

Menangle Pedestrian Bridge over the Main Southern Railway Line

Review of Environmental Factors

November 2023



<https://thevillagecommunity.mirvac.com/>

Acknowledgement of Country

Mirvac acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Owners of the lands and waters of Australia, and we offer our respect to their Elders past and present.



Document control

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Related policy and supporting information (Transport for New South Wales)

- [Transport Environment and Sustainability Policy](#)
- [Environment & Sustainability Management Framework](#)

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Glossary

Term	Meaning
ACHA	Aboriginal Cultural Heritage Assessment
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
ALRA	<i>Aboriginal Land Rights Act 1976</i>
ARTC	Australian Rail Track Corporation
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
CEMP	Construction Environmental Management Plan
CTMP	Construction Traffic Management Plan
DDA	<i>Disability Discrimination Act 1992 (Commonwealth)</i>
DCP	Wollondilly Development Control Plan 2016
dB(A)	Decibel
DSAPT	Disability Standards for Accessible Public Transport
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2021 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>
EPI	Environmental Planning Instrument
ESD	Ecologically Sustainable Development
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
LEP	Wollondilly Local Environmental Plan 2011
LGA	Wollondilly Shire Local Government Area
Mirvac Homes (NSW) Pty Ltd	Mirvac
MNES	Matters of National Environmental Significance
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
PSI	Preliminary Site Investigation
RIM	Rail Infrastructure Manager
REF	Review of Environmental Factors
SEPP	State Environmental Planning Policy
SoHI	Statement of Heritage Impact
Sturt Noble	Sturt Noble and Associates
SWMP	Soil and Water Management Plan
TEC	Threatened ecological communities
Transport	Transport for NSW

Executive summary

The proposal

Mirvac Homes (NSW) Pty Ltd (Mirvac) proposes to construct a new pedestrian bridge over the Main Southern Railway Line on behalf of Transport for NSW (Transport), located between the intersections of Station Street with Stevens Road to the west, Moreton Park Road to the east, and the existing Menangle Train Station (the Proposal). The proposed activity is situated within the Wollondilly Shire Local Government Area (LGA) and includes part of the road reserve for Station Street, part of the road reserve for Stevens Road, part of Lot 11 DP 1262205 (Main Southern Railway Line), and part of the road reserve of Moreton Park Road. Key features of the Proposal are shown in Figure 0-1 below.

Key features of the Proposal include:

- Construction of a standalone elevated pedestrian footpath and handrail adjacent to the existing road bridge to be in Transport's ownership
- Provision of an easement by Wollondilly Shire Council to maintain the bridge structure within the Council road reserve
- Installation of ramps with siderails and stairs, as well as associated lighting
- Associated vegetation removal
- Installation of subsoil drains and two drainage pits on the western portion of the subject site, and
- Installation of new kerbs and gutters in selected areas.

This REF has been prepared to assess all matters affecting or likely to affect the environment by reason of the construction and operation of the Proposal under the provisions of Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). For the purposes of these works, Mirvac is the proponent and Transport is the determining authority under Division 5.1 of the EP&A Act.

Subject to receiving approval for the works, the intent is to commence construction of the bridge to align with ARTC Possession Windows on the following dates:

- First Priority: 10-13 November 2023, and
- Second Priority: 2-5 February 2024.

The urgency for delivery of this activity is driven by the need to provide safe pedestrian access for local residents and those moving into the area within the Wollondilly Shire region.

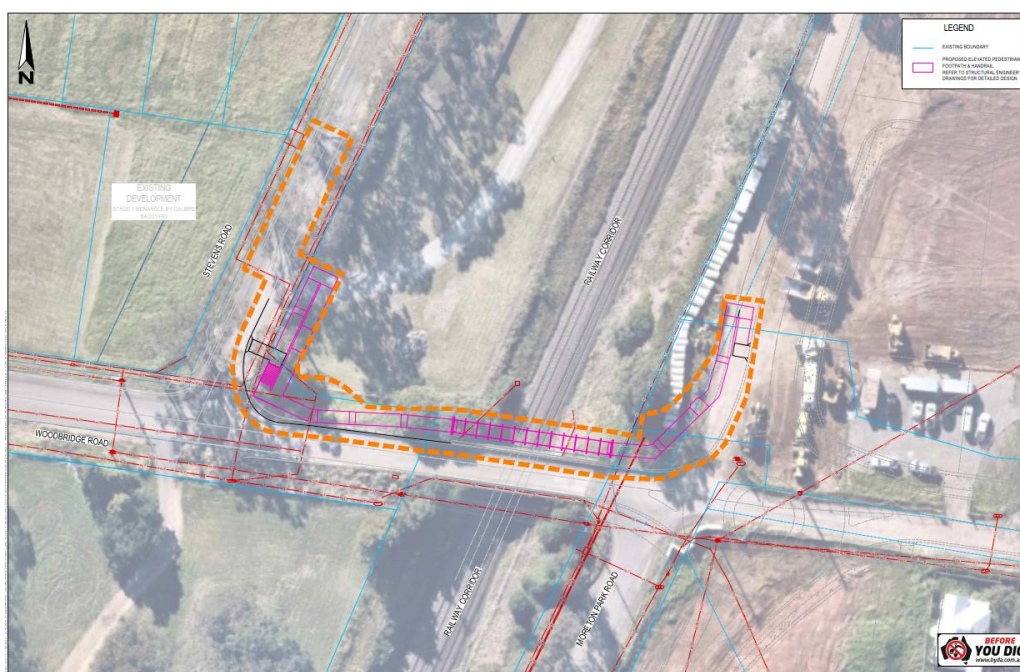


Figure 0-1: The proposed development and extent of works (source: Egis, 2023)

Need for the proposal

The need for the proposed development has arisen from the rezoning of land at Menangle to the east and west of the Main Southern Railway Line on 21 December 2018 under the *Wollondilly Local Environmental Plan 2011* (Amendment No. 28) from RU1 Primary Production Zone to the R2 Low Density Residential Zone, and the subsequent granting of development consent for residential subdivision on the eastern side of the railway line (DA/2020/401/1, granted on 9/11/2021). This development has created a future demand for pedestrian and cyclist access across the rail line. The existing Menangle rail overbridge, linking Station Street to Moreton Park Road, is a narrow, two-lane vehicular bridge that does not provide for safe pedestrian or cyclist crossing, independent of vehicular traffic.

As the developer of the residential subdivision at 1370 Moreton Park Road on the east side of the railway line, Mirvac has undertaken to obtain the necessary approvals for the construction of the pedestrian and cyclist overbridge and construct it, prior to handover to Transport.

The Proposal would ensure that the pedestrian and cyclist overbridge would meet legislative requirements under the *Disability Discrimination Act 1992* (Commonwealth) (DDA) and the *Disability Standards for Accessible Public Transport 2002* (DSAPT), contributing to an accessible path of travel to the Menangle Railway Station, accessed via Stevens Road.

The Proposal is designed to safeguard pedestrians and the community from on-going hazards associated with walking on the existing road along Station Street with no protection from oncoming traffic. Further, no provision is currently provided for disabled access over the bridge to allow safe access to the Menangle railway station. The Proposal would also assist the existing and future residential communities of Menangle situated east and west of the railway station – who will both be burdened by a lack of connection between the two communities as well as open space areas due to the railway line. These factors led to the need to investigate opportunities to improve pedestrian access and movement within Menangle over the Main Southern Railway Line.

Chapter 2 of this Review of Environmental Factors (REF) further describes the need for the Proposal and outlines the options considered in developing the design.

Proposal objectives

The objectives of the Proposal are:

- To construct a new pedestrian bridge adjacent to the existing vehicular bridge with a standalone elevated pedestrian bridge that will be DDA compliant.
- To offer safe pedestrian access across the Main Southern Railway Line, connecting the local community to the central town of Menangle as well as linking Stage 1 with Stages 2, 3, & 4 of Mirvac's master planned residential development.
- To accommodate increased pedestrian traffic resulting from the rezoning of surrounding lands, and future population increase at Menangle.

Options considered

Following the identification of pedestrian access issues between the intersections of Station Street with Stevens Road to the west and Moreton Park Road to the east, a number of options for a pedestrian overbridge were investigated.

Five options were considered for the proposed activity:

- **Option 1:** Demolition of the existing bridge to construct a new wider bridge with the necessary pedestrian paths.
- **Option 2:** Construction of a standalone pedestrian bridge adjacent to the existing bridge.
- **Option 3:** Reconfiguration of the existing bridge to accommodate the necessary access paths.
- **Option 4:** Construction of a bolt on-structure on the southern side of the bridge.
- **Option 5:** Construction of a bolt-on structure to the north side of the bridge, predominantly in public land where the road reserve is sufficiently wide to allow the works without impacting on additional private or public properties.

Initially, the pedestrian crossing was intended to be attached to the existing road bridge. Plans were drawn up for a lightweight steel cantilever frame with fibreglass decking and the existing bridge analysed for effects of this. However, this design was rejected by Transport as the owner of the road bridge due to concerns with the existing road bridge's structural integrity.

Option 2 was selected as it delivers the desired outcome with the least impacts on the operations of the Main Southern Railway Line and adjacent private properties, within the shortest timeframe. More in-depth details of these options are provided in Chapter 2 of this REF.

Statutory and planning framework

The EP&A Act provides for the environmental impact assessment of development in NSW. Part 5, Division 5.1 of the EP&A Act generally specifies the environmental impact assessment requirements for activities undertaken by or on behalf of public authorities, such as Transport, which do not require development consent.

State Environmental Planning Policy (Transport and Infrastructure) 2021 is the primary environmental planning instrument (EPI) relevant to the proposed development and is the key EPI which determines that this Proposal is permissible without consent and therefore is to be assessed under Part 5, Division 5.1 of the EP&A Act.

Section 2.92 of SEPP (Transport and Infrastructure) allows for the development of 'rail infrastructure facilities' *by or on behalf of a public authority without consent on any land*. Section 2.91 defines 'rail infrastructure facilities' as including 'pedestrian and cycleway facilities'. As Transport is a public authority and the proposal is for a rail infrastructure facility under SEPP (Transport and Infrastructure), the proposal is permissible without consent. The environmental impacts of the proposal have therefore been assessed under Part 5, Division 5.1 of the EP&A Act and development consent from Council is not required.

This REF has been prepared to assess the construction and operational environmental impacts of the proposal. The REF has been prepared in accordance with Section 171 of the *Environmental Planning and Assessment Regulation (2021)* (EP&A Regulation).

It should be noted that the proposed linkage is also identified in the indicative pedestrian/cycle network shown in the Wollondilly Development Control Plan as a shared cycleway/footpath.

Chapter 6 of this REF presents the environmental impact assessment for the Proposal in accordance with these requirements.

Community and stakeholder consultation

Mirvac have consulted with the community and key stakeholders throughout the development of the proposal, as an element of the residential subdivision development proposal that forms part of the infrastructure and supports the residential use of land to the east of the Main Southern Railway Line.

Mirvac have engaged the community and stakeholders to increase public understanding of, and participation in, the development of the proposed Residential subdivision development including the Menangle Pedestrian Overbridge which forms an element of the wider residential development in Menangle by Mirvac known as “The Village”. The proposal has benefited from the input of local knowledge, provided through community engagement, which has helped identify issues and opportunities to improve proposal outcomes.

To date, consultation has been carried out through public exhibition, community notification letters and stakeholder meetings regarding the wider proposal. Identified stakeholders include:-

- Government authorities and statutory corporations such as Transport, Wollondilly Shire Council, Australian Rail Track Corporation;
- Political representatives including Wollondilly Shire Councillors, the State member for Wollondilly and the Federal Member for Hume;
- Local community stakeholders such as the purchasers and residents of The Village estate by Mirvac, currently under development and occupation, as well as existing landowners adjacent to the proposed pedestrian bridge site and in its immediate vicinity; and
- The broader community including community organisations (including the Menangle Rural Fire Service and Durham Green Village) and local businesses (such as the Menangle Store) and the local newspaper, the Wollondilly Express.

Information about the proposal for the Menangle Pedestrian Overbridge has been made publicly available at the Mirvac website including a full copy of the REF and its supporting documentation .

Community and stakeholder consultation would continue during the public display of the REF and the community have been invited to provide comments and feedback on the proposal, with key issues being considered and addressed. Details will be summarised within Section 5 of final version of this REF.

Further consultation would continue into the construction period with the community and key stakeholders. The community would be notified of the temporary changes to traffic conditions and traffic delays during the construction period.

Environmental impacts

A range of potential environmental issues and impacts were identified and associated with the proposed activity. The key potential impacts assessed are:

- Designing the construction program to minimise impacts on the rail activities
- Potential for soil displacement during ground-disturbing operation, including erosion and the generation of sediment-contaminated runoff
- Acoustic and vibration impacts on sensitive receivers during construction
- Loss of 1-2 existing native trees (one dead), removal of exotic weeds and understorey
- Addition of new structure within Heritage Conservation Area/Landscape Conservation Area

- Potential (low) for disturbance of relics (European or Indigenous) during works, and
- Disruption to local traffic during construction.

Suitable mitigation measures and management strategies have been identified in this REF to achieve acceptable outcomes during construction and operational phases of the activity. Residual impacts are considered to be very low.

Justification and conclusion

The primary driver for the development of the proposed activity is the delivery of safe pedestrian access over the Main Southern Railway Line, connecting the current community on the western side of the railway corridor with the expected future residential population on the eastern side associated with Mirvac's master planned development. Impacts on the existing natural environment are minor in nature and traffic conditions will only be impacted during the interim period prior to and during construction of the proposed pedestrian bridge.

The Proposal actions the relevant Council strategies regarding the development of Menangle delivering a connected and cohesive pedestrian and cycle network indicatively shown in the *Wollondilly Development Control Plan 2016*.

The proposal will primarily deliver much needed safe access across the Main Southern Railway Line, connecting residents and workers to the east and west of the railway corridor. Further, it provides a walking and cycle linkage which facilitates active transport and promotes healthy lifestyles. Refer to Chapter 8 for the full justification and conclusions.

Display of the review of environmental factors

This REF is on display between Tuesday 14 November and Monday 11 December 2023. The documents are available as pdf files on the Mirvac website at <https://thevillagecommunity.mirvac.com/>.

1. Introduction

This Chapter introduces the Proposal and provides context for the environmental assessment. In introducing the proposal, the objectives and project development history are detailed and the purpose of the report provided.

1.1 Proposal identification

Menangle is a semi-rural suburb situated in Sydney's south-west within the Wollondilly Shire LGA. At the moment, urban development is concentrated around the Menangle Train Station between Menangle Road and the Main Southern Railway Line. A new residential master planned community is currently being developed by Mirvac which spans either side of the railway. A railway overbridge still stands since its initial construction in the early 1890s connecting the existing road network to the future residential development at Station Street. For prospective residents on the eastern side of the railway line to access the town centre, individuals will be required to walk along the existing road bridge over the Main Southern Railway Line.

This overbridge has been identified to be an accessibility safety hazard as it does not currently safeguard pedestrians walking along Station Street, nor does the bridge meet key requirements under the *Disability Discrimination Act 1992* (Commonwealth) (DDA) and the *Disability Standards for Accessible Public Transport 2002* (DSAPT). These factors led to the need to investigate opportunities to improve pedestrian access and movement within Menangle over the Main Southern Railway Line.



Figure 1-1: Aerial view of the existing road bridge over the Main Southern Railway Line (source: Nearmap, 2022)

Mirvac proposes to construct a new pedestrian bridge over the Main Southern Railway Line on behalf of Transport, located between the intersections of Station Street with Stevens Road to the west, Moreton Park Road to the east, and the existing Menangle Train Station. The proposed activity includes part of the road reserve for Station Street, part of the road reserve for Stevens Road, part of Lot 11 DP 1262205 (Main Southern Railway Line), and part of the road reserve of Moreton Park Road.

Key features of the Proposal are summarised as follows:

- Construction of a standalone elevated pedestrian footpath and handrail adjacent to the existing road bridge (to be within the ownership of Transport)

- Provision of an easement by Wollondilly Shire Council to maintain the bridge structure within the Council road reserve
- Installation of ramps with siderails and stairs, as well as associated lighting
- Associated vegetation removal, including the removal of 150m² of remnant Cumberland Plain Woodland including two juvenile Narrow-leave Ironbark trees at the corner of Stevens Road & Station Street, and existing shrubs and groundcovers of limited ecological value.
- Installation of subsoil drains and two drainage pits on the western portion of the subject site, and
- Installation of new kerbs and gutters in selected areas.

The location of the proposal is shown in Figure 1-2 and an overview of the proposal is provided in Figure 1-3. Chapter 3 describes the proposal in more detail.

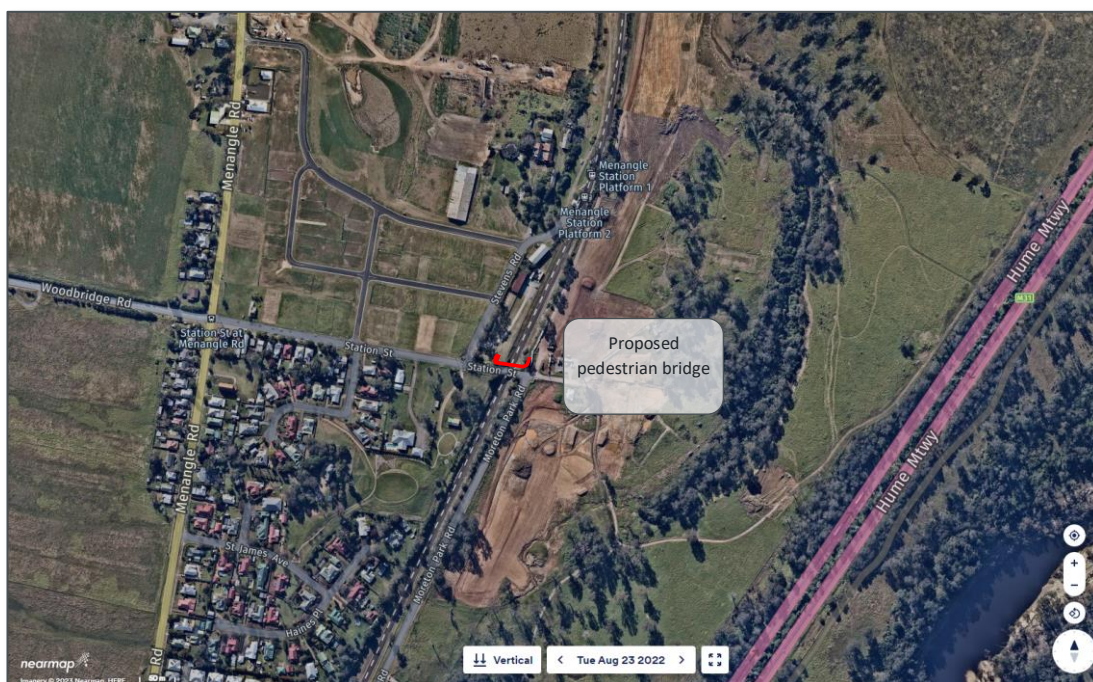


Figure 1-2: Locational context of the proposed development (source: Nearmap, 2022)

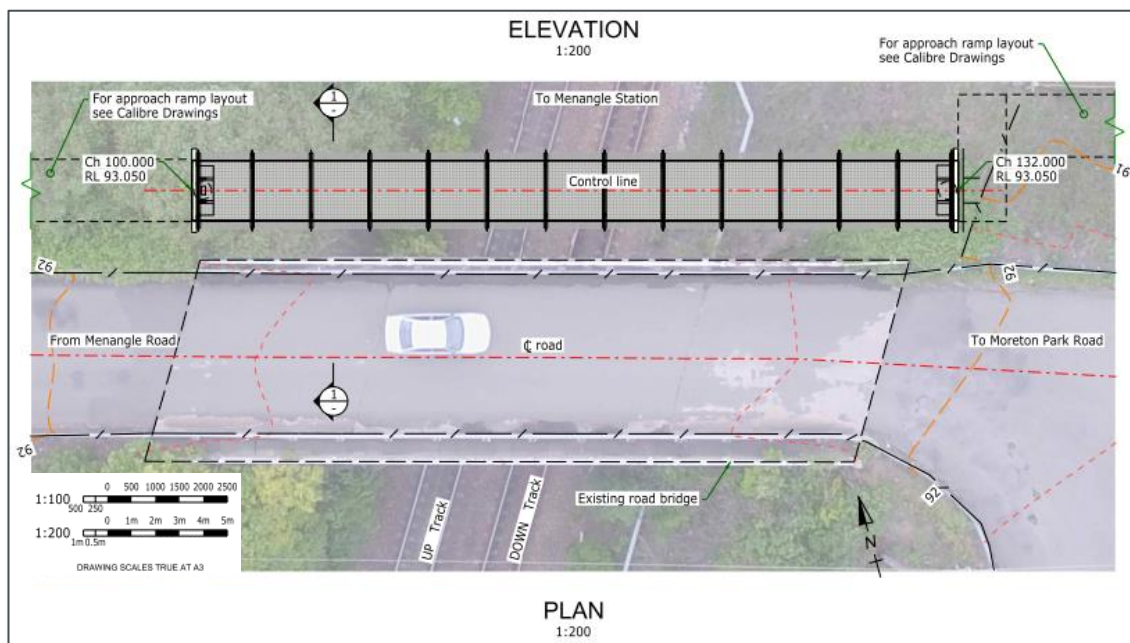


Figure 1-3: The proposal (source: Bridge Design, 2022)

1.2 Location of the proposal

Menangle is located within the semi-rural LGA of Wollondilly Shire, approximately 70km south-west of Sydney CBD and 9km south-west of Campbelltown. The suburb consists of predominantly low-density residential housing with land immediately east and west of the Menangle railway station zoned for future neighbourhood centres located north of the proposed development site.

The proposed activity includes part of the road reserve for Station Street, part of the road reserve for Stevens Road, part of Lot 11 DP 1262205 (Main Southern Railway Line), and part of the road reserve of Moreton Park Road. The subject site is a road bridge in Station Street, situated over the Main Southern Rail Line approximately 250m south of Menangle Station. Station Street is a two-lane road approximately 4m in width, which runs over the bridge for approximately 30 metres. The bridge is limited to a two-lane road bounded by guard rails on either side, with no designated foot path. Moreton Park Road runs parallel to the rail line as part of an alternate route to Douglas Park and then forms the western approach to the bridge, which is on an eastward extension of the Station Street Alignment. Station Street completes the alternate route to Douglas Park, re-joining the main route at Menangle Road.

Land to the north-west of the bridge has been subdivided from residential purposes, is registered, and is currently under housing construction. Land to the east will be subject to future residential subdivisions as it transitions from primary production use. Existing residential lands are located south-west of the bridge, and vacant rural lands to the north-west (beyond the current residential development activities). Land immediately east and west of Menangle Station has been rezoned to be future neighbourhood centres.

The regional location of the Proposal is shown in Figure 1-4.



Figure 1-4: Regional context map (source: SIX Maps, 2023)

1.3 Purpose of the report

This REF has been prepared by Egis (formerly Calibre Professional Services) to assess the potential impacts of the construction of a pedestrian bridge in Menangle. For the purposes of these works, Mirvac is the proponent and Transport are the determining authority under Division 5.1 of the EP&A Act.

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal on the environment, and to detail safeguard and management measures to be implemented to mitigate the likely impacts identified.

The description of the proposed work and assessment of associated environmental impacts has been undertaken having regard to the provisions of Section 171 of the EP&A Regulation, the factors in *Guidelines for Division 5.1 assessments* (DPE, 2022), the *Biodiversity Conservation Act, 2016* (BC Act), the *Fisheries Management Act 1994* (FM Act), and the Australian Government’s *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act).

In doing so, the REF helps to fulfil the requirements of Section 5.5 of the EP&A Act, including that Transport examine and take into account, to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval sought from the Minister for Planning under Division 5.2 of the EP&A Act.
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in Section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement or a Biodiversity Development Assessment Report.
- The significance of any impact on nationally listed biodiversity matters under the EPBC Act, including whether there is a real possibility that the activity may threaten long-term survival of these matters, and if offsets are required and able to be secured.
- The potential for the Proposal to significantly impact any other matters of national environmental significance or Commonwealth land and the need to make a referral to the Australian Department of Climate Change, Energy, the Environment and Water for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

Refer to Chapter 4 of this REF for more information on statutory considerations.

1.4 Additional information

This REF includes the following plans, reports, and memoranda in support of the document. These documents should be read in conjunction with the REF and form part of the REF for the purposes of approval under Part 5 of the EP&A Act.

