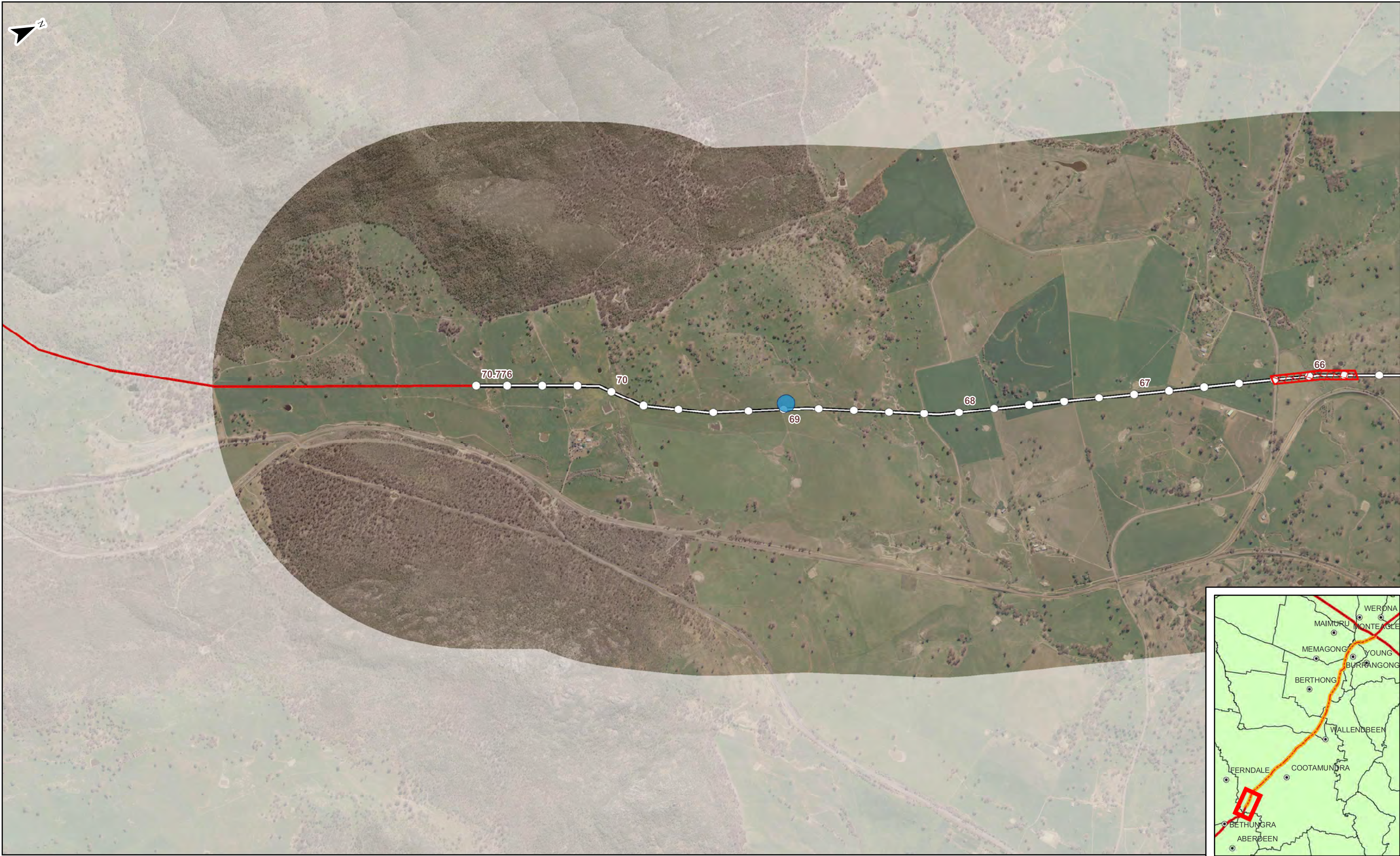




- | | | |
|---------------------|----------------------------|--------------------|
| Archaeological Site | Gas Pipeline Section 2 | Scarred Tree |
| Salvage Excavation | Historic Site Monitoring | Aborist Inspection |
| Surface Collection | Historic Site | Fenced |
| 200m Interval Point | Aboriginal Site Monitoring | No Direct Impacts |

9.2 Historical heritage

9.2.1 Assessment methodology

An initial review of literature to identify any previously recorded heritage sites was then confirmed via field survey and assessment. The assessment examined the historical land use and disturbance before describing the historical context and reviewing previous surveys conducted. The assessment included an archaeological survey along the Proposal route (70 km) with 20 m width either side of the alignment. The survey was conducted on foot along transects over five days (6th-10th June 2011).

9.2.2 Existing Environment

There is reduced chance for archaeological remains to survive because of the land cover and soil modification through agricultural activities across the study area. In 1829-1830 European exploration in the area occurred during an expedition by Charles Sturt and George Macleay as they traced the Murrumbidgee River to its junction with the Murray River and down to Lake Alexandrina. Within 15 years following reports back from explorers, the land began to be occupied by pastoralists. Townships in the general vicinity of the study area were largely founded as a result of settlement of early pastoral runs, service and rail construction between Albury and Goulburn or as a result of gold rushes in the mid to late 1800's.

