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 under the EPBC Act
- The factors specified in the Guideline for Division 5.1 assessments (Department of Planning and Environment, 2022) and as required under section 171 of the Environmental Planning and Assessment Regulation 2021 and the Roads and Related Facilities EIS Guideline (Department of Urban Affairs and Planning, 1996). The factors specified in section 171 of the Environmental Planning and Assessment Regulation 2021 are also considered in Appendix A
- Site-specific safeguards and management measures are provided to mitigate the identified potential impacts.

6.1 Traffic and transport

A Traffic Assessment Report (TAR) has been prepared for the proposal by Stantec. The main findings of that assessment are summarised below while the full report is included in Appendix C.

6.1.1 Methodology

Potential impacts of the proposal on traffic and transport were assessed by completing a detailed analysis which included:

- A desktop review of publicly available information relevant to the proposed works, including:
  - Aerial imagery of roads and intersection layouts, active transport connections, and parking within and near the proposal area available through Google Maps (accessed 23 October 2024)
  - NSW Government's online interactive crash map (accessed 23 October 2024)
  - Cycleway Finder – Transport for NSW (accessed 23 October 2024)
  - NSW Road Network Classifications map (accessed 24 October 2024)
- Identification of safeguards and management measures to address potential impacts.

6.1.2 Existing environment

Existing road network

The existing road network, within and surrounding the proposal area, as identified on Transport's online NSW Road Network Classifications map (Transport for NSW, 2024) consists of the following:

- State road (Argyle Street)
- Regional road (Berrima Road)
- Local roads (Lackey Road, Garret Street, Lytton Road, Suttor Road, Bulwer Road, Beaconsfield Road).

An existing shared path is located within the proposal area and runs along the western side of Suttor Road, before continuing northbound along Argyle Street, then following the Wingecarribee River to Burradoo, as identified on Transport's online Cycleway Finder. The shared path connects with the Bong Bong cycle track to the east of the proposal area.

Traffic flows

The main arterial road through Moss Vale is Argyle Street, with peak traffic movements occurring near the railway overbridge. Turning movements and delays on Argyle Street generally occur at the intersections with Kirkham Street, Arthur Street and Lackey Road. Current and future traffic flows, based on a scenario in which no bypass is built, at the overbridge on Argyle Street (vehicles per hour) are noted in Table 6-1.

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Table 6-1: Traffic flows at the overbridge on Argyle Street (vehicles per hour)

Period	2021	2026	2036
Morning peak	1,719	1,972	2,276
Evening peak	1,387	1,810	2,052

The TAR identified that by 2036, the intersections along Argyle Street within the town centre will fail without the proposed bypass.

Road safety

A review of crash data dated from 2019 to 2023 in the Moss Vale town centre area from the NSW Centre for Road Safety crashes map (Transport for NSW, 2024) identified 54 vehicular crashes within Moss Vale. Of these crashes, 1 resulted in a fatality, 7 in serious injury, 17 in moderate injury, 9 in minor injury and 20 resulting in no injury.

Public transport

The Moss Vale Train Station and Moss Vale Bus Interchange are located at the intersection of Argyle Street and Lackey Road, approximately 1 kilometre from the proposal. Bus routes in the proposal area include routes along Argyle Street, Suttor Road and Berrima Road.

Parking

There are no formal parking spaces located in the proposal area. Site inspections indicate that grass verges along Suttor Road, McCourt Road and Lackey Road are sometimes used for informal parking. A large majority of residences and businesses provide off-street parking, with few cars being required to park on the street.

6.1.3 Potential impacts

Construction

Potential impacts to traffic and transport as a result of construction of the proposal would be temporary. Traffic impacts would occur due to the movement of construction vehicles along Argyle Street, Berrima Road and surrounding local roads for site access and the haulage of construction materials. Construction sites would be primarily accessed via approved heavy vehicle routes.

An increase in travel time for local traffic in Moss Vale is anticipated due to reduced speed limits around construction sites and as a result of up to 400 construction vehicle movements per day during peak of construction, as required for construction of the proposal.

Temporary partial or full closure of roads and altered property accesses may occur during construction. Property access would be maintained as far as practicable throughout construction. The roads which are likely to be impacted include Argyle, Suttor Road, McCourt Road, Lackey Road, Beaconsfield Road, Bulwer Road, Headlam Road and Berrima Road.

Construction of the proposal would require some lane closures at the location of proposed intersections during construction. This may impact upon public transport routes, pedestrians and cyclists. Lane closures may have some impact on emergency vehicle response times, however as these would generally be carried out at night (where practical) so as to minimise any queueing, the impact is expected to be minimal and managed with appropriate traffic control measures.

Construction of the proposal would not result in the loss of any formal parking spaces. As a majority of residences and businesses have suitable off-street parking, it is not anticipated that any shortage of parking spaces would occur.

Operation

The operation of the proposal would have a positive impact on local traffic by diverting traffic onto the bypass and away from the Moss Vale town centre. By 2026, the bypass would take around 5,000 vehicles per day off Argyle Street near the rail overbridge, and by 2036 around 7,200 vehicles per day. This would result in 15,000 vehicles per day of expected traffic on Argyle Street in 2036, less than the current day flows.

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Traffic relief would not only occur on Argyle Street but also at the key intersections with Lackey Road, Kirkham Road and Arthur Street.

The proposal would achieve the objective of reducing traffic on Argyle Street, with the 2026 and 2036 traffic flows with a bypass showing a reduction compared to traffic flows without the bypass upgrade (refer to Table 6-2).

Table 6-2: Hourly traffic flows for base and proposed bypass (2026 and 2036)

Intersection	Base – 2026		With bypass – 2026		Base – 2036		With bypass – 2036	
	AM peak	PM peak	AM peak	PM peak	AM peak	PM peak	AM peak	PM peak
Argyle Street south of Suttor Road	1,686	1,697	1,260	1,376	1,711	1,727	1,237	1,542
Argyle Street at the Railway Bridge	1,972	1,810	1,413	1,347	2,276	2,052	1,442	1,452
Lackey Road south of Garret Street	630	517	361	302	910	717	494	407
Berrima Road north of Lytton Road	995	857	679	607	1,506	1,254	892	830
West of Bulwer Road	-	-	326	247	-	-	539	381
Bulwer Road to Beaconsfield Road	-	-	338	255	-	-	549	385
Beaconsfield Road to Lackey Road	-	-	553	436	-	-	796	621
Lackey Road to Suttor Road	-	-	697	556	-	-	1,037	782
Suttor Road to Argyle Street	-	-	560	528	-	-	697	665

The proposal would also result in positive impacts for public transport as the reduction in traffic through Moss Vale town centre may assist with reducing travel times for buses travelling through Moss Vale.

The proposal would have a positive impact on pedestrians and cyclists as it would provide a shared path which is separated from the road, and which connects with existing pedestrian and cycling infrastructure, therefore significantly adding to the active transport network in Moss Vale.

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6.1.4 Safeguards and management measures

Table 6-3: Traffic safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Traffic and transport	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Traffic Control at Work Sites Technical Manual (Transport for NSW, 2022) and QA Specification G10 Traffic Management (Transport for NSW, 2022). The TMP will include: • Confirmation of haulage routes • Measures to maintain access to local roads and properties • Site-specific traffic control measures (including signage) to manage and regulate traffic movement • Measures to maintain pedestrian and cyclist access • Requirements and methods to inform the local community of impacts on the local road network • Requirements and methods to consult emergency services (police, ambulance, fire) and SES with regard to traffic delays during construction • Requirement in relation to the Transport WAD process for works on Transport for NSW road corridors • Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads • A response plan for any construction traffic incident • Consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic • Monitoring, review and amendment mechanisms.	Contractor	Pre-construction

6.2 Noise and vibration

A construction and operational noise and vibration assessment was prepared for the proposal by Renzo Tonin & Associates. The main findings of that assessment are summarised below while the full report is included in Appendix D.

6.2.1 Methodology

The methodology for the construction noise assessment involved the following:

- Identification of noise sensitive receivers and carrying out of noise monitoring to establish noise management levels
- Development of likely construction scenarios for the proposal including the plant / equipment required for each scenario and their sound power level
- Modelling of construction noise for each scenario to determine noise level at the potentially most affected receivers
- Consideration of construction vibration with reference to previous vibration measurements from selected plant and equipment
- Identification of safeguards and management measures to address potential impacts.

The methodology for the operational noise assessment involved calculation of changes to road traffic noise along the bypass. Noise modelling was carried out using the Road Traffic Noise Module in the CadnaA (Version 2023) noise modelling software. The operational noise assessment has been carried out consistent with the EPAs NSW Road Noise Policy (RNP) (Department of Environment, Climate Change and Water, 2011) and the Transport for NSW Road Noise Criteria Guideline (RNCG) (Transport for NSW, 2023) which provides guidance in how to apply the RNP.

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The ‘Opening Year’ (where noise levels are predicted for the year 2026 for both the ‘build’ and ‘no build’ options, for the day and night periods) scenario was modelled to assess road traffic noise from the proposal.

6.2.2 Existing environment

To facilitate the assessment of noise impacts from the proposal, noise sensitive receivers along the route have been divided into Noise Catchment Areas (NCAs). NCAs are areas that are likely to have similar noise exposures, on the basis of factors such as topography, road design (cuttings, embankments, intersections etc), setbacks and types of residences or other noise receptors. Six NCAs were identified for the proposal, as described in Table 6-4 and shown in Figure 6-1.

Table 6-4: Noise catchment areas

Noise catchment area	Description
NCA 1	Industrial area in Moss Vale west of Bulwer Road
NCA 2	Residential area in Moss Vale, between Bulwer Road and Beaconsfield Road
NCA 3	Residential and industrial area in Moss Vale, between Beaconsfield Road and Lackey Road
NCA 4	Residential and industrial area in Moss Vale, between Lackey Road and Suttor Road
NCA 5	Residential area in Moss Vale, between Suttor Road and 1 block west from Argyle Street
NCA 6	Residential area in Moss Vale, east of 1 block west of Argyle Street

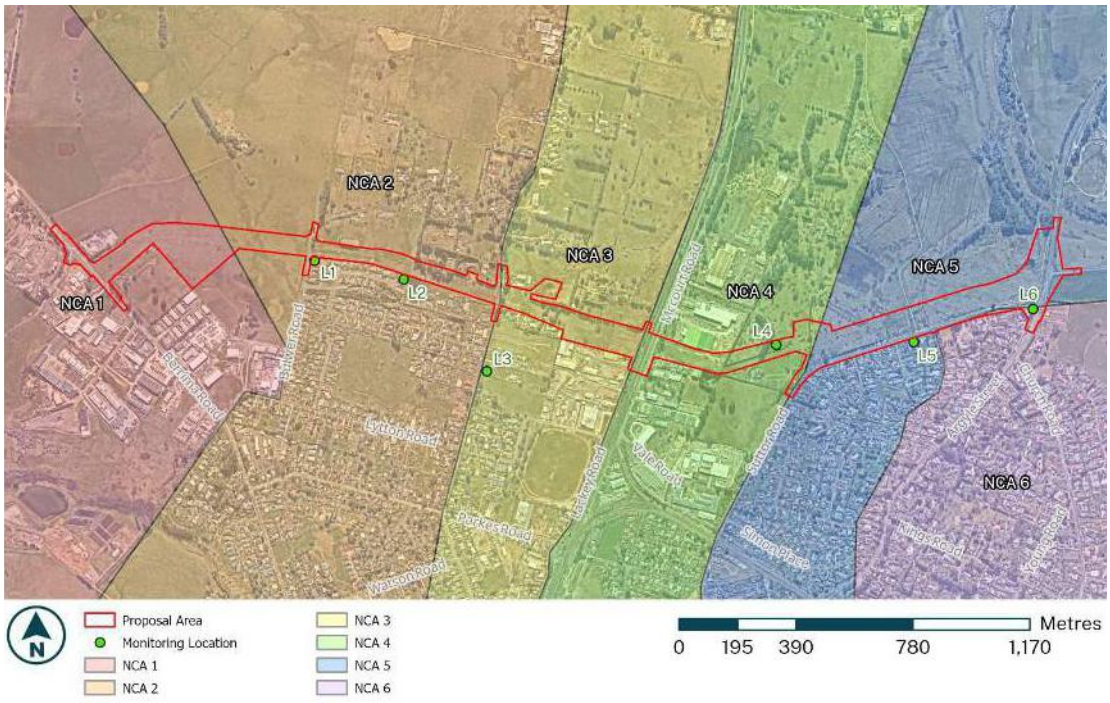


Figure 6-1: Noise catchment areas and monitoring locations

Unattended noise monitoring was carried out at 6 locations (refer to Figure 6-1) between 18 May 2022 and 1 June 2022. Measured background noise levels are provided in Table 6-5.

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Table 6-5: Existing background noise levels (RBL, dBA)

ID	Address	Applicable NCA	Day	Evening	Night
L1	41 Bulwer Road, Moss Vale	NCA 2	35 (33)	31	30 (28)
L2	28 Napper Close, Moss Vale	NCA 2	35 (33)	31	30 (27)
L3	1-33 Beaconsfield Road, Moss Vale	NCA 3	36	35	32
L4	Adjacent to 36 Suttor Road, Moss Vale	NCA 4	40	35	30
L5	79 Suttor Road, Moss Vale	NCA 5	36	34	30 (28)
L6	23 Argyle Street Moss Vale	NCA 6	47	38	32

Note: Numbers in brackets represents the measured (actual) RBL value, which is below the minimum policy of 30dB(A) during the evening or night or 35dB(A) during the day period.

Monitoring locations L3 and L5 were also used to establish existing traffic noise levels. Measured daytime and night-time traffic noise levels at these locations are presented in Table 6-6.

Table 6-6: Summary of monitored traffic noise levels (dBA)

ID	Monitoring location	$L_{Aeq\ (15\ hour)}$ (7:00am – 10:00pm)	$L_{Aeq\ (9\ hour)}$ (10:00pm – 7:00am)
L3	1-33 Beaconsfield Road, Moss Vale	66	61
L5	79 Suttor Road, Moss Vale	70	65

6.2.3 Criteria

Construction noise criteria

Noise management levels (NMLs) for the proposal were established in accordance with the Interim Construction Noise Guideline (ICNG) (Department of Environment and Climate Change, 2009) and the Transport for NSW Construction Noise and Vibration Guideline (Roads)' (CNVG) (Roads and Maritime Services, 2023). The ICNG prescribes noise management goals for receivers. As a guide, construction noise for residential receivers should not exceed the background noise levels by more than 10 dB(A) during standard hours, and by more than 5 dB(A) out-of-hours (that is, for evening and night-time work). The level of 75 dB(A) is identified as the point above which there may be a strong community reaction to construction noise.

The project specific NMLs for the residential receivers identified for the proposal are provided in Table 6-7.

Table 6-7: Noise management levels – residential receivers

Time of day	Noise management level ($L_{Aeq(15min)}$)				
	NCA 2	NCA 3	NCA 4	NCA 5	NCA 6
Day	45	46	50	46	57
Evening	36	40	40	39	43
Night-time	35	37	35	35	37

The noise management level of industrial premises located in NCA 1, NCA 2 and NCA 3 is an external noise level of 75 dBA ($L_{Aeq(15min)}$).

Construction traffic noise criteria

When construction related traffic moves onto the public road network, vehicle movements are regarded as additional road traffic and are assessed under the RNP. An initial screening test is applied by evaluating if noise levels would increase by more than 2 dBA due to construction traffic or a temporary detour due to a road closure.

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Construction vibration criteria

Construction vibration is associated with 3 main types of impact:

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

Criteria has been established with reference to the EPAs Assessing Vibration; a technical guideline (Department of Environment and Conservation, 2006), British Standard BS 6472-1992 Evaluation of human exposure to vibration in buildings (1-80Hz) and German Standard DIN4150-3: Vibrations in buildings - Part 3: Effects on structures. These criteria are detailed in the noise and vibration assessment in Appendix D.

Operational noise criteria

The proposed bypass is classed as a 'new road development'. The applicable road traffic noise criteria for residences under the RNCG for the proposal are summarised in Table 6-8.

Table 6-8: Road traffic noise assessment criteria for residential land uses

Road category	Type of project / land use	Assessment criteria	
		Day 7:00am – 10:00pm	Night 10:00pm – 7:00am
Freeway/arterial/sub-arterial roads	Existing residences affected by noise from new freeway / arterial / sub-arterial road corridors	$L_{Aeq,(15\ hour)}$ 55 (external)	$L_{Aeq,(9\ hour)}$ 50 (external)
	Existing residences affected by increases in traffic noise of 12dBA or more from redevelopment of existing freeway/ arterial/sub-arterial roads	Between $L_{Aeq,(15\ hour)}$ 42- 55 (external)	Between $L_{Aeq,(9\ hour)}$ 42- 50 (external)

Where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria. In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

6.2.4 Potential impacts

Construction

Construction noise levels

Noise predictions have been made based on the possible worst case noise impacts, taking into consideration the most noise intensive plant operating in a 15-minute period. The following scenarios were modelled:

- Site establishment (including establishment of ancillary facilities)
- Utilities relocations
- Construction of bridge approach
- Bridge construction
- Pavement construction
- Finishing and landscaping.

Further detail on these construction scenarios is provided in Appendix D.

Construction work is anticipated to be carried out during standard daytime hours whenever practicable; however, there may be periods of out of hours works during the evening or night-time periods. Out of hours works would typically occur during pavement construction activities where the new pavements would tie into the existing pavements at either ends of the proposal and would only occur for a short duration (indicatively around 2 weeks in each location).

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Out of hours works would also be required for utility relocation activities where utilities are located within the road corridor requiring road closures, or during switching of existing utilities to new utilities during periods when there is low demand / use of the utilities.

Construction noise impacts were predicted to the receiver locations surrounding the proposal by modelling the noise sources, receiver locations and construction activities as outlined above. Predicted noise level ranges determined for each construction activity represent all plant items operating concurrently at the closest distance to receivers and the quietest plant item operating at the furthest distance to receivers. This approach is conservative and has been adopted to ensure the full extent of possible noise impacts are assessed (what might occur in the worst-case). Therefore, the noise generated during construction works would generally be within the range of predictions presented in summary below and in depth in Appendix D.

Construction noise levels for each noise scenario are presented in detail in Appendix D and a summary provided below:

- The day, evening and night construction NMLs would generally be exceeded at most residential receivers in each NCA
- Residential receivers directly adjacent to the construction works are also predicted to be highly noise affected (ie >75dB(A)
- For the industrial receivers, construction noise levels exceed the relevant NMLs at some receiver locations and also exceed the highly noise affected level of 75dB(A)
- In most cases the exceedances of the NMLs and highly noise affected level of 75dB(A) are based on the activity occurring at a point nearest to the receiver and with all plant and equipment operating concurrently. However, not all plant and equipment would typically operate concurrently, and this is considered to be a worst-case scenario.

Based on these predicted noise levels presented and in accordance with the CNVG, reasonable and feasible noise management measures would therefore be implemented during construction.

Construction traffic

It is assumed that traffic associated with the construction of the proposal would use Berrima Road and Argyle Street as a route to and from the construction site. Transport's online Traffic Volume Viewer shows that the Average Annual Daily Traffic (AADT) volumes along Berrima Road and Argyle Street in the vicinity of the proposal are greater than 5,000 and 16,000 vehicles, respectively.

Based on the estimated construction traffic movements and the existing AADT volumes along Berrima Road and Argyle Street, it is expected that construction traffic would increase existing traffic volumes by no more than 2 dB(A). An increase of no more than 2 dB(A) is not considered significant and therefore specific construction traffic noise impacts are not anticipated.

Construction vibration

Based on the proposed plant items expected to be used during construction, the potential vibration impacts are summarised in Table 6-9.

Table 6-9: Potential vibration impacts

Approx. distance to nearest buildings from works	Type of nearest sensitive buildings	Assessment on potential vibration impacts	
		Structural damage risk	Human disturbance
15 – 30m	Residential / Industrial	Low risk of structural damage from construction works	Medium risk of adverse impacts as a result of construction work
30 – 50m	Residential / Industrial	Very low risk of structural damage from construction works	Low risk of adverse impacts as a result of construction work
>50m	Residential / Industrial	Very low risk of structural damage from construction works	Very low risk of adverse impacts as a result of construction work

Consultation with APA would need to be undertaken in order to establish project specific minimum working distances for working near APA Gas Transmission Pipelines.

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Operation

Road traffic noise assessment

The results of operational road traffic noise modelling for the design year 2036 are summarised in Table 6-10 which provides the number of residences where consideration of further treatment is required. Details of properties requiring further consideration of at-property treatment are provided in Appendix D.

