173 – 181 OLD LOGAN VILLAGE ROAD: NOISE IMPACT ASSESSMENT

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Assured Environmental

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Table 1: History of Revisions

Revision	Date	Issued to	Changes
R1	18/12/2025	W. Powell	Initial release

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GLOSSARY

A-Weighting	A response provided by an electronic circuit which modifies sound in such a way that the resulting level is similar, to that perceived by the human ear.
ABL	Assessment Background Level is derived from the measured noise levels and calculated to be the tenth percentile of the background L_{A90} noise levels (i.e. sort the recorded hourly L_{A90} into ascending order and select the lowest ten percentile level). The ABL is a single-figure background level representing each assessment period (day / evening / night).), i.e. three ABLs for each 24-hour period of monitoring.
Background Creep	A gradual increase in the total amount of background noise in the area or place measured.
Background Noise	Noise level at a given location and time measured in the absence of any alleged noise nuisance sources. Typically, represented by the L_{A90} noise statistic.
Calibrator	An instrument used to carry out 'field calibrations' before and after monitoring to ensure the sound level meter does not drift.
dB (decibel)	This is the scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and the reference pressure (0.00002 N/m^2).
dB(A) or dBA	This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e., 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Fast Time Weighting	Sound level meters apply a time-smoothing function to the measured sound. Fast time weighting has an exponential smoothing time constant of 125 milliseconds.
Free field	Refers to a sound pressure level determined at a point away from reflective surfaces other than the ground with no significant contribution due to sound from other reflective surfaces; generally, as measured outside and away from buildings.
L_{Aeq}	This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over the given period. Noise levels often fluctuate over a wide range with time. Therefore, when a noise varies over time, the L_{Aeq} is the equivalent continuous sound which would contain the same sound energy as the time varying sound. Many studies show that human reaction to level-varying sounds tends to relate closer to the L_{Aeq} noise level than any other descriptor.
L_{A10}, L_{A90}, L_{An}	Noise level exceeded for n% of the measurement period with A-weighted, calculated by statistical analysis - where n is between 0.01% and 99.99%. For example, L_{A10} is the noise level just exceeded for 10% of the measurement period, calculated by statistical analysis and used to determine traffic noise and L_{A90} is the noise level exceeded for 90% of the measurement period, A-weighted and calculated by statistical analysis and used to determine background noise levels.
$L_{A10,(1\text{-}hour)}$	The LA10, (1-hour) is the A-weighted noise level exceeded for 10% of a 1-hour period, this statistical measure is used as a descriptor for typical peak traffic noise. The LA10, (1-hour) is used in assessing the peak traffic noise conditions during the loudest daytime hour.
$L_{A10,(12\text{-}hour)}$	The LA10, (12-hour) is the A-weighted noise level exceeded for 10% of a 12-hour daytime period, this statistical measure is used to represent the overall traffic noise environment across the day. This measure is an indicator of general daytime noise exposure

$L_{A90, (8\text{-hour})}$	The LA90, (8-hour) is the A weighted noise level exceeded for 90% of the 8-hour period night-time period. This statistical measure is used to describe the background or ambient noise level when traffic is minimal. The LA90, (8-hour) is used to distinguish between ambient noise and road traffic noise emissions.
L_{AFmax}	A-weighted, fast response, maximum, sound level.
L_{AFmin}	A-weighted, fast response, minimum, sound level.
RBL	Rating background noise level is the overall single-figure background level representing each assessment period (day / evening / night) over the whole monitoring period, i.e., three RBLs for the whole monitoring period.
SPL	Sound pressure level is a measure of the loudness of sound, determined by the pressure of sound waves in the air, measured in decibels (dB).
SWL	Sound power level in decibels is ten times the logarithm of the ratio of the sound power to the sound power reference level of 1 picowatt.

ABBREVIATIONS

AML	Attended Monitoring Location
AHD	Australian Height Datum
CRTN	Calculation of Road Traffic Noise
DA	Development Approval
DTMR	Department of Transport and Main Roads
FF	First Floor
GF	Ground Floor
IR	Information Request
LIDAR	Light Direction and Ranging
NML	Noise Monitoring Location
MCU	Material Change of Use
NIA	Noise Impact Assessment
QLD	Queensland
RFI	Request for Information
SARA	State Assessment and Referral Agency
SDAP	State Development Assessment Provisions
SWL	Sound Power Level
TMR	Department of Transport and Main Roads

1 INTRODUCTION

1.1 Background

Assured Environmental (AE) has been engaged by TLPC Pty Ltd (herein referred to as 'TLPC') on behalf of Canterbury College ("the Applicant") to provide an acoustic assessment for a proposed development located at 173-181 Old Logan Village Road, Waterford (herein referred to as the "Subject Site"). The applicant is seeking approval for a Material Change of Use (MCU) to facilitate the Development Application (DA) of a multiple dwelling development.

The initial DA was submitted to City of Logan Council (reference MCUI/30/2025, dated 25 July 2025), and an Information Request (IR) was received from Council on 15 July 2025 and 22 August 2025. This IR included the following item related to acoustics:

2. Environment - Acoustic Information (Reverse Amenity)

2.1 *Provide to Council a noise impact assessment report to demonstrate that the proposed development will comply with the noise criteria identified in section 7 - Policy for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure prepared by Department of Transport and Main Roads.*

Further Advice:
As the subject site is located within 100 metres of government-supported transport infrastructure (i.e., Waterford Tamborine Roads), the proposed development is required to comply with PO8/AO8 of the Community facilities zone and PO6/AO6 of the Low density residential zone codes.

In addition to the above, the State Assessment and Referral Agency (SARA) issued an IR (reference 2507-46932 SRA, dated 25 July 2025), stating the following related to acoustics:

Issue:

The subject site is mapped as being affected by a state transport noise corridor and the proposal is for a sensitive land use. However, the application does not include a noise impact assessment or similar and as such SARA is not able to appropriately assess the proposal against Performance Outcomes (PO) PO39 and PO42 of State code 1: Development in a state-controlled road environment (State code 1) of SDAP.

The subject site is impacted by the following noise categories:

- *Category 2: 63 dB(A) =< Noise Level < 68 dB(A)*
- *Category 1: 58 dB(A) =< Noise Level < 63 dB(A).*

Action:

The applicant is requested to submit an acoustic report or similar prepared by an appropriately qualified acoustic consultant and certified by a Registered Professional Engineer of Queensland that demonstrates compliance with PO39 to PO43 of State Code 1.

The Acoustic Report / Traffic Noise Assessment must (but is not limited to):

a) be in accordance with the Department of Transport and Main Roads (DTMR's) Transport Noise Management Code of Practice.

b) *be prepared in accordance environmental emission criteria for noise as set out in DTMR's Development Affected by Environmental Emissions from Transport Policy, Version 4, dated October 2017.*
c) *recommend mitigation measures for ameliorating any transport noise impacts that meet the design standards set out in MRTS15 Noise Fences dated March 2019.*
d) *demonstrate that the development can achieve the relevant environmental emission criteria for noise with the recommended noise attenuation treatments.*

Odour and Noise Impact (RFI from Logan City Council dated 22/08/2025 -Document Number 18763180)

1.4. Submit an odour and noise impact report for the proposed private sewer pump stations, demonstrating:

1.4.1 The potential impact on the proposed development and the surrounding community

1.4.2 Compliance with relevant odour and acoustic standards

1.4.3 Proposed Mitigation measures to address any identified impacts

1.2 Scope of Assessment

Assured Environmental (AE) was appointed by TLPC to undertake a Noise Impact Assessment for the proposed facility at the Subject Site that satisfies the items within the aforementioned IRs.

This acoustic assessment has been undertaken to assess the potential reverse amenity impacts of the private sewer pump station located within the Subject Site and road traffic noise affecting the Subject Site in accordance with the following policies and guidelines:

- Logan City Council Planning Scheme, 2015 (LCCPS);
- QLD State Development Assessment Provisions, 2025 (SDAP);
- QLD Environmental Protection Act, 1994 (EP Act); and
- QLD Environmental Protection (Noise) Policy, 2019 (EPP (Noise)).
- Development Affected by Environmental Emissions from Transport Policy, Version 4, 2017
- QLD Development Code MP 4.4 – Buildings in a Transport Noise Corridor, (2015)

In accordance with the requirements of the above guidelines, computational modelling and first-principle calculations have been undertaken to support the assessment of the potential for adverse amenity impacts as a result of the proposed development at the Subject Site.

1.3 This Report

This report summarises the methodology, results and conclusions of the Noise Impact Assessment.

2 PROJECT DESCRIPTION

2.1 Development Description

The proposed development is for a multiple dwelling located in the Community Facility Zone (Education Precinct) within the suburb of Waterford, Queensland. The proposed development is located at 173-201 Old Logan Village Road, specifically Lot 9 on RP813095. The proposed development involves the demolition of an existing residential dwelling and construction of a multiple dwelling comprising of 50 units.

The proposed development includes;

- The proposal involves 34% landscaping on site
- Communal open spaces of 1,086 m^2
- 113 car parking spaces
- Access to be provided via Old Loagan Village Road; and
- A flood free access route is available through the Canterbury College campus.

On 15 June 2025, the Development Application was submitted to City of Logan Council, this NIA was developed to demonstrate compliance can be achieved with the applicable noise criteria for the proposed development and in response to the RFIs raised by Logan City Council and the State Assessment and Referral Agency (SARA).

2.2 Proposed Use

As part of the proposed development of the Multiple Dwellings on Lot 9 on RP813095 another simultaneous application is being lodged involving Reconfiguring a Lot (ROL) for the purpose of a Boundary Realignment. This application will realign the boundaries over the two sites to allow the ELC(Lot 10 RP813095) and Multiple Dwellings (Lot 9 RP813095) to operate on their own lots. Detailed site plans are presented in Appendix A.

Detailed site plans are presented in Appendix A.

3 DESCRIPTION OF ENVIRONMENTAL VALUE

3.1 Location and Surrounding Land Use

The Subject Site is located at 173 – 181 Old Logan Village Road, Waterford, specifically on Lot 9 on RP813095. The Subject Site is located approximately 8.35 km south-east of Logan Central.

3.2 Surrounding Uses

The area has largely been developed for the purposes of residential/rural residential uses, with the Canterbury College located to the east. The Subject Site is bound by the Waterford-Tamborine Road to the West.

The surrounding land uses are described as follows:

- To the North: Low-density residential properties including a homeless shelter to the North and a retirement village to the Northeast;
- To the East: Area is defined as community facilities which includes the Canterbury College, Canterbury Taipans Athletics fields and Sporting club, and the Canterbury functions centre. Further east of the community facilities are low density residential properties;
- To the South: Area is defined by rural and low-density residential properties; and
- To the West: Rural and low-density residential areas and a recreation and open space area defined by Spann Park.

Land use zoning for the surrounding area is presented below in Figure 1. A review of the area has confirmed that existing residential uses are mixed lowset dwellings and two storey residential uses in the immediate vicinity.

3.3 Topography

The local topography, as obtained from LiDAR imaging is illustrated Figure 2. Review of the topography of the Subject Site and nearby locality demonstrated a generally flat topography, The Subject Site slopes from the property's frontage at 19 m to 16.5 m Australian Height Datum (AHD) at the rear boundary.

3.4 Sensitive Receptors

There are existing dwellings located in the vicinity of the Subject Site. Sensitive uses have been determined based on the land zoning, a site visit and aerial imaging. The nearest sensitive receptors are shown in Figure 3.

Table 2 provides a summary of the nearby sensitive receptors and approximate distance to the Subject Site.

Table 2: Nearby Sensitive Receptors

Receptor ID	Description	Coordinates (EPSG 7856)		Distance to Site Boundary (m) [a)]	Assessable Height (m) [b)]
		Easting	Northing		
R01	Low Density Residential	514564	6934913	0	1.5, 4.5
R02	Low Density Residential	514618	6934905	21	1.5, 4.5
R03	Rural Residential	514538	6935256	22	1.5, 4.5
R04	Community Facilities	514642	6935267	20	1.5
R05	Community Facilities	514638	6935218	22	1.5
R06[c)]	Community Facilities	514590,	6935189	0	1.5, 4.5
R07	Rural Residential	514502	6935340	55	1.5, 4.5
R08[d)]	Medium Density Residential	514570	6935243	0	1.5,4.5

a) Distance measured from site boundary to sensitive receiver.
b) Per relevant criteria to be discussed in this assessment.
c) Proposed ELC development at 183-203 Old Logan Village Road
d) Townhouse (Unit 38) within the Subject Site is the receptor most affected by the private sewer pump station, this receptor was selected as it is the most affected by operational noise sources, where compliance is achieved at this receptor all other townhouses within the Subject Site are less affected and therefore compliance will be implied.

