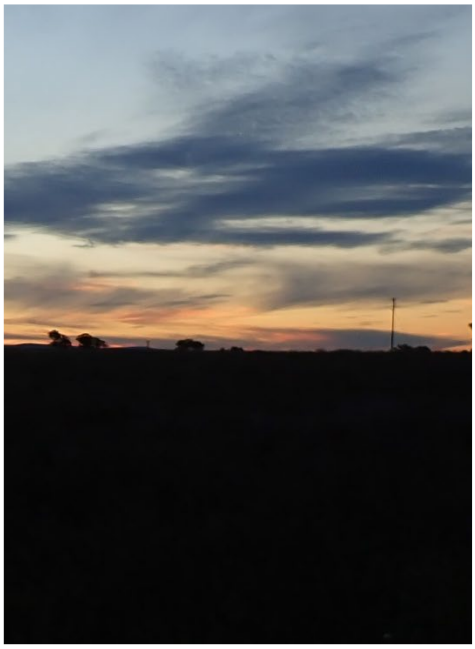
PLANNING PROPOSAL

Additional Permitted Land Use, 127-141 Lochrey Road, Gunnedah

August 2022

Project Number: 20-639



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Planning Proposal

This Planning Proposal (PP) was prepared under Section 3.33 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to seek an amendment to Gunnedah Local Environmental Plan 2012 (Gunnedah LEP). The PP would enable additional permitted uses on land at 127-141 Lochrey Road, Gunnedah.

The subject land is legally described as Lot 1 DP 841781, however the additional permitted uses would only apply to the part of the lot west of the Oxley Highway, as shown in Figure 1.

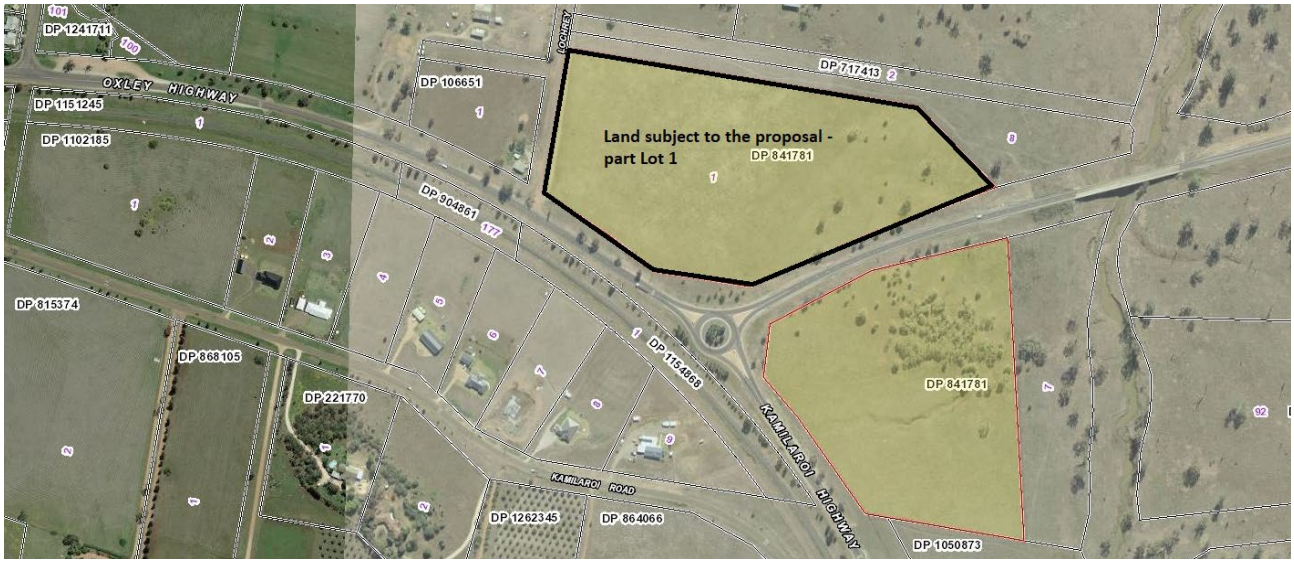

Figure 1 Land application for this PP (identified by black line) on Lot 1 DP 841781

The PP requires for the PP authority, Gunnedah Shire Council (Council) to exercise its function under Division 3.4 of the EP&A Act in relation to the land and amend Schedule 1 of Gunnedah LEP to include:

Use of certain land at 127-141 Lochrey Road, Gunnedah

(1) That the use would apply to part of Lot 1, DP 841781, Lochrey Road, Gunnedah.
(2) That development for the purpose of highway service centre and caravan park be permitted with development consent.

The PP does not seek to amend the land use zone or development standards applying to the land.

The PP was prepared in accordance with the Local Environmental Plan Making Guideline (DPIE, 2021) and outlines the effect of, and provides justification for, the proposed changes to Gunnedah LEP. The PP demonstrates consistency with the appliable regional and local strategic framework, State Environmental Planning Policies, and the Local Planning Directions made under Section 9.1 of the EP&A Act.

The following supporting documentation are appended to this PP:

- Appendix A Concept Design
- Appendix B Proposal site analysis
- Appendix C Traffic Impact Assessment (TIA)
- Appendix D Noise (Acoustic) Assessment.

Background

NGH Pty Ltd acts on behalf of Charlie One Pty Ltd in the preparation of this PP. Subject to the proposed amendment being made under Section 3.36 of the EP&A Act, Charlie One Pty Ltd intends to seek consent for a subsequent development application (DA) involving a highway service centre on the land, generally consistent with the concept design included in Appendix A. The highway service centre would include a caravan park, involving facilities and caravan parking areas to provide a short-term option for accommodating visitors (travelling within their own caravans or the like) in proximity to local businesses within Gunnedah. The caravan park would provide a suitable buffer between the proposed highway service centre to existing residential land uses to minimise potential impacts to amenity.

The legal description of the subject land and land ownership is identified in Table 0-1.

Table 0-1 Subject land and land ownership

Subject land	Landholder
127-141 Lochrey Road Gunnedah NSW - legally described as Part Lot 1 DP 841781	Mr RJ Tudgey & Ms L. Quelch.

The subject land is located at the intersection of the Oxley Highway and Kamilaroi Highway, approximately 2.7 kilometres to the southeast of the Central Business District (CBD) of Gunnedah. The Oxley Highway severs the lot, as shown in Figure 2 . The land drains toward the Mooki River, located on adjoining land to the east.

The land is within Zone RU1 Primary Production and has a minimum lot size of 200 hectares, for the purposes of permitting dwelling houses, under Section 4.2A of Gunnedah LEP. The adjoining areas to the south of the Kamilaroi Highway are within Zone R5 Large Lot Residential and have a minimum lot size of 1.2 hectares. The adjoining land parcels to the north, west and south of the land include large lot residential and rural dwelling houses.

The part of the land to which this PP applies is approximately eight hectares in area. There are no buildings present, and the only improvements are rural fencing. The land was previously used for agriculture and is mostly clear of trees, apart from a scattering of paddock trees as seen on the aerial photo included in Figure 1.

Access is currently via the unsealed Lochrey Road, off the Kamilaroi Highway. Lochrey Road is located approximately 200 metres northeast of the intersection Oxley Highway and Kamilaroi Highway.

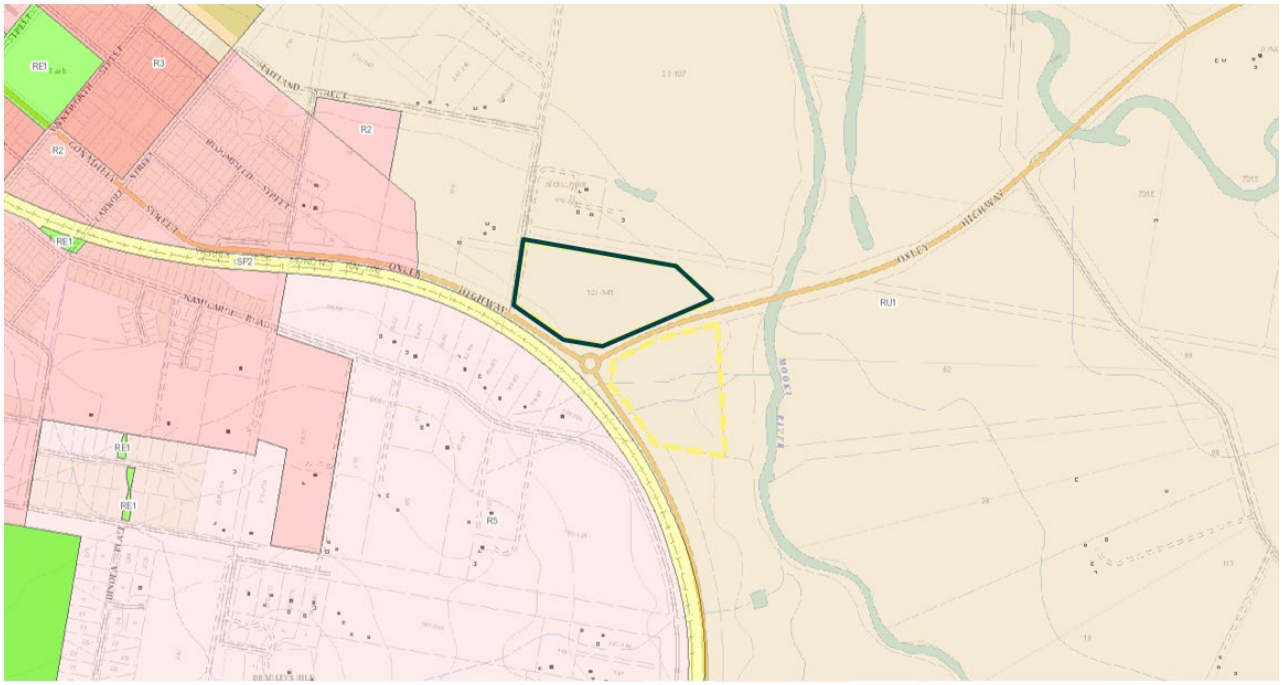

Figure 2 Land use zoning under Gunnedah LEP 2012, showing the applicable land in black outline (NSW Gov. NSW Planning Portal, 2021)

1. Part 1 Objectives or Intended Outcomes

The intent of this PP is to amend Gunnedah LEP 2012 to enable the development of a 'highway service centre' with 'caravan park' on part of the subject land.

Furthermore, the PP seeks to achieve the following objectives:

- Enable the orderly development of certain rural land, zoned for primary production, for land uses consistent to the strategic location at a highway junction and large land area, which are complementary to existing businesses and services within the Gunnedah Town Centre.
- Provide opportunity to support employment opportunities during construction and ongoing operation of proposed land uses.
- Include the use of a caravan park that would increase overnight stays by visitors and tourists, providing support to retail and services within the Gunnedah local economy.
- Provide for a development that is consistent with and/or does not compromise the intended outcomes of regional and local strategic land use plans (including the Gunnedah residential strategy), the objectives of Zone RU1 Primary Production, and is compatible with existing and envisaged surrounding land uses.

2. Part 2 Explanation of the provisions

The proposed outcome of the PP would be achieved by amending Schedule 1 Additional permitted uses of Gunnedah LEP 2012, to insert as an additional item the following:

2 Use of certain land at 127-141 Lochrey Road, Gunnedah

This clause applies to part of the land at Part Lot 1 DP 841781, 127-141 Lochrey Road, Gunnedah, shown as “Item 2” on the Additional Permitted Uses Map.

Development for the purpose of a highway service centre is permitted with development consent.

Development for the purpose of a caravan park is permitted with development consent.

The proposed outcome of the PP would also include amendment to the Additional Permitted Uses Map within the Gunnedah LEP, to identify the applicable land as shown in Appendix E.

3. Part 3 Justification

3.1. Section A - need for the PP

3.1.1. Is the PP a result of an endorsed LSPS, strategic study or report?

The PP is not the result of an endorsed LSPS, strategic study or report.

The PP, however, is not inconsistent with:

- *Draft Gunnedah Shire Local Housing Strategy (Exhibition Copy Dated 20 October 2021)* (Elton Consulting, 2021)
- *Gunnedah Shire Local Strategic Planning Statement, Future 2040* (GSC, 2020) (LSPS)
- *Gunnedah Community Strategic Plan 2017 – 2027* (GSC, 2017)
- *Gunnedah Urban Land Use Strategy* (Insight, 2016)
- *Gunnedah Shire Rural Strategy* (EDGE Land Planning, 2007).

Specifically, the following provisions show the proposal would be compatible with the surrounding future desired character and would not be inconsistent with the currently available strategies:

- The *Draft Gunnedah Shire Local Housing Strategy* (Elton Consulting, 2021) identifies potential residential constraints and opportunities for the proposal site and land to the west and south of the proposal site. The proposal site was identified within an area of potential mixed use/residential unconstrained land (see Appendix B, Figure 14), the 2016 strategy also identified land the to the northwest as having potential for R5 large lot residential land. Specialist consideration of potential traffic impacts and noise impacts on potential future residential land and existing rural dwellings and residential areas on surrounding land have been included with this proposal, refer to Appendix C and Appendix D.
- *Draft Gunnedah Urban Land use Strategy* (Insight, 2016) *Volume 2: Commercial Activation and Opportunities Strategy* includes a demand analysis for retail floor space. The PP would support the Council in achieving this demand and 2026 projections, would not have a negative impact on the CBD and would not result in significant commercial activity on the periphery of Gunnedah (as part of this proposal or cumulatively). There is land identified to have a B7 zoning within Volume 2. This land is located 260m to the west of the proposal site, this is a zoning that is compatible with the proposed highway service centre and caravan park land uses.

It is understood that Council is in the process of developing other local strategies to support the LSPS, however, as they are incomplete and are unable to be considered as part of this report.

As outlined above and in Appendix A, it is considered the current permissible uses prevents the best outcomes for the site being realised, including community and visitors needs and business and freight growth opportunities. An amendment of the Gunnedah LEP is vital, to support a development application relating to Part Lot 1 DP 841781.

3.1.2. Is the PP the best means of achieving the objectives or intended outcomes, or is there a better way?

Yes, an amendment to Schedule 1 of the Gunnedah LEP to enable currently prohibited land uses on the applicable land is considered the best means of giving effect to the objectives of the PP (and enable determination of a subsequent DA consistent with the Concept Design in Appendix A).

The applicable land is within Zone RU1 Primary Production under the Gunnedah LEP, however its limited area of approximately eight hectares, being severed by the Oxley Highway from the remaining part of the subject land means this land is less suitable to support extensive agriculture. However, these characteristics, dual highway frontage, and proximity to urban land within Gunnedah makes this site viable for the proposed land uses.

Rezoning of the land to an alternative zone, which supports the proposed land uses was considered but is not supported as this does not provide the same level of certainty to Council or the community of the intended outcomes on the land. The standard LEP instrument includes several mandated land uses permitted with consent within each potential employment zone. Were the land rezoned prior to being developed, there is a risk that a DA for an alternative permissible land use could be lodged, resulting in an out of centre commercial use that does not support the existing B2 Local Centre Zone within the Gunnedah town centre.

It is considered that the proposed LEP amendment is justifiable and in the public interest.

3.2. Section B - relationship to strategic planning framework

3.2.1. Will the PP give effect to the objectives and actions of the applicable regional or district plan or strategy (including any exhibited draft plans or strategies)?

New England North West Regional Plan 2036

The New England North West Regional Plan 2036 NSW Gov., 2017) (the Plan) establishes a framework for growth over the next 15 years for the New England and North West Region. The subject land is located within Gunnedah LGA is in the south-western part of the region. The Plan includes regional goals, directions, and actions to guide land use planning priorities and decision-making. The following provisions from the Plan are relevant to the PP, as outlined in Table 3-1.

Table 3-1 Considerations under the New England North West Regional Plan 2036

Regional Goals and Objectives	Comment
Goal 1: A strong and dynamic regional economy. Direction 1: Expand agribusiness and food processing sectors. Direction 2: Build agricultural productivity.	The PPs additional permitted uses supports Direction 1, specifically: *Action 1.4 Encourage commercial, tourist and recreation activities that complement and promote a stronger agricultural sector and build the sector's adaptability*.

Regional Goals and Objectives	Comment
Direction 3: Protect and enhance productive agricultural lands. Direction 7: Build strong economic centres. Direction 8: Expand tourism and visitor opportunities.	The highway service centre land use would provide a support service for tourism in a location with access to rural areas where intensive agriculture and food processing growth is encouraged. The PP is not considered to be inconsistent with Direction 2. The proposed additional land use is not seen to be a land use that has notable interface conflicts with agriculture. The PP is not considered to be inconsistent with Direction 3. The proposed additional land use would result in a reduction of agricultural land. The location, however, is considered to be well suited to the proposed land use and is not seen to be a land use that has notable conflicts with agriculture or resulting in removal of land with high agricultural value or land capability. The PP is not inconsistent with Direction 7, that states: *The vitality of central business precincts within cities and centres will be promoted. New commercial precincts should be avoided outside of centres. Where out-of-centre commercial areas are proposed, they must be of an appropriate size to their service catchment. Well-located employment land is a key component to a successful centre. Employment land supply will be encouraged in locations supported by freight access and protected from encroachment by incompatible development. Certain industries may need to be located away from centres due to their type, scale and nature, and this should be addressed in local growth management strategies.* The subject land is located outside of the centre of Gunnedah but is located to provide best accessibility to major roads of the area and convenient access for heavy vehicles. It is not a type of development that is typically located within or suited to a commercial centre. It would be unlikely to undermine the primacy of the Gunnedah CBD. The location is considered appropriate for the additional land use proposed. The PP works towards achieving the proposed Actions 7.1, 7.2, 7.3, 7.4, 7.5 and 7.6 as: • The location is close to Gunnedah town centre but does not detract from the town centre as the primary area for services for the community. • The proposal provides employment opportunities close to the town centre. • The proposal maximises the benefits of the existing infrastructure. • The proposal is not likely to conflict with existing land uses due to available buffers and existing noise and air quality conditions. The proposal provides an appropriate

Regional Goals and Objectives	Comment
	mix of land use on the site that would be compatible with the surrounds. • The land use employment opportunities and growth would be controlled by the proposed LEP provisions and DA processes. The PP also works towards achieving expansion of tourism visitation and expenditure as set out in Direction 8, specifically by providing a supporting land use for tourism visitors that would be in an appropriate location and controlled by the proposed LEP provisions and DA processes.
Goal 2: A healthy environment with pristine waterways Direction 10: Sustainably manage and conserve water resources. Direction 11: Protect areas of potential high environmental value. Direction 12: Adapt to natural hazards and climate change.	The PP is not inconsistent with this Goal or Direction 10, 11 or 12. The land supports options for avoidance of areas mapped as waterways, having biodiversity value, or containing native vegetation. The land is outside of areas subject to flooding and is not bushfire prone land. These matters would also be addressed at the development application stage.
Goal 3: Strong infrastructure and transport networks for a connected future. Direction 13: Expand emerging industries through freight and logistics connectivity. Direction 14: Enhance transport and infrastructure networks.	The PP directly supports this goal and aligns with the statement from the goal: *Freight and logistics industries will be a focus for investment to grow social and economic ties across communities and borders. Investment, integration and alignment of road, rail, port, utility and airport infrastructure will foster emerging industries.* The PP site is consistent with Direction 13 and 14 as it: • Is for a land use that would support freight activities. • It is proposed in an area that can be protected from encroachment of sensitive land uses and maximises opportunities of location at the junction of two highways. • Existing planning strategies of the Gunnedah Council support this, including the *Gunnedah Shire Rural Strategy* (EDGE Land Planning, 2007) and the residential release phasing set out in the *Urban Land Use Strategy* (Insight, 2016).
Goal 4: Attractive and thriving Communities. Direction 23: Collaborate with Aboriginal communities to	Aboriginal heritage would be assessed as part of the DA process, if required. This would be consistent with Action 23.4: *Undertake Aboriginal cultural heritage assessments to inform the design of planning and development proposals*

Regional Goals and Objectives	Comment
respect and protect Aboriginal culture and heritage.	*so that impacts to Aboriginal cultural heritage are avoided and appropriate heritage management mechanisms are identified.* A basic AHIMS search has been conducted with results identifying two sites within 1km and no sites recorded within 200m of the PP site. It is noted that the proposal site size and location provide opportunities to consider design options that would avoid or minimise impacts to Aboriginal heritage. A due diligence assessment may need to be submitted with any future development application.

Draft New England North West Regional Plan 2041

The Draft New England North West Regional Plan 2041 was publicly exhibited between November 2021 to 18 February 2022. The 2041 plan will replace the existing 2036 plan (outlined above) having consideration for changes and trends and identifying actions and initiatives for the coming five years.

The Plan provides guidance for councils in preparing local strategic plans, local plans, and planning proposals. The PP is consistent the objectives of this plan, as identified in Table 3-2 below.

Table 3-2 Considerations under the New England North West Regional Plan 2041

Objectives and strategies	Comment
OBJECTIVE 1: **Coordinate land use planning for future population growth, community need and regional economic development**	The PP will result in the provision of land uses on land identified as being suitable for development, not being constrained by flooding, within proximity to the urban areas of Gunnedah. The resultant service centre will not impact on adjacent land from developing for residential uses to accommodate growth of the Gunnedah in the future. The envisaged service station and caravan park will help support economic development by increasing the stay of visitors who may also patronise local retail or services.
OBJECTIVE 2: **Protect the viability and integrity of rural land**	The PP will enable a non-rural use on land zoned for primary production. However, this will not result in an inconsistency with this objective for the following reasons: • The applicable land has an area of only eight hectare, which is considerably less than the 200-hectare minimum lot size and therefore unlikely to accommodate a viable agricultural use.

	• The applicable land is severed from its residual part by the Oxley Highway, which would further make it difficult to be used for an agriculture use as part of a larger holding. • Adjacent land parcels include residential uses (large lot residential and rural dwellings), which are identified within the Draft Gunnedah Shire Local Housing Strategy for future land use change to accommodate residential growth given the proximity to existing urban land uses and being unconstrained by flooding.
OBJECTIVE 5: **Enhance the diversity and strength of Central Business Districts and town centres**	The PP supports this objective by: • Not rezoning the land to a business/employment zone that may otherwise have potential to permit uses that compete with those within the established Gunnedah town centre (B2 Local Centre Zone). • The additional permitted uses proposed will complement the existing or future land uses within the Gunnedah town centre and increase the opportunity for increased patronage by people staying overnight within the proposed caravan park.
OBJECTIVE 6: **Coordinate the supply of well-located employment land**	The PP will enable the subsequent development of land uses that will generate employment both during construction and during ongoing operations.
OBJECTIVE 7: **Support a diverse visitor economy**	The PP seeks to enable a caravan park on the applicable land, which will support the visitor and tourism economy and provide opportunities for people to stay within Gunnedah.

3.2.2. Is the PP consistent with a council LSPS that has been endorsed by the Planning Secretary or GSC, or another endorsed local strategy or strategic plan?

Local Strategic Planning Statement

The Gunnedah Shire *Local Strategic Planning Statement, Future 2040* (GSC, 2020) (LSPS) is applicable to the subject land. The following themes, planning priorities and actions from the LSPS relevant to the PP are discussed in Table 3-3

Table 3-3 Considerations under the Local Strategic Planning Statement, Future 2040

Themes, planning priorities and actions	Comment
Boundless Opportunity Local Planning Priority 1: Grow business, services and the digital economy through education, employment, training and innovation. Local Planning Priority 2: Develop industrial, commercial, and agricultural land. Local Planning Priority 3: Grow tourism. Local Planning Priority 4: Develop infrastructure to support growth and change. Local Planning Priority 5: Support Traditional Custodians.	The PP would facilitate the intended highway service centre, thereby providing entry level jobs and opportunities for the unskilled as well as opportunities for those with some training and skills. Although not within the areas noted as potential employment land under the LSPS, the characteristics of the subject land matches those of employment land that is likely to be in high demand, large lots; good access to the highway/ railway; level land; and access to infrastructure; no likely significant impacts to the environment; not productive agricultural land; and appropriately distanced from sensitive land uses. The PP directly supports tourism, providing services for the transient population seeking activities and experiences in Gunnedah and the surrounding areas. The large-scale site supports caravan parking assisting in capturing the passing traffic at minimum, as short-stay overnight visitors.
Places for People Local Planning Priority 6: Enhance Gunnedah Shire's liveability. Local Planning Priority 7: Housing types for lifestyle diversity. Local Planning Priority 8: Re-imagine and re-energize the Gunnedah CBD.	The PP is not considered to detract from the livability of the city. It is also noted that the development location is considered suitable, and it is unlikely to affect future planning decisions about residential development as the plan states: *New residential development or infill development should avoid being located close to the freight network or freight and logistics facilities. Any developments near the freight network needs to take into consideration the existing and future freight movements on the network and allow the corridors to operate at maximum efficiency. New and infill developments will need to mitigate against noise and air emissions, as well as vibrations from the freight network.*

Themes, planning priorities and actions	Comment
Connected and Accessible Local Planning Priority 9: Develop transport and freight opportunities. Local Planning Priority 10: Support accessible, high quality, local open spaces.	The PP directly supports Local Planning Priority 9 and the NSW freight task set to increase by 28 percent by 2036. The PP site has been carefully chosen at the intersection of the 'Oxley and Kamilaroi Highways, providing access to the Newell and New England Highways, with these north-south highways being major interstate routes'. The site also provides an opportunity for rest and recovery for freight drivers and tourists.
Sustainable and Resilient Local Planning Priority 11: Preserve biodiversity and prepare for climate change.	The PP avoids important agricultural land (IAL) and is not considered incompatible with continued use of adjacent agricultural uses. The PP avoids flood planning land. Water management would be considered as part of the future development application process. The subject land for the PP provides opportunities for avoidance of identified areas of native vegetation and potential habitat.

Gunnedah Community Strategic Plan

The *Gunnedah Community Strategic Plan, 2017-2027* (GSC, 2017) (Community Plan) is applicable to the subject land. Outcomes and strategies from the Community Plan relevant to the PP are discussed in Table 3-4.

Table 3-4 Considerations under the Community Strategic Plan 2017-2027

Outcome and Strategy	Comment
2.4 The Gunnedah Shire is an attractive place to invest. *2.4.1 Market and promote the Gunnedah Shire as an attractive place for business and investment.*	This PP is consistent with outcome 2.4 and strategy 2.4.1 and would encourage new business and investment.
3.3 Villages are vibrant and sustainable. *3.3.2 Maintain quality transport links between Gunnedah and Villages.*	The additional land use proposed supports use of main transport routes between Gunnedah and villages, consistent with outcome 3.3 and strategy 3.3.2.
4.1 Balance between development and environmental protection. *4.1.2 … encourage green space in commercial developments*	The size of the site and proposed additional land use would allow for designs, consistent with outcome 4.1 and strategy 4.1.2.

Gunnedah Shire Rural Strategy

The *Gunnedah Shire Rural Strategy* (EDGE Land Planning, 2007) (Rural Strategy) is applicable to the subject land. The following key matters from the Rural Strategy relevant to the PP are discussed in Table 3-5.

Table 3-5 Considerations under the Gunnedah Shire Rural Strategy

Key matters	Comment
Water catchments and flooding, native vegetation and biodiversity, soils, topography, landscape character, bushfire risk, weeds, social and economic factors, rural land use and potential for conflict.	The site is a highly accessible location at a key entry point to Gunnedah giving it strategic importance. The proposal to introduce the additional permissible land use of highway service centre has been considered against the key matters raised in the Rural strategy. It is noted that the key focus area for future development was land located to the southwest of Gunnedah a significant distance from the proposal site. Other key matters raised in the Rural Strategy (listed in the left-hand column) have been considered as potential constraints for the additional land use. There is not considered to be any significant constraints for the land based on these factors and the proposal for additional land use is not considered unreasonable. The proposed additional land use provides an opportunity to make the most of a site in a visually prominent location, but also to take advantage of a location with a good buffer from residential areas and with low risk of land use conflicts, construction hazards and environmental impacts.

3.2.3. Is the PP consistent with any other applicable State and regional studies or strategies?

There are no further applicable State and regional studies or strategies, other than those addressed elsewhere within this PP.

3.2.4. Is the PP consistent with applicable SEPPs?

State Environmental Planning Policies (SEPPs) relevant to the PP are addressed in Table 3-6. This proposal is consistent with the SEPPs.

Table 3-6 Considerations under the relevant State Environmental Planning Policies

Relevant SEPP	Comment/consistency with SEPP
State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP)	A Traffic Impact Assessment (TIA) (Appendix C) was prepared to support this PP. The TIA demonstrates the feasibility of the Concept Design (Appendix A) and the ability for the proposed LEP amendment to result in development that complies with the TISEPP.

Relevant SEPP	Comment/consistency with SEPP
	It is noted that a subsequent DA would be required to further consider and address Section 2.116-2.119 and section 2.121 and any other relevant provisions of the TISEPP.
State Environmental Planning Policy (Primary Production) 2021 (PPSEPP)	The PPSEPP does not currently identify any State significant agricultural land (within Schedule 1) and therefore there are no specific provisions of this SEPP relevant to the subject land. However, it is noted the draft mapping that was exhibited in November 2021 mapped the proposal site. The draft mapping was based on 'A guideline to identifying important agricultural lands in NSW' (DPI 2017). Important agricultural land (IAL) is defined as being existing or future location of local or regionally important agricultural industries or resources based on: 1. a current land use map that identifies where agricultural industries are located 2. a simple map of important biophysical resources for agriculture applicable across all agricultural industries 3. an additional extra overlay of socio-economic information also applicable across all agricultural industries 4. an agricultural industry map that identifies the location of specific agricultural industries using critical biophysical criteria, access to infrastructure and socio-economic location criteria.' Any requirements of the PPSEPP relevant at the time of the DA would be considered and addressed.
State Environmental Planning Policy (Resilience and Hazards) 2021 (R&HSEPP)	Chapter 3 of the R&HSEPP would to be considered at DA stage, including the completion of a preliminary hazard analysis, where required. The site has a history of agricultural land use. A Preliminary Site Investigation would be completed at the DA stage if required in accordance with the requirements of Chapter 4 of the R&HSEPP.
State Environmental Planning Policy (Biodiversity and Conservation) 2021 (B&CSEPP)	The B&CSEPP would be considered at DA stage. The appropriate level of biodiversity assessment would be completed as part of the design stage and a consideration would include assessment of potential impacts to Koala and/or their habitat and feed trees. Any future DA may need to consider the provisions of the Gunnedah Koala Strategy.
State Environmental Planning Policy (Industry and Employment) 2021 (I&ESEPP)	Signage would be an important element of the development and I&ESEPP, Chapter 3 would be considered at DA stage when the signage details are known.

3.2.5. Is the PP consistent with applicable Ministerial Directions (section 9.1 Directions)?

Yes. The following Ministerial Directions (dated 03 June 2022) are applicable to the PP, as outlined in Table 3-7:

Table 3-7 Consideration of Ministerial Directions

Ministerial Directions	Comment
Direction 1.1 Implementation of Regional Plans	The PPs is consistent with the *New England North West Regional Plan 2036* (NSW Gov., 2017). Refer to part 3.2.1 of this PP for relevant considerations.
Direction 1.4 Site specific provisions	This PP seek to amend the Gunnedah LEP in order to allow a particular land use to be carried out on the land consistent with subsection (1) (c) of this direction, that is to 'allow that land use on the relevant land without imposing any development standards or requirements in addition to those already contained in the principal environmental planning instrument being amended.' A Concept Design was developed to demonstrate how the outcomes of the PP may be implemented by a subsequent development proposal. However, the concept design would not form part of the LEP amendment, consistent with the intent of this direction.
Direction 4.3 Flooding	The PP is not located within land mapped as flood planning land.
Direction 4.4 Remediation of Contaminated Land	The PP site has been historically used for Agricultural uses. The PP does not propose to enable development for residential, hospital, educational, recreational, or childcare purposes, however a PSI would be completed to inform a subsequent DA for the land.
6.2 Caravan Parks and Manufactured Home Estates	This PP includes the proposed use for the purpose of a caravan park. The land use is proposed to enable the provision of the land use in a suitable location. The concept layout shows how the additional land use of caravan park would provide a buffer between the proposed land use of highway service centre and the existing dwellings and land identified for potential residential estates under the *Draft Gunnedah Shire Local Housing Strategy*.
Direction 9.1 Rural Zones	The PP is consistent with the terms of this Direction. In respect of Part Lot 1 DP 841781, the PP would not rezone land from a rural zone to a residential, business, industrial, village or tourist zone. The PP is generally consistent with the Objective of this Direction as the proposal retains land within the flood plain protect the agricultural production value of rural land.
Direction 9.2 Rural Lands	The PP is consistent with the terms of this Direction because it: • Is consistent with regional and local strategic plans statement as discussed in sections 3.2.1 and 3.2.2.

Ministerial Directions	Comment
	• Is for land identified as Class 4, with moderate to severe agricultural limitations. • Has considered and future designs would protect environmental values, including biodiversity, cultural heritage. • Is for land considered suitable for the proposed additional land use because of the generally flat/gently sloping topography, large size, and location fronting two highways. • Does not further fragment rural land and is not likely to result in land use conflicts. • Considers the social, economic, and environmental interests of the community, refer to section 3.3 below.

3.3. Section C - environmental, social and economic impact

3.3.1. Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected because of the proposal?

The PP is unlikely to have adverse environmental effects. The PP relates to land zoned RU1 Primary Production, which is partly cleared of native vegetation through historic farming practices, however some native vegetation remains.

Gunnedah is known as the Koala Capital. The Koala SEPP 2021 would need to be considered with any future development application as well as Councils Koala Strategy (2015). A map showing potential habitat areas is shown in Figure 3. Where possible, avoidance of identified areas would be applied at the design stage, and/or the necessary biodiversity assessment would be completed.

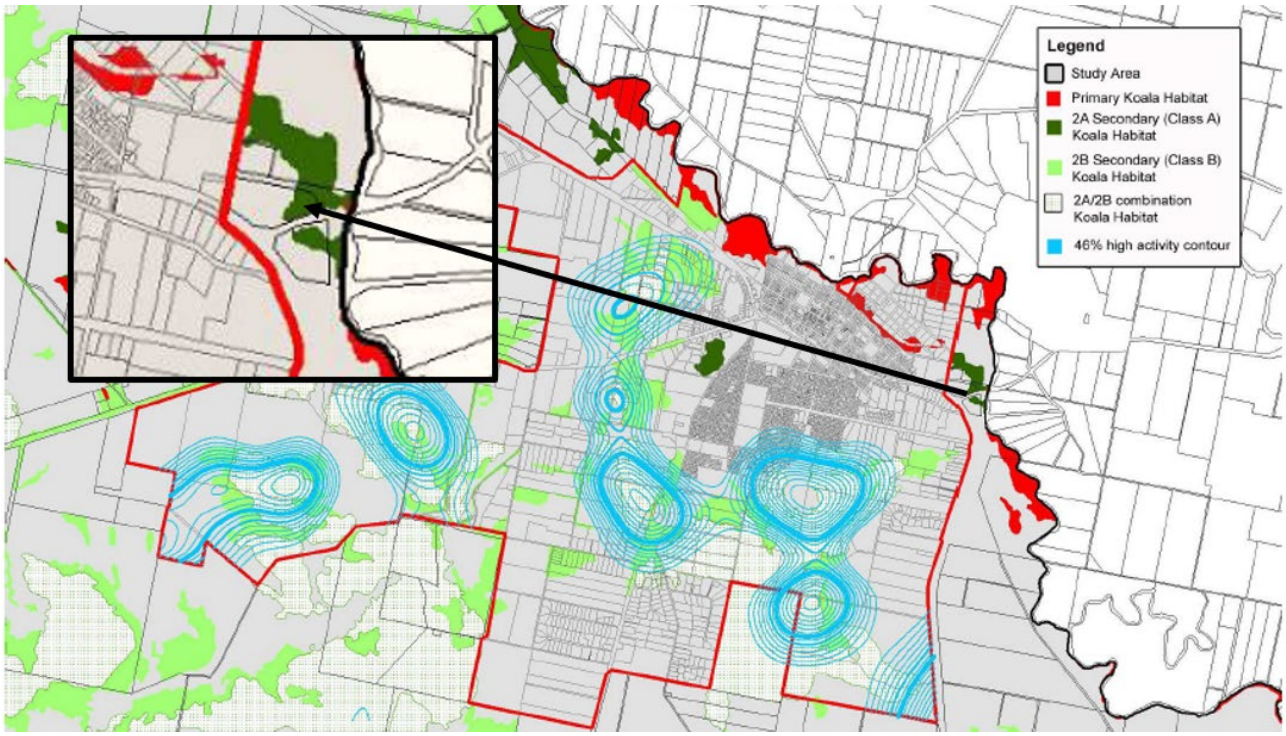

Figure 3 Map and extract showing area of secondary koala habitat within the proposal site (GSC, 2015).

The land is mapped on the NSW Governments SEED map (NSW Gov, 2021), as indicated in Figure 4, as non-native vegetation (PCT id:0) in the portion of the site to the north of the Oxley Highway and to the south with areas of non-native vegetation, candidate native grasslands (PCT id:1) and Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion (PCT id:27).

PCT 27 is classified on the NSW DPIE Environment website (NSW Gov, 2021) as:

- **Scientific name:** *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions*
- **Conservation status in NSW:** Endangered Ecological Community
- **Commonwealth status:** Endangered

Opportunities exist for avoidance of native vegetation as the first option in design of the future development (refer to the concept design in Appendix A). Where necessary, further study and/or mitigation implementation at DA stage are also possible to avoid adverse impacts because of the proposal.

The subject land is not identified on the Biodiversity Values Map, under the *Biodiversity Conservation Regulation 2017* (BC Regulation), as shown in Figure 5 on the following page. The areas of high biodiversity value are indicated by the purple layer, mapping the Mooki River to the east of the subject land.

A Bionet review and the Commonwealth Protected Matters Search tool results (dated 15/03/2021) has been considered, the key results are the potential for threatened vegetation communities to be

present on the site. This is considered a low risk due to opportunities existing for avoidance as the first option in design of the future development.

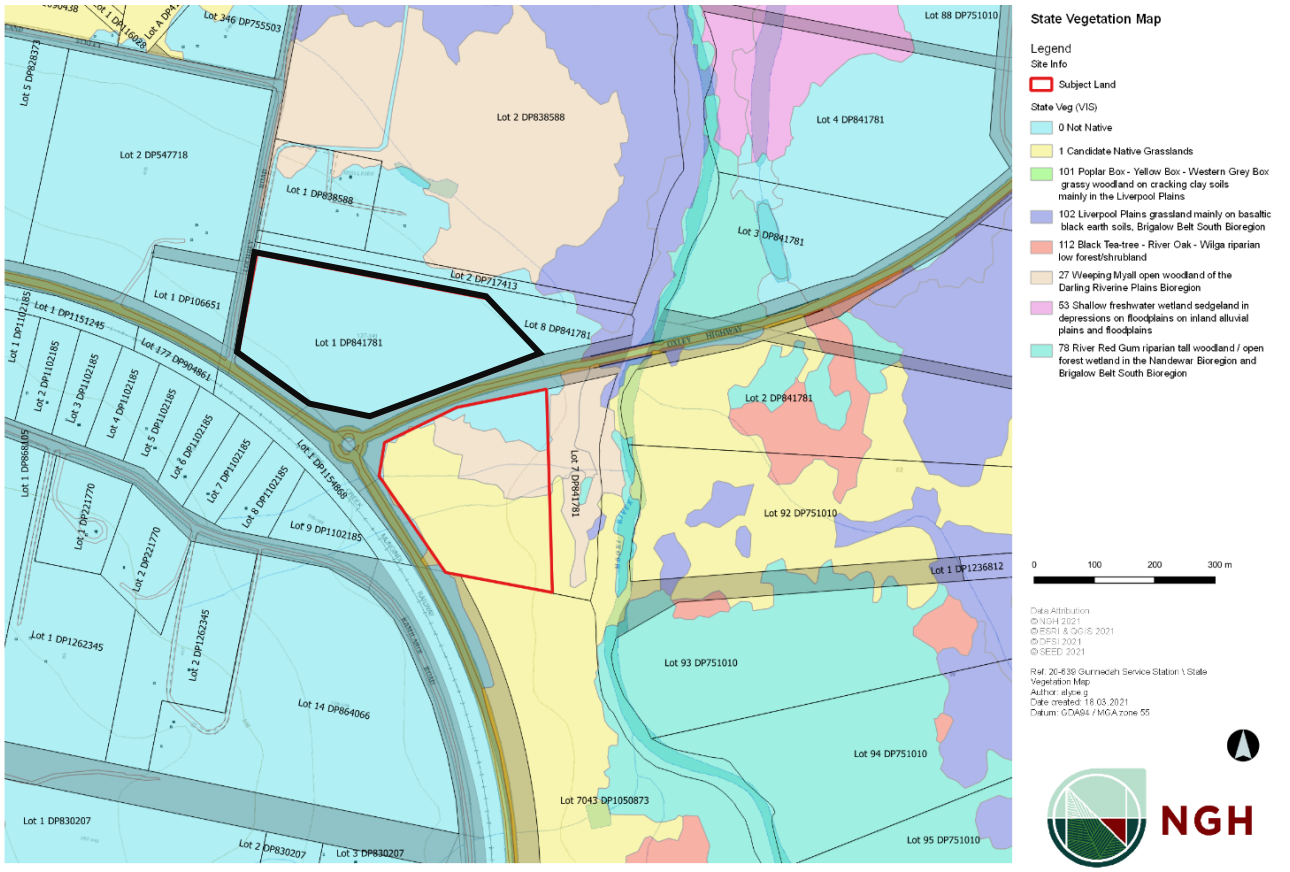

Figure 4 State Vegetation Type Map - Border Rivers Gwydir / Namoi (NSW Gov, SEED 2021)

Figure 5 Biodiversity Values Map (NSW Gov DPIE, 2021)

3.3.2. Are there any other likely environmental effects of the PP and how are they proposed to be managed?

There are no other likely environmental effects as a result of the PP. Noise and Traffic assessments have been completed for the concept plan provided at Appendix A. Refer to the supporting reports in Appendix C and Appendix D.

The traffic assessment showed:

- The site access can be designed safely and meet the requirements of the relevant agency.
- The road network would be capable of accommodating the proposal and expected traffic that would be generated.
- The site access would be separated from roads accessing near dwellings.

The noise assessment showed:

- Generally, if disturbance issues are controlled, there is limited potential for structural damage to buildings.
- The noise modelling for operation show compliance with noise management levels with the exception of cumulative operations at R1 which is predicted to exceed by 2 dB(A) and 3 dB(A) for evening and night respectively. This is modelled as a worst-case scenario, therefore, actual noise levels received can be expected to be significantly lower. Based on this assessment compliance can be expected for the development.

Other potential environmental effects associated with the future development application/s are briefly addressed in Appendix B (B1.2).

All potential environmental effects associated with any future construction and operation would be addressed at the DA stage. Designing for the avoidance and mitigation of potential impacts of construction and operation would form part of the DA process.

3.3.3. Has the PP adequately addressed any social and economic effects?

The PP seeks a LEP amendment to include a land use not suitable in existing areas within the CBD. There is sufficient traffic moving indicating that there would be no significant reduction of use at existing facilities/businesses of a similar nature that are located within the city centre of Gunnedah, minimising impacts on the viability of the CBD. The proposal may also have a beneficial result in keeping heavy vehicles from entering the centre of town improving road safety.

The PP has considered land availability, traffic access, potential environmental effects that can result in negative social and economic impacts. There is expected to be some change to the noise and odour environment from the potential additional land use, however, being located at the intersection of the Oxley and Kamilaroi highways, would already have noticeable noise and air quality impacts. The requirement for construction and operational noise management plans would be expected to be form part of any future DA consent conditions. Visual changes to the streetscape and rural area, light spill from the future development and waste management would also need to be considered in the design process for the DA, and managed and mitigated as necessary.

The proposal would require upgrades to Council and other utility services to connect to the site. The PP would support the continued growth of the freight and tourism in the Gunnedah Shire. This

PP would also create opportunities for potential positive social and economic benefits that could be anticipated for the local community and economy, in the form of job creation and employment benefits.

It is considered that the PPs social, economic, and environmental impacts can be managed through the DA process.

3.4. Section D - infrastructure (Local, State and Commonwealth)

3.4.1. Is there adequate public infrastructure for the PP?

Road network

The land has direct access to a classified road and a local road.

The development would be a traffic generating development and referral to Transport for NSW would be required with any development. Initial consultation on the concept proposal has been completed as part of the preparation of the TIA.

Services

The proposal would require upgrades to Council and other utility services to connect to the site for the proposed additional land use (highway service centre), as determined through a dial before you dig search and consideration of Councils servicing plans.

The subject land is covered by the *Gunnedah Shire Council – Development Servicing Plan for Water Supply* (GSC, 2016)' but is not covered by the *Gunnedah Shire Council – Development Servicing Plan for Sewage* (GSC, 2014). The sewage coverage limits are just to the west of the subject land on the western side of Lochrey Road. The drainage coverage limits are located further west.

3.4.2. What are the views of state and federal public authorities and government agencies consulted in order to inform the Gateway determination?

Transport for NSW were consulted as part of the TIA, specifically regarding the potential site access and egress. In principle support was provided for the option provided in the concept design.

It is understood that further consultation with relevant State and/or Commonwealth public authorities would be carried out by Council post-gateway determination, where included as a condition.

A subsequent DA is also likely to prompt further consultation with Transport for NSW, due to potential traffic generation and direct highway access.

4. Part 4 Mapping

The PP would result in an amendment to the Additional Permitted Uses Map (Sheet APU_005AA), in Gunnedah LEP.

The proposed amendment is shown in Appendix E.

5. Part 5 Community Consultation

Community consultation would be undertaken by Council in accordance with the conditions of the Gateway Determination.

6. Part 6 Project Timeline

The project timeline would be prepared by Council in accordance with the required timeframe set as a condition of a gateway determination.

Appendix A CONCEPT DESIGN

The following plan shows the potential highway service entre and caravan park design, that would be finalised via a DA process if this PP was successful.

PRELIMINARY COPY ONLY

NOT TO BE USED FOR CONSTRUCTION PURPOSES

NORTH

THIS DRAWING MAY NOT BE TO SCALE
REFER TO GRAPHIC SCALE BELOW

1 : 200 — 0 2 4 6 8 10m
1 : 100 — 0 1 2 3 4 5m
1 : 50 — 0 1 2 2.5m
1 : 20 — 0 0.5 1m

NOTES

DO NOT SCALE FROM THIS DRAWING - USE FIGURED DIMENSIONS ONLY

ALL DIMENSIONS AND LEVELS ARE TO BE VERIFIED ON SITE AND THE ARCHITECT NOTIFIED OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION

DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER CONTRACT DOCUMENTS

ELECTRONIC DATA IS ISSUED AS A PROFESSIONAL COURTESY ONLY AND IS FOR COMMUNICATION AT THE DATE OF TRANSMISSION ONLY. IT IS THE RESPONSIBILITY OF THE RECIPIENT TO ASCERTAIN THE ACCURACY AND STATUS OF THE INFORMATION CONTAINED AND TO USE THE INFORMATION APPROPRIATELY

REV	DATE	AMENDMENT
A	05.04.17	ISSUED FOR INFORMATION
B	04.05.21	ISSUED FOR INFORMATION
C	27.05.21	ISSUED FOR INFORMATION
D	05.07.21	ISSUED FOR INFORMATION
E	11.03.22	ISSUED FOR INFORMATION

PROPOSED SERVICE CENTRE & FAST FOOD OUTLETS FOR ZANNES DEVELOPMENTS LOT 1, DP 841781 CORNER OF OXLEY & KAMILAROI HIGHWAYS, GUNNEDAH

P.O. BOX 801, TAMWORTH N.S.W. 2340
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Member Australian Institute of Architects
NSW ARCHITECTS REGISTRATION BOARD No. GREG HILL 5660
GREGORY HILL ARCHITECTS PTY. LTD. A.C.N. 060 766 403 TRADING AS

HILLLOCKARTARCHITECTS

TITLE
FEASIBILITY PLAN

DESIGN	DOCUMENTATION
GREG HILL	NP
PLOT DATE	SCALE
11/03/2022	1:1000

SIZE	DRAWING No.	Rev.
A1	Z0917 FD101	E

Appendix B PROPOSAL SITE ANALYSIS

B.1 Site Analysis

The context of the PP has been undertaken by reviewing the concept design for the subject land for the additional land use against relevant maps, legislation, and other Council provisions. Key maps and the summary of the LEP analysis is provided below.

B1.1 Important Maps – site context, services and other environmental matters

Part Lot 1 DP 841781 and the area to which the PP applies (black outline) is indicated in Figure 6 below.