Table 6-10: Operational road traffic noise – number of impacted receivers

NCA	Total number of residences addressed in NCA	Number of residences exceeding RNCG noise criteria	Number of residences exceeding the cumulative limit with project roads adding >2dB to the total noise level	Number of residences requiring further treatment
NCA2	249	24	13	24
NCA3	52	8	3	8
NCA4	2	2	-	2
NCA5	161	32	18	32
NCA6	133	15	5	15
Total	597	81	39	81

Maximum noise level assessment

Table 6-11 below provides an indication of expected L_{Amax} noise levels for heavy vehicle passbys and compression braking events at various distances from the proposal. These distances are considered to be representative of residences nearest to the proposal that would more than likely be impacted by maximum noise events. The noise source levels are based on the following sound power levels.

- Typical truck passby level – L_{Amax} 114dB(A) re. 1pW
- Typical truck compression braking level – L_{Amax} 130dB(A) re. 1pW.

Table 6-11: Maximum noise levels at various distances

Distance from road	L_{Amax} noise levels dB(A)	
	Truck passby	Truck compression braking
10m	86	99
20m	80	93
30m	76	89
50m	72	85
100m	66	79
150m	62	75
200m	60	73
300m	56	69
500m	52	65

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From the maximum noise levels presented in the table above, distances of greater than approximately 100 metres from the road would likely result in L_{Amax} noise levels of less than 65 dB(A) during truck passbys, where 65 dB(A) is considered to be the equivalent external maximum noise level where sleep disturbance would be triggered indoors according to the RNP.

During truck compression braking events, distances of greater than 500 metres are not likely to result in sleep disturbance.

Noise mitigation options

Options for noise mitigation include:

- Quieter pavement surfaces
- Noise mounds
- Noise walls
- At-property treatments.

Application of a quiet pavement is not recommended for this proposal as there are several main intersections, some with roundabouts, where traffic slows down and then accelerates which is not ideal for quiet pavements and can cause increased wear and maintenance.

Based on the noise assessment the following operational noise mitigation has been identified:

- A noise barrier between Bulwer Road and Beaconsfield Road at a height of approximately 3 metres
- A noise barrier east of Beaconsfield Road at a height of approximately 2.5 metres.

To mitigate residual impacts, at-property treatment is recommended at 63 properties. Field inspections of each affected property would be required during the detailed design stage to determine the appropriate treatment.

The proposal is designed to minimise the severity of changes in grade to reduce the need for compression braking and higher engine revving. Further, the number of intersections and roundabouts have been selected to minimise the requirements for additional acceleration and deceleration, while maintaining an effective road network.

6.2.5 Safeguards and management measures

Table 6-12: Noise and vibration safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Construction noise and vibration	A Noise and Vibration Management Plan will be prepared and implemented as part of the CEMP. The plan will generally follow the approach in the ICNG (Department of Environment and Climate Change, 2009) and identify: • Key potential noise and vibration generating activities associated with the activity • Feasible and reasonable mitigation measures to be implemented taking guidance from the Transport CNVG • A monitoring program to assess performance against relevant noise and vibration criteria • A review process scheduling and assessing out-of-hours activities including consideration of alternatives to out-of-hours work, plant selection, work locations and screening to minimise impacts • A working schedule which records respite periods for extended out-of-hours works • Arrangements for consultation with affected neighbours, utility providers, 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.	Contractor	Detailed design / Pre-construction

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Impact	Environmental safeguards	Responsibility	Timing
Operational noise and vibration	The following operational noise mitigation is to be provided: • Noise barriers between Bulwer Road and Beaconsfield Road, and east of Beaconsfield Road • Further consideration of at-property treatment to 63 identified properties.	Contractor	Construction

6.3 Biodiversity

The potential impacts of the proposal on biodiversity were assessed in the Moss Vale Bypass Biodiversity Assessment Report (BAR) prepared by East Coast Ecology which is provided in Appendix E. The existing environment, potential impacts of the proposal and safeguards to mitigate them are summarised below.

6.3.1 Methodology

A detailed methodology for the biodiversity assessment is provided in the BAR in Appendix E. A summary of the methodology includes:

- A thorough review of relevant and publicly available literature, mapping and background information to identify vegetation communities, threatened and migratory species, endangered populations and threatened ecological communities (TECs) (or their habitats) that occur within 5 kilometres of the proposal area including:
  - EPBC Protected Matters Search Tool
  - NSW BioNet. The website of the Atlas of NSW Wildlife
  - NSW BioNet. Threatened Biodiversity Data Collection
  - NSW BioNet. Vegetation Classification System
  - Key Fish Habitat Maps – Hawkesbury-Nepean
  - The NSW State Vegetation Type Map
  - eSPADE v2.2.0
  - Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method
  - Threatened Species Survey and Assessment: Guidelines for developments and activities working draft
- Field surveys were undertaken on 2 October 2024, consisting of:
  - Determination of the extent of native vegetation through a field assessment using a GPS-enabled tablet
  - Targeted habitat surveys by meandering throughout the study area.

6.3.2 Existing environment

Landscape context

The study area is located within the Moss Vale Biogeographic Regionalisation for Australia (IBRA) Subregion, within the Sydney Basin IBRA Bioregion. It is located within the 'Moss Vale Highlands' Mitchell Landscape Ecosystem. Several unnamed tributaries of the Wingecarribee River cross through the proposal area, as shown in Figure 6-2.

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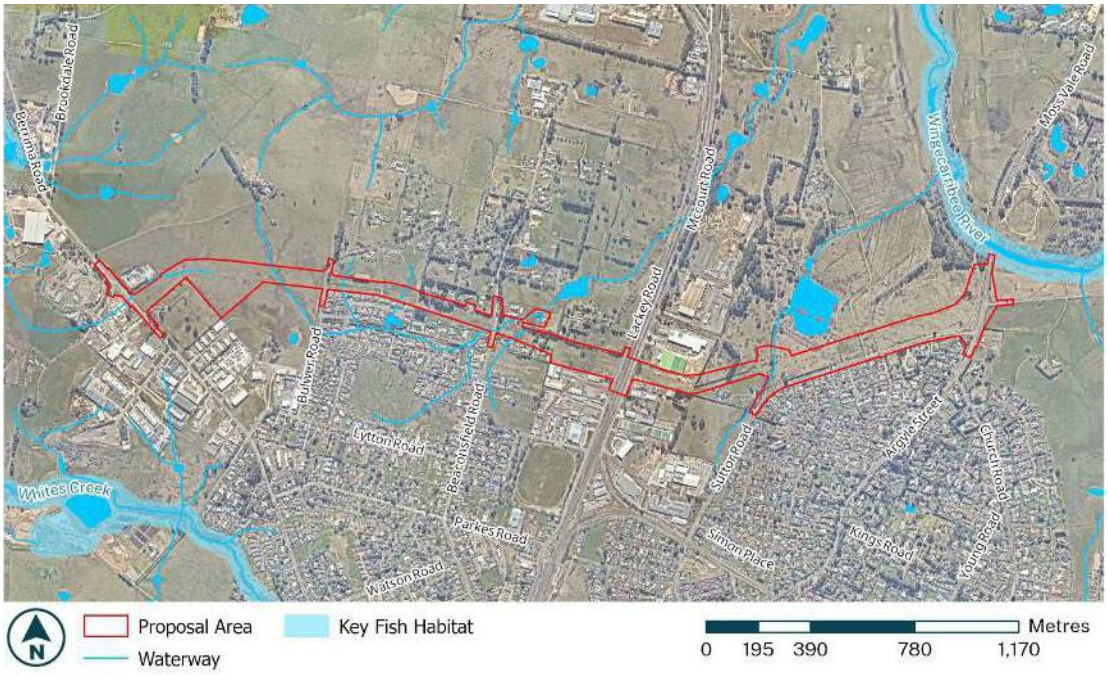


Figure 6-2: Waterways in the proposal area

Native vegetation

One Plant Community Type (PCT) and 2 vegetation types that do not conform to the definition of a PCT were identified in the study area (refer to Table 6-13). The location of PCTs is shown in Figure 6-3.

Table 6-13: Vegetation identified in the study area

Plant community type	Condition class	Threatened ecological community	Area in study area (hectares)
PCT 3302: Southern Highlands Shale-Basalt Dry Forest – Wet Sclerophyll Forests (Grassy sub-formation)	Poor	Southern Highlands Shale Woodlands in the Sydney Basin Bioregion EEC listed under the BC Act	0.58
Total area of native vegetation			**0. 58**
Exotic Dominated Grassland	N/A	N/A	26.45
Exotic Canopy	N/A	N/A	2.07
Total area of non-native vegetation			**28.52**
Total area of vegetation			**29.10**

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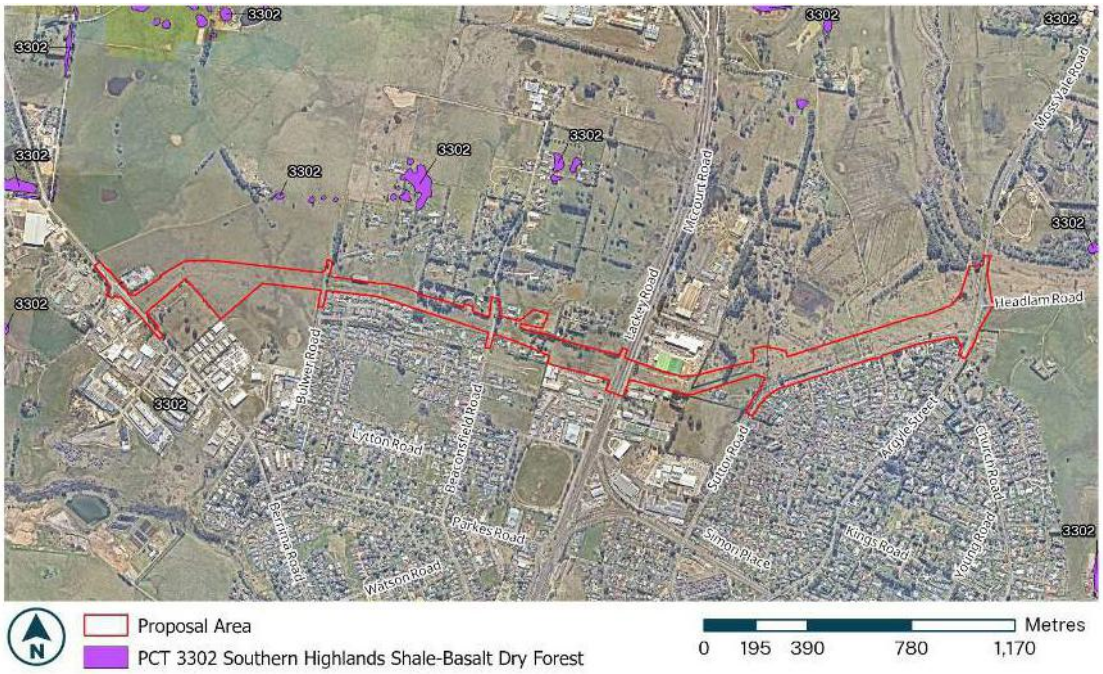


Figure 6-3: PCTs in proposal area

Threatened ecological communities

One threatened ecological community (TEC) listed under the BC Act and EPBC Act occurs in the study area, being Southern Highlands Shale-Basalt Dry Forest (PCT 3302). This PCT is associated with the BC Act and EPBC Act listed endangered ecological community, Southern Highlands Shale Woodlands in the Sydney Basin Bioregion.

PCT 3302 within the proposal area is highly degraded and primarily exists as isolated paddock trees over exotic dominated grassland.

Threatened species

A total of 14 threatened flora have been recorded within a five-kilometre radius of the proposal area (refer to Table 6-14 and Figure 6-5).

One threatened flora species, *Eucalyptus macarthurii*, was observed during the site surveys, with 15 semi-mature/mature individuals identified within the proposal area, as shown in Figure 6-4. Three records of Latham's Snipe are mapped within the proposal area, with an additional 9 threatened species considered to have a moderate or higher likelihood of being present.

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Figure 6-4: Eucalyptus macarthurii locations

Table 6-14: Threatened flora species potentially within proposal area

Scientific name	Common name	BC Act	EPBC Act	Records within 5km of proposal area	Likelihood of occurrence within proposal area
Acacia bynoeana	Bynoe's Wattle	E	V	1	Unlikely
Boronia deanei	Deane's Boronia	V	V	Modelled only	Unlikely
Commersonia prostrata	Dwarf Kerrawang	E	E	Modelled only	Unlikely
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Modelled only	Unlikely
Eucalyptus aggregata	Eucalyptus aggregata population in the Wingecarribee LGA	V	V	12	Low
Eucalyptus aggregata	Black Gum	V	V	12	Low
Eucalyptus macarthurii	Paddys River Box	E	E	624	Recorded
Kunzea cambagei	Cambage Kunzea	V	V	Modelled only	Unlikely
Persoonia glaucescens	Mittagong Geebung	E	V	1	Unlikely
Persoonia mollis subsp. revoluta	-	V	-	1	Unlikely
Persoonia oxycoccoides	-	E	E	Modelled only	Unlikely

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Scientific name	Common name	BC Act	EPBC Act	Records within 5km of proposal area	Likelihood of occurrence within proposal area
Phyllota humifusa	Dwarf Phyllota	V	V	1	Unlikely
Pomaderris brunnea	Brown Pomaderris	E	V	Modelled only	Unlikely
Pomaderris cotoneaster	Cotoneaster Pomaderris	V	V	Modelled only	Unlikely

V – Vulnerable; E – Endangered

A total of 39 threatened fauna species have been recorded within a five-kilometre radius of the proposal area (refer to Table 6-15).

One threatened fauna species, *Gallinago hardwickii* (Latham's Snipe) was observed during the site assessment. Three individuals were flushed from a small unmapped creek line in the centre of the proposal area. Based on habitat and records, 9 threatened fauna species have a moderate or higher likelihood of occurrence within or adjacent to the proposal area, including *Artamus cyanopterus cyanopterus* (Dusky Woodswallow), *Callocephalon fimbriatum* (Gang-gang Cockatoo), *Calyptorhynchus lathami lathami* (Glossy Black-cockatoo), *Gallinago hardwickii* (Latham's Snipe), *Haliaeetus leucogaster* (White-bellied Sea-Eagle), *Hieraaetus morphnoides* (Little Eagle), *Rostratula australis* (Australian Painted Snipe), *Myotis macropus* (Southern Myotis), and *Phascolarctos cinereus* (Koala).

Table 6-15: Threatened fauna species potentially within the proposal area

Scientific name	Common name	BC Act	EPBC Act	Records within 5km of proposal area	Likelihood of occurrence within proposal area
Anthochaera Phrygia	Regent Honeyeater	CE	CE	Modelled only	Low
Aphelocephala leucopsis	Southern Whiteface	V	V	Modelled only	Low
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	19	Moderate
Botaurus poiciloptilus	Australasian Bittern	E	E	6	Low
Calidris acuminata	Sharp-tailed Sandpiper	-	V	Modelled only	Low
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	49	Moderate
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	V	18	Moderate
Circus assimilis	Spotted Harrier	V	-	1	Low
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	Modelled only	Low
Daphoenositta chrysoptera	Varied Sittella	V	-	4	Low
Falco hypoleucos	Grey Falcon	E	-	Modelled only	Low
Gallinago hardwickii	Latham's Snipe	V	V	30	Recorded

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Scientific name	Common name	BC Act	EPBC Act	Records within 5km of proposal area	Likelihood of occurrence within proposal area
Grantiella picta	Painted Honeyeater	V	V	Modelled only	Low
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	25	Moderate
Hieraaetus morphnoides	Little Eagle	V	-	11	Moderate
Hirundapus caudacutus	White-throated Needletail	-	V	1	Low
Melanodryas cucullata cucullate	South-eastern Hooded Robin	V	-	Modelled only	Low
Ninox connivens	Barking Owl	V	-	1	Low
Oxyura australis	Blue-billed Duck	V	-	75	Low
Petroica boodang	Scarlet Robin	V	-	16	Low
Petroica phoenicea	Flame Robin	V	-	4	Low
Pycnoptilus floccosus	Pilotbird	-	V	Modelled only	Low
Rostratula australis	Australian Painted Snipe	E	E	9	Moderate
Stagonopleura guttata	Diamond Firetail	V	-	Modelled only	Low
Stictonetta naevosa	Freckled Duck	V	-	46	Low
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Modelled only	Low
Dasyurus maculatus	Spotted-tailed Quoll	V	E	1	Low
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E	E	Modelled only	Low
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	3	-Low
Myotis macropus	Southern Myotis	V	-	3	Moderate
Petauroides Volans	Southern Greater Glider	-	V	Modelled only	Low
Petaurus australis australis	Yellow-bellied Glider (south-eastern)	V	-	Modelled only	Low
Petaurus norfolcensis	Squirrel Glider	V	-	1	Low
Phascolarctos cinereus	Koala	V	E	7	Moderate
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	34	Low
Litoria watsoni	Southern Heath Frog	E	E	Modelled only	Unlikely

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Scientific name	Common name	BC Act	EPBC Act	Records within 5km of proposal area	Likelihood of occurrence within proposal area
Hoplocephalus bungaroides	Broad-headed Snake	E	V	Modelled only	Unlikely
Keyacris scurra	Key's Matchstick Grasshopper	E	-	Modelled only	Low
Macquaria australasica	Macquarie Perch	-	E	Modelled only	Unlikely

V – Vulnerable; E – Endangered; CE – Critically Endangered

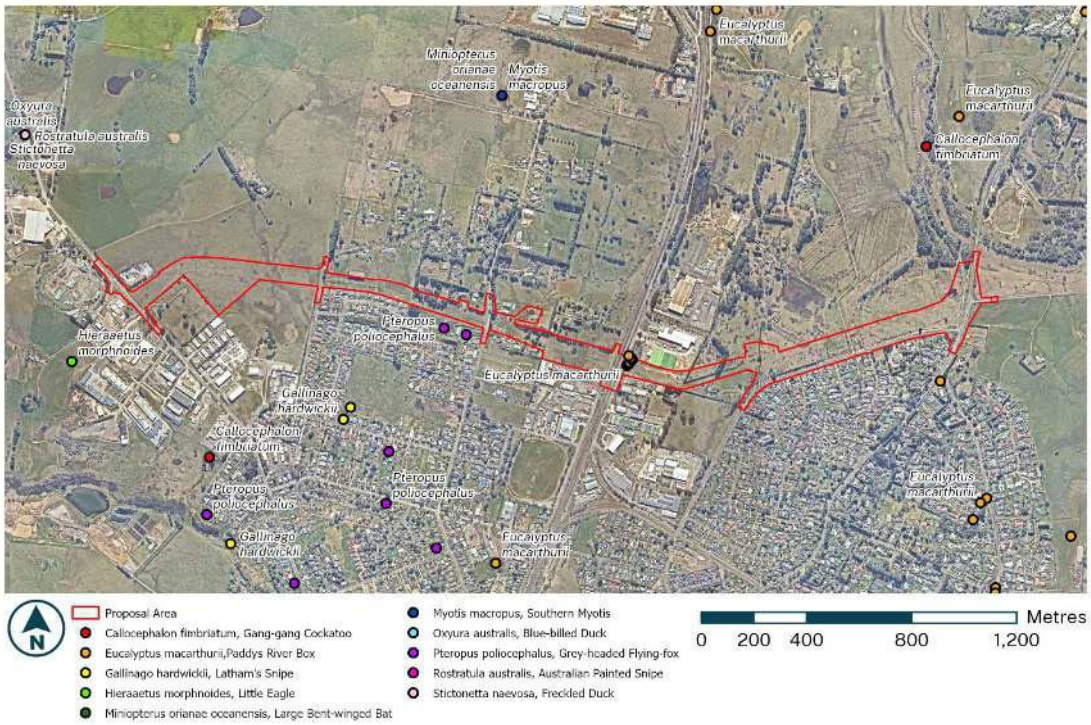


Figure 6-5: Threatened species in the proposal area

Migratory species

Database searches revealed 8 migratory terrestrial species, or their habitat, are known to occur within the proposal area, with these species not breeding within Australia (refer to Table 6-16).

Table 6-16: Migratory species potentially within the proposal area

Scientific name	Common name	EPBC Act status
Cuculus optatus	Oriental Cuckoo	Migratory, CAMBA, JAMBA, ROKAMBA
Gallinago hardwickii	Latham's Snipe	Migratory, Bonn, JAMBA, ROKAMBA
Hirundapus caudacutus	White-throated Needletail	Vulnerable, Migratory, CAMBA, JAMBA, ROKAMBA
Monacha melanopsis	Black-faced Monarch	Migratory, Bonn
Monarcha trivirgatus	Spectacled Monarch	Migratory, Bonn

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Scientific name	Common name	EPBC Act status
Motacilla flava	Yellow Wagtail	Migratory, CAMBA, JAMBA, ROKAMBA
Myiagra cyanoleuca	Satin Flycatcher	Migratory, Bonn
Rhipidura rufifrons	Rufous Fantail	Migratory, Bonn

CAMBA = China-Australia Migratory Bird Agreement, JAMBA = Japan-Australia Migratory Bird Agreement, ROKAMBA = Republic of Korea-Australia Migratory Bird Agreement and Bonn = Convention on the Conservation of Migratory Species of Wild Animals.