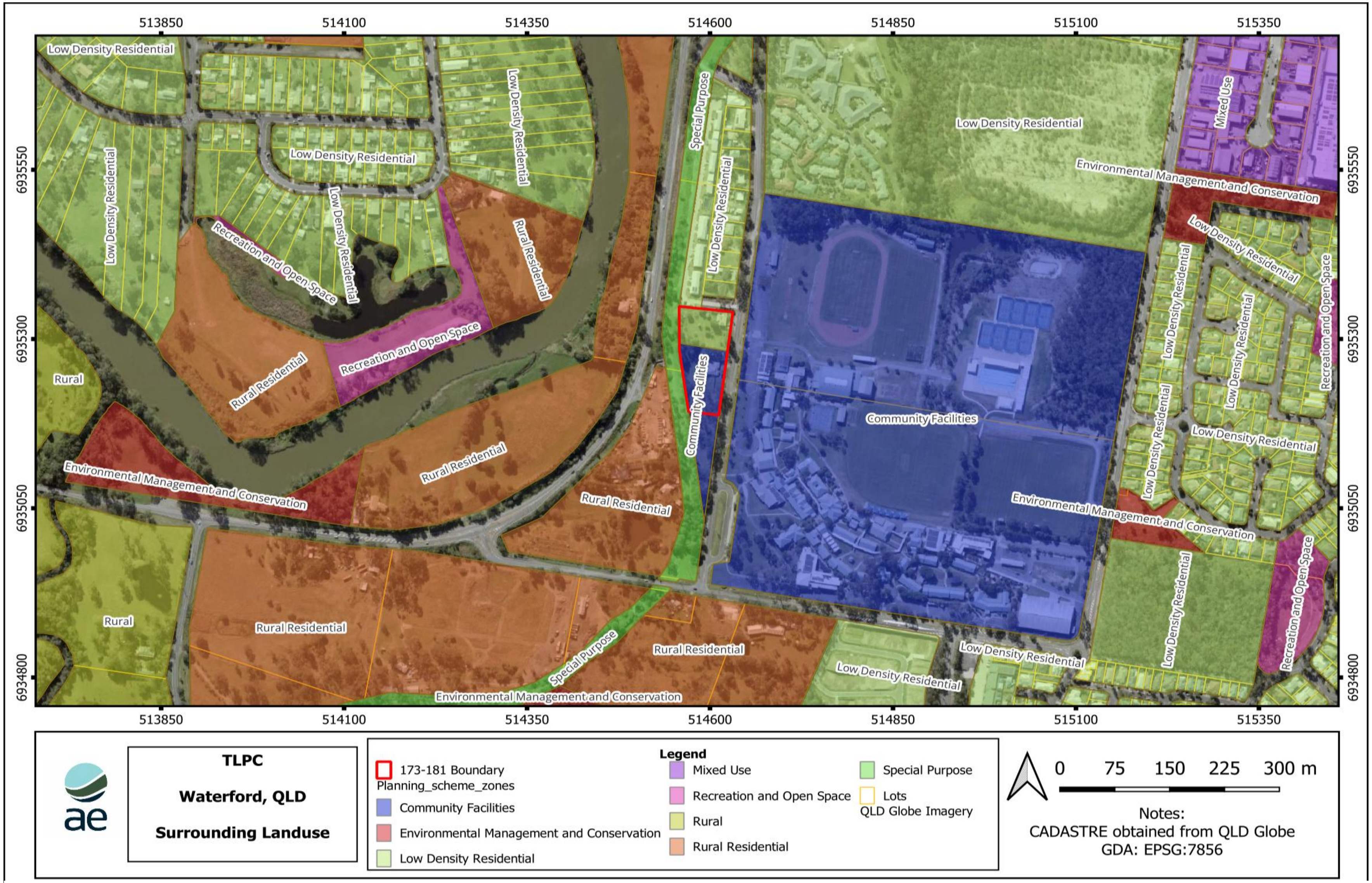


Figure 1:Logan City Council Zoning

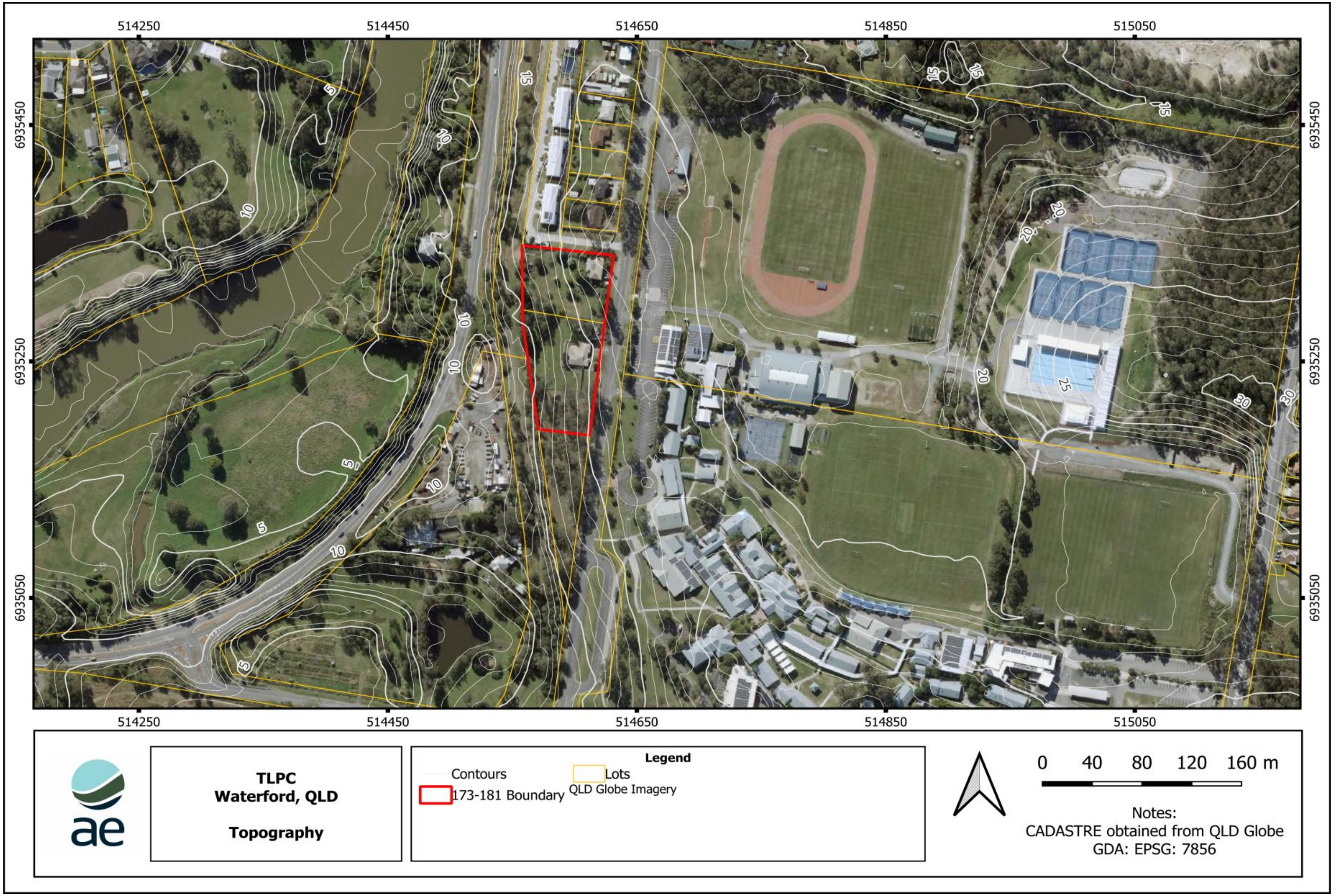


Figure 2: Subject Site Topography

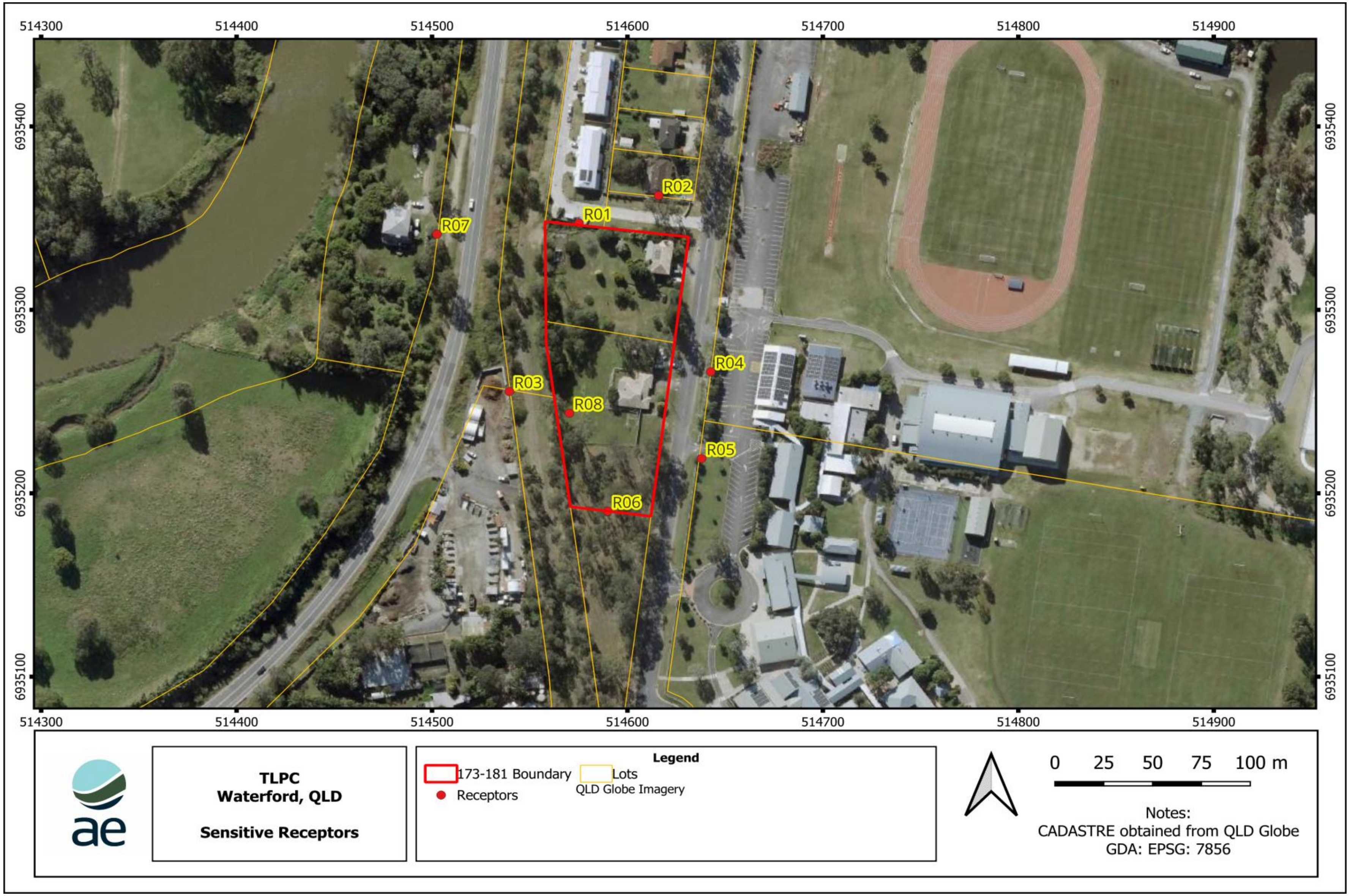


Figure 3: Sensitive Receptors

3.5 Noise Monitoring Methodology

Two sets of long-term noise monitoring were conducted as part of the acoustic assessment at two locations near the Subject Site. AE conducted unattended long term monitoring survey near the front of the residence located at 173 Old Logan Village Road (NML1); this survey was used to quantify the existing background acoustic environment for sensitive receptors (residential) near the proposed development.

The second set of long-term noise logging was conducted at Noise Monitoring Location (NML) 2. The logger was placed at the rear of the existing residential property on 173 Old Logan Village Road where vehicle noise emissions was the dominant audible noise source and was used to quantify the road traffic noise generated from Waterford Tamborine Road (State Route 95).

For the purposes of verification and calibration of the CadnaA generated computational model, a 15-minute attended road traffic noise measurement was completed near Waterford Tamborine Road. The attended road traffic noise measurement was completed simultaneously with a traffic count; the Attended Monitoring Location (AML1) and unattended Noise Monitoring Locations are identified in in Figure 4.

