounters with Aboriginal Objects are unlikely to occur within the majority of the Proposed Works Area's PPS, apart from the PPS 31 location

At this location, it is considered to be likely that there could be Aboriginal Objects, given that this is a registered PAD site. Given this fact for works to proceed at this location, an ACHA which informs an AHIP is required, in order to understand and assess potential impacts to Aboriginal Cultural Heritage value.



4 Conclusions and recommendations

Niche has been engaged by Endeavour Energy to prepare a due diligence assessment of the Nepean Feeder Line from the Spring Farm Substation in the north to the Menangle Road connection point in the south prior to maintenance and upgrade works.

The following recommendations have been developed as a result of this AODDA report:

1. *With respect to ACH, works can proceed with caution except at PPS 31.*

Apart from Power Pole Site 31, and associated AHIMS site #52-2-4675 boundaries, works can proceed with caution at the other PPS sites described in this report with respect to Aboriginal Cultural Heritage.

2. *Action needed regarding potential impacts to AHIMS site #52-2-4675 at PPS 31 before works at this location can commence.*

Unless ground disturbance can be avoided with regard to AHIMS site #52-2-4675, works at PPS 31 cannot proceed until further investigation in the form of an ACHA which informs an AHIP is completed. An AHIP providing permission must be in place before any works which will cause ground disturbance are undertaken at this location, or within this AHIMS site boundary.

3. *Record keeping*

The site location for #52-2-3247 (Camden Park 7-ST / CP-ST-07) should be updated in the AHIMS system with the ground-truthed location identified during the field survey.

4. *Record Keeping*

This due diligence assessment must be kept by Endeavour Energy so that it can be presented, if needed, as a defence from prosecution under Section 86(2) of the *NPW Act*.

5. *Unexpected finds procedure, Aboriginal object/s*

If suspected Aboriginal objects are identified during construction the following procedures must be followed:

- (1) Immediately cease all activity at the location.
- (2) Ensure no further harm occurs and secure the area.
- (3) Notify Environment Protection Authority's Enviro Line on 131 555 and a suitably qualified archaeologist.
- (4) No further action to be undertaken until Heritage NSW provides written consent.

6. *Unexpected finds procedure, Suspected Human Remains*

In the unlikely event that suspected human remains are encountered during works, all work in the area that may cause further impact must cease immediately and:

- (1) The location, including a 20 m curtilage, should be secured using barrier fencing to avoid further harm..
- (2) The NSW Police must be contacted immediately.
- (3) No further action is to be undertaken until the NSW Police provide written notification.
- (4) If the skeletal remains are identified as Aboriginal, Endeavour Energy or their agent must contact:
 - (a) Heritage NSW's Enviroline on 131 555; and representatives of the RAPs.
- (5) No works are to continue until Heritage NSW provides written notification to the proponent or their Agent.



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Appendix 1 - AHIMS extensive search



Contact us

info@niche-eh.com
niche-eh.com

NSW Office

Sydney: Dharug Country
02 9630 5658
L3, 93 George St
Parramatta NSW 2150

QLD Office

Brisbane:
Turrbal and Jagera Country
07 2104 8594 Ground Floor,
Suite 3 North Tower
527 Gregory Terrace
Fortitude Valley QLD 4006

VIC Office

Melbourne:
Wurundjeri Country
0488 224 036
Level 3, 162 Collins Street
Melbourne VIC 3000

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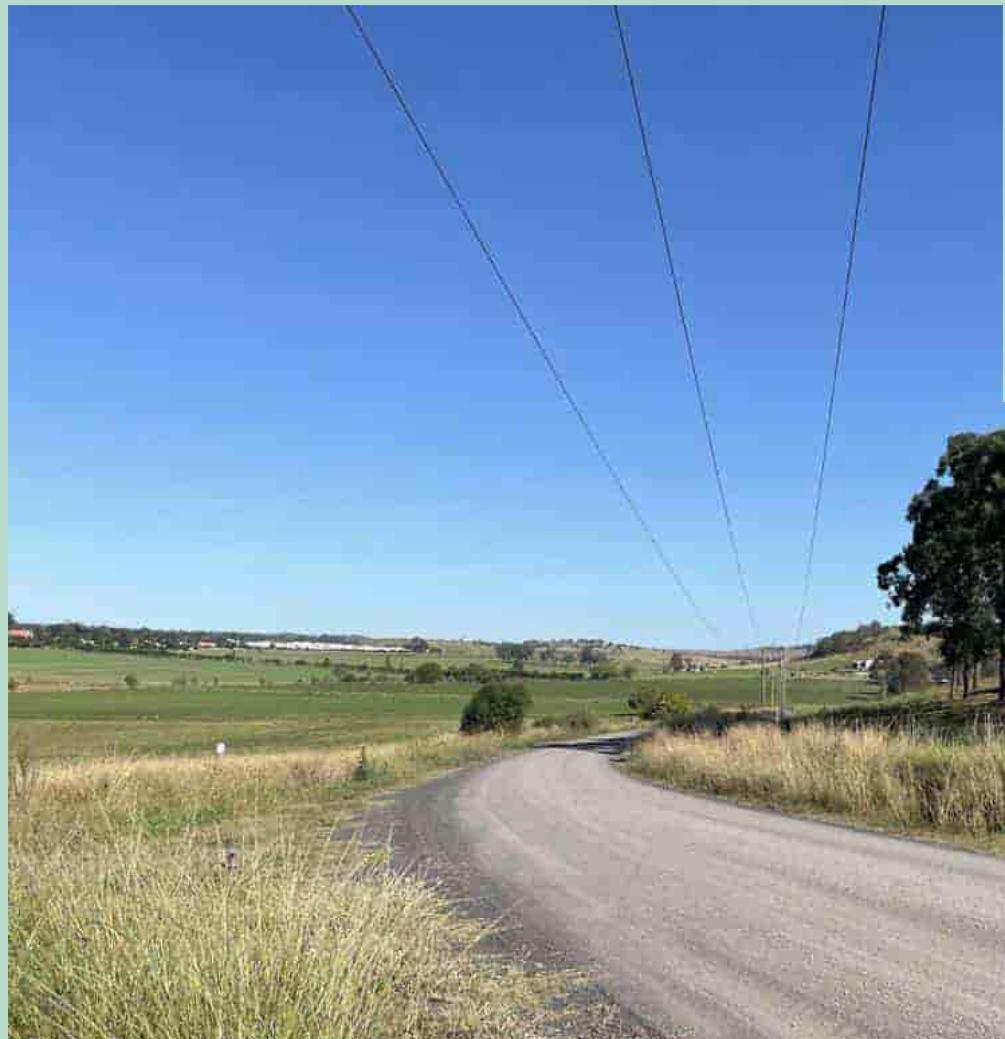


Environmental
planning, approvals
and management



Spatial Services

Annex 5. Statement of Heritage Impacts



Nepean Zone Substation Feeder Upgrade

Statement of Heritage Impact

Prepared for Endeavour Energy | 24/10/2024



Nepean Zone Substation Feeder Upgrade SoHI

Document control

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Glossary and list of abbreviations

Term or abbreviation	Definition
NHL	National Heritage List: The Commonwealth Government's statutory register of places of National heritage significance, overseen by the National Heritage Council under the provisions of the <i>EPBC Act 1999</i> .
CHL	Commonwealth Heritage List: The Commonwealth Government's statutory register of heritage items and places which are managed by Commonwealth Government agencies or are on lands managed by the Commonwealth Government. Note that these items are not necessarily of national heritage significance.
SHR	State Heritage Register: The NSW Government's statutory register of places of State heritage significance, overseen by the NSW Heritage Council under the provisions of the <i>NSW Heritage Act 1977</i> .
SHI	State Heritage Inventory: The name given to the online database of NSW heritage items and places, maintained by Heritage NSW. This database includes state and local items, with local councils submitting sites to the database for access by the general public. This database has been transformed into the HMS website.
HMS	Heritage Management System (NSW): The current database of SHR, LEP and S.170 heritage items in NSW. This system is maintained by Heritage NSW and includes a web-viewer and mechanism for submitting approvals and permits applications to Heritage NSW.
S.170 Agency Register	S.170 State Agency Heritage Asset Registers: Statutory lists maintained under the provisions of the <i>Heritage Act 1977</i> by each State Agency in NSW of heritage items or places either directly maintained by that agency, or which exist on lands managed by that agency.
Heritage Act	The Heritage Act 1977 (NSW): The primary legislation used to manage heritage value in NSW. This act provides for the NSW Heritage council, the SHR, S.170 registers and protection for non-listed heritage 'relics' across NSW.
NPWS Act	The National Parks and Wildlife Act 1974 (NSW): The legislation used to create and manage national parks in NSW, which also includes management of Aboriginal cultural heritage across NSW.
EPBC Act	The Environment Protection and Biodiversity Conservation Act 1999: The Commonwealth (Australian National) Government legislation that manages heritage items of National heritage significance and heritage items managed by Commonwealth Government Agencies and Departments (NHL and CHL items).
EP&A Act	The Environmental Protection and Assessment Act 1979 (NSW): The NSW planning legislation which specifies, amongst other considerations, planning considerations related to heritage items of local significance. This Act specifies planning instruments such as SEPPs and LEPs.
LEP	Local Environmental Plan: A legislative instrument created by the EP&A Act which specifies management of environmental matters within a certain LGA. Each LEP contains a statutory list of local heritage items in Schedule 5. Each LGA has their own LEP and is required to maintain and update this plan.



Term or abbreviation	Definition
SEPP	State Environmental Planning Policy: A legislative instrument created by EP&A Act which specifies management of environmental matters within a certain focus of policy or industry.
DCP	Development Control Plan: A management plan which outlines specific development controls active across an LGA or controls specific to precincts and conservation areas within an LGA. This plan regulates development and heritage outcomes on a local level and is subject to the EP&A Act and other legislation.
LGA	Local Government Area: the administrative area which each Local Council manages in NSW.



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1 Introduction

1.1 Project Background

Niche Environment and Heritage Pty Ltd (Niche) has been engaged by Endeavour Energy to assess proposed upgrade works to replace and enhance an existing energy feeder line infrastructure (the proposed works).

In order to support this assessment, in the form of a Review of Environmental Factors (REF), Niche has prepared a Statement of Heritage Impact (SoHI) Assessment (this report) which investigates and assesses potential impacts on Historical Period heritage items and heritage values.

1.2 The Subject Area and Proposed Works

The existing feeder transmission line is located between Nepean Transmission Substation, 156 Springs Rd, Spring Farm NSW 2570, to Menangle Road, Menangle NSW 2568.

The formal description of the Subject Area is outlined in Table 1.

Table 1. Formal Description of Subject Area

Lot/DP within 25 m of pole	Land Use (Ownership)
47/ DP1232874	Infrastructure
1/ DP368665	Environmental Conservation
2/DP213696	Primary Production (EMAI)
1/ DP213696	Primary Production (EMAI)
2/ DP1050479	Primary Production (EMAI)
2/ DP1133910	Primary Production (EMAI)
100/ DP1276755	Primary Production
1242/ DP1121129	Primary Production

The Subject Area consists of 20 m radius 'buffer zones' around each of the power pole sites (referred to as 'PPS' in this report- these are sites where existing poles are to be removed, existing poles are to be replaced with new poles, and sites where new poles are to be installed) See Figure 1 and Figure 2 for more details.

The proposed works involve replacing up to 28 existing poles, removing up to 3 poles, constructing up to 4 new poles, and replacing existing overhead conductors and associated overhead line fittings. New Poles are of a steel type and design which is up to 30m high, which replaces smaller existing wooden power poles. Removal of vegetation within 20 m of replaced, removed and new poles is expected. The proposal works will be within the



previously disturbed existing powerline from Nepean Zone Substation. The northern-most PPS will be connected to the Spring Farm Substation via trenching/under-boring of approximately 60 m. The proposed works will be discussed in further detail in Section 5 of this report.

1.3 Objectives of the Report

The purpose of this SoHI is to assess potential impacts on heritage values within the PPS and suggest measures to mitigate or avoid harm to this value.

1.4 Report Methodology

This SoHI has been prepared in accordance with the principles and methodology contained in *The Burra Charter: The Australia ICOMOS¹ Charter for Places of Cultural Significance* (2013) and in accordance with the best practice standards set out by the Heritage NSW. The relevant best practice guidelines include:

- *Guidelines for preparing a statement of heritage impact* (Department of Planning and Environment, 2023)
- *Assessing Heritage Significance* (Department of Planning and Environment, 2023)
- *Assessing Significance for Historical Archaeological Sites and 'Relics'* (Heritage Council of NSW, 2009)
- *Material Threshold Policy* (Heritage NSW, February 2020)

1.4.1 Literature Review and Database Searches

A review of relevant literature and databases was undertaken to determine the potential for historical heritage items to occur within the PPS. The literature and databases that were reviewed included:

- Heritage Branch Heritage Inventory (State Heritage Register, State Heritage Inventory).
- Camden Local Environmental Plan 2010 heritage schedules.
- Wollondilly Local Environmental Plan 2011 heritage schedules.
- Camden Development Control Plan 2019.
- Wollondilly Development Control Plan 2016.
- Commonwealth heritage registers including the Australian Heritage Database, Commonwealth Heritage List, and former Register of the National Estate (RNE).
- Background research, including previous historical heritage studies and reports.

1.4.2 Site Inspection

The site inspection was conducted on 23rd April 2024 by Samuel Ward (Heritage Consultant, Niche), Oliver Rocheacute;couste (Heritage Consultant, Niche), Mandy Melvaine (Ecology Consultant, Niche) and Justin Meredith (Environmental Approvals, Niche) along with representatives from Endeavour Energy. A second supplemental day of site inspection was undertaken on 3rd May 2024 by Samuel Ward (Heritage Consultant, Niche) and Mandy Melvaine (Ecology Consultant, Niche), with representatives from Endeavour Energy in attendance. The site inspection consisted of a walkover of the accessible areas of the PPS, noting any features of historical fabric, archaeological evidence, or significant landscape features. The results of the site inspection will be discussed in the Physical Analysis chapter (see Section 3.2) of this report.

¹ Australia ICOMOS (International Council on Monuments and Sites) is a non-government, not-for-profit organisation of cultural heritage professionals formed as a national committee of ICOMOS in 1976.



1.5 Statutory Framework for Heritage Regulation

In NSW Historic Period heritage is regulated by legislation and associated planning instruments which are intended to protect and conserve the heritage value of places and objects of significance. The relevant regulation and statutory instruments include:

Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places. Under the EPBC Act, protected heritage items of significance are listed on the National Heritage List (NHL) or the Commonwealth Heritage List (CHL). The NHL provides protection to places of cultural significance to the nation of Australia, while the CHL comprises natural, Aboriginal, and historic heritage places owned and controlled by the Commonwealth.

The NSW Heritage Act 1977 (Heritage Act)

The Heritage Act affords statutory protection to those items identified as having heritage significance and which form part of the NSW heritage record. The Act defines a heritage item as "a place, building, work, relic, moveable object or precinct." Heritage items which have been assessed to have state heritage significance and have been approved by the Heritage Council of NSW are listed on the State Heritage Register (SHR). Items which are owned or managed by NSW government agencies or bodies are required to maintain a register of heritage assets under S.170 of the Heritage Act (commonly referred to as an agencies S.170 register). All heritage items are declared to Heritage NSW and are listed on the State Heritage Inventory, currently the Heritage Management System website.

Environmental Planning and Assessment Act 1979 (EP&A Act)

The Environmental Planning and Assessment Act 1979 (EP&A Act) establishes the framework for cultural heritage values to be formally assessed in the land use planning process in NSW. The EP&A Act also requires local governments to prepare planning instruments, such as Local Environmental Plans (LEPs) to provide guidance on the level of environmental assessment required. Local Heritage items are therefore listed on each council's LEP planning instrument, with some items having separate planning controls introduced under the relevant council's Development Control Plan (DCP).



1.6 Identified Heritage Items

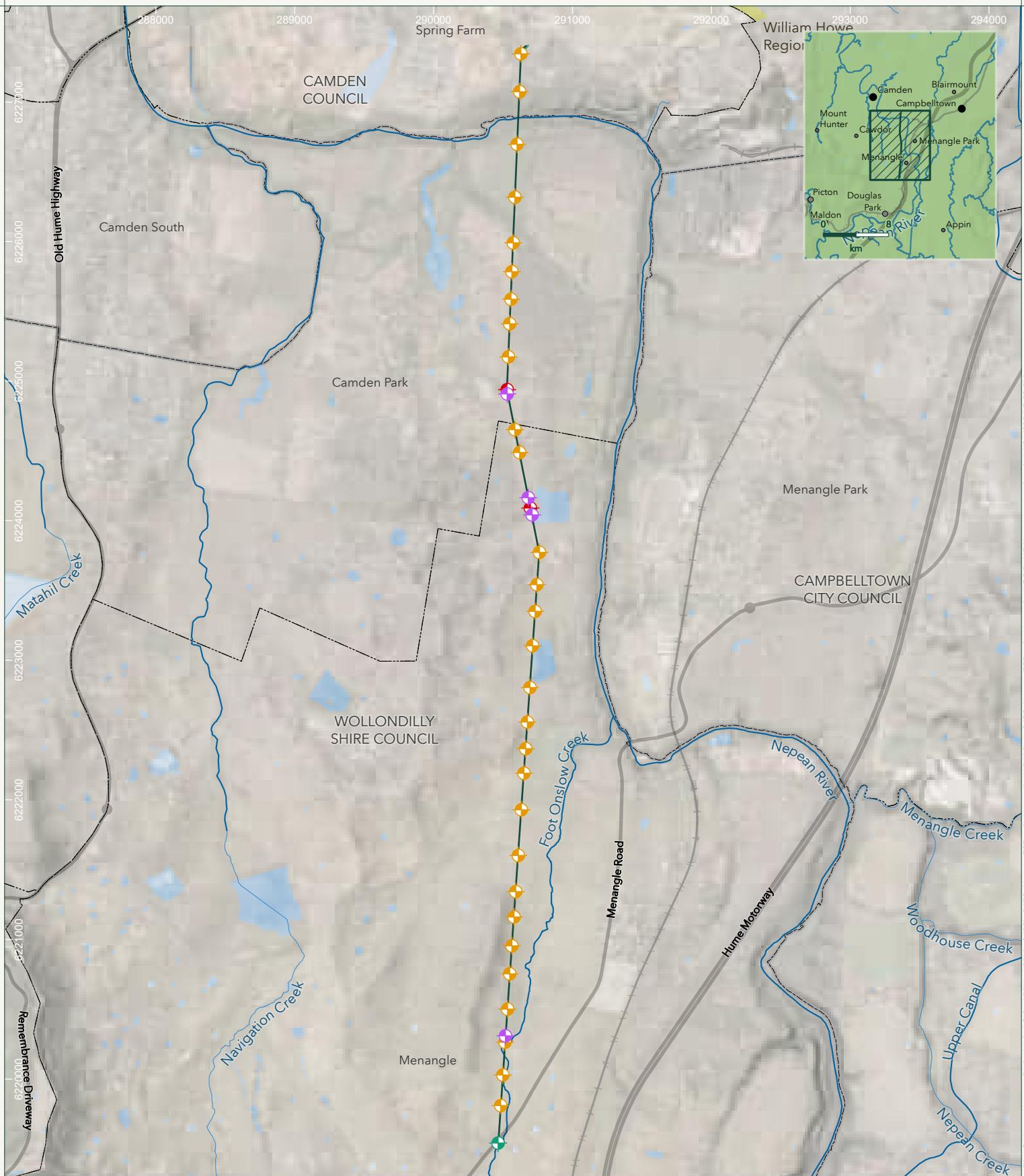
A review of relevant literature and databases was undertaken to determine the potential for historical heritage items to occur within, or near to, the PPS (see Figure 3 and Table 2). The literature and databases that were reviewed are listed above (see Section 1.4.1):

Table 2: Results of the Heritage Register Searches

Item #	Item Name	Location	Level of Significance	Relationship to the PPS
SHR #00341	Camden Park	Elizabeth Macarthur Avenue, Camden Park	State	PPS partially transects
SHR#01697	Camden Park Estate and Belgenny Farm	Elizabeth Macarthur Avenue, Camden Park	State	PPS partially transects
LEP #I54	Camden Park Estate - Dairy No.8, Cottages and Orchard Sites	445 Remembrance Driveway, Camden Park (Lot 2, DP 1050479)	Local	PPS partially transects
LEP #I84	Dairy No.4 (EMAI Cottage 29)	60 Woodbridge Road, Menangle (Lot 2, DP 1133910)	Local	PPS partially transects
LEP #I99	Menangle Gate Lodge (Former)	60 Woodbridge Road, Menangle (Lot 2, DP 1133910)	Local	PPS partially transects
C6	Menangle Landscape Conservation Area	Menangle	Local	PPS partially transects

1.7 Authorship and Acknowledgements

This SoHI has been written by John McLellan Gillen (Senior Heritage Consultant, Niche), and Samuel Ward (Heritage Consultant, Niche) with document review and quality control provided by Joshua Madden (Principal, Sustainable Heritage). Technical assistance was provided by Matthew Zajaczkowski and Andrea Sward (Heritage Consultants, Niche). Unless otherwise attributed, images used in this report are produced by Niche.



Proposed works point

- Existing Pole
- New Pole
- Remove Pole
- Replace Pole

Main alignment

- Trench
- Proposed works area
- Major road
- Minor road

Rail

- Hydrography
- Perennial Stream
- Non Perennial Stream
- Waterbody

Protected Areas of NSW

- Regional Park
- Administrative and Property Boundaries
- Local Government Area
- Suburb

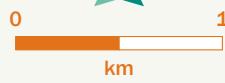
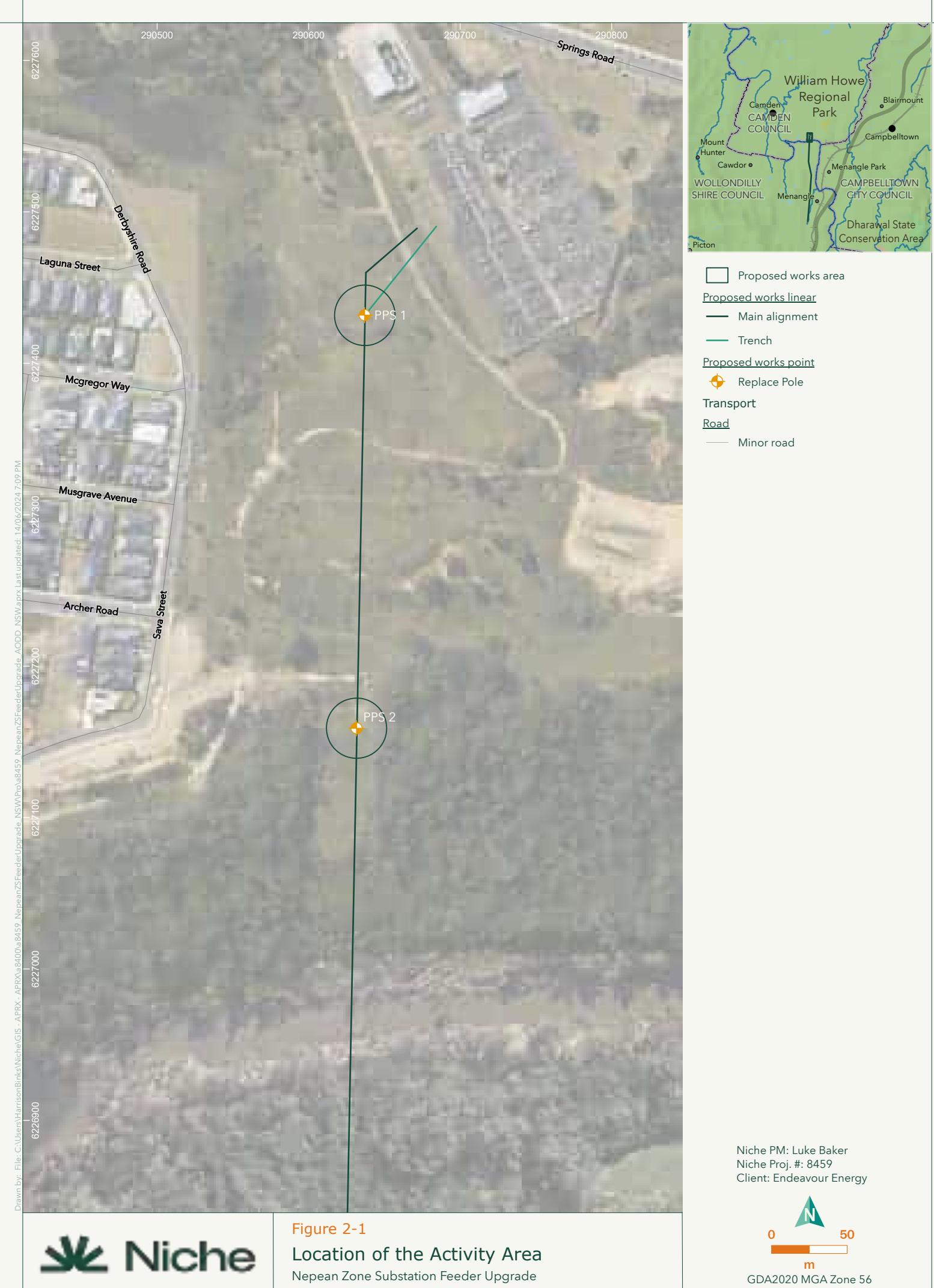
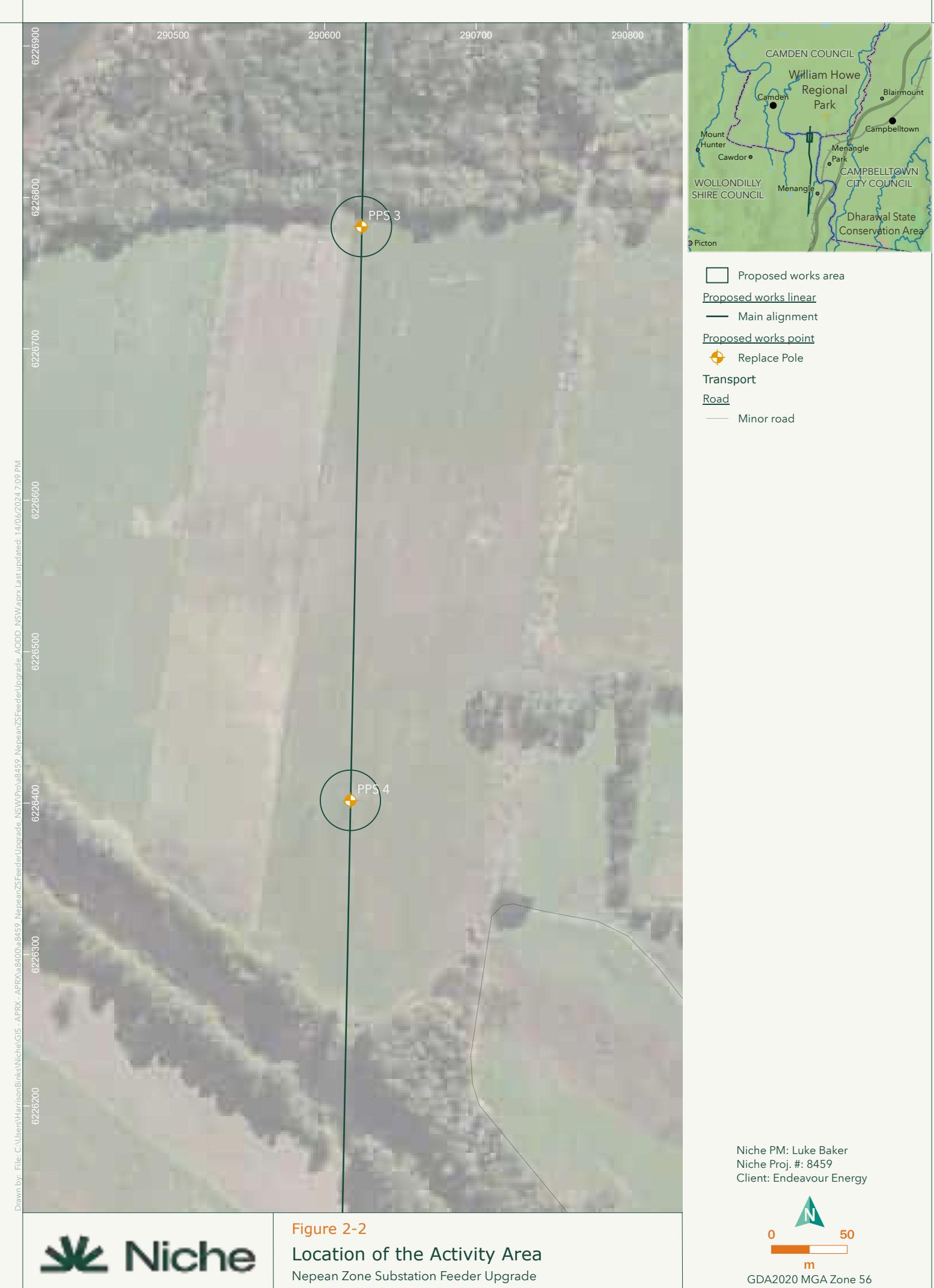