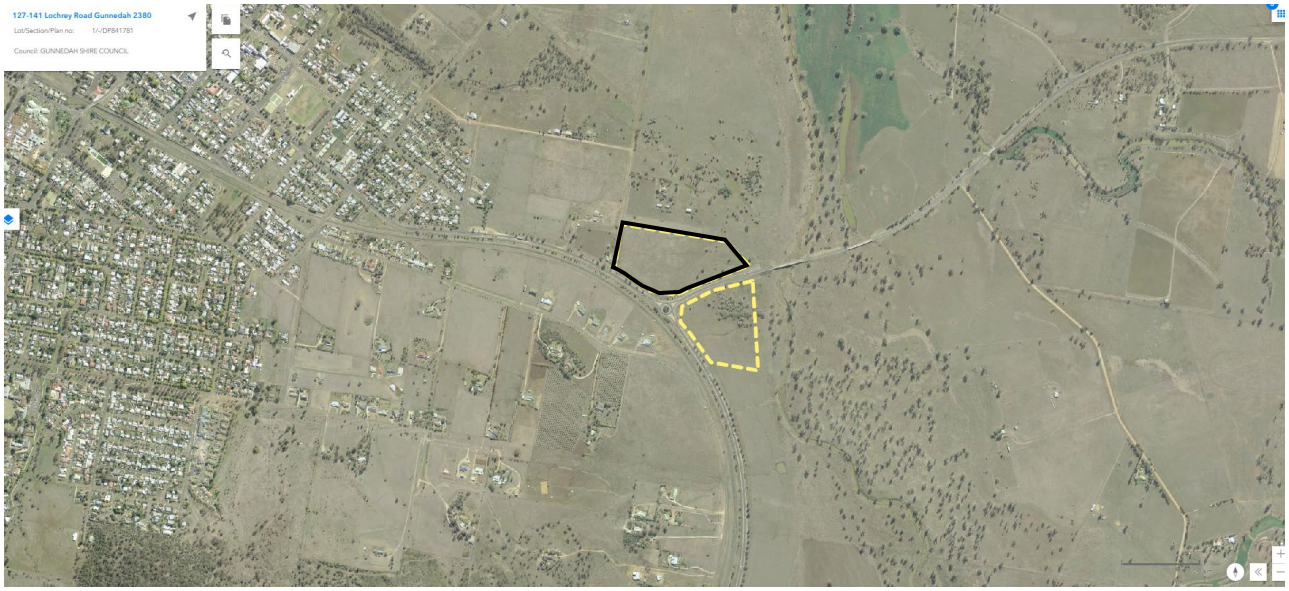


Figure 6 Aerial image of the land subject to the PP (Source: NSW Gov. DPIE, 2021)

Figure 7 LEP Flood Planning and Bushfire Prone Land mapping (Source: NSW Gov. DPIE, 2021)

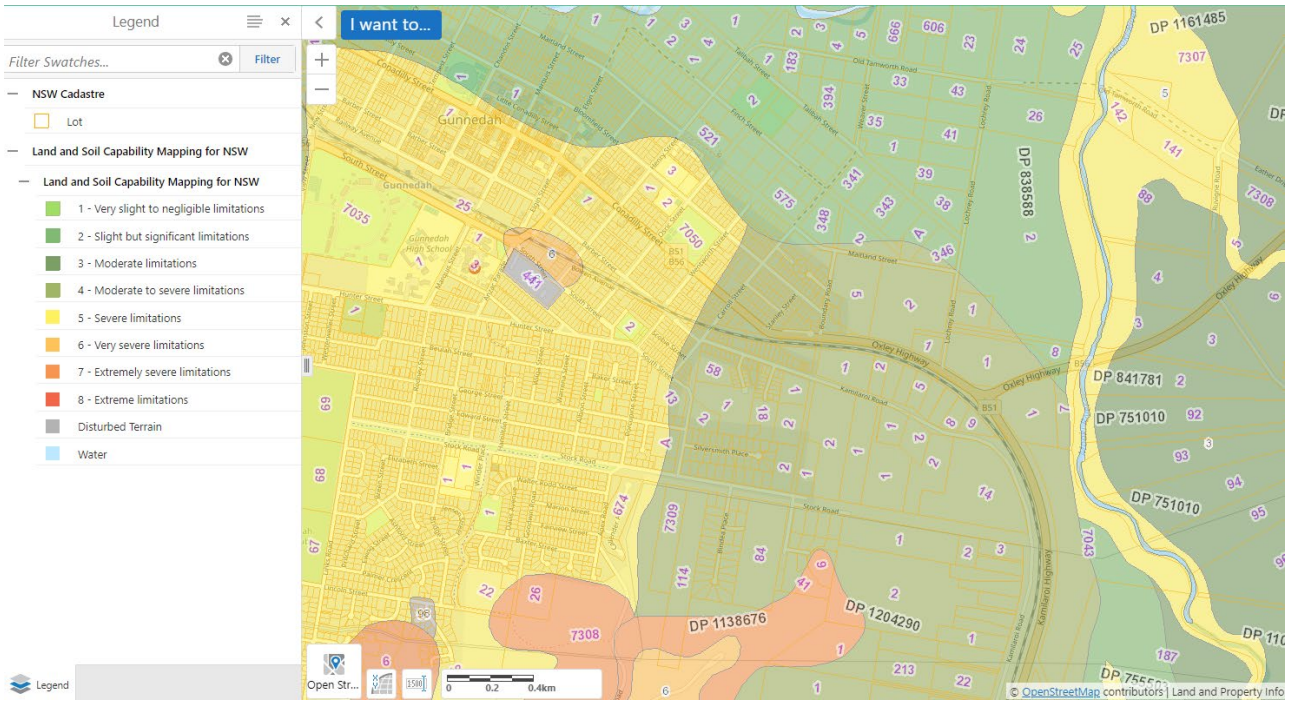


Figure 8 NSW Land and soil capability map – Class 4 Moderate to severe limitations (Source: SEED, 2021)

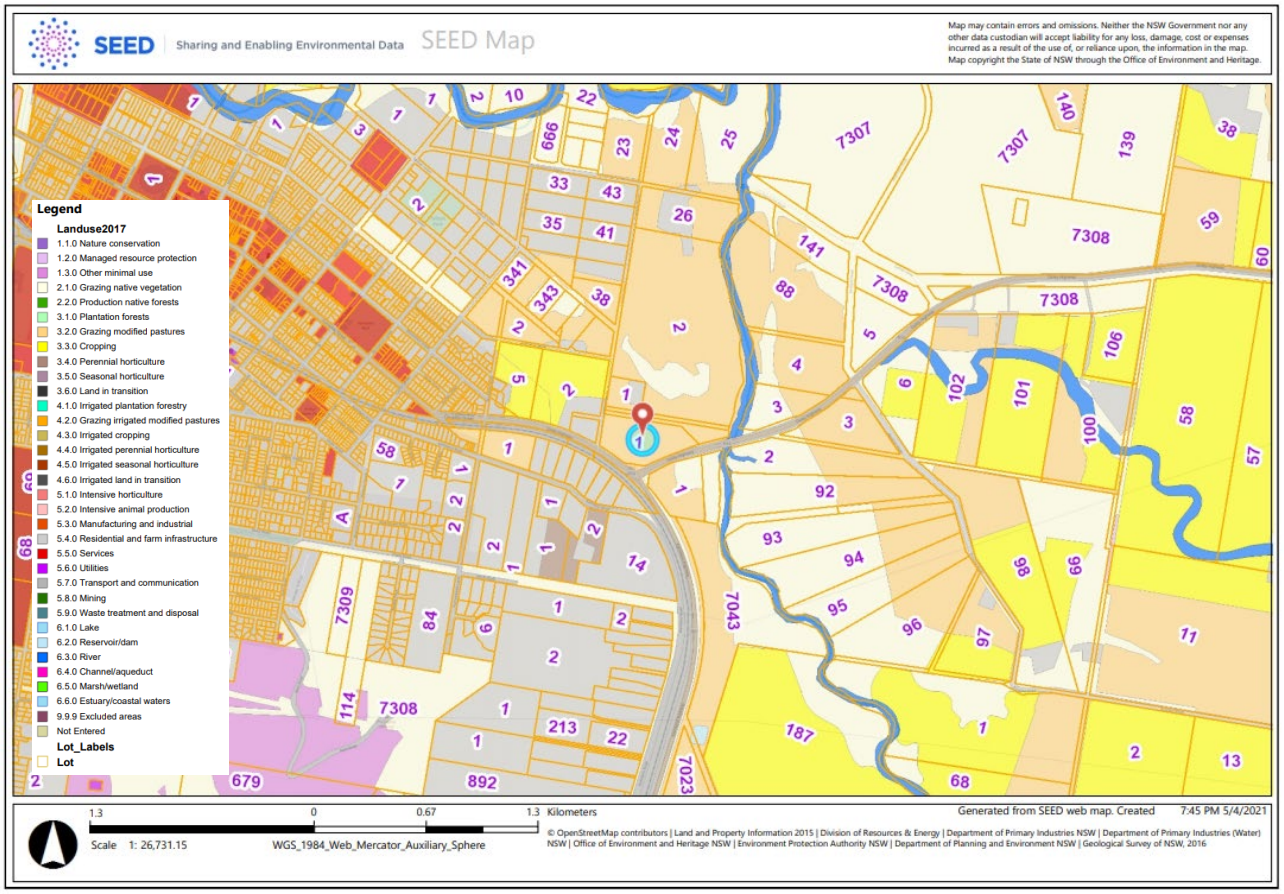


Figure 9 NSW Land use 2017 (Source: SEED, 2021)

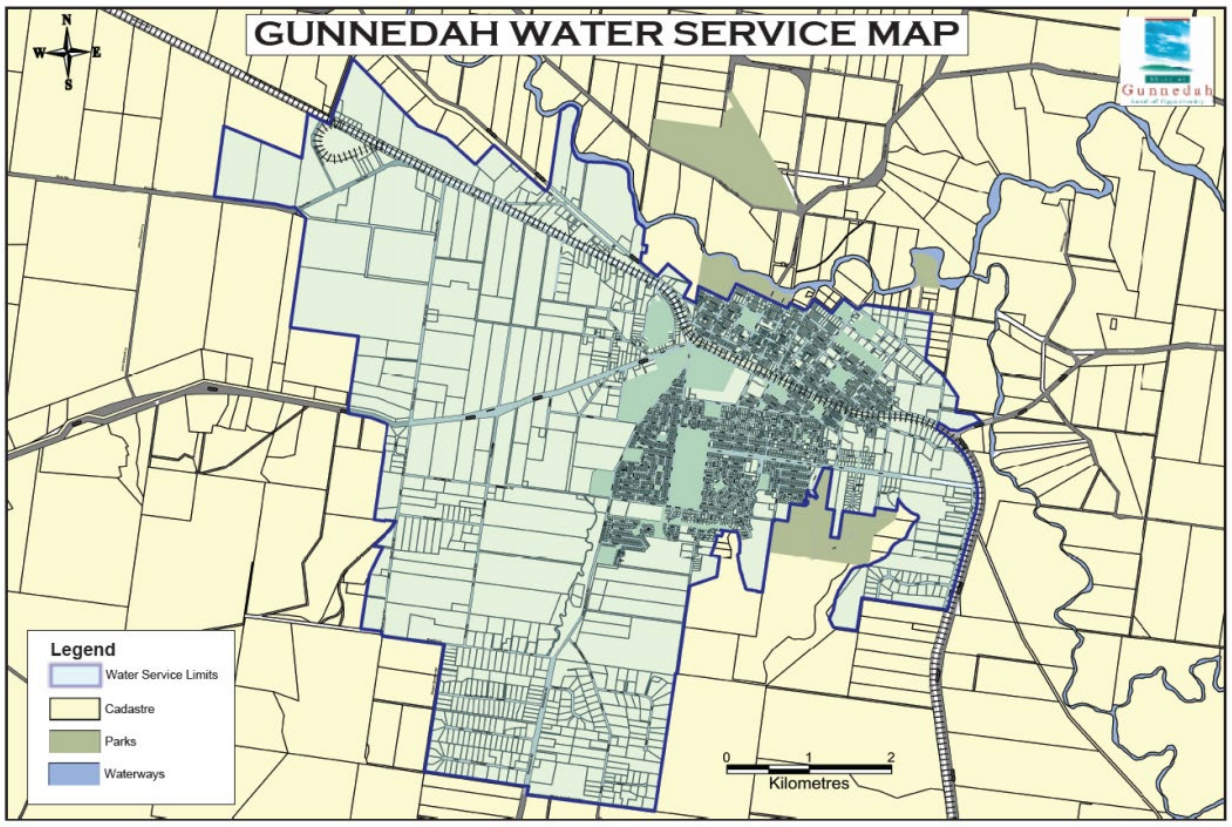


Figure 10 Gunnedah Shire Council – Development Servicing Plan for Water Supply (GSC, 2016)

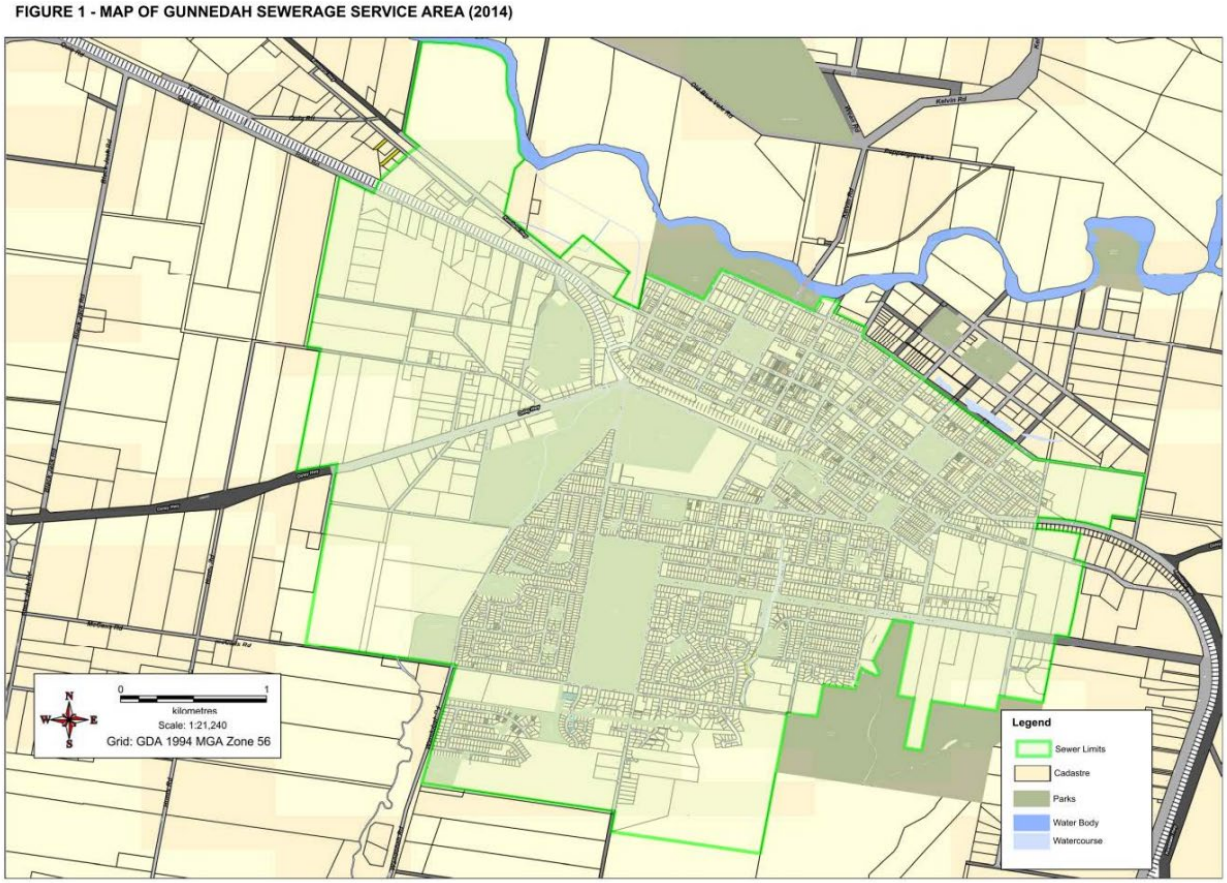


Figure 11 Gunnedah Shire Council – Development Servicing Plan for Sewage (GSC, 2014)

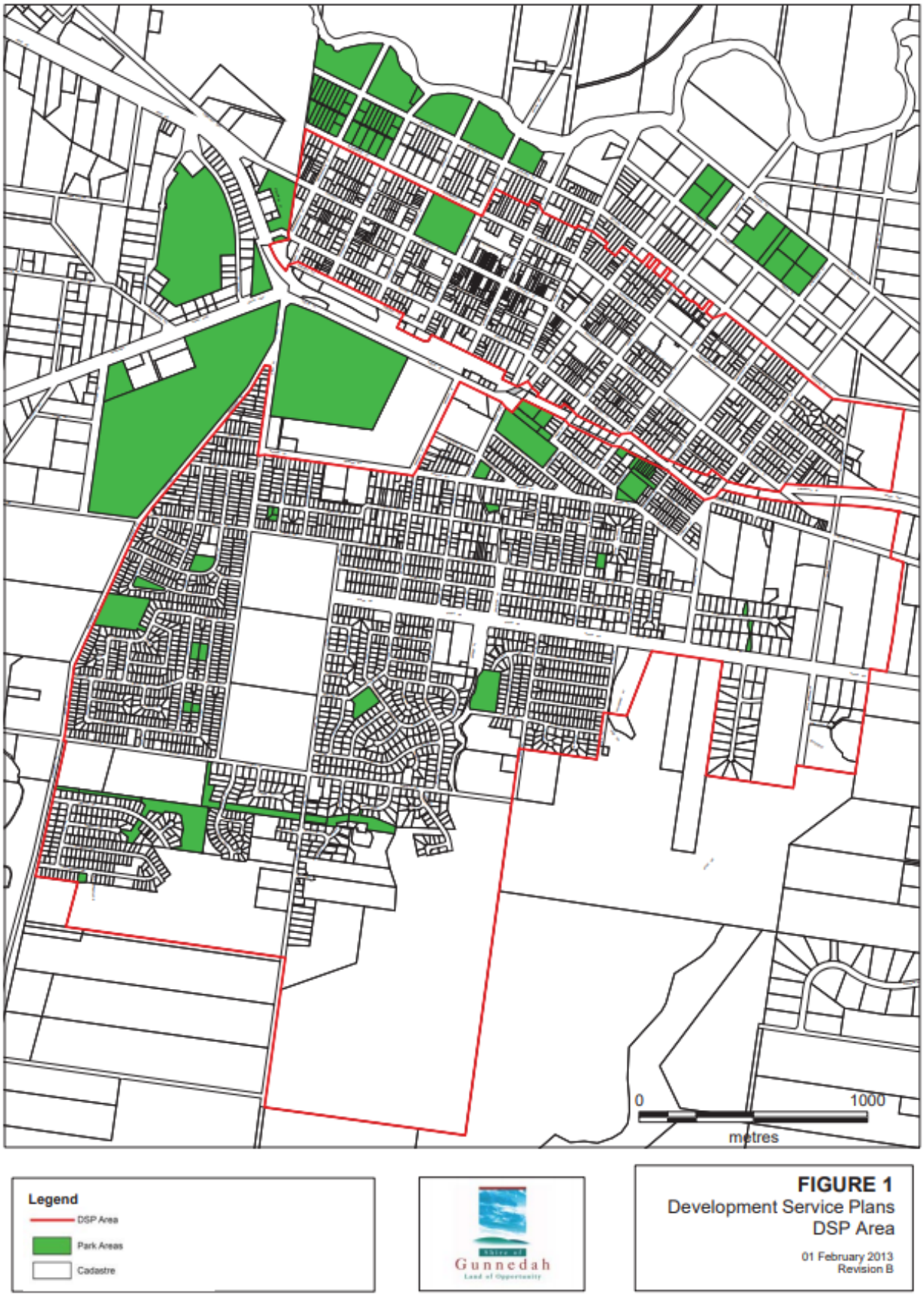


Figure 12 Developer Services Plan Stormwater – Service Area (GHD, 2013)

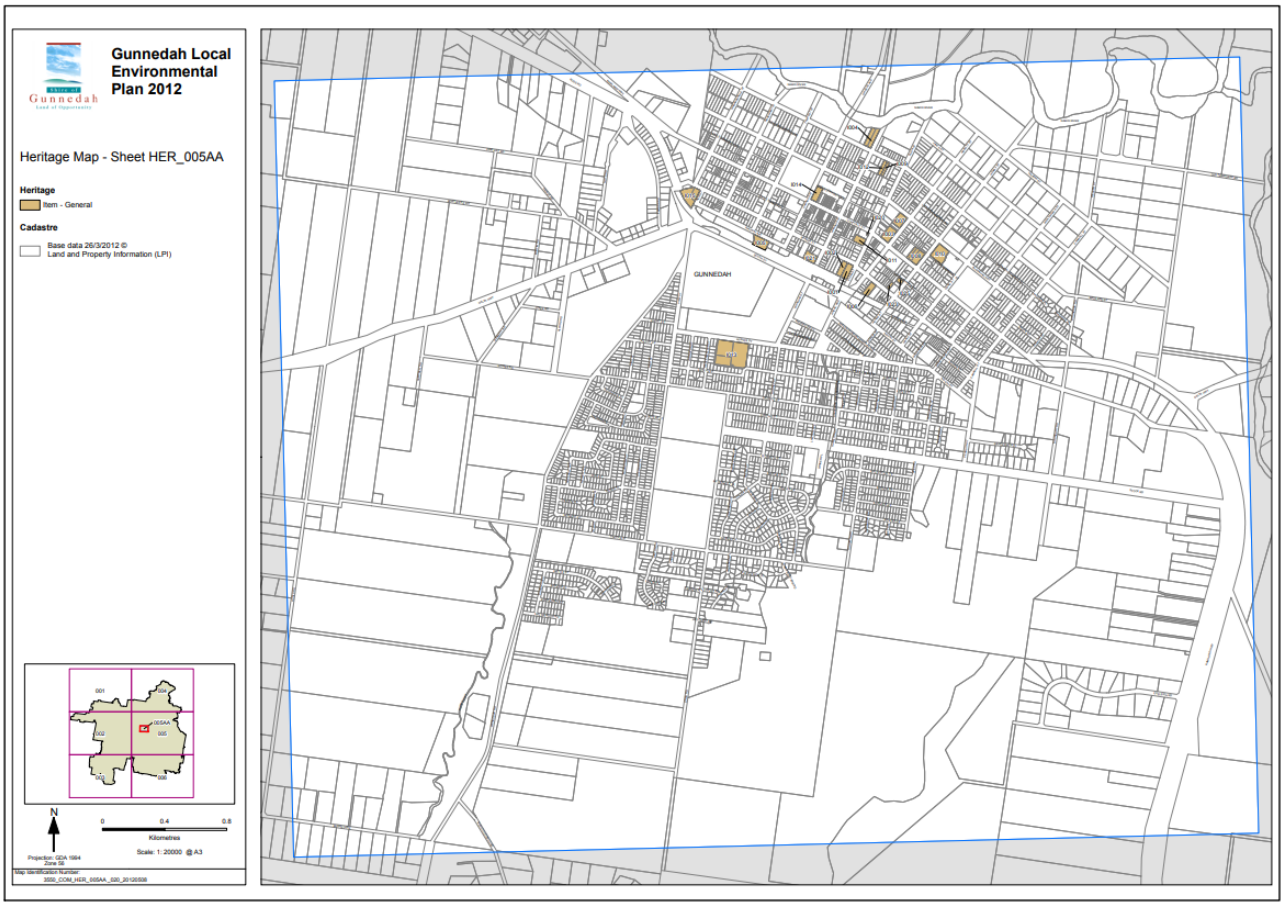


Figure 13 LEP Local heritage items map

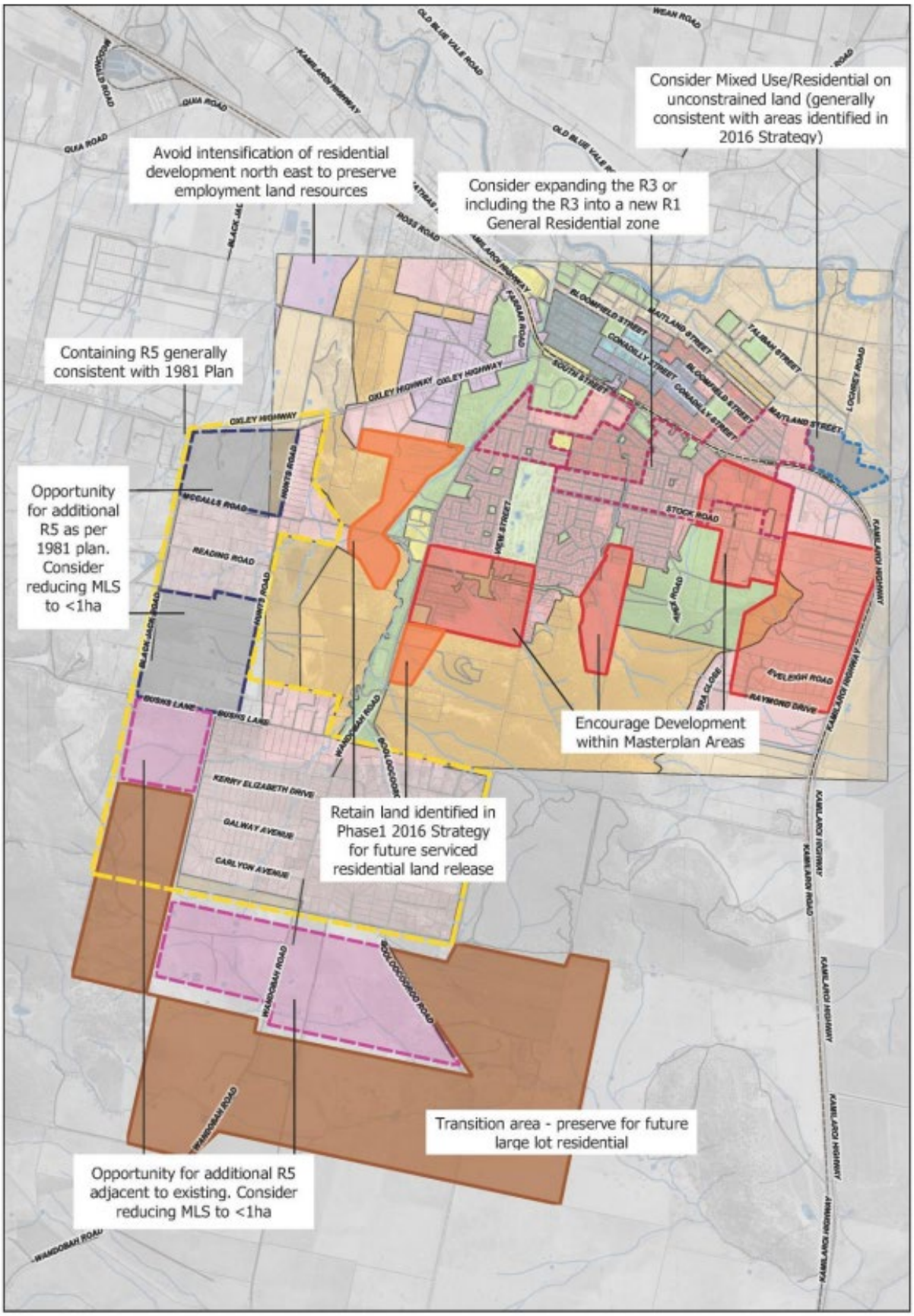


Figure 14 Draft Gunnedah Shire Local Housing Strategy - Summary of precincts and opportunities map (Source: Elton Consulting, 2021)

B1.2 Consideration of potential environmental effects, avoidance and mitigation.

Traffic

The future development of the site would generate additional traffic in the area and would require direct access to the Oxley Highway, a classified road managed by Transport for NSW. A TIA (Amber, 2022) was completed for the proposal to consider options for site access and potential traffic implications. The TIA showed safe access, consistent with transport for NSW and Council needs can be achieved.

The TIA considered the existing road network operation and traffic volumes and the site, based on the concept design, could generate a total of 261 (combined inbound and outbound) vehicle movements during the morning and evening peak periods. The analysis of the traffic volumes showed the development of the site as a service centre is expected to be able to be established with a minimal impact to the operation of the surrounding road network which is expected to be able to continue to operate with a good level of service.

A total of 105 parking spaces have been included in the sites concept design. The TIA's analysis shows this would be a suitable level of car parking to accommodate the parking demand generated by the proposed uses.

Further analysis of the final site design and development of appropriate management measures, such as implementing a traffic management plan, would be required at DA stage.

Noise

The future development of the site would result in a change to the existing noise environment. An acoustic assessment (RAPT, 2022) considered the potential for construction and operational noise and vibration impacts.

The report concluded that construction noise management levels would be complied with in most situations. The potential for exceedances for some receivers assessed in certain situations was identified. However, the highly noise affected level of 75dB(A) LAeq(15min) is expected to be complied with.

For operation the report, noise modelling identified the proposal would be able to be designed to comply with established project noise trigger levels. As such the proposal would be unlikely to result in excessive noise from operations including from cumulative effects.

Mitigation measures to limit and minimise construction noise and vibration and operational noise have been identified for consideration as part of any future DA's, such as the implementation of a noise management plans.

Flood Planning

The land is not flood prone land but does border the LEP flood planning mapped area. Due to the nature of construction of Highway Service Centres and caravan parks the PP would have no likely environmental effects on flooding in the locality.

Bushfire Prone Land

The subject land is not mapped as bushfire prone land. Bushfire prone land is located approximately 700 m to the southwest of the land.

Aboriginal Heritage

Matters concerning Aboriginal cultural heritage have been considered. A basic AHIMS search was conducted on 11 July 2022. No sites are recorded, and no Aboriginal Places or sites have been recorded within a 200m buffer of the subject land; however, 2 Aboriginal sites are recorded within 1000 m of the subject land. As the works would disturb the land, the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010) would apply. Further study, including visual inspection of the site may be required with any future development application.

Opportunities exist for avoidance as the first option in design of the future development. Where necessary further specialist study, engagement with Registered Aboriginal Parties (RAPs) and/or mitigation implementation at DA stage are also possible to avoid, minimise or manage any potential adverse impacts.

Post-European heritage

There are no heritage items near or within the subject land, as shown in Figure 13.

Airspace operations

Gunnedah airport is over 3km from the subject land. The intended highway service centre would not introduce obstacles or reflective hazards and would have no likely environmental effects on the airport, other than the positive effect of supporting transport and tourism through the region.

Land use conflicts (Air quality and odour)

Opportunities exist for avoidance of impacts as the first option in design of the future development. Separation from existing residential areas is provided by roads. The PP does not alter this potential buffer. Where necessary further specialist study and/or mitigation implementation at DA stage are also possible to avoid or manage (mitigate) any air quality or odour impacts from the Highway Service Centre.

Soils and water

There are no likely adverse environmental effects to soils or water as a result of the PP. Soil and water management would be addressed at DA stage. This may include the development of a soil and water management plan for construction. Designing for the mitigation of potential impacts of construction and operation would form part of the DA process.

Site servicing

There are no likely adverse environmental effects from site servicing and infrastructure as a result of the PP. Connections to services for the future development would be a consideration during the design stage. The site is currently within the service area for water but is located just outside of

Council's DSP area for sewage and stormwater. Electricity and phone services would be connected as necessary in consultation with relevant providers. It is proposed that all details of all proposed servicing infrastructure would be addressed with the Development Application. Also refer to discussion in section 3.4.1.

B1.3 Gunnedah LEP analysis – suitability of the proposed LEP amendment

NGH has conducted initial consultation with Council regarding the proposed Gunnedah LEP amendment. Council directed that the separation of the highway service centre elements from the land to the west and north would be important consideration, it was acknowledged that this can be achieved with siting, specifically noting the potential design solutions using the caravan park as a buffer to the west. Council identified the need to resolve access to the site with a Traffic Impact Assessment (including consultation with Council and relevant agencies). Council identified the need to address the potential for noise impacts requiring specialist acoustic assessment.

This PP seeks to amend the provisions of the Gunnedah LEP at 127-141 Lochrey Road to enable development that is currently not permissible under the current RU1 land zoning. The proposal seeks to include an additional land use. This would be in acknowledgement of the location of the subject site and compatibility with the surrounding developments including specifically the residential (rural and large lot) uses separated by roads from the site, as shown in Figure 15 below.

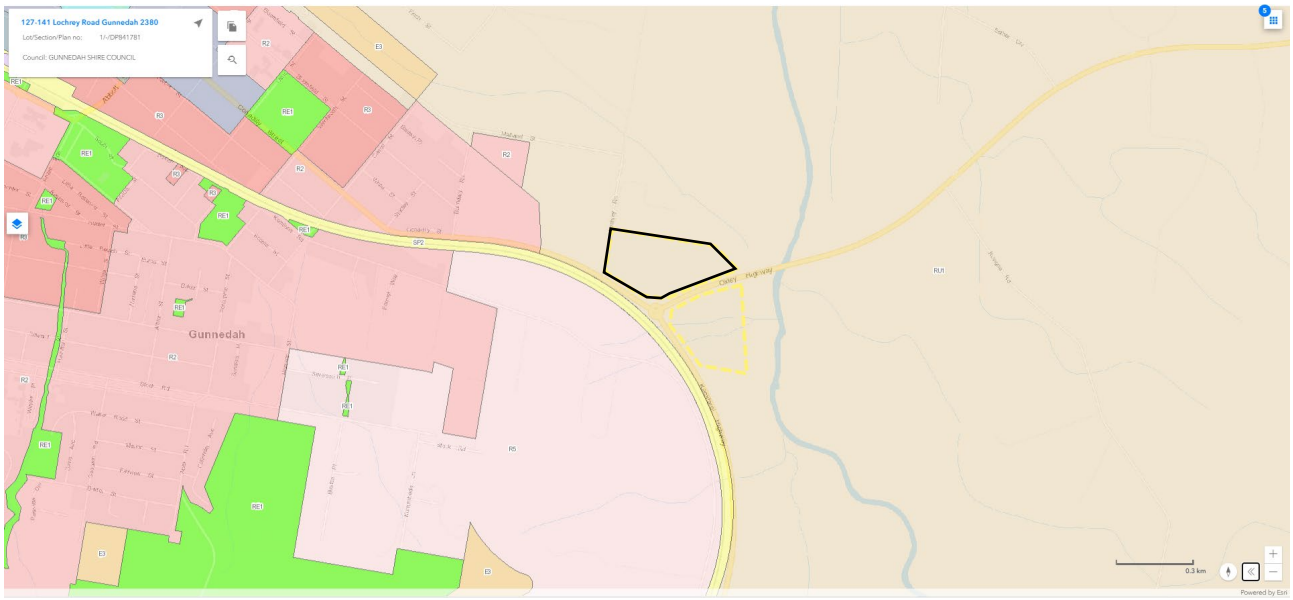


Figure 15 Existing zoning of the subject and surrounding land (Source: NSW Gov, DPIE 2021)

The proposed LEP amendment would support the development proposal for the highway service centre on the portion of the site located to the west of the Oxley Highway. The proposed service centre would provide services for the transient population, supporting the directions of the regional and local strategic plans.

The PP has considered the impacts to the rural land within the subject site and environmental values of the subject land as well as surrounding land. It is considered that the proposed amendments would not be inconsistent with the objectives of the RU1 Primary Production zone under the Gunnedah LEP:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*

- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To provide for a range of ecologically sustainable agricultural and rural land uses and development on broad acre rural lands.*
- *To protect significant agricultural resources (soil, water and vegetation) in recognition of their value to Gunnedah's longer term economic sustainability.*
- *To conserve and enhance the quality of valuable environmental assets, including waterways, riparian land, wetlands and other surface and groundwater resources, remnant native vegetation and fauna movement corridors as part of all new development and land use.*

The PP would not be inconsistent with the aims of the Gunnedah LEP:

- *To protect and promote the use and development of land for arts and cultural activity, including music and other performance arts.*
- *To conserve and enhance, for current and future generations, the ecological integrity, environmental heritage and environmental significance of Gunnedah.*
- *To promote the economic well being of the community in a socially and environmentally responsible way, focusing on new employment growth and a diversified economy.*
- *To encourage the proper management of productive agricultural land and prevent the fragmentation of agricultural holdings.*
- *To provide opportunities for a range of new housing and housing choice.*
- *To facilitate the provision and co-ordination of community services and facilities.*
- *To seek the provision of adequate and appropriate infrastructure to meet the needs of future development.*
- *To provide direction and guidance in the management of growth and development.*
- *To conserve the cultural and environmental heritage of Gunnedah.*
- *To allow development in a way that minimises risks due to environmental hazards.*

Although the PP would result in a spot change, permitting additional uses that would otherwise be prohibited in the RU1 zone, the PP is considered reasonable and should be supported because, the proposal would:

- Allow for design options that would avoid or minimise impact on the amenity of neighbouring properties.
- Allow for design options that would avoid or minimise environmental impacts (specifically for biodiversity, Aboriginal heritage, and flood hazards).
- Provide employment opportunities close to residential areas.
- Work towards growth and support of freight networks and opportunities.

Appendix C TRAFFIC IMPACT ASSESSMENT

Amber

Traffic & Transportation Direction

Gunnedah Highway Service Centre

127-141 Lochrey Road, Gunnedah

Traffic and Transport Assessment

June 2022

Reference: 193 rep 220628 final

Gunnedah Highway Service Centre

127-141 Lochrey Road, Gunnedah

Traffic and Transport Assessment

Prepared for: Charlie One Pty Ltd

Status: Final report

Date: 28 June 2022

Reference: 193 rep 220628 final

Contact

Website: www.amberorg.com.au E: info@amberorg.com.au Phone: 1800 022 363

Table of Contents

1. Introduction

Amber Organisation has been engaged by Charlie One Pty Ltd to provide a Traffic and Transport Assessment associated with a proposal to amend the Gunnedah Local Environmental Plan 2012 (LEP) with respect to land at 127-141 Lochrey Road, Gunnedah.

The site is proposed to be developed with the intention of constructing a mixed-used development including a service centre with fast food outlets and a campervan park. A Feasibility Plan has been developed for the site which provides a draft internal layout with two vehicle accesses to the site proposed from the eastern and western frontages with Oxley Highway. It is understood the Feasibility Plan is a conceptual model for delivery of the overarching development of the land and is not intended to represent the final development arrangement.

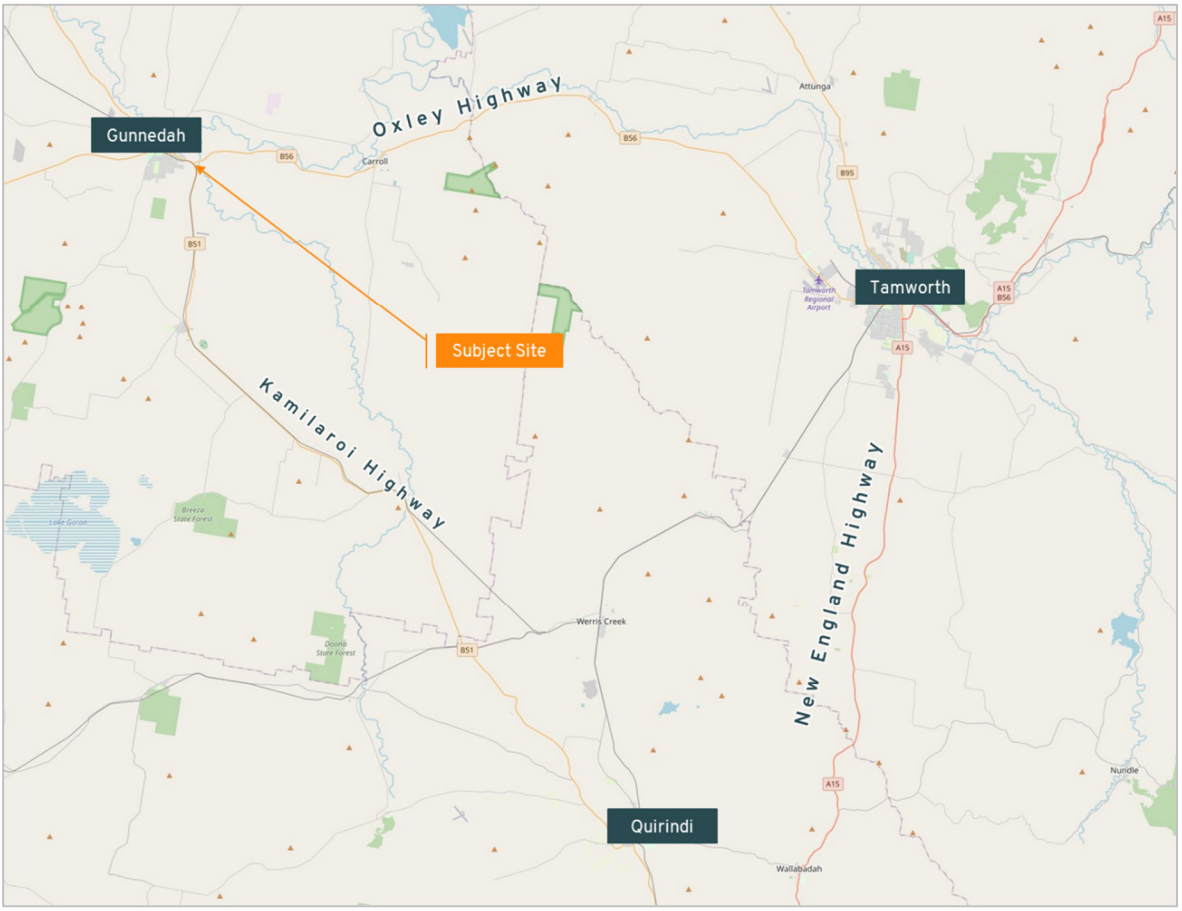
The subject site is currently zoned RU1 – Primary Production which prohibits the use of the land as a highway service centre and caravan park. The Planning Proposal seeks to amend the LEP by providing an amendment to *Schedule 1 Additional Permitted Uses* to add highway service centre as an additional permitted use with consent for Lot 1 DP841781.

This report has been prepared to provide a preliminary Traffic and Transport Assessment of the proposal sufficient to support the Planning Proposal and provide Council, regulatory agencies and the Department of Planning, Industry and Environment the confidence that the proposal can be delivered with acceptable impacts to the local traffic environment.

2. Transport Environment

The site is located at 127-141 Lochrey Road, Gunnedah (Lot 1 DP841781), and is situated on the northern and eastern side of the intersection of Kamilaroi Highway and Oxley Highway. The location of the site in relation to the surrounding road network is shown within Figure 1.

Figure 1: Surrounding Road Network



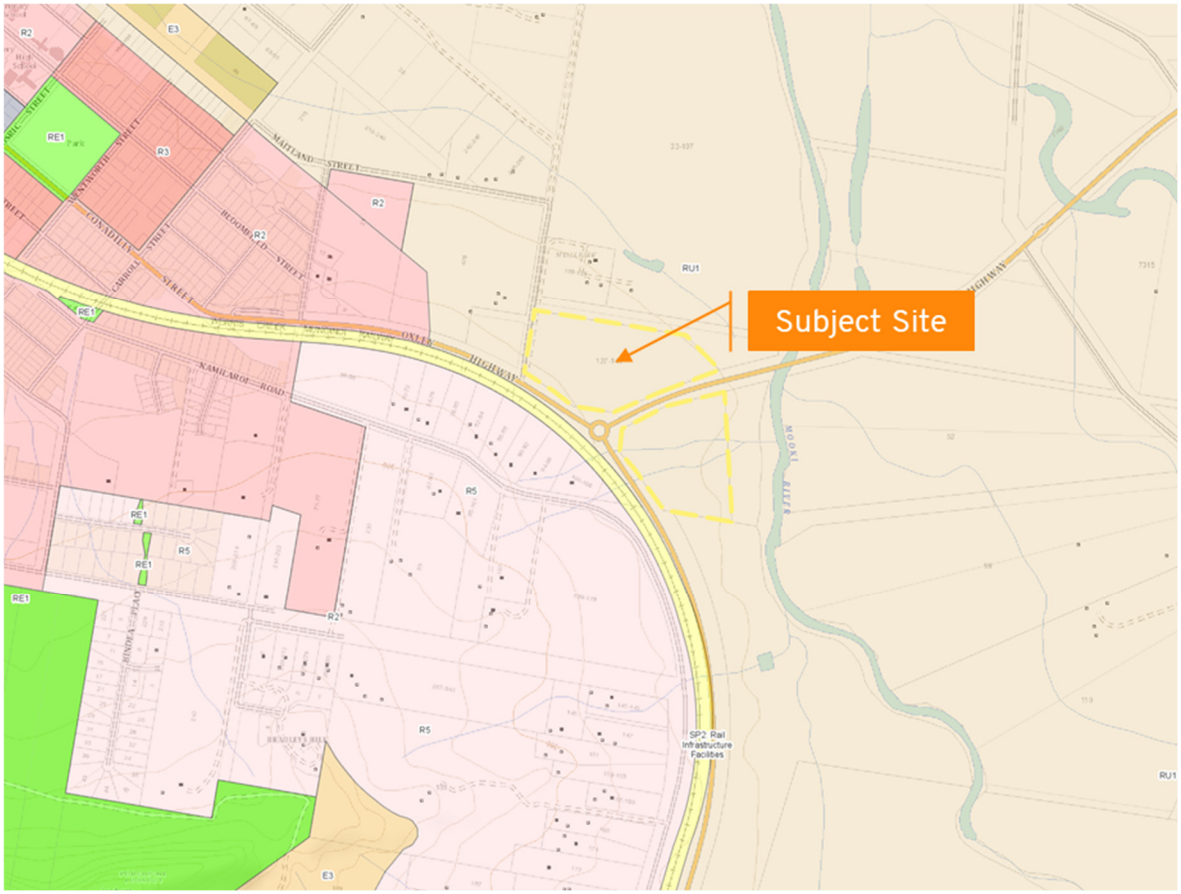
Source: Open Street Map

The site is located on the south-eastern outskirts of Gunnedah and is well placed to attract drivers travelling between Gunnedah and Tamworth to the east via Oxley Highway and vehicles travelling between Gunnedah and New England Highway to the south via Kamilaroi Highway.

The site and the surrounding land to the northeast of Kamilaroi Highway is zoned RU1 – Primary Production and is primarily occupied by agricultural land. Land to the southwest of Kamilaroi Highway is zoned R5 - Large Lot Residential and is occupied by a number of larger residential lots and agricultural land use. West of the site is zoned R2 - Low Density Residential and is occupied by residential dwellings. Further west is the Gunnedah City Centre which provides a range of land uses.

Figure 2 shows the surrounding land use zoning within the vicinity of the site.

Figure 2: Land Zoning Map



Source: NSW Government ePlanning Spatial Viewer

Key activities provided within the surrounding area include:

- Kitchener Park Oval located 1.5km west of the site;
- Gunnedah Jockey Club located 3.0km north of the site;
- Gunnedah High School located 2.5km west of the site;
- Porcupine Lookout located 1.8km south of the site; and
- Gunnedah Rural Museum located 4.0km west of the site.

The site is situated on the eastern side of Kamilaroi Highway on both sides of Oxley Highway, with the land to be utilised for the purposes of a service centre only including the land to the northwest of Oxley Highway. The site also has frontage to Lochrey Road at the western boundary and Crown Land is provided along the northern boundary. The site has a total area of approximately 8,6000sqm (part of 127-141 Lochrey Road west of the Oxley Highway) and no dedicated vehicle access is currently provided from the road network.

The site and the surrounding area are illustrated within Figure 3.

Figure 3: Site and Surrounds

Source: SIX Maps

2.1 Road Network

Oxley Highway is a State Road which runs in a general east-west alignment. It links Port Macquarie and Pacific Highway to New England Highway near Bendemeer. Oxley Highway continues west of Tamworth, through Gunnedah and extends to link with Newell Highway near Coonabarabran. It terminates at its connection with Mitchell Highway at Nevertire. Between Tamworth and Gunnedah it has a typical carriageway width of 9.0 metres accommodating one lane of traffic in each direction. It has a speed limit of 100km/hr which is reduced to 60km/hr adjacent to the site.

Kamilaroi Highway is classified as a State Road and is under the care and management of Transport for NSW (TfNSW). It runs in a general northwest-southeast alignment extending between Newell Highway in Narrabi and New England Highway near Willow Tree. It has a typical carriageway width of 9.0 metres accommodating one lane of traffic in each direction. It has a speed limit of 60km/hr within Gunnedah which increases to 100km/hr southeast of Oxley Highway.

Lochrey Road is a municipal local road under the care and management of Council. It is currently an unsealed road in poor condition with a carriageway width of approximately 3.0 metres that extends between Oxley Highway and Old Tamworth Road. It primarily services a single dwelling located on the north-western corner of its intersection with Oxley Highway.

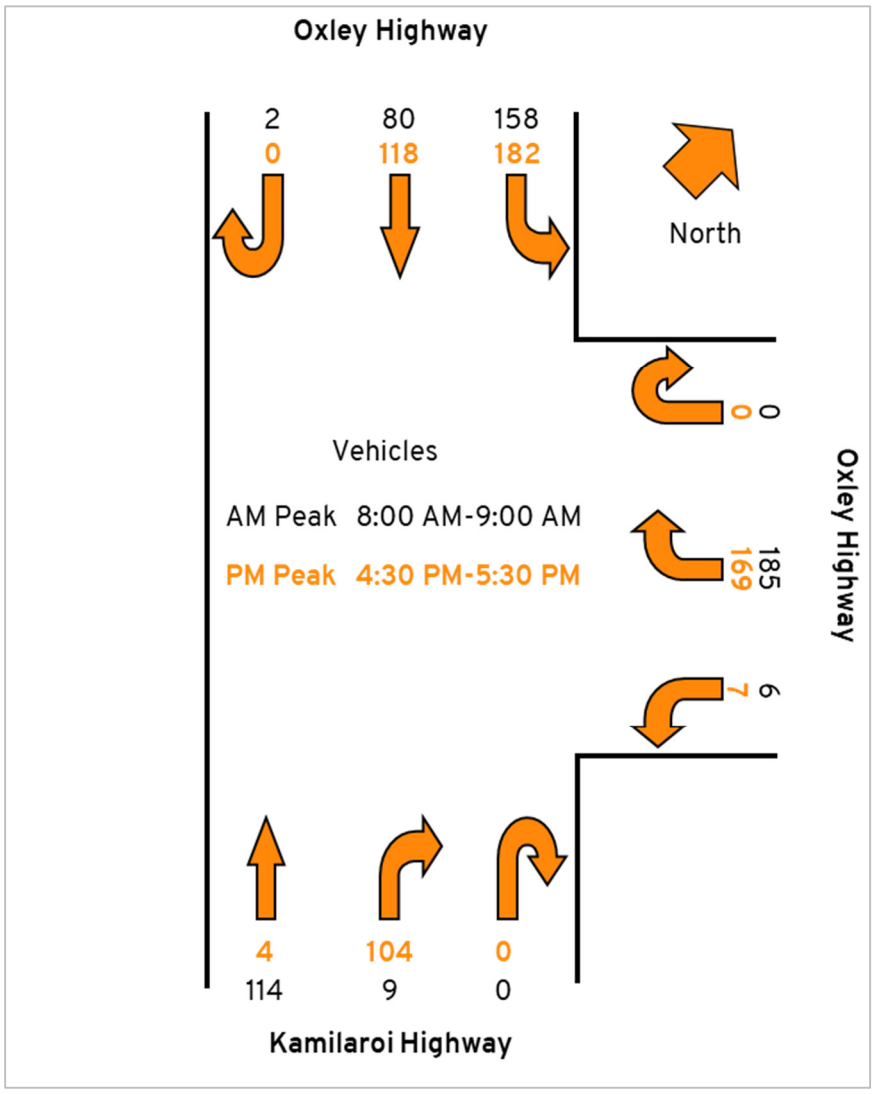
The intersection of Kamilaroi Highway and Oxley Highway is controlled by a single lane roundabout. The intersection of Oxley Highway and Lochrey Road is priority controlled and has been designed with a sealed surface with Lochrey Road being widened to accommodate simultaneous two-way vehicle movement.

2.2 Traffic Environment

2.2.1 Intersection Volumes

Amber Organisation conducted turning movement counts at the roundabout intersection of Oxley Highway and Kamilaroi Highway on Wednesday 10 November 2021. Traffic counts were undertaken from 7:30am to 9:00am and 4:30pm to 6:00pm in order to determine the morning and evening peak hour volumes. The peak hour volumes are presented within Figure 4.

Figure 4: Peak Hour Turning Movements – Kamilaroi Highway / Oxley Highway



The survey results are summarised below:

- The morning peak hour occurs at 8:00am and the evening peak hour occurs at 4:30pm;
- The intersection recorded a total of 554 and 584 vehicle movements during the morning and evening peak hour, respectively;
- The majority of vehicle movements were recorded between the northern and eastern legs of Oxley Highway; and

- During the morning peak the majority of vehicle movements are northbound on Kamilaroi Highway and during the evening peak the majority are southbound.

Overall, the intersection accommodates a low level of traffic and is expected to be able to readily accommodate an increase in traffic movements.

2.2.2 Midblock Volumes

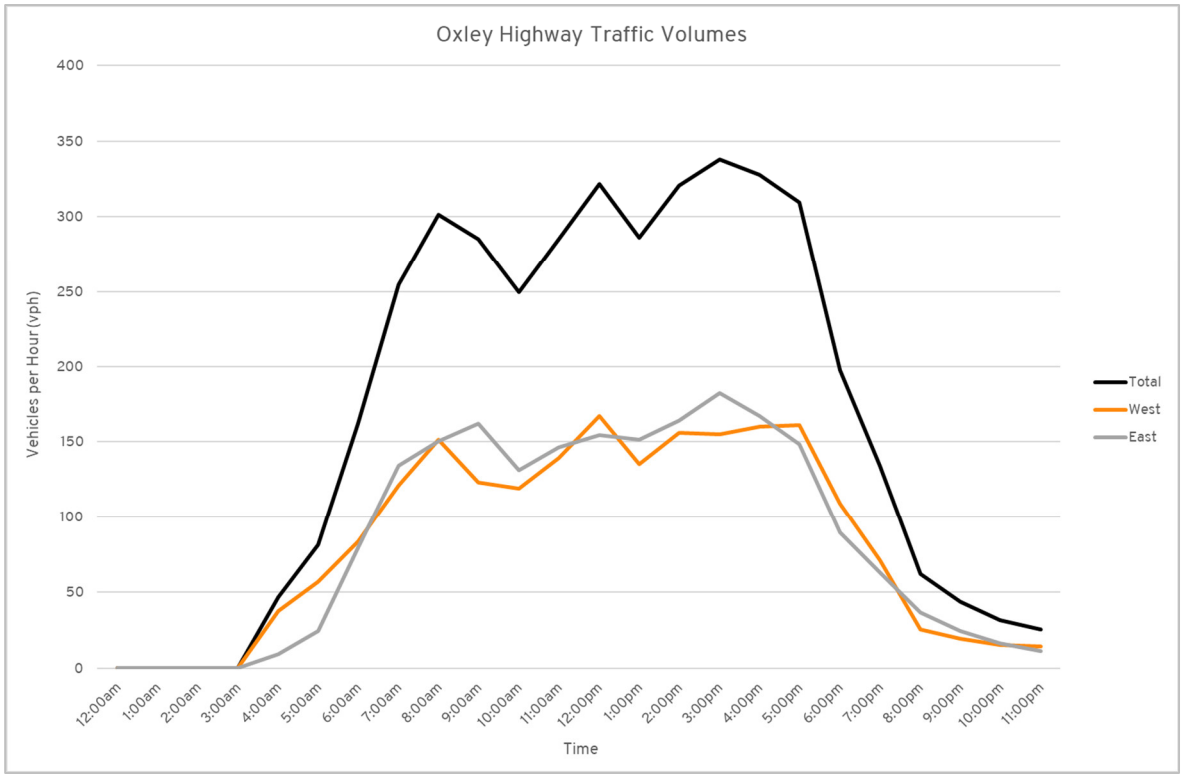
Traffic volume data has been collected from the TfNSW Traffic Volume database for any nearby data stations. The closest available station which provides recent data is located on Oxley Highway to the east of the site. A summary of the traffic volumes is provided within Table 1.

Table 1: State Road Traffic Volumes

Road	Survey Location	Station ID	Survey Year	Recorded Volume	Heavy Vehicles
Oxley Highway	1.45km East of Wilkinson Road, Gunnedah 2380	6167	2021	3,506 vpd 297 vph AM 333 vph PM	19% heavy

The traffic volumes have been calculated for each hour and separated in to east and westbound movements and are shown below in Figure 5.

Figure 5: Oxley Highway Traffic Volume Data 2021



The data indicates that Oxley Highway has a relatively constant level of traffic between 7:00am and 5:00pm and lower traffic volumes outside of these times. The traffic volume data also indicates that Oxley Highway currently carries a high level of heavy vehicle movements.

The traffic volumes were recorded during the COVID-19 pandemic which may impact travel behaviour and subsequently the traffic volumes on the road network. The data station also

provides traffic counts each year between 2015 and 2019 before the pandemic. The average daily traffic count for these years was 3,532 vehicle movements per day which is similar to the traffic volumes presented within Table 1. As such the traffic volumes for Oxley Highway in 2021 are considered to be similar to pre-pandemic volumes.

The TfNSW traffic volume data reflects the traffic volumes recorded on Oxley Highway as part of the turning movement count survey. Therefore, the traffic volumes recorded at the intersection are considered to be suitable for use within this assessment.

2.2.3 Road Network Operation

In order to determine the existing operating conditions at the intersection of Kamilaroi Highway and Oxley Highway an analysis was undertaken using the SIDRA computer modelling program. The traffic volumes have been based on the traffic volumes presented within Figure 4. The results of the analysis are provided within Appendix A and are summarised below.