Known heritage sites and items

There was one known Historical heritage site in the study area: the Nubba Station and Homestead which is of local historical, associative and technical/scientific significance. The Station and Homestead was a focal point for development in the area, being a large complex of buildings servicing a large farm. It is of local associative significance (criterion b, see below) as the home of the first elected mayor of Wallendbeen, Peter Sinclair. It is of research/technical significance, having the potential to yield information through archaeological investigation regarding the operation of a pastoral property from at least the 1860's.

Assessment of Historic Significance

The historic heritage item was assessed following the NSW heritage assessment criteria. An item is considered to be of State (or local) heritage significance if, in the opinion of the Heritage Council of NSW, it meets one or more of the following criteria:

- **Criterion a** – historical: Nubba Station and Homestead is of local significance as a focal point of early settlement, development and employment in the area to the south of Wallendbeen. This is evident as the first mayor of Wallendbeen was from the Station
- **Criterion b** – associative: Nubba Station and Homestead is of local associative significance, being the home of Peter Sinclair, the first mayor of Wollendbeen.
- **Criterion c** – aesthetic: This item does not meet this criterion as it does not demonstrate aesthetic characteristics and/or a high degree of creative or technical accomplishment.
- **Criterion d** – social: This item does not meet this criterion as it does not have a strong or special association with a particular community or cultural group.
- **Criterion e** – technical: Nubba Station and Homestead is of local research significance, having archaeological potential to yield information regarding the development of pastoral activities in the area. The substantial nature of the extant elements is also of research interest.
- **Criterion f** – rarity: This item does not meet this criterion because it is not rare.
- **Criterion g** – representative: This item does not meet this criterion as it has lost the principle characteristics of the class.

9.3 Potential Impacts on Heritage Values

9.3.1 During Construction

Aboriginal Heritage

A total of 13 recorded sites (out of 17 sites) would potentially be impacted as a result of the pipeline's construction. Six of the seven AHIMS heritage items would be potentially affected by the Proposal. Most of the potentially impacted sites are artefact scatter sites located along the Proposal's easement.

There is also one scarred tree located along the pipeline west of the railway track and Temora Rd in Cootamundra (55.2 KP). Earthworks such as clearing and grading are the main construction activities of the Proposal that may cause impacts to heritage items. There is also the potential for further discoveries during trench works, particularly in areas nearby already identified sites.

Potential Impact on High Significance Sites

There were six sites of high scientific significance identified in the assessment. Two of the sites of high significance were identified to be potentially impacted as a result of the Proposal. The sites were:

- An artefact scatter listed as an AHIMS site at Muttama Creek (BY/11).
- A scarred tree (KP 55.2, coded APA-ST5-11).

Although it is unlikely Scarred tree sites APA-ST2-11 and APA-ST3-11 might be impacted by construction. The remaining sites of High scientific significance are scarred trees APA-ST4-11 and APA-ST1-11 both of which are not considered likely to incur any direct impacts as a result of the Proposal.

Low-Moderate Site Types

Other sites likely to be directly affected by the Proposal were considered to have medium to low scientific significance. These sites are shown in Table 14.

Table 14 – Low-Moderate known Aboriginal Archaeological potentially impacted by the Proposal

AHIMS listed sites	Identified in AECOM Survey
- AHIMS ID 50-3-0002: Young (BY/12).	- APA-AS1-11 (artefact scatter).
- AHIMS ID 50-3-0003: Stony Creek (BY/13).	- APA-AS2-11 (artefact scatter).
- AHIMS ID 50-3-0004: Wombat (By/14) Tumbleton Creek.	- APA-AS3-11 (artefact scatter).
- AHIMS ID 50-5-0007: Frampton (BY/9).	- APA-IA1-11 (Isolated Artefact).
- AHIMS ID 50-6-0002: Cootamundra (BY/10).	- APA-IA2-11 (Isolated Artefact).
	- APA-IA3-11 (Isolated Artefact).

Historical Heritage

The old Nubba Homestead is located 200 m to the east of the pipeline easement. It is considered that it would not be directly impacted by the construction of the proposed pipeline. It should be noted however that historical records suggest that the site complex is much larger than the homestead raising the potential for sub-surface archaeological assets to be present over a large area. Therefore this historical site presents potential for unanticipated discoveries during initial earthworks and trenching related to the Proposal.

9.3.2 During Operation

During operation of the Proposal it is unlikely there would be any further disturbance and impact of heritage items.

9.4 Proposed Mitigation Measures

A range of mitigation and management measures have been developed to manage any potential impacts as a result of the Proposal. The proposed management measures are presented in Figure 11. These measures include:

- Known sites to be temporarily fenced during construction;
- Surface collection of impacted aboriginal sites;
- Scarred trees to be reassessed by a qualified arborist;
- Salvage excavation of artefact scatters potentially directly impacted; and

- Monitoring of archaeological sites (e.g. from a representation of the Local Aboriginal Land Council during excavation works and monitoring for the discovery of any archaeological artefacts during clearing near the Old Nubba Homestead).

Potential impacts on Heritage values and applicable mitigation and management measures have been synthesised in Table 15.

Table 15 – Potential heritage impacts, mitigation and management measures.