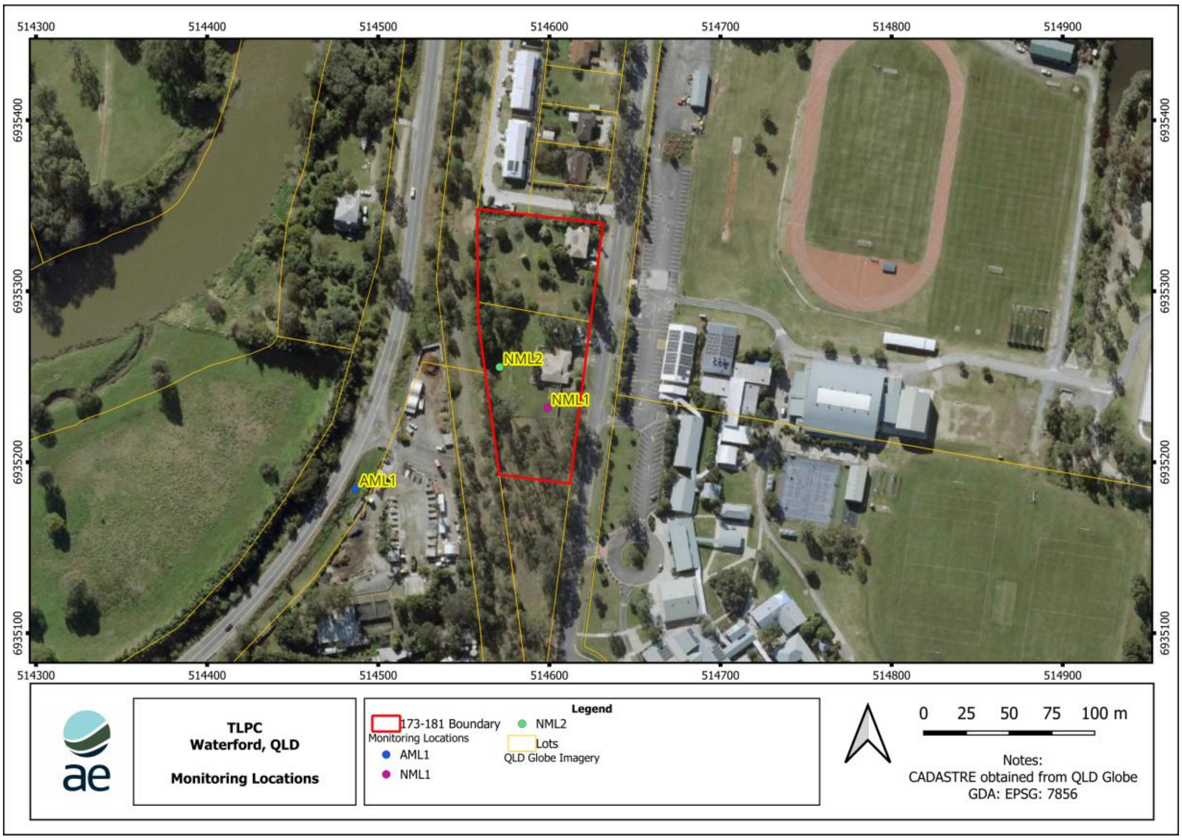


Figure 4: Noise Monitoring Location

Noise measurements were undertaken from the 3 - 15 of September 2025. Each survey is reported to have been conducted in accordance with the requirements of *Australian Standard AS 1055-2018 'Acoustics – Description and measurement of environmental noise'* using Rion NL42 environmental noise loggers. Each instrument was situated in a free-field position and an averaging time of 15 minutes adopted for the monitoring. The microphones were each positioned at a height of 1.4 m above ground level and fitted with a windshield throughout the measurements.

Noise monitoring conducted at NML1 was used for determining the background acoustic environment, this measurement has a potential to be affected by rainfall and wind speeds above 5 m/s. A weather station was co-located with the noise monitoring loggers and was used to collect meteorological data obtained during the noise surveys, a review of meteorological data from an onsite weather station co-located with the noise logger has been conducted alongside the trends in the noise monitoring data. Periods impacted by extraneous noise, wind, or rain were excluded from the analysis of background acoustic environment.

Review of the 1/3 octave noise levels identified that some background acoustic environment data (NML1) was affected by extraneous noise sources such as insects and birds and the monitoring data has consequently been adjusted to remove this influence.

A summary of the noise levels for each period across various statistical noise parameters are presented in Table 3. Detailed noise monitoring analysis is presented in Appendix D.

Table 3: Summary of Noise Monitoring Results (NML 1)

Period	Noise Metric (dB(A))					
	L_{Amax}	L_{A1}	L_{A10}	L_{A90}	L_{Aeq}	RBL[a)]
Day (7 am to 6 pm)	92	64	60	51	58	49
Evening (6 pm to 10 pm)	101	63	59	46	56	43
Night (10 pm to 7 am)	83	62	57	39	55	31
Early Morning (6 am to 7 am)	81	65	61	52	59	54
Late Afternoon (6 pm to 7 pm)	80	64	60	49	57	47

e) RBL is the rating background level or overall background noise level for each period.

A review of the noise logger graphs and the above results suggests that the periods from 6 am to 7 am the local area experiences elevated background noise, elevated noise levels are primarily associated with residential and transport-related activities such as people preparing for work, vehicles starting and departing, and the commencement of public transport. Review of the hourly traffic count (available on the Queensland Open Data Portal) for Waterford Tamborine Road further demonstrated traffic counts were near peak levels between 6am to 7am .

Elevated noise levels that are uncharacteristic of the remainder of the night period and are of similar nature to the noise levels through the day period. Typically, in this instance a shoulder period would be defined as it would be unreasonable to assess activities within this period against the nighttime criterion. It is AE's opinion based on review of the traffic count on Waterford Tamborine Road and given the measured RBL's during the early morning period (6 am to 7 am) were significantly higher than the nighttime acoustic environment therefore a shoulder period for 6 am to 7 am is warranted.

Noise monitoring conducted at NML2 was used for determining road traffic noise generated on Waterford Tamborine Road. The road traffic noise measurement has the potential to be affected by rainfall and wind speed conditions of 3 m/s. A weather station was co-located with the noise monitoring loggers and was used to collect meteorological data obtained during the noise surveys, a review of meteorological data from an onsite weather station co-located with the noise logger has been conducted alongside the trends in the noise monitoring data. Periods impacted by extraneous noise, wind, or rain were excluded from the analysis of road traffic noise

Table 4 provides a summary of relevant road traffic noise levels based on the long-term acoustic monitoring survey conducted at NML2.

Table 4. Summary of Measured Road Traffic Noise Levels (NML 2)

Monitoring Location	Distance from Nearest Traffic Lane	Measured Noise Level (dB(A))			
		Max. $L_{Aeq, 1 hour}$	$L_{A10, 1 hour}$	$L_{A10, 12 hour}$	$L_{A90, 8 hours}$
NML 2	58 m (Waterford Tamborine Road)	61	64	61	37

Table 5 provides a summary of relevant road traffic noise levels based on the short-term attended acoustic monitoring survey conducted at AML1.

Table 5. Summary of Attended Road Traffic Noise Measurement (AML 1)

Monitoring Location	Distance from Nearest Traffic Lane	Measured Noise Level (dB(A))			
		Max. $L_{Aeq, 15min}$	$L_{A1, 15min}$	$L_{A10, 15min}$	$L_{A90, 15min}$
NML 2	58 m (Waterford Tamborine Road)	92	84	79	59

4 PLANNING SCHEME AND ASSESSMENT CRITERIA

4.1 Overview

The assessment considers the potential operational noise impacts from the proposed childcare centre at the Subject Site. This section reviews the applicable criteria, taking into consideration the Logan Planning Scheme (2015)

The Logan Planning Scheme does not provide specific acceptable outcomes for noise criteria for multipole dwelling, in lieu of this the planning scheme does provide noise emission and noise immission standards for the protection of residential amenity and general amenity. Table 5 presents the noise emissions standards for residential amenity. Table 6 presents the noise emission standard for general amenity.

Table 5: Logan Planning Scheme 2015 Table 3.2.1.1 - Noise Emissions Standards for Protection of Residential Amenity

Noise Level at the Boundary of Premises			
Noise Type	Time period	Monday to Saturday	Sunday and Public Holidays
Non-steady sound	Day 7:00am-6:00pm	$LA_{eq,adj,T} \leq L_{A90}$ plus 5 dB(A)	$LA_{eq,adj,T} \leq L_{A90}$ plus 5 dB(A)
	Evening 6:00pm to 10:00pm	$LA_{eq,adj,T} \leq L_{A90}$ plus 5 dB(A)	$LA_{eq,adj,T} \leq L_{A90}$ plus 5 dB(A))
	Night 10:00-7:00am	$LA_{eq,adj,T} \leq L_{A90}$ plus 0 dB(A)) and $L_{Amax} \leq$ 60 dB(A)	$LA_{eq,adj,T} \leq L_{A90}$ plus 0 dB(A)) and $L_{Amax} \leq$ 60 dB(A)
Continuous noise	Anytime	$L_{A90,T}$ plus 0 dB(A)	$L_{A90,T}$ plus 0 dB(A)

Table 6: Logan Planning Scheme 2015 Table 3.2.1.2 Noise Emission Standards for the Protection of General Amenity

Noise Level at the boundary of premises			
Noise Type	Time period	Monday to Saturday	Sunday and Public Holidays
Non-steady sound	Day 7:00am - 6:00pm	$LA_{eq,adj,T} \leq L_{A90}$ plus 10 dB(A)	$LA_{eq,adj,T} \leq L_{A90}$ plus 5 dB(A)
	Evening 6:00pm to 10:00pm	$LA_{eq,adj,T} \leq L_{A90}$ plus 10 dB(A)	$LA_{eq,adj,T} \leq L_{A90}$ plus 5 dB(A))
	Night 10:00-7:00am	$LA_{eq,adj,T} \leq L_{A90}$ plus 5 dB(A)) and $L_{Amax} \leq$ 80 dB(A)	$LA_{eq,adj,T} \leq L_{A90}$ plus 5 dB(A)) and $L_{Amax} \leq$ 80 dB(A)
Continuous noise	Anytime	$L_{A90,T}$ plus 5 dB(A)	$L_{A90,T}$ plus 5 dB(A)

4.2 Sleep Disturbance

Predicted noise impacts from development can be assessed for the potential to cause sleep disturbance by comparison against the noise levels recommended by the World Health Organisation (WHO), as discussed in the following publications:

- Community Noise; Berglund M and Lindvall T (WHO,1995);
- Guidelines for Community Noise; Berglund M, Lindvall T and Schwela D (WHO, 1999);
- Burden of disease from environmental noise (WHO, 2011); and
- Environmental noise guidelines for the European Region (WHO, 2018).

For a good night sleep, the WHO recommend indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night. If negative effects on sleep are to be avoided the equivalent sound pressure level should not exceed 30 dB $L_{Aeq,8\text{-}hour}$ indoors for continuous noise.

The noise level criteria recommended by WHO for protection against sleep disturbance are shown in Table 7.

Table 7: WHO Recommended Noise Criteria for Prevention of Sleep Disturbance

Noise Descriptor	Recommended Criterion (indoors, in sleeping spaces)	Façade Noise Reduction a)	External (Free-Field) Sleep Disturbance Criterion
L_{Aeq}	30 dB(A)	7 dB(A)	37 dB(A)
L_{Amax}	45 dB(A)	7 dB(A)	52 dB(A)

f) Standard conservative facade noise transmission loss, per discussion above.

4.3 Summary of Operational Noise Criteria

The noise criteria for each time-period (day, evening and night) at sensitive receptors around the Subject Site have been determined after reviewing the applicable policies and selecting the lowest criterion for each receptor in each period.

For this assessment, the noise criteria in Table 8 and Table 9 have been adopted and are listed according to the receptor type and ID (per Table 2).

Table 8: Summary Operational Noise Criteria – Non-Steady Noise

Receptor Type and ID	Period	Noise Parameter (dB(A))	
		$L_{Aeq,period}$	L_{Amax} a)
Residential Amenity (R01 - R03, R07 - R08)	Day (7 am to 6 pm)	54	-
	Evening (6 pm to 10 pm)	48	-
	Night (10 pm to 7 am)	31	52
General Amenity (R04 - R06)	Day (7 am to 6 pm)	59	-
	Evening (6 pm to 10 pm)	53	-
	Night (10 pm to 7 am)	36	80

Table 9: Summary of Operational Noise Criteria - Continuous Noise

Receptor Type and ID	Period	Noise Parameter (dB(A))	
		$L_{Aeq,period}$	L_{Amax} a)
Residential Amenity (R01, - R03, R07 - R08)	Day (7 am to 6 pm)	48	-
	Evening (6 pm to 10 pm)	43	-
	Night (10 pm to 7 am)	31	52
General Amenity (R04 - R06)	Day (7 am to 6 pm)	54	-
	Evening (6 pm to 10 pm)	48	-
	Night (10 pm to 7 am)	36	-

4.4 Road Traffic Noise Intrusion

Waterford Tamborine Road (State Route 95) is a state-controlled road which generates the majority of road traffic noise at the Subject Site. Noise criteria for road traffic noise generated by state-controlled roads are governed by State Development Code 1: Development in a state-controlled road environment.