Table 2: SIDRA Analysis Results Summary – Kamilaroi Highway and Oxley Highway

Movement		AM Peak			PM Peak		
		Average Delay (sec)	95% Queue (m)	Level of Service	Average Delay (sec)	95% Queue (m)	Level of Service
Kamilaroi Highway South	Through	5.5	5.2	A	5.3	4.5	A
	Right Turn	10.1		B	10.0		B
Oxley Highway East	Left Turn	4.6	7.0	A	4.8	7.3	A
	Right Turn	9.4		A	9.7		A
Oxley Highway North	Left Turn	4.1	8.0	A	4.8	13.2	A
	Through	4.3		A	5.0		A

Based on the above assessment the following conclusions are provided:

- The intersection is expected to operate with a good level of service, acceptable delays and queue lengths, during both the morning and evening peak hour; and
- The intersection recorded a degree of saturation of 0.169 and 0.264 during the morning and evening peak hour, respectively.

Overall, the results of the analysis indicate that the intersection has ample spare capacity to accommodate an increase in traffic.

2.3 Sustainable Transport

No public transport or walking and cycling facilities are currently provided within the vicinity of the site.

2.4 Road Safety

Amber has conducted a review of the TfNSW Centre for Road Safety Crash and Casualty Statistics database for all injury crashes within 500 metres of the subject site. The crash database provides

the location and severity of all injury and fatal crashes for the five-year period from 2016 to 2020. The crash search revealed the following crashes:

- One moderate injury rear-end crash located on Oxley Highway, east of the site next to the Mooki River;
- One moderate injury right-near crash located on the roundabout intersection of Oxley Highway and Kamilaroi Highway, south of the site; and
- One serious injury run off road crash located on the roundabout intersection of Oxley Highway and Kamilaroi Highway, south of the site.

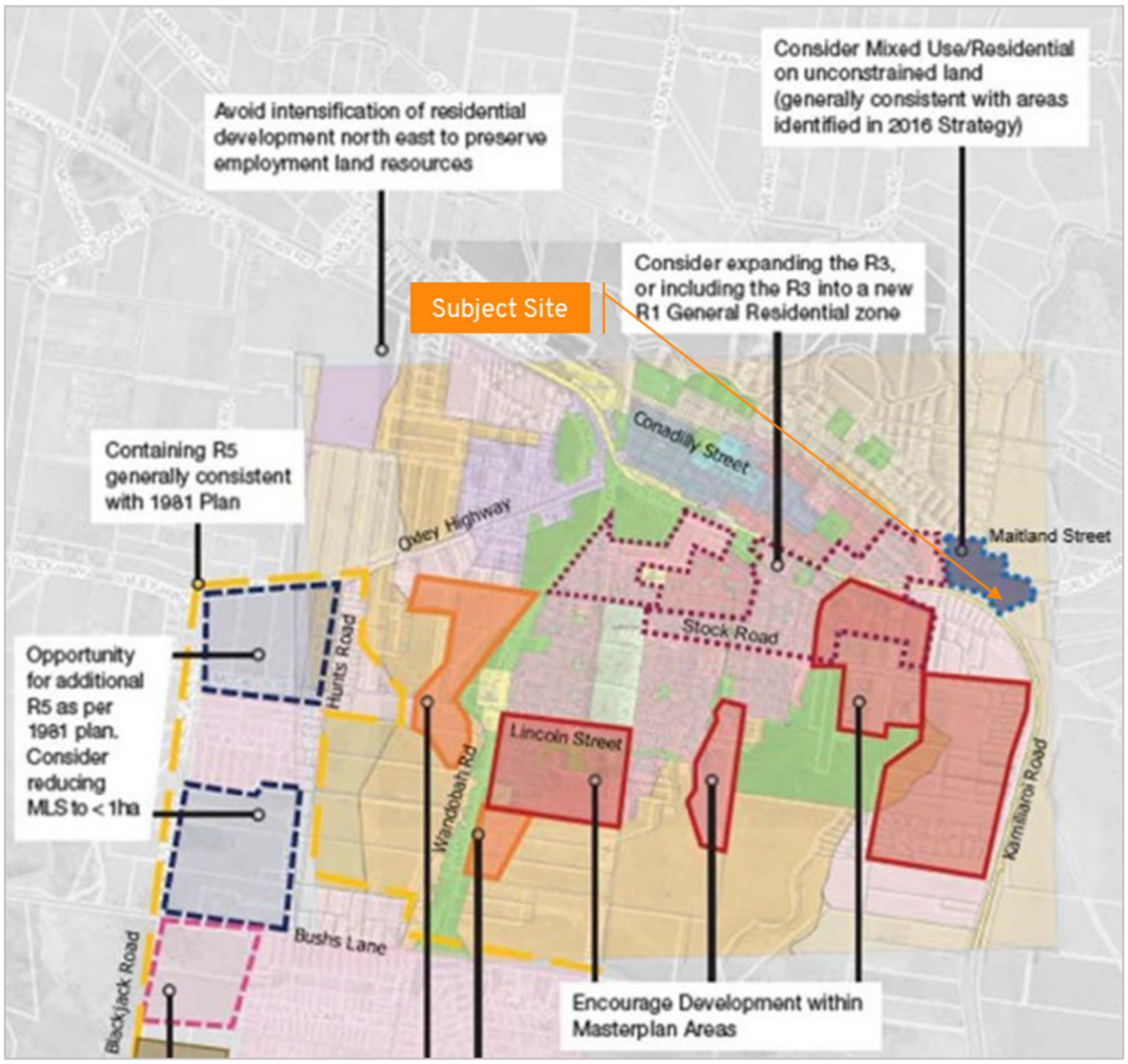
The crash search indicates that there are no discernible crash trends within the vicinity of the subject site. Given the low number of crashes and associated traffic volumes on the surrounding roads, it is concluded that the road network is currently operating in a relatively safe manner.

3. Future Road Environment

The draft Gunnedah Shire Local Housing Strategy has recently been prepared which identifies areas suitable for the provision of additional housing to assist Gunnedah Shire Council to meet the demands generated by expected population growth and demographic change. The Strategy has been prepared in response to the limited supply of serviced residential land and housing choice to meet the short and medium term needs of the community. It aligns with NSW Government and Council policy and the Directions of the New England North West Regional Plan 2036.

The Strategy recommends investigating land extending between Maitland Street and Kamilaroi Highway which includes the subject site. The proposed land is recommended as mixed use/residential land and is illustrated within Figure 16 of the document which is provided below.

Figure 6: Draft Gunnedah Shire Local Housing Strategy – Figure 16



Source: Draft Gunnedah Shire Local Housing Strategy

Council has advised that has part of the development of the Maitland Street land Lochrey Road would be upgraded in order to provide suitable vehicle access between Oxley Highway and Maitland Street. However, no design has been prepared for Lochrey Road at this stage.

4. Development Proposal

4.1 LEP Amendment

It is proposed to amend the Gunnedah Local Environmental Plan 2012 (LEP) with respect to land at 127-141 Lochrey Road, Gunnedah. The subject site is currently zoned RU1 – Primary Production which prohibits the use of the land as a highway service centre and caravan park. The Planning Proposal seeks to amend the LEP by providing an amendment to *Schedule 1 Additional Permitted Uses* to add highway service centre and caravan park as an additional permitted use with consent for Lot 1 DP841781.

The proposed development would be a highway service centre as defined:

> ***highway service centre*** *means a building or place used to provide refreshments and vehicle services to highway users. It may include any one or more of the following—*
>
> *(a) a restaurant or cafe,*
>
> *(b) take away food and drink premises,*
>
> *(c) service stations and facilities for emergency vehicle towing and repairs,*
>
> *(d) parking for vehicles,*
>
> *(e) rest areas and public amenities.*

And a caravan park as defined:

> ***caravan park*** *means land (including a camping ground) on which caravans (or caravans and other moveable dwellings) are, or are to be, installed or placed.*

4.2 Site Layout

The site is proposed to be developed with the intention of constructing a mixed-used development including a service centre with fast food outlets and a campervan park. A Feasibility Plan was developed for the site which provides a draft internal layout with two vehicle accesses to the site proposed from the two frontages with Oxley Highway. It is understood the Feasibility Plan is a conceptual model for delivery of the overarching development of the land and is not intended to represent the final development arrangement.

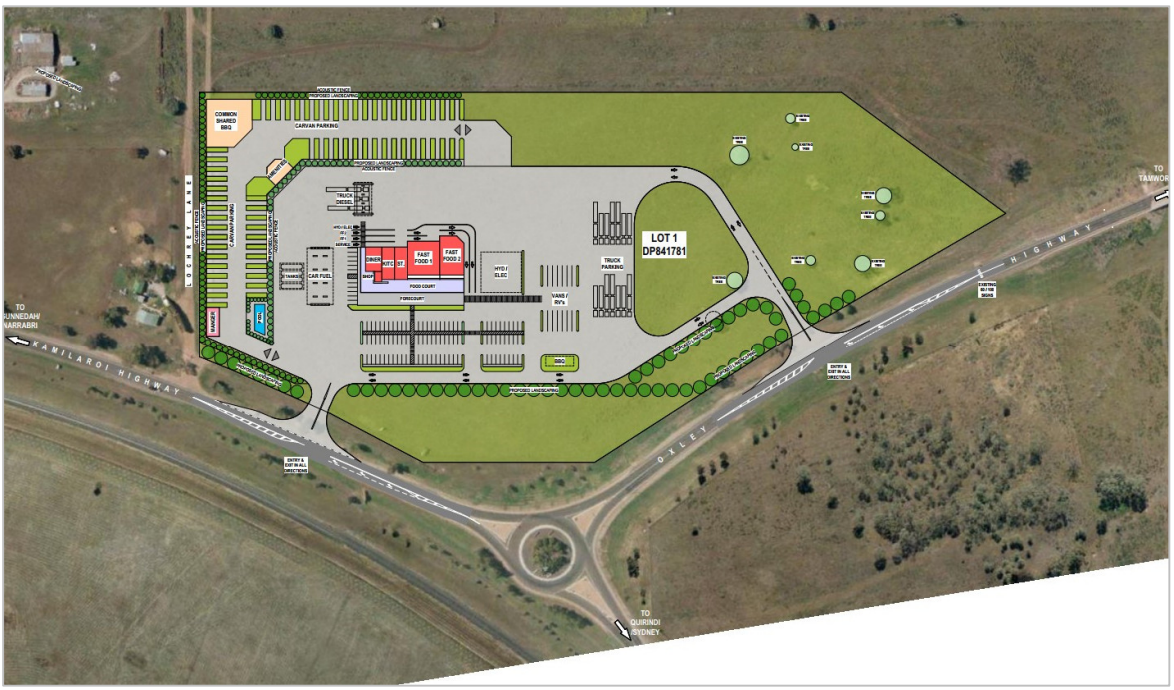
For the purposes of this assessment, the site has been assessed as having the following key features:

- A total of 12 bowsers including 8 for light vehicle sand 4 four heavy vehicles, which are provided in separate areas;
- A convenience store with a floor area of approximately 550sqm associated with the service station that would also sell food, drinks, and general goods;
- Two fast food outlets with a total floor area of approximately 840sqm, that would provide drive through facilities along the northern side of the building and approximately 120 internal seats;

- Parking areas for trucks, RVs, light vehicles and hydrogen/electric vehicles;
- A BBQ facility for use by service centre patrons;
- A caravan park which would accommodate approximately 47 berths and provide BBQ facilities, amenities building, and a building to accommodate the manager and service patrons.

The Feasibility Plan is provided within Figure 7 which shows the proposed site layout and associated facilities.

Figure 7: Site Feasibility Plan



Source: Hill Lockart Architects

The plan also shows the proposed site access locations to/from Oxley Highway. The accesses are proposed to accommodate all vehicle movements with turn facilities proposed within the road carriageway to allow vehicles to turn safely from the road network. The turn facilities are proposed to be designed in accordance with the Austroads Guidelines.

5. Traffic Assessment

5.1 Traffic Generation

5.1.1 Service Station

Based on our experience with similar service station developments, the traffic volumes generated by the proposed use depends on the following:

- Traffic generation heavily depends on the traffic volumes of the adjacent roads rather than the size of the site or the number of bowsers as the majority of visitors to the site are already on the road network and choose to purchase fuel based on convenience;
- Service stations typically generate higher traffic generation rates during the evening peak period when compared to the morning peak period. This is primarily due to drivers choosing to purchase fuel on their homeward journey as opposed to their journey to a destination when they have a target arrival time; and
- The provision of other uses on-site, which may include a convenience store or fast food outlet, can generate additional vehicle movements.

The following assessment has focused on the evening peak period with lower traffic rates anticipated during the morning peak period.

5.1.1.1 Service Station and Convenience Store

The NSW RTA Guide to Traffic Engineering Developments (RTA Guide), October 2002, specifies the expected evening peak hour trip generation rates for service stations and convenience stores. The trip generation rate is calculated using the following formula:

Evening peak hour vehicle trips = 0.04 A(S) + 0.3 A(F)

Where: A(S) = Area of the site (sqm)

A(F) = Gross floor area of convenience store (sqm)

The service station component of the site has a total area of 72,330sqm which does not provide a realistic calculation for the purposes of estimating the traffic generation for the service station component. Accordingly, the area has been limited to the canopy and parking area adjacent to the convenience store and the truck canopy area which provides a site area of 230sqm. The convenience store has a gross floor area of 550sqm. Using the formula above, the service station and convenience store are expected to generate approximately 174 vehicle movements during the evening peak hour.

Survey data collected by Amber and others for a range of service station developments, including sites on major urban arterial roads, indicates that service stations typically generate between 100 and 180 movements during the weekday commuter peak hours. As such, the above calculation is considered to provide a conservative estimate of the potential traffic generation of the service station component of the development given the low level of traffic on the road network.

5.1.1.2 Fast Food Outlet

The RTA Guide suggests that McDonald's Restaurants are the highest traffic generating facilities when compared to similar convenience restaurants and are expected to generate in the order of 180 vehicle movements per hour. The second highest traffic generator is a Kentucky Fried Chicken Restaurant which generate an average of 100 vehicle movements per hour.

If the fast food outlets were a McDonalds and KFC the associated traffic generation based on the RTA Guide would be 280 vehicle movements during the peak hour.

5.1.1.3 Summary

For the purposes of this assessment the following assumptions have been made when determine the potential traffic generation for the service station and associated convenience store and fast food outlets:

- The morning peak hour has conservatively been assessed as having the same traffic generation as the evening peak hour;
- Given the limited residential land use in the surrounding area it has been assumed that 80% of the vehicle movements for the fast food outlets are associated with vehicles using the service station and are not expected to generate an additional vehicle movement on the road network or at the site access. As such, the fast food outlets are expected to generate 54 vehicle movements in each of the peak hours; and
- The vehicle movements are evenly split between inbound and outbound vehicle movements.

Based on the above assumptions the service station and associated convenience store and fast food outlets are expected to generate the following traffic volumes in the morning and evening peak hour.

Table 3: Service Station Peak Hour Traffic Generation

	AM Peak (vph)	PM Peak (vph)
Arriving Trips	114	114
Departing Trips	114	114
Total	**228**	**228**

Any traffic volumes generated by the truck parking area are expected to be minimal and have not been included within the above traffic numbers.

5.1.2 Caravan Park

The RTA Guide recommends the use of the traffic generation rates within the ITE Trip Generation Manual when determining the traffic volumes for caravan parks. However, the caravan park is not considered to be reflective of a typical caravan park whereby the level of turnover is expected to be higher given the limited level of amenities and likelihood for people to use the site as a stopover location as part of a longer trip rather than a long-term stay.

For the purposes of this assessment, it has been assumed that 70% of all berths generate one vehicle movement to the site in the evening peak hour and one vehicle movement from the site

during the morning peak hour. As such, the caravan park is expected to generate the following traffic volumes in the morning and evening peak hour.

Table 4: Caravan Park Peak Hour Traffic Generation

	AM Peak (vph)	PM Peak (vph)
Arriving Trips	0	33
Departing Trips	33	0
Total	**33**	**33**

It is noted that if the ITE rate were applied the caravan park would be estimated to generate 3 vehicle movements per hour.

5.1.3 Summary

Based on the above, the site is expected to generate the following traffic volumes during the morning and evening peak periods.

Table 5: Total Traffic Generation

	AM Peak	PM Peak
Inbound	114	147
Outbound	147	114
Total	**261**	**261**

5.2 Traffic Distribution

The distribution of service station traffic at the accesses and on the surrounding road network has been based on the following assumptions:

- The distribution of the service station traffic at each of the accesses is based on the existing traffic volumes on the road network;
- A large proportion of trips associated with the service station and associated uses will be pass-by trips that are already distributed on the surrounding road network. These vehicles are already accommodated on the road network and do not represent an increase in traffic volumes associated with the proposal. For the purposes of this assessment and in line with generally accepted rates, it is assumed that 80% of the service station traffic movements travelling from Gunnedah are already on the road network. A rate of 90% has been adopted for all other movements given the limited residential use to the east and south of the site;
- All vehicle movements that are single purpose trips to the service centre are assumed to exit the site and travel back in the direction they accessed the site;
- All vehicle movements have been assumed to enter and exit the site via the same access. Whilst it is acknowledged that some vehicles will enter via one access and exit via the other access, it is considered that this would occur in a relatively even distribution resulting in similar traffic movements at the accesses; and
- All vehicles have been assumed to enter via the first site access they pass if accessing the site.

All caravan park traffic has been assumed to access the site via the western Oxley Highway access and the distribution on the road network has been based on the existing traffic distribution on the road network. It is considered that this provides a conservative assessment as it results in vehicles on Oxley Highway to the east travelling through the roundabout intersection to access the site. It is expected that signage would be provided at the site to assist with directing caravan park users to the correct access.

Based on this distribution and the assumptions above, the site is expected to generate the following traffic volumes on the road network.

Figure 8: Peak Hour Turning Movements – Site Traffic

The figure shows that the site traffic is relatively evenly spread between the site accesses with the western Oxley Highway access experiencing the highest level of traffic. This is primarily due to the vehicle movements associated with the caravan park. The left turn into the eastern Oxley Highway access experiences the lowest level of traffic as few vehicles turn right from Kamilaroi Highway onto the eastern leg of Oxley Highway and travel past the site.

The traffic volumes indicate that the intersection of Kamilaroi Highway and Oxley Highway only accommodates an increase of 25 and 14 vehicle movements in the morning and evening peak hours, respectively.

The negative traffic volumes represent a removal of through movements at the access as these vehicles will subsequently turn into the site.

5.3 Traffic Assessment

The future traffic volumes on the road network have been calculated with the inclusion of the development traffic. The traffic volumes are presented within Figure 9

Figure 9: Peak Hour Turning Movements – Future Traffic Volumes with Site Traffic

The SIDRA analysis presented within Section 2.2.3 of this report indicate that the intersection of Kamilaroi Highway and Oxley Highway is currently operating with a good level of service and has ample spare capacity to accommodate an increase in traffic movements. Therefore, the increase of 25 and 14 vehicle movements in the morning and evening peak hours is expected to be able to be readily accommodated at the intersection.

The accesses accommodate a lower level of traffic than the intersection of Kamilaroi Highway and Oxley Highway and as such, are also expected to be able to readily accommodate the traffic volumes generated by the service centre.

Accordingly, the development of the site as a service centre is expected to be able to be established with a minimal impact to the operation of the surrounding road network which is expected to be able to continue to operate with a good level of service.

6. Access Arrangements

6.1 Access Locations

The Feasibility Plan shows the proposed site access locations to/from Oxley Highway. The accesses are proposed to accommodate all vehicle movements with turn facilities proposed within the road carriageway to allow vehicles to turn safely from the road network.

An initial option was assessed that utilised Lochrey Road to gain access to the site via the western boundary following discussions with Gunnedah Shire Council. It was understood that the road would be upgraded as part of the future residential land to the north and would provide a suitable vehicle access location that minimised connections to the State Road network. However, Gunnedah Shire Council have subsequently advised that the level of noise generated by heavy vehicles would detrimentally impact nearby residents and subsequently Lochrey Road is not considered acceptable for vehicle access.

Consultation was undertaken with TfNSW in order to confirm the preferred access arrangements for the site. A range of design options were provided which included the following:

- Option 1: Access via both accesses with right turn movements prohibited at the western access.
- Option 2: Access via both accesses with all turn movements permitted.
- Option 3: Access provided via new leg to the intersection of Kamilaroi Highway and Oxley Highway.

The proposed design options are presented within Appendix B and the subsequent response from TfNSW is provided within Appendix C. Based on the discussions and response from TfNSW, it is concluded that the best access option is to provide both accesses with all turn movements permitted. The roundabout access option is likely to provide significant construction costs that make the access impractical.

6.2 Turn Treatments

Austroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings specifies the turning treatments required at intersections. Figure 3.25 of the guide specifies the required turn treatments on the major road at unsignalised intersections.

For the purposes of this assessment, it has been assumed that a short Auxiliary Left Turn and Channelised Right Turn facility are provided at both accesses. The designs presented within Appendix B show that the accesses can be designed in accordance with the Austroads Guide. Suitable separation has been provided between Lochrey Road, the Oxley Highway / Kamilaroi Highway intersection, and the western access to allow the turn facilities to be provided.

Accordingly, it is concluded that suitable turn facilities are able to be provided at both accesses to allow vehicles to safely turn from the road network.

6.3 Sight Distance

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections specifies the Safe Intersection Sight Distance (SISD) as the minimum sight distance which should be provided

along the major road at any intersection. Table 3.1 of the guide specifies the SISD required for various design speeds, with the following sight distances required at the accesses:

- A design speed of 70km/hr has been adopted at the western access given the posted speed limit of 60km/hr, which requires a sight distance of 141 metres based on a 1.5 second reaction time;
- A design speed of 110km/hr has been adopted at the eastern access which is considered a conservative approach given Oxley Highway reduces from 100km/hr to 60km/hr near the site access. The required sight distance for a design speed of 110km/hr is 285 metres based on a reaction time of 2.0 metres.

The available sight distance at the site accesses is summarised in Table 6.

Table 6: Turning Volumes for Turn Treatment Calculations

Access	Sight Distance	
	Nort/West	South/East
West	350m+	220m to intersection with Kamilaroi Highway
East	194m to intersection with Kamilaroi Highway	350m+

Accordingly, the available sight distance at the accesses exceeds the requirements of the Austroads Guide and the accesses are considered to be able to provide safe vehicle movement between the site and the road network.

7. Parking Requirement

The number of car parking spaces required for various land uses is listed under Appendix 1 of the Gunnedah Development Control Plan 2012 (DCP). Application of the relevant parking rates based on the Feasibility Plan is provided below in Table 1.

Table 7: Development Control Plan Car Parking Requirement

Use	Number / Floor Area	Parking Rate	Parking Requirement
Service Station	0 work bays	6 spaces per work bay	0 spaces
	100sqm convenience store	1 space per 20sqm GFA of convenience store	5 spaces
	450sqm GFA	1 space per 6.5sqm GFA	69 spaces
Drive In Take Away Food Shop	840sqm GFA	1 space per 10sqm GFA	84 spaces
	120 seats	1 space per 5 seats	24 spaces
Camp or Caravan Site	47 sites	1 space per site	47 spaces
		1 space per 10 sites for visitor parking	5 spaces
Total			**234 spaces**

Accordingly, the development based on the Feasibility Plan would have a statutory parking requirement of 234 spaces. It is considered that the 47 spaces associated with the caravan park are accommodated within the individual berths which leaves a requirement for 187 standard parking spaces.

The DCP also provides the following commentary in relation to service stations:

> *'The additional requirements should be cumulative but may be reduced where it can be demonstrated that the times of peak demand for the various facilities do not coincide. All parking should be clearly designated and located so as not to obstruct the normal sale of petrol and should minimise the potential for vehicular/pedestrian conflict. Consideration should be given to providing adequate manoeuvring space for caravans and B-Doubles.'*

It is considered that the service station is the primary activity on-site and will be the major driving factor behind visitors to the site, with the convenience store and fast food outlets acting as ancillary uses. Accordingly, the proposed operation of the site as a service station with ancillary uses will result in a lower parking demand compared to the combined DCP parking rates for the convenience store and fast food outlets.

Generally, when using a service station drivers will choose to leave their vehicles at the pump while paying for petrol and utilising the services provided by the associated convenience store. As such, it is considered that the DCP parking requirement for the convenience store of 74 car parking spaces is an over-estimate of the parking demand in this case and that the actual parking demand will be lower.

For the purpose of this assessment, the DCP parking rates for the fast food outlets and general floor area for the service station have been provided with a reduction factor of 50%. The subsequent parking demand for the site is 99 spaces.

A total of 105 parking spaces are shown on-site to accommodate the parking demand generated by the service station, convenience store and fast food outlets. In addition, an area has been provided to allow for truck parking and vans/RVs. Accordingly, it is concluded that the site is able to provide a suitable level of car parking to accommodate the parking demand generated by the proposed uses.

8. Site Layout

The Feasibility Plan demonstrates that the proposed uses can be comfortably provided on the large site which allows suitable internal vehicle circulation and minimises conflict. A summary of an assessment of the Feasibility Plan layout is provided below:

- The entrance to the campervan park is able to be suitably separated from the western access to prevent vehicles associated with the caravan park queueing onto the road network;
- The bowsers have been located away from the access locations to prevent vehicles queueing for fuel extending onto the road network;
- Drive through facilities are able to be provided for the fast food outlets to allow sufficient queuing to prevent drive through vehicles impacting other uses;
- Truck bowsers are able to be separated from personal vehicles which is appropriate given the high percentage of heavy vehicles;
- Parking for the various uses is able to be accommodated within the site; and
- Suitable areas are provided for service vehicles at the rear of the buildings.

Overall, the Feasibility Plan demonstrates that the site has sufficient area to accommodate the proposed uses in a suitable manner.

9. Conclusion

Amber Organisation has reviewed a proposal to amend the Gunnedah Local Environmental Plan 2012 (LEP) with respect to land at 127-141 Lochrey Road, Gunnedah.

The site is proposed to be developed with the intention of constructing a mixed-used development including a service centre with fast food outlets and a caravan park. The subject site is currently zoned RU1 – Primary Production which prohibits the use of the land as a highway service centre. The Planning Proposal seeks to amend the LEP by providing an amendment to *Schedule 1 Additional Permitted Uses* to add highway service centre and caravan park as an additional permitted use with consent for Lot 1 DP841781.

A Feasibility Plan has been developed for the site which provides a draft internal layout with two vehicle accesses to the site proposed from Oxley Highway. It is understood the Feasibility Plan is a conceptual model for delivery of the overarching development of the land and is not intended to represent the final development arrangement.

Based on the above assessment, the following conclusions are provided:

- Based on the Feasibility Plan the site is expected to generate a minimal number of additional traffic movements on the road network with the majority of vehicles accessing the site already being accommodated on the road network. The intersection of Kamilaroi Highway and Oxley Highway is expected to be able to readily accommodate the minor increase in traffic generated and continue to operate with a good level of service.
- The site accesses are expected to accommodate a modest level of traffic and are able to accommodate the expected traffic volumes.
- Potential designs for the accesses have been established through consultation with TfNSW and Council. The preferred option is to provide access via both the eastern and western frontages to Oxley Highway with the accesses accommodating all vehicle movements. Turn facilities are able to be provided at the accesses in accordance with Austroads Guide and the sight distance at the accesses complies with the Austroads Guide. As such, vehicles are expected to be able to safely enter and exit the site via new accesses to Oxley Highway.
- The site has sufficient space to accommodate the parking demand generated by a service centre. The parking rate is expected to be lower than the DCP parking requirement given the primary generator of the site will be associated with the service station and the convenience store and food outlets are ancillary uses. The caravan park is expected to accommodate the parking demand associated with the use.
- The site is able to provide a layout that would allow suitable vehicle circulation with the Feasibility Plan also showing areas for truck parking, caravan parking and electric vehicle parking.

Accordingly, the Planning Proposal to allow the use of the site as a service centre is concluded to be acceptable in relation to traffic and parking impacts, with the future development of the site expected to have a minimal impact on traffic operations on the surrounding road network.

Appendix A

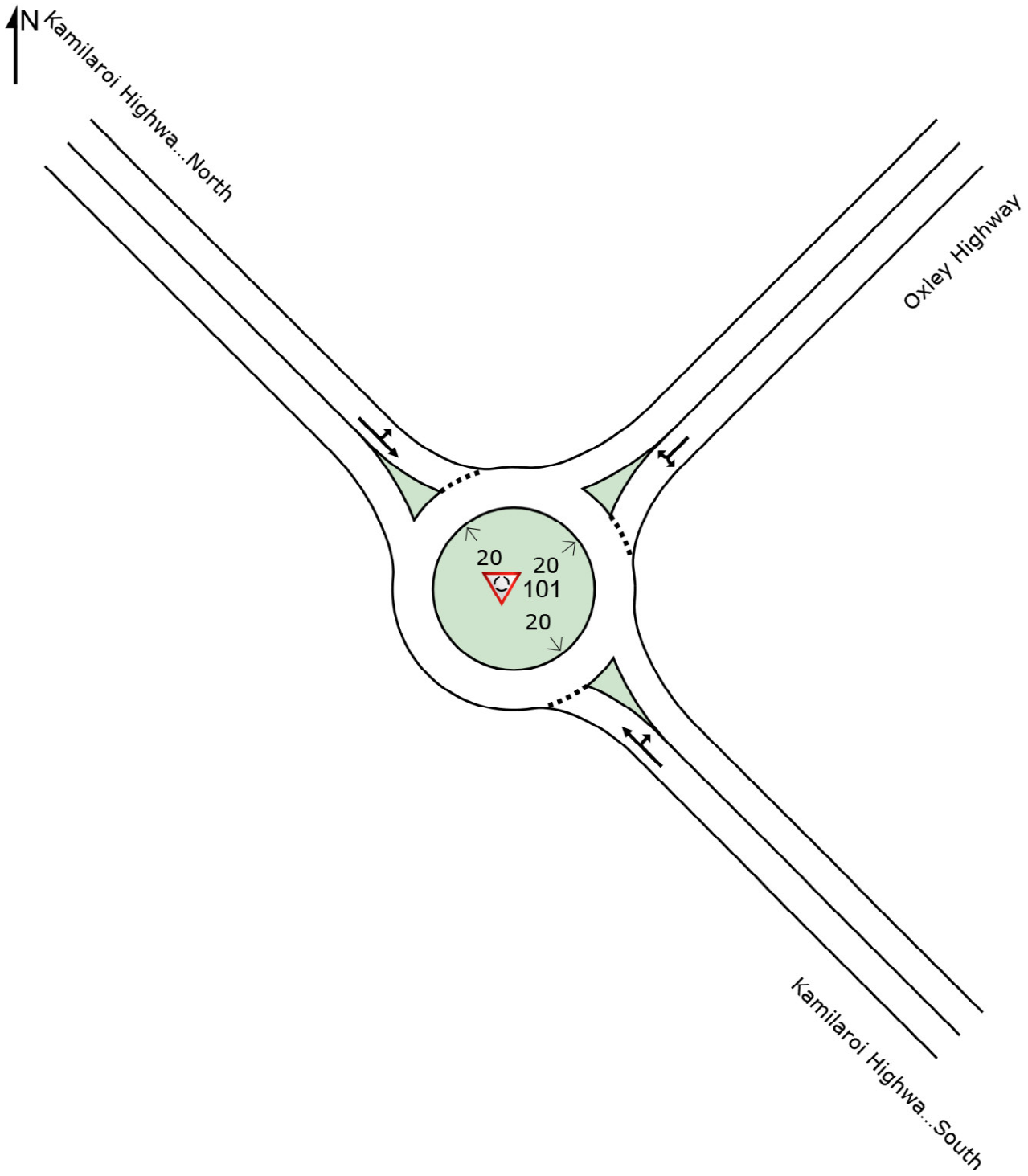
SIDRA Results

SITE LAYOUT

Site: 101 [Kamilaroi Highway / Oxley Highway (Site Folder: General)]

Existing - AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Kamilaroi Highway / Oxley Highway (Site Folder: General)]

Existing - AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Kamilaroi Highway South														
5	T1	114	19.0	120	19.0	0.123	5.5	LOS A	0.6	5.2	0.40	0.51	0.40	54.3
6	R2	9	19.0	9	19.0	0.123	10.1	LOS B	0.6	5.2	0.40	0.51	0.40	53.9
Approach		123	19.0	129	19.0	0.123	5.8	LOS A	0.6	5.2	0.40	0.51	0.40	54.3
NorthEast: Oxley Highway														
7	L2	6	19.0	6	19.0	0.165	4.6	LOS A	0.9	7.0	0.26	0.60	0.26	50.9
9	R2	185	19.0	195	19.0	0.165	9.4	LOS A	0.9	7.0	0.26	0.60	0.26	51.8
Approach		191	19.0	201	19.0	0.165	9.3	LOS A	0.9	7.0	0.26	0.60	0.26	51.8
NorthWest: Kamilaroi Highway North														
10	L2	158	19.0	166	19.0	0.169	4.1	LOS A	1.0	8.0	0.08	0.44	0.08	54.7
11	T1	80	19.0	84	19.0	0.169	4.3	LOS A	1.0	8.0	0.08	0.44	0.08	56.2
Approach		238	19.0	251	19.0	0.169	4.2	LOS A	1.0	8.0	0.08	0.44	0.08	55.2
All Vehicles		552	19.0	581	19.0	0.169	6.3	LOS A	1.0	8.0	0.21	0.51	0.21	53.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMBER ORGANISATION | Licence: PLUS / 1PC | Processed: Wednesday, 23 March 2022 8:15:02 AM
Project: D:\OneDrive - Amber Organisation Pty Ltd\Amber\Jobs\193 - 127-141 Lochrey Road, Gunnedah - Service Centre\SIDRA\193 - KH OH 220323.sip9

MOVEMENT SUMMARY

Site: 101 [Kamilaroi Highway / Oxley Highway (Site Folder: General)]

Existing - PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

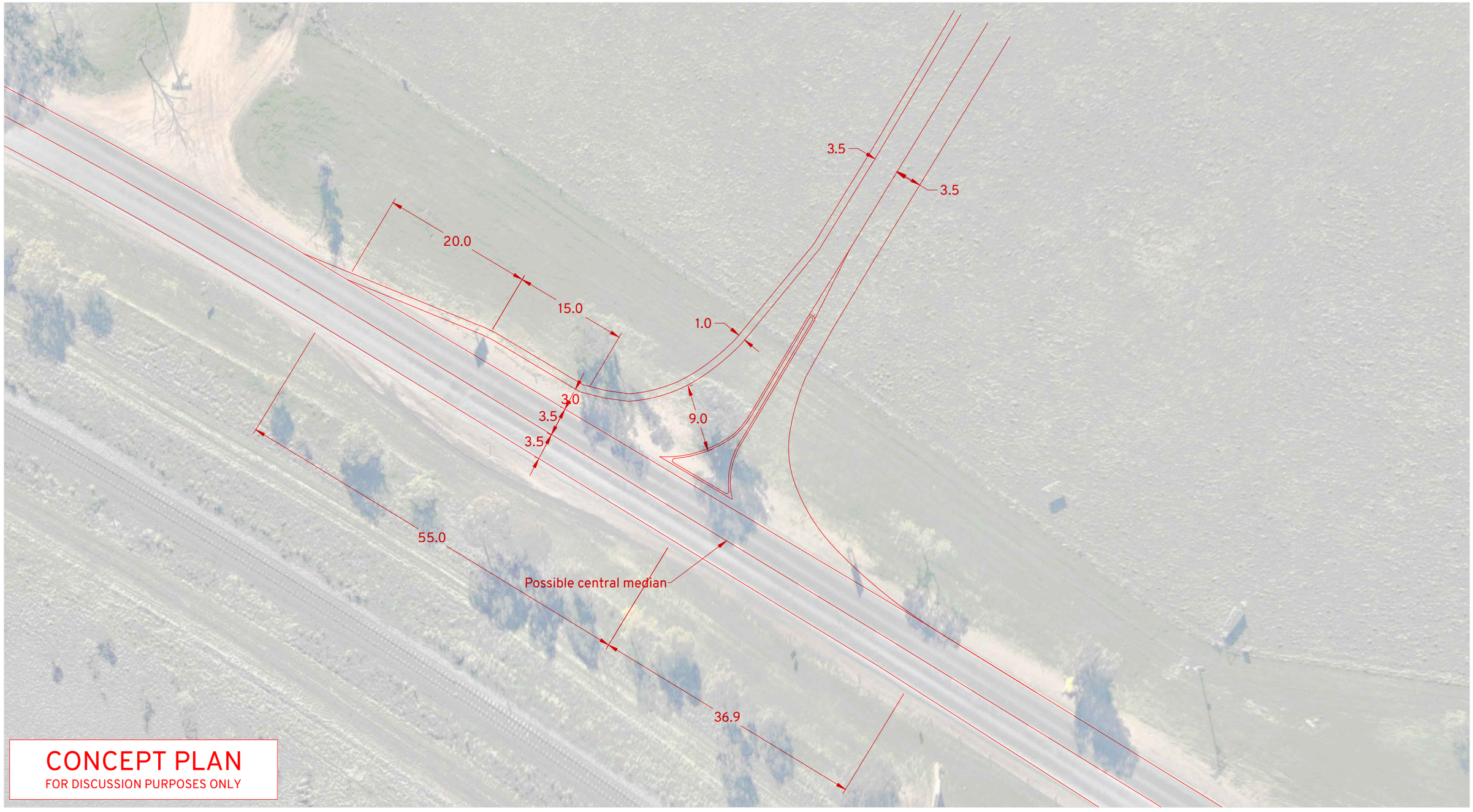
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Kamilaroi Highway South														
5	T1	4	19.0	4	19.0	0.107	5.3	LOS A	0.6	4.5	0.38	0.63	0.38	51.8
6	R2	104	19.0	109	19.0	0.107	10.0	LOS B	0.6	4.5	0.38	0.63	0.38	51.4
Approach		108	19.0	114	19.0	0.107	9.8	LOS A	0.6	4.5	0.38	0.63	0.38	51.5
NorthEast: Oxley Highway														
7	L2	7	19.0	7	19.0	0.163	4.8	LOS A	0.9	7.3	0.34	0.61	0.34	50.7
9	R2	169	19.0	178	19.0	0.163	9.7	LOS A	0.9	7.3	0.34	0.61	0.34	51.6
Approach		176	19.0	185	19.0	0.163	9.5	LOS A	0.9	7.3	0.34	0.61	0.34	51.6
NorthWest: Kamilaroi Highway North														
10	L2	182	19.0	192	19.0	0.264	4.8	LOS A	1.6	13.2	0.34	0.48	0.34	53.7
11	T1	118	19.0	124	19.0	0.264	5.0	LOS A	1.6	13.2	0.34	0.48	0.34	55.1
Approach		300	19.0	316	19.0	0.264	4.9	LOS A	1.6	13.2	0.34	0.48	0.34	54.2
All Vehicles		584	19.0	615	19.0	0.264	7.2	LOS A	1.6	13.2	0.35	0.55	0.35	52.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMBER ORGANISATION | Licence: PLUS / 1PC | Processed: Wednesday, 23 March 2022 8:15:03 AM
Project: D:\OneDrive - Amber Organisation Pty Ltd\Amber\Jobs\193 - 127-141 Lochrey Road, Gunnedah - Service Centre\SIDRA\193 - KH OH 220323.sip9

Appendix B

Access Design Options



CONCEPT PLAN
FOR DISCUSSION PURPOSES ONLY

The following design details have been taken from Austroads Guide to Road Design Part 4A:

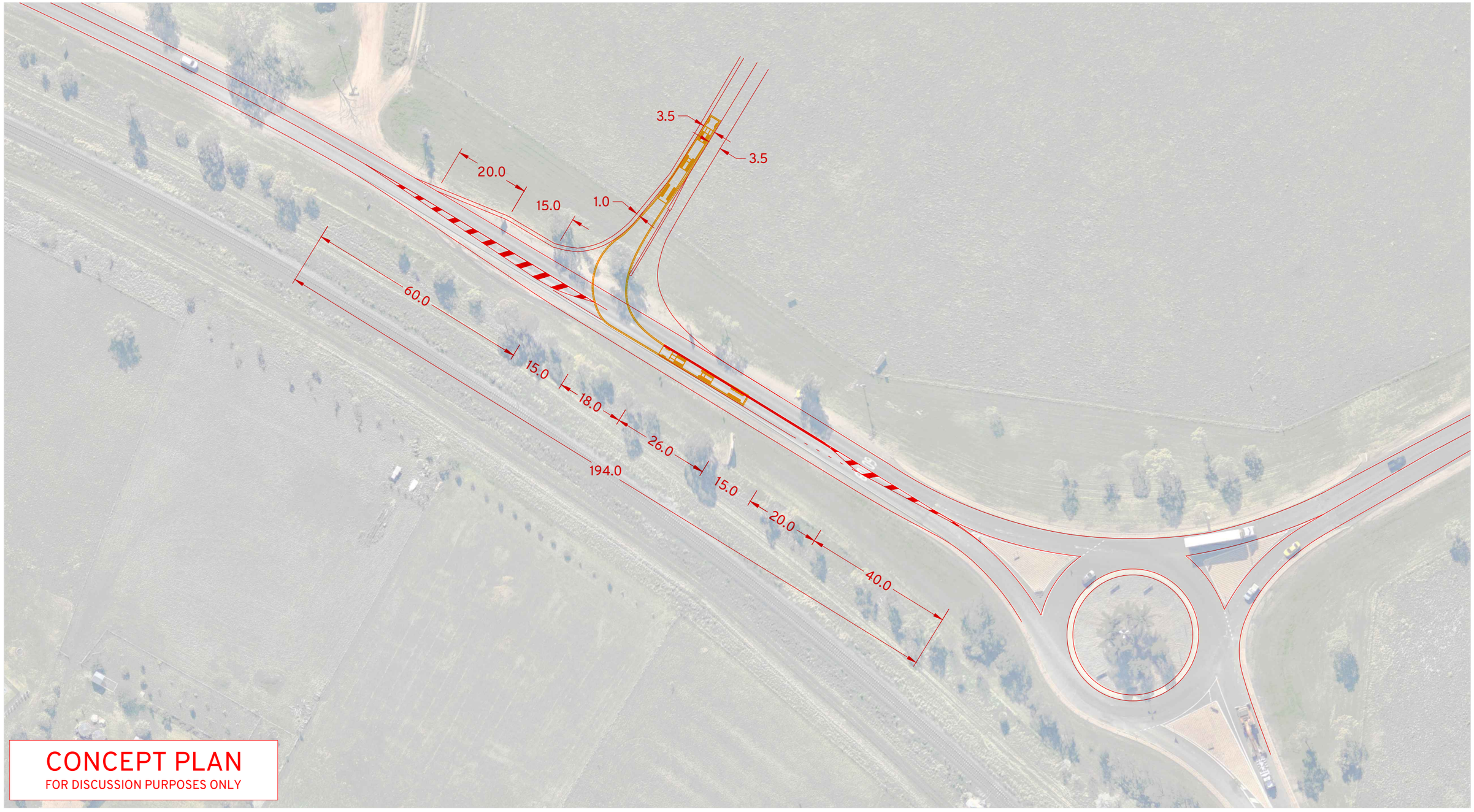
Basic Left Turn Treatment (BAL) Section 8.2.1.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 3.0m.

Rural Left-turn Treatment with short left turn lane (AUL(s)) Section 8.2.2.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 2.5m.
4: Taper length calculates to 20m.
5: Minimum length of parallel widened shoulder used from Table 8.2 is 35m.

Service Centre Development
127-141 Lochrey Road, Gunnedah
Option 1: Oxley Highway West Left-in/Left-Out Feasibility Design

DRAWN: CT
DATE: 24/11/2021
SCALE: 1:500m@ A3
DWG NO: 193 S01A

Amber 01



CONCEPT PLAN
FOR DISCUSSION PURPOSES ONLY

The following design details have been taken from Austroads Guide to Road Design Part 4A:

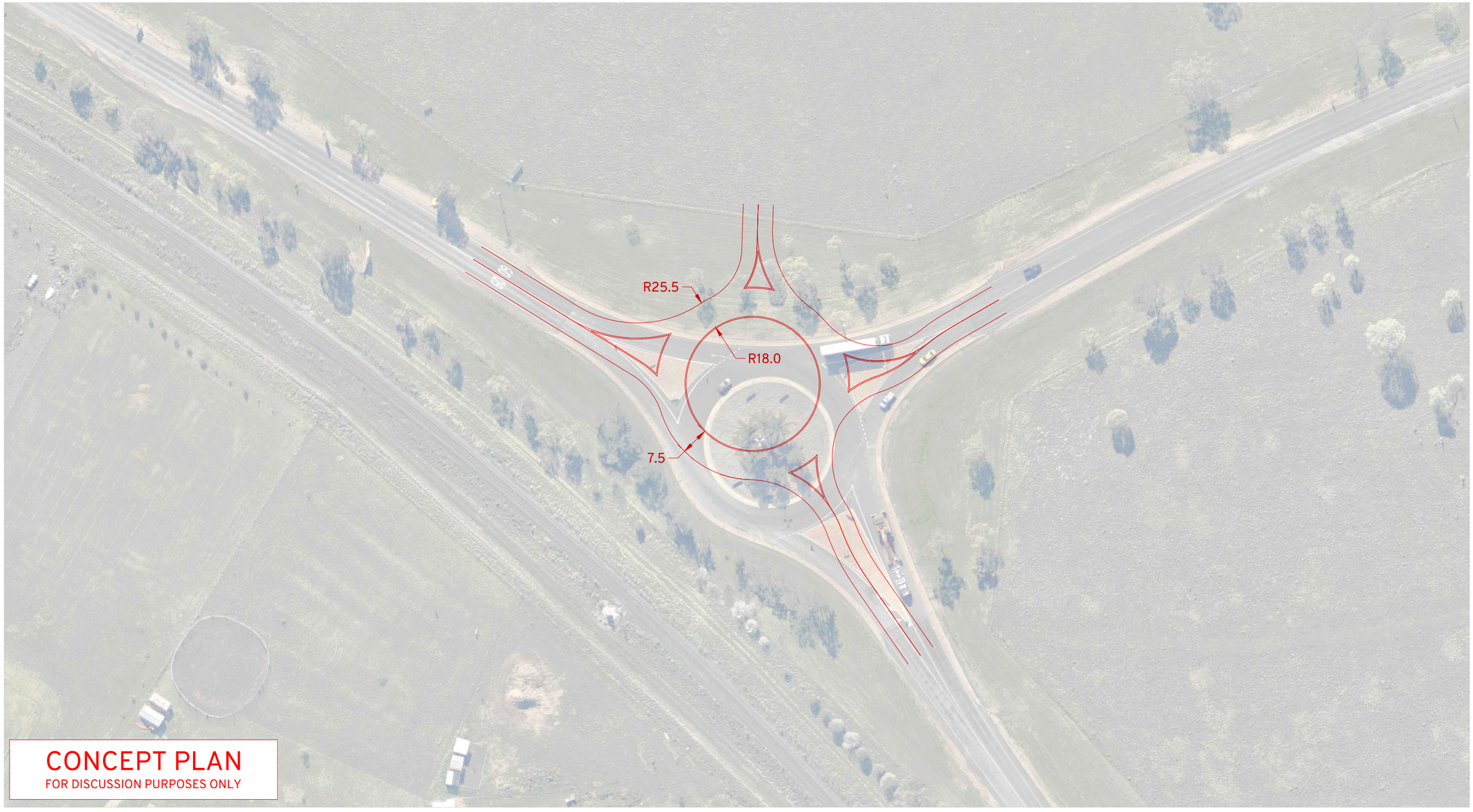
Channelised Right-turn Treatment (CHR(s)) Section 7.5.2.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 3.0m.
4: Lateral movement length *(A)* is 60m.
5: Storage length is 26m for one B-double design vehicle.

Rural Left-turn Treatment with short left turn lane (AUL(s)) Section 8.2.2.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 2.5m.
4: Taper length calculates to 20m.
5: Minimum length of parallel widened shoulder used from Table 8.2 is 35m.

Service Centre Development
127-141 Lochrey Road, Gunnedah
Option 2: Oxley Highway West CHR(s)/AUL(s) Feasibility Design

DRAWN: CT
DATE: 24/11/2021
SCALE: 1:1 @ A3
DWG NO: 193 S01A

Amber 02

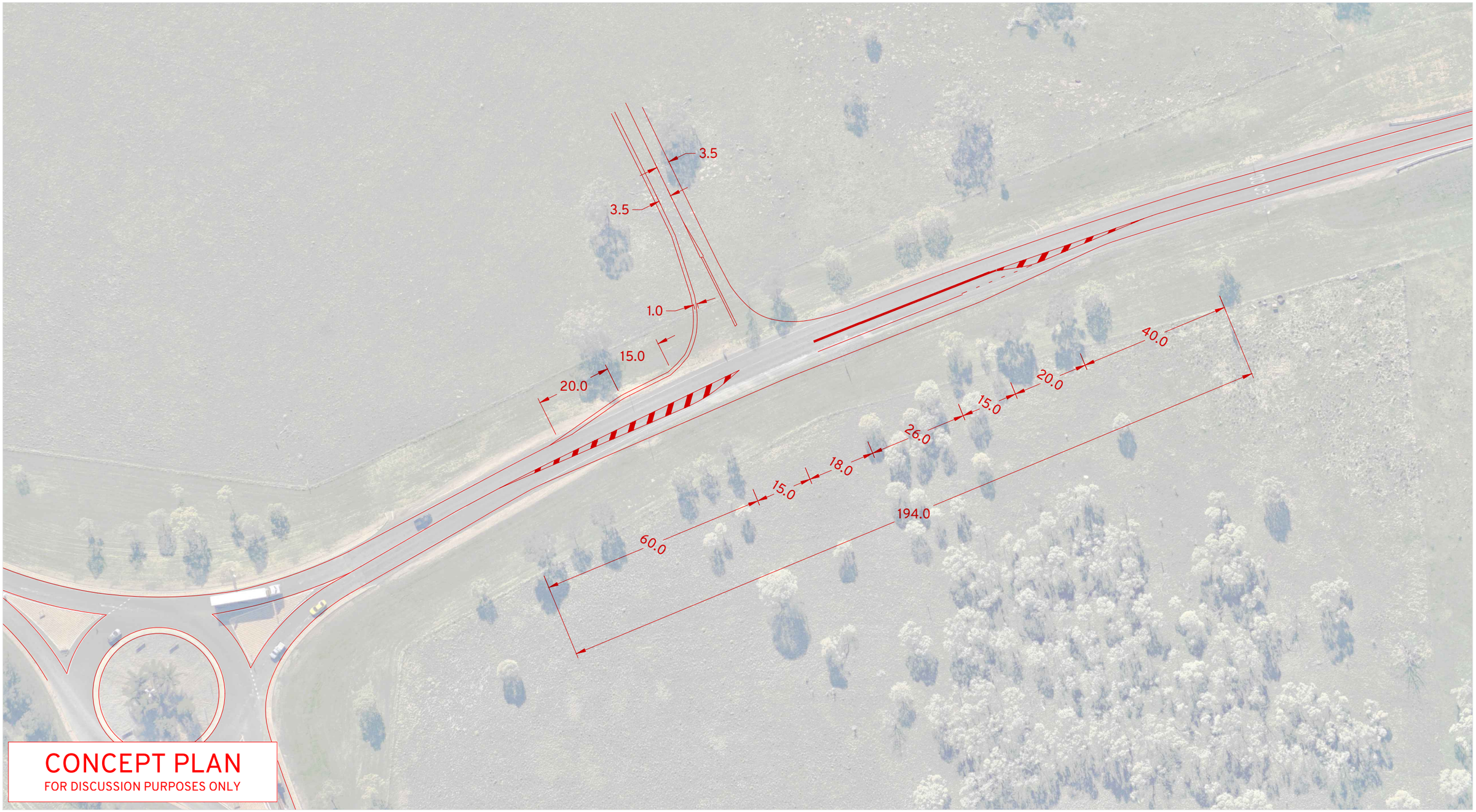


CONCEPT PLAN
FOR DISCUSSION PURPOSES ONLY

Service Centre Development
127-141 Lochrey Road, Gunnedah
Option 3: Roundabout Access Feasibility Design

DRAWN: CT
DATE: 24/11/2021
SCALE: 1:1 @ A3
DWG NO: 193 S01A

Amber 03



The following design details have been taken from Austroads Guide to Road Design Part 4A:

Channelised Right-turn Treatment (CHR(s)) Section 7.5.2.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 3.0m.
4: Lateral movement length *(A)* is 60m.
5: Storage length is 26m for one B-double design vehicle.

Rural Left-turn Treatment with short left turn lane (AUL(s)) Section 8.2.2.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 2.5m.
4: Taper length calculates to 20m.
5: Minimum length of parallel widened shoulder used from Table 8.2 is 35m.

Service Centre Development
127-141 Lochrey Road, Gunnedah
Option 4: Oxley Highway East CHR(s)/AUL(s) Feasibility Design

DRAWN: CT
DATE: 24/11/2021
SCALE: 1:1 @ A3
DWG NO: 193 S01A

Amber 04

Appendix C

TfNSW Access Design Response

13 January 2022

File No: NTH15/00090/02

The Director
Amber Organisation
Email: mike@amberorg.com.au

Attention: Mike Willson - Director

Dear Sir,

RE: Preliminary Advice – Proposed Highway Service Centre and Caravan Park
Part Lot 1 DP 841781; 127-141 Lochrey Road, Gunnedah.

I refer to your email of 24 November 2021 requesting comment from Transport for NSW (TfNSW) in relation to the abovementioned pre planning proposal.