The documentation includes:

Appendix A	Consideration of section 171 factors and matters of national environmental significance and Commonwealth land prepared by Egis
Appendix B	Statutory consultation checklists prepared by Egis
Appendix C	Engineering Plans prepared by Egis
Appendix D	Structural Plans prepared by Bridge Design
Appendix E	Detailed Survey prepared by ADW Johnson
Appendix F	Landscape Plans prepared by Sturt Noble Associates
Appendix G	Flora and Fauna Assessment prepared by Biosis
Appendix H	Historical Heritage Assessment and Statement of Heritage Impact prepared by Biosis
Appendix I	Stormwater Management Memo prepared by Egis
Appendix J	Visual Impact Assessment prepared by Sturt Noble Associates

Appendix K	Arboricultural Impact Assessment Report prepared by Sturt Noble Arboriculture
Appendix L	Geotechnical Report prepared by Geotechnique
Appendix M	Preliminary Site Investigation prepared by Geotechnique
Appendix N	Aboriginal Due Diligence Assessment prepared by Niche Environment and Heritage
Appendix O	Review of Titling Obligations
Appendix P	Bushfire Certificate prepared by Blackash
Appendix Q	Site Services Survey prepared by Australian Locating Services
Appendix R	Services Location Report prepared by Australian Locating Services
Appendix S	Traffic Impact Assessment Report prepared by PDC Consultants
Appendix T	Concept Traffic Management Plan prepared by Egis
Appendix U	Notification Requirements prepared by Wollondilly Shire Council
Appendix V	Correspondence from Authorities prepared by Egis
Appendix W	Noise & Vibration Report prepared by Renzo Tonin
Appendix X	Transport for NSW Procedure for Aboriginal Cultural Heritage Consultation and Investigation Letter prepared by Transport
Appendix Y	Lighting Design prepared by Edgewater Connections
Appendix Z	Construction Methodology prepared by Christie Civil

2. Need and options considered

This Chapter describes the need for the Proposal in terms of its strategic setting and operational need. It identifies the various options considered and the selection of the preferred option for the proposal.

2.1 Strategic need for the proposal

Table 2-1 provides an overview of NSW Government and local council strategies and plans relevant to the Proposal.

Table 2-1: Key NSW Government and Wollondilly Shire Council policies and strategies relevant to the Proposal

Policy/Strategy	Overview	How the Proposal aligns
<i>Disability Inclusion Action Plan (2020-2025)</i> (Transport, 2020)	The <i>Disability Inclusion Action Plan 2020-2025</i> was developed by Transport in consultation with the Accessible Transport Advisory Committee, which consists of representatives from peak disability and ageing organisations within NSW. The <i>Disability Inclusion Action Plan</i> identifies the challenges, the achievements to date, the considerable undertaking that is required to finish the job and provides a solid and practical foundation for future progress over the next five years.	The Proposal has been developed with consideration of the objectives outlined in the <i>Disability Inclusion Action Plan</i> and seeks to improve and provide equitable access to public transport facilities. The Proposal would include accessible ramps leading up to the pedestrian bridge, connecting to Council's existing path network. Protection screens will run around the extent of the bridge structure.
<i>Staying Ahead: State Infrastructure Strategy 2022-2042</i> (Infrastructure NSW, 2022)	The <i>State Infrastructure Strategy 2022-2042</i> sets out Infrastructure NSW's advice on the infrastructure needs and priorities of the State for the next 20 years, and beyond.	The Proposal would support ongoing investment in railway infrastructure facilities and would align with the need to continue to provide safe access to public transport to support Sydney's increasing population.
<i>A Metropolis of Three Cities – Greater Sydney Region Plan</i> (Greater Sydney Commission, 2018a)	The <i>Greater Sydney Region Plan</i> is the NSW Government's 40-year land use plan for Sydney. It establishes a vision for a metropolis of three cities – the Eastern Harbour City, the Central River City, and the Western Parkland City. The site of the proposed development is situated in the south-west portion of the Western Parkland City.	The Proposal would particularly support Objective 3 of the Plan, which is to ensure infrastructure adapts to meet future needs. The Proposal would be consistent with this objective by providing a unifying feature across the rail corridor, providing significant public benefit to the future community of Menangle resulting from Mirvac's master planned residential development.
<i>Western City District Plan</i> (Greater Sydney Commission, 2018b)	The Proposal is located within the <i>Western City District Plan</i> which, among other western LGAs, applies to the Wollondilly Shire LGA. The plan describes the planning priorities and actions to improve liveability and achieve a productive and sustainable future for the district.	The Proposal would support Planning Priority W1 (Planning for a city supported by infrastructure) and Planning Priority W4 (Fostering healthy, creative, culturally rich and socially connected communities). The Proposal would assist in ensuring infrastructure aligns with forecasted growth and facilitating aspects of a healthy and active built environment for the Menangle community by providing safe access across the Main Southern Railway Line.
<i>Wollondilly 2040: A vision for the future of Wollondilly – Local Strategic Planning Statement 2020</i>	The <i>Wollondilly Local Strategic Planning Statement 2020</i> is intended to guide future local planning priorities, decisions and actions within the Wollondilly LGA. Of relevance to the Proposal are Planning Priorities 1 and 8, briefly outlined below.	The Proposal would improve safe access within Mirvac's master planned residential development through the provision of a unifying feature over the railway line. This new access would support the current and future population of Menangle.

(Wollondilly Shire Council, 2020a)	Planning Priority 1: Aligning infrastructure provision with community needs Planning Priority 6: Embedding health and wellbeing consideration into land use planning for healthy places Planning Priority 8: Enhancing vibrant, healthy and sustainable local towns and villages	Once constructed, the proposed pedestrian bridge will create a key link to the centre of Menangle, encouraging active transport and fostering healthy lifestyles. The Proposal showcases an improvement to infrastructure whilst being respectful to the historical significance of the town.
Wollondilly Centres Strategy (Wollondilly Shire Council, 2020b)	The <i>Wollondilly Centres Strategy</i> was prepared in response to the recommendations of the <i>Wollondilly Local Strategic Planning Statement</i> and provides a holistic consideration of all Centres to inform decisions on land use, policy, consultation, public works and other actions.	One of the key principles for Access and Movement is to improve land adjoining rail stations within the Centres to ensure they support connections to bus, car, and pathway routes. The Strategy identifies an opportunity for Council to “advocate for, and work with, relevant agencies in the upgrade and improvements to railway properties” in Menangle. The Proposal will directly action this opportunity and provide a high-quality linkage east and west of the Main Southern Railway Line.
Menangle Centre Detailed Report (Wollondilly Shire Council, 2020c)	Subordinate to the <i>Wollondilly Centres Strategy</i> , the <i>Menangle Centre Detailed Report</i> provides a background of Menangle, detailing its history and summarising the opportunities available.	One of the opportunities identified in the Report is collaboration with Transport to upgrade the railway station property and assets. The proposed pedestrian bridge is facilitating the improvement of Menangle Station through creating a safe access link to the Station for the current and future Menangle community.

2.2 Limitations of existing infrastructure

A railway overbridge still stands since its initial construction in the early 1900s and connects the existing road network to the future residential development at Station Street. The bridge was later widened to accommodate a second lane as residential development intensified, transforming Menangle from a rural service centre to a residential town.

From not undertaking the proposed activity, Wollondilly Shire Council and the community risk on-going safety hazards including pedestrians walking on the road along Station Street with no protection from oncoming traffic, and a lack of disabled access over the bridge to allow safe access to the railway station. In addition, future residential communities of Menangle, both east and west will be burdened by a lack of connections between the two communities and associated open space areas.

The following accessibility issues have been identified at the existing road bridge over the Main Southern Railway Line and have been addressed in the proposed design pedestrian bridge:

- The current road bridge carries low volumes of traffic, servicing a predominantly rural area with large lots. This will change following residential development on the eastern side of the railway line, which will lead to an increase in traffic using the bridge as the area transitions to residential use over time.
- The existing bridge does not offer safe pedestrian access, nor is it DDA compliant as there is currently no separate access across the Main Southern Railway Line for pedestrians and cyclists, leading to an increased potential for conflict with vehicles as the area develops for residential purposes.
- Land immediately adjoining either side of bridge is zoned R2 Residential, with B1 Neighbourhood Centre land to the north which will in time likely be developed into a small Town Centre, increasing the pedestrian movement on the bridge.
- In the wider area, land surrounding the bridge has been rezoned R2 Low Density Residential permitting subdivision for residential purposes which, when developed, will increase the volumes of traffic carried across the bridge.

The objective of the proposed activity is to provide a standalone pedestrian bridge linking the residential development on both sides of the Main Southern Railway Line to provide the public benefit of access in the area.

2.3.1 Proposal objectives

- To augment the existing bridge with a standalone elevated pedestrian bridge that will be DDA compliant.
- To offer safe pedestrian access across the Main Southern Railway Line, connecting Stage 1 with Stages 2, 3, & 4 of Mirvac's master planned residential development.
- To accommodate increased pedestrian traffic resulting from the rezoning of surrounding lands, and future population increase.

The development criteria for the proposal are listed in Table 2-2, below.

Requirement	Development criteria
Civil	- Design in accordance with relevant Australian Standards. - Construction of the proposed works during one of the operational shutdown periods of the Main Southern Railway Line south of Macarthur by ARTC.
Environmental	Carrying out of works to minimise disturbance to any surrounding native vegetation and fauna habitat.
Visual	Implementation of mitigation measures recommended in the Visual Impact Assessment, including incorporating planting to screen the bridge approaches and the careful selection of materials and colours to blend the development into the existing setting.
Design	Design in accordance with relevant Disability Standards.



The need for safe pedestrian access over the railway line was the main driver for the concept of the proposed development. In terms of the design of the bridge, the primary objective was to ensure the structure seamlessly ties in with the surrounding

area. It is important that the bridge does not create any unnecessary visual impacts to the local region, which is confirmed in the Visual Impact Assessment attached in Appendix J.

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

Initially, the pedestrian crossing was intended to be attached to the existing road bridge. Plans were drawn up for a lightweight steel cantilever frame with fibreglass decking and the existing bridge analysed for effects of this. However, this design was rejected by Transport as the owner of the road bridge due to concerns with the existing road bridge's structural integrity.

The preferred option was then selected based on the following criteria:

- Single span requiring no structure in the operating part of the rail corridor
- Foundations above the rail collision zone, and
- Robust deck construction to absorb the required 500kN rail impact load.

The preferred option was analysed to successfully satisfy the Proposal objectives and deliver the best safety outcome for the current and future residents of Menangle.

2.4.2 Identified options

A site meeting was held on 23/01/2020 with representatives of Wollondilly Shire Council, Transport, John Holland, ARTC, Mirvac, Egis and Bridge Design to discuss the feasibility of options identified for the provision of a pedestrian overbridge.

Prior to subdivision works being undertaken by Mirvac, the original parcels of land to which residential development is currently occurring were former Lot 201 & 202 DP 590247, as shown in Figure 2-2 below. These lots were under the ownership of El Bethel Pty Ltd who have been involved in consultation activities and are the Joint Venture development partner with Mirvac.

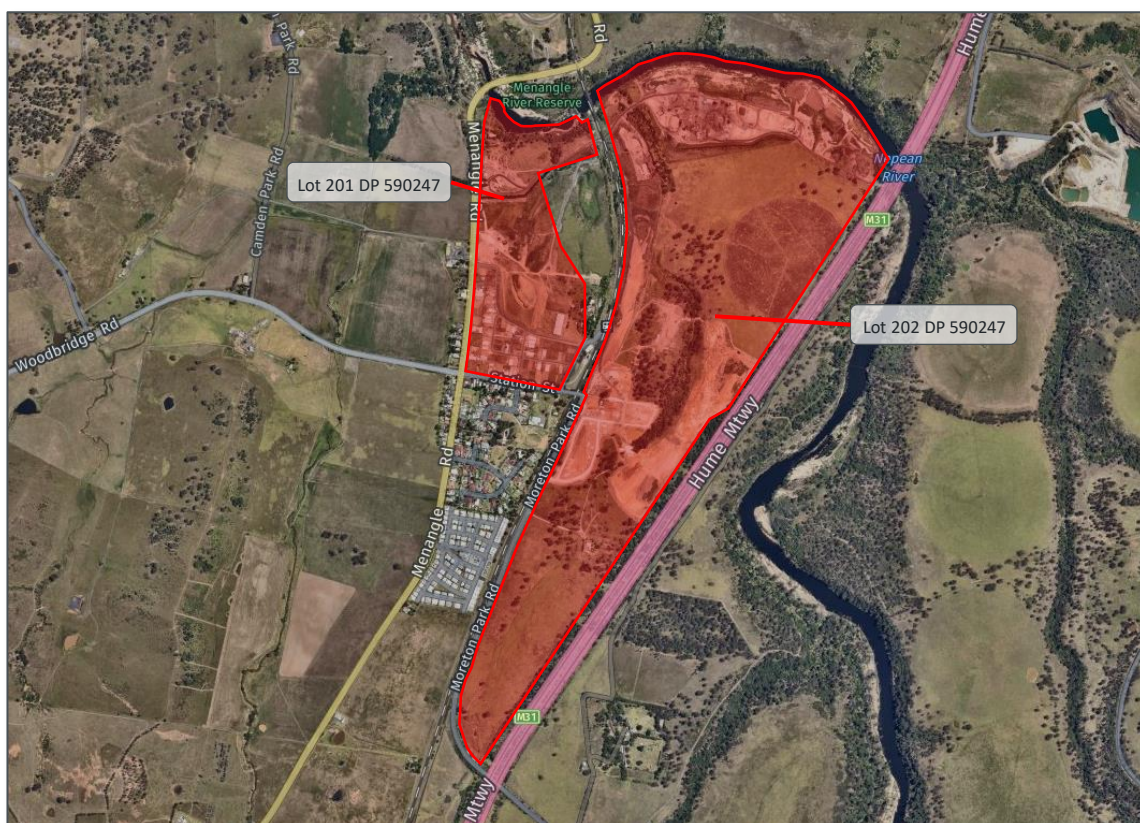


Figure 2-2: Original parcels of land prior to subdivision by Mirvac (source: Nearmap 2023)

The proposed activity was one of five options considered:

- **Option 1:** Demolition of the existing bridge to construct a new wider bridge with the necessary pedestrian paths.
- **Option 2:** Construction of a standalone pedestrian bridge adjacent to the existing bridge.
- **Option 3:** Reconfiguration of the existing bridge to accommodate the necessary access paths.
- **Option 4:** Construction of a bolt on-structure on the southern side of the bridge.
- **Option 5:** Construction of a bolt-on structure to the north side of the bridge.

2.4.3 Analysis of options

Analysis of the above identified options was undertaken to evaluate which bridge design option would provide the safest and most feasible outcome for the Menangle community. It is acknowledged that each option would deliver a safe pedestrian connection over the railway line, which is the primary objective of the Proposal. Each option is discussed below.

- **Option 1:** This option was ruled out as the demolition and construction phase would greatly impact the operation of the Main Southern Rail Line below to an unacceptable level. Further, this option bore great capital and time costs.
- **Option 2:** This option was originally dismissed as it would also unacceptably impact the operation of the Main Southern Rail Line below during the construction phase. Following further discussions with Transport and concerns regarding the structural integrity of the existing road bridge, this option was chosen as the preferred option.
- **Option 3:** This option required the narrowing of vehicle lanes on the bridge to a width that would compromise safety.
- **Option 4:** The road reserve is not wide enough to permit this, and additional private properties would be affected.
- **Option 5:** This option is predominantly contained in public land where the road reserve is sufficiently wide to allow works to proceed without impacting on additional private or public properties. Concerns with the structural integrity of the existing road bridge led to this dismissal of this option.

2.5 Preferred option

The proposed standalone structure adjacent to the existing pedestrian bridge on the north side of the bridge (**Option 2**) is the preferred option as it delivers the desired outcome with the least impacts on the operations of the Main Southern Railway Line and adjacent private properties, within the shortest timeframe.

It is acknowledged that a bolt-on structure to the north side of the bridge (**Option 5**) was originally proposed following initial consultation with state agencies, however this has now been revised following further consultation into a free-standing pedestrian bridge that will have about a 2m gap with the road bridge. The bolt-on option would have relied heavily on the structural integrity of the existing road bridge, which Transport own and are responsible for, and this was not preferential.

The preferred option for the proposed activity has been designed in accordance with the principles of ecologically sustainable development (ESD). These principles are generally defined under Section 193 of the EP&A Regulation as follows:

- The precautionary principle
- Inter-generational equity
- Conservation of biological diversity and ecological integrity, and
- Improved valuation, pricing and incentive mechanisms.

The proposed pedestrian bridge will improve the safety of pedestrians from the existing scenario without impacting on the existing vehicle carriageway. It will provide a unifying feature over the Main Southern Railway Line, connecting the future residential community with the town centre. Minor vegetation works are required to accommodate the proposed development and increased pedestrian traffic. Tree removal is limited to five trees following assessment of the development footprint which ensures ecological and biological conservation measures have been implemented. Surrounding landscape areas are to continue to be maintained by Wollondilly Shire Council and any external environmental costs are to be at Council's discretion.

Properties affected by the proposed development are primarily within public ownership, thus impacts are minimised. The private property that is impacted by the proposed works is that to the east of the existing road bridge within which the

associated subdivision works are occurring. The selected option is efficient and timely, eliminating the need for the existing bridge to be demolished and rebuilt, and mitigating major impacts on the railway line.

Details of the preferred option are further outlined in the Engineering Plans in Appendix C and the Structural Plans in Appendix D of this REF. Section 8.2.1 of this REF further expands on how the proposed works satisfy the principles of ESD.

3. Description of the proposal

This chapter describes the proposal and provides descriptions of existing conditions, the design parameters including major design features, the construction method and associated infrastructure and activities.

3.1 The proposal

Mirvac proposes to construct a new pedestrian bridge over the Main Southern Railway Line on behalf of Transport, located between the intersections of Station Street with Stevens Road to the west, Moreton Park Road to the east, and the existing Menangle Train Station. The proposed activity is situated within the Wollondilly Shire LGA includes part of the road reserve for Station Street, part of the road reserve for Stevens Road, part of Lot 11 DP 1262205 (Main Southern Railway Line), a small part of Lot 1 DP1272871, and part of the road reserve of Moreton Park Road. The proposal is shown in Figure 1-3 and below in Figure 3-1 to Figure 3-3.

Key features of the Proposal are summarised as follows:

- Site preparation including tree clearing, demolition and excavation of the works area, set up of a site compound and preparation of a crane platform and piling platforms for bridge and associated access ramp foundations;
- Construction of a standalone elevated pedestrian footpath and handrail adjacent to the existing road bridge to be in Transport ownership;
- Provision of an easement by Wollondilly Shire Council to maintain the bridge structure within the Council road reserve;
- Installation of ramps with siderails and stairs, as well as associated lighting;
- Associated vegetation removal, including the removal of 150m² of remnant Cumberland Plain Woodland limited to two juvenile Narrow-leave Ironbark trees at the corner of Stevens Road & Station Street;
- Installation of subsoil drains and two drainage pits on the western portion of the subject site,
- Installation of concrete shared path new kerbs and gutters in selected areas; and
- Installation of street signage and landscaping of disturbed areas.

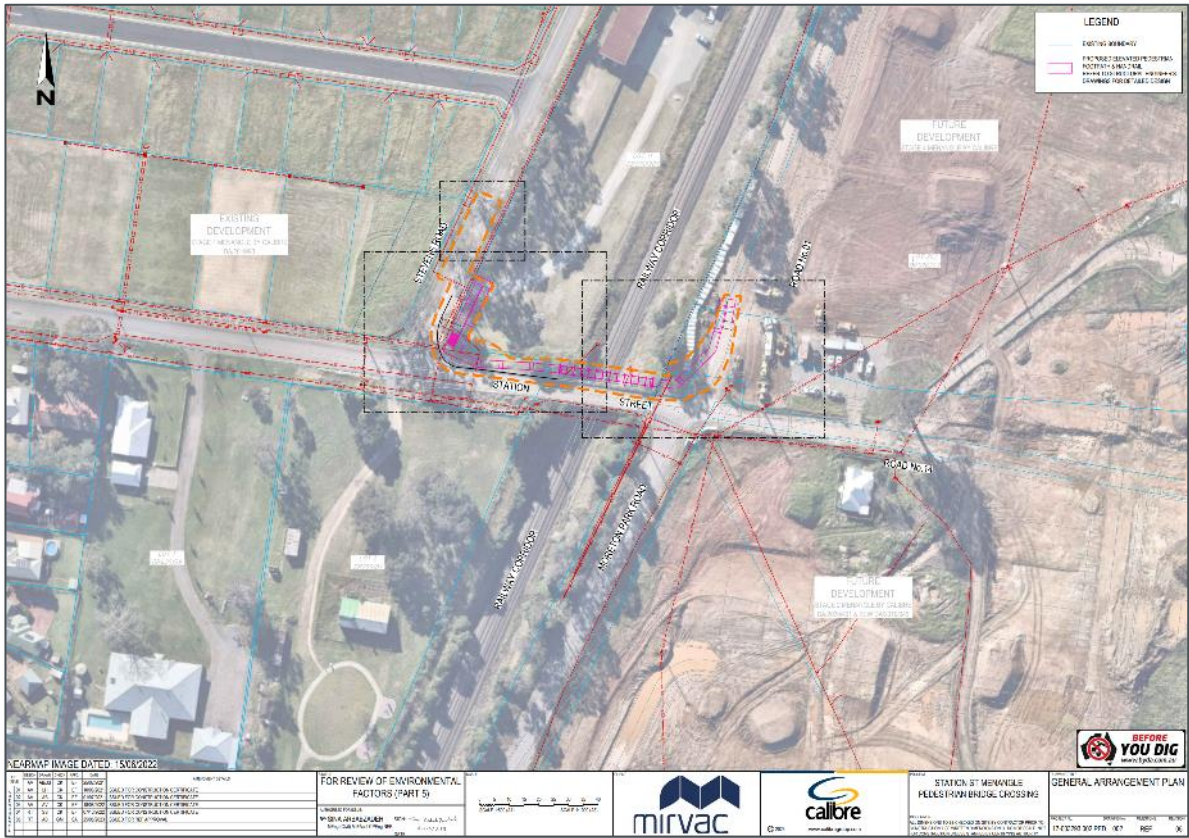


Figure 3-1: General arrangement of the proposed pedestrian bridge (source: Egis, 2022)

3.2 Design

3.2.1 Design criteria

A key element of the Proposal’s objectives is to deliver a pedestrian bridge that will be DDA compliant. As such, the approach ramps of the proposed bridge have been designed in accordance with Part 6 of the *Disability Standards for Accessible Public Transport 2002* (DSAPT). Section 6.1 of the DSAPT notes that “a ramp on an access path must comply with AS1428.2 (1992) Clause 8.” Accordingly, the bridge has been designed to this standard.

The design of the proposed railway crossing over the Main Southern Rail Line has also complied with the standards as specified in AS1428, AS5100-217, and the Transport for NSW Technical Directions and Bridge Construction Specifications. Additionally, grade and clearance requirements are satisfied. ARTC’s Code of Practice, in particular Section 9 – Structures, has also been considered during the design of the proposed pedestrian bridge.

3.2.2 Engineering constraints

The primary constraint impacting on construction of the proposed works is the operational shutdown periods of the Main Southern Railway Line south of Macarthur by ARTC for maintenance purposes. Approach ramps may be delivered prior to these ARTC Possession Windows, however, construction of the structure over the railway line may only commence during the nominated maintenance periods. The soonest possession window Mirvac is aiming to construct the structure over the railway corridor is from 2-5 February 2024, then from 19-22 April 2024.

Existing services will be adjusted at the construction phase and will be the responsibility of the appointed contractor.

3.3 Construction activities

Civil works associated with Station Street, Stevens Road, and Moreton Park Road (e.g. line-marking and signage) will be approved through a s138 application, pursuant to the *Roads Act 1993* with Wollondilly Shire Council.

3.3.1 Work methodology

A site compound will be set up to the west of the bridge and all materials will be stored in this area. As previously noted, the construction of the bridge over the Main Southern Railway Line will need to be undertaken during one of the ARTC Possession Windows. Prior to this time, as much work as possible for the bridge beam will be delivered onto the ground. This would include installation of safety screen frames, sacrificial form work, deck edge boards, etc.