Fauna habitat and wildlife corridors

The proposal area consists of agricultural, residential and industrial land that has already fragmented the landscape, with historical clearing already presenting as a barrier to the movement for terrestrial and arboreal mammals, reptiles and amphibians.

Coarse woody debris, 1 culvert (however not suitable habitat for threatened species), nectar/lerp-bearing trees and shrubs, sap and gum sources, seed-bearing trees and shrubs, tree hollows, decorticating bark, and 4 small streams and 3 farm dams were recorded in the proposal area. No rock outcrops and bush rock, large stick nests, she-oak fruit, soft-fruit-bearing trees or shrubs, dense shrubbery and leaf litter, open water bodies and any estuarine, beach, mudflats or rocky foreshores were recorded in the proposal area.

Koala habitat

SEPP (Biodiversity and Conservation) 2021 Koala habitat protection chapters apply to development applications within prescribed LGAs, including Wingecarribee. While the provisions do not directly apply to EP&A Act Division 5.1 assessments, the presence of core and/or potential Koala habitat is considered good assessment practice.

During the site surveys, it was noted that the proposal area was highly degraded and contained a small number of Koala use trees, this was limited to a small stand of *Eucalyptus amplifolia* in the eastern corner of the proposal area (near Argyle Street). No Koalas, or evidence of Koalas (scats, tracks, scratches etc.) were identified during the field surveys.

Groundwater dependent ecosystems

A review of the Bureau of Meteorology's Atlas of Groundwater Dependent Ecosystem (BoM, 2024) found no aquatic groundwater dependent ecosystems to occur within the proposal area. The closest aquatic groundwater dependent ecosystem is Wingecarribee River, located north-east of the proposal area, and it is noted as a high potential aquatic groundwater dependent ecosystem. PCT 3302: Southern Highlands Shale Woodland within the study area is not mapped as a groundwater dependent ecosystem.

Areas of outstanding biodiversity value

No areas of outstanding biodiversity value occur within the study area or surrounding area.

Matters of National Environmental Significance

Matters of National Environmental Significance (MNES) are environmental values listed under the EPBC Act, with the Protected Matters Search Tool identifying the following as potentially occurring within the proposal area:

- Five threatened ecological communities
- Seventy threatened species
- Fourteen threatened migratory species.

Two EPBC Act listed species were identified within the proposal area:

- *Eucalyptus macarthurii*
- *Gallinago hardwickii* (Latham's Snipe).

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Four EPBC Act listed species that have the potential to occur within the proposal area are:

- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
- *Calyptorhynchus lathami lathami* (South-eastern Glossy Black Cockatoo)
- *Rostratula australis* (Australian Painted Snipe)
- *Phascolarctos cinereus* (Koala).

6.3.3 Potential impacts

Construction

Removal of native vegetation

The proposal would result in the removal of 0.58 hectares of PCT 3302: Southern Highlands Shale-Basalt Dry Forest. Vegetation within the proposal area is generally in poor condition due to historical clearing and invasion of environmental and priority weeds. The majority of the impacts would be to degraded vegetation (28.52 hectares) including exotic dominated grassland and exotic trees/shrubs.

Removal of threatened fauna habitat

All vegetation proposed to be removed provides minor foraging habitat for a suite of protected fauna species. Sensitive and/or specialist fauna habitat that may be directly impacted by the proposal include 6 hollow-bearing trees and 1 stag.

The tree hollows in the proposal area may provide potential breeding habitat for threatened species including the Gang-gang Cockatoo, the Glossy Black Cockatoo and threatened microbats.

Trampling of threatened flora species

One threatened flora species, *Eucalyptus macarthurii*, has been identified within and surrounding the proposal area and may be impacted as a result of trampling. Forty-six individuals were identified within proximity to the proposal area, however the implementation of safeguards and management measures, including tree protection zones, flagging and demarcating would reduce any risk of accidental damage. No impacts are expected to occur outside of the proposal area.

Impacts on threatened species and communities

Fifteen semi-mature/mature *Eucalyptus macarthurii* and numerous saplings occur within the proposal area. An additional 46 individuals occur within proximity to the proposal area and would not be impacted by the proposal.

The *Gallinago hardwickii* (Latham's Snipe) is the only threatened fauna species which was recorded utilising a creek line within the proposal area.

Nine threatened fauna species are considered to have a moderate or higher likelihood of occurring within the proposal area and could be impacted by the proposed works. These species are:

- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
- *Caltpyorhynchus lathami lathami* (South-eastern Glossy Black Cockatoo)
- *Gallinago hardwickii* (Latham's Snipe)
- *Haliaeetus leucogaster* (White-bellied Sea-Eagle)
- *Hieraaetus morphnoides* (Little Eagle)
- *Rostratula australis* (Australian Painted Snipe)
- *Myotis macropus* (Southern Myotis)
- *Phascolarctos cinereus* (Koala).

A five-part test (BC Act) and an Assessment of Significance (EPBC Act) were prepared to assess whether the impacts to threatened species and communities could constitute a significant impact, with the results indicating a significant impact is not likely.

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Wildlife connectivity and habitat fragmentation

The proposal would not result in excessive landscape scale habitat fragmentation, due to the high degree of fragmentation in the landscape associated with historical clearing and the surrounding land use. The proposal has also minimised fragmentation by aligning closely to the existing infrastructure and land uses.

However, the proposal could result in some minor localised fragmentation of habitat including habitat used by threatened flora and fauna. This is not expected to result in any substantial biodiversity impacts.

Fauna injury and mortality

Injury and mortality of fauna could occur during vegetation clearing required for the proposal. Less mobile species may be more susceptible to injury or mortality as they typically cannot quickly move away from clearing activities.

Entrapment of wildlife in any trenches or pits that are dug is possible if the trenches are deep and steep sided. Wildlife may also become trapped in or may choose to shelter in machinery that is stored overnight.

Collisions between fauna and vehicles during the construction phase may also result in fauna injury or mortality.

Risk of starvation, exposure and loss of shade or shelter

It is highly unlikely that any threatened fauna would be exposed to increased risks from starvation, exposure, and loss of shade and shelter beyond the proposal area as a result of the proposal. Potential disturbances from noise during construction may result such habitats becoming unsuitable for certain species.

Operation

The proposal includes substantial landscape plantings along the alignment using native species, such that there would be a net increase in the number of native trees as a result of the proposal.

Edge effects

Adjacent habitats are currently subject to a degree of edge effects due to prior clearing and surrounding land use. As such an increase to edge effects is not expected to occur to the surrounding vegetation as a result of the proposal.

Light, dust, and noise impacts

Increased impacts associated with light, dust, and noise are expected to be negligible during the operation of the proposal. Any potential impacts are not considered significant as it is highly unlikely that species abundance would be diminished.

Invasion and spread of weeds

The proposal is not likely to cause an indirect introduction or spread of weeds as a result of the operation.

Loss of breeding habitats

Six hollow bearing trees and 1 hollow bearing stag are identified as breeding habitat within the proposal area. Impacts to these hollows would occur during construction and have been considered above.

No breeding habitat features (e.g. hollows, nests, caves) were identified immediately adjacent to the proposal area. It is therefore considered unlikely that the proposal would result in impacts to breeding habitats during operation.

Invasion and spread of pests

The proposal is located in an area that likely has pest animal populations (e.g. feral cats, foxes, rabbits). The proposal is unlikely to result in an increase in available habitat for these species and is unlikely to lead to an increase in pest animal populations.

Conclusion on significance of impacts

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* and therefore a *Species Impact Statement* or Biodiversity Development Assessment Report is not required.

The result of the Tests of Significance (Appendix C of the BAR) and Assessments of Significance (Appendix D of the BAR) determined that the proposal is not likely to significantly impact threatened species, ecological communities or migratory species, within the meaning of the EPBC Act.

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6.3.4 Safeguards and management measures

Table 6-17: Biodiversity safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Biodiversity	Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated and implemented where practicable and feasible.	Contractor	Pre-construction
Removal of native vegetation	Native vegetation removal will be minimised through construction planning.	Contractor	During construction
Removal of native vegetation	Pre-clearing surveys and final pre-clearing checks will be undertaken in accordance with *Guide 1: Pre-clearing process of the Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	Pre-construction
Removal of native vegetation	Native vegetation on the corner of Suttor Street and Argyle Street needs to be ground-truthed prior to removal to identify the Eucalyptus species.	Council / Contractor	Pre-construction
Removal of native vegetation	Vegetation removal will be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
Removal of native vegetation	An unexpected threatened species finds procedure is to be developed as part of the CEMP using the template in *Guide 1: Pre-clearing process* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024). The procedure is to be followed if threatened ecological communities, either new TECs or new occurrences of known TECs, not assessed in the biodiversity assessment, are identified within the proposal area.	Contractor	During construction
Removal of native vegetation	The following should be implemented as part of the CEMP: • Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas • Pre-clearing survey requirements • Procedures for unexpected threatened species finds and fauna handling • Procedures addressing relevant matters specified in the Policy and guidelines for fish habitat conservation and management (Department of Primary Industries, 2013) • Protocols to manage weeds, pathogens and pest species.	Contractor	During construction
Direct impacts to threatened species	Threatened fauna habitat removal will be minimised through construction planning.	Contractor	Pre-construction
Direct impacts to threatened species	Fauna encountered on-site during construction will be managed in accordance with *Guide 9: Fauna handling* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
Direct impacts to threatened species	Habitat removal will be undertaken by staged clearing in accordance with *Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction

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Impact	Environmental safeguards	Responsibility	Timing
Direct impacts to threatened species	Habitat will be replaced or re-instated in accordance with *Guide 5: Reuse of woody debris and bushrock* (Transport for NSW, 2024) and *Guide 8: Artificial hollows of the Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
Removal of threatened plants	Removal of *Eucalyptus macarthurii* will be avoided through construction planning, where possible.	Contractor	Pre-construction
Removal of threatened plants	Clearing limits and exclusion zones will be clearly identified prior to work within the vicinity of the *Eucalyptus macarthurii* that occur in proximity to the Subject Land to ensure no impacts to these individuals.	Contractor	Pre-construction
Changes to hydrology	Changes to existing surface water flows will be minimised through construction planning.	Contractor	Pre-construction
Edge effects	Exclusion zones will be set up at the limit of clearing in accordance with *Guide 2: Exclusion zones* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
Injury and mortality of fauna	Fauna will be managed in accordance with *Guide 9: Fauna handling* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
Invasion and spread of weeds	Weed species will be managed in accordance with *Guide 6: Weed management* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
Invasion and spread of pathogens and disease	Pathogens will be managed in accordance with *Guide 7: Pathogen management* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction

6.4 Hydrology, water and flooding

The potential impacts of the proposal on hydrology, water and flooding were assessed in the Moss Vale Bypass Technical Report: Flooding prepared by Lyall & Associated which is provided in Appendix F. The existing environment, potential impacts of the proposal and safeguards to mitigate them are summarised below.

6.4.1 Methodology

The methodology for the flooding assessment aligns with current best practice and relevant national and state guidelines, including *Australian Rainfall and Runoff* (Geoscience Australia, 2019) and the NSW Floodplain Risk Management Manual (Department of Planning and Environment, 2023).

Key steps in the assessment included:

- Review of available data and existing flood studies of the catchments within which the proposal is located
- Development of a set of hydrologic and hydraulic models (collectively referred to as 'flood models') of the catchments that are located within the study area
- Flood modelling and preparation of figures showing flood behaviour under present day (i.e. pre-proposal) conditions for design floods with annual exceedance probabilities (AEPs) of 10%, 5%, 1% and 0.2%, as well as the probable maximum flood (PMF)
- Assessment of the impact of the proposal (both during its construction and operation) on flood behaviour for a range of flood events

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- Assessment of the potential impact future climate change could have on flood behaviour under operational conditions, as well as the impact of the proposal on flood behaviour under potential future climate change conditions
- Identification of measures to manage the risk of flooding to the proposal and its impact on existing flood behaviour.

6.4.2 Existing environment

The Moss Vale Bypass corridor is located within the catchments of the Wingecarribee River, Stony Creek, and Whites Creek. Most of the alignment drains to 2 unnamed tributaries of the Wingecarribee River, with the remainder draining to Stony Creek and Whites Creek. The area is a mix of cleared pastoral land, remnant bushland, and urban development. Flow in the Wingecarribee River is regulated by the Wingecarribee Reservoir and Cecil Hoskins Dam.

The existing drainage system includes piped drainage lines, open channels, and farm dams. Key features are a 450 mm diameter drainage line from Berrima Road through the Wingecarribee Resource Recovery Centre, and multiple crossings of Unnamed Tributaries 1 and 2. These features are shown in Figure 4.2 of the flooding report in Appendix F. In addition to this existing drainage system, Council is separately planning drainage works at Berrima Road and Bulwer Road. For the purposes of this assessment, it is assumed that those works would be completed for the drainage works as part of this proposal to tie into.

Flooding in the corridor can result from both riverine and local catchment events. Under current conditions, sections of Berrima Road, Beaconsfield Road, Suttor Road, and Argyle Street are subject to inundation during significant rainfall events, with depths up to 0.7 m possible during a 1% AEP event (see Figure 4.4 in the flooding report in Appendix F). The PMF would result in widespread inundation, with depths exceeding 1 metre at several locations along the alignment (see Figure 4.5 in the flooding report in Appendix F).

6.4.3 Potential impacts

Construction

Construction of the Moss Vale Bypass has the potential to interact with flood behaviour along the corridor, particularly in areas where construction activities occur within flood prone land. The location of work areas and compound sites in relation to indicate flood extents is shown in Figure 5.1 in the flooding report (Appendix F).

Key potential impacts during construction include:

- Activities within construction compounds or work areas may have a minor impact on flood behaviour if layouts are configured to prevent temporary works from obstructing overland flow paths along site boundaries
- Without appropriate staging of construction activities and provision of temporary drainage works, there is potential to obstruct or alter the conveyance of flow in drainage lines that cross the work area, especially during the construction of transverse drainage structures, which require temporary diversion of flow
- Site facilities and materials located within portions of construction compounds that cross watercourses may obstruct the conveyance of flow along those watercourses
- Activities within the area proposed to construct the bridge have the potential to obstruct the conveyance of flow along Lackey Road and McCourt Road.

The assessment found that some construction areas, particularly compound sites and bridge works, are at risk of inundation during events as frequent as the 20% AEP (1-in-5 year) storm. Detailed planning of construction layouts and staging would be required to minimise obstruction of flow paths and maintain safe evacuation routes for personnel.

Operation

The concept design for the Moss Vale Bypass included a comprehensive corridor-wide assessment to identify feasible locations for water quality basins. However, in practice, most potential sites were compromised by either challenging ground elevations or the presence of utility easements, meaning that for the majority of locations basin construction was not feasible.

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The few locations that passed these initial constraints were confined to narrow strips immediately adjacent to the proposed bypass. These strips imposed substantial limitations on basin footprint due to proximity to the bypass alignment and common-property boundaries. As a result, none of the identified sites could accommodate basins with sufficient detention or treatment capacity to deliver meaningful water detention or water quality outcomes.

The concept design (undertaken in 2023) introduced 3 compact detention basins spaced along the bypass corridor. Each basin was sized to intercept stormwater, attenuate peak flow rates, and retain runoff long enough to allow suspended solids to settle. To enhance sediment removal, the design incorporated a filtration layer consisting of a sand bed laid over slotted or porous pipework, enabling fine particle capture while allowing clarified water to drain away.

During a review of the concept design, the proposed detention basins were examined in detail. The review identified that steep grades, constrained land parcels, and the presence of buried utilities limited both the size and placement of each basin. Council also identified the long-term maintenance burden associated with these small-scale detention structures, particularly given their limited treatment capacity and therefore limited benefit. As a result of the design review, the basins were ultimately removed from the final concept design.

Various locations within the site are currently subject to erosion which contributes sediment to the downstream catchment and this is particularly evident at McCourt Road. The construction of the Moss Vale Bypass would provide a sealed road surface and stabilised batter with controlled stormwater flows.

The design of the proposal includes a comprehensive drainage design consisting of a pit and pipe network, transverse drainage structures and open channels along the road alignment. In addition to these engineered solutions, the Moss Vale Bypass alignment presents opportunities for natural water quality improvement. Some drainage runoff is expected to traverse long stretches of rural grassed areas, which often lead to existing dams and ponding zones. These features provide passive attenuation, allowing sediment and pollutants to settle before runoff reaches the Wingecarribee River. This landscape-driven approach offers a low-impact means of improving stormwater quality through natural filtration and retention.

Section 171A of the Environmental Planning and Assessment Regulation 2021 requires determining authorities to consider whether the carrying out of an activity will have a neutral or beneficial effect (NorBE) on water quality. Consideration of Section 171A factors and the WaterNSW NorBE guide is included in Appendix B.

The bypass is designed to maintain or improve flood immunity for the new road and shared paths, and to avoid significant adverse impacts on surrounding development for events up to the 1% AEP flood.

The operation of the Moss Vale Bypass has the potential to influence flood behaviour in the surrounding area due to the presence of new road embankments, drainage structures, and associated modifications to local flow paths.

The post-proposal indicative depth of inundation for a range of flood events is shown in Figures 6.1, 6.2 and 6.3 in the flooding report (Appendix F). The change in flood levels (afflux) due to the proposal is shown in Figures 6.4, 6.5 and 6.6 in the flooding report (Appendix F).

Key potential impacts during operation include:

- The bypass may cause minor increases in flood depths, velocities, or durations of inundation in some areas adjacent to the corridor, particularly near upgraded drainage lines and embankments. In most cases, these increases are within established limits, but at a small number of locations, the impacts exceed thresholds and require consultation with affected property owners
- The road and its drainage structures may alter the distribution of overland flow, leading to localised increases or decreases in flood extent and duration, especially near transverse drainage crossings
- In some areas, the bypass may slightly increase flood levels or velocities downstream of upgraded outlets, which can be managed through scour protection and energy dissipation measures
- During extreme events (such as the PMF), the raised embankments may increase flood depths upstream of the road at a small number of properties, but these changes are not expected to significantly increase flood hazard or risk to critical infrastructure or sensitive land uses.

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6.4.4 Safeguards and management measures

Table 6-18: Hydrology, water and flooding safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Construction flooding	Detailed construction planning would consider flood risk at work areas and associated compound sites, including: • Reviewing construction site layouts and staging construction activities in order to avoid or minimise obstruction of overland flow paths and limiting the extent of flow diversion required • Designing the layout of construction facilities and implementing stormwater management controls during their establishment in order to manage the impact of flooding on construction personnel, equipment and materials • Identifying and applying measures to not worsen flood impacts on the community and on other property and infrastructure during construction up to and including the 1% AEP flood event where reasonable and feasible. Where warranted by the scale and nature of the proposed works this would include flood modelling and assessment to assess the extent of potential impacts and therefore the scope of mitigation measures that may be required • Measures to mitigate alterations to local runoff conditions due to construction activities.	Contractor	Pre-construction
Construction flooding	Spoil stockpiles would be located in areas which are not subject to frequent inundation by floodwater, ideally outside the 10% AEP flood extent. The exact level of flood risk accepted at stockpile sites would depend on the duration of stockpiling operations, the type of material stored, the nature of the receiving drainage lines and also the extent to which it would impact flooding conditions in adjacent development.	Contractor	Pre-construction
Construction flooding	Construction facilities would be located outside high flood hazard areas based on a 1% AEP flood.	Contractor	Pre-construction
Construction flooding	Flood emergency management measures for construction of the proposal would be prepared and incorporated into relevant environmental and/or safety management documentation. This would include: • Contingency planning for construction facilities that are located in areas that are inundated by mainstream flooding during a 1% AEP event • For construction facilities located within the floodplain the identification of how flood related risks to personal safety and damage to construction facilities and equipment will be managed • Procedures to monitor accurate and timely weather data, and disseminate warnings to construction personnel of impending flood producing rain.	Contractor	Pre-construction
Operational flooding	Council will consult with affected property owners in regard to any residual flood impacts that exceed the limits set out in Section 3.3.2 of the flooding technical report (Appendix F).	Council	Pre-construction

6.5 Geology, soils and contamination

The potential impacts of the proposal on geology, soils and contamination were assessed in the Geotechnical Investigation Factual Report (GFR), Preliminary Site Investigation (PSI) and the Detailed Site Investigation (DSI) prepared for the Moss Vale Bypass, which are provided in Appendices I, J, and K, respectively. The existing environment, potential impacts of the proposal and safeguards to mitigate them are summarised below.