The State Assessment and Referral Agency (SARA) have identified the proposal should be assessed against Performance Outcomes (PO) PO39 to PO43 of the state code 1.

It is further noted that the proposed development is required to comply with PO8/AO8 of the Community facilities zone and PO6/AO6 of the Low-density residential zone codes. These performance and acceptable outcomes refence the "Development Affected by Environmental Emissions from Transport Policy" (State of Queensland - Department of Transport and Main Roads 2017). The criteria established in this document is identical to the criteria established in State Development Code 1, therefore compliance with State Development Code 1 will imply compliance with PO8/AO8 of the Community facilities zone and PO6/AO6 of the Low-density residential zone codes.

Table 10 and demonstrate the relevant Performance Outcomes (PO 39 – PO43) identified in State Code 1.

Table 10: State Code 1: - Environmental Emissions

Material Change of Use (Accommodation Activity)	
Ground floor level requirements adjacent to a state-controlled road or type 1 multi modal corridor	
PO39 Development minimises noise intrusion from a **state-controlled road in private open space.**	AO39.1 Development provides a noise barrier or earth mound which is designed, sited and constructed: 1. to achieve the maximum free field acoustic levels in reference table 2 (item 2.2) for private open space at the ground floor level; 2. in accordance with: a) Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b) Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c) Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO39.2** Development achieves the maximum free field acoustic level in reference table 2 (item 2.2) for **private open space by alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.
PO39 Development (excluding a relevant residential building or relocated building) minimises noise intrusion from a state controlled road in habitable rooms at the façade.	AO40.1 Development (excluding a relevant residential building or relocated building) provides a noise barrier or earth mound which is designed, sited and constructed:

Material Change of Use (Accommodation Activity)	
Ground floor level requirements adjacent to a state-controlled road or type 1 multi modal corridor	
	1. to achieve the maximum building façade acoustic level in reference table 1 (item 1.1) for habitable rooms; 2. . in accordance with: a. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR AO40.2 Development (excluding a relevant residential building or relocated building) achieves the maximum building façade acoustic level in reference table 1 (item 1.1) for habitable rooms by alternative noise attenuation measures where it is not practical to provide a noise barrier or earth mound
PO41 Habitable rooms (excluding a relevant residential building or relocated building) are designed and constructed using materials to achieve the maximum internal acoustic level in reference table 3 (item 3.1).	No acceptable outcome is provided
Above ground floor level requirements (accommodation activity) adjacent to a state-controlled road or type 1 multi-modal corridor	
PO42 Balconies, podiums, and roof decks include: 1. a continuous **solid gap-free structure** or balustrade (excluding gaps required for drainage purposes to comply with the Building Code of Australia); 2. highly acoustically absorbent material treatment for the total area of the soffit above balconies, podiums, and roof decks.	No acceptable outcome is provided.
PO43 Habitable rooms (excluding a relevant **residential building or relocated building**) are designed and constructed using materials to achieve the maximum internal acoustic level in reference table 3 (item 3.1).	No Acceptable outcome is provided

The Subject Site is a "Multiple Dwelling" which falls under "accommodation Activity", Table 11 to Table 13 demonstrate the acoustic level criteria presented in State Development Code 1. These tables are drawn from State Development Code 1, Reference Table 1, 2 and 3 which provide specific criteria noise criteria the development should be assessed against based on the type of occupancy.

Table 11 provides reference to the established noise criteria for noise levels assessed at the façade of each individual dwelling.

Table 11: Reference Table 1 - Maximum Building Facade Acoustic Levels

Type of occupancy/activity	Acoustic Levels
Accommodation Activity	a) ≤60 dB(A) L_{10} (18 hour) façade corrected (measured L_{90} (8 hour) free field between 10pm and 6am ≤40 dB(A)) OR b) ≤63 dB(A) L_{10} (18 hour) façade corrected (measured L_{90} (8 hour) free field between 10pm and 6am > 40 dB(A))

Table 12 provides reference to the established noise criteria for noise levels assessed at private open spaces at each individual dwelling.

Table 12: Reference Table 2 - Maximum Free Field Acoustic Levels

Type of occupancy/activity	Acoustic Levels
Private open space for residential lots **Private open space for an accommodation activity (including lots created for a future accommodation activity)**	a) ≤57 dB(A) L_{10} (18 hour) free field (measured L_{90} (18 hour) free field between 6am and 12 midnight ≤45 dB(A)) OR b) ≤60 dB(A) L_{10} (18 hour) free field (measured L_{90} (18 hour) free field between 6am and 12 midnight >45 dB(A))

Table 13 provides reference to the established noise criteria for internal noise levels at each individual dwelling.

Table 13: Reference Table 3 - Maximum Internal Acoustic Levels

Type of occupancy/activity	Acoustic Levels
Habitable rooms in an accommodation activity (excluding uses addressed in QDC MP4.4)	a) ≤35 dB(A) L_{eq} (1 hour) (maximum hour over 24 hours)

5 NOISE MODELLING

5.1 Methodology Overview

For the purposes of predicting impacts associated with road traffic noise intrusion on the Subject Site, noise modelling was completed using the proprietary software CadnaA (version 2026 build 213.5606) developed by DataKustik. CadnaA incorporates the influence of meteorology, terrain, ground type and air absorption in addition to source characteristics to predict noise impacts at receptor locations.

5.2 Meteorology

Noise levels were predicted using the CONCAWE propagation methodology, which incorporates the influence of meteorological conditions on the propagation of noise through the atmosphere. The modelled meteorological parameters shown in Table 14 were selected to predict the worst-case noise levels at all receptors during all seasons and all time periods.

Table 14: Model Parameters

Parameter	Day (Noise-Enhancing)	Evening (Noise-Enhancing)	Night (Noise-Enhancing)
Temperature (night)	20°C	10°C	10°C
Relative Humidity	75%	75%	75%
Wind Speed (m/s)	3.0	3.0	2.0
Stability Class	D	D	F
Wind Direction:	Worst Case	Worst Case	Worst Case

5.3 Model Configuration

Table 15 summarises the model configuration used for the modelling.

Table 15: Model Configuration

Parameter	Approach
Road Traffic Noise	
Standard	Calculation of Road Traffic Noise (CRTN)
Digital Terrain	LiDAR data at 2 m intervals.
Ground Absorption	Default absorption of 0.1

5.4 Noise Sources

Table 16 provides a summary of the noise sources adopted for this assessment and the operational details of each source, Sound power levels for each source were obtained based on surveys of similar sources by AE, published literature and manufacturer information. All data has been reviewed for any applicable adjustments for tonality and impulsiveness in accordance with AS 1055:2018 Acoustics – Description and measurement of environmental noise. Sound power levels described in Table 16 consider the following assumptions:

- Operational noise sources associated with the multiple dwellings are expected to be limited to mechanical plant items servicing the Subject Site. This assessment only considers the private sewer pump station

- Private sewer pump station is operating 100% of the time. Sound power levels were drawn from AE's sound power level database.

- Sewer pumps modelled to consider both pumps operating in tandem to reflect worst-case noise emissions produced by the private sewer pump station.

Table 16: Sound Power Levels

Noise Source	Qty	Height (m)	Acoustical Usage (%)			Sound Power Level (SWL) dB(A))		Additional Corrections a)
			Day	Evening	Night	L_{Aeq}	L_{Amax}	
Continuous Noise Sources								
Private Sewer Pump	2	0.5	100%	100%	100%	78	88	-

a) Any additional corrections applied for noise characteristics, such as tonality, low frequency and impulsiveness.

The location of the private sewer pump station is identified in Figure 5. It is noted that the private sewer pump station is located closest to unit 38 of the townhouse development.

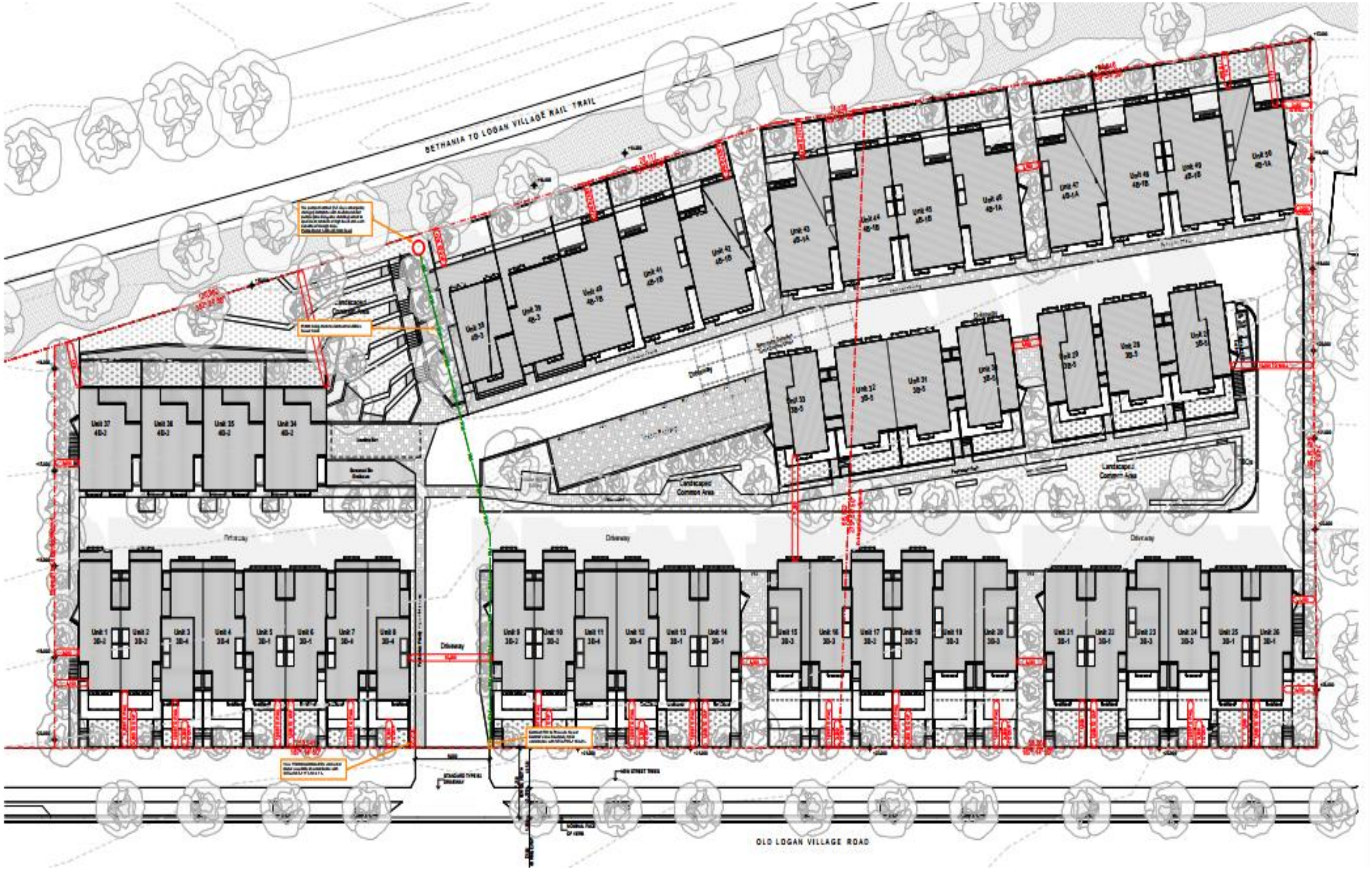


Figure 5: Hydraulic Services - Location of Private Sewer Pump Station

6 PREDICTED OPERATIONAL NOISE EMISSIONS

6.1 Overview

The predicted operational noise levels at nearby sensitive receptors to the Subject Site are based on the equipment details in Table 16 and the methodology described in Section 5. It is noted that the site only considers the private sewer pump station in this assessment. The results of the assessment assume the acoustic mitigation detailed in Section 6.3 are implemented.

6.2 Continuous Noise

Table 17 presents a summary of the results of predictive noise modelling at each of the sensitive receptors for private sewer pump station. The results of the modelling confirm that compliance is predicted to be achieved at all nearby sensitive receptors (including at elevated locations) with the proposed mitigation measures. Results for R08 (Unit 38) are representative of the most affected townhouse within the Subject Site, where compliance is achieved at the most affected townhouse (R08) compliance is implied at all other receptors within the Subject Site.