Figure 1
Location Map
Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy





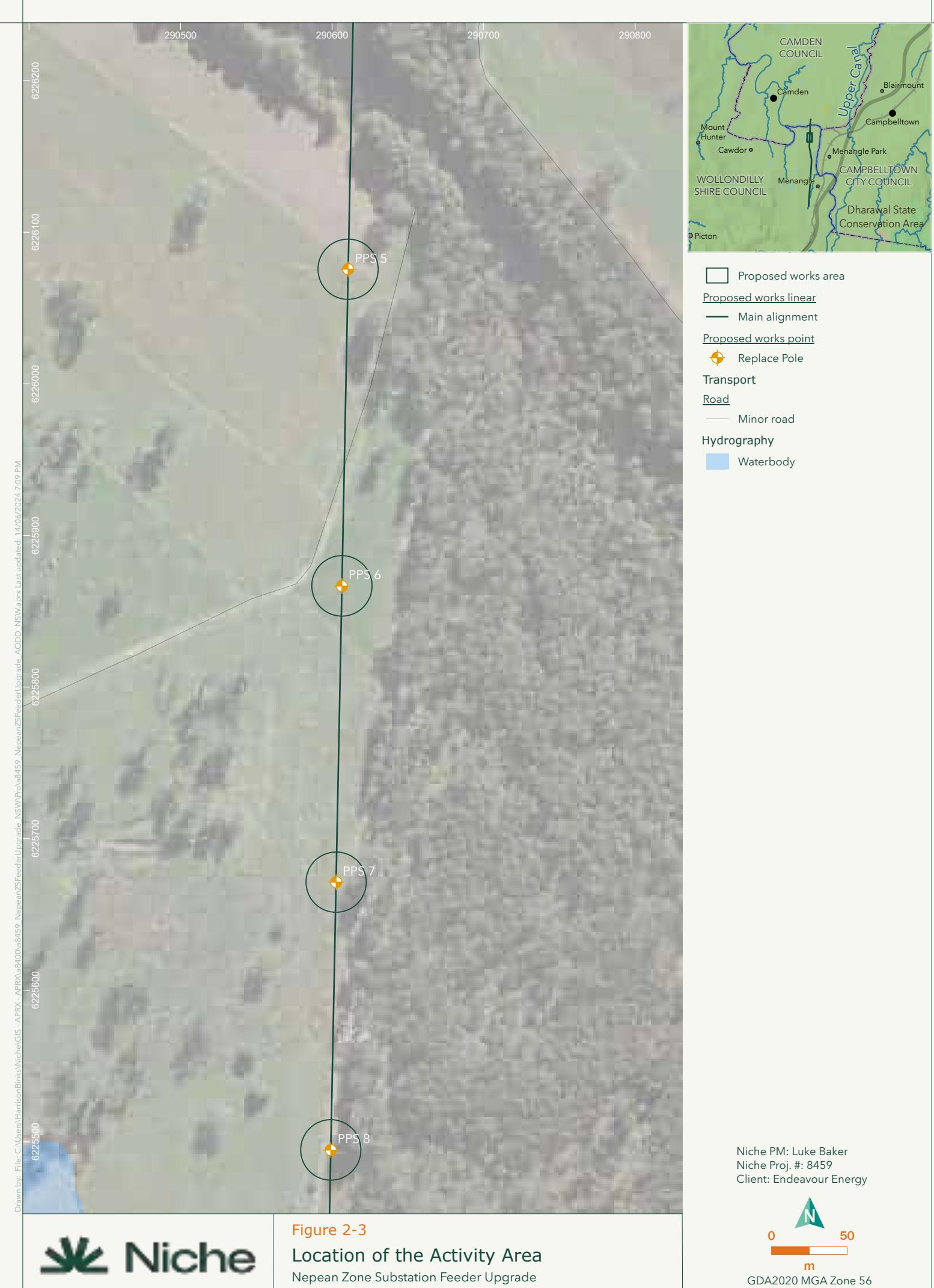
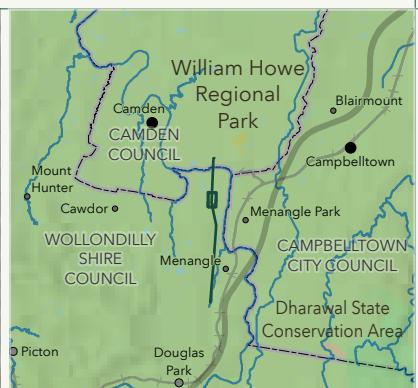
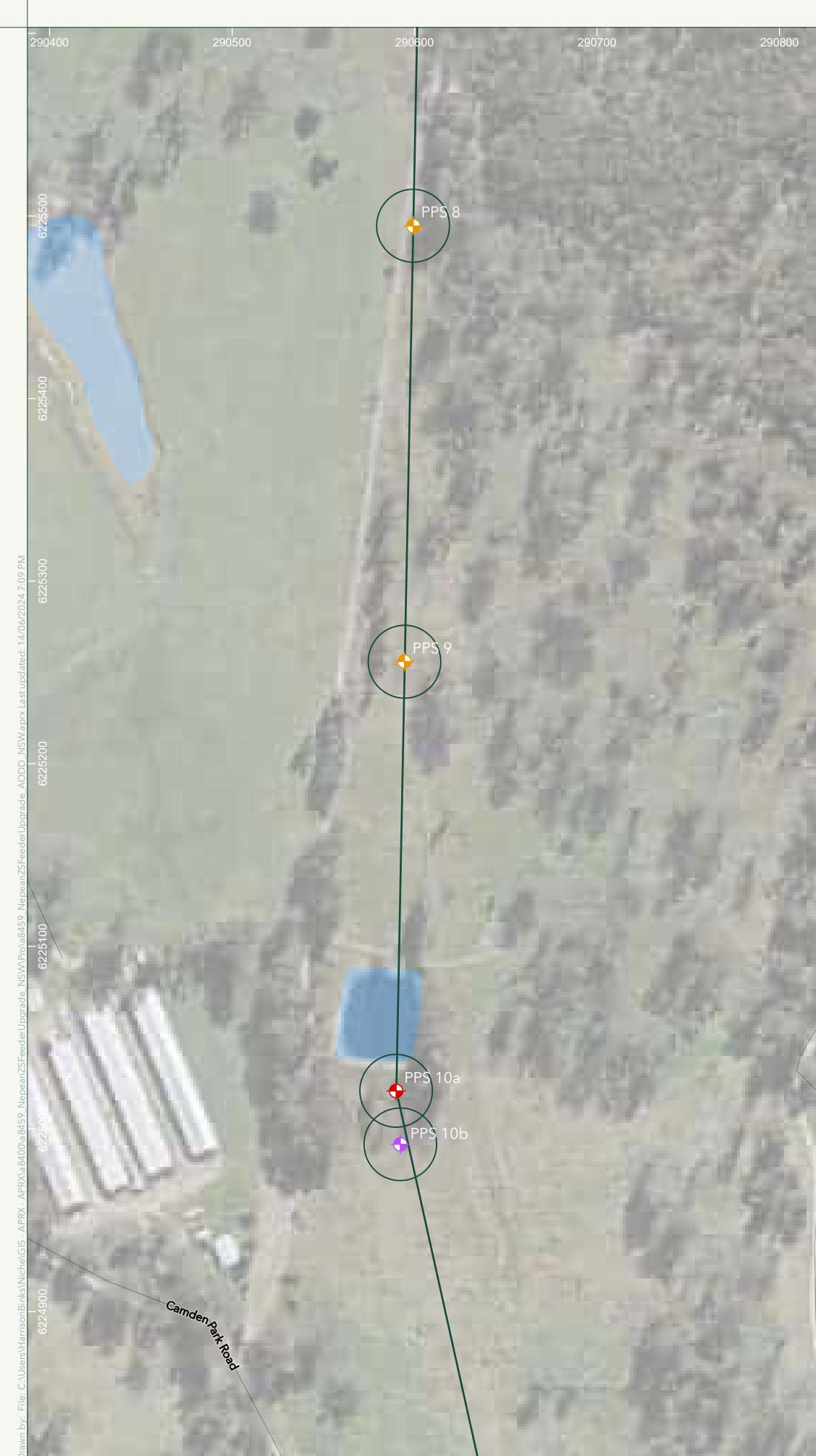


Figure 2-3
Location of the Activity Area
Nepean Zone Substation Feeder Upgrade





Proposed works area

Proposed works linear

Main alignment

Proposed works point

New Pole

Remove Pole

Replace Pole

Transport

Road

Minor road

Hydrography

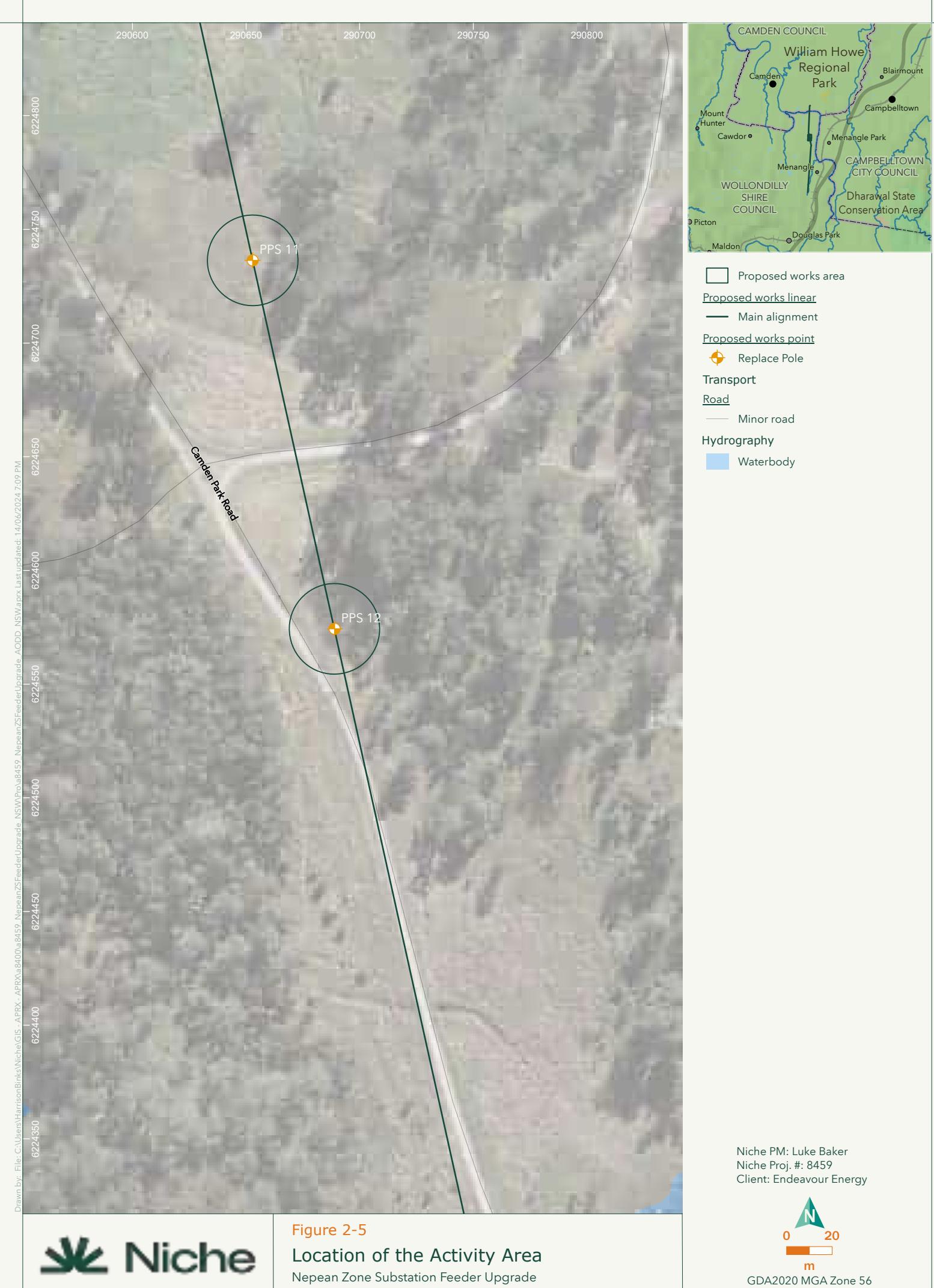
Waterbody

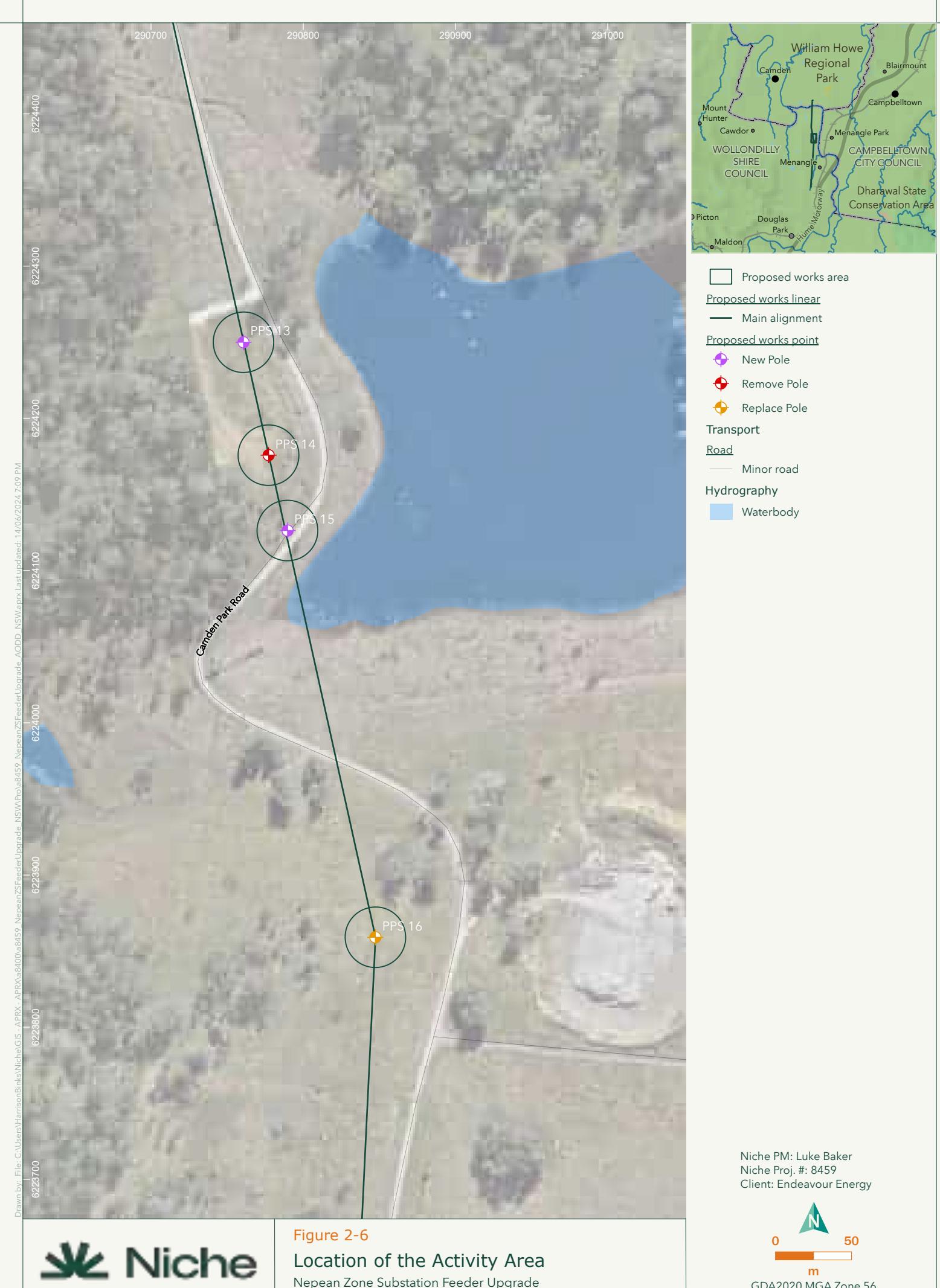
Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

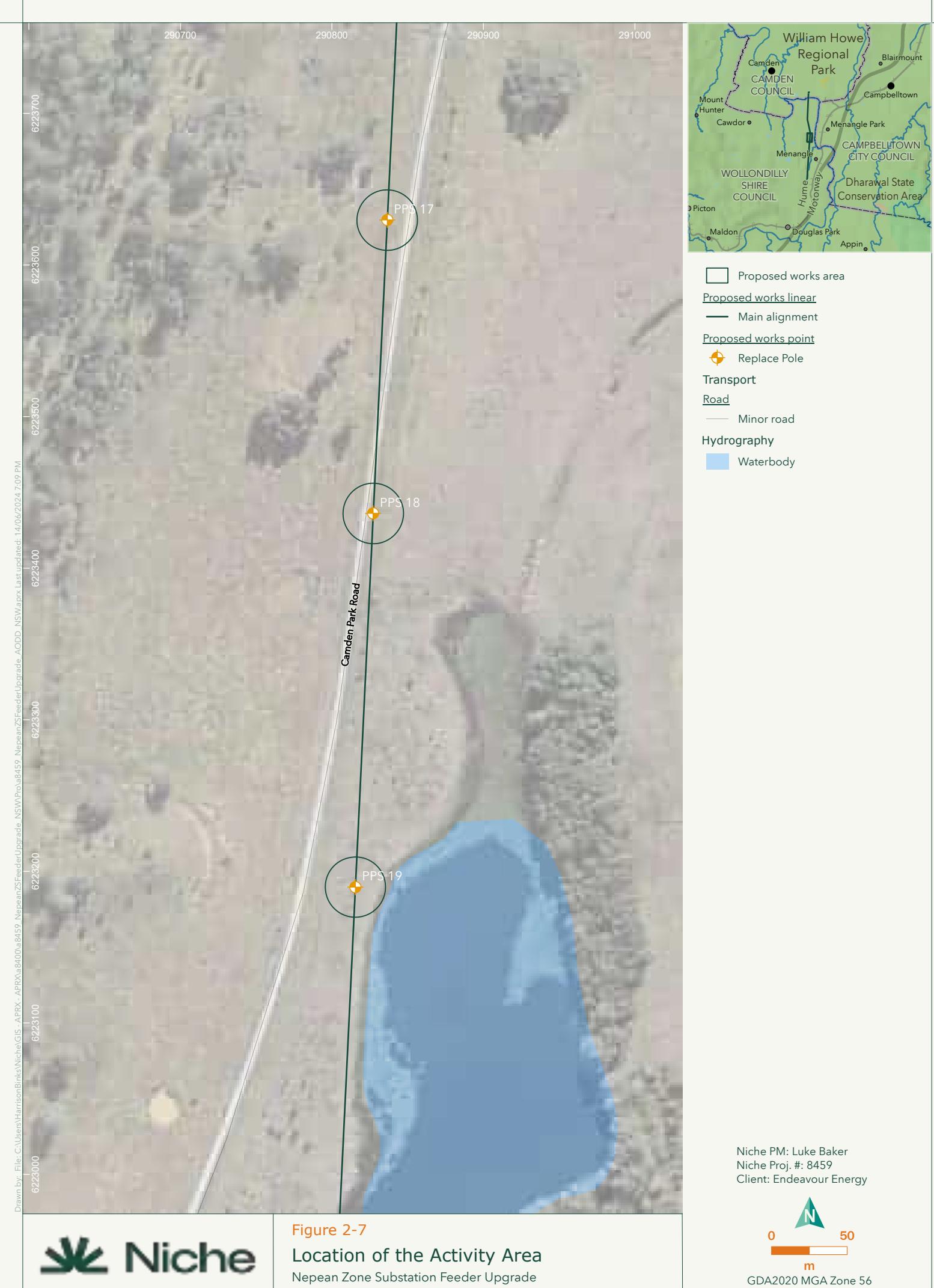


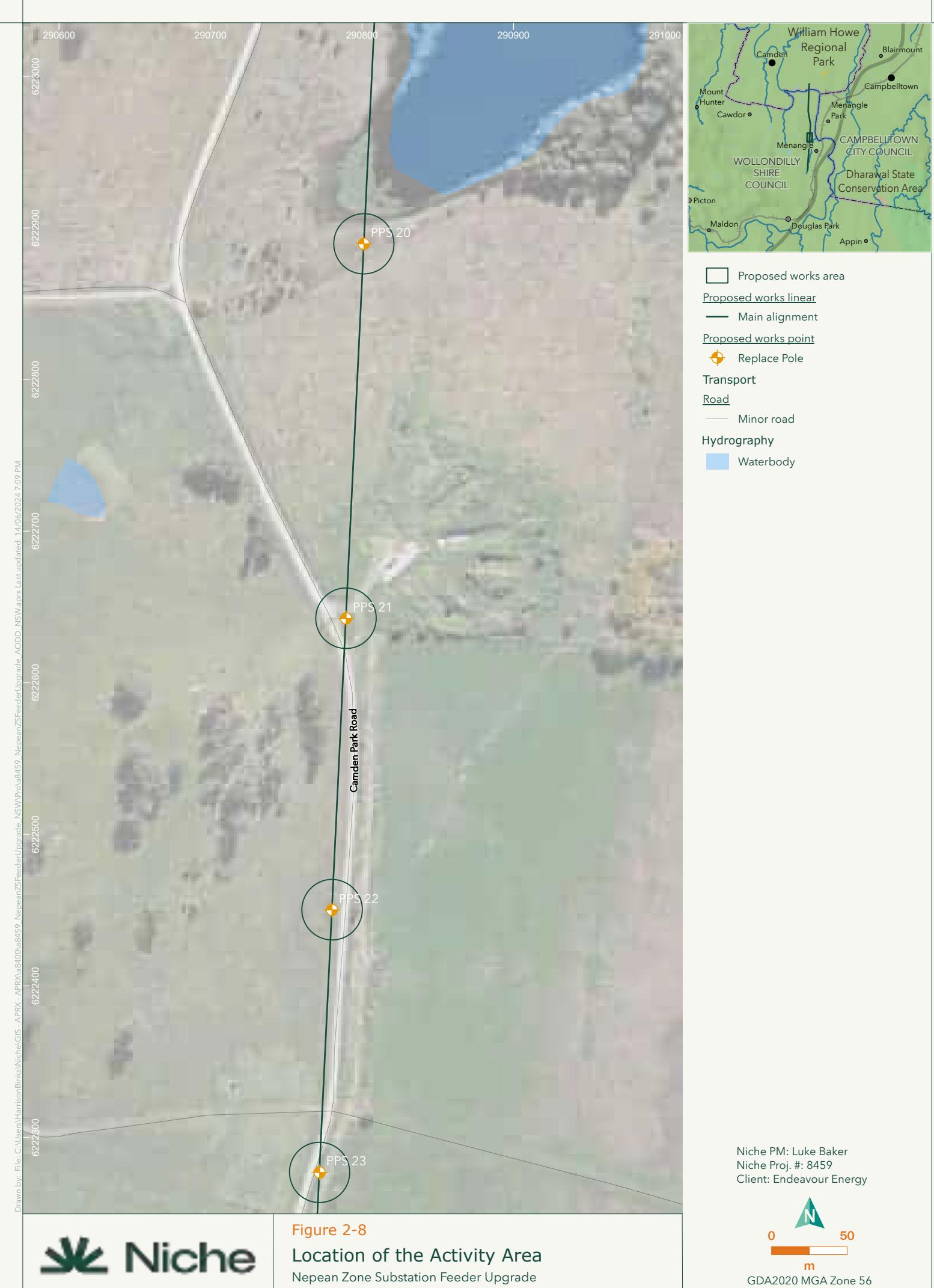
Figure 2-4
Location of the Activity Area
Nepean Zone Substation Feeder Upgrade

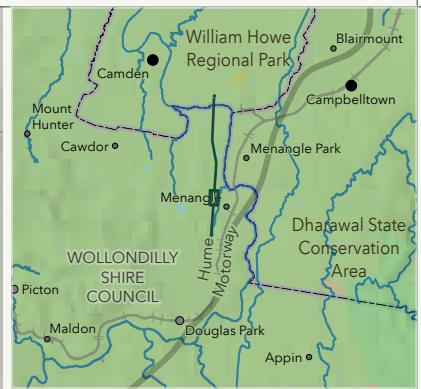












Proposed works area
 Proposed works linear
 Main alignment
 Proposed works point
 Replace Pole
 Transport
 Road
 Minor road