Roles and Responsibilities

Our key interests are the safety and efficiency of the transport network, the needs of our customers and the integration of land use and transport in accordance with Future Transport Strategy 2056.

Lochrey Road is a public local road. The Oxley Highway (HW11) & Kamilaroi Highway (HW29) are classified (State) roads. Gunnedah Shire Council is the Roads Authority for all public roads in the local government area pursuant to Section 7 of the *Roads Act 1993*. TfNSW can exercise roads authority functions for classified roads in accordance with Sections 61 & 64 of the Roads Act. Any road works on a classified (State) road will require the consent of TfNSW and are subject to the terms of a Works Authorisation Deed (WAD) or other suitable agreement with TfNSW.

In accordance with Clause 101 of the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) the Consent Authority is to have consideration for the safety, efficiency and ongoing operation of the classified road, as the development has frontage to a classified road. TfNSW is given the opportunity to comment on traffic generating development of a size or capacity listed under Schedule 3.

It is emphasised that the following comments are based on the information provided to TfNSW at this time, they are not final and further comment will be provided following a review of any planning proposal and/or development application referred by the relevant planning authority.

Transport for NSW Response

TfNSW understands that the Proponent is undertaking due diligence to inform a Planning Proposal that would amend the *Gunnedah Local Environmental Plan 2021* to permit a Highway Service Centre and Caravan Park as additional permitted uses on the subject site.

TfNSW has reviewed the access options submitted and provides the following comments to assist development and consultation of further options;

1. The observed traffic volumes may reflect short-term changes in travel patterns arising from Covid-19, and pre-pandemic traffic volumes should be identified to ensure analysis is reflective of longer-term trends.

2. Consideration must be given to relevant design vehicles when considering intersection and access treatments. Whilst the Austroads warrants may suggest that shortened turn treatments (CHR-S / AUL-S) may be suitable for observed volumes, further consideration will need to be given to deceleration and storage lengths for relevant design vehicles.

3. The following comments are provided in response to the access options included in Drawing no. 193 S01A attached to your enquiry;

    - Option 1 appears to only provide access for eastbound traffic leaving Gunnedah. It is considered likely this arrangement would encourage westbound traffic to attempt U-turns at the Lochrey Road intersection. Further consideration should be given to Options or combinations of options that enable access for all directions of travel.

    - Option 2 may present limitations to the design of the CHR and AUL treatments given proximity to the nearby roundabout and the Lochrey Road intersection respectively. This option would appear to be more appropriate as an upgrade of the Oxley Highway and Lochrey Road intersection, providing clear separation to the roundabout and enabling site access from Lochrey Road.

    - Option 3 would not be acceptable as demonstrated in the submitted sketch. Any further option proposing a fourth leg on the roundabout will need to further adjust all approaches to achieve evenly separated approaches. Note that any reconstruction of the roundabout will need to be designed to accommodate the turn paths of relevant design vehicles and a suitable pavement specification.

    - Option 4 may be acceptable subject to further analysis and could be an effective compliment to a modified option 2 subject to further analysis and detail of the development internal design.

Any roadwork on classified (State) road/s is to be designed and constructed in accordance with the current Austroads Guidelines, Australian Standards and TfNSW Supplements.

The Developer will be required to enter into a Works Authorisation Deed (WAD) or other suitable agreement as required by TfNSW for any road works on the classified (State) road. The developer will be responsible for all costs associated with the roadwork and administration for the WAD. It is recommended that developers familiarise themselves with the requirements of the WAD process. Further information can be obtained from the TfNSW website.

If you have any further enquiries regarding the above comments please do not hesitate to contact Leisa Sedger, Development Services Case Officer or the undersigned on (02) 6640 1362 or via email at: development.north@transport.nsw.gov.au

Yours faithfully,

Matt Adams
A/Manager Development Services
Community and Place | Region North
Regional & Outer Metropolitan

Copy for: Gunnedah Shire Council - council@infogunnedah.com.au

Appendix D NOISE (ACOUSTIC) ASSESSMENT

Acoustic Assessment –Caravan Park and Service Centre Gunnedah, NSW.

Prepared for
NGH

July 2022

Document Details

Acoustic Assessment –Caravan Park and Service Centre Gunnedah, NSW

Prepared For:

NGH

35 Kincaid Street

Wagga Wagga, NSW 2650

Prepared By:

RAPT Consulting

18&19 / 10 Kenrick Street

The Junction, NSW 2291

ABN: 30330220290

www.raptconsulting.com.au

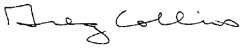
Document ID	Rev No.	Author		Date
2221349_220701	0	Gregory Collins-MAAS		01 July 2022

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Table Index

Figure Index

1. Introduction

1.1 Background

RAPT Consulting has been engaged to undertake an acoustic assessment NGH to inform a Development Application (DA) for a caravan park and service centre at Gunnedah, NSW. The proposal seeks to amend the Gunnedah LEP to amend Schedule 1, to add an additional permitted use for the land at 127-141 Lochrey Road, Gunnedah.

The subject land is legally described as Lot 1 DP 841781 and located at the intersection of the Oxley Highway and Kamilaroi Highway (and is divided by the Oxley Highway). The Site and surrounding area is shown in Figure 1-1 and a concept site layout is shown in Figure 1-2.

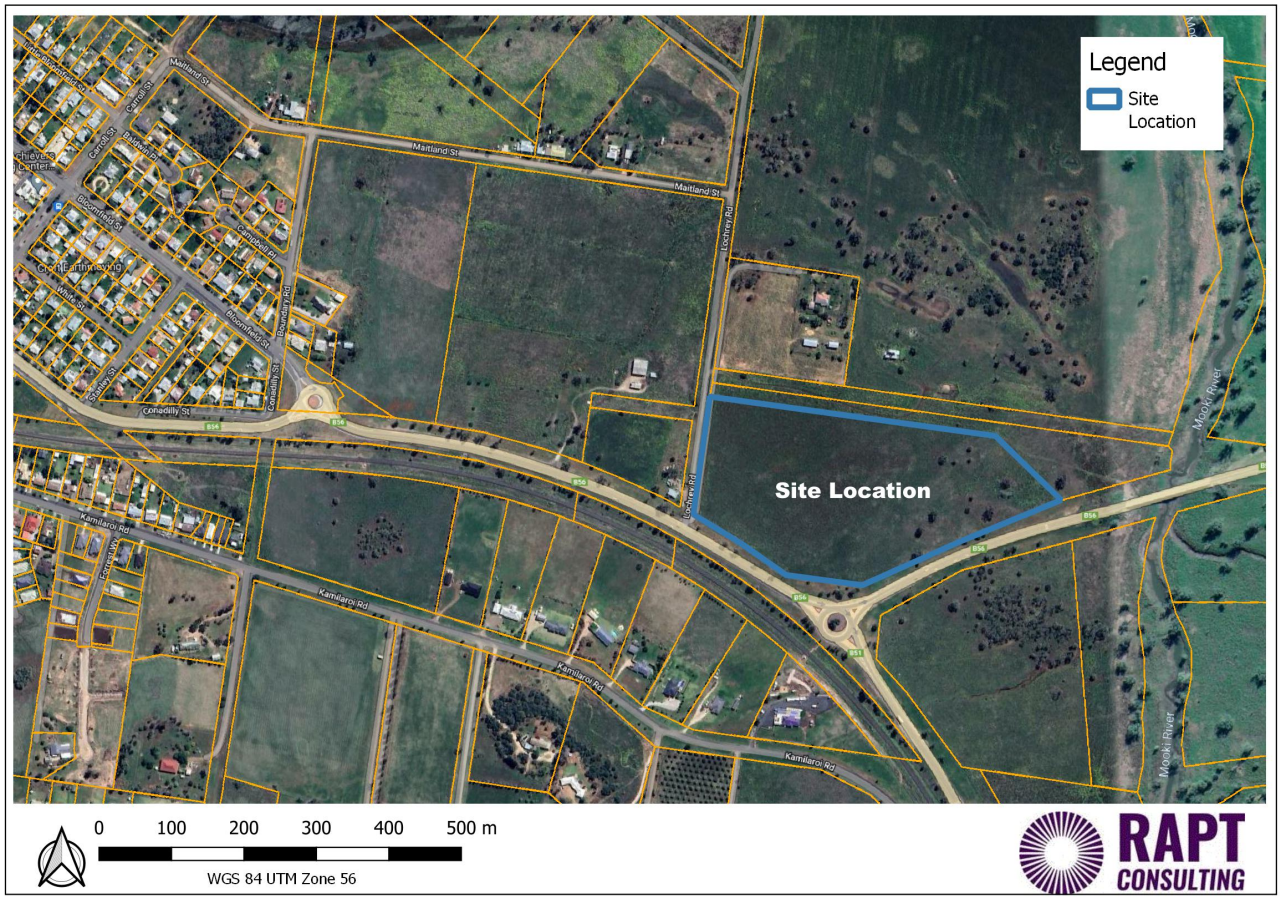


Figure 1-1 Site and Surrounding Area

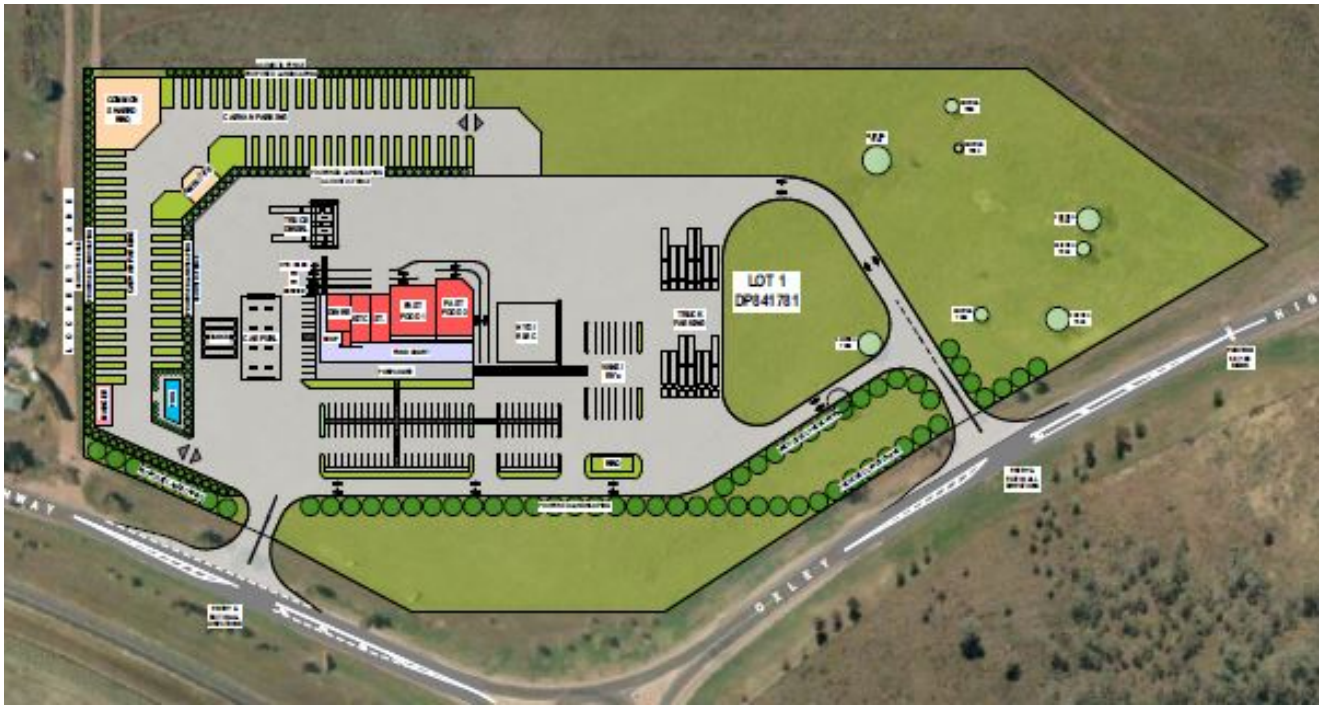


Figure 1-2 Conceptual Site Layout (Source: Hill Lockart Architects)

1.2 Assessment Objectives

This acoustic assessment considers the potential impacts of the operation of the proposal. The purpose is to assess potential noise and vibration from the project and to recommend mitigation measures where required.

1.3 Scope

The acoustic assessment scope of work included:

- Initial desk top review to identify noise sensitive receptors from aerial photography
- Undertake noise measurements to determine ambient and background noise levels
- Establish project noise goals for the operation of the proposed project
- Identify the likely principal noise sources during construction and operation and their associated noise levels
- assessment of potential noise, vibration and sleep disturbance impacts associated with construction and operation aspects of the project
- provide recommendations for feasible and reasonable noise and vibration mitigation and management measures, where noise or vibration objectives may be exceeded.

1.4 Relevant Guidelines

The relevant policies and guidelines for noise and vibration assessments in NSW that have been considered during the preparation of this assessment include:

- Assessing Vibration: A Technical Guideline, Department of Environment and Conservation (DEC), 2006
- British Standard BS7385.2 - 1993 Evaluation and Measurement for Vibration in Buildings, Part 2 - Guide to damage levels from ground borne vibration 1993
- DIN 4150: Part 3-1999 Structural vibration – Effects of vibration on structures 1999
- NSW Road Noise Policy (RNP), Department of Environment, Climate Change and Water (DECCW), 2011
- Noise Policy for Industry (NPfI), Environment Protection Authority (EPA), 2017.
- Interim Construction Noise Guideline (ICNG) (NSW DECC, 2009)

1.5 Limitations

The purpose of the report is to provide an independent acoustic assessment for the proposal.

It is not the intention of the assessment to cover every element of the acoustic environment, but rather to conduct the assessment with consideration to the prescribed work scope.

The findings of the acoustic assessment represent the findings apparent at the date and time of the assessment undertaken. It is the nature of environmental assessments that all variations in environmental conditions cannot be assessed and all uncertainty concerning the conditions of the ambient environment cannot be eliminated. Professional judgement must be exercised in the investigation and interpretation of observations.

In conducting this assessment and preparing the report, current guidelines for acoustics, noise were referred to. This work has been conducted in good faith with RAPT Consulting's understanding of the client's brief and the generally accepted consulting practice.

No other warranty, expressed or implied, is made as to the information and professional advice included in this report. It is not intended for other parties or other uses.

2. Existing Environment

2.1 Receptors

The area surrounding the site is zoned R2 Low Density Residential, R3 Medium Density Residential, R5 Large Lot Residential, RU1 Primary Production and SP2 Infrastructure. A map showing the land use zonings in the vicinity of the proposal are shown in Figure 2-1.

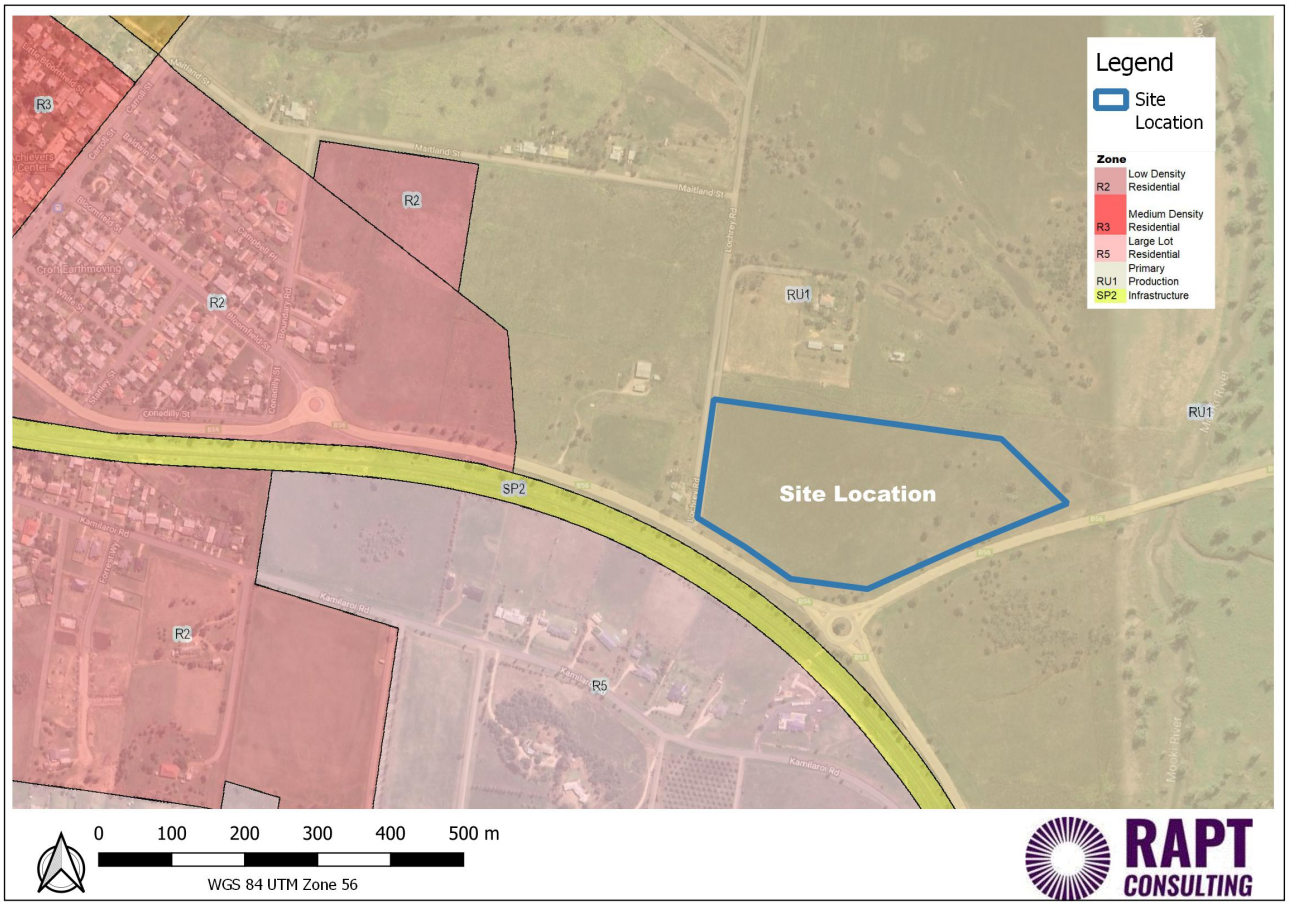


Figure 2-1 Land Use Zonings

Closest receptors to the proposal assessed in this acoustic assessment are identified in Table 2-1 and Figure 2-2.

Table 2-1 Nearest Receptors to Study Area

Receiver ID	Address	Receptor Type	Easting	Northing
R1	88 Conadilly Street	Residential	239700	6568640
R2	102-125 Lochrey Road	Residential	239878	6568881
R3	248 Maitland Street	Residential	239605	6569087
R4	242 Maitland Street	Residential	239529	6569094
R5	240 Maitland Street	Residential	239487	6569099
R6	17 Boundary Road	Residential	239215	6568877
R7	15 Boundary Road	Residential	239216	6568828
R8	2 Boundary Road	Residential	239124	6568760
R9	54 Kamilaroi Road	Residential	239095	6568569
R10	72 Kamilaroi Road	Residential	239417	6568520
R11	76 Kamilaroi Road	Residential	239474	6568493
R12	90 Kamilaroi Road	Residential	239540	6568476
R13	82-84 Kamilaroi Road	Residential	239605	6568459
R14	86-88 Kamilaroi Road	Residential	239662	6568417
R15	90-92 Kamilaroi Road	Residential	239712	6568387
R16	94-98 Kamilaroi Road	Residential	239766	6568361
R17	100-108 Kamilaroi Road	Residential	239842	6568345

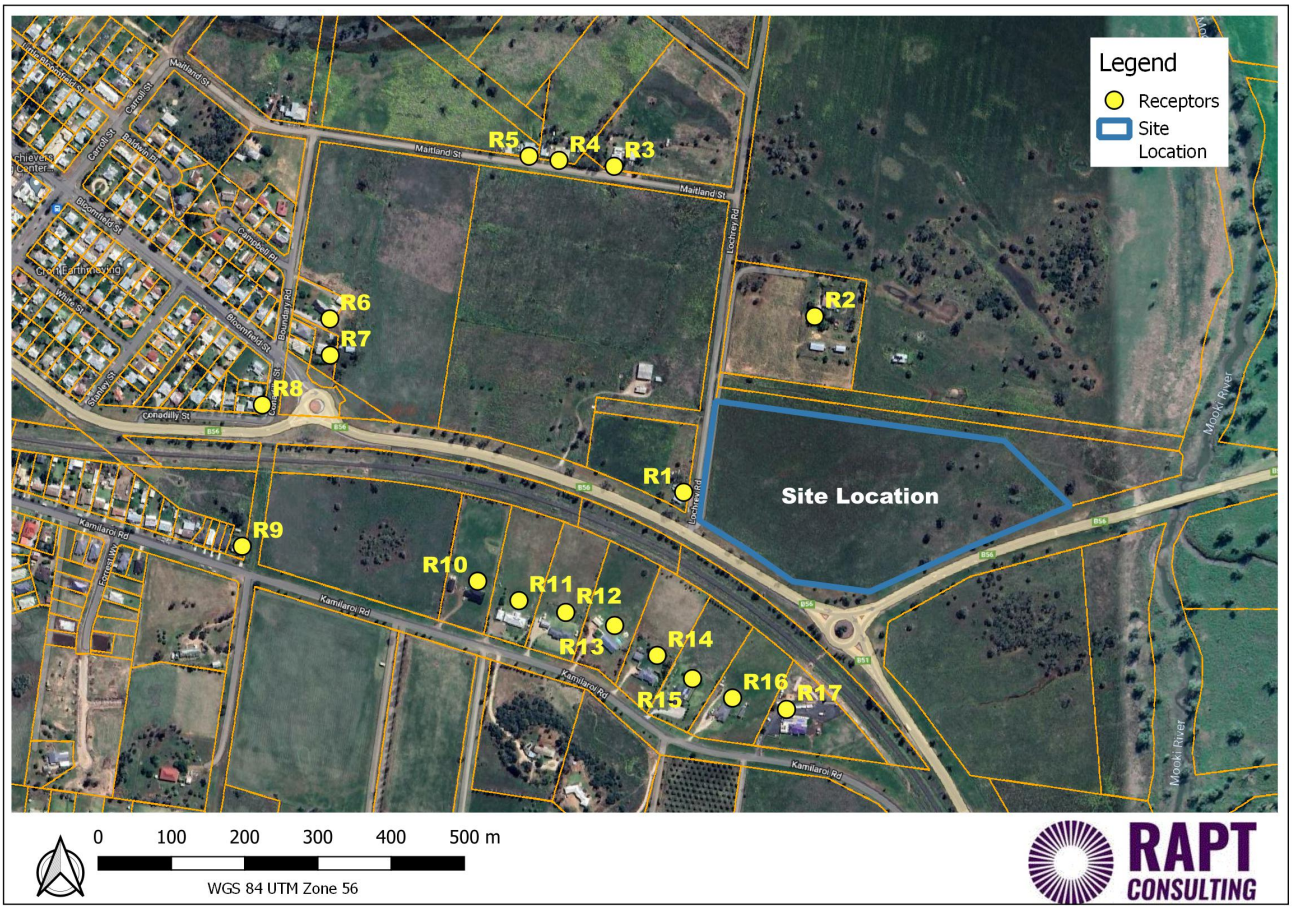


Figure 2-2 Receptors Surrounding The Proposal Site

2.2 Background and Ambient Noise

To establish background and ambient noise levels, noise monitoring was undertaken by RAPT Consulting from 23 March to 30 March 2022 at 88 Conadilly Street and from 6 May to 12 May 2022 at 419 Conadilly Street. Site observations noted the locations were considered indicative of the local ambient noise environment and also presented as secure locations whereby minimising the risk of theft or vandalism to the monitoring equipment. Additionally, they are considered as acceptable locations for determination of the background noise with consideration to the NSW Environment Protection Authority's (EPA's) – Noise Policy for Industry (NPfI). During site visits it was noted that Conadilly Street road traffic, distant road traffic, rail noise and natural wildlife, primarily described the ambient noise environment and is indicative of a sub-urban noise environment.

The monitoring locations are shown in Figure 2-3.

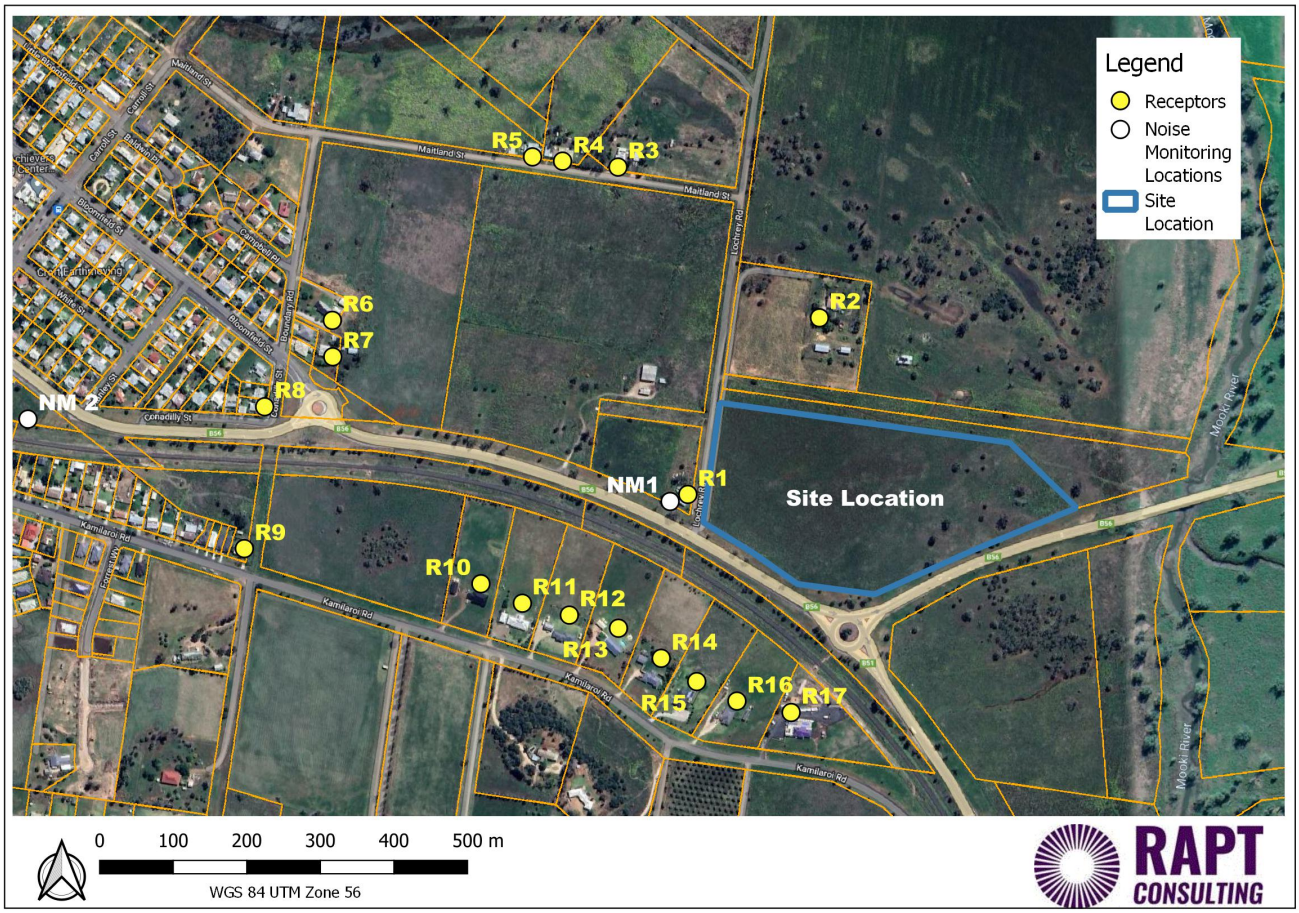


Figure 2-3 Monitoring Locations.

Monitoring was undertaken using a RION NL-42 noise loggers with Type 2 Precision. These loggers are capable of measuring continuous sound pressure levels and are able to record L_{Amin}, L_{A90}, L_{A10}, L_{Amax} and L_{Aeq} noise descriptors. The instruments were programmed to accumulate environmental noise data continuously over sampling periods of 15 minutes for the entire monitoring period.

The noise surveys were conducted with consideration to the procedures described in Australian Standard AS 1055:2018, “Acoustics – Description and Measurement of Environmental Noise” and the NSW Noise Policy for Industry (NPfI). Calibration was checked before and after each measurement and no significant drift occurred. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics – Sound level meters – Specifications.

The L_{A90} descriptor is used to measure the background noise level. This descriptor represents the noise level that is exceeded for 90 percent of the time over a relevant period of measurement. In line with the procedures described in the EPA’s NPfI, the assessment background level (ABL) is established by determining the lowest tenth-percentile level of the L_{A90} noise data acquired over each period of interest. The background noise level or rating background level (RBL) representing the day, evening and night-time assessment periods is based on the median of individual ABL’s determined over the entire monitoring duration. The RBL is representative of the average minimum background sound level, or simply the background level.

The L_{Aeq} is the equivalent continuous noise level which would have the same total acoustic energy over the measurement period as the varying noise actually measured, so it is in effect an energy average.

Weather information for the unattended noise logging was obtained from the Bureau of Meteorology Orange Airport AWS for the monitoring period and any data adversely affected by rain, wind (more than 5 m/s as per NPfI) or extraneous noise were discarded.

The RBL and ambient LAeq levels are provided in Table 2-2 below.

Table 2-2 Background and Ambient Noise Monitoring Results

	Rating background level, L_{A90}, dB(A)			Ambient noise levels, L_{Aeq} dB(A)		
Monitoring Location	**Day[1]**	**Evening[1]**	**Night[1]**	**Day[1]**	**Evening[1]**	**Night[1]**
88 Conadilly Street	42	42	42[3] (44)	59	58	57
419 Conadilly Street	40	31	30[2] (26)	64	62	62

Note 1 Day: 7:00 to 18:00 Monday to Saturday and 8:00 to 18:00 Sundays & Public Holidays
Evening: 18:00 to 22:00 Monday to Sunday & Public Holidays
Night: 22:00 to 7:00 Monday to Saturday and 22:00 to 8:00 Sundays & Public Holidays

Note 2 Table 2.1 of the NPfI specifies a minimum assumed rating background noise level of 35dB(A) for day and 30 dB(A) for evening and night-time. Number in brackets (XX) represents actual measured RBL determined for assessment period.

Note 3 As per the NPfI, project intrusiveness noise level for evening be set at no greater than the project intrusiveness noise level for daytime. The project intrusiveness noise level for night-time should be no greater than the project intrusiveness noise level for day or evening. Number in brackets (XX) represents actual measured RBL determined for assessment period.

3. Noise and Vibration Objectives

3.1 Construction Noise

Construction noise is assessed with consideration to DECCW Interim Construction Noise Guidelines (ICNG) (July 2009). The ICNG is a non-mandatory guideline that is usually referred to by local councils and other NSW government entities when construction / demolition works require development approval. The ICNG recommend standard hours for construction activity as detailed in Table 3-1.

Table 3-1 ICNG Recommended Construction Hours

Work type	Recommended standard hours of work
Normal construction	Monday to Friday: 7 am to 6 pm. Saturday: 8 am to 1 pm. No work on Sundays or Public Holidays.
Blasting	Monday to Friday: 9 am to 5 pm. Saturday: 9 am to 1 pm. No work on Sundays or Public Holidays.

The ICNG provides noise management levels for construction noise at residential and other potentially sensitive receivers. These management levels are to be calculated based on the adopted rating background level (RBL) at nearby locations, as shown in Table 3-2.

Table 3-2 ICNG Noise Guidelines at Receivers

Period	Management Level $L_{Aeq(15\ min)}$
Residential Recommended standard hours	Noise affected level: RBL + 10 Highly noise affected level: 75 dB(A)
Residential Outside recommended standard hours	Noise affected level: RBL + 5
Classrooms at schools and other educational institutions	Internal Noise Level 45 dB(A) (applies when properties are being used) Outdoor Noise Level 55 dB(A) (assumes 10dB(A) loss through an open window
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	65 dB(A)
Offices, retail outlets (external)	70 dB(A)
industrial premises (external)	75 dB(A)

The above levels apply at the boundary of the most affected residences / offices or within 30 m from the residence where the property boundary is more than 30 m from the residence.

The *noise affected level* represents the point above which there may be some community reaction to noise. Where the *noise affected level* is exceeded all feasible and reasonable work practices to minimise noise should be applied and all potentially impacted residents should be informed of the nature of the works, expected noise levels, duration of works and a method of contact. The *noise affected level* is the background noise level plus 10 dB(A) during recommended standard hours and the background noise level plus 5 dB(A) outside of recommended standard hours.

The *highly noise affected level* represents the point above which there may be strong community reaction to noise and is set at 75 dB(A). Where noise is above this level, the relevant authority may require respite periods by restricting the hours when the subject noisy activities can occur, considering:

- Times identified by the community when they are less sensitive to noise (such as mid-morning or mid-afternoon for works near residences).
- If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

It is understood construction is planned for standard hours. Based on the above and the RBL's determined from site monitoring, construction noise management levels (NML's) have been conservatively derived based on monitoring from 419 Conadilly Street, as shown in Table 3-3.

Table 3-3 ICNG NML's Leq(15min) dB(A)

Receiver	Within Recommended Standard Hours
Residential	50

3.2 Vibration Guidelines

3.2.1 Human Exposure

Vibration goals the were sourced from the DECCW's *Assessing Vibration: a technical guideline*, which is based on guidelines contained in British Standard (BS) 6472–1992, *Evaluation of human exposure to vibration in buildings (1–80 Hz)*.

Vibration, at levels high enough, has the potential to cause damage to structures and disrupt human comfort. Vibration and its associated effects are usually classified as continuous, impulsive or intermittent as follows:

- continuous vibration continues uninterrupted for a defined period and includes sources such as machinery and continuous construction activities
- impulsive vibration is a rapid build up to a peak followed by a damped decay. It may consist of several cycles at around the same amplitude, with durations of typically less than two seconds and no more than three occurrences in an assessment period. This may include occasional dropping of heavy equipment or loading activities

- intermittent vibration occurs where there are interrupted periods of continuous vibration, repeated periods of impulsive vibration or continuous vibration that varies significantly in magnitude. This may include intermittent construction activity, impact pile driving, jack hammers.

The preferred and maximum values for continuous and impulsive vibration are defined in Table 2.2 of the guideline and are reproduced in Table 3-4 for the applicable receivers.

Table 3-4 Preferred and Maximum Levels for Human Comfort

Location	Assessment Period[4]	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Continuous vibration (weighted RMS acceleration, m/s^2, 1-80Hz)					
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Impulsive vibration (weighted RMS acceleration, m/s^2, 1-80Hz)					
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14

Note 4 Daytime is 7:00am to 10:00pm and Night-time is 10:00pm to 7:00am

The acceptable vibration dose values (VDV) for intermittent vibration are defined in Table 2.4 of the guideline and are reproduced in Table 3-5 for the applicable receiver type.

Table 3-5 Acceptable Vibration Dose Values for Intermittent Vibration (m/s1.75)

Location	Daytime [5]		Night-time [5]	
	Preferred value	Maximum value	Preferred value	Maximum value
Critical areas[6]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Note 5 Daytime is 7:00 to 22:00 and night-time is 22:00 to 7:00: and
Note 6 Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be needed to assess intermittent values against the continuous or impulsive criteria for critical areas.

3.2.2 Building Damage

Currently, there is no Australian Standard that sets the criteria for the assessment of building damage caused by vibration. Guidance of limiting vibration values is attained from reference to the following International Standards and Guidelines:

- British Standard BS7385.2 - 1993 *Evaluation and Measurement for Vibration in Buildings*, Part 2 - Guide to damage levels from ground borne vibration

- German Standard DIN 4150-3: 1999-02 Structural Vibration – Part 3: *Effects of vibration on structures*.

The recommended Peak Particle Velocity (PPV) guidelines for the possibility of vibration induced building damage are derived from the minimum vibration levels above which any damage may occur are presented in Table 3-6 for DIN 4150-3: 1999-02 and Table 3-7 for BS7385.2 – 1993.

Table 3-6 DIN 4150-3 Guideline values for vibration velocity to be used when evaluating the effects of short-term vibration on structures

Type of Structure	Peak Component Particle Velocity, mm/s			
	Vibration at the foundation at a frequency of			Vibration of horizontal plane of highest floor at all frequencies
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz[6]	
Buildings used for commercial purposes, industrial buildings, and buildings of similar design	20	20-40	40-50	40
Dwellings and buildings of similar design and/or occupancy	5	5-15	15-20	15
Structures that, because of their sensitivity to vibration, do not correspond to those listed in lines 1 and 2 of table 5-7 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

Note 7 At frequencies above 100Hz, the values given in this column may be used as minimum values

Table 3-7 BS7385.2 Transient Vibration Guideline Values for Potential building - Cosmetic Damage

Building Type[9]	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz[8]	15 Hz and above[8]
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
Unreinforced or light framed structures. Residential or light commercial type buildings.	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 8 Values referred to are at the base of the building: and
Note 9 For transient vibration effecting unreinforced or light framed structures at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.

Unlike noise which travels through air, the transmission of vibration is highly dependent on substratum conditions between the source/s and receiver. Also dissimilar to noise travelling through air, vibration levels diminish quickly over distance, thus an adverse impact from vibration on the broader community is not typically expected. Vibration during works is considered an intermittent source associated with two main types of impact: disturbance at receivers and potential architectural/structural damage to buildings. Generally, if disturbance issues are controlled, there is limited potential for structural damage to buildings.

Ground Vibration – Minimum Working Distances from Sensitive Receivers

While this is not a transport (roads or rail) project, The Transport for NSW Construction Noise and Vibration Strategy (CNVS) provides guidance for minimum working distances. As a guide, minimum working distances from sensitive receivers for typical items of vibration intensive plant are listed in Table 20 of the CNVS. The minimum distances are quoted for both “cosmetic” damage (refer BS 7385) and human comfort (refer OH&E’s Assessing Vibration - a technical guideline). DIN 4150 has criteria of particular reference for heritage structures. Table 3-8 provides the recommended minimum safe working distances for vibration intensive plant from sensitive receivers.

Table 3-8 Recommended Minimum Safe Working Distances for Vibration Intensive Plant from Sensitive Receiver

Plant Item	Rating / Description	Minimum Distance Cosmetic Damage		Minimum Distance Human Response (NSW EPA Guideline)
		Residential and Light Commercial (BS 7385)	Heritage Items (DIN 4150, Group 3)	
Vibratory Roller	<50 kN (1-2 tonne)	5m	11m	15m to 20m
	<100 kN (2-4 tonne)	6m	13m	20m
	<200 kN (4-6 tonne)	12m	15m	40m
	<300kN (7-13 tonne)	15m	31m	100m
	>300kN (13-18 tonne)	20m	40m	100m
	>300kN (>18 tonne)	25m	50m	100m
Small Hydraulic Hammer	300kg (5 to 12 t excavator)	2m	5m	7m
Medium Hydraulic Hammer	900kg (12 to 18 t excavator)	7m	15m	23m
Large Hydraulic Hammer	1600kg (18 to 34 t excavator)	22m	44m	73m
Vibratory Pile Driver	Sheet Piles	2m to 20m	5m to 40m	20m
Pile Boring	≤ 800mm	2m (nominal)	5m	4m
Jack Hammer	Hand Held	1m (nominal)	3m	2m

While significant vibration generating activities are not expected as part of the proposal, during construction it is recommend if any of the above activities are planned, they be limited to vibratory roller <100 kN (2-4 tonne), and medium hydraulic hammer 900kg (12 to 18 t excavator).

3.3 Operational Noise – NSW Noise Policy for Industry

The NPfI provides guidance on the assessment of operational noise impacts associated with the projects operation. The NPfI assessment procedure has two components:

- Controlling intrusive noise impacts in the short-term for residences
- Maintaining noise level amenity for residences and other land uses.

Project Intrusiveness Noise Levels

According to the NPfI, the intrusiveness of a noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the $L_{Aeq,15min}$ descriptor) does not exceed the background noise level measured in the absence of the source by more than 5 dB(A). The project intrusiveness noise level, which is only applicable to residential receivers, is determined as follows:

$L_{Aeq,15minute}$ Intrusiveness noise level = Rating Background Level ('RBL') plus 5 dB(A)

For conservatism RBL's taken from 419 Conadilly Street have been utilised. Based on the measured and adopted noise levels outlined in Table 2-2, The intrusiveness noise levels for residential receivers are provided in Table 3-9.

Table 3-9 Intrusiveness Noise Levels

Period	RBL. L_{A90}, dB(A)	Intrusiveness noise level (RBL + 5), dB(A)
Day	40	45
Evening	31	36
Night	30	35

Amenity Noise Levels

The project amenity noise levels for different time periods of day are determined with consideration to Section 2.4 of the NPfI. The NPfI recommends amenity noise levels ($L_{Aeq,period}$) for various receivers including residential, commercial, industrial receivers and sensitive receivers such as schools, hotels, hospitals, churches and parks. These "recommended" amenity noise levels represent the objective for total industrial noise experienced at a receiver location. However, when assessing a single industrial development and its impact on an area, "project" amenity noise levels apply.

The NPfI recommended amenity noise levels are shown in 3-10 below.

Table 3-10 NPfI Recommended Amenity Noise Levels

Type of Receiver	Noise Amenity Area	Time of Day[10, 11]	Recommended amenity noise level, LAeq, dB(A)[12, 13]
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks	See column 4	See column 4	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School classroom (internal)	All	Noisiest 1-hour period when in use	35[14]
Hospital ward	All		
- Internal		Noisiest 1-hour	35
- External		Noisiest 1-hour	50
Place of worship (internal)	All	When in use	40
Passive recreation (e.g. national park)	All	When in use	50
Active recreation (e.g. school playground, golf course)	All	When in use	55
Commercial premises	All	When in use	65
Industrial premises	All	When in use	70
Industrial interface (applicable only to residential noise amenity areas)	All	When in use	Add 5 dB(A) to recommended noise amenity area

Note 10 Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.

Note 11 On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.

Note 12 The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

Note 13 The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated

Note 14 In the case where existing schools are affected by noise from existing industrial noise sources, the acceptable LAeq noise level may be increased to 40 dB LAeq(1hr)

High Traffic

The level of transport noise, road traffic noise in particular, may be high enough to make noise from an industrial source effectively inaudible, even though the LAeq noise level from that industrial noise source may exceed the project amenity noise level. In such cases the project amenity noise level may be derived from the LAeq, period(traffic) minus 15 dB(A).

This high traffic project amenity noise level may be applied only if all the following apply:

- traffic noise is identified as the dominant noise source at the site
- the existing traffic noise level is 10 dB or more above the recommended amenity noise level for the area
- it is highly unlikely traffic noise levels will decrease in the future.

In this case based on noise measurements and attended observations when comparing to the above critieria, the high traffic application does not apply.

To ensure that the total industrial noise level (existing plus new) remain within the recommended amenity noise levels for an area, the project amenity noise level that applies for each new industrial noise source is determined as follows:

Project amenity noise level = Recommended amenity noise level (Table 3-10) – 5dB(A)

Additionally, given that the intrusiveness noise level is based on a 15-minute assessment period and the project amenity noise level is based on day, evening and night assessment periods, the NPfI provides the following guidance on adjusting the $L_{Aeq,(period)}$ level to a representative $L_{Aeq,15minute}$ level in order to standardise the time periods.

$L_{Aeq(15minute)} = L_{Aeq(period)} + 3dB(A)$

The project amenity noise levels ($L_{Aeq,15min}$) for sub-urban residences and other receptors applied for this project are shown in Table 3-11.

Table 3-11 Project Amenity Noise Levels

Type of Receiver	Noise Amenity Area	Time of Day	Recommended Noise Level, dB(A)	
			$L_{Aeq,\ Period}$	$L_{Aeq,\ 15min}$
Residence	Sub-Urban	Day	55 – 5 = 50	50 + 3 = 53
		Evening	45 – 5 = 40	40 + 3 = 43
		Night	40 – 5 = 35	35 + 3 = 38
Active Recreation Area (e.g. school playground, golf course)	All	When in use	55 – 5 = 50	50 + 3 = 53
School Classroom (Internal)	All	Noisiest 1 hour when in use	35 – 5 = 30	30 + 3 = 33

Project Noise Trigger Levels

The project noise trigger level is the lower of the intrusiveness and the amenity noise levels. Table 3-12 presents the project noise trigger levels for the day, evening, and night-time periods.

Table 3-12 Project Noise Trigger Levels

Type of receiver	Assessment period	Intrusiveness noise levels, $L_{Aeq,15min}$, dB(A)	Amenity noise levels, $L_{Aeq,15min}$, dB(A)	Project noise trigger levels, $L_{Aeq,15min}$, dB(A)
Residential Sub-Urban	Day	45	53	**45**
	Evening	36	43	**36**
	Night	35	38	**35**
Active Recreation Area (e.g. school playground, golf course)	When in use	-	53	**53**
School Classroom (External)[15]	When in Use	-	43	**43**

Note 15 Conversion of trigger levels from internal to external for school classroom and assumes 10dB(A) loss from outside to inside through open window.

Maximum Noise Level Assessment

The NPfI requires the potential for sleep disturbance to be assessed by considering maximum noise levels events during the night-time period.

Where the subject development/premises night-time noise levels at a residential location exceed the following screening levels a detailed maximum noise level event assessment should be undertaken:

- $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the RBL, and the number of times this happens during the night-time period.

Based on the adopted background noise levels during the night, the sleep disturbance criteria for the nearest noise sensitive residential receivers are provided in Table 3-13.

Table 3-13 Night-Time Sleep Disturbance Screening Levels

Receiver type	Assessment Level $L_{Aeq,15min}$, dB(A)	Assessment Level L_{AFmax}, dB(A)
Residential	40	52

The RNP (DECCW 2011) provides additional information on sleep disturbance and concludes that:

- *Maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep*
- *One or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.*

The above references identify that internal noise levels of 50 to 55 dB(A), are unlikely to cause awakenings. On the assumption that there is a 10 dB(A) outside-to-inside noise loss through an open window (see Section 2.6 of the NPfI, p15), this indicates that external noise levels of LAmax 60 to 65 dB(A) are unlikely to cause awakening reactions.

3.4 NSW Road Noise Policy (RNP)

The NSW Road Noise Policy (RNP) recommends various criteria for different road and residential developments and uses. Although it is not mandatory to achieve the noise assessment criteria in the RNP, proponents will need to provide justification if it is not considered feasible or reasonable to achieve them. Based on the definitions in the RNP, Conadilly Road is considered to be a sub arterial / arterial road. Based on this, the following noise goals for residences taken from Table 3 of the RNP are provided in Table 3-14 Below.

Table 3-14 Road Noise Policy Goals

Road Category	Day	Night
Existing residences affected by additional traffic on existing sub-arterial / arterial roads generated by land use development	60 $L_{Aeq(15hr)}$ External	55 $L_{Aeq(9hr)}$ External

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

4. Assessment of Potential Impacts

4.1 Construction Noise

Construction can occur in the vicinity of residences or other sensitive land uses and be variable in times of occurrence. These aspects of construction can exacerbate noise levels and their effects. Construction noise by its nature is temporary, may not be amenable to purpose-built noise control measures applied to industrial processes, and may move as construction progresses. With these constraints in mind, the ICNG was developed to focus on applying a range of work practices most suited to minimise construction noise impacts, rather than focusing only on achieving numeric noise levels. While some noise from construction sites is inevitable, the aim of the Guideline is to protect much of residences and other sensitive land uses from noise pollution most of the time.

While it is unknown at this stage what specific plant and equipment are planned to be used, generally the typical construction activity on the proposal will be in the form of construction of the office building. Other equipment may be used however it is anticipated that they would produce similar noise emissions. Therefore, an assumed construction sequence would be:

- Excavation/Site preparation.
- Building of site facilities.

Table 4-1 provides general plant and machinery data that has been used to predict noise levels at the neighbouring properties. The noisiest data has been chosen for each piece of plant/machinery to present a worst-case scenario.

Table 4-1 Plant and Equipment Noise Levels

Plant Item	Activity Noise Level L_{Aeq} @ 10m	DEFRA Construction Noise Database	Anticipated Usage %[16]
Excavation			
Dozer	80	Table 2 Ref 10	50
Tracked Excavator	79	Table 2 Ref 14	50
Articulated Dump Truck	74	Table 2 Ref 32	50
Roller	73	Table 2 Ref 38	50
Building			
Concrete Pump & Cement Mixer	67	Table 4 Ref 24	50
Poker Vibrator	69	Table 4 Ref 34	50
Mobile Telescopic Crane	67	Table 4 Ref 36	50
Diesel Generator	61	Table 4 Ref 75	90

Note 16The sound power levels for the individual plant items are worst-case levels representative of the equipment operating at maximum capacity. In practice, not all plant items would operate at maximum capacity at the same time and therefore the estimated usage has been adjusted to reflect this. This adjustment is consistent with RAPT Consulting experience on similar projects.

Construction Operations

Acoustic modelling was undertaken using Soft Noise "Predictor" to predict the effects of construction noise. Predictor is a computer program for the calculation, assessment and prognosis of noise propagation. Predictor calculates environmental noise propagation according to ISO 9613-2, "Acoustics – Attenuation of sound during propagation outdoors". Terrain topography, ground absorption, atmospheric absorption and relevant shielding objects are taken into account in the calculations.

Enhancing Weather Conditions

Fact Sheet D of the NPfI provides guidance for accounting for noise-enhancing weather conditions. Two options are available to consider meteorological effects:

1. Adopt the noise-enhancing meteorological conditions for all assessment periods for noise impact assessment purposes without an assessment of how often these conditions occur – a conservative approach that considers source-to-receiver wind vectors for all receivers and F class temperature inversions with wind speeds up to 2 m/s at night. Or

2. Determine the significance of noise-enhancing conditions. This involves assessing the significance of temperature inversions (F and G class stability categories) for the night-time period and the significance of light winds up to and including 3 m/s for all

assessment periods during stability categories other than E, F or G. Significance is based on a threshold of occurrence of 30% determined in accordance with the provisions in this policy. Where noise-enhancing meteorological conditions occur for less than 30% of the time, standard meteorological conditions may be adopted for the assessment.

As a detailed analysis of the significance of noise enhancing conditions has not been undertaken, option 1 has been utilised. Table D1 from the NPfI is reproduced in Table 4-2 and shows the noise enhancing meteorological conditions that have been adopted for this assessment

Table 4-2Noise Enhancing Meteorological Conditions

Meteorological Conditions	Meteorological Parameters
Noise-enhancing meteorological conditions	Daytime/evening: stability category D with light winds (up to 3 m/s at 10 m AGL). Night-time: stability category F with winds up to 2 m/s at 10 m AGL.

Note 17 m/s = metres per second; m = metres; AGL = above ground level; where a range of conditions is nominated, the meteorological condition delivering the highest-predicted noise level should be adopted for assessment purposes. However, feasible and reasonable noise limits in consents and licences derived from this process would apply under the full range of meteorological conditions nominated under standard or noise-enhancing conditions as relevant. All wind speeds are referenced to 10 m AGL. Stability categories are based on the Pasquill–Gifford stability classification scheme.

Other Key assumptions in the model include:

- topographical information was obtained from NSW Government Spatial Services
- all cleared areas were modelled considering a conservative ground factor of 0.8 to account for grassed areas
- all residential receivers were modelled at 1.5 metres above the ground surface

Construction noise levels have been predicted based on the potential construction noise levels provided in Table 4-1. These noise levels represent different equipment noise levels and give an idea how noise levels may change across the proposal area with different activities being undertaken.

The magnitude of off-site noise impact associated with construction would be dependent upon several factors:

- The intensity of construction activities
- The location of construction activities
- The type of equipment used
- Intervening terrain; and
- The prevailing weather conditions.

In addition, construction machinery would likely move about the study area, variously altering the directivity of the noise source with respect to individual receivers and their distances.

Noise levels at sensitive receivers can be significantly lower than the worst-case scenario when the construction works move to a more distant location in the work area. An example of this is shown in Figure 4-1.

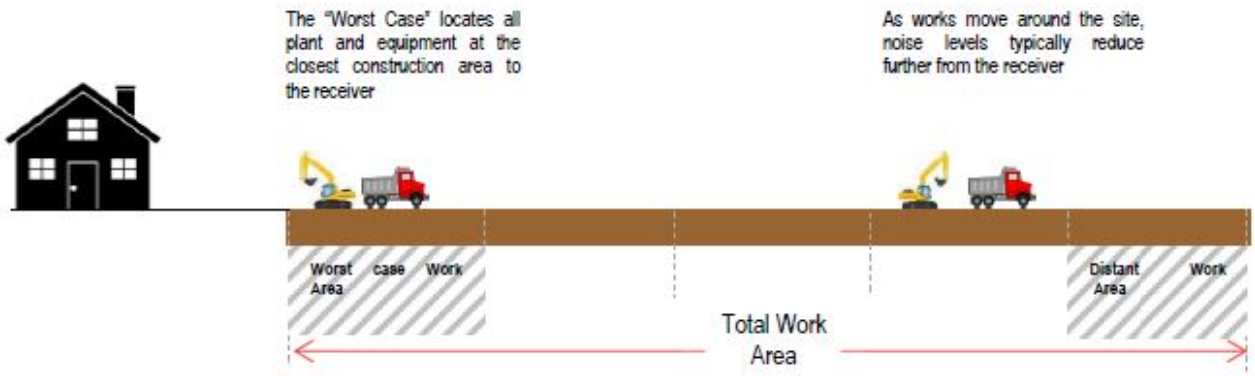


Figure 4-1 Example of Differing Work Areas

During any given period, the machinery items to be used in the study area would operate at maximum sound power levels for only brief stages. At other times, the machinery may produce lower sound levels while carrying out activities not requiring full power. It is highly unlikely that all construction equipment would be operating at their maximum sound power levels at any one time. Finally, certain types of construction machinery would be present in the study area for only brief periods during construction. Therefore, the modelled construction noise results are considered to represent a worst-case scenario. Two scenarios were assessed, one for the car wash area and one for the building area. These scenarios also demonstrate how received noise levels can change due to location of construction activity.