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6.5.1 Methodology

Potential issues relating to geology, soils and contamination relevant to the proposal area were identified by undertaking a desktop review of the following sources:

- EPA contaminated land record of notices (NSW Environmental Protection Authority, 2024) (accessed 23 October 2024)
- Contaminated sites notified to the EPA (NSW Environmental Protection Authority, 2024) (accessed 23 October 2024)
- MinView spatial geology website (NSW Department of Primary Industries and Regional Development, 2024) (accessed 23 October 2024)
- ePlanning Spatial Viewer Acid Sulfate Soils Map (NSW Department of Planning, Housing and Infrastructure, 2024) (accessed 23 October 2024)
- Geotechnical Investigation Factual Report: Proposed Moss Vale Road Bypass
- Preliminary Site Investigation: Proposed Moss Vale Road Bypass
- Detailed Site Investigation: Proposed Moss Vale Road Bypass.

6.5.2 Existing environment

Geology

A review of the MinView spatial geology website identified that the proposal area is underlaid by 4 geological units:

- Most of the proposal area is underlaid by Residuum (Q_r), comprised of residual deposits of unconsolidated clayey coarse to fine grained sands to weakly consolidated sandy clay layers, with poor to extensive soil development noted
- A small area in the eastern corner of the proposal area is underlaid by Ashfield Shale (Twia), comprised of light grey to chocolate brown sideritic claystone to siltstone; dark-grey to black when fresh. Intercalated sandstone/siltstone laminate. Sandstone is quartzose with minor labile content, micaceous locally, with rare plant fossils noted
- A small area in the northern corner of the proposal area is underlaid by Bringelly Shale (Twib), comprised of light to dark grey, sideritic claystone to siltstone, dark grey carbonaceous claystone, sandstone to siltstone, and quartz-lithic very fine to medium grained sandstone. Plant fragments are abundant locally, typically strongly weathered with extensive soil development noted
- A small area in the northwestern corner of the proposal is underlaid by Floodplain Deposits (Q_af), comprised of silt and clay with variable soil development, and with sand and gravels noted locally.

Soils

The DSI noted the general soil profile being comprised of topsoil underlain by natural soil. Fill materials were encountered at a number of locations underlain by natural soil within the proposal area.

Acid sulfate soils

Acid sulfate soils are sediments and soils containing iron sulphides that generate sulphuric acid following exposure to oxygen through drying and rewetting. Acid sulfate soils usually occur in low lying parts of coastal floodplains, rivers and creeks. Potential Acid sulfate soils contain iron sulphides that have not been exposed to air or oxidised. They pose an environmental risk as they would become acidic when exposed to air during construction activities.

The Acid Sulfate Soil Risk Map on the ePlanning Spatial Viewer indicates that the proposal area is not located within an identified acid sulfate soils risk area.

Contamination

A search of the NSW's EPA contaminated land record of notices was undertaken for the Wingecarribee Shire LGA. The search did not identify any contaminated land sites within the proposal area. One site (Moss Vale North Depot on Bowman Road/Berrima Road, Moss Vale) was identified as being located approximately 900m south from the proposal area, with no impacts anticipated due to its distance from the proposed works.

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A search of the List of Contaminated Sites Notified to the NSW EPA did not identify any contaminated sites within the proposal area. One site (Moss Vale Refuelling Facility on Lackey Road, Moss Vale) was identified as being located approximately 1km south-east of the proposal area, with no impacts anticipated due to its distance from the proposed works.

The PSI identified potential areas of environmental concern, which included the risk of agricultural chemicals and fertilisers contaminating the site from previous agricultural use. Other potential contamination included metals from the degradation of metal features nearby, and previous car wrecks. Other contaminants may include petroleum hydrocarbon resulting from fuel leaks from vehicles or from uncontrolled filling activities in the road reserve near the corner of Suttor Road and Argyle Street.

The DSI noted that the test pits and boreholes did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter.

6.5.3 Potential impacts

Construction

Construction activities involving ground disturbance such as vegetation clearing and excavation for the proposed works, would increase the potential for erosion, which may result in the mobilisation of soils and subsequent sedimentation of receiving environments. Work activities with the potential to expose soil include:

- Earthworks within the proposal area
- Drainage works
- Vehicle movements
- Removal and installation of fill material
- Stockpiling
- Vegetation removal
- Grubbing processes
- Landscaping.

These activities would potentially cause:

- Erosion and sedimentation of exposed soils
- Erosion, leaching and dust generation from stockpiled materials
- Loss of soil quality and condition from material stockpiling
- Associated soil quality impacts as a result of accidental spills and leaks caused by:
  - Use of fuels and oils outside of bunded and/or contained areas
  - Leaks from poorly maintained vehicles, machinery and equipment
  - Temporary storage and management of spoil and waste.

Unmitigated potential impacts associated with the sedimentation of eroded material include:

- Increased sedimentation and elevated turbidity levels of nearby drainage channels from exposed soil during site disturbance and movement of construction vehicles, particularly following rainfall events
- Increased levels of nutrients, metals and other pollutants, transported via sediment receiving watercourses.

During construction, there would be the potential for the proposed works to result in contamination of soil and/or water due to leaks and spills of potentially contaminating materials. Management measures would be implemented during the proposed works to minimise the risk of spills and contain spills if they occur. Spill response procedures would be followed.

Operation

Upon completion of the proposed works, any disturbed areas would be stabilised. It is not expected that the operation of the proposed works would have any ongoing impact on soils or contamination.

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6.5.4 Safeguards and management measures

Table 6-19: Geology, soils and contamination safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Contaminated land	A pre-construction Land Condition Assessment will be undertaken of the ancillary facilities, to determine the baseline condition of the site prior to being utilised for the proposal.	Contractor	Pre-construction
Contaminated land	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. Works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls (or further actions identified in consultation with the EPA) have been implemented.	Contractor	Construction
Contaminated land	If any suspect materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos containing material, ash material, etc.) are encountered between the sampling locations during any stage of future earthworks/site preparation, Unexpected Finds Management Protocol (Appendix F of the DSI) should be implemented. In the event of contamination, detailed assessment, remediation and validation should be carried out by suitably qualified asbestos and contaminated land specialist consultants.	Contractor	Construction
Accidental spill	A site-specific emergency spill plan will be developed and include spill-management measures in accordance with the Transport Code of Practice for Water Management (Roads and Traffic Authority, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities.	Contractor	Detailed design / pre-construction
Erosion and sedimentation	Site-specific Erosion and Sediment Control Plan(s) will be prepared and implemented. The Plan will include arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.	Contractor	Pre-construction / construction
Waste management and resource recovery	For any materials to be excavated and removed from the site, classification of the materials will be undertaken in accordance with the NSW EPA Waste Classification Guidelines 2014, the NSW EPA resource recovery exemptions and orders under the Protection of the Environment Operations (Waste) Regulation 2014, or NSW EPA Certification: Virgin excavated natural material (VENM). Off-site disposal of material will be at a facility that can lawfully accept the material.	Contractor	Construction

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Impact	Environmental safeguards	Responsibility	Timing
Imported fill	Any imported materials must be assessed by a qualified environmental consultant, prior to importation, to ensure suitability for the proposed use. In addition, the imported materials must be free of unusual odour and not be discoloured. The imported materials should be VENM or excavated natural material (ENM) or materials that conform to the requirement of relevant EPA orders and exemptions, including, but not limited to the: • Excavated Public Road Material Order 2014 and Excavated Public Road Material Exemption 2014 • Reclaimed Asphalt Pavement Order 2014 and Reclaimed Asphalt Pavement Exemption 2014 • Recovered Aggregate Order 2014 and Recovered Aggregate Exemption 2014.	Contractor	Construction

6.6 Aboriginal cultural heritage

An Aboriginal cultural heritage assessment (ACHA) has been prepared for the proposal by Austral Archaeology. The main findings of that assessment are summarised below, while the full report is included in Appendix J.

6.6.1 Methodology

The ACHA has been prepared in accordance with the Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (Office of Environment and Heritage, 2011) while consultation with Aboriginal people has been in accordance with Aboriginal Cultural Heritage Consultation Requirements for Proponents (Department of Environment, Climate Change and Water, 2010). The ACHA included the following methodology:

- Consultation with Aboriginal stakeholders including 4 registered Aboriginal parties
- Desktop research to determine the landscape context of the proposal area
- Desktop research on the history and archaeological context of the proposal area
- A predictive model which considers the following variables:
  - Relationship between site types and their spatial distribution within the landscape
  - Raw site types, raw material types and site densities and their relationship to salient environmental features
  - Information in ethnohistorical sources that may indicate important natural resources or landscape features that may have been exploited
  - Potential chronological and spatial relationships between sites
- A field survey was conducted on 1 March 2023 by Austral Archaeology with assistance from a representative of the Illawarra Local Aboriginal Land Council and a representative of Cubbitch Barta
- Assessment of the results of consultation, desktop research and field surveys to consider the archaeological potential of the proposal area and potential for the proposal to impact Aboriginal heritage.

Test excavations of the proposal area were conducted from 26 June 2023 to 19 July 2023 and comprised 127 test pits across 7 areas of archaeological potential.

An Aboriginal Heritage Information Management System (AHIMS) search of the proposal area was carried out following the preparation of the ACHA, on 21 October 2024.

6.6.2 Existing environment

At the time of preparing the ACHA, a search of the AHIMS database identified no Aboriginal sites within the study area. An initial visual inspection of the study area identified 6 areas of potential subsurface archaeological sensitivity. Due to the poor ground surface visibility, no surface Aboriginal objects were identified in the areas of archaeological sensitivity.

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The field survey conducted in March 2023 was intended to refine and confirm the areas of potential identified as part of the initial visual inspection. The archaeological survey identified no new Aboriginal sites or features; however, it did determine 8 areas with potential for subsurface archaeological deposits that required test excavations.

Test excavations were conducted from 26 June 2023 to 19 July 2023 and comprised 127 test pits across 7 areas of archaeological potential. Eight potential archaeological deposit areas were initially identified for testing; however, 1 area was removed from the testing program due to the presence of a gas pipeline and fibre optic cables. Many of the areas were also reduced when the level of soil disturbance was made visible following vegetation slashing.

The Aboriginal sites identified along with their significance are described in Table 6-20. These sites have since been registered on the AHIMS database and are shown on Figure 6-6.

Table 6-20: Aboriginal sites identified

ID	Site name	Context	Status	Features	Aboriginal cultural heritage values
52-4-0761	MVB AS1	Open site	Valid	Artefact	MVB AS1 comprises a relatively undisturbed moderate-density subsurface artefact scatter within a footslope landform. The site consists of 35 artefacts with the most common artefact type being flakes. There were 5 raw material types present with quartz being the most dominant. Other raw material types included chert, silcrete, basalt and quartzite. Some formal tool types are present in the assemblage and a potential cultural fire feature is located within the centre of the site. This site is therefore considered to be of moderate archaeological significance.
52-4-0762	MVB AS2	Open site	Valid	Artefact	MVB AS2 comprises a low-density subsurface artefact scatter within a semi-disturbed context located on a crest landform. The site consists of 3 artefacts including a quartz flake, a piece of quartz debitage and a silcrete core. No rare tool types or materials are present within the assemblage and the scatter is therefore considered to be of low significance.
52-4-0763	MVB AS3	Open site	Valid	Artefact	MVB AS3 comprises a high-density subsurface artefact scatter within an undisturbed crest landform. The site consists of 145 artefacts, the majority being flakes, debitage and cores, however, 1 blade was also found. Raw materials present include quartzite, silcrete, quartz and chert, with silcrete being the most dominant. A variety of materials and formal tool types are present within the assemblage, and it is therefore considered to be of high significance.
52-4-0765	MVB IF1	Open site	Valid	Artefact	MVB IF1 comprises an isolated subsurface artefact within a semi-disturbed context located on a shoulder landform. The site consists of a single silcrete piece of debitage that had no cortex, a single faceted platform and a feathered termination. No rare tool types or materials are present within the assemblage and the site is therefore considered to be of low significance.

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ID	Site name	Context	Status	Features	Aboriginal cultural heritage values
52-4-0764	MVB AS4	Open site	Valid	Artefact	MVB AS4 comprises a low-density subsurface artefact scatter within a semi-disturbed context located on a crest landform. The site consists of 6 artefacts. Four of the artefacts were manufactured from quartz and 2 manufactured from silcrete. Four of the artefacts are flakes and 2 debitage. No rare tool types or materials are present within the assemblage and the scatter is therefore considered to be of low significance.



Figure 6-6: AHIMS sites near the proposal area

6.6.3 Potential impacts

Construction

As a result of the test excavations, 5 Aboriginal sites were identified, that would be affected by the proposal. These impacts are summarised in Table 6-21.

Table 6-21: Impacted Aboriginal sites

ID	Site name	Type of harm	Degree of harm	Consequence of harm
52-4-0761	MVB AS1	Direct	Total	Total loss of value
52-4-0762	MVB AS2	Direct	Total	Total loss of value
52-4-0763	MVB AS3	Direct	Total	Total loss of value
52-4-0765	MVB IF1	Direct	Total	Total loss of value
52-4-0764	MVB AS4	Direct	Total	Total loss of value

Operation

The proposal would not involve any impacts to Aboriginal cultural heritage during operation.

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6.6.4 Safeguards and management measures

Table 6-22: Aboriginal heritage safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Aboriginal cultural heritage	Prior to any works occurring, an area-wide Aboriginal Heritage Impact Permit (AHIP) will be applied for the 5 Aboriginal sites that will be affected due to the proposed works.	Contractor	Pre-construction
Aboriginal cultural heritage	Workers will be inducted as to appropriate Aboriginal heritage protection measures.	Contractor	Construction
Aboriginal cultural heritage	An unexpected find procedure will be implemented as outlined in the ACHA.	Contractor	Construction
Aboriginal cultural heritage	Wingecarribee Shire Council will continue to inform the Aboriginal stakeholders about the management of Aboriginal cultural heritage within the study area throughout the completion of the proposal.	Council	Construction
Aboriginal cultural heritage	Salvage of identified Aboriginal heritage features and relocation of artefacts from high-value areas will be undertaken prior to the commencement of any works that may impact these items. This process will be carried out in accordance with the approved AHIP and in consultation with Registered Aboriginal Parties.	Contractor / Council	Pre-construction

6.7 Non-Aboriginal heritage

Potential impacts of the proposal on non-Aboriginal heritage have been assessed in the Statement of Heritage Impact (SOHI) prepared by OzArk (refer to Appendix K). The existing environment, potential impacts of the proposal and safeguards to mitigate them, are summarised below.

6.7.1 Methodology

A detailed methodology is provided in the SOHI (Appendix K). In summary the methodology included:

- A visual inspection undertaken on 2 October 2024
- Desktop database searches to identify any potential previously recorded heritage located near the proposal area, including:
  - National and Commonwealth heritage listings
  - State Heritage Register (SHR)
  - Wingecarribee Shire LEP 2010
  - Moss Vale Township Development Control Plan 2021
- Preparation of a Statement of Heritage Significance
- Identification of impacts during construction and operation of the proposal
- Identification of construction and operational safeguards and management measures for the proposed works.

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6.7.2 Existing environment

History

An extensive history of Moss Vale has been undertaken during the Wingecarribee Heritage Study (JRC Planning Services, 1993) and Survey (Architectural Projects, 2009).

In 1798, Vice Admiral and Governor General John Hunter ordered ex-convict and explorer John Wilson to survey the south-west of Sydney who went as far as the junction of the Wingecarribee and Wollondilly Rivers before returning to Parramatta. Various early explorers including John Warby, George Caley, Hamilton Hume, and Surveyor General Lieutenant John Oxley then went on to further explore the Southern Highlands. Oxley left his home in Kirkham (UK) and settled in 1816 on 2,400 acres of land west of Bowral and is considered the first British settler in the region. Dr Charles Throsby, a surgeon and explorer, was granted 1,000 acres of land in 1817 at what was later the Bong Bong locality. The estate was named Throsby Park.

On 31 March 1821, Oxley was instructed by Governor Lachlan Macquarie to designate areas for farming and surveyor William Harper reserved land for the townships of Picton and Bong Bong on 14 November 1821. Following the death of Dr Charles Throsby, his nephew Mr. Charles Throsby continued to expand the Throsby estate. Throsby Park was later subdivided to allow the development of Moss Vale.

Following expansion of the rural railway network and the establishment of the Robertson Land Acts in 1861 that allowed the purchase of Crown Lands, new settlements were established across the Southern Highlands. The Sutton Forest railway station opened in 1867 and in 1877 was renamed to Moss Vale. In 1932, the Moss Vale to Port Kembla railway line opened and this further drove Moss Vale's development into a resort destination for prominent Sydney businessmen, politicians, and professional people. In the early 20th century various country estates were constructed with expansive English-styled gardens and large hedgerows that are now synonymous with the Southern Highlands urban landscape. Villages within the Southern Highlands arose along the road and rail linkages between Sydney and Canberra and along the Great South Road.

Results of database searches

Heritage items within and adjacent to the proposal area are listed in Table 6-23 and shown on Figure 6-7.

Table 6-23: Results of database searches

Database	Type of search	Results
State Heritage Register (SHR)	Wingecarribee Shire (LGA)	• Christ Church, Churchyard & Cemetery (SHR #01383)
Wingecarribee Shire Council	Schedule 5 of the LEP	• Christ Church (LEP I163) • Austermere (LEP I398) • Bong Bong Common Archaeological Area (A1191) • Burradoo Landscape Conservation Area (C1834)

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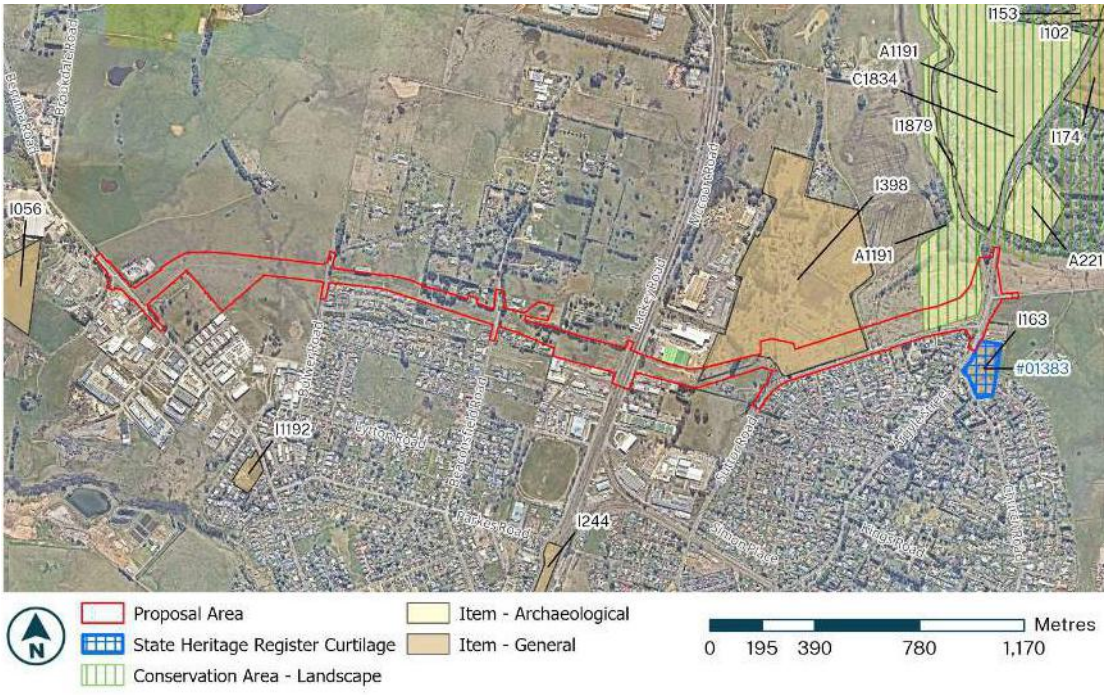


Figure 6-7: Heritage items near the proposal area

Assessment of heritage significance for Christ Church, Churchyard & Cemetery (SHR #01383/I163), Austermere (I398), Bong Bong Common (A1191) and Burradoo Landscape Conservation Area (C1834) are provided in Appendix K.

Potential heritage items

The visual inspection identified 2 potential heritage items of interest adjacent to or within the proposal area.

A railway signal hut was noted to be located within the proposal area; however, it was later assessed this item does not have heritage value as it appears to be a more recent structure. The proposed works would avoid this item.

The Moss Vale General Cemetery abuts the southern boundary of the proposal area towards the western extent. The cemetery's significance has not been previously assessed; however, the 1932 Bong Bong Parish map states the cemetery was dedicated and clearly demarcated on 21 August 1897. The visual inspection identified that boundaries of the cemetery adjacent to the proposal area are clearly defined by fence lines, indicating that there is a negligible likelihood for historical burials to be present beyond the designated lot boundary.

6.7.3 Potential impacts

Construction

Potential archaeological deposits

No potential archaeological deposits with historical significance were identified within the proposal area. Parts of the Bong Bong Common archaeological area (A1191) and Austermere (LEP I398) are located within the proposal area and have been noted to have been previously disturbed by the construction of a high-pressure gas main and optic cables, and historical vegetation clearing.