Figure 3-2: Site work areas - overview (source: Christie Civil, 2023)

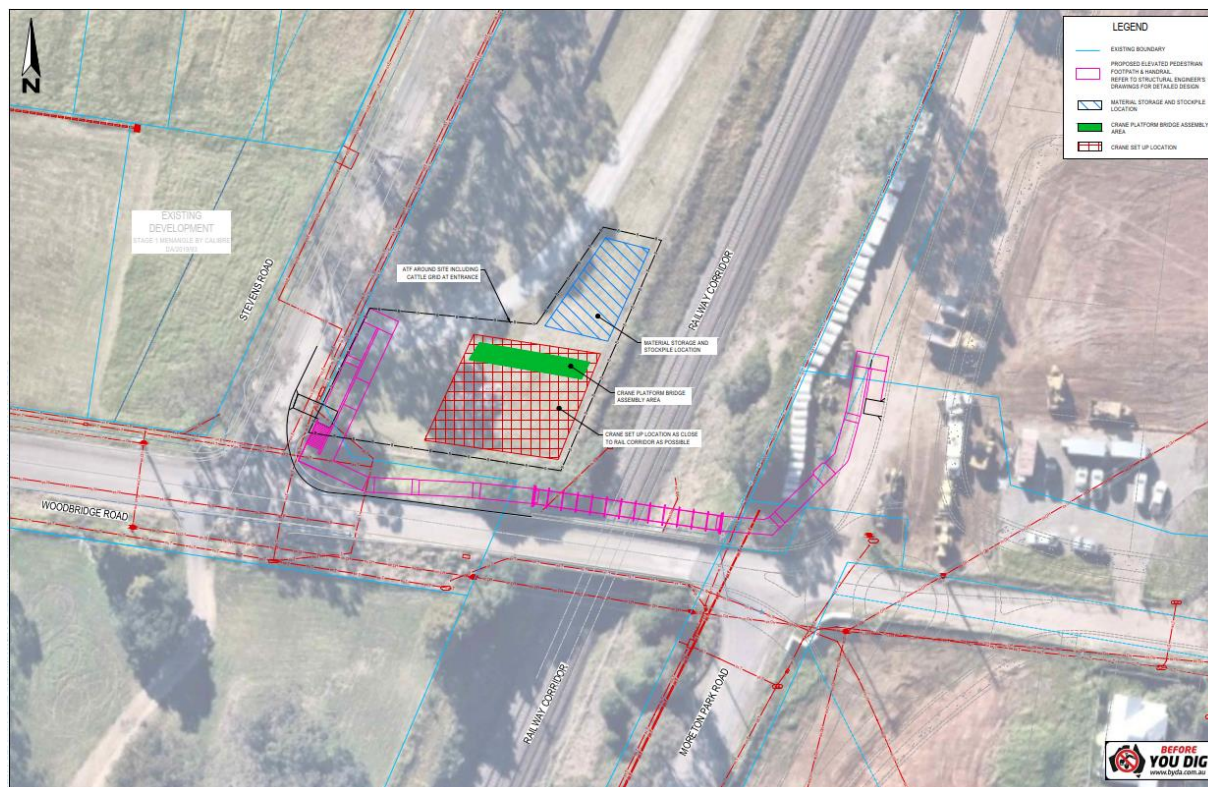


Figure 3-3 Site work areas – Detail (source: Christie Civil, Egis, 2023)

Detailed methodologies will be determined during construction planning.

A Construction Environmental Management Plan (CEMP) will be prepared by the contractor and approved by Transport prior to commencement of construction of the proposed pedestrian overbridge. The proposed sequencing and methodology, including the development of an unexpected finds procedure, tree clearing, demolition and excavation will be required to be detailed in Transport's mandated format. This will include a Preliminary Erosion and Sediment Control Program, and include compliance with the recommendations of:

- Stormwater Management Memo prepared by Egis (Appendix I);
- Arboricultural Assessment prepared by Sturt Noble Arboriculture (Appendix K);
- Noise and Vibration Impact Assessment – Pedestrian Bridge Crossing prepared by Renzo Tonin and Associates (Appendix W);
- Concept Traffic Management Plan by PDC Consultants (Appendix T);
- Unexpected Finds Protocol in the Preliminary Site Investigation Report prepared by Geotechnique (Appendix M);
- Unexpected Finds Protocol in the Historical Heritage Assessment and Statement of Heritage Impact prepared by Biosis (Appendix H);
- Unexpected Finds Protocol in the Aboriginal Due Diligence Assessment prepared by Niche Environment and Heritage (Appendix N); and
- Flora and Fauna Assessment prepared by Biosis (Appendix G).

The proposed construction methodology includes the following steps:

1. Complete documentation
2. Procure Super T beam
3. Mobilise on site
4. Set up site compound

5. Prepare crane platform
6. Utility adjustment (If required)
7. An unexpected finds procedure will be developed & readied for implementation prior to excavation starting
8. Tree clearing, demo & excavation
9. Piling platforms
10. Piling
11. Concrete Abutments
12. Installation of precast concrete bridge girder
13. Construction of elevated pedestrian ramps and handrails
14. Drainage works in Stevens Road
15. Concrete Footpath
16. Street Signage, and
17. Landscaping.

Construction Activities will be divided into the following phases:

1. Compound, Site Entry and Exit Set Up – access will be established into the Pacific National site (Transport land) to deliver the beam and establish the crane pad. This will avoid load restriction on the bridge and require the smallest lifting reach from the crane. All materials and stockpiles will be located within the compound on the eastern side of the railway line, which will minimise the need to cross the rail line and enter the controlled area. All site vehicles will enter and exit the site via Stevens Road.
2. Establishment of Piling and Crane platforms – within the compound, a piling platform and a crane platform will be established to facilitate bridge and ramp construction. This will include the following steps:
 - a) Geotechnical investigation to determine existing ground conditions;
 - b) Platform design based on existing ground conditions and loads applied by the crane;
 - c) Certification by a geotechnical engineer prior to use.
3. Undertake ground works, piling, construction of headstocks prior to beam arrival.
4. Bridge beam delivery and installation – delivery of the bridge beam to ground level, construction activities prior to lifting beam into place including:
 - a) Installation of safety screen frames;
 - b) Sacrificial form work;
 - c) Deck edge boards.
5. Once beam is in place, construct decking, ramps, handrails to complete structure.
6. Complete site civil, drainage and services works including drainage works in Stevens Road, concrete footpath, street signage and landscaping.
7. Breakdown of site compound and make good of works area, removal of waste.

3.3.2 Construction workforce

The main groups responsible for the day-to-day management on site are the Christie Civil Site Team, including the Project Manager, Site Supervisor (Foreman), Site Engineers, and Leading Hands.

3.3.3 Construction hours and duration

Site works for the foundations, bridge and frame is about 15 weeks. Construction hours will follow the standard EPA construction hours, except where weekend possessions of the rail corridor are required in order to access the airspace over the rail line. Construction will occur in discrete periods within the 15-week timeframe as required to maintain continuity of workflow to ensure the nominated rail corridor shutdown periods are achieved.

3.3.4 Plant and equipment

It is estimated that a 300T crane will be used for the installation of the bridge beams. Further details of the equipment to be utilised will be determined during construction planning. It is assumed that standard equipment including excavators, power and hand tools will be utilised for the duration of works.

The Anticipated Construction Plant and Equipment to be used in the project include:

No.	Type of Plant	How Used
1.	Small and Large Excavators	• Clearing of batters. • Demolition of fencing, etc. • Batter shaping. • Preparing for piling rig. • Trenching. • Drainage construction.
2.	Piling Rig (Assume CFA Piles)	• Install piles to support abutments. • Install piles to support elevated walkways.
3.	Small mobile crane	• Lifting material around site, including: ○ Reinforcement. ○ Formwork materials. ○ Elevated walkway materials.
4.	Concrete Pumps	• Pour concrete to piles. • Pour concrete to abutments. • Pour concrete to ramps and walkways.
5.	Rollers	• Compaction of DGB for Crane and Piling platforms. • Pavement construction.
6.	Bobcat / Positrack	• Spreading of DGB for Crane and Piling Platforms. • Spreading of Pavement aggregates.
7.	Elevated Work Platforms	• Installing Elevated walkway.
8.	Asphalt Paver	• Asphalt road pavement.

Table 3-1: Anticipated Construction Plant and Equipment (source: Civil Construction Methodology - Christie Civil)

3.3.5 Earthworks

The extent of cut and fill locations is shown in Figure 3-4 below. Earthworks volumes have been estimated and the stockpile site is to be located adjacent to the railway corridor.

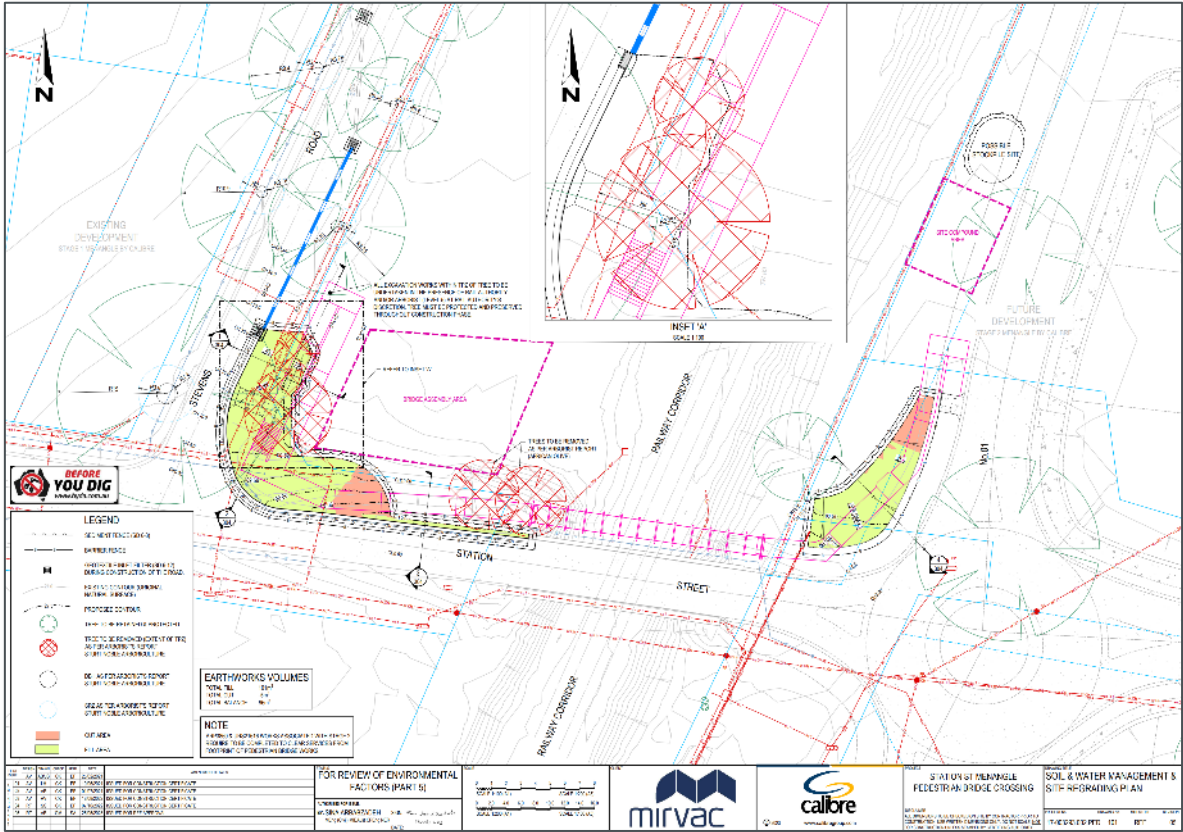


Figure 3-4: Areas of cut and fill (source: Egis, 2022)

3.3.6 Source and quantity of materials

A list of proposed material suppliers for the aggregates & sand, concrete, concrete pipe, and reinforcement is included within the construction methodology provided in Appendix Z.

3.3.7 Traffic management and access

A Traffic Impact Assessment Report was completed by PDC Consultants to investigate the anticipated traffic impacts of the proposed development and is attached in Appendix S of this REF. The proposal will involve temporary partial closure of both Station Street and Stevens Road to complete works.

All trucks will arrive and depart the site via Station Street which provides direct access to Menangle Road approximately 400m west of the site. Trucks will use Menangle Road to access the arterial road network to the north, by using Tindall Street and Kellicar Road to access Narellan Road and Hume Highway. Thus, trucks would not be required to circulate through local streets to access the site, except for the short section of Station Street. The proposed truck routes would have a limited impact on neighbouring residents and businesses.

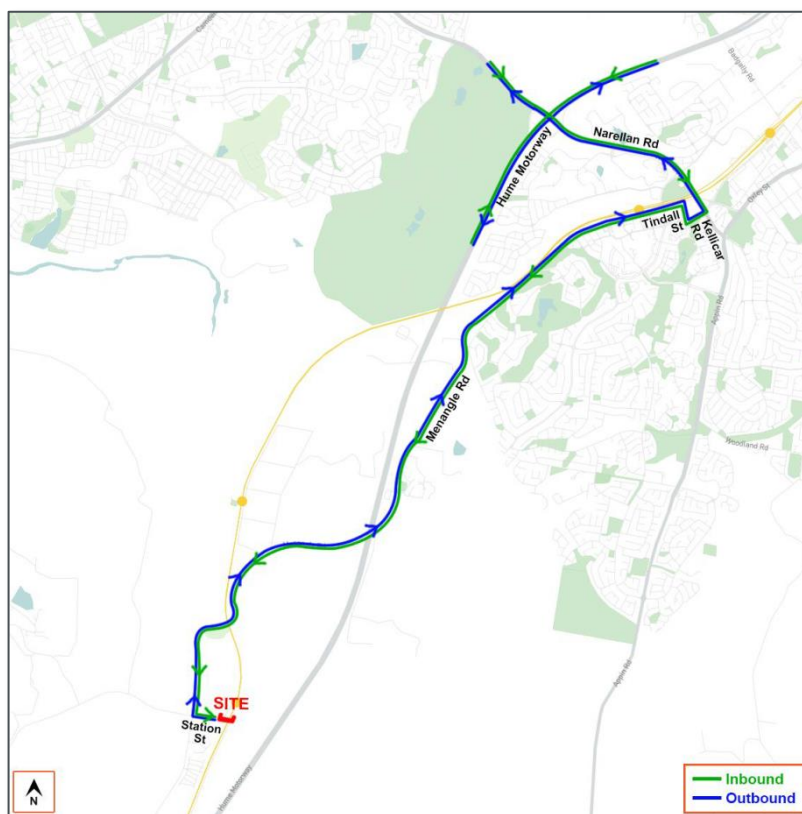


Figure 3-5: Truck Routes (source: PDC, 2022)

An indicative loading zone location has been sited wholly within Lot 1 DP 1272871 in land comprising part of Stage 4 of Mirvac's wider future residential development. Trucks using the proposed loading zone will be able to turn within Lot 1 and therefore enter and exit the loading zone from and to Station Street in a forward direction.



Figure 3-6: Indicative Loading Zone Location (source: PDC, 2022)

Based on the anticipated loading zone illustrated in Figure 3-6 above, a preliminary Traffic Guidance Scheme (TGS) (former Traffic Control Plan) has been prepared to demonstrate the example traffic management arrangements that may be necessary to facilitate the safe and efficient operation of the work site. The TGS has been designed in accordance with the *RMS Traffic Control at Work Sites Manual* and *Australian Standard AS 1742.3-2009, Part 3: Traffic Control for Works on Roads*.

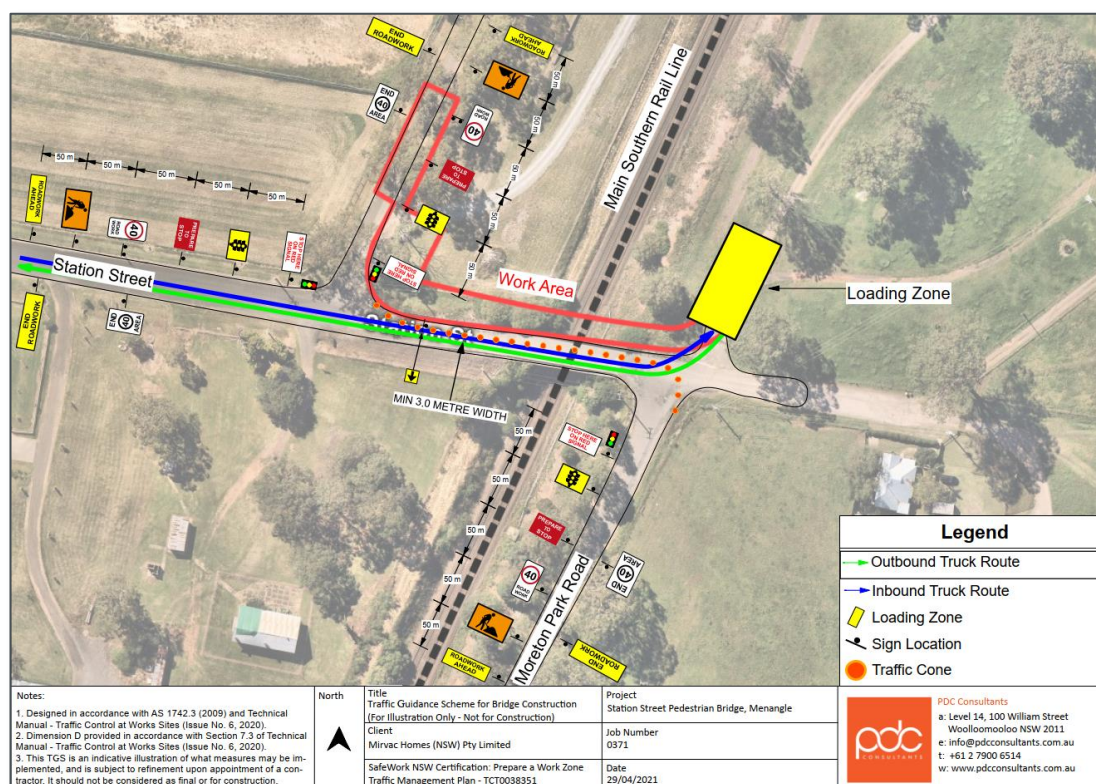


Figure 3-7: Traffic Guidance Scheme (former Traffic Control Plan) for Bridge Construction (source: PDC, 2022)

A TGS will be prepared with appropriate mitigations during the construction period. This could include (but is not limited to):

- The use of temporary barriers to provide some degree of run off road crash containment and protection.
- Reduction of Station Street road bridge to a one-lane, two-way temporary configuration, with appropriate traffic controls to time-separate the eastbound and westbound movements.
- Reduction of the speed limit to compensate for the increased risks of the reduction in width and lanes.

Construction of the pedestrian bridge is expected to occur over a period of approximately 24 weeks; however, this is subject to change pending the contractor's proposed construction methodology. Furthermore, works within the rail corridor (Lot 11 DP 1262205) will require ARTC track possessions, the programming of which may in turn impact the construction programme and methodology. This may require out of hours works on weekends, depending on the availability of possession slots in the proposed construction period. Due to the limited windows of installation out of hours work may be required. This will be agreed in advance with the RIM. It is expected that possessions would only require one or two weekends within the construction period, with all other construction activities occurring within the standard work hours.

Works within the rail corridor will likely occur during ARTC track possessions which will require out of hours work. Works within the Council road reserve will adopt standard construction hours:

- Monday-Friday: 7:00am-5:00pm. No construction work on Sundays and public holidays for standard construction activities.

During rail corridor possessions, weekend work will be required including Saturday: 8:00am-5:00pm. Saturday night works and works on Sundays will only be required where rail corridor activities cannot be completed on Saturday (Noise impacts are to be minimised in accordance with the Construction Noise and Vibration Guideline (Transport for NSW) and Construction Noise and Vibration Strategy (Transport for NSW)) – during rail corridor possessions only.

3.4 Public utility adjustment

There are services currently located within the existing road bridge crossing. There is no intention to adjust these services as part of the project. Part of the project will require the minor adjustment of existing services to ensure their continuity during construction and to facilitate any connections to our proposed services within the bridge. Refer to the Lighting Design in Appendix Y.

It should be noted that an easement will be created within Council's road reserve, a public road, for access and maintenance for the approaches for the proposed pedestrian bridge pursuant to s88b(1) & (2) of the *Conveyancing Act 1919* and the *Roads Act 1993*.

3.5 Operation and maintenance

Structures constructed under this Proposal, including access ramps and the bridge itself, would be maintained by Transport following the handover period of the asset

4. Statutory and planning framework

This chapter provides the statutory and planning framework for the proposal and considers the provisions of relevant state environmental planning policies, local environmental plans, and other legislation.

4.1 Environmental Planning and Assessment Act 1979

The EP&A Act provides the statutory basis for planning and environmental assessment in NSW. The EP&A Act provides the framework for environmental planning and development approvals and includes provisions to ensure that the potential environmental impacts of a development are assessed and considered in the decision-making process. As noted above, this REF is subject to assessment under Part 5 Division 5.1 of the EP&A Act. For the purposes of these works, Mirvac is the proponent and Transport is the determining authority under Division 5.1 of the EP&A Act.

To meet the environmental assessment requirements of Part 5 of the EP&A Act, either an Environmental Impact Statement (EIS) or a REF assessment is prepared. An EIS is required where the Proposal is likely to significantly affect the environment or is likely to significantly affect threatened species, populations and ecological communities.

As works required for the Proposal are minor in nature, confined to previously disturbed areas and the rail corridor and are not likely to impact on areas of high environmental/ biodiversity value and/or threatened and protected species, the Proposal is not likely to significantly affect the environment and a REF.

4.1.1 State Environmental Planning Policies

It is noted that the Proposal does not require development consent or approval under the following SEPPs:

- *State Environmental Planning Policy (Resilience and Hazards) 2021*
- *State Environmental Planning Policy (Planning Systems) 2021*
- *State Environmental Planning Policy (Precincts – Central River City)*
- *State Environmental Planning Policy (Precincts – Eastern Harbour City)*
- *State Environmental Planning Policy (Precincts – Regional) 2021*, and
- *State Environmental Planning Policy (Precincts – Western Parkland City) 2021*.

State Environmental Planning Policy (Transport and Infrastructure) 2021

State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP (Transport and Infrastructure)) aims to facilitate the effective delivery of infrastructure across the State. Section 2.91 of SEPP (Transport and Infrastructure) permits development on any land for the purpose of a railway or railway infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for a railway infrastructure facility, being a pedestrian bridge over the Main Southern Railway Line in Menangle and is to be carried out on behalf of Transport, it can be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (NSW). Development consent from council is not required.

Section 2.10 to 2.15 of SEPP (Transport and Infrastructure) contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Consultation, including consultation as required by SEPP (Transport and Infrastructure) (where applicable), is discussed in Chapter 5 of this REF.

Section 2.98 of SEPP (Transport and Infrastructure) refers to development in or adjacent to rail corridors. To construct the proposed pedestrian bridge, a crane will be required in the air space above the rail corridor, thus compliance with this section is necessary.

It is noted that ARTC have two 4-day shutdown periods where the Main Southern Railway Line is not in operation beyond Macarthur for maintenance purposes. Following approval of the Proposal the approach ramps will be constructed, however, the structure over the rail corridor will only be constructed during the earliest shutdown period of the railway line.

State Environmental Planning Policy (Resilience and Hazards) 2021

State Environmental Planning Policy (Resilience and Hazards) 2021 (SEPP (Resilience and Hazards)) aims to promote an integrated and coordinated approach to planning for vulnerable areas and minimise any adverse impacts resulting from associated hazards.

A Preliminary Site Investigation Report was prepared by Geotechnique Pty Ltd which assessed the soils within the accessible part of the proposed pedestrian bridge. It was concluded that the laboratory test results satisfied the criteria for stating that the analytes selected are either not present (at concentrations less than laboratory limits of reporting) or present in the sampled soil at concentrations that do not pose a risk of hazard to human health or the environment under a 'commercial/industrial' form of development. Thus, the site is considered environmentally suitable for the proposed pedestrian bridge construction. Refer to the Preliminary Site Investigation Report in Appendix M.

4.1.2 Local Environmental Plan

Wollondilly Local Environmental Plan 2011

The *Wollondilly Local Environment Plan 2011* (Wollondilly LEP 2011) is the prevailing Environment Planning Instrument (EPI) for Wollondilly. The LEP applies to most forms of development that are not recognised under a SEPP. The Wollondilly LEP 2011 zones the land on which the development takes place. The proposed pedestrian bridge will be constructed on R2 Low Density Residential zoned land and over SP2 Infrastructure (Railway) zoned land for the Main Southern Railway Line.

The objectives of the R2 Low Density Residential Zone are as follows:

- To provide for the housing needs of the community within a low density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To support the health and well-being of the community by providing well-connected and walkable residential areas close to services and employment.

The proposed pedestrian bridge will provide a connecting link between Stage 1 of Mirvac's future residential development on the western side of the railway line, and Stages 2, 3, & 4 on the eastern side of the railway line. The bridge will deliver a safe walking environment for residents and will enable easy access to the town centre.

The Wollondilly LEP 2011 lists heritage items of local significance that the proposed development area is situated within. These are:

- Menangle Conservation Area (Item No. C1) Menangle Rod & Woodbridge Road/Station Street, Menangle, and
- Menangle Landscape Conservation Area (Item No. C6) Menangle Road & Woodbridge Road/Station Street, Menangle.