Niche PM: Luke Baker
 Niche Proj. #: 8459
 Client: Endeavour Energy

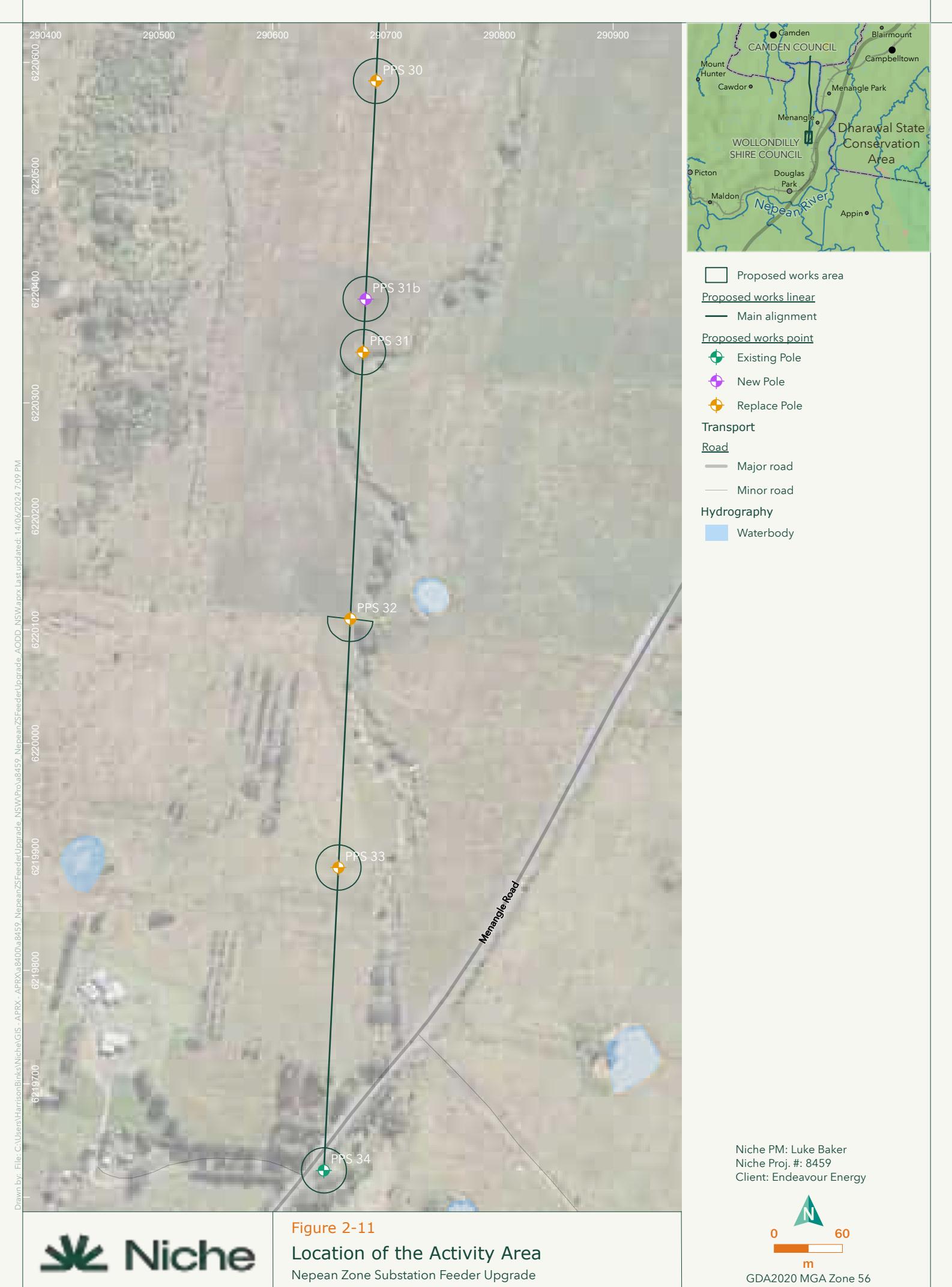


GDA2020 MGA Zone 56



Figure 2-9
Location of the Activity Area
 Nepean Zone Substation Feeder Upgrade





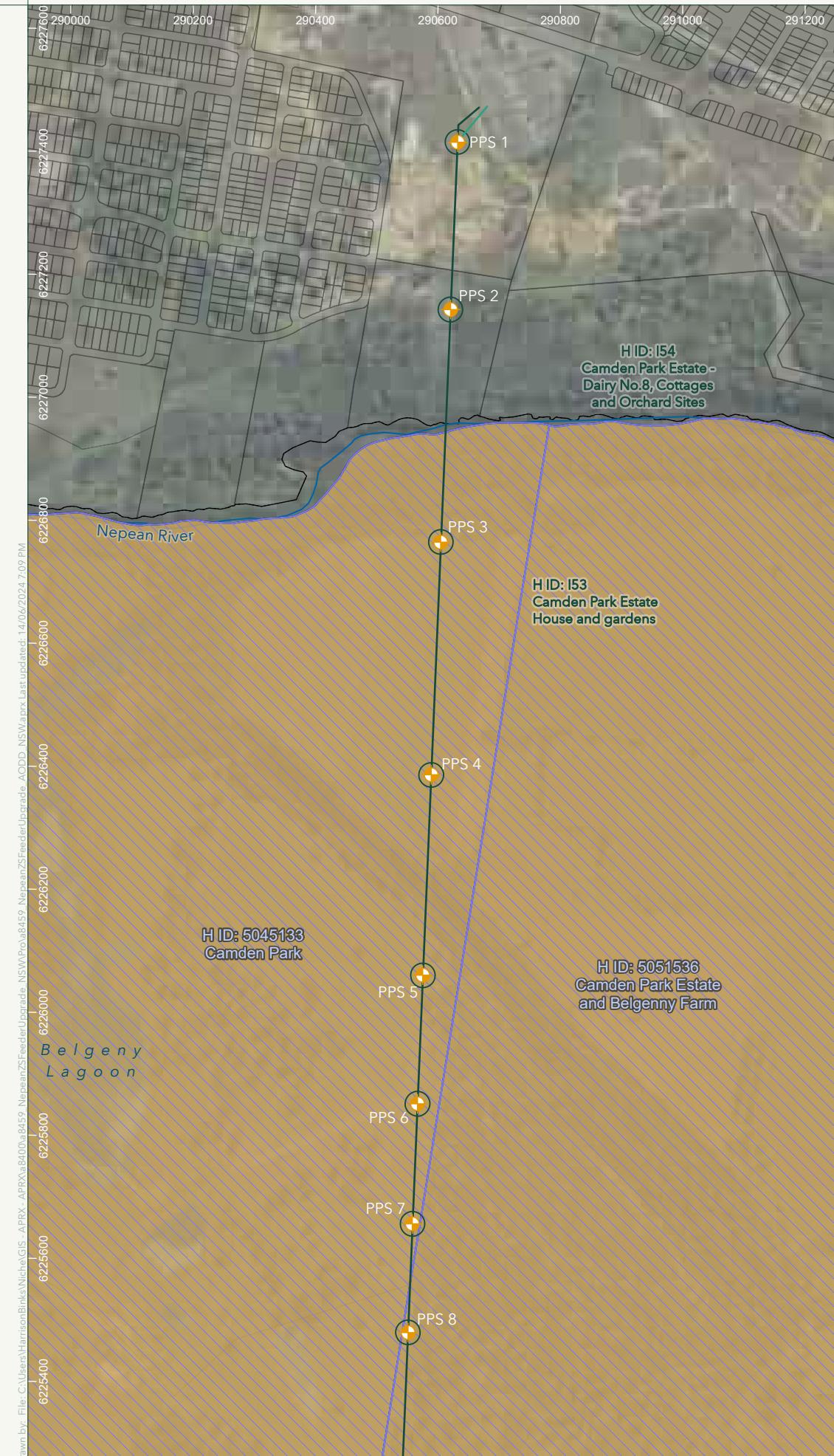
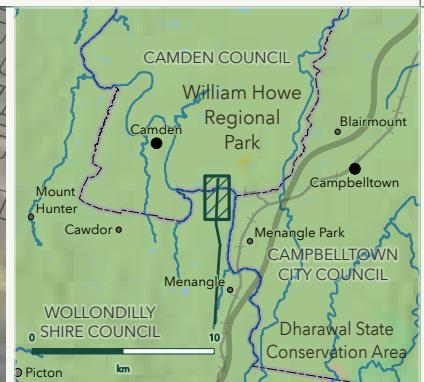
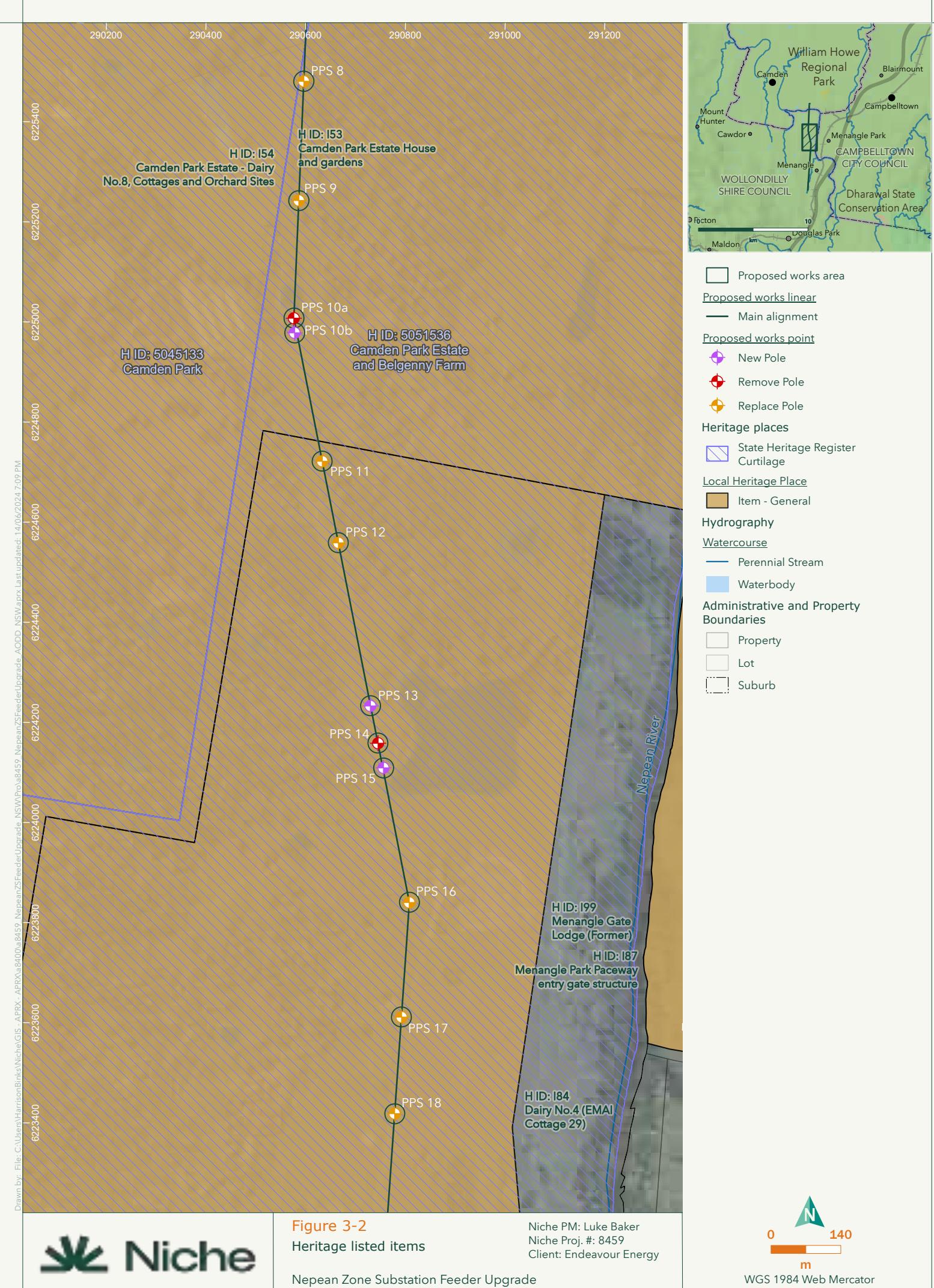


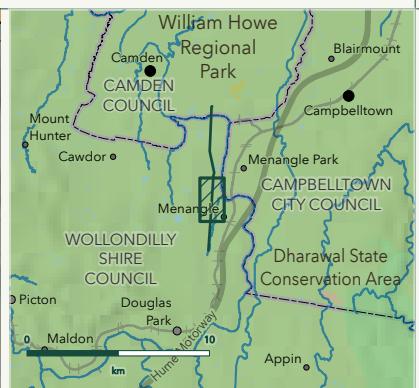
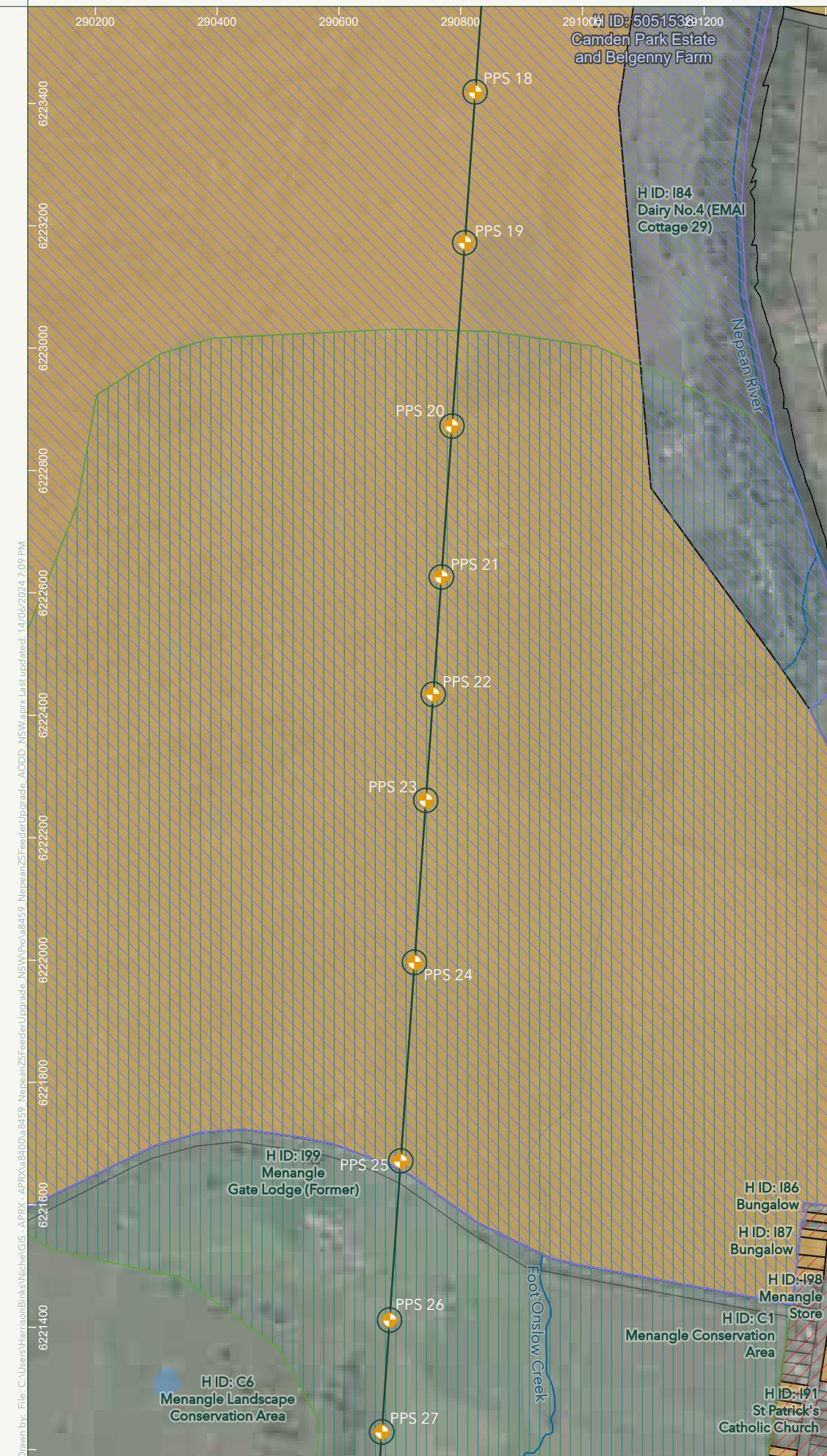
Figure 3-1
Heritage listed items

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

Nepean Zone Substation Feeder Upgrade







Proposed works area

Proposed works linear

Proposed works point

Replace Pole

Heritage places

State Heritage Register
Curtilage

Local Heritage Place

Conservation Area - General

Conservation Area - Landscape

Item - General

Hydrography

Watercourse

Perennial Stream

Waterbody

Administrative and Property Boundaries

Property

Lot

Suburb

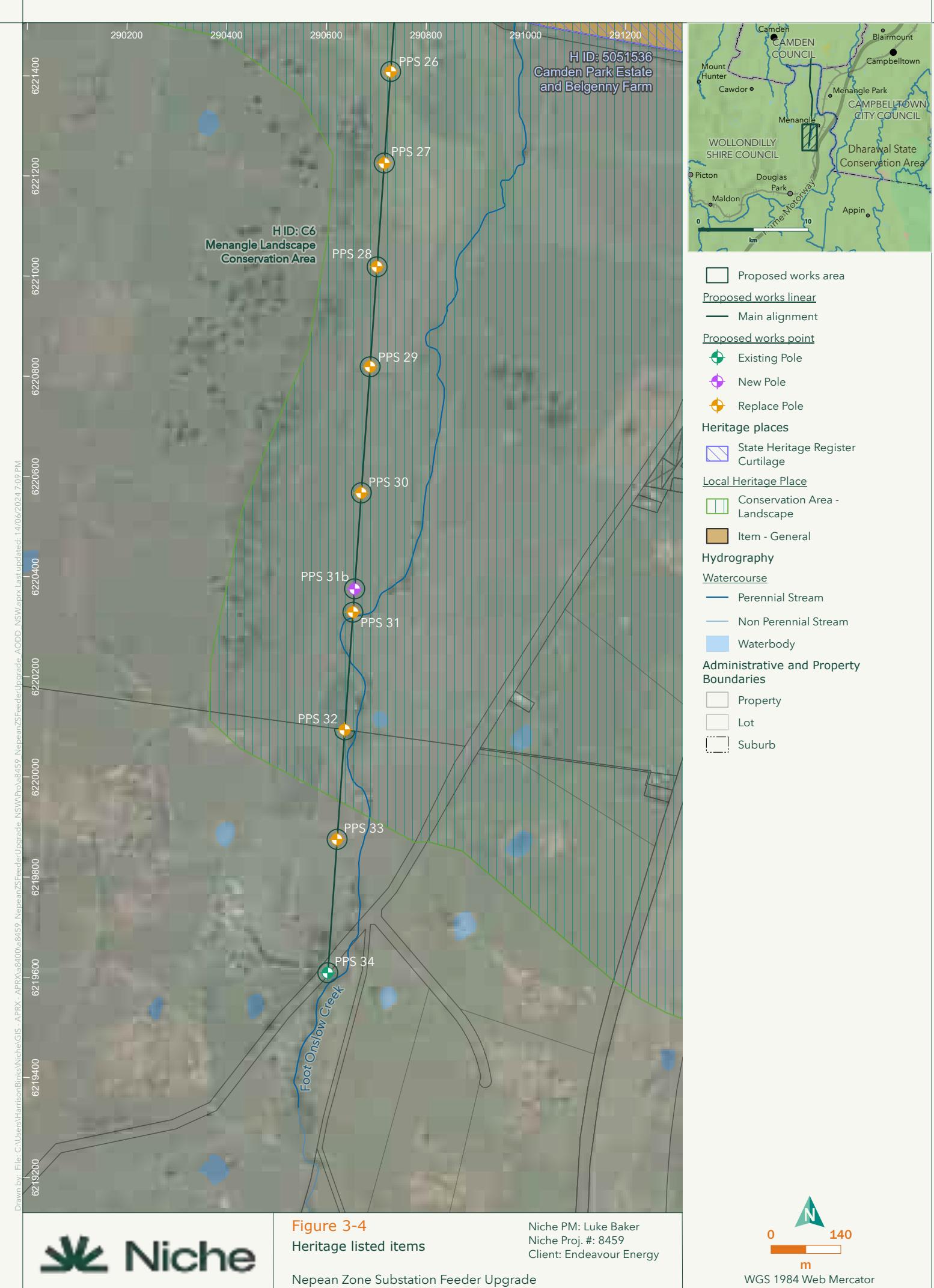


Figure 3-3
Heritage listed items

Nepean Zone Substation Feeder Upgrade

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy

0 140
m
WGS 1984 Web Mercator





2 Historical Context

The following section provides an overview of the historical context of the site and outlines the overall development of the region surrounding the PPS. It is not intended as a comprehensive history of the region or PPS.

2.1 Regional Historical Context

2.1.1 The Aboriginal Landscape

Aboriginal people have lived in this area for thousands of years, with archaeological investigations providing evidence of occupation for at least 50,000 years. There is still much debate on the languages and dialects spoken by Aboriginal people in this area. The region appears to have been at the intersection of three language groups. Part of the Camden area was known by two names: Baragil in one language, and Benkennie, meaning 'high, dry land' in another (Changing Camden 2014). Reports made by Europeans between 1828 and 1843 provide evidence that the surrounding area was occupied by the Muringong clan of the Gundungurra Aboriginal people. A later ethnographic report claimed that Aboriginal people at Camden spoke the Dharug dialect, which closely resembled the Gundungurra. It is also possible that the Dharawal language was spoken in the Camden area (Betteridge 2012, Martin 2014). During archaeological investigations for the Camden Park Urban Release Area, six scarred trees were recorded in the area to the west of the cemetery (Betteridge 2012). Several more scarred trees in the area, firmly dating to the 1850s, are no longer in situ (JRC 1993).

The destruction of the traditional way of life in the area was caused by European diseases, and disruption of lifestyle by permanent settlement and by force. As a result, most Aboriginal people dispersed from the region, although some remained and became involved with European settlement, working in the homesteads and farms (JRC 1993). Corroborees taking place near Camden Park were documented by the Macarthur family as late as 1850 (OEH 2007).

The early 1800s saw increased contact between the Aboriginal people of the area and the Europeans. Agricultural development in the area aggravated the deteriorating relations between these two groups (Changing Camden 2014), along with a drought from 1814 to 1816 which forced Gundangara Aboriginal Peoples east, back towards encroaching European settlement areas. The increasingly violent relations were predicated by murders of Aboriginal and European People and were concluded by a massacre of Aboriginal People at Appin in 1816. This was the outcome of a deterrence raid ordered by Governor Macquarie Whilst contact continued between the two groups as late as the 1850s, the Aboriginal presence in the region declined towards the end of the 19th Century (AHMS 2017).

2.1.2 Early European settlement of the 'Cowpastures' district

With the arrival of the first fleet in 1788, the European settlers introduced many species of domesticated animals, pets and insects with which to establish their colony, oblivious to the environmental and social impact of this action. Cattle were amongst the species introduced to sustain the colony, and within the year of their arrival, two bulls and four cows had escaped from the herd at the government farm at Port Jackson (AHMS 2017). These animals were later found to have moved to the land south of the Nepean River, close to the PPS, and to have grown into a herd of wild cattle. Governor Hunter named the area 'The Cowpastures' and in 1802 a convict man named John Warby was stationed in the Campbelltown region to care for this herd (AHMS 2017). 1803 saw the district declared a government reserve, and in 1805 Constables were stationed at Elderslie to protect the valuable cattle and further settlement was forbidden there (Betteridge 2012).

Aboriginal groups certainly witnessed the cattle roaming the area, evidenced by the paintings in sandstone shelters along the Georges River. These images clearly depict hooved animals. Bull Cave, near Campbelltown, is



a notable example (Changing Camden 2014). The following statement regarding the local Aboriginal people's interaction with the introduced cattle is attributed to Governor King in 1804:

It has been reported that the Natives have killed some. This I doubt, as the Natives have always shewn the greatest fear on Meeting them, and climbed Trees till they left the place. Perhaps in course of Time this may be the Case. After tasting Beef, they may endeavour to kill them. (King to Macarthur, 2 Nov 1805, HRA Ser 1 Vol.5).

This area was typified by fertile lands which were well suited for farmland. Despite being officially declared out of bounds to settlers, visitors frequented the region. Early 19th Century images of the area depict dense woodland interspersed with rolling plains, streams and lagoons. The lack of underbrush (likely due to burning back by the local Aboriginal peoples) provided perfect conditions for grazing cattle.

Initially, the district was isolated from the rest of the colony, as shown by a 1796 illustration by Governor Hunter (see Image 1). Produced soon after the discovery of the feral cattle, this sketch map identifies the main areas of European settlement at the time. The area is described in Hunter's notes as a 'beautiful country' and the area is referred to as the 'cow pasture plains.'

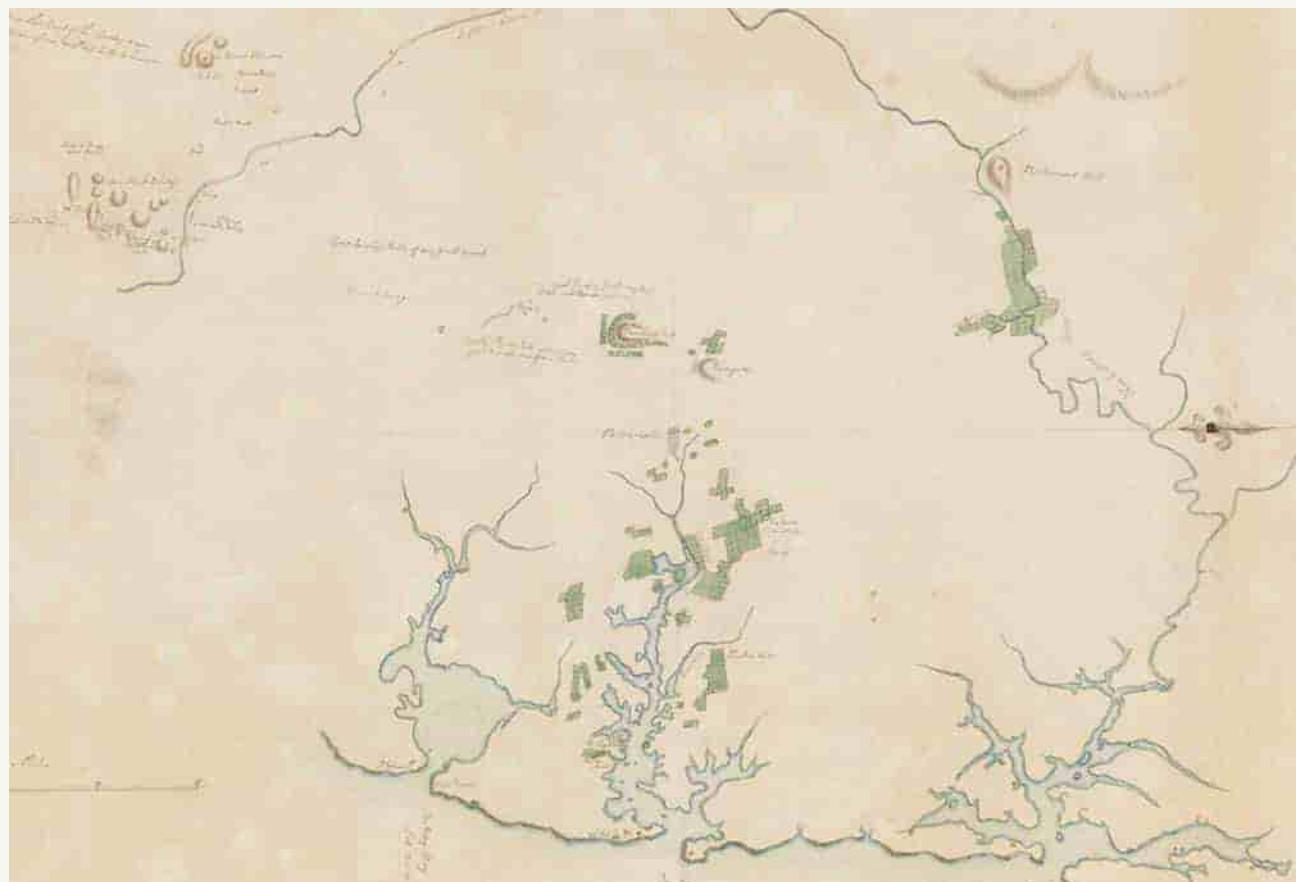


Image 1: 1796 sketch of the colony by Governor Hunter with the Cowpastures area indicated (NSW State Library Catalogue with Niche annotation).