Construction Noise Impact Assessment Results

Noise levels were predicted to each assessed receptor assuming receiver heights of 1.5m above ground level for typical construction activities. Table 4-3 summarises the maximum predicted noise level from each of the construction scenarios at identified residential receptors. Predicted exceedances of NML's are highlighted in RED.

Table 4-3 Predicted Construction Noise Levels dB(A) Leq(15min)

Receiver	Excavation East	Excavation West	Building East	Building West	Standard Hours NML	Highly Affected Noise Level
R1	48	58	37	47	50	75

Receiver	Excavation East	Excavation West	Building East	Building West	Standard Hours NML	Highly Affected Noise Level
R2	45	46	35	36	50	75
R3	31	34	21	23	50	75
R4	30	33	20	22	50	75
R5	30	33	19	22	50	75
R6	28	31	17	20	50	75
R7	28	31	17	20	50	75
R8	30	33	20	22	50	75
R9	30	33	19	22	50	75
R10	38	46	27	35	50	75
R11	39	47	28	36	50	75
R12	45	48	34	38	50	75
R13	46	50	35	39	50	75
R14	47	49	36	34	50	75
R15	47	44	37	34	50	75

Receiver	Excavation East	Excavation West	Building East	Building West	Standard Hours NML	Highly Affected Noise Level
R16	43	49	32	33	50	75
R17	44	48	33	33	50	75

The results of the construction assessment indicate compliance with NML's can be achieved in all situations with the exception of excavation east works modelling scenarios suggest there could be exceedances at R10 – R15 for excavation works west at R1. The highly affected noise level is expected to be complied with in all situations.

While NML's can be achieved in most cases, there is a risk for NML's to be exceeded depending on work activities and locations. With this in mind it is recommended a construction noise management plan be implemented as part of the proposal to minimise the risk of adverse noise emanating upon the community.

Modelled scenarios are shown in Figures 4-2 – 4-5.

Figure 4-2 Excavation East dB(A) Leq(15min)

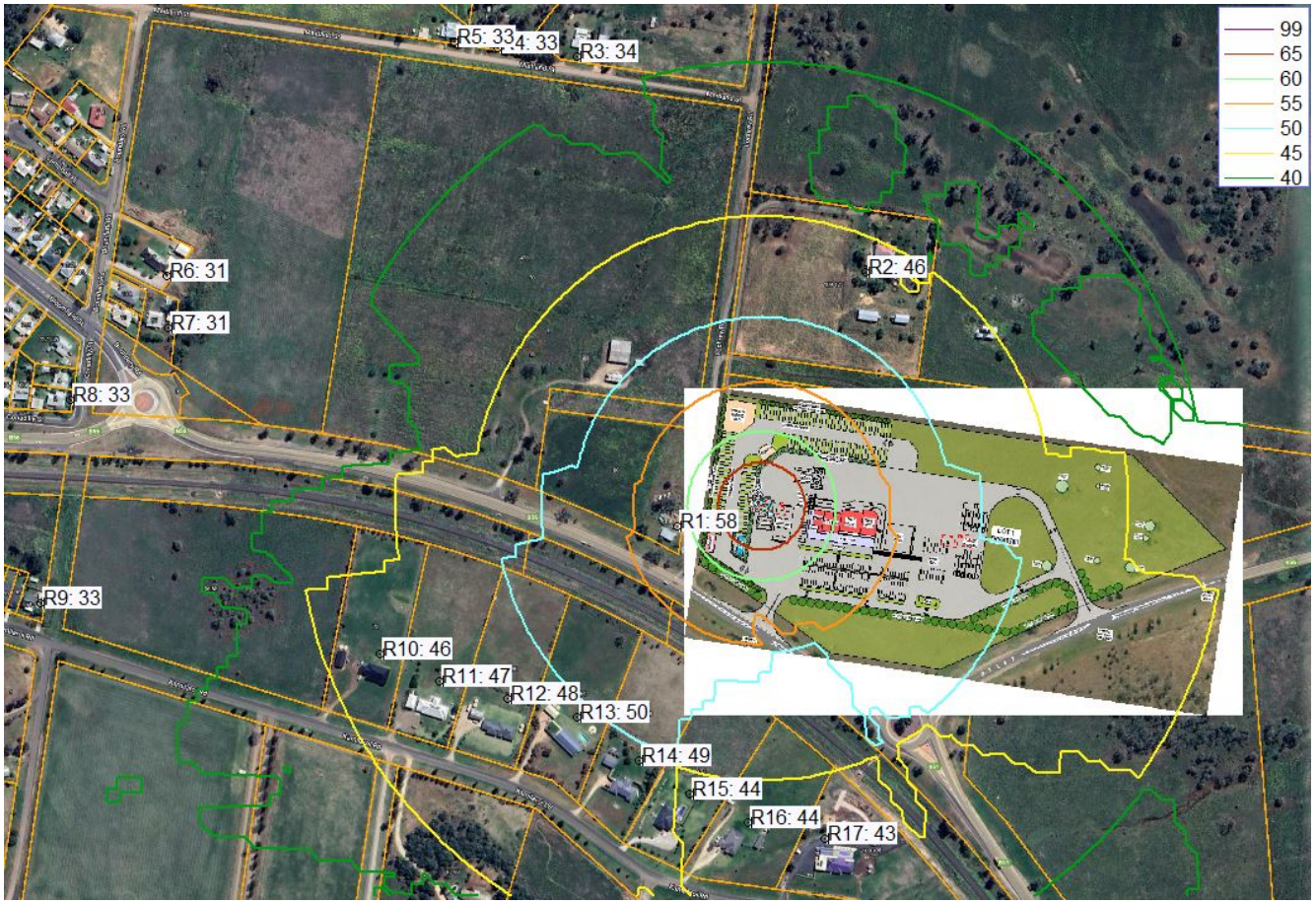


Figure 4-3 Excavation West dB(A) Leq(15min)

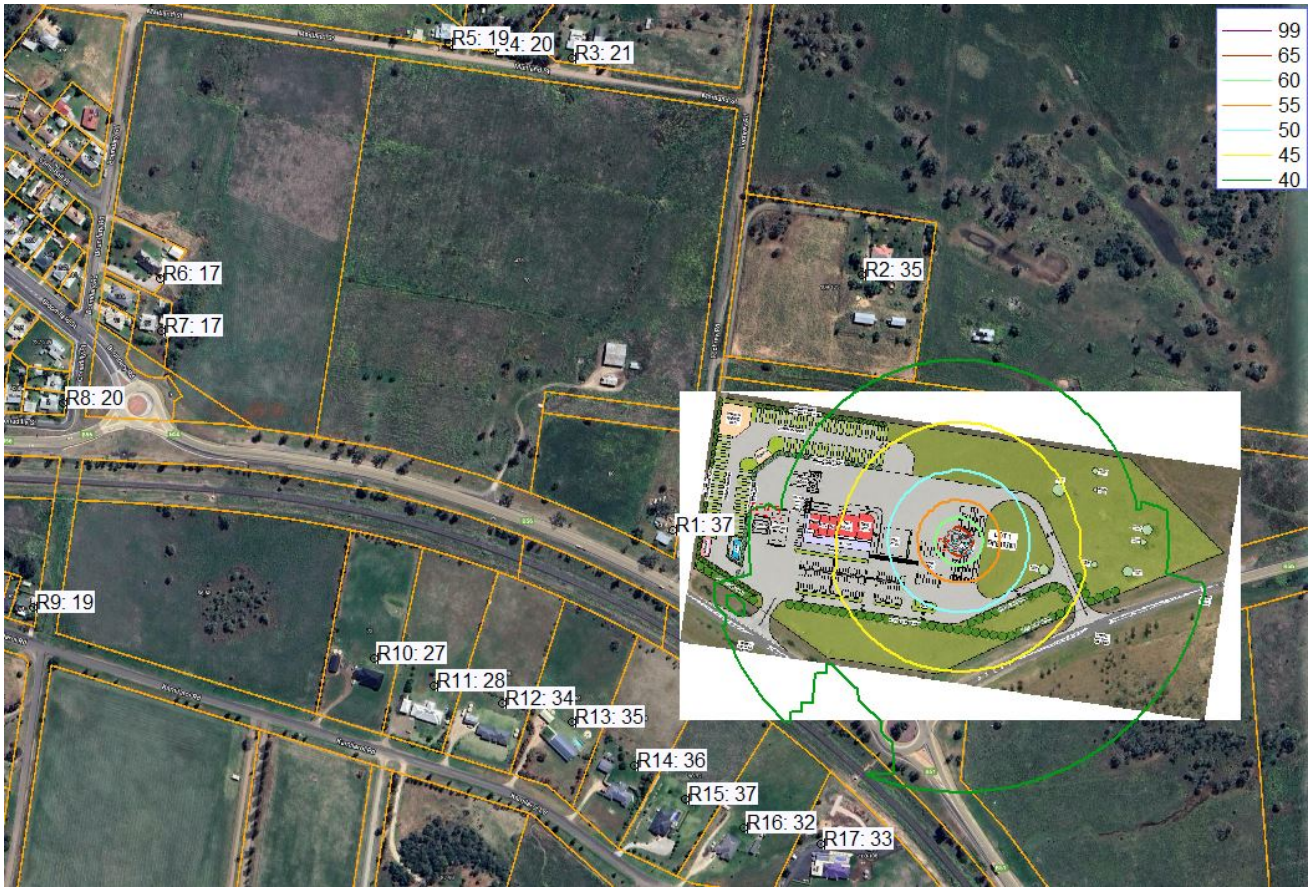


Figure 4-4 Building East dB(A) Leq(15min)

Figure 4-5 building West dB(A) Leq(15min)

4.2 Construction Noise Management Plan

A Construction Noise Management Plan (CNMP) could be prepared prior to the commencement of works and implemented through all phases of the proposed construction works. The CNMP would provide the framework for the management of all potential noise impacts resulting from the construction works and would detail the environmental mitigation measures to be implemented throughout the construction works.

4.2.1 Planning and design of construction works

During the detailed planning, scheduling and design of the construction works the following noise management and mitigation measures should be investigated and, as required, implemented prior to the commencement of noise generating works.

Notification before and during construction

- Affected neighbours to the construction works would be advised in advance of the proposed construction period at least 1 week prior to the commencement of works.
- Consultation and communication between the site and neighbours to the site would assist in minimising uncertainty, misconceptions and adverse reactions to noise.
- All site workers (including subcontractors and temporary workforce) should be familiar with the potential for noise impacts upon residents and encouraged to take all practical and reasonable measures to minimise noise during their activities.

- The constructor or site supervisor (as appropriate) should provide a community liaison phone number and permanent site contact so that the noise related complaints, if any, can be received and addressed in a timely manner.
- The constructor (as appropriate) should establish contact with the residents and communicate, particularly when noisy activities are planned.

Best practice measures when operating on construction site

- Construction works should adopt Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) practices as addressed in the ICNG. BMP includes factors discussed within this report and encouragement of a project objective to reduce noise emissions. BATEA practices involve incorporating the most advanced and affordable technology to minimise noise emissions.
- Ensure that all construction works scheduled for standard construction hours comply with the start and finish time.
- Where practical, simultaneous operation of dominant noise generating plant should be managed to reduce noise impacts, such as operating at different times or increase the distance between plant and the nearest identified receiver.
- High noise generating activities such as jack hammering should only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block.
- Where possible, reversing beepers on mobile equipment would be replaced with low-pitch tonal beepers (quackers). Alternatives to reversing beepers include the use of spotters and designing the site to reduce the need for reversing may assist in minimising the use of reversing beepers.
- Equipment which is used intermittently should be shut down when not in use.
- All engine covers should be kept close while equipment is operating.
- The construction site would be arranged to minimise noise impacts by locating potentially noisy activities away from the nearest receivers wherever possible.
- To minimise heavy equipment handling noise, material stockpiles should be located as far as possible from the nearest receptors
- Loading and unloading areas should be located as far as possible from the nearest receptors.
- Where possible, trucks associated with the work area should not be left standing with their engine operating in a street adjacent to a residential area.
- All vehicular movements to and from the site should comply with the appropriate regulatory authority requirement for such activities.

Complaint handling

Noise and vibration monitoring should be undertaken upon receipt of a complaint to identify and quantify the issue and determine options to minimise impacts.

- If valid noise and/or vibration data for an activity is available for the complainant property, from works of a similar severity and location, it is not expected that monitoring will be repeated upon receipt of repeated complaints for these activities, except where vibration levels are believed to be potentially damaging to the building.

- Any noise and/or vibration monitoring should be undertaken by a qualified professional and with consideration to the relevant standards and guidelines. Attended noise and/or vibration monitoring should be undertaken upon receipt of a noise and/or vibration complaint. Monitoring should be undertaken and reported within a timely manner (say 3 to 5 working days). If exceedance is detected, the situation should be reviewed to identify means to reduce the impact to acceptable levels.

4.3 Operational Noise

For the purposes of this assessment, the site has been assessed as having the following key features:

- A total of 12 bowsers including 8 for light vehicle sand 4 four heavy vehicles, which are provided in separate areas

- A convenience store with a floor area of approximately 550sqm associated with the service station that would also sell food, drinks, and general goods

- Two fast food outlets with a total floor area of approximately 840sqm, that would provide drive through facilities along the northern side of the building and approximately 120 internal seats

- Parking areas for trucks, RVs, light vehicles and hydrogen/electric vehicles

- A BBQ facility for use by service centre patrons

- A caravan park which would accommodate approximately 47 berths and provide BBQ facilities, amenities building, and a building to accommodate the manager and service patrons.

Acoustic modelling was also undertaken using Bruel and Kjaer's "Predictor" to predict the effects of site operational noise.

Modelling results are based on available information provided and should only be used as a guide for comparative purposes. Plant layout and building structures were based on information provided at the time of the assessment. Noise model setup are as outlined in section 4.1 and noise enhancing meteorological conditions were utilised as per Table 4-2.

Additionally a 2.4 metre acoustic fence has been assumed as shown in Figures 4-6 – 4-11 as blue consistent with the conceptual site layout provided in Figure 1-2 . Acoustic fences are impervious to the ground to the recommended height and are generally constructed from colorbond, lapped and capped timber, bricks, hebel power panel or concrete blocks. No gaps should exist in the fence. There are other options available, and the higher the fence, the greater the density and being as close as possible to the source in question make an acoustic fence more effective. A material surface density of 10 kg/m2 is typically sufficient.

Mechanical Plant

At this stage, the mechanical plant has not been selected for the development. However, it is not uncommon for the mechanical plant not to be selected prior to submitting a development application. Mechanical plant may consist of an air conditioning system, refrigeration and exhaust fans. A typical range of sound power levels for mechanical plant is given in Table 4-4 below.

Table 4-4 Sound Power Levels of Mechanical Plant

Plant Type	SWL dB(A)
Small (single fan) condenser	65
Medium (double fan) condenser	70
Large (double fan) condenser	80

For conservatism, is has been assumed that 2 large double fan condenser units will be operating as outdoor sources on top of the new service station building / food outlet building.

Drive Through Intercom

A sound power level of 70 SWL dB(A) has been adopted from RAPT Consulting's internal database.

Service Station / Convenience Store and Fast Food Outlet Traffic Generation

Information sourced from the Amber Traffic & Transportation Direction assessment *Gunnedah Highway Service Centre 127-141 Lochrey Road, Gunnedah Traffic and Transport Assessment March 2022* for the project indicates:

- A maximum 174 total trips per evening peak hour for fuel and food outlet stops.
- A maximum of 280 total trips per peak hour for fast food outlet traffic generation.

For the purposes of this assessment the following assumptions have been made when determine the potential traffic generation for the service station and associated convenience store and fast-food outlets:

- The morning peak hour has conservatively been assessed as having the same traffic generation as the evening peak hour
- Given the limited residential land use in the surrounding area it has been assumed that 80% of the vehicle movements for the fast food outlets are associated with vehicles using the service station and are not expected to generate an additional vehicle movement on the road network or at the site access. As such, the fast food outlets are expected to generate 54 vehicle movements in each of the peak hours, and
- The vehicle movements are evenly split between inbound and outbound vehicle movements

Based on the above assumptions the service station and associated convenience store and fast food outlets are expected to generate the following traffic volumes in the morning and evening peak hour.

Table 4-5 Service Station Peak Hour Traffic Generation

	AM Peak	PM Peak
Arriving Trips	114	114
Departing Trips	114	114
Total	228	228

This total number has been converted to 57 trips in a 15 minute period.

A sound power level of 86 SWL dB(A) has been adopted for these vehicle movements on the site for idling and travelling at 10km/hr, 78 SWL dB(A) for a car door opening and closing taken from RAPT Consulting's internal database. Additionally 10% have been assumed to be trucks using the diesel bowsers with a sound power level of 100 SWL dB(A).

Caravan Park Traffic Generation

For the purposes of this assessment, it has been assumed that 70% of all berths generate one vehicle movement to the site in the evening peak hour and one vehicle movement from the site during the morning peak hour. As such, the caravan park is expected to generate the following traffic volumes in the morning and evening peak hour.

Table 4-6 Caravan Park Peak Hour Traffic Generation

	AM Peak	PM Peak
Arriving Trips	0	33
Departing Trips	33	0
Total	33	33

This total number has been converted to 8 trips in a 15 minute period. A sound power level of 86 SWL dB(A) has been adopted for these vehicle movements on the site for idling and travelling at 10km/hr, 78 SWL dB(A) for a car door opening and closing.

Waste management is understood to be undertaken during operating particularly daytime hours only sound power levels for garbage trucks operating onsite have been sourced from RAPT Consulting's database. A sound power level of 100 dB(A) operating for 60 seconds in a 15-minute period has been assumed.

Caravan Park Noise

Campers noise in the form of human normal to raised voice has been sourced from RAPT Consulting's database and has been assessed with a sound power level of 70 dB(A). Camper noise has been assumed to be operating from the camping area in the form of 4 persons conversing in each of the camping sites for 50% of the time as they would not all be speaking simultaneously.

Music emanating from the Barbecue area has also been conservatively modelled with a sound power level of 85 SWL dB(A).

All items were modelled operating simultaneously to simulate a reasonable worst case scenario with weather enhancing conditions as previously outlined. The results are provided in Table 4-7. Any predicted exceedances are highlighted in RED.

Table 4-7 Operational Noise Modelling Results dB(A) Leq(15min)

Receiver	Cumulative Results	Project Noise Trigger Level Day / Evening / Night	Caravan Park Noise Results	Project Noise Trigger Level Day / Evening / Night	Service Station / Food Service Noise Results	Project Noise Trigger Level Day / Evening / Night
R1	40	45 / 36 / 35	36	45 / 36 / 35	38	45 / 36 / 35
R2	36	45 / 36 / 35	29	45 / 36 / 35	35	45 / 36 / 35
R3	26	45 / 36 / 35	19	45 / 36 / 35	25	45 / 36 / 35
R4	24	45 / 36 / 35	18	45 / 36 / 35	23	45 / 36 / 35
R5	24	45 / 36 / 35	17	45 / 36 / 35	23	45 / 36 / 35
R6	22	45 / 36 / 35	15	45 / 36 / 35	21	45 / 36 / 35
R7	23	45 / 36 / 35	17	45 / 36 / 35	22	45 / 36 / 35
R8	24	45 / 36 / 35	17	45 / 36 / 35	23	45 / 36 / 35
R9	24	45 / 36 / 35	18	45 / 36 / 35	23	45 / 36 / 35
R10	32	45 / 36 / 35	25	45 / 36 / 35	31	45 / 36 / 35
R11	34	45 / 36 / 35	26	45 / 36 / 35	33	45 / 36 / 35
R12	35	45 / 36 / 35	27	45 / 36 / 35	34	45 / 36 / 35
R13	37	45 / 36 / 35	28	45 / 36 / 35	36	45 / 36 / 35
R14	38	45 / 36 / 35	28	45 / 36 / 35	37	45 / 36 / 35
R15	38	45 / 36 / 35	27	45 / 36 / 35	38	45 / 36 / 35
R16	37	45 / 36 / 35	27	45 / 36 / 35	37	45 / 36 / 35
R17	38	45 / 36 / 35	27	45 / 36 / 35	37	45 / 36 / 35

As can be seen in Table 4-5, the modelled results suggest compliance can occur during all peak hour situations as peak hour occurs during daytime from 8:00am to 9:00am and 4:30pm – 5:30pm including cumulative operations of the caravan park and service centre.

The information provided in The Amber Traffic & Transportation Direction assessment indicates the Oxley Highway has a relatively constant level of traffic between 7:00am and 5:00pm and lower traffic volumes outside of these times. Therefore, the peak hour scenarios are considered reasonable worst case and are not expected to occur during evening or night time periods. Even if this did occur the maximum exceedance predicted would be 2 dB(A) for the evening and 3 dB(A) during night which is generally considered imperceptible to barely perceptible to the human ear.

Figures of the operational peak hour results are provided in Figures 4-6 – 4-8

Figure 4-6 Cumulative Operations dB(A) Leq(15min)

Figure 4-7 Service Centre Operations dB(A) Leq(15min)

Figure 4-8 Caravan Park Operations dB(A) Leq(15min)

An evening and night-time modelling scenario was run by conservatively assuming that half of peak hour traffic movements may occur at the caravan park and service centre. The results are shown in Table 4-8.

Table 4-8 Off Peak Operations dB(A) Leq(15min)

Receiver	Cumulative Results	Project Noise Trigger Level Day / Evening / Night	Caravan Park Noise Results	Project Noise Trigger Level Day / Evening / Night	Service Station / Food Service Noise Results	Project Noise Trigger Level Day / Evening / Night
R1	38	45 / 36 / 35	34	45 / 36 / 35	35	45 / 36 / 35
R2	33	45 / 36 / 35	27	45 / 36 / 35	32	45 / 36 / 35
R3	24	45 / 36 / 35	17	45 / 36 / 35	22	45 / 36 / 35
R4	22	45 / 36 / 35	15	45 / 36 / 35	20	45 / 36 / 35
R5	21	45 / 36 / 35	15	45 / 36 / 35	20	45 / 36 / 35
R6	19	45 / 36 / 35	13	45 / 36 / 35	18	45 / 36 / 35
R7	20	45 / 36 / 35	15	45 / 36 / 35	19	45 / 36 / 35
R8	21	45 / 36 / 35	15	45 / 36 / 35	20	45 / 36 / 35
R9	22	45 / 36 / 35	17	45 / 36 / 35	20	45 / 36 / 35

Receiver	Cumulative Results	Project Noise Trigger Level Day / Evening / Night	Caravan Park Noise Results	Project Noise Trigger Level Day / Evening / Night	Service Station / Food Service Noise Results	Project Noise Trigger Level Day / Evening / Night
R10	30	45 / 36 / 35	23	45 / 36 / 35	29	45 / 36 / 35
R11	31	45 / 36 / 35	24	45 / 36 / 35	30	45 / 36 / 35
R12	32	45 / 36 / 35	25	45 / 36 / 35	32	45 / 36 / 35
R13	34	45 / 36 / 35	26	45 / 36 / 35	33	45 / 36 / 35
R14	35	45 / 36 / 35	26	45 / 36 / 35	35	45 / 36 / 35
R15	35	45 / 36 / 35	25	45 / 36 / 35	35	45 / 36 / 35
R16	35	45 / 36 / 35	25	45 / 36 / 35	34	45 / 36 / 35
R17	35	45 / 36 / 35	25	45 / 36 / 35	34	45 / 36 / 35

The results for evening and night time show compliance with all scenarios with the exception of cumulative operations at R1 which is predicted to exceed by 2 dB(A) and 3 dB(A) for evening and night respectively.

These are reasonable worst case scenarios with all items outlined above operating simultaneously. In reality, it is highly unlikely for this scenario to occur where all of these items are operating simultaneously at their sound power levels. Therefore, actual noise levels received can be expected to be significantly lower. Based on this assessment compliance can be expected for the development.

As this was a maximum noise level assessment, sleep disturbance noise goals are expected to be met in all situations

While compliance is expected to be achievable for the proposal, it is recommended that the proposal implement an operational noise management plan as part of its operations to deal with the unlikely occurrence of excessive noise emanating from operations.

The evening and night operational modelled results are provided in Figures 4-9 – 4-11.

Figure 4-9 Evening / Night Cumulative Operational Modelled Results dB(A) Leq(15min)

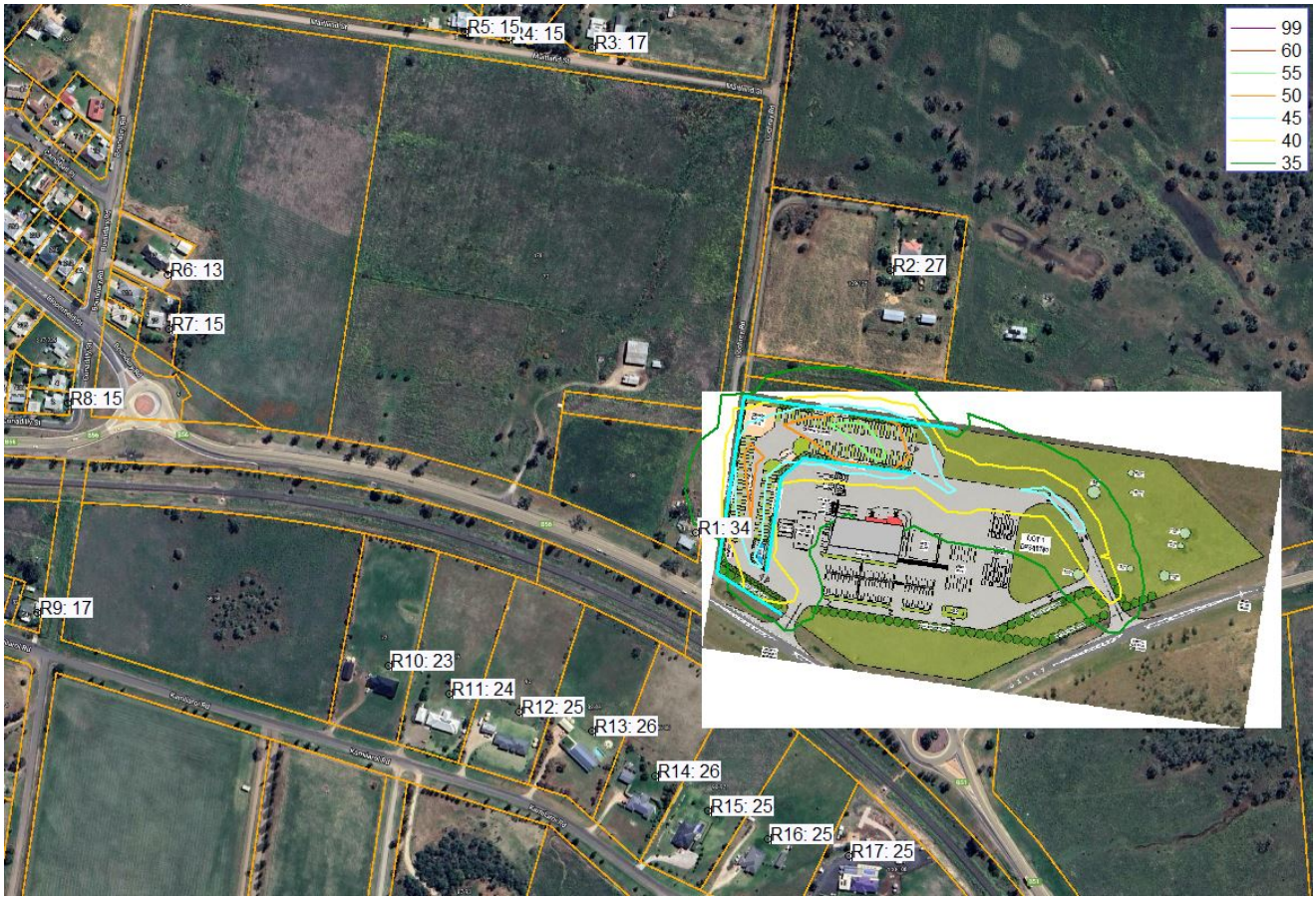


Figure 4-10 Evening / Night Caravan Park Operational Modelled Results dB(A) Leq(15min)

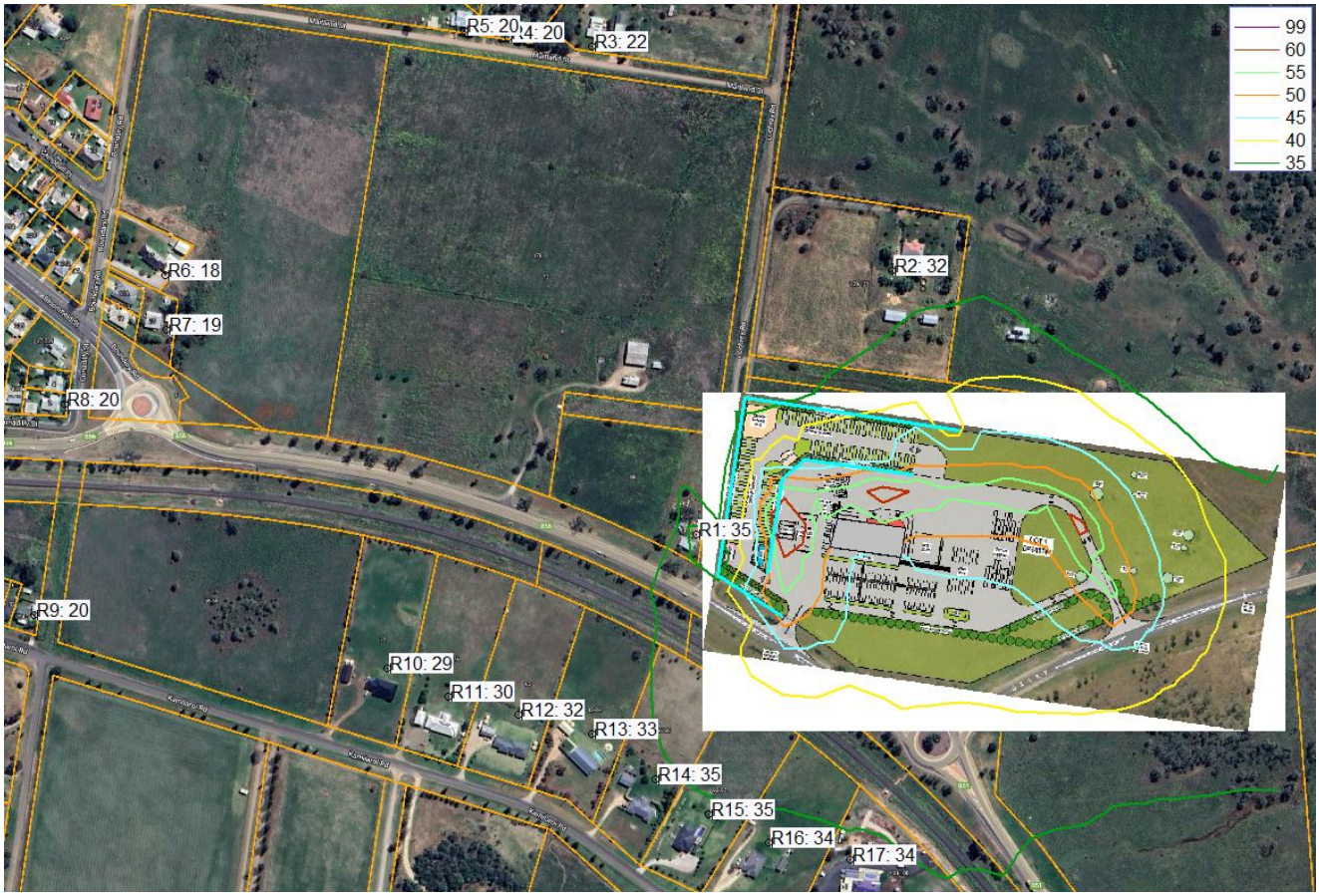


Figure 4-11 Evening / Night Service Centre Operational Modelled Results dB(A) Leq(15min)

Road Noise

Traffic information pertaining to the proposal has been sourced from Amber Traffic & Transport Direction.

Peak hour traffic survey information contained within the report is provided in Table 4-9 along with potential additional vehicle trips as a result of the proposal.

Table 4-9 Traffic Information

Road Situation	Peak Hour Traffic	Additional Vehicles	%Change
AM Peak	261	25	11%
PM Peak	261	14	6%

To increase noise levels by 2dB(A) one would have to increase the cumulative traffic volume by 60%, which in this case does not occur. Therefore, compliance is expected.

With consideration to deceleration and acceleration noises, they can differ from the cruising traffic noise that occurs in the absence of traffic control device or entry and exit points from items such as this proposal. However, with our past experience where noise levels from vehicles were measured at an intersection for both free-flowing and stop-and-go conditions, and the levels were measured to fall within 1dB(A) for each scenario. This outcome can be explained by there being relatively quiet periods with very little to no traffic noise generated from stopped or slow moving vehicles at an intersection, while there is generally more noise generated from faster continuous moving vehicles found under free-flowing traffic conditions. Therefore, while accelerating and decelerating may alter the 'character' of noise, it will not significantly alter the absolute level of noise.

5. Conclusion

This acoustic assessment has been undertaken for NGH to inform a Development Application (DA) for a caravan park and service centre at Gunnedah, NSW.

Construction

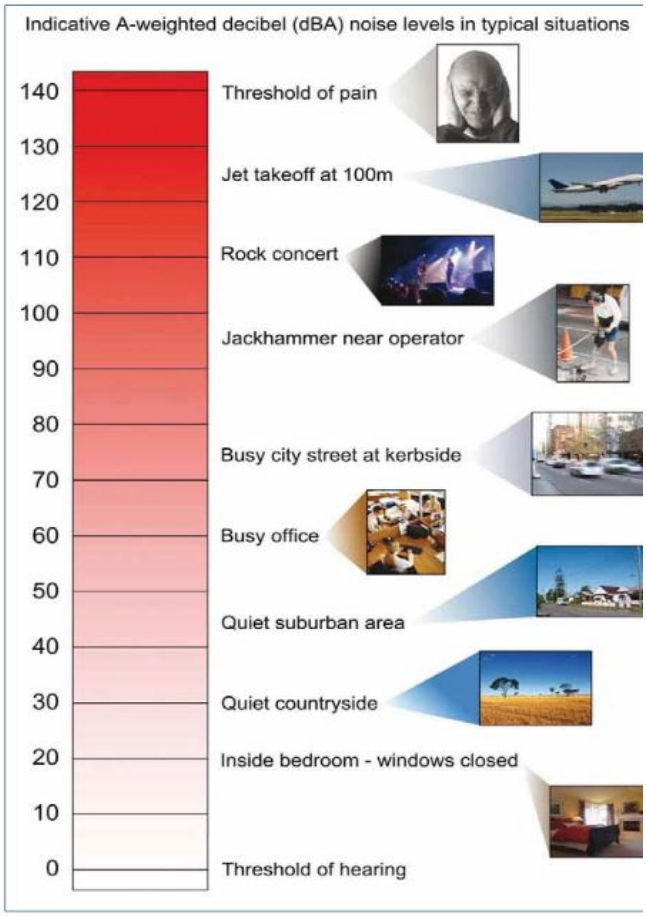
The assessment outlined in this report indicates that construction noise management levels will be complied with in most situations. However, there is the potential for exceedances for some receivers assessed in certain situations. However, the highly noise affected level of 75dB(A) $L_{Aeq(15min)}$ is expected to be complied with. A set of standard mitigation measures for construction noise and vibration have been provided based on anticipated requirements of the proposal. It is believed construction noise can be minimised and managed to be acceptable to the local community through the implementation of a CNMP similar to what has been recommended in this report.

Operation

The results of the assessment indicate the proposal is predicted to comply with established project noise trigger levels.

While compliance is expected to be achievable for the proposal, it is recommended that the proposal implement an operational noise management plan as part of its operations to deal with the unlikely occurrence of excessive noise emanating from operations.

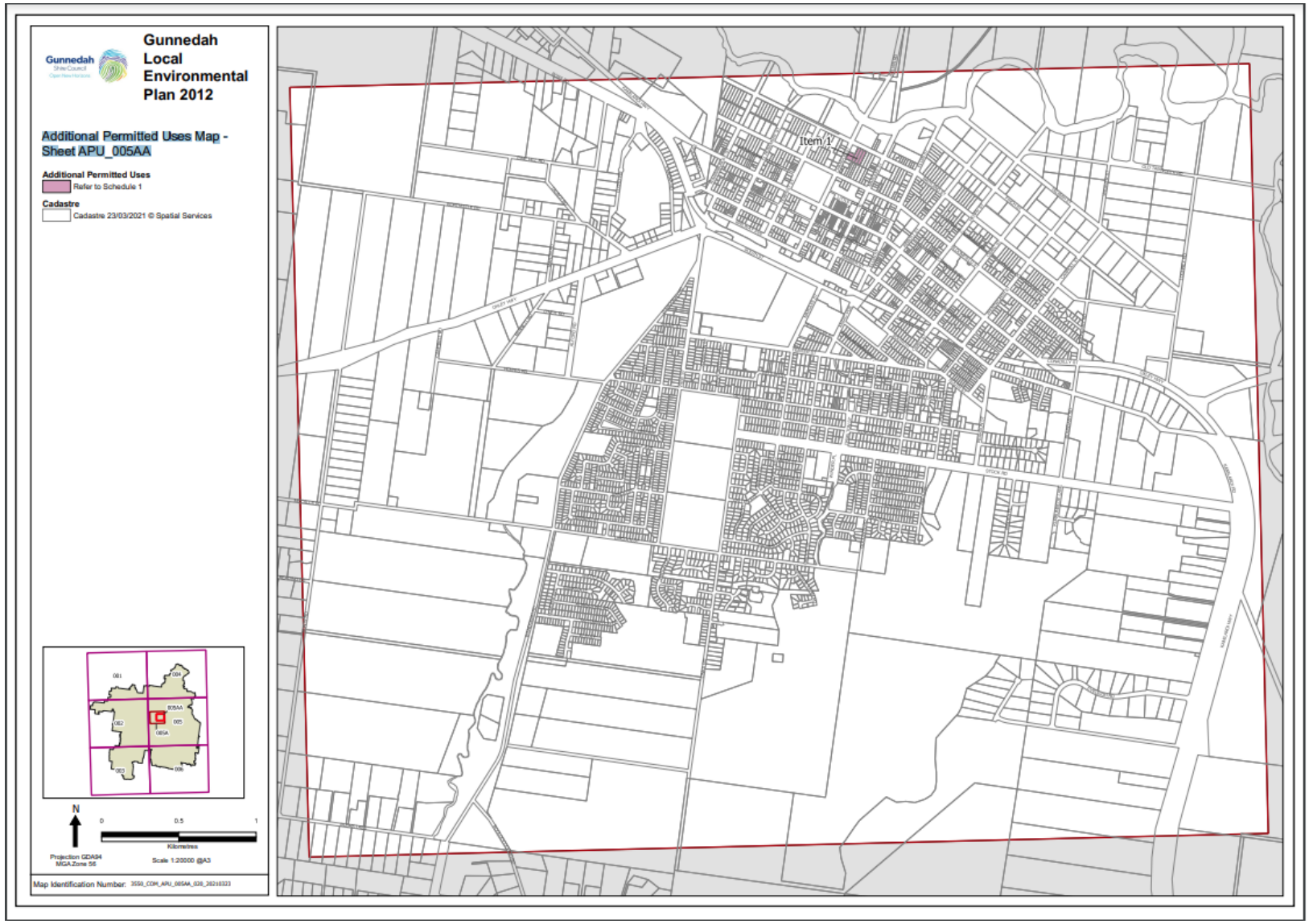
Appendix A: Glossary of Acoustic Terms

Term	Definition
dB	Decibel is the unit used for expressing the sound pressure level (SPL) or power level (SWL) in acoustics. The picture below indicates typical noise levels from common noise sources. 
dB(A)	Frequency weighting filter used to measure 'A-weighted' sound pressure levels, which conforms approximately to the human ear response, as our hearing is less sensitive at very low and very high frequencies.
$L_{Aeq(period)}$	Equivalent sound pressure level: the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
$L_{A10(period)}$	The sound pressure level that is exceeded for 10% of the measurement period.
$L_{A90(period)}$	The sound pressure level that is exceeded for 90% of the measurement period.
L_{Amax}	The maximum sound level recorded during the measurement period.
Noise sensitive receiver	An area or place potentially affected by noise which includes:

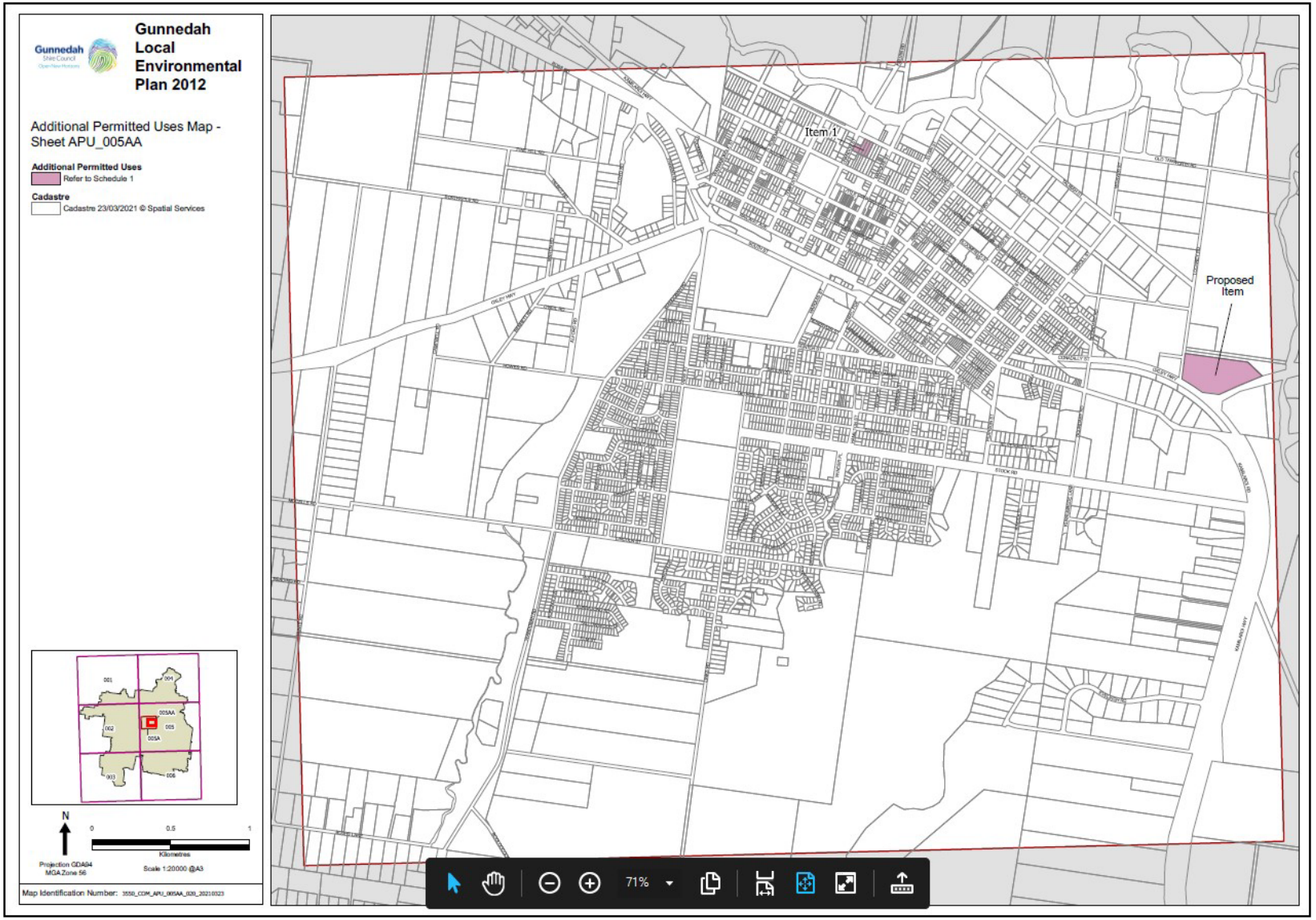
	A residential dwelling. An educational institution, library, childcare centre or kindergarten. A hospital, surgery or other medical institution. An active (e.g. sports field, golf course) or passive (e.g. national park) recreational area. Commercial or industrial premises. A place of worship.
Rating Background Level (RBL)	The overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period.
Feasible and Reasonable (Noise Policy for Industry Definition)	**Feasible** mitigation measure is a noise mitigation measure that can be engineered and is practical to build and/or implement, given project constraints such as safety, maintenance and reliability requirements. Selecting **Reasonable** measures from those that are feasible involves judging whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure. To make a judgement, consider the following: Noise impacts Noise mitigation benefits Cost effectiveness of noise mitigation Community views.
Sound power level (SWL)	The sound power level of a noise source is the sound energy emitted by the source. Notated as SWL, sound power levels are typically presented in dB(A).

Appendix E ADDITIONAL PERMITTED USES MAP

E1.1 Existing Map Sheet



E1.2 Proposed Map Sheet



Appendix A CONCEPT DESIGN

The following plan shows the potential highway service entre and caravan park design, that would be finalised via a DA process if this PP was successful.

PRELIMINARY COPY ONLY

NOT TO BE USED FOR CONSTRUCTION PURPOSES

NORTH

THIS DRAWING MAY NOT BE TO SCALE
REFER TO GRAPHIC SCALE BELOW

1 : 200 — 0 2 4 6 8 10m
1 : 100 — 0 1 2 3 4 5m
1 : 50 — 0 1 2 2.5m
1 : 20 — 0 0.5 1m

NOTES

DO NOT SCALE FROM THIS DRAWING - USE FIGURED DIMENSIONS ONLY

ALL DIMENSIONS AND LEVELS ARE TO BE VERIFIED ON SITE AND THE ARCHITECT NOTIFIED OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION

DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER CONTRACT DOCUMENTS

ELECTRONIC DATA IS ISSUED AS A PROFESSIONAL COURTESY ONLY AND IS FOR COMMUNICATION AT THE DATE OF TRANSMISSION ONLY. IT IS THE RESPONSIBILITY OF THE RECIPIENT TO ASCERTAIN THE ACCURACY AND STATUS OF THE INFORMATION CONTAINED AND TO USE THE INFORMATION APPROPRIATELY

REV	DATE	AMENDMENT
A	05.04.17	ISSUED FOR INFORMATION
B	04.05.21	ISSUED FOR INFORMATION
C	27.05.21	ISSUED FOR INFORMATION
D	05.07.21	ISSUED FOR INFORMATION
E	11.03.22	ISSUED FOR INFORMATION

PROPOSED SERVICE CENTRE & FAST FOOD OUTLETS FOR ZANNES DEVELOPMENTS LOT 1, DP 841781 CORNER OF OXLEY & KAMILAROI HIGHWAYS, GUNNEDAH

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HILLLOCKARTARCHITECTS

TITLE
FEASIBILITY PLAN

DESIGN	DOCUMENTATION
GREG HILL	NP
PLOT DATE	SCALE
11/03/2022	1:1000

SIZE	DRAWING No.	Rev.
A1	Z0917 FD101	E

Appendix C TRAFFIC IMPACT ASSESSMENT

Amber

Traffic & Transportation Direction

Gunnedah Highway Service Centre

127-141 Lochrey Road, Gunnedah

Traffic and Transport Assessment

June 2022

Reference: 193 rep 220628 final

Gunnedah Highway Service Centre

127-141 Lochrey Road, Gunnedah

Traffic and Transport Assessment

Prepared for: Charlie One Pty Ltd

Status: Final report

Date: 28 June 2022

Reference: 193 rep 220628 final

Contact

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Table of Contents

1. Introduction

Amber Organisation has been engaged by Charlie One Pty Ltd to provide a Traffic and Transport Assessment associated with a proposal to amend the Gunnedah Local Environmental Plan 2012 (LEP) with respect to land at 127-141 Lochrey Road, Gunnedah.

The site is proposed to be developed with the intention of constructing a mixed-used development including a service centre with fast food outlets and a campervan park. A Feasibility Plan has been developed for the site which provides a draft internal layout with two vehicle accesses to the site proposed from the eastern and western frontages with Oxley Highway. It is understood the Feasibility Plan is a conceptual model for delivery of the overarching development of the land and is not intended to represent the final development arrangement.

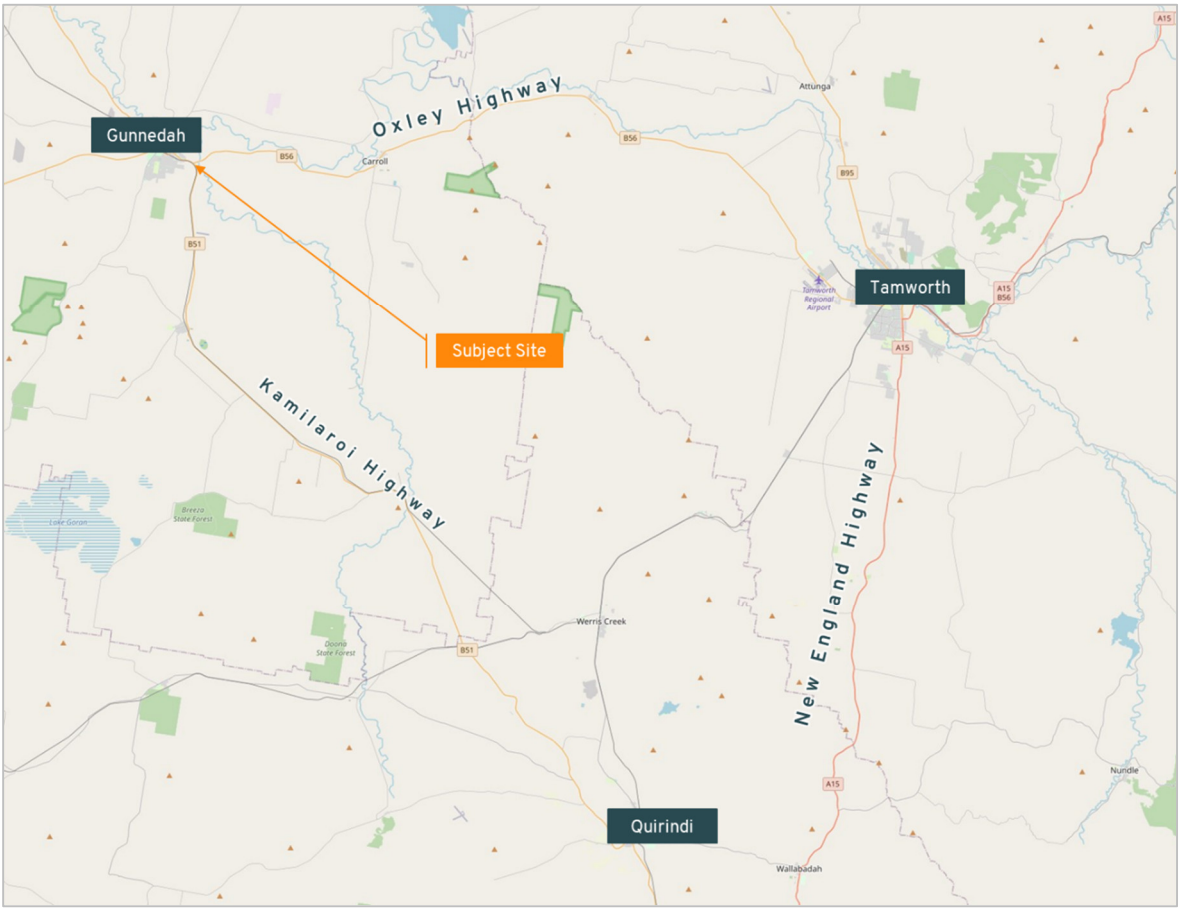
The subject site is currently zoned RU1 – Primary Production which prohibits the use of the land as a highway service centre and caravan park. The Planning Proposal seeks to amend the LEP by providing an amendment to *Schedule 1 Additional Permitted Uses* to add highway service centre as an additional permitted use with consent for Lot 1 DP841781.

This report has been prepared to provide a preliminary Traffic and Transport Assessment of the proposal sufficient to support the Planning Proposal and provide Council, regulatory agencies and the Department of Planning, Industry and Environment the confidence that the proposal can be delivered with acceptable impacts to the local traffic environment.

2. Transport Environment

The site is located at 127-141 Lochrey Road, Gunnedah (Lot 1 DP841781), and is situated on the northern and eastern side of the intersection of Kamilaroi Highway and Oxley Highway. The location of the site in relation to the surrounding road network is shown within Figure 1.