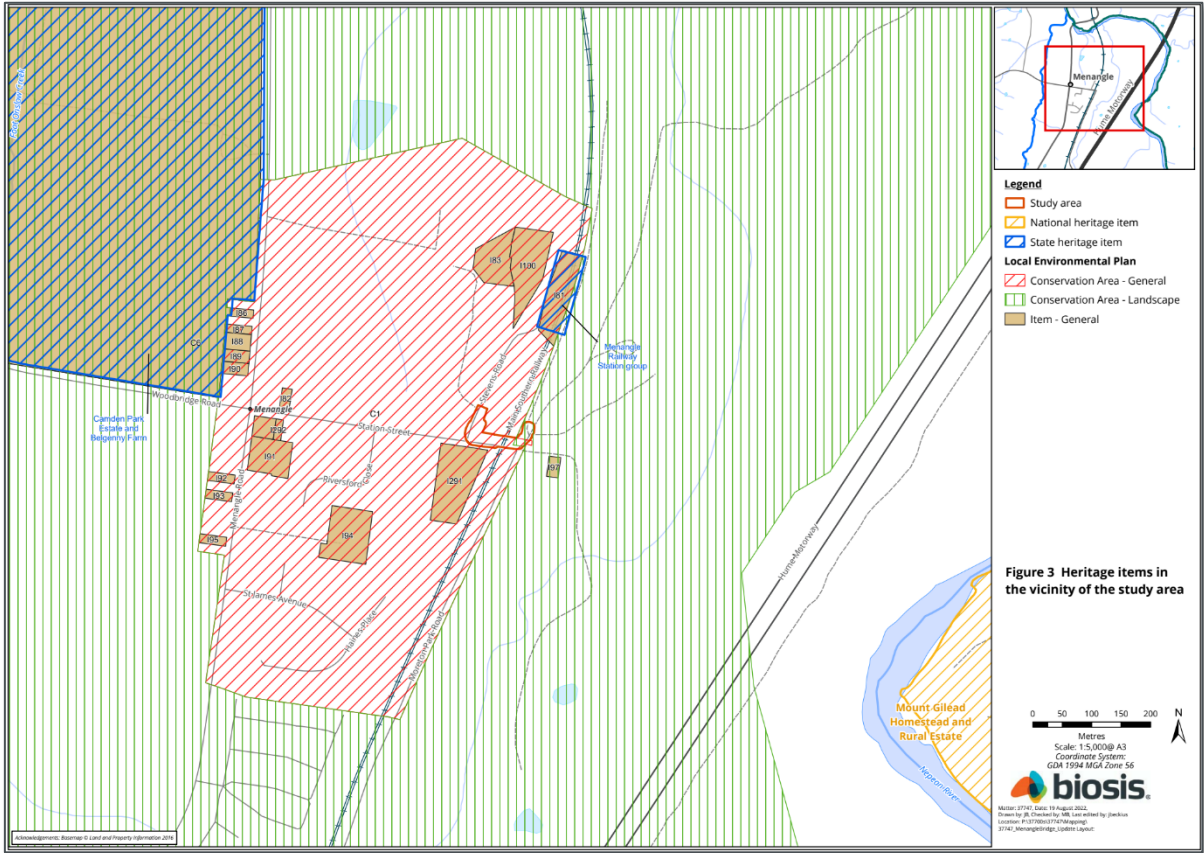


Figure 4-1: Heritage items in the vicinity of the study area (source: Biosis 2022)

Biosis Pty Ltd were commissioned to undertake a Historical Heritage Assessment (HHA) and Statement of Heritage Impact (SoHI) for the land proposed for the pedestrian bridge (study area) as well as any additional areas in the vicinity which are likely to be affected by the proposal, either directly or indirectly. The assessment identified no historical archaeological potential within the study area and the proposed pedestrian bridge will result in minimal impacts to the surround heritage and heritage landscape, should mitigation measures be implemented. As such, no further assessment is required prior to works and an unexpected finds protocol should be implemented should archaeology be uncovered. Refer to Appendix H for the HHA and SoHI.

Assessment of the proposed works against the provisions of the Wollondilly LEP 2011 have been made to the extent that the LEP applies. As the proposed development is for a public authority, being Transport, consent is required under SEPP (Transport and Infrastructure).

4.1.3 Development Control Plan

Wollondilly Development Control Plan 2016

The *Wollondilly Development Control Plan 2016* (DCP), more specifically the site-specific controls contained within the DCP Volume 3 – Subdivision, Section 3.14, relate to the development of residential land in Menangle. Figure 3 in the DCP indicatively shows the link over the Main Southern Railway Line to be used as a shared cycleway/footpath, demonstrating the identification of the proposed activity in Council’s plans for the area.

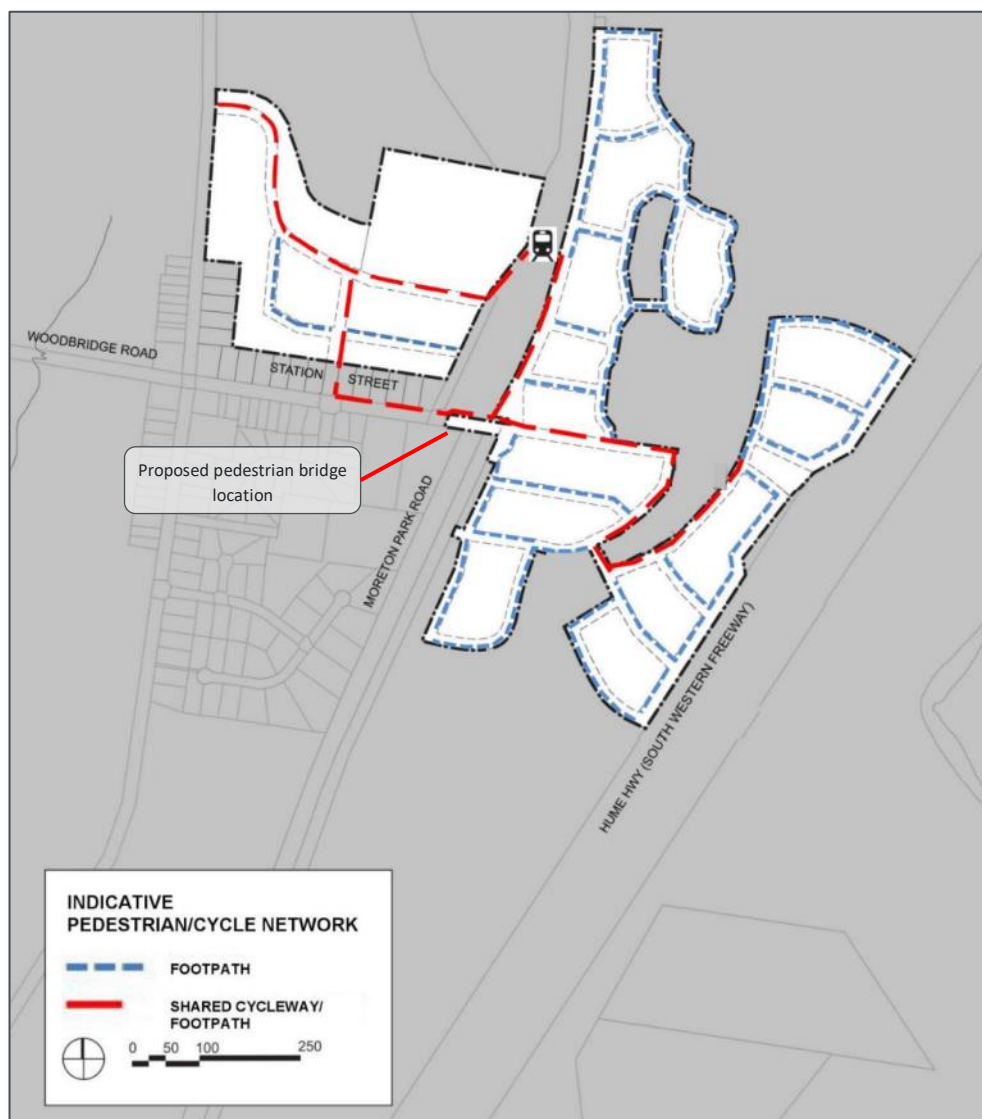


Figure 4-2: Indicative Pedestrian/Cycle Network (source: Figure 3 from Wollondilly DCP, Volume 3, Section 3.14, 2016)

The proposed activity will directly contribute to the achievement of the pedestrian/cycle network outlined in the DCP controls for Menangle.

4.2 Other relevant NSW legislation

4.2.1 Transport Administration Act 1988

The *Transport Administration Act 1988* was established for the administration of transport services provided to the people of NSW. Transport is a state Government agency constituted by this Act. General functions to be carried out by Transport range from transport planning, policy, and funding, to transport services coordination and incident management.

The proposed works are being undertaken on behalf of Transport and will be carried out in accordance with this Act.

4.2.2 Crown Land Management Act 2016

The *Crown Land Management Act 2016* was established to make provision for the ownership, use and management of the Crown land of NSW, as well as for the consistent, efficient, fair, and transparent management of Crown land for the benefit of the people of NSW.

The ramps leading up to the proposed pedestrian bridge lie within Wollondilly Council's road reserve while the land under the bridge forms part of the Main Southern Railway Line which is owned and operated by the Australian Rail Track Corporation (ARTC). As a result, there is no Crown land available within the extent of the site area.

4.2.2.1 Aboriginal Land Rights Act 1976

The *Aboriginal Land Rights Act 1976* (ALRA) makes provisions with respect to the land rights of Aboriginal persons, including provisions for or with respect to the constitution of Aboriginal Land Councils, the vesting of land in those Councils, the acquisition of land by or for those Councils and the allocations of funds to and by those Councils; to amend certain other Acts; and to make provisions for certain other purposes.

As discussed above in Section 4.2.2 above, since there is no Crown land identified within the boundaries of the site area, the provisions of the ALRA do not apply to the proposed development.

4.2.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC ACT) lists threatened species, populations and ecological communities in NSW. If a threatened species, population, or ecological community or its habitat, is likely to occur in any area which may be affected by a development proposal, then a 'seven part test' in accordance with Section 5A of the EP&A Act must be conducted to determine whether the proposal could have a significant impact. A Flora and Fauna Assessment has been undertaken in support of this REF, which concludes that the activity will not have a significant impact on threatened species, populations and ecological communities. The Flora and Fauna Assessment is included in Appendix G.

4.2.4 National Parks and Wildlife Act 1974

Section 90 of the *National Parks and Wildlife Act 1974* (NPW Act) states that if an Aboriginal artefact or site is detected on site then an application must be submitted to the Office of Environment and Heritage for approval to destroy, remove or deface an Aboriginal site and this approval must be obtained prior to the commencement of earthworks. An Aboriginal Objects Due Diligence Assessment has been undertaken in support of this REF and concludes that it is unlikely that Aboriginal objects have survived within the Activity Area due to significant ground disturbances associated with vegetation removal, the construction of roads, bridges, railway corridor and associated infrastructure. These disturbances have modified the Activity Area to such an extent, that the potential for subsurface Aboriginal objects is low.

No Aboriginal heritage constraints were identified for the proposed activity and no further investigation or impact assessment is required. A copy of the Due Diligence Assessment is included in Appendix N of this REF.

4.2.5 Heritage Act 1977

Pursuant to Section 57 of the *Heritage Act 1977* (Heritage Act), a proposed activity in relation to an item which is subject to an interim heritage order or is listed on the State Heritage Register, requires approval of the relevant approval body. This relates to the following actions:

- Demolish the building or work.
- Damage or despoil the place, precinct or land or any part of the place, precinct, or land.
- Move, damage, or destroy the relic or moveable object.
- Excavate any land for the purpose of exposing or moving the relic.
- Carry out any development in relation to the land on which the building, work or relic is situated, the land that comprises the place, or land within the precinct.
- Alter the building, work, relic, or moveable object.
- Display any notice or advertisement on the place, building, work, relic, moveable object, or land, or in the precinct.
- Damage or destroy any tree or other vegetation on or remove any tree or other vegetation from the place, precinct, or land.

A Historical Heritage Assessment and SoHI has been undertaken in support of this REF and it concludes that the likelihood of encountering relics is low and that buildings or works of significance are not likely to be impacted by the proposed activity. A copy of the Historical Heritage Assessment and Statement of Heritage Impact is included in Appendix H.

4.3 Commonwealth legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

Under the EPBC Act, a referral is required to the Australian Government for proposed actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land. These are considered in the Flora and Fauna Assessment attached in Appendix G and Chapter 6 of the REF.

Findings – matters of national environmental significance

The assessment of the Proposal's impact on matters of national environmental significance and the environment of Commonwealth land, found that there is unlikely to be a significant impact on relevant matters of national environmental significance or on Commonwealth land. Accordingly, the proposal has not been referred to the Australian Government Department of Climate Change, Energy, the Environment and Water under the EPBC Act.

No threatened ecological communities or threatened species listed under the EPBC Act were recorded or assessed to have a medium or greater potential to occur within the study area.

4.3.2 Native Title Act 1993

The *Native Title Act 1993* recognises and protects Native Title. The Act covers actions affecting native title and the processes for determining whether native title exists and compensation for actions affecting native title. It establishes the Native Title Registrar, the National Native Title Tribunal, the Register of Native Title Claims and the Register of Indigenous Land Use Agreements, and the National Native Title Register. Under the Act, a future act includes proposed public infrastructure on land or waters that affects native title rights or interest.

A search of the [Native Title Tribunal Native Title Vision](#) website was undertaken, however no Native Title holders/claimants were identified.

4.4 Confirmation of statutory position

The proposal is categorised as development for the purpose of a railway infrastructure facility and is being carried out by or on behalf of a public authority. Under section 2.91 of SEPP (Transport and Infrastructure) the proposal is permissible without consent. The proposal is not State significant infrastructure or State significant development. The proposal can be assessed under Division 5.1 of the EP&A Act.

Transport is the determining authority for the proposal. This REF fulfils Transport's obligation under section 5.5 of the EP&A Act including to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity.

5. Stakeholder and Community Consultation

This chapter discusses the consultation undertaken to date for the proposal and the consultation proposed for the future.

5.1 Consultation strategy

Mirvac have consulted with the community and key stakeholders throughout the development of the proposal, as an element of the residential subdivision development proposal that forms part of the infrastructure that supports the residential use of land to the east of the Main Southern Railway Line.

Mirvac have engaged the community and stakeholders to increase public understanding of, and participation in, the development of the proposed residential subdivision development including the Menangle Pedestrian Overbridge which forms an element of the wider residential development in Menangle by Mirvac known as “The Village.” The proposal has benefited from the input of local knowledge, provided through community engagement, which has helped identify issues and opportunities to improve proposal outcomes.

The key objectives for carrying out stakeholder and community consultation on the proposal are:

- Ensuring that the community and key stakeholders are accurately informed in relation to the scope and timing of all stages of the proposed activity and have the opportunity, where applicable, to provide input as part of the process.
- Ongoing consultation with Wollondilly Shire Council
- Targeted consultation with key stakeholders and agencies
- Building a database of interested community members who Mirvac could continue to engage during the proposal’s development.

The following sections outline the consultation that has been carried out as part of the proposal’s development.

5.2 Previous consultation and notification

The origins of the proposal lie with the decision on 9 December 2014 to rezone part of (then) lots 201 & 202 in DP 590247 and (then) Lot 21/581 in DP 58 to residential, which was publicly exhibited from 1 July 2015 to 28 July 2015, including a masterplan concept for future residential development of the land either side of the railway line in the vicinity of Station Street and Moreton Park Road Menangle. The masterplan documentation exhibited included a concept design for a footbridge over the Main South Rail Line in the location proposed. The Wollondilly Local Environmental Plan Amendment No 28, which rezoned the adjoining land residential was made on 21 December 2018.

Seven development applications for the residential subdivision of the land were lodged between 2017 and 2021 and each of these subdivision developments were notified for a minimum of 14 days to landowners in the vicinity of the development. The pedestrian bridge is one of the public works proposed in conjunction with the residential development along with the proposed roundabout at the intersection of Station Street, Menangle Road and Woodbridge Road, that have been discussed with Council, reported to Council meetings and the subject of local news articles over the past nine years. The local Menangle community were informed of the proposal to construct a pedestrian overbridge at the Station Street/Moreton Park Road rail overbridge.

Mirvac held a community information session in September 2019 prior to commencing works for Stage 1 of the development that also included a presentation of the overall development including the pedestrian overbridge. The invitations for the information session were by way of letterbox drop that included the existing residents of Station Street.

Members of the local community and key stakeholders were contacted using a range of methods as outlined in Table 5.

Method	Details
Community information session	Community information sessions were held with residents of Menangle and representatives of Wollondilly Shire Council, with a separate session held at the Durham Green Retirement Village, both on 23 September 2019. While these sessions were aimed at informing about the wider residential development at Menangle, the pedestrian bridge was also highlighted and discussed.
Letter box drops	Letters were dropped to existing residents of Station Street, Menangle village and the Durham Green retirement village.
Stakeholder meetings	Fortnightly Meetings of project team with Transport representatives in 2023 to facilitate resolution of design, reporting and consultation issues for project REF approval. Periodic meetings with ARTC since 2018 to achieve a third-party works agreement for construction of the pedestrian overbridge.

Table 5-1: Communication consultation methods

5.3 Aboriginal community consultation

5.3.1 Aboriginal Cultural Heritage Assessment Report 2019

As part of one of the Development Applications facilitating Mirvac’s masterplanned residential development, being DA/2019/645/1 for a procedural subdivision and bulk earthworks, an Aboriginal Cultural Heritage Assessment Report was prepared by Kayandel Archaeological Services (KAS). The primary objective of the report was to conduct archaeological survey of the subject area (shown in Figure 5-1 below) to determine if there were any sites of cultural significance, as well as detail the consultation undertaken with Aboriginal community stakeholders.



Figure 2: Subject Area

Figure 5-1: Subject area (source: Kayandel Archaeological Services, 2019)

KAS undertook consultation with the identified Aboriginal stakeholders known to hold cultural knowledge relating to the subject area and who are respected within the Aboriginal community. In accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010, there are 4 stages to the consultation process:

1. Stage 1: Notification of Project Proposal and Registration of Interest
2. Stage 2: Presentation of Information about the Project
3. Stage 3: Gathering of Information about Cultural Significance
4. Stage 4: Review of Draft Cultural Heritage Assessment.

Stage 1

Groups and individuals recognised as having a potential interest in the cultural heritage of the subject area were identified following enquiries with relevant organisations, such as the Office of Environment and Heritage, the Tharawal Local Aboriginal Land Council, and Wollondilly Shire Council. An advertisement for the project was also placed in the Wollondilly Advertiser on 7 November 2018, however no responses were received.

In addition to the advertisement, KAS wrote to the groups and individuals identified on 16 November 2018 inviting them to register their interest in being consulted for the project. A total of 12 representatives were registered at the completion of this period, determining the Registered Aboriginal Parties (RAPs) to participate in the consultation activities.

Registered Aboriginal Party	Representative
Yulay	Arika Jalomaki
Yurrandaali Cultural Services	Bo Field
Barraby Cultural Services	Lee Field
Tharawal Local Aboriginal Land Council	Robyn Straub
A1 Indigenous Services	Carolyn Hickey
Gulaga	Wendy Smith
Cubbitch Barta Native Title Claimants Aboriginal Corporation	Glenda Chalker
Didge Ngunawal Clan	Paul Boyd and Lilly Carroll
Barking Owl Aboriginal Corporation	Jody Kulakowski
Butucarbin Aboriginal Corporation	Lowanna Gibson
Amanda Hickey Cultural Services	Amanda Hickey
Widescope	Steven Hickey

Figure 5-2: List of Registered Aboriginal Parties (source: Kayandel Archaeological Services, 2019)

Stages 2 & 3

KAS provided the RAPs with a combined Stage 2 & Stage 3 document, which outlined the project details, previous archaeological investigations within the subject area, and proposed field survey methodology and a 15c Notification. 8 RAPs provided comments to this document to which KAS responded to.

Stage 4

In response to the draft Aboriginal Cultural Heritage Assessment Report and Archaeological Technical Report for the subject area distributed to the RAPs, the Cubbitch Barta Native Title Claimants Aboriginal Corporation and the Darug Land Observations groups provided detailed comments which were acknowledged and addressed by KAS in their report.

5.3.2 Aboriginal Objects Due Diligence Assessment 2021

An Aboriginal Objects Due Diligence Assessment was prepared by Niche Environment and Heritage in 2021 and a revised assessment conducted in 2022.

A search on the Aboriginal Heritage Information Management System (AHIMS) found no recorded sites located within the activity area and one recorded Aboriginal cultural heritage site located within 200m of the activity area. Further searches of the World Heritage Database, the Commonwealth Heritage List, National Heritage List, State Heritage Register, State Heritage Inventory, the Wollondilly LEP 2011, and the Wollondilly DCP 2011 found no Aboriginal heritage items within the activity area.

It was concluded that it is unlikely that Aboriginal objects have survived within the activity area due to significant ground disturbances associated with vegetation removal, the construction of roads, bridge, railway corridor and associated infrastructure. These disturbances have modified the activity area to such an extent that the potential for subsurface Aboriginal objects is low. No Aboriginal heritage constraints were identified for the proposed activity.

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* states that where a desktop and visual inspection has occurred and concluded that Aboriginal Objects are unlikely to occur, an Aboriginal Heritage Impact Permit (AHIP) application will not be necessary. Thus, it was confirmed that the proposed activity may proceed with caution without a further Aboriginal Cultural Heritage Assessment (ACHA), AHIP or further consultation with the Aboriginal community. In March 2023, the Aboriginal Objects Due Diligence Assessment was reviewed by a Transport Aboriginal Cultural Heritage Officer for consistency against the Transport *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) in Appendix X. The Stage 1 Assessment, provided in Appendix N, found that the project is unlikely to have an impact on Aboriginal cultural heritage.

5.4 Wollondilly Shire Council consultation

Council regularly undertakes community consultation as part of its activities. Ongoing communication with Wollondilly Shire Council has been integral to the design and development of the proposed activity. Consultation activities included liaison with Council to determine their design requirements as the Road Authority under the *Roads Act 1993* – this information was then provided to other authorities.

The draft Voluntary Planning Agreement (VPA) between Wollondilly Shire Council and Mirvac Homes (NSW) Pty Ltd included the pedestrian bridge in the exhibited version prior to it being finalised. The pedestrian bridge was subsequently removed from the VPA prior to finalisation, as it is intended to be finally in the ownership of Transport and not Wollondilly Council. No issues were raised from a contamination perspective and Council accepted the Preliminary Site Investigation (Appendix M) to have adequately determined the location of the pedestrian bridge. Council's tree management officer also made some comments regarding tree heights and species. Landscape Plans were amended accordingly and are attached in Appendix F.

Refer to Appendix V for the record of Correspondence from Authorities.

5.5 Australian Rail Track Authority Consultation

Maintenance of the Main Southern Railway Line south of Macarthur falls under the responsibility of ARTC as the RIM for the Main Southern Line. Consultation was undertaken in the form of email exchanges in March 2021 to obtain their design and construction requirements for the proposed pedestrian bridge. Their comments are summarised in the table below.

Issue raised	Response	Recommended change to Proposal
Design will need to comply with ARTC and Australian Standards.	Bridge design has been undertaken to appropriate standards.	No change required.
Design will require independent certification.	Independent certification of design will be obtained.	No change required.
Developer will need to enter a Works Licence with ARTC for works to be conducted in, over, or under the rail corridor.	Works are by or on behalf of Transport. A Works Licence will be obtained.	No change required.
Compliance with ARTC's Environmental Protection Licence when works are undertaken in the rail corridor.	A copy of ARTC Environmental Protection Licence will be obtained and will be complied with during construction.	No change required.
Ownership of the pedestrian bridge and maintenance responsibility clearly defined.	The bridge structure over the railway line will be owned by Transport. The approach ramps will be owned by Wollondilly Shire Council.	Maintenance arrangements are still being determined and will be finalised prior to the bridge being commissioned.

Table 5-1: Consultation with ARTC

Further discussions are ongoing with ARTC in pursuit of the Third Party Works agreement for access to the rail corridor during construction and to ensure that the final design meets ARTC requirements and is sufficiently robust for future changes to the corridor condition.

5.6 Government agency and stakeholder involvement

ARTC are the Rail Infrastructure Manager (RIM) for the proposed pedestrian bridge. Comments were made on their behalf by John Holland Rail (JHR) in reference to the structural plans for the bolt-on bridge design option. As a result of the latest standalone bridge design, some comments were no longer relevant. Responses to JHR's comments were provided on 30 September 2022.