The pasturelands and rich alluvial soils of the Cowpastures were soon sought after by settlers, who were frustrated by the soil unsuitable for farming at Sydney, the depleted soils closer to Parramatta, and the heavy flooding of the Hawkesbury River (Dictionary of Sydney 2008, OEH 2007). The rich natural resources and the idyllic European interpretation of the landscape at the time is shown by Joseph Lycett's "View of the Cowpastures" made in 1824 (see Image 2).



Image 2: 'View of Cowpastures', Joseph Lycett 1824 (National Library of Australia).

2.2 The Expansion and Decline of Camden Park Estate

In 1805, John Macarthur was the first European to be granted 5000 acres of land in the Cowpastures district. He named the estate 'Camden' after his benefactor, Lord Camden. Macarthur was an English soldier, entrepreneur and later credited as the pastoralist who established the Australian wool industry. He arrived in the colony as a lieutenant in 1790 and soon gained powerful patrons (Dictionary of Sydney 2008).

By the end of 1805 Macarthur had built a 'small, miserable hut' on a ridge overlooking his land and moved a large flock of merino sheep to the property. This residence was later replaced by the 'Farm Cottage', which was, in turn, replaced by the large sandstone Palladian-style Camden Park House in 1835 (see Image 3). He intended to establish a fine wool trade with England. Activity on Macarthur's land at the Cowpastures initially centred on an area the local Aborigines called 'Benkennie' close to the Nepean crossing, giving the later Belgenny Farm its name (Betteridge 2012). With the establishment of the nearby settlement of Camden, John Macarthur renamed his estate 'Camden Park'.

The 1820s were prosperous for the Macarthur family. They continued to gain land through grants and sales, and in 1837 the estate reached its maximum size of 27,698 acres, as shown by Image 4 below. In 1823 John Macarthur rejected an offer of land to the south of his land, described as 'Barren rocks ranges 1000 to 1500 ft high - without water'.

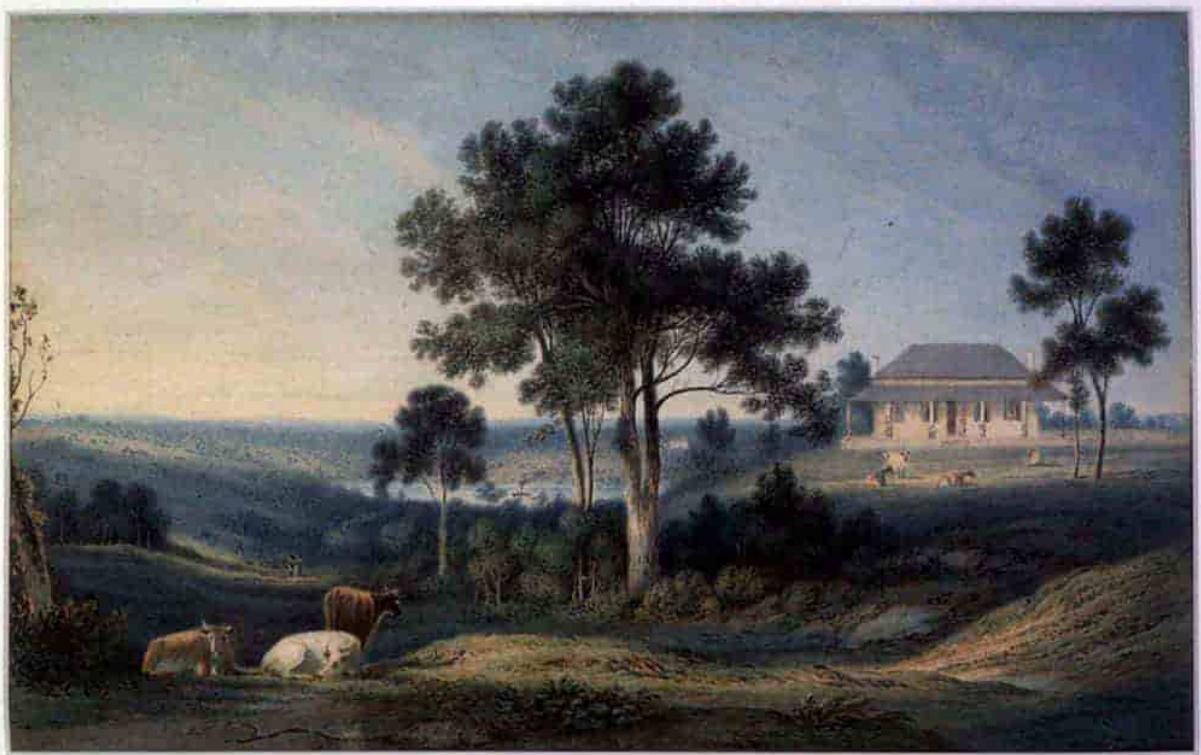


Image 3: Managers House, Camden Park by Henry Curzon Allport, 1842 (National Library of Australia).

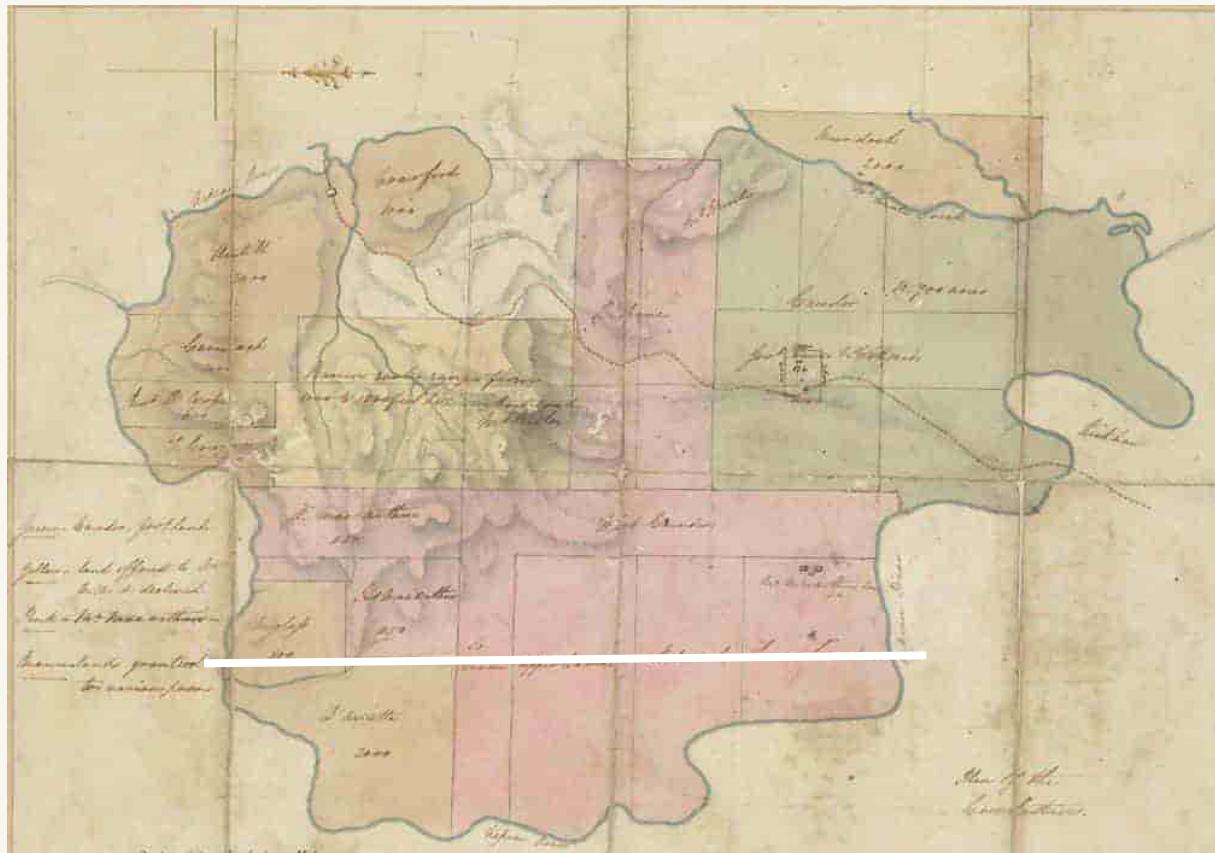


Image 4: 1823-1825 Plan of the Cowpastures including 'Camden Park' estate (shaded pink). The approximate location of the power line route sites is indicated with the white line (NSW State Library Catalogue, with Niche annotation).

Macarthur received exceptional prices for the wool from this estate in London (Martin 2014). This was made possible by a large convict workforce employed as shepherds, herdsmen and farm labourers (Betteridge 2012) on the estate, making up 90% of the workforce. During the later 1830s and 1840s skilled immigrants were brought to the estates. These eventually became tenant farmers and rent from these farms became an important source of income for the estate. The economic recession of 1840 resulted in portions of the Cowpastures, then part of the Camden Park Estate, being sold (Dictionary of Sydney 2008). However, in 1846 John Macarthur's son William noted that there were 'upwards of 800 souls' on the estate (Thorp 1987a, Martin 2014).

2.2.1 Camden Park and the local dairy industry

As the economic focus of Camden Park shifted from the wool industry, several crops and other pursuits were introduced in the 19th Century. One of these was dairying, and this grew to become the prominent industry of not just the Camden Park Estate but also the surrounding region (Thorp, 1987a). The introduction of refrigeration and the connection of Camden with the NSW rail network in the late 19th Century allowed for the distribution of perishable milk products on an industrial scale to meet the growing demand of the greater Sydney region (JRC Planning Service 1993).

As the industry expanded in the 20th Century, additional technological developments in separating, treating and mechanising milk extraction allowed for a period of intensification. This culminated in the reduced-size Camden Park Estate in the 1960s as the highest-production Dairy Farm in Australia at this time (Thorp, 1987b; belgennyfarm.com.au).



The early dairy industry at Camden Park was run as a cooperative partnership of tenant farmers who were responsible for their individual allotments, and a centralised dairy and associated infrastructure that processed the milk products and organised distribution of milk, butter and cream which was run by the Camden Park Estate Company. This pattern of centralisation of each industry around key areas of activity was identified by Thorp and held true during most of the development of the Estate as a commercial entity, up until the 1970s (Thorp 1987).

Several dairies were introduced during this period, in an arc originating with the first dairy located at Belgenny Farm (Thorp 1987). These settlement patterns were typified by rough, timber, open-framed milking and hay sheds and associated cattle yards, along with cottages and plantings of non-native species of trees and shrubs. Rough timber milking sheds provided shelter for milking and cattle across the subdivided tenant's allotments, with little else apart from fencing to alter the landscape, which was given over for grazing and occasional crops (Thorp 1987). Several creamery production facilities were also built across the Estate at this time, consisting of structures of wooden construction.

As the 20th Century progressed, the development of pasteurisation processes and the move from tenant farming resulted in an intensification of the local dairy industry around strategically placed dairies, which were upgraded to include modern machines. In the 1920s Camden Park established the first of these hygienic 'model' dairies and soon upgraded all their dairies to this standard.

Inventory of the sale at auction of one of these dairies located near the PPS describes the features of this 'model' pattern. These types of dairies sought to decrease human handling of the extracted milk and prevent bacteria from being introduced during the milking process. This was accomplished by increasingly complex machinery used for milking and storing milk as well as using purpose-built brick and concrete structures for milking rather than relying on a decentralised system which was previously the case.

Plate 5 shows a typical 'model' dairy, with brick and concrete central structures, wooden outbuildings and hay sheds, yards and open grazing land surrounding the central complex.

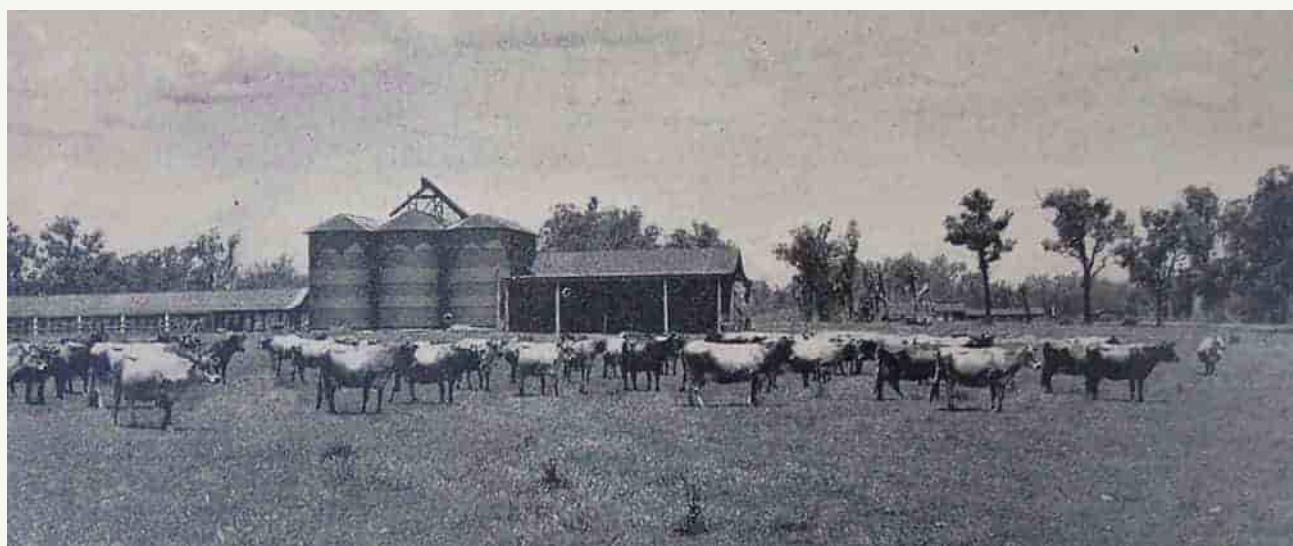


Image 5: Scene showing a Camden Vale Milk dairy: note the outbuildings in the distance (Camden Library collection, circa 1920s).



2.2.2 Irrigation and erosion control

One of the measures introduced during this period of technological development of the Camden Park Estate was designed to drought-proof the property, reduce erosion and improve the fertility of the southern portion of the estate.

The 'keyline' drought-proofing system was developed in the late 1940s by Percival Yeoman, an Australian pastoralist who adopted and implemented it at Camden Park Estate (see Image 6). This system consists of adapting a system of dams and irrigation infrastructure to increase the water content of the soil essentially creating a water storage system that uses the soil as the storage reservoir, topped up from traditional dams.

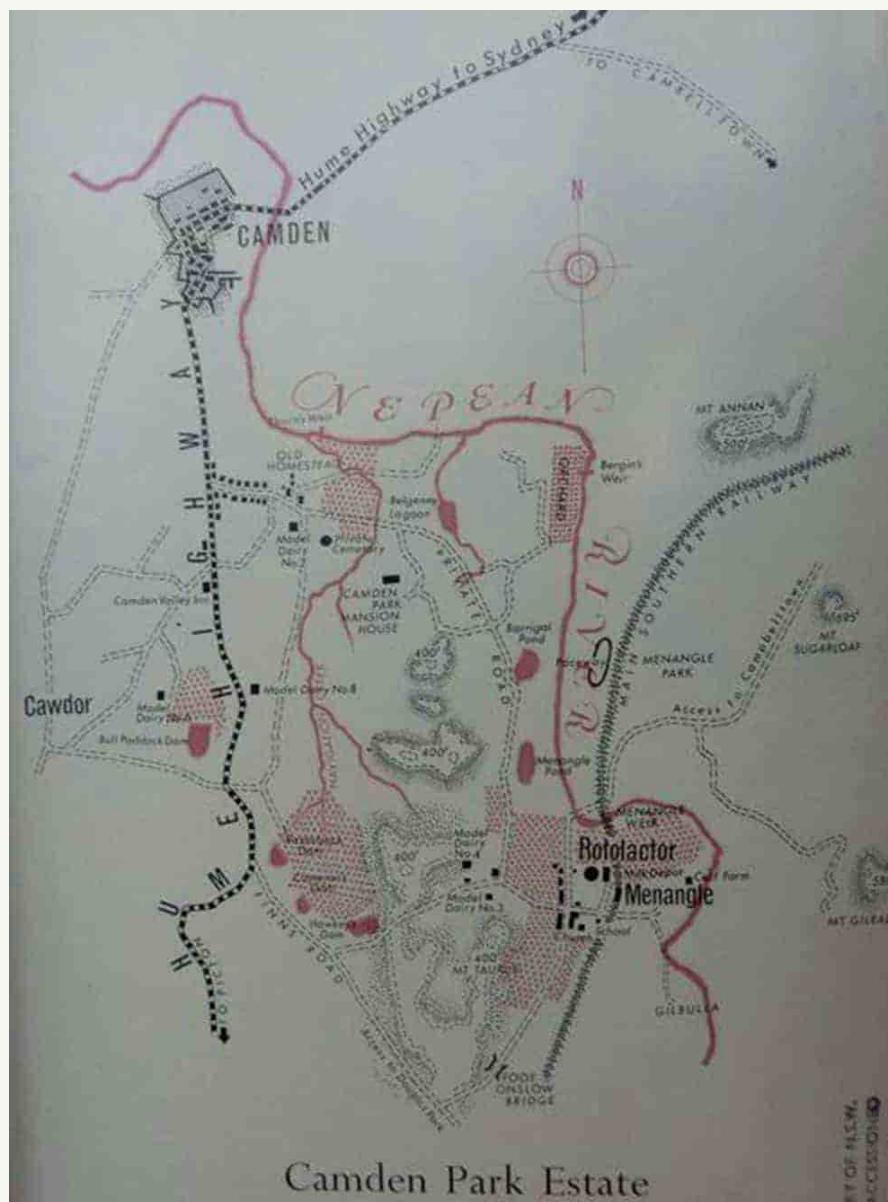


Image 6: 'Keyline' drought-proofing system at Camden Park Estate (Source: (Reproduced from Camden Park Estate 1795-1965. Australia's oldest pastoral property, Camden Park Estate Pty Ltd, Menangle, 1965).



To implement this system, which was specifically adapted for the Camden Park Estate from the 'Keyline' principles (See Image 7), four dams were constructed along the Navigation Creek watercourse: Razorback Dam in 1961, Cameron Dam, Hawkey's Dam and Bull Paddock Dam in 1964.

Most of these dams are located in the southwestern corner of the estate, east of the Hume Highway except Bull Paddock Dam, which is across the highway to the West at Cawdor. By 1965 the clearance of heavy timber, the arrangement of irrigation drainage lines and the creation of artificial contours on lower slopes to manage water movement were also completed. These works were costly to undertake, and while they did achieve success in their goal of water management and drought-proofing, the work resulted in an economic strain that reduced the profitability of Camden Park Estate.



Image 7: Oblique aerial image taken (facing south-southeast) of the southwest corner of the former Camden Park Estate showing three newly created dams (the largest being Hawkey's Dam, which is sometimes mislabelled as Cameron's Dam. (Reproduced from Camden Park Estate 1795-1965. Australia's oldest pastoral property, Camden Park Estate Pty Ltd, Menangle, 1965)

2.2.3 State government conservation and development

During the twentieth century, the large estate was gradually reduced through the sale of small farms, often to provide financing and capital for the estate to develop, improve facilities or deal with economic pressures. Unfortunately, improvements to the infrastructure and facilities during the Twentieth Century were costly and increases in production efficiency, hygiene and quality of the produce did not translate into returns on this investment.

Coupled with the downturn in the market for dairy products in the 1970s, Camden Park Estate was not considered viable to continue as a pastoral estate. Property investors attempted to develop Camden Park, which caused concern within the community regarding the preservation of historic buildings, the surrounding significant landscape of Belgenny Farm, and the larger Camden Park Estate. The community response, as well as



the opinion of governmental officials, indicated a realisation of the heritage value represented at Camden Park. These opinions referenced the legacy of innovation represented by the rotolactor, or by the insight into an early colonial-period estate provided by the evidence of Belgenny Farm.

After a period of negotiation and subsequent land sales, the estate was finally sold to the NSW State Government by 1974. Camden House and the surrounding land which was not part of the Camden Park Estate Commercial venture remained in the possession of the Macarthur-Onslow Family. The remaining lands of Camden Park Estate were acquired over the period 1974 to 1995 and were then placed under the management of the newly created Belgenny Farm Agricultural Heritage Centre Trust.

The 1983 report on Camden Park Estate by Tanner and Associates for the Department of Environment and Planning created an inventory of structures existing at the time within the estate grounds, including Camden Park House. One objective of the report was to ascertain where suitable locations for a government agricultural research facility could be located. Over the period leading to 1990, plans for relocating existing government agricultural laboratories and research stations to Camden Park Estate were explored, and the move was finalised.

The Elizabeth Macarthur Agricultural Institute (EMAI) was opened in 1990 and utilised the lands identified towards the southwest corner of the Camden Park Estate (now the EMAI property, where the PPS's proposed boreholes are located). This new facility continued the tradition of agricultural innovation that distinguished Camden Park Estate and continues to utilise these lands for research and agricultural use.

The EMAI also maintains the area as a cultivated and working agricultural station, with cropping and pastoral activities carried out on site. Access routes across the property, as well as fencing, are maintained from the previous tenet properties that used to make up Camden Park Estate. Many existing structures, such as some of the satellite Dairy sites are currently abandoned and not in use. The changing nature of usage during this historical period can be seen on historical aerial imagery from the mid to late 20th century, as presented on Figure 4 at the end of this chapter.

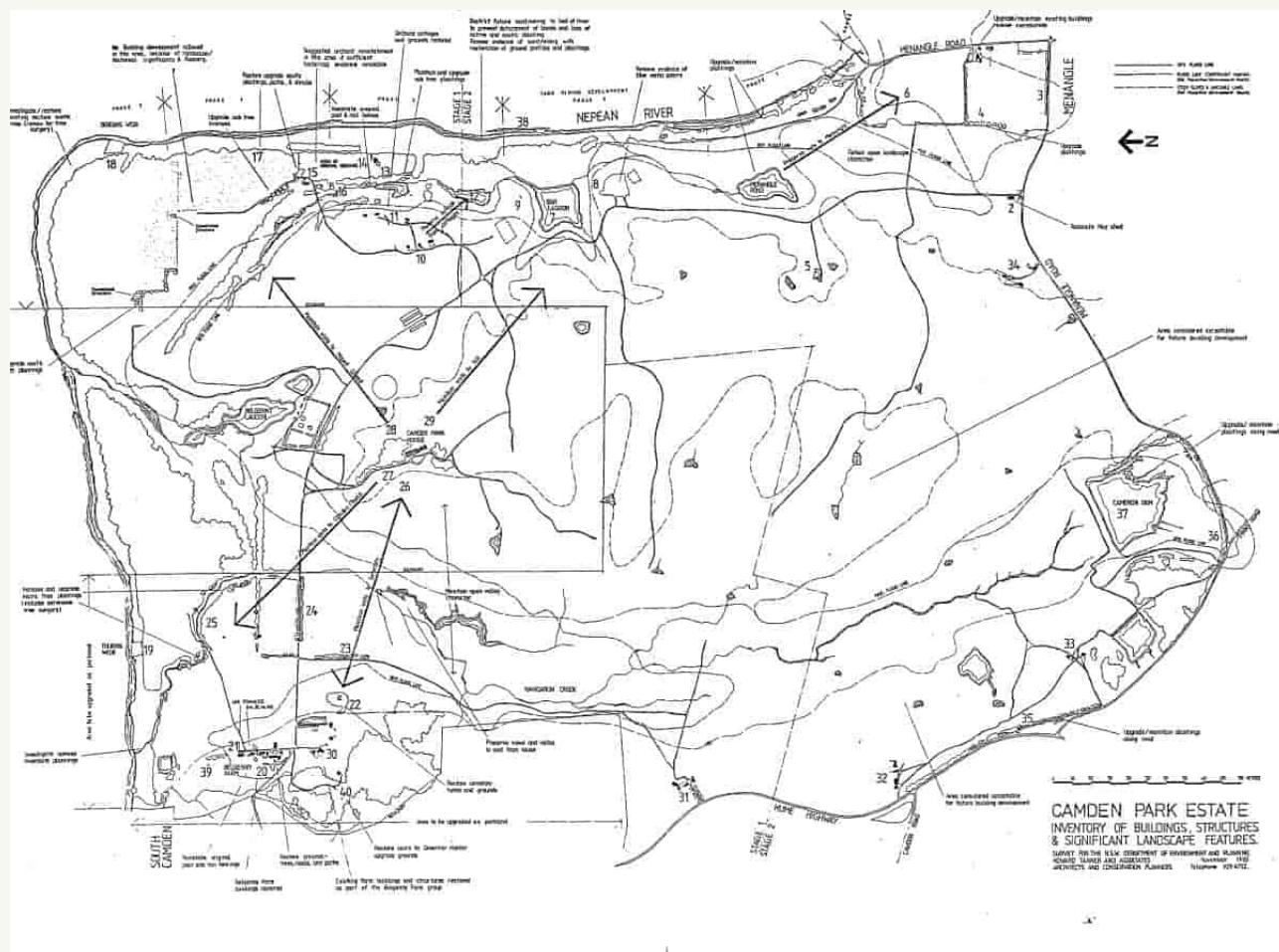


Image 8: 1983 map of Camden Park Estate, showing buildings, structures and significant landscape features. Note that Hawkey's Dam is labelled Cameron Dam. (Source Tanner and Associates)

