RATCH-Australia Corporation

Third Modification Application

COLLECTOR WIND FARM

JULY 2019

ngh environmental

Document Verification

Project Title: Collector Wind Farm

Project Number: 18-124

Project File Name: Collector Third Modification Application v1

Revision	Date	Prepared by (name)	Reviewed by (name)	Approved by (name)
Draft v1	16/01/19	Hannah Weiss Louiza Romane	Nick Graham-Higgs	Nick Graham-Higgs
Final v1	15/05/19	Louiza Romane Mitch Palmer	Nick Graham-Higgs	Nick Graham-Higgs
Final v1.1	27/06/19	Louiza Romane	Nick Graham-Higgs	Nick Graham-Higgs
Final v1.2	16/07/19	Hannah Weiss (noise update)	Brooke Marshall	Brooke Marshall

NGH Environmental Pty Ltd (ACN: 124 444 622. ABN: 31 124 444 622)

www.nghenvironmental.com.au e: ngh@nghenvironmental.com.au

Sydney Region
18/21 mary st
surry hills nsw 2010 (t 02 8202 8333)

Canberra - NSW SE & ACT
8/27 yallourn st (po box 62)
fyshwick act 2609 (t 02 6280 5053)

Brisbane
level 5, 320 adelaide st
brisbane qld 4000 (t 07 3511 0238)

Newcastle - Hunter and North Coast
7/11 union st
newcastle west nsw 2302 (t 02 4929 2301)

Wagga Wagga - Riverina and Western NSW
suite 1, 39 fitzmaurice st (po box 5464)
wagga wagga nsw 2650 (t 02 6971 9696)

Bega - ACT and South East NSW
suite 1, 216 carp st (po box 470)
bega nsw 2550 (t 02 6492 8333)

CONTENTS

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

BDAR	Biodiversity Development Assessment Report
CEMP	Construction environmental management plan
Cwth	Commonwealth
DPE	(NSW) Department of Planning and Environment
EA	Environmental Assessment
EEC	Endangered Ecological Community
EPA	(NSW) Environmental Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
FBA	Framework for Biodiversity Assessment
Ha	hectares
ICNG	Interim Construction Noise Guideline
NPfI	Noise Policy for Industry
Km	kilometres
LGA	Local Government Area
M	Metres
MOD 1	Collector Wind Farm Modification Report (NGH Environmental, 2015)
MOD 2	Collector Wind Farm Second Modification Application (NGH Environmental, 2018)
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change and Water
SSD	State Significant Development
SWQMP	Soil and Water Quality Management Plan
TCBP	Temporary Concrete Batch Plant
ULSC	Upper Lachlan Shire Council
WTG	Wind Turbine Generator

1 INTRODUCTION

1.1 BACKGROUND

The Collector Wind Farm was originally assessed in the Environmental Assessment (EA) report finalised in June 2012 (APP Corporation 2012). Approval for the Collector Wind Farm was granted on 2 December 2013 under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The project was transitioned to State Significant Development (SSD) on 6 July 2018. The project is situated in the Upper Lachlan Shire Local Government Area (LGA) about 3.5 km north-west of Collector village and 55 km north-east of Canberra. Project approval permits the construction, operation and decommissioning of up to 55 wind turbines and associated infrastructure including:

- Substation and transformers.
- Underground cabling and overhead transmission connections.
- Operations and maintenance facility.
- Access tracks.

The Environmental Assessment for the wind farm identified that:

- Preparation works for siting of a mobile concrete batching plant may be required and would be subject to a separate development application.

The Project Approval Conditions of Consent includes reference to development of a temporary batch plant. Condition D21 states that;

> *Unless otherwise approved by the Secretary, the location of ancillary facilities associated with the construction of the Project shall:*
>
> *(f) be separated from nearest residences by at least 200 metres (or at least 300 metres for a temporary batching plant).*

A modification to the approved project was prepared in September 2015 and granted on 22 July 2016 to make changes to the location of ancillary infrastructure; blade length of the wind turbines, and biodiversity offsetting and clearing limits (MOD 1; NGH Environmental 2015).

A second modification application to the planning approval to incorporate the works required for the upgrade to Lerida Road South and connection infrastructure was prepared in December 2018 (Second Modification Application; NGH Environmental 2018).