Refer to Appendix V for the record of correspondence from Authorities.

5.7 Ongoing or future consultation

A Stakeholder Engagement Strategy has been prepared and endorsed by Transport to inform and consult with stakeholders prior to the determination of the REF.

Identified stakeholders include:

- Government authorities and statutory corporations such as Transport, Wollondilly Shire Council, Australian Rail Track Corporation;
- Political representatives including Wollondilly Shire Councillors, the State member for Wollondilly and the Federal Member for Hume;
- Local community stakeholders such as the purchasers and residents of The Village estate by Mirvac, currently under development and occupation, as well as existing landowners adjacent to the proposed pedestrian bridge site and in its immediate vicinity; and
- The broader community including community organisations (including the Menangle Rural Fire Service and Durham Green Village) and local businesses (such as the Menangle Store) and the local newspaper, the Wollondilly Express.

This REF is on display for comment between Tuesday 14 November and Monday 11 December 2023. Mirvac will invite feedback on the proposal and the REF would be available to view on the Mirvac website. <https://thevillagecommunity.mirvac.com/>.

Following the public display period, Mirvac will collate and consider the submissions received during public display of the REF. A submissions report will also be prepared providing responses to the submissions received and will be made available on the Mirvac website <https://thevillagecommunity.mirvac.com/>. After this consideration, Transport will determine whether or not the proposal should proceed as proposed and will inform the community and stakeholders of this decision.

If the proposal is determined to proceed, further consultation will be undertaken with the residents of Station Street, those of the residential development adjacent to the Menangle Station and identified stakeholders prior to and during construction. This would take the form of further letterbox drops to residents of Station Street, variable message signs advising road users of changed traffic conditions and contact by letter to identified stakeholder groups.

6. Environmental assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment, potentially impacted upon by the proposal, are considered. This includes consideration of:

- Potential impacts on matters of national environmental significance (MNES) under the EPBC Act
- The factors specified in the Guideline for Division 5.1 assessments (DPE, 2022) and as required under Section 171 of the EP&A Regulation, and
- Site-specific safeguards and management measures are provided to mitigate the identified potential impacts.

6.1 Biodiversity

6.1.1 Methodology

A Flora and Fauna Assessment was prepared by Biosis and is attached in Appendix G of this REF. To conduct their studies, Biosis completed a database and literature review, as well as a field investigation. A review of information including the Protected Matters Search Tool and Vegetation Information System mapping was carried out followed by an investigation of the study area by a registered ecologist. Vegetation within the study area was surveyed and classified by plant community type (PCT). A habitat-based assessment was also completed to determine the presence of suitable habitat for threatened species previously recorded or predicted to occur within 5 kilometres (km).

6.1.2 Existing environment

Flora

Previous disturbances surrounding the study area have impacted the quality of habitat for threatened biota. Vegetation within the study area consists primarily of remnant canopy trees with highly disturbed understorey and ground cover exotic species. The vegetation of the study area comprises two communities:

- PCT 849 Grey Box – Forest Red Gum grassy woodland on the flats of the Cumberland Plain, Sydney Basin Bioregion which forms part of Cumberland Plain Woodland Critically Endangered Ecological Community (CEEC), and
- Urban native/exotic.

Background searches identified 21 threatened flora species recorded or predicted to occur within 5km of the study area. Those species considered most likely to have habitat within the study area based on background research are as follows:

- Spiked rice-flower (*Pimelea Spicata*) (Endangered, EPBC Act and BC Act), and
- Camden White Gum (*Eucalyptus Benthamii*) (Endangered, EPBC and BC Act).

During a field investigation, no threatened flora species were recorded. It is considered unlikely that the study area can provide more than marginal habitat for any of the flora species. The threatened flora species predicted to occur have at maximum, a low likelihood of occurring within the study area.

Refer to the Flora and Fauna Assessment for further flora characteristics. The condition of identified trees is included in the Arboricultural Assessment included within Appendix K of this REF.

Fauna

Background searches identified 51 threatened fauna species recorded (EES, 2021) or predicted to occur (Commonwealth of Australia, 2021) within 5km of the study area. Those species considered most relevant to the study area are:

- Cumberland Plain Land Snail (*Meriodolum corneovirens*) (Endangered, BC Act)
- Grey-headed Flying-fox (*Pteropus poliocephalus*) (Vulnerable, EPBC Act and BC Act)
- Gang-gang Cockatoo (*Callocephalon fimbriatum*) (Vulnerable, BC Act)
- Little Lorikeet (*Glossopsitta pusilla*) (Vulnerable, BC Act)

- Koala (*Phascolarctos cinereus*) (Vulnerable, BC Act, EPBC Act)
- Dusky Woodswallow (*Artamus cyanopterus*) (Vulnerable, BC Act)
- Diamond Firetail (*Stagonopleura guttata*) (Vulnerable, BC Act), and
- Brown tree-creeper (*Climacteris picumnus victoriae*) (Vulnerable, BC Act).

The study area provides limited fauna habitat for threatened species due to previous disturbance including historic clearing and existing land use. The impact area was investigated for potential habitat for Cumberland Plain Land Snail (*Meriodolum corneovirens*). Due to the absence of shelter and foraging habitat, the study area has been assessed as not suitable Cumberland Plain Land Snail habitat. The proposed works are not considered likely to result in a significant impact to threatened species and/or their habitats as listed under the EPBC Act or BC Act.

Vegetation within the study area may occasionally provide foraging for highly mobile nectar and eucalypt feeding arboreal mammals and birds such as Grey-headed Flying-fox (*Pteropus poliocephalus*) (Vulnerable, BC Act and Vulnerable EPBC Act), Gang-gang Cockatoo (*Callocephalon fimbriatum*) (Vulnerable, BC Act), and Little Lorikeet (*Glossopsitta pusilla*) (Vulnerable BC Act).

Koala records exist within the wider locality, predominantly recorded to occur east of the Hume Motorway. The Hume Motorway and rail corridor, and the presence of dogs on neighbouring properties provide significant barriers to dispersal for this species and further reduce suitability of the study area. There is potential for Koala to move within the study area, yet the study area is not considered to provide suitable habitat for the Koala.

The removal of One Ironbark tree and One Yellow Box at the corner of Stevens Road and Station Street as part of the proposed works is considered unlikely to impact on connectivity for fauna species moving through the broader landscape. A further four trees are likely to be significantly impacted due to disturbance in their root zones due to infrastructure conduits needing to be established. The impacts on the four trees will be mitigated by using underboring techniques to minimise disturbance, which with appropriate tree management during construction, should ensure their survival.

This vegetation does not provide connectivity to any further areas of native vegetation.

Ultimately, there is a low likelihood of occurrence for the above listed species within the area of the proposed activity and its immediate surrounds, which are undergoing urban development following rezoning.

The proposed works are not considered likely to result in a significant impact to threatened species and/or their habitats as listed under the EPBC Act or BC Act.

Endangered Ecological Communities

Two threatened ecological communities (TECs) are mapped in the broader landscape:

- Cumberland Plain Woodland of the Sydney Basin Bioregion (CEEC, EPBC Act and BC Act), and
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (CEEC, EPBC Act, BC Act)

No threatened ecological communities or threatened species listed under the EPBC Act were recorded or assessed to have a medium or greater potential to occur within the study area, owing to the limited footprint of the proposed activity and the partly developed status of the subject site.

6.1.3 Potential impacts

The proposed pedestrian bridge works involve the following impacts to ecological features:

- Removal of 150 square metres of vegetation forming part of Cumberland Plain Woodland CEEC consisting of one narrow-leaved Ironbark tree and one yellow box tree
- Removal of 77 square metres of vegetation consisting of Urban Native/Exotic including two African Olive trees, and
- Removal of 150 square metres of vegetation providing marginal habitat for threatened flora and fauna.

Tests of Significance have been prepared for threatened biota that are deemed likely to be subject to negative impacts under the BC Act. These tests concluded that a significant impact was not likely to result from the project, due to the minimal amount of clearing required in an area of already degraded vegetation.

The proposal is not likely to significantly impact threatened species or ecological communities or their habitats, within the meaning of the *Biodiversity Conservation Act 2016* or *Fisheries Management Act 1994* and therefore a Species Impact Statement or Biodiversity Development Assessment Report is not required.

No threatened ecological communities or threatened species listed under the EPBC Act were recorded or assessed to have a medium or greater potential to occur within the study area. Thus, the proposal is not likely to significantly impact threatened species, ecological communities or migratory species, within the meaning of the EPBC Act.

The project has a minimal potential bushfire risk and will not alter or increase the bushfire risk in the immediate surrounds. A bushfire risk assessment was carried out by BlackAsh Bushfire Consultants and a copy of their certification is provided in Appendix P of this REF.

6.1.4 Safeguards and management measures

Vegetation required for removal forms part of the Cumberland Plain Woodland CEEC. Whilst assessment of this community determined that the proposal is unlikely to result in a significant impact to the community, a set of recommended environmental safeguards are to be followed to minimise disturbance to any surrounding native vegetation and fauna habitat and ensure the ecological sustainable development of the proposal. These recommendations are detailed in the table below.

Impact	Environmental safeguards	Responsibility	Timing	Reference
Disturbance to the surrounding area	There is to be no disturbance or damage to threatened species or areas of outstanding value.	Proponent and Contractor	Pre-construction and construction	BIO1
Threatened fauna	Works are not to harm threatened fauna (including where they inhabit bridges or other structures e.g. timber fence posts or maritime piles).	Proponent and Contractor	Pre-construction and construction	BIO2
Unexpected threatened flora or fauna	If threatened fauna or flora species are discovered unexpectedly, stop works immediately and follow the Transport Unexpected Threatened Species Find Procedure contained in the Transport Biodiversity Guidelines – Guide 1 (Pre-clearing process (EMF-BD-GD-0032)).	Proponent and Contractor	Construction	BIO3
Protecting retained trees	Trees to be retained will be marked and protected in accordance with AS4970-2009.	Proponent and Contractor	Pre-construction and construction	BIO4
Offsetting	Offsetting of the two native trees to be removed will be undertaken in accordance with the <i>Transport for NSW Tree and Hollow Replacement Guidelines</i> . Details of the offsetting will be included in the project's CEMP including the decision to either pay into the Transport for NSW Conservation Fund or locally replace.	Proponent and Contractor	Pre-construction and construction	BIO5

Table 6-1: Biodiversity safeguards and management measures

Offsetting for the two trees to be removed is likely to be either a payment of \$2000 into the offsetting fund or the planting of 16 like for like trees, to be determined during finalisation of the CEMP for the works.

6.2 Hydrology and flooding

6.2.1 Methodology

A Stormwater Management Memo was prepared by Egis which addresses Wollondilly Shire Council's requirements to include the catchment for the pedestrian bridge crossing proposed under this application with Stages 1 and 2 of Mirvac's master planned residential development. This memo is based on the MUSIC and DRAINS modelling completed for Stages 1 and 2 and demonstrates the updated modelling provided to Council for these stages.

The Stormwater Management Memo details the modelling and analysis undertaken to date and is attached in Appendix I of this REF.

6.2.2 Existing environment

The site of the proposed activity is above the flood planning level of 78.1m for the Nepean River at Menangle Railway. The small area of the development site would have negligible effects on the stormwater flows in the two catchments east and west of the Main Southern Railway Line in their developed states. Modelling has been undertaken in DRAINS that demonstrates that the proposed stormwater management systems in both catchments would continue to perform above required levels during flood events.

Topography

The topography of the land to the east of the proposed site area between the Main Southern Railway Line and the Hume Highway (Lots 1 & 2 DP 1272871) comprises floodplains with levees and river terraces with a local relief of up to 60 metres. The landscape is subject to flooding, seasonal water logging and very high soil erosion. The site features gently undulating slopes and low rolling hills with a local relief of 10-30 metres falling north to the Nepean River and West to the Hume Motorway.

Catchment and Key Catchment Characteristics

The proposed activity is located just south of the Nepean River, and therefore is within the Nepean River Catchment. The site drains to the Nepean River with grades typically at 3-6%. The site lies within the catchment of 2 tributary streams of the Nepean River, including a second-order stream to the east of the rail line and a first-order stream to the west of the rail line. The latter stream is being partially diverted and piped as a result of residential development of land at 15 Menangle Road, Menangle. The catchment to the east will undergo modification due to residential and commercial development in the near future, however the current main stream will remain in rural use and will remain in a revegetated state following the implementation of a Vegetation Management Plan as part of the development of that site.

6.2.3 Potential impacts

Construction

Due to the small development footprint of the activity (the pedestrian overbridge will be primarily an aerial structure with a relatively small area for footings), the activity would have minimal to no impact on any waterbody, watercourse, wetland or natural drainage system. The main likelihood of affectation (although slight) would be during construction, where surface disturbance will occur from activities such as the clearance of existing vegetation, establishment of footings and stabilisation of the site following works.

Operation

There is likely to be minimal additional runoff generated by new hardstand as a result of the proposed activity. In terms of water quality, the pedestrian bridge is proposed to drain to stormwater treatment trains in both eastern and western catchments that will incorporate bioretention basins.

Note that differing water quality objectives apply to the models as the first model (western catchment) was undertaken prior to Wollondilly Shire Council adopting its own water quality objectives. In both catchments, the water quality objectives will be achieved, and supplementary modelling conducted as part of this REF shows that the addition of the proposed activity will not alter the functioning of the proposed basins and that the Water Quality Objectives will continue to be achieved following construction of the proposed pedestrian bridge.

6.2.4 Safeguards and management measures

Potential water quality impacts, however minor, will be managed through the implementation of the measures detailed in the table below.

Impact	Environmental safeguards	Responsibility	Timing	Reference
Water quality	Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spills/slicks) is to be undertaken on a regular basis to identify any potential spills or deficient silt curtains or erosion and sediment controls.	Proponent and Contractor	Construction	W2
	Water quality control measures are to be used to prevent any materials (eg. concrete, grout, sediment etc) entering drain inlets or waterways.	Proponent and Contractor	Construction	W3
	Measures to control pollutants from stormwater and spills would be investigated and incorporated in the pavement drainage system at locations where it discharges to the receiving drainage lines. Measures aimed at reducing flow rates during rain events and potential scour would also be incorporated in the design of the pavement drainage system.	Proponent and Contractor	Construction	W4
Erosion and sedimentation	Erosion and sediment control measures are to be implemented and maintained in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book) to: - Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drainage inlets. - Reduce water velocity and capture sediment on site. - Minimise the amount of material transported from site to surrounding pavement surfaces. - Divert clean water around the site.	Proponent and Contractor	Pre-construction and construction	SED1
	Erosion and sedimentation controls are to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.	Proponent and Contractor	Construction	SED2
	Erosion and sediment control measures are not to be removed until the works are completed and areas are stabilised.	Proponent and Contractor	Construction	SED3
	Work areas are to be stabilised progressively during the works.	Proponent and Contractor	Construction	SED4
	A progressive erosion and sediment control plan is to be prepared for the works.	Proponent and Contractor	Pre-construction	SED5

Table 6-2: Hydrology safeguards and management measures

6.3 Soils and contamination

6.3.1 Methodology

A geotechnical investigation was prepared by Geotechnique Pty Ltd to determine existing subsurface conditions at the subject site. Field work for the investigation was conducted on 10 and 11 May 2021 including the following works:

- Reviewing available geological information relevant to the site
- OH&S and walkover survey to assess existing site conditions
- Reviewing services plans obtained from “Dial Before You Dig” to determine locations of services across the site
- Scanning borehole locations for underground services to ensure that services were not damaged during field work
- Drilling 2 boreholes (BH1 and BH2) at each abutment location to depths of 14.5m
- Conducting Standard Penetration Tests at regular depth intervals in the boreholes to assess strength characteristics of sub-surface soils
- Recovering representative soil and rock samples for visual assessment and laboratory tests, and
- Measuring depths to groundwater level or seepage in the drilled boreholes, where encountered.

Refer to the Geotechnical Assessment included within Appendix L of this REF.

A contamination assessment was also conducted by Geotechnique Pty Ltd to determine any contamination in and along the retaining wall for the eastern approach ramp for the proposed pedestrian bridge. The following activities formed the scope of work undertaken for this investigation:

- An inspection of the site to determine current site conditions and identify any environmental concerns based on visual and olfactory indicators of potential contamination
- Judgemental soil sampling aimed at ascertaining the presence or otherwise of soil contaminants along the proposed retaining wall for the proposed eastern approach ramp
- Chemical analysis
- Preparation and analysis of standard quality assurance and quality control samples
- Assessment of the laboratory analytical results against current applicable guidelines, and
- Assessment of the contamination status of soil.

Refer to the Preliminary Site Investigation in Appendix M of this REF.

6.3.2 Existing environment

The site for the proposed pedestrian bridge consists primarily of the road shoulder and is bordered by rail corridor land with a corridor entrance and steep batter on the west side of the tracks. A guard rail was observed on the north shoulder of the Station Street bridge side and a vacant shoulder on the eastern side of the tracks.

The soil landscape of the area where the proposed activity would occur is Theresa Park Group, which is characterised by gently undulating slopes, mostly less than 5%, on Tertiary and Quaternary flood plains and terraces of Nepean River south of Cobbitty Creek. Soils in this landscape are highly variable and include poorly structured orange to red silty loam. The landscape is susceptible to localised flooding, seasonal water logging, very high erosion and concentrated flows.

The proposed activity will not be undertaken on land likely to contain acid sulphate soils.

6.3.1 Criteria

The following investigation levels and screening levels developed in the National Environment Protection (Assessment of Site Contamination) Measure were used Preliminary Site Investigation:

- Risk-based Health Investigation Levels
- Health Screening Levels
- Ecological Screening Levels, and

- Ecological Investigation Levels.

The site would be deemed contaminated or containing contamination “hot spots” if the above criteria area unfulfilled.

6.3.2 Potential impacts

Generally, the proposed activity does not have the potential to cause contamination, nor will it be likely to have a significant impact on soils and topography. The pedestrian bridge will also not have an impact on land stability as the recommended compaction process is achievable noting the batter and proximity to rail. This is assuming these works need to be undertaken during rail shutdown/ARTC Possession Window dates.

Borehole tests conducted as part of the Preliminary Site Investigation demonstrated no sign of fibre-cement pieces or other significant evidence of visual contamination. These results demonstrate that the site is suitable for the proposed activity of construction of a pedestrian overpass bridge.

During construction, the proposed activity would not involve significant excavation works and therefore there is unlikely to have any adverse impact on soil quality. However, there is potential for erosion to occur over the cleared area during the construction phase.

6.3.3 Safeguards and management measures

Based on the contamination assessment, all the laboratory test results satisfied the criteria for stating that the analytes selected are either not present (i.e. concentrations less than laboratory level) or present in the sampled soil within the accessible part of proposed pedestrian bridge concentrations that do not pose a risk of hazard to human health or the environment under a “commercial/industrial” form of development. It was concluded that the activity area is environmentally suitable for the proposed pedestrian bridge and will not be constructed on contaminated land.

In respect of soil and topography, the following safeguards and management measures have been identified:

Impact	Environmental safeguards	Responsibility	Timing	Reference
Contaminated materials	For any materials to be excavated and removed from the site, waste classification of materials is to be undertaken in accordance with the NSW EPA Waste Classification Guidelines prior to disposal at an appropriately licensed facility.	Proponent and Contractor	Construction	CON1
	Imported material (e.g., ENM) will be classified prior to use.	Proponent and Contractor	Construction	CON2
	If suspect materials are encountered during any stage of future site preparation/earthworks, an unexpected finds management protocol will be implemented.	Proponent and Contractor	Construction	CON3

Table 6-3: Traffic and transport safeguards and management measures

6.4 Traffic and transport

6.4.1 Methodology

A Traffic Impact Assessment Report was completed by PDC Consultants to investigate the anticipated traffic impacts of the proposed development and is attached in Appendix S of this REF. To gain an understanding of the existing vehicular and pedestrian traffic conditions, traffic surveys were undertaken on 21/04/21 between 6:00am-8:00pm.

Pedestrian trip generation was analysed based on the traffic surveys of several types of development commissioned by Transport to inform the RMS Guide Update. Mirvac's master planned residential development comprises two key types of development which were surveyed by the RMS Guide Update, being low density residential developments and neighbourhood centre developments.

Bicycle trip generation within the surrounding Menangle area was determined following an analysis of ABS Quick Stats data.

Bridge capacity analysis was undertaken to understand the level of service (LOS) of a pedestrian footpath within the urban street environment using the *Highway Capacity Manual 2010*.

6.4.2 Existing environment

The road network primarily consists of Station Street which is a two-lane public road owned by Wollondilly Shire Council which runs from the intersection of Menangle Road and Woodbridge Road to the west and to Moreton Park Road to the east. Stevens Road is accessed off Station Street approximately 40 metres west of the subject site and leads to the Menangle Station. Two private road networks operate directly north-west, and west of the subject site.

The subject site of the proposed activity includes a portion of the road reserve of Station Street between Stevens Road and the Main Southern Railway, part of the Main Southern Railway lands (existing and proposed overbridge) and touches the road reserve of Moreton Park Road.

The Hume Motorway is a state arterial highway that runs in a north-south alignment with two lanes in either direction. The nearest interchange access to the activity area is at Bingara Gorge 14km to the south and Campbelltown 8km to the north.

Menangle Road is a regional road in the vicinity of the site which carries a single lane in each direction. Menangle Road becomes a main road (MR 179) approximately 1km north of Station Street at its crossing of the Nepean River.

Station Street is a local road which runs in an east-west alignment between its intersections with Menangle Road to the west and Moreton Park Road to the east. It carries a single lane of traffic in each direction.

Moreton Park Road is a local road which runs in a north-south alignment between Douglas Park to the south and Station Street, Menangle to the north. Moreton Park Road carries a single lane of traffic in each direction and is generally rural in nature. Due to the current condition of the road, it does not generate significant pedestrian traffic owing to the limited number of rural properties that access the road within walking distance of Menangle Village. As such, the current rail bridge makes no provision for the separation of pedestrian or cyclist use and does not include a verge.



Figure 6-1: Location and road hierarchy plan (source: PDC Consultants, 2022)

When complete the proposed pedestrian overbridge will enhance pedestrian, cyclist and vehicle flow in the locality as the current bridge makes no provision for separation of pedestrian or cyclist movement from vehicular traffic.

6.4.3 Potential impacts

Construction

The Proposal will involve temporary partial closure of both Station Street and Stevens Road to complete construction of the proposed pedestrian bridge including reduction to a one-lane, two-way temporary configuration, with appropriate traffic controls to time-separate the eastbound and westbound movements.

Operation

Once the overbridge is constructed, pedestrians will be redirected away from the existing road bridge to cross over the railway corridor, significantly improving safety and connectivity between the residential areas of Wollondilly and the town centre.

6.4.4 Safeguards and management measures

Prior to the commencement of construction, interim arrangements for pedestrian access across the railway line needs to be addressed in a Traffic Management Plan.

The proposed measures should be implemented as part of a Construction Traffic Management Plan for the proposed activity:

- All trucks will arrive and depart the site via Station Street which provides direct access to Menangle Road approximately 400m west of the site.
- The site benefits from convenient access to the arterial road network via Menangle Road and hence trucks would not be required to circulate through local streets to access the site, except for the short section of Station Street.
- The proposed truck routes would have a limited impact on neighbouring residents and businesses.

Impact	Environmental safeguards	Responsibility	Timing	Reference
Traffic and transport	Where possible, current traffic movements and property accesses are to be maintained during the works. Any disturbance is to be minimised to prevent unnecessary traffic delays.	Proponent and Contractor	Construction	T1
	A traffic control plan will be prepared in accordance with documentation submitted with the REF. A preliminary Construction Traffic Management Plan (CTMP) has been prepared for the proposed activity which outlines the measures to be used in order to manage the likely disruptions to vehicle and pedestrian access during the construction period. This is attached in Appendix T of this REF and will be updated by the contractor once appointed.	Proponent and Contractor	Pre-construction	T2

Table 6-4: Traffic and transport safeguards and management measures

6.5 Noise and vibration

6.5.1 Methodology

The detailed methodology used for noise and vibration assessment is outlined in Appendixes A and B of the Noise and Vibration Impact Assessment in Appendix W. Broadly this includes identification of relevant acoustic concepts; the Individual's perception of sound; selection of Environmental Noise Indicators; effect of cumulative sound exposure; and monitoring methodology. Section 4.2 of the Noise and Vibration Impact Assessment includes identification of construction noise sources including construction activities and the noise levels generated by the equipment proposed to be used on site during construction.

