# Appendix L

## NOISE AND VIBRATION ASSESSMENT

Blackett Acoustics

Noise & Vibration Consultants

COWRA BYPASS

# CONSTRUCTION AND OPERATIONAL ROAD TRAFFIC NOISE AND VIBRATION ASSESSMENT

Report No BA141002
Version B

July 2015

Prepared
for

Geolyse Pty Ltd
154 Peisley Street
ORANGE, NSW 2800

Association of Australian Acoustical Consultants

**Blackett Acoustics is an AAAC Member Firm Since 2014**

TABLE OF CONTENTS

## GLOSSARY

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are defined below.

Maximum Noise Level ($L_{Amax}$) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

$L_{A1}$ – The $L_{A1}$ level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the $L_{A1}$ level for 99% of the time.

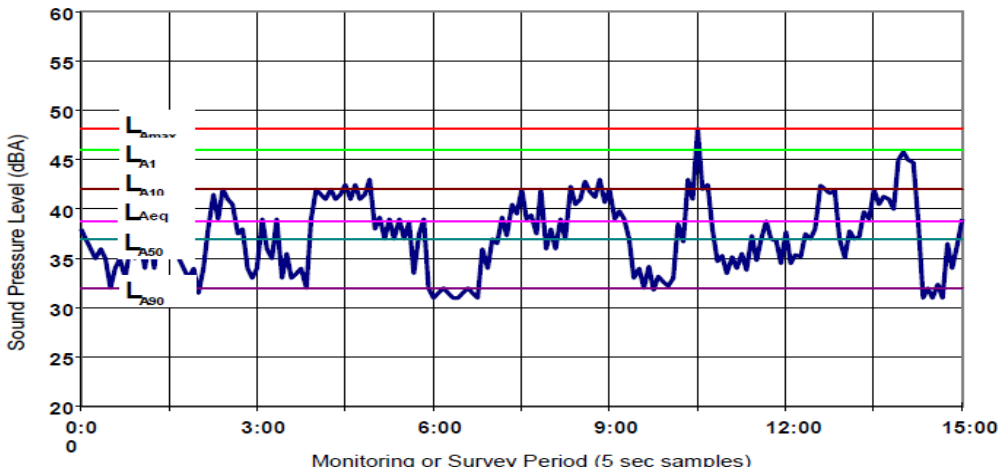
$L_{A10}$ – The $L_{A10}$ level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the $L_{A10}$ level for 90% of the time. The $L_{A10}$ is a common noise descriptor for environmental noise and road traffic noise.

$L_{Aeq}$ – The equivalent continuous sound level ($L_{Aeq}$) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

$L_{A90}$ – The $L_{A90}$ level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the $L_{A90}$ level for 10% of the time. This measure is commonly referred to as the background noise level.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10$^{th}$ percentile (lowest 10$^{th}$ percent) background level ($L_{A90}$) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.



# 1 INTRODUCTION

The Cowra Council has adopted Option 3 of GHD's report entitled "Cowra Shire Council - Cowra Heavy Vehicle Bypass Study Final Report" dated June 2013 as the preferred heavy vehicle bypass route.

The approximate length of work is 8,400m with a single lane in each direction. The Cowra Heavy Vehicle Bypass (CHVB) aimed to reduce heavy vehicle traffic passing through Cowra by providing a route linking Mid Western Highway at Campbell Street, skirting to the southern of the railway and connecting to Grenfell Road via Airport Road.

Figure 1-1 presents an aerial with the indicative proposed CHVB route and the identified study area for this Project. The study area north of the proposed CHVB route has been identified based on a 2dBA contour line generated using the 2dB increase screening principle contained in Roads and Maritime Services (RMS) document entitled Noise Criteria Guideline (NCG). This approach was adopted as the receivers located north of the proposed CHVB are also influenced by traffic noise from the Mid Western Highway.

The assessment corridor south of the proposed CHVB has been extended to at least 600m away from the proposed CHVB alignment. This approach is also consistent with the NCG.

**Figure 1-1 Aerial of Project Site**


Blackett Acoustics has been commissioned by Cowra Shire Council to provide an assessment of the noise and vibration impacts associated with construction and operation of the CHVB project.

The potential noise and vibration impacts of the CHVB project can be separated as follows:

- Noise and vibration impact on surrounding areas during the construction phase of the project due to the building of the new road and ancillary works; and
- Noise impacts on surrounding areas during the operational phase of the project after commissioning due to changed road traffic conditions.

The purpose of the report is to identify surrounding noise sensitive receivers and establish noise and vibration level criteria which are based on the following guidelines:

- NSW Environment Protection Agency (EPA) - The Road Noise Policy (RNP)
- Roads and Maritime Services (RMS) - Noise Criteria Guideline (NCG)
- Roads and Maritime Services (RMS) - Noise Mitigation Guideline (NMG)
- NSW Environment Protection Agency (EPA) - The *Interim Construction Noise Guidelines* (ICNG)

## 2 EXISTING ACOUSTIC ENVIRONMENT

Ambient noise monitoring was conducted, using unattended noise loggers, in order to characterise the existing noise environment adjacent to the project corridor (in relation to both the construction and operational noise assessments) and to establish the noise levels upon which to base the noise emission objectives. Environmental noise monitoring was performed at 3 representative locations along the length of CHVB project corridor.

These locations have been selected based on a detailed inspection of potentially affected areas, giving considerations to other noise sources which may adversely influence the measurements, security issues for the noise monitoring devices and gaining permission for access from the residents or landowner. The noise measurement data is also used to calibrate the traffic noise model. The address of the monitoring locations are as below:

- **Location 1, 121 Waratah Street:** Noise logger was deployed in the front yard with full angle of view to the Airport Road. The setback distance is approximately 20m from the nearest kerbside.
- **Location 2, 29 Fishburn Street:** Noise logger was deployed In the backyard of this property for the purpose of establishing the existing ambient noise level only. The existing through traffic along this section of road is minimal and restricts to local traffic only.
- **Location 3, 37 Campbell Street:** Noise logger was deployed In the front yard next to the main gate with full angle of view to the existing road. The setback distance is approximately 40m from the nearest kerbside.

The monitoring was conducted between Tuesday, 28 April 2015 and Tuesday, 5 May 2015. The measurements were conducted at a height of 1.5m above ground and in free field positions.

Figure 2-1 to Figure 2-3 present aerial photos indicating the unattended noise loggers placement positions at the respective monitored locations.

**Figure 2-1 Monitoring Location 1 - 119-121 Waratah Street**

**Figure 2-2 Monitoring Location 2 - 29 Fishburn Street**


**Figure 2-3 Monitoring Location 3 - 37 Campbell Street**


All noise measurement instrumentation used in the surveys were designed to comply with the requirements of AS 1259.2-1990 *"Acoustics – Sound Level Meters. Part 2: Integrating – Averaging"* and carried appropriate and current NATA

calibration certificates. The equipment used for the continuous unattended noise surveys comprised Inforbyte Environmental Noise Loggers.

The calibration of the loggers at each receiver locations were checked prior to, and following, each measurement survey and the variation in calibration was found not to exceed 0.5 dB at any location.

All noise loggers were set to record statistical noise descriptors in continuous 15-minute sampling periods for the duration of their deployment. Weather data recorded during the noise monitoring survey was used to assist in identifying potentially adverse weather conditions that could have a detrimental impact on the measured noise levels such as rainy periods, etc.

Table 2-1 summarises the measured $L_{Aeq}$ noise levels. these are assumed to represent road noise in all cases. This data is used to verify and calibrate the road traffic noise model.

**Table 2-1 Summary of Measured Road Traffic Noise Levels**

| Identified Receiver Location | Measured $L_{Aeq}$ Noise Level (dBA) | |
|---|---|---|
| | Daytime $L_{Aeq,15hr}$ | Night Time $L_{Aeq,9hr}$ |
| Location 1 - 119-121 Waratah St | 47.3 | 38.0 |
| Location 3 - 37 Campbell St | 50.5 | 41.4 |

Table 2-2 presents the background noise levels derived from the ambient noise data for the purpose of establishing the construction noise objectives. These are in terms of the Rating Background Level (RBL), which is a measure of background noise defined in the *Industrial Noise Policy* (*INP*), (EPA, 2000).

**Table 2-2 Summary of Measured RBL Noise Levels**

| Identified Receiver Location | Measured RBL Noise Level (dBA) | | |
|---|---|---|---|
| | Daytime | Evening | Night Time |
| **Location 1 -** 119-121 Waratah St | 31 | 28 | 24 |
| **Location 2 -** 39 Fishburn St | 35 | 33 | 24 |
| **Location 3 -** 37 Campbell St | 37 | 31 | 25 |

Note: Background noise levels above are Rating Background Noise Levels based on procedures contained within the *Industrial Noise Policy (INP), (EPA,2000)*; and Daytime (7.00 am-6.00 pm), Evening (6.00 pm-10.00 pm) and Night time (10.00 pm-7.00 am).

# 3 NOISE CRITERIA

This section of the report establishes site specific noise criteria.

## 3.1 Road Traffic Noise

### 3.1.1 Residences

Criteria for assessment of road traffic noise are set out in the NSW Government's *Road Noise Policy (RNP)*. The RMS has also published the Noise Criteria Guideline (NCG) and Noise Mitigation Guideline (NMG) to assist in implementing the *RNP*.

Under the *RNP*, road developments are classified as either "new road" or "redevelopment of an existing road". For all noise-sensitive locations considered in this project, the proposed CHVB would be classified as a *"new road*" as the proposed road project changes the functional class of the existing local road to collector/sub-arterial road

Table 3-1 sets out the assessment criteria for residences to be applied to particular types of project, road category and land use.

**Table 3-1 Assessment Criteria for Operational Traffic Noise - Residences**

| Road Category | Type of Project/ Land Use | Assessment Criteria | |
|---|---|---|---|
| | | **Daytime (7.00am-10.00pm)** | **Night Time (10.00pm-7.00am)** |
| Freeway/arterial/sub-arterial roads | Existing residences affected by noise from **new** freeway/arterial/sub-arterial roads | $L_{Aeq,15hour}$ 55dBA (external) | $L_{Aeq,9hour}$ 50dBA (external) |

In applying Table 3-1, the predicted traffic noise level is to be assessed at two times:

- The noise level immediately after opening of the project is to be compared with the noise level under existing conditions immediately before opening; and
- The noise levels 10 years after opening is to be compared with the noise level at the same time period under a "no build" scenario - that is, allowing for any organic traffic growth that would have occurred in the absence of the project.

In response to a submission during a session of public consultation on Wednesday, 6 May 2015, noise levels for 20 years after opening will be assessed instead of 10 years after opening.

In addition to the assessment criteria outlined in Table 3-1, any increase in the total traffic noise level at a location due to the proposed project or traffic-generating development must be considered.

Residences experiencing increases in total traffic noise level above the relative increase criteria in Table 3-2 should also be considered for mitigation.

**Table 3-2 Relative Increase Criteria for Residential Land Uses**

| Road Category | Type of Project/Development | Assessment Criteria | |
|---|---|---|---|
| | | Daytime (7.00am-10.00pm) | Night Time (10.00pm-7.00am) |
| Freeway/arterial/sub-arterial roads and transitways | New road corridor/redevelopment of existing road/land use development with the potential to generate additional traffic on existing road | Existing traffic $L_{Aeq,15hour}$ +12dB (external) | Existing traffic $L_{Aeq,9hour}$ +12dB (external) |

### 3.1.2 Other Noise Sensitive Receivers

Road traffic noise criteria for other (non-residential) noise sensitive receivers are summarised in Table 3-3.

**Table 3-3 Road Traffic Noise Criteria for Non-Residential Sensitive Land Uses**

| Existing sensitive land use | Assessment criteria – dB(A) | | Additional considerations |
|---|---|---|---|
| | Day (7am–10pm) | Night (10pm–7am) | |
| 1. School classrooms | $L_{Aeq,\ (1\ hour)}$ 40 (internal) | – | In the case of buildings used for education or health care, noise level criteria for spaces other than classrooms and wards may be obtained by interpolation from the 'maximum' levels shown in Australian Standard 2107:2000 (Standards Australia 2000). |
| 2. Hospital wards | $L_{Aeq,\ (1\ hour)}$ 35 (internal) | $L_{Aeq,\ (1\ hour)}$ 35 (internal) | |
| 3. Places of worship | $L_{Aeq,\ (1\ hour)}$ 40 (internal) | $L_{Aeq,\ (1\ hour)}$ 40 (internal) | The criteria are internal, i.e. the inside of a church. Areas outside the place of worship, such as a churchyard or cemetery, may also be a place of worship. Therefore, in determining appropriate criteria for such external areas, it should be established what is in these areas that may be affected by road traffic noise.<br>For example, if there is a church car park between a church and the road, compliance with the internal criteria inside the church may be sufficient. If, however, between the church and the road are areas where outdoor services may take place such as weddings and funerals, external criteria for these areas are appropriate. As issues such as speech intelligibility may be a consideration in these cases, the passive recreation criteria (see point 5) may be applied. |
| 4. Open space (active use) | $L_{Aeq,\ (15\ hour)}$ 60 (external) when in use | – | Active recreation is characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion.<br>Passive recreation is characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, e.g. playing chess, reading.<br>In determining whether areas are used for active or passive recreation, the type of activity that occurs in that area and its sensitivity to noise intrusion should be established. For areas where there may be a mix of passive and active recreation, e.g. school playgrounds, the more stringent criteria apply. Open space may also be used as a buffer zone for more sensitive land uses. |
| 5. Open space (passive use) | $L_{Aeq,\ (15\ hour)}$ 55 (external) when in use | – | |

**Table 3-3 (cont) Road Traffic Noise Criteria for Non-Residential Sensitive Land Uses**

| Existing sensitive land use | Assessment criteria – dB(A) | | Additional considerations |
|---|---|---|---|
| | Day (7am–10pm) | Night (10pm–7am) | |
| 6. Isolated residences in commercial or industrial zones | – | – | For isolated residences in industrial or commercial zones, the external ambient noise levels can be higher than those in residential areas. Internal noise levels in such residences are likely to be more appropriate in assessing any road traffic noise impacts, and the proponent should determine suitable internal noise level targets, taking guidance from Australian Standard 2107:2000 (Standards Australia 2000). |
| 7. Mixed use development | – | – | Each component of use in a mixed use development should be considered separately.<br>For example, in a mixed use development containing residences and a child care facility, the residential component should be assessed against the appropriate criteria for residences and the child care component should be assessed against the appropriate criteria for child care facilities. |
| 8. Child care facilities | Sleeping rooms $L_{Aeq,\ (1\ hour)}$ 35 (internal)<br>Indoor play areas $L_{Aeq,\ (1\ hour)}$ 40 (internal)<br>Outdoor play areas $L_{Aeq,\ (1\ hour)}$ 55 (external) | – | Multipurpose spaces, e.g. Shared indoor play/sleeping rooms should meet the lower of the respective criteria.<br>Measurements for sleeping rooms should be taken during designated sleeping times for the facility, or if these are not known, during the highest hourly traffic noise level during the opening hours of the facility. |
| 9. Aged care facilities | – | – | Residential land use noise assessment criteria should be applied to these facilities, see **Table 3**. |

Note: Land use developers must meet internal noise goals set for sensitive developments alongside busy roads in the Infrastructure SEPP.

## 3.2 Airborne Construction Noise

The *NSW Interim Construction Noise Guideline (ICNG)* presents the process to assess construction in NSW. The *ICNG* was developed by taking into consideration that construction is temporary, noisy and difficult to ameliorate. As such, the *ICNG* was developed to focus on applying a range of work practices most suited to minimising construction noise impacts, rather than focusing only on achieving a numeric noise level. The *ICNG* recommends that standard construction work hours should typically be as follows:

- Monday to Friday 7.00 am to 6.00 pm.
- Saturday 8.00 am to 1.00 pm.
- No work on Sundays or public holiday.

Construction activities for the Project are proposed to occur during the above recommended standard hours only.

Table 3-4 recommends quantitative management noise goals at residences potentially impacted by construction activities.

**Table 3-4 Construction Noise at Residences using Quantitative Assessment**

| Time of Day | Management Level $L_{Aeq\ (15\ min)}$ | How to Apply |
|---|---|---|
| Recommended standard hours:<br>Monday to Friday<br>7am to 6pm<br>Saturday<br>8am to pm<br>No work on Sundays or public holidays | Noise affected<br>RBL + 10dBA | The noise affected level represents the point above which there may be some community reaction to noise.<br>• Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.<br>• The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details. |
| | Highly noise affected<br>75dBA | The highly noise affected level represents the point above which there may be strong community reaction to noise.<br>• Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking in to account:<br>1. Times identified by the community when they are less sensitive to noise ( such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences<br>2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times. |
| Outside recommended standard hours | Noise affected<br>RBL + 5dBA | • A strong justification would typically be required for works outside the recommended standard hours.<br>• The proponent should apply all feasible and reasonable work practices to meet the noise affected level.<br>• Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should negotiate with the community. |

In addition to the above criteria, where any work is conducted during the night time period (10.00pm-7.00 am), the EPA recommends that to protect against sleep disturbance, $L_{A1,1min}$ noise levels should not exceed the background level by more than 15dBA at any residence. In practice, the $L_{A1,1min}$ level can be represented by the maximum noise level.

# 4 VIBRATION CRITERIA

During construction phase, impacts from vibration can be considered both in terms of effects on building occupants (human comfort) and the effects on the building structure (building damage). Of these considerations, the human comfort limits are the most stringent. Therefore, for occupied buildings, if compliance with human comfort limits is achieved, it will follow that compliance will be achieved with the building damage objectives.

## 4.1 Human Comfort

The EPA's *Assessing Vibration: A Technical Guideline* provides acceptable values for continuous and impulsive vibration in the range 1-80Hz. Both preferred and maximum vibration limits are defined for various locations and are shown in Table 4-1

**Table 4-1 Preferred and Maximum Peak Particle Velocity (PPV) Values for Continuous and Impulsive Vibration**

| Location | Assessment Period [1] | PPV (mm/s) | |
|---|---|---|---|
| | | Preferred Values | Maximum Values |
| **Continuous Vibration** | | | |
| Critical areas [2] | Day or night time | 0.14 | 0.28 |
| Residences | Daytime | 0.28 | 0.56 |
| | Night time | 0.20 | 0.40 |
| Offices, schools, educational institutions and places of worship | Day or night time | 0.56 | 1.1 |
| Workshops | Day or night time | 1.1 | 2.2 |
| **Impulsive Vibration** | | | |
| Critical areas [2] | Day or night time | 0.14 | 0.28 |
| Residences | Daytime | 8.6 | 17.0 |
| | Night time | 2.8 | 5.6 |
| Offices, schools, educational institutions and places of worship | Day or night time | 18.0 | 36.0 |
| Workshops | Day or night time | 18.0 | 36.0 |

Notes: 1 Daytime is 7.00am to 10.00pm and night time is 10.00pm to 7.00am.
2 Examples include hospital operating theatres and precision laboratories where sensitive operations are

occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas. Source BS 6472-1992.

These limits relate to a long-term (15 hours for daytime), continuous exposure to vibration sources. Where vibration is intermittent, a Vibration Dose Value is calculated, and acceptable values are shown in Table 4-2.

**Table 4-2 Acceptable Vibration Dose Values for Intermittent Vibration ($m/s^{1.75}$)**

| Location | Daytime [1] | | Night Time [1] | |
|---|---|---|---|---|
| | **Preferred Value** | **Maximum Values** | **Preferred Value** | **Maximum Value** |
| Critical areas [2] | 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 |

Notes: 1 Daytime is 7.00am to 10.00pm and night time is 10.00pm to 7.00am.

2 Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas. Source BS 6472-1992.

The dose value takes into account the degree of intermittency of the vibration. For this project, any vibration being generated would be generated for a significant part of any day, and the difference between an assessment using dose values and one using peak particle velocity is considered very small.

## 4.2 Building Damage

In terms of the most recent relevant vibration damage objectives, Australian Standard AS 2187: Part 2-2006 *"Explosives – Storage and Use – Part 2: Use of Explosives"* recommends the frequency dependent guideline values and assessment methods given in BS7385 Part 2-1993 *"Evaluation and measurement for vibration in buildings Part 2"* as they "are applicable to Australian conditions".

The British Standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

The recommended limits (guide values) from BS7385 for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented numerically in Table 4-3 and Figure 4-1.

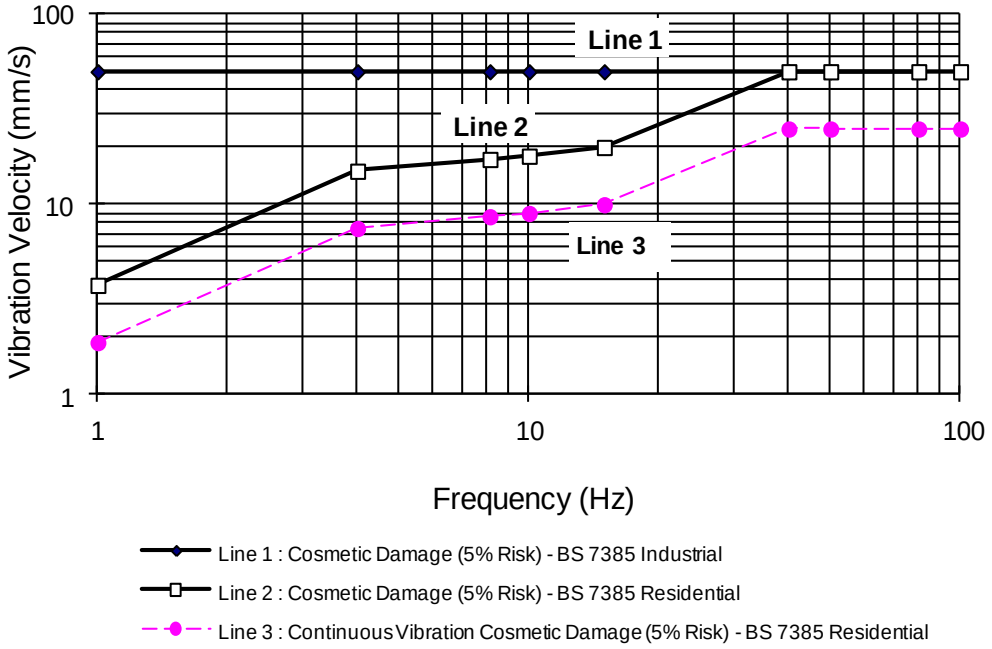
**Table 4-3 Transient Vibration Guide Values - Minimal Risk of Cosmetic Damage**

| Type of building | Peak component particle velocity in frequency range of predominant pulse | |
|---|---|---|
| | 4 Hz to 15 Hz | 15 Hz and above |
| 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 20mm/s at 15 Hz | 20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above |

The standard states that the guide values in Table 4-3 relate predominantly to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings. Rockbreaking/hammering and vibratory rolling activities are considered to have the potential to cause dynamic loading in some structures (e.g. residences) and it may therefore be appropriate to reduce the transient values by 50%.

The British Standard goes on to state that "Some data suggests that the probability of damage *tends towards zero at 12.5mm/s peak component particle velocity"*. In addition, a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive.

**Figure 4-1 Graph of Transient Vibration Guide Values for Cosmetic Damage**




In addition to the British Standard, for the case of nearby heritage buildings (if any) and also typical residential construction, guidance for structural damage is derived from the German Standard DIN 4150 -3 "Structural Vibration Part 3 – Effects of

Vibration on Structures. The following Table details these recommendations for heritage buildings.

**Table 4-4 DIN 4150 recommend PPV vibration level for Heritage Buildings**

| Building | Guideline Values for Velocity – mm/s | | |
|---|---|---|---|
| | 1-10 Hz | 10 to 15 Hz | 40 to 50 Hz |
| Heritage Building | 3 | 3 to 8 | 8-10 |
| Typical Residential Building | 5 | 5 to 15 | 15 to 20 |

# 5 ROAD TRAFFIC NOISE EMISSION

## 5.1 Methodology of Assessing Traffic Noise Impact

The assessment of traffic noise impact during the operational phase of CHVB Project is based on guidance contained the *RNP* (EPA, 2011).

The *RNP* states that noise levels are to be assessed based on traffic volumes projected at a point in time 10 years after the opening of the Project. For the purpose of this Project, the future build scenario will be set at a point in time 20 years after the opening of the Project.

The proposed project is scheduled to open in 2015; therefore, the future assessment year applicable to this project is 2035. All future calculations and modelling are based on the Annual average daily traffic (AADT) traffic forecasts provided by Geolyse Pty Ltd.

Detailed noise calculations have been carried out for four different scenarios as below:

- **Existing Scenario (Year 2015) -** this has been modelled to allow for validation of the noise model against noise survey results during a survey conducted in April/May 2015.
- **Year 2015 Build Scenario -** represents noise levels modelled with the traffic forecast for Year 2015, with the proposed CHVB incorporated.
- **Year 2035 No Build Scenario -** represents noise levels modelled with traffic forecast 20 years post opening, but without the proposed CHVB.
- **Year 2035 Build Scenario -** represents noise levels modelled with the traffic forecast for Year 2035, with the proposed CHVB incorporated.

The following factors are considered during the assessment process:

- Traffic volume and likely proportions of heavy vehicles;
- Topographical information along and surrounding the entire project corridor;

- Land use surrounding the project;
- Vehicle speed;
- Different noise emission levels and source heights;
- Location of the noise sources on the motorway;
- Road surface types;
- Road gradient; and
- Attenuation from noise barriers (both natural and purpose built for the project).

## 5.2 Noise Modelling Procedures

Noise levels from both the existing and proposed road designs were calculated using procedures based on the *CoRTN (Calculation of Road Traffic Noise)* (UK Department of Transport, 1988) prediction algorithms. The standard prediction procedures were modified in the following ways.

- $L_{Aeq}$ values were calculated from the $L_{A10}$ values predicted by the *CoRTN* algorithms using the well-validated approximation $L_{Aeq,1hour} = L_{A10,1hr} – 3$. (NSW RMS, 2001);

- Noise source heights were set at 0.5m for cars, 1.5m for heavy vehicle engines and 3.6m for heavy vehicle exhausts, representing typical values for Australian vehicles. Noise from a heavy vehicle exhaust is 8dBA lower than the noise from the engine; and

- Previous research in Australia has established a negative correction to the *CoRTN* predictions of -1.7dB for façade-corrected levels. Corrections for Australian conditions have been included in noise modelling for this project. (Samuels and Saunders, 1982).

The model was implemented using CadnaA software (Version 4.5). Road design information was based on data supplied by the Cowra Shire Council. This has previously been found to give a good correlation with measured noise levels in similar situations. With barriers, hard ground is assumed, as required under the *CoRTN* procedures.

### 5.2.1 Traffic Data

As the intention of monitoring traffic noise was partly to validate the noise model, simultaneous traffic counts were conducted at two locations along the Project for the duration of the noise monitoring. The recorded traffic data are presented in Table 5-1.

**Table 5-1 Traffic Volumes Recorded for Validation of Noise Model**

| Road Location | Time Period | AADT | Light | Heavy |
|---|---|---|---|---|
| Mid Western Hwy (west of Cowra) | Day | 2116 | 1981 | 135 |
| | Night | 230 | 210 | 20 |
| Segment 1 Mid Western Hwy to Olympic Hwy (Airport Road) | Day | 268 | 262 | 6 |
| | Night | 33 | 33 | 0 |
| Segment 2 Olympic Hwy to Lachlan Valley Way | Day | 0 | 0 | 0 |
| | Night | 0 | 0 | 0 |
| Segment 3 Lachlan Valley Way to Mid Western Hwy (Campbell St) | Day | 171 | 169 | 2 |
| | Night | 14 | 14 | 0 |
| Mid Western Hwy (east of Cowra) | Day | 2693 | 2523 | 170 |
| | Night | 307 | 265 | 42 |

**Note:** Daytime: 7.00am-10.00pm, Night Time: 10.00pm-7.00am

The forecasted traffic volumes for Year 2015 (with CHVB), Year 2035 (without CHVB) and Year 2035 (with CHVB) are presented in Table 5-2 to Table 5-4.