The visual inspection confirmed that the Christ Church, Churchyard & Cemetery (SHR #01383/LEP I163) curtilage and Moss Vale General Cemetery do not extend into the proposal area.

Use

Austermere (LEP I398) is currently abandoned. The proposed works may encourage restoration and conservation works of this abandoned heritage item which may lead to reuse and ongoing maintenance of this item.

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The portions of Bong Bong Common (A1191) and the Burradoo Conservation Area (C1834) that extend into the proposal area do not have a dedicated use and, as such, there would be no impact to the use of these items. Impacts to the curtilage of these items is considered below.

Use of Christ Church, Churchyard & Cemetery (SHR #01383/LEP I163) for its religious and social function would not be impacted by the proposed works.

Demolition

The proposed works do not involve demolition, partial or whole, of any heritage structures.

Curtilage

The curtilages of items Austermere (LEP I398), Christ Church, Churchyard & Cemetery (SHR #01383/LEP I163) and Bong Bong Common (A1191) extend into the proposal area and would be impacted. However, the identified historical values of these items do not pertain to these areas.

The proposed works would follow the existing alignment of 3 optic fibre cables and the APA gas line that have previously disturbed the proposal area which would minimise additional impact to the curtilages.

Moveable heritage

No items of moveable heritage have been identified within the proposal area.

Natural heritage

The proposed works would require the removal of non-native tree vegetation within the Austermere (LEP I398), with the vegetation not being a part of the original estate gardens. This vegetation does not contribute to the aesthetic heritage values of the property or the gardens.

Some non-native vegetation would be required to be removed within the Burradoo Landscape Conservation Area (C1834) and Bong Bong Common (A1191) curtilage; however, this would be replaced by native plantings along the bypass which are more sympathetic to the natural environment of the listed item.

Sufficient curtilage would be retained around the heritage items, so that the overall natural aesthetic values are not substantially impacted. The landscaping design for the proposed works has taken consideration towards native vegetation screening to further minimise impact to the aesthetic value of the gardens associated with the Austermere (LEP I398) that are noted as contributing to the significance of the item.

Conservation areas

The proposed works would require the minor removal of non-significant tree vegetation located within the curtilage of the Austermere (LEP I398), Bong Bong Common (A1191), and the Burradoo Landscape Conservation Area (C1834). Although there may be some impact during construction, this would be offset by new vegetation plantings within the bypass corridor.

Operation

Settings, views and vistas

The context of the heritage items has been previously altered through residential and industrial development such as the construction of roads and the gas pipeline. The views of the items would not be substantially altered by the proposed works.

The views from Christ Church, Churchyard & Cemetery (SHR #01383/LEP I163) have previously been impacted by a substation and the existing roads. Additionally, tall, dense pine planting block views from the item to the proposal area.

Therefore, the proposed works would have minimal further impact to the views to and from the listed heritage items.

Conservation areas

The *Moss Vale Township DCP Section A7.10: New Development within the vicinity of heritage items* stipulates that new developments within the vicinity of a heritage item should be sympathetic to the existing streetscape. The bypass corridor would incorporate a mix of exotic and native plantings to revegetate the corridor and minimise the visual impact of the bypass on the nearby heritage items.

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Cumulative impacts

Numerous previous developments associated with the development of Moss Vale have been undertaken either within the curtilage or near to the heritage items which has resulted in a cumulative impact to the heritage items that overlap with the proposal area.

The proposed works would result in an addition to the cumulative impacts in the area but would not significantly diminish the area's historic values.

6.7.4 Safeguards and management measures

Table 6-24: Non-Aboriginal heritage safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Non-Aboriginal heritage	A Non-Aboriginal Heritage Management Plan will be prepared and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to non-Aboriginal heritage.	Contractor	Detailed design / pre-construction
Non-Aboriginal heritage	An Unanticipated Finds Protocol (as per Appendix 3 of the SOHI) will be followed if any unexpected heritage items are encountered during works.	Contractor	Construction
Non-Aboriginal heritage	The proposed works will minimise the removal of vegetation within the Austermere (LEP I398) curtilage.	Contractor	Pre-construction / Construction
Non-Aboriginal heritage	Landscaping associated with the proposed works will consider the inclusion of tree planting to form a vegetation screen between the proposal area and Austermere (LEP I398) to minimise impact to the aesthetic and natural values of the item.	Contractor	Construction

6.8 Visual amenity

Potential impacts of the proposal on landscape character and visual amenity have been assessed in the Landscape Character and Visual Impact Assessment (LCVIA) prepared by Phillips Marler (refer to Appendix M). The existing environment, potential impacts of the proposal and safeguards to mitigate them, are summarised below.

6.8.1 Methodology

A detailed methodology is provided in the LCVIA (Appendix M). In summary the methodology included:

- Defining landscape character and character impacts of the area through contextual analysis including a site investigation/survey
- Identifying the proposal's objectives and principles
- Selecting and evaluating landscape character zone and viewpoints
- Reviewing the Statement of Heritage Impact prepared by OzArk Environment and Heritage (refer to Appendix K)
- Assessing the landscape character and visual impacts of the proposal through combining the sensitivity and the magnitude of the works to provide an overall impact rating as indicated by visual impact grading matrix (Table 6-25)
- Identification of safeguards and mitigation measures to address potential impacts.

The assessment was prepared using guidance from the Transport for NSW *Guideline for Landscape Character and Visual Impact Assessment* (2023). These guidelines establish an assessment process with reference to the sensitivity of an area and magnitude of the proposal in that area (refer to Table 6-25).

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Table 6-25: Visual impact assessment matrix

		Magnitude			
		High	**Moderate**	**Low**	**Negligible**
Sensitivity	**High**	High	High-moderate	Moderate	Negligible
	Moderate	High-moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Guidance on the meaning of different ratings is provided in Table 6-26.

Table 6-26: Magnitude and sensitivity definitions

Rank	Description
Negligible	Very minor loss or alteration to 1 of more key elements/features/characteristics of the baseline visual character (i.e. pre-upgrade view) and/or introduction of elements that are consistent with the visual character to the existing landscape character (i.e. approximating the 'no change' situation).
Low	Minor loss of/or alteration to 1 or more key elements/features/characteristics of the baseline visual character (i.e. pre-upgrade view) and/or introduction of elements that are consistent with the existing landscape character.
Moderate	Partial loss of/or alteration to 1 or more key elements/features/characteristics of the baseline visual character (i.e. pre-upgrade view) and/or introduction of elements that may be prominent but not considered to be substantially uncharacteristic of the existing landscape character.
High	Substantial to total loss of key elements/features/characteristics of the baseline visual character (i.e. pre-upgrade view) and/or introduction of elements considered to be totally uncharacteristic of the existing landscape character.

The potential visual impact of the proposal has been assessed in relation to the key viewpoints. The levels of significance of potential visual impact have been assessed through consideration of the combination of magnitude of visual change in the landscape and its proximity to the viewer and the sensitivity in relation to the quality of the view and how sensitive it is to the proposed change.

The magnitude of visual change is strongly influenced by the level of visibility of the proposal resulting from the combination of scale, extent, distance and duration of the views. Visual sensitivity depends on the nature of the existing environment and on the likely response from people viewing the scene. For example, people driving on a busy road and/or at high speeds are likely to be less sensitive to a change in the environment since they are focused on changes in traffic conditions and driving, compared to someone who is enjoying a recreational experience or someone who is viewing the scene from their living room.

6.8.2 Existing environment

The proposal undulate over several ridgelines with gentle gradients. The road corridor commences at the intersection of Suttor Road and Argyle Street; running west through open paddocks with scattered trees with the low-density residential area of Suttor Road adjacent to the south. The paddocks are prone to flooding from the Wingecarribee River to the north-east.

The road corridor then rises gently up to a ridge between large acreage blocks defined by wind-breaks of typically *Pinus Radiata* (Monterey Pines) on their boundaries before gently sloping down through an industrial area to McCourt Road and the Main Southern Railway corridor. The area west of the railway corridor and Lackey Road is low lying and often waterlogged before gently sloping up to the next ridge in the west.

The road corridor continues west over this ridge, gently sloping down to Beaconsfield Road then on a gradual up-slope towards Bulwer Road. To the north of the road corridor are large acreage blocks set on a ridge that runs east-west. The southern side of the road corridor is adjacent to mostly small residential blocks and several larger blocks either side of Beaconsfield Road.

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From Bulwer Road, the land slopes up into open grass paddocks with scattered trees. After crossing the top of the ridge, the road corridor heads south-west, gently down a slope to end at Berrima Road between an industrial area and the Moss Vale Cemetery.

The proposal area is located adjacent to the Southern Highlands Innovation Park (SHIP), a regionally significant employment precinct identified in Wingecarribee Shire Council's Master Plan (2025). The precinct is expected to undergo substantial transformation from a rural landscape to an industrial and employment hub, as outlined in the Master Plan (Wingecarribee Shire Council, 2025).

6.8.3 Potential impacts

Construction

The proposal would result in visual impacts along the Moss Vale Bypass alignment, and required site compounds, due to construction activities. The visual character would be impacted by:

- Construction plant and equipment
- Temporary safety barriers and traffic control equipment
- Temporary construction lighting, including lighting at night time
- Earthworks, roadworks, and bridge structure development.

The impacts on visual amenity during construction activities would be confined to the Moss Vale Bypass corridor and identified intersections, as well as site compounds. Following the completion of construction, the impacts associated with construction equipment and facilities would be removed and disturbed areas which do not form part of the operational footprint would be restored.

Operation

While the proposal is in a currently underutilised and inactivated area on the outskirts of Moss Vale, the Moss Vale bypass would be a prominent new feature in the landscape, particularly for properties along Suttor Road, Beaconsfield Road, Napper Place, and Moss Vale Cemetery.

The proposal sits adjacent to the Southern Highlands Innovation Park, a regionally significant employment precinct identified in Wingecarribee Shire Council's Master Plan (2025). This Master Plan outlines substantial industrial development across the precinct, transitioning the landscape from rural character to an employment hub. In this context, the visual impact of the bypass is considered minor and consistent with the evolving character of the area.

The proposal includes new streetlights which would further illuminate the road environment. The lighting design adopts standard luminaires which are directed downwards towards the carriageways and therefore the potential for light spill to adjacent areas has been minimised.

The design has incorporated the following key elements to manage the potential landscape character and visual impacts of the new infrastructure:

- Integration with existing paddocks/pastures
- Utilising trees to identify places of significance and provide amenity
- Providing robust planting to embankments
- Planting to road verges that enhance pedestrian legibility and safety.

The LCVIA (Appendix M) identified and assessed potential operational impacts at 13 landscape character zones. These landscape character zones are shown in **Error! Reference source not found.** and a summary of the assessment provided in Table 6-27.

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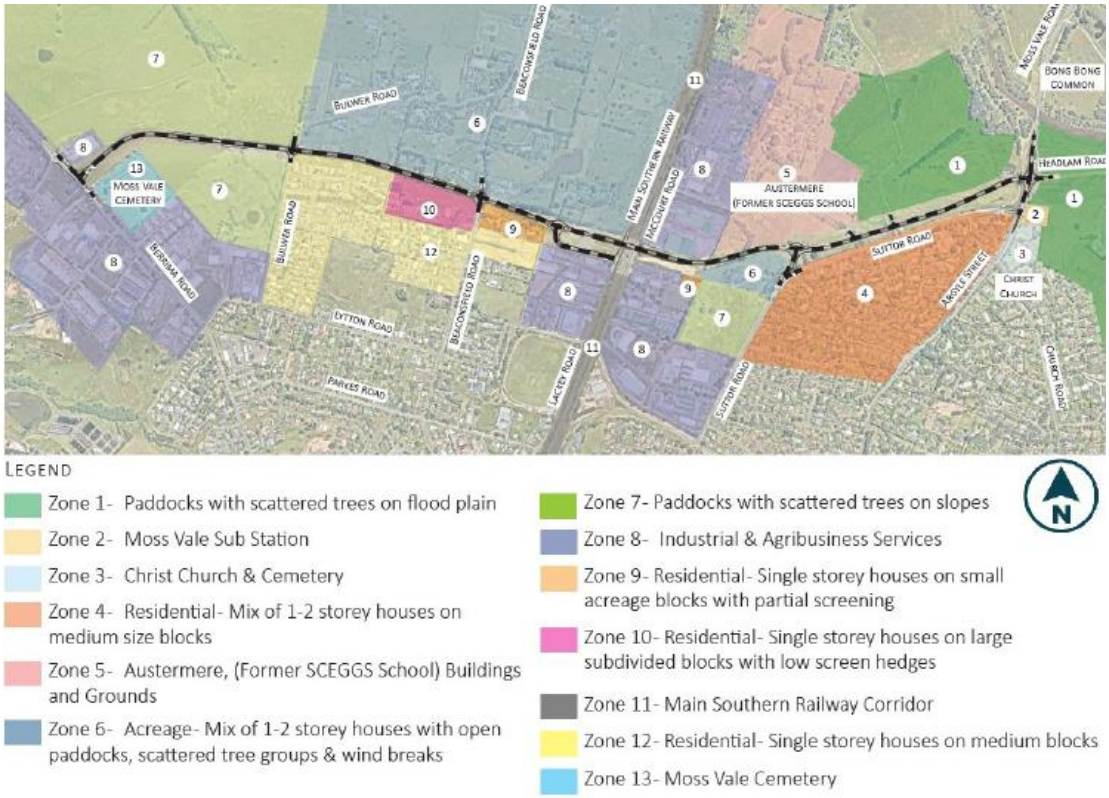


Figure 6-8: Landscape character zones

Table 6-27: Landscape character impacts

Zone	Name	Sensitivity	Magnitude	Impact	Comments
1	Paddocks with scattered trees on floodplain	Moderate	Moderate	Moderate	The new road would create a prominent landform, breaking the existing open rural character. The magnitude of the proposed bypass within the context of a well-defined boundary and entry point to Bong Bong Common, would be considered moderate, resulting in the overall moderate impact.
2	Moss Vale Sub Station	Negligible	Negligible	Negligible	There would be no impact on the character and setting of the substation site due to the mid to long distance views to the bypass.
3	Christ Church & Cemetery	Moderate	Low	Moderate-Low	Glimpses of the new road infrastructure would be visible through mature vegetation, resulting in a moderate-low impact.
4	Residential – Mix of 1–2 storey houses on medium blocks	Moderate	Moderate	Moderate	Residences along Suttor Road would have a full or partially screened view of the new road. Receivers further south would also have partial views of the new road from a distance. As the embankment is setback from the edge of Suttor Road, the impact on the setting of these residences would be moderate.

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Zone	Name	Sensitivity	Magnitude	Impact	Comments
5	Austermere (Former SCEGGS School) Buildings and Grounds	High	Moderate	High-Moderate	The new road and vegetation removal would create a break in the open rural character of the surrounding paddocks and the formal entry plantings, resulting in the road being partially visible from the mid-distance views of the old SCEGGS buildings. Glimpses of the proposed road would also be visible in the long distance, through the gaps of mature trees and vegetation surrounding the old SCEGGS buildings located on the high point of the site. This would create a moderate to high impact.
6	Acreage – 1–2 storey houses, open paddocks, windbreaks	Moderate	Low	Moderate-Low	Residences would have partial to full views onto the road between tree groups and windbreaks. As the majority of residences are set back at a distance and at a higher elevation than the new road, the impact to character would be low to moderate.
7	Paddocks with scattered trees on slopes	Low	Low	Low	The openness of the paddocks would result in full visibility of the new road across the paddocks from short to long distances. However, as the majority of this open rural area is zoned for future light industrial and commercial land use, the magnitude would be considered low, resulting in the overall low impact.
8	Industrial & Agribusiness Services	Low	Low	Low	Buildings fronting the proposed road are mostly large sheds and are occupied by industrial and agribusinesses services with minimal windows facing the road corridor. The proposed bridge over the railway line and embankments on either side would restrict views across open paddocks however, this will have low impact on the character and setting of these businesses.
9	Residential – Single storey houses on small acreage, partial screening	Moderate	High	High-Moderate	Due to the removal of vegetation, the new road would be fully visible from residences within close proximity. The proximity and magnitude of visual impact of the road would create a high to moderate impact on the character of these residences.
10	Residential – Single storey houses on large subdivided blocks, low hedges	Moderate	Moderate	Moderate	Due to the removal of vegetation, the new road would be visible from setback residences located on the western side of Beaconsfield Road. This would result in a moderate impact on the character of these residences.
11	Main Southern Railway Corridor	Low	High	Moderate	The railway corridor is a segregated space from the adjacent land uses. The proposed road bridge would be a large element above the rail corridor and while it would not impact the use of the railway, it would be the dominant element in the space, resulting in a moderate impact.

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Zone	Name	Sensitivity	Magnitude	Impact	Comments
12	Residential – Single storey houses on medium blocks	High	High	High	The proposed road would sit at a higher elevation directly adjacent to the residences on Napper Close. The removal of vegetation and the close proximity of new road would create a high impact on the character of these residences.
13	Moss Vale Cemetery	Moderate	Moderate	Moderate	The new road would be set back from the boundary of the cemetery but in full visibility. Future vegetated screening along the boundaries of the cemetery would reduce the magnitude of change resulting in a moderate impact.

The LCVIA (Appendix M) also provided an assessment of visual impacts to 43 viewpoints, including a range of close, mid-distance, distant and long-distance views (as shown in **Error! Reference source not found.**). Viewpoints with an impact rating of moderate-low or higher are summarised in Table 6-28. An assessment of other viewpoints is provided in Appendix M. A photo of each viewpoint, including the new road infrastructure visible in each viewpoint is also provided in Appendix M.

The assessment identifies some locations would experience moderate to high visual impacts due to proximity and direct views of the road, embankments, and noise walls. These impacts would reduce over time as new tree plantings grow and mature. For more distant locations and industrial areas, the visual impact would be low or negligible.

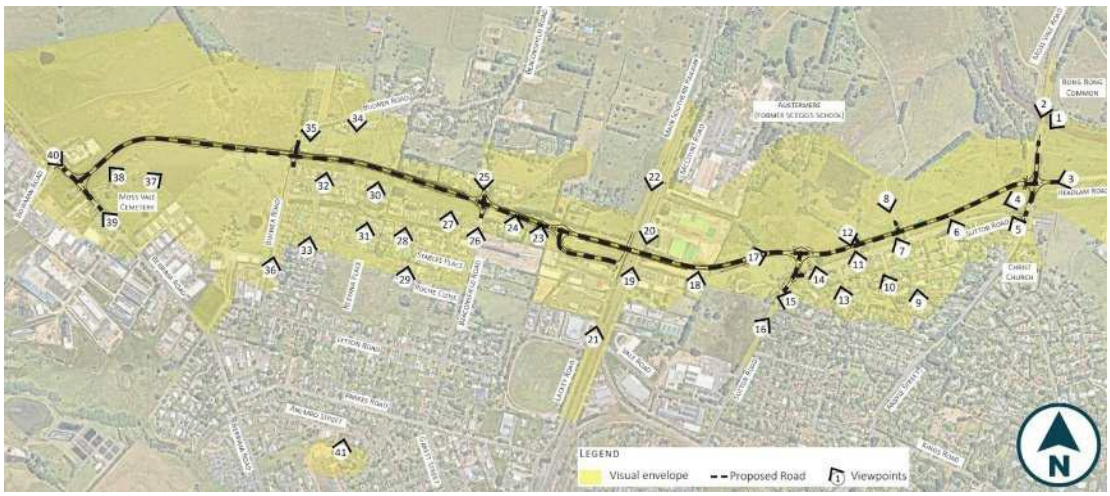


Figure 6-9: Viewpoint locations

Table 6-28: Visual impacts

ID	Description	Sensitivity	Magnitude	Visual impact
V3	Open view from Headlam Road	Low Close but not highly sensitive, some screening.	Moderate Road and embankment visible, some change.	Moderate-Low Proximity increases impact, but not dominant.
V4	Open view from Argyle Street / Headlam Road intersection	High Close, highly visible, sensitive location.	High Road/embankment is a major new element.	High Major change, highly visible and close.