Potential Impacts	Mitigation and management measures												
Pre Construction													
Impact on scarred trees during preparation of site for construction.	Installation of temporary fencing prior to works commencing to avoid any impacts.												
Disturbance and damage of artefact scatters and isolated artefacts during clearing and grading.	Installation of temporary fencing and surface collection prior to works commencing so to avoid any impacts. Sites requiring surface collection include: - AHIMS ID 50-5-0007: Frampton (BY/9). - AHIMS ID 50-6-0002: Cootamundra (BY/10). - APA-AS1-11 (artefact scatter). - APA-AS2-11 (artefact scatter). - APA-AS3-11 (artefact scatter). - APA-IA1-11 (Isolated Artefact). - APA-IA2-11 (Isolated Artefact). - APA-IA3-11 (Isolated Artefact).												
Damage to additional heritage items around sites identified in survey.	Salvage excavation for sites with sub-surface potential (artefact scatters) (although limited to the Proposed impact area). Sites requiring salvage include: - AHIMS ID 50-3-0002: Young (BY/12). - AHIMS ID 50-3-0003: Stony Creek (BY/13). - AHIMS ID 50-3-0004: Wombat (BY/14) Tumbleton Creek. - AHIMS ID 50-6-0003: Muttama Creek (BY/11).												
During Construction													
Impacts to APA ST5-11 (Scarred tree at 55.2 km).	Arborist to inspect and develop management measures.												
Impacts to APA ST2 and ST3 (scarred trees at 34.4km and 35.1km) and Old Nubba Homestead historical site.	No direct impacts expected however, to ensure no disturbance the sites would be temporarily fenced during construction.												
Disturbance and damage to potential Aboriginal sites and/or artefacts.	Monitoring of potential Aboriginal sites during excavation at the following approximate areas: <table> <tr> <td>- KP 3.9 – 4.5</td><td>- KP 32.6 – 33.8</td></tr> <tr> <td>- KP 4.8 – 6.4</td><td>- KP 42 – 42.6</td></tr> <tr> <td>- KP 7.5 – 8.2</td><td>- KP 52.4 – 53.1</td></tr> <tr> <td>- KP 11.7 – 12.7</td><td>- KP 57.3 – 58.1</td></tr> <tr> <td>- KP 24.8 – 25.3</td><td>- KP 65.7 – 66.2</td></tr> <tr> <td>- KP 30.2 – 30.8</td><td></td></tr> </table>	- KP 3.9 – 4.5	- KP 32.6 – 33.8	- KP 4.8 – 6.4	- KP 42 – 42.6	- KP 7.5 – 8.2	- KP 52.4 – 53.1	- KP 11.7 – 12.7	- KP 57.3 – 58.1	- KP 24.8 – 25.3	- KP 65.7 – 66.2	- KP 30.2 – 30.8	
- KP 3.9 – 4.5	- KP 32.6 – 33.8												
- KP 4.8 – 6.4	- KP 42 – 42.6												
- KP 7.5 – 8.2	- KP 52.4 – 53.1												
- KP 11.7 – 12.7	- KP 57.3 – 58.1												
- KP 24.8 – 25.3	- KP 65.7 – 66.2												
- KP 30.2 – 30.8													

10.0 Human Amenities

10.1 Characterisation of human receptors

10.1.1 Data analysis

A GIS analysis and aerial photo interpretation was undertaken, to determine human receptors adjacent to the Study Area. The Young - Bethungra topographic data set was sourced from the Land and Property Information (part of the NSW Department of Land). The geodata is based on a topographic map and is a digital representation of features on the earth's surface. Features include buildings, roads and lakes and are spatially represented as points, lines or polygons, and attributes. This information is presented graphically in Figure 12, and illustrates human receptors, or other sensitive receivers located within close proximity to the Proposal.

10.1.2 Data limitations

Some limitations from the data analysis include the fact that a building point may not be a sensitive receptor type. For example, a hangar or sheds on rural properties were identified as a building point but may not represent a human receptor. For this reason, complimentary aerial photo interpretation, coupled with information on existing landholders adjacent to the existing pipeline was utilised to characterise human receptors. Notwithstanding limitations still apply on the specific number and location of human receptors, although these limitations are expected to be minor.

10.2 Noise and vibration

10.2.1 Assessment Methodology

Noise, vibration and blasting impacts were assessed using a quantitative approach based on a tiered impact assessment to determine construction and operation's activities generating noises, noise off-set distances, possible mitigation measures and potential sensitive noise receptors within the area of interest. The quantitative noise and vibration assessment was undertaken through the following steps:

- Review of the proposed construction and operation activities (e.g. clearing, trenching, drilling) to identify those which are likely to generate significant noise and vibration. The parameters taken into account include proposed techniques and equipments, hours of operation and duration of each phase.
- Assessment of the potential noise and vibration impacts as a consequence of the identified construction and operation activities.
- Development of off-set distances for the proposed construction and operation activities using criteria outlined in OEH publications and other standards (e.g. Interim Construction Noise Guideline, 2009).
- Identification of sensitive receptors, such as residences and residential zones within off-set distances that could experience noises and vibrations exceeding the defined thresholds.
- Evaluation of feasible and reasonable noises and vibrations mitigation measures.

10.2.2 Existing Environment

The vast majority of the pipeline route is located in open countryside where noise Rating Background Level is considered to be at 30 decibels (dB). Although the background noise may be less, where the rating background level is found to be less than 30 dB, the level used for assessment purposes is set to 30 dB (EPA 2000). This Rating Background Level (RBL) has also been used for the urban area as no direct monitoring of noise background level has been undertaken. A RBL of 30 dB is very conservative for an urban environment.

10.2.3 Noise Criteria

The OEH (2009) Interim Construction Noise Guideline provides criteria for consideration in assessing noise impacts for a project in terms of recommended hours for construction work (Table 16) and noise level for different types of receptors. Given that the Proposal in many cases involves construction that would not be audible to any receivers; it is likely that these hours could be altered to expedite the construction process generally.