**Table 5-2 Traffic Volumes, Year 2015 (With CHVB)**

| Road Location | Time Period | AADT | Light | Heavy |
|---|---|---|---|---|
| Mid Western Hwy (west of Cowra) | Day | 2116 | 1981 | 135 |
| | Night | 230 | 210 | 20 |
| Segment 1 Mid Western Hwy to Olympic Hwy (Airport Road) | Day | 1055 | 948 | 107 |
| | Night | 119 | 103 | 16 |
| Segment 2 Olympic Hwy to Lachlan Valley Way | Day | 1353 | 1176 | 177 |
| | Night | 152 | 120 | 32 |
| Segment 3 Lachlan Valley Way to Mid Western Hwy (Campbell St) | Day | 1326 | 1176 | 150 |
| | Night | 150 | 119 | 31 |
| Mid Western Hwy (east of Cowra) | Day | 2693 | 2523 | 170 |
| | Night | 307 | 265 | 42 |

**Note:** Daytime: 7.00am-10.00pm, Night Time: 10.00pm-7.00am

**Table 5-3 Traffic Volumes, Year 2035 (Without CHVB)**

| Road Location | Time Period | AADT | Light | Heavy |
|---|---|---|---|---|
| Mid Western Hwy (west of Cowra) | Day | 3132 | 2932 | 200 |
| | Night | 340 | 310 | 30 |
| Segment 1 Mid Western Hwy to Olympic Hwy (Airport Road) | Day | 347 | 339 | 8 |
| | Night | 43 | 43 | 0 |
| Segment 2 Olympic Hwy to Lachlan Valley Way | Day | 0 | 0 | 0 |
| | Night | 0 | 0 | 0 |
| Segment 3 Lachlan Valley Way to Mid Western Hwy (Campbell St) | Day | 221 | 219 | 3 |
| | Night | 18 | 18 | 0 |
| Mid Western Hwy (east of Cowra) | Day | 3986 | 3734 | 252 |
| | Night | 454 | 392 | 62 |

**Note:** Daytime: 7.00am-10.00pm, Night Time: 10.00pm-7.00am

**Table 5-4 Traffic Volumes, Year 2035 (With CHVB)**

| Road Location | Time Period | AADT | Light | Heavy |
|---|---|---|---|---|
| Mid Western Hwy (west of Cowra) | Day | 3132 | 2932 | 200 |
| | Night | 340 | 310 | 30 |
| Segment 1 Mid Western Hwy to Olympic Hwy (Airport Road) | Day | 1561 | 1403 | 158 |
| | Night | 177 | 151 | 26 |
| Segment 2 Olympic Hwy to Lachlan Valley Way | Day | 2002 | 1740 | 262 |
| | Night | 225 | 178 | 47 |
| Segment 3 Lachlan Valley Way to Mid Western Hwy (Campbell St) | Day | 1962 | 1740 | 222 |
| | Night | 223 | 177 | 46 |
| Mid Western Hwy (east of Cowra) | Day | 3986 | 3734 | 252 |
| | Night | 454 | 392 | 62 |

**Note:** Daytime: 7.00am-10.00pm, Night Time: 10.00pm-7.00am

### 5.2.2 Posted Traffic Speed

The sign posted speed limit for the purpose of noise modelling are extracted from GHD's report entitled "Cowra Shire Council - Cowra Heavy Vehicle Bypass Study Final

Report" dated June 2013. Table 5-5 presents the sign posted speed limit for each section along the CHVB.

**Table 5-5 Sign Posted Speed Limit**

| Chainage | | Sign Posted Speed (km/hr) |
|---|---|---|
| Start | End | |
| 8400 | 8000 | 70 |
| 8000 | 4500 | 80 |
| 4500 | 3400 | 70 |
| 3400 | 2900 | 70 |
| 2900 | 2600 | 60 |
| 2600 | 1350 | 50 |
| 1350 | 0 | 50 |

### 5.2.3 Road Surface Types

The surface corrections for various road surfaces relative to dense graded asphaltic concrete are presented in Table 5-6.

**Table 5-6 Road Surface Corrections**

| Surface type (Regularly Trafficked) | Noise Level Variation, dBA | | |
|---|---|---|---|
| | Traffic Noise | Individual Vehicle Pass-by Noise | |
| | | Cars | Trucks |
| 14mm chip seal | +4.0 | +4.0 | +4.0 |
| 14mm chip seal with 7mm scattered | +2.0 | +2.0 | +2.0 |
| Portland cement concrete: tyned and dragged | 0 to +3.0 | +1.0 to +3.5 | -1.0 to +1.0 |
| Cold overlay | +2.0 | +2.0 | +2.0 |
| Dense Graded Asphalt | 0 | 0 | 0 |
| Portland cement concrete: exposed aggregate | -0.5 to -3.0 | -0.1 | -6.7 |
| Stone mastic asphalt | -2.0 to -3.5 | -2.2 | -4.3 |
| Open graded asphaltic concrete | 0 to -4.5 | -0.2 to -4.2 | -4.9 |

The existing road on the Mid Western Highway and the proposed CHVB pavement surfacing is mostly surfaced with 14mm chip seal with 7mm scattered.

Section 7 of this report presents the predicted noise levels based on the identified existing and proposed road surface types.

### 5.2.4 Identified Receivers

The location of buildings surrounding the proposed CHVB alignment was determined from aerial photographs, and buildings were digitised to approximately 600m away from the proposed CHVB corridor. The height of each building was determined by visual observation and are generally single storey buildings. In each building, a receiver was located at 1.5m above the highest floor.

## 6 NOISE MODEL VALIDATION

The results of traffic noise measurements presented in Section 3 and model calculations for the same period, based on monitored traffic flows are compared in Table 6-1. Noise levels are shown to one decimal place to minimise rounding effects.

**Table 6-1 Measured and Calculated Traffic Noise Levels - dBA**

| Location | Measured Day | Predicted Day | Diff. Day | Measured Night | Predicted Night | Diff. Night |
|---|---|---|---|---|---|---|
| Location 1 - 119-121 Waratah St | 47.3 | 46.5 | 0.8 | 38.0 | 40.0 | 2.0 |
| Location 3 - 37 Campbell St | 50.5 | 49.6 | 0.9 | 41.4 | 43.4 | 2.0 |

**Note:** Daytime: 7.00am-10.00pm, Night Time: 10.00pm-7.00am

Based on the results presented in Table 6-1, the following could be established:

- Location 1 - Predicted daytime and night time noise levels are within the 2dBA range; and
- Location 3 - Predicted daytime and night time noise levels are within the 2dBA range.
- Accordingly, no correction factor is required for both daytime and night time period along the entire length of the respective road alignments.

The measurement results represent the $L_{Aeq,period}$ for all valid days of the monitoring period. Data has been excluded during times of rain or wind. Data that most likely do not represent traffic noise were also excluded. This exclusion is based on analysis of the logger charts in Appendix A.

# 7 PREDICTED NOISE LEVEL AT IDENTIFIED RECEIVERS

For the Year 2015 and Year 2035 scenarios, façade noise levels were calculated at each building facade along the proposed CHVB. The CadnaA program incorporates a procedure to determine the most-affected location on a facade, and this was used in each case.

For the Build scenarios, the cumulative noise emission levels from the existing and new roads have been taken into considerations. This approach is consistent with the NCG and NMG.

Comparisons of the predicted noise levels between the two scenarios with the relevant time period base criteria were conducted.

Table 7-1 presents a summary of the number of receiver locations where the following principles of the NCG and NMG are met and qualifies for considerations of noise mitigation.

- Does the total noise level predicted at the receiver exceed the controlling criterion from the NCG. The controlling criterion is based on either the RNP daytime $L_{Aeq,15hr}$ 55dBA and night time LAeq,9hr 50dBA criteria for new roads or based on existing traffic $L_{Aeq}$ noise levels plus 12dBA which is the relative increase criteria (RIC) for residential land uses. The more stringent of the two established criteria will be the controlling criterion.

- Is the total noise level above the cumulative limit. When the total noise level in the build year is 5dBA or more above the NCG criterion, it is considered to have exceeded the cumulative limit. Receivers where the exceedances occurs will qualify for consideration of noise mitigation.

- Has the total noise level increase by more than 2.0dBA after the completion of the new road project.

Figure 7-1 presents the consideration of noise mitigation principles as outlined above.

**Figure 7-1 Summary of Qualifying Process for a Receiver**

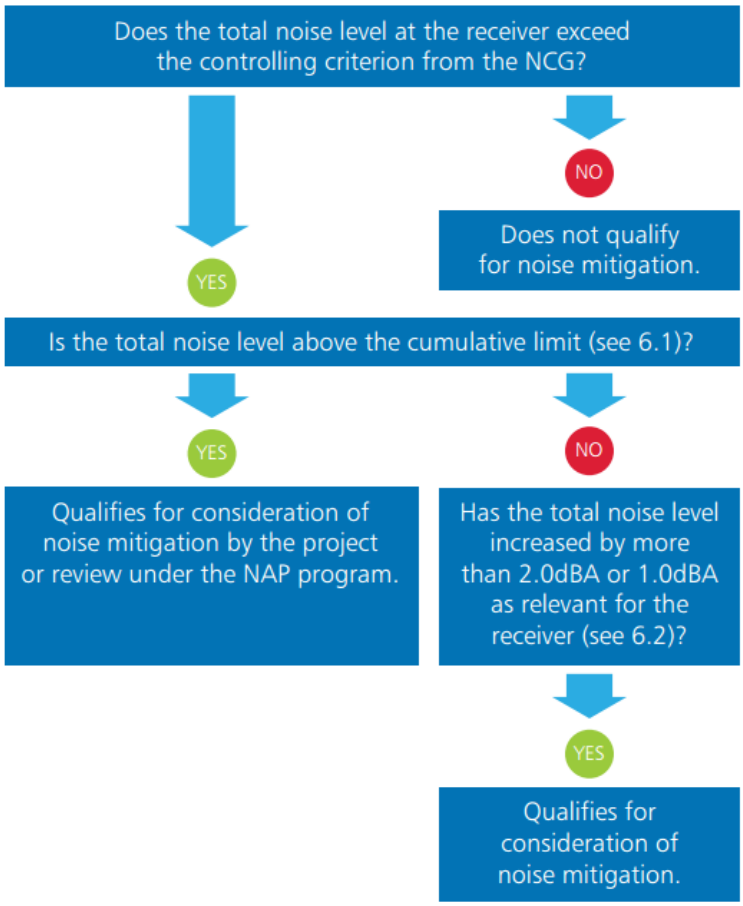



Table 7-1 presents the total number of receiver locations which qualify for consideration of noise mitigation in the Year of Opening (Yr2015) and 20 Years after Opening (Yr2035).

**Table 7-1 No. of Receiver Locations which Qualifies for Consideration of Noise Mitigation**

| Scenario | Road Surface | Total Number of Receivers Qualify for Consideration of Noise Mitigation |
|---|---|---|
| Year 2015 Build Scenario | 14mm chip seal with 7mm scattered | 84 |
| Year 2035 Build Scenario | | 125 |

Appendix B presents the tabulated results for Year 2015 No Build and Year 2015 Build Scenarios.

Figure 7-2 to Figure 7-5 further illustrate the receiver locations which qualify for consideration of noise mitigation for Year 2015 scenario.

Appendix C presents the tabulated results for Year 2035 No Build and Year 2035 Build Scenarios.

Figure 7-6 to Figure 7-9 further illustrate the receiver locations which qualify for consideration of noise mitigation for Year 2035 scenario.

As a detailed site survey has not been conducted, all the receivers identified in the assessments are conservatively assumed to be residential and consideration of noise mitigation is only applicable to receiver identified as residential.

## 8 FEASIBLE AND REASONABLE NOISE MITIGATION

For receiver locations eligible for consideration of noise mitigation, the EPA recommends the following form of treatments are:

- Road design and traffic management;
- Quiet pavement surface;
- In corridor noise barriers/mounds; and
- At property treatments or localised barriers/mounds.

A preliminary analysis has been undertaken to determine what noise control is considered "feasible and reasonable". A re-evaluation of potential noise impacts has been undertaken assuming a low noise pavement such as Open Graded Asphaltic Concrete (OGAC). The use of OGAC rather than dense graded asphalt can reduce traffic noise caused by surface/tyre interactions by up to 4dBA. However, it should be noted that OGAC has a limited life with respect to traffic noise reduction, because of the clogging of air voids over time. Accordingly, the correction applied for the use of OGAC adopted is -4dBA.

Table 8-1 presents a summary of the number of receiver locations, with OGAC low noise pavement considered, which will still qualify for consideration of noise mitigations.

**Table 8-1 No. of Receiver Locations which still Qualifies for Consideration of Noise Mitigation after Considering Low Noise Pavement**

| Scenario | Road Surface | Total Number of Receivers Qualify for Consideration of Noise Mitigation |
|---|---|---|
| Year 2015 Build Scenario | OGAC | 20 |
| Year 2035 Build Scenario | | 34 |

Based on the results presented in Table 8-1, most of the identified receivers which qualifies for consideration of noise mitigation will achieve compliance with the established controlling noise criterion from the NCG with the inclusion of OGAC. However, there are still 20 receivers in Year 2015 and 34 receivers in Year 2035 which will require additional noise mitigation such as architectural treatment or noise barriers.

Figure 8-1 to Figure 8-4 further illustrate the receiver locations which qualify for consideration of noise mitigation for Year 2035 scenario after the implementation of low noise pavement such as OGAC.

After reviewing the results presented in Figure 8-1 to Figure 8-4, it has been identified that between chainage 5200 to 5700, has the potential for the implementation of noise barrier as the secondary mitigation option after OGAC low noise pavement has been considered. A total of **12 receivers** have been identified along this section of the proposed bypass qualify for noise mitigation. Figure 8-5 presents the indicative location of the proposed noise barrier between chainage 5200 and 5700.

**Figure 8-5 Indicative Location of Proposed Noise Barrier**

Table 8-2 presents the number of residential receiver locations along chainage 5200 to 5700, which still qualify for the noise mitigation after the implementation of noise barrier.

**Table 8-2 No. of Receiver Qualify for Noise Mitigation (Chainage 5200 to 5700)**

| Receiver | Proposed Barrier Height | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **0.0m** | **1.2m** | **1.8m** | **2.4m** | **3.0m** | **3.6m** | **4.2m** | **4.8m** | **5.4m** |
| NCA C017 | Q | Q | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ |
| NCA C029 | Q | Q | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ |
| NCA C030 | Q | Q | Q | Q | DNQ | DNQ | DNQ | DNQ | DNQ |
| NCA C031 | Q | Q | Q | Q | Q | DNQ | DNQ | DNQ | DNQ |
| NCA C038 | Q | Q | Q | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ |
| NCA C039 | Q | Q | Q | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ |
| NCA C046 | Q | Q | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ |
| NCA C051 | Q | Q | Q | Q | Q | Q | Q | Q | DNQ |
| NCA C052 | Q | Q | Q | Q | Q | DNQ | DNQ | DNQ | DNQ |
| NCA C053 | Q | Q | Q | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ |
| NCA C054 | Q | Q | Q | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ |
| NCA C066 | Q | Q | Q | DNQ | DNQ | DNQ | DNQ | DNQ | DNQ |
| Total of Receivers still qualify for consideration of noise mitigation | 12 | 12 | 9 | 4 | 3 | 1 | 1 | 1 | 0 |

Note: Qualify for treatment = "Q" and Do not Qualify for treatment = "DNQ".

Based on the results presented in Table 8-2, the identified lower barrier height where two-thirds of the receivers identified do not need/do not qualify for at property treatment is 2.4m. This approach is consistent with the NMG barrier design process. More in-depth assessment will be required for barrier optimisation and purpose of cost benefit analysis.

After the installation of the proposed noise barrier, there are still **26** receiver locations which require consideration of architectural treatment. Architectural treatment for mitigation of noise usually depends on the level of exceedance over the target noise criteria. Typically the level of treatment is:

- **Option 1:** 1-10dBA exceedance - offer fresh air ventilation, sealing of wall vents and check window and door seals and replace where necessary; and

- **Option 2:** >10dBA exceedance - offer fresh air ventilation, sealing of wall vents and check window and door seals and replace where necessary. Offer (residences in suitable condition/fabric) to upgrade glazing and doors (if required) that are exposed to road noise from the new road.

Table 8-3 presents the receiver locations requiring consideration for architectural treatment and the predicted level of exceedances.

**Table 8-3 Receivers for Architectural Treatment**

| Receiver | Predicted Level of Exceedances (dBA) |
|---|---|
| NCA B007 | 7 |
| NCA B008 | 5 |
| NCA B009 | 10 |
| NCA B010 | 1 |
| NCA B032 | 3 |
| NCA B033 | 3 |
| NCA B034 | 1 |
| NCA B072 | 2 |
| NCA B073 | 4 |
| NCA B074 | 7 |
| NCA B133 | 2 |
| NCA B147 | 3 |
| NCA B192 | 4 |
| NCA B197 | 6 |
| NCA C030 | 1 |
| NCA C031 | 2 |
| NCA C051 | 3 |
| NCA C052 | 1 |
| NCA C284 | 4 |
| NCA C285 | 5 |
| NCA C368 | 4 |
| NCA C369 | 4 |
| NCA C370 | 3 |
| NCA C425 | 2 |
| NCA C427 | 1 |
| NCA C428 | 2 |

Based on the results presented in Table 8-3, all the 26 receiver locations will qualify for Option 1 level of architectural treatment.

## 9 CONSTRUCTION NOISE ASSESSMENT

This section of the report assesses the potential impact of noise during the construction of the CHVB project. Construction is expected to take more than 3 weeks and a quantitative assessment will be adopted. Construction work will take place during recommended standard hours only.

## 9.1 Noise Management Levels

Based on the background noise levels presented in Section 2, the project has been broken up into three different Noise Catchment Areas (NCAs) based on factors including geographical location, level of noise exposure and location of the ambient noise monitoring was conducted. The specific construction noise management levels for residential receptors are as presented in Table 9-1.

**Table 9-1 Project Specific Noise Management Levels, $L_{Aeq,15min}$ - dBA**

| Noise Management Levels $L_{Aeq,15min}$ | | | |
|---|---|---|---|
| **NCA** | **Daytime** | **Outside Recommended Standard Hours** | |
| | | **Evening** | **Night Time** |
| **1** | 41 | 35 | 35 |
| **2** | 45 | 35 | 35 |
| **3** | 47 | 35 | 35 |

Note: Daytime (7.00am-6.00pm), Evening (6.00pm-10.00pm) and Night time (10.00pm-7.00am).

## 9.2 Construction Activities & Equipment Noise Levels

Typical construction activities and sound levels of typical construction equipment are listed in Table 9-2, based on construction activities from similar projects, as design input to the project. The Table gives the sound power level based on the $L_{Aeq}$ ($L_{weq}$) and $L_{Amax}$ ($L_{wmax}$) sound power levels emitted by the equipment.

**Table 9-2 Typical Construction Events and Plant Sound Levels – dBA**

| **Activity** | **Plant and Equipment** | **Sound Power Level (SWL)** | |
|---|---|---|---|
| | | **$L_{Aeq}$** | **$L_{Amax}$** |
| Traffic control | • Traffic control vehicles | 93 | 97 |
| Linemarking | • Linemarking trucks<br>• Traffic control vehicles | 93<br>93 | 97<br>97 |
| Saw cutting | • Saw cutter<br>• Light vehicles<br>• Water cart | 114<br>93<br>109 | 118<br>97<br>113 |
| Clearing and grubbing | • Excavator (30t)<br>• Chainsaw<br>• Mulcher<br>• Dump truck<br>• Water cart | 109<br>114<br>114<br>93<br>109 | 115<br>118<br>118<br>97<br>113 |
| Earthworks | • Excavator<br>• Dump truck<br>• Compactor | 109<br>93<br>109 | 115<br>97<br>115 |

| Activity | Plant and Equipment | Sound Power Level (SWL) | |
|---|---|---|---|
| | | $L_{Aeq}$ | $L_{Amax}$ |
| | • Water cart | 109 | 113 |
| | • Grader | 109 | 115 |
| | • Profiler | 114 | 118 |
| | • Dozer | 114 | 118 |
| | Roller | 106 | 114 |
| Pavement construction (rip and re-compact sub-grade, place select material and compact) | • Grader | 109 | 115 |
| | • Excavator | 109 | 115 |
| | • Roller | 106 | 114 |
| | • Dump truck | 93 | 97 |
| | • Water cart | 109 | 113 |
| | • Wacker Packer | 106 | 107 |
| | • Spray sealing equipment | 109 | 113 |
| Paving (delivery of raw materials, placement of surface material, saw cutting) | • Profiler | 114 | 118 |
| | • Paver | 114 | 118 |
| | • Asphalt truck | 93 | 97 |
| | • Sprayer | 93 | 97 |
| | • Roller | 106 | 114 |
| Drainage works | • Agitator truck | 109 | 113 |
| | • Concrete pump | 108 | 112 |
| | • Vibrators | 106 | 107 |
| | • Jackhammer | 115 | 117 |
| | • Welding machine | 106 | 107 |
| | • Under boring equipment | 107 | 110 |
| Landscaping and vegetation | • Light vehicles | 93 | 97 |
| | • Trucks | 93 | 97 |
| Sedimentation basins works | • Excavator | 109 | 115 |
| | • Concrete pump | 108 | 112 |
| | • Concrete trucks | 109 | 113 |
| | • Vibrators | 106 | 107 |
| | • Trucks | 93 | 97 |

Using the assumed plant items and their associated sound power levels (with consideration given to the operational changes, intermittent processes and changes in distance of mobile plant), Table 9-3 presents a combined $L_{Aeq}$ sound power level for each scenario and ranks the construction events with potential noise impacts in descending order.

**Table 9-3 Ranking of Construction Events - dBA**

| Ranking | Activity | Equivalent $L_{weq}$ |
|---|---|---|
| 1 | Earthworks | 119 |
| 2 | Clearing and grubbing | 118 |
| 3 | Paving (delivery of raw materials, placement of surface material, saw cutting) | 117 |
| | Drainage works | |
| 4 | Pavement construction (rip and re-compact sub-grade, place select material and compact) | 116 |
| 5 | Saw cutting | 114 |
| 6 | Sedimentation basins works | 113 |
| 7 | Landscaping and vegetation | 98 |
| 8 | Linemarking | 94 |
| 9 | Traffic control | 89 |

## 9.3 Predicted Noise Levels

Table 9-4 and presents a summary of the typical range of maximum $L_{Aeq}$ noise levels that may be expected at each NCAs (without the implementation of any special noise mitigation) for each of the propose construction activities. The construction activities are presented in ascending ranked order from left to right of the tables.

**Table 9-4 Predicted $L_{Aeq,15min}$ Construction Noise Levels - dBA**

| NCA | Daytime $L_{Aeq,15min}$ Management Level | Range of Predicted Range of $L_{Aeq,15min}$ Construction Noise Levels | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Rank 1 | Rank 2 | Rank 3 | Rank 4 | Rank 5 | Rank 6 | Rank 7 | Rank 8 | Rank 9 |
| 1 | 41 | 30-83 | 29-82 | 28-81 | 27-80 | 25-78 | 24-77 | 9-62 | 5-58 | 5-53 |
| 2 | 45 | 30-74 | 29-73 | 28-72 | 27-71 | 25-69 | 24-68 | 9-53 | 5-49 | 5-44 |
| 3 | 47 | 42-83 | 41-82 | 40-81 | 39-80 | 37-78 | 36-77 | 21-62 | 17-58 | 12-53 |

As can be seen from predicted noise levels presented in Table 9-4, in many receiver locations the noise management levels are expected to be exceeded at least during some stage during project construction. Noise management and mitigation would therefore need to be considered and implemented where reasonable and feasible, to minimise the acoustic impacts.

This should be assessed in detail in the Construction Noise and Vibration Management Plan to be prepared by the contractor prior to commencement of works on site. At that stage, full details of the construction methodology, type and number of equipment on site will be better known.

## 9.4 Mitigation of Construction Noise

Best practice mitigation and management measures will be used to minimise construction noise and vibration at noise sensitive receivers, thereby reducing the potential impacts. This will be described in a Construction Noise and Vibration Management Plan (CNVMP), to be prepared by the contractor for the project.

The CNVMP will consider the following issues as a minimum:

a) identify nearby residences and other sensitive land uses;

b) develop noise management levels consistent with the *ICNG*;

c) assess the potential impact from the proposed construction methods;

d) where management levels are exceeded examine of feasible and reasonable noise mitigation;

e) develop reactive and proactive strategies for dealing with any noise complaints;

f) identify a site contact person to follow up complaints; and

g) noise monitoring.

In general, management of noise and vibration requires attention to the following:

- Construction hours.
- Noise and vibration monitoring on site and at sensitive receivers.
- Training and awareness.
- Consultation with potentially affected residents, including regular updates on the nature, timing and duration of anticipated works.
- Incident and emergency response.
- Non-conformance, preventative and corrective action.

Where appropriate the specific noise mitigation measures could include:

- Mitigation of specific noise sources may be possible by using portable temporary screens.
- Respite and/or restricted construction hours may be considered for extended periods of driven piling, rock breaking and other high noise generating activities.
- Maximising the offset distance between noisy plant items and sensitive receivers.
- Avoiding using noisy plant simultaneously and/or close together, adjacent to sensitive receivers.

- Orienting equipment away from sensitive receivers.
- Carrying out loading and unloading away from sensitive receivers.
- Using dampened tips on rock breakers (if any).
- Using noise source controls, such as the use of residential class mufflers, to reduce noise from all plant and equipment including bulldozers, cranes, graders, excavators and trucks.
- Selecting plant and equipment based on noise emission levels.
- Using alternative construction methods to minimise noise levels.
- Providing alternative arrangements with affected residents such as temporary relocation.
- Selecting site access points and roads as far as possible away from sensitive receivers.
- Using spotters, closed circuit television monitors, “smart” reversing alarms, or “squawker” type reversing alarms in place of traditional reversing alarms.
- Design site compounds and site work methods to minimise the need for reversing, therefore minimising reversing alarm noise.

Education and training of site staff is necessary for satisfactory implementation of noise mitigation measures. Education and training strategies should focus on:

- Site awareness training / environmental inductions that include a section on noise mitigation techniques / measures to be implemented throughout the project.
- Ensuring work occurs within approved hours.
- Locating noisy equipment away from sensitive receivers.
- Using noise screens for mobile plant and equipment.
- Ensuring plant and equipment is well maintained and not making excessive noise.
- Turning off machinery when not in use.

## 10 CONSTRUCTION VIBRATION ASSESSMENT

Impacts from vibration can be considered both in terms of effects on building occupants (human comfort) and the effects on the building structure (building damage). Of these considerations, the human comfort limits are the most stringent. Therefore, for occupied buildings, if compliance with human comfort limits is achieved, it will follow that compliance will be achieved with the building damage objectives.

## 10.1 Vibration Impacts

Ground vibration may potentially be caused by piling, rock hammering, drilling and ground compaction operations associated with construction of roads. Vibration levels generated during piling and ground compaction operations (including vibratory rolling) will depend on the exact equipment to be used and the type of ground.

Table 10-1 provides estimated vibration levels at a range of distances from piling, rock hammering, drilling and ground compaction operations. These vibration levels have been taken from Blackett Acoustics's database and are based on previous measurements on similar projects. The vibratory roller, impact piling and bored piling were measured in soft ground whilst the other equipment listed operates in rock.

**Table 0-1 Typical Vibration Levels from Construction Plant for Typical Worst-case Ground Conditions**

| Source | Peak Particle Vibration Levels, mm/s | | | | | |
|---|---|---|---|---|---|---|
| | 5m | 10m | 20m | 30m | 40m | 50m |
| Vibratory roller | - | 4.1 | 2.6 | 2.4 | 2.2 | 1.9 |
| Heavy Rock Breaker | 4.5 | 1.3 | 0.4 | 0.2 | 0.12 | 0.085 |
| Rock drill (estimate) | - | 0.5 | 0.2 | 0.1 | 0.05 | 0.04 |
| Light Rock Hammer (e.g. 600kg) | 0.2 | 0.06 | 0.02 | 0.01 | - | - |
| Impact Piling | 11 | 3.5 | 1.0 | 0.5 | 0.2 | 0.05 |
| Bored Piling | - | 0.2 | <0.1 | - | - | - |

Note: Theoretically, there can be an increase in vibration levels from two pieces of plant operating at the same location and in phase for energy average levels; however, this is unlikely to affect the peak particle velocity as they are random incoherent vibration sources. Given this, vibration assessments are conducted based on individual sources.

The vibration criterion associated with building damage to residences (15 mm/s) is easily complied with, considering the typical distances that any construction activities will be occurring from residential buildings. The criterion based on DIN4150 depends on the frequency, but for normal construction activity the frequency would suggest even a higher criterion. Compliance with the criterion indicates that there is a low risk of building damage from the proposed construction works.

In respect of human comfort, the only activities with potential for affecting nearby residents is vibratory roller. A vibratory roller generates continuous vibration and it has been assumed that one may operate almost continuously for a full day during daytime hours. On this basis, depending upon the response of the particular ground type at the location, the daytime human comfort criterion would only be met at distances significantly greater than 50m.

### 10.2 Vibration Mitigation Measures

When vibratory rollers are brought to the site, ground-borne vibration levels will be measured to establish the minimum working separation between the equipment and nearby vibration sensitive receivers.

Continuous vibration monitoring will be carried out when a vibratory roller is operated within 30 m of a building, or as required. Where the measured vibration levels exceed the appropriate limit applying to the measurement, construction activities or equipment will be modified (e.g. using a lighter or smaller vibratory roller) to ensure ongoing compliance with the limits. Otherwise, arrangements will be made with the affected residents to allow the operations to continue without affecting the residents' comfort.

Vibration monitoring will be carried out in response to a complaint about construction vibration in a residence. The monitoring will be carried out within the residence on the floor either at the location where the complaint originated or mid-floor span in a typical room.

The above mitigation measures, and any other measures deemed feasible and reasonable, should be addressed by the contractor in the Construction Noise and Vibration Management Plan for the project.

## 11 CONCLUSION

Noise from the proposed Southern Ring Road project has been assessed. The following aspects have been considered:

- Operational noise; and
- Construction noise and vibration.

### 11.1 Noise Monitoring

Long term unattended noise monitoring was undertaken at three locations, for use on the project. The noise monitoring data was used to establish background noise levels for setting construction noise objectives, and to provide existing traffic noise levels for the purpose of verification/ calibration of the noise model.

### 11.2 Traffic Noise Modelling and Validation

The noise model used for the noise predictions was calibrated using three different road segments and based on the measured existing noise levels provided for the project.

The noise predictions for various modelling scenarios, without noise mitigation being considered, are as below:

- Year 2015 No Build Scenario noise levels;

- Year 2015 Build Scenario;
- Year 2035Build Scenario; and
- Year 2035 Build Scenario.