2.3 Summary of the Historical Context

The historical context provides an overview of the key transformative phases in the history of the PPS, and the Camden Park estate. Once the PPS became part of this estate, it was cleared, cultivated and used for pastoral purposes: initially for wool production, and subsequently through tenant farms for dairy cows. The investment in the twentieth century of landscape modification and the construction of dams for irrigation and drought management transformed the physical layout and drainage of the PPS and precipitated the closure of the Camden Park Estate as a commercial farming endeavour. The creation of the EMAI facility in the early 1990s has seen the continued agricultural use of the PPS, however. This new use as a research and government agricultural facility has been punctuated by efforts to retain historical associations to Camden Park, as well as new opportunities for industrial use, such as the 2006 gas project which exists across the EMAI facility

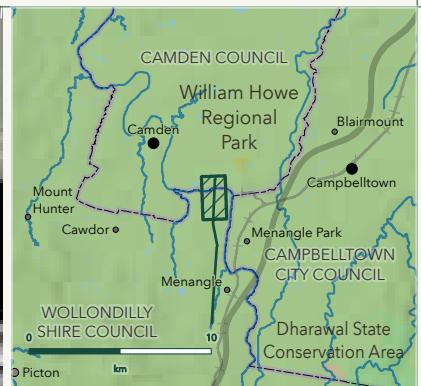


Figure 4-1
Historical Aerial Photographs - 1947

Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy



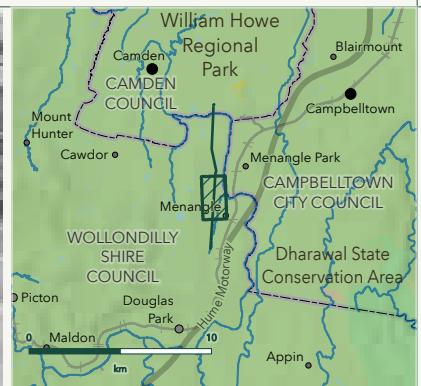
Nepean Zone Substation Feeder Upgrade

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WGS 1984 Web Mercator









Proposed works point



Proposed works linear

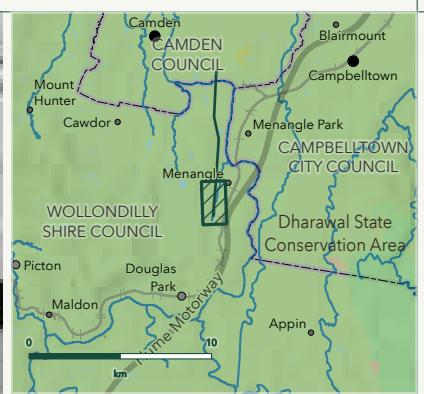


Figure 5-3

Historical Aerial Photographs - 1960

Nepean Zone Substation Feeder U

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Niche Proj. #: 8459
Client: Endeavour Energy



Proposed works point

- Existing Pole (Green diamond)
- New Pole (Orange diamond)
- Replace Pole (Pink diamond)

Proposed works linear

- Main alignment (Green line)

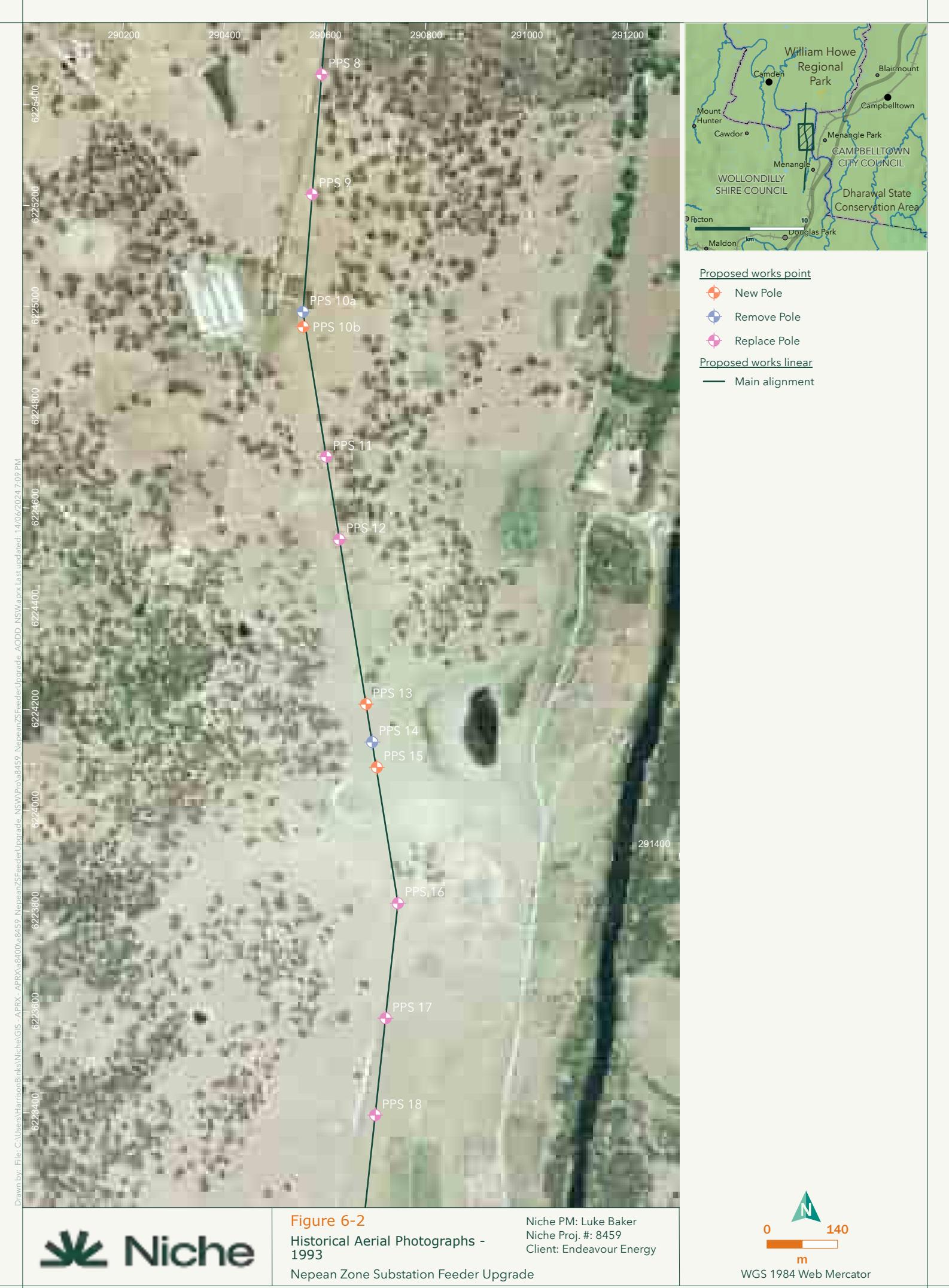


Figure 5-4
Historical Aerial Photographs - 1960
Nepean Zone Substation Feeder Upgrade

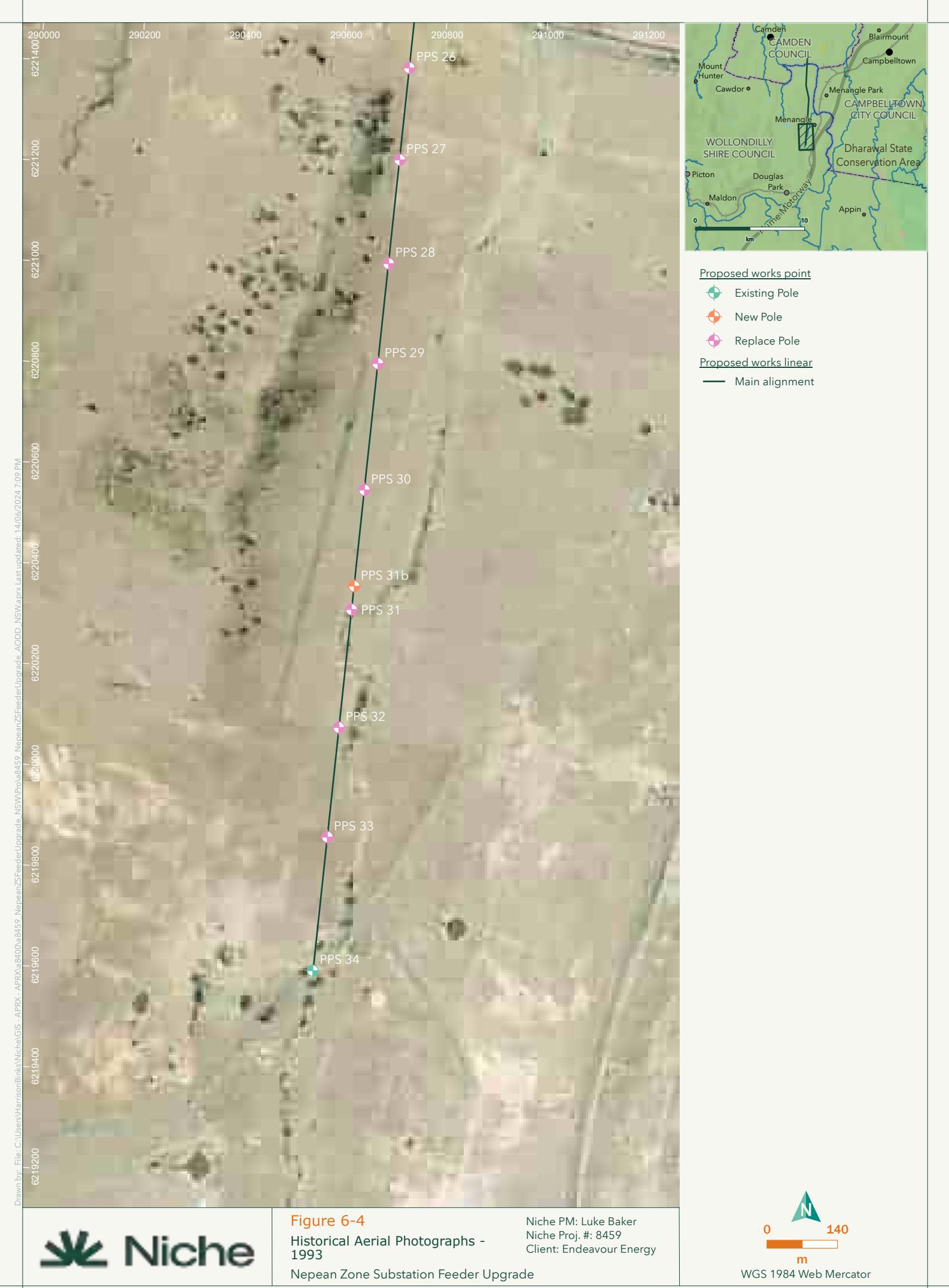
Niche PM: Luke Baker
Niche Proj. #: 8459
Client: Endeavour Energy













3 Physical Analysis

This chapter details the physical description of the PPS as well as outlining the results of the site inspection. This section provides a description of the current status of the PPS's fabric, and physical features. The record of the site inspection in this chapter can be used to 'ground truth' the results of the desktop assessment and historical analysis.

3.1 Physical Description of the PPS

The PPS is mostly within the boundary of the former Camden Park Estate and extends from the Substation at 156 Springs Road, Spring Farm in the north, across the Nepean River through Camden Park and the Elizabeth Macarthur Agricultural Institute (EMAI), to the Mt Taurus property in the south. The southern termination of the Feeder Line is at the already developed new power infrastructure south of Menangle Road.

The landscape of the PPS is mostly open rural pasture and farmland, with some open woodland and watercourses in pockets near to the PPS. Much of the PPS has been transformed through past agricultural practices, and the previous installation of the existing power poles. This transformation includes ploughing, installation of fencing, cropping, pastoral use, and bulldozing to create dams, roads and level places (the latter associated with some of the previous pole installations).

3.2 Site Inspection

The site inspection was conducted on 23rd April 2024 by Samuel Ward (Heritage Consultant, Niche), Oliver Rocheouste (Heritage Consultant, Niche), Mandy Melvaine (Ecology Consultant, Niche) and Justin Meredith (Environmental Approvals, Niche) along with representatives from Endeavour Energy. A second supplemental day of site inspection was undertaken on 3rd May 2024 by Samuel Ward (Heritage Consultant, Niche) and Mandy Melvaine (Ecology Consultant, Niche), with representatives from Endeavour Energy in attendance. The site inspection consisted of a walkover of the accessible areas of the PPS, noting any features of historical fabric, archaeological evidence, or significant landscape features.

3.2.1 Site Inspection Results

During the site inspection, personnel from Endeavour Energy confirmed the locations where works are to be undertaken (Power Pole Sites or PPS), and whether (at these sites) existing poles needed to be replaced at the same location or removed and replaced with new poles at new locations. Figure 2 and Appendix 1 shows the locations of each Power Pole Site (PPS), and the proposed activity at each site. Appendix 1 also contains imagery of each site, and descriptions of works to be undertaken and any relevant observations recorded from the site inspection and analysis of the physical features of the PPS. Please note that detailed descriptions of the proposed works, and examples of the new steel poles to be installed, are outlined in Section 5.1 of this report.

The site inspection identified that the majority of the PPS were located within ploughed fields, open pasture, or the road reserve of the rural gravel roads which exist within the former Camden Park Estate. The views to and from the village of Menangle from some of the PPS located in the southern portion of the EMAI property were identified as potentially significant, as they exist within a rural landscape and have been further described by a conservation area. Despite this, several other infrastructure items and another power line are also part of this visual landscape and were observed during the site inspection. No structures associated with the EMAI property apart from recently installed fencing, cattle loading yards which are not more than 10 years old, and a small earthen dam were the only structures close to any of the PPS.



3.2.2 Archaeological Potential of the PPS

The historical research of the study area indicates that it has been used primarily for pastoral and agricultural activities over the past 200 years of occupation. The following Section is based on the analysis of the archival evidence, survey (Section 3, 4) and evidence acquired from previous archaeological excavation. An assessment of potential Aboriginal archaeology has not been undertaken as part of this assessment.

3.2.2.1 Previous archaeological investigations or analysis within the Camden Park district

Very little physical investigation of the archaeological resource has been undertaken in the project area itself, although several studies have been conducted across the region that was formerly part of the Camden Park Estate.

Excavations within the Belgenny Farm compound (Thorp 1987b) took place within and directly surrounding the extant stables building and also included monitoring pipe trenches in the farmyard. No deposits relevant to the project area were encountered. The 2010 excavations within Belgenny Farm of the 'Small Miserable Hut' increased archaeological understanding of living and working conditions, and the remains of three cottages provided new information on the living conditions of the convict and tenant workforce at the Farm (Martin 2014).

Surveys carried out for the Wollondilly Heritage Study (JRC 1993) concluded that evidence of dairying is visible in the project area through small fields individually connected to a milking shed. The accompanying research showed that the EMAL region was previously divided into small landholdings occupied by Macarthur's tenants. This indicates that there is the potential for archaeological evidence of smaller tenant farms to be located within the study area. Wheat farming is known to have been carried out in the area. The ploughing required for arable farming may have disturbed any potential remains of former land use but could also provide evidence of this earlier land use.

The 1987 study concluded that there is little sub-surface evidence to suggest that the EMAL section of the Camden Estate was extensively developed by the Macarthur's. The majority of the project area appears to have served as paddocks since European settlement of the area began. Many of the small farms appear to have been centred along established roads through the district and therefore Thorp determined that there is little probability of additional sites being located elsewhere in the project area (Thorp 1987a).

The 'model' dairy as a type of settlement pattern has been widely observed and documented within the local area, as seen in Section 2. The pattern of locations of concentrated settlement with sparse regions of grazing and cropping land surrounding them was identified by Thorp, and the physical evidence gathered reinforces this settlement pattern as that which exists within the project area. This is consistent with patterns observed across the district occupied by the former Camden Park Estate.

It may be concluded that the while the archaeological potential associated with structures is high, the majority of the PPS are assessed as having low potential for archaeological deposits to be present.

3.2.2.2 Integrity of archaeological evidence and identified archaeological potential

During the site inspection, as described in this Section, any structures or physical land features which could provide an indication of archaeological potential based on the rational understood from the desktop assessment. There were no structures related to history associated with the early development of Camden Park, and most of the PPS exhibits no other structures at PPS apart from the electrical poles and infrastructure. Where structures were evident at PPS these were agricultural equipment, fences, cattle grids and dams which are related to later 20th Century development of the Camden Estate under NSW government management. It was assessed from the site inspection that there is a very low potential for intact archaeology to be present at the power pole sites (PPS).



3.3 Physical Analysis Conclusions

The site inspection, and desktop analysis of the EMAI property has provided an indication of the physical evidence of human activity which exists within this property. This has also provided an overview of what archaeological potential may exist within proximity to the PPS locations. This section has provided the following conclusions:

- That the EMAI property was largely used as pastural lands prior to the collapse of the Camden Park Estate company, and there were few built structures constructed across the site.
- The landscape of the EMAI property has been in continuous use for agriculture up to the present. This included the past Camden Estate tenant farming practises but is most visibly expressed by the EMAI infrastructure and use of the site. Fences and access roads across the property are maintained, and ongoing cropping and pastural use of paddocks is evident. Several structures are spread over the landscape, such as water troughs and other agricultural implements, which all relate to ongoing use and maintenance of this property.
- That at each of the PPS the past land use indicates recent activity related to the current use for agricultural purposes, and there were no structures which would indicate potential for intact archaeological deposits, or any evidence related to the early occupation of Camden Park



4 Assessment of Significance

This section provides an analysis of the significance of the PPS, with reference to previous statements and assessments of significance, comparative assessment, and the NSW significance assessment criteria.

4.1 Methodology for Assessing Significance

The NSW Heritage Manual guideline, 'Assessing Heritage Significance: Guidelines for assessing places and objects against the Heritage Council of NSW criteria'², provides a framework for significance assessments undertaken in NSW. These guidelines incorporate the seven aspects of cultural heritage value identified in the Australia ICOMOS Charter for Places of Cultural Significance, *The Burra Charter*, into a framework currently accepted by the NSW Heritage Council³.

4.1.1 Criteria for Assessing Significance in NSW

The criteria specified for use in NSW when assessing significance of heritage items or places are presented in Table 3. Using these criteria, a place can be assessed to be of local, state or no heritage significance.

Table 3: NSW Heritage Assessment Criteria

NSW Criterion		Description
Criterion (a):	Historic Significance	A place or object is important in the course, or pattern, of NSW (or the local area's) cultural or natural history.
Criterion (b):	Historical association	A place or object has strong or special association with the life or works of a person, or group of persons, of importance in NSW (or the local area's) cultural or natural history.
Criterion (c):	Aesthetic/ creative/ technical achievement	A place or object is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).
Criterion (d):	Social, cultural, and spiritual significance	A place or object has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural, or spiritual reasons.
Criterion (e):	Research potential	A place or object has potential to yield information that will contribute to an understanding of NSW (or the local area's) cultural or natural history.
Criterion (f):	Rare	A place or object possesses uncommon, rare, or endangered aspects of NSW (or the local area's) cultural or natural history.
Criterion (g):	Representative	A place or object is important in demonstrating the principal characteristics of a class of NSW (or the local area's): <ul style="list-style-type: none">– Cultural or natural places– Cultural or natural environments.

² Department of Planning and Environment (DPE). (2023). *Assessing Heritage Significance*. State of NSW DPE.

³ Australia ICOMOS (2013). *The Burra Charter, the Australia ICOMOS Charter for Places of Cultural Significance*, ICOMOS Australia.



4.2 Previous Statements of Significance

The significance of the identified heritage item (see section 1.6) is presented on its heritage item listing sheet, and in previous assessments that analyse this structure. The below table (see Table 4) summarises the previous significance assessments for each item as presented in the State Heritage Inventory (SHI).

Table 4: Significance Assessment for Identified Heritage Items

NSW Heritage Criteria	Heritage item
Criterion (a) Historic Significance:	Camden Park Estate, Camden Park Estate and Belgenny Farm
Criterion (b) Special Association w/ group or person:	Camden Park Estate, Camden Park Estate and Belgenny Farm
Criterion (c) Aesthetic/creative /technical achievement:	Camden Park Estate, Camden Park Estate and Belgenny Farm
Criterion (d) Social, cultural, and spiritual significance:	Camden Park Estate, Camden Park Estate and Belgenny Farm
Criterion (e) Research Potential/ Scientific Significance:	Camden Park Estate, Camden Park Estate and Belgenny Farm
Criterion (f) Rarity:	Camden Park Estate, Camden Park Estate and Belgenny Farm
Criterion (g) Representativeness:	Camden Park Estate, Camden Park Estate and Belgenny Farm

These previous assessments of significance have identified that the PPS, which is within the former boundaries of Camden Park Estate, has several key elements of significance can be summarised from these statements:

- *Camden Park shows a high degree of technical and creative excellence being a rare, and still relatively intact, example of a model rural estate of the early 19th century. It is the oldest pastoral sheep stud in Australia.*
- *The estate's considerable social and historic significance is also due to its ability to demonstrate the way of life, tastes, customs and functions of a 19th - early 20th century rural establishment. The site was a particularly fine example of a colonial rural estate and served as a prototype for other 19th century estates. The intactness of the site's structures and their landscape settings enhances its role as a relatively unique survivor and as a site of archaeological and scientific importance.*
- *Camden Park Estate has important associations with key figures in the history of New South Wales, particularly John and Elizabeth Macarthur, their sons James and William, and Mrs Elizabeth Macarthur-Onslow.*



- *EMAI is historically significant at a State level because it shows evidence of significant human activity in the agricultural industries and shows the continuity of that activity over the bulk of the non-Aboriginal history of New South Wales. It is representative since it has attributes typical of a particular way of life, and is outstanding because of its integrity, setting, condition and size. It contains elements that are at the same time rare because it provides evidence of a defunct way of life and agricultural practices, as well as being scarce examples of their type and showing unusually accurate evidence of significant human activities. As a significant cultural landscape, the property demonstrates overlays of the continual pattern of human use and occupation associated with the evolution of rural life in this State.*
- *Elements of the property have an unusually intact record of farm building construction techniques, rural technological change and agricultural practice over a period in excess of 180 years.*

4.3 Assessment of Significance for the PPS

The assessment of the PPS's significance which takes into consideration the previous significance assessments and is presented below. This assessment was conducted as per the NSW guidelines: Assessing Heritage Significance⁴.

4.3.1 Significance Assessment

The significance assessment for the PPS /Heritage Item is presented in Table 5.

Table 5: Significance Assessment for The PPS

NSW Heritage Criteria	Previous Assessment Record
Criterion (a) Historical significance:	The PPS is related to Camden Park Estate and is part of a landscape which represents the development of agriculture in Australia for over 200 years. The landscape of the PPS continues to represent the extent and nature of Camden Park Estate, and also the continued tradition of agricultural innovation represented by the EMAI facility and ongoing research at this site.
Criterion (b) Historical association:	The PPS is associated with the Macarthur-Onslow family who are key historical figures in the development and life of NSW. The EMAI regions partially within the PPS is representative of the work of Elizabeth Macarthur and her management of Camden Park Estate, which included the switch to dairy production.
Criterion (c) Aesthetic/creative /technical achievement:	The PPS continues to represent and participate in the ongoing research and technological innovation with regards to agricultural practises in Australia. The PPS reflects a landscape which has been modified according to innovative principles of a drought prevention, and the various dams and embankments are evidence of the implementation of innovative technology. The EMAI property continues to represent a past rural landscape in an area which is fast succumbing to urban development and is therefore aesthetically distinctive within the Camden district.

⁴ Department of Planning and Environment (DPE). (2023). *Assessing Heritage Significance*. State of NSW DPE.



Criterion (d) Social, cultural, and spiritual significance:	The PPS is important for its association with the Macarthur-Onslow family and the tenants and workers who participated in rural endeavours within the region. In addition, the former estate and current EMAI facility are recognised by the community as a landscape which is important for historical, social, spiritual and innovative reasons. The landscape of the PPS still grounds the surrounding region as a rural setting and provides a sense of place to local residents and visitors alike.
Criterion (e) Research Potential:	The PPS, which has been subject to significant transformation that has affected the likelihood of archaeological deposits across the majority of the PPS. While the broader EMAI property, particularly in the location of structures associated with the early phases of development of Camden Park, has the potential to provide substantial information to scientific and archaeological research, as a representative landscape of early farming methods as well as continuous and ongoing development of agricultural practises in NSW, the PPS is unlikely to have intact deposits associated with the PPS.
Criterion (f) Rarity:	The PPS, as a component of the former Camden Park Estate, provides a rare example of early agricultural practises in NSW, as well as how innovation and technology has informed Australian agricultural practises for over 200 years. As the site of the EMAI facility, the PPS continues to demonstrate agricultural development and research which is of exceptional interest to the community of NSW.
Criterion (g) Representativeness:	The PPS is representative of colonial life and the colonial rural landscape of NSW, as well as the evolution and innovative leadership which the Camden Park Estate provided to Australia's primary industries from this early historical period into the present through the EMAI facility.

4.4 Statement of Cultural Significance

The PPS, as a part of the former Camden Park Estate, is a rare representative example of a 19th Century rural landscape which continued to function through to the latter 20th Century. This landscape provides evidence of a colonial rural estate, organised in 19th Century English tradition, which served as a prototype for development in the early colonial period.

The PPS is associated with the Macarthur-Onslow family who are key historical figures in the development and life of NSW. The EMAI regions and Dairy farming witnessed by the PPS is representative of the work of Elizabeth Macarthur and her management of Camden Park Estate, which included the switch to dairy production.

The PPS shows little evidence of archaeological potential related to significant historical phases of development, regardless of archaeological potential which may be associated with other, more significant locations within the EMAI property - at the PPS works sites there is little archaeological potential.



5 Assessment of Heritage Impacts

This section provides the assessment of the potential heritage impacts of the PPS.

5.1 The Proposed Works

5.1.1 Description of the proposed works

The proposed works consist of the removal of existing electricity poles at the Power Pole Sites (PPS) which make up the Subject Area. Existing poles (which are of a wooden, twin-post design) are to be replaced with taller (up to 30 m high) steel power poles, again with twin upright members (see Image 10 for an example of this type of power pole). Across the PPS, the location of some replacement power poles will be shifted in order to avoid impacts to vegetation, or for practical reasons such as the existing pole's proximity to existing infrastructure (see Figure 2 for details of replacement versus new power pole sites). The conductors are to be replaced and re-strung, and a underground connection is to be established (via trenching or under boring, depending on practicality) between the Substation site at 156 Spring Road, Spring Farm and PPS 1. This substation to PPS 1 underground connection is not located within any heritage curtilage.



Image 9: Image of existing wooden power poles which are currently installed across the PPS.



Image 10: View of steel power poles of the same type to be installed new as part of the proposed works.



5.2 Impact Assessment

Known and potential impacts on heritage items can be quantified under three main categories: direct impact, indirect impact and actions which cause no negative impact. The category of impacts caused are dependent on the nature of the proposed works, the significance of the heritage item, its significant fabric, archaeological potential, and its associated curtilage.

5.2.1 Direct Impacts to Heritage Significance

Direct impacts are caused when the completion of the proposed development will result in a modification or alteration to the fabric of a heritage item which will impact the heritage value or significance of the place. Table 6 presents an analysis of potential direct impacts on heritage elements identified within the PPS.