Figure 1: Surrounding Road Network



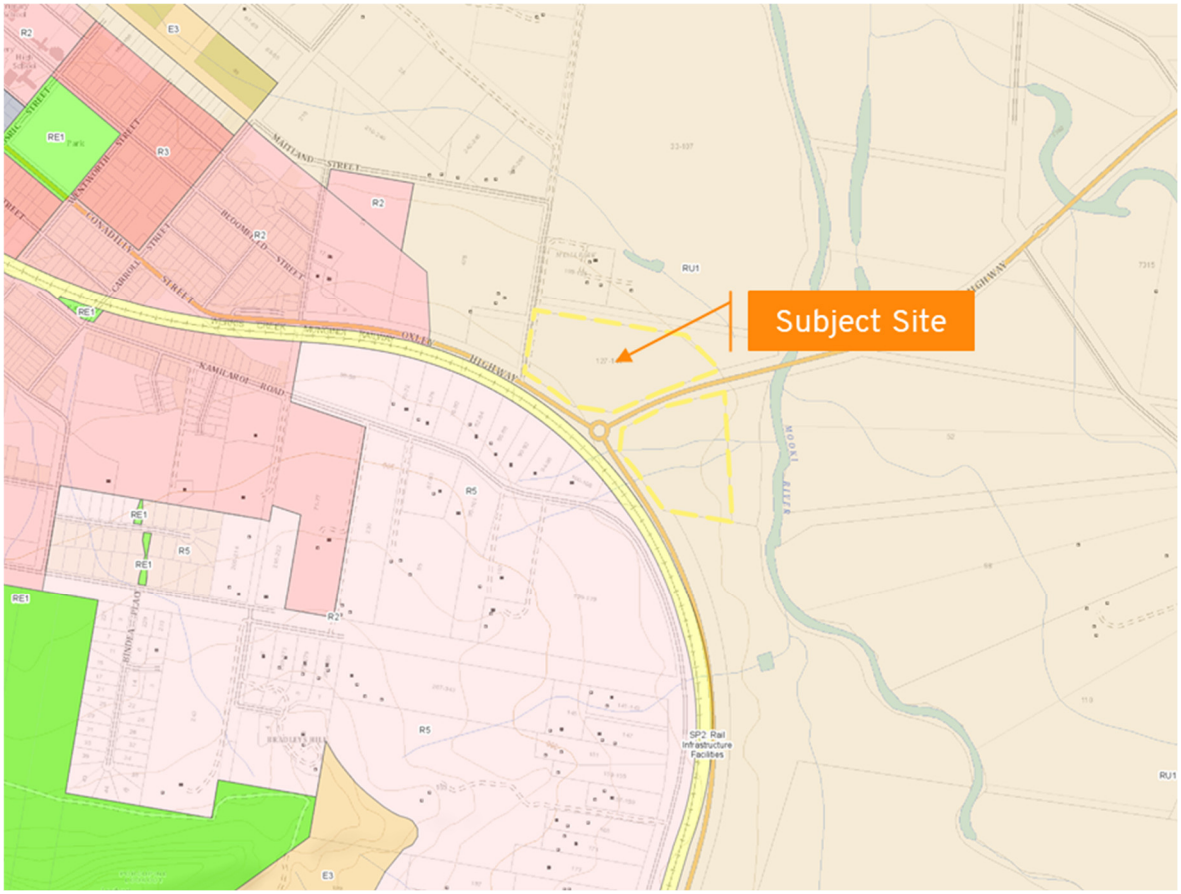
Source: Open Street Map

The site is located on the south-eastern outskirts of Gunnedah and is well placed to attract drivers travelling between Gunnedah and Tamworth to the east via Oxley Highway and vehicles travelling between Gunnedah and New England Highway to the south via Kamilaroi Highway.

The site and the surrounding land to the northeast of Kamilaroi Highway is zoned RU1 – Primary Production and is primarily occupied by agricultural land. Land to the southwest of Kamilaroi Highway is zoned R5 - Large Lot Residential and is occupied by a number of larger residential lots and agricultural land use. West of the site is zoned R2 - Low Density Residential and is occupied by residential dwellings. Further west is the Gunnedah City Centre which provides a range of land uses.

Figure 2 shows the surrounding land use zoning within the vicinity of the site.

Figure 2: Land Zoning Map



Source: NSW Government ePlanning Spatial Viewer

Key activities provided within the surrounding area include:

- Kitchener Park Oval located 1.5km west of the site;
- Gunnedah Jockey Club located 3.0km north of the site;
- Gunnedah High School located 2.5km west of the site;
- Porcupine Lookout located 1.8km south of the site; and
- Gunnedah Rural Museum located 4.0km west of the site.

The site is situated on the eastern side of Kamilaroi Highway on both sides of Oxley Highway, with the land to be utilised for the purposes of a service centre only including the land to the northwest of Oxley Highway. The site also has frontage to Lochrey Road at the western boundary and Crown Land is provided along the northern boundary. The site has a total area of approximately 8,6000sqm (part of 127-141 Lochrey Road west of the Oxley Highway) and no dedicated vehicle access is currently provided from the road network.

The site and the surrounding area are illustrated within Figure 3.

Figure 3: Site and Surrounds

Source: SIX Maps

2.1 Road Network

Oxley Highway is a State Road which runs in a general east-west alignment. It links Port Macquarie and Pacific Highway to New England Highway near Bendemeer. Oxley Highway continues west of Tamworth, through Gunnedah and extends to link with Newell Highway near Coonabarabran. It terminates at its connection with Mitchell Highway at Nevertire. Between Tamworth and Gunnedah it has a typical carriageway width of 9.0 metres accommodating one lane of traffic in each direction. It has a speed limit of 100km/hr which is reduced to 60km/hr adjacent to the site.

Kamilaroi Highway is classified as a State Road and is under the care and management of Transport for NSW (TfNSW). It runs in a general northwest-southeast alignment extending between Newell Highway in Narrabi and New England Highway near Willow Tree. It has a typical carriageway width of 9.0 metres accommodating one lane of traffic in each direction. It has a speed limit of 60km/hr within Gunnedah which increases to 100km/hr southeast of Oxley Highway.

Lochrey Road is a municipal local road under the care and management of Council. It is currently an unsealed road in poor condition with a carriageway width of approximately 3.0 metres that extends between Oxley Highway and Old Tamworth Road. It primarily services a single dwelling located on the north-western corner of its intersection with Oxley Highway.

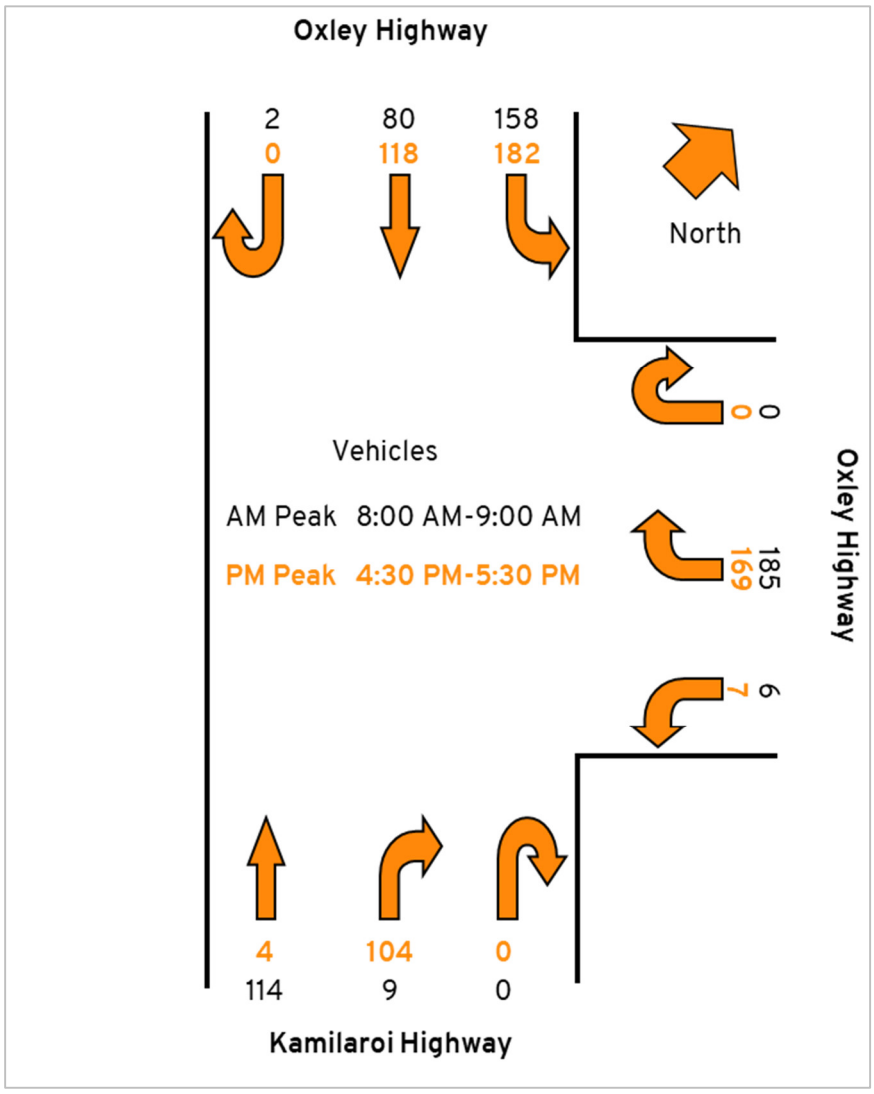
The intersection of Kamilaroi Highway and Oxley Highway is controlled by a single lane roundabout. The intersection of Oxley Highway and Lochrey Road is priority controlled and has been designed with a sealed surface with Lochrey Road being widened to accommodate simultaneous two-way vehicle movement.

2.2 Traffic Environment

2.2.1 Intersection Volumes

Amber Organisation conducted turning movement counts at the roundabout intersection of Oxley Highway and Kamilaroi Highway on Wednesday 10 November 2021. Traffic counts were undertaken from 7:30am to 9:00am and 4:30pm to 6:00pm in order to determine the morning and evening peak hour volumes. The peak hour volumes are presented within Figure 4.

Figure 4: Peak Hour Turning Movements – Kamilaroi Highway / Oxley Highway



The survey results are summarised below:

- The morning peak hour occurs at 8:00am and the evening peak hour occurs at 4:30pm;
- The intersection recorded a total of 554 and 584 vehicle movements during the morning and evening peak hour, respectively;
- The majority of vehicle movements were recorded between the northern and eastern legs of Oxley Highway; and

- During the morning peak the majority of vehicle movements are northbound on Kamilaroi Highway and during the evening peak the majority are southbound.

Overall, the intersection accommodates a low level of traffic and is expected to be able to readily accommodate an increase in traffic movements.

2.2.2 Midblock Volumes

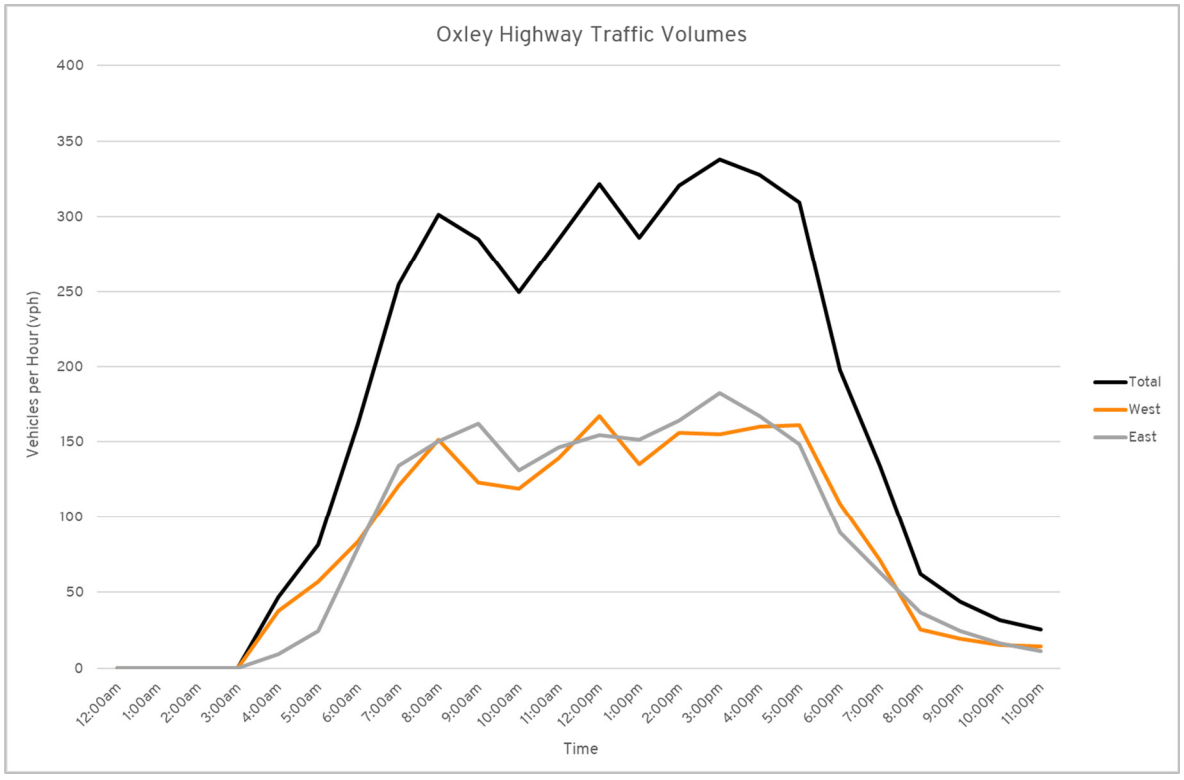
Traffic volume data has been collected from the TfNSW Traffic Volume database for any nearby data stations. The closest available station which provides recent data is located on Oxley Highway to the east of the site. A summary of the traffic volumes is provided within Table 1.

Table 1: State Road Traffic Volumes

Road	Survey Location	Station ID	Survey Year	Recorded Volume	Heavy Vehicles
Oxley Highway	1.45km East of Wilkinson Road, Gunnedah 2380	6167	2021	3,506 vpd 297 vph AM 333 vph PM	19% heavy

The traffic volumes have been calculated for each hour and separated in to east and westbound movements and are shown below in Figure 5.

Figure 5: Oxley Highway Traffic Volume Data 2021



The data indicates that Oxley Highway has a relatively constant level of traffic between 7:00am and 5:00pm and lower traffic volumes outside of these times. The traffic volume data also indicates that Oxley Highway currently carries a high level of heavy vehicle movements.

The traffic volumes were recorded during the COVID-19 pandemic which may impact travel behaviour and subsequently the traffic volumes on the road network. The data station also

provides traffic counts each year between 2015 and 2019 before the pandemic. The average daily traffic count for these years was 3,532 vehicle movements per day which is similar to the traffic volumes presented within Table 1. As such the traffic volumes for Oxley Highway in 2021 are considered to be similar to pre-pandemic volumes.

The TfNSW traffic volume data reflects the traffic volumes recorded on Oxley Highway as part of the turning movement count survey. Therefore, the traffic volumes recorded at the intersection are considered to be suitable for use within this assessment.

2.2.3 Road Network Operation

In order to determine the existing operating conditions at the intersection of Kamilaroi Highway and Oxley Highway an analysis was undertaken using the SIDRA computer modelling program. The traffic volumes have been based on the traffic volumes presented within Figure 4. The results of the analysis are provided within Appendix A and are summarised below.

Table 2: SIDRA Analysis Results Summary – Kamilaroi Highway and Oxley Highway

Movement		AM Peak			PM Peak		
		Average Delay (sec)	95% Queue (m)	Level of Service	Average Delay (sec)	95% Queue (m)	Level of Service
Kamilaroi Highway South	Through	5.5	5.2	A	5.3	4.5	A
	Right Turn	10.1		B	10.0		B
Oxley Highway East	Left Turn	4.6	7.0	A	4.8	7.3	A
	Right Turn	9.4		A	9.7		A
Oxley Highway North	Left Turn	4.1	8.0	A	4.8	13.2	A
	Through	4.3		A	5.0		A

Based on the above assessment the following conclusions are provided:

- The intersection is expected to operate with a good level of service, acceptable delays and queue lengths, during both the morning and evening peak hour; and
- The intersection recorded a degree of saturation of 0.169 and 0.264 during the morning and evening peak hour, respectively.

Overall, the results of the analysis indicate that the intersection has ample spare capacity to accommodate an increase in traffic.

2.3 Sustainable Transport

No public transport or walking and cycling facilities are currently provided within the vicinity of the site.

2.4 Road Safety

Amber has conducted a review of the TfNSW Centre for Road Safety Crash and Casualty Statistics database for all injury crashes within 500 metres of the subject site. The crash database provides

the location and severity of all injury and fatal crashes for the five-year period from 2016 to 2020. The crash search revealed the following crashes:

- One moderate injury rear-end crash located on Oxley Highway, east of the site next to the Mooki River;
- One moderate injury right-near crash located on the roundabout intersection of Oxley Highway and Kamilaroi Highway, south of the site; and
- One serious injury run off road crash located on the roundabout intersection of Oxley Highway and Kamilaroi Highway, south of the site.

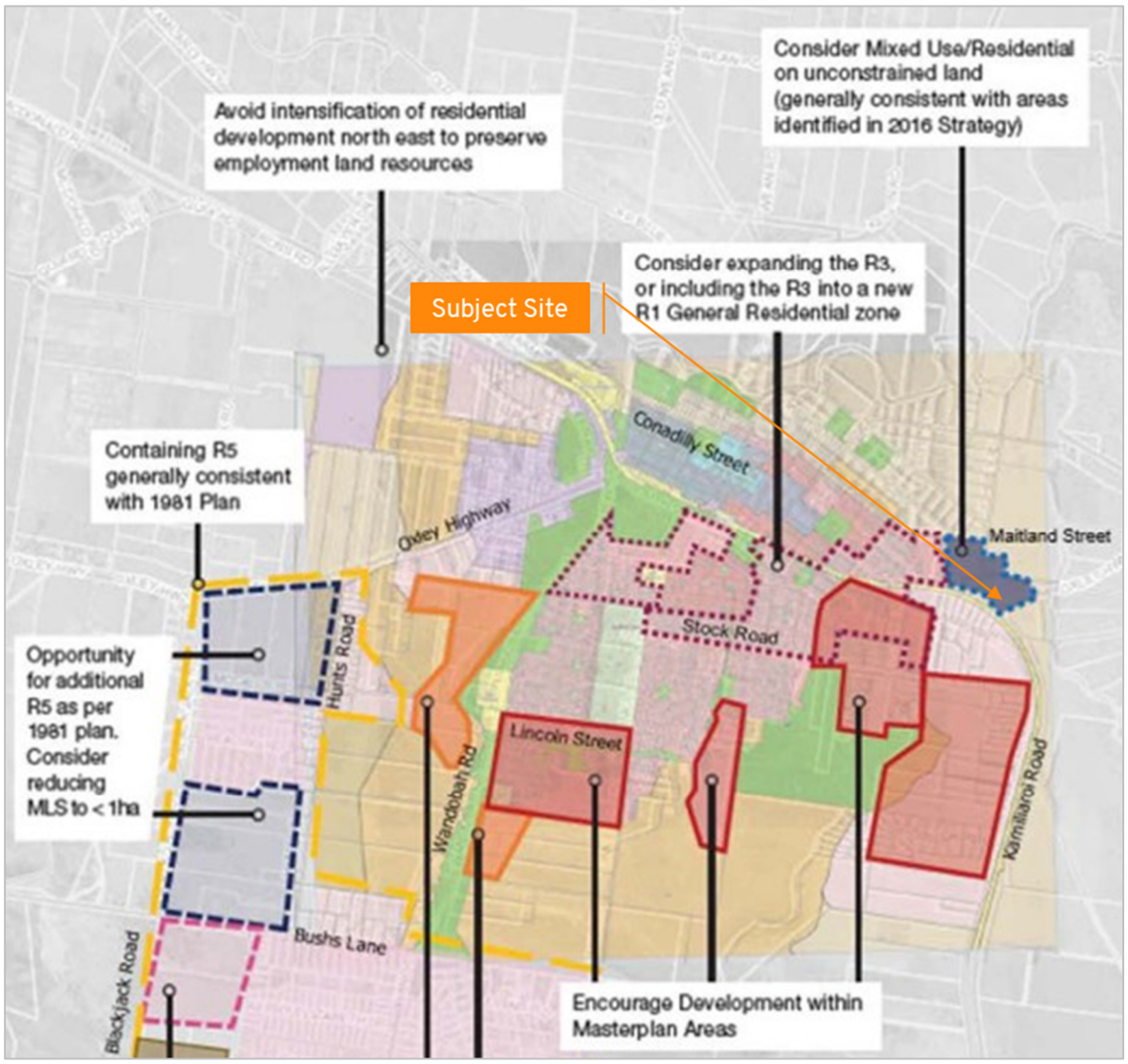
The crash search indicates that there are no discernible crash trends within the vicinity of the subject site. Given the low number of crashes and associated traffic volumes on the surrounding roads, it is concluded that the road network is currently operating in a relatively safe manner.

3. Future Road Environment

The draft Gunnedah Shire Local Housing Strategy has recently been prepared which identifies areas suitable for the provision of additional housing to assist Gunnedah Shire Council to meet the demands generated by expected population growth and demographic change. The Strategy has been prepared in response to the limited supply of serviced residential land and housing choice to meet the short and medium term needs of the community. It aligns with NSW Government and Council policy and the Directions of the New England North West Regional Plan 2036.

The Strategy recommends investigating land extending between Maitland Street and Kamilaroi Highway which includes the subject site. The proposed land is recommended as mixed use/residential land and is illustrated within Figure 16 of the document which is provided below.

Figure 6: Draft Gunnedah Shire Local Housing Strategy – Figure 16



Source: Draft Gunnedah Shire Local Housing Strategy

Council has advised that has part of the development of the Maitland Street land Lochrey Road would be upgraded in order to provide suitable vehicle access between Oxley Highway and Maitland Street. However, no design has been prepared for Lochrey Road at this stage.

4. Development Proposal

4.1 LEP Amendment

It is proposed to amend the Gunnedah Local Environmental Plan 2012 (LEP) with respect to land at 127-141 Lochrey Road, Gunnedah. The subject site is currently zoned RU1 – Primary Production which prohibits the use of the land as a highway service centre and caravan park. The Planning Proposal seeks to amend the LEP by providing an amendment to *Schedule 1 Additional Permitted Uses* to add highway service centre and caravan park as an additional permitted use with consent for Lot 1 DP841781.

The proposed development would be a highway service centre as defined:

> ***highway service centre*** *means a building or place used to provide refreshments and vehicle services to highway users. It may include any one or more of the following—*
>
> *(a) a restaurant or cafe,*
>
> *(b) take away food and drink premises,*
>
> *(c) service stations and facilities for emergency vehicle towing and repairs,*
>
> *(d) parking for vehicles,*
>
> *(e) rest areas and public amenities.*

And a caravan park as defined:

> ***caravan park*** *means land (including a camping ground) on which caravans (or caravans and other moveable dwellings) are, or are to be, installed or placed.*

4.2 Site Layout

The site is proposed to be developed with the intention of constructing a mixed-used development including a service centre with fast food outlets and a campervan park. A Feasibility Plan was developed for the site which provides a draft internal layout with two vehicle accesses to the site proposed from the two frontages with Oxley Highway. It is understood the Feasibility Plan is a conceptual model for delivery of the overarching development of the land and is not intended to represent the final development arrangement.

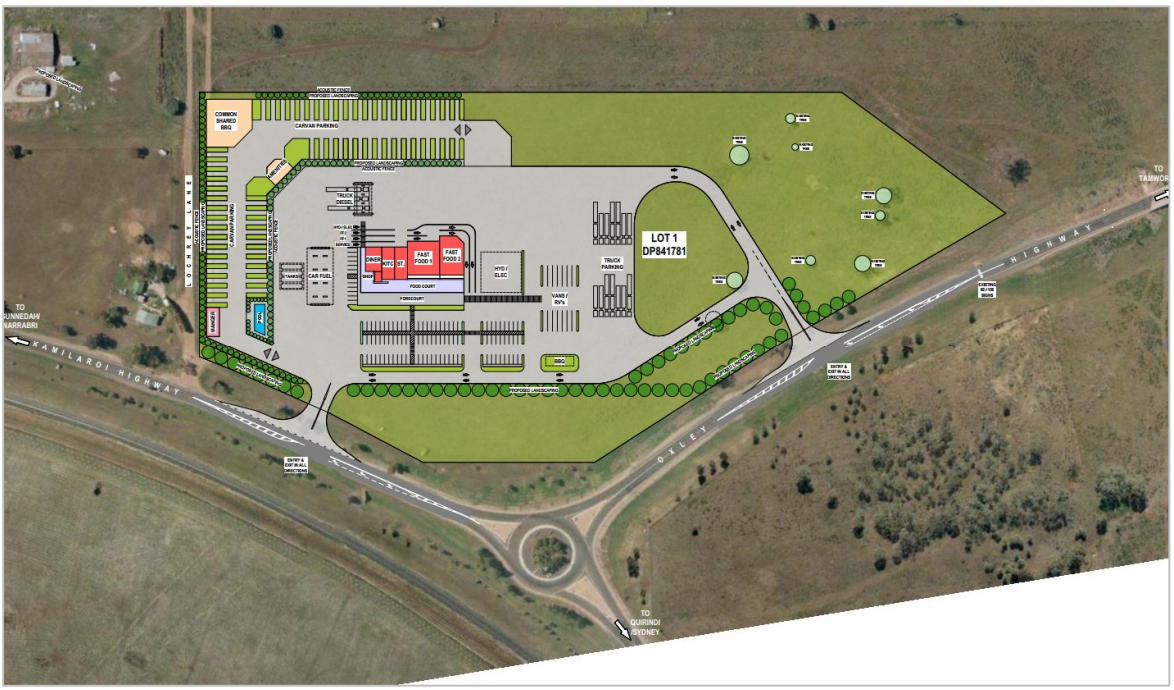
For the purposes of this assessment, the site has been assessed as having the following key features:

- A total of 12 bowsers including 8 for light vehicle sand 4 four heavy vehicles, which are provided in separate areas;
- A convenience store with a floor area of approximately 550sqm associated with the service station that would also sell food, drinks, and general goods;
- Two fast food outlets with a total floor area of approximately 840sqm, that would provide drive through facilities along the northern side of the building and approximately 120 internal seats;

- Parking areas for trucks, RVs, light vehicles and hydrogen/electric vehicles;
- A BBQ facility for use by service centre patrons;
- A caravan park which would accommodate approximately 47 berths and provide BBQ facilities, amenities building, and a building to accommodate the manager and service patrons.

The Feasibility Plan is provided within Figure 7 which shows the proposed site layout and associated facilities.

Figure 7: Site Feasibility Plan



Source: Hill Lockart Architects

The plan also shows the proposed site access locations to/from Oxley Highway. The accesses are proposed to accommodate all vehicle movements with turn facilities proposed within the road carriageway to allow vehicles to turn safely from the road network. The turn facilities are proposed to be designed in accordance with the Austroads Guidelines.

5. Traffic Assessment

5.1 Traffic Generation

5.1.1 Service Station

Based on our experience with similar service station developments, the traffic volumes generated by the proposed use depends on the following:

- Traffic generation heavily depends on the traffic volumes of the adjacent roads rather than the size of the site or the number of bowsers as the majority of visitors to the site are already on the road network and choose to purchase fuel based on convenience;
- Service stations typically generate higher traffic generation rates during the evening peak period when compared to the morning peak period. This is primarily due to drivers choosing to purchase fuel on their homeward journey as opposed to their journey to a destination when they have a target arrival time; and
- The provision of other uses on-site, which may include a convenience store or fast food outlet, can generate additional vehicle movements.

The following assessment has focused on the evening peak period with lower traffic rates anticipated during the morning peak period.

5.1.1.1 Service Station and Convenience Store

The NSW RTA Guide to Traffic Engineering Developments (RTA Guide), October 2002, specifies the expected evening peak hour trip generation rates for service stations and convenience stores. The trip generation rate is calculated using the following formula:

Evening peak hour vehicle trips = 0.04 A(S) + 0.3 A(F)

Where: A(S) = Area of the site (sqm)

A(F) = Gross floor area of convenience store (sqm)

The service station component of the site has a total area of 72,330sqm which does not provide a realistic calculation for the purposes of estimating the traffic generation for the service station component. Accordingly, the area has been limited to the canopy and parking area adjacent to the convenience store and the truck canopy area which provides a site area of 230sqm. The convenience store has a gross floor area of 550sqm. Using the formula above, the service station and convenience store are expected to generate approximately 174 vehicle movements during the evening peak hour.

Survey data collected by Amber and others for a range of service station developments, including sites on major urban arterial roads, indicates that service stations typically generate between 100 and 180 movements during the weekday commuter peak hours. As such, the above calculation is considered to provide a conservative estimate of the potential traffic generation of the service station component of the development given the low level of traffic on the road network.

5.1.1.2 Fast Food Outlet

The RTA Guide suggests that McDonald's Restaurants are the highest traffic generating facilities when compared to similar convenience restaurants and are expected to generate in the order of 180 vehicle movements per hour. The second highest traffic generator is a Kentucky Fried Chicken Restaurant which generate an average of 100 vehicle movements per hour.

If the fast food outlets were a McDonalds and KFC the associated traffic generation based on the RTA Guide would be 280 vehicle movements during the peak hour.

5.1.1.3 Summary

For the purposes of this assessment the following assumptions have been made when determine the potential traffic generation for the service station and associated convenience store and fast food outlets:

- The morning peak hour has conservatively been assessed as having the same traffic generation as the evening peak hour;
- Given the limited residential land use in the surrounding area it has been assumed that 80% of the vehicle movements for the fast food outlets are associated with vehicles using the service station and are not expected to generate an additional vehicle movement on the road network or at the site access. As such, the fast food outlets are expected to generate 54 vehicle movements in each of the peak hours; and
- The vehicle movements are evenly split between inbound and outbound vehicle movements.

Based on the above assumptions the service station and associated convenience store and fast food outlets are expected to generate the following traffic volumes in the morning and evening peak hour.

Table 3: Service Station Peak Hour Traffic Generation

	AM Peak (vph)	PM Peak (vph)
Arriving Trips	114	114
Departing Trips	114	114
Total	**228**	**228**

Any traffic volumes generated by the truck parking area are expected to be minimal and have not been included within the above traffic numbers.

5.1.2 Caravan Park

The RTA Guide recommends the use of the traffic generation rates within the ITE Trip Generation Manual when determining the traffic volumes for caravan parks. However, the caravan park is not considered to be reflective of a typical caravan park whereby the level of turnover is expected to be higher given the limited level of amenities and likelihood for people to use the site as a stopover location as part of a longer trip rather than a long-term stay.

For the purposes of this assessment, it has been assumed that 70% of all berths generate one vehicle movement to the site in the evening peak hour and one vehicle movement from the site

during the morning peak hour. As such, the caravan park is expected to generate the following traffic volumes in the morning and evening peak hour.

Table 4: Caravan Park Peak Hour Traffic Generation

	AM Peak (vph)	PM Peak (vph)
Arriving Trips	0	33
Departing Trips	33	0
Total	**33**	**33**

It is noted that if the ITE rate were applied the caravan park would be estimated to generate 3 vehicle movements per hour.

5.1.3 Summary

Based on the above, the site is expected to generate the following traffic volumes during the morning and evening peak periods.

Table 5: Total Traffic Generation

	AM Peak	PM Peak
Inbound	114	147
Outbound	147	114
Total	**261**	**261**

5.2 Traffic Distribution

The distribution of service station traffic at the accesses and on the surrounding road network has been based on the following assumptions:

- The distribution of the service station traffic at each of the accesses is based on the existing traffic volumes on the road network;
- A large proportion of trips associated with the service station and associated uses will be pass-by trips that are already distributed on the surrounding road network. These vehicles are already accommodated on the road network and do not represent an increase in traffic volumes associated with the proposal. For the purposes of this assessment and in line with generally accepted rates, it is assumed that 80% of the service station traffic movements travelling from Gunnedah are already on the road network. A rate of 90% has been adopted for all other movements given the limited residential use to the east and south of the site;
- All vehicle movements that are single purpose trips to the service centre are assumed to exit the site and travel back in the direction they accessed the site;
- All vehicle movements have been assumed to enter and exit the site via the same access. Whilst it is acknowledged that some vehicles will enter via one access and exit via the other access, it is considered that this would occur in a relatively even distribution resulting in similar traffic movements at the accesses; and
- All vehicles have been assumed to enter via the first site access they pass if accessing the site.

All caravan park traffic has been assumed to access the site via the western Oxley Highway access and the distribution on the road network has been based on the existing traffic distribution on the road network. It is considered that this provides a conservative assessment as it results in vehicles on Oxley Highway to the east travelling through the roundabout intersection to access the site. It is expected that signage would be provided at the site to assist with directing caravan park users to the correct access.

Based on this distribution and the assumptions above, the site is expected to generate the following traffic volumes on the road network.

Figure 8: Peak Hour Turning Movements – Site Traffic

The figure shows that the site traffic is relatively evenly spread between the site accesses with the western Oxley Highway access experiencing the highest level of traffic. This is primarily due to the vehicle movements associated with the caravan park. The left turn into the eastern Oxley Highway access experiences the lowest level of traffic as few vehicles turn right from Kamilaroi Highway onto the eastern leg of Oxley Highway and travel past the site.

The traffic volumes indicate that the intersection of Kamilaroi Highway and Oxley Highway only accommodates an increase of 25 and 14 vehicle movements in the morning and evening peak hours, respectively.

The negative traffic volumes represent a removal of through movements at the access as these vehicles will subsequently turn into the site.

5.3 Traffic Assessment

The future traffic volumes on the road network have been calculated with the inclusion of the development traffic. The traffic volumes are presented within Figure 9

Figure 9: Peak Hour Turning Movements – Future Traffic Volumes with Site Traffic

The SIDRA analysis presented within Section 2.2.3 of this report indicate that the intersection of Kamilaroi Highway and Oxley Highway is currently operating with a good level of service and has ample spare capacity to accommodate an increase in traffic movements. Therefore, the increase of 25 and 14 vehicle movements in the morning and evening peak hours is expected to be able to be readily accommodated at the intersection.

The accesses accommodate a lower level of traffic than the intersection of Kamilaroi Highway and Oxley Highway and as such, are also expected to be able to readily accommodate the traffic volumes generated by the service centre.

Accordingly, the development of the site as a service centre is expected to be able to be established with a minimal impact to the operation of the surrounding road network which is expected to be able to continue to operate with a good level of service.

6. Access Arrangements

6.1 Access Locations

The Feasibility Plan shows the proposed site access locations to/from Oxley Highway. The accesses are proposed to accommodate all vehicle movements with turn facilities proposed within the road carriageway to allow vehicles to turn safely from the road network.

An initial option was assessed that utilised Lochrey Road to gain access to the site via the western boundary following discussions with Gunnedah Shire Council. It was understood that the road would be upgraded as part of the future residential land to the north and would provide a suitable vehicle access location that minimised connections to the State Road network. However, Gunnedah Shire Council have subsequently advised that the level of noise generated by heavy vehicles would detrimentally impact nearby residents and subsequently Lochrey Road is not considered acceptable for vehicle access.

Consultation was undertaken with TfNSW in order to confirm the preferred access arrangements for the site. A range of design options were provided which included the following:

- Option 1: Access via both accesses with right turn movements prohibited at the western access.
- Option 2: Access via both accesses with all turn movements permitted.
- Option 3: Access provided via new leg to the intersection of Kamilaroi Highway and Oxley Highway.

The proposed design options are presented within Appendix B and the subsequent response from TfNSW is provided within Appendix C. Based on the discussions and response from TfNSW, it is concluded that the best access option is to provide both accesses with all turn movements permitted. The roundabout access option is likely to provide significant construction costs that make the access impractical.

6.2 Turn Treatments

Austroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings specifies the turning treatments required at intersections. Figure 3.25 of the guide specifies the required turn treatments on the major road at unsignalised intersections.

For the purposes of this assessment, it has been assumed that a short Auxiliary Left Turn and Channelised Right Turn facility are provided at both accesses. The designs presented within Appendix B show that the accesses can be designed in accordance with the Austroads Guide. Suitable separation has been provided between Lochrey Road, the Oxley Highway / Kamilaroi Highway intersection, and the western access to allow the turn facilities to be provided.

Accordingly, it is concluded that suitable turn facilities are able to be provided at both accesses to allow vehicles to safely turn from the road network.

6.3 Sight Distance

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections specifies the Safe Intersection Sight Distance (SISD) as the minimum sight distance which should be provided

along the major road at any intersection. Table 3.1 of the guide specifies the SISD required for various design speeds, with the following sight distances required at the accesses:

- A design speed of 70km/hr has been adopted at the western access given the posted speed limit of 60km/hr, which requires a sight distance of 141 metres based on a 1.5 second reaction time;
- A design speed of 110km/hr has been adopted at the eastern access which is considered a conservative approach given Oxley Highway reduces from 100km/hr to 60km/hr near the site access. The required sight distance for a design speed of 110km/hr is 285 metres based on a reaction time of 2.0 metres.

The available sight distance at the site accesses is summarised in Table 6.

Table 6: Turning Volumes for Turn Treatment Calculations

Access	Sight Distance	
	Nort/West	South/East
West	350m+	220m to intersection with Kamilaroi Highway
East	194m to intersection with Kamilaroi Highway	350m+

Accordingly, the available sight distance at the accesses exceeds the requirements of the Austroads Guide and the accesses are considered to be able to provide safe vehicle movement between the site and the road network.

7. Parking Requirement

The number of car parking spaces required for various land uses is listed under Appendix 1 of the Gunnedah Development Control Plan 2012 (DCP). Application of the relevant parking rates based on the Feasibility Plan is provided below in Table 1.

Table 7: Development Control Plan Car Parking Requirement

Use	Number / Floor Area	Parking Rate	Parking Requirement
Service Station	0 work bays	6 spaces per work bay	0 spaces
	100sqm convenience store	1 space per 20sqm GFA of convenience store	5 spaces
	450sqm GFA	1 space per 6.5sqm GFA	69 spaces
Drive In Take Away Food Shop	840sqm GFA	1 space per 10sqm GFA	84 spaces
	120 seats	1 space per 5 seats	24 spaces
Camp or Caravan Site	47 sites	1 space per site	47 spaces
		1 space per 10 sites for visitor parking	5 spaces
Total			**234 spaces**

Accordingly, the development based on the Feasibility Plan would have a statutory parking requirement of 234 spaces. It is considered that the 47 spaces associated with the caravan park are accommodated within the individual berths which leaves a requirement for 187 standard parking spaces.

The DCP also provides the following commentary in relation to service stations:

> *'The additional requirements should be cumulative but may be reduced where it can be demonstrated that the times of peak demand for the various facilities do not coincide. All parking should be clearly designated and located so as not to obstruct the normal sale of petrol and should minimise the potential for vehicular/pedestrian conflict. Consideration should be given to providing adequate manoeuvring space for caravans and B-Doubles.'*

It is considered that the service station is the primary activity on-site and will be the major driving factor behind visitors to the site, with the convenience store and fast food outlets acting as ancillary uses. Accordingly, the proposed operation of the site as a service station with ancillary uses will result in a lower parking demand compared to the combined DCP parking rates for the convenience store and fast food outlets.

Generally, when using a service station drivers will choose to leave their vehicles at the pump while paying for petrol and utilising the services provided by the associated convenience store. As such, it is considered that the DCP parking requirement for the convenience store of 74 car parking spaces is an over-estimate of the parking demand in this case and that the actual parking demand will be lower.

For the purpose of this assessment, the DCP parking rates for the fast food outlets and general floor area for the service station have been provided with a reduction factor of 50%. The subsequent parking demand for the site is 99 spaces.

A total of 105 parking spaces are shown on-site to accommodate the parking demand generated by the service station, convenience store and fast food outlets. In addition, an area has been provided to allow for truck parking and vans/RVs. Accordingly, it is concluded that the site is able to provide a suitable level of car parking to accommodate the parking demand generated by the proposed uses.

8. Site Layout

The Feasibility Plan demonstrates that the proposed uses can be comfortably provided on the large site which allows suitable internal vehicle circulation and minimises conflict. A summary of an assessment of the Feasibility Plan layout is provided below:

- The entrance to the campervan park is able to be suitably separated from the western access to prevent vehicles associated with the caravan park queueing onto the road network;
- The bowsers have been located away from the access locations to prevent vehicles queueing for fuel extending onto the road network;
- Drive through facilities are able to be provided for the fast food outlets to allow sufficient queuing to prevent drive through vehicles impacting other uses;
- Truck bowsers are able to be separated from personal vehicles which is appropriate given the high percentage of heavy vehicles;
- Parking for the various uses is able to be accommodated within the site; and
- Suitable areas are provided for service vehicles at the rear of the buildings.

Overall, the Feasibility Plan demonstrates that the site has sufficient area to accommodate the proposed uses in a suitable manner.

9. Conclusion

Amber Organisation has reviewed a proposal to amend the Gunnedah Local Environmental Plan 2012 (LEP) with respect to land at 127-141 Lochrey Road, Gunnedah.

The site is proposed to be developed with the intention of constructing a mixed-used development including a service centre with fast food outlets and a caravan park. The subject site is currently zoned RU1 – Primary Production which prohibits the use of the land as a highway service centre. The Planning Proposal seeks to amend the LEP by providing an amendment to *Schedule 1 Additional Permitted Uses* to add highway service centre and caravan park as an additional permitted use with consent for Lot 1 DP841781.

A Feasibility Plan has been developed for the site which provides a draft internal layout with two vehicle accesses to the site proposed from Oxley Highway. It is understood the Feasibility Plan is a conceptual model for delivery of the overarching development of the land and is not intended to represent the final development arrangement.

Based on the above assessment, the following conclusions are provided:

- Based on the Feasibility Plan the site is expected to generate a minimal number of additional traffic movements on the road network with the majority of vehicles accessing the site already being accommodated on the road network. The intersection of Kamilaroi Highway and Oxley Highway is expected to be able to readily accommodate the minor increase in traffic generated and continue to operate with a good level of service.
- The site accesses are expected to accommodate a modest level of traffic and are able to accommodate the expected traffic volumes.
- Potential designs for the accesses have been established through consultation with TfNSW and Council. The preferred option is to provide access via both the eastern and western frontages to Oxley Highway with the accesses accommodating all vehicle movements. Turn facilities are able to be provided at the accesses in accordance with Austroads Guide and the sight distance at the accesses complies with the Austroads Guide. As such, vehicles are expected to be able to safely enter and exit the site via new accesses to Oxley Highway.
- The site has sufficient space to accommodate the parking demand generated by a service centre. The parking rate is expected to be lower than the DCP parking requirement given the primary generator of the site will be associated with the service station and the convenience store and food outlets are ancillary uses. The caravan park is expected to accommodate the parking demand associated with the use.
- The site is able to provide a layout that would allow suitable vehicle circulation with the Feasibility Plan also showing areas for truck parking, caravan parking and electric vehicle parking.

Accordingly, the Planning Proposal to allow the use of the site as a service centre is concluded to be acceptable in relation to traffic and parking impacts, with the future development of the site expected to have a minimal impact on traffic operations on the surrounding road network.

Appendix A

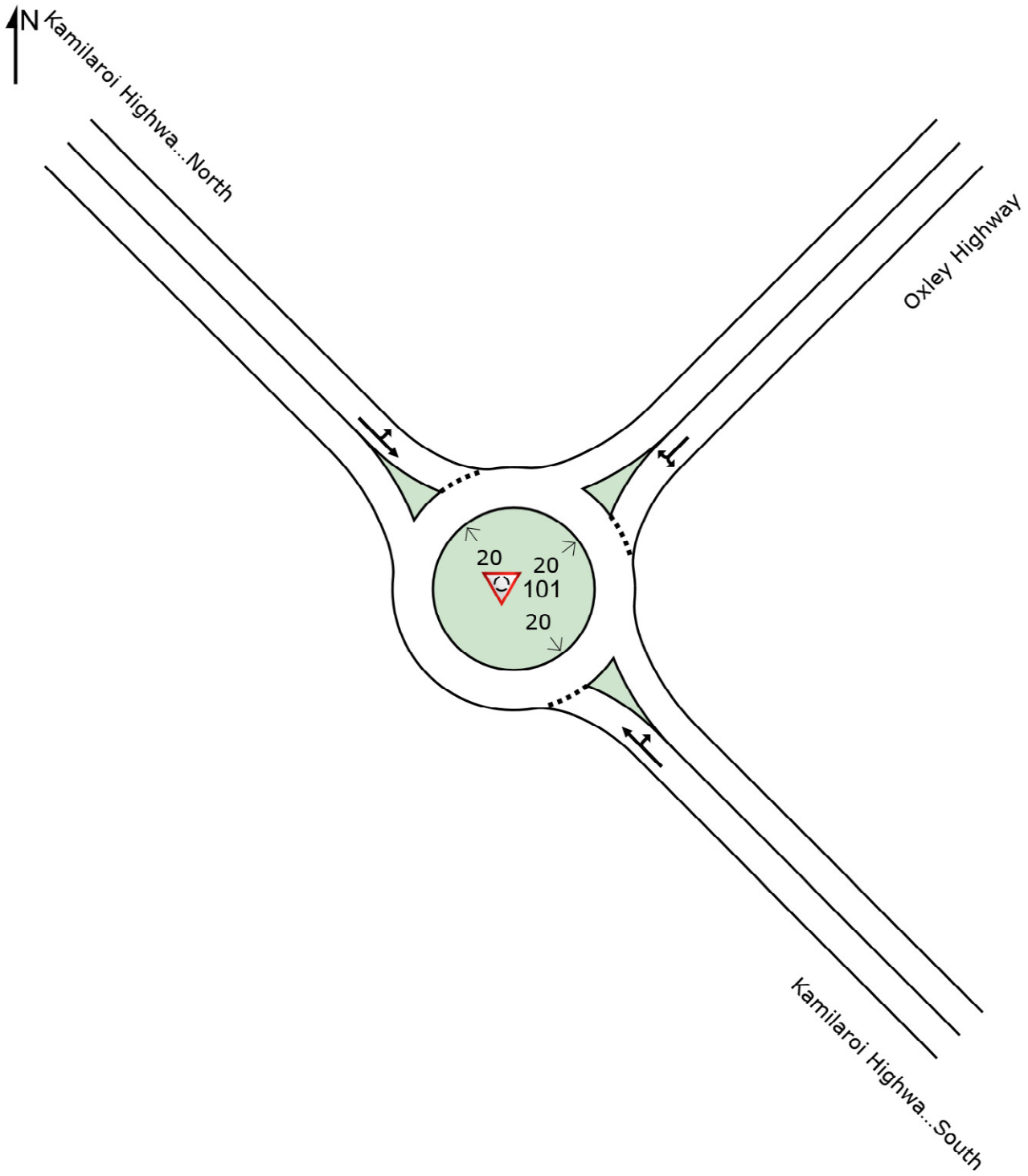
SIDRA Results

SITE LAYOUT

Site: 101 [Kamilaroi Highway / Oxley Highway (Site Folder: General)]

Existing - AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Kamilaroi Highway / Oxley Highway (Site Folder: General)]

Existing - AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Kamilaroi Highway South														
5	T1	114	19.0	120	19.0	0.123	5.5	LOS A	0.6	5.2	0.40	0.51	0.40	54.3
6	R2	9	19.0	9	19.0	0.123	10.1	LOS B	0.6	5.2	0.40	0.51	0.40	53.9
Approach		123	19.0	129	19.0	0.123	5.8	LOS A	0.6	5.2	0.40	0.51	0.40	54.3
NorthEast: Oxley Highway														
7	L2	6	19.0	6	19.0	0.165	4.6	LOS A	0.9	7.0	0.26	0.60	0.26	50.9
9	R2	185	19.0	195	19.0	0.165	9.4	LOS A	0.9	7.0	0.26	0.60	0.26	51.8
Approach		191	19.0	201	19.0	0.165	9.3	LOS A	0.9	7.0	0.26	0.60	0.26	51.8
NorthWest: Kamilaroi Highway North														
10	L2	158	19.0	166	19.0	0.169	4.1	LOS A	1.0	8.0	0.08	0.44	0.08	54.7
11	T1	80	19.0	84	19.0	0.169	4.3	LOS A	1.0	8.0	0.08	0.44	0.08	56.2
Approach		238	19.0	251	19.0	0.169	4.2	LOS A	1.0	8.0	0.08	0.44	0.08	55.2
All Vehicles		552	19.0	581	19.0	0.169	6.3	LOS A	1.0	8.0	0.21	0.51	0.21	53.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMBER ORGANISATION | Licence: PLUS / 1PC | Processed: Wednesday, 23 March 2022 8:15:02 AM
Project: D:\OneDrive - Amber Organisation Pty Ltd\Amber\Jobs\193 - 127-141 Lochrey Road, Gunnedah - Service Centre\SIDRA\193 - KH OH 220323.sip9

MOVEMENT SUMMARY

Site: 101 [Kamilaroi Highway / Oxley Highway (Site Folder: General)]

Existing - PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

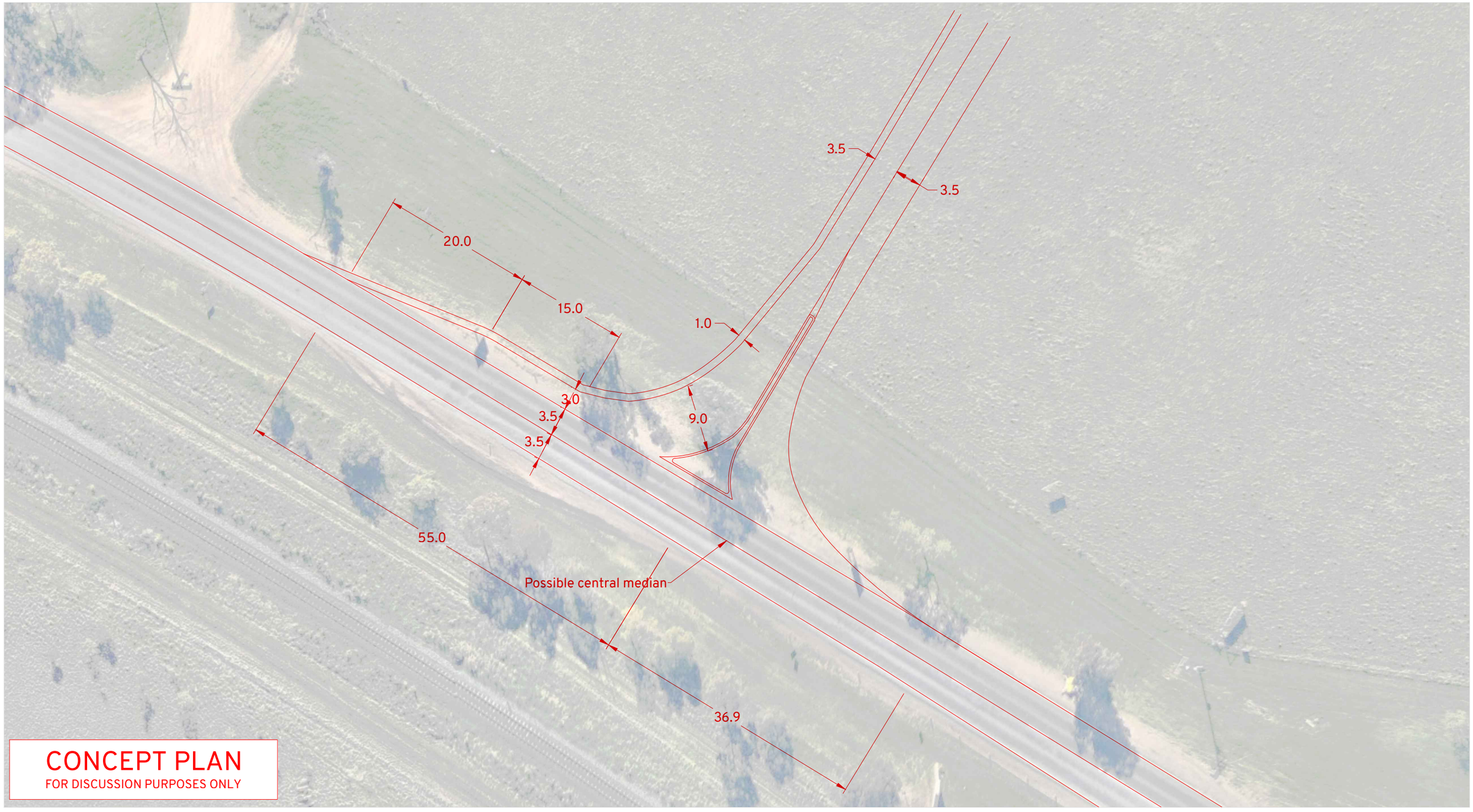
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Kamilaroi Highway South														
5	T1	4	19.0	4	19.0	0.107	5.3	LOS A	0.6	4.5	0.38	0.63	0.38	51.8
6	R2	104	19.0	109	19.0	0.107	10.0	LOS B	0.6	4.5	0.38	0.63	0.38	51.4
Approach		108	19.0	114	19.0	0.107	9.8	LOS A	0.6	4.5	0.38	0.63	0.38	51.5
NorthEast: Oxley Highway														
7	L2	7	19.0	7	19.0	0.163	4.8	LOS A	0.9	7.3	0.34	0.61	0.34	50.7
9	R2	169	19.0	178	19.0	0.163	9.7	LOS A	0.9	7.3	0.34	0.61	0.34	51.6
Approach		176	19.0	185	19.0	0.163	9.5	LOS A	0.9	7.3	0.34	0.61	0.34	51.6
NorthWest: Kamilaroi Highway North														
10	L2	182	19.0	192	19.0	0.264	4.8	LOS A	1.6	13.2	0.34	0.48	0.34	53.7
11	T1	118	19.0	124	19.0	0.264	5.0	LOS A	1.6	13.2	0.34	0.48	0.34	55.1
Approach		300	19.0	316	19.0	0.264	4.9	LOS A	1.6	13.2	0.34	0.48	0.34	54.2
All Vehicles		584	19.0	615	19.0	0.264	7.2	LOS A	1.6	13.2	0.35	0.55	0.35	52.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMBER ORGANISATION | Licence: PLUS / 1PC | Processed: Wednesday, 23 March 2022 8:15:03 AM
Project: D:\OneDrive - Amber Organisation Pty Ltd\Amber\Jobs\193 - 127-141 Lochrey Road, Gunnedah - Service Centre\SIDRA\193 - KH OH 220323.sip9

Appendix B

Access Design Options



CONCEPT PLAN
FOR DISCUSSION PURPOSES ONLY

The following design details have been taken from Austroads Guide to Road Design Part 4A:

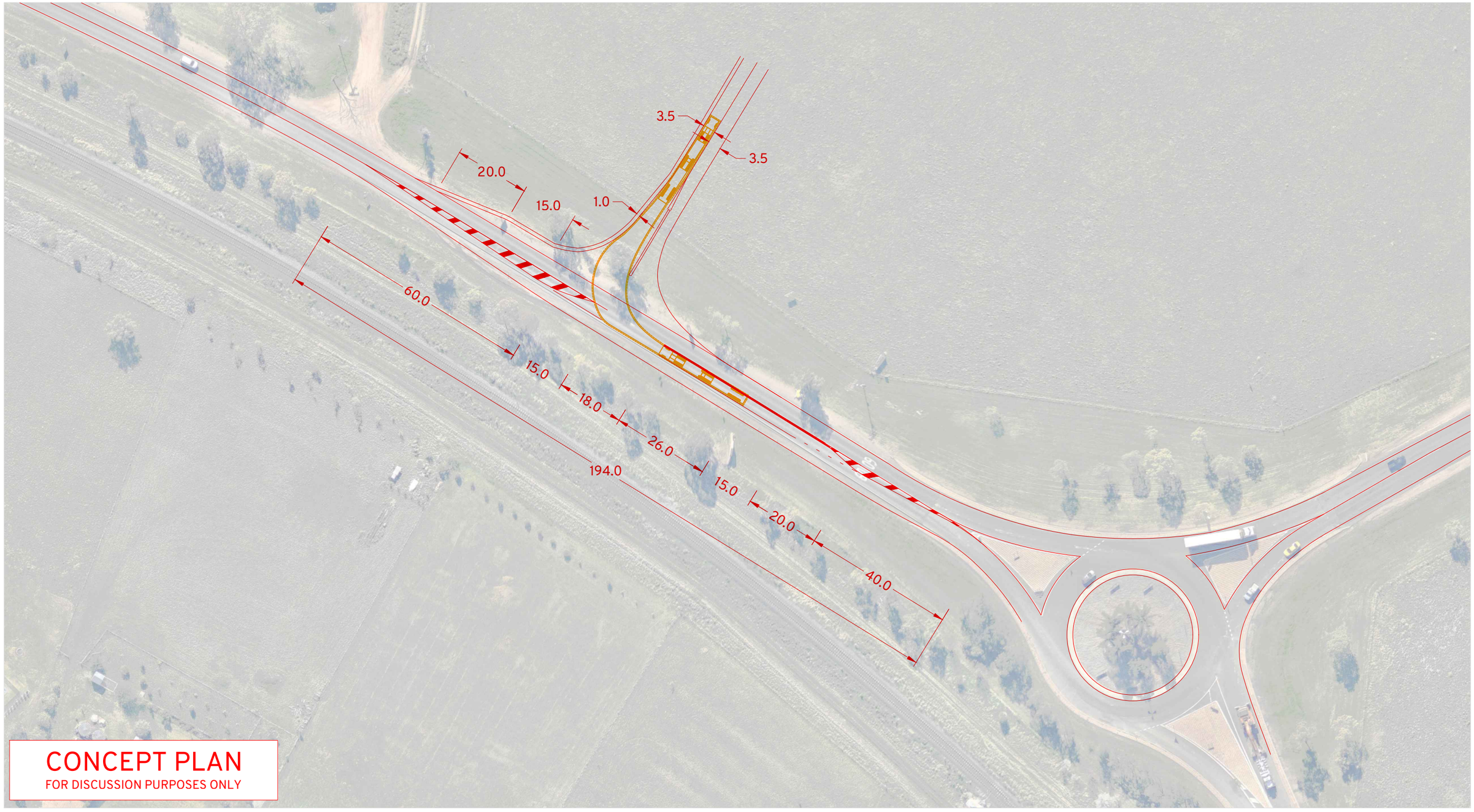
Basic Left Turn Treatment (BAL) Section 8.2.1.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 3.0m.