The proposed Southern Ring Road was initially proposed to be surfaced with 14mm chip seal with 7mm scattered. Based on the proposed road surface of 14mm chip seal with 7mm scattered predicted noise levels, the following is established:

- In Year 2015, 84 receiver locations would exceed the relevant base criteria and would qualify for considerations of noise mitigation
- In Year 2035, 125 receiver locations would exceed the relevant base criteria and would qualify for considerations of noise mitigation.

However, with the proposed upgrade with OGAC road surface type, the total number of receiver locations which would exceed the relevant base criteria and qualify for considerations of noise mitigation for year 2015 and year 2035 are 20 and 34 respectively.

It has been identified that a cluster of 12 receiver locations out of the 34 receivers in year 2035 are located along chainage 5200 to 5700. Initial barrier analysis has established that the lower barrier height which two-thirds of the receivers behind the proposed barrier do not require at property treatment is 2.4m.

With the implementation of the proposed noise barrier along chainage 5200 to 5700, there are 26 remaining receiver locations which require consideration of architectural treatment.

### 11.3 Construction Noise and Vibration Assessment

Noise from construction is expected to result in impact at some receiver locations, for at least some of the time. It is likely that the noise management levels would be exceeded during project construction.

Vibration will generally be within comfort levels, and well within damage thresholds, although perceptible at times. The most significant vibration is expected to occur during the use of vibratory rollers.

In order to minimise the impacts, it is recommended that a Construction Noise and Vibration Management Plan be prepared by the contractor prior to undertaking works on site. This will be based on the proposed construction methodology, activities and details of plant and equipment available at the time, to review the impacts and identify management and mitigation measures that can be implemented where feasible and reasonable.

Note

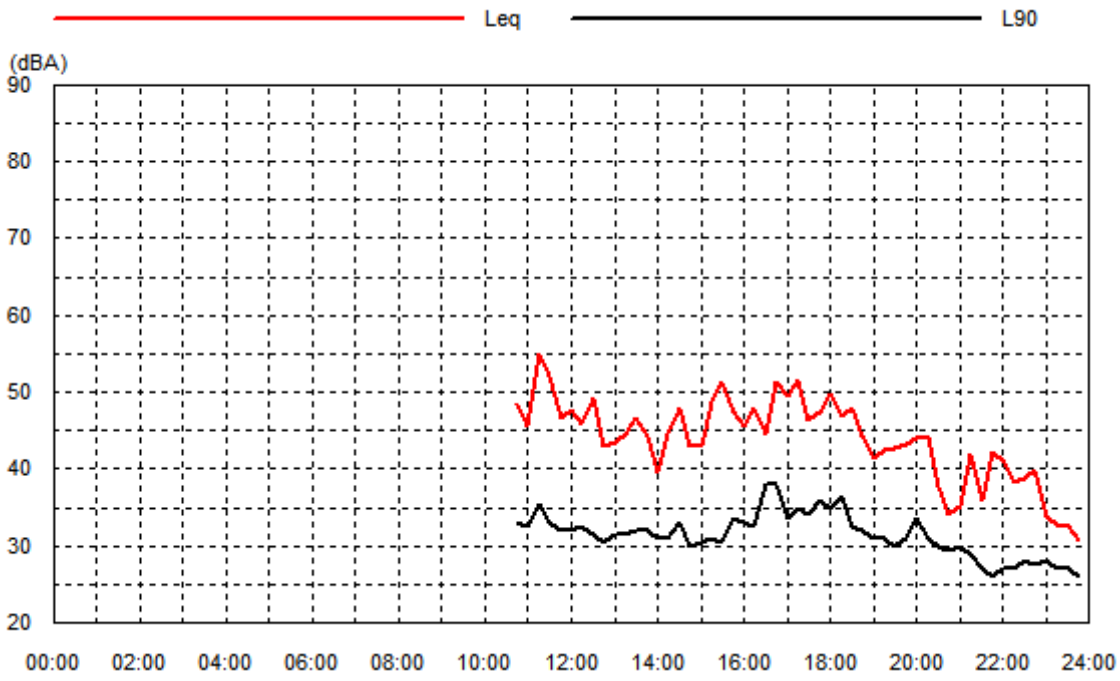
**All materials specified by Blackett Acoustics have been selected solely on the basis of acoustic performance. Any other properties of these materials, such as fire rating, chemical properties etc. should be checked with the suppliers or other specialised bodies for fitness for a given purpose.**

| Version | Status | Issue Date | Prepared by |
|---|---|---|---|
| A | Draft | 1 July 2015 | Jimi Ang |
| B | Draft | 10 July 2015 | Jimi Ang |
| B | Final | 30 November 2016 | Jimi Ang |