Table 6: Potential Direct Impacts from the Proposed Works

Proposed Work Activity	Potential Impact on Heritage elements/ PPS /Heritage Item	Assessment of Impacts	Mitigative Measures/ circumstances and discussion of impact
Trenching between Spring Farm Substation and PPS 1	Nil – not within heritage curtilage, or areas indicating presence of potential for archaeological relics	Unlikely	This trenching is occurring in an area where there are no heritage curtilages, and much past ground disturbance activity has previously occurred, not least the installation and removal of a significant amount of infrastructure.
Removal of existing power poles	Potential for unknown archaeological deposits related to the former Camden Park or Menangle settlement to be disrupted by ground disturbance associated with this activity, or plant movements.	Low – there is a low potential for archaeology within the PPS, and it is likely that any intact deposits would be determined to be non-significant.	The footprint of the disturbance is not likely to be outside of the previous impact zone caused by the installation of the existing wooden poles. Where this is not the case (where poles have been relocated) the PPS show no indication of archaeological potential and are not near to structures which could indicate archaeological potential. Archaeological potential is considered to be low across the majority of the rural landscape which is not associated with structures or other features.
Installation of new power infrastructure	Potential for unknown archaeological deposits related to the former Camden Park or Menangle settlement to be disrupted by ground disturbance associated with this activity, or plant movements.	Low – there is a low potential for archaeology within the PPS, and it is likely that any intact deposits would be determined to be non-significant.	The installation of larger new steel poles is not likely to increase ground disturbance by a significant amount. The machinery to be used will minimize impacts over having to excavate to extract and install these poles – use of cranes and plant will largely resolve this issue.



Proposed Work Activity	Potential Impact on Heritage elements/ PPS /Heritage Item	Assessment of Impacts	Mitigative Measures/ circumstances and discussion of impact
Installation of new power infrastructure	Increase in the visual disturbance to the landscape of the former Camden Park Estate items, and the Menangle Conservation Area, disrupting views and vistas in and around these items.	The increase in height and change in type of poles will cause a minor increase to the visibility of this power line, and its intrusion into the rural landscape of the PPS.	<p>The upgrade to this infrastructure item will not involve an intrusion of a new visual element to the rural landscape, as the existing power line already follows this route and predates the listing of each of the SHR items and conservation area. Overhead and non-residential powerlines are common within the local region, and this powerline actually feeds the local powerlines connected to some sites within the current Camden Park estate and EMAI properties.</p> <p>The existing power line has reached its usable lifespan and will become unable to be used unless work is undertaken to replace this existing infrastructure.</p> <p>Pole types have been selected to use existing pole locations as much as possible and minimise the number of additional poles. If EE used modern standard pole designs, there would be many more pole locations required. This would result in greater overall impact. There will be only one additional pole location and two pole relocations. EE has adjusted the design to mimic the existing structures as much as possible with different materials (steel replacing wood). This is due to lack of availability of replacement wooden power poles, and limitations to the design of alternate smaller poles.</p>
Access to alignment including works on Foot Onslow Creek Crossing	Vehicle/plant movements.	None	Vehicles will be using existing access corridors and easements to access the ETL alignment. There will be little risk of impacts to heritage items or values, especially considering these activities in the context of the rural farming setting.



5.2.2 Indirect Impacts to Heritage Significance

Indirect Impacts are caused when other sites/visual landscapes or nearby fabric are modified due to the proposed works on the item itself. This often involves modification to significant views of an item, changes to the item's setting or how it interacts with the surrounding landscape, or noise or vibration impacts caused by the proposed works. These impacts are assessed with the understanding that heritage items do not exist within a vacuum, but as a nexus of complex interactions within a particular landscape. Table 7 provides an analysis of potential indirect impacts on heritage elements identified within the PPS.

Table 7: Potential Indirect Impacts from the Proposed Works

Proposed Work Activity	Potential Impact on Heritage elements/ PPS /Heritage Item	Assessment of Impacts	Mitigative Measures/ circumstances and discussion of impact
Installation of replacement poles	Vibration caused by plant during installation.	The PPS sites are not situated near to sensitive structures, there is no risk of vibration caused by works impacting the fabric of the identified heritage items.	Not likely to cause impacts due to large amount of separation between plant and any sensitive structures which may be associated with the former Camden Estate, Mt Taurus property, or Menangle Village.



5.2.3 Material Threshold Policy Analysis

The proposed works have the low potential for impacts to archaeology within the EMAL property, as well as minor impacts to the visual landscape of the SHR items associated with the PPS. With the mitigation measures in place, and the considerations raised regarding the visual impacts (see Table 6), the overall impact to heritage significance will be minor in nature.

The scale of the change from wooden to steel poles of greater height is considered to be a minor change in the magnitude of this feature (see Image 9 compared to Image 10), when considered in the rural landscape which the existing power infrastructure within this item already engages with as a visual element. The proposed works are necessary to maintain the distribution of power to some parts of the EMAL site. The choice of this upgrade design will result in far less overall change when considered against the alternative of more frequent but smaller power poles, which would result in a greater degree of visual disturbance.

Therefore, it is considered that the proposed works will result in minor adverse visual impacts to the state heritage significance of the SHR items associated with the former Camden Park Estate.

5.2.4 Statutory and Heritage Approval Requirements

For some works within the boundary of SHR items, standard exemptions to the requirement to obtain approval for works within SHR curtilage (according to S.57(1) of the Heritage Act 1977) are applicable. These standard exemptions, which are gazetted under S.57(2) of the Heritage Act 1977, are self-assessed, but require the proposed works to fall entirely within specified limited works descriptions and comply with standard conditions such as acceptable record-keeping. Standard exemptions for NSW SHR items are broken down by activities related to common types of maintenance and usage tasks. For the proposed works to fall under standard exemptions, they would need to meet the requirements for *Standard Exemption 5: Repair or replacement of non-significant services (mechanical, electrical and plumbing)*, and *Standard Exemption 8: Excavation*.

Any repair or replacement of electrical or non-telecommunications services within a SHR item must fall within the definition of Standard Exemption 5, as this is the exemption which governs this activity. As such, it is not possible to use another exemption to apply to these works. In addition, because the Proposed Works will include ground disturbance activity, Standard Exemption 8 must be applied to this aspect of the Proposed Works - this requirement is referenced in Standard Exemption 5: that if ground disturbance occurs, the works must comply with Standard Exemption 8.

Unfortunately, the proposed works do not fit within the requirements for these Standard Exemptions. One of the Relevant Standards for Standard Exemption 5 includes as a requirement:

*c. The specified activities/works must not involve alteration to, damage to, or the removal of, significant fabric. **The specified activities/works must not impact significant views and landscape values.***

As the proposed works will have a minor impact on the landscape value of Camden Park and EMAL, this requirement is failed. There are other aspects of the proposed works which also fail requirements for Standard Exemptions, but since all requirements must be fulfilled, the above is all that needs to be listed here.

In order for works to proceed an approval must be obtained from Heritage NSW through the Heritage Management System (HMS) under S.60 of the Heritage Act 1977.



5.3 Statement of Heritage Impact

The heritage items identified within the PPS and the associated heritage value of these items is assessed to be at risk of potential minor impacts from the proposed works. These direct impacts can be partially mitigated by the fact that the PPS are located outside of identified areas of archaeological potential. It is further noted that potential impacts to sub-surface archaeology, would be minor overall, despite the potential scale of impacts if they were to occur at the PPS. This is due to the assessed low archaeological potential of the EMAI property outside of identified areas of potential which makes impacts in this case unlikely.

Other potential impacts have been identified as the minor disruption to the visual catchment of heritage items and the associated rural landscape caused by the increased scale of the taller steel power poles compared to the shorter wooden power poles. However, given the existence of this power line currently within the item, the nature of the rural environment which includes several overhead power lines, and the alternative options for safely upgrading this essential infrastructure item, the proposed works are considered to be the optimal solution for this aging infrastructure.



6 Conclusion and Reccomendations

6.1 Conclusions

This Statement of Heritage Impact report has assessed the significance of the PPS, and the potential impact of the Proposed Works. In order to accomplish this, the historical context of the heritage items and setting of the PPS was assessed, heritage registers and the statutory context of the PPS was searched, and the fabric and archaeological potential elements of the PPS were analysed to understand the contribution to the overall heritage value of this item. The following conclusions were reached:

6.1.1 Summary of Cultural Significance

The PPS, as a part of the former Camden Park Estate, is a rare representative example of a 19th Century rural landscape which continued to function through to the latter 20th Century. This landscape provides evidence of a colonial rural estate, organised in 19th Century English tradition, which served as a prototype for development in the early colonial period.

The PPS is associated with the Macarthur-Onslow family who are key historical figures in the development and life of NSW. The EMAI regions and Dairy farming witnessed by the PPS is representative of the work of Elizabeth Macarthur and her management of Camden Park Estate, which included the switch to dairy production.

The EMAI property, which has been subject to significant transformation that has affected the likelihood of archaeological deposits across the majority of the PPS, nonetheless has the potential to provide substantial information to scientific and archaeological research, but this potential is associated with structures related to early phases of historical development. As a representative landscape of early farming methods as well as continuous and ongoing development of agricultural practises in NSW, the EMAI property and the former Camden Park Estate can provide evidence which is not available from another source. This site is an important benchmark available for study, and comparison. However, the PPS shows little evidence of archaeological potential related to significant historical phases of development.

6.1.2 Summary of Heritage Impacts

The heritage items identified within the PPS and the associated heritage value of these items is assessed to be at risk of potential minor impacts from the proposed works. These direct impacts can be partially mitigated by the fact that the PPS are located outside of identified areas of archaeological potential. It is further noted that potential impacts to sub-surface archaeology, would be minor overall, despite the potential scale of impacts if they were to occur at the PPS. This is due to the assessed low archaeological potential of the EMAI property outside of identified areas of potential which makes impacts in this case unlikely.

Other potential impacts have been identified as the minor disruption to the visual catchment of heritage items and the associated rural landscape caused by the increased scale of the taller steel power poles compared to the shorter wooden power poles. However, given the existence of this power line currently within the item, the nature of the rural environment which includes several overhead power lines, and the alternative options for safely upgrading this essential infrastructure item, the proposed works are considered to be the optimal solution for this aging infrastructure



Whether the Proposed Works are Acceptable or Not Acceptable

The proposed works are considered to be an acceptable solution to address the issue of this aging infrastructure item. An approval is necessary under S.60 of the Heritage Act prior to works commencing.

6.2 Recommendations

Following analysis of the desktop findings, the site inspection results and the analysis of significance and heritage impacts, the following recommendations have been made regarding the Proposed Works within the PPS (see Table 8).

Table 8: Recommendations

Recommendations	
1.	S.60 Approval Application for works
2.	Stop work in case of unexpected archaeological finds



7 References List

Australia ICOMOS (2013). *The Burra Charter, the Australia ICOMOS Charter for Places of Cultural Significance*, ICOMOS Australia.

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Appendix 1: Site inspection Results

Table 9: Observations from the physical inspections of the Power Pole Sites (PPS)

PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
Spring Farm Substation	Trenching/Under-boring between substation and PPS1	<p>The northern-most connection point related to the proposed works.</p> <p>Varying levels of GSV and exposures are present.</p> <p>Images presented of this site show the existing electrical infrastructure at this location.</p>	 <p>Picture 1: View of the substation at Spring Farm.</p>  <p>Picture 2: View of the various connection points at the Substation, looking southwest towards other power infrastructure surrounding PPS 1. Trenching or under boring will be used to connect PPS 1 with the substation near to this connection point.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 1	Replace Pole (while there are several poles at this location, the pole set (an H-pole design with twin posts) is the pole being replaced. This is typical of the existing poles within the PPS (most of which have twin posts))	To the south of these H poles, there is a depression which looks like a dam catchment area. Access tracks to this pole will utilise existing ones and clear a path with slashing.	  Picture 3: View of PPS 1 with the infrastructure to be replaced in the foreground. Note that the poles in the background are not involved in this project. Picture 5: View looking northeast back towards the substation from PPS 1 along the route to be under bored/trenched.



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
			 <p data-bbox="866 790 1484 938">Picture 4: View looking south from this PPS, showing the multiple lines which cross this unused land north of the Nepean River, and near to the substation. Only one set of wires are under modification as part of this project.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 2	Replace Pole	<p>Area has long grass covering a sandy base, most likely brought into stabilise area for the easement and installation of the poles. Access tracks will use existing access tracks leading to pole with a laydown area just to the northeast of the pole. Surrounding area will be slashed. Sandy base has been disturbed so potential for artefacts is low in this area.</p>	 <p>Picture 6: View of the pole infrastructure located at this PPS. Note that the height of these poles are almost as high as the replacement steel versions. This is not usual, as most wooden poles on this power line are much shorter.</p>  <p>Picture 7 View looking south from this site, showing the wires crossing the Nepean River which marks the northern boundary of the Camden Park SHR item, and the boundary between Wollondilly and Camden LGAs at this point.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 3	Replace Pole	<p>Low visibility due to grass coverage and crops. Possible high disturbance due to farming activities and the previous power pole installation. Access track will follow the existing one.</p>	 <p>Picture 8: View of the infrastructure present at PPS 3.</p>  <p>Picture 9: View looking south over the cropped field which this pole site is immediately to the north of the pole site.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 4	Replace Pole	Low visibility and limited exposures due to being in a crop field. Access track may run through field from the south or from the east.	 <p data-bbox="855 794 1484 1329">Picture 10: View looking south of PPS 4 which is located within a cropped field.</p> <p data-bbox="1484 319 2140 794">Picture 11: View looking north from the PPS 4 location showing the cropped field and multiple wire routes at this site. The wires to the west are not part of this proposed works activity.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 5	Replace Pole	<p>Area heavily disturbed by ploughing. Evidence of topsoil has been removed from the area. Access track heading to this site would come from the east.</p>	 <p data-bbox="855 794 1484 1337">Picture 12: View looking north across fields of the infrastructure at PPS 5. Note the bracing wires necessary to ensure the stability of this older wooden pole structure at this location.</p> <p data-bbox="1484 319 2142 794">Picture 13: View looking south of this PPS. Note the unploughed patch of land surrounding these poles – as this location is within a ploughed field. The side of this raised section shows a mixed stratigraphy, indicating that agricultural activity predicated the previous pole installation.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 6	Replace Pole	Low visibility and no exposures present. Access track to follow existing one adjacent to site.	 <p data-bbox="864 1156 1477 1219">Picture 14: View looking south of the infrastructure located at PPS 6.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 7	Replace Pole	Low visibility and minimal exposures present. Access track will go through paddock.	 <p data-bbox="855 794 1477 1329">Picture 15: View looking south of the infrastructure located at PPS 7.</p> <p data-bbox="1500 319 2131 794">Picture 16: View looking north from PPS 7.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 8	Replace Pole	Low visibility, adjacent to access track. Some exposures to the south east of the pole beside fence line but no artefacts found.	 <p>Picture 17: View of the infrastructure located at PPS 8.</p> <p>Picture 18: View looking north showing the rural gravel road near to this site.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 9	Replace Pole	<p>Low visibility and no exposures due to surrounding long grass. Area will have to be slashed for an access track to be made.</p>	 <p>Picture 19: View looking south of infrastructure located at PPS 9.</p> <p>Picture 20: View looking north at the open overgrown pasture at this location.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 10a	Remove Pole	<p>Low visibility due to surrounding long grass. Some exposures present but no artefacts. To the north of this site is a local dam with red algae. An exposed area is found to the south side of the dam, but no artefacts, disturbance by ant nest.</p>	 Picture 21: View looking south from the dam's embankment of PPS 10a power poles. Note that these poles are to be relocated to PPS 10b near to where the vehicles are located in this picture.  Picture 22: View across the dam looking north from the PPS 10a site. Note that proximity to this dam is the reason for relocating this pole.



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 10b	New Pole	<p>Suggested new location for nearby pole. Other area is deemed to be too tight for machinery and would require more vegetation removal. This location is more open and would not deviate from the power line above. Visibility is low and no exposures. An area to the west of this location contains a dam spillage area.</p>	 <p>Picture 23: View looking south at the alternate location selected for this power pole, note the overgrown pasture present at this position.</p>  <p>Picture 24: View of the existing power pole at PPS 10a - the camera is located at the new alternate location for these poles at PPS 10b.</p>

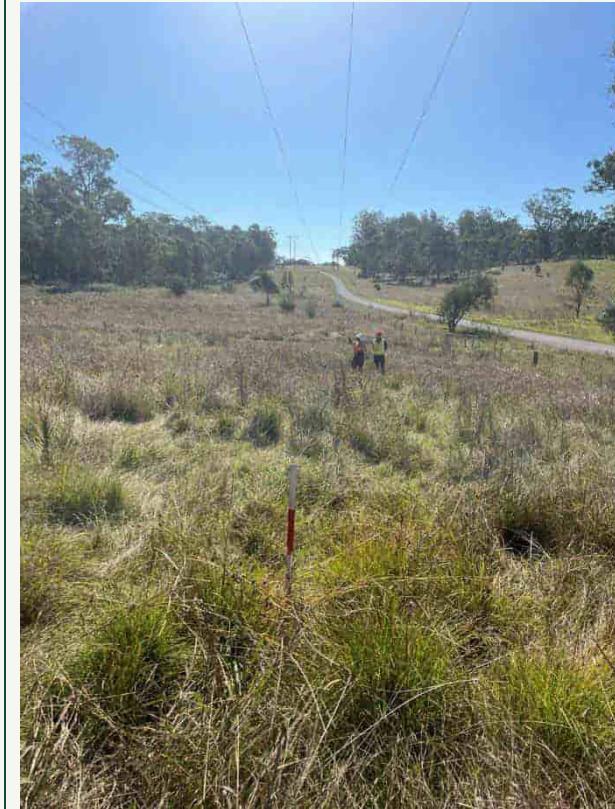
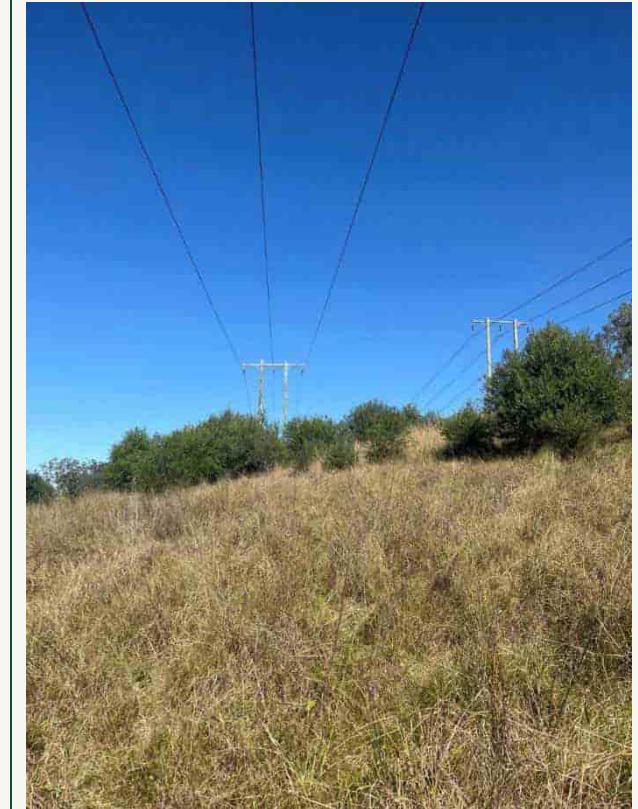


PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 11	Replace Pole	Low visibility and no exposures in surrounding area. Nearby existing access track will be used. Area around will be slashed.	 <p>Picture 25: View of the power pole at PPS 11, which will be moved slightly to the west (up to 4 m distance), in order to avoid impacts from overhanging tree branches.</p> <p>Picture 26: View looking north from PPS 11, showing the overhanging tree branches to be avoided for ecological reasons.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 12	Replace Pole	Low visibility no exposures.	 <p data-bbox="866 1156 1260 1187">Picture 27: View of PPS 12 location.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 13	New Pole	<p>New Pole location selected as one of two to replace PPS 14 (this existing pole is to be replaced by two poles on either side of the local ridgeline).</p> <p>This general region has had significant grading and land transformation as part of previous power line works. Evidence of flattening and road creation on this local hill.</p>	 <p>Picture 28: View of the site for a new power pole at PPS 13, in order to remove PPS 14.</p>  <p>Picture 29: View of the existing infrastructure south of this location at PPS 14.</p>

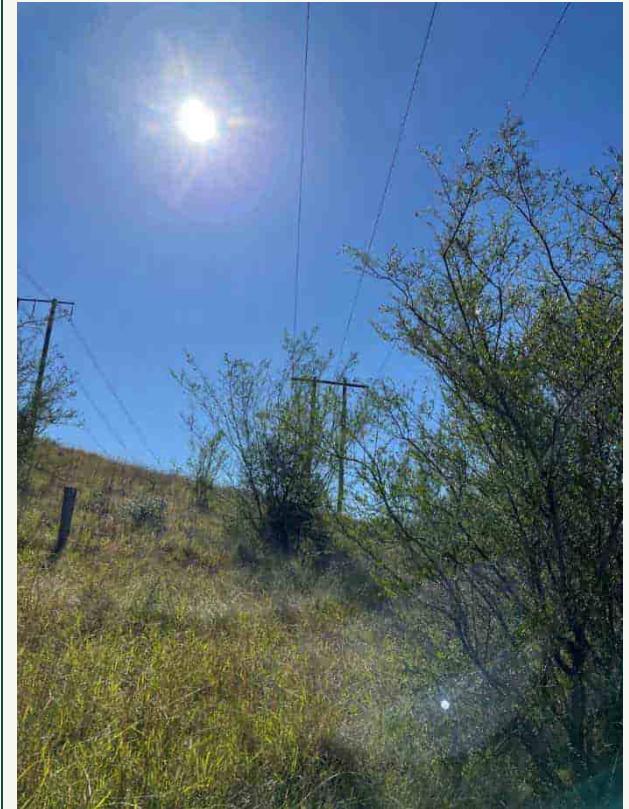


PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 14	Remove Pole	<p>Existing PPS which will be removed and replaced with two new pole sites.</p> <p>This general region has had significant grading and land transformation as part of previous power line works. Evidence of flattening and road creation on this local hill.</p>	 <p>Picture 30: View of the infrastructure to be removed at PPS 14.</p> <p>Picture 32: view looking north from the existing PPS 14 site. Note the additional power line to the west of the Nepean Feeder line - this other power line is not part of the proposed works.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
			 <p data-bbox="866 782 1410 847">Picture 31: View looking south of the landscape surrounding PPS 14.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 15	New Pole	<p>Low visibility and no exposures present.</p> <p>This general region has had significant grading and land transformation as part of previous power line works. Evidence of flattening and road creation on this local hill.</p>	  <p>Picture 33: View of the new location PPS 15 looking south across the landscape.</p> <p>Picture 34: View looking north from the location of the new pole, showing the existing infrastructure location.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 16	Replace Pole	Low visibility and no exposures. Adjacent to existing access track.	 <p data-bbox="855 1143 1484 1206">Picture 35: View of PPS 16 showing the infrastructure at this location.</p> <p data-bbox="1484 1143 2135 1238">Picture 37: View looking north from PPS 16 showing the rolling open pastureland at this point in the power route.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
			 <p data-bbox="866 790 1477 854">Picture 36: View looking south from PPS 16 showing the open pasture at this location.</p>  <p data-bbox="1489 790 2113 854">Picture 38: View towards a former quarry site from PPS 16.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record	
PPS 17	Replace Pole	Some exposure present due to access track. Low visibility due to grass coverage. Adjacent to existing access track in separate paddock. Surrounding area to be slashed.		<p>Picture 39: View of PPS 17 looking south, showing the open pasture at this location.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 18	Replace Pole	<p>Poles adjacent to existing access track. Exposure present due to road. Low visibility near poles and terrain associated with nearby fence line and current road reserve.</p>	 <p data-bbox="866 1160 1327 1192">Picture 40: View of PPS 18 looking south</p>  <p data-bbox="1500 811 2113 859">Picture 41: View of the road reserve at PPS 18 looking north from this site.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 19	Replace Pole	Low visibility due to grass coverage. No exposures. Located north west of nearby dam.	 <p data-bbox="855 1160 1462 1224">Picture 42: View looking south from PPS 19, showing the open grassy landscape at this location.</p> <p data-bbox="1507 335 2129 790">Picture 44: View looking southeast from PPS 19 of the standing water in the drainage line to the east of the powerline route at this location.</p>

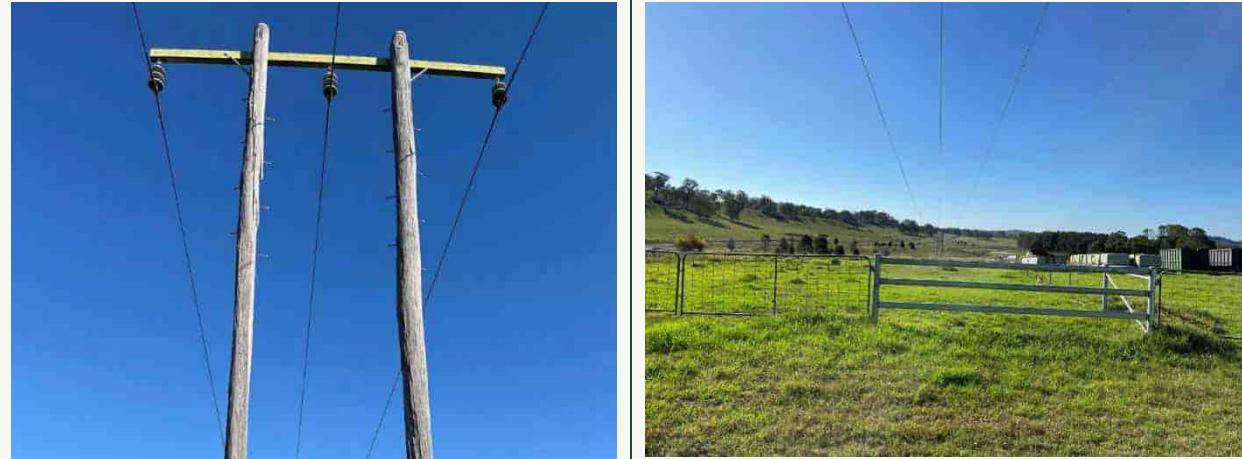


PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record	
			 Picture 43: View of the route looking north from PPS 19.	