Predicted noise contours for continuous plant and equipment are presented in Appendix C. Review of the predicted contours confirms that compliance with the noise objectives is predicted to be achieved at all nearby sensitive zones and uses.

Table 17: Predicted Receptor Noise Levels, dB(A) for Continuous Noise Sources

Receptor	Predicted Noise Levels (dB(A))			Criteria, Day / Evening / Night (dB(A))	Comply (Y/N)
	Day ($L_{Aeq, 1\text{-hour}}$)	Evening ($L_{Aeq, 1\text{-hour}}$)	Night ($L_{Aeq, 1\text{-hour}}$)		
R01 G.F	<10	<10	<10	48 / 43 / 31	Y / Y / Y
R01 G.F	<10	<10	<10	48 / 43 / 31	Y / Y / Y
R02 G.F	<10	<10	<10	48 / 43 / 31	Y / Y / Y
R02 F.F	<10	<10	<10	48 / 43 / 31	Y / Y / Y
R03 [b)]	20	20	20	48 / 43 / 31	Y / Y / Y
R04 [b)]	<10	<10	<10	54 / 48 / 36	Y / Y / Y
R05 [b)]	<10	<10	<10	54 / 48 / 36	Y / Y / Y
R06 G. F [b)]	<10	<10	<10	54 / 48 / 36	Y / Y / Y
R06 F.F [b)]	<10	<10	<10	54 / 48 / 36	Y / Y / Y
R07 G.F	<10	<10	<10	48 / 43 / 31	Y / Y / Y
R07 F.F	13	13	13	48 / 43 / 31	Y / Y / Y
R08[c)] G.F	26	26	26	48 / 43 / 31	Y / Y / Y
R08 [c)] F.F	35	35	35	48 / 43 / 31	Y / Y / Y
R08 [c)] S.F	33	33	33	48 / 43 / 31	Y / Y / Y

a) *G. F = Ground Floor; F. F = First Floor; S. F = Second Floor*
b) *Educational and commercial receptors were assessed against the general amenity criteria as per the Logan City Council planning scheme*
c) *R08 is the most affected townhouse within the Subject Site, compliance at this receptor implies compliance with all other townhouse receptors within the Subject Site.*

6.3 Acoustic Mitigation Measures

The following noise mitigation/management measures are recommended to ensure compliance is achieved:

- The private sewer pumps require an acoustic enclosure that achieves a minimum reduction of 18dB, examples of products available online that could achieve this reduction include:
  - Flex Shield Acoustic Enclosures (up to 40 dB reduction); and
  - Jako Industries Acoustic Enclosures (up to 20dB reduction).
- Alternatively, the sewer pump station could be located underground and covered with a sealed access hatch to minimise noise emissions generated by the private sewer pump station. Standard construction materials can achieve the required noise reduction for the sealed access hatch, examples of materials that would achieve or surpass the required noise reduction have been listed below.
  - Wood (30mm plywood cover);
  - Fibre cement (9mm);
  - Concrete (30mm); or
  - Steel (2mm).

Mitigation of the private sewer pump station is required to ensure the acoustic amenity of townhouse receptors within the Subject Site is protected. This assessment considers the acoustic impacts at Unit 38 as this receptor is located closest to the private sewer pump station, where compliance can be achieved at Unit 38, compliance with all other residences further away is implied.

7 ROAD TRAFFIC NOISE ASSESSMENT

7.1 Existing Traffic Volumes

Traffic volume data is referenced from the Queensland Government Open Data Portal where traffic census data is available from 2014-2024 for all state declared roads. Traffic Data was taken from the 2024 Census for Waterford - Tamborine Road, Site ID 11443.

The Queensland Government Open Data Portal also provides an hourly traffic count for Waterford – Tamborine Road, the hourly traffic count data during the daytime (6am to 10pm) was reviewed and used to model period specific road traffic vehicle movements along Waterford – Tamborine Road. Table 18 presents the existing road traffic volumes sources from the Queensland open data portal.

Table 18: Existing Road Traffic Volumes

Road Name	Site ID	AADT	Heavy Vehicles	Speed Limit
Waterford - Tamborine Road	1143	19864	9.3%	80 km/h

7.2 Future Traffic Volumes

The noise model was developed to reflect the future road traffic numbers with expected 2036 peak traffic volumes. These have been derived from the 2024 volume census (see Table 20) assuming a 5.72% p.a. growth rate[a] (as predicted by the Queensland Government Open Data Portal). The resultant noise levels were used to calculate the road traffic noise impacts for the 10-year horizon.

7.3 Noise Modelling Methodology

All predictions have been undertaken in accordance with Calculation of Road Traffic Noise (CRTN) methodology developed by the UK Department of Transport. The predictive noise modelling incorporated the following assumptions:

- L_{Aeq} values were calculated from the L_{A10} values predicted by the CRTN methodology using the approximation $L_{Aeq} = L_{A10} - 3$ dB.
- Noise source heights were set at 0.5 m above road level for cars, 1.5 m for heavy vehicle engines and 3.6 m for heavily vehicle exhausts.
- Noise from heavy vehicle exhausts is 8 dB lower than the steady continuous engine noise.
- The vehicle speed is assumed to be 80 km/h throughout the relevant section of Waterford-Tamborine Road
- The road surface is assumed to be Dense Grade Asphalt. No surface correction is applied.
- Corrections established for Australian conditions applied through a negative correction to the CRTN predictions of -0.7 dB for free-field corrected levels (Samuels and Saunders, 1982).

[a] *Queensland Open Data Portal – Waterford - Tamborine Road – Road Section ID 207 – Site ID 11443, 10 Year Growth.*

7.4 Road Traffic Noise Model Calibration

The applicability of the CTRN model has been statistically analysed by Saunders, Hall and Leach (1983). The accuracy figures are presented in Table 19 and drawn from the Transport Noise Management Code of Practice (TMR), It is noted that the accuracy represents the 95% confidence limits.

Table 19: CRTN Calibration Factors and Accuracies for Queensland Conditions - Table 4.3.2.1 Transport Noise Management Code of Practice

Road Location	Receptor Location	Calibration Factor (dB(A))	Accuracy of Calibrated Calculation or Prediction (dB(A))
Across Queensland Pacific Motorway, Logan Motorway to Nerang) (1983)	Free Field	0.7 for all sites	± 3.6
	1 m in front of building façade	1.7 for all sites	± 3.6
Along the Pacific Motorway (Logan Motorway to Nerang) (2004)	Free Field	-9.7 for PCC sites	± 3.6
		-6.0 for OGA sites	± 3.6
	1 m in front of building facade	-9.7 for PCC sites	± 3.6
		-6.0 for OGA sites	± 3.6

DGA: Dense Graded Asphalt. PCC: Portland Cement Concrete. OGA: Open Graded Asphalt

For the road traffic noise survey conducted at NML2 the applicable accuracy of calibrated calculation or prediction is ± 3.6 dB(A).

Initial computational results found the road traffic noise modelled to be within the ± 3.6 dB(A) accuracy tolerance of the measured results, however during the assessment the modelling software underwent a large update. The updated results after the software update found the road traffic model results had changed and the results were no longer within the accuracy tolerance of ± 3.6 dB. AE was unable to revert the software to previous versions and reproduce the results of the original calibration.

To verify the accuracy of the computational model, AE conducted additional attended road traffic noise survey with a simultaneous traffic count at a second calibration location (AML1). The second location was chosen closer to Waterford – Tamborine Road to reduce the impact topography may have on the measured values. The traffic count was used in the computational model to predict noise emissions and compared against the measured values at the attended monitoring location (as shown in Table 20). The attended measurements were found to be within the ± 3.6 dB(A) accuracy tolerance when compared to the predicted values using the traffic count and thereby demonstrated the model was accurately predicting noise emissions generated along Waterford – Tamborine Road.

Table 20: Model Calibration

Receptor	Period	Noise Levels (dB(A))		Accuracy (dB(A))
		Predicted	Measured	
Initial Run				
NML2	$L_{Aeq, 1 hour}$	59.5	61.3	+1.8
	$L_{A10, 18 hour}$	64.3	60.2	-4.1
Second Run	$L_{Aeq, period}$	72.5	75.0	+2.5
AML1	$L_{A10, period}$	75.5	78.8	+3.2

AE found the uncalibrated model overpredicts by up to 4.1 dB(A) above the predicted values based on traffic count, this is 0.5 dB(A) above the acceptable tolerance range identified in Table 19. AE deemed the model to be accurately predicting road traffic noise emission. AE concluded the computational road traffic noise model was accurately predicting noise emissions based on the following reasoning:

- Initial computational modelling found the predicted results to be within the ± 3.6 dB(A) accuracy tolerance, after the software update to CadnaA the predicted results had changed to outside this tolerance range by a small amount (+0.5 dB(A) above tolerance);
- An attended road traffic noise measurement was taken at AML1 as a second reference calibration point and used in the model after the aforementioned software update. A road traffic count was conducted simultaneously and used to model accurately road noise emissions. The modelled road noise based on the traffic count and the measured noise levels at AML1 was within the acceptable tolerance range of ± 3.6 dB(A). This demonstrated the computational model was accurately modelling road traffic noise emissions generated on Waterford-Tamborine Road and therefore the computational model can be considered valid;
- The initial road traffic survey conducted at NML2 may have been influenced by site topography (elevated receptor compared to the road) and vegetation screening effects that could not be fully captured within the model; and
- The monitoring surveys occurred near a minor bend on Waterford-Tamborine Road, the bend in the road may have minor impacts on the speed of passing vehicles and subsequently have minor impacts on measured noise levels.

7.5 Road Traffic Noise Modelling Results

7.5.1 Internal Noise Levels

Road traffic noise levels were predicted at the locations of the external façades of all proposed noise sensitive spaces in order to determine the required façade noise reduction to achieve compliance in internal spaces. Façade noise levels at a height of 1.5 m, 4.5 m and 7.5m at the corresponding floor level were selected as this represents the likely exposure in the middle of the façade where glazed elements are located. The predicted noise contours at this height are presented in Appendix D.

The most noise-affected façade is the western façade fronting Waterford- Tamborine Road, with habitable rooms being most exposed.

The highest predicted noise levels at the external façade of the dwellings is 71 dB(A), thus requiring a façade reduction of 36 dB. To achieve compliance with the internal noise criteria, the habitable room facades must be designed to achieve a minimum R_W value based on the assigned MP4.4 Noise Category.

Table 21 presents the category of building materials required to achieve the necessary noise reduction at each unit, it is noted that some units require a higher category of building materials at elevated levels to achieve the necessary façade reduction levels as they are more exposed to road traffic noise.

The minimum R_W values for each relevant building component within each sensitive room based on the MP4.4 Noise Category is provided in Appendix B , along with suitable glazing recommendations to meet these values.

As windows and doors will need to be closed to achieve the internal noise criteria, it is recommended that mechanical ventilation be installed in habitable rooms. Any penetrations introduced into the façade because of mechanical ventilation systems should not compromise its acoustic integrity.

Table 21: Recommended Building Facade Materials

Receptor	Ground Floor	First Floor	Second Floor
Unit 1	Category 0	Category 0	Category 1
Unit 2	Category 0	Category 0	Category 1
Unit 3	Category 0	Category 0	Category 0
Unit 4	Category 0	Category 0	Category 0
Unit 5	Category 0	Category 0	Category 0
Unit 6	Category 0	Category 0	Category 0
Unit 7	Category 0	Category 1	Category 1
Unit 8	Category 0	Category 1	Category 1
Unit 9	Category 1	Category 1	Category 1
Unit 10	Category 1	Category 1	Category 1
Unit 11	Category 1	Category 1	Category 1
Unit 12	Category 1	Category 1	Category 1
Unit 13	Category 0	Category 0	Category 0
Unit 14	Category 0	Category 0	Category 0
Unit 15	Category 0	Category 0	Category 0
Unit 16	Category 0	Category 0	Category 0
Unit 17	Category 0	Category 0	Category 1
Unit 18	Category 0	Category 0	Category 1
Unit 19	Category 0	Category 0	Category 0
Unit 20	Category 0	Category 0	Category 0
Unit 21	Category 0	Category 0	Category 1
Unit 22	Category 0	Category 0	Category 1
Unit 23	Category 0	Category 1	Category 1
Unit 24	Category 0	Category 1	Category 1
Unit 25	Category 1	Category 1	Category 1
Unit 26	Category 1	Category 1	Category 1
Unit 27	Category 0	Category 1	Category 1

Unit 28	Category 0	Category 0	Category 1
Unit 29	Category 0	Category 0	Category 1
Unit 30	Category 0	Category 0	Category 0
Unit 31	Category 0	Category 0	Category 0
Unit 32	Category 0	Category 0	Category 1
Unit 33	Category 0	Category 0	Category 1
Unit 34	Category 2	Category 2	Category 2
Unit 35	Category 2	Category 2	Category 2
Unit 36	Category 2	Category 2	Category 2
Unit 37	Category 2	Category 2	Category 2
Unit 38	Category 2	Category 2	Category 2
Unit 39	Category 2	Category 2	Category 2
Unit 40	Category 2	Category 2	Category 3
Unit 41	Category 2	Category 2	Category 3
Unit 42	Category 2	Category 2	Category 3
Unit 43	Category 2	Category 2	Category 3
Unit 44	Category 2	Category 2	Category 3
Unit 45	Category 2	Category 2	Category 3
Unit 46	Category 2	Category 3	Category 3
Unit 47	Category 2	Category 3	Category 3
Unit 48	Category 2	Category 3	Category 3
Unit 49	Category 2	Category 3	Category 3
Unit 50	Category 3	Category 3	Category 3

Notes: Building Material Categories as per MP4.4 SCHEDULE 1 to 3 - MINIMUM R_W REQUIREMENTS

7.5.2 External Building Façade Levels

Road traffic noise levels were predicted at the locations of each individual dwelling within the proposed development, noise levels were reviewed at heights at 1.5 m, 4.5 m and 7.5m to account for ground, first and second floor receptors. This section demonstrates the maximum noise levels expected at the façade of each dwelling. The model considers a +2.5 dB façade correction to account for façade effects in line with common industry practice.