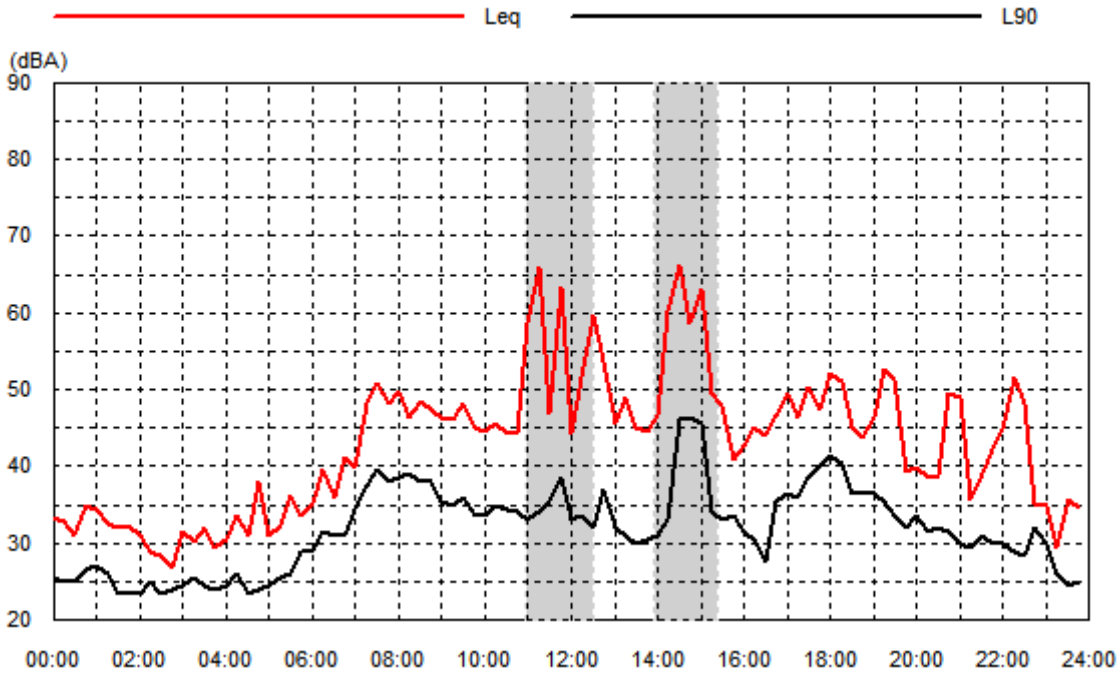
# Appendix A
## Noise Logger Graphs

**Location: Location 1 - 121 Waratah St**
Data shaded: extraneous noise

**Tue 28 Apr 15**

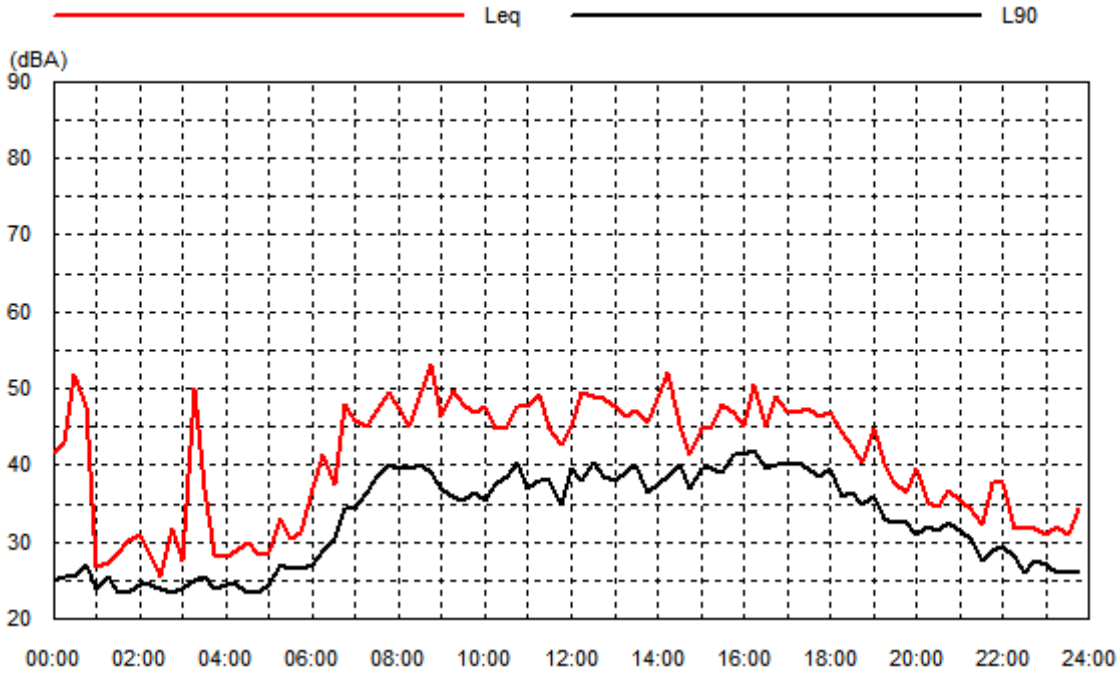



**Wed 29 Apr 15**

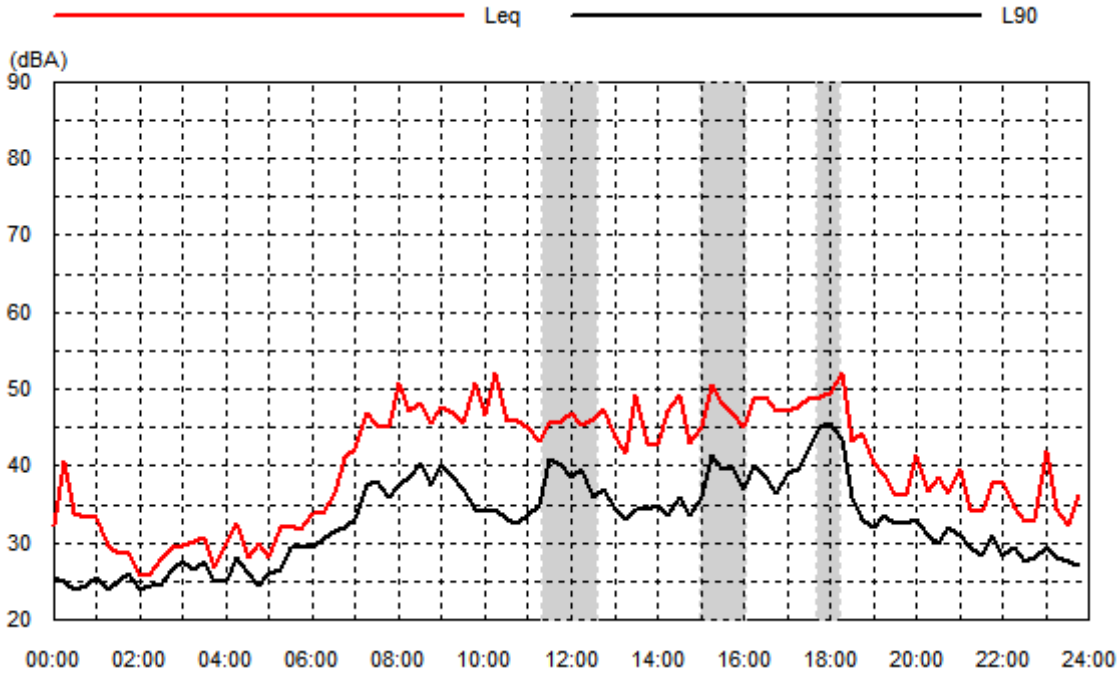


**Location: Location 1 - 121 Waratah St**
Data shaded: extraneous noise

**Thu 30 Apr 15**

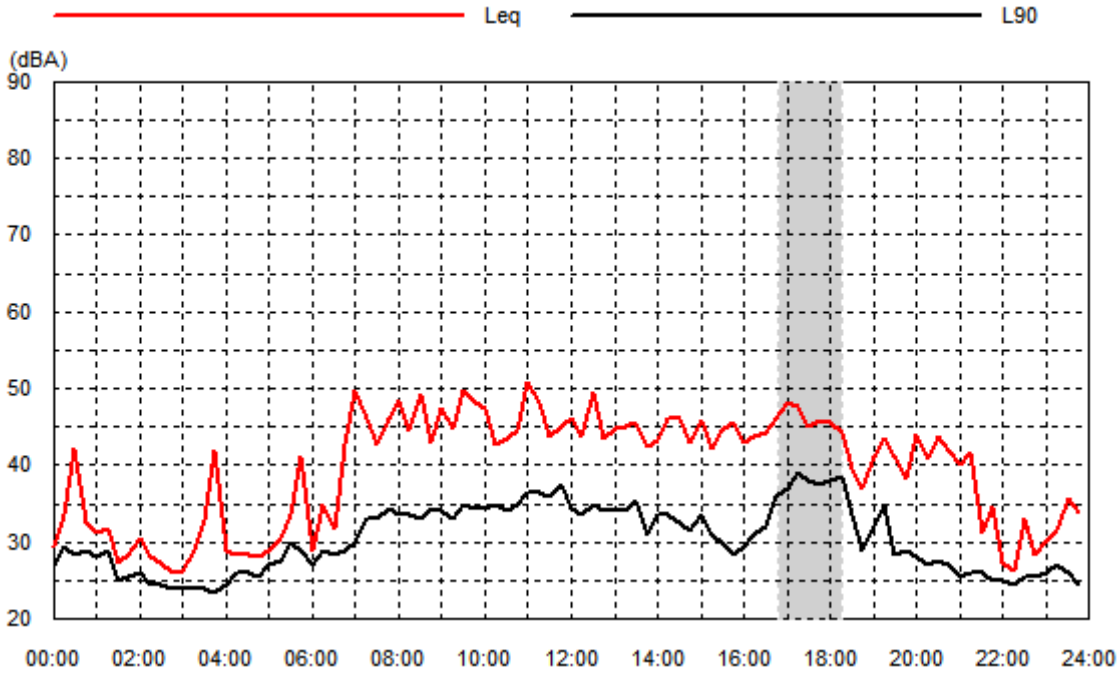



**Fri 01 May 15**

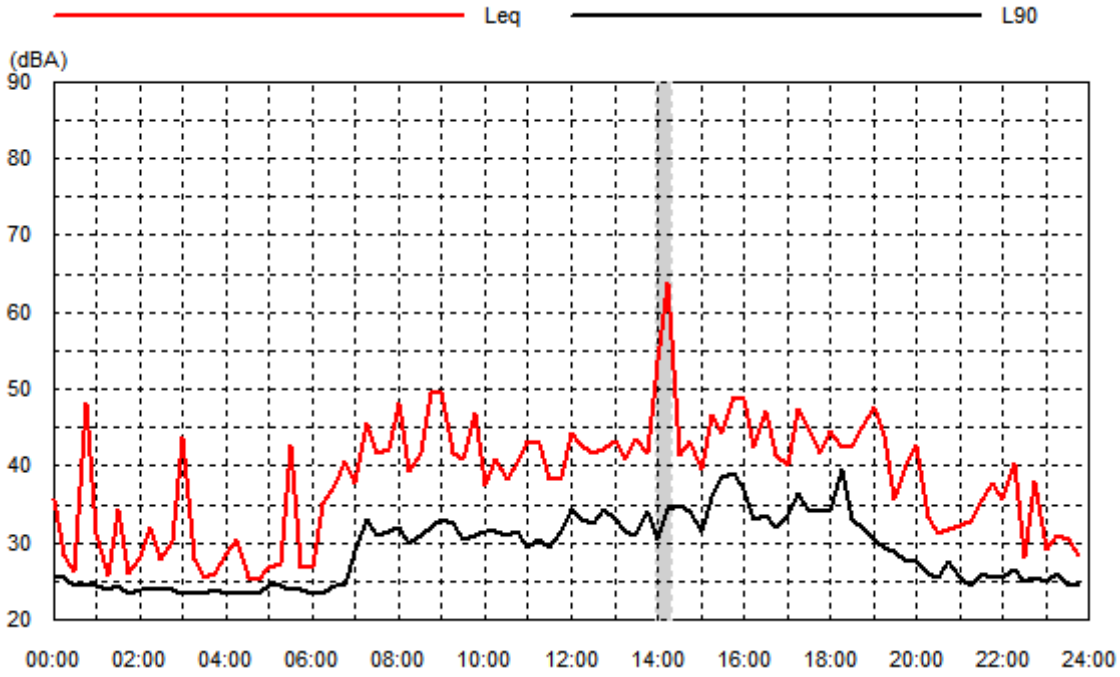


**Location: Location 1 - 121 Waratah St**
Data shaded: extraneous noise

**Sat 02 May 15**

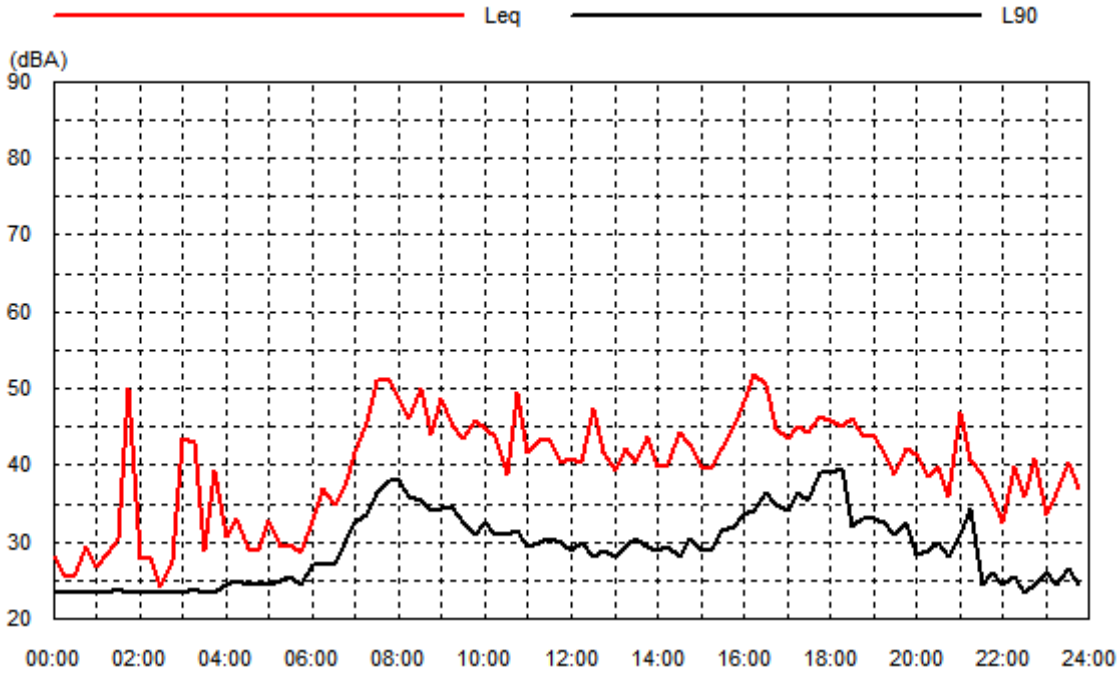



**Sun 03 May 15**

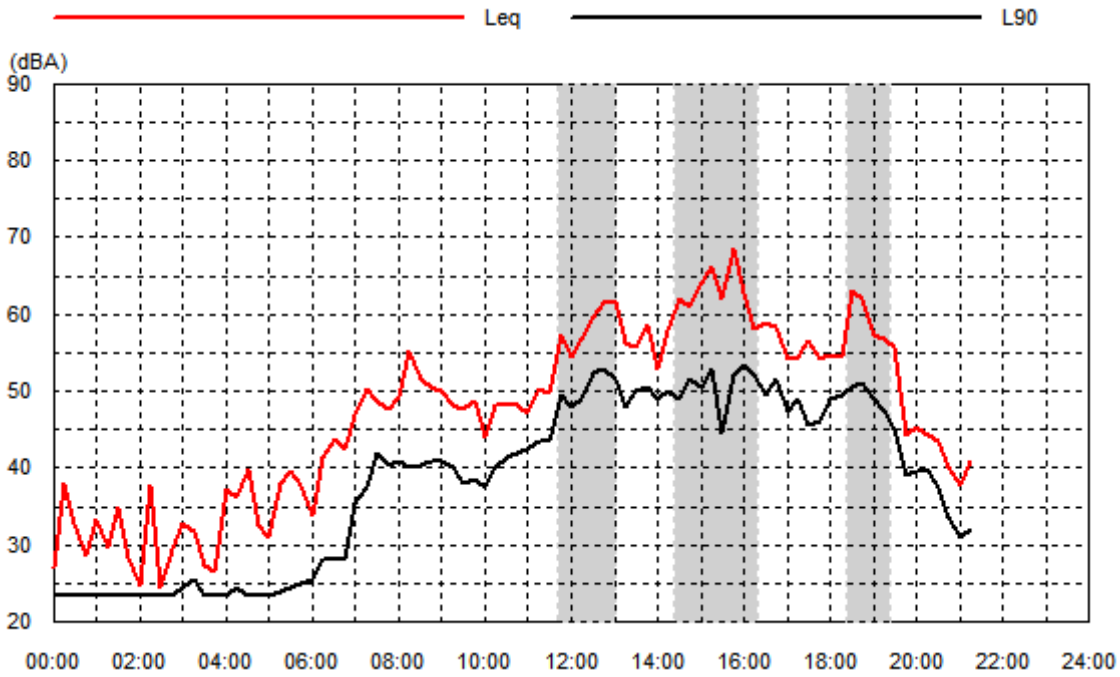


**Location: Location 1 - 121 Waratah St**
Data shaded: extraneous noise

**Mon 04 May 15**

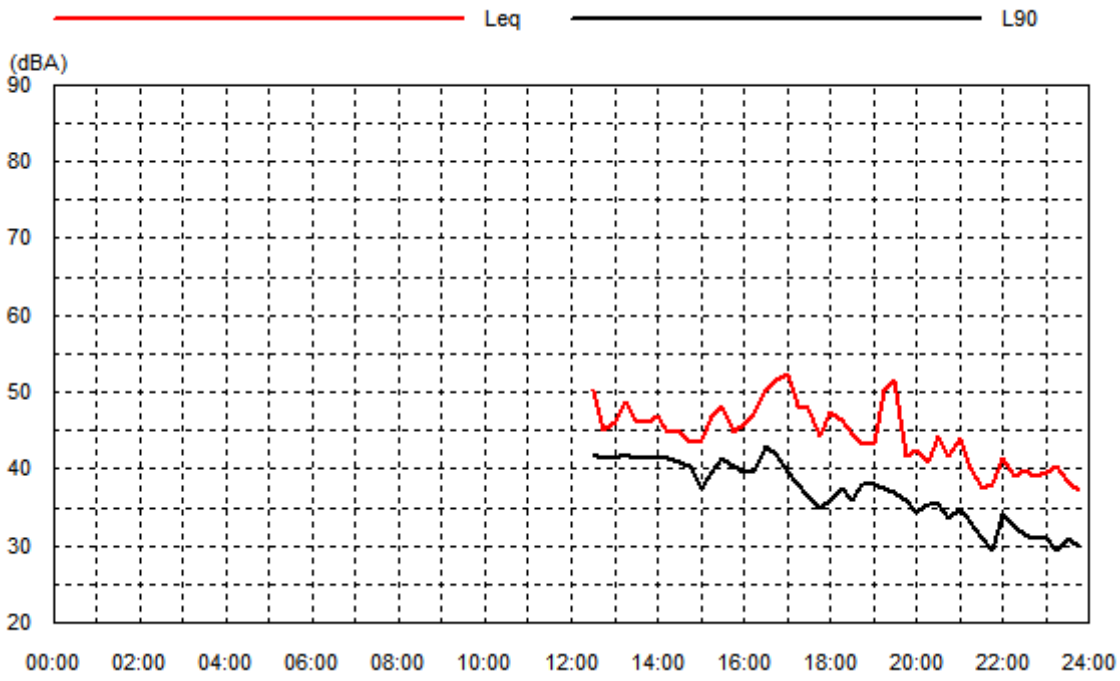



**Tue 05 May 15**

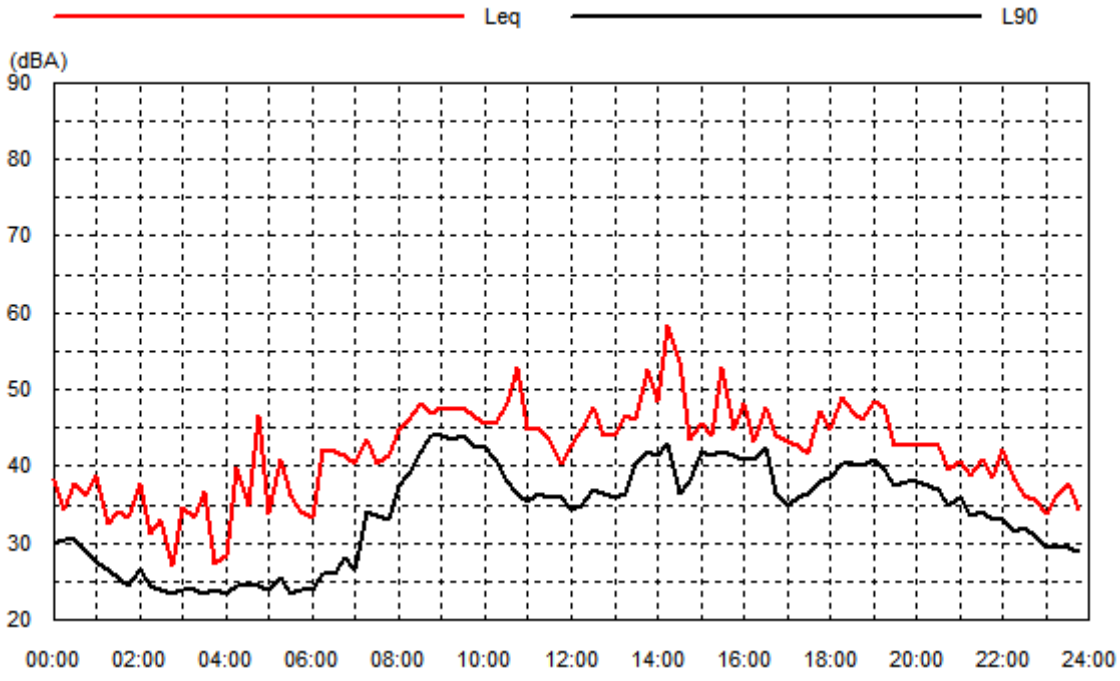


**Location: Location 2 - 29 Fishburn St**
Data shaded: extraneous noise

**Tue 28 Apr 15**

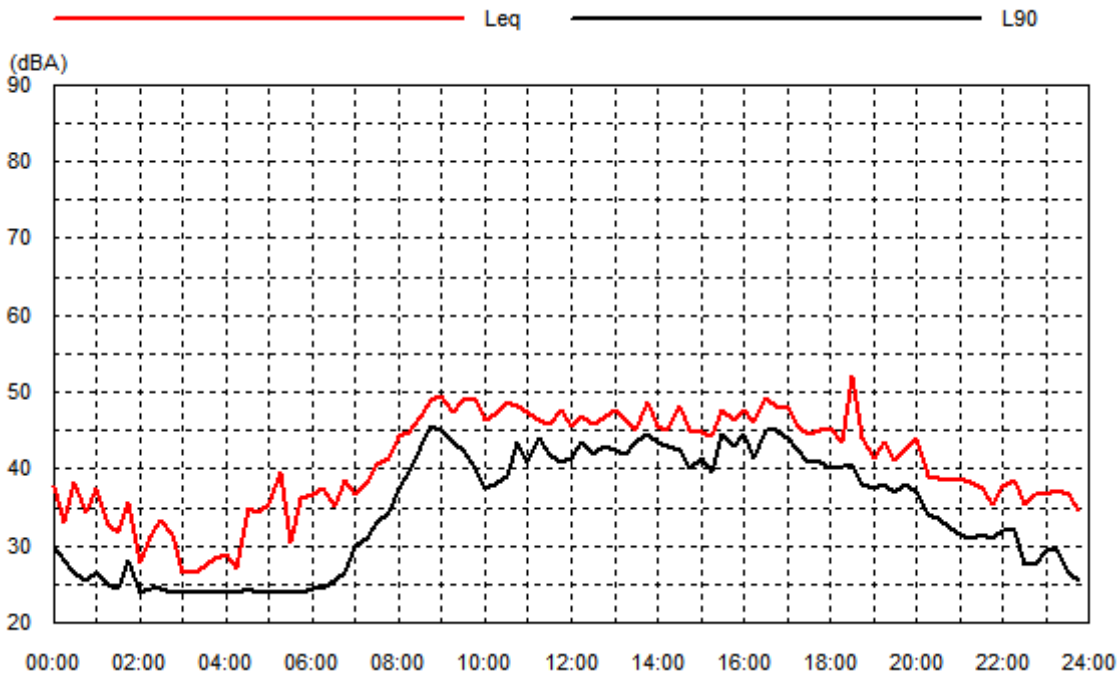



**Wed 29 Apr 15**

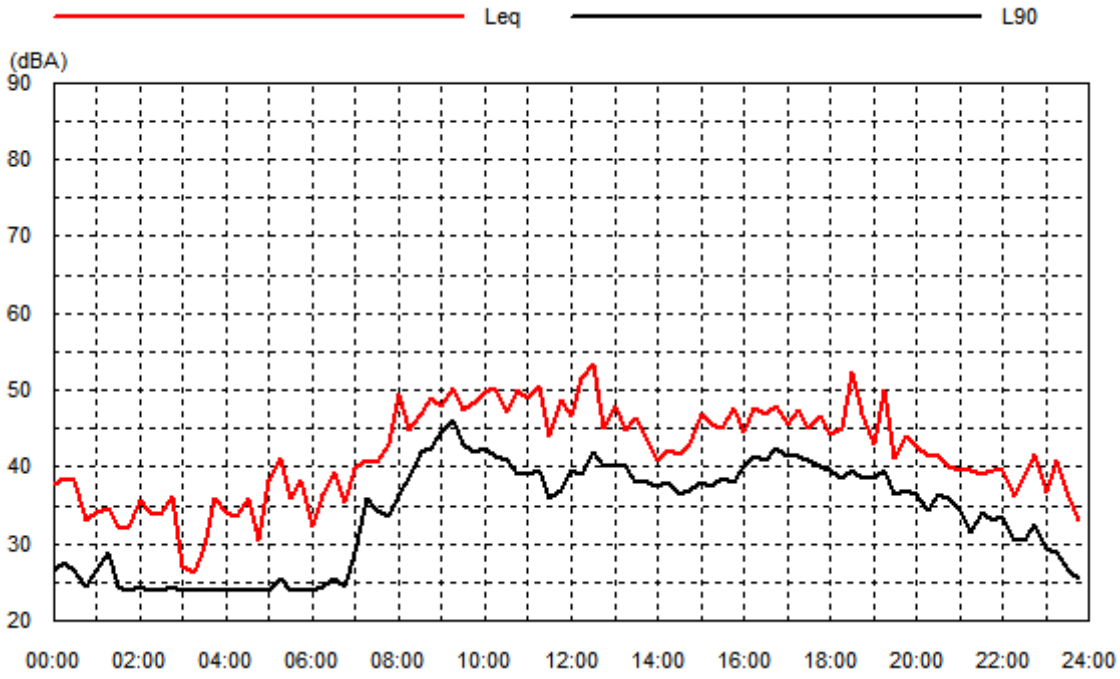


**Location: Location 2 - 29 Fishburn St**
Data shaded: extraneous noise

**Thu 30 Apr 15**

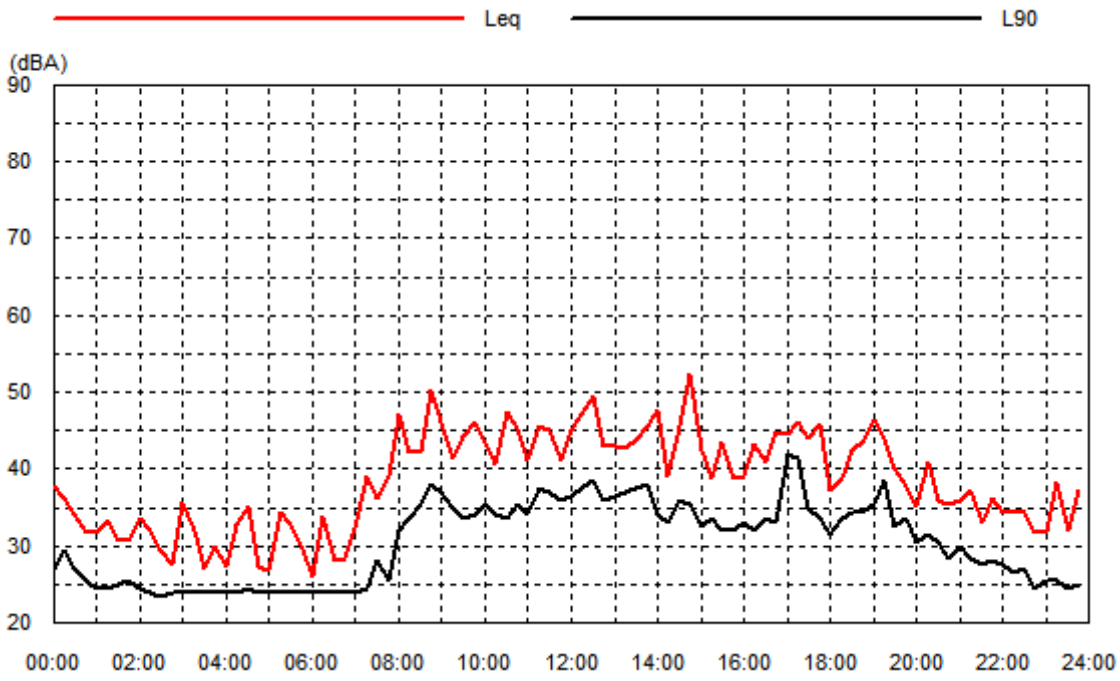



**Fri 01 May 15**

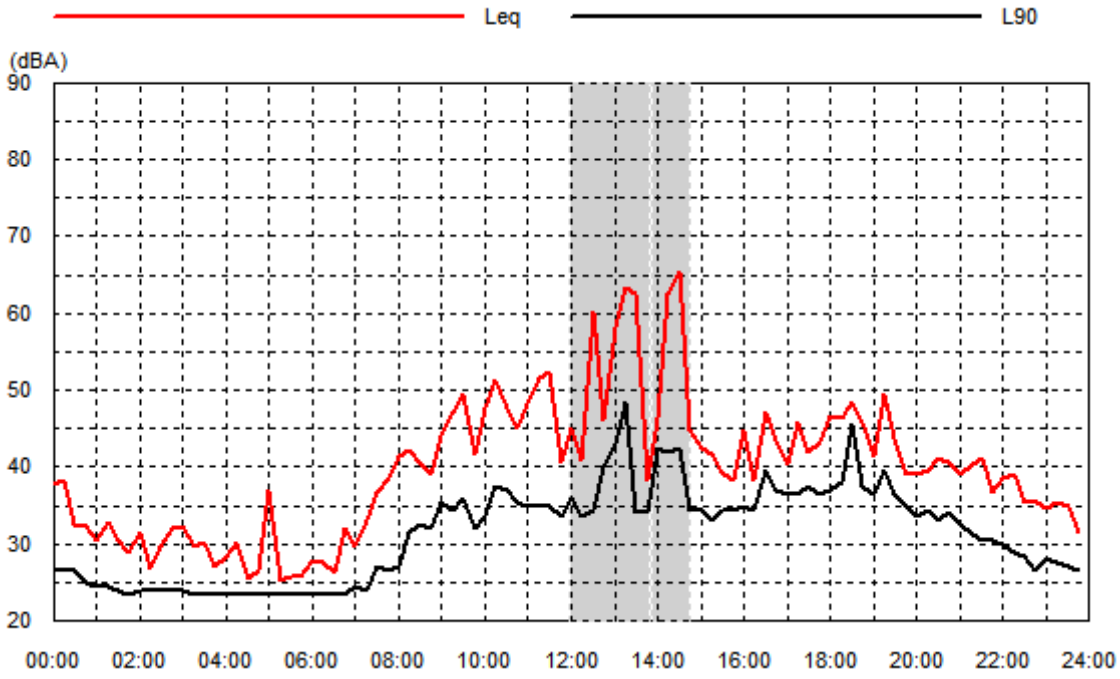


**Location: Location 2 - 29 Fishburn St**
Data shaded: extraneous noise

**Sat 02 May 15**

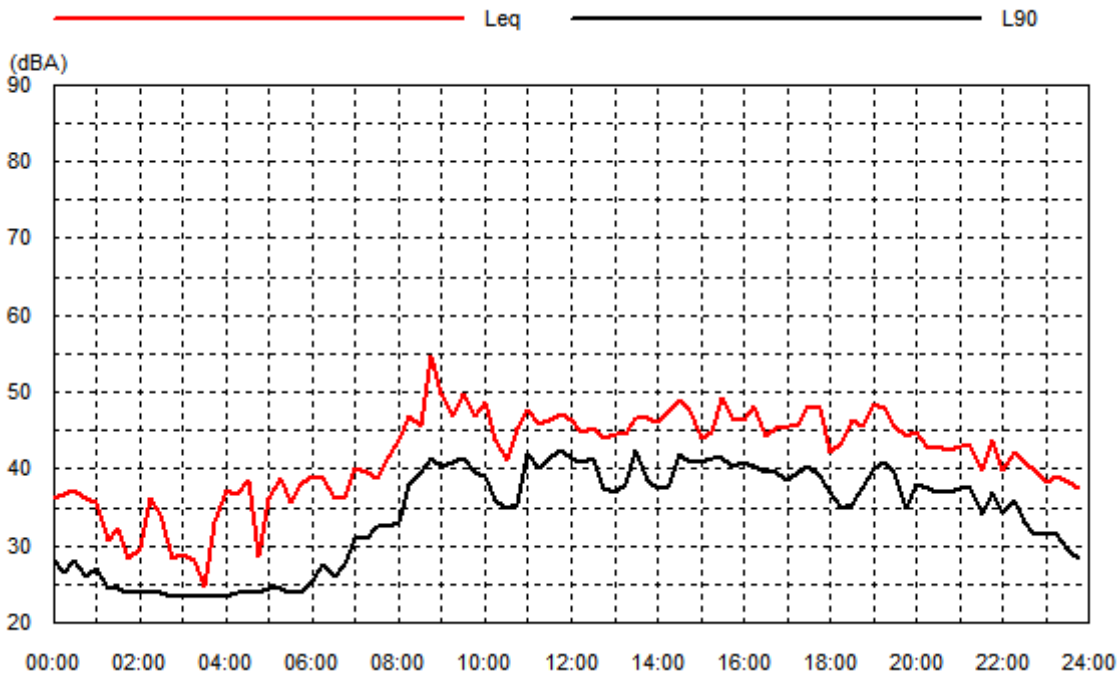



**Sun 03 May 15**

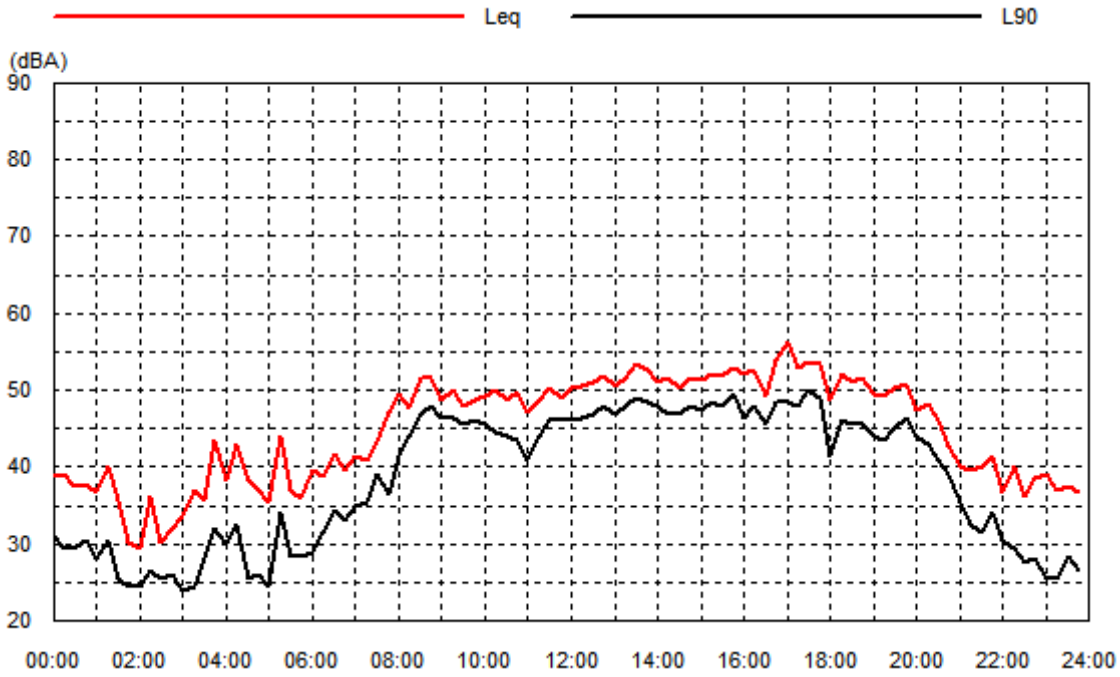


**Location: Location 2 - 29 Fishburn St**
Data shaded: extraneous noise

**Mon 04 May 15**

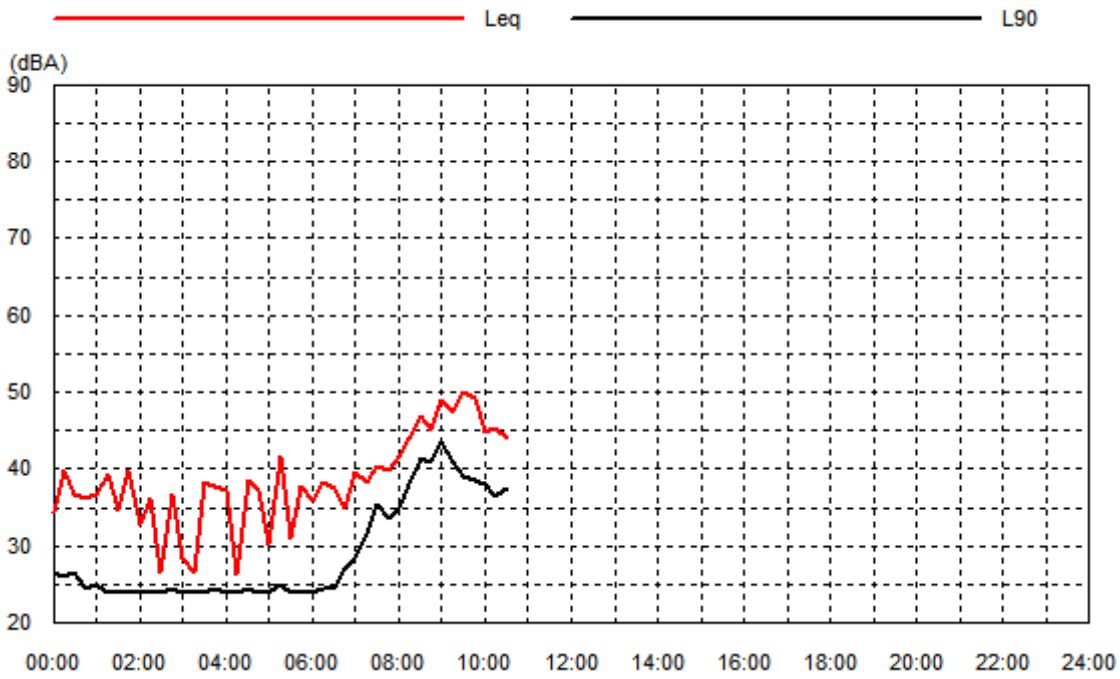



**Tue 05 May 15**



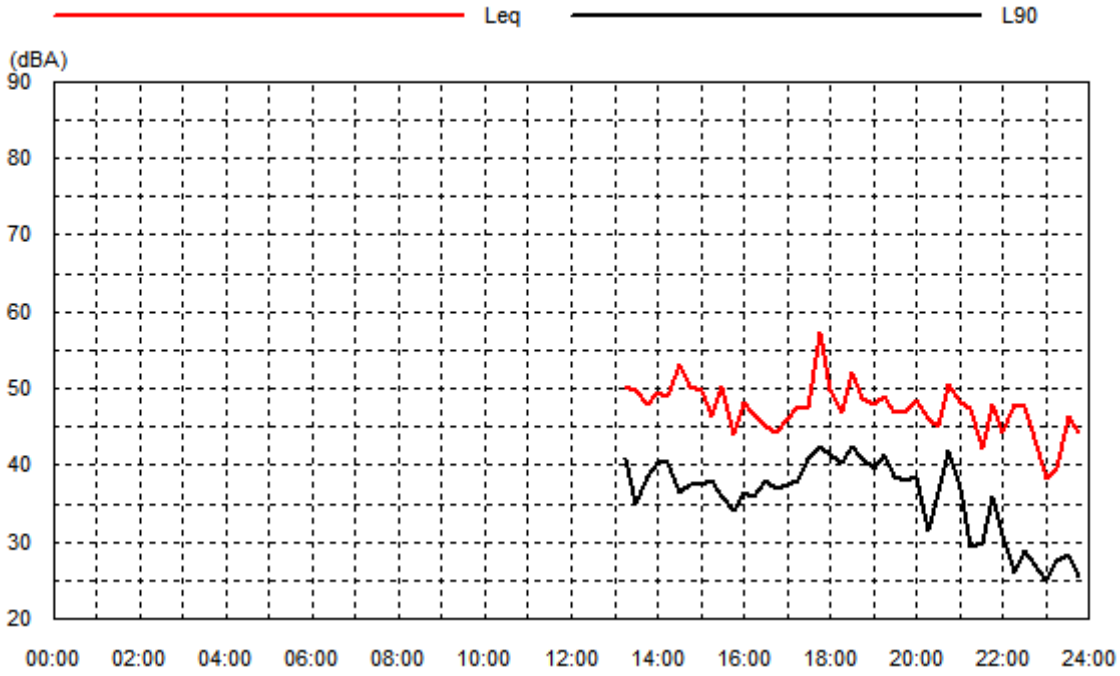
**Location: Location 2 - 29 Fishburn St**
Data shaded: extraneous noise