Rural Left-turn Treatment with short left turn lane (AUL(s)) Section 8.2.2.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 2.5m.
4: Taper length calculates to 20m.
5: Minimum length of parallel widened shoulder used from Table 8.2 is 35m.

Service Centre Development
127-141 Lochrey Road, Gunnedah
Option 1: Oxley Highway West Left-in/Left-Out Feasibility Design

DRAWN: CT
DATE: 24/11/2021
SCALE: 1:500m@ A3
DWG NO: 193 S01A

Amber 01



CONCEPT PLAN
FOR DISCUSSION PURPOSES ONLY

The following design details have been taken from Austroads Guide to Road Design Part 4A:

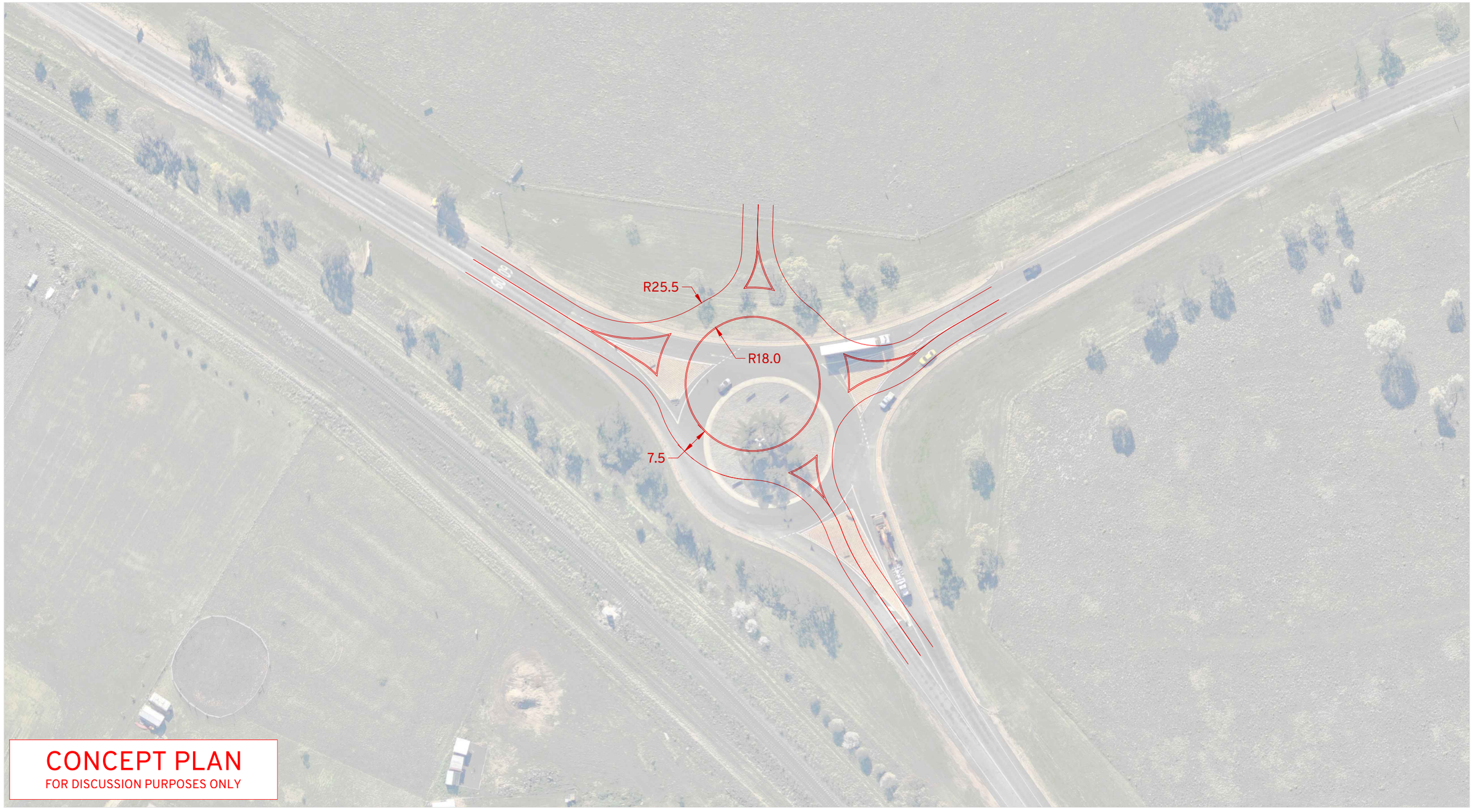
Channelised Right-turn Treatment (CHR(s)) Section 7.5.2.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 3.0m.
4: Lateral movement length *(A)* is 60m.
5: Storage length is 26m for one B-double design vehicle.

Rural Left-turn Treatment with short left turn lane (AUL(s)) Section 8.2.2.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 2.5m.
4: Taper length calculates to 20m.
5: Minimum length of parallel widened shoulder used from Table 8.2 is 35m.

Service Centre Development
127-141 Lochrey Road, Gunnedah
Option 2: Oxley Highway West CHR(s)/AUL(s) Feasibility Design

DRAWN: CT
DATE: 24/11/2021
SCALE: 1:1 @ A3
DWG NO: 193 S01A

Amber 02

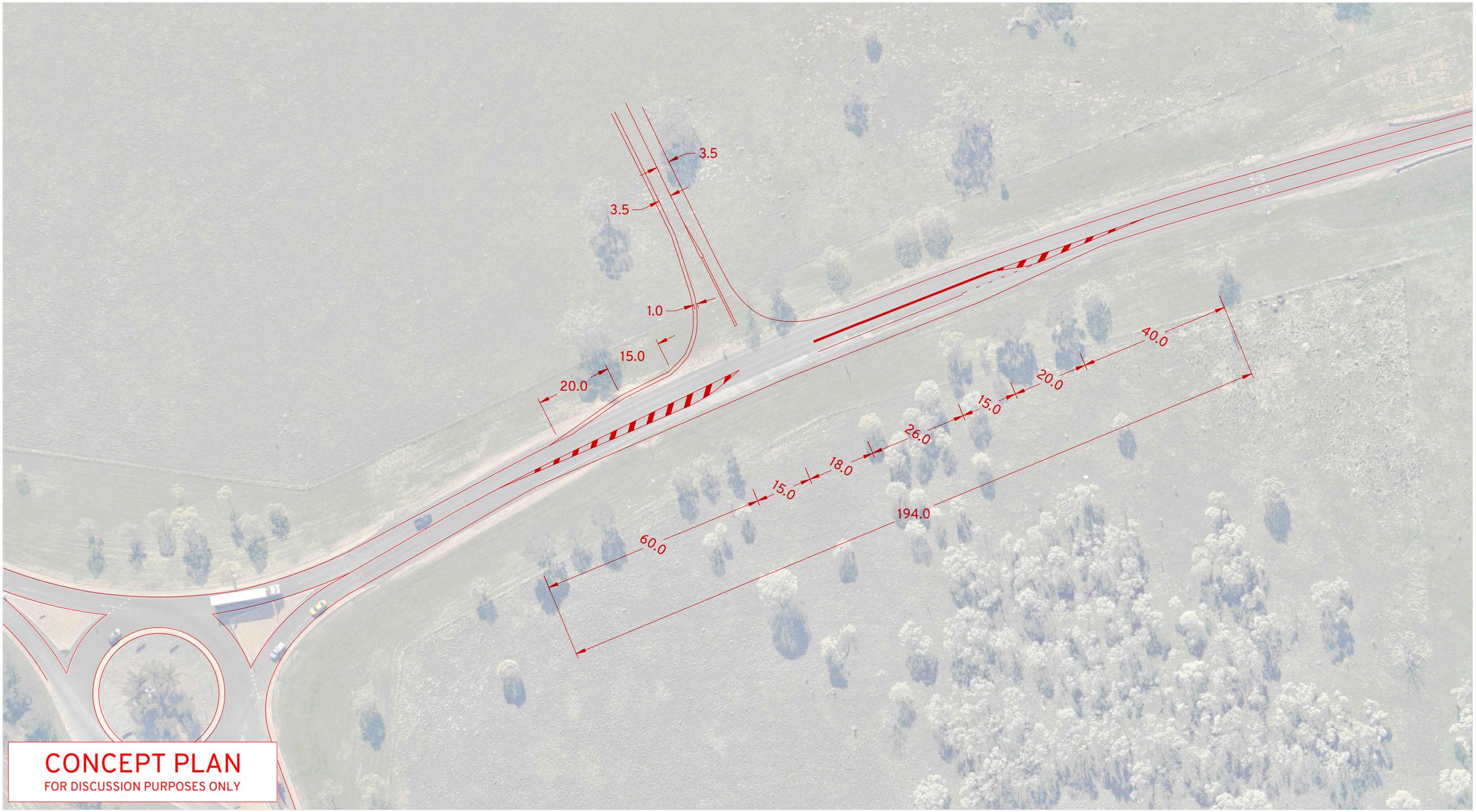


CONCEPT PLAN
FOR DISCUSSION PURPOSES ONLY

Service Centre Development
127-141 Lochrey Road, Gunnedah
Option 3: Roundabout Access Feasibility Design

DRAWN: CT
DATE: 24/11/2021
SCALE: 1:1 @ A3
DWG NO: 193 S01A

Amber 03



The following design details have been taken from Austroads Guide to Road Design Part 4A:

Channelised Right-turn Treatment (CHR(s)) Section 7.5.2.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 3.0m.
4: Lateral movement length *(A)* is 60m.
5: Storage length is 26m for one B-double design vehicle.

Rural Left-turn Treatment with short left turn lane (AUL(s)) Section 8.2.2.
1: Design speed of 70km/h.
2: Lane widths of 3.5m have been used.
3: Formation/carriageway widening is 2.5m.
4: Taper length calculates to 20m.
5: Minimum length of parallel widened shoulder used from Table 8.2 is 35m.

Service Centre Development
127-141 Lochrey Road, Gunnedah
Option 4: Oxley Highway East CHR(s)/AUL(s) Feasibility Design

DRAWN: CT
DATE: 24/11/2021
SCALE: 1:1 @ A3
DWG NO: 193 S01A

Amber 04

Appendix C

TfNSW Access Design Response

13 January 2022

File No: NTH15/00090/02

The Director
Amber Organisation
Email: mike@amberorg.com.au

Attention: Mike Willson - Director

Dear Sir,

RE: Preliminary Advice – Proposed Highway Service Centre and Caravan Park
Part Lot 1 DP 841781; 127-141 Lochrey Road, Gunnedah.

I refer to your email of 24 November 2021 requesting comment from Transport for NSW (TfNSW) in relation to the abovementioned pre planning proposal.

Roles and Responsibilities

Our key interests are the safety and efficiency of the transport network, the needs of our customers and the integration of land use and transport in accordance with Future Transport Strategy 2056.

Lochrey Road is a public local road. The Oxley Highway (HW11) & Kamilaroi Highway (HW29) are classified (State) roads. Gunnedah Shire Council is the Roads Authority for all public roads in the local government area pursuant to Section 7 of the *Roads Act 1993*. TfNSW can exercise roads authority functions for classified roads in accordance with Sections 61 & 64 of the Roads Act. Any road works on a classified (State) road will require the consent of TfNSW and are subject to the terms of a Works Authorisation Deed (WAD) or other suitable agreement with TfNSW.

In accordance with Clause 101 of the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) the Consent Authority is to have consideration for the safety, efficiency and ongoing operation of the classified road, as the development has frontage to a classified road. TfNSW is given the opportunity to comment on traffic generating development of a size or capacity listed under Schedule 3.

It is emphasised that the following comments are based on the information provided to TfNSW at this time, they are not final and further comment will be provided following a review of any planning proposal and/or development application referred by the relevant planning authority.

Transport for NSW Response

TfNSW understands that the Proponent is undertaking due diligence to inform a Planning Proposal that would amend the *Gunnedah Local Environmental Plan 2021* to permit a Highway Service Centre and Caravan Park as additional permitted uses on the subject site.

TfNSW has reviewed the access options submitted and provides the following comments to assist development and consultation of further options;

1. The observed traffic volumes may reflect short-term changes in travel patterns arising from Covid-19, and pre-pandemic traffic volumes should be identified to ensure analysis is reflective of longer-term trends.

2. Consideration must be given to relevant design vehicles when considering intersection and access treatments. Whilst the Austroads warrants may suggest that shortened turn treatments (CHR-S / AUL-S) may be suitable for observed volumes, further consideration will need to be given to deceleration and storage lengths for relevant design vehicles.

3. The following comments are provided in response to the access options included in Drawing no. 193 S01A attached to your enquiry;

    - Option 1 appears to only provide access for eastbound traffic leaving Gunnedah. It is considered likely this arrangement would encourage westbound traffic to attempt U-turns at the Lochrey Road intersection. Further consideration should be given to Options or combinations of options that enable access for all directions of travel.

    - Option 2 may present limitations to the design of the CHR and AUL treatments given proximity to the nearby roundabout and the Lochrey Road intersection respectively. This option would appear to be more appropriate as an upgrade of the Oxley Highway and Lochrey Road intersection, providing clear separation to the roundabout and enabling site access from Lochrey Road.

    - Option 3 would not be acceptable as demonstrated in the submitted sketch. Any further option proposing a fourth leg on the roundabout will need to further adjust all approaches to achieve evenly separated approaches. Note that any reconstruction of the roundabout will need to be designed to accommodate the turn paths of relevant design vehicles and a suitable pavement specification.

    - Option 4 may be acceptable subject to further analysis and could be an effective compliment to a modified option 2 subject to further analysis and detail of the development internal design.

Any roadwork on classified (State) road/s is to be designed and constructed in accordance with the current Austroads Guidelines, Australian Standards and TfNSW Supplements.

The Developer will be required to enter into a Works Authorisation Deed (WAD) or other suitable agreement as required by TfNSW for any road works on the classified (State) road. The developer will be responsible for all costs associated with the roadwork and administration for the WAD. It is recommended that developers familiarise themselves with the requirements of the WAD process. Further information can be obtained from the TfNSW website.

If you have any further enquiries regarding the above comments please do not hesitate to contact Leisa Sedger, Development Services Case Officer or the undersigned on (02) 6640 1362 or via email at: development.north@transport.nsw.gov.au

Yours faithfully,

Matt Adams
A/Manager Development Services
Community and Place | Region North
Regional & Outer Metropolitan

Copy for: Gunnedah Shire Council - council@infogunnedah.com.au

Appendix D NOISE (ACOUSTIC) ASSESSMENT

Acoustic Assessment –Caravan Park and Service Centre Gunnedah, NSW.

Prepared for
NGH

July 2022

Document Details

Acoustic Assessment –Caravan Park and Service Centre Gunnedah, NSW

Prepared For:

NGH

35 Kincaid Street

Wagga Wagga, NSW 2650

Prepared By:

RAPT Consulting

18&19 / 10 Kenrick Street

The Junction, NSW 2291

ABN: 30330220290

www.raptconsulting.com.au

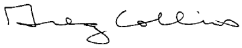
Document ID	Rev No.	Author		Date
2221349_220701	0	Gregory Collins-MAAS		01 July 2022

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Table Index

Figure Index

1. Introduction

1.1 Background

RAPT Consulting has been engaged to undertake an acoustic assessment NGH to inform a Development Application (DA) for a caravan park and service centre at Gunnedah, NSW. The proposal seeks to amend the Gunnedah LEP to amend Schedule 1, to add an additional permitted use for the land at 127-141 Lochrey Road, Gunnedah.

The subject land is legally described as Lot 1 DP 841781 and located at the intersection of the Oxley Highway and Kamilaroi Highway (and is divided by the Oxley Highway). The Site and surrounding area is shown in Figure 1-1 and a concept site layout is shown in Figure 1-2.

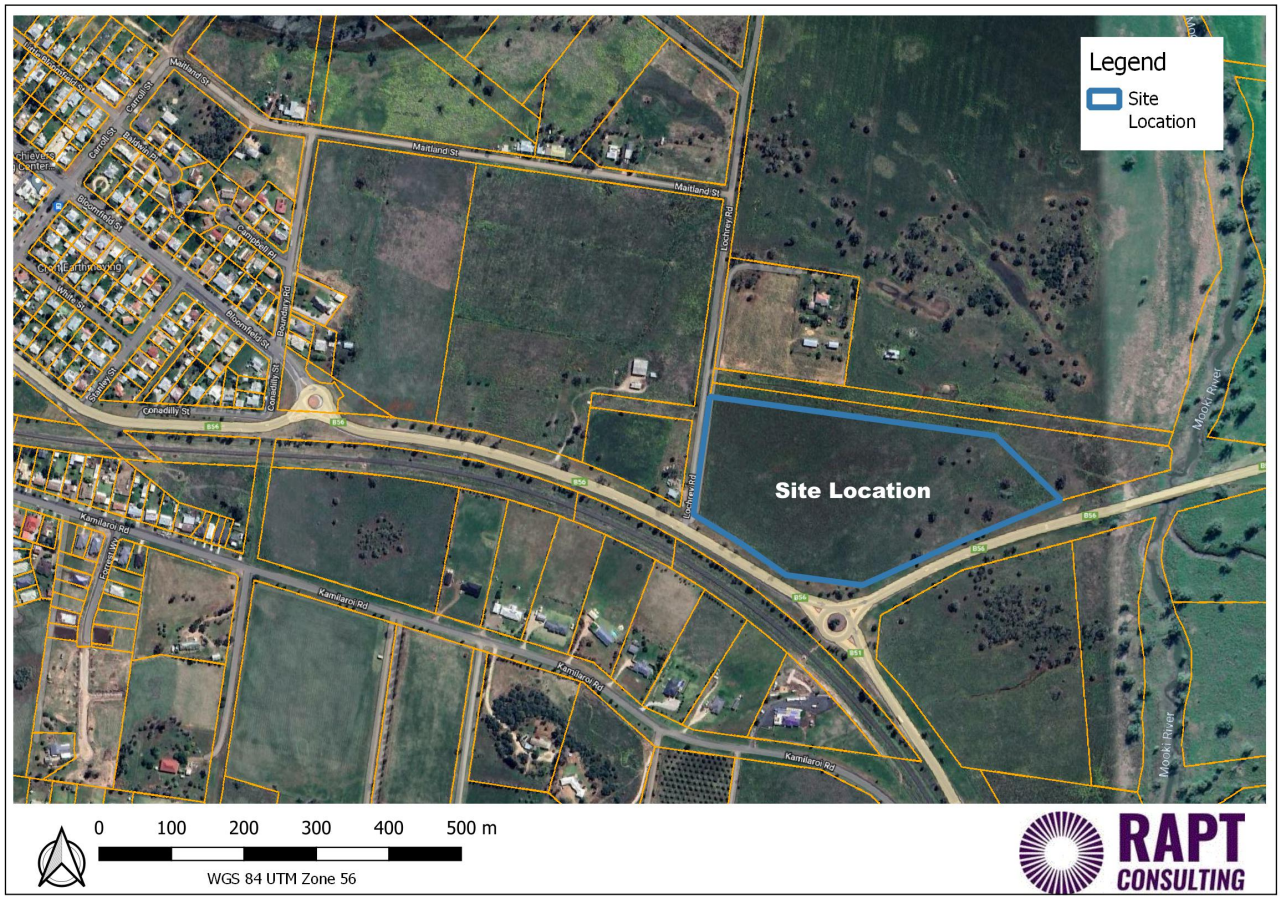


Figure 1-1 Site and Surrounding Area

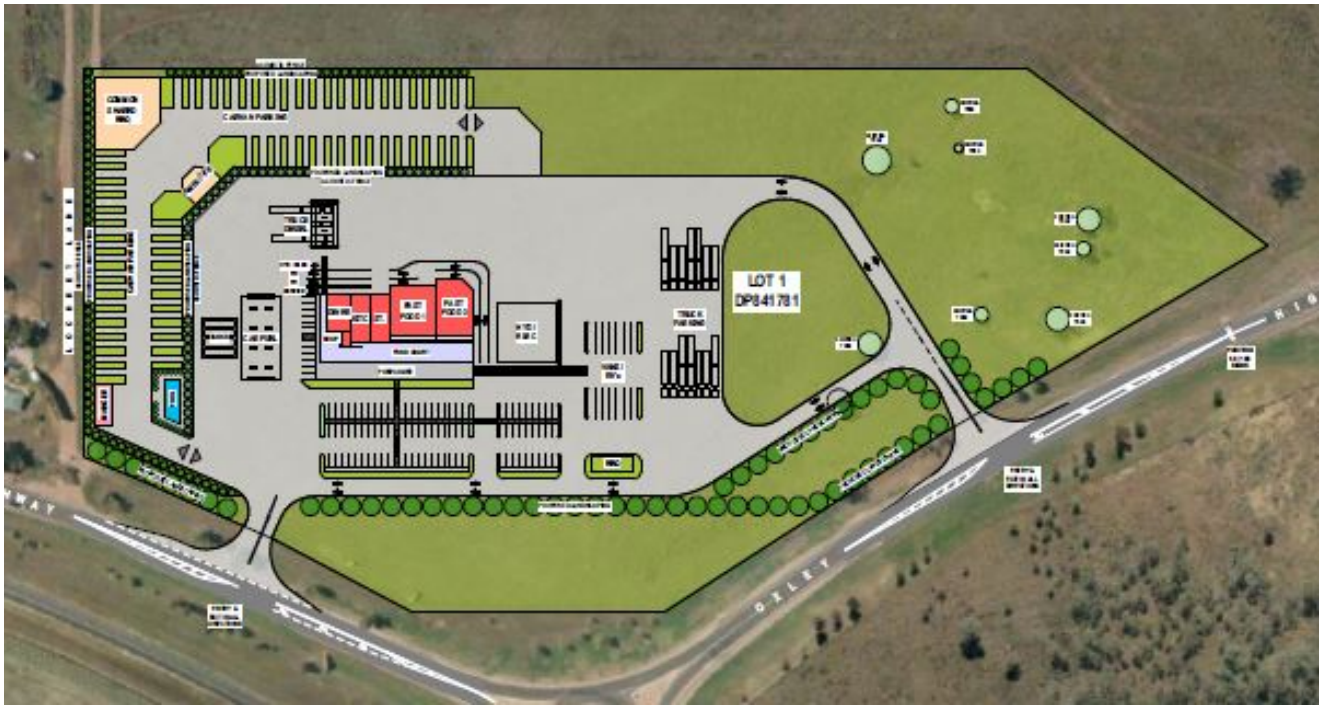


Figure 1-2 Conceptual Site Layout (Source: Hill Lockart Architects)

1.2 Assessment Objectives

This acoustic assessment considers the potential impacts of the operation of the proposal. The purpose is to assess potential noise and vibration from the project and to recommend mitigation measures where required.

1.3 Scope

The acoustic assessment scope of work included:

- Initial desk top review to identify noise sensitive receptors from aerial photography
- Undertake noise measurements to determine ambient and background noise levels
- Establish project noise goals for the operation of the proposed project
- Identify the likely principal noise sources during construction and operation and their associated noise levels
- assessment of potential noise, vibration and sleep disturbance impacts associated with construction and operation aspects of the project
- provide recommendations for feasible and reasonable noise and vibration mitigation and management measures, where noise or vibration objectives may be exceeded.

1.4 Relevant Guidelines

The relevant policies and guidelines for noise and vibration assessments in NSW that have been considered during the preparation of this assessment include:

- Assessing Vibration: A Technical Guideline, Department of Environment and Conservation (DEC), 2006
- British Standard BS7385.2 - 1993 Evaluation and Measurement for Vibration in Buildings, Part 2 - Guide to damage levels from ground borne vibration 1993
- DIN 4150: Part 3-1999 Structural vibration – Effects of vibration on structures 1999
- NSW Road Noise Policy (RNP), Department of Environment, Climate Change and Water (DECCW), 2011
- Noise Policy for Industry (NPfI), Environment Protection Authority (EPA), 2017.
- Interim Construction Noise Guideline (ICNG) (NSW DECC, 2009)

1.5 Limitations

The purpose of the report is to provide an independent acoustic assessment for the proposal.

It is not the intention of the assessment to cover every element of the acoustic environment, but rather to conduct the assessment with consideration to the prescribed work scope.

The findings of the acoustic assessment represent the findings apparent at the date and time of the assessment undertaken. It is the nature of environmental assessments that all variations in environmental conditions cannot be assessed and all uncertainty concerning the conditions of the ambient environment cannot be eliminated. Professional judgement must be exercised in the investigation and interpretation of observations.

In conducting this assessment and preparing the report, current guidelines for acoustics, noise were referred to. This work has been conducted in good faith with RAPT Consulting's understanding of the client's brief and the generally accepted consulting practice.

No other warranty, expressed or implied, is made as to the information and professional advice included in this report. It is not intended for other parties or other uses.

2. Existing Environment

2.1 Receptors

The area surrounding the site is zoned R2 Low Density Residential, R3 Medium Density Residential, R5 Large Lot Residential, RU1 Primary Production and SP2 Infrastructure. A map showing the land use zonings in the vicinity of the proposal are shown in Figure 2-1.

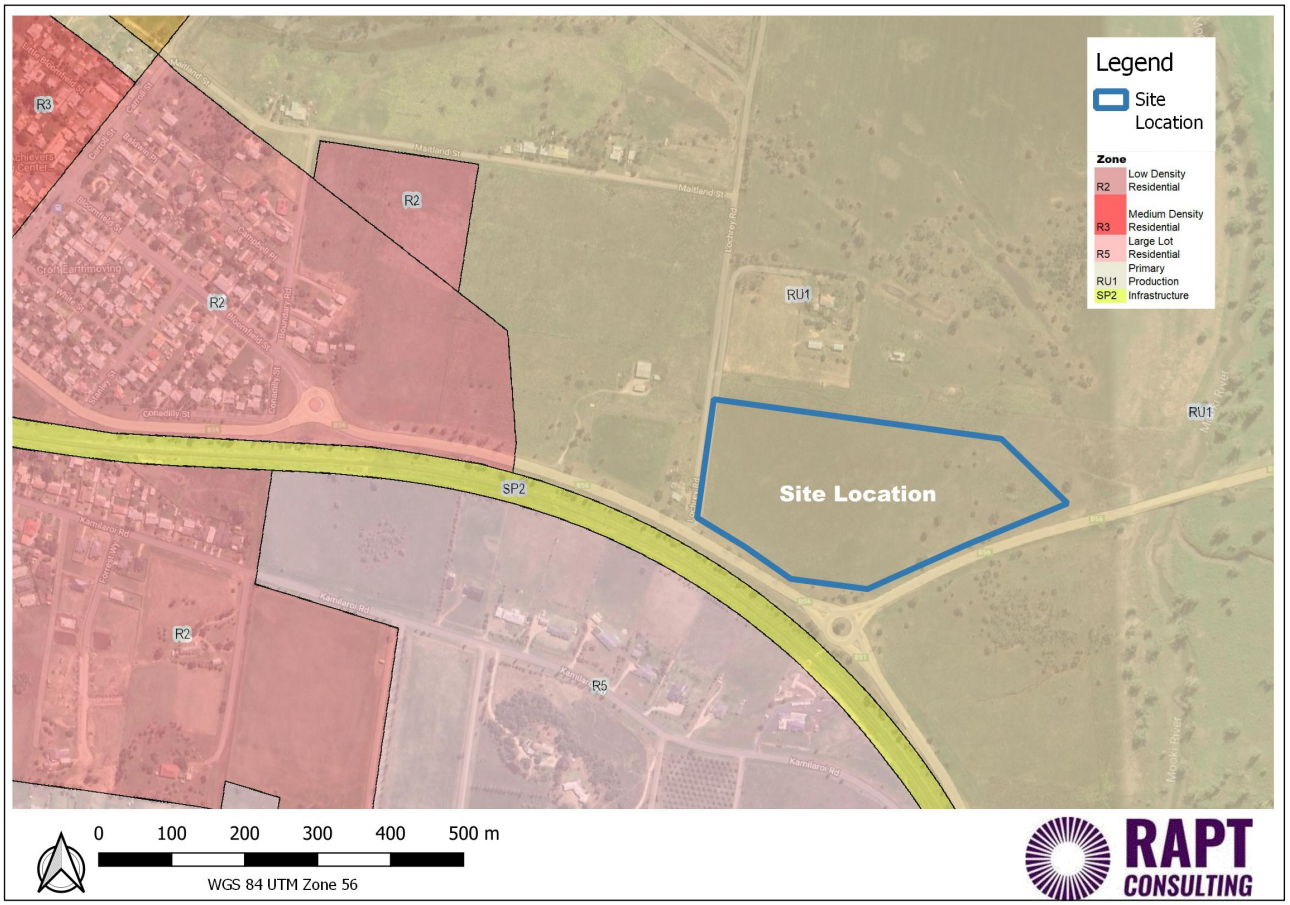


Figure 2-1 Land Use Zonings

Closest receptors to the proposal assessed in this acoustic assessment are identified in Table 2-1 and Figure 2-2.

Table 2-1 Nearest Receptors to Study Area

Receiver ID	Address	Receptor Type	Easting	Northing
R1	88 Conadilly Street	Residential	239700	6568640
R2	102-125 Lochrey Road	Residential	239878	6568881
R3	248 Maitland Street	Residential	239605	6569087
R4	242 Maitland Street	Residential	239529	6569094
R5	240 Maitland Street	Residential	239487	6569099
R6	17 Boundary Road	Residential	239215	6568877
R7	15 Boundary Road	Residential	239216	6568828
R8	2 Boundary Road	Residential	239124	6568760
R9	54 Kamilaroi Road	Residential	239095	6568569
R10	72 Kamilaroi Road	Residential	239417	6568520
R11	76 Kamilaroi Road	Residential	239474	6568493
R12	90 Kamilaroi Road	Residential	239540	6568476
R13	82-84 Kamilaroi Road	Residential	239605	6568459
R14	86-88 Kamilaroi Road	Residential	239662	6568417
R15	90-92 Kamilaroi Road	Residential	239712	6568387
R16	94-98 Kamilaroi Road	Residential	239766	6568361
R17	100-108 Kamilaroi Road	Residential	239842	6568345

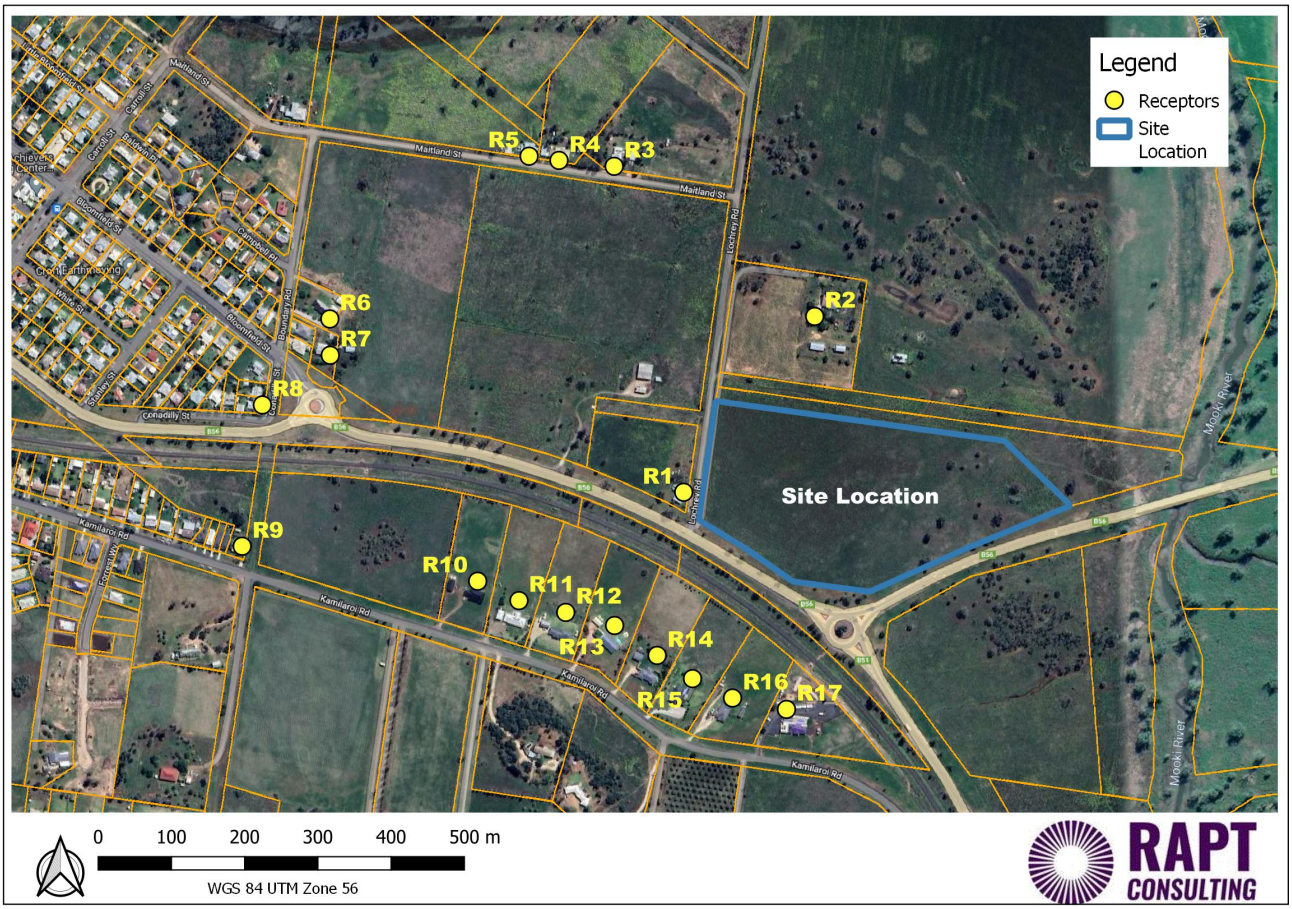


Figure 2-2 Receptors Surrounding The Proposal Site

2.2 Background and Ambient Noise

To establish background and ambient noise levels, noise monitoring was undertaken by RAPT Consulting from 23 March to 30 March 2022 at 88 Conadilly Street and from 6 May to 12 May 2022 at 419 Conadilly Street. Site observations noted the locations were considered indicative of the local ambient noise environment and also presented as secure locations whereby minimising the risk of theft or vandalism to the monitoring equipment. Additionally, they are considered as acceptable locations for determination of the background noise with consideration to the NSW Environment Protection Authority's (EPA's) – Noise Policy for Industry (NPfI). During site visits it was noted that Conadilly Street road traffic, distant road traffic, rail noise and natural wildlife, primarily described the ambient noise environment and is indicative of a sub-urban noise environment.

The monitoring locations are shown in Figure 2-3.

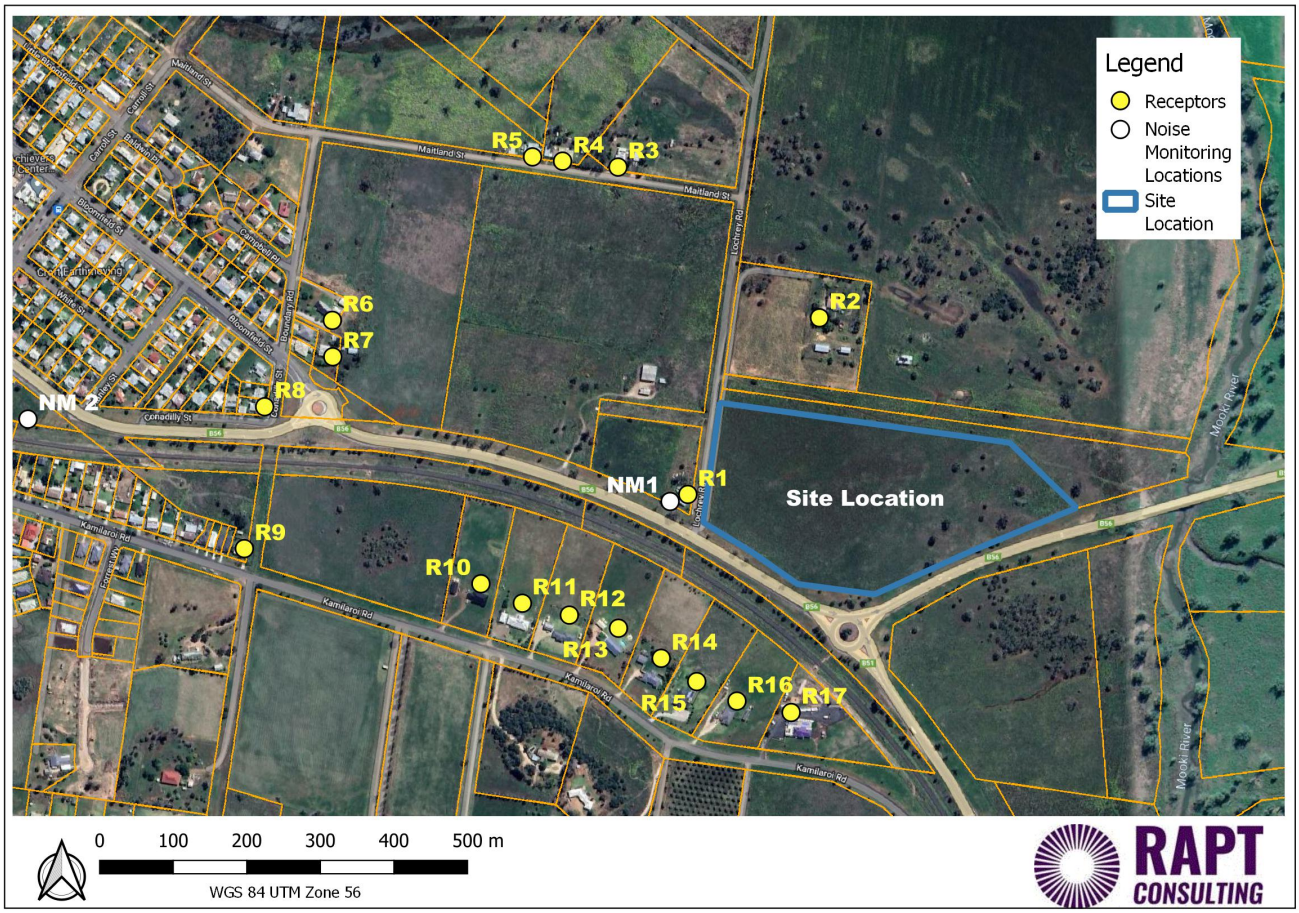


Figure 2-3 Monitoring Locations.

Monitoring was undertaken using a RION NL-42 noise loggers with Type 2 Precision. These loggers are capable of measuring continuous sound pressure levels and are able to record L_{Amin}, L_{A90}, L_{A10}, L_{Amax} and L_{Aeq} noise descriptors. The instruments were programmed to accumulate environmental noise data continuously over sampling periods of 15 minutes for the entire monitoring period.

The noise surveys were conducted with consideration to the procedures described in Australian Standard AS 1055:2018, “Acoustics – Description and Measurement of Environmental Noise” and the NSW Noise Policy for Industry (NPfI). Calibration was checked before and after each measurement and no significant drift occurred. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics – Sound level meters – Specifications.

The L_{A90} descriptor is used to measure the background noise level. This descriptor represents the noise level that is exceeded for 90 percent of the time over a relevant period of measurement. In line with the procedures described in the EPA’s NPfI, the assessment background level (ABL) is established by determining the lowest tenth-percentile level of the L_{A90} noise data acquired over each period of interest. The background noise level or rating background level (RBL) representing the day, evening and night-time assessment periods is based on the median of individual ABL’s determined over the entire monitoring duration. The RBL is representative of the average minimum background sound level, or simply the background level.

The L_{Aeq} is the equivalent continuous noise level which would have the same total acoustic energy over the measurement period as the varying noise actually measured, so it is in effect an energy average.

Weather information for the unattended noise logging was obtained from the Bureau of Meteorology Orange Airport AWS for the monitoring period and any data adversely affected by rain, wind (more than 5 m/s as per NPfI) or extraneous noise were discarded.

The RBL and ambient LAeq levels are provided in Table 2-2 below.

Table 2-2 Background and Ambient Noise Monitoring Results

	Rating background level, L_{A90}, dB(A)			Ambient noise levels, L_{Aeq} dB(A)		
Monitoring Location	**Day[1]**	**Evening[1]**	**Night[1]**	**Day[1]**	**Evening[1]**	**Night[1]**
88 Conadilly Street	42	42	42[3] (44)	59	58	57
419 Conadilly Street	40	31	30[2] (26)	64	62	62

Note 1 Day: 7:00 to 18:00 Monday to Saturday and 8:00 to 18:00 Sundays & Public Holidays
Evening: 18:00 to 22:00 Monday to Sunday & Public Holidays
Night: 22:00 to 7:00 Monday to Saturday and 22:00 to 8:00 Sundays & Public Holidays

Note 2 Table 2.1 of the NPfI specifies a minimum assumed rating background noise level of 35dB(A) for day and 30 dB(A) for evening and night-time. Number in brackets (XX) represents actual measured RBL determined for assessment period.

Note 3 As per the NPfI, project intrusiveness noise level for evening be set at no greater than the project intrusiveness noise level for daytime. The project intrusiveness noise level for night-time should be no greater than the project intrusiveness noise level for day or evening. Number in brackets (XX) represents actual measured RBL determined for assessment period.

3. Noise and Vibration Objectives

3.1 Construction Noise

Construction noise is assessed with consideration to DECCW Interim Construction Noise Guidelines (ICNG) (July 2009). The ICNG is a non-mandatory guideline that is usually referred to by local councils and other NSW government entities when construction / demolition works require development approval. The ICNG recommend standard hours for construction activity as detailed in Table 3-1.

Table 3-1 ICNG Recommended Construction Hours

Work type	Recommended standard hours of work
Normal construction	Monday to Friday: 7 am to 6 pm. Saturday: 8 am to 1 pm. No work on Sundays or Public Holidays.
Blasting	Monday to Friday: 9 am to 5 pm. Saturday: 9 am to 1 pm. No work on Sundays or Public Holidays.

The ICNG provides noise management levels for construction noise at residential and other potentially sensitive receivers. These management levels are to be calculated based on the adopted rating background level (RBL) at nearby locations, as shown in Table 3-2.

Table 3-2 ICNG Noise Guidelines at Receivers

Period	Management Level $L_{Aeq(15\ min)}$
Residential Recommended standard hours	Noise affected level: RBL + 10 Highly noise affected level: 75 dB(A)
Residential Outside recommended standard hours	Noise affected level: RBL + 5
Classrooms at schools and other educational institutions	Internal Noise Level 45 dB(A) (applies when properties are being used) Outdoor Noise Level 55 dB(A) (assumes 10dB(A) loss through an open window
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	65 dB(A)
Offices, retail outlets (external)	70 dB(A)
industrial premises (external)	75 dB(A)

The above levels apply at the boundary of the most affected residences / offices or within 30 m from the residence where the property boundary is more than 30 m from the residence.

The *noise affected level* represents the point above which there may be some community reaction to noise. Where the *noise affected level* is exceeded all feasible and reasonable work practices to minimise noise should be applied and all potentially impacted residents should be informed of the nature of the works, expected noise levels, duration of works and a method of contact. The *noise affected level* is the background noise level plus 10 dB(A) during recommended standard hours and the background noise level plus 5 dB(A) outside of recommended standard hours.

The *highly noise affected level* represents the point above which there may be strong community reaction to noise and is set at 75 dB(A). Where noise is above this level, the relevant authority may require respite periods by restricting the hours when the subject noisy activities can occur, considering:

- Times identified by the community when they are less sensitive to noise (such as mid-morning or mid-afternoon for works near residences).
- If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

It is understood construction is planned for standard hours. Based on the above and the RBL's determined from site monitoring, construction noise management levels (NML's) have been conservatively derived based on monitoring from 419 Conadilly Street, as shown in Table 3-3.

Table 3-3 ICNG NML's Leq(15min) dB(A)

Receiver	Within Recommended Standard Hours
Residential	50

3.2 Vibration Guidelines

3.2.1 Human Exposure

Vibration goals the were sourced from the DECCW's *Assessing Vibration: a technical guideline*, which is based on guidelines contained in British Standard (BS) 6472–1992, *Evaluation of human exposure to vibration in buildings (1–80 Hz)*.

Vibration, at levels high enough, has the potential to cause damage to structures and disrupt human comfort. Vibration and its associated effects are usually classified as continuous, impulsive or intermittent as follows:

- continuous vibration continues uninterrupted for a defined period and includes sources such as machinery and continuous construction activities
- impulsive vibration is a rapid build up to a peak followed by a damped decay. It may consist of several cycles at around the same amplitude, with durations of typically less than two seconds and no more than three occurrences in an assessment period. This may include occasional dropping of heavy equipment or loading activities

- intermittent vibration occurs where there are interrupted periods of continuous vibration, repeated periods of impulsive vibration or continuous vibration that varies significantly in magnitude. This may include intermittent construction activity, impact pile driving, jack hammers.

The preferred and maximum values for continuous and impulsive vibration are defined in Table 2.2 of the guideline and are reproduced in Table 3-4 for the applicable receivers.

Table 3-4 Preferred and Maximum Levels for Human Comfort

Location	Assessment Period[4]	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Continuous vibration (weighted RMS acceleration, m/s^2, 1-80Hz)					
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Impulsive vibration (weighted RMS acceleration, m/s^2, 1-80Hz)					
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14

Note 4 Daytime is 7:00am to 10:00pm and Night-time is 10:00pm to 7:00am

The acceptable vibration dose values (VDV) for intermittent vibration are defined in Table 2.4 of the guideline and are reproduced in Table 3-5 for the applicable receiver type.

Table 3-5 Acceptable Vibration Dose Values for Intermittent Vibration (m/s1.75)

Location	Daytime [5]		Night-time [5]	
	Preferred value	Maximum value	Preferred value	Maximum value
Critical areas[6]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Note 5 Daytime is 7:00 to 22:00 and night-time is 22:00 to 7:00: and
Note 6 Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be needed to assess intermittent values against the continuous or impulsive criteria for critical areas.

3.2.2 Building Damage

Currently, there is no Australian Standard that sets the criteria for the assessment of building damage caused by vibration. Guidance of limiting vibration values is attained from reference to the following International Standards and Guidelines:

- British Standard BS7385.2 - 1993 *Evaluation and Measurement for Vibration in Buildings*, Part 2 - Guide to damage levels from ground borne vibration

- German Standard DIN 4150-3: 1999-02 Structural Vibration – Part 3: *Effects of vibration on structures*.

The recommended Peak Particle Velocity (PPV) guidelines for the possibility of vibration induced building damage are derived from the minimum vibration levels above which any damage may occur are presented in Table 3-6 for DIN 4150-3: 1999-02 and Table 3-7 for BS7385.2 – 1993.

Table 3-6 DIN 4150-3 Guideline values for vibration velocity to be used when evaluating the effects of short-term vibration on structures

Type of Structure	Peak Component Particle Velocity, mm/s			
	Vibration at the foundation at a frequency of			Vibration of horizontal plane of highest floor at all frequencies
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz[6]	
Buildings used for commercial purposes, industrial buildings, and buildings of similar design	20	20-40	40-50	40
Dwellings and buildings of similar design and/or occupancy	5	5-15	15-20	15
Structures that, because of their sensitivity to vibration, do not correspond to those listed in lines 1 and 2 of table 5-7 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

Note 7 At frequencies above 100Hz, the values given in this column may be used as minimum values

Table 3-7 BS7385.2 Transient Vibration Guideline Values for Potential building - Cosmetic Damage

Building Type[9]	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz[8]	15 Hz and above[8]
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
Unreinforced or light framed structures. Residential or light commercial type buildings.	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 8 Values referred to are at the base of the building: and
Note 9 For transient vibration effecting unreinforced or light framed structures at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.

Unlike noise which travels through air, the transmission of vibration is highly dependent on substratum conditions between the source/s and receiver. Also dissimilar to noise travelling through air, vibration levels diminish quickly over distance, thus an adverse impact from vibration on the broader community is not typically expected. Vibration during works is considered an intermittent source associated with two main types of impact: disturbance at receivers and potential architectural/structural damage to buildings. Generally, if disturbance issues are controlled, there is limited potential for structural damage to buildings.

Ground Vibration – Minimum Working Distances from Sensitive Receivers

While this is not a transport (roads or rail) project, The Transport for NSW Construction Noise and Vibration Strategy (CNVS) provides guidance for minimum working distances. As a guide, minimum working distances from sensitive receivers for typical items of vibration intensive plant are listed in Table 20 of the CNVS. The minimum distances are quoted for both “cosmetic” damage (refer BS 7385) and human comfort (refer OH&E’s Assessing Vibration - a technical guideline). DIN 4150 has criteria of particular reference for heritage structures. Table 3-8 provides the recommended minimum safe working distances for vibration intensive plant from sensitive receivers.