This third modification application to the planning approval proposes the installation and use of a temporary concrete batch plant (TCBP) onsite at the Collector Wind Farm and has been prepared following consultation with DPE who confirmed a modification application was required. The proposal follows extensive pre-construction planning and development by the construction contractor, which has identified a number of benefits from the use of an onsite TCBP to improve the construction efficiency of the project, as well as reducing transport impacts as detailed below:

- Delivery of concrete from Goulburn (as originally approved) could result in some foundation concrete pours being extended to 2 days rather than 1, with potential implications for the overall construction schedule and management of concrete quality and consistency. Use of an onsite TCBP avoids these potential implications by enabling all concrete pours to be completed within a single day;

- Use of an onsite TCBP would significantly reduce heavy vehicle movements along Hume Highway and Lerida Road South, with a net reduction of around 3,750 as the ~4,000 concrete agitator movements would be replaced by ~250 material delivery vehicles (water, cement, aggregate).
- Condition D20 (b) requires all heavy vehicle egress from Lerida Road South does not turn right onto the Hume Highway. As such, heavy vehicles would turn left from Lerida Road South and use the turnaround facility at Gunning to head east on the Hume Highway from the project site. This adds approximately 30km additional travel distance for concrete agitators returning to Goulburn – the use of an onsite TCBP would avoid this, saving over 22,000km agitator mileage along the Highway, with associated savings in fuel use and emissions, road wear and tear, and interactions with other vehicle users on the highway.

Given these significant project and environmental benefits, the Proponent is proposing to construct and operate a TCBP on the wind farm site.

1.2 AIM AND SCOPE OF THIS MODIFICATION

Works that are the subject of this modification comprise of the construction, operation and decommissioning of a TCBP within the Collector wind farm site, at a location south of the approved construction compound in proximity to the approved location for wind turbine 21 (WTG 21).

This Modification Report:

- Describes the proposed modification, its justification and benefits.
- Identifies the planning context of the proposed modification.
- Describes consultation undertaken with reference to the proposed modification.
- Identifies and assesses any changes to the nature and level of impacts that would occur because of the proposed modification.
- Considers whether additional mitigation strategies would be required to manage the impacts of the proposed modification.

The report has been prepared to support an application to modify the approval for the Collector Wind Farm, granted in 2013 under Part 3A of the EP&A Act. Given the transition of this project to SSD, this modification application is being made in accordance with section 4.55(1A) of the EP&A Act.

The planning context for this modification application is provided in Section 3.

2 MODIFICATION DESCRIPTION

2.1 PROPOSED MODIFICATION

The proposed modification sought by this application involves the construction, operation and decommissioning of an onsite temporary concrete batch plant. The TCBP would comprise an area approximately 6,750 m^2, an area which would include all batch plant equipment, stockpiles and environmental controls. Access to the TCBP would be via an existing project approved access road adjacent to the TCBP.

The proposed TCBP location is identified in Figure 2-1 and Figure 2-2 in the context of the approved wind farm layout and infrastructure. Appendix A identifies the TCBP in relation to vegetation mapping.

The proposed area would be cleared, levelled and a stable hardstand created using crushed rock. The temporary hardstand and associated infrastructure will be present on site for approximately 45 weeks from Q3 2019 during the construction program. This is based on a schedule of completing two WTG foundations per week. This duration allows for eight weeks of installation / construction, mobilisation and testing prior to the first WTG foundation being poured; and four weeks of demobilisation and rehabilitation of the area upon completion of the WTG foundation pours.

The modification would involve the following components:

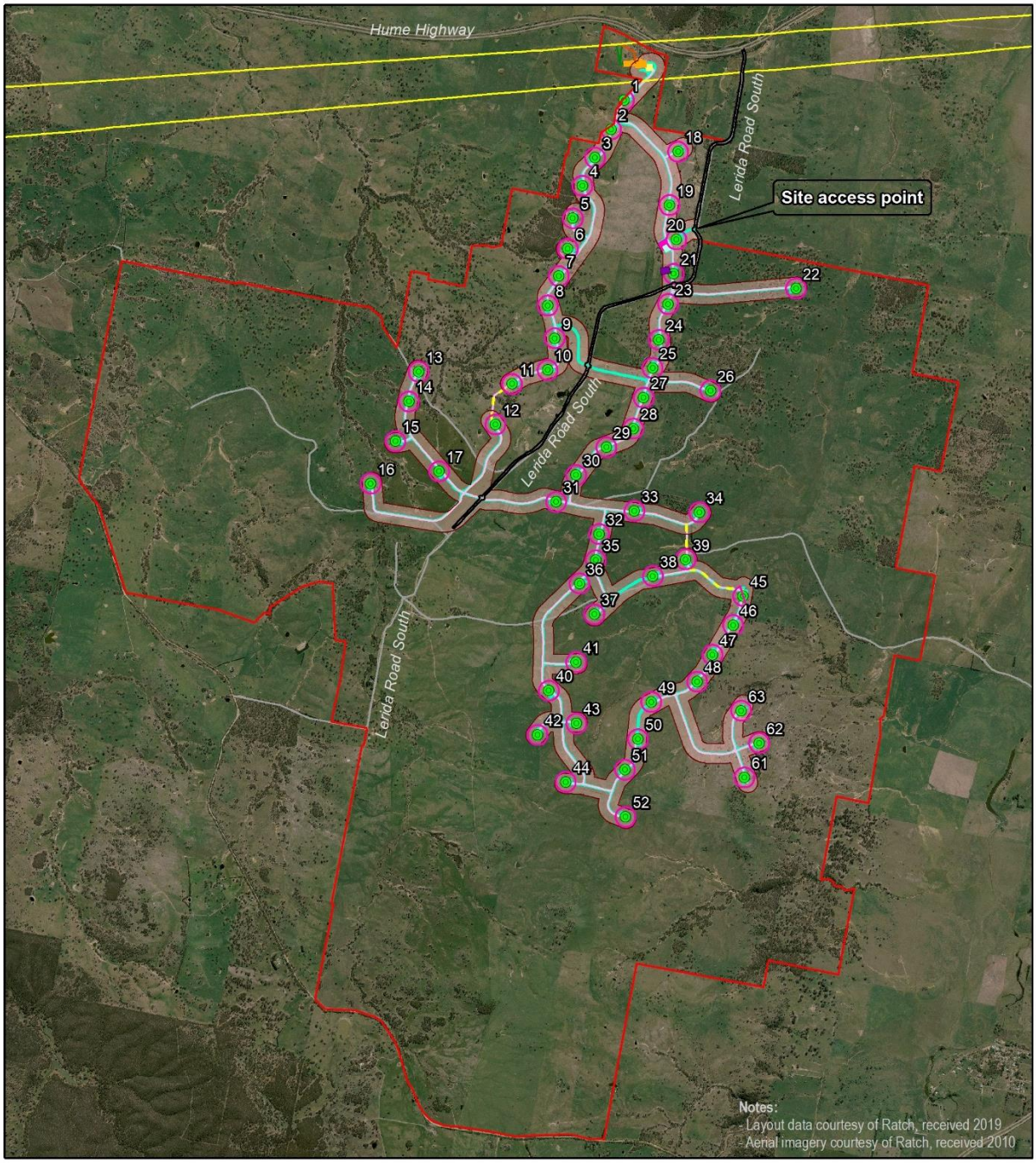
- Clearing an area of approximately 0.7 ha of grassland (identified as Derived Native Grassland in low or poor condition consisting of a low diversity and cover of native species and high cover and abundance of exotic flora). There are no trees located within or in close proximity of the footprint of the proposed plant
- Storage of topsoil for subsequent rehabilitation
- Ground levelling and laying of crushed rock hardstand
- Fencing to protect livestock
- The construction of:
    - The batch plant with loading ramp and office
    - One sediment pond and washout area
    - One slump sand
    - One storage silo and silo refill tanker loading zone
    - Two stockpiles, one for sand and one for aggregate, and stock pile refill loading zones
    - Two water tanks and a water tank refill loading zone
    - Staff/visitor parking area
- The installation of:
    - One storage container
    - A spare generator
    - Additives (Intermediate Bulk Containers (IBCs) in bunds)
    - Diesel fuel (in bunds)
- Decommissioning of the batch plant and rehabilitation of the site:
    - Removal of all infrastructure
    - Removal of crushed rock and rehabilitation of land
    - Re-landscaping of ground
    - Re-planting of native vegetation

The proposed location for the proposed TCBP is shown in Figure 2-1; with an indicative layout provided as Figure 2-3. The final layout is dependent on detailed design following approval.

This modification would result in a number of benefits from the use of an onsite TCBP to improve the construction efficiency of the project, as well as reducing transport impacts:

- Enabling all concrete pours to be completed within a single day.
- Reducing concrete agitator movements along Hume Highway and Lerida Road South by up to 4,000; with a net reduction of 3,750 in all heavy vehicle movements when material deliveries are accounted for.
- Saving over 22,000km agitator mileage along the Hume Highway, with associated savings in fuel use and emissions, road wear and tear, and interactions with other vehicle users on the highway.

The potential impacts associated with the TCBP have been fully assessed within Section 5 of this modification application.