**Wed 06 May 15**

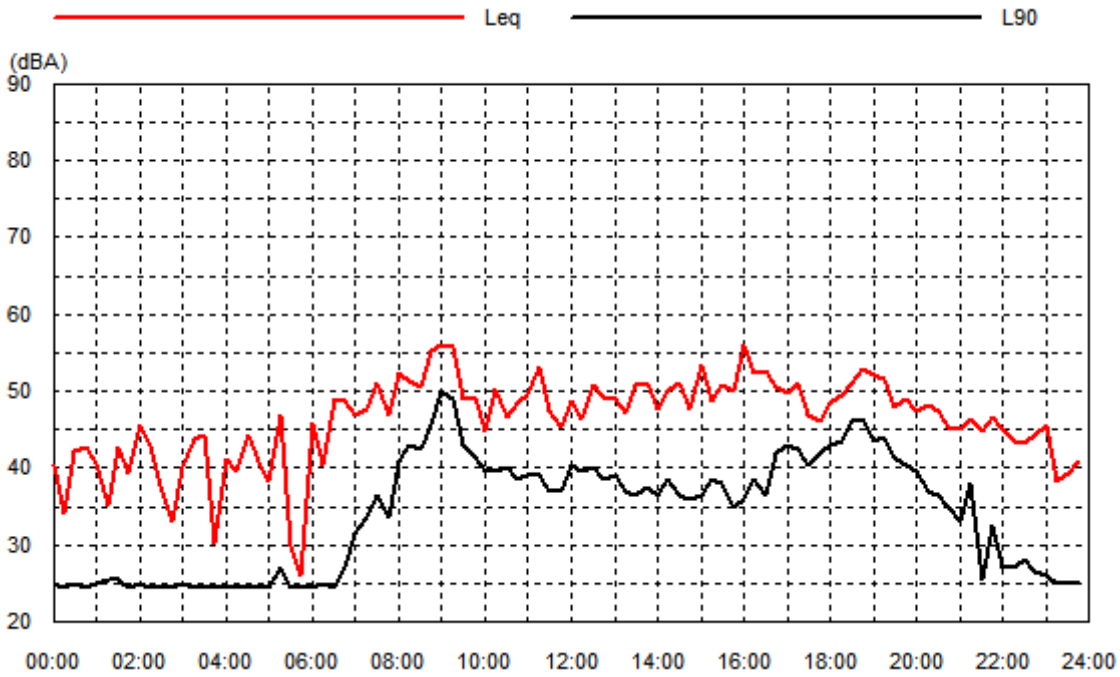


**Location: Location 3 - 37 Campbell Street**
Data shaded: extraneous noise

**Tue 28 Apr 15**

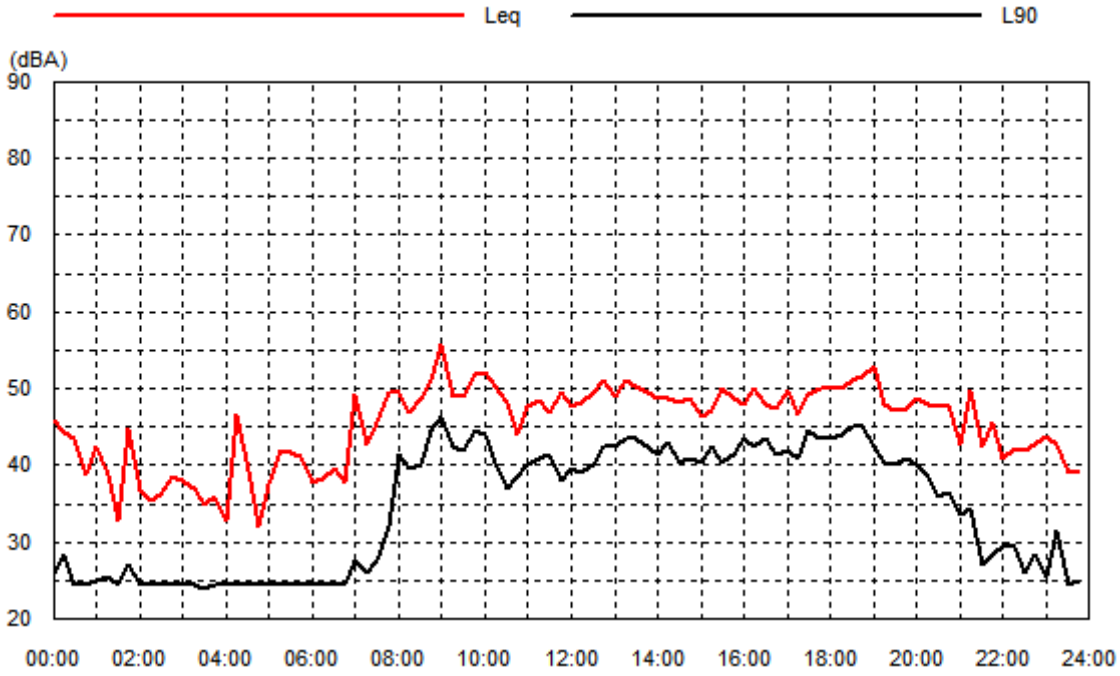



**Wed 29 Apr 15**

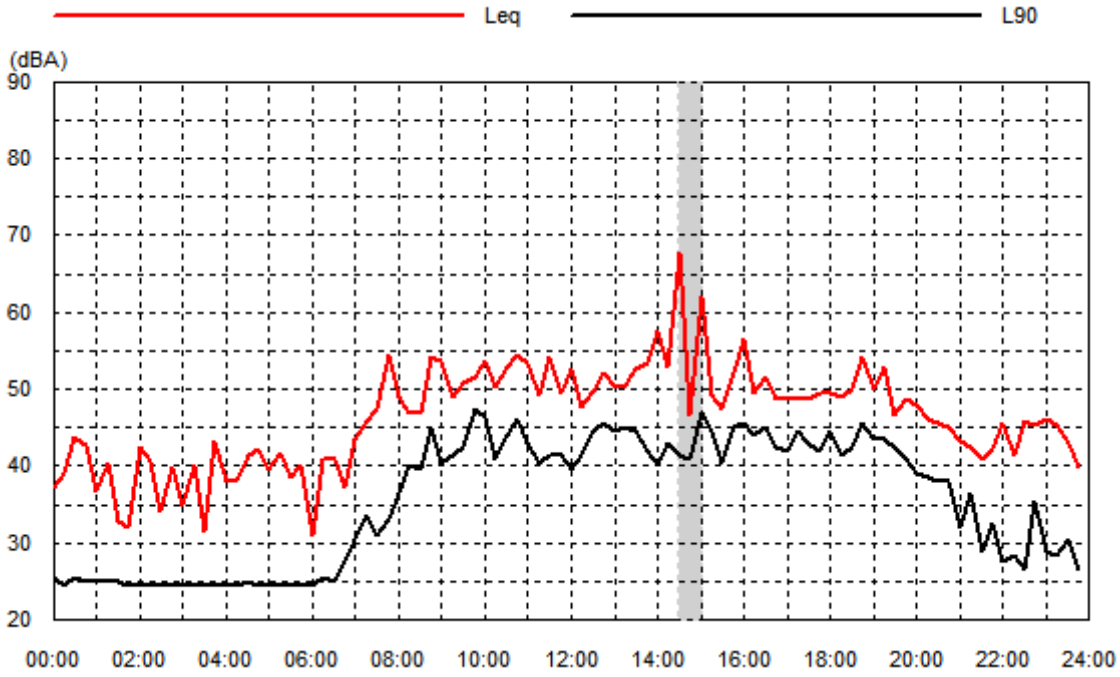


**Location: Location 3 - 37 Campbell Street**
Data shaded: extraneous noise

**Thu 30 Apr 15**

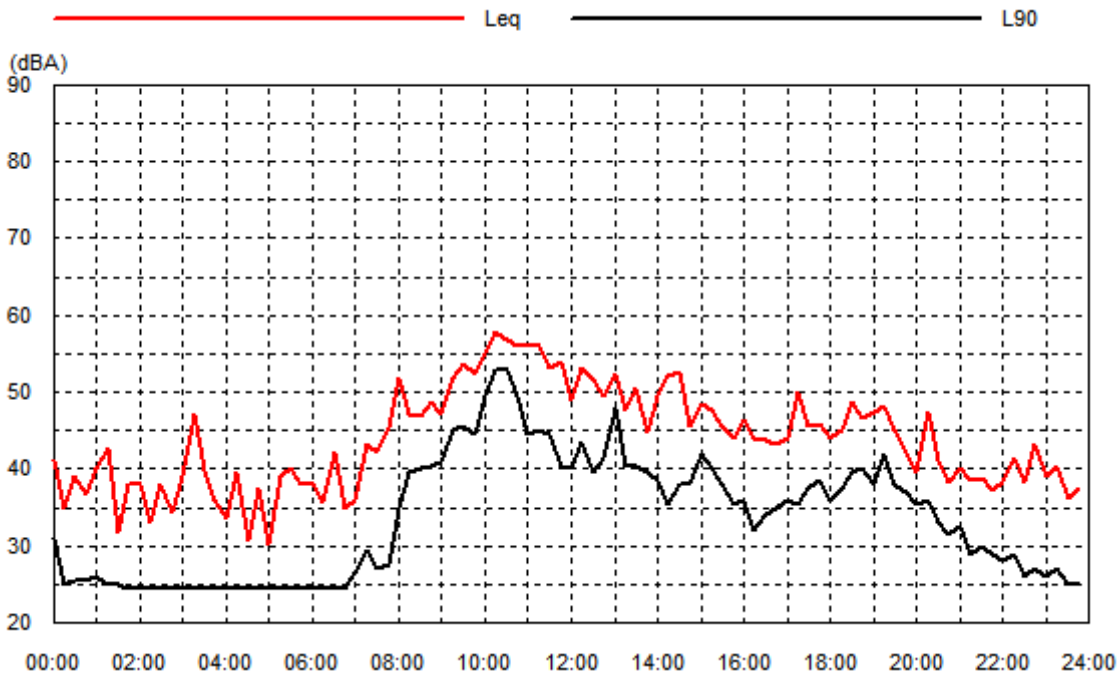



**Fri 01 May 15**

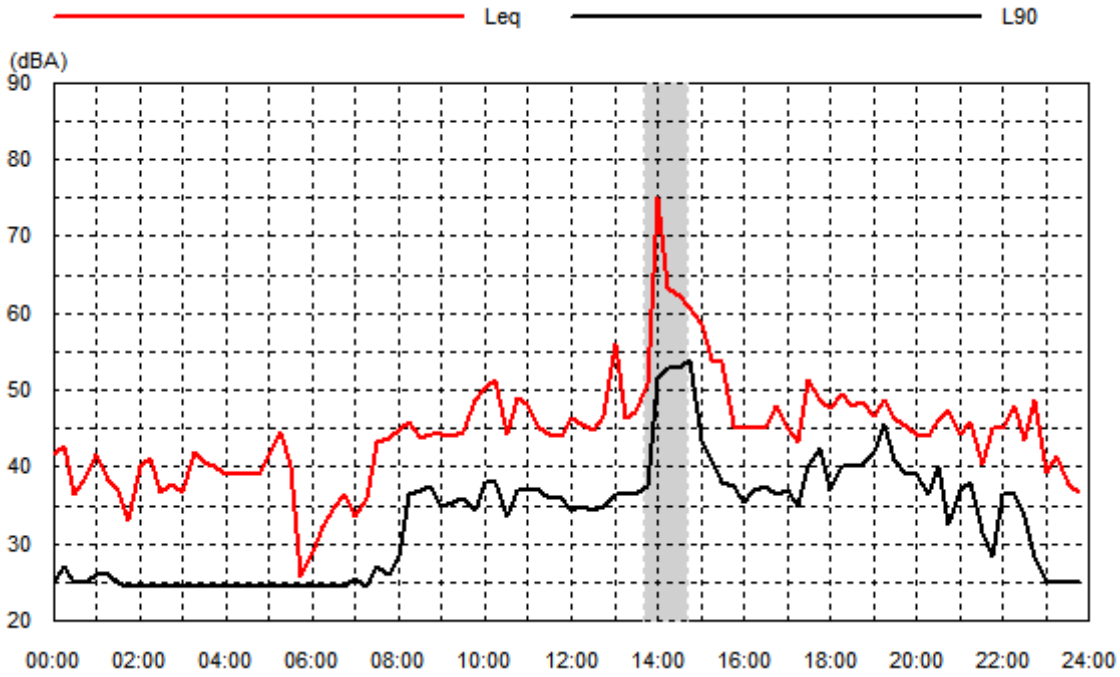


**Location: Location 3 - 37 Campbell Street**
Data shaded: extraneous noise

**Sat 02 May 15**

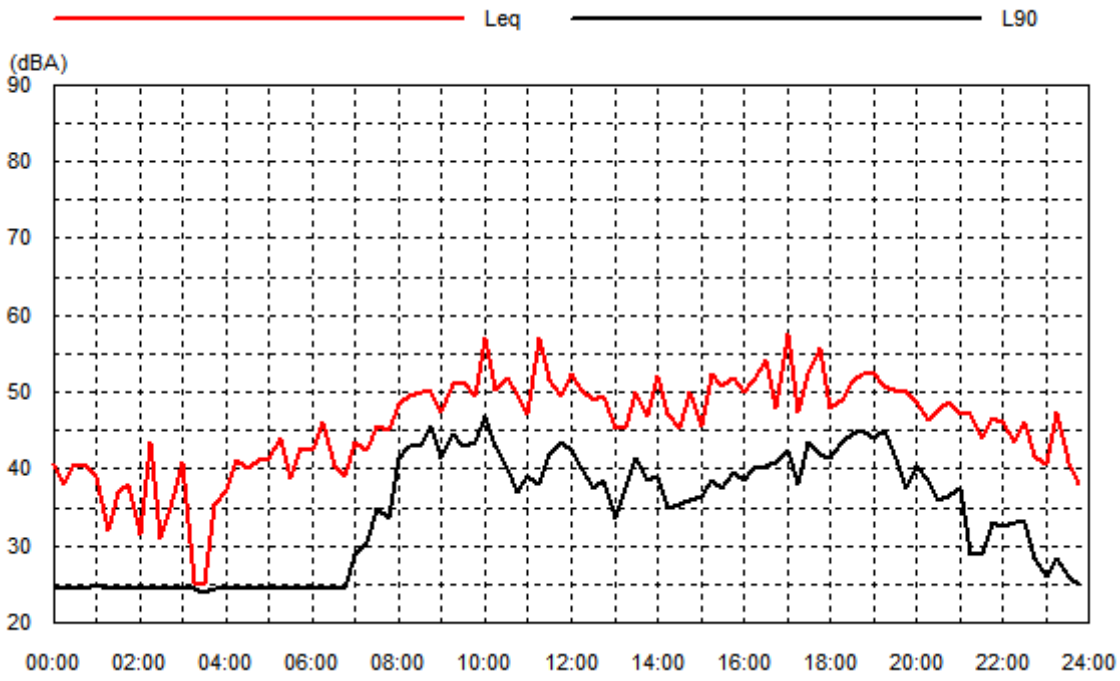



**Sun 03 May 15**

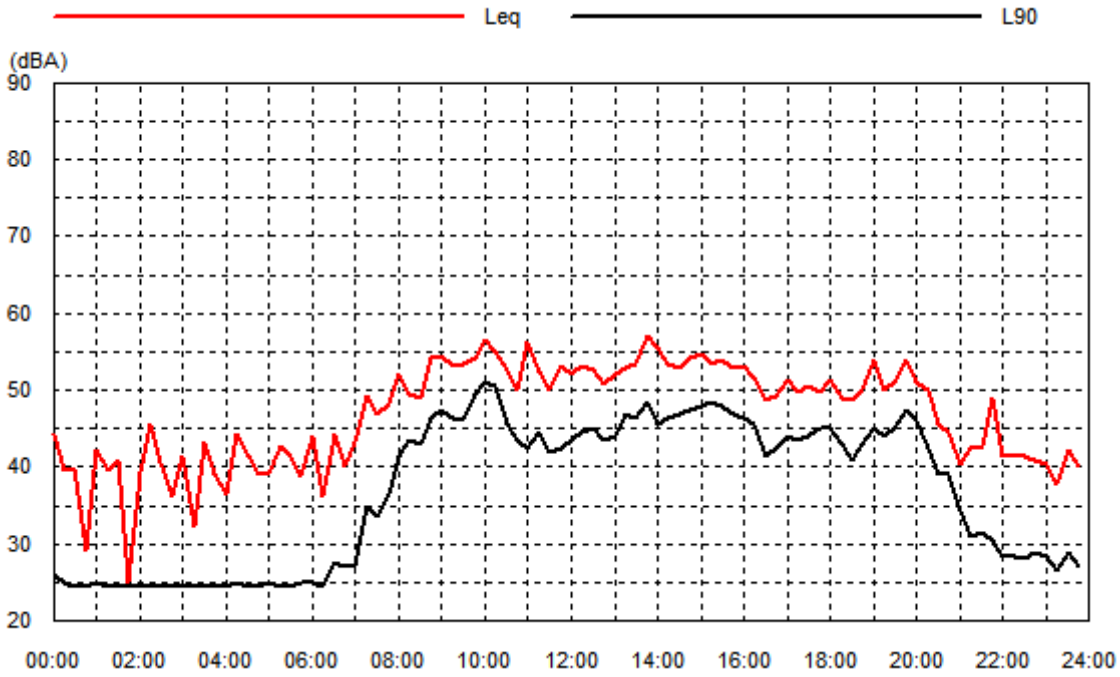


**Location: Location 3 - 37 Campbell Street**
Data shaded: extraneous noise

**Mon 04 May 15**

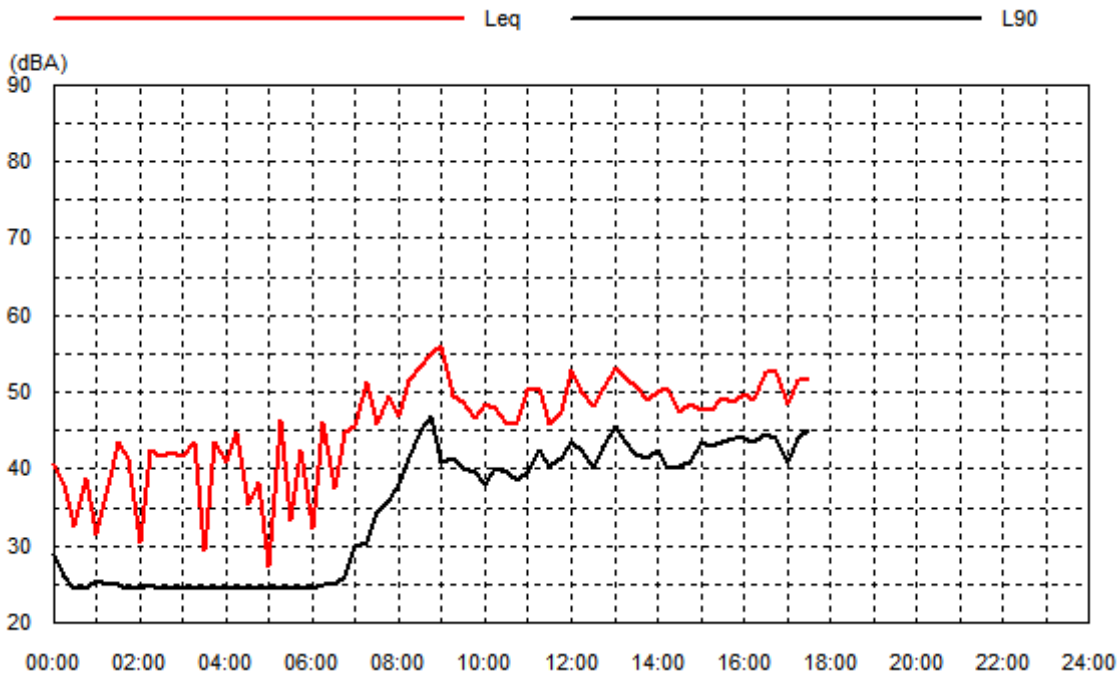



**Tue 05 May 15**



**Location: Location 3 - 37 Campbell Street**
Data shaded: extraneous noise

**Wed 06 May 15**



# Appendix B

## Year 2015 Predicted $L_{AEQ}$ Noise Levels

## (Without Mitigation)

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA A001 | 48 | 41 | 53 | 47 |
| NCA A002 | 47 | 40 | 55 | 49 |
| NCA A003 | 41 | 34 | 43 | 36 |
| NCA A004 | 45 | 38 | 53 | 47 |
| NCA A005 | 41 | 34 | 47 | 40 |
| NCA A006 | 40 | 33 | 44 | 38 |
| NCA A007 | 39 | 32 | 43 | 36 |
| NCA A008 | 38 | 32 | 41 | 35 |
| NCA A009 | 48 | 42 | 57 | 51 |
| NCA A010 | 42 | 35 | 50 | 43 |
| NCA A011 | 43 | 36 | 51 | 45 |
| NCA A012 | 38 | 31 | 41 | 35 |
| NCA A013 | 38 | 31 | 41 | 35 |
| NCA A014 | 44 | 38 | 53 | 47 |
| NCA A015 | 42 | 36 | 51 | 45 |
| NCA A016 | 38 | 31 | 46 | 40 |
| NCA A017 | 40 | 33 | 48 | 42 |
| NCA A018 | 46 | 39 | 55 | 49 |
| NCA A019 | 40 | 33 | 49 | 43 |
| NCA A020 | 44 | 38 | 54 | 48 |
| NCA A021 | 45 | 39 | 55 | 48 |
| NCA A022 | 36 | 30 | 44 | 38 |
| NCA A023 | 44 | 37 | 54 | 47 |
| NCA A024 | 39 | 33 | 49 | 43 |
| NCA A025 | 36 | 30 | 44 | 38 |
| NCA A026 | 35 | 30 | 44 | 38 |
| NCA A027 | 43 | 37 | 53 | 46 |
| NCA A028 | 42 | 35 | 51 | 45 |
| NCA A029 | 35 | 30 | 45 | 38 |
| NCA A030 | 45 | 39 | 55 | 48 |
| NCA A031 | 44 | 38 | 54 | 48 |
| NCA A032 | 47 | 41 | 57 | 51 |
| NCA A033 | 46 | 39 | 55 | 49 |
| NCA A034 | 37 | 30 | 47 | 41 |
| NCA A035 | 35 | 30 | 43 | 37 |
| NCA A036 | 37 | 31 | 46 | 39 |
| NCA A037 | 35 | 30 | 43 | 37 |
| NCA A038 | 47 | 41 | 57 | 51 |
| NCA A040 | 38 | 31 | 39 | 32 |
| NCA A041 | 37 | 31 | 38 | 31 |
| NCA A042 | 38 | 31 | 38 | 32 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA A043 | 38 | 31 | 38 | 32 |
| NCA A044 | 38 | 31 | 38 | 32 |
| NCA A045 | 38 | 31 | 38 | 32 |
| NCA A046 | 35 | 30 | 37 | 31 |
| NCA A047 | 37 | 30 | 38 | 31 |
| NCA A048 | 37 | 31 | 38 | 31 |
| NCA A049 | 36 | 30 | 38 | 31 |
| NCA A050 | 37 | 31 | 38 | 31 |
| NCA A051 | 37 | 31 | 38 | 31 |
| NCA A052 | 37 | 31 | 38 | 31 |
| NCA A053 | 37 | 31 | 38 | 32 |
| NCA A054 | 37 | 30 | 38 | 32 |
| NCA A055 | 38 | 31 | 38 | 32 |
| NCA A056 | 36 | 30 | 38 | 31 |
| NCA A057 | 38 | 31 | 38 | 32 |
| NCA A058 | 39 | 32 | 39 | 33 |
| NCA A059 | 37 | 31 | 39 | 32 |
| NCA A060 | 37 | 30 | 38 | 32 |
| NCA A061 | 36 | 30 | 39 | 33 |
| NCA A062 | 37 | 30 | 38 | 32 |
| NCA A063 | 37 | 31 | 39 | 32 |
| NCA A064 | 37 | 30 | 39 | 32 |
| NCA A065 | 36 | 30 | 40 | 33 |
| NCA A066 | 35 | 30 | 41 | 35 |
| NCA A067 | 36 | 30 | 40 | 34 |
| NCA A068 | 36 | 30 | 39 | 33 |
| NCA A069 | 35 | 30 | 42 | 36 |
| NCA A070 | 39 | 33 | 49 | 42 |
| NCA A071 | 37 | 30 | 39 | 33 |
| NCA A072 | 36 | 30 | 40 | 33 |
| NCA A073 | 36 | 30 | 40 | 34 |
| NCA A074 | 37 | 30 | 39 | 32 |
| NCA A075 | 37 | 30 | 39 | 33 |
| NCA A076 | 37 | 30 | 39 | 32 |
| NCA A077 | 35 | 30 | 39 | 32 |
| NCA A078 | 36 | 30 | 40 | 34 |
| NCA A079 | 35 | 30 | 40 | 34 |
| NCA A080 | 36 | 30 | 40 | 33 |
| NCA A081 | 36 | 30 | 41 | 34 |
| NCA A082 | 37 | 30 | 41 | 34 |
| NCA A083 | 37 | 30 | 40 | 33 |
| NCA A084 | 37 | 31 | 40 | 34 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA A085 | 37 | 31 | 39 | 33 |
| NCA A086 | 37 | 31 | 39 | 33 |
| NCA A087 | 37 | 30 | 39 | 33 |
| NCA A088 | 37 | 31 | 39 | 33 |
| NCA A089 | 37 | 31 | 44 | 37 |
| NCA A090 | 38 | 32 | 45 | 39 |
| NCA A091 | 38 | 32 | 39 | 33 |
| NCA A092 | 38 | 31 | 39 | 33 |
| NCA A093 | 37 | 31 | 39 | 33 |
| NCA A094 | 38 | 31 | 40 | 33 |
| NCA A095 | 37 | 30 | 40 | 33 |
| NCA A096 | 37 | 30 | 40 | 33 |
| NCA A097 | 37 | 30 | 40 | 33 |
| NCA A098 | 38 | 31 | 40 | 34 |
| NCA A099 | 38 | 31 | 41 | 35 |
| NCA A100 | 40 | 33 | 40 | 34 |
| NCA A101 | 40 | 33 | 40 | 34 |
| NCA A102 | 39 | 33 | 40 | 33 |
| NCA A103 | 39 | 33 | 40 | 34 |
| NCA A104 | 40 | 33 | 41 | 34 |
| NCA A105 | 40 | 34 | 41 | 35 |
| NCA A106 | 42 | 35 | 43 | 36 |
| NCA A107 | 42 | 35 | 42 | 35 |
| NCA A108 | 44 | 38 | 54 | 48 |
| NCA A109 | 45 | 38 | 54 | 48 |
| NCA A110 | 44 | 37 | 53 | 47 |
| NCA A111 | 45 | 38 | 55 | 48 |
| NCA A112 | 38 | 31 | 47 | 40 |
| NCA A113 | 37 | 30 | 45 | 39 |
| NCA A114 | 36 | 30 | 45 | 39 |
| NCA A115 | 36 | 30 | 42 | 36 |
| NCA A116 | 34 | 30 | 42 | 36 |
| NCA A117 | 43 | 36 | 53 | 46 |
| NCA A118 | 34 | 30 | 41 | 35 |
| NCA A119 | 32 | 30 | 40 | 33 |
| NCA A120 | 30 | 30 | 40 | 33 |
| NCA A121 | 30 | 30 | 38 | 32 |
| NCA A122 | 30 | 30 | 37 | 31 |
| NCA A123 | 30 | 30 | 41 | 35 |
| NCA A124 | 30 | 30 | 39 | 33 |
| NCA A125 | 30 | 30 | 37 | 30 |
| NCA A126 | 30 | 30 | 36 | 29 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA A127 | 30 | 30 | 35 | 29 |
| NCA A128 | 30 | 30 | 40 | 34 |
| NCA A039 | 37 | 30 | 48 | 42 |
| NCA B001 | 35 | 30 | 45 | 39 |
| NCA B002 | 35 | 30 | 44 | 39 |
| NCA B003 | 34 | 30 | 45 | 39 |
| NCA B004 | 34 | 30 | 46 | 40 |
| NCA B005 | 34 | 30 | 48 | 43 |
| NCA B006 | 33 | 30 | 49 | 44 |
| NCA B007 | 34 | 30 | 57 | 51 |
| NCA B008 | 34 | 30 | 55 | 50 |
| NCA B009 | 34 | 30 | 60 | 54 |
| NCA B010 | 35 | 30 | 52 | 46 |
| NCA B011 | 35 | 30 | 51 | 45 |
| NCA B012 | 36 | 30 | 48 | 42 |
| NCA B013 | 37 | 31 | 44 | 38 |
| NCA B014 | 38 | 31 | 42 | 36 |
| NCA B015 | 37 | 31 | 44 | 39 |
| NCA B016 | 37 | 31 | 44 | 38 |
| NCA B017 | 38 | 32 | 42 | 36 |
| NCA B018 | 37 | 31 | 42 | 37 |
| NCA B019 | 37 | 31 | 44 | 38 |
| NCA B020 | 37 | 31 | 44 | 39 |
| NCA B021 | 36 | 30 | 44 | 38 |
| NCA B022 | 36 | 30 | 45 | 39 |
| NCA B023 | 36 | 30 | 46 | 40 |
| NCA B024 | 36 | 30 | 45 | 39 |
| NCA B025 | 36 | 30 | 44 | 39 |
| NCA B026 | 35 | 30 | 47 | 42 |
| NCA B027 | 36 | 30 | 46 | 41 |
| NCA B028 | 37 | 30 | 47 | 41 |
| NCA B029 | 35 | 30 | 49 | 43 |
| NCA B030 | 36 | 30 | 48 | 43 |
| NCA B031 | 36 | 30 | 48 | 43 |
| NCA B032 | 35 | 30 | 54 | 49 |
| NCA B033 | 35 | 30 | 55 | 49 |
| NCA B034 | 35 | 30 | 52 | 47 |
| NCA B035 | 36 | 30 | 52 | 46 |
| NCA B036 | 36 | 30 | 52 | 46 |
| NCA B037 | 38 | 32 | 43 | 38 |
| NCA B038 | 37 | 31 | 43 | 38 |
| NCA B039 | 38 | 32 | 41 | 36 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA B040 | 37 | 31 | 40 | 35 |
| NCA B041 | 39 | 33 | 40 | 35 |
| NCA B042 | 39 | 33 | 40 | 34 |
| NCA B043 | 37 | 31 | 41 | 36 |
| NCA B044 | 37 | 30 | 43 | 37 |
| NCA B045 | 36 | 30 | 43 | 37 |
| NCA B046 | 36 | 30 | 44 | 39 |
| NCA B047 | 37 | 31 | 43 | 37 |
| NCA B048 | 37 | 31 | 43 | 37 |
| NCA B049 | 36 | 30 | 43 | 37 |
| NCA B050 | 35 | 30 | 43 | 37 |
| NCA B051 | 37 | 31 | 40 | 35 |
| NCA B052 | 38 | 31 | 40 | 35 |
| NCA B053 | 36 | 30 | 40 | 34 |
| NCA B054 | 37 | 30 | 40 | 34 |
| NCA B055 | 38 | 32 | 40 | 34 |
| NCA B056 | 36 | 30 | 40 | 34 |
| NCA B057 | 37 | 30 | 39 | 33 |
| NCA B058 | 38 | 32 | 39 | 33 |
| NCA B059 | 38 | 31 | 39 | 33 |
| NCA B060 | 36 | 30 | 40 | 35 |
| NCA B061 | 36 | 30 | 42 | 36 |
| NCA B062 | 35 | 30 | 44 | 39 |
| NCA B063 | 32 | 30 | 49 | 43 |
| NCA B064 | 33 | 30 | 46 | 41 |
| NCA B065 | 34 | 30 | 49 | 44 |
| NCA B066 | 32 | 30 | 49 | 44 |
| NCA B067 | 32 | 30 | 47 | 41 |
| NCA B068 | 32 | 30 | 43 | 38 |
| NCA B069 | 32 | 30 | 46 | 40 |
| NCA B070 | 31 | 30 | 45 | 40 |
| NCA B071 | 32 | 30 | 45 | 40 |
| NCA B072 | 32 | 30 | 51 | 45 |
| NCA B073 | 35 | 30 | 54 | 49 |
| NCA B074 | 39 | 33 | 61 | 55 |
| NCA B075 | 41 | 34 | 53 | 46 |
| NCA B076 | 32 | 30 | 44 | 38 |
| NCA B077 | 33 | 30 | 43 | 37 |
| NCA B078 | 34 | 30 | 43 | 38 |
| NCA B079 | 35 | 30 | 42 | 36 |
| NCA B080 | 35 | 30 | 42 | 36 |
| NCA B081 | 34 | 30 | 41 | 35 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA B082 | 35 | 30 | 41 | 35 |
| NCA B083 | 35 | 30 | 42 | 36 |
| NCA B084 | 35 | 30 | 40 | 35 |
| NCA B085 | 35 | 30 | 39 | 33 |
| NCA B086 | 33 | 30 | 41 | 35 |
| NCA B087 | 35 | 30 | 40 | 34 |
| NCA B088 | 34 | 30 | 41 | 35 |
| NCA B089 | 34 | 30 | 42 | 36 |
| NCA B090 | 35 | 30 | 41 | 35 |
| NCA B091 | 32 | 30 | 43 | 37 |
| NCA B092 | 33 | 30 | 41 | 36 |
| NCA B093 | 33 | 30 | 42 | 36 |
| NCA B094 | 35 | 30 | 41 | 36 |
| NCA B095 | 37 | 31 | 39 | 33 |
| NCA B096 | 37 | 31 | 39 | 33 |
| NCA B097 | 36 | 30 | 40 | 34 |
| NCA B098 | 36 | 30 | 40 | 35 |
| NCA B099 | 35 | 30 | 40 | 34 |
| NCA B100 | 35 | 30 | 39 | 33 |
| NCA B101 | 33 | 30 | 39 | 33 |
| NCA B102 | 33 | 30 | 41 | 35 |
| NCA B103 | 36 | 30 | 40 | 34 |
| NCA B104 | 33 | 30 | 38 | 32 |
| NCA B105 | 36 | 30 | 40 | 34 |
| NCA B106 | 36 | 30 | 41 | 35 |
| NCA B107 | 35 | 30 | 41 | 35 |
| NCA B108 | 35 | 30 | 39 | 33 |
| NCA B109 | 36 | 30 | 40 | 35 |
| NCA B110 | 36 | 30 | 39 | 34 |
| NCA B111 | 36 | 30 | 39 | 33 |
| NCA B112 | 36 | 30 | 41 | 35 |
| NCA B113 | 36 | 30 | 39 | 33 |
| NCA B114 | 33 | 30 | 41 | 35 |
| NCA B115 | 37 | 31 | 39 | 33 |
| NCA B116 | 36 | 30 | 39 | 33 |
| NCA B117 | 37 | 30 | 39 | 33 |
| NCA B118 | 37 | 31 | 39 | 33 |
| NCA B119 | 37 | 31 | 40 | 34 |
| NCA B120 | 37 | 30 | 38 | 31 |
| NCA B121 | 38 | 31 | 39 | 33 |
| NCA B122 | 37 | 30 | 40 | 34 |
| NCA B123 | 37 | 31 | 40 | 34 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA B124 | 36 | 30 | 40 | 34 |
| NCA B125 | 36 | 30 | 40 | 34 |
| NCA B126 | 37 | 30 | 40 | 34 |
| NCA B127 | 37 | 30 | 40 | 34 |
| NCA B128 | 37 | 30 | 39 | 34 |
| NCA B129 | 35 | 30 | 39 | 34 |
| NCA B130 | 36 | 30 | 38 | 32 |
| NCA B131 | 37 | 30 | 39 | 33 |
| NCA B132 | 37 | 30 | 39 | 34 |
| NCA B133 | 34 | 30 | 53 | 47 |
| NCA B134 | 34 | 30 | 51 | 45 |
| NCA B135 | 33 | 30 | 44 | 39 |
| NCA B136 | 32 | 30 | 46 | 40 |
| NCA B137 | 32 | 30 | 45 | 40 |
| NCA B138 | 32 | 30 | 45 | 39 |
| NCA B139 | 31 | 30 | 43 | 37 |
| NCA B140 | 31 | 30 | 43 | 37 |
| NCA B141 | 31 | 30 | 45 | 39 |
| NCA B142 | 30 | 30 | 42 | 37 |
| NCA B143 | 30 | 30 | 41 | 36 |
| NCA B144 | 30 | 30 | 43 | 37 |
| NCA B145 | 30 | 30 | 42 | 36 |
| NCA B146 | 30 | 30 | 43 | 38 |
| NCA B147 | 34 | 30 | 53 | 48 |
| NCA B148 | 33 | 30 | 49 | 44 |
| NCA B149 | 31 | 30 | 43 | 37 |
| NCA B150 | 30 | 30 | 41 | 35 |
| NCA B151 | 30 | 30 | 41 | 35 |
| NCA B152 | 30 | 30 | 42 | 36 |
| NCA B153 | 30 | 30 | 40 | 35 |
| NCA B154 | 30 | 30 | 41 | 35 |
| NCA B155 | 30 | 30 | 40 | 35 |
| NCA B156 | 30 | 30 | 40 | 34 |
| NCA B157 | 30 | 30 | 40 | 34 |
| NCA B158 | 30 | 30 | 39 | 34 |
| NCA B159 | 30 | 30 | 37 | 31 |
| NCA B160 | 30 | 30 | 39 | 33 |
| NCA B161 | 30 | 30 | 39 | 33 |
| NCA B162 | 30 | 30 | 38 | 33 |
| NCA B163 | 30 | 30 | 38 | 32 |
| NCA B164 | 30 | 30 | 39 | 33 |
| NCA B165 | 30 | 30 | 40 | 34 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA B166 | 30 | 30 | 39 | 34 |
| NCA B167 | 30 | 30 | 39 | 33 |
| NCA B168 | 30 | 30 | 40 | 35 |
| NCA B169 | 30 | 30 | 39 | 33 |
| NCA B170 | 30 | 30 | 38 | 32 |
| NCA B171 | 30 | 30 | 39 | 33 |
| NCA B172 | 30 | 30 | 39 | 34 |
| NCA B173 | 30 | 30 | 40 | 35 |
| NCA B174 | 30 | 30 | 40 | 34 |
| NCA B175 | 30 | 30 | 39 | 33 |
| NCA B176 | 30 | 30 | 39 | 34 |
| NCA B177 | 30 | 30 | 40 | 34 |
| NCA B178 | 30 | 30 | 41 | 35 |
| NCA B179 | 30 | 30 | 39 | 33 |
| NCA B180 | 30 | 30 | 40 | 34 |
| NCA B181 | 30 | 30 | 40 | 35 |
| NCA B182 | 30 | 30 | 42 | 36 |
| NCA B183 | 30 | 30 | 40 | 34 |
| NCA B184 | 30 | 30 | 40 | 35 |
| NCA B185 | 30 | 30 | 41 | 36 |
| NCA B186 | 30 | 30 | 41 | 36 |
| NCA B187 | 31 | 30 | 42 | 37 |
| NCA B188 | 30 | 30 | 41 | 36 |
| NCA B189 | 31 | 30 | 43 | 37 |
| NCA B190 | 31 | 30 | 42 | 37 |
| NCA B191 | 31 | 30 | 42 | 36 |
| NCA B192 | 37 | 30 | 55 | 49 |
| NCA B193 | 34 | 30 | 50 | 44 |
| NCA B194 | 35 | 30 | 50 | 44 |
| NCA B195 | 35 | 30 | 49 | 44 |
| NCA B196 | 35 | 30 | 46 | 41 |
| NCA B197 | 43 | 35 | 56 | 50 |
| NCA C001 | 36 | 30 | 45 | 40 |
| NCA C002 | 36 | 30 | 45 | 40 |
| NCA C003 | 35 | 30 | 45 | 40 |
| NCA C004 | 36 | 30 | 45 | 40 |
| NCA C005 | 36 | 30 | 45 | 40 |
| NCA C006 | 35 | 30 | 45 | 40 |
| NCA C007 | 35 | 30 | 45 | 40 |
| NCA C008 | 36 | 30 | 45 | 39 |
| NCA C009 | 35 | 30 | 45 | 40 |
| NCA C010 | 35 | 30 | 45 | 40 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C011 | 34 | 30 | 45 | 40 |
| NCA C012 | 35 | 30 | 45 | 40 |
| NCA C013 | 34 | 30 | 45 | 40 |
| NCA C014 | 34 | 30 | 46 | 40 |
| NCA C015 | 35 | 30 | 47 | 41 |
| NCA C016 | 37 | 30 | 48 | 43 |
| NCA C017 | 39 | 31 | 50 | 45 |
| NCA C018 | 35 | 30 | 43 | 38 |
| NCA C019 | 34 | 30 | 43 | 38 |
| NCA C020 | 36 | 30 | 42 | 37 |
| NCA C021 | 36 | 30 | 43 | 37 |
| NCA C022 | 35 | 30 | 43 | 38 |
| NCA C023 | 34 | 30 | 45 | 40 |
| NCA C024 | 34 | 30 | 45 | 40 |
| NCA C025 | 35 | 30 | 46 | 40 |
| NCA C026 | 35 | 30 | 46 | 40 |
| NCA C027 | 35 | 30 | 46 | 41 |
| NCA C028 | 37 | 30 | 48 | 43 |
| NCA C029 | 38 | 31 | 50 | 44 |
| NCA C030 | 41 | 33 | 52 | 47 |
| NCA C031 | 42 | 34 | 53 | 48 |
| NCA C032 | 34 | 30 | 44 | 38 |
| NCA C033 | 35 | 30 | 43 | 38 |
| NCA C034 | 34 | 30 | 44 | 39 |
| NCA C035 | 33 | 30 | 44 | 38 |
| NCA C036 | 35 | 30 | 45 | 40 |
| NCA C037 | 35 | 30 | 46 | 40 |
| NCA C038 | 40 | 32 | 51 | 45 |
| NCA C039 | 40 | 33 | 51 | 46 |
| NCA C040 | 34 | 30 | 43 | 38 |
| NCA C041 | 34 | 30 | 43 | 38 |
| NCA C042 | 34 | 30 | 44 | 39 |
| NCA C043 | 35 | 30 | 42 | 37 |
| NCA C044 | 35 | 30 | 43 | 38 |
| NCA C045 | 35 | 30 | 45 | 40 |
| NCA C046 | 39 | 32 | 50 | 45 |
| NCA C047 | 35 | 30 | 42 | 36 |
| NCA C048 | 35 | 30 | 43 | 37 |
| NCA C049 | 34 | 30 | 44 | 39 |
| NCA C050 | 37 | 30 | 48 | 43 |
| NCA C051 | 45 | 37 | 56 | 51 |
| NCA C052 | 43 | 35 | 54 | 49 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C053 | 41 | 33 | 52 | 47 |
| NCA C054 | 41 | 33 | 52 | 47 |
| NCA C055 | 38 | 30 | 48 | 43 |
| NCA C056 | 34 | 30 | 44 | 38 |
| NCA C057 | 36 | 30 | 47 | 41 |
| NCA C058 | 34 | 30 | 43 | 38 |
| NCA C059 | 35 | 30 | 43 | 37 |
| NCA C060 | 35 | 30 | 42 | 36 |
| NCA C061 | 35 | 30 | 42 | 36 |
| NCA C062 | 36 | 30 | 42 | 36 |
| NCA C063 | 35 | 30 | 41 | 36 |
| NCA C064 | 34 | 30 | 43 | 37 |
| NCA C065 | 36 | 30 | 46 | 41 |
| NCA C066 | 41 | 33 | 52 | 46 |
| NCA C067 | 39 | 31 | 50 | 45 |
| NCA C068 | 40 | 32 | 50 | 45 |
| NCA C069 | 40 | 32 | 50 | 45 |
| NCA C070 | 39 | 31 | 49 | 44 |
| NCA C071 | 35 | 30 | 46 | 40 |
| NCA C072 | 35 | 30 | 45 | 40 |
| NCA C073 | 35 | 30 | 45 | 39 |
| NCA C074 | 35 | 30 | 43 | 37 |
| NCA C075 | 38 | 31 | 49 | 43 |
| NCA C076 | 35 | 30 | 43 | 38 |
| NCA C077 | 35 | 30 | 42 | 37 |
| NCA C078 | 34 | 30 | 43 | 38 |
| NCA C079 | 35 | 30 | 41 | 36 |
| NCA C080 | 35 | 30 | 41 | 36 |
| NCA C081 | 35 | 30 | 42 | 36 |
| NCA C082 | 35 | 30 | 42 | 36 |
| NCA C083 | 35 | 30 | 41 | 36 |
| NCA C084 | 36 | 30 | 41 | 35 |
| NCA C085 | 35 | 30 | 41 | 36 |
| NCA C086 | 36 | 30 | 40 | 35 |
| NCA C087 | 35 | 30 | 41 | 36 |
| NCA C088 | 35 | 30 | 41 | 35 |
| NCA C089 | 36 | 30 | 40 | 35 |
| NCA C090 | 36 | 30 | 40 | 35 |
| NCA C091 | 36 | 30 | 39 | 34 |
| NCA C092 | 36 | 30 | 40 | 34 |
| NCA C093 | 36 | 30 | 41 | 35 |
| NCA C094 | 35 | 30 | 41 | 35 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C095 | 35 | 30 | 41 | 35 |
| NCA C096 | 36 | 30 | 41 | 35 |
| NCA C097 | 36 | 30 | 40 | 34 |
| NCA C098 | 36 | 30 | 39 | 34 |
| NCA C099 | 35 | 30 | 40 | 35 |
| NCA C100 | 35 | 30 | 40 | 34 |
| NCA C101 | 35 | 30 | 40 | 35 |
| NCA C102 | 36 | 30 | 42 | 37 |
| NCA C103 | 37 | 30 | 44 | 38 |
| NCA C104 | 34 | 30 | 40 | 35 |
| NCA C105 | 36 | 30 | 42 | 36 |
| NCA C106 | 35 | 30 | 41 | 35 |
| NCA C107 | 35 | 30 | 41 | 35 |
| NCA C108 | 38 | 30 | 48 | 43 |
| NCA C109 | 38 | 31 | 48 | 43 |
| NCA C110 | 38 | 31 | 48 | 43 |
| NCA C111 | 38 | 31 | 48 | 42 |
| NCA C112 | 38 | 31 | 47 | 42 |
| NCA C113 | 38 | 31 | 47 | 42 |
| NCA C114 | 35 | 30 | 44 | 39 |