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ID	Description	Sensitivity	Magnitude	Visual impact
V6	Open views from Suttor Road residences	Moderate Close to residences, some screening.	Low Road passes through cut/fill, less prominent.	Moderate-Low Proximity, but not dominant in view.
V7	Filtered/open views from Suttor Road (east)	High Close to residences, intersection highly visible.	High Major elements (intersection, tree removal) dominate.	High Major change, directly affects sensitive receptors.
V8	Open view from 42 Suttor Road	Moderate Mid-distance, some prominence.	Low Road is visible but not dominant.	Moderate-Low Moderate change, but not overwhelming.
V11	Filtered/open views from Suttor Road (west)	Moderate Close, some screening, residential context.	Low Road behind vegetation, not dominant.	Moderate-Low Some impact due to proximity, but screened.
V12	Filtered views from Austermere driveway	Moderate Close, institutional setting, some screening.	Moderate Road and tree removal are large elements.	Moderate Proximity and scale of change.
V14	Filtered view from Suttor Road (central)	Low Mid-distance, partial screening.	Moderate Some road visible, not dominant.	Moderate-Low Some change, but not overwhelming.
V17	Unobstructed view from Austermere / 5 Suttor Road	High Close, unobstructed, sensitive residential.	High Road, cutting, tree removal are major elements.	High Major change, highly visible.
V18	Unobstructed view from 12 McCourt Road	Moderate Close, unobstructed, but not most sensitive.	High Road cutting/embankment are large elements.	High-Moderate Major change, but not the most sensitive.
V19	Unobstructed view from McCourt Road (northbound)	Moderate Mid-distance, unobstructed, some sensitivity.	Moderate Bridge and tree removal are large elements.	Moderate Noticeable change, but not overwhelming.
V23	Filtered/open views from 57 and 53 Beaconsfield Road	High Close, filtered/open, sensitive residential.	High Noise wall is dominant, close proximity.	High Major change, highly visible.
V24	Filtered/open views from 51 and 49 Beaconsfield Road	High Close, filtered/open, sensitive residential.	High Noise wall is dominant, close proximity.	High Major change, highly visible.
V25	Unobstructed view from Beaconsfield Road (southbound)	High Close, unobstructed, sensitive residential.	Moderate-High Intersection/tree removal prominent.	High-Moderate \Major change, but some background vegetation.
V26	Unobstructed view from Beaconsfield Road (northbound)	Moderate Mid-distance, unobstructed.	Moderate Noise wall prominent, some screening.	Moderate Noticeable change, but not overwhelming.
V27	Filtered view from Trotters Lane/Beaconsfield Road	Moderate Mid-distance, filtered, residential.	High Noise wall prominent, tree removal visible.	Moderate Noise wall is prominent, but some screening.

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ID	Description	Sensitivity	Magnitude	Visual impact
V30	Partial view from Napper Place	Moderate Close, partial, residential.	High Noise wall/tree removal dominant.	High-Moderate Major change, but not the most sensitive.
V32	Partial view from Napper Place corner	Moderate Close, partial, residential.	High Noise wall/tree removal dominant.	High-Moderate Major change, but not the most sensitive.
V35	Filtered/open view from 50 & 48 Bulwer Road	Low Mid-distance, filtered/open, not highly sensitive.	Moderate Noise wall is a small/low element.	Moderate-Low Some change, but not overwhelming.
V37	Unobstructed view from Moss Vale Cemetery (north)	Moderate Mid-distant, unobstructed, cemetery context.	Moderate: Road/embankment/cutting prominent.	Moderate Noticeable change, but not overwhelming.
V38	Unobstructed view from Moss Vale Cemetery (west)	Moderate Close, unobstructed, cemetery context.	Moderate Road/embankment prominent, but screening planned.	Moderate Major change, but mitigated by screening.
V40	Open/screened view from Berrima Road (eastbound)	Low Mid, open/screened, not sensitive.	Moderate: Intersection visible, but not dominant.	Moderate-Low Some change, but not overwhelming.

6.8.4 Safeguards and management measures

The proposal would be delivered in accordance with the urban design and landscape design (refer to Appendix M). This design has incorporated a number of features to minimise potential landscape character and visual impacts on the bypass including a design pattern on noise and retaining walls and landscape planting to soften the new road infrastructure.

Visual safeguard and management measures for the construction phase are provided in the table below.

Table 6-29: Visual safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Visual amenity	Construction areas and compound sites will be maintained during construction, kept tidy and well-presented including sorting and regular removal of excess materials to reduce visual impact.	Contractor	Construction
Visual amenity	The ancillary facilities and construction areas (outside of the operational area of the proposal) will be progressively restored to at least its pre-construction condition.	Contractor	Construction / Post-construction
Site Lighting	Night time lighting on the construction site will be sited to minimise impacts on nearby residential receivers and existing road corridors.	Contractor	Construction

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6.9 Property and land use

6.9.1 Methodology

Potential impacts of the proposal on property and land use were assessed by completing a qualitative desktop assessment which included a review of the following publicly available information:

- Aerial imagery of the proposal area via Google Maps and Nearmap (accessed 21 October 2024)
- Data from the NSW SEED website (accessed 21 October 2024) including:
  - LEP Zoning Maps
  - Crown Land
- Cadastral Data sources from the NSW SIXMaps Spatial Services (accessed 21 October 2024).

6.9.2 Existing environment

Land use

The corridor for the Moss Vale Bypass has largely been cleared for previous land uses. Surrounding land uses largely include:

- Low density residential along the southern edge of the proposal area
- Agricultural and residential uses to the north of the proposal area
- Industrial uses surrounding the rail line and at the western end of the proposal area
- Moss Vale General Cemetery at the western end of the proposal area
- A public park at the eastern end of the proposal area
- Environmental conservation to the north of the proposal area.

Utilities

A number of major utilities are located within or adjacent to the proposal (shown on Figure 6-10) including:

- Two gas pipelines run through the length of the proposal area
- Optus optic fibre cable runs through the length of the proposal area
- 33kV transmission lines run across the alignment at the eastern end of the proposal area, through the alignment at the eastern end and across the alignment adjacent to the Main Southern Railway line
- The Main Southern Railway crosses through the centre of the proposal area.

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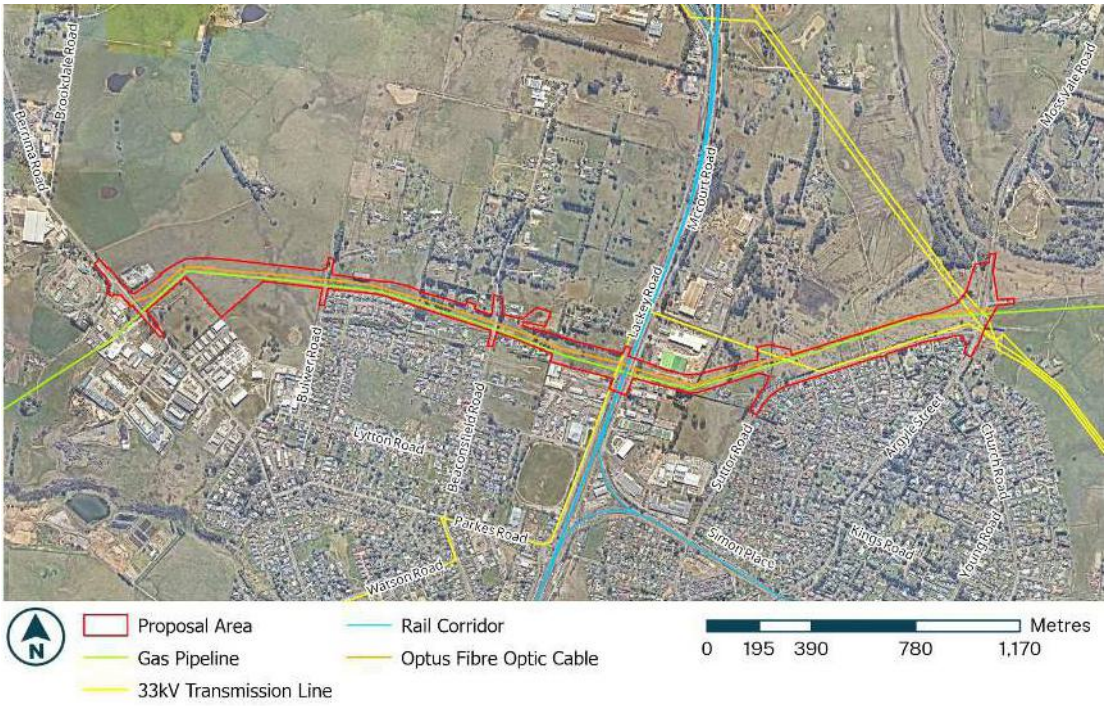


Figure 6-10: Utilities in the proposal area

6.9.3 Potential impacts

Construction

Council has progressively acquired the land for the proposal, with a number of acquisitions occurring in the 1980's and between 2020 to 2024. As a result, no property acquisition is required for the proposal.

Noise and vibration, visual and air quality impacts on nearby properties are addressed in Sections 6.2, 6.8, and 6.11, respectively.

Operation

The proposal is located on several zones under the Wingecarribee LEP. The proposal is consistent with the objectives of these zones, as considered in Table 4-1.

6.9.4 Safeguards and management measures

Table 6-30: Property and land use safeguards and land use

Impact	Environmental safeguards	Responsibility	Timing
Utilities	All works will be undertaken in accordance with approved utility plans. Ongoing engagement with utility authorities will be undertaken regarding shutdowns, protection, and installation works.	Contractor / Council	Pre-construction / During construction

6.10 Socio-economic

6.10.1 Methodology

The proposal is anticipated to have some short-term localised impacts and long-term benefits to the communities nearby and therefore a basic level of socio-economic assessment was carried out.

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The socio-economic assessment:

- Identifies the existing socio-economic characteristics of the locality through desktop research including reference to the Australian Bureau of Statistics 2021 Census of Population and Housing data and the Wingecarribee Shire Council website
- Identifies the types and location of social infrastructure that may be affected by the proposal
- Identifies the location of businesses which may be affected by the proposal
- Considers the outcome of other environmental assessment carried out for the proposal containing relevant socio-economic themes, including traffic and transport, noise and vibration, non-Aboriginal heritage, Aboriginal cultural heritage and landscape character and visual amenity.

6.10.2 Existing environment

Population and demography

Key population and demographic information for the Moss Vale – Berrima Statistical Area 2 (SA2) is provided in Table 6-31.

Table 6-31: Key population and demographic information

Indicator	Moss Vale – Berrima SA2	NSW
Population	10,648	8,072,161
Median age	45	39
Age 0- 14 years	17.9%	18.2%
Age 15 – 65 years	57.3%	64.2%
Age 65 and over	24.8%	17.7%
Aboriginal and/or Torres Strait Islander	2.9%	3.4%
Median Weekly Household Income	$1,552	$1,829

Travel to work

The most common means of travel to work for people in the Moss Vale – Berrima SA2 in the 2021 census are:

- Car, as driver – 60.6%
- Worked at home – 16.9%
- Car, as passenger – 4.3%
- Walked only – 3.1%
- Truck – 1.3%
- Bus – 0.5%
- Did not go to work – 10.5%.

The 2021 census was completed while many areas of NSW were under lockdown as a result of the COVID-19 pandemic, as such the travel to work data would reflect the level of movements under the lockdown. As a result, the 2016 census data has also been considered.

The 2016 census results for travel to work are:

- Car, as driver – 69.0%
- Worked at home – 6.3%
- Car, as passenger – 4.9%
- Walked only – 3.4%
- Truck – 1.4%.

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Income and employment

The top industries of employment in the Moss Vale – Berrima SA2 are:

- Cafes and restaurants
- Aged care residential services
- Hospitals (except psychiatric hospitals)
- Secondary education
- Takeaway food services.

Community values

The Wingecarribee Community Strategic Plan states that residents value the following aspects of the LGA:

- Natural environment and open space
- Country lifestyle
- Friendly community
- Central location and proximity to Sydney
- Peace and quiet
- Overall atmosphere.

Social infrastructure

Social infrastructure in Moss Vale is listed in Table 6-32.

Table 6-32: Social infrastructure in Moss Vale

Name	Type	Address
Moss Vale Public School	Primary School	6/22 Browley Street
St Pauls Catholic Parish Primary School	Primary School	18 Garrett Street
The Kings School, Tudor House	Primary School	6480 Illawarra Highway
Moss Vale High School	High School	21 Narellan Road
St Pauls International College	High School	463 Argyle Street
University of Wollongong, Southern Highlands Campus	Tertiary Education	Kirkham Street
TAFE NSW – Moss Vale	Tertiary Education	Kirkham Street
Wembley Road Preschool	Early learning	10 Wembley Road
Southern Highlands ELC	Early learning	50 Beaconsfield Road
KU Moss Vale	Early learning	Mann Crescent and Ralfe Street
KU Donkin	Early learning	Donkin Avenue
Rainbow Kindy Moss Vale	Early learning	35 Spring Street
Southern Medical Centre	Medical facility	61 Elizabeth Street
Highlands General Practice	Medical facility	1/41 Willow Drive
Moss Vale Uniting Church	Place of worship	568 Argyle Street
St Paul's Parish Catholic Church	Place of worship	24 Garrett Street
Christ Church Anglican Church and Cemetery	Place of worship	Argyle Street and Church Road
Moss Vale Presbyterian Church	Place of worship	7 Browley Street, Moss Vale

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Name	Type	Address
St John's Anglican Church	Place of worship	Waite Street and Browley Street
Connect Christian Church	Place of worship	Railway Street and Spring Street
Kingdom Hall of Jehovah's Witnesses	Place of worship	63 Church Road
Plymouth Brethren Christian Church	Place of worship	93 Suttor Road
Moss Vale Rural Fire Brigade Station	Community	49 Berrima Road
Wingecarribee Animal Shelter	Community	1 Bowman Road
Moss Vale Senior Citizens & Community Centre	Community	14 Queen Street
Moss Vale Public Library	Community	68 Elizabeth Street
Country Women's Association Moss Vale	Community	66 Elizabeth Street
Moss Vale Fire Station	Community	64 Elizabeth Street
Moss Vale Masonic Centre	Community	50 Elizabeth Street
Southern Highlands Police Station	Community	67 Elizabeth Street
Moss Vale Court House	Community	356 Argyle Street
Moss Vale Girl Guides and Scouts	Community	Donkin Avenue
Moss Vale Civic Centre (including Emergency Operations Centre)	Community	68 Elizabeth Street
Moss Vale General Cemetery	Cemetery	75 Berrima Road
Moss Vale War Memorial Aquatic Centre	Sporting facility	8 Kirkham Road
Lackey Park	Sporting facility	100 Lackey Road
Lackey Park Basketball facility	Sporting facility	15 Parkes Road
Community Oval	Sporting facility	11 Donkin Avenue
Church Road Playing Fields	Sporting facility	51 Church Road
Moss Vale Showground	Showground	16 Illawarra Highway

Business and industry

Businesses near the proposal area are generally located on Lackey Road and McCourt Road. The businesses in this area are generally industrial in nature and include automotive, storage, equipment hire and construction company premises. More industrial premises are located at the western end of the proposal area, including a concrete supplier, recycling centre, hardware store, animal shelter and construction material wholesaler. These premises are generally not considered sensitive receivers as they are industrial in nature and would emit their own sources of noise and vibration, and are not reliant on foot traffic for customers. The animal shelter at the western end of the proposal area may be more sensitive to potential amenity-related impacts.

A new State Emergency Service (SES) facility has recently been constructed on Berrima Road. The Moss Vale Bypass would improve access to the regional transport network for the SES, enhancing emergency response times and operational efficiency.

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6.10.3 Potential impacts

Construction

The estimated duration of construction is approximately 2.5 years. The proposal would have the potential to cause temporary impacts (as considered in this chapter of the REF), such as:

- Construction of the proposal may temporarily impact the local amenity and character of the proposal area. Impacts to amenity would generally result from construction noise, dust and visual impacts and would generally be experienced by road users, nearby residential receivers and commercial properties
- Construction of the proposal would provide direct employment opportunities which would positively impact local workers and contractors engaged to deliver the proposal
- Construction of the proposal may temporarily impact traffic in Moss Vale as a result of lane closures required to construct the proposed intersections. This would have a social impact as a majority of people in Moss Vale drive to work, and businesses in the proposal area are generally reliant on road access for customers to access the businesses. Road closures may result in a longer commute time for workers and potentially a reduction in trade for businesses in and around the proposal area. Further details are provided in Section 6.1.

Each section of Chapter 6 provides safeguards to minimise impacts associated with the construction phase of the proposal and would in-turn contribute to minimising socio-economic impacts of the proposal during construction. Safeguards are proposed in this section to further reduce impacts to the community by way of notifications to potentially affected local residents and businesses.

Operation

Operation of the proposal is expected to benefit the community in the long term as it would ease traffic congestion in the centre of Moss Vale, improving safety and amenity for pedestrians. Concerns have been raised that diverting traffic away from Argyle Street may impact on local business due to a reduction in passing trade. However, it is considered that reducing the traffic and freight burden along this corridor would assist people to park and access the local shopping precinct. The operation of the proposal would also have a positive impact on amenity in the town centre as traffic would be diverted onto the bypass. The proposal may result in a negative amenity impact on areas adjacent to the proposal area due to the increase in traffic. These impacts are anticipated to be minor with the implementation of safeguards outlined in this REF.

Council would continue to engage with the business community by enacting the objectives of Council's Community Strategic Plan and through its periodic review.

6.10.4 Safeguards and management measures

Table 6-33: Socio economic safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Socio-economic	A Communication Plan will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The plan will include (as a minimum): • Mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions • Contact name and number for complaints. The plan will be prepared in accordance with the Stakeholder and Community Engagement Guidelines (Transport for NSW, 2023).	Contractor	Detailed design / Pre-construction
Socio-economic impacts	Local residents and affected businesses will be notified before work starts regarding the timing, duration and likely impact of construction activities, including interruptions to utility services.	Council	Pre-construction

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6.11 Air quality

6.11.1 Methodology

Potential impacts of the proposal on air quality were assessed by completing a qualitative desktop assessment, which involved:

- A desktop review of publicly available information to inform the existing environment of the proposal area, including:
  - Long-term monitoring data from nearby weather stations operated by Bureau of Meteorology (BoM)
  - The Commonwealth Department of Climate Change Energy, the Environment and Water National Pollutant Database to identify any projects or facilities that may be contributing to local air quality conditions
  - Data from the Bargo air quality monitoring station as part of the NSW Air Quality Monitoring Network made available by the Climate and Atmospheric Science Branch of NSW Department of Planning, Housing and Infrastructure (DPHI)
  - Data from the Moss Vale Road traffic counting station in Bowral made available from Transport for NSW via the Traffic Volume Viewer
- Preparation of a qualitative assessment of potential impacts during both construction and operation
- Identification of safeguards and mitigation measures to address potential impacts.

Potential air quality impacts during operation were assessed using Transport's Roadside Air Quality Screening Tool (Transport for NSW, 2024). The air quality model incorporates road type, gradient, traffic volume, traffic speed and traffic composition inputs, and accounts for battery electric vehicles uptake to meet net zero policy settings. The closest receiver used was around 15 metres from the proposal, along with a 90% percentile $PM_{2.5}$ and PM_{10} background concentration (from the nearest monitoring station, Bargo) to determine the estimated air quality concentration at that receiver.

The location of sensitive receivers was assessed using Nearmap browser (accessed 29 October 2024).

6.11.2 Existing environment

Climate and meteorology

Weather and climate data has been compiled from the Bureau of Meteorology Moss Vale Automatic Weather Station (AWS). Weather data for Moss Vale is detailed in Table 6-34.

Table 6-34: Weather in Moss Vale

Measure	Summer	Winter	Annual
Mean maximum temperature	24.8°C	12.7°C	19°C
Mean minimum temperature	13.6°C	3.1°C	8.3°C
Mean rainfall (per month)	76.7mm	64.7mm	66.7mm

Background air quality

The New South Wales Annual Compliance Report 2021, National Environmental Protection (Ambient Air Quality) Measure (AAQ NEPM) (Department of Planning and Environment, 2023) outlines national standards and goals for air quality.

In NSW, the AAQ NEPM is implemented under the POEO Act, the Protection of the Environment Operations (Clean Air) Regulation 2010 and the Protection of the Environment Operations (General) Regulation 2009.

There are no air quality monitoring stations in Moss Vale or neighbouring Bowral. The nearest air quality monitoring station is located at Bargo, which is approximately 35 kilometres from the proposal area. In the NSW annual compliance report 2021, Bargo is identified as being compliant with all air quality measures with exception of Ozone 8-hour, which was non-compliant.

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Local emissions sources

Local emissions in Moss Vale would largely be from local traffic and industrial sources. Pollutant concentrations of PM_{10}, $PM_{2.5}$, CO, NO_2 and benzene are generally considered to be attributable to road operations. The traffic volume viewer located on Moss Vale Road in Bowral experiences an average of around 15,000 annual average daily traffic volume, including both northbound and southbound movements.

In 2021, Argyle Street was measured to have average hourly traffic flows of 1,719 in the morning peak and 1,387 in the evening peak. In the baseline scenario, in which no bypass is built, it is forecast that by 2036 average hourly traffic flows would be 2,276 in the morning peak and 2,052 in the evening peak.

Receivers

Nearby sensitive receivers include residential receivers and non-residential receivers (refer to Table 6-32).

6.11.3 Potential impacts

Construction

Potential impacts associated with the proposal include minor emissions from machinery and dust. Emissions from construction vehicles / equipment would be minor and short-term.