Table 16 –Standard Hours for Construction Work (OEH 2009)

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 blasting on Sundays or public holidays

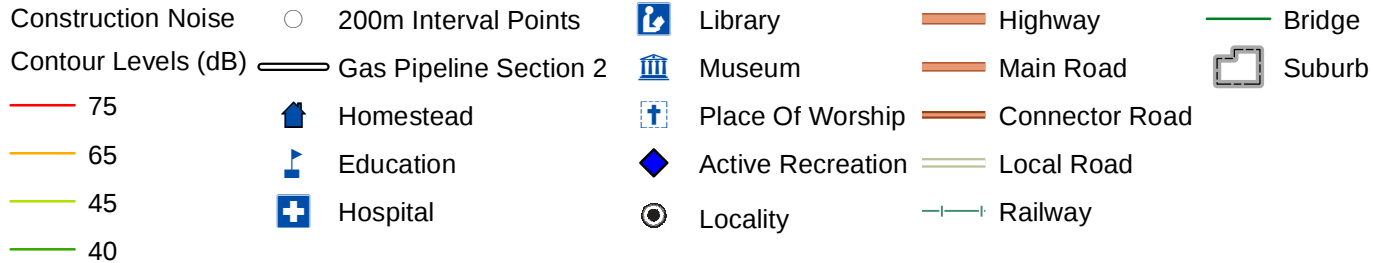
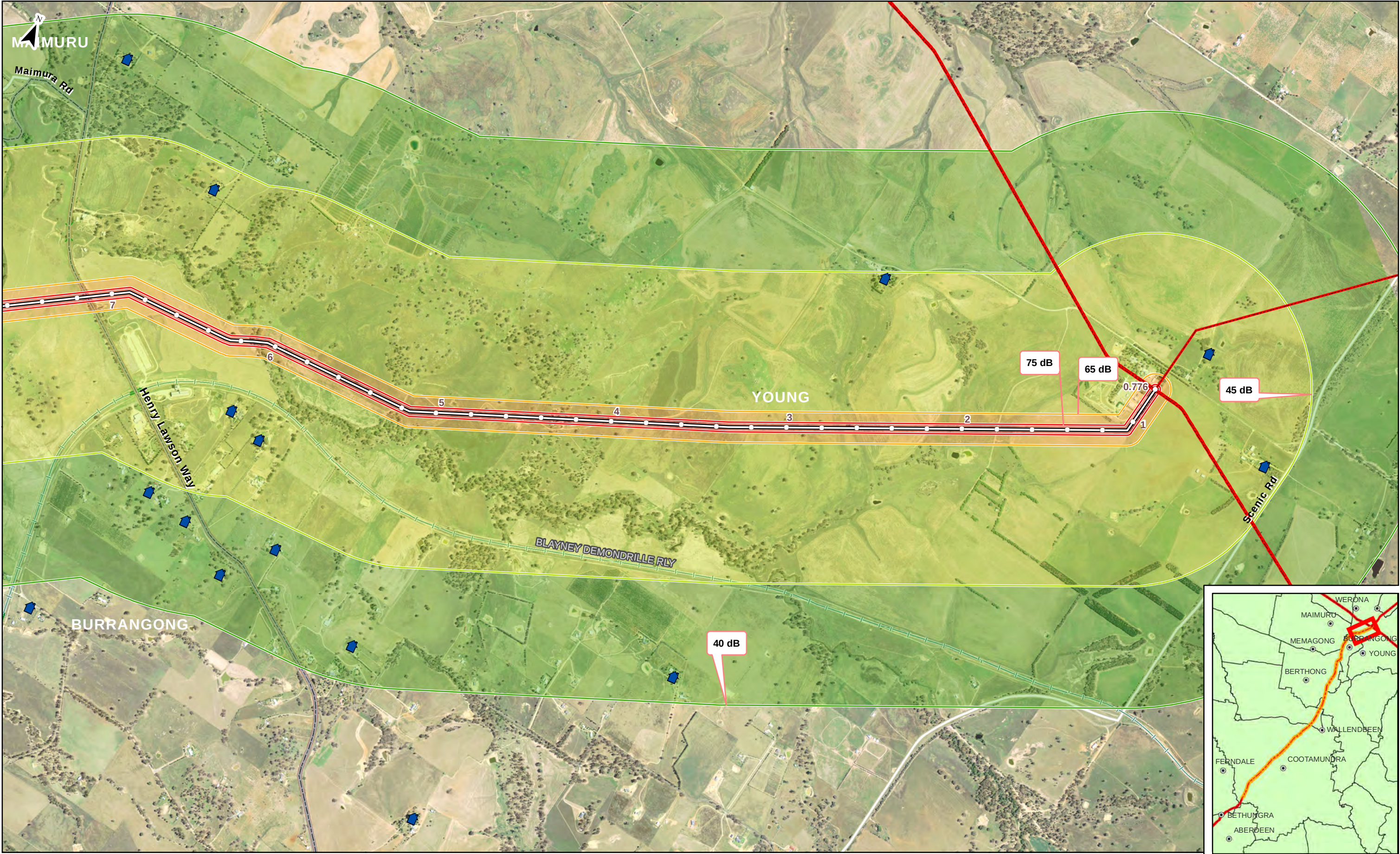
Table 17 – Noise level thresholds for different human receptors (OEH 2009)