| NCA C115 | 35 | 30 | 44 | 38 |
| NCA C116 | 35 | 30 | 43 | 38 |
| NCA C117 | 35 | 30 | 43 | 38 |
| NCA C118 | 36 | 30 | 43 | 38 |
| NCA C119 | 37 | 31 | 42 | 37 |
| NCA C120 | 36 | 30 | 43 | 37 |
| NCA C121 | 35 | 30 | 42 | 36 |
| NCA C122 | 36 | 30 | 42 | 37 |
| NCA C123 | 35 | 30 | 42 | 36 |
| NCA C124 | 37 | 31 | 41 | 35 |
| NCA C125 | 36 | 30 | 41 | 36 |
| NCA C126 | 37 | 31 | 40 | 35 |
| NCA C127 | 36 | 30 | 40 | 34 |
| NCA C128 | 37 | 31 | 40 | 35 |
| NCA C129 | 37 | 31 | 40 | 34 |
| NCA C130 | 36 | 30 | 39 | 33 |
| NCA C131 | 34 | 30 | 39 | 34 |
| NCA C132 | 34 | 30 | 39 | 34 |
| NCA C133 | 36 | 30 | 40 | 35 |
| NCA C134 | 35 | 30 | 40 | 34 |
| NCA C135 | 35 | 30 | 39 | 34 |
| NCA C136 | 35 | 30 | 39 | 34 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C137 | 38 | 31 | 47 | 42 |
| NCA C138 | 38 | 31 | 47 | 42 |
| NCA C139 | 37 | 30 | 47 | 41 |
| NCA C140 | 36 | 30 | 46 | 41 |
| NCA C141 | 38 | 31 | 47 | 42 |
| NCA C142 | 38 | 32 | 47 | 42 |
| NCA C143 | 36 | 30 | 43 | 38 |
| NCA C144 | 37 | 31 | 43 | 38 |
| NCA C145 | 36 | 30 | 44 | 38 |
| NCA C146 | 36 | 30 | 43 | 38 |
| NCA C147 | 38 | 32 | 43 | 38 |
| NCA C148 | 38 | 32 | 44 | 38 |
| NCA C149 | 36 | 30 | 41 | 36 |
| NCA C150 | 36 | 30 | 41 | 35 |
| NCA C151 | 36 | 30 | 41 | 35 |
| NCA C152 | 36 | 30 | 40 | 35 |
| NCA C153 | 37 | 31 | 40 | 34 |
| NCA C154 | 37 | 31 | 40 | 34 |
| NCA C155 | 37 | 31 | 41 | 36 |
| NCA C156 | 37 | 31 | 43 | 37 |
| NCA C157 | 38 | 31 | 47 | 41 |
| NCA C158 | 35 | 30 | 40 | 34 |
| NCA C159 | 35 | 30 | 39 | 34 |
| NCA C160 | 35 | 30 | 40 | 34 |
| NCA C161 | 35 | 30 | 40 | 34 |
| NCA C162 | 35 | 30 | 40 | 34 |
| NCA C163 | 35 | 30 | 40 | 34 |
| NCA C164 | 37 | 31 | 40 | 35 |
| NCA C165 | 35 | 30 | 39 | 34 |
| NCA C166 | 35 | 30 | 40 | 34 |
| NCA C167 | 35 | 30 | 39 | 34 |
| NCA C168 | 35 | 30 | 40 | 34 |
| NCA C169 | 35 | 30 | 39 | 34 |
| NCA C170 | 34 | 30 | 39 | 33 |
| NCA C171 | 34 | 30 | 39 | 34 |
| NCA C172 | 33 | 30 | 39 | 33 |
| NCA C173 | 33 | 30 | 39 | 33 |
| NCA C174 | 34 | 30 | 39 | 34 |
| NCA C175 | 33 | 30 | 39 | 34 |
| NCA C176 | 33 | 30 | 39 | 34 |
| NCA C177 | 34 | 30 | 39 | 33 |
| NCA C178 | 33 | 30 | 38 | 33 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C179 | 35 | 30 | 39 | 33 |
| NCA C180 | 35 | 30 | 39 | 33 |
| NCA C181 | 35 | 30 | 38 | 33 |
| NCA C182 | 35 | 30 | 39 | 33 |
| NCA C183 | 36 | 30 | 39 | 34 |
| NCA C184 | 37 | 31 | 39 | 33 |
| NCA C185 | 38 | 32 | 39 | 34 |
| NCA C186 | 38 | 32 | 40 | 35 |
| NCA C187 | 38 | 31 | 46 | 41 |
| NCA C188 | 38 | 31 | 46 | 41 |
| NCA C189 | 36 | 30 | 45 | 40 |
| NCA C190 | 37 | 31 | 45 | 40 |
| NCA C191 | 37 | 31 | 45 | 40 |
| NCA C192 | 37 | 31 | 45 | 40 |
| NCA C193 | 38 | 31 | 46 | 40 |
| NCA C194 | 38 | 32 | 46 | 40 |
| NCA C195 | 38 | 32 | 46 | 41 |
| NCA C196 | 36 | 30 | 43 | 38 |
| NCA C197 | 36 | 30 | 43 | 38 |
| NCA C198 | 36 | 30 | 43 | 37 |
| NCA C199 | 37 | 31 | 43 | 38 |
| NCA C200 | 38 | 32 | 42 | 37 |
| NCA C201 | 38 | 32 | 41 | 35 |
| NCA C202 | 37 | 31 | 41 | 35 |
| NCA C203 | 37 | 31 | 41 | 35 |
| NCA C204 | 37 | 31 | 40 | 34 |
| NCA C205 | 38 | 32 | 40 | 35 |
| NCA C206 | 37 | 31 | 40 | 34 |
| NCA C207 | 37 | 31 | 39 | 34 |
| NCA C208 | 37 | 31 | 39 | 34 |
| NCA C209 | 37 | 31 | 39 | 33 |
| NCA C210 | 37 | 31 | 39 | 33 |
| NCA C211 | 37 | 31 | 39 | 33 |
| NCA C212 | 37 | 31 | 39 | 33 |
| NCA C213 | 37 | 31 | 39 | 33 |
| NCA C214 | 37 | 31 | 38 | 33 |
| NCA C215 | 37 | 31 | 39 | 33 |
| NCA C216 | 36 | 30 | 38 | 32 |
| NCA C217 | 36 | 30 | 38 | 32 |
| NCA C218 | 36 | 30 | 38 | 32 |
| NCA C219 | 36 | 30 | 38 | 33 |
| NCA C220 | 36 | 30 | 38 | 33 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C221 | 37 | 31 | 39 | 33 |
| NCA C222 | 37 | 31 | 43 | 38 |
| NCA C223 | 37 | 31 | 43 | 38 |
| NCA C224 | 37 | 31 | 43 | 38 |
| NCA C225 | 36 | 30 | 42 | 37 |
| NCA C226 | 38 | 32 | 43 | 37 |
| NCA C227 | 38 | 32 | 40 | 35 |
| NCA C228 | 38 | 32 | 41 | 35 |
| NCA C229 | 37 | 31 | 39 | 34 |
| NCA C230 | 37 | 32 | 40 | 34 |
| NCA C231 | 37 | 31 | 39 | 34 |
| NCA C232 | 37 | 31 | 39 | 33 |
| NCA C233 | 36 | 31 | 39 | 33 |
| NCA C234 | 37 | 31 | 39 | 33 |
| NCA C235 | 37 | 31 | 39 | 33 |
| NCA C236 | 36 | 30 | 39 | 33 |
| NCA C237 | 37 | 31 | 39 | 33 |
| NCA C238 | 36 | 30 | 39 | 33 |
| NCA C239 | 36 | 30 | 38 | 33 |
| NCA C240 | 36 | 30 | 38 | 33 |
| NCA C241 | 36 | 30 | 38 | 33 |
| NCA C242 | 36 | 30 | 38 | 33 |
| NCA C243 | 36 | 30 | 38 | 33 |
| NCA C244 | 39 | 33 | 46 | 41 |
| NCA C245 | 37 | 31 | 45 | 40 |
| NCA C246 | 40 | 33 | 47 | 41 |
| NCA C247 | 40 | 33 | 47 | 41 |
| NCA C248 | 40 | 33 | 47 | 41 |
| NCA C249 | 40 | 34 | 47 | 41 |
| NCA C250 | 40 | 34 | 47 | 41 |
| NCA C251 | 40 | 34 | 46 | 41 |
| NCA C252 | 41 | 35 | 47 | 41 |
| NCA C253 | 41 | 35 | 46 | 41 |
| NCA C254 | 37 | 31 | 43 | 38 |
| NCA C255 | 38 | 32 | 43 | 37 |
| NCA C256 | 38 | 32 | 43 | 37 |
| NCA C257 | 38 | 32 | 43 | 38 |
| NCA C258 | 39 | 33 | 43 | 38 |
| NCA C259 | 40 | 34 | 43 | 38 |
| NCA C260 | 41 | 35 | 44 | 38 |
| NCA C261 | 41 | 35 | 43 | 38 |
| NCA C262 | 40 | 34 | 43 | 37 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C263 | 39 | 33 | 41 | 35 |
| NCA C264 | 38 | 32 | 39 | 34 |
| NCA C265 | 40 | 34 | 42 | 36 |
| NCA C266 | 40 | 34 | 42 | 36 |
| NCA C267 | 37 | 31 | 39 | 34 |
| NCA C268 | 37 | 31 | 39 | 33 |
| NCA C269 | 40 | 34 | 41 | 36 |
| NCA C270 | 40 | 34 | 41 | 36 |
| NCA C271 | 37 | 31 | 39 | 33 |
| NCA C272 | 37 | 31 | 39 | 33 |
| NCA C273 | 40 | 34 | 41 | 36 |
| NCA C274 | 40 | 34 | 41 | 35 |
| NCA C275 | 39 | 33 | 40 | 35 |
| NCA C276 | 38 | 32 | 40 | 34 |
| NCA C277 | 38 | 32 | 40 | 34 |
| NCA C278 | 37 | 31 | 39 | 34 |
| NCA C279 | 36 | 30 | 38 | 33 |
| NCA C280 | 37 | 31 | 39 | 33 |
| NCA C281 | 39 | 33 | 47 | 42 |
| NCA C282 | 40 | 34 | 47 | 41 |
| NCA C283 | 42 | 35 | 49 | 44 |
| NCA C284 | 50 | 43 | 61 | 56 |
| NCA C285 | 51 | 44 | 62 | 57 |
| NCA C286 | 45 | 38 | 55 | 50 |
| NCA C287 | 44 | 37 | 54 | 48 |
| NCA C288 | 43 | 36 | 52 | 47 |
| NCA C289 | 43 | 36 | 51 | 45 |
| NCA C290 | 43 | 37 | 50 | 45 |
| NCA C291 | 42 | 36 | 50 | 45 |
| NCA C292 | 43 | 37 | 46 | 41 |
| NCA C293 | 42 | 36 | 49 | 43 |
| NCA C294 | 42 | 35 | 48 | 43 |
| NCA C295 | 41 | 35 | 46 | 41 |
| NCA C296 | 40 | 34 | 46 | 40 |
| NCA C297 | 40 | 35 | 46 | 41 |
| NCA C298 | 40 | 34 | 46 | 41 |
| NCA C299 | 40 | 34 | 46 | 41 |
| NCA C300 | 40 | 33 | 46 | 41 |
| NCA C301 | 40 | 34 | 45 | 39 |
| NCA C302 | 40 | 34 | 45 | 40 |
| NCA C303 | 41 | 35 | 45 | 40 |
| NCA C304 | 40 | 34 | 42 | 37 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C305 | 40 | 34 | 42 | 36 |
| NCA C306 | 40 | 34 | 42 | 36 |
| NCA C307 | 39 | 33 | 41 | 35 |
| NCA C308 | 39 | 33 | 41 | 35 |
| NCA C309 | 40 | 34 | 41 | 36 |
| NCA C310 | 40 | 34 | 41 | 35 |
| NCA C311 | 39 | 33 | 40 | 35 |
| NCA C312 | 40 | 34 | 41 | 35 |
| NCA C313 | 39 | 33 | 40 | 35 |
| NCA C314 | 39 | 33 | 41 | 35 |
| NCA C315 | 39 | 34 | 40 | 35 |
| NCA C316 | 40 | 34 | 41 | 35 |
| NCA C317 | 40 | 34 | 41 | 35 |
| NCA C318 | 40 | 34 | 41 | 35 |
| NCA C319 | 40 | 34 | 41 | 35 |
| NCA C320 | 40 | 34 | 41 | 35 |
| NCA C321 | 41 | 35 | 47 | 42 |
| NCA C322 | 41 | 35 | 47 | 42 |
| NCA C323 | 42 | 36 | 46 | 41 |
| NCA C324 | 41 | 35 | 47 | 41 |
| NCA C325 | 41 | 35 | 45 | 40 |
| NCA C326 | 43 | 37 | 46 | 40 |
| NCA C327 | 42 | 35 | 49 | 44 |
| NCA C328 | 41 | 35 | 46 | 40 |
| NCA C329 | 41 | 36 | 46 | 40 |
| NCA C330 | 42 | 36 | 46 | 41 |
| NCA C331 | 43 | 37 | 47 | 42 |
| NCA C332 | 43 | 37 | 47 | 41 |
| NCA C333 | 45 | 39 | 47 | 41 |
| NCA C334 | 45 | 39 | 47 | 41 |
| NCA C335 | 40 | 35 | 43 | 38 |
| NCA C336 | 39 | 33 | 42 | 36 |
| NCA C337 | 38 | 32 | 42 | 37 |
| NCA C338 | 40 | 34 | 43 | 38 |
| NCA C339 | 46 | 40 | 47 | 41 |
| NCA C340 | 47 | 41 | 48 | 42 |
| NCA C341 | 42 | 36 | 44 | 39 |
| NCA C342 | 41 | 35 | 42 | 36 |
| NCA C343 | 48 | 42 | 48 | 43 |
| NCA C344 | 40 | 34 | 41 | 36 |
| NCA C345 | 46 | 40 | 47 | 41 |
| NCA C346 | 44 | 38 | 45 | 39 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C347 | 39 | 33 | 41 | 36 |
| NCA C348 | 38 | 32 | 40 | 35 |
| NCA C349 | 38 | 32 | 40 | 35 |
| NCA C350 | 39 | 33 | 40 | 35 |
| NCA C351 | 40 | 34 | 41 | 35 |
| NCA C352 | 40 | 34 | 41 | 35 |
| NCA C353 | 40 | 34 | 41 | 35 |
| NCA C354 | 40 | 34 | 41 | 36 |
| NCA C355 | 41 | 35 | 42 | 37 |
| NCA C356 | 41 | 35 | 41 | 36 |
| NCA C357 | 41 | 35 | 42 | 36 |
| NCA C358 | 41 | 35 | 42 | 36 |
| NCA C359 | 42 | 36 | 42 | 36 |
| NCA C360 | 44 | 38 | 45 | 39 |
| NCA C361 | 44 | 38 | 44 | 39 |
| NCA C362 | 44 | 38 | 44 | 39 |
| NCA C363 | 44 | 37 | 54 | 49 |
| NCA C364 | 41 | 35 | 50 | 44 |
| NCA C365 | 42 | 36 | 51 | 46 |
| NCA C366 | 46 | 39 | 56 | 50 |
| NCA C367 | 43 | 37 | 49 | 44 |
| NCA C368 | 50 | 42 | 61 | 55 |
| NCA C369 | 51 | 43 | 62 | 56 |
| NCA C370 | 51 | 44 | 62 | 57 |
| NCA C371 | 44 | 38 | 50 | 45 |
| NCA C372 | 41 | 35 | 49 | 43 |
| NCA C373 | 43 | 37 | 47 | 42 |
| NCA C374 | 40 | 34 | 44 | 38 |
| NCA C375 | 43 | 37 | 48 | 43 |
| NCA C376 | 43 | 37 | 47 | 41 |
| NCA C377 | 43 | 37 | 47 | 41 |
| NCA C378 | 43 | 38 | 47 | 41 |
| NCA C379 | 43 | 37 | 47 | 41 |
| NCA C380 | 42 | 36 | 46 | 41 |
| NCA C381 | 43 | 37 | 46 | 40 |
| NCA C382 | 45 | 40 | 47 | 42 |
| NCA C383 | 44 | 38 | 46 | 41 |
| NCA C384 | 47 | 41 | 47 | 42 |
| NCA C385 | 44 | 38 | 47 | 41 |
| NCA C386 | 45 | 39 | 52 | 47 |
| NCA C387 | 48 | 41 | 57 | 52 |
| NCA C388 | 48 | 41 | 58 | 53 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C389 | 48 | 42 | 48 | 43 |
| NCA C390 | 48 | 42 | 49 | 43 |
| NCA C391 | 46 | 40 | 46 | 40 |
| NCA C392 | 47 | 41 | 48 | 42 |
| NCA C393 | 45 | 39 | 45 | 40 |
| NCA C394 | 46 | 40 | 47 | 41 |
| NCA C395 | 47 | 41 | 47 | 42 |
| NCA C396 | 46 | 40 | 47 | 41 |
| NCA C397 | 46 | 40 | 47 | 41 |
| NCA C398 | 46 | 40 | 53 | 47 |
| NCA C399 | 44 | 38 | 49 | 44 |
| NCA C400 | 43 | 36 | 50 | 45 |
| NCA C401 | 43 | 37 | 45 | 39 |
| NCA C402 | 45 | 39 | 46 | 40 |
| NCA C403 | 49 | 43 | 50 | 44 |
| NCA C404 | 48 | 42 | 49 | 43 |
| NCA C405 | 50 | 44 | 50 | 44 |
| NCA C406 | 49 | 43 | 50 | 44 |
| NCA C407 | 46 | 40 | 47 | 41 |
| NCA C408 | 49 | 43 | 49 | 43 |
| NCA C409 | 46 | 40 | 52 | 47 |
| NCA C410 | 51 | 45 | 54 | 48 |
| NCA C411 | 47 | 41 | 48 | 42 |
| NCA C412 | 47 | 41 | 48 | 42 |
| NCA C413 | 50 | 45 | 51 | 45 |
| NCA C414 | 51 | 45 | 51 | 45 |
| NCA C415 | 46 | 41 | 47 | 41 |
| NCA C416 | 49 | 43 | 49 | 43 |
| NCA C417 | 56 | 50 | 56 | 51 |
| NCA C418 | 46 | 40 | 49 | 44 |
| NCA C419 | 57 | 51 | 57 | 51 |
| NCA C420 | 56 | 50 | 56 | 50 |
| NCA C421 | 55 | 49 | 56 | 50 |
| NCA C422 | 53 | 48 | 55 | 50 |
| NCA C423 | 52 | 46 | 54 | 48 |
| NCA C424 | 56 | 50 | 56 | 51 |
| NCA C425 | 52 | 46 | 61 | 55 |
| NCA C426 | 50 | 44 | 57 | 51 |
| NCA C427 | 50 | 44 | 60 | 54 |
| NCA C428 | 50 | 44 | 61 | 56 |
| NCA C429 | 49 | 43 | 54 | 49 |
| NCA C430 | 48 | 42 | 53 | 48 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C431 | 53 | 47 | 55 | 49 |
| NCA C432 | 50 | 44 | 52 | 46 |
| NCA C433 | 50 | 44 | 51 | 45 |
| NCA C434 | 51 | 45 | 53 | 47 |
| NCA C435 | 48 | 42 | 53 | 48 |
| NCA C436 | 34 | 30 | 40 | 35 |
| NCA C437 | 33 | 30 | 38 | 33 |
| NCA C438 | 34 | 30 | 39 | 34 |
| NCA C439 | 33 | 30 | 41 | 35 |
| NCA C440 | 36 | 30 | 40 | 35 |
| NCA C441 | 37 | 31 | 41 | 36 |
| NCA C442 | 33 | 30 | 41 | 35 |
| NCA C443 | 34 | 30 | 41 | 35 |
| NCA C444 | 37 | 31 | 42 | 36 |
| NCA C445 | 36 | 30 | 42 | 36 |
| NCA C446 | 37 | 31 | 41 | 36 |
| NCA C447 | 34 | 30 | 41 | 36 |
| NCA C448 | 34 | 30 | 42 | 36 |
| NCA C449 | 37 | 30 | 42 | 36 |
| NCA C450 | 36 | 30 | 42 | 36 |
| NCA C451 | 37 | 31 | 42 | 36 |
| NCA C452 | 37 | 31 | 41 | 35 |
| NCA C453 | 37 | 31 | 41 | 35 |
| NCA C454 | 36 | 30 | 41 | 35 |
| NCA C455 | 37 | 31 | 41 | 35 |
| NCA C456 | 36 | 30 | 41 | 35 |
| NCA C457 | 36 | 30 | 40 | 35 |
| NCA C458 | 37 | 31 | 41 | 36 |
| NCA C459 | 36 | 30 | 41 | 35 |
| NCA C460 | 36 | 30 | 41 | 35 |
| NCA C461 | 36 | 30 | 41 | 35 |
| NCA C462 | 37 | 31 | 41 | 36 |
| NCA C463 | 37 | 31 | 41 | 35 |
| NCA C464 | 37 | 31 | 41 | 35 |
| NCA C465 | 38 | 32 | 40 | 34 |
| NCA C466 | 38 | 32 | 41 | 36 |
| NCA C467 | 36 | 30 | 41 | 35 |
| NCA C468 | 37 | 31 | 41 | 35 |
| NCA C469 | 37 | 31 | 41 | 35 |
| NCA C470 | 36 | 31 | 41 | 35 |
| NCA C471 | 37 | 31 | 41 | 36 |
| NCA C472 | 37 | 31 | 41 | 35 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C473 | 37 | 31 | 41 | 35 |
| NCA C474 | 34 | 30 | 37 | 32 |
| NCA C475 | 37 | 31 | 38 | 33 |
| NCA C476 | 36 | 30 | 38 | 32 |
| NCA C477 | 37 | 31 | 38 | 32 |
| NCA C478 | 37 | 31 | 38 | 33 |
| NCA C479 | 36 | 30 | 38 | 32 |
| NCA C480 | 36 | 30 | 38 | 32 |
| NCA C481 | 37 | 31 | 38 | 33 |
| NCA C482 | 37 | 31 | 38 | 33 |
| NCA C483 | 36 | 30 | 38 | 32 |
| NCA C484 | 37 | 31 | 38 | 32 |
| NCA C485 | 37 | 31 | 38 | 32 |
| NCA C486 | 38 | 32 | 39 | 33 |
| NCA C487 | 37 | 31 | 39 | 33 |
| NCA C488 | 37 | 31 | 39 | 33 |
| NCA C489 | 38 | 32 | 39 | 33 |
| NCA C490 | 37 | 31 | 39 | 33 |
| NCA C491 | 38 | 32 | 39 | 33 |
| NCA C492 | 38 | 32 | 39 | 33 |
| NCA C493 | 38 | 32 | 39 | 33 |
| NCA C494 | 38 | 32 | 39 | 33 |
| NCA C495 | 38 | 32 | 39 | 33 |
| NCA C496 | 38 | 32 | 39 | 34 |
| NCA C497 | 38 | 32 | 39 | 33 |
| NCA C498 | 37 | 31 | 39 | 33 |
| NCA C499 | 37 | 31 | 39 | 33 |
| NCA C500 | 37 | 31 | 39 | 33 |
| NCA C501 | 37 | 32 | 39 | 34 |
| NCA C502 | 37 | 31 | 40 | 34 |
| NCA C503 | 38 | 32 | 40 | 35 |
| NCA C504 | 38 | 32 | 40 | 34 |
| NCA C505 | 38 | 32 | 40 | 34 |
| NCA C506 | 39 | 33 | 41 | 36 |
| NCA C507 | 39 | 33 | 41 | 36 |
| NCA C508 | 38 | 32 | 39 | 34 |
| NCA C509 | 39 | 33 | 40 | 34 |
| NCA C510 | 39 | 33 | 40 | 34 |
| NCA C511 | 38 | 32 | 40 | 34 |
| NCA C512 | 38 | 32 | 39 | 33 |
| NCA C513 | 39 | 33 | 40 | 34 |
| NCA C514 | 39 | 33 | 40 | 34 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C515 | 39 | 33 | 41 | 35 |
| NCA C516 | 39 | 33 | 41 | 35 |
| NCA C517 | 38 | 32 | 40 | 34 |
| NCA C518 | 39 | 33 | 40 | 34 |
| NCA C519 | 39 | 33 | 40 | 35 |
| NCA C520 | 39 | 33 | 40 | 34 |
| NCA C521 | 38 | 33 | 40 | 34 |
| NCA C522 | 39 | 33 | 40 | 34 |
| NCA C523 | 39 | 33 | 39 | 34 |
| NCA C524 | 38 | 33 | 39 | 33 |
| NCA C525 | 38 | 32 | 39 | 33 |
| NCA C526 | 39 | 33 | 40 | 34 |
| NCA C527 | 38 | 32 | 40 | 34 |
| NCA C528 | 37 | 31 | 39 | 33 |
| NCA C529 | 37 | 31 | 39 | 33 |
| NCA C530 | 38 | 32 | 39 | 33 |
| NCA C531 | 37 | 31 | 38 | 32 |
| NCA C532 | 37 | 31 | 38 | 33 |
| NCA C533 | 37 | 31 | 38 | 33 |
| NCA C534 | 36 | 30 | 37 | 32 |
| NCA C535 | 36 | 30 | 37 | 32 |
| NCA C536 | 36 | 30 | 38 | 32 |
| NCA C537 | 36 | 30 | 37 | 32 |
| NCA C538 | 36 | 30 | 37 | 32 |
| NCA C539 | 36 | 30 | 38 | 32 |
| NCA C540 | 36 | 30 | 38 | 32 |
| NCA C541 | 35 | 30 | 37 | 32 |
| NCA C542 | 37 | 31 | 38 | 33 |
| NCA C543 | 36 | 30 | 38 | 32 |
| NCA C544 | 36 | 30 | 37 | 32 |
| NCA C545 | 35 | 30 | 38 | 32 |
| NCA C546 | 36 | 30 | 38 | 32 |
| NCA C547 | 36 | 30 | 38 | 33 |
| NCA C548 | 36 | 30 | 38 | 33 |
| NCA C549 | 37 | 31 | 38 | 32 |
| NCA C550 | 36 | 31 | 38 | 33 |
| NCA C551 | 36 | 31 | 38 | 32 |
| NCA C552 | 37 | 31 | 38 | 33 |
| NCA C553 | 37 | 31 | 38 | 32 |
| NCA C554 | 37 | 31 | 38 | 33 |
| NCA C555 | 37 | 32 | 39 | 33 |
| NCA C556 | 38 | 32 | 39 | 33 |

| Name | Year 2015 No Build Scenario | | Year 2015 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C557 | 38 | 32 | 39 | 33 |
| NCA C558 | 38 | 32 | 40 | 34 |
| NCA C559 | 38 | 32 | 40 | 34 |
| NCA C560 | 39 | 33 | 40 | 35 |
| NCA C561 | 39 | 33 | 41 | 35 |
| NCA C562 | 41 | 35 | 41 | 35 |
| NCA C563 | 40 | 34 | 41 | 35 |
| NCA C564 | 40 | 34 | 41 | 35 |
| NCA C565 | 40 | 34 | 41 | 35 |
| NCA C566 | 40 | 34 | 41 | 35 |
| NCA C567 | 40 | 34 | 40 | 35 |
| NCA C568 | 40 | 34 | 40 | 35 |
| NCA C569 | 39 | 33 | 40 | 34 |
| NCA C570 | 39 | 33 | 40 | 34 |
| NCA C571 | 39 | 33 | 40 | 34 |
| NCA C572 | 37 | 31 | 39 | 34 |
| NCA C573 | 36 | 30 | 38 | 32 |
| NCA C574 | 38 | 32 | 40 | 34 |
| NCA C575 | 40 | 34 | 41 | 35 |
| NCA C576 | 37 | 31 | 38 | 33 |
| NCA C577 | 39 | 34 | 41 | 35 |
| NCA C578 | 39 | 33 | 40 | 35 |
| NCA C579 | 40 | 34 | 41 | 35 |
| NCA C580 | 40 | 34 | 41 | 35 |
| NCA C581 | 40 | 34 | 41 | 35 |
| NCA C582 | 40 | 34 | 40 | 35 |
| NCA C583 | 40 | 34 | 41 | 35 |