Dust could be generated from a variety of activities including:

- Earthworks
- Transportation and handling of soils and materials
- Use of construction vehicles, machinery, plant and equipment
- Line-marking.

The total amount of dust would depend on the silt and moisture content in the soil, prevailing weather conditions and the types of activities being carried out. Depending on wind speed and direction, short-term impacts could be experienced at some nearby sensitive receivers.

Operation

The proposal aims to redirect traffic from the centre of Moss Vale through the bypass. This would lead to an increase in road traffic emissions near the bypass, however, may lead to an improvement in air quality in the Moss Vale town centre as a result of the reduced traffic congestion and consequent reduction in vehicle idling and frequent acceleration.

Transport's Roadside Air Quality Screening Tool results indicate that general traffic using the bypass would not result in exceedance of NSW EPA air quality criteria nitrogen dioxide, $PM_{2.5}$ and PM_{10} (refer to Appendix L).

6.11.4 Safeguards and management measures

Table 6-35: Air quality safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Air Quality	An Air Quality Management Plan will be prepared and implemented as part of the CEMP. The plan will include, but not be limited to: • Potential sources of air pollution • Air quality management objectives consistent with any relevant published EPA guidelines • Mitigation and suppression measures to be implemented, such as using water trucks to supress dust, and staging work to minimise exposed areas • Methods to manage work during strong winds or other adverse weather conditions • A progressive rehabilitation strategy for exposed surfaces.	Contractor	Pre-construction

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6.12 Other impacts

6.12.1 Existing environment and potential impacts

Table 6-36: Other potential impacts

Environmental factor	Existing environment	Potential impacts
Waste and resource use	Waste and resource use would be managed in accordance with the resource management hierarchy principles outlined in the *Waste Avoidance and Resource Recovery Act 2001*. These resource management hierarchy principles, in order of priority are: • 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. By adopting the above principles, the proposal would aim to efficiently reduce resource use, reduce costs, and reduce environmental harm in accordance with the principles of ecologically sustainable development.	The proposal is not expected to generate large quantities of waste materials. The following waste streams have been identified: • Spoil • Removed vegetation • Waste concrete/asphalt • General solid waste.
Hazard and risk management	Land in the eastern portion of the proposal (north of Suttor Road) and the western portion (between Bulwer Road and Berrima Road) is mapped as Category 3 Bushfire Prone Land. The existing flooding environment and risks are considered in Section 6.4.	The proposal would not have any impact on bushfire risk. The provision of landscaping along the alignment would be unlikely to impact the existing bushfire prone land mapping. During operations, the presence of the road could act as a fire break and provide potential access for bushfire response. The impacts of the proposal on drainage and stormwater are addressed in Section 6.4.

6.12.2 Safeguards and management measures

Table 6-37: Other impacts safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Waste	A Waste Management Plan will be prepared and implemented as part of the CEMP. The plan will include but not be limited to: • Measures to avoid and minimise waste associated with the proposal • Classification of wastes and management options (re-use, recycle, stockpile, disposal) • Recycled materials will be used in construction where feasible • Use of waste-derived materials will comply with the relevant NSW EPA Resource Recovery Orders and Exemptions, including those for excavated public road material, reclaimed asphalt pavement, and recovered aggregate • Statutory approvals required for managing on- and off-site waste, or application of any relevant resource recovery exemptions • Procedures for storage, transport and disposal • Monitoring, record keeping and reporting. The plan will align with the Environmental Procedure - Management of Wastes on Transport for NSW Land (Transport for NSW, 2014) and relevant Transport Waste fact sheets.	Contractor	Detailed design / Pre-construction

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6.13 Cumulative impacts

A cumulative impact occurs when 2 or more projects are carried out concurrently and near to one another. The impacts may be caused by both construction and operational activities and can result in a greater impact to the surrounding area than would be expected of each project was carried out in isolation.

6.13.1 Study area

The study area for the cumulative impact assessment considered other projects within a 5 kilometre radius of the proposal area.

6.13.2 Other projects and developments

A number of developments are currently proposed or underway within a 5-kilometre radius of the proposal. These include:

- Ashbourne Estate (over 1,000 dwellings)
- The proposed Plasrefine / Repoly Plastics Recycling Facility, noting development consent was refused by the Independent Planning Commission in early 2025
- Moss Vale Station and Stabling Yard upgrade Upgrades. The station upgrade is complete with the stabling yard expected to be completed in late 2025
- Berrima Road Deviation Project
- Bong Bong Common Intersection upgrade
- Moss Vale Sewerage Treatment Plant upgrade
- Industrial development associated with the Southern Highlands Innovation Park.

Council is also planning new urban release areas in South Bowral and South Moss Vale.

These projects have the potential to interact with the proposal during construction and operation, particularly in relation to traffic, noise, and cumulative land use change.

6.13.3 Potential impacts

Table 6-38: Potential cumulative impacts

Environmental factor	Construction impacts	Operational impacts
Noise and vibration	There is the potential for the proposal to occur concurrently with nearby construction works associated with other projects. There is low potential for cumulative noise impacts (generating a higher noise level than for any individual project) where works are carried out at the same time.	Cumulative operational noise impacts may occur if receivers are subject to both an increase in operational road traffic noise from the proposal and operational noise from new developments (such as new industrial development within the SHIP). Operational noise mitigation measures for the proposal have been determined in accordance with the EPAs NSW Road Noise Policy, and future developments will need to be designed to achieve applicable noise criteria from the Noise Policy for Industry. This will reduce the potential impact of cumulative noise impacts.
Traffic and transport	Multiple projects which generate construction traffic, and/or which involve traffic lane closures can combine to result in cumulative delays and affect people's ability to access places of employment, services, family and friends. Where lane closures are needed, coordination with other projects would reduce the potential for cumulative impacts (i.e. the number of closure/diversion periods).	The proposal would improve the operational performance of the road network and would have a positive effect on the cumulative impacts of other projects on traffic and transport. Other road and transport improvement projects (such as the Moss Vale Station upgrade, Berrima Road deviation and Bong Bong intersection upgrade) would be complementary to the proposal.

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6.13.4 Safeguards and management measures

Table 6-39: Cumulative safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Cumulative construction impacts	Current and upcoming projects with the potential to interact with the proposal will be monitored. Where potential cumulative impacts are identified, the scheduling of works will be coordinated with interacting projects to minimise potential impacts. This will include: • Scheduling works to allow suitable respite periods for construction noise • Scheduling of works to minimise consecutive construction noise impacts, where feasible • Coordinating lane closures and pedestrian/cyclist diversions to minimise the overall number of occasions where disruption occurs.	Council/Transport for NSW	Pre-construction/Construction

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7 Environmental management

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 applied during the construction and operation of the proposal.

A Construction Environmental Management Plan (CEMP) will be prepared to describe the safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

As a minimum, the CEMP will address the following:

- Any requirements associated with statutory approvals
- Details of how the project will implement the identified safeguards outlined in the REF
- Issue-specific environmental management plans
- 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
- Procedures for audit and review.

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7.2 Summary of safeguards and management measures

Environmental safeguards and management measures outlined in this REF will be implemented 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 work on the surrounding environment.

The safeguards and management measures are summarised in Table 7-1.

Table 7-1: Summary of safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing
TT1	Traffic and transport	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Traffic Control at Work Sites Technical Manual (Transport for NSW, 2022) and QA Specification G10 Traffic Management (Transport for NSW, 2022). The TMP will include: • Confirmation of haulage routes • Measures to maintain access to local roads and properties • Site-specific traffic control measures (including signage) to manage and regulate traffic movement • Measures to maintain pedestrian and cyclist access • Requirements and methods to inform the local community of impacts on the local road network • Requirements and methods to consult emergency services (police, ambulance, fire) and SES with regard to traffic delays during construction • Requirements in relation to the Transport WAD process for works on Transport for NSW road corridors • Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads • A response plan for any construction traffic incident • Consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic • Monitoring, review and amendment mechanisms.	Contractor	Pre-construction Construction

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No.	Impact	Environmental safeguards	Responsibility	Timing
NV1	Noise and vibration	A Noise and Vibration Management Plan will be prepared and implemented as part of the CEMP. The plan will generally follow the approach in the ICNG (Department of Environment and Climate Change, 2009) and identify: • Key potential noise and vibration generating activities associated with the activity • Feasible and reasonable mitigation measures to be implemented taking guidance from the Transport CNVG • A monitoring program to assess performance against relevant noise and vibration criteria • A review process scheduling and assessing out-of-hours activities including consideration of alternatives to out-of-hours work, plant selection, work locations and screening to minimise impacts • A working schedule which records respite periods for extended out-of-hours works • Arrangements for consultation with affected neighbours, utility providers, 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.	Contractor	Detailed design/Pre-construction
NV2	Noise and vibration	The following operational noise mitigation is to be provided: • Noise barriers between Bulwer Road and Beaconsfield Road and east of Beaconsfield Road • Further consideration of at-property treatment to 63 identified properties.	Contractor	Construction
B1	Biodiversity	Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated and implemented where practicable and feasible.	Contactor	Pre-construction
B2	Removal of native vegetation	Native vegetation removal will be minimised through construction planning.	Contractor	During construction
B3	Removal of native vegetation	Pre-clearing surveys and final pre-clearing checks will be undertaken in accordance with *Guide 1: Pre-clearing process of the Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	Pre-construction
B4	Removal of native vegetation	Native vegetation on the corner of Suttor Street and Argyle Street needs to be ground-truthed prior to removal to identify the Eucalyptus species.	Council/Contractor	Pre-construction
B5	Removal of native vegetation	Vegetation removal will be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock,* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
B6	Removal of native vegetation	An unexpected threatened species finds procedure is to be developed as part of the CEMP using the template in Guide 1: Pre-clearing process of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024). The procedure is to be followed if threatened ecological communities, either new TECs or new occurrences of known TECs, not assessed in the biodiversity assessment, are identified within the proposal area.	Contractor	During construction

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No.	Impact	Environmental safeguards	Responsibility	Timing
B7	Removal of native vegetation	The following should be implemented as part of the CEMP: • Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas • Pre-clearing survey requirements • Procedures for unexpected threatened species finds and fauna handling • Procedures addressing relevant matters specified in the Policy and guidelines for fish habitat conservation and management (Department of Primary Industries, 2013) • Protocols to manage weeds, pathogens and pest species.	Contractor	During construction
B8	Direct impacts to threatened species	Threatened fauna habitat removal will be minimised through construction planning.	Contractor	Pre-construction
B9	Direct impacts to threatened species	Fauna encountered on-site during construction will be managed in accordance with *Guide 9: Fauna handling* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
B10	Direct impacts to threatened species	Habitat removal will be undertaken by staged clearing in accordance with *Guide 4: Clearing of vegetation and removal of bushrock* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
B11	Direct impacts to threatened species	Habitat will be replaced or re-instated in accordance with *Guide 5: Reuse of woody debris and bushrock* (Transport for NSW, 2024) and *Guide 8: Artificial hollows of the Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
B12	Removal of threatened plants	Removal of *Eucalyptus macarthurii* will be avoided through construction planning, where possible.	Contractor	Pre-construction
B13	Removal of threatened plants	Clearing limits and exclusion zones will be clearly identified prior to work within the vicinity of the *Eucalyptus macarthurii* that occur in proximity to the Subject Land to ensure no impacts to these individuals.	Contractor	Pre-construction
B14	Changes to hydrology	Changes to existing surface water flows will be minimised through construction planning.	Contractor	Pre-construction
B15	Edge effects	Exclusion zones will be set up at the limit of clearing in accordance with *Guide 2: Exclusion zones* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
B16	Injury and mortality of fauna	Fauna will be managed in accordance with *Guide 9: Fauna handling of the Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
B17	Invasion and spread of weeds	Weed species will be managed in accordance with *Guide 6: Weed management of the Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction
B17	Invasion and spread of pathogens and disease	Pathogens will be managed in accordance with *Guide 7: Pathogen management of the Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW, 2024).	Contractor	During construction

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No.	Impact	Environmental safeguards	Responsibility	Timing
HF1	Construction flooding	Detailed construction planning would consider flood risk at work areas and associated compound sites, including: • Reviewing construction site layouts and staging construction activities in order to avoid or minimise obstruction of overland flow paths and limiting the extent of flow diversion required • Designing the layout of construction facilities and implementing stormwater management controls during their establishment in order to manage the impact of flooding on construction personnel, equipment and materials • Identifying and applying measures to not worsen flood impacts on the community and on other property and infrastructure during construction up to and including the 1% AEP flood event where reasonable and feasible. Where warranted by the scale and nature of the proposed works this would include flood modelling and assessment to assess the extent of potential impacts and therefore the scope of mitigation measures that may be required • Measures to mitigate alterations to local runoff conditions due to construction activities.	Contractor	Pre-construction
HF2	Construction flooding	Spoil stockpiles would be located in areas which are not subject to frequent inundation by floodwater, ideally outside the 10% AEP flood extent. The exact level of flood risk accepted at stockpile sites would depend on the duration of stockpiling operations, the type of material stored, the nature of the receiving drainage lines and also the extent to which it would impact flooding conditions in adjacent development.	Contractor	Pre-construction
HF3	Construction flooding	Construction facilities would be located outside high flood hazard areas based on a 1% AEP flood.	Contractor	Pre-construction
HF4	Construction flooding	Flood emergency management measures for construction of the proposal would be prepared and incorporated into relevant environmental and/or safety management documentation. This would include: • Contingency planning for construction facilities that are located in areas that are inundated by mainstream flooding during a 1% AEP event • For construction facilities located within the floodplain the identification of how flood related risks to personal safety and damage to construction facilities and equipment will be managed • Procedures to monitor accurate and timely weather data, and disseminate warnings to construction personnel of impending flood producing rain.	Contractor	Pre-construction
HF5	Operational flooding	Council will consult with affected property owners in regard to any residual flood impacts that exceed the limits set out in Section 3.3.2 of the flooding technical report (Appendix F).	Council	Pre-construction
SW1	Contaminated land	A pre-construction Land Condition Assessment will be undertaken of the ancillary facilities, to determine the baseline condition of the site prior to being utilised for the proposal.	Contractor	Pre-construction
SW2	Contaminated land	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. Works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls (or further actions identified in consultation with the EPA) have been implemented.	Contractor	Construction
SW3	Contaminated land	If any suspect materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos containing materials, ash material, etc.) are encountered between the sampling locations during any stage of future earthworks/site preparation, Unexpected Finds Management Protocol (Appendix F of the DSI) should be implemented. In the event of contamination, detailed assessment, remediation and validation should be carried out by suitably qualified asbestos and contaminated land specialist consultants.	Contractor	Construction

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No.	Impact	Environmental safeguards	Responsibility	Timing
SW4	Accidental spill	A site-specific emergency spill plan will be developed and include spill-management measures in accordance with the Transport Code of Practice for Water Management (Roads and Traffic Authority, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities.	Contractor	Detailed design / pre-construction
SW5	Erosion and sedimentation	Site-specific Erosion and Sediment Control Plan(s) will be prepared and implemented. The Plan will include arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.	Contractor	Pre-construction / construction
SW6	Waste management and resource recovery	For any materials to be excavated and removed from the site, classification of the materials will be undertaken in accordance with the NSW EPA Waste Classification Guidelines 2014, the NSW EPA resource recovery exemptions and orders under the Protection of the Environment Operations (Waste) Regulation 2014, or NSW EPA Certification: Virgin excavated natural material (VENM). Off-site disposal of material will be a facility that can lawfully accept the material.	Contractor	Construction
SW7	Imported fill	Any imported materials must be assessed by a qualified environmental consultant, prior to importation, to ensure suitability for the proposed use. In addition, the imported materials must be free of unusual odour and not be discoloured. The imported materials should be VENM or excavated natural material (ENM) or materials that conform to the requirement of relevant EPA orders and exemptions including but not limited to the: • Excavated Public Road Material Order 2014 and Excavated Public Road Material Exemption 2014 • Reclaimed Asphalt Pavement Order 2014 and Reclaimed Asphalt Pavement Exemption 2014 • Recovered Aggregate Order 2014 and Recovered Aggregate Exemption 2014.	Contractor	Construction
AH1	Aboriginal cultural heritage	Prior to any works occurring, an area-wide Aboriginal Heritage Impact Permit (AHIP) will be applied for the 5 Aboriginal sites that will be affected due to the proposed works.	Contractor	Pre-construction
AH2	Aboriginal cultural heritage	Workers will be inducted as to appropriate Aboriginal heritage protection measures.	Contractor	Construction
AH3	Aboriginal cultural heritage	An unexpected find procedure will be implemented as outlined in the ACHA.	Contractor	Construction
AH4	Aboriginal cultural heritage	Wingecarribee Shire Council will continue to inform the Aboriginal stakeholders about the management of Aboriginal cultural heritage within the study area throughout the completion of the proposal.	Council	Construction
AH5	Aboriginal cultural heritage	Salvage of identified Aboriginal heritage features and relocation of artefacts from high-value areas will be undertaken prior to the commencement of any works that may impact these items. This process will be carried out in accordance with the approved AHIP and in consultation with Registered Aboriginal Parties.	Contractor / Council	Pre-construction
NAH1	Non-Aboriginal heritage	A Non-Aboriginal Heritage Management Plan will be prepared and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to non-Aboriginal heritage.	Contractor	Detailed design / pre-construction
NAH2	Non-Aboriginal heritage	An Unanticipated Finds Protocol (as per Appendix 3 of the SOHI) will be followed if any unexpected heritage items are encountered during works.	Contractor	Construction

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No.	Impact	Environmental safeguards	Responsibility	Timing
NAH3	Non-Aboriginal heritage	The proposed works will minimise the removal of vegetation within the Austermere (LEP I398) curtilage.	Contractor	Pre-construction / Construction
NAH4	Non-Aboriginal heritage	Landscaping associated with the proposed works will consider the inclusion of tree planting to form a vegetation screen between the proposal area and Austermere (LEP I398) to minimise impact to the aesthetic and natural values of the item.	Contractor	Construction
V1	Visual amenity	Construction areas and compound sites will be maintained during construction, kept tidy and well-presented including sorting and regular removal of excess materials to reduce visual impact.	Contractor	Construction
V2	Visual amenity	The ancillary facilities and construction areas (outside of the operational area of the proposal) will be progressively restored to at least its pre-construction condition.	Contractor	Construction / Post-construction
V3	Site Lighting	Night time lighting on the construction site will be sited to minimise impacts on nearby residential receivers and existing road corridors.	Contractor	Construction
P1	Utilities	All works will be undertaken in accordance with approved utility plans. Ongoing engagement with utility authorities will be undertaken regarding shutdowns, protection, and installation works.	Contractor / Council	Pre-construction / During construction
SE1	Socio-economic	A Communication Plan will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The plan will include (as a minimum): • Mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions • Contact name and number for complaints. The plan will be prepared in accordance with the Stakeholder and Community Engagement Guidelines (Transport for NSW, 2023).	Contractor	Detailed design / Pre-construction
SE2	Socio-economic impacts	Local residents and affected businesses will be notified before work starts regarding the timing, duration and likely impact of construction activities, including interruptions to utility services.	Council	Pre-construction
AQ1	Air Quality	An Air Quality Management Plan will be prepared and implemented as part of the CEMP. The plan will include, but not be limited to: • Potential sources of air pollution • Air quality management objectives consistent with any relevant published EPA and/or Office of Environment and Heritage (OEH) guidelines • Mitigation and suppression measures to be implemented, such as using water trucks to supress dust, and staging work to minimise exposed areas • Methods to manage work during strong winds or other adverse weather conditions • A progressive rehabilitation strategy for exposed surfaces.	Contractor	Detailed design / Pre-construction

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No.	Impact	Environmental safeguards	Responsibility	Timing
W1	Waste	A Waste Management Plan will be prepared and implemented as part of the CEMP. The plan will include but not be limited to: • Measures to avoid and minimise waste associated with the project • Classification of wastes and management options (re-use, recycle, stockpile, disposal) • Recycled materials will be used in construction where feasible • Use of waste-derived materials will comply with the relevant NSW EPA Resource Recovery Orders and Exemptions, including those for excavated public road material, reclaimed asphalt pavement, and recovered aggregate. • Statutory approvals required for managing on- and off-site waste, or application of any relevant resource recovery exemptions • Procedures for storage, transport and disposal • Monitoring, record keeping and reporting. The plan will align with the Environmental Procedure - Management of Wastes on Transport for NSW Land (Transport for NSW, 2014) and relevant Transport Waste fact sheets.	Contractor	Detailed design / Pre-construction
C1	Cumulative construction impacts	Current and upcoming projects with the potential to interact with the proposal will be monitored. Where potential cumulative impacts are identified, the scheduling of works will be coordinated with interacting projects to minimise potential impacts. This will include: • Scheduling works to allow suitable respite periods for construction noise • Scheduling of works to minimise consecutive construction noise impacts, where feasible • Coordinating lane closures and pedestrian/cyclist diversions to minimise the overall number of occasions where disruption occurs.	Council / Transport for NSW	Pre-construction/ Construction

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7.3 Licencing and approvals

Table 7-2 provides a summary of the licensing and approval requirements relevant to the proposal.