Receptors	Management level LAeq (15 min)
Residence / Standard hours	Noise affected / RBL + 10 dB
	Highly noise affected / 75 dB(A)
Classrooms at schools and other educational institutions Internal noise level	Internal noise level 45 dB(A)
Hospital wards and operating theatres	Internal noise level 45 dB(A)
Places of worship	Internal noise level 45 dB(A)
Active recreation areas	65 dB(A)

Modelling of noise level and offset distances have been calculated for the noisiest equipment (side boom) to be used on site and for other equipments such as excavators and trenchers to be used on site. This modelling does not integrate meteorological enhancement such as wind speed and direction (resulting in numerous potential combinations) or temperature inversion (as it only affects noise propagation during night time which is not applicable to this project). The modelling does not include traffic noise as it is expected that traffic noise level would be below the noise level of the equipment mentioned above.

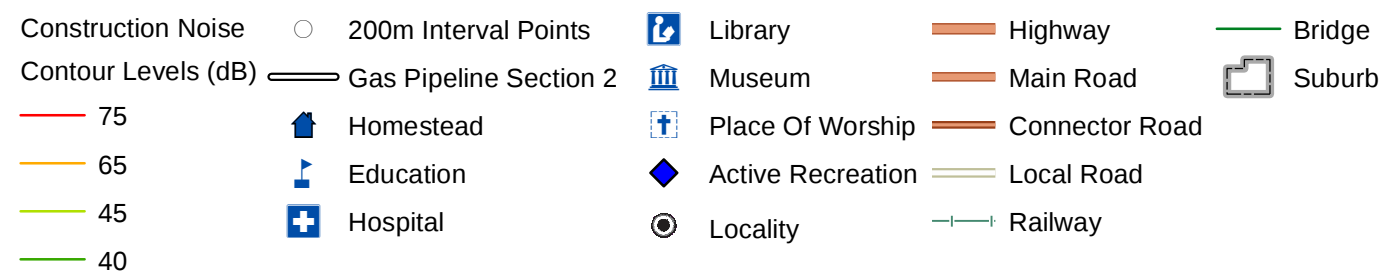
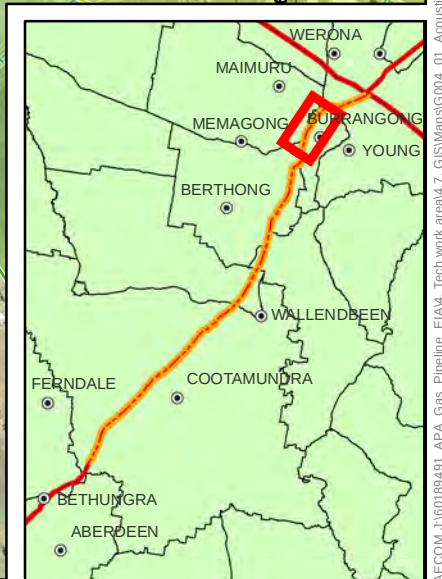
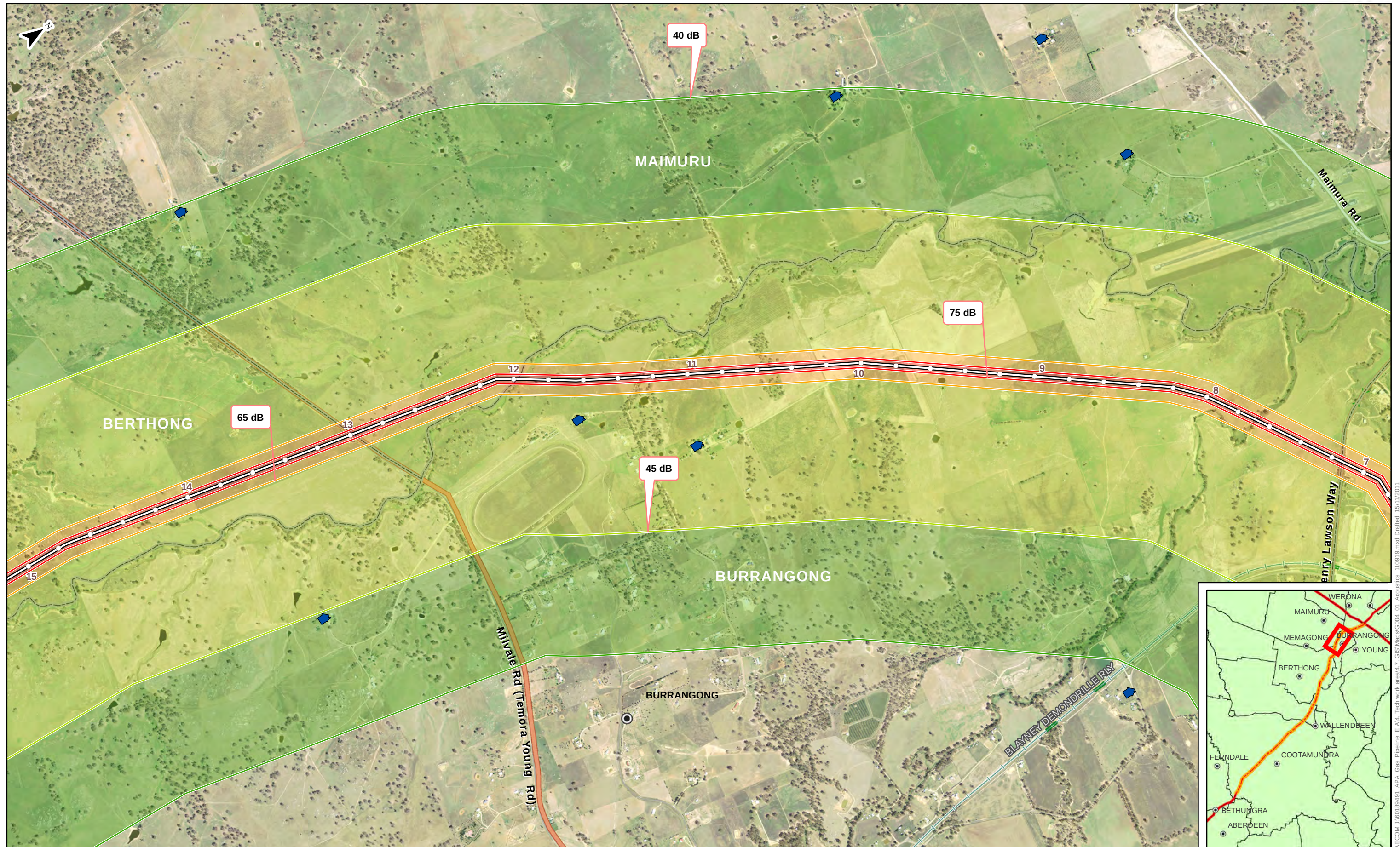
Table 18 – Modelled offset distances