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 20	Replace Pole	Low visibility no exposures. Just south of local dam.	  <p data-bbox="866 1160 1343 1192">Picture 45: View looking south of PPS 20.</p> <p data-bbox="1507 806 2106 870">Picture 46: View of PPS 20 looking northeast towards the standing water to the east of the powerline route.</p>

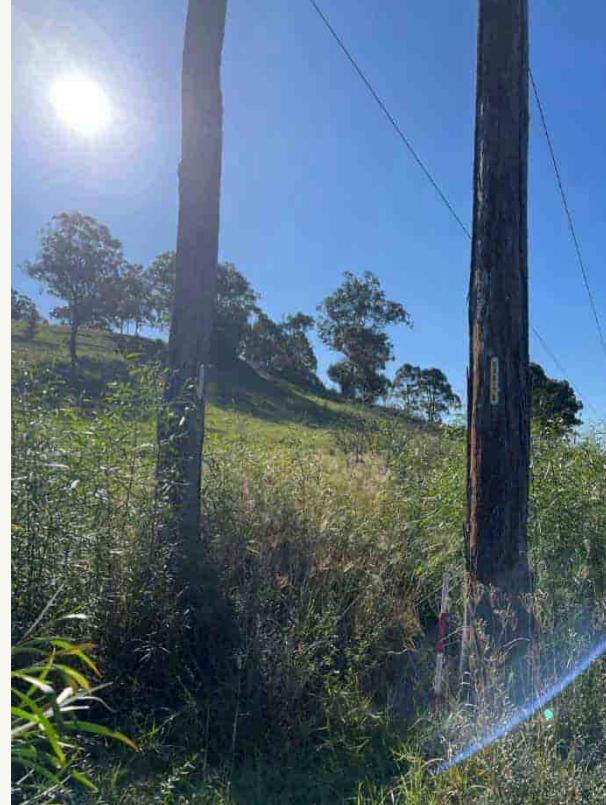


PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 21	Replace Pole	Low visibility, adjacent to existing access track. Heavily disturbed due to farming activities.	 <p>Picture 47: View of PPS 21 looking south showing the agricultural infrastructure at this location.</p> <p>Picture 49: View looking north from PPS 21 showing recent agricultural infrastructure near to this site.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record	
			 <p>Picture 48: View of recently constructed cattle loading site, and cattle grate near to PPS 21.</p>	



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 22	Replace Pole	Low visibility around pole due to high grass. No exposures. Adjacent to road. Works will require a road closure.	  Picture 50: View of PPS 22 showing the high grass at this part of the road reserve. Picture 51: View looking south towards the rural landscape around Menangle Village from PPS 22.



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 23	Replace Pole	Low visibility, some exposure due to nearby gravel road. Pole beside road.	 <p>Picture 52: View of PPS 23 showing the locations in a road reserve, looking south.</p> <p>Picture 54: View looking southeast towards the village of Menangle showing the open, rural setting of this section of the EMAL property.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
			 <p>Picture 53: View looking northeast from PPS 23 showing ridgeline to the west of the powerline route.</p>  <p>Picture 55: View looking northeast from PPS 23 showing the modified landscape of the road reserve at this location.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 24	Replace Pole	Low visibility due to grass coverage. No exposures. There is a drainage line that is located to the south of the pole. Due to this feature the pole may be relocated to a new location 4 m north at least.	 <p>Picture 56: View looking south from PPS 24.</p> <p>Picture 57: View looking north from PPS 24.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 25	Replace Pole	Pole located just north of Woodbridge road. Low visibility and no exposures nearby. Also near disturbed earth due to the construction of the road.	 <p data-bbox="862 1160 1439 1224">Picture 58: View looking south of the infrastructure present at PPS 25.</p> <p data-bbox="1500 1160 2124 1224">Picture 61: View looking west from the PPS 25 showing local power infrastructure present at this location.</p>



Picture 59: View looking north from PPS 25 showing the rural open vista at this location.



Picture 62: View looking east from PPS 25 to Menangle.

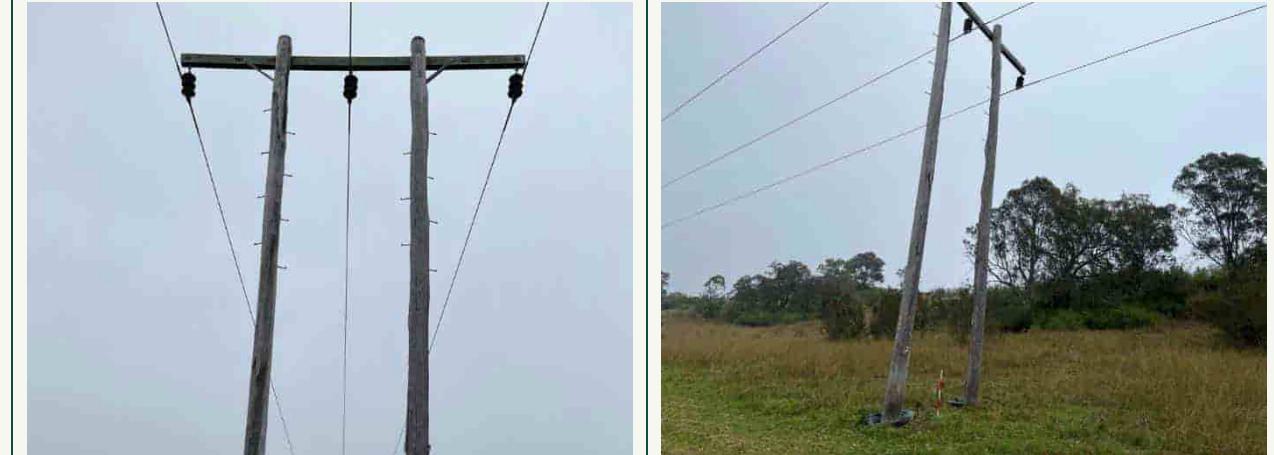


Picture 60: View looking northeast across fields towards Menangle from PPS 25.



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 26	Replace Pole	Low visibility and no exposures nearby, within rural property which shows signs of landscape modification.	 Picture 63: View looking south of PPS 26 poles.  Picture 64: View looking north towards EMAI from PPS 26, showing the rural landscape.



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 27	Replace Pole	Low visibility and no exposures nearby, within cleared pasture.	 <p data-bbox="855 1160 1455 1224">Picture 65: View of the PPS 27 location showing the infrastructure and open pasture at this site.</p> <p data-bbox="1500 806 2106 870">Picture 67: View looking southwest of PPS 27 and the ridgeline to the west of the power line route.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record	
			 <p>Picture 66: View looking north from PPS 27.</p>	



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 28	Replace Pole	Low visibility and no exposures nearby, within cleared pasture.	 <p data-bbox="866 1156 1365 1219">Picture 68: View looking south showing the infrastructure at PPS 28.</p>  <p data-bbox="1507 801 2106 865">Picture 70: View looking south from this PPS, showing the open pasture that is present at this location.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record	
				Picture 69: View looking north from PPS 28.

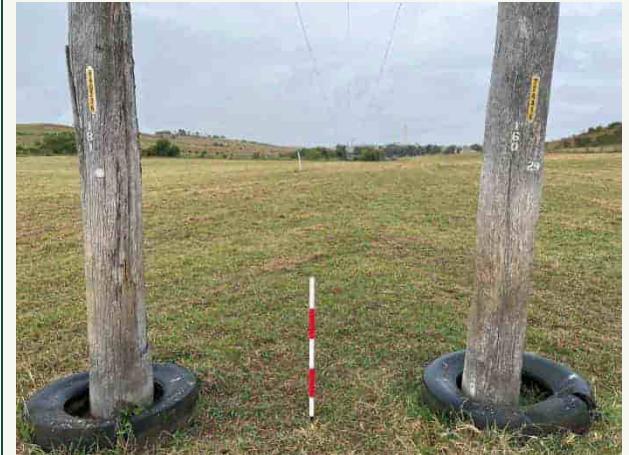


PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 29	Replace Pole	Low visibility and single exposure nearby, within small laneway between cleared pasture fields. Exposure shows introduced gravel, possibly from nearby gravel quarry.	 <p>Picture 71: View of PPS 29 looking south from the small laneway between two pasture fields.</p> <p>Picture 73: View from PPS 29 looking north.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
			 <p>Picture 72: View of introduced gravel surface at this laneway at PPS 29.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 30	Replace Pole	Low visibility and no exposures nearby, within cleared pasture.	 <p>Picture 74: View of PPS 30 looking south, showing the location of this site within open pasture.</p>  <p>Picture 75: View of ground surface at PPS 30 looking north.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 31	Replace Pole	<p>Pole located on eroding northern river bank of Foot Onslow Creek, within AHIMS site #52-2-4675.</p> <p>Severe erosion has revealed the local stratigraphy and provides a cross section of the embankment where the poles are installed.</p> <p>Past clearing for agricultural purposes has significantly modified this landscape and increased the level of local erosion, evidenced by the encroachment of the eroded embankment on the poles, with their stability currently in jeopardy.</p>	  <p>Picture 76: View of PPS 31 looking south, showing the infrastructure installed at this location.</p> <p>Picture 79: View of PPS 31 looking south. Note that Foot Onslow Creek is immediately south of these poles.</p>



Picture 77: View of PPS 31 showing the proximity of eroded terrain to the footings of these power poles.



Picture 80: View looking east at PPS 31 showing the creek bank in relation to this site.



Picture 78: View across the creek bed looking north towards PPS 31. The severe amount of erosion at the creek bank is clear from this image.



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 32	Replace Pole	<p>Low visibility and limited exposures nearby, within cleared pasture/roadway.</p> <p>This pole is not within an AHIMS site boundary, but is close to Foot Onslow Creek, although not in this watercourse's riverbank, unlike PPS 31.</p> <p>There is significant evidence of local disturbance at this site, with a agricultural waste dump site in close proximity to the pole in an eroded section of riverbank.</p> <p>The riverbank closest to this site was searched for evidence of Aboriginal Objects however none were found</p>	 <p>Picture 81: View from PPS 32 looking north towards PPS 31</p>  <p>Picture 84: View of PPS 32 looking east towards Foot Onslow Creek.</p>



Picture 82: View looking northwest through trees towards PPS 32

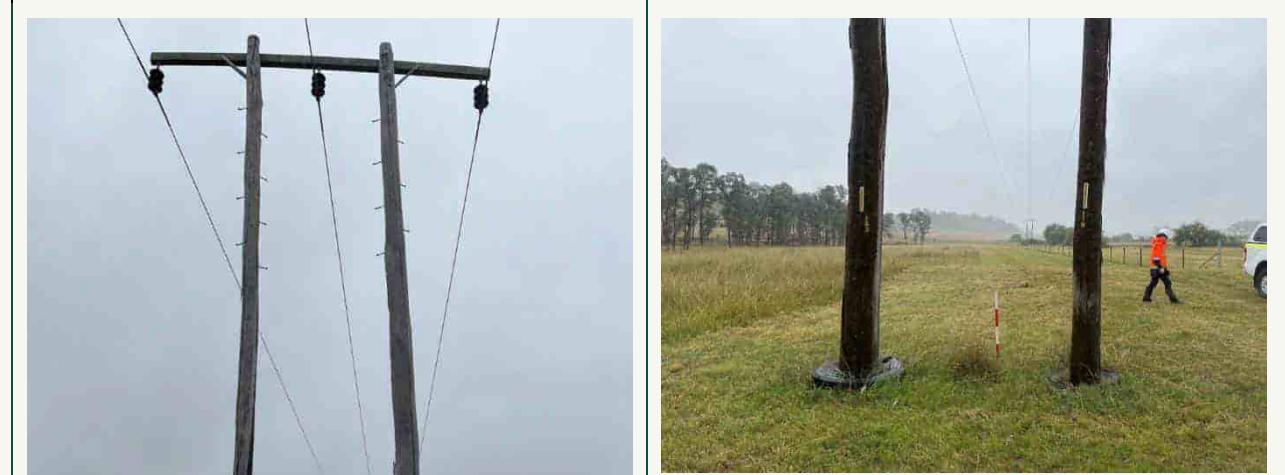


Picture 85: View of agricultural waste dump near to this PPS in a section of creek bank.



Picture 83: View of exposure area on the creek bank near to PPS 32



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 33	Replace Pole	Low visibility and no exposures nearby, within cleared pasture/ grass laneway on the side of a ploughed field.	 <p data-bbox="855 794 2140 1332">Picture 86: View looking south towards the southern connection point at PPS 34. Picture 87: View looking north at this power pole site, showing the placing of this site within open pasture.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
PPS 34	Existing Pole No works planned for this PPS - this is the connection with the existing newly installed powerlines at the southern extent of the Nepean Feeder Line.	This site is the final southern connection point of the Nepean Feeder Line - it has a newly installed steel power stanchion of the design planned to be used for all the new/replacement poles in the PPS. No assessment required at this location.	 <p data-bbox="866 1144 1477 1219">Picture 88: View of new steel poles already in place at the southern connection point.</p>



PPS Name	Nature of works at PPS	Observations and Description of Physical Features	Photo Record
Alternate Access point - Foot Onslow Creek crossing	Reinforcement of this crossing point with steel plates	<p>This crossing point is located outside to the east of PPS33 and provides alternate access to the alignment over paddocks and across Foot Onslow Creek. At present the crossing has no fixed surface and has a unstable muddy bottom, but may have previously had a concrete ford in place. The works plans are for steel plates to be placed to create a ford across the stream.</p> <p>Picture 89: View of existing crossing of Foot Onslow Creek, note the muddy surface which is unsuitable for access by maintenance plant.</p>	  <p>Picture 90: Alternate view looking northwest showing the debris left in the creek bed, potentially from a previous concrete ford (right of vehicle) and of corrugated iron (to the left). Elements of the previous possible ford structure remain in situ in the stream.</p>



Contact us

info@niche-env.com
niche-env.com

NSW Office

Sydney, Dharawal Country
02 9630 5658
L2, 93 George St
Parramatta NSW 2150

QLD Office

Brisbane
Tumbulgum Jagera Country
07 2104 8594 Ground Floor,
Suite 3 North Tower
527 Gregory Terrace
Fortitude Valley QLD 4006

VIC Office

Melbourne:
Watsonia Country
0488 224 036
Level 3, 162 Collins Street
Melbourne VIC 3000

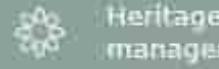
Our Expertise



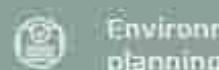
Natural capital
and offsetting



Ecology



Heritage
management



Environmental
planning,
approvals, and
management



Spatial Services

Annex 6. Environmental Protection Authority search

nsw **epa** Your environment Reporting, incidents and recovery programs Licensing and Regulation Working together About us

Public registers

+ POEO Public Register
- Contaminated land record of notices
 About the record of notices
 List of notified sites
 Tips for searching
 Disclaimer
 Dangerous goods licences
 Pesticide licences
 Radiation licences

Home Public registers Contaminated land record of notices

Search results

Your search for: LGA: WOLLONDILLY SHIRE COUNCIL

Suburb	Address	Site Name	Notices related to this site
MALDON	Lot 2 Wilton Park ROAD	Maldon Works	1 current

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Annex 7. Notifications and responses (consultation)

22 November 2024

Andrew Carfield
General Manager
Camden Council
PO Box 183
Camden NSW 2570
Via email: mail@camden.nsw.gov.au

Dear Mr Carfield,

Re: Endeavour Energy – REF Application - Feeder 85J Nepean to Menangle

Endeavor Energy (EE) is working to complete a Review of Environmental Factors (REF) for the proposed upgrade project (NPR-000002) on Feeder 85J between Nepean Zone Substation and Menangle (Figures attached).

The proposed works will involve the replacement of existing power poles, removal of old power poles, and establishment of new power poles (hereafter referred to as the Project). The transmission line will also be replaced with a new 66K feeder to support increased supply, following rezoning of the area to establish new homes, and local centres.

The existing feeder is located between Nepean Transmission Substation, 156 Springs Road, Spring Farm NSW 2570, to Menangle Road, Menangle NSW 2568. The upgrade of the feeder will occur over approximately 7.6 kilometres (km) of existing transmission line. The works will involve:

- Existing substation at 156 Springs Road, Spring Farm to be connected to Power Pole Site 1 (PPS-1) via trenching or underboring. Using an existing feeder bay, new footings may be required.
- Replacement of up to 28 poles, removal of up to three poles, and construction of up to four poles in new locations. Works will be within 20 m of new and existing pole locations.
- Replacement of existing overhead conductors and associated overhead line fittings.

The Project is located within the existing EE feeder alignment which runs through private landholdings including Elizabeth Macarthur Agricultural Institute (EMAI), Camden South.

Upgrade of the feeder is proposed by EE to meet increasing electricity demand in the Greater Macarthur Area in the Camden and Wollondilly Shire Local Government Area. Notification has been sent to both Councils.

In accordance with Part 5 of the NSW Environmental Planning and Assessment Act 1979, Endeavour Energy has prepared a draft Review of Environmental Factors (REF) for the proposal. The REF provides the proposal description and justification, an overview of the

relevant legislative framework, the environmental impact assessment and mitigation measures to be applied during construction and operation of the proposal.

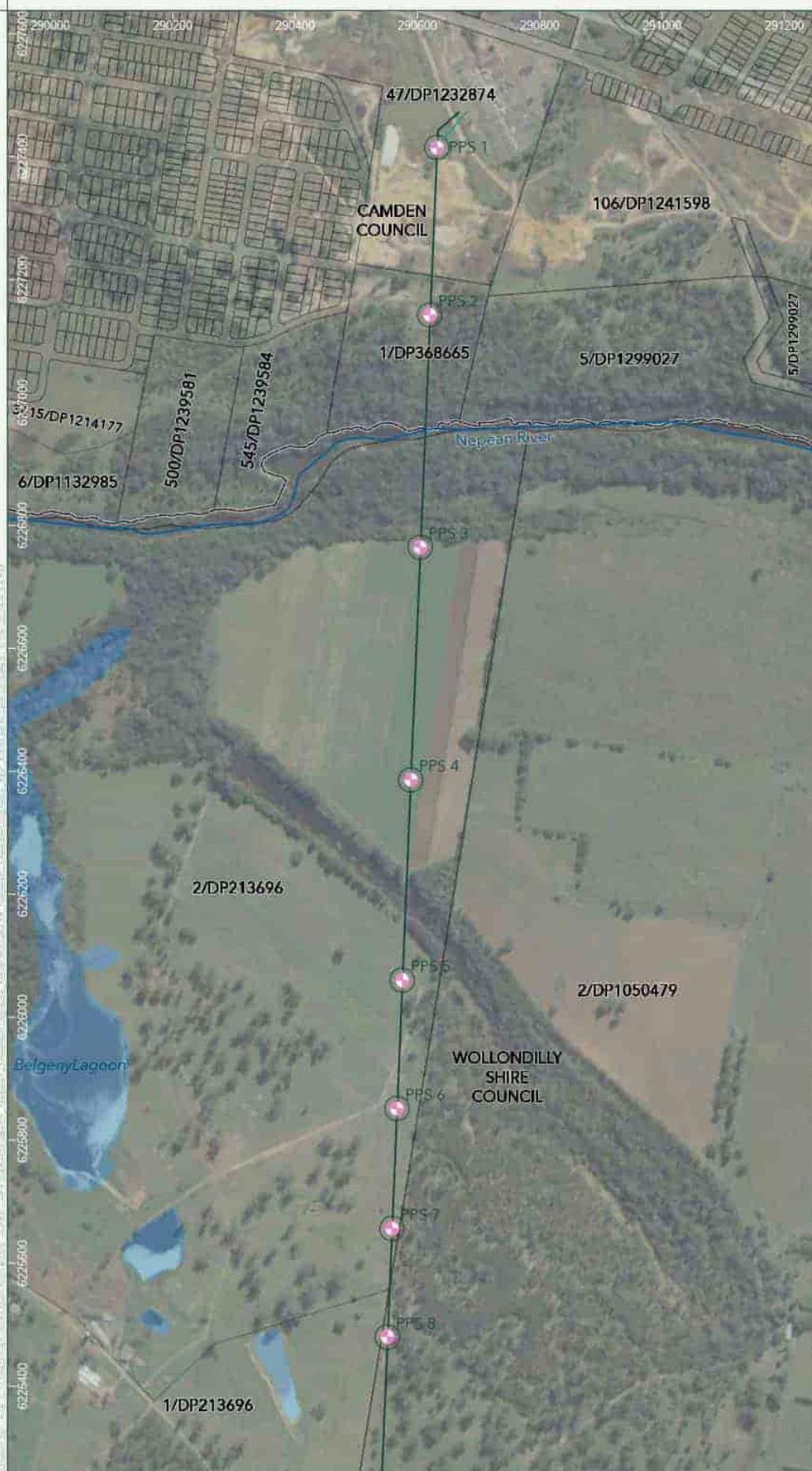
The works are expected to commence in the first quarter of 2025. In accordance with Section 45(4) of the NSW Electricity Supply Act 1995, Endeavour Energy wishes to notify Council of the proposal, and provide an opportunity for the Council to make a submission in relation to the proposal.

Notification of the exact construction date and any necessary precautions will be provided to the Council and neighbouring properties prior to commencement.

Sincerely,



Nigel Harpley
Environmental Specialist
Endeavour Energy
0461 397 111
nigel.harpley@endeavourenergy.com.au



■ Proposed works area
 ■ Proposed works linear
 — Main alignment
 — Trench
 ■ Proposed works point
 ♦ Replace Pole
 ■ Hydrography
 ■ Watercourse
 — Perennial Stream
 ■ Waterbody
 ■ Administrative and Property Boundaries
 ■ Lot
 ■ Local Government Area

Niche

Figure 2-1

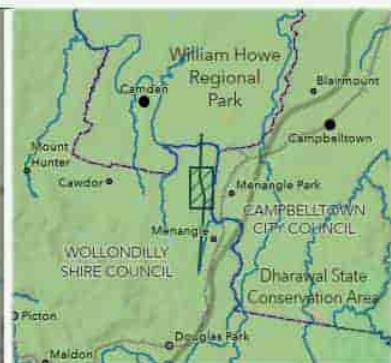
Site Plan

Nepean Zone Substation Feeder Upgrade Client: Endeavour Energy

Niche PM: Luke Baker
Niche Proj. #: 8459

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WGS 1984 Web Mercator

Native Office of Environment and Heritage's BioNet Atlas, which holds the data from a number of providers. Date Obtained: 13/12/2023. © Hi-Resat: Esri, Geoscience Australia, NASA, NOAA, USGS; World Ocean Base: NOAA, Geoscience Australia, Esri, Garmin, NaturalVue, public NSW; Imagery: © Department of Customer Service 2023/World Hillshade: Esri, Geoscience Australia, NASA, NOAA, USGS; Watercourses, Waterbodies, Road and Rail alignments: Protected Area of NSW © Spatial Services 2021. © Niche uses GDA2020 as standard for all project related data, in order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984-Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid ticks marks and labels shown around the border of the map are preserved in GDA2020, using the relevant MGA zone.



Proposed works area
 Proposed works linear
 Main alignment
 Proposed works point
 New Pole
 Remove Pole
 Replace Pole
 Hydrography
 Watercourse
 Perennial Stream
 Waterbody
 Administrative and Property Boundaries
 Lot
 Local Government Area

Niche

Figure 2-2

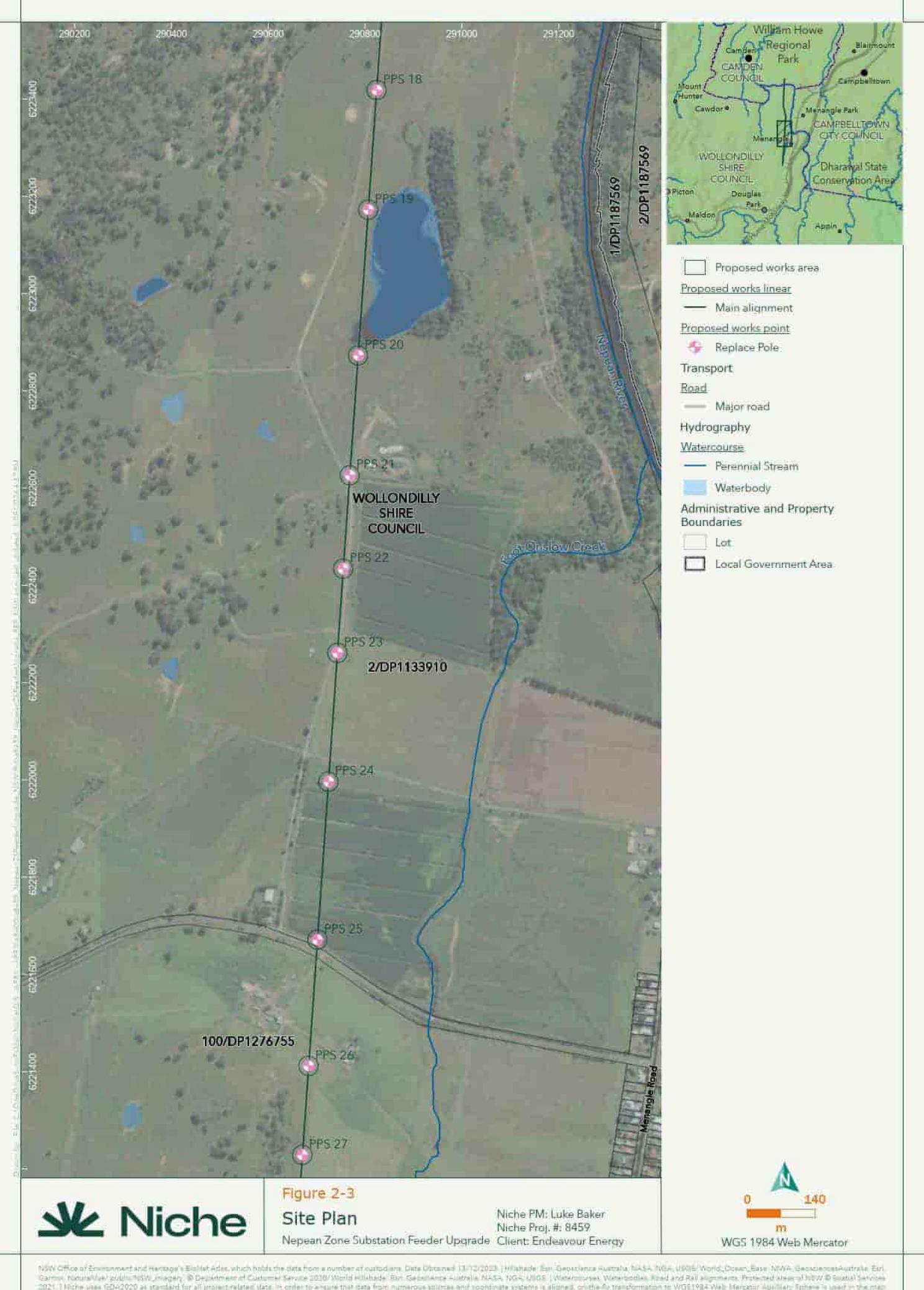
Site Plan

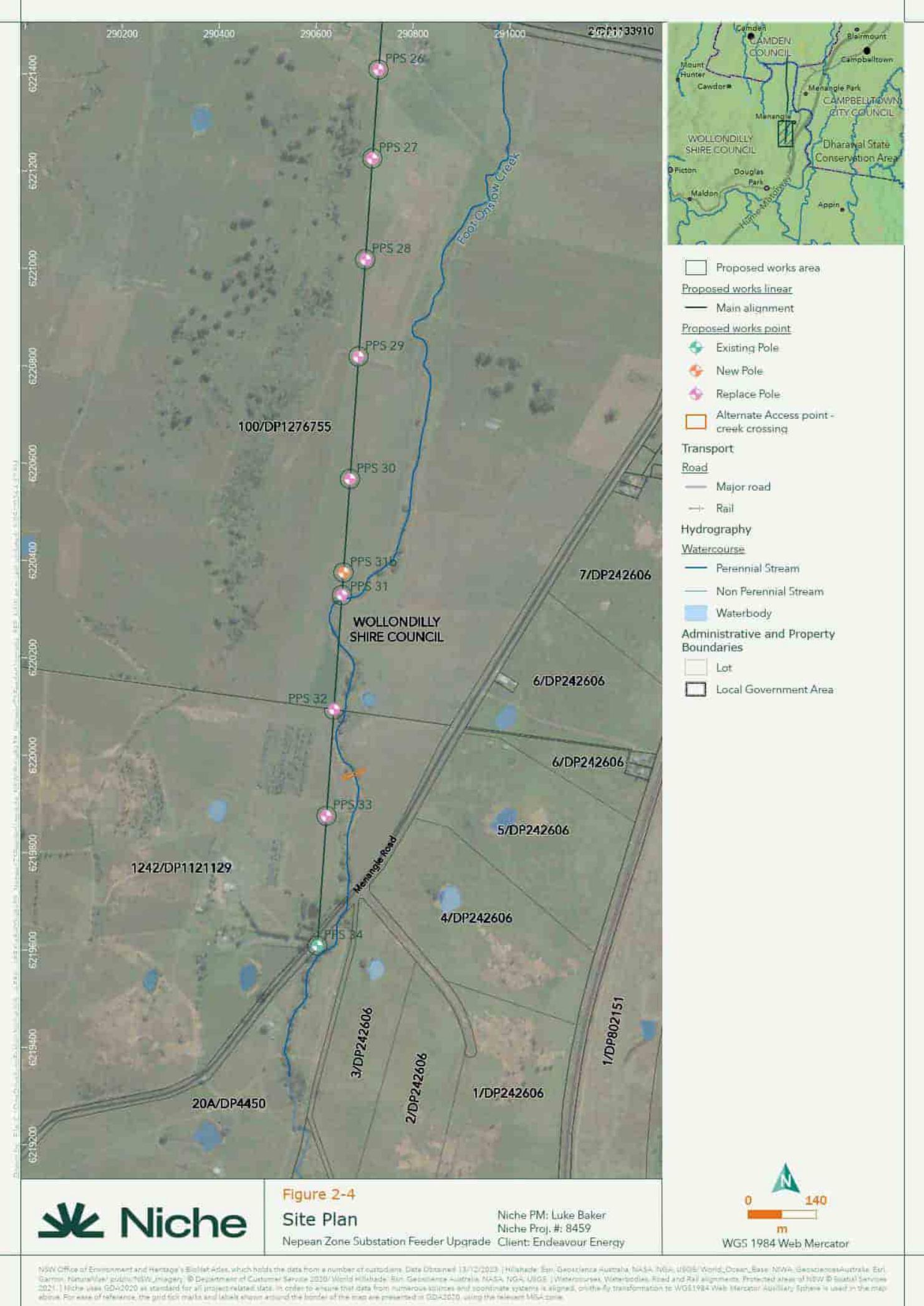
Nepean Zone Substation Feeder Upgrade Client: Endeavour Energy

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NSW Office of Environment and Heritage's BioNet Atlas, which holds the data from a number of custodians. Data Obtained: 13/12/2023. (Habitat: Bar, Geoscience Australia, NASA, INGA, USGS, World_Drone_Base, NWA, GeoscienceAustralia, Esri, Garmin, NaturalVue, publicNSW_Migratory) © Department of Customer Service 2023/World_Habitat_Skin_Geoscience_Australia, NASA, INGA, USGS, Watercourses, Waterbodies, Road and Rail alignments, Protected areas of NSW (© Spatial Services 2021). Niche uses GDA-2020 as standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are presented in GDA2020, using the relevant MSA zone.