# Appendix C

## Year 2035 Predicted $L_{AEQ}$ Noise Levels

## (Without Mitigation)

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA A001 | 47 | 41 | 54 | 46 |
| NCA A002 | 47 | 39 | 55 | 48 |
| NCA A003 | 40 | 33 | 42 | 35 |
| NCA A004 | 44 | 37 | 54 | 46 |
| NCA A005 | 40 | 33 | 47 | 40 |
| NCA A006 | 39 | 32 | 44 | 37 |
| NCA A007 | 39 | 32 | 43 | 35 |
| NCA A008 | 38 | 31 | 41 | 34 |
| NCA A009 | 48 | 41 | 58 | 51 |
| NCA A010 | 42 | 34 | 50 | 43 |
| NCA A011 | 42 | 35 | 51 | 44 |
| NCA A012 | 38 | 31 | 41 | 34 |
| NCA A013 | 38 | 31 | 41 | 34 |
| NCA A014 | 44 | 37 | 54 | 47 |
| NCA A015 | 42 | 34 | 51 | 44 |
| NCA A016 | 38 | 31 | 46 | 39 |
| NCA A017 | 40 | 32 | 48 | 41 |
| NCA A018 | 46 | 38 | 56 | 49 |
| NCA A019 | 39 | 32 | 49 | 42 |
| NCA A020 | 44 | 37 | 54 | 47 |
| NCA A021 | 45 | 38 | 55 | 48 |
| NCA A022 | 35 | 30 | 44 | 37 |
| NCA A023 | 44 | 36 | 54 | 47 |
| NCA A024 | 39 | 32 | 49 | 42 |
| NCA A025 | 35 | 30 | 45 | 38 |
| NCA A026 | 35 | 30 | 45 | 37 |
| NCA A027 | 43 | 36 | 53 | 46 |
| NCA A028 | 41 | 34 | 52 | 44 |
| NCA A029 | 35 | 30 | 45 | 38 |
| NCA A030 | 45 | 38 | 55 | 48 |
| NCA A031 | 44 | 37 | 55 | 47 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA A032 | 47 | 40 | 58 | 51 |
| NCA A033 | 46 | 38 | 56 | 49 |
| NCA A034 | 36 | 30 | 47 | 40 |
| NCA A035 | 35 | 30 | 43 | 36 |
| NCA A036 | 37 | 30 | 45 | 38 |
| NCA A037 | 35 | 30 | 43 | 36 |
| NCA A038 | 47 | 40 | 58 | 51 |
| NCA A040 | 38 | 31 | 39 | 33 |
| NCA A041 | 37 | 31 | 39 | 32 |
| NCA A042 | 38 | 31 | 38 | 32 |
| NCA A043 | 38 | 31 | 39 | 32 |
| NCA A044 | 38 | 31 | 38 | 32 |
| NCA A045 | 38 | 31 | 38 | 31 |
| NCA A046 | 36 | 30 | 38 | 32 |
| NCA A047 | 38 | 31 | 39 | 32 |
| NCA A048 | 37 | 31 | 38 | 32 |
| NCA A049 | 37 | 30 | 38 | 32 |
| NCA A050 | 37 | 30 | 38 | 31 |
| NCA A051 | 38 | 31 | 38 | 32 |
| NCA A052 | 37 | 31 | 39 | 32 |
| NCA A053 | 38 | 31 | 39 | 32 |
| NCA A054 | 37 | 31 | 38 | 32 |
| NCA A055 | 37 | 31 | 38 | 32 |
| NCA A056 | 37 | 30 | 38 | 32 |
| NCA A057 | 38 | 31 | 39 | 32 |
| NCA A058 | 39 | 32 | 40 | 33 |
| NCA A059 | 37 | 30 | 39 | 32 |
| NCA A060 | 37 | 30 | 39 | 32 |
| NCA A061 | 37 | 30 | 39 | 33 |
| NCA A062 | 37 | 30 | 39 | 32 |
| NCA A063 | 37 | 30 | 39 | 32 |
| NCA A064 | 37 | 30 | 39 | 32 |
| NCA A065 | 36 | 30 | 40 | 33 |
| NCA A066 | 35 | 30 | 41 | 35 |
| NCA A067 | 36 | 30 | 41 | 34 |
| NCA A068 | 36 | 30 | 39 | 32 |
| NCA A069 | 35 | 30 | 43 | 35 |
| NCA A070 | 39 | 32 | 49 | 42 |
| NCA A071 | 37 | 30 | 40 | 33 |
| NCA A072 | 37 | 30 | 40 | 33 |
| NCA A073 | 37 | 30 | 40 | 33 |
| NCA A074 | 37 | 30 | 40 | 32 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA A075 | 37 | 31 | 40 | 33 |
| NCA A076 | 37 | 30 | 39 | 32 |
| NCA A077 | 36 | 30 | 39 | 32 |
| NCA A078 | 36 | 30 | 40 | 33 |
| NCA A079 | 36 | 30 | 40 | 33 |
| NCA A080 | 36 | 30 | 40 | 34 |
| NCA A081 | 37 | 30 | 41 | 34 |
| NCA A082 | 37 | 30 | 41 | 34 |
| NCA A083 | 37 | 30 | 40 | 33 |
| NCA A084 | 38 | 31 | 41 | 34 |
| NCA A085 | 38 | 31 | 40 | 33 |
| NCA A086 | 38 | 31 | 40 | 33 |
| NCA A087 | 38 | 31 | 40 | 33 |
| NCA A088 | 38 | 31 | 39 | 32 |
| NCA A089 | 37 | 30 | 44 | 36 |
| NCA A090 | 39 | 32 | 46 | 39 |
| NCA A091 | 39 | 32 | 40 | 33 |
| NCA A092 | 38 | 32 | 40 | 33 |
| NCA A093 | 38 | 31 | 40 | 33 |
| NCA A094 | 39 | 32 | 40 | 33 |
| NCA A095 | 38 | 31 | 40 | 33 |
| NCA A096 | 38 | 31 | 40 | 33 |
| NCA A097 | 38 | 31 | 40 | 33 |
| NCA A098 | 38 | 31 | 40 | 33 |
| NCA A099 | 39 | 32 | 42 | 35 |
| NCA A100 | 40 | 33 | 40 | 34 |
| NCA A101 | 40 | 33 | 41 | 34 |
| NCA A102 | 40 | 33 | 41 | 34 |
| NCA A103 | 40 | 33 | 41 | 34 |
| NCA A104 | 40 | 33 | 42 | 34 |
| NCA A105 | 40 | 34 | 41 | 35 |
| NCA A106 | 41 | 34 | 42 | 35 |
| NCA A107 | 41 | 34 | 42 | 35 |
| NCA A108 | 44 | 37 | 54 | 47 |
| NCA A109 | 45 | 37 | 55 | 47 |
| NCA A110 | 43 | 36 | 53 | 46 |
| NCA A111 | 45 | 37 | 55 | 48 |
| NCA A112 | 38 | 30 | 47 | 40 |
| NCA A113 | 37 | 30 | 46 | 39 |
| NCA A114 | 36 | 30 | 46 | 38 |
| NCA A115 | 36 | 30 | 43 | 36 |
| NCA A116 | 34 | 30 | 43 | 35 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA A117 | 43 | 35 | 53 | 45 |
| NCA A118 | 33 | 30 | 41 | 34 |
| NCA A119 | 31 | 30 | 39 | 33 |
| NCA A120 | 31 | 30 | 40 | 34 |
| NCA A121 | 30 | 30 | 38 | 31 |
| NCA A122 | 30 | 30 | 37 | 30 |
| NCA A123 | 30 | 30 | 41 | 35 |
| NCA A124 | 30 | 30 | 40 | 34 |
| NCA A125 | 30 | 30 | 37 | 30 |
| NCA A126 | 30 | 30 | 36 | 29 |
| NCA A127 | 30 | 30 | 35 | 28 |
| NCA A128 | 30 | 30 | 41 | 34 |
| NCA A039 | 37 | 30 | 48 | 42 |
| NCA B001 | 35 | 30 | 46 | 40 |
| NCA B002 | 35 | 30 | 45 | 39 |
| NCA B003 | 34 | 30 | 46 | 40 |
| NCA B004 | 34 | 30 | 47 | 41 |
| NCA B005 | 34 | 30 | 49 | 43 |
| NCA B006 | 33 | 30 | 49 | 44 |
| NCA B007 | 34 | 30 | 58 | 52 |
| NCA B008 | 34 | 30 | 56 | 51 |
| NCA B009 | 34 | 30 | 61 | 55 |
| NCA B010 | 35 | 30 | 52 | 46 |
| NCA B011 | 35 | 30 | 51 | 45 |
| NCA B012 | 36 | 30 | 49 | 43 |
| NCA B013 | 37 | 31 | 44 | 38 |
| NCA B014 | 38 | 32 | 42 | 37 |
| NCA B015 | 37 | 31 | 45 | 39 |
| NCA B016 | 37 | 31 | 44 | 39 |
| NCA B017 | 38 | 32 | 43 | 38 |
| NCA B018 | 37 | 31 | 44 | 38 |
| NCA B019 | 37 | 31 | 45 | 39 |
| NCA B020 | 37 | 31 | 45 | 40 |
| NCA B021 | 37 | 31 | 45 | 39 |
| NCA B022 | 37 | 31 | 45 | 40 |
| NCA B023 | 36 | 30 | 47 | 41 |
| NCA B024 | 37 | 31 | 46 | 41 |
| NCA B025 | 37 | 31 | 46 | 40 |
| NCA B026 | 36 | 30 | 48 | 42 |
| NCA B027 | 36 | 30 | 47 | 42 |
| NCA B028 | 37 | 31 | 48 | 42 |
| NCA B029 | 36 | 30 | 50 | 44 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA B030 | 36 | 30 | 49 | 44 |
| NCA B031 | 36 | 30 | 49 | 43 |
| NCA B032 | 36 | 30 | 55 | 49 |
| NCA B033 | 36 | 30 | 55 | 50 |
| NCA B034 | 36 | 30 | 53 | 47 |
| NCA B035 | 36 | 30 | 52 | 47 |
| NCA B036 | 36 | 30 | 53 | 47 |
| NCA B037 | 38 | 32 | 44 | 39 |
| NCA B038 | 38 | 32 | 44 | 39 |
| NCA B039 | 39 | 33 | 42 | 37 |
| NCA B040 | 38 | 32 | 42 | 36 |
| NCA B041 | 39 | 33 | 41 | 36 |
| NCA B042 | 39 | 33 | 41 | 35 |
| NCA B043 | 37 | 31 | 42 | 37 |
| NCA B044 | 37 | 31 | 43 | 38 |
| NCA B045 | 36 | 30 | 43 | 38 |
| NCA B046 | 37 | 31 | 45 | 39 |
| NCA B047 | 37 | 31 | 44 | 38 |
| NCA B048 | 37 | 31 | 43 | 38 |
| NCA B049 | 37 | 30 | 43 | 37 |
| NCA B050 | 35 | 30 | 43 | 37 |
| NCA B051 | 38 | 31 | 42 | 36 |
| NCA B052 | 38 | 31 | 42 | 36 |
| NCA B053 | 37 | 31 | 42 | 36 |
| NCA B054 | 37 | 30 | 42 | 36 |
| NCA B055 | 38 | 31 | 41 | 35 |
| NCA B056 | 37 | 30 | 41 | 35 |
| NCA B057 | 37 | 30 | 40 | 34 |
| NCA B058 | 38 | 32 | 40 | 34 |
| NCA B059 | 38 | 31 | 40 | 34 |
| NCA B060 | 36 | 30 | 41 | 36 |
| NCA B061 | 36 | 30 | 43 | 37 |
| NCA B062 | 35 | 30 | 45 | 39 |
| NCA B063 | 33 | 30 | 49 | 43 |
| NCA B064 | 34 | 30 | 47 | 41 |
| NCA B065 | 34 | 30 | 50 | 44 |
| NCA B066 | 33 | 30 | 50 | 44 |
| NCA B067 | 33 | 30 | 47 | 41 |
| NCA B068 | 33 | 30 | 45 | 39 |
| NCA B069 | 33 | 30 | 47 | 41 |
| NCA B070 | 32 | 30 | 46 | 40 |
| NCA B071 | 33 | 30 | 46 | 40 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA B072 | 33 | 30 | 51 | 46 |
| NCA B073 | 34 | 30 | 55 | 50 |
| NCA B074 | 39 | 32 | 62 | 56 |
| NCA B075 | 40 | 33 | 53 | 46 |
| NCA B076 | 33 | 30 | 44 | 38 |
| NCA B077 | 34 | 30 | 43 | 37 |
| NCA B078 | 35 | 30 | 44 | 38 |
| NCA B079 | 35 | 30 | 43 | 37 |
| NCA B080 | 35 | 30 | 43 | 37 |
| NCA B081 | 35 | 30 | 42 | 36 |
| NCA B082 | 35 | 30 | 42 | 36 |
| NCA B083 | 35 | 30 | 42 | 37 |
| NCA B084 | 35 | 30 | 42 | 36 |
| NCA B085 | 35 | 30 | 40 | 34 |
| NCA B086 | 33 | 30 | 42 | 36 |
| NCA B087 | 35 | 30 | 41 | 35 |
| NCA B088 | 35 | 30 | 42 | 36 |
| NCA B089 | 34 | 30 | 42 | 36 |
| NCA B090 | 35 | 30 | 42 | 36 |
| NCA B091 | 33 | 30 | 44 | 38 |
| NCA B092 | 34 | 30 | 42 | 36 |
| NCA B093 | 33 | 30 | 42 | 36 |
| NCA B094 | 35 | 30 | 42 | 36 |
| NCA B095 | 37 | 31 | 40 | 34 |
| NCA B096 | 37 | 31 | 40 | 34 |
| NCA B097 | 36 | 30 | 41 | 35 |
| NCA B098 | 36 | 30 | 41 | 35 |
| NCA B099 | 36 | 30 | 41 | 35 |
| NCA B100 | 36 | 30 | 40 | 35 |
| NCA B101 | 34 | 30 | 41 | 35 |
| NCA B102 | 34 | 30 | 41 | 35 |
| NCA B103 | 36 | 30 | 41 | 35 |
| NCA B104 | 34 | 30 | 40 | 34 |
| NCA B105 | 36 | 30 | 41 | 35 |
| NCA B106 | 36 | 30 | 41 | 35 |
| NCA B107 | 36 | 30 | 42 | 36 |
| NCA B108 | 36 | 30 | 40 | 34 |
| NCA B109 | 36 | 30 | 41 | 35 |
| NCA B110 | 36 | 30 | 41 | 35 |
| NCA B111 | 36 | 30 | 40 | 34 |
| NCA B112 | 36 | 30 | 42 | 36 |
| NCA B113 | 36 | 30 | 40 | 34 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA B114 | 34 | 30 | 42 | 36 |
| NCA B115 | 37 | 31 | 39 | 33 |
| NCA B116 | 36 | 30 | 39 | 34 |
| NCA B117 | 37 | 30 | 40 | 34 |
| NCA B118 | 37 | 31 | 40 | 34 |
| NCA B119 | 37 | 31 | 40 | 35 |
| NCA B120 | 37 | 30 | 38 | 32 |
| NCA B121 | 37 | 31 | 40 | 34 |
| NCA B122 | 37 | 31 | 41 | 35 |
| NCA B123 | 37 | 31 | 41 | 35 |
| NCA B124 | 37 | 30 | 41 | 35 |
| NCA B125 | 36 | 30 | 40 | 35 |
| NCA B126 | 36 | 30 | 41 | 35 |
| NCA B127 | 36 | 30 | 41 | 35 |
| NCA B128 | 37 | 30 | 40 | 34 |
| NCA B129 | 36 | 30 | 40 | 34 |
| NCA B130 | 37 | 30 | 39 | 33 |
| NCA B131 | 37 | 30 | 40 | 34 |
| NCA B132 | 37 | 30 | 40 | 34 |
| NCA B133 | 35 | 30 | 53 | 48 |
| NCA B134 | 34 | 30 | 52 | 46 |
| NCA B135 | 33 | 30 | 45 | 39 |
| NCA B136 | 32 | 30 | 46 | 40 |
| NCA B137 | 32 | 30 | 46 | 40 |
| NCA B138 | 32 | 30 | 45 | 39 |
| NCA B139 | 30 | 30 | 43 | 38 |
| NCA B140 | 31 | 30 | 43 | 37 |
| NCA B141 | 31 | 30 | 45 | 39 |
| NCA B142 | 30 | 30 | 43 | 37 |
| NCA B143 | 30 | 30 | 42 | 36 |
| NCA B144 | 30 | 30 | 43 | 37 |
| NCA B145 | 30 | 30 | 43 | 37 |
| NCA B146 | 31 | 30 | 44 | 38 |
| NCA B147 | 34 | 30 | 54 | 48 |
| NCA B148 | 33 | 30 | 50 | 44 |
| NCA B149 | 30 | 30 | 43 | 37 |
| NCA B150 | 30 | 30 | 42 | 36 |
| NCA B151 | 30 | 30 | 42 | 36 |
| NCA B152 | 30 | 30 | 42 | 37 |
| NCA B153 | 30 | 30 | 41 | 36 |
| NCA B154 | 30 | 30 | 41 | 35 |
| NCA B155 | 30 | 30 | 41 | 35 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA B156 | 30 | 30 | 41 | 35 |
| NCA B157 | 30 | 30 | 40 | 35 |
| NCA B158 | 30 | 30 | 40 | 34 |
| NCA B159 | 30 | 30 | 37 | 32 |
| NCA B160 | 30 | 30 | 40 | 34 |
| NCA B161 | 30 | 30 | 39 | 34 |
| NCA B162 | 30 | 30 | 39 | 33 |
| NCA B163 | 30 | 30 | 38 | 33 |
| NCA B164 | 30 | 30 | 39 | 34 |
| NCA B165 | 30 | 30 | 41 | 35 |
| NCA B166 | 30 | 30 | 40 | 35 |
| NCA B167 | 30 | 30 | 40 | 34 |
| NCA B168 | 30 | 30 | 41 | 36 |
| NCA B169 | 30 | 30 | 39 | 34 |
| NCA B170 | 30 | 30 | 39 | 33 |
| NCA B171 | 30 | 30 | 39 | 34 |
| NCA B172 | 30 | 30 | 40 | 34 |
| NCA B173 | 30 | 30 | 41 | 36 |
| NCA B174 | 30 | 30 | 41 | 35 |
| NCA B175 | 30 | 30 | 40 | 34 |
| NCA B176 | 30 | 30 | 41 | 35 |
| NCA B177 | 30 | 30 | 41 | 36 |
| NCA B178 | 30 | 30 | 42 | 36 |
| NCA B179 | 30 | 30 | 40 | 35 |
| NCA B180 | 30 | 30 | 40 | 35 |
| NCA B181 | 30 | 30 | 41 | 36 |
| NCA B182 | 30 | 30 | 43 | 37 |
| NCA B183 | 30 | 30 | 41 | 36 |
| NCA B184 | 30 | 30 | 41 | 36 |
| NCA B185 | 30 | 30 | 42 | 37 |
| NCA B186 | 30 | 30 | 42 | 37 |
| NCA B187 | 30 | 30 | 43 | 38 |
| NCA B188 | 30 | 30 | 43 | 37 |
| NCA B189 | 30 | 30 | 43 | 38 |
| NCA B190 | 30 | 30 | 43 | 38 |
| NCA B191 | 30 | 30 | 43 | 37 |
| NCA B192 | 35 | 30 | 56 | 50 |
| NCA B193 | 34 | 30 | 50 | 44 |
| NCA B194 | 34 | 30 | 50 | 45 |
| NCA B195 | 34 | 30 | 50 | 44 |
| NCA B196 | 33 | 30 | 48 | 42 |
| NCA B197 | 34 | 30 | 57 | 52 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C001 | 36 | 30 | 46 | 40 |
| NCA C002 | 35 | 30 | 46 | 41 |
| NCA C003 | 35 | 30 | 46 | 40 |
| NCA C004 | 35 | 30 | 46 | 41 |
| NCA C005 | 35 | 30 | 46 | 41 |
| NCA C006 | 35 | 30 | 46 | 40 |
| NCA C007 | 35 | 30 | 46 | 40 |
| NCA C008 | 34 | 30 | 45 | 40 |
| NCA C009 | 34 | 30 | 45 | 40 |
| NCA C010 | 34 | 30 | 45 | 40 |
| NCA C011 | 34 | 30 | 45 | 40 |
| NCA C012 | 34 | 30 | 46 | 40 |
| NCA C013 | 34 | 30 | 46 | 40 |
| NCA C014 | 33 | 30 | 46 | 41 |
| NCA C015 | 33 | 30 | 47 | 41 |
| NCA C016 | 32 | 30 | 48 | 43 |
| NCA C017 | 32 | 30 | 50 | 45 |
| NCA C018 | 35 | 30 | 44 | 39 |
| NCA C019 | 34 | 30 | 45 | 39 |
| NCA C020 | 35 | 30 | 43 | 38 |
| NCA C021 | 35 | 30 | 44 | 39 |
| NCA C022 | 34 | 30 | 44 | 39 |
| NCA C023 | 34 | 30 | 45 | 40 |
| NCA C024 | 33 | 30 | 46 | 41 |
| NCA C025 | 33 | 30 | 46 | 41 |
| NCA C026 | 33 | 30 | 46 | 41 |
| NCA C027 | 33 | 30 | 47 | 42 |
| NCA C028 | 32 | 30 | 49 | 43 |
| NCA C029 | 32 | 30 | 50 | 45 |
| NCA C030 | 32 | 30 | 52 | 47 |
| NCA C031 | 31 | 30 | 54 | 49 |
| NCA C032 | 34 | 30 | 45 | 40 |
| NCA C033 | 35 | 30 | 45 | 39 |
| NCA C034 | 33 | 30 | 46 | 40 |
| NCA C035 | 33 | 30 | 45 | 40 |
| NCA C036 | 33 | 30 | 47 | 41 |
| NCA C037 | 33 | 30 | 47 | 42 |
| NCA C038 | 33 | 30 | 51 | 46 |
| NCA C039 | 33 | 30 | 52 | 47 |
| NCA C040 | 34 | 30 | 45 | 39 |
| NCA C041 | 34 | 30 | 45 | 39 |
| NCA C042 | 33 | 30 | 46 | 41 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C043 | 34 | 30 | 44 | 38 |
| NCA C044 | 34 | 30 | 45 | 40 |
| NCA C045 | 34 | 30 | 46 | 41 |
| NCA C046 | 33 | 30 | 51 | 45 |
| NCA C047 | 34 | 30 | 43 | 38 |
| NCA C048 | 34 | 30 | 44 | 39 |
| NCA C049 | 34 | 30 | 45 | 40 |
| NCA C050 | 33 | 30 | 49 | 44 |
| NCA C051 | 33 | 30 | 57 | 52 |
| NCA C052 | 33 | 30 | 54 | 49 |
| NCA C053 | 33 | 30 | 52 | 47 |
| NCA C054 | 33 | 30 | 52 | 47 |
| NCA C055 | 34 | 30 | 49 | 44 |
| NCA C056 | 34 | 30 | 45 | 40 |
| NCA C057 | 34 | 30 | 48 | 42 |
| NCA C058 | 34 | 30 | 45 | 39 |
| NCA C059 | 34 | 30 | 44 | 39 |
| NCA C060 | 34 | 30 | 43 | 38 |
| NCA C061 | 34 | 30 | 43 | 38 |
| NCA C062 | 35 | 30 | 43 | 38 |
| NCA C063 | 35 | 30 | 43 | 37 |
| NCA C064 | 34 | 30 | 44 | 39 |
| NCA C065 | 33 | 30 | 47 | 42 |
| NCA C066 | 33 | 30 | 52 | 47 |
| NCA C067 | 34 | 30 | 50 | 45 |
| NCA C068 | 34 | 30 | 51 | 46 |
| NCA C069 | 35 | 30 | 50 | 45 |
| NCA C070 | 34 | 30 | 49 | 44 |
| NCA C071 | 34 | 30 | 47 | 41 |
| NCA C072 | 34 | 30 | 46 | 41 |
| NCA C073 | 35 | 30 | 46 | 41 |
| NCA C074 | 35 | 30 | 44 | 39 |
| NCA C075 | 35 | 30 | 49 | 44 |
| NCA C076 | 35 | 30 | 44 | 39 |
| NCA C077 | 35 | 30 | 44 | 38 |
| NCA C078 | 34 | 30 | 45 | 39 |
| NCA C079 | 34 | 30 | 43 | 38 |
| NCA C080 | 35 | 30 | 43 | 38 |
| NCA C081 | 35 | 30 | 43 | 38 |
| NCA C082 | 34 | 30 | 43 | 38 |
| NCA C083 | 35 | 30 | 43 | 37 |
| NCA C084 | 36 | 30 | 42 | 37 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C085 | 35 | 30 | 43 | 37 |
| NCA C086 | 36 | 30 | 42 | 37 |
| NCA C087 | 35 | 30 | 43 | 37 |
| NCA C088 | 35 | 30 | 42 | 37 |
| NCA C089 | 36 | 30 | 42 | 36 |
| NCA C090 | 36 | 30 | 41 | 36 |
| NCA C091 | 36 | 30 | 41 | 36 |
| NCA C092 | 36 | 30 | 41 | 35 |
| NCA C093 | 35 | 30 | 42 | 37 |
| NCA C094 | 35 | 30 | 42 | 36 |
| NCA C095 | 35 | 30 | 42 | 36 |
| NCA C096 | 36 | 30 | 41 | 36 |
| NCA C097 | 36 | 30 | 41 | 36 |
| NCA C098 | 36 | 30 | 41 | 35 |
| NCA C099 | 36 | 30 | 41 | 36 |
| NCA C100 | 36 | 30 | 41 | 35 |
| NCA C101 | 36 | 30 | 41 | 36 |
| NCA C102 | 35 | 30 | 43 | 38 |
| NCA C103 | 36 | 30 | 45 | 39 |
| NCA C104 | 35 | 30 | 41 | 36 |
| NCA C105 | 36 | 30 | 43 | 37 |
| NCA C106 | 36 | 30 | 42 | 37 |
| NCA C107 | 36 | 30 | 42 | 37 |
| NCA C108 | 35 | 30 | 48 | 43 |
| NCA C109 | 35 | 30 | 49 | 43 |
| NCA C110 | 35 | 30 | 48 | 43 |
| NCA C111 | 35 | 30 | 48 | 43 |
| NCA C112 | 35 | 30 | 47 | 42 |
| NCA C113 | 37 | 31 | 47 | 42 |
| NCA C114 | 35 | 30 | 45 | 40 |
| NCA C115 | 35 | 30 | 45 | 40 |
| NCA C116 | 35 | 30 | 45 | 39 |
| NCA C117 | 35 | 30 | 45 | 39 |
| NCA C118 | 36 | 30 | 45 | 39 |
| NCA C119 | 37 | 31 | 43 | 38 |
| NCA C120 | 36 | 30 | 44 | 39 |
| NCA C121 | 36 | 30 | 43 | 38 |
| NCA C122 | 36 | 30 | 44 | 38 |
| NCA C123 | 36 | 30 | 43 | 38 |
| NCA C124 | 37 | 31 | 42 | 37 |
| NCA C125 | 36 | 30 | 43 | 37 |
| NCA C126 | 37 | 31 | 41 | 36 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C127 | 36 | 30 | 41 | 36 |
| NCA C128 | 37 | 31 | 41 | 36 |
| NCA C129 | 37 | 31 | 41 | 36 |