Section 4.3 of the Noise and Vibration Impact Assessment Report details the methodology for Construction airborne noise assessment, including consideration of the following matters:

- Location of noise sources and sensitive receiver building locations
- Height of sources and receivers referenced to digital ground contours for the site and surrounding area
- Sound Power Levels (LW) of plant and equipment likely to be used during the various construction activities
- Each noise-sensitive building in the project has been assessed separately, considering all facades
- Separation distances between sources and receivers
- Acoustic shielding, potential reflections and attenuation from intervening structures, barriers and topography (natural and purpose built), and
- Ground absorption between the source and receiver, typically assuming 0.5 dBA.

Construction noise levels are assessed at the most noise affected facade and floor level of a receiver building. Construction noise levels experienced at other points on the building may be lower.

The predicted levels are conservative and represent the equipment/plant operating simultaneously in any 15-minute period. Where plant items are not operating simultaneously, or for reduced times in a 15-minute period, noise impacts could be lower than predicted.

A 5 dB(A) penalty in accordance with the Environmental Protection Agency's Interim Construction Guideline (ICNG) has been factored into the noise modelling levels where applicable to allow for particularly annoying activities, such as rock hammering, saw cutting and jack hammering.

A simplified assumption of the location of activities is modelled, with each activity assumed to be undertaken at the closest point to the receiver in the works area.

Works are assessed against Noise Management Levels (NML's) set under the ICNG to determine the potential construction noise impact measured against three different conditions, during normal construction hours, during works undertaken outside of recommended construction hours (weekend rail corridor possession windows) and night-time (including assessment of sleep disturbance risks). Consideration is also extended to the potential impacts of Construction related Road Traffic Noise.

Consideration of construction vibration impacts includes three main types of potential impact:

- Disturbance to building occupants;
- Potential damage to buildings; and
- Potential damage to sensitive equipment in a building.

Further detail of the noise and vibration objectives can be found in Section 3 of Appendix W.

6.5.2 Existing environment

A desktop land use survey was conducted as part of the Noise and Vibration Impact Assessment to understand the existing environment in the vicinity of the project. The existing acoustic and vibrational environment is characterised by a mix of rural uses, the construction of new dwelling houses is occurring immediately to the west and east of the site with subdivision works occurring to the north east. Existing dwellings and public land are located to the south west of the site. The Main Southern Railway Line runs through the middle of the site, with a combination of passenger and freight services. The Hume Motorway lies approximately 600 metres to the east of the subject site and Menangle Soil and Sand sandmining and soil mixing activities are located approximately one (1) kilometre to the north which adds to the background ambient noise in the vicinity of the site surrounds.

Sensitive receivers are land uses that are affected by noise and vibration in a way that causes disturbance to the use of land or premises. Sensitive receivers identified in the vicinity of the site are detailed in the table below:

Receiver type	Description / NCA	Address	Approximate closest distance to the Proposal, metres	Receiver ID
Residential	Low density suburban residential area along either side of the rail corridor	1390 Moreton Park Road, Menangle	173	R1
		42 Station Street, Menangle	58	R2
		28 Station Street, Menangle	85	R3
		26A Station Street, Menangle	99	R4
		27 Station Street, Menangle	317	R5
		110 Menangle Road, Menangle	404	R6
		1 Riversford Close, Menangle	142	R7
		4 Sulman Place, Menangle	338	R8
		13 St James Avenue, Menangle	356	R9
		7 Haines Place, Menangle	264	R10
		Villa 701/153 Menangle Road, Menangle	517	R11
		Durham Green Lodge, Menangle	677	R12
		1370 Moreton Park Road, Menangle	546	R13
Place of Worship	St James Anglican Church Menangle	131 Menangle Road, Menangle	250	R14
	St Patrick's Catholic Church	119 Menangle Road, Menangle	341	R15
Recreational Active	Dean McGrath Park (Playground)	18 Station Street, Menangle	198	R16
Commercial	The Menangle Store	2 Station Street, Menangle	342	R17
Industrial	Benedict Sands Menangle	31 Menangle Road, Menangle	760	R18
Infrastructure	Menangle Station	Stevens Road, Menangle	210	R19
	Menangle Rural Fire Brigade	90 Menangle Road, Menangle	486	R20
	Elizabeth Macarthur Agricultural Institute	60 Woodbridge Road, Menangle	634	R21

Figure 6-2 Nearest and representative noise sensitive receivers (source: Renzo Tonin, 2023).

6.5.1 Criteria

The noise and vibration assessment was conducted against the following criteria:

Guideline/policy document	Assessment aspect
Construction Noise and Vibration Strategy (Transport for NSW, 2019)	Airborne noise, ground-borne noise and vibration impacts (including construction traffic within the construction support site boundary)
Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009)	Airborne noise and ground-borne noise impacts (including construction traffic within the construction support site boundary)
Assessing Vibration: a technical guideline (Department of Environment and Climate Change, 2006)	Vibration amenity - construction and operations

British Standard BS 7385: Part 2-1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from groundborne vibration (BSI, 1993)	Vibration impacts to structures and blasting impacts
German Standard DIN 4150-3 (2016) Structural vibration – Effects of vibration on structures (Deutsches Institut für Normung, 2016)	Vibration impacts to structures and blasting impacts
NSW Road Noise Policy (Department of Environment, Climate Change and Water, 2011)	Construction road traffic noise impacts (on public roads)

Table 6-5: Noise and Vibration Assessment Criteria (Source: Renzo Tonin, 2023)

6.5.2 Potential impacts

Construction

The majority of acoustic and vibration impacts are expected during the construction period and are temporary in nature. Construction is expected to occur over a period of 15 weeks; however, activities will not be constant over this period. Noise Modelling Assumptions for construction activities and likely equipment required are outlined in the following table:

Ref.	Stage	Construction activity	Activity Lw, dB(A)		Construction equipment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
			L _{Aeq} (5min) ¹	L _{Amax}	Concrete pump	Concrete vibrators	Daymaker	Generator	Elevated work platform	Excavator with bucket	Franna crane	Front end loader	Forklift	Hand tools	Vibratory roller	Truck (medium rigid)	Dump truck	Semi-trailer truck	Water truck	Plate compactor	Piling rig - bored	Vacuum truck	Regulator	Rail saw ³	Rail profile grinder ³	Ballast tamper	Mobile crane	Welding equipment	Concrete agitator	Drill rig (borehole)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
					Sound Power level (Lw) (L _{Aeq})	Assumed usage time (min)	Sound Power level (Lw) (L _{Amax})																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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S1	Preconstruction site investigation works	Site investigation (utilities), validation of detailed site survey	112	117				•		•				•				•				•																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</

- Notes:
1. Activity L_{Aeq}5min sound power levels (L_w) are based upon the loudest 3 items of plant/equipment operating simultaneously in the same location. Number of units operating at any one time may change on site.
 2. Assumptions in table are for modelling purposes, based on a conservative, but realistic estimate of equipment operating concurrently for each activity.
 3. Activity L_{Amax} sound power levels (L_w) is based upon the loudest item of plant/equipment for equipment potentially used during the night period with high noise events.
 4. In accordance with the ICNG and the TNSW CNVS, a 5 dB(A) 'penalty' is applied for activities identified as particularly annoying, such as rock hammers, power saws and grinding operations.

Table 6-6 Noise modelling assumptions for construction - activities and equipment (Source: Renzo Tonin, 2023).

Separate consideration is given for construction activities within and outside standard construction hours. Table 10 outlines the degree of disturbance for each category of activity, with Table 11 showing the predicted levels of disturbance from construction noise.

Assessment	Time of day	Key			
L _{Aeq} (15min)	Standard hours ¹	0-10 dB(A) over NML (light blue) Clearly audible	11-20 dB(A) over NML (mid blue) Moderately intrusive	> 20 dB(A) above NML (dark blue) Highly intrusive	
	Outside standard hours	1-5 dB(A) above NML (green) Noticeable	6-15 dB(A) above NML (yellow) Clearly audible	16-25 dB(A) above NML (orange) Moderately intrusive	> 25 dB(A) above NML (purple) Highly intrusive
Sleep disturbance	Night only	L _{Amax} above sleep disturbance screening criterion (yellow)		L _{Amax} above awakening level (> 65 dB(A), purple)	

Note: 1. Highly noise affected (HNA) which is greater than 75dB(A) is shown with **Bold** text and applies to residential receiver buildings only during standard construction hours.

Table 6-7: Key to the predicted construction noise results tables (Source; Renzo Tonin, 2023)

Stage	Construction activity	Assessment reference	Highly noise affected ²	Day (standard hours)			Day (outside standard hours)				Evening				Night				Sleep disturbance	
			L _{Aeq}	L _{eq}			L _{Aeq}				L _{Aeq}				L _{Aeq}				L _{Amax}	
			> 75 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	> 20 dB(A)	1 – 5 dB(A)	6 – 15 dB(A)	16 – 25 dB(A)	> 25 dB(A)	1 – 5 dB(A)	6 – 15 dB(A)	16 – 25 dB(A)	> 25 dB(A)	1 – 5 dB(A)	6 – 15 dB(A)	16 – 25 dB(A)	> 25 dB(A)	Screening	Awakening
Pre-construction site investigation works	Site investigation (utilities), validation of detailed site survey,	S1	0	27	0	0	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	
Temporary site compound and staging area	Site preparation/ demobilisation (<i>standard hours only</i>)	S2	0	14	0	0	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	
	Site compound activities (ie. laydown)	S3	0	1	0	0	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	
Piling	Civil related (footings excavation works)	S4	0	32	1	0	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	
Form, reo & pour abutment	Civil related (concreting, installation works)	S5	0	14	0	0	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	
Installation of the bridge beams	OHW works - A 300T crane (estimated) will be used for the installation of the bridge beams	S6	0	27	0	0	28	27	0	0	27	14	0	0	32	28	0	0	10	0

Notes: 1. Construction noise level cells are shaded based upon the predicted worst case NML exceedance of the controlling time period in accordance with the key presented in Table 4-5.
2. Highly noise affected applies during standard hours, as per the ICNG.
3. No typical work is proposed outside standard construction hours.

Table 6-8: Number of receiver properties over the noise management level – residential receivers (Source: Renzo Tonin, 2023)

Table 11 demonstrates that the majority of activities carried out during standard construction hours will remain below the levels where the noise could be considered moderately intrusive, with the exception of the proposed piling works to establish the footings. This activity is only marginally within the moderately intrusive range.

The main activities that will cause noise disturbance will be for the installation of the bridge beams, which will occur out of hours during the possession windows. This activity would create noise that is noticeable/clearly audible outside of standard construction hours and which would likely cause sleep disturbance in the evening and night. It is noted that the possessions would be infrequent over the course of single weekends and that a single weekend is likely to be sufficient to install the bridge beams. With appropriate notification and mitigation measures this can be considered an acceptable level of impact for a proposal of this nature.

The proposed construction activities do not include a large number of associated heavy vehicle movements and are likely to be restricted to deliveries of materials to the temporary site compound. Heavy vehicle movements are likely to be in the order of four per hour during daytime periods. With appropriate management measure put in place during construction, additional traffic noise from construction traffic is likely to be below 2dB as a result of construction of the pedestrian bridge.

With respect to predicted vibration impacts, these are likely to be limited to the operation of specific plant, the nature of its operation (including duration) and the intervening geology between the source and the receiver. The Noise and Vibration Impact Assessment Report details the following recommended minimum working distance for vibration intensive plant (referenced from Transport for NSW Construction and Noise Vibration Strategy) :

Plant item	Rating/ description	Minimum working distance (metres)		
		Cosmetic damage		Human response
		Unreinforced or light framed structures (sound structure)	Structurally unsound heritage structures (unsound structure)	
Smooth drum roller	< 300 kN (typically 7-13 tonne)	15 metres ¹	31 metres	100 metres ¹
Plate compactor/ Wacker packer	Handheld	1 metres (nominal)	5 metres	15 metres
Jackhammer	Handheld ¹	1 metres (nominal) ¹	5 metres	Avoid contact with structure ¹

Note 1: Source: TfNSW Construction Noise and Vibration Strategy (Appendix D)

Table 6-9 Recommended minimum working distances from vibration intensive plant (Source: Renzo Tonin & Transport)

Based on the above recommended distances in Table 12, above, there are no sensitive uses within the radius of the activities that were likely to suffer cosmetic damage or human response impact from vibration. There is potential for up to three properties that may be occupied during the construction period to feel vibrations from the vibratory roller. The level of impacts from use can be managed through providing respite periods during the use of the vibratory roller and limiting its use during night-time works (out of hours work period 2).

Should the above measures still result in measured vibration monitoring results that exceed the perception levels following application of feasible and reasonable mitigation measures (as set out in Section 4.6.2 of the Noise and Vibration Impact Assessment Report), then additional mitigation measures may need to be implemented.

Construction hours	Receiver perception	above VML	Additional mitigation measures
Standard Hours	Human disturbance	> HVML	PN, V, RO
	Building damage	> DVML	V, AC
OOHW Period 1	Human disturbance	> HVML	PN, V, SN, RO, RP, DR
	Building damage	> DVML	V, AC
OOHW Period 2	Human disturbance	> HVML	PN, V, SN, RO, RP, DR, AA
	Building damage	> DVML	V, AC

Notes: PN = Project notification RO = Project specific respite offer RP = Project specific respite offer
V = Verification monitoring AA = Alternative accommodation DR = Duration reduction
SN = Specific notifications, individual briefing or phone call
AC = Alternative construction methodology

Table 6-10: Additional vibration noise management measures matrix (Source: Renzo Tonin, 2023)

Operation

There is no expectation of ongoing noise and vibration from the Pedestrian Overbridge during its operations, with impacts confined to the construction phase only. Decking will be constructed out of in-situ concrete, minimising the sound of footfall. Vibration impacts will be negligible as the overbridge will only be used by pedestrians and dismounted cyclists.

6.5.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Reference
Noise and vibration	A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the <i>Interim Construction Noise Guideline (ICNG) (DECC, 2009)</i> and identify: - all potential significant noise and vibration generating activities associated with the activity - feasible and reasonable mitigation measures to be implemented, taking into account <i>Beyond the Pavement: urban design policy, process and principles</i> (Transport, 2014). - a monitoring program to assess performance against relevant noise criteria - arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures - contingency measures to be implemented in the event of non-compliance with noise and vibration criteria.	Proponent and Contractor	Pre-construction]	NV1 Section 4.6 of QA G36 <i>Environment Protection</i>
	All sensitive receivers (e.g., schools and local residents) likely to be affected will be notified at least [insert no. of days] prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of: - the project - the construction period and construction hours - contact information for project management staff - complaint and incident reporting, and - how to obtain further information.	Proponent and Contractor	Pre-construction]	NV2
	Noise impacts will be minimised in accordance with Transport Construction and Maintenance Noise Estimator (EMF-NV-TT-0067) and Transport Construction noise and vibration guidelines (for roads and maritime) 2022 (EMF-NV-GD-0056).	Proponent and Contractor	Construction	NV3
	Measures, including allowing adequate distance that rollers and other vibration producing equipment can come to adjacent buildings and/or using non vibration producing equipment, to minimise or prevent vibration impacts.	Proponent and Contractor	Construction	NV4

Table 6-11: Noise and vibration safeguards and management measures

6.6 Aboriginal cultural heritage

6.6.1 Methodology

The Department of Planning and Environment sets out a process for identifying Aboriginal parties who may have information on the cultural significance of objects or places and providing Aboriginal people with opportunities to comment on the methods used to identify and assess objects or places, and opportunities to contribute to the development of management options and recommendations. Kayandel Archaeological Services (KAS) undertook consultation with the identified Aboriginal stakeholders known to hold cultural knowledge relating to the subject area and who were generally accepted within the Aboriginal community as being the holder of a right to speak for the *country* in which the subject area is located. These consultation activities were carried out as part of the large lot procedural subdivision and bulk earthworks Development Application submitted by Mirvac to facilitate transforming the land to accommodate future residential uses. The purpose of the community consultation was to understand the cultural values of the subject area and to understand the community's views and concerns about the development. It did not include discussion of the Pedestrian Bridge as a stand-alone project, only as part of the overall development.

Niche Environment and Heritage prepared an Aboriginal Objects Due Diligence Assessment for the proposed development, and is attached in Appendix N. The Due Diligence follows the process outlined in the Figure 6-2 below. In March 2023, the Aboriginal Objects Due Diligence Assessment was reviewed by a Transport Aboriginal Cultural Heritage Officer for consistency against the Transport for NSW *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) in Appendix X. The Stage 1 Assessment, provided in Appendix N, found that the project is unlikely to have an impact on Aboriginal cultural heritage.

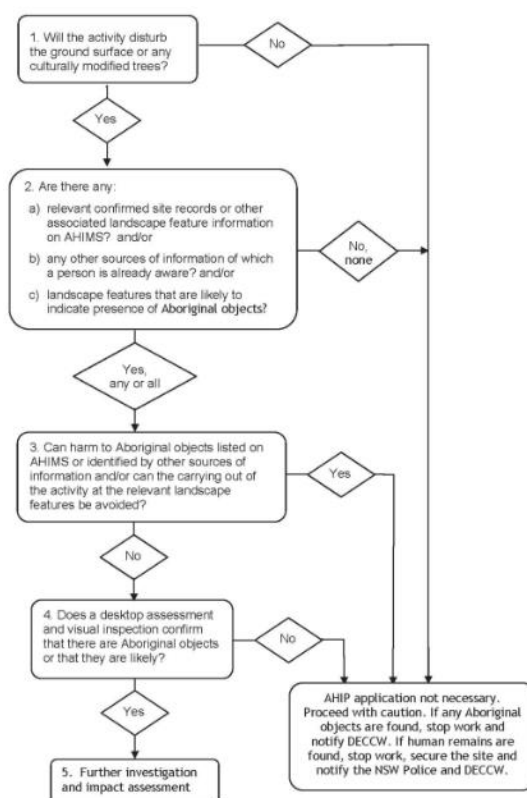


Figure 6-3: The *Due Diligence Code of Practice for the Protection of Aboriginal objects in NSW* (source: Niche Environment and Heritage, 2022)

6.6.2 Existing environment

An AHIMS search found no recorded sites located within the activity area and one recorded Aboriginal cultural heritage site located within 200m of the area of the proposed works.

Searches of the World Heritage Database, the Commonwealth Heritage List, National Heritage List, State Heritage Register, State Heritage Inventory, the Wollondilly Local Environmental Plan 2011, and the Wollondilly Development Control Plan found no Aboriginal heritage items within the Activity Area.

6.6.1 History

The Menangle area is the traditional country of the Tharawal people. The records and histories of the Tharawal and their country at the time of contact with Europeans are subject to bias and are generally fragmented.

Despite great changes that were so quickly brought to the Aboriginal people of the region including drought and the competition of resources, and punitive action against the Aboriginal population under direction by Governor Macquarie in the early 1800s, the Tharawal continue as custodians of the land, and many continue to live in the country today.

6.6.2 Potential impacts

It is unlikely that Aboriginal objects have survived within the activity area due to significant ground disturbances associated with vegetation removal, the construction of roads, bridge, railway corridor and associated infrastructure. These disturbances have modified that Activity Area to such an extent that the potential for subsurface Aboriginal objects is low.

No Aboriginal heritage constraints were identified for the proposed activity and no further investigation or impact assessment is required for Aboriginal Cultural Heritage.

It is noted that the proposed activity will not affect wild resources or access to these resources that are used or valued by the Aboriginal community. The activity is occurring within the verge of existing roads, an existing rail line and in highly disturbed rural lands.

The proposed activity includes vegetation removal of a selection of trees. The activity will not disturb any culturally modified trees as none have been identified from the site inspection.

The activity area is located 120m away from an ephemeral first order drainage line, which is an associated tributary of the Nepean River. Generally, there is a higher probability of Aboriginal Objects occurring within land that is within 200m of water. However, there is limited potential for subsurface deposit within the activity area due to significant ground disturbances due to prior development for railway and road purposes.

6.6.3 Safeguards and management measures

In the Aboriginal Objects Due Diligence Assessment, Niche Environmental identified the following mitigation measure in the unlikely event that artefacts are encountered in the subject site of the activity:

Impact	Environmental safeguards	Responsibility	Timing	Reference
Aboriginal heritage artefacts	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Transport Aboriginal cultural heritage officer and Senior Manager Environment and Sustainability contacted immediately. Refer to steps in the Transport Unexpected heritage items procedure (EMF-HE-PR-0076) which must be followed.	Proponent and Contractor	Construction	ACH1

Table 6-12: Aboriginal cultural heritage safeguards and management measures

6.7 Non-Aboriginal heritage

6.7.1 Methodology

A Historical Heritage Assessment and Statement of Heritage Impact has been undertaken by Biosis Pty Ltd (Appendix H) in accordance with current heritage guidelines including Assessing Heritage Significance for Archaeological Sites and 'Relics' and the Burra Charter. The following is a summary of the major objectives of the Historical Heritage Assessment:

- Identify and assess the heritage values associated with the study area. The assessment aims to achieve this objective through providing a brief summary of the principle historical influences that have contributed to creating the present – day built – environment of the study area using resources already available and some limited new research.
- Assess the impact of the proposed works on the cultural heritage significance of the study area.
- Identifying sites and features within the study area which are already recognised for their heritage value through statutory and non – statutory heritage listings.
- Recommend measures to avoid or mitigate any negative impacts on the heritage significance of the study area.

While the study area is within the Conservation Area and Landscape Conservation Area, they do not specifically list the bridge or indicate that the bridge contributes to the significance of the listing.

A search in the national and state heritage registers was undertaken in the databases listed in Table 6-13, below.

Database	Status
National Heritage List	No known items or places of significance
Commonwealth Heritage List	No known items or places of significance
State Heritage Register	No known items or places of significance
Section 170 Heritage and Conservation Registers	No known items of significance
Wollondilly LEP 2011	The study area is within two listed conservation areas and is in the vicinity of heritage items of local significance

Table 6-13: Non-Indigenous Heritage (Source: Biosis, 2022)

A search of the national and state heritage registers indicates that the proposed activity is not located in an area where there is national or state items of heritage significance. A search of relevant Environmental Planning Instruments identified the proposed activity to be in an area of local items of heritage significance or heritage conservation areas.

6.7.2 Existing environment

The study area is listed within two conservation areas of local significance listed under Schedule 5 Environmental Heritage of the *Wollondilly LEP 2011*:

- Menangle Conservation Area Item No. C1 Menangle Road and Woodbridge Road/Station Street Menangle. Conservation area of local significance including the study area.
- Menangle Landscape Conservation Area Item No. C6 Menangle Road and Woodbridge Road/Station Street Menangle. Conservation area of local significance including the study area.

The study area is also situated in the vicinity of two heritage items of local significance listed under Schedule 5 Environmental Heritage of the *Wollondilly LEP 2011*:

- Menangle Public School (former) (item no. I291) 28 Station Street, Lot 1 DP 795181. Item of local significance located adjacently south.
- Dairy Cottage (item no I97) 1370 Moreton Park Road, Part Lot 3 DP 1272871. Item of local significance located approximately 45m east.

There are no items listed on the SHR within the study area. The following heritage items are listed in the vicinity:

- Menangle Railway Station group, (Item No. 01191), Main Southern Railway, Menangle, located approximately 190 metres north of the study area.
- This item is unlikely to be directly affected by the works to establish the activity.

6.7.1 History

Historical research has been undertaken to identify the land use history of the study area, to isolate key phases in its history and to identify the location of any built heritage or archaeological resources which may be associated with the study area.

The earliest European exploration of the Cumberland Plain was made in 1789 with the first group reaching the Nepean River on 28 June 1789. A government party was established in 1792 and the area was named “Cowpastures” following the sighting of cattle. Shortly after, the land was declared for government grazing to ensure the survival of the wild and newer stock. Over time, cattle numbers rose, and it was estimated that there were between 500-600 wild cattle. Emancipated convicts and settlers began to migrate to the Cowpastures and establish farms and pastoral runs. In order to protect the government’s cattle from theft, Governor King in 1803 forbade the crossing of the Nepean River without an official permit issued by himself.

The study area is contained within two land grants, one to John Macarthur and one to Walter Davidson. Macarthur was a significant landowner in the early colony and, along with his wife Elizabeth, arrived in Port Jackson with their son Edward in 1790. The Macarthur’s first established Elizabeth Farm in Parramatta, and further acquired land in Cabramatta, Castle Hill, Dundas, Field of Mars, Prospect and Toongabbie. They then swapped some of this land for land in the Cowpastures in 1805.

A program of land clearing was undertaken in the 1820s in preparation for the property as a pastoral farm and sheep stud, the oldest in Australia. By the end of the decade, fencing was established throughout the property, which managed sheep, cattle, horses and dairy cows, and, with crops such as wheat and maize grown on the river flats. Following John Macarthur’s death in 1834, the management of the Estate passed to James and William Macarthur, fourth and youngest sons of John and Elizabeth respectively. In 1837, James and William purchased Davidson’s share of the land.