Table 7-2: Summary of licencing and approvals required

Instrument	Requirement	Timing
National Parks and Wildlife Act 1974 (s90)	Aboriginal heritage impact permit	Prior to start of the activity.
Roads Act 1993	A Road Occupancy License and Works Authorisation Deed would be sought under the Roads Act where construction is proposed on existing roads.	Prior to start of the activity.
Protection of the Environment Operations Act 1997	Environment Protection Licence	Prior to start of the activity.

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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

The proposed Moss Vale Bypass would result in positive social impacts as it would improve the amenity in the Moss Vale town centre, particularly on Argyle Street, by diverting traffic to the bypass. The proposal would also ease the traffic at the intersections of Argyle Street with Waite Street and Lackey Road. The proposal includes a shared path which would improve safety and amenity for pedestrians and cyclists. The bypass is consistent with the future character of the area as it would support the SHIP, which would be key employment lands for the Southern Highlands in the future.

A 'do nothing' approach was not considered appropriate as it does not address the identified need and does not meet the proposal's objectives.

While there would be some environmental impacts as a consequence of the proposal including traffic and transport impacts, noise impacts, Aboriginal cultural heritage impacts, vegetation removal, visual impacts, and potential soil and water impacts, they have been avoided or minimised where possible through design and the site-specific safeguards summarised in Chapter 7.

The benefits of the proposal are considered to outweigh the mostly temporary adverse impacts and risks associated with the proposal.

8.2 Objectives of EP&A Act

Table 8-1 reviews the consistency of the proposal with the objects of the EP&A Act

Table 8-1: Objects of the EP&A Act

Instrument	Requirement
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.	The proposal aims to improve the social and economic welfare of the community by redirecting traffic from the town centre, improving safety and amenity in the commercial centre.
1.3(b) To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	The proposal and its associated construction methodology have been designed to minimise impacts on the surrounding environment.
1.3(c) To promote the orderly and economic use and development of land.	Land in the proposal area has been acquired for the purposes of a bypass and would be used in a way which benefits the community. The proposal would also support the SHIP, a key employment area.
1.3(d) To promote the delivery and maintenance of affordable housing.	The proposal would assist with alleviating the expected traffic generation from Ashbourne Estate and other residential developments in and around Moss Vale. This would support the development of new housing supply.

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Instrument	Requirement
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.	The alignment of the proposal is largely cleared of vegetation and therefore would not have any significant impacts on threatened species or ecological communities.
1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	The proposal has been designed to minimise impact on Aboriginal and non-Aboriginal heritage items.
1.3(g) To promote good design and amenity of the built environment.	The proposal has been designed to adhere to urban design principles and would further improve amenity in Moss Vale town centre.
1.3(h) To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.	Not relevant to the proposal.
1.3(i) To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.	Not relevant to the proposal.
1.3(j) To provide increased opportunity for community participation in environmental planning and assessment.	Community consultation has been undertaken as detailed in Chapter 5.

8.3 Ecologically sustainable development

Ecologically sustainable development (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 proposal.

ESD requires the effective integration of economic and environmental considerations in decision-making processes. The 4 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. The proposal alignment is located on land which has already been acquired for the purpose of the bypass and would have minimal impacts on biodiversity.

Intergenerational 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.

A preferred route alignment that minimises vegetation clearance within sensitive ecological areas, so that such areas are conserved for future generations, has been selected.

The impacts of the proposal have been identified as short term and manageable. Benefits to road users in terms of improved connectivity and freight efficiency, and to the Moss Vale town centre would be realised over the short and longer term.

Conservation of biological diversity and ecological integrity

The twin principles of biodiversity conservation and ecological integrity have been a consideration during the design and assessment process with a view to identifying, avoiding, minimising and mitigating impacts. The proposal is not expected to have significant biodiversity impacts.

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Landscaping would consider the structure and species of locally endemic flora so that biological diversity in the local area is maintained. Site selection criteria were established for construction-phase facilities to minimise native vegetation clearance.

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.

While it is often difficult to place a reliable monetary value on the residual, environmental and social effects of the proposal, the value placed on environmental resources within and around the corridor is evident in the extent of environmental investigations, planning and design of impact mitigation measures to prevent adverse environmental impacts.

8.4 Conclusion

The proposed construction and operation of a bypass of Moss Vale 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.

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 Aboriginal heritage, air quality, noise and vibration, visual amenity and biodiversity impacts. Safeguards and management measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would also improve safety, amenity and traffic in the Moss Vale town centre. On balance, the proposal is considered justified and is recommended for approval.

8.4.1 Significance of impact under NSW legislation

By implementing the mitigation and management measures outlined in this REF and constructing the works in accordance with the plans, the proposal has been shown not 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. Development consent is not required.

8.4.2 Significance of impact under Australian legislation

The proposal is not likely to have a significant impact on matters of national environmental significance or 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.

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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.

Signed:	
Name:	Todd Brookes
Position	Principal – environment
Company name:	bd infrastructure
Date:	20 February 2026

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Terms and acronyms

Term / Acronym	Description
AADT	Annual Average Daily Traffic
AAQ	Ambient Air Quality
AEP	Annual Exceedance Probability
AHIMS	Aboriginal Heritage Information Management System
AMP	AM peak period
BAR	Biodiversity Assessment Report
BC Act	*Biodiversity Conservation Act 2016 (NSW)*
CEMP	Construction Environmental Management Plan
CLM Act	Contaminated Land Management Act 1997
Council	Wingecarribee Shire Council
CSP	Community Strategic Plan
dB(A)	A-weighted decibel
DPHI	Department of Planning, Housing, and Infrastructure. Formerly known as Department of Planning and Environment (DPE)
DSI	Detailed Site Investigation
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979 (NSW).* Provides the legislative framework for land use planning and development assessment in NSW
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).* Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
FM Act	*Fisheries Management Act 1994 (NSW)*
GFR	Geotechnical Investigation Report
ha	hectares
Heritage Act	*Heritage Act 1977 (NSW)*
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
LGA	Local Government Area

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Term / Acronym	Description
MNES	Matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)*
MVEC	Moss Vale Enterprise Corridor
NCA	Noise Catchment Area
NEPM	National Environmental Protection Measure
NML	Noise Management Level
NO_2	Nitrogen Dioxide
NPW Act	*National Parks and Wildlife Act 1974 (NSW)*
OEH	Office of Environment and Heritage within the Department of Planning and Environment.
PACHCI	Procedure for Aboriginal Cultural Heritage Consultation and Investigation
PCT	Plant Community Type
PMF	Probable maximum flood
PMP	PM peak period
$PM_{2.5}$	Particles with a diameter of 2.5 micrometres or less
PM_{10}	Particles with diameter of 10 micrometres or less
POEO Act	*Protection of the Environment Operations Act 1997*
PSI	Preliminary Site Investigation
RAPs	Registered Aboriginal Parties
RBL	Rating Background Noise Level
RCNG	Transport for NSW Road Noise Criteria Guideline (RNCG) (2022)
REF	Review of Environmental Factors
RMS	NSW Roads and Maritime Services, now Transport for NSW
RNP	EPAs NSW Road Noise Policy (DECCW, 2011)
RSW	Reinforced Soil Wall
SA2	Statistical Area 2: A medium sized general purpose area of between 3,000 and 25,00 people, used in the Australian Census.
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
SEPP (Biodiversity and Conservation)	State Environmental Planning Policy (Biodiversity and Conservation) 2021
SEPP (Planning Systems)	State Environmental Planning Policy (Planning Systems) 2021
SEPP (Resilience and Hazards)	State Environmental Planning Policy (Resilience and Hazards) 2021
SEPP (Transport and Infrastructure)	State Environmental Planning Policy (Transport and Infrastructure) 2021
SHR	State Heritage Register

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Term / Acronym	Description
SOHI	Statement of Heritage Impact
TAR	Traffic Assessment Report
TEC	Threatened Ecological Community
TMP	Traffic Management Plan
Transport	Transport for NSW
WLEP 2010	Wingecarribee Local Environmental Plan 2010

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Appendices

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Appendix A: Consideration of Section 171 factors and matters of national environmental significance and Commonwealth land

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Section 171 Factors

In addition to the requirements of the Guideline for Division 5.1 assessments (Department of Planning and Environment, 2022) and the Roads and Related Facilities EIS Guideline (Department of Urban Affairs and Planning, 1996) as detailed in the REF, the following factors, listed in section 171 of the Environmental Planning and Assessment Regulation 2021, have also been considered to assess the likely impacts of the proposal on the natural and built environment.

Factor	Impact
a. Any environmental impact on a community?	Short term minor negative
b. Any transformation of a locality?	Nil
c. Any environmental impact on the ecosystems of the locality?	Short term minor negative
d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Short term minor negative Long term positive
e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	Short term minor negative Long term positive
f. Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)?	Short term minor negative
g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	Nil
h. Any long-term effects on the environment?	Nil
i. Any degradation of the quality of the environment?	Short term minor negative
j. Any risk to the safety of the environment?	Nil
k. Any reduction in the range of beneficial uses of the environment?	Nil
l. Any pollution of the environment?	Short term minor negative
m. Any environmental problems associated with the disposal of waste?	Nil
n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?	Nil
o. Any cumulative environmental effect with other existing or likely future activities?	Nil
p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	Nil
q. Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1,	The proposal is consistent with relevant planning documentation from Wingecarribee Shire Council.
r. Other relevant environmental factors.	In considering the potential impacts of this proposal all relevant environmental factors have been considered, refer to Chapter 6 of this assessment.

Matters of National Environmental Significance and Commonwealth land

Under the environmental assessment provisions of the EPBC Act, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Department of Climate Change, Energy, the Environment and Water.

A referral is not required for proposed actions that may affect nationally-listed threatened species, endangered ecological communities and migratory species. Impacts on these matters are still assessed as part of the REF in accordance with Australian Government significant impact criteria and taking into account relevant guidelines and policies.

Matter		Impact
a	Any impact on a World Heritage property? The proposal is not located near any world heritage properties	Nil
b	Any impact on a National Heritage place? The proposal is not located near any national heritage places	Nil
c	Any impact on a wetland of international importance? The proposal is not located near any wetlands of national importance.	Nil
d	Any impact on a listed threatened species or communities? The BAR (Appendix F) determined that no significant impact on threatened species would arise as a result of the proposal.	Nil
e	Any impacts on listed migratory species? The BAR (Appendix F) determined that no significant impact on migratory species would arise as a result of the proposal,	Nil
f	Any impact on a Commonwealth marine area? The proposal is not located near any Commonwealth marine areas.	Nil
g	Does the proposal involve a nuclear action (including uranium mining)? Not applicable to proposal.	Nil
h	Additionally, any impact (direct or indirect) on the environment of Commonwealth land? The proposal is not located near any Commonwealth lands.	Nil

Appendix B: Environmental Planning and Assessment Regulation 2021 section 171(A) factors – activities in catchments and WaterNSW Guide checklist

SEPP (Biodiversity and Conservation) – Chapter 6 (Water Catchments)

Chapter 6 of SEPP (Biodiversity and Conservation) relates to the use of land within regulated catchments. In these catchments, Transport is required to consider the environmental impact of activities to which Division 5.1 of the EP&A Act applies before carrying out the activity.

The 4 regulated catchments are:

a) Sydney Drinking Water Catchment

b) Sydney Harbour Catchment

c) Georges River Catchment

d) Hawkesbury-Nepean Catchment.

In undertaking an activity in a regulated catchment Transport must satisfy sections 6.6(2), 6.7(2), 6.8(2) and 6.9(2) and consider environmental impacts listed in sections 6.6(1), 6.7(1), 6.8(1) and 6.9(1) of State Environmental Planning Policy (Biodiversity and Conservation) 2021. This includes specific consideration of water quality and quantity, aquatic ecology, flooding, and recreation and public access.

The proposal is located in the Sydney Drinking Water Catchment, the below tables consider the impacts of the proposal on each of the identified factors.

Water quality and quantity

Reference	Matter	Comment
6.6(1)(a)	whether the development will have a neutral or beneficial effect on the quality of water entering a waterway,	Neutral effect. Refer to Section 6.4.
6.6(1)(b)	whether the development will have an adverse impact on water flow in a natural waterbody,	Neutral effect. Refer to Section 6.4.
6.6(1)(c)	whether the development will increase the amount of stormwater run-off from a site,	The proposal would increase the area of impervious surface resulting in a potential increase in stormwater runoff. The proposal includes a drainage network to appropriately manage runoff from the road.
6.6(1)(d)	whether the development will incorporate on-site stormwater retention, infiltration or reuse,	The proposal does not include any stormwater retention measures. Drainage from the road would be managed through the new drainage network and would discharge through existing grassed areas, facilitating infiltration. Further details are provided in Section 6.4.
6.6(1)(e)	the impact of the development on the level and quality of the water table,	The proposal is not anticipated to impact the water table. No changes to groundwater levels or quality are expected.
6.6(1)(f)	the cumulative environmental impact of the development on the regulated catchment	The proposal would have negligible impacts on the catchment and therefore the potential for cumulative impacts is limited.
6.6(1)(g)	whether the development makes adequate provision to protect the quality and quantity of ground water.	Safeguards relating to the protection of water quality are included in Section 6.4.
6.6(2)(a)	the effect on the quality of water entering a natural waterbody will be as close as possible to neutral or beneficial, and	Neutral effect. Refer to Section 6.4.
6.6(2)(b)	the impact on water flow in a natural waterbody will be minimised.	Neutral effect. Refer to Section 6.4.
6.7(1)(a)	whether the development will have a direct, indirect or cumulative adverse impact on terrestrial, aquatic or migratory animals or vegetation,	Impact not significant. Mitigation measures listed in Chapter 7 will be implemented to avoid adverse impacts on biodiversity.

Reference	Matter	Comment
6.7(1)(b)	whether the development involves the clearing of riparian vegetation and, if so, whether the development will require— (i) a controlled activity approval under the Water Management Act 2000, or (ii) a permit under the Fisheries Management Act 1994,	No approvals or permits are required, no riparian vegetation is to be removed.
6.7(1)(c)	whether the development will minimise or avoid— (i) the erosion of land abutting a natural waterbody, or (ii) the sedimentation of a natural waterbody,	Mitigation measures listed in Chapter 7 will be implemented to avoid erosion and sedimentation.
6.7(1)(d)	whether the development will have an adverse impact on wetlands that are not in the coastal wetlands and littoral rainforests area,	Not relevant to proposal area.
6.7(1)(e)	whether the development includes adequate safeguards and rehabilitation measures to protect aquatic ecology,	The proposal would not affect aquatic ecology. Mitigation measures listed in Chapter 7 will be implemented to avoid adverse impacts on biodiversity.
6.7(1)(f)	if the development site adjoins a natural waterbody—whether additional measures are required to ensure a neutral or beneficial effect on the water quality of the waterbody.	The proposal area does not adjoin a natural waterbody. No additional measures are proposed.
6.7(2)(a)	the direct, indirect or cumulative adverse impact on terrestrial, aquatic or migratory animals or vegetation will be kept to the minimum necessary for the carrying out of the development,	Impact not significant. Mitigation measures listed in Chapter 7 will be implemented to avoid adverse impacts on biodiversity.
6.7(2)(b)	the development will not have a direct, indirect or cumulative adverse impact on aquatic reserves,	The proposal would not affect an aquatic reserve.
6.7(2)(c)	if a controlled activity approval under the Water Management Act 2000 or a permit under the Fisheries Management Act 1994 is required in relation to the clearing of riparian vegetation—the approval or permit has been obtained,	No approval or permit required.
6.7(2)(d)	the erosion of land abutting a natural waterbody or the sedimentation of a natural waterbody will be minimised,	Mitigation measures listed in Chapter 7 will be implemented to avoid erosion.
6.7(2)(e)	the adverse impact on wetlands that are not in the coastal wetlands and littoral rainforests area will be minimised.	Not relevant to proposal area.
6.8(1)	the likely impact of the development on periodic flooding that benefits wetlands and other riverine ecosystems.	The proposal would have minor impacts on existing flood behaviour. Further assessment is provided in Section 6.4 and Appendix F.
6.8(2)(a)	if there is a flood, result in a release of pollutants that may have an adverse impact on the water quality of a natural waterbody, or	The proposal would have minor impacts on existing flood behaviour. Further assessment is provided in Section 6.4 and Appendix F.
6.8(2)(b)	have an adverse impact on the natural recession of floodwaters into wetlands and other riverine ecosystems.	The proposal would have minor impacts on existing flood behaviour. Further assessment is provided in Section 6.4 and Appendix F.
6.9(1)(a)	the likely impact of the development on recreational land uses in the regulated catchment,	The proposed shared path would have a positive impact on recreational land uses.

Reference	Matter	Comment
6.9(1)(b)	whether the development will maintain or improve public access to and around foreshores without adverse impact on natural waterbodies, watercourses, wetlands or riparian vegetation.	The proposal would improve public access to the to the Wingecarribee River foreshore for pedestrians and cyclists as a result of the proposed shared path which would connect with the existing Wingecarribee River walking track. Mitigation measures listed in Chapter 7 will be implemented to avoid adverse impacts on the watercourses.
6.9(2)(a)	the development will maintain or improve public access to and from natural waterbodies for recreational purposes, including fishing, swimming and boating, without adverse impact on natural waterbodies, watercourses, wetlands or riparian vegetation,	The proposal would improve access to the Wingecarribee River for pedestrians and cyclists as a result of the proposed shared path which would connect with the existing Wingecarribee River walking track.
6.9(2)(b)	New or existing points of public access between natural waterbodies and the site of the development will be stable and safe,	Not relevant to the proposal.
6.9(2)(c)	if land forming part of the foreshore of a natural waterbody will be made available for public access as a result of the development but is not in public ownership—public access to and use of the land will be safeguarded.	Not relevant to the proposal.

Section 6.5 (Sydney Water Drinking Catchment) of SEPP (Biodiversity and Conservation) relates to the use of land within the Sydney drinking water catchment. In accordance with section 8.11 of SEPP (Biodiversity and Conservation), Council is required to consider whether or not an activity to which Division 5.1 of the EP&A Act applies will have a neutral or beneficial effect on water quality before carrying out the activity. These factors are considered in the table below.

Factor	Impact
1. Are there any identifiable potential impacts on water quality? What pollutants are likely? During construction and/or post construction?	During construction, the potential pollutants are sediments (fine and coarse), nitrogen, phosphorus, pathogens, hazardous chemicals and contaminants such as oil/fuel. During operation, pollutants associated with road traffic would be anticipated.
2. For each pollutant, list the safeguards needed to prevent or mitigate potential impacts on water quality (these may be Water NSW endorsed current recommended practices and/or equally effective other practices)	During construction, appropriate mitigation measures will be implemented to management water quality risks. This includes erosion and sediment controls in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Managing Urban Stormwater: Soils and Construction Volume 2D Main Road Construction (Department of Environment and Climate Change NSW, 2008), along with appropriate storage of fuels and chemicals, and spill response procedures. During operation, the road design includes a drainage network to manage drainage from the road surface. Discharge will be directed through adjacent grassed pasture land to provide filtration. Further information is provided in Section 6.4.
3. Will the safeguards be adequate for the time required? How will they need to be maintained?	Construction mitigation measures will be checked and maintained on a regular basis and will not be removed until works have been completed. Maintenance of safeguards would include: • Replacing / repairing any damaged controls • Ensuring all controls are operating as intended. During operations, the road will be subject to usual Council road maintenance activities including checking and repair of any drainage elements. The drainage system has been designed to be of relatively low maintenance.

Factor	Impact
4. Will all impacts on water quality be effectively contained on the site by the identified safeguards (above) and not reach any watercourse, waterbody or drainage depression? Or will impacts on water quality be transferred outside the site for treatment? How? Why?	The mitigation measures proposed in Chapter 7 and the drainage design approach outlined in Section 6.4.will be sufficient to manage water quality impacts.
5. Is it likely that a neutral or beneficial effect on water quality will occur? Why?	While the proposal results in some risks to water quality, mitigation measures will be implemented to appropriately manage the risk. As such, it is considered that the proposal would have a neutral effect on water quality.

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Appendix C: Traffic Assessment Report

Appendix D: Noise and Vibration Impact Assessment

Appendix E: Biodiversity Assessment Report

Appendix F: Flooding Report

Appendix G: Geotechnical Investigation Factual Report

Appendix H: Preliminary Site Investigation

Appendix I: Detailed Site Investigation

Appendix J: Aboriginal Cultural Heritage Assessment

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Appendix K: Statement of Heritage Impact

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Appendix L: Roadside Air Quality Screening Tool

Appendix M: Landscape Character and Visual Impact Assessment

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Appendix N: Technical Report – Flooding