| NCA C130 | 36 | 31 | 40 | 35 |
| NCA C131 | 35 | 30 | 40 | 35 |
| NCA C132 | 35 | 30 | 41 | 35 |
| NCA C133 | 36 | 30 | 41 | 36 |
| NCA C134 | 36 | 30 | 41 | 36 |
| NCA C135 | 36 | 30 | 41 | 35 |
| NCA C136 | 36 | 30 | 41 | 35 |
| NCA C137 | 37 | 31 | 47 | 42 |
| NCA C138 | 37 | 31 | 47 | 42 |
| NCA C139 | 36 | 30 | 47 | 42 |
| NCA C140 | 36 | 30 | 47 | 41 |
| NCA C141 | 37 | 31 | 47 | 42 |
| NCA C142 | 38 | 32 | 47 | 42 |
| NCA C143 | 35 | 30 | 44 | 39 |
| NCA C144 | 36 | 31 | 44 | 39 |
| NCA C145 | 36 | 31 | 45 | 39 |
| NCA C146 | 36 | 30 | 45 | 39 |
| NCA C147 | 38 | 32 | 44 | 39 |
| NCA C148 | 38 | 32 | 45 | 39 |
| NCA C149 | 36 | 30 | 43 | 38 |
| NCA C150 | 36 | 30 | 42 | 37 |
| NCA C151 | 36 | 30 | 42 | 37 |
| NCA C152 | 37 | 31 | 42 | 36 |
| NCA C153 | 37 | 31 | 41 | 36 |
| NCA C154 | 37 | 31 | 41 | 35 |
| NCA C155 | 37 | 31 | 42 | 37 |
| NCA C156 | 37 | 31 | 44 | 38 |
| NCA C157 | 37 | 31 | 47 | 42 |
| NCA C158 | 36 | 30 | 41 | 36 |
| NCA C159 | 35 | 30 | 40 | 35 |
| NCA C160 | 35 | 30 | 41 | 35 |
| NCA C161 | 36 | 30 | 41 | 35 |
| NCA C162 | 35 | 30 | 41 | 35 |
| NCA C163 | 36 | 30 | 41 | 35 |
| NCA C164 | 37 | 31 | 41 | 36 |
| NCA C165 | 36 | 30 | 41 | 35 |
| NCA C166 | 36 | 30 | 41 | 35 |
| NCA C167 | 36 | 30 | 41 | 35 |
| NCA C168 | 36 | 30 | 41 | 35 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C169 | 36 | 30 | 41 | 35 |
| NCA C170 | 35 | 30 | 40 | 35 |
| NCA C171 | 35 | 30 | 40 | 35 |
| NCA C172 | 35 | 30 | 40 | 35 |
| NCA C173 | 34 | 30 | 40 | 35 |
| NCA C174 | 35 | 30 | 41 | 35 |
| NCA C175 | 35 | 30 | 41 | 35 |
| NCA C176 | 34 | 30 | 40 | 35 |
| NCA C177 | 35 | 30 | 40 | 34 |
| NCA C178 | 34 | 30 | 40 | 34 |
| NCA C179 | 36 | 30 | 40 | 35 |
| NCA C180 | 37 | 31 | 40 | 35 |
| NCA C181 | 36 | 30 | 40 | 34 |
| NCA C182 | 36 | 30 | 40 | 35 |
| NCA C183 | 36 | 30 | 40 | 35 |
| NCA C184 | 37 | 32 | 40 | 34 |
| NCA C185 | 38 | 32 | 40 | 34 |
| NCA C186 | 38 | 32 | 41 | 35 |
| NCA C187 | 36 | 30 | 47 | 41 |
| NCA C188 | 38 | 32 | 46 | 41 |
| NCA C189 | 37 | 31 | 46 | 40 |
| NCA C190 | 36 | 30 | 46 | 41 |
| NCA C191 | 37 | 31 | 46 | 41 |
| NCA C192 | 36 | 31 | 46 | 41 |
| NCA C193 | 37 | 31 | 46 | 41 |
| NCA C194 | 39 | 33 | 46 | 41 |
| NCA C195 | 37 | 31 | 47 | 41 |
| NCA C196 | 36 | 31 | 44 | 39 |
| NCA C197 | 37 | 31 | 44 | 39 |
| NCA C198 | 37 | 31 | 44 | 39 |
| NCA C199 | 38 | 32 | 45 | 39 |
| NCA C200 | 38 | 32 | 43 | 38 |
| NCA C201 | 38 | 32 | 42 | 36 |
| NCA C202 | 37 | 31 | 42 | 37 |
| NCA C203 | 37 | 32 | 42 | 36 |
| NCA C204 | 37 | 31 | 41 | 35 |
| NCA C205 | 38 | 32 | 41 | 36 |
| NCA C206 | 38 | 32 | 41 | 35 |
| NCA C207 | 37 | 31 | 40 | 35 |
| NCA C208 | 37 | 31 | 40 | 35 |
| NCA C209 | 37 | 32 | 40 | 35 |
| NCA C210 | 37 | 32 | 40 | 35 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C211 | 37 | 31 | 40 | 34 |
| NCA C212 | 37 | 31 | 40 | 34 |
| NCA C213 | 37 | 32 | 40 | 34 |
| NCA C214 | 37 | 32 | 40 | 34 |
| NCA C215 | 37 | 31 | 40 | 34 |
| NCA C216 | 36 | 31 | 39 | 34 |
| NCA C217 | 37 | 31 | 39 | 34 |
| NCA C218 | 37 | 31 | 39 | 34 |
| NCA C219 | 37 | 31 | 40 | 34 |
| NCA C220 | 37 | 32 | 40 | 34 |
| NCA C221 | 37 | 32 | 40 | 34 |
| NCA C222 | 37 | 31 | 45 | 39 |
| NCA C223 | 37 | 31 | 44 | 39 |
| NCA C224 | 38 | 32 | 44 | 39 |
| NCA C225 | 37 | 31 | 44 | 38 |
| NCA C226 | 38 | 33 | 44 | 38 |
| NCA C227 | 39 | 33 | 42 | 36 |
| NCA C228 | 38 | 32 | 42 | 37 |
| NCA C229 | 38 | 32 | 41 | 35 |
| NCA C230 | 38 | 32 | 41 | 35 |
| NCA C231 | 38 | 32 | 40 | 35 |
| NCA C232 | 38 | 32 | 40 | 35 |
| NCA C233 | 38 | 32 | 40 | 34 |
| NCA C234 | 38 | 32 | 40 | 35 |
| NCA C235 | 38 | 32 | 40 | 34 |
| NCA C236 | 38 | 32 | 40 | 34 |
| NCA C237 | 38 | 32 | 40 | 34 |
| NCA C238 | 38 | 32 | 40 | 35 |
| NCA C239 | 38 | 32 | 40 | 34 |
| NCA C240 | 37 | 31 | 40 | 34 |
| NCA C241 | 38 | 32 | 40 | 34 |
| NCA C242 | 37 | 31 | 40 | 34 |
| NCA C243 | 37 | 31 | 40 | 34 |
| NCA C244 | 39 | 33 | 47 | 42 |
| NCA C245 | 38 | 32 | 46 | 41 |
| NCA C246 | 39 | 33 | 47 | 42 |
| NCA C247 | 39 | 33 | 47 | 42 |
| NCA C248 | 39 | 33 | 47 | 42 |
| NCA C249 | 39 | 33 | 47 | 42 |
| NCA C250 | 41 | 35 | 47 | 42 |
| NCA C251 | 40 | 34 | 47 | 42 |
| NCA C252 | 42 | 36 | 47 | 42 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C253 | 41 | 36 | 47 | 42 |
| NCA C254 | 38 | 32 | 44 | 39 |
| NCA C255 | 39 | 33 | 44 | 39 |
| NCA C256 | 40 | 34 | 44 | 39 |
| NCA C257 | 39 | 33 | 44 | 39 |
| NCA C258 | 39 | 33 | 45 | 39 |
| NCA C259 | 41 | 35 | 45 | 39 |
| NCA C260 | 42 | 36 | 45 | 40 |
| NCA C261 | 42 | 36 | 44 | 39 |
| NCA C262 | 41 | 35 | 44 | 38 |
| NCA C263 | 40 | 34 | 42 | 36 |
| NCA C264 | 39 | 33 | 41 | 35 |
| NCA C265 | 40 | 35 | 43 | 37 |
| NCA C266 | 40 | 34 | 42 | 37 |
| NCA C267 | 39 | 33 | 41 | 35 |
| NCA C268 | 38 | 32 | 41 | 35 |
| NCA C269 | 40 | 34 | 42 | 37 |
| NCA C270 | 40 | 35 | 42 | 37 |
| NCA C271 | 38 | 32 | 40 | 35 |
| NCA C272 | 38 | 32 | 40 | 34 |
| NCA C273 | 40 | 34 | 42 | 36 |
| NCA C274 | 40 | 34 | 42 | 36 |
| NCA C275 | 39 | 33 | 41 | 35 |
| NCA C276 | 39 | 33 | 41 | 35 |
| NCA C277 | 39 | 33 | 41 | 35 |
| NCA C278 | 38 | 33 | 41 | 35 |
| NCA C279 | 38 | 32 | 40 | 34 |
| NCA C280 | 38 | 32 | 40 | 35 |
| NCA C281 | 39 | 33 | 48 | 43 |
| NCA C282 | 41 | 35 | 48 | 42 |
| NCA C283 | 41 | 35 | 50 | 45 |
| NCA C284 | 42 | 36 | 62 | 57 |
| NCA C285 | 43 | 37 | 64 | 58 |
| NCA C286 | 42 | 37 | 56 | 51 |
| NCA C287 | 42 | 36 | 55 | 50 |
| NCA C288 | 41 | 35 | 53 | 48 |
| NCA C289 | 42 | 36 | 52 | 46 |
| NCA C290 | 43 | 37 | 51 | 46 |
| NCA C291 | 42 | 36 | 51 | 46 |
| NCA C292 | 43 | 37 | 47 | 42 |
| NCA C293 | 42 | 36 | 50 | 44 |
| NCA C294 | 41 | 35 | 49 | 44 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C295 | 42 | 36 | 47 | 42 |
| NCA C296 | 41 | 35 | 47 | 42 |
| NCA C297 | 41 | 36 | 47 | 42 |
| NCA C298 | 40 | 35 | 47 | 42 |
| NCA C299 | 41 | 35 | 47 | 42 |
| NCA C300 | 40 | 34 | 47 | 42 |
| NCA C301 | 41 | 35 | 46 | 40 |
| NCA C302 | 41 | 35 | 46 | 41 |
| NCA C303 | 42 | 36 | 46 | 41 |
| NCA C304 | 41 | 35 | 43 | 38 |
| NCA C305 | 41 | 35 | 43 | 38 |
| NCA C306 | 41 | 35 | 43 | 37 |
| NCA C307 | 41 | 35 | 43 | 37 |
| NCA C308 | 40 | 34 | 42 | 36 |
| NCA C309 | 41 | 35 | 42 | 37 |
| NCA C310 | 41 | 35 | 42 | 37 |
| NCA C311 | 40 | 34 | 42 | 36 |
| NCA C312 | 41 | 35 | 42 | 36 |
| NCA C313 | 40 | 34 | 42 | 36 |
| NCA C314 | 40 | 34 | 42 | 36 |
| NCA C315 | 40 | 35 | 42 | 36 |
| NCA C316 | 40 | 35 | 42 | 36 |
| NCA C317 | 40 | 35 | 42 | 36 |
| NCA C318 | 40 | 34 | 42 | 36 |
| NCA C319 | 40 | 34 | 41 | 36 |
| NCA C320 | 41 | 35 | 42 | 36 |
| NCA C321 | 42 | 36 | 48 | 43 |
| NCA C322 | 42 | 36 | 48 | 43 |
| NCA C323 | 43 | 37 | 48 | 42 |
| NCA C324 | 42 | 36 | 48 | 42 |
| NCA C325 | 42 | 36 | 46 | 41 |
| NCA C326 | 44 | 39 | 47 | 41 |
| NCA C327 | 42 | 36 | 50 | 44 |
| NCA C328 | 42 | 37 | 47 | 41 |
| NCA C329 | 43 | 37 | 47 | 42 |
| NCA C330 | 42 | 36 | 47 | 42 |
| NCA C331 | 44 | 38 | 49 | 43 |
| NCA C332 | 44 | 39 | 48 | 42 |
| NCA C333 | 46 | 40 | 48 | 43 |
| NCA C334 | 46 | 40 | 48 | 42 |
| NCA C335 | 42 | 36 | 44 | 39 |
| NCA C336 | 40 | 35 | 43 | 38 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C337 | 40 | 34 | 44 | 38 |
| NCA C338 | 41 | 35 | 45 | 39 |
| NCA C339 | 47 | 41 | 48 | 43 |
| NCA C340 | 48 | 42 | 49 | 43 |
| NCA C341 | 43 | 38 | 46 | 40 |
| NCA C342 | 42 | 36 | 43 | 38 |
| NCA C343 | 49 | 43 | 50 | 44 |
| NCA C344 | 41 | 35 | 43 | 37 |
| NCA C345 | 48 | 42 | 48 | 42 |
| NCA C346 | 45 | 39 | 46 | 40 |
| NCA C347 | 40 | 34 | 43 | 37 |
| NCA C348 | 40 | 34 | 42 | 36 |
| NCA C349 | 39 | 34 | 42 | 36 |
| NCA C350 | 40 | 34 | 42 | 36 |
| NCA C351 | 41 | 35 | 42 | 37 |
| NCA C352 | 41 | 35 | 42 | 36 |
| NCA C353 | 41 | 35 | 42 | 36 |
| NCA C354 | 41 | 35 | 42 | 36 |
| NCA C355 | 43 | 37 | 44 | 38 |
| NCA C356 | 42 | 36 | 42 | 37 |
| NCA C357 | 42 | 36 | 43 | 37 |
| NCA C358 | 42 | 36 | 43 | 37 |
| NCA C359 | 42 | 36 | 43 | 37 |
| NCA C360 | 45 | 39 | 46 | 40 |
| NCA C361 | 44 | 38 | 45 | 39 |
| NCA C362 | 44 | 38 | 45 | 39 |
| NCA C363 | 41 | 35 | 55 | 49 |
| NCA C364 | 40 | 34 | 51 | 45 |
| NCA C365 | 42 | 36 | 52 | 46 |
| NCA C366 | 44 | 38 | 56 | 51 |
| NCA C367 | 44 | 38 | 50 | 45 |
| NCA C368 | 41 | 36 | 62 | 57 |
| NCA C369 | 43 | 37 | 63 | 58 |
| NCA C370 | 45 | 39 | 63 | 58 |
| NCA C371 | 45 | 39 | 51 | 46 |
| NCA C372 | 42 | 36 | 50 | 45 |
| NCA C373 | 44 | 38 | 49 | 43 |
| NCA C374 | 41 | 36 | 45 | 40 |
| NCA C375 | 43 | 37 | 49 | 44 |
| NCA C376 | 43 | 38 | 48 | 43 |
| NCA C377 | 43 | 38 | 48 | 42 |
| NCA C378 | 45 | 39 | 48 | 42 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C379 | 44 | 38 | 48 | 43 |
| NCA C380 | 43 | 37 | 47 | 42 |
| NCA C381 | 45 | 39 | 47 | 41 |
| NCA C382 | 47 | 41 | 48 | 43 |
| NCA C383 | 45 | 39 | 48 | 42 |
| NCA C384 | 47 | 42 | 48 | 43 |
| NCA C385 | 45 | 39 | 48 | 42 |
| NCA C386 | 46 | 40 | 53 | 48 |
| NCA C387 | 46 | 40 | 58 | 53 |
| NCA C388 | 45 | 39 | 59 | 54 |
| NCA C389 | 49 | 43 | 49 | 44 |
| NCA C390 | 49 | 43 | 50 | 45 |
| NCA C391 | 47 | 41 | 47 | 41 |
| NCA C392 | 48 | 42 | 49 | 43 |
| NCA C393 | 45 | 39 | 46 | 40 |
| NCA C394 | 47 | 41 | 48 | 42 |
| NCA C395 | 47 | 41 | 48 | 42 |
| NCA C396 | 47 | 41 | 47 | 42 |
| NCA C397 | 47 | 41 | 47 | 42 |
| NCA C398 | 46 | 40 | 53 | 48 |
| NCA C399 | 46 | 40 | 51 | 45 |
| NCA C400 | 43 | 37 | 51 | 46 |
| NCA C401 | 44 | 39 | 46 | 40 |
| NCA C402 | 46 | 40 | 48 | 42 |
| NCA C403 | 51 | 45 | 51 | 46 |
| NCA C404 | 49 | 43 | 50 | 44 |
| NCA C405 | 51 | 45 | 51 | 46 |
| NCA C406 | 51 | 45 | 51 | 45 |
| NCA C407 | 47 | 41 | 48 | 42 |
| NCA C408 | 50 | 44 | 50 | 44 |
| NCA C409 | 47 | 41 | 53 | 48 |
| NCA C410 | 52 | 46 | 55 | 49 |
| NCA C411 | 48 | 42 | 49 | 44 |
| NCA C412 | 48 | 42 | 49 | 44 |
| NCA C413 | 51 | 45 | 52 | 46 |
| NCA C414 | 51 | 46 | 52 | 46 |
| NCA C415 | 47 | 42 | 48 | 42 |
| NCA C416 | 49 | 43 | 49 | 44 |
| NCA C417 | 57 | 51 | 58 | 52 |
| NCA C418 | 47 | 41 | 51 | 45 |
| NCA C419 | 58 | 52 | 58 | 52 |
| NCA C420 | 57 | 51 | 57 | 51 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C421 | 56 | 50 | 57 | 51 |
| NCA C422 | 54 | 48 | 56 | 51 |
| NCA C423 | 53 | 48 | 55 | 50 |
| NCA C424 | 56 | 51 | 57 | 52 |
| NCA C425 | 50 | 44 | 62 | 57 |
| NCA C426 | 49 | 43 | 57 | 52 |
| NCA C427 | 50 | 44 | 61 | 56 |
| NCA C428 | 50 | 44 | 62 | 57 |
| NCA C429 | 50 | 44 | 55 | 49 |
| NCA C430 | 49 | 43 | 54 | 49 |
| NCA C431 | 54 | 48 | 55 | 50 |
| NCA C432 | 51 | 45 | 53 | 47 |
| NCA C433 | 50 | 44 | 52 | 46 |
| NCA C434 | 52 | 46 | 53 | 48 |
| NCA C435 | 48 | 42 | 53 | 48 |
| NCA C436 | 35 | 30 | 42 | 36 |
| NCA C437 | 34 | 30 | 40 | 34 |
| NCA C438 | 35 | 30 | 41 | 35 |
| NCA C439 | 34 | 30 | 42 | 36 |
| NCA C440 | 37 | 31 | 42 | 36 |
| NCA C441 | 37 | 31 | 42 | 37 |
| NCA C442 | 34 | 30 | 42 | 36 |
| NCA C443 | 35 | 30 | 42 | 36 |
| NCA C444 | 37 | 31 | 42 | 37 |
| NCA C445 | 36 | 30 | 42 | 37 |
| NCA C446 | 37 | 31 | 42 | 36 |
| NCA C447 | 36 | 30 | 42 | 36 |
| NCA C448 | 36 | 30 | 42 | 37 |
| NCA C449 | 36 | 30 | 42 | 37 |
| NCA C450 | 36 | 30 | 42 | 37 |
| NCA C451 | 37 | 31 | 42 | 36 |
| NCA C452 | 37 | 31 | 41 | 36 |
| NCA C453 | 37 | 31 | 42 | 36 |
| NCA C454 | 36 | 30 | 42 | 36 |
| NCA C455 | 37 | 31 | 42 | 36 |
| NCA C456 | 36 | 30 | 42 | 36 |
| NCA C457 | 36 | 30 | 41 | 36 |
| NCA C458 | 37 | 31 | 42 | 36 |
| NCA C459 | 37 | 31 | 42 | 36 |
| NCA C460 | 36 | 30 | 42 | 36 |
| NCA C461 | 36 | 30 | 42 | 36 |
| NCA C462 | 37 | 31 | 42 | 36 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C463 | 37 | 31 | 41 | 36 |
| NCA C464 | 38 | 32 | 42 | 36 |
| NCA C465 | 38 | 32 | 41 | 35 |
| NCA C466 | 38 | 32 | 42 | 36 |
| NCA C467 | 36 | 30 | 41 | 36 |
| NCA C468 | 36 | 31 | 41 | 35 |
| NCA C469 | 36 | 31 | 41 | 36 |
| NCA C470 | 37 | 31 | 41 | 36 |
| NCA C471 | 37 | 31 | 42 | 36 |
| NCA C472 | 36 | 30 | 41 | 35 |
| NCA C473 | 37 | 31 | 41 | 35 |
| NCA C474 | 35 | 30 | 39 | 33 |
| NCA C475 | 37 | 32 | 39 | 34 |
| NCA C476 | 37 | 31 | 39 | 34 |
| NCA C477 | 37 | 31 | 39 | 34 |
| NCA C478 | 38 | 32 | 40 | 34 |
| NCA C479 | 37 | 31 | 39 | 34 |
| NCA C480 | 37 | 31 | 39 | 34 |
| NCA C481 | 37 | 32 | 39 | 34 |
| NCA C482 | 37 | 32 | 40 | 34 |
| NCA C483 | 37 | 31 | 39 | 33 |
| NCA C484 | 38 | 32 | 39 | 34 |
| NCA C485 | 38 | 32 | 39 | 34 |
| NCA C486 | 38 | 32 | 40 | 34 |
| NCA C487 | 38 | 32 | 40 | 34 |
| NCA C488 | 38 | 32 | 40 | 34 |
| NCA C489 | 38 | 32 | 40 | 34 |
| NCA C490 | 38 | 32 | 40 | 34 |
| NCA C491 | 38 | 32 | 40 | 34 |
| NCA C492 | 38 | 32 | 40 | 34 |
| NCA C493 | 38 | 32 | 40 | 34 |
| NCA C494 | 38 | 32 | 40 | 34 |
| NCA C495 | 38 | 32 | 40 | 34 |
| NCA C496 | 38 | 32 | 40 | 34 |
| NCA C497 | 38 | 33 | 40 | 34 |
| NCA C498 | 38 | 32 | 40 | 34 |
| NCA C499 | 38 | 32 | 40 | 34 |
| NCA C500 | 38 | 32 | 40 | 34 |
| NCA C501 | 38 | 32 | 40 | 35 |
| NCA C502 | 37 | 31 | 41 | 35 |
| NCA C503 | 38 | 32 | 41 | 35 |
| NCA C504 | 38 | 32 | 41 | 35 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C505 | 39 | 33 | 41 | 35 |
| NCA C506 | 39 | 33 | 42 | 36 |
| NCA C507 | 39 | 33 | 42 | 36 |
| NCA C508 | 39 | 33 | 40 | 35 |
| NCA C509 | 39 | 33 | 41 | 35 |
| NCA C510 | 39 | 33 | 41 | 35 |
| NCA C511 | 39 | 33 | 40 | 35 |
| NCA C512 | 39 | 33 | 40 | 34 |
| NCA C513 | 39 | 33 | 40 | 34 |
| NCA C514 | 39 | 33 | 40 | 34 |
| NCA C515 | 39 | 33 | 41 | 36 |
| NCA C516 | 39 | 33 | 41 | 35 |
| NCA C517 | 39 | 33 | 41 | 35 |
| NCA C518 | 39 | 33 | 40 | 35 |
| NCA C519 | 39 | 33 | 40 | 35 |
| NCA C520 | 39 | 33 | 40 | 35 |
| NCA C521 | 39 | 33 | 40 | 35 |
| NCA C522 | 40 | 34 | 41 | 35 |
| NCA C523 | 39 | 34 | 40 | 34 |
| NCA C524 | 39 | 33 | 40 | 34 |
| NCA C525 | 39 | 33 | 40 | 34 |
| NCA C526 | 39 | 33 | 40 | 35 |
| NCA C527 | 39 | 33 | 40 | 35 |
| NCA C528 | 37 | 32 | 40 | 34 |
| NCA C529 | 38 | 32 | 40 | 34 |
| NCA C530 | 39 | 33 | 40 | 34 |
| NCA C531 | 38 | 32 | 39 | 34 |
| NCA C532 | 38 | 32 | 40 | 34 |
| NCA C533 | 38 | 32 | 40 | 34 |
| NCA C534 | 37 | 31 | 39 | 33 |
| NCA C535 | 37 | 31 | 39 | 33 |
| NCA C536 | 37 | 32 | 39 | 33 |
| NCA C537 | 37 | 31 | 39 | 33 |
| NCA C538 | 37 | 31 | 39 | 33 |
| NCA C539 | 37 | 32 | 39 | 34 |
| NCA C540 | 38 | 32 | 40 | 34 |
| NCA C541 | 37 | 31 | 39 | 33 |
| NCA C542 | 38 | 32 | 40 | 34 |
| NCA C543 | 37 | 31 | 40 | 34 |
| NCA C544 | 37 | 31 | 39 | 33 |
| NCA C545 | 37 | 31 | 39 | 33 |
| NCA C546 | 37 | 31 | 39 | 34 |

| Name | Year 2035 No Build Scenario | | Year 2035 Build Scenario | |
|---|---|---|---|---|
| | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) | Daytime ($L_{Aeq,15hr}$) | Night Time ($L_{Aeq,9hr}$) |
| NCA C547 | 38 | 32 | 40 | 34 |
| NCA C548 | 37 | 31 | 40 | 34 |
| NCA C549 | 38 | 32 | 40 | 34 |
| NCA C550 | 38 | 32 | 40 | 34 |
| NCA C551 | 38 | 32 | 40 | 34 |
| NCA C552 | 38 | 32 | 40 | 34 |
| NCA C553 | 38 | 33 | 40 | 34 |
| NCA C554 | 39 | 33 | 40 | 34 |
| NCA C555 | 39 | 33 | 40 | 34 |
| NCA C556 | 39 | 33 | 40 | 34 |
| NCA C557 | 39 | 33 | 40 | 35 |
| NCA C558 | 39 | 34 | 41 | 35 |
| NCA C559 | 39 | 33 | 41 | 35 |
| NCA C560 | 39 | 33 | 41 | 35 |
| NCA C561 | 39 | 33 | 41 | 35 |
| NCA C562 | 41 | 35 | 42 | 36 |
| NCA C563 | 40 | 34 | 41 | 35 |
| NCA C564 | 40 | 34 | 41 | 35 |
| NCA C565 | 40 | 34 | 41 | 35 |
| NCA C566 | 40 | 34 | 41 | 35 |
| NCA C567 | 40 | 34 | 41 | 35 |
| NCA C568 | 40 | 34 | 41 | 35 |
| NCA C569 | 40 | 34 | 41 | 35 |
| NCA C570 | 40 | 34 | 41 | 35 |
| NCA C571 | 40 | 34 | 41 | 35 |
| NCA C572 | 39 | 33 | 41 | 35 |
| NCA C573 | 37 | 31 | 40 | 34 |
| NCA C574 | 39 | 33 | 41 | 35 |
| NCA C575 | 40 | 34 | 41 | 35 |
| NCA C576 | 38 | 32 | 39 | 34 |
| NCA C577 | 40 | 34 | 41 | 35 |
| NCA C578 | 40 | 34 | 41 | 35 |
| NCA C579 | 40 | 34 | 41 | 35 |
| NCA C580 | 40 | 34 | 41 | 35 |
| NCA C581 | 40 | 34 | 41 | 35 |
| NCA C582 | 40 | 34 | 41 | 35 |
| NCA C583 | 40 | 34 | 41 | 36 |