Dwellings located along the western boundary of the Subject Site are closer to the road and therefore more highly affected by road traffic noise generated on Waterford-Tamborine Road. The computational mode predicted $L_{A10,\,18\ hours}$ noise levels at units along the western boundary (Units 34 – 50) to exceed the 63 dB(A) criterion by 0 - 10 dB The highest façade noise levels were 73 dB at the most affected receptor (Second floor of Unit 50).

It is notable that while minor exceedances predicted at the ground floor receptors may be controlled by an acoustic barrier/ fencing on the perimeter of the dwellings, the fencing will have little effect at mitigating noise at elevated receptors (first and second floor receptors). It is not a practical solution to increase the size of the acoustic barrier without causing impacts to visual amenity and daylight access. Where acoustic treatments in the form of acoustic barriers are not reasonable or practical to implement, acoustic mitigation at the façade of the building provides an alternative acoustic treatment to meet the intent of the external building façade criteria.

While exceedances were predicted at first and second floor receptor external facades of units 34 - 50 the sensitive internal spaces will be controlled by upgraded façade materials. In AE's professional opinion the upgraded external façade materials identified in the architectural plans will ensure the sensitive spaces are sufficiently protected, as such with the recommended mitigation measures implemented, the townhouse development will meet the intent of the external façade criteria.

The units located in the central portion and eastern portion of the Subject Site are shielded by the buildings on the western boundary (Units 34 - 50) and therefore all remaining dwellings (units 1-33) are predicted to be compliant at the external façade .

With the acoustic mitigation measures used to control internal noise levels implemented, the intent of the external façade criteria will be met and acoustic amenity for the sensitive receptors will be protected.

The predicted noise contours are presented in Appendix C.

7.5.3 External Open Space Levels

The site plans demonstrate the individual dwellings have private open outdoor spaces close that need to be considered. Road traffic noise levels were predicted at the locations of each private open space. Noise levels were reviewed at heights at 1.5 m to account for open spaces located on the ground floor.

Dwellings located along the western boundary of the Subject Site are closer to the road and therefore more highly affected by road traffic noise generated on Waterford-Tamborine Road. The computational mode predicted $L_{A10,\,18\ hours}$ noise levels at units along the western boundary (Units 34 – 50) to exceed the 63 dB(A) criterion by 0 - 3 dB The highest noise levels were 63 dB at the most affected receptor (Unit 50).

The units located in the central portion and eastern portion of the Subject Site are shielded by the buildings on the western boundary and were predicted to be compliant at the relevant open spaces for all other units (Units 1 - 33) within the Subject Site. It is noted that the private open spaces of Units 34 - 50, located closest to the western boundary of the Subject Site, are predicted to exceed the applicable open space criteria. These predictions include the effect of the existing 1.8 m acoustic barrier along the western frontage of these units. Increasing the height of this barrier is not considered practical due to potential negative visual amenity impacts.

While minor exceedances of 0 - 3 dB are identified, it should be noted that the noise model applies a conservative annual road traffic growth rate of 5.72 % p.a. Exceedances of this magnitude are generally considered negligible to marginal and are unlikely to be perceptible to an average listener. Given the visual constraints associated with increasing barrier height, no further increases to the barrier extent is recommended. In AE's opinion, the minor exceedances at the private open spaces of Units 34 - 50 are acceptable and are not expected to result in adverse acoustic amenity impacts.

The Technical Specification Transport and Main Roads Specification MRTS15 Noise Fences identifies that an acoustic barrier must achieve a minimum surface density at air dry moisture content (excluding structural components) of 15kg / m^2. Acoustic barriers identified at the frontage of Units 34-50 are required to reach a minimum surface density of 15kg/m^2 to ensure they are effective barriers to control road traffic noise intrusion at the ground level where the private open spaces are located.

The predicted noise contours are presented in Appendix C.

8 CONCLUSION

TLPC is seeking development consent for a Material Change of Use (MCU) to construct, operate and maintain a 50-townhouse development at 173 – 181 Old Logan Village Road, Waterford QLD, as well as on part of 183 – 203 Old Logan Village Road. An investigation of the operational impacts of the private sewer pump station and a road traffic noise impact assessment of noise intrusion generated along the adjacent State Road has been prepared to support the Development Consent.

Environmental noise data has been referenced to derive the existing traffic noise levels and compared against the available traffic data census provided to ensure accuracy in modelling.

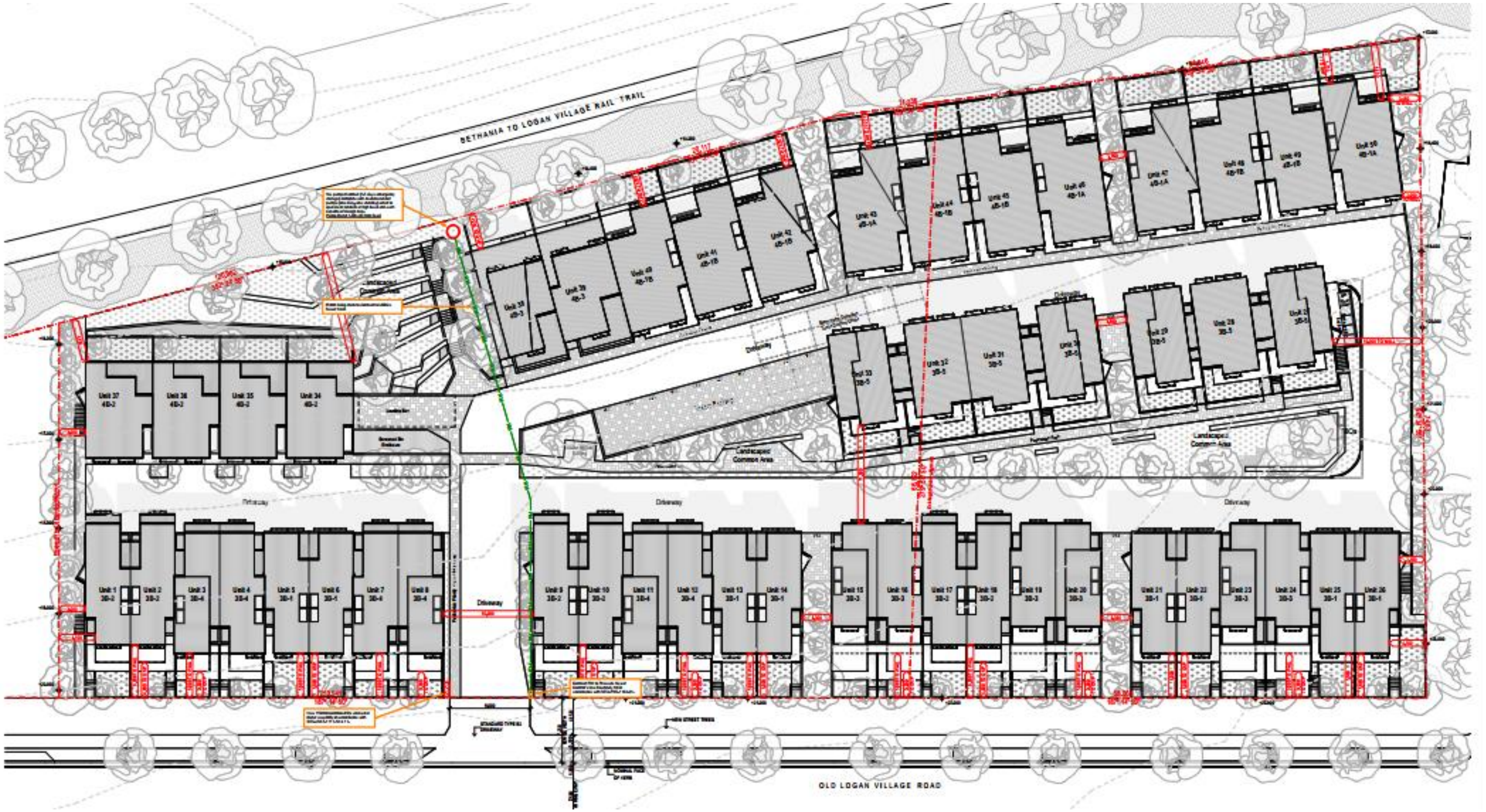
AE conducted an operational acoustic impact assessment of the private sewer pump station located within the Subject Site to assess potential acoustic impacts it may have on townhouse dwellings within the Subject Site and nearby sensitive receptors. AE found the noise impacts of the private sewer pump station could be mitigated using a standard acoustic enclosure or placing the pumps below ground with a sealed access hatch. With the proposed acoustic mitigation implemented the private sewer pump station will not cause adverse acoustic amenity impacts and the proposed private sewer pump location is considered acceptable.

A detailed assessment of road traffic noise intrusion over a future 10-year planning period has been conducted, and suitable noise mitigation measures to preserve amenity in both internal and external areas have been provided.

AE acknowledges that some minor exceedances (0 – 3 dB) above the applicable criteria were predicted for the private open spaces of Units 34 - 50, though AE considers minor exceedances of this magnitude to be acceptable given the development is implementing acoustic mitigation in the form of acoustic barriers . It is further noted that the computational model considers a conservative annual growth rate of 5.72% p and the computational model was demonstrated to slightly over predict the results based on the calibration scenario.

Where the above recommendations are adopted, AE considers the development to be suitable for the Subject Site and unlikely to cause adverse noise amenity impacts for the development The risk of adverse noise amenity impacts as a result of the proposed development is low.