In 1863, the Menangle Railway Station was constructed, and the rail bridge was extended over the Nepean River which provided cheap and reliable transport to the Sydney market for the first time, and gave Camden Park Estate overnight delivery of milk to the Sydney market. The Crown Plan shown below is dated 1893, and records an overbridge [3] crossing the Great Southern Railway which was likely constructed shortly prior.

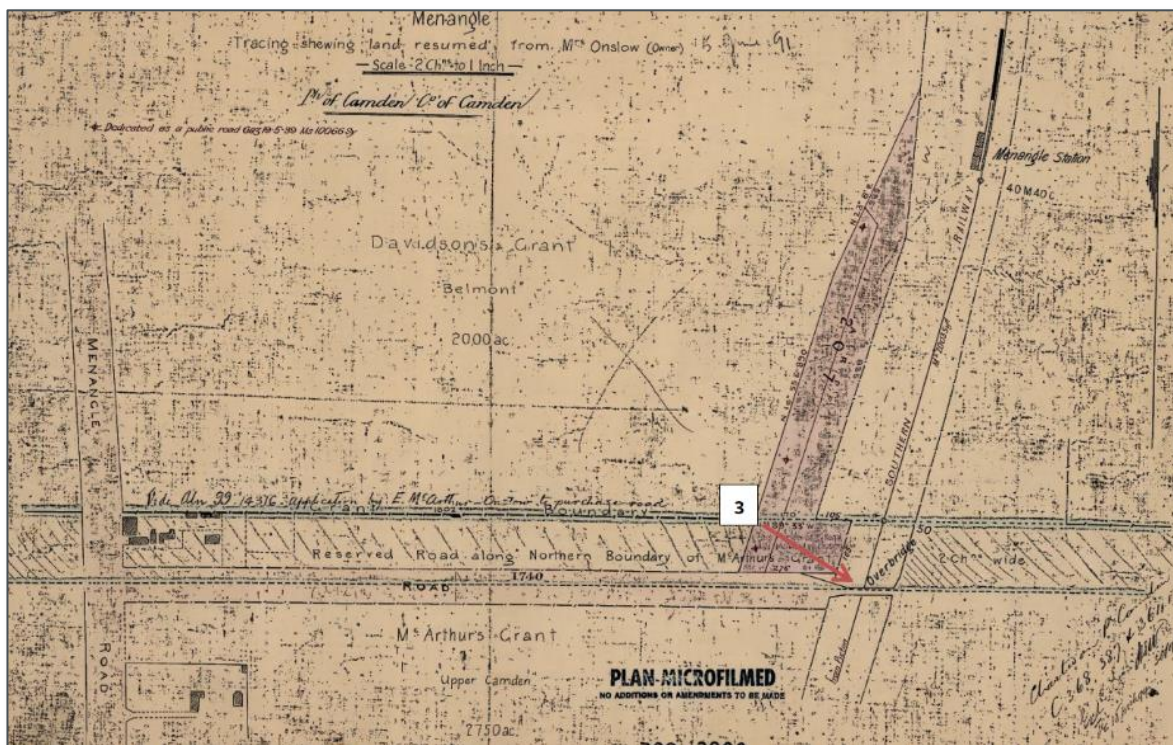


Figure 6-4: Crown Plan of the resumed land for the Railway Station Yard and road dated to 1893 (source: Biosis, 2022 – NSW Land Registry Services, Crown Plan 789.3000)

With the expansion of grazing and the impact of wheat rust, many pastoralists refocused their efforts to dairying, with the Macarthur’s and Camden Park Estate being leaders in this endeavour. Many of the buildings on the Estate were converted to

creameries, with new dairy buildings constructed and new technology brought to the property over time. Improvements were made to the Estate and its buildings from 1889 once the management of the Estate passed to Elizabeth Macarthur Onslow, daughter of James Macarthur, and Aston John Onslow Thomson, a relation of Elizabeth. By 1899, the dairy and orchards were the primary income generators for the Estate. In the same year, Elizabeth established the Estate as a private company, Camden Park Estate Pty Ltd, with her children installed as directors and shareholders. The dairy revolution of the 1890s and the overall success of the dairying industry brought prosperity to Menangle. The estate constructed a central creamery adjacent to the railway line where cream was separated and processed to supply the Sydney market.

Camden Park Estate was brought under Torrens Title during 1900 and this began a period of subdivision within the estate. Substantial tracts of land around the peripheries of the estate, that were much less suitable for dairying, were subdivided into farm lots from 1905-1910. The effect of the subdivisions was to consolidate the estate around its main dairying facilities at Camden, Menangle, and Cawdor. The sale of Camden Park Estate Pty Ltd in 1973 was the end of the period for Menangle as a closed estate village. Sometime between 1951 and 1978, the overbridge was reconstructed and widened to a double lane car overbridge with railing.

6.7.2 Potential impacts

The Historical Heritage Assessment prepared by Biosis has identified no historical archaeological potential within the study area. While the bridge is within the heritage curtilage of two conservation areas, this assessment concluded that the bridge holds no heritage significance of its own. The bridge upgrade will result in minimal impacts to the surrounding heritage landscape, should the recommended mitigation measures be implemented. As such, no further assessment is required prior to works commencing.

This study concluded that the potential for encountering relics of significance within the study area was low and that the impacts on the heritage values of the surrounds would be minor.

The impact of the proposed activity on historical heritage is limited to a minor visual impact to the Menangle Conservation Area C1 and the Menangle Landscape Conservation Area C6. This involves the loss of mature vegetation from the Stevens Road verge (one mature native tree removed and potential removal of a second) and the construction of a new pedestrian bridge structure that will be a standalone structure adjacent to the existing road bridge crossing. The proposed works will not be significantly more visually intrusive than the existing road overbridge structure. Any minor visual impact can be mitigated through the use of planting as proposed in the Visual Impact Assessment in Appendix J and the proposed Landscape Plan in Appendix F for additional information and the proposed mitigation measures for the visual impacts on the Heritage Conservation Area and Landscape Conservation Area.

Biosis have identified that the activity is unlikely to significantly impact on places, buildings, landscape, or moveable heritage items. The existing road bridge has been assessed by Biosis to not contain heritage significance and therefore, any changes to the bridge will have no impact to its significance.

6.7.3 Safeguards and management measures

In the Historical Heritage Assessment and Statement of Heritage Impact, Biosis formulated recommendations to respond to client requirements and the significance of the site. These are outlined in the Table below.

Impact	Environmental safeguards	Responsibility	Timing	Reference
Non-Aboriginal heritage	If unexpected heritage items are uncovered during the works, all works must cease in the vicinity of the material/find and the steps in the Transport Unexpected heritage items procedure (EMF-HE-PR-0076) must be followed.	Proponent and Contractor	Construction	NAH1 Section 4.9 of QA G36 <i>Environment Protection</i>

Table 6-14: Non-Aboriginal heritage safeguards and management measures

6.8 Landscape character and visual impacts

6.8.1 Methodology

The site is located within the Menangle Conservation Area and the Menangle Landscape Conservation area, both of which are listed in the *Wollondilly Local Environmental Plan 2011* (Wollondilly LEP) and subject to specific controls in the Wollondilly DCP. A Visual Impact Assessment (refer to Appendix J) of the activity has been undertaken by Sturt Noble and Associates (Sturt Noble) that notes the following visual characteristics of the subject site.

The Wollondilly Shire Council DCP 2016 Volume 1: Landscape Conservation Area – Menangle lists four significant view corridors that must be maintained. One view is within the vicinity of the subject site and is described in the DCP as:

- North - Railway, Rotolactor, Central Creamery with grazing and cropping land

Figure 6-5 below, extracted from the Visual Impact Assessment by Sturt Noble Associates identifies the view corridor as shown in the DCP. When on site, SNA investigated this view corridor and found that due to the landform and built form in the area, this view corridor will be unaffected by the proposed pedestrian bridge.



Figure 6-5: Context Plan showing visual relationship of subject site to significant view corridors and visual elements in the landscape (source: Sturt Noble, 2022)

6.8.2 Existing environment

The site is located 250m south of the Menangle Train Station and is centred around the Station Street road bridge that crosses the train tracks. To the west of the bridge, Station Street continues in a straight line to meet Menangle Road while to the east it turns into a private road after meeting Moreton Park Road. The area to the south-west of the site consists of large residential blocks that are located on the edge of the suburban centre of Menangle, while the land to the north and east consists of open farmland with scatterings of trees and farmhouses. Running directly through the site and below street level is the Main Southern Railway Line.

The site contains significant scenic or visually significant characteristics. The activity area is in the vicinity of one view corridor identified under the Wollondilly Shire Council DCP 2016 Volume 1: Landscape Conservation Area being North – Railway,

Rotolactor, Central Creamery with grazing and cropping land. This view corridor will be unaffected by the proposed pedestrian bridge.

There are limited public private and public view lines extending to the site of the proposed overbridge, which are constrained by the existing topography, vegetation and the existing road overbridge structure. The view lines are specific to the visual catchment of the Bridge and do not correspond to the view corridors identified in the Menangle DCP. These are detailed in Figure 6-6 below:

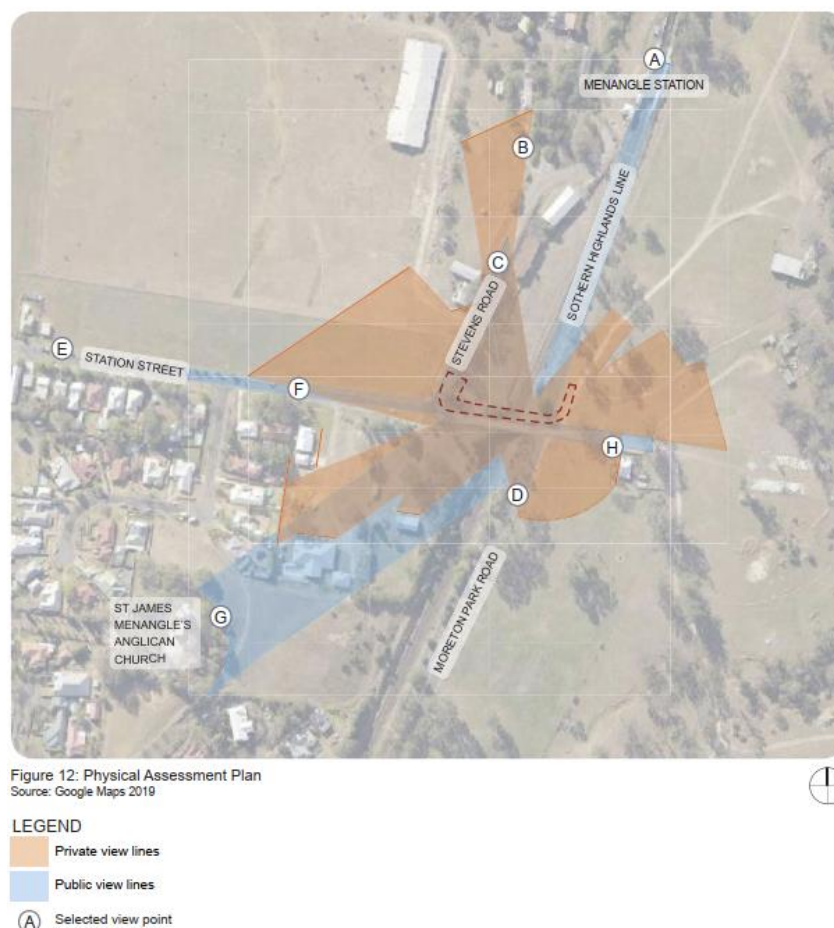


Figure 6-6: Physical Assessment Plan showing the private and public view lines for the proposed activity (source: Sturt Noble, 2022)

The area currently has a predominantly rural character, including Menangle Village itself. The area to the north of Station Street is currently undergoing development for residential subdivision, and the area to the east of the Main Southern Rail line is currently under application for the same purpose.

Since European occupation, the site had primarily been used for viticulture and the grazing for dairy cows. It was in one of the first land grants in the area. In the 1860's the Great Southern Railway was constructed, and the construction of the Menangle Station occurred soon after this. The original road bridge over the railway line was built during the 1890s and was a single lane bridge. At some point during 1951-1978 the bridge was demolished and rebuilt into the bridge that is on the site.

The surrounding area has a gentle slope from a southern mound where the St James Menangle's Anglican Church is situated. From this rise the ground slopes gently away to the north and east where the site is located. The landscape has been steeply cut into to accommodate the train line.

The visual character of the site is that it has previously been cleared, and the vegetation currently growing around the bridge consists of remnant canopy trees with highly disturbed understorey and ground cover species that are mainly exotic grasses and weeds. Remnant native species and exotic introduced species are distributed linearly along the side of Steven's Road, with smaller remnant patches also occurring at the edges of Station Street. The Wollondilly DCP makes specific reference to Stevens Road, stating:

"The row of established vegetation that runs along Stevens Road shall be retained during any future development."

The image below shows the extent of change in the visual environment looking towards the overbridge from the east. This demonstrates that the addition of the pedestrian overbridge will not greatly alter the visual environment, especially when considering that the existing rural context is in the process of urban transformation.



Figure 24: View H Existing



Figure 25: View H Indicative Extent and Mass of the Proposal

Figure 6-7: Extracted images from Visual Impact Assessment that shows the existing bridge and additional massing from the addition of the proposed pedestrian bridge (source: Sturt Noble, 2022)

6.8.3 Criteria

The plan below, taken from the Arboricultural Impact Assessment Report in Appendix K, illustrates the trees along Stevens Road to be retained and their requisite Tree Protection Zones (TPZs) and Structural Root Zones (SRZs). These zones have been arrived at using methods as detailed in Australian Standard 4970-2009. Of particular note are Trees 1, 5 & 6 along the western side of Stevens Road which will also have a footpath made of permeable pavement that will work with the SRZs of the trees. Its impact will not be other than what is expected and will therefore not be significant.

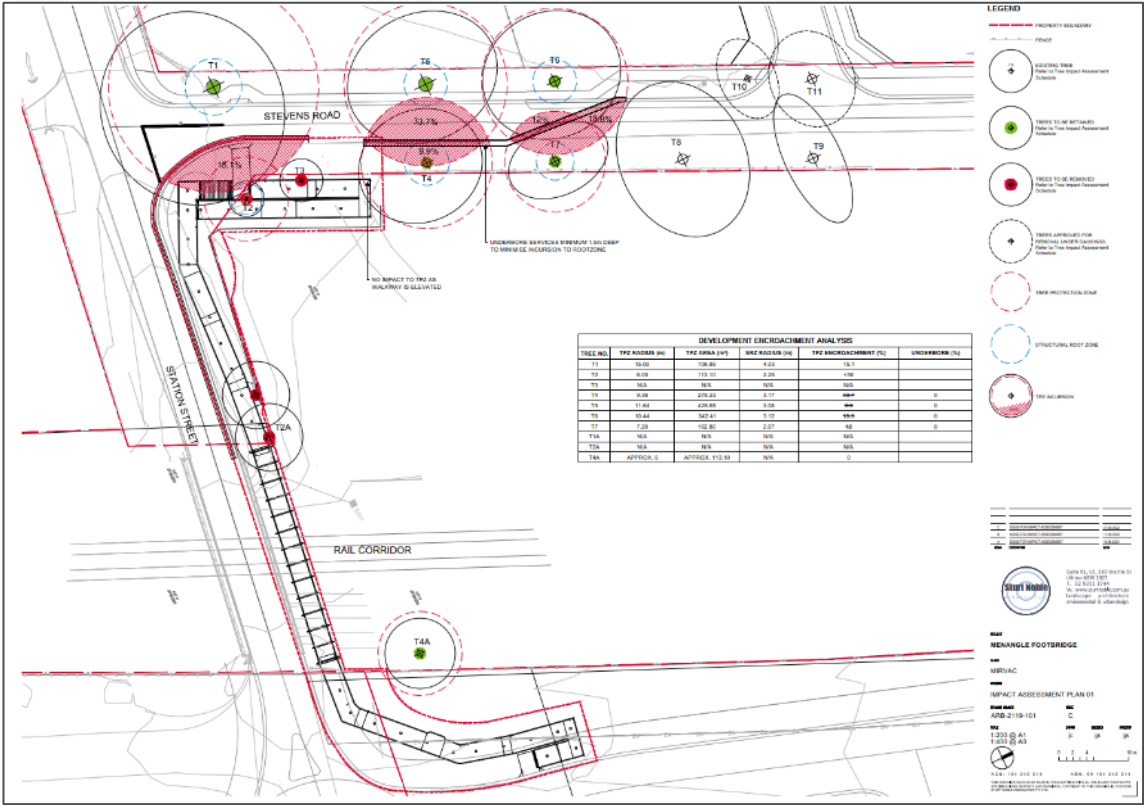


Figure 6-8: Impact Assessment Plan 01 showing Trees 1, 5 & 6 (source: Sturt Noble, 2022)

These trees were assessed from the ground by the Visual Tree Assessment method using non-invasive tools such as binoculars and acoustic mallet. Each tree was given a Sustainable Retention Index Value according to the rating system set out in the Sustainable Retention Index Value Matrix. The value of each tree is based on its health, vigour, structure, and age class. Each tree was also given a Tree Significance in landscape rating.

6.8.4 Potential impacts

Construction

The proposed activity will have some affectation of visual or scenic landscapes during construction. Construction works would involve limited disturbance of the current landform, with a small area of clearing of native and exotic vegetation. This would involve works within Stevens Road and includes the loss of a mature native tree, which would impact on the row of established vegetation highlighted in the DCP. The reason for this vegetation removal is to facilitate Australian Standard-compliant access ramps (AS1428.1-2001 Design for Access and Mobility) and the designed solution represents the only feasible option for achieving a DDA compliant design.

Operation

The proposed pedestrian bridge and its approaches will result in no high visual impacts to existing views of the site. The proposed activity is considered to have a low visual impact on the surrounding landscape and will be carried out at ground level causing no impact on the privacy of neighbouring residents or casting shadows on adjacent buildings. The design of the proposed pedestrian bridge results in minimal changes to the views assessed. A visual impact assessment was conducted for the subject site and concluded that the visual impacts of the proposal were minor.

6.8.5 Safeguards and management measures

The proposed pedestrian bridge and its approaches will result in no high visual impacts to existing views of the site. The proposed activity is considered to have a low visual impact on the surrounding landscape. The design of the proposed pedestrian bridge results in minimal changes to the views assessed. The visual impacts caused by tree removal in Stevens Road will be mitigated by additional landscape planting once the construction work is completed.

The following measures are proposed to minimise any visual impacts:

Impact	Environmental safeguards	Responsibility	Timing	Reference
Visual amenity	Landscaping is to be managed in accordance with the Landscape Plan documentation submitted with the REF.	Proponent and Contractor	Construction	VIS1
Increased massing of the bridge from the security fence	- Make the fence as perforated as possible to reduce its weight and massing in the landscape whilst maintain compliance with ARTC standards for throw screens. - Appropriately select materials and colours for the security fence that visually recede and blend into the surroundings as much as possible whilst still complying with ARTC standards for security fencing.	Proponent and Contractor	Construction	VIS2
Visibility of the approaches for the new pedestrian bridge and the removal of existing vegetation, increasing the hardness of the view	- Screen the bridge approaches with new tree and shrub planting. - Soften the proposed pedestrian bridge with a planted edge between the road and ridge. - Appropriately select materials and colours for the pedestrian bridge to make it blend in with existing built forms.	Proponent and Contractor	Construction	VIS3

Table 6-15: Landscape character and visual safeguards and management measures

6.9 Land use and socio-economic

6.9.1 Existing environment

The proposed Pedestrian/Cycle Overbridge includes a single span extending over the Main Southern Railway Line. Station Street is a two-lane public road, and the Station Street road bridge has road and pedestrian barriers on either side with a utilities trench on the south side of the bridge. The bridge adjoins Moreton Park Road to east, which continues south parallel to the train Line.

Despite being a public road, the subject site carries a low recreational value, as pedestrians have to walk on the road in order to cross the train line given no footpath is provided. The proposed works will positively benefit the recreational needs of the community through providing a designated and protected pedestrian footpath.



Figure 6-9: Location of Proposed Pedestrian Bridge (source: SIX Maps, 2023)

The site is located between predominantly rural land, residential within the existing Menangle Village, vacant land (including development sites) with scattered vegetation. Part of Menangle surrounding the subject site to the east and west was rezoned by an amendment to *Wollondilly Local Environmental Plan 2011* to residential and commercial uses. This has enabled residential subdivision, and future commercial development of surrounding lands, with areas of public open space whilst maintaining residual rural use on the balance areas of the parcels that were part rezoned. Neighbouring lands have already been subject to Development Applications to Wollondilly Shire Council seeking to develop the land for the purposes of the recently permitted uses. The subject site is part of the Menangle General Conservation Area and the Menangle Landscape Conservation Area and is in close proximity to heritage items such as the Menangle Railway Station Group, the Former Camden Park Estate Central Creamery and Former Menangle Public School.

Surrounding land uses include the following:

- Existing low density residential to the south-west
- Future low density residential to the north-west, south-east and north-east.
- Rural uses to the north-west, north-east and south-east
- The Nepean River to the north, and
- Future Neighbourhood Centre (Central Creamery) directly east and west of Menangle Station.

6.9.2 Potential impacts

Construction

Considering the scale of the work, no significant social issues relating to the construction and operation of the proposed activity have been identified.

Temporary jobs will be created throughout the design and planning phase. During construction, temporary jobs will be created and once operational, the pedestrian bridge will facilitate the safe transport of workers and relevant persons over the Main Southern Railway Line to and from the urban areas on the eastern side of the railway corridor.

Operation

Once constructed, the pedestrian bridge will have a small positive effect on economic factors (such as property values) as it will improve accessibility for properties on the east side of the Main Southern Railway Line (currently under application for residential subdivision). Further, the bridge will provide a key linkage for individuals working on the ongoing urban expansion on the eastern side of the railway corridor.

The Proposal is likely to create local recreational benefits and will have a positive effect on the safety of the community by providing dedicated, safe, DDA-compliant access for pedestrians and cyclists across the Main Southern Railway Line. It will enhance accessibility within the expanded Menangle community by providing safe access for pedestrians, cyclists and the disabled and will improve the level of public infrastructure available to the Menangle community.

The activity would have minimal effect on Menangle Railway Station as the new pedestrian bridge would be visible from the station (as the existing road bridge is now) and would contribute to the accessibility of the station from the eastern side of the Main Southern Rail Line.

6.9.3 Safeguards and management measures

No management measures have been identified for this matter.

6.10 Sustainability

6.10.1 Existing environment

The contribution of the construction and operation of the proposed pedestrian bridge to the greenhouse gas emissions output of NSW, as well as the wider effects of climate change, has been taken into consideration.

6.10.2 Potential impacts

Construction

Greenhouse gas emissions will result from the following activities:

- Construction traffic and equipment emissions
- Emissions generated in producing construction materials
- Upstream and downstream lifecycle emissions, and
- Emissions resulting from the breakdown of cleared vegetation.

The proposal is of such scale that would only generate minor greenhouse gas emissions from the above sources over its construction period. Consequently, the proposed activity will have negligible contribution to the State’s annual greenhouse gas emissions.

The greatest contribution, which would be likely to be over half of the total emissions, would come from the embodied energy associated with the energy-intensive production of the concrete and other construction materials needed for the proposal.

Operation

Overall, the proposed pedestrian bridge and cycle link is expected to have a positive impact on climate change as it enables and encourages the current and future residents of Menangle to walk or cycle rather than drive, lowering greenhouse gas emissions and promoting active transport.

6.10.3 Safeguards and management measures

The proposed pedestrian bridge over the Main Southern Railway Line is to be delivered within the environmental and sustainability framework established by Transport.

Impact	Environmental safeguards	Responsibility	Timing	Reference
Air Quality	Measures (including watering or covering exposed areas) are to be used to minimise or prevent air pollution or dust	Proponent and Contractor	Construction	AQ1

Impact	Environmental safeguards	Responsibility	Timing	Reference
Air Quality	Works (including the spraying of paint or other materials) are to be used to minimise or prevent air pollution and dust.	Proponent and Contractor	Construction	AQ2
Air Quality	Vehicles and vessels transporting waste or other materials that may produce odours or dust are to be managed to suppress dust emissions.	Proponent and Contractor	Construction	AQ3
Waste Management	A Waste Management Plan must be prepared that follows the Transport for New South Wales Waste Management Guidelines.	Proponent and Contractor	Construction	WM1
Waste Management	Resource hierarchy manage principles are to be followed: • Avoid unnecessary resource consumption as a priority • Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery) • Disposal is taken as a last resort (in accordance with the Waste Avoidance and Recovery Act 2001)	Proponent and Contractor	Construction	WM2
Waste Management	Work areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day	Proponent and Contractor	Construction	WM3
Hazard and Risk	Vehicle wash down and/or cement truck washout is to occur in a designated bunded area	Proponent and Contractor	Construction	HAZ1
Hazard and Risk	An emergency spill kit is to be kept on site and maintained throughout the construction work. The spill kit must be appropriately sized for the volume of substances at the work site.	Proponent and Contractor	Construction	HAZ2
Hazard and Risk	All workers will be advised of the location of the spill kit and trained in its use.	Proponent and Contractor	Construction	HAZ3

Table 6-16 Air quality, waste management and hazard and risk safeguards and management measures

6.11 Cumulative impacts

6.11.1 Study area

The assessment of cumulative impacts has specifically considered the urban development east and west of the Menangle train station, as well as the central town of Menangle.