Side Boom (112 dB(A) for SWL)				
Number of plant in use	1	1	1	1
SWL – dB(A)	112	112	112	112
SPL (Criteria) – dB(A)	75	65	45	40
r (distance) – m	28	89	891	1585
Other equipment (92 dB(A) for SWL)				
Number of plant in use	1	2	4	
SWL – dB(A)	92	95	98	
SPL (Criteria) – dB(A)	75	65	45	
r (distance) – m	3	13	178	



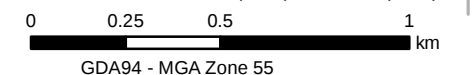
YOUNG - WAGGA WAGGA PIPELINE SECTION 2
Receptors and Construction Noise Map

Source: LPMA (2010), StreetPro (2009)
0 0.25 0.5 1 km
GDA94 - MGA Zone 55



YOUNG - WAGGA WAGGA PIPELINE SECTION 2
Receptors and Construction Noise Map

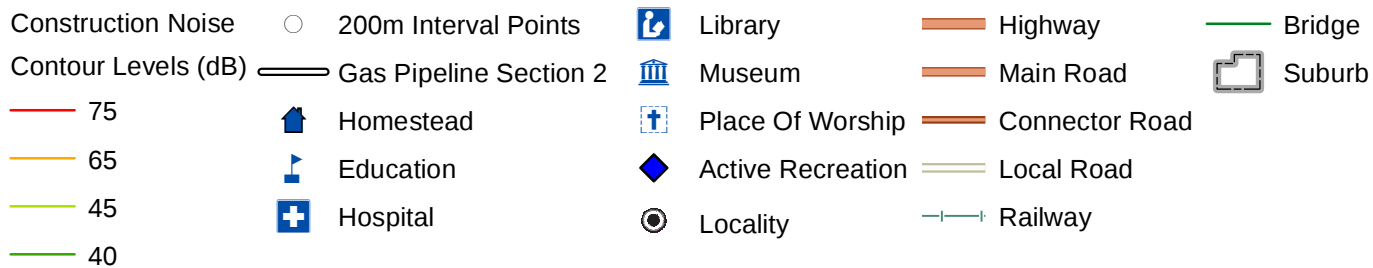
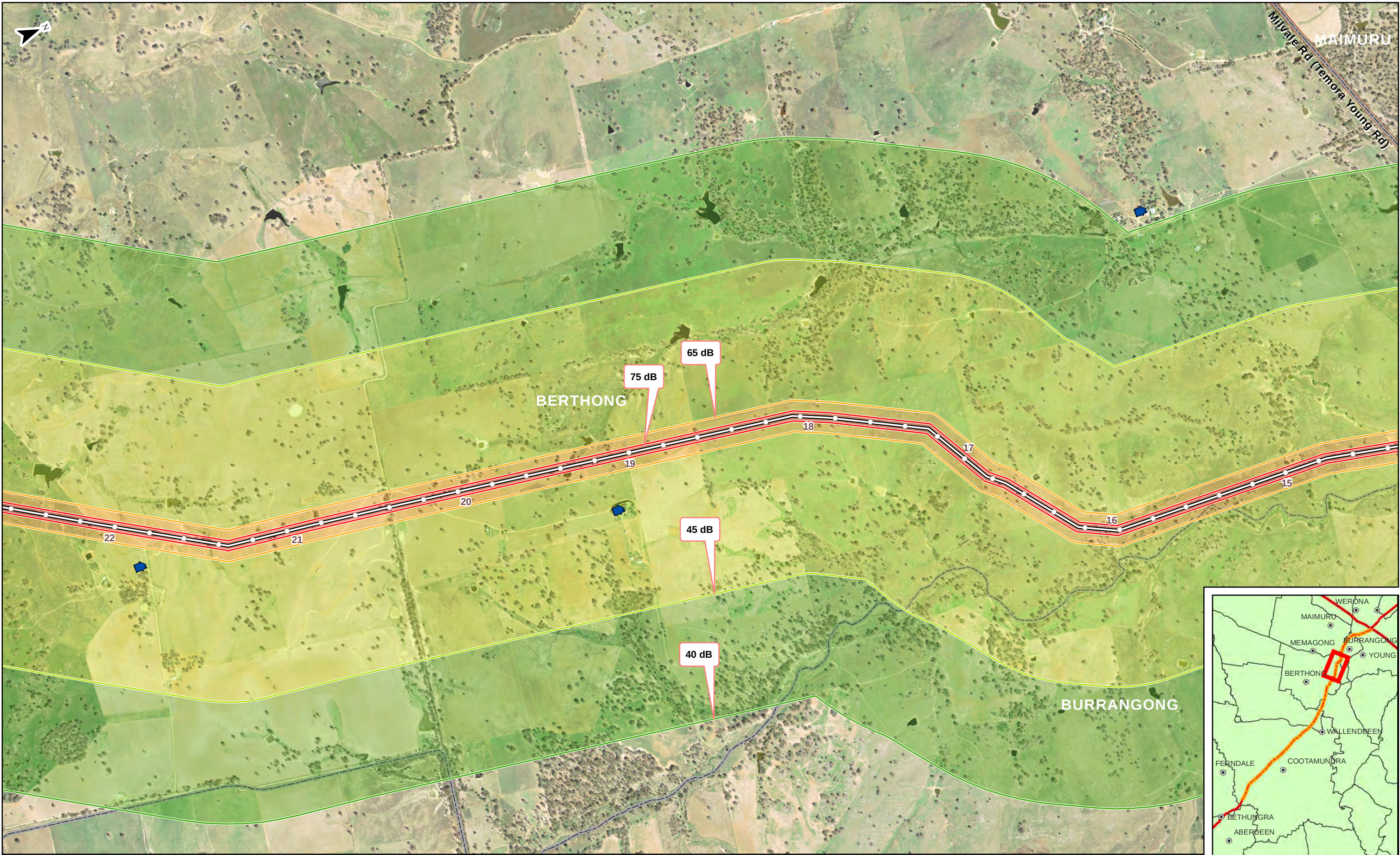
Source: LPMA (2010), StreetPro (2009)