APPENDIX A: PROPOSED DEVELOPMENT PLANS



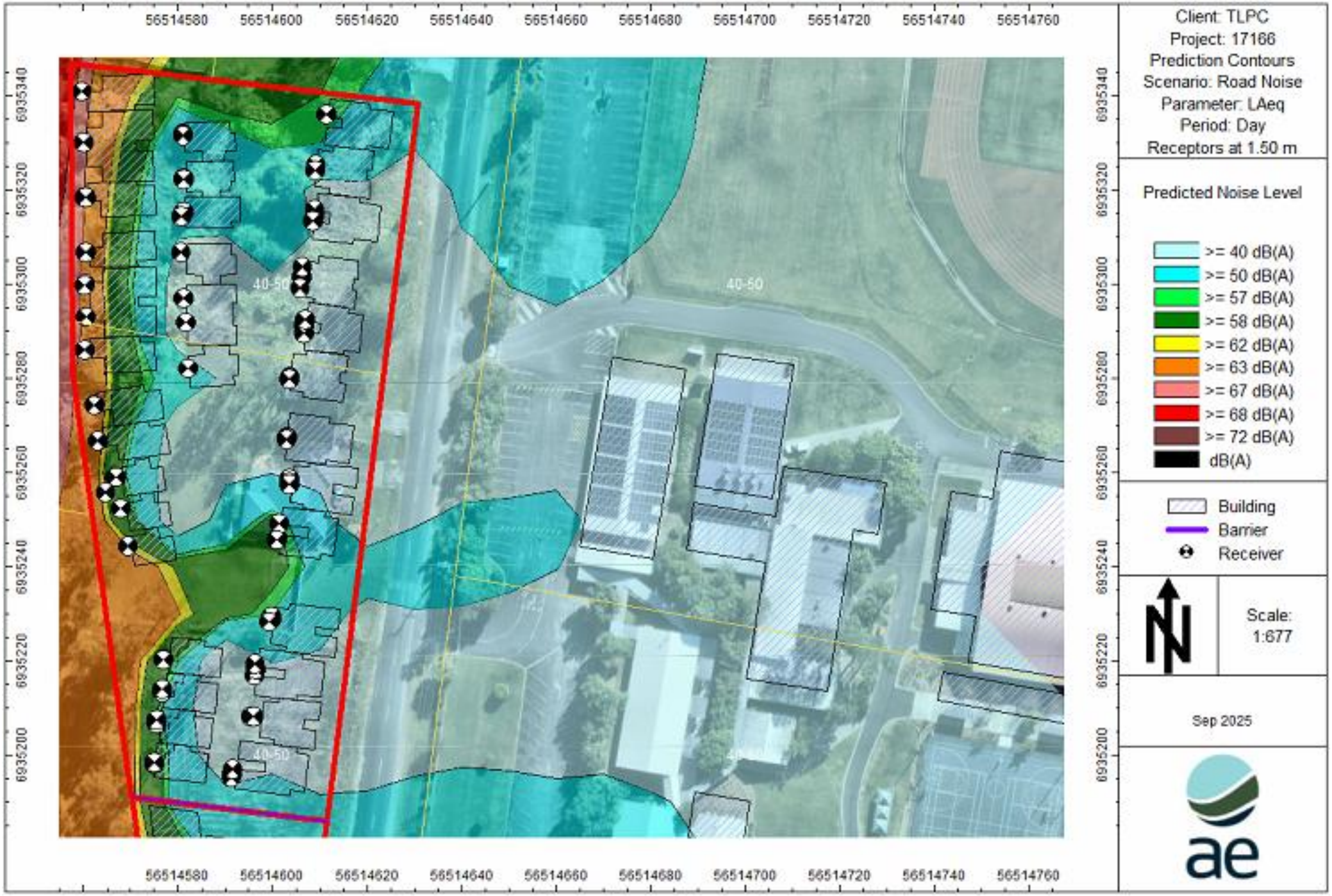
APPENDIX B: MP4.4 SCHEDULE 1 to 3 - MINIMUM R_W REQUIREMENTS

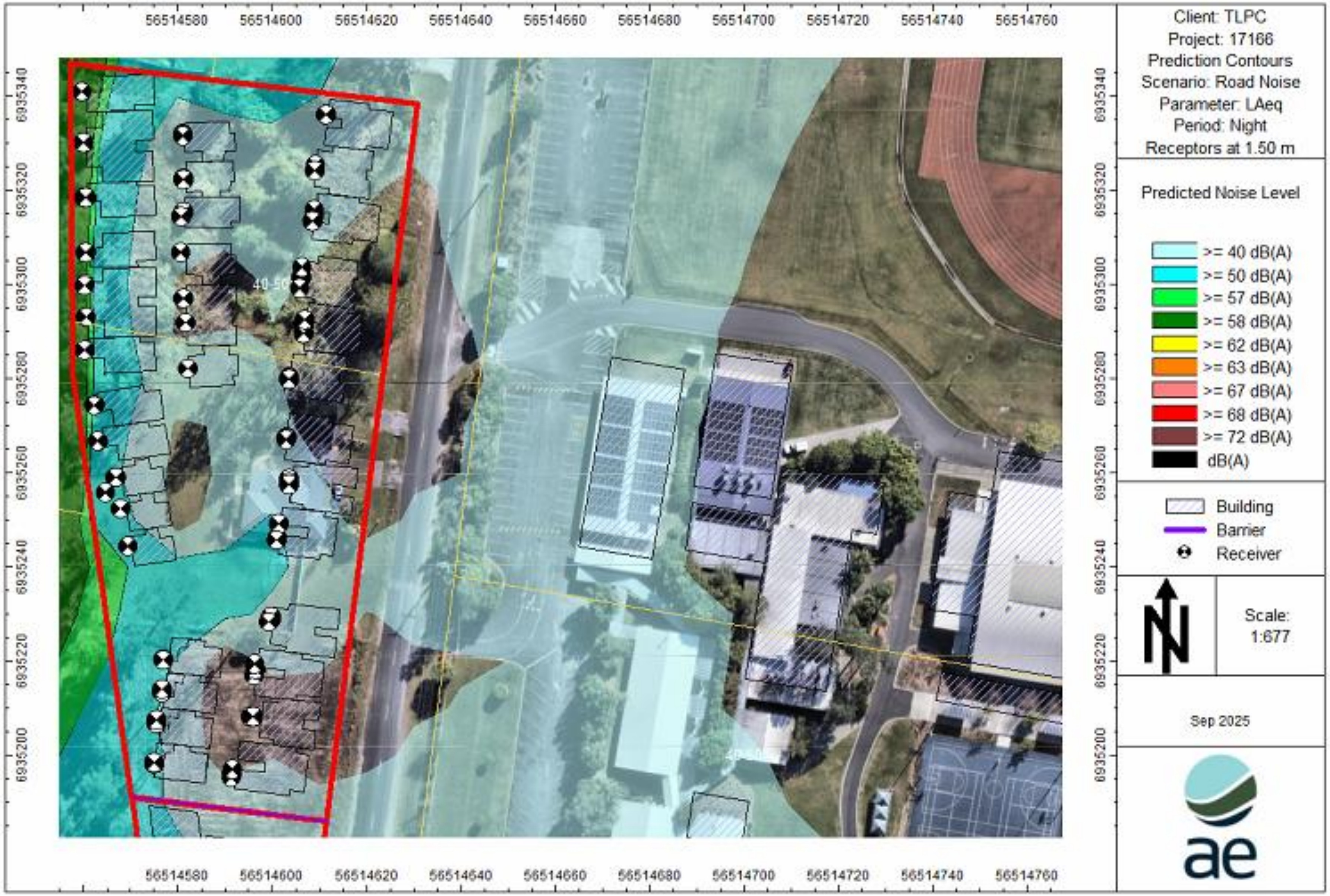
Noise Category	Minimum transport noise reduction (dB (A)) required for habitable rooms	Component of building's external envelope	Minimum R_W required for each component
Category 3	35	Glazing	38 (where total area of glazing for a habitable room is greater than 1.8m^2) 35 (where total area of glazing for a habitable room is less than or equal to 1.8m^2)
		External Walls	47
		Roof	41
		Floors	45
		Entry Doors	33
Category 2	30	Glazing	35 (where total area of glazing for a habitable room is greater than 1.8m^2)
			32 (where total area of glazing for a habitable room is less than 1.8m^2)
		External walls	41
		Roof	38
		Floors	45
		Entry doors	33
Category 1	25	Glazing	27 (where total area of glazing for a habitable room is greater than 1.8m^2)
			24 (where total area of glazing for a habitable room is less than 1.8m^2)
		External walls	35
		Roof	35
		Entry doors	28

Noise Category	Minimum transport noise reduction (dB (A)) required for habitable rooms	Component of building's external envelope	Minimum R_W required for each component
Category 0	No additional acoustic treatment required - standard building assessment provisions apply.		

Component of building's external envelope	Minimum R_W	Acceptable forms of construction
Glazing	35	Minimum 10.38mm thick laminated glass, with full perimeter acoustically rated seals.
	32	Minimum 6.38mm thick laminated glass with full perimeter acoustically rated seals.
	27	Minimum 4mm thick glass with full perimeter acoustically rated seals
	24	Minimum 4mm thick glass with standard weather seals

APPENDIX C: Noise Contours (LA10)APPENDIX D: NOISE CONTOURS (LA_{eq})





Client: TLPC
Project: 17166
Prediction Contours
Scenario: Road Noise
Parameter: LAeq
Period: Night
Receptors at 1.50 m
Predicted Noise Level
>= 40 dB(A)
>= 50 dB(A)
>= 57 dB(A)
>= 58 dB(A)
>= 62 dB(A)
>= 63 dB(A)
>= 67 dB(A)
>= 68 dB(A)
>= 72 dB(A)
dB(A)
Building
Barrier
Receiver
N
Scale: 1:677
Sep 2025
56514580
56514600
56514620
56514640
56514660
56514680
56514700
56514720
56514740
56514760
6935340
6935320
6935300
6935280
6935260
6935240
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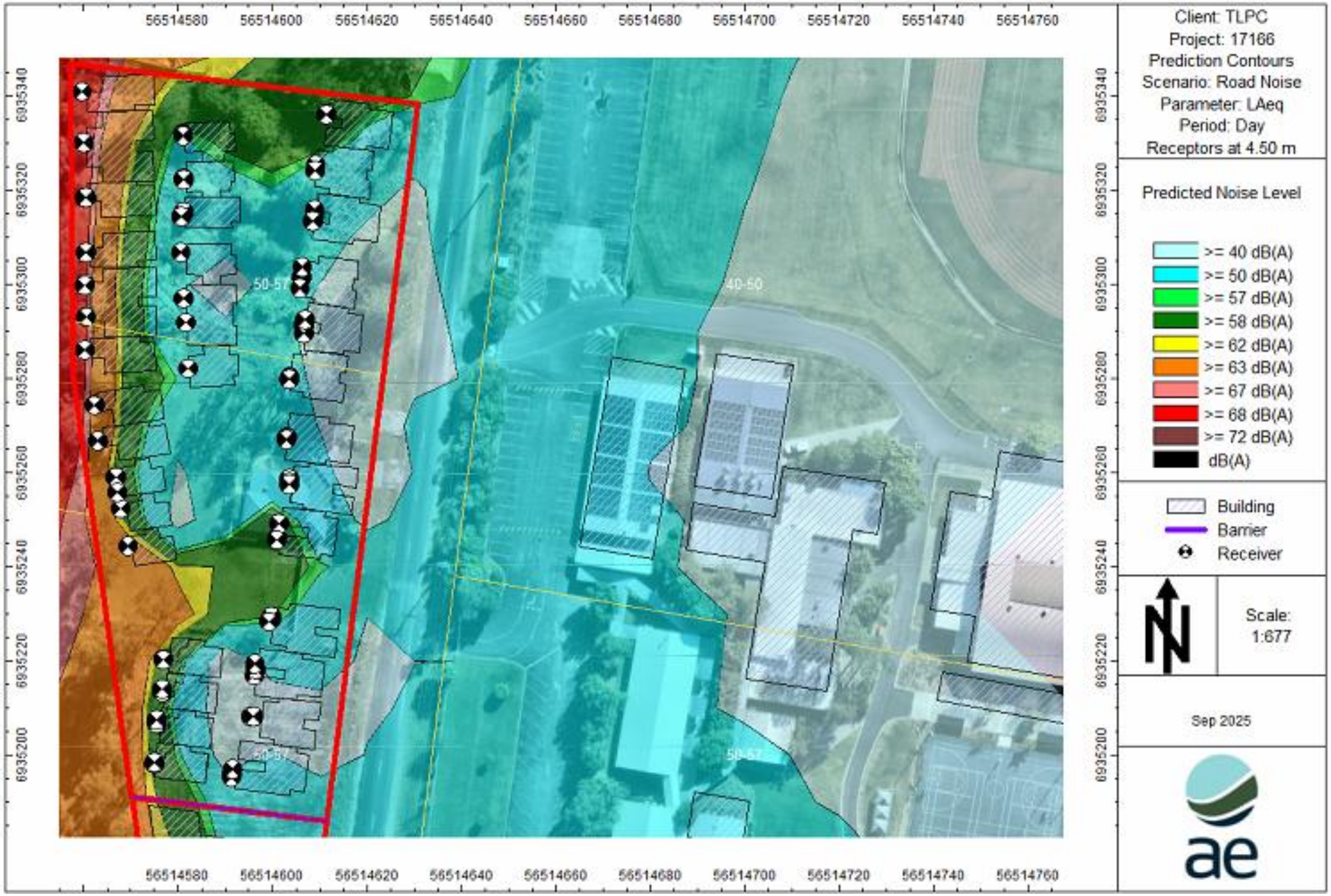