6.11.2 Other projects and developments

A search of the Wollondilly Shire Council's DA Tracker in May 2023 identified a series of development applications related to the Proposal, predominantly being the staged subdivision applications for Mirvac's master planned residential community in Menangle. The residential population resulting from these subdivisions will be the primary users of the proposed pedestrian bridge.

Project	Description	Construction/Operational impacts
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Stage 1: DA/2019/93/1, DA/2019/93/2, DA/2019/93/3 97-lot Torrens title subdivision and associated works - Modification of Conditions of Consent	Subdivision by Torrens title to create 97 residential lots in 2 stages, earthworks, construction of roads, retaining walls and bioretention basin, tree removal, decommissioning and filling of an existing dam, street tree planting and associated works. Approved on 19 June 2020.	As Stage 1 is located on the western side of the rail corridor, minimal impacts will result from the proposed activity.
Stage 2: DA/2020/401/1, DA/2020/401/2 117-lot Torrens title subdivision and associated works	Subdivision by Torrens title to create 117 residential lots and residues in 2 stages, earthworks, construction of roads, retaining walls, bio-retention basin, temporary basin, tree removal, street tree planting and associated works. Approved on 9 November 2021.	The pedestrian bridge will enable the construction workers for Stage 2 to safely cross over the rail corridor.
Stage 3: DA/2021/842/1 71-lot Torrens title subdivision and associated works	Subdivision by Torrens title to create 71 residential lots, retaining walls and associated works. Lodged on 9 September 2021.	The pedestrian bridge will enable the future construction workers for Stage 3 to safely cross over the rail corridor.
Stage 4: DA/2022/259/1 97-lot Torrens title subdivision and associated works	Subdivision by Torrens title to create 56 lots, 3 super lots, 2 drainage reserves, 2 residue lots and earthworks. Lodged on 4 April 2022.	The pedestrian bridge will enable the future construction workers for Stage 4 to safely cross over the rail corridor.

Table 6-17: Related projects

6.11.3 Potential impacts

It is unlikely that there will be any significant cumulative impacts as a result of carrying out the proposed activity. The size and scale of the proposed activity is relatively small in the context of the residential development occurring on either side of the Main Southern Railway Line. As such any impacts caused by the activity will not contribute significantly to the cumulative impacts in the locality.

7. Environmental management

This chapter describes how the proposal will be managed to reduce potential environmental impacts during detailed design, construction and operation. A framework for managing potential impacts is provided. A summary of site-specific environmental safeguards is provided and the licence and/or approval requirements required prior to construction are listed.

7.1 Environmental management plans

Safeguards and management measures have been identified in the REF in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these safeguards and management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

The majority of safeguards mentioned in Table 7-1 below have been taken from Transport's Environmental assessment procedure for routine minor works – Safeguard list (EIA-P05-G01-T02).

The safeguards and management measures outlined in this REF will be incorporated into CEMP to be prepared to Transport's requirements prior to construction in order to implement the environmental measures necessary for construction of the proposed pedestrian bridge. Transport will provide review and approval of the CEMP prior to the commencement of construction. The proposed sequencing and methodology, including the development of an unexpected finds procedure, tree clearing, demolition and excavation, is detailed in the construction methodology document which is attached in Appendix Z of this REF.

7.2 Summary of safeguards and management measures

Environmental safeguards and management measures outlined in this REF will be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The safeguards and management measures are summarised in Table 7-1.

Ref.	Impact	Environmental safeguards	Responsibility	Timing
GEN1	General – environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include site inductions and regular “toolbox” style briefings.	Proponent and Contractor	Pre-construction
GEN2	General – environmental awareness	Works and ancillary area limits will be clearly delineated and marked. Vehicles and plant/equipment will to be kept away from environmentally sensitive areas and outside the dripline of trees.	Proponent and Contractor	Construction
GEN3	General safeguard	If the scope of the proposal changes at any time, works will be reviewed for consistency with this REF in accordance with the Transport for NSW Environmental Assessment Procedure (EMF-PA-PR-0070).	Proponent	Detailed design, pre-construction
GEN4	General safeguard	A Construction Environmental Management Plan will be prepared by the contractor and approved by Transport prior to commencement of construction. The safeguards and management measures outlined in this REF will be incorporated into CEMP. As a minimum the CEMP will address: - Any requirement associated with statutory approvals - Details of how the project will implement the identified safeguards outlined in the REF - Roles and responsibilities - Communication requirements - Induction and training requirements - Procedures for monitoring and evaluating environmental performance, and for corrective action - Reporting requirements and record-keeping - Procedures for emergency and incident management, and - Procedures for audit and review.	Proponent and Contractor	Pre-construction
GEN5	General safeguard	No new access tracks to be created for the works (as required).	Proponent and Contractor	Pre-construction, construction
GEN6	General safeguard	Parking of vehicles and storage of plant/equipment is to occur on existed paved areas. Where this is not possible, vehicles and plant/equipment are to be kept away from environmentally sensitive areas and outside the dripline of trees.	Proponent and Contractor	Pre-construction, construction
BIO1	Disturbance to the	There is to be no disturbance or damage to threatened species or areas of outstanding value.	Proponent and Contractor	Pre-construction and construction

Ref.	Impact	Environmental safeguards	Responsibility	Timing
	surrounding area			
BIO2	Threatened fauna	Works are not to harm threatened fauna (including where they inhabit bridges or other structures).	Proponent and Contractor	Pre-construction and construction
BIO3	Unexpected threatened flora or fauna	If threatened fauna or flora species are discovered unexpectedly, stop works immediately and follow the Transport Unexpected Threatened Species Find Procedure contained in the Transport Biodiversity Guidelines – Guide 1 (Pre-clearing process (EMF-BD-GD-0032)).	Proponent and Contractor	Construction
BIO4	Protecting retained trees	Trees to be retained will be protected in accordance with AS4970-2009.	Proponent and Contractor	Pre-construction and construction
BIO5	Offsetting	Offsetting of the two native trees to be removed will be undertaken in accordance with the <i>Transport for NSW Tree and Hollow Replacement Guidelines</i> . Details of the offsetting will be included in the project's CEMP including the decision to either pay into the Transport for NSW Conservation Fund or locally replace.	Proponent and Contractor	Pre-construction and construction
W1	Water quality	Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spill/slicks) is to be undertaken on a regular basis to identify any potential spills or deficient silt curtains or erosion and sediment controls.	Proponent and Contractor	Construction
W2	Water quality	Water quality control measures are to be used to prevent any materials (eg. concrete, grout, sediment etc) entering drain inlets or waterways.	Proponent and Contractor	Construction
W3	Water quality	Measures to control pollutants from stormwater and spills would be investigated and incorporated in the pavement drainage system at locations where it discharges to the receiving drainage lines. Measures aimed at reducing flow rates during rain events and potential scour would also be incorporated in the design of the pavement drainage system.	Proponent and Contractor	Construction
SED1	Erosion and sedimentation	Erosion and sediment control measures are to be implemented and maintained to: - Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drainage inlets - Reduce water velocity and capture sediment on site - Minimise the amount of material transported from site to surrounding pavement surfaces - Divert clean water around the site. (in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book)).	Proponent and Contractor	Pre-construction and construction
SED2	Erosion and sedimentation	Erosion and sedimentation controls are to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.	Proponent and Contractor	Construction
SED3	Erosion and sedimentation	Erosion and sediment control measures are not to be removed until the works are completed and areas are stabilised.	Proponent and Contractor	Construction
SED4	Erosion and sedimentation	Work areas are to be stabilised progressively during the works.	Proponent and Contractor	Construction

Ref.	Impact	Environmental safeguards	Responsibility	Timing
SED5	Erosion and sedimentation	A progressive erosion and sediment control plan is to be prepared for the works.	Proponent and Contractor	Pre-construction
CON1	Contaminated materials	For any materials to be excavated and removed from the site, waste classification of materials is to be undertaken in accordance with the NSW EPA Waste Classification Guidelines prior to disposal at an appropriately licensed facility.	Proponent and Contractor	Construction
CON2	Contaminated materials	Imported material (e.g., ENM) will be classified prior to use.	Proponent and Contractor	Construction
CON3	Contaminated materials	If suspect materials are encountered during any stage of future site preparation/earthworks, an unexpected finds management protocol will be implemented.	Proponent and Contractor	Construction
T1	Traffic and transport	Where possible, current traffic movements and property accesses are to be maintained during the works. Any disturbance is to be minimised to prevent unnecessary traffic delays.	Proponent and Contractor	Construction
T2	Traffic and transport	A traffic control plan will be prepared in accordance with documentation submitted with the REF. A preliminary Construction Traffic Management Plan (CTMP) has been prepared for the proposed activity which outlines the measures to be used in order to manage the likely disruptions to vehicle and pedestrian access during the construction period. This is attached in Appendix T of this REF and will be updated by the contractor once appointed.	Proponent and Contractor	Pre-construction
NV1	Noise and vibration	A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in <i>the Interim Construction Noise Guideline (ICNG) (DECC, 2009)</i> and identify: - all potential significant noise and vibration generating activities associated with the activity. - feasible and reasonable mitigation measures to be implemented, taking into account <i>Beyond the Pavement: urban design policy, process and principles</i> (Transport, 2014). - a monitoring program to assess performance against relevant noise criteria. - arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures. - contingency measures to be implemented in the event of non-compliance with noise and vibration criteria.	Proponent and Contractor	Pre-construction
NV2	Noise and vibration	All sensitive receivers (e.g., schools and local residents) likely to be affected will be notified at least 7 days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of: - the project - the construction period and construction hours - contact information for project management staff - complaint and incident reporting, and - how to obtain further information.	Proponent and Contractor	Pre-construction Construction

Ref.	Impact	Environmental safeguards	Responsibility	Timing
NV3	Noise and vibration	Noise impacts will be minimised in accordance with Transport Construction and Maintenance Noise Estimator (EMF-NV-TT-0067) and Transport Construction noise and vibration guidelines (for roads and maritime) 2022 (EMF-NV-GD-0056).	Proponent and Contractor	Construction
NV4	Noise and vibration	Measures, including allowing adequate distance that rollers and other vibration producing equipment can come to adjacent buildings and/or using non vibration producing equipment, to minimise or prevent vibration impacts.	Proponent and Contractor	Construction
ACH1	Aboriginal heritage artefacts	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Transport Aboriginal cultural heritage officer and Senior Manager Environment and Sustainability contacted immediately. Refer to steps in the Transport Unexpected heritage items procedure (EMF-HE-PR-0076) which must be followed.	Proponent and Contractor	Construction
NAH1	Non-Aboriginal heritage artefacts	If unexpected heritage items are uncovered during the works, all works must cease in the vicinity of the material/find and the steps in the Transport Unexpected heritage items procedure (EMF-HE-PR-0076) must be followed.	Proponent and Contractor	Construction
VIS1	Visual amenity	Landscaping is to be managed in accordance with the Landscape Plan documentation submitted with the REF.	Proponent and Contractor	Construction
VIS2	Increased massing of the bridge from the security fence	- Make the fence as perforated as possible to reduce its weight and massing in the landscape whilst maintain compliance with ARTC standards for throw screens. - Carefully select materials and colours for the security fence that visually recede and blend into the surroundings as much as possible whilst still complying with ARTC standards for security fencing.	Proponent and Contractor	Construction
VIS3	Visibility of the approaches for the new pedestrian bridge and the removal of existing vegetation, increasing the hardness of the view	- Screen the bridge approaches with new tree and shrub planting. - Soften the proposed pedestrian bridge with a planted edge between the road and ridge. - Carefully select materials and colours for the pedestrian bridge to make it blend in with existing built forms.	Proponent and Contractor	Construction
AQ1	Air quality	Measures (including watering or covering exposed areas) are to be used to minimise or prevent air pollution and dust.	Proponent and Contractor	Construction
AQ2	Air quality	Works (including the spraying of paint and other materials) are not to be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.	Proponent and Contractor	Construction

Ref.	Impact	Environmental safeguards	Responsibility	Timing
AQ3	Air quality	Vehicles and vessels transporting waste or other materials that may produce odours or dust are to be covered during transportation.	Proponent and Contractor	Construction
AQ4	Air quality	Stockpiles or areas that may generate dust are to be managed to suppress dust emissions.	Proponent / Contractor	Construction
WM1	Waste management	A Waste Management Plan must be prepared that follows the Transport for NSW Waste Management Guidelines (EMF-WM-GD-0055).	Proponent and Contractor	Construction
WM2	Waste management	Resource management hierarchy principles are to be followed: • Avoid unnecessary resource consumption as a priority • Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery) • Disposal is undertaken as a last resort (in accordance with the Waste Avoidance & Resource Recovery Act 2001).	Proponent and Contractor	Construction
WM3	Waste management	Work areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.	Proponent and Contractor	Construction
HAZ1	Hazard and risk	Vehicle wash down and/or cement truck washout is to occur in a designated bunded area.	Proponent and Contractor	Construction
HAZ2	Hazard and risk	An emergency spill kit is to be kept on site at all times and maintained throughout the construction work. The spill kit must be appropriately sized for the volume of substances at the work site.	Proponent and Contractor	Construction
HAZ3	Hazard and risk	All workers will be advised of the location of the spill kit and trained in its use.	Proponent and Contractor	Construction

Table 7-1: Summary of safeguards and management measures

7.3 Licensing and approvals

The following table presents a list of licensing and approvals required with this application.

Instrument	Requirement	Timing
<i>Coal Mine Subsidence Compensation Act 2017</i>	Approval to alter or erect improvements or to subdivide land within a mine subsidence district from the Subsidence Advisory.	Prior to start of the activity.
<i>Roads Act 1993</i>	Approval to erect a structure or carry out a work in, on or over a public road, or dig up or disturb the surface of a public road or remove or interfere with a structure, work or tree on a public road.	<i>Prior to the start of the activity.</i>

Table 7-2: Summary of licensing and approvals required

8. Conclusion

This chapter provides the justification for the proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the proposal is in the public interest. The proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Section 193 of the *Environmental Planning and Assessment Regulation 2021*.

8.1 Justification

8.1.1 Social factors

Safety and accessibility are the driving forces of the Proposal. Once constructed, pedestrian transport over the Main Southern Railway Line will significantly improve from its current state. The future community associated with Mirvac’s master planned residential development will directly benefit from the delivery of the proposed pedestrian bridge as it provides them safe access to the Menangle Train Station, as well as the central town of Menangle.

The primary pedestrian and cyclist access desire lines for movement between the expected new urban areas on the eastern side of the railway line and the existing urban areas of Menangle on the western side will be via the existing road bridge connection over the railway line at Station Street. This road bridge does not currently offer safe pedestrian access as there is no separate access for pedestrians and cyclists, leading to an increased potential for conflict with vehicles. The anticipated growth of the Menangle population and the consequential usage of the bridge prompted the design and development of the pedestrian bridge proposed under this application.

8.1.2 Biophysical factors

The existing vegetation around the road bridge over the Main Southern Railway will be slightly altered with new tree and shrub planting to screen the bridge approaches. The planted edge will visually soften the appearance of the proposed pedestrian bridge to blend into the surroundings as much as possible.

1-2 native trees have been identified for removal, one of which is dead. Exotic weeds and excessive understorey will also be removed however this will not adversely affect the existing natural environment within the study area.

8.1.3 Economic factors

During construction, temporary jobs will be created and once operational, the pedestrian bridge will facilitate the safe transport of workers and relevant persons over the Main Southern Railway Line to and from the urban areas on the eastern side of the railway corridor.

8.1.4 Public interest

With future urban development on either side of the railway corridor, public pedestrian access will be required from both sides of the railway line to and from the Menangle Train Station. The proposed pedestrian bridge structure will serve as a unifying feature over the Main Southern Railway Line and facilitate both pedestrian and cyclist activity.

The proposed pedestrian bridge is consistent with strategic or operational needs of the Menangle community. The proposed linkage is identified in the indicative pedestrian/cycle network shown in the Wollondilly Development Control Plan as a shared cycleway/footpath. This unifying feature over the railway corridor will create safe public access to and from the Menangle Train Station which is currently significantly constrained.

8.2 Objects of the EP&A Act

The table below details how the Proposal is consistent with the objects of the EP&A Act.

Instrument	Requirement
<i>1.3(a) To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State’s natural and other resources.</i>	The need for safe pedestrian access over the railway line was the main driver for the concept of the proposed development. Once constructed, the bridge will serve as a unifying feature across the rail corridor, providing significant public benefit to the current and future community of Menangle.

Instrument	Requirement
<i>1.3(b) To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.</i>	Relevant ecologically sustainable development principles have been incorporated into the design and development of the Proposal.
<i>1.3(c) To promote the orderly and economic use and development of land.</i>	Once constructed, the bridge will serve as a unifying feature across the rail corridor, providing pedestrian access within Mirvac's master planned residential development and connecting the current and future community of Menangle with the town centre.
<i>1.3(d) To promote the delivery and maintenance of affordable housing.</i>	Not relevant to the project.
<i>1.3(e) To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.</i>	Not relevant to the project.
<i>1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).</i>	An Aboriginal Objects Due Diligence Assessment was prepared by Niche Environment and Heritage in 2021 and a revised assessment conducted in 2022. It was concluded that it is unlikely that Aboriginal objects have survived within the activity area due to significant ground disturbances and the proposed activity may proceed with caution without a further Aboriginal Cultural Heritage Assessment (ACHA) or AHIP. Transport have advised that this assessment is sufficient and no further consultation with the Aboriginal community is required.
<i>1.3(g) To promote good design and amenity of the built environment.</i>	The proposed activity has been designed in accordance with, Disability Standards for Accessible Public Transport (DSAPT), all relevant Australian Standards, and Wollondilly Shire Council's standards. Once constructed, the pedestrian bridge will serve as a safe and accessible connection within Mirvac's master planned residential development and with the Menangle town centre.
<i>1.3(h) To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.</i>	The proposed pedestrian bridge structure, including access ramps either side of the railway line, will be within the ownership of Transport. Transport will be responsible for maintaining the structure and ensuring the safety of users.
<i>1.3(i) To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.</i>	Not relevant to the project.
<i>1.3(j) To provide increased opportunity for community participation in environmental planning and assessment.</i>	The REF will be publicly exhibited in October 2023 for the community to provide comment. Transport will then respond to these comments and prepare a subsequent Submissions Report.

Table 8-1: Objects of the Environmental Planning and Assessment Act 1979

8.2.1 Ecologically sustainable development

Mirvac are committed to ensuring that its projects are implemented in a manner that is consistent with the principles of Ecologically sustainable development (ESD).

ESD is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The principles of ESD have been an integral consideration throughout the development of the project.

These principles are generally defined under Section 193 of the EP&A Regulation as follows:

- The precautionary principle – if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- Inter-generational equity – the present generation should ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- Conservation of biological diversity and ecological integrity – the conservation of biological diversity and ecological integrity should be a fundamental consideration, and
- Improved valuation, pricing and incentive mechanisms – environmental factors should be included in the valuation of assets and services.

ESD requires the effective integration of economic and environmental considerations in decision-making processes. The principles have been adopted by Transport throughout the development and assessment of the Proposal. The four main principles supporting the achievement of ESD are discussed below.

The precautionary principle

The precautionary principle deals with reconciling scientific uncertainty about environmental impacts with certainty in decision-making. It provides that where there is a threat of serious or irreversible environmental damage, the absence of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation.

This principle was considered during route options development (refer to Chapter 2). The precautionary principle has guided the assessment of environmental impacts for this REF and the development of mitigation measures. Consultation with key specialists, such as Biosis Pty Ltd the environmental consultant, were incorporated to gain a detailed understanding of the existing environment. The size and scale of the proposed activity is relatively small in the context of the residential development occurring on either side of the Main Southern Railway Line. All options considered were assessed to have minimal impacts on existing vegetation and surrounding residential properties.

Inter-generational equity

Social equity is concerned with the distribution of economic, social and environmental costs and benefits. Inter-generational equity introduces a temporal element with a focus on minimising the distribution of costs to future generations.

The Proposal provides a substantial benefit to the current and future generations of the Menangle local community. Currently, users traverse the existing road bridge to cross over the railway line. This road bridge does not currently offer safe pedestrian access as there is no separate access for pedestrians and cyclists, leading to an increased potential for conflict with vehicles. Once constructed, the proposed pedestrian bridge will significantly improve pedestrian safety whilst promoting healthy lifestyles of walking and cycling in place of driving. Both current and expected future generations of the Menangle community will benefit in the long term by the delivery of the proposed pedestrian bridge.

Conservation of biological diversity and ecological integrity

The size and scale of the proposed activity is relatively small in the context of the residential development occurring on either side of the Main Southern Railway Line. All options considered resulted in minimal impacts on the flora and fauna natural environment in and around the Proposal's site area. Landscaping works will be carried out in accordance with the Landscape Plans provided in Appendix F of this REF.

Improved valuation, pricing and incentive mechanisms

The principle of internalising environmental costs into decision making requires consideration of all environmental resources that may be affected by the carrying out of a project, including air, water, land and living things. Valuation of environmental resources were not a major consideration for the proposed activity.

8.3 Conclusion

The proposed construction of a new pedestrian bridge over the Main Southern Railway Line located between the intersections of Station Street with Stevens Road to the west, Moreton Park Road to the east, and the existing Menangle Train Station is subject to assessment under Division 5.1 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

This has included consideration (where relevant) of conservation agreements and plans of management under the NPW Act, biodiversity stewardship sites under the BC Act, wilderness areas, areas of outstanding value, impacts on threatened species and ecological communities and their habitats, and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the EPBC Act.

Mirvac Homes (NSW) Pty Ltd

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal, as described in the REF, best meets the project objectives but would still result in some minor impacts on the natural environment and traffic conditions, particularly during the interim period prior to and during construction of the proposed pedestrian bridge. Safeguards and management measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal will primarily deliver much needed safe access across the Main Southern Railway Line, connecting residents and workers to the east and west of the railway corridor. Further, it provides a walking and cycle linkage which facilitates active transport and promotes healthy lifestyles. On balance, the proposal is considered justified and the following conclusions are made.

Significance of impact under NSW legislation

The proposal would be unlikely to cause a significant impact on the environment. Therefore, it is not necessary for an environmental impact statement to be prepared nor approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act. A Biodiversity Development Assessment Report or Species Impact Statement is not required. The proposal is subject to assessment under Division 5.1 of the EP&A Act. Consent from Council is not required.

Significance of impact under Australian legislation

The proposal is not likely to have a significant impact on matters of national environmental significance nor the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). A referral to the Australian Department of Climate Change, Energy, the Environment and Water is not required.

9. Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Name: Tom Foster
Position: Senior Town Planner
Company name: Egis
Date: 08 November 2023

I certify that I have reviewed and endorsed the contents of this REF, and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under Section 170 of the EP&A Regulation, and the information is neither false nor misleading. I accept it on behalf of Mirvac Homes (NSW).

Name: Aaron Baker
Position: Project Director
Entity: Mirvac Homes (NSW)
Date: 08 November 2023

10. EP&A Regulation publication requirement

Requirement	Yes/No
Does this REF need to be published under section 171(4) of the EP&A Regulation?	Yes

Table 10-1: EP&A Regulation publication requirement

11. References

Greater Sydney Commission, 2018a, *A Metropolis of Three Cities – Greater Sydney Region Plan*, Sydney

Greater Sydney Commission, 2018b, *Western City District Plan*, Sydney

Infrastructure NSW, 2022, *Staying Ahead: State Infrastructure Strategy 2022-2042*, Sydney

Transport for NSW, 2020, *Disability Inclusion Action Plan (2020-2025)*, Sydney

Wollondilly Shire Council, 2020a, *Wollondilly 2040: A vision for the future of Wollondilly – Local Strategic Planning Statement*, Sydney

Wollondilly Shire Council, 2020b, *Wollondilly Centres Strategy*, Sydney

Wollondilly Shire Council, 2020c, *Menangle Centre Detailed Report*, Sydney