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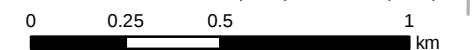
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Fig 12B



YOUNG - WAGGA WAGGA PIPELINE SECTION 2
Receptors and Construction Noise Map

Source: LPMA (2010), StreetPro (2009)

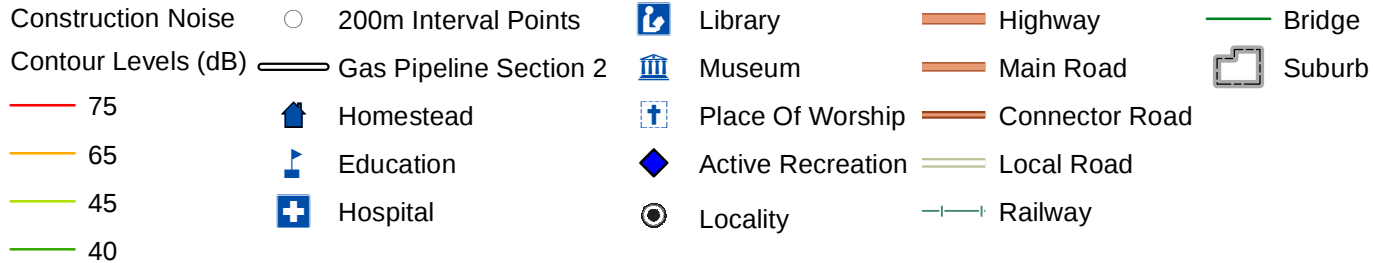
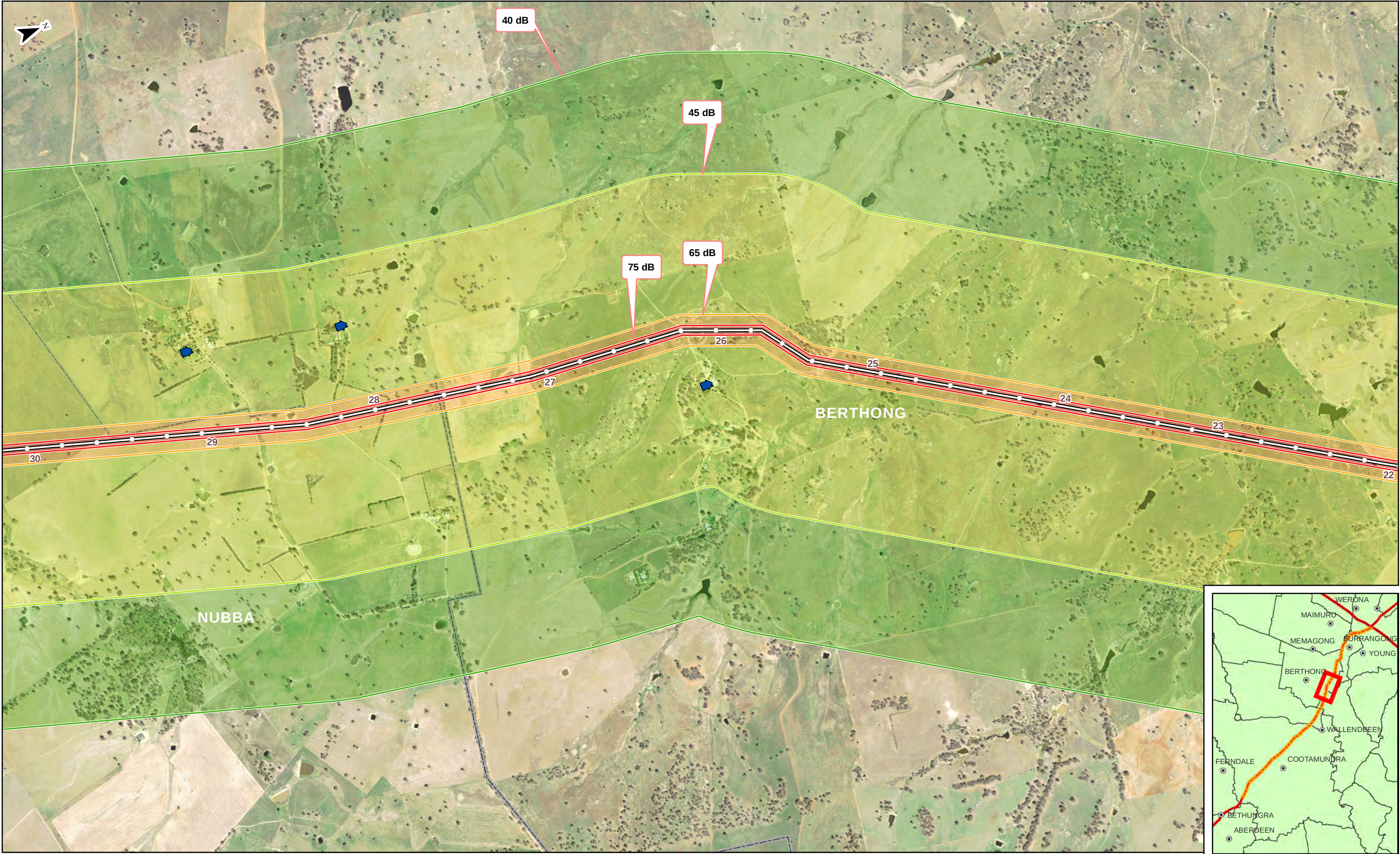