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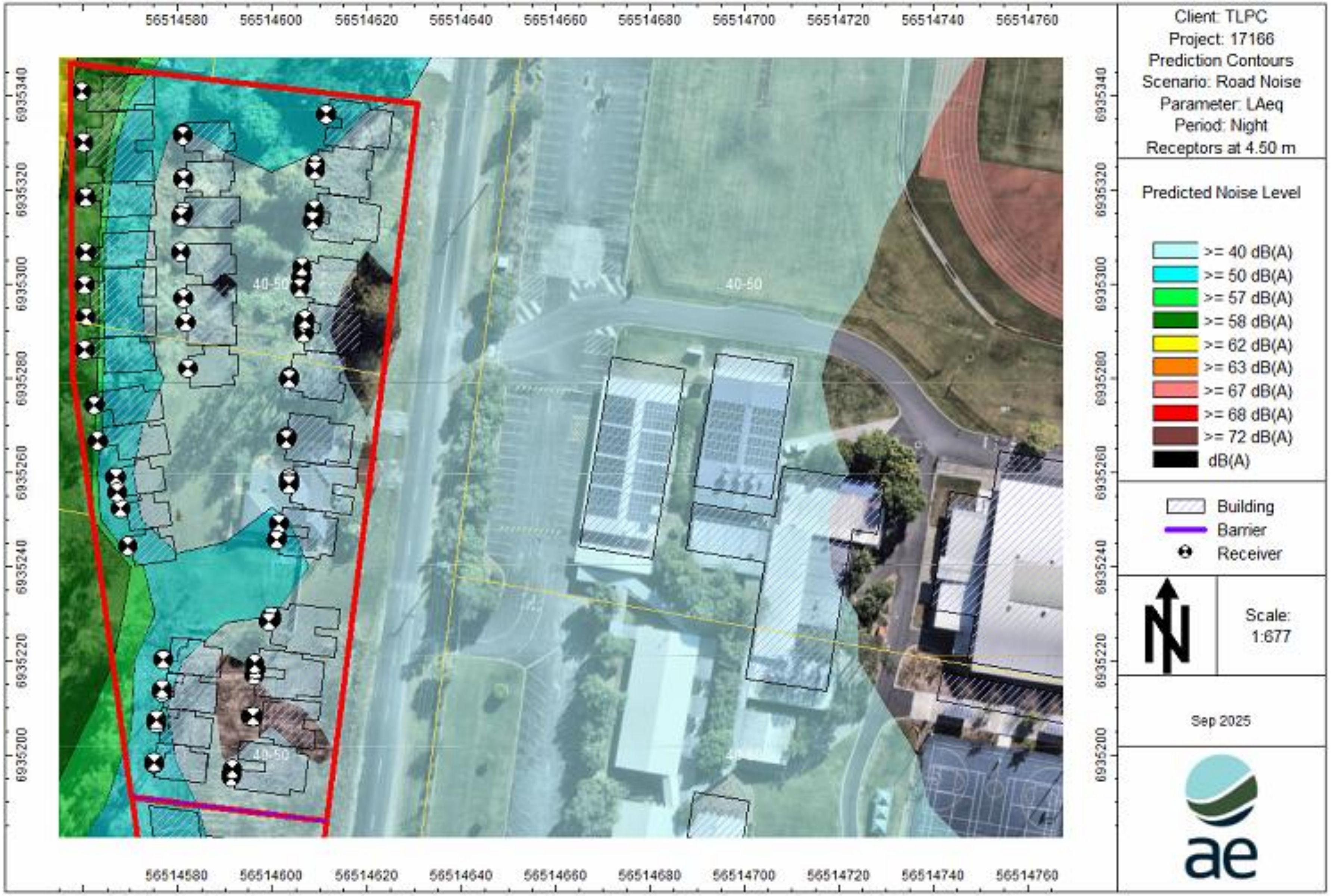
6935220
6935200
50-57
40-50
50-57
50-57
Client: TLPC
Project: 17166
Prediction Contours
Scenario: Road Noise
Parameter: LAeq
Period: Day
Receptors at 4.50 m
Predicted Noise Level
>= 40 dB(A)
>= 50 dB(A)
>= 57 dB(A)
>= 58 dB(A)
>= 62 dB(A)
>= 63 dB(A)
>= 67 dB(A)
>= 68 dB(A)
>= 72 dB(A)
dB(A)
Building
Barrier
Receiver
Scale:
1:677
Sep 2025



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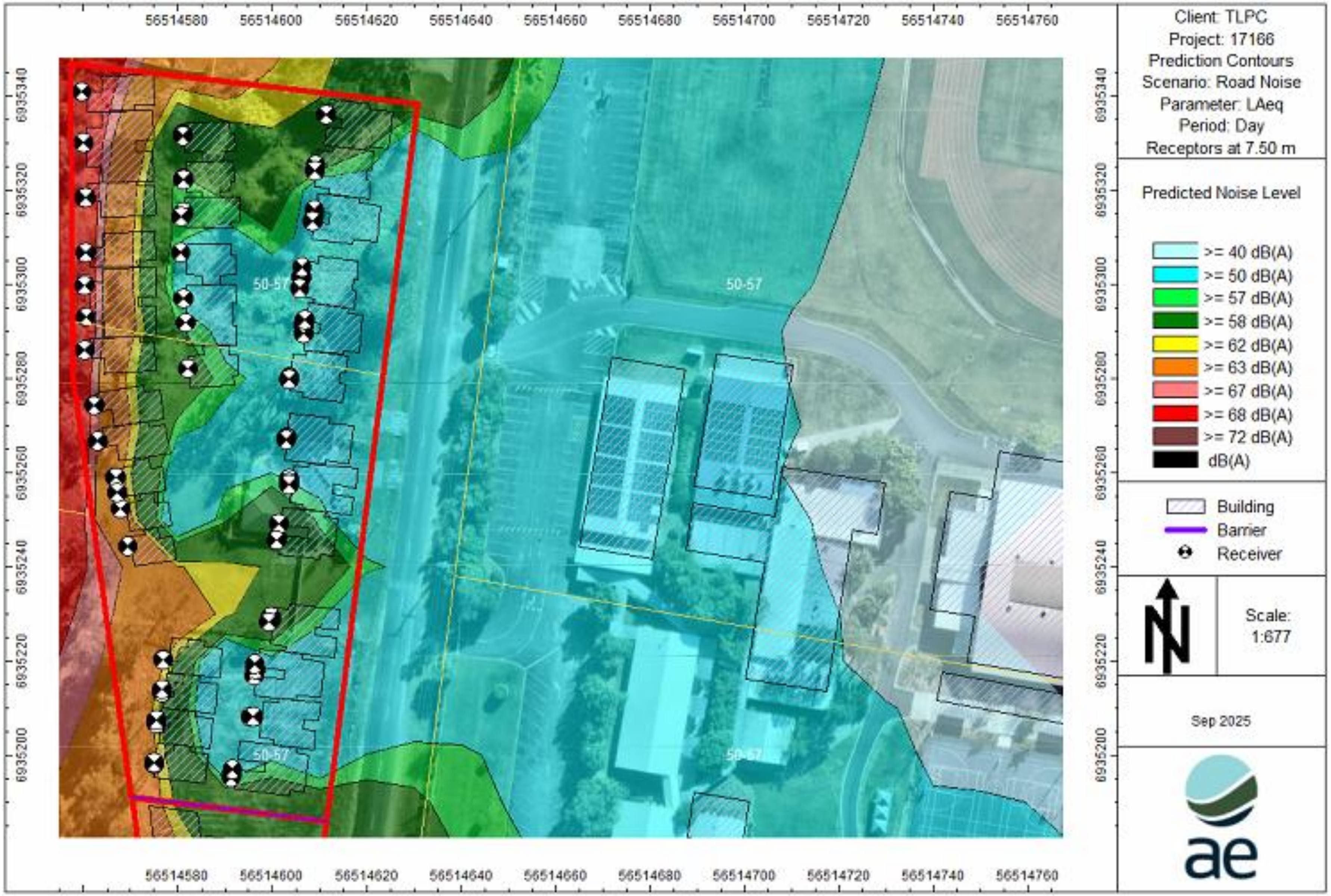
6935260
6935240
6935220
6935200
40-50
Client: TLPC
Project: 17166
Prediction Contours
Scenario: Road Noise
Parameter: LAeq
Period: Night
Receptors at 4.50 m
Predicted Noise Level
>= 40 dB(A)
>= 50 dB(A)
>= 57 dB(A)
>= 58 dB(A)
>= 62 dB(A)
>= 63 dB(A)
>= 67 dB(A)
>= 68 dB(A)
>= 72 dB(A)
dB(A)
Building
Barrier
Receiver
Scale:
1:677
Sep 2025



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6935260
6935240
6935220
6935200
50-57
Client: TLPC
Project: 17166
Prediction Contours
Scenario: Road Noise
Parameter: LAeq
Period: Day
Receptors at 7.50 m
Predicted Noise Level
>= 40 dB(A)
>= 50 dB(A)
>= 57 dB(A)
>= 58 dB(A)
>= 62 dB(A)
>= 63 dB(A)
>= 67 dB(A)
>= 68 dB(A)
>= 72 dB(A)
dB(A)
Building
Barrier
Receiver
N
Scale:
1:677
Sep 2025
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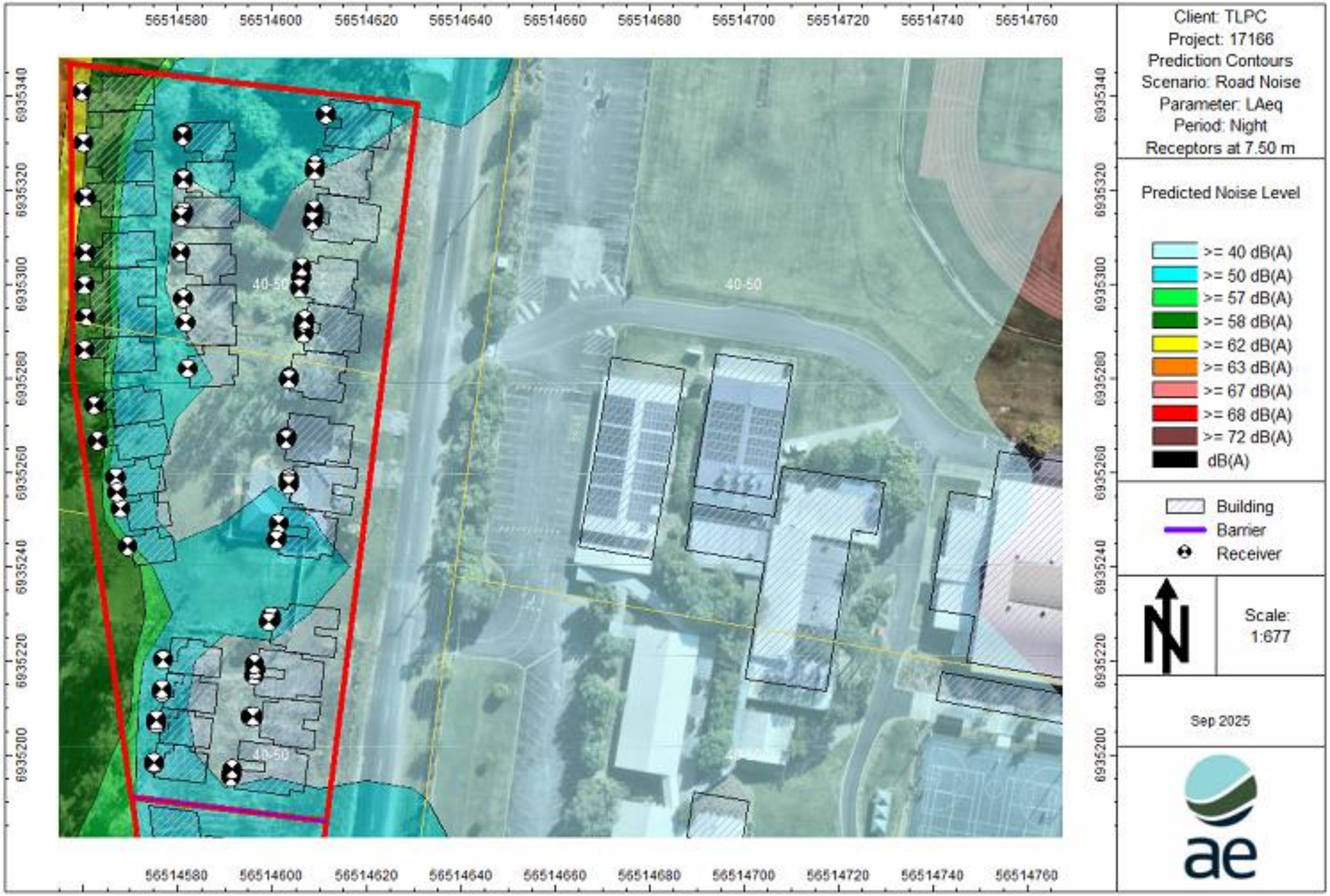
Client: TLPC
Project: 17166
Prediction Contours
Scenario: Road Noise
Parameter: LAeq
Period: Night
Receptors at 7.50 m
Predicted Noise Level
>= 40 dB(A)
>= 50 dB(A)
>= 57 dB(A)
>= 58 dB(A)
>= 62 dB(A)
>= 63 dB(A)
>= 67 dB(A)
>= 68 dB(A)
>= 72 dB(A)
dB(A)
Building
Barrier
Receiver
Scale:
1:677
Sep 2025
40-50
56514580
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