Table 3-8 Recommended Minimum Safe Working Distances for Vibration Intensive Plant from Sensitive Receiver

Plant Item	Rating / Description	Minimum Distance Cosmetic Damage		Minimum Distance Human Response (NSW EPA Guideline)
		Residential and Light Commercial (BS 7385)	Heritage Items (DIN 4150, Group 3)	
Vibratory Roller	<50 kN (1-2 tonne)	5m	11m	15m to 20m
	<100 kN (2-4 tonne)	6m	13m	20m
	<200 kN (4-6 tonne)	12m	15m	40m
	<300kN (7-13 tonne)	15m	31m	100m
	>300kN (13-18 tonne)	20m	40m	100m
	>300kN (>18 tonne)	25m	50m	100m
Small Hydraulic Hammer	300kg (5 to 12 t excavator)	2m	5m	7m
Medium Hydraulic Hammer	900kg (12 to 18 t excavator)	7m	15m	23m
Large Hydraulic Hammer	1600kg (18 to 34 t excavator)	22m	44m	73m
Vibratory Pile Driver	Sheet Piles	2m to 20m	5m to 40m	20m
Pile Boring	≤ 800mm	2m (nominal)	5m	4m
Jack Hammer	Hand Held	1m (nominal)	3m	2m

While significant vibration generating activities are not expected as part of the proposal, during construction it is recommend if any of the above activities are planned, they be limited to vibratory roller <100 kN (2-4 tonne), and medium hydraulic hammer 900kg (12 to 18 t excavator).

3.3 Operational Noise – NSW Noise Policy for Industry

The NPfI provides guidance on the assessment of operational noise impacts associated with the projects operation. The NPfI assessment procedure has two components:

- Controlling intrusive noise impacts in the short-term for residences
- Maintaining noise level amenity for residences and other land uses.

Project Intrusiveness Noise Levels

According to the NPfI, the intrusiveness of a noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the $L_{Aeq,15min}$ descriptor) does not exceed the background noise level measured in the absence of the source by more than 5 dB(A). The project intrusiveness noise level, which is only applicable to residential receivers, is determined as follows:

$L_{Aeq,15minute}$ Intrusiveness noise level = Rating Background Level ('RBL') plus 5 dB(A)

For conservatism RBL's taken from 419 Conadilly Street have been utilised. Based on the measured and adopted noise levels outlined in Table 2-2, The intrusiveness noise levels for residential receivers are provided in Table 3-9.

Table 3-9 Intrusiveness Noise Levels

Period	RBL. L_{A90}, dB(A)	Intrusiveness noise level (RBL + 5), dB(A)
Day	40	45
Evening	31	36
Night	30	35

Amenity Noise Levels

The project amenity noise levels for different time periods of day are determined with consideration to Section 2.4 of the NPfI. The NPfI recommends amenity noise levels ($L_{Aeq,period}$) for various receivers including residential, commercial, industrial receivers and sensitive receivers such as schools, hotels, hospitals, churches and parks. These "recommended" amenity noise levels represent the objective for total industrial noise experienced at a receiver location. However, when assessing a single industrial development and its impact on an area, "project" amenity noise levels apply.

The NPfI recommended amenity noise levels are shown in 3-10 below.

Table 3-10 NPfI Recommended Amenity Noise Levels

Type of Receiver	Noise Amenity Area	Time of Day[10, 11]	Recommended amenity noise level, LAeq, dB(A)[12, 13]
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks	See column 4	See column 4	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School classroom (internal)	All	Noisiest 1-hour period when in use	35[14]
Hospital ward	All		
- Internal		Noisiest 1-hour	35
- External		Noisiest 1-hour	50
Place of worship (internal)	All	When in use	40
Passive recreation (e.g. national park)	All	When in use	50
Active recreation (e.g. school playground, golf course)	All	When in use	55
Commercial premises	All	When in use	65
Industrial premises	All	When in use	70
Industrial interface (applicable only to residential noise amenity areas)	All	When in use	Add 5 dB(A) to recommended noise amenity area

Note 10 Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.

Note 11 On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.

Note 12 The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

Note 13 The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated

Note 14 In the case where existing schools are affected by noise from existing industrial noise sources, the acceptable LAeq noise level may be increased to 40 dB LAeq(1hr)

High Traffic

The level of transport noise, road traffic noise in particular, may be high enough to make noise from an industrial source effectively inaudible, even though the LAeq noise level from that industrial noise source may exceed the project amenity noise level. In such cases the project amenity noise level may be derived from the LAeq, period(traffic) minus 15 dB(A).

This high traffic project amenity noise level may be applied only if all the following apply:

- traffic noise is identified as the dominant noise source at the site
- the existing traffic noise level is 10 dB or more above the recommended amenity noise level for the area
- it is highly unlikely traffic noise levels will decrease in the future.

In this case based on noise measurements and attended observations when comparing to the above critieria, the high traffic application does not apply.

To ensure that the total industrial noise level (existing plus new) remain within the recommended amenity noise levels for an area, the project amenity noise level that applies for each new industrial noise source is determined as follows:

Project amenity noise level = Recommended amenity noise level (Table 3-10) – 5dB(A)

Additionally, given that the intrusiveness noise level is based on a 15-minute assessment period and the project amenity noise level is based on day, evening and night assessment periods, the NPfI provides the following guidance on adjusting the $L_{Aeq,(period)}$ level to a representative $L_{Aeq,15minute}$ level in order to standardise the time periods.

$L_{Aeq(15minute)} = L_{Aeq(period)} + 3dB(A)$

The project amenity noise levels ($L_{Aeq,15min}$) for sub-urban residences and other receptors applied for this project are shown in Table 3-11.

Table 3-11 Project Amenity Noise Levels

Type of Receiver	Noise Amenity Area	Time of Day	Recommended Noise Level, dB(A)	
			$L_{Aeq,\ Period}$	$L_{Aeq,\ 15min}$
Residence	Sub-Urban	Day	55 – 5 = 50	50 + 3 = 53
		Evening	45 – 5 = 40	40 + 3 = 43
		Night	40 – 5 = 35	35 + 3 = 38
Active Recreation Area (e.g. school playground, golf course)	All	When in use	55 – 5 = 50	50 + 3 = 53
School Classroom (Internal)	All	Noisiest 1 hour when in use	35 – 5 = 30	30 + 3 = 33

Project Noise Trigger Levels

The project noise trigger level is the lower of the intrusiveness and the amenity noise levels. Table 3-12 presents the project noise trigger levels for the day, evening, and night-time periods.

Table 3-12 Project Noise Trigger Levels

Type of receiver	Assessment period	Intrusiveness noise levels, $L_{Aeq,15min}$, dB(A)	Amenity noise levels, $L_{Aeq,15min}$, dB(A)	Project noise trigger levels, $L_{Aeq,15min}$, dB(A)
Residential Sub-Urban	Day	45	53	**45**
	Evening	36	43	**36**
	Night	35	38	**35**
Active Recreation Area (e.g. school playground, golf course)	When in use	-	53	**53**
School Classroom (External)[15]	When in Use	-	43	**43**

Note 15 Conversion of trigger levels from internal to external for school classroom and assumes 10dB(A) loss from outside to inside through open window.

Maximum Noise Level Assessment

The NPfI requires the potential for sleep disturbance to be assessed by considering maximum noise levels events during the night-time period.

Where the subject development/premises night-time noise levels at a residential location exceed the following screening levels a detailed maximum noise level event assessment should be undertaken:

- $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the RBL, and the number of times this happens during the night-time period.

Based on the adopted background noise levels during the night, the sleep disturbance criteria for the nearest noise sensitive residential receivers are provided in Table 3-13.

Table 3-13 Night-Time Sleep Disturbance Screening Levels

Receiver type	Assessment Level $L_{Aeq,15min}$, dB(A)	Assessment Level L_{AFmax}, dB(A)
Residential	40	52

The RNP (DECCW 2011) provides additional information on sleep disturbance and concludes that:

- *Maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep*
- *One or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.*

The above references identify that internal noise levels of 50 to 55 dB(A), are unlikely to cause awakenings. On the assumption that there is a 10 dB(A) outside-to-inside noise loss through an open window (see Section 2.6 of the NPfI, p15), this indicates that external noise levels of LAmax 60 to 65 dB(A) are unlikely to cause awakening reactions.

3.4 NSW Road Noise Policy (RNP)

The NSW Road Noise Policy (RNP) recommends various criteria for different road and residential developments and uses. Although it is not mandatory to achieve the noise assessment criteria in the RNP, proponents will need to provide justification if it is not considered feasible or reasonable to achieve them. Based on the definitions in the RNP, Conadilly Road is considered to be a sub arterial / arterial road. Based on this, the following noise goals for residences taken from Table 3 of the RNP are provided in Table 3-14 Below.

Table 3-14 Road Noise Policy Goals

Road Category	Day	Night
Existing residences affected by additional traffic on existing sub-arterial / arterial roads generated by land use development	60 $L_{Aeq(15hr)}$ External	55 $L_{Aeq(9hr)}$ External

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

4. Assessment of Potential Impacts

4.1 Construction Noise

Construction can occur in the vicinity of residences or other sensitive land uses and be variable in times of occurrence. These aspects of construction can exacerbate noise levels and their effects. Construction noise by its nature is temporary, may not be amenable to purpose-built noise control measures applied to industrial processes, and may move as construction progresses. With these constraints in mind, the ICNG was developed to focus on applying a range of work practices most suited to minimise construction noise impacts, rather than focusing only on achieving numeric noise levels. While some noise from construction sites is inevitable, the aim of the Guideline is to protect much of residences and other sensitive land uses from noise pollution most of the time.

While it is unknown at this stage what specific plant and equipment are planned to be used, generally the typical construction activity on the proposal will be in the form of construction of the office building. Other equipment may be used however it is anticipated that they would produce similar noise emissions. Therefore, an assumed construction sequence would be:

- Excavation/Site preparation.
- Building of site facilities.

Table 4-1 provides general plant and machinery data that has been used to predict noise levels at the neighbouring properties. The noisiest data has been chosen for each piece of plant/machinery to present a worst-case scenario.

Table 4-1 Plant and Equipment Noise Levels

Plant Item	Activity Noise Level L_{Aeq} @ 10m	DEFRA Construction Noise Database	Anticipated Usage %[16]
Excavation			
Dozer	80	Table 2 Ref 10	50
Tracked Excavator	79	Table 2 Ref 14	50
Articulated Dump Truck	74	Table 2 Ref 32	50
Roller	73	Table 2 Ref 38	50
Building			
Concrete Pump & Cement Mixer	67	Table 4 Ref 24	50
Poker Vibrator	69	Table 4 Ref 34	50
Mobile Telescopic Crane	67	Table 4 Ref 36	50
Diesel Generator	61	Table 4 Ref 75	90

Note 16The sound power levels for the individual plant items are worst-case levels representative of the equipment operating at maximum capacity. In practice, not all plant items would operate at maximum capacity at the same time and therefore the estimated usage has been adjusted to reflect this. This adjustment is consistent with RAPT Consulting experience on similar projects.

Construction Operations

Acoustic modelling was undertaken using Soft Noise "Predictor" to predict the effects of construction noise. Predictor is a computer program for the calculation, assessment and prognosis of noise propagation. Predictor calculates environmental noise propagation according to ISO 9613-2, "Acoustics – Attenuation of sound during propagation outdoors". Terrain topography, ground absorption, atmospheric absorption and relevant shielding objects are taken into account in the calculations.

Enhancing Weather Conditions

Fact Sheet D of the NPfI provides guidance for accounting for noise-enhancing weather conditions. Two options are available to consider meteorological effects:

1. Adopt the noise-enhancing meteorological conditions for all assessment periods for noise impact assessment purposes without an assessment of how often these conditions occur – a conservative approach that considers source-to-receiver wind vectors for all receivers and F class temperature inversions with wind speeds up to 2 m/s at night. Or

2. Determine the significance of noise-enhancing conditions. This involves assessing the significance of temperature inversions (F and G class stability categories) for the night-time period and the significance of light winds up to and including 3 m/s for all

assessment periods during stability categories other than E, F or G. Significance is based on a threshold of occurrence of 30% determined in accordance with the provisions in this policy. Where noise-enhancing meteorological conditions occur for less than 30% of the time, standard meteorological conditions may be adopted for the assessment.

As a detailed analysis of the significance of noise enhancing conditions has not been undertaken, option 1 has been utilised. Table D1 from the NPfI is reproduced in Table 4-2 and shows the noise enhancing meteorological conditions that have been adopted for this assessment

Table 4-2Noise Enhancing Meteorological Conditions

Meteorological Conditions	Meteorological Parameters
Noise-enhancing meteorological conditions	Daytime/evening: stability category D with light winds (up to 3 m/s at 10 m AGL). Night-time: stability category F with winds up to 2 m/s at 10 m AGL.

Note 17 m/s = metres per second; m = metres; AGL = above ground level; where a range of conditions is nominated, the meteorological condition delivering the highest-predicted noise level should be adopted for assessment purposes. However, feasible and reasonable noise limits in consents and licences derived from this process would apply under the full range of meteorological conditions nominated under standard or noise-enhancing conditions as relevant. All wind speeds are referenced to 10 m AGL. Stability categories are based on the Pasquill–Gifford stability classification scheme.

Other Key assumptions in the model include:

- topographical information was obtained from NSW Government Spatial Services
- all cleared areas were modelled considering a conservative ground factor of 0.8 to account for grassed areas
- all residential receivers were modelled at 1.5 metres above the ground surface

Construction noise levels have been predicted based on the potential construction noise levels provided in Table 4-1. These noise levels represent different equipment noise levels and give an idea how noise levels may change across the proposal area with different activities being undertaken.

The magnitude of off-site noise impact associated with construction would be dependent upon several factors:

- The intensity of construction activities
- The location of construction activities
- The type of equipment used
- Intervening terrain; and
- The prevailing weather conditions.

In addition, construction machinery would likely move about the study area, variously altering the directivity of the noise source with respect to individual receivers and their distances.

Noise levels at sensitive receivers can be significantly lower than the worst-case scenario when the construction works move to a more distant location in the work area. An example of this is shown in Figure 4-1.

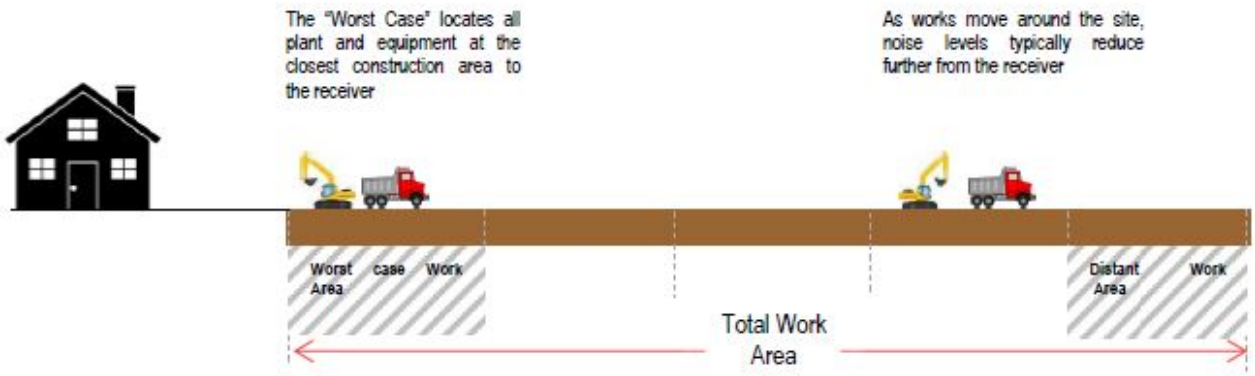


Figure 4-1 Example of Differing Work Areas

During any given period, the machinery items to be used in the study area would operate at maximum sound power levels for only brief stages. At other times, the machinery may produce lower sound levels while carrying out activities not requiring full power. It is highly unlikely that all construction equipment would be operating at their maximum sound power levels at any one time. Finally, certain types of construction machinery would be present in the study area for only brief periods during construction. Therefore, the modelled construction noise results are considered to represent a worst-case scenario. Two scenarios were assessed, one for the car wash area and one for the building area. These scenarios also demonstrate how received noise levels can change due to location of construction activity.

Construction Noise Impact Assessment Results

Noise levels were predicted to each assessed receptor assuming receiver heights of 1.5m above ground level for typical construction activities. Table 4-3 summarises the maximum predicted noise level from each of the construction scenarios at identified residential receptors. Predicted exceedances of NML's are highlighted in RED.

Table 4-3 Predicted Construction Noise Levels dB(A) Leq(15min)

Receiver	Excavation East	Excavation West	Building East	Building West	Standard Hours NML	Highly Affected Noise Level
R1	48	58	37	47	50	75

Receiver	Excavation East	Excavation West	Building East	Building West	Standard Hours NML	Highly Affected Noise Level
R2	45	46	35	36	50	75
R3	31	34	21	23	50	75
R4	30	33	20	22	50	75
R5	30	33	19	22	50	75
R6	28	31	17	20	50	75
R7	28	31	17	20	50	75
R8	30	33	20	22	50	75
R9	30	33	19	22	50	75
R10	38	46	27	35	50	75
R11	39	47	28	36	50	75
R12	45	48	34	38	50	75
R13	46	50	35	39	50	75
R14	47	49	36	34	50	75
R15	47	44	37	34	50	75

Receiver	Excavation East	Excavation West	Building East	Building West	Standard Hours NML	Highly Affected Noise Level
R16	43	49	32	33	50	75
R17	44	48	33	33	50	75

The results of the construction assessment indicate compliance with NML's can be achieved in all situations with the exception of excavation east works modelling scenarios suggest there could be exceedances at R10 – R15 for excavation works west at R1. The highly affected noise level is expected to be complied with in all situations.

While NML's can be achieved in most cases, there is a risk for NML's to be exceeded depending on work activities and locations. With this in mind it is recommended a construction noise management plan be implemented as part of the proposal to minimise the risk of adverse noise emanating upon the community.

Modelled scenarios are shown in Figures 4-2 – 4-5.

Figure 4-2 Excavation East dB(A) Leq(15min)

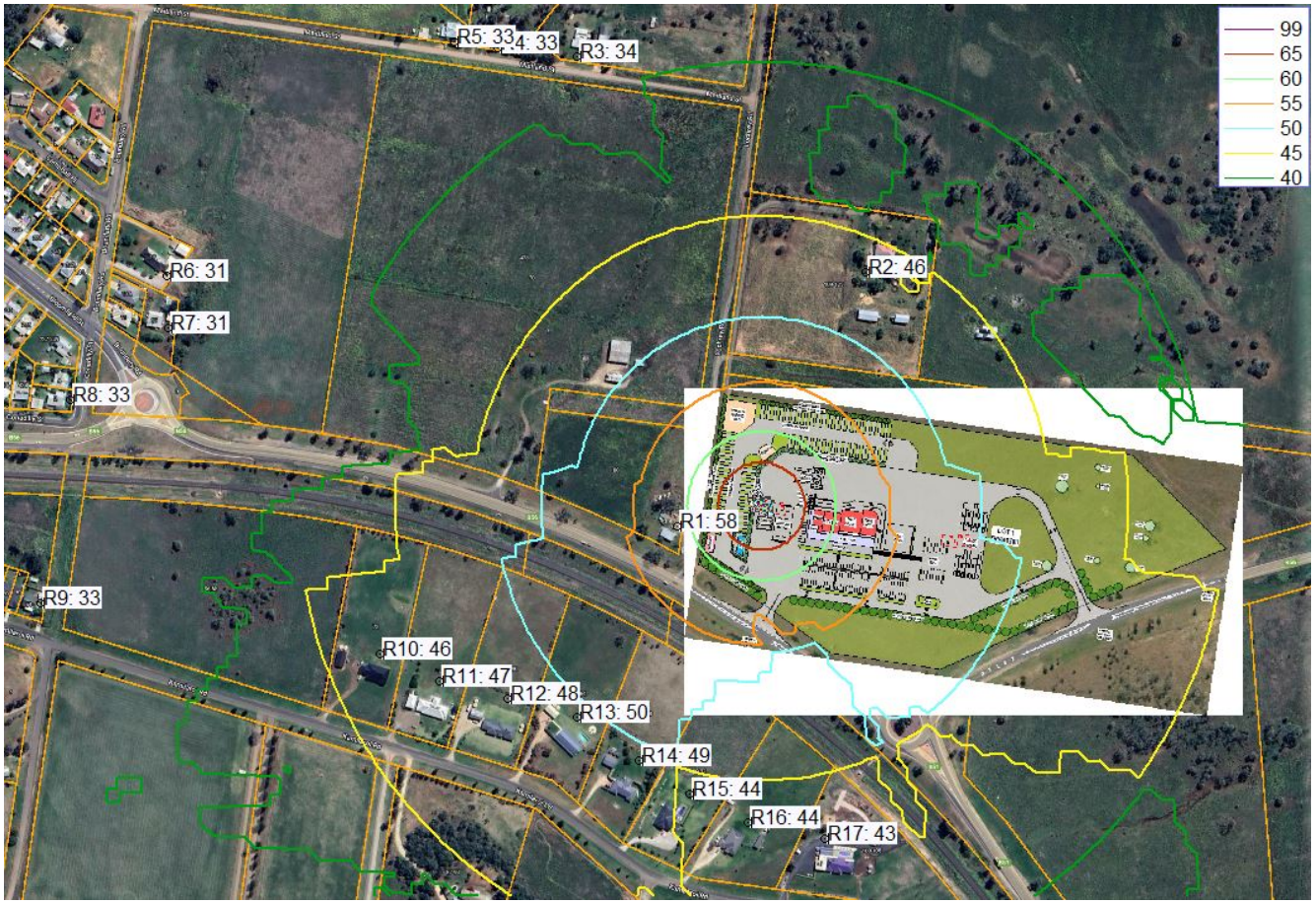


Figure 4-3 Excavation West dB(A) Leq(15min)

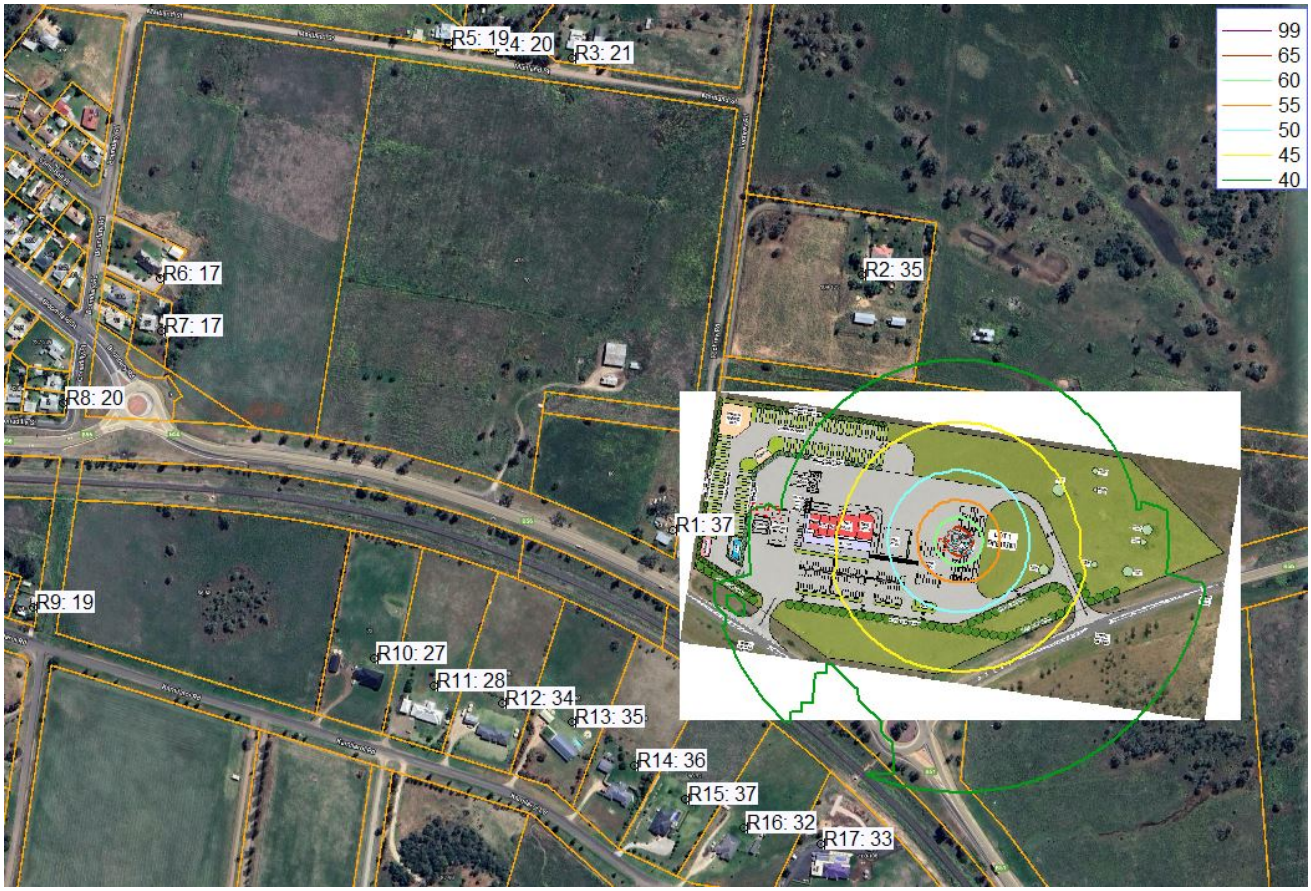


Figure 4-4 Building East dB(A) Leq(15min)

Figure 4-5 building West dB(A) Leq(15min)

4.2 Construction Noise Management Plan

A Construction Noise Management Plan (CNMP) could be prepared prior to the commencement of works and implemented through all phases of the proposed construction works. The CNMP would provide the framework for the management of all potential noise impacts resulting from the construction works and would detail the environmental mitigation measures to be implemented throughout the construction works.

4.2.1 Planning and design of construction works

During the detailed planning, scheduling and design of the construction works the following noise management and mitigation measures should be investigated and, as required, implemented prior to the commencement of noise generating works.

Notification before and during construction

- Affected neighbours to the construction works would be advised in advance of the proposed construction period at least 1 week prior to the commencement of works.
- Consultation and communication between the site and neighbours to the site would assist in minimising uncertainty, misconceptions and adverse reactions to noise.
- All site workers (including subcontractors and temporary workforce) should be familiar with the potential for noise impacts upon residents and encouraged to take all practical and reasonable measures to minimise noise during their activities.

- The constructor or site supervisor (as appropriate) should provide a community liaison phone number and permanent site contact so that the noise related complaints, if any, can be received and addressed in a timely manner.
- The constructor (as appropriate) should establish contact with the residents and communicate, particularly when noisy activities are planned.

Best practice measures when operating on construction site

- Construction works should adopt Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) practices as addressed in the ICNG. BMP includes factors discussed within this report and encouragement of a project objective to reduce noise emissions. BATEA practices involve incorporating the most advanced and affordable technology to minimise noise emissions.
- Ensure that all construction works scheduled for standard construction hours comply with the start and finish time.
- Where practical, simultaneous operation of dominant noise generating plant should be managed to reduce noise impacts, such as operating at different times or increase the distance between plant and the nearest identified receiver.
- High noise generating activities such as jack hammering should only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block.
- Where possible, reversing beepers on mobile equipment would be replaced with low-pitch tonal beepers (quackers). Alternatives to reversing beepers include the use of spotters and designing the site to reduce the need for reversing may assist in minimising the use of reversing beepers.
- Equipment which is used intermittently should be shut down when not in use.
- All engine covers should be kept close while equipment is operating.
- The construction site would be arranged to minimise noise impacts by locating potentially noisy activities away from the nearest receivers wherever possible.
- To minimise heavy equipment handling noise, material stockpiles should be located as far as possible from the nearest receptors
- Loading and unloading areas should be located as far as possible from the nearest receptors.
- Where possible, trucks associated with the work area should not be left standing with their engine operating in a street adjacent to a residential area.
- All vehicular movements to and from the site should comply with the appropriate regulatory authority requirement for such activities.

Complaint handling

Noise and vibration monitoring should be undertaken upon receipt of a complaint to identify and quantify the issue and determine options to minimise impacts.

- If valid noise and/or vibration data for an activity is available for the complainant property, from works of a similar severity and location, it is not expected that monitoring will be repeated upon receipt of repeated complaints for these activities, except where vibration levels are believed to be potentially damaging to the building.

- Any noise and/or vibration monitoring should be undertaken by a qualified professional and with consideration to the relevant standards and guidelines. Attended noise and/or vibration monitoring should be undertaken upon receipt of a noise and/or vibration complaint. Monitoring should be undertaken and reported within a timely manner (say 3 to 5 working days). If exceedance is detected, the situation should be reviewed to identify means to reduce the impact to acceptable levels.

4.3 Operational Noise

For the purposes of this assessment, the site has been assessed as having the following key features:

- A total of 12 bowsers including 8 for light vehicle sand 4 four heavy vehicles, which are provided in separate areas

- A convenience store with a floor area of approximately 550sqm associated with the service station that would also sell food, drinks, and general goods

- Two fast food outlets with a total floor area of approximately 840sqm, that would provide drive through facilities along the northern side of the building and approximately 120 internal seats

- Parking areas for trucks, RVs, light vehicles and hydrogen/electric vehicles

- A BBQ facility for use by service centre patrons

- A caravan park which would accommodate approximately 47 berths and provide BBQ facilities, amenities building, and a building to accommodate the manager and service patrons.

Acoustic modelling was also undertaken using Bruel and Kjaer's "Predictor" to predict the effects of site operational noise.

Modelling results are based on available information provided and should only be used as a guide for comparative purposes. Plant layout and building structures were based on information provided at the time of the assessment. Noise model setup are as outlined in section 4.1 and noise enhancing meteorological conditions were utilised as per Table 4-2.

Additionally a 2.4 metre acoustic fence has been assumed as shown in Figures 4-6 – 4-11 as blue consistent with the conceptual site layout provided in Figure 1-2 . Acoustic fences are impervious to the ground to the recommended height and are generally constructed from colorbond, lapped and capped timber, bricks, hebel power panel or concrete blocks. No gaps should exist in the fence. There are other options available, and the higher the fence, the greater the density and being as close as possible to the source in question make an acoustic fence more effective. A material surface density of 10 kg/m2 is typically sufficient.

Mechanical Plant

At this stage, the mechanical plant has not been selected for the development. However, it is not uncommon for the mechanical plant not to be selected prior to submitting a development application. Mechanical plant may consist of an air conditioning system, refrigeration and exhaust fans. A typical range of sound power levels for mechanical plant is given in Table 4-4 below.

Table 4-4 Sound Power Levels of Mechanical Plant

Plant Type	SWL dB(A)
Small (single fan) condenser	65
Medium (double fan) condenser	70
Large (double fan) condenser	80

For conservatism, is has been assumed that 2 large double fan condenser units will be operating as outdoor sources on top of the new service station building / food outlet building.

Drive Through Intercom

A sound power level of 70 SWL dB(A) has been adopted from RAPT Consulting's internal database.

Service Station / Convenience Store and Fast Food Outlet Traffic Generation

Information sourced from the Amber Traffic & Transportation Direction assessment *Gunnedah Highway Service Centre 127-141 Lochrey Road, Gunnedah Traffic and Transport Assessment March 2022* for the project indicates:

- A maximum 174 total trips per evening peak hour for fuel and food outlet stops.
- A maximum of 280 total trips per peak hour for fast food outlet traffic generation.

For the purposes of this assessment the following assumptions have been made when determine the potential traffic generation for the service station and associated convenience store and fast-food outlets:

- The morning peak hour has conservatively been assessed as having the same traffic generation as the evening peak hour
- Given the limited residential land use in the surrounding area it has been assumed that 80% of the vehicle movements for the fast food outlets are associated with vehicles using the service station and are not expected to generate an additional vehicle movement on the road network or at the site access. As such, the fast food outlets are expected to generate 54 vehicle movements in each of the peak hours, and
- The vehicle movements are evenly split between inbound and outbound vehicle movements

Based on the above assumptions the service station and associated convenience store and fast food outlets are expected to generate the following traffic volumes in the morning and evening peak hour.

Table 4-5 Service Station Peak Hour Traffic Generation

	AM Peak	PM Peak
Arriving Trips	114	114
Departing Trips	114	114
Total	228	228

This total number has been converted to 57 trips in a 15 minute period.

A sound power level of 86 SWL dB(A) has been adopted for these vehicle movements on the site for idling and travelling at 10km/hr, 78 SWL dB(A) for a car door opening and closing taken from RAPT Consulting's internal database. Additionally 10% have been assumed to be trucks using the diesel bowsers with a sound power level of 100 SWL dB(A).

Caravan Park Traffic Generation

For the purposes of this assessment, it has been assumed that 70% of all berths generate one vehicle movement to the site in the evening peak hour and one vehicle movement from the site during the morning peak hour. As such, the caravan park is expected to generate the following traffic volumes in the morning and evening peak hour.

Table 4-6 Caravan Park Peak Hour Traffic Generation

	AM Peak	PM Peak
Arriving Trips	0	33
Departing Trips	33	0
Total	33	33

This total number has been converted to 8 trips in a 15 minute period. A sound power level of 86 SWL dB(A) has been adopted for these vehicle movements on the site for idling and travelling at 10km/hr, 78 SWL dB(A) for a car door opening and closing.

Waste management is understood to be undertaken during operating particularly daytime hours only sound power levels for garbage trucks operating onsite have been sourced from RAPT Consulting's database. A sound power level of 100 dB(A) operating for 60 seconds in a 15-minute period has been assumed.

Caravan Park Noise

Campers noise in the form of human normal to raised voice has been sourced from RAPT Consulting's database and has been assessed with a sound power level of 70 dB(A). Camper noise has been assumed to be operating from the camping area in the form of 4 persons conversing in each of the camping sites for 50% of the time as they would not all be speaking simultaneously.

Music emanating from the Barbecue area has also been conservatively modelled with a sound power level of 85 SWL dB(A).

All items were modelled operating simultaneously to simulate a reasonable worst case scenario with weather enhancing conditions as previously outlined. The results are provided in Table 4-7. Any predicted exceedances are highlighted in RED.

Table 4-7 Operational Noise Modelling Results dB(A) Leq(15min)

Receiver	Cumulative Results	Project Noise Trigger Level Day / Evening / Night	Caravan Park Noise Results	Project Noise Trigger Level Day / Evening / Night	Service Station / Food Service Noise Results	Project Noise Trigger Level Day / Evening / Night
R1	40	45 / 36 / 35	36	45 / 36 / 35	38	45 / 36 / 35
R2	36	45 / 36 / 35	29	45 / 36 / 35	35	45 / 36 / 35
R3	26	45 / 36 / 35	19	45 / 36 / 35	25	45 / 36 / 35
R4	24	45 / 36 / 35	18	45 / 36 / 35	23	45 / 36 / 35
R5	24	45 / 36 / 35	17	45 / 36 / 35	23	45 / 36 / 35
R6	22	45 / 36 / 35	15	45 / 36 / 35	21	45 / 36 / 35
R7	23	45 / 36 / 35	17	45 / 36 / 35	22	45 / 36 / 35
R8	24	45 / 36 / 35	17	45 / 36 / 35	23	45 / 36 / 35
R9	24	45 / 36 / 35	18	45 / 36 / 35	23	45 / 36 / 35
R10	32	45 / 36 / 35	25	45 / 36 / 35	31	45 / 36 / 35
R11	34	45 / 36 / 35	26	45 / 36 / 35	33	45 / 36 / 35
R12	35	45 / 36 / 35	27	45 / 36 / 35	34	45 / 36 / 35
R13	37	45 / 36 / 35	28	45 / 36 / 35	36	45 / 36 / 35
R14	38	45 / 36 / 35	28	45 / 36 / 35	37	45 / 36 / 35
R15	38	45 / 36 / 35	27	45 / 36 / 35	38	45 / 36 / 35
R16	37	45 / 36 / 35	27	45 / 36 / 35	37	45 / 36 / 35
R17	38	45 / 36 / 35	27	45 / 36 / 35	37	45 / 36 / 35

As can be seen in Table 4-5, the modelled results suggest compliance can occur during all peak hour situations as peak hour occurs during daytime from 8:00am to 9:00am and 4:30pm – 5:30pm including cumulative operations of the caravan park and service centre.

The information provided in The Amber Traffic & Transportation Direction assessment indicates the Oxley Highway has a relatively constant level of traffic between 7:00am and 5:00pm and lower traffic volumes outside of these times. Therefore, the peak hour scenarios are considered reasonable worst case and are not expected to occur during evening or night time periods. Even if this did occur the maximum exceedance predicted would be 2 dB(A) for the evening and 3 dB(A) during night which is generally considered imperceptible to barely perceptible to the human ear.

Figures of the operational peak hour results are provided in Figures 4-6 – 4-8

Figure 4-6 Cumulative Operations dB(A) Leq(15min)

Figure 4-7 Service Centre Operations dB(A) Leq(15min)

Figure 4-8 Caravan Park Operations dB(A) Leq(15min)

An evening and night-time modelling scenario was run by conservatively assuming that half of peak hour traffic movements may occur at the caravan park and service centre. The results are shown in Table 4-8.

Table 4-8 Off Peak Operations dB(A) Leq(15min)

Receiver	Cumulative Results	Project Noise Trigger Level Day / Evening / Night	Caravan Park Noise Results	Project Noise Trigger Level Day / Evening / Night	Service Station / Food Service Noise Results	Project Noise Trigger Level Day / Evening / Night
R1	38	45 / 36 / 35	34	45 / 36 / 35	35	45 / 36 / 35
R2	33	45 / 36 / 35	27	45 / 36 / 35	32	45 / 36 / 35
R3	24	45 / 36 / 35	17	45 / 36 / 35	22	45 / 36 / 35
R4	22	45 / 36 / 35	15	45 / 36 / 35	20	45 / 36 / 35
R5	21	45 / 36 / 35	15	45 / 36 / 35	20	45 / 36 / 35
R6	19	45 / 36 / 35	13	45 / 36 / 35	18	45 / 36 / 35
R7	20	45 / 36 / 35	15	45 / 36 / 35	19	45 / 36 / 35
R8	21	45 / 36 / 35	15	45 / 36 / 35	20	45 / 36 / 35
R9	22	45 / 36 / 35	17	45 / 36 / 35	20	45 / 36 / 35

Receiver	Cumulative Results	Project Noise Trigger Level Day / Evening / Night	Caravan Park Noise Results	Project Noise Trigger Level Day / Evening / Night	Service Station / Food Service Noise Results	Project Noise Trigger Level Day / Evening / Night
R10	30	45 / 36 / 35	23	45 / 36 / 35	29	45 / 36 / 35
R11	31	45 / 36 / 35	24	45 / 36 / 35	30	45 / 36 / 35
R12	32	45 / 36 / 35	25	45 / 36 / 35	32	45 / 36 / 35
R13	34	45 / 36 / 35	26	45 / 36 / 35	33	45 / 36 / 35
R14	35	45 / 36 / 35	26	45 / 36 / 35	35	45 / 36 / 35
R15	35	45 / 36 / 35	25	45 / 36 / 35	35	45 / 36 / 35
R16	35	45 / 36 / 35	25	45 / 36 / 35	34	45 / 36 / 35
R17	35	45 / 36 / 35	25	45 / 36 / 35	34	45 / 36 / 35

The results for evening and night time show compliance with all scenarios with the exception of cumulative operations at R1 which is predicted to exceed by 2 dB(A) and 3 dB(A) for evening and night respectively.

These are reasonable worst case scenarios with all items outlined above operating simultaneously. In reality, it is highly unlikely for this scenario to occur where all of these items are operating simultaneously at their sound power levels. Therefore, actual noise levels received can be expected to be significantly lower. Based on this assessment compliance can be expected for the development.

As this was a maximum noise level assessment, sleep disturbance noise goals are expected to be met in all situations

While compliance is expected to be achievable for the proposal, it is recommended that the proposal implement an operational noise management plan as part of its operations to deal with the unlikely occurrence of excessive noise emanating from operations.

The evening and night operational modelled results are provided in Figures 4-9 – 4-11.

Figure 4-9 Evening / Night Cumulative Operational Modelled Results dB(A) Leq(15min)

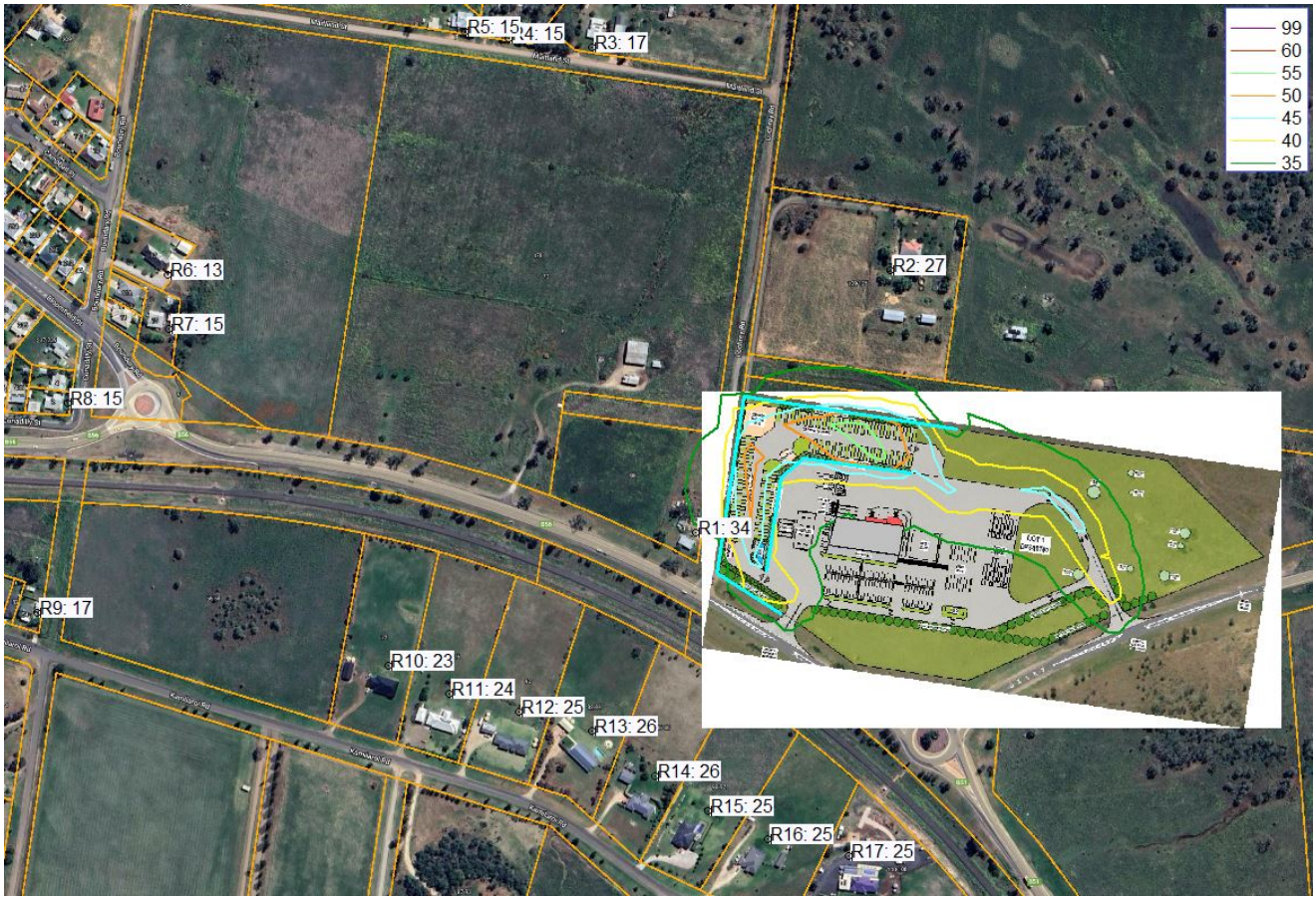


Figure 4-10 Evening / Night Caravan Park Operational Modelled Results dB(A) Leq(15min)

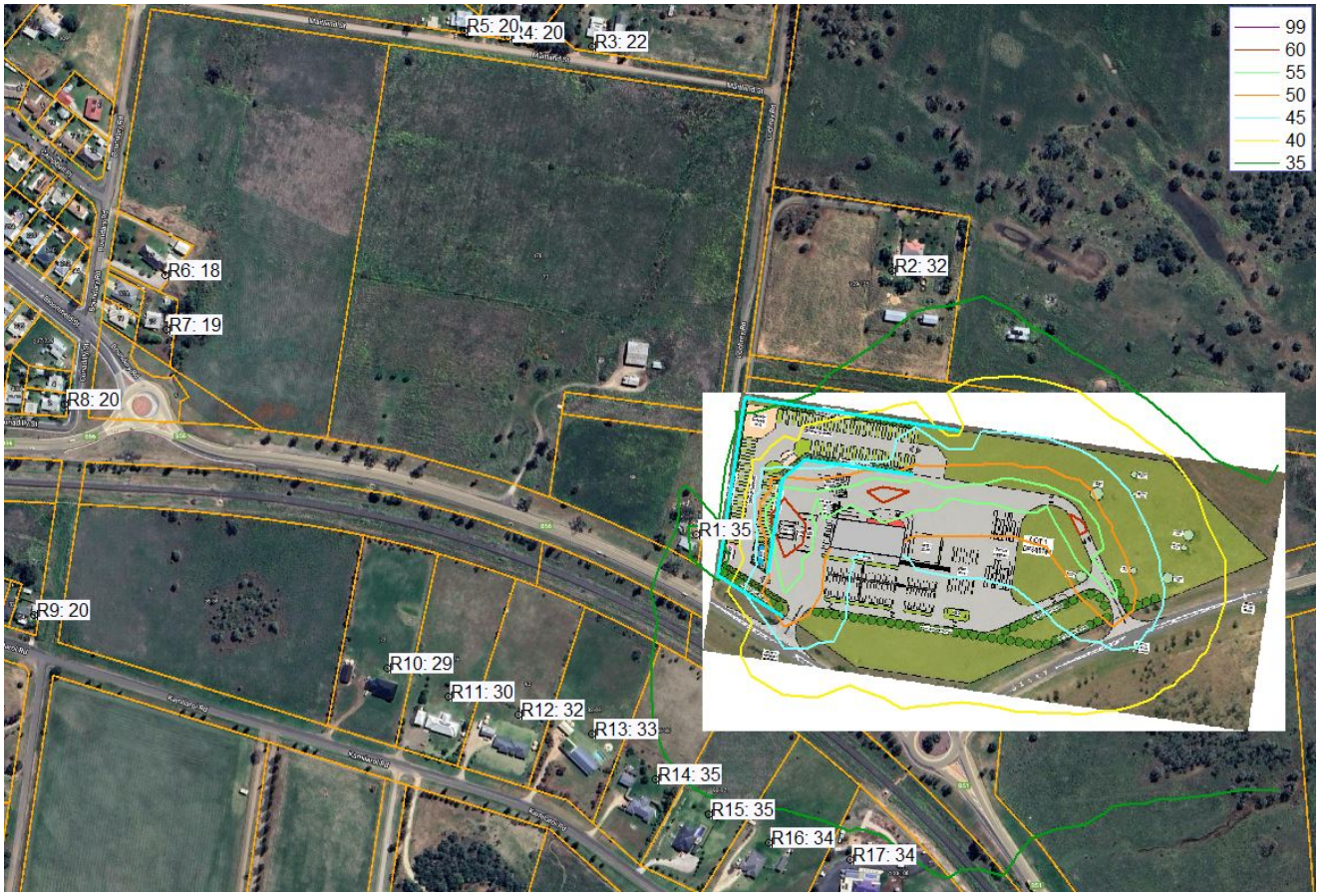


Figure 4-11 Evening / Night Service Centre Operational Modelled Results dB(A) Leq(15min)

Road Noise

Traffic information pertaining to the proposal has been sourced from Amber Traffic & Transport Direction.

Peak hour traffic survey information contained within the report is provided in Table 4-9 along with potential additional vehicle trips as a result of the proposal.

Table 4-9 Traffic Information

Road Situation	Peak Hour Traffic	Additional Vehicles	%Change
AM Peak	261	25	11%
PM Peak	261	14	6%

To increase noise levels by 2dB(A) one would have to increase the cumulative traffic volume by 60%, which in this case does not occur. Therefore, compliance is expected.

With consideration to deceleration and acceleration noises, they can differ from the cruising traffic noise that occurs in the absence of traffic control device or entry and exit points from items such as this proposal. However, with our past experience where noise levels from vehicles were measured at an intersection for both free-flowing and stop-and-go conditions, and the levels were measured to fall within 1dB(A) for each scenario. This outcome can be explained by there being relatively quiet periods with very little to no traffic noise generated from stopped or slow moving vehicles at an intersection, while there is generally more noise generated from faster continuous moving vehicles found under free-flowing traffic conditions. Therefore, while accelerating and decelerating may alter the 'character' of noise, it will not significantly alter the absolute level of noise.

5. Conclusion

This acoustic assessment has been undertaken for NGH to inform a Development Application (DA) for a caravan park and service centre at Gunnedah, NSW.

Construction

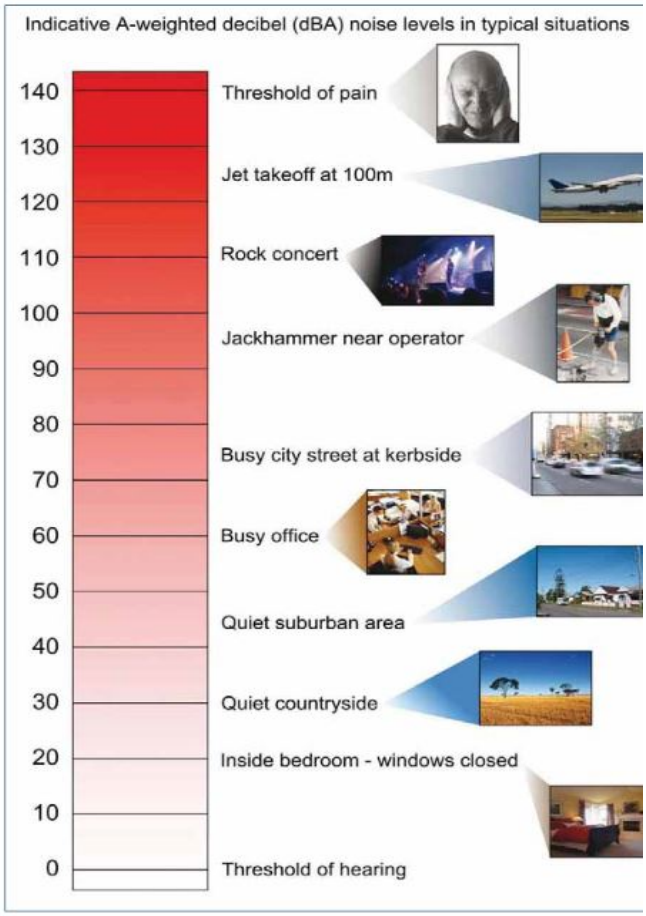
The assessment outlined in this report indicates that construction noise management levels will be complied with in most situations. However, there is the potential for exceedances for some receivers assessed in certain situations. However, the highly noise affected level of 75dB(A) $L_{Aeq(15min)}$ is expected to be complied with. A set of standard mitigation measures for construction noise and vibration have been provided based on anticipated requirements of the proposal. It is believed construction noise can be minimised and managed to be acceptable to the local community through the implementation of a CNMP similar to what has been recommended in this report.

Operation

The results of the assessment indicate the proposal is predicted to comply with established project noise trigger levels.

While compliance is expected to be achievable for the proposal, it is recommended that the proposal implement an operational noise management plan as part of its operations to deal with the unlikely occurrence of excessive noise emanating from operations.

Appendix A: Glossary of Acoustic Terms

Term	Definition
dB	Decibel is the unit used for expressing the sound pressure level (SPL) or power level (SWL) in acoustics. The picture below indicates typical noise levels from common noise sources. 
dB(A)	Frequency weighting filter used to measure 'A-weighted' sound pressure levels, which conforms approximately to the human ear response, as our hearing is less sensitive at very low and very high frequencies.
$L_{Aeq(period)}$	Equivalent sound pressure level: the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
$L_{A10(period)}$	The sound pressure level that is exceeded for 10% of the measurement period.
$L_{A90(period)}$	The sound pressure level that is exceeded for 90% of the measurement period.
L_{Amax}	The maximum sound level recorded during the measurement period.
Noise sensitive receiver	An area or place potentially affected by noise which includes:

	A residential dwelling. An educational institution, library, childcare centre or kindergarten. A hospital, surgery or other medical institution. An active (e.g. sports field, golf course) or passive (e.g. national park) recreational area. Commercial or industrial premises. A place of worship.
Rating Background Level (RBL)	The overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period.
Feasible and Reasonable (Noise Policy for Industry Definition)	**Feasible** mitigation measure is a noise mitigation measure that can be engineered and is practical to build and/or implement, given project constraints such as safety, maintenance and reliability requirements. Selecting **Reasonable** measures from those that are feasible involves judging whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure. To make a judgement, consider the following: Noise impacts Noise mitigation benefits Cost effectiveness of noise mitigation Community views.
Sound power level (SWL)	The sound power level of a noise source is the sound energy emitted by the source. Notated as SWL, sound power levels are typically presented in dB(A).