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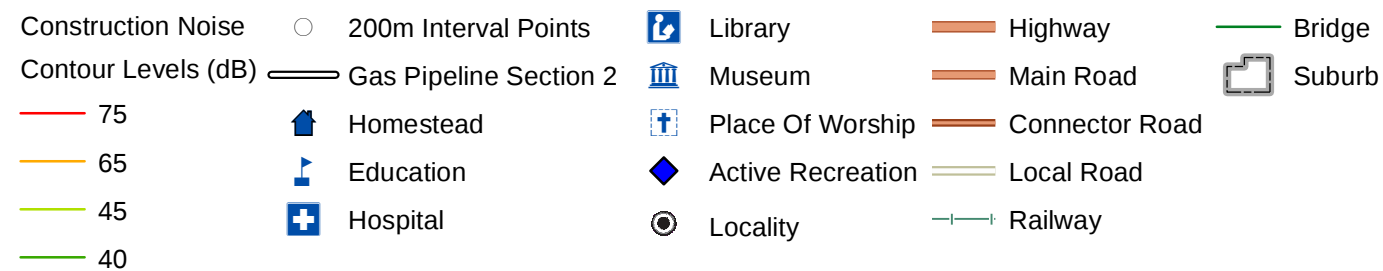
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Fig 12C



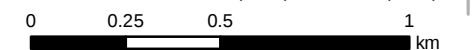
YOUNG - WAGGA WAGGA PIPELINE SECTION 2
Receptors and Construction Noise Map

Source: LPMA (2010), StreetPro (2009)
0 0.25 0.5 1 km
GDA94 - MGA Zone 55



YOUNG - WAGGA WAGGA PIPELINE SECTION 2
Receptors and Construction Noise Map

Source: LPMA (2010), StreetPro (2009)



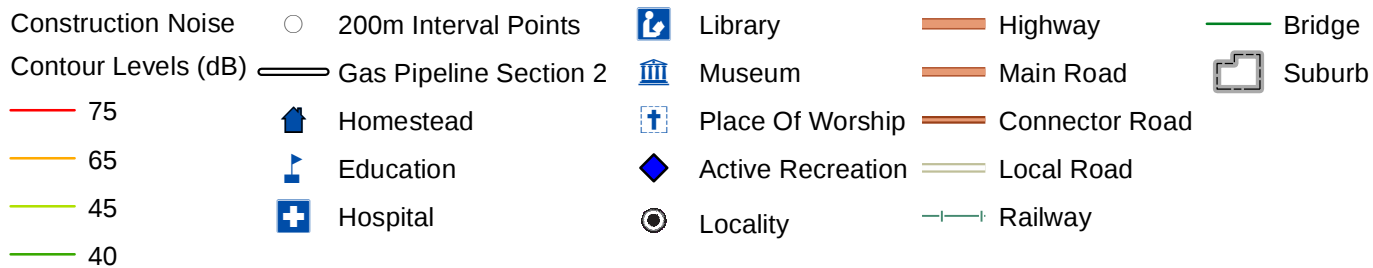
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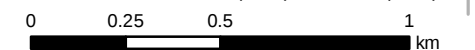
Fig 12E

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YOUNG - WAGGA WAGGA PIPELINE SECTION 2
Receptors and Construction Noise Map

Source: LPMA (2010), StreetPro (2009)



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Fig. **12F**

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