22 November 2024

Ben Taylor
Chief Executive Officer
Wollondilly Shire Council
PO Box 21
Picton NSW
Via email: council@wollondilly.nsw.gov.au

Dear Mr Taylor,

Re: Endeavour Energy – REF Application - Feeder 85J Nepean to Menangle

Endeavor Energy (EE) is working to complete a Review of Environmental Factors (REF) for the proposed upgrade project (NPR-000002) on Feeder 85J between Nepean Zone Substation and Menangle (Figures attached).

The proposed works will involve the replacement of existing power poles, removal of old power poles, and establishment of new power poles (hereafter referred to as the Project). The transmission line will also be replaced with a new 66K feeder to support increased supply, following rezoning of the area to establish new homes, and local centres.

The existing feeder is located between Nepean Transmission Substation, 156 Springs Road, Spring Farm NSW 2570, to Menangle Road, Menangle NSW 2568. The upgrade of the feeder will occur over approximately 7.6 kilometres (km) of existing transmission line. The works will involve:

- Existing substation at 156 Springs Road, Spring Farm to be connected to Power Pole Site 1 (PPS-1) via trenching or underboring. Using an existing feeder bay, new footings may be required.
- Replacement of up to 28 poles, removal of up to three poles, and construction of up to four poles in new locations. Works will be within 20 m of new and existing pole locations.
- Replacement of existing overhead conductors and associated overhead line fittings.

The Project is located within the existing EE feeder alignment which runs through private landholdings including Elizabeth Macarthur Agricultural Institute (EMAI), Camden South.

Upgrade of the feeder is proposed by EE to meet increasing electricity demand in the Greater Macarthur Area in the Camden and Wollondilly Shire Local Government Area. Notification has been sent to both Councils.

In accordance with Part 5 of the NSW Environmental Planning and Assessment Act 1979, Endeavour Energy has prepared a draft Review of Environmental Factors (REF) for the proposal. The REF provides the proposal description and justification, an overview of the relevant legislative framework, the environmental impact assessment and mitigation measures to be applied during construction and operation of the proposal.

The works are expected to commence in the first quarter of 2025. In accordance with Section 45(4) of the NSW Electricity Supply Act 1995, Endeavour Energy wishes to notify Council of the proposal, and provide an opportunity for the Council to make a submission in relation to the proposal.

Notification of the exact construction date and any necessary precautions will be provided to the Council and neighbouring properties prior to commencement.

Sincerely,



Nigel Harpley
Environmental Specialist
Endeavour Energy
0461 397 111
nigel.harpley@endeavourenergy.com.au

4 December 2024

Click to enter Title First name Surname

Click to enter Recipient's company name

Click to enter Recipient's company address

Click to enter Recipient's company address

Click to enter SUBURB STATE POSTCODE

**UPCOMING WORK
IN YOUR AREA**



Dear *Click to enter* Title Surname

Improving electricity supply in your area

Endeavour Energy is responsible for building, maintaining and operating an electricity network that connects 2.7 million people to traditional and renewable energy sources in homes and businesses across Sydney's Greater West, the Blue Mountains, Southern Highlands, the Illawarra and the South Coast.

We're focused on providing reliable electricity supply as we continue to invest in the upgrade of electricity infrastructure leveraging the latest technology to build a safer, reliable and more resilient network.

Electricity supply to the Greater Macarthur Area - Nepean Zone Substation Feeder Upgrade

Endeavour Energy supply electricity to the Greater Macarthur Area and require upgraded feeders within existing transmission lines to meet increasing electricity demand throughout the Southern Macarthur Growth Area. To complete this, Endeavour Energy propose the replacement of existing power poles, removal of old power poles, and establishment of new power poles within the existing feeder line located between Nepean Transmission Substation, 156 Springs Road, Spring Farm NSW 2570, to Menangle Road, Menangle NSW 2568.

The transmission line will also be replaced with a new 66K feeder to support increased supply, following rezoning of the area to establish new homes, and local centres.

The upgrade of the feeder will occur over approximately 7.6 kilometres (km) of existing transmission line. The works will involve:

- Existing substation at 156 Springs Road, Spring Farm to be connected to Power Pole Site 1 (PPS-1) via trenching or underboring. Using an existing feeder bay, new footings may be required.
- Replacement of up to 28 poles, removal of up to three poles, and construction of up to four poles in new locations. All works will be within 20 m of new and existing poles.
- Replacement of existing overhead conductors and associated overhead line fittings.

Review of Environmental Factors

Endeavour Energy, being the approved network operator and the organisation behind this proposal, will conduct a thorough evaluation of the project. This evaluation will consider all aspects, including environmental, technical, financial, and impacts on the community. In line with the NSW Environmental Planning and Assessment Act 1979 (EP&A Act), Endeavour Energy will prepare a draft Review of Environmental Factors (REF) which will outline:

- the proposal description and justification (including benefits and objectives)
- an overview of the relevant legislative framework
- consultation completed during the assessment phase
- consideration of alternatives
- the environmental impact assessment and mitigation measures to be applied during construction and operation of the proposal.

The initial draft of the Review of Environmental Factors related to this proposal will be available online at the Endeavour Energy website once completed.

If approved, a Decision Statement, containing the development consent conditions and authorising the construction works, will be issued by Endeavour Energy for the development and will be available online

About the work ahead – timing and construction impacts

Following approval, we plan to initiate preparatory work in February 2025 and aim to finish the construction process by June 2026. However, this timeline may be subject to changes due to unforeseen factors like adverse weather conditions or storms.

The work involved should not require any power outages at your property other than for a short period of time when generators are connected. Prior notification will be given for any outages. Road users might experience occasional disruptions while the work is in progress. To manage this, traffic control measures will be enforced as necessary. If construction activities are scheduled near your property, we will ensure you receive advanced notice via SMS and/or post. We will also put in place measures to limit disruption as much as possible.

Questions or concerns

Community input and feedback is important and encouraged throughout the course of this project. For further information, or to provide feedback, please visit our website (linked above) and do not hesitate to contact me within the next 21 days referencing “Nepean Zone Substation Feeder Upgrade”.

Michelle Butler
Environmental Specialist

 **131003**
 environment@endeavourenergy.com.au

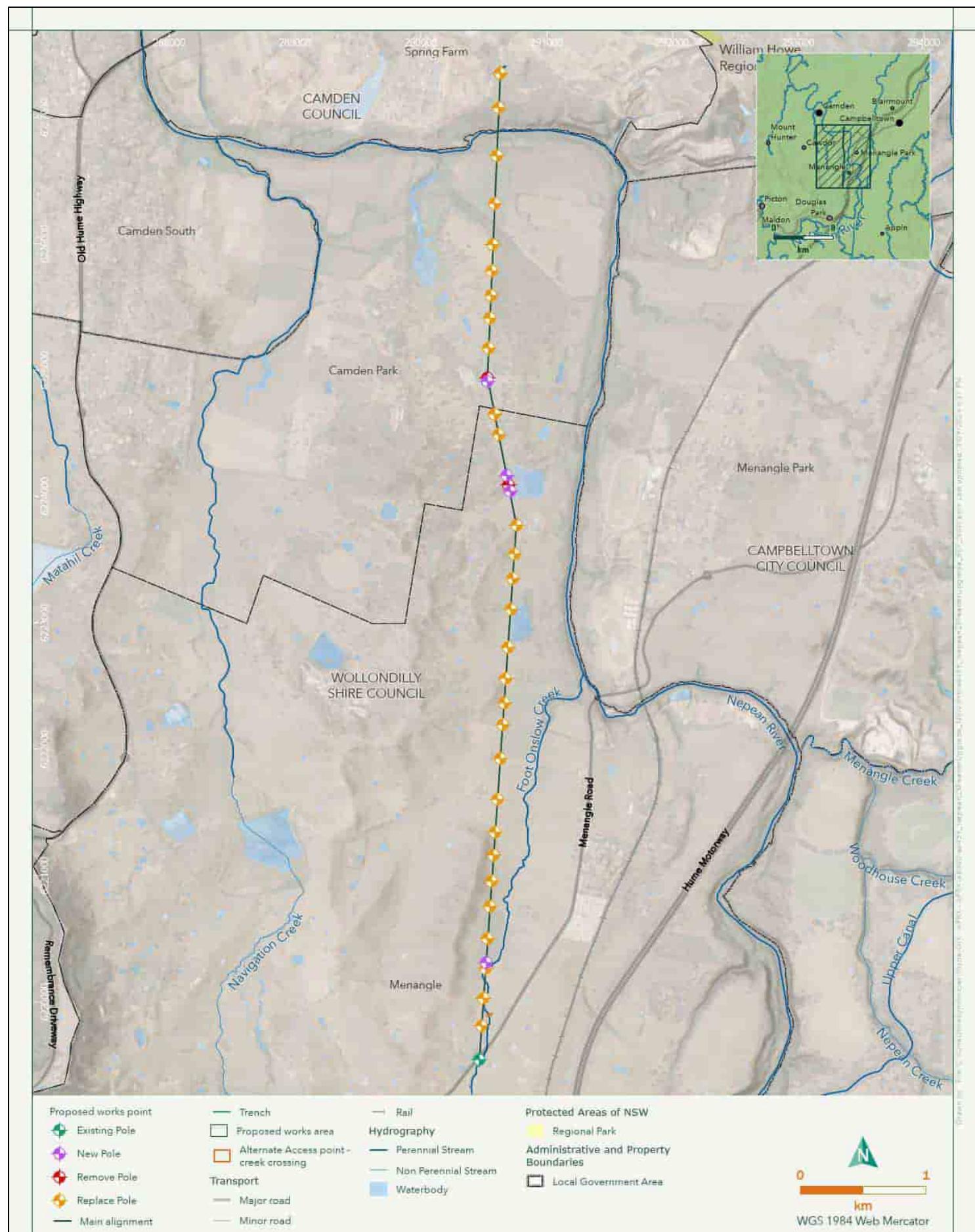


Figure 1: Location Map

Annex 8. Summary of mitigation measures

Environmental Aspect	Mitigation Measures
Endeavour Energy (General requirements)	<p>The Project or activity shall be carried out consistent with the REF</p> <p>Prior to any work commencing, the Endeavour Energy Project Manager and the Principal Construction Contractor must obtain the project Decision Statement and familiarise themselves with its conditions.</p> <p>A Construction Environmental Management Plan (CEMP), or equivalent, shall be prepared addressing the environmental safeguards identified in the REF and any appropriate industry standards. The CEMP shall be submitted to the Environmental Services Team for review and approval prior to on-ground works commencing.</p> <p>A copy of the Project REF Decision statement and any other pertinent certificates/agreements, permits and documentation to be relied upon shall be always available to the Project team/crews during construction.</p> <p>All works to be carried out in accordance with the approved Project design.</p> <p>The Project Manager/Construction Contractor is to prepare a dilapidation report or photographic record as deemed necessary of any Council, private or Endeavour Energy assets which have the potential to be damaged by the Project.</p> <p>All works shall be consistent with Endeavour Energy's Environmental Management System (EMS).</p>
Land Use	<p>All impacted sensitive receivers and landowners within or adjacent to the works will be notified in writing 7 to 14 days prior to the commencement of construction works. Notification will include:</p> <ul style="list-style-type: none"> ▪ Proposed commencement date ▪ Brief of scope of works ▪ Anticipated duration of the works ▪ 24-hour contact details of the Project Manager or other appropriate contact person in the event of any complaints ▪ Details on proposed blocking or impairing access to driveways and/or residences/businesses (if any) <p>Evidence of this notification should be stored in the Project file. This notification will be required in addition to any notification carried out during the preparation of this REF.</p>
	<p>On completion of the work, the existing easement associated with the replacement of fibre optic works, shall be stabilised and returned to as close to original condition or as otherwise agreed with the landowner.</p>
Geology and Soils	<p>An Erosion and Sediment Control Plan (ESCP) shall be prepared as part of the CEMP. All erosion and sediment control measures shall be designed, implemented and maintained in general accordance with <i>Managing Urban Stormwater: Soil and Construction Volume 1</i> (Landcom, 2004) ('the Blue Book') (particularly Section 2.2). The ESCP shall include stockpiles, stormwater run-off, trees, site boundaries, site access and storage areas. Exposed surfaces shall be kept to a minimum to limit the potential for erosion and dust generation.</p> <p>Inspections of the erosion and sediment controls will be on a periodic basis and at opportunistic times such as following rainfall events that cause run-off. The inspection program will record the following:</p> <ul style="list-style-type: none"> • Condition of rehabilitation areas (including records of any slumping) • Condition of sediment and erosion control structures • Whether sediment or other pollutants are leaving the site or have the potential to do so • Maintenance requirements Location(s) where sediment is disposed. • Pre-rainfall inspection to ensure that the controls are in place and working.
	<p>Vegetation disturbance is to be minimised. Activities will be preferentially undertaken in cleared or weedy areas or in areas that have been subject to previous disturbance or are themselves existing access tracks.</p> <p>Soil compaction will be minimised by utilising existing access tracks where possible and minimising vehicle movements along access tracks to only that required.</p>

Environmental Aspect	Mitigation Measures
	<p>Sites which are subject to levelling will be re-contoured to match the surrounding topography post development.</p> <p>All chemicals or other hazardous substances shall be stored in bunded and weatherproof facilities away from drainage lines. The capacity of the bunded area shall be at least 110% of the largest chemical volume contained within the bunded area.</p> <p>A spill kit will be located at each site to manage hydrocarbon spills (if there are any) and be used in the event of a spill.</p> <p>Any imported fill shall be certified at source location as pathogen and weed free Excavated Natural Material (ENM) or Virgin Excavated Natural Material (VENM) in accordance with the POEO Act and the <i>Protection of the Environment (Waste) Regulation 2014</i> (POEO Waste Regulation).</p> <p>Any sediment removed from the site that is potential acid sulphate soil is to be tested and treated to ensure compliance with waste classification guidelines for offsite disposal (EPA 2014).</p> <p>Any material or soil suspected of showing evidence of contamination shall be sampled and analysed by a NATA Registered laboratory and managed in accordance with the <i>Waste Classification Guidelines</i> (EPA 2014), the Guidelines on the <i>Duty to Report Contamination</i> (EPA 2015) and the <i>Contaminated Land Management Act 1997</i>.</p> <p>Spoil management and dewatering of worksites will be managed in accordance with the following EE Standards and the Environmental Guidelines Handbook:</p> <ul style="list-style-type: none"> EMS 0007 – Waste Management EMS 0008 - Environmental Incidents Response and Management EMS 0013 - Spoil Management EMS 0014 – Dewatering worksites. <p>Existing roads and, access tracks and rail corridor are to be used for vehicles and equipment to gain access to the sites.</p> <p>New access tracks shall be constructed with erosion and sediment controls.</p>
Hydrology and Water Quality	<p>The drainage lines and waterbodies would be avoided by the Project.</p> <p>Spoil shall be stockpiled in a manner so as to avoid the possibility of sediments entering watercourses (including stormwater drains) or migrating off-site.</p> <p>Any bulk fuel or hazardous material transport vehicles shall be parked on level ground a minimum of 40 m away from watercourses (including drainage lines).</p> <p>Any groundwater encountered would be dewatered, collected and disposed of appropriately. If minor dewatering is required, the management of discharge water shall be documented in the CEMP and be in accordance with EE procedure EMS0014. Discharge water should be limited to vegetated, grassed areas, away from waterways, and within the feeder line overhead alignment. If the discharge water is highly turbid, dewatering through a filter sock (or similar) shall be considered, where appropriate, to minimise sedimentation.</p>
Flora	<p>Disturbance would be restricted to the disturbance of ground layer within some slashing of native shrubs and grasses. No trees would be removed.</p> <p>Soil disturbance would be minimised and soil that is disturbed would be replaced according to the natural profile of the soil (i.e. topsoil reinstated as the top layer).</p> <p>All actions should be in accordance with EE's "Pests, Weeds and Diseases" section of the EE Environmental Guidelines Handbook.</p>
Fauna	<p>All large trees, stags and fallen hollow logs would be avoided.</p> <p>The removal of hollow bearing trees is not anticipated to be required</p>
Noise and Vibration	<p>Construction hours must be limited to standard construction working hours (Monday to Friday: 7 am to 6 pm, Saturday: 8 am to 1 pm, No work on Sundays or public holidays), unless otherwise approved. Any out-of-hours-works must be conducted in accordance with the requirements of EE's Environmental Guidelines Handbook.</p> <p>All vehicles and other equipment will be switched off when not in use. Vehicles must adhere to speed limits.</p> <p>Limit concurrent use of machinery where possible.</p>

Environmental Aspect	Mitigation Measures
	<p>Minimising noisy activities in proximity to the residential premises where feasible.</p> <p>Where maximum vibration values in DEC (2006) cannot be met after all feasible and reasonable measures have been applied, any unacceptable impacts may be dealt with between the operator and the affected community. Negotiation should be made available to those people whose amenity is potentially affected by non-achievement of the relevant vibration criteria.</p>
	<p>Where minimum distances outlined in BS 7385 (1993) cannot be maintained, a dilapidation assessment will be required to manage the risk of cosmetic damages within the Study Area.</p> <p>Minimise soil disturbance. Water carts to be used if necessary.</p> <p>Weather conditions to be monitored. Works are not to take place in extreme wind conditions (> 40 km/h).</p> <p>All vehicles, plant and equipment are modern, well maintained and fit for purpose. Emissions from these items will be regulated by their standard exhaust systems.</p> <p>All vehicles and other equipment will be switched off when not in use. Vehicles must adhere to speed limits.</p> <p>Limit concurrent use of machinery where possible.</p> <p>Where minimum distances outlined in BS 7385 (1993) cannot be maintained, a dilapidation assessment will be required to manage the risk of cosmetic damages within the Study Area.</p>
	<p>Traffic and Accessibility</p> <p>Ensure that a Traffic Management Plan is prepared and followed.</p> <p>Traffic control is to be used to maintain continued traffic access where feasible.</p> <p>The temporary modification to traffic will be as minimal as possible.</p> <p>Any Transport for NSW (TfNSW) Permits required for the lane closures will be obtained prior to the commencements of the works.</p> <p>Emergency services and public transport methods will be notified.</p> <p>After significant rainfall of < 10 mm/24 hrs, undertake inspection of the access track to determine if use of the track at this time would potentially result in a detrimental effect, and if required allow for the road to sufficiently dry out.</p> <p>Traffic, transportation and access mitigation and management strategies shall be documented and implemented in accordance with the CEMP and updated as required.</p>
	<p>Visual Amenity</p> <p>The canopy trees within the TEC will be avoided.</p> <p>All actions should be in accordance with the best Practice weed management guidelines (DPI 2021).</p> <p>All construction plant, equipment, waste and excess materials shall be contained within the designated boundaries of the work site and shall be removed from the site following the completion of construction.</p> <p>Disturbed areas would be rehabilitated to previous conditions if feasible.</p> <p>Materials used for the Project would be consistent with the existing materials where possible.</p>
<p>Aboriginal cultural heritage and archaeology</p>	<p>All site workers and contractors should be inducted to the area and informed of their obligations under the <i>National Parks and Wildlife Act 1974</i>.</p> <p>In the event that previously unknown Aboriginal object(s) and/or sites are discovered during the proposed activity, work must stop. A temporary fence is to be erected around the Aboriginal cultural heritage site, with a buffer zone of at least 10 m around the known edge. Contact an EE Environmental Specialist as further assessment may be required. The EE Environmental Specialist will be responsible for notifying Heritage NSW and Aboriginal Stakeholders. A qualified archaeologist may also be required to assess the find. Works should not proceed without advice from Heritage NSW or an appropriately qualified archaeologist.</p> <p>In the unlikely event that suspected human remains are encountered during the proposed activity, all work in the area that may cause further impact, must cease immediately and:</p> <ul style="list-style-type: none"> The location, including a 10 m curtilage, should be secured using barrier fencing to avoid further harm. The NSW Police must be contacted immediately.

Environmental Aspect	Mitigation Measures
	<ul style="list-style-type: none"> • No further action is to be undertaken until the NSW Police provide written notification to the Proponent. • If the skeletal remains are identified as Aboriginal, the Proponent or their agent must contact Heritage NSW, previously known as the Office of Environment and Heritage (OEH) Enviroline on 131 555; and representatives of the Gandangara Local Aboriginal Land Council (ILALC). • No works are to continue until Heritage NSW provides notification to the Proponent or their Agent.
Historic Heritage	<p>A Section 60 Approval permit must be obtained for the proposed works in accordance with the Heritage Act 1977. Prior to works commencing, an application must be submitted to Heritage NSW with the SoHI (Annex 5) attached, and the conditions in the S.60 permit approval letter from Heritage NSW followed when received.</p> <p>Stop work in case of unexpected archaeological finds. The following procedure must be implemented as part of the normal work methods, and then followed in the event of the unexpected find of suspected archaeological material during the works:</p> <ul style="list-style-type: none"> • Stop work in a 20 m area around the unexpected find and secure this area using barrier fencing (or similar) to avoid further harm. • Notify a suitably qualified archaeologist and engage them to assess the suspected material to determine the historical significance of the find. • If assessed to be not culturally significant or a relic, proceed with works with caution. If assessed to be of cultural value or a relic, works must cease in this portion of the site (within 100 m of the find) and the NSW Heritage Council and Local Government Council must be contacted as per S.146 of the Heritage Act 1977. Any directions or responses from these organisations should be considered. Additional works of this type could include salvage excavation, testing, further monitoring, and archival recording.
Generation of waste and hazardous materials	<p>Avoid the generation of waste and recycle and reuse whenever possible.</p> <p>Waste mitigation and management strategies shall be documented in the Work Instructions.</p> <p>All waste, including surplus soils, which cannot be reused shall be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA 2014), removed from the site and disposed of at a facility that can lawfully accept the waste in accordance with the POEO Act and POEO Waste Regulation.</p> <p>Invasive weed material to be disposed of or treated appropriately as per EE's "Pests, Weeds and Diseases" section of the EE Environmental Guidelines Handbook and EMS0004.</p>



Contact Us

Niche Environment and Heritage

02 9630 5658

info@niche-eh.com

NSW Head Office – Sydney
PO Box 2443 North Parramatta
NSW 1750 Australia

QLD Head Office – Brisbane
PO Box 540 Sandgate
QLD 4017 Australia

Sydney
Brisbane
Cairns
Port Macquarie
Illawarra
Coffs Harbour
Central Coast
Gold Coast
Canberra



Our services

Ecology and biodiversity

Terrestrial
Freshwater
Marine and coastal
Research and monitoring
Wildlife Schools and training

Heritage management

Aboriginal heritage
Historical heritage
Conservation management
Community consultation
Archaeological, built and landscape values

Environmental management and approvals

Impact assessments
Development and activity approvals
Rehabilitation
Stakeholder consultation and facilitation
Project management

Environmental offsetting

Offset strategy and assessment (NSW, QLD, Commonwealth)
Accredited BAM assessors (NSW)
Biodiversity Stewardship Site Agreements (NSW)
Offset site establishment and management
Offset brokerage
Advanced Offset establishment (QLD)