MODIFIED PROJECT LAYOUT

Collector Wind Farm Modification Application

- Site boundary
- Lerida Road South upgrade boundary
- Existing transmission lines
- Existing roads

Wind turbines

- Approved turbine locations
- Development envelope (turbines)

Ancillary facilities

- Transgrid laydown area
- Temporary construction compound
- Temporary concrete batch plant

Ancillary infrastructure

- Development envelope (roads)
- Road layout
- Cabling trench
- Comms cable trench
- HV lines
- Potential overhead line
- Substation
- O&M building & compound

0 0.25 0.5 1 Kilometres

A4 @ 1:55000
Ref: 5541-7
Author: BH

ngh environmental

www.nghenvironmental.com.au

Figure 2-1 Temporary onsite Concrete Batch Plant location in context of approved wind farm layout and infrastructure.

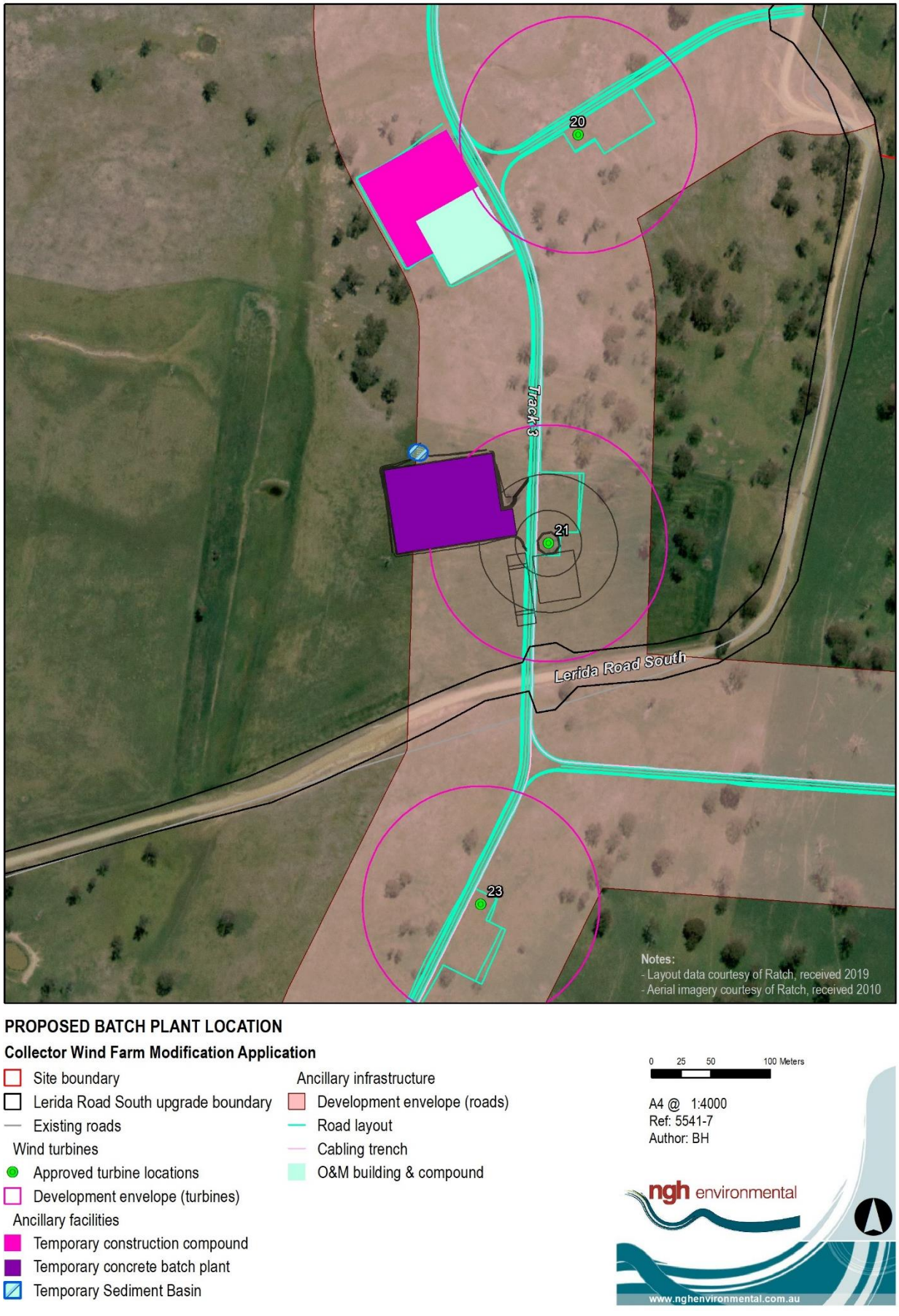


Figure 2-2 Temporary onsite Concrete Batch Plant location in context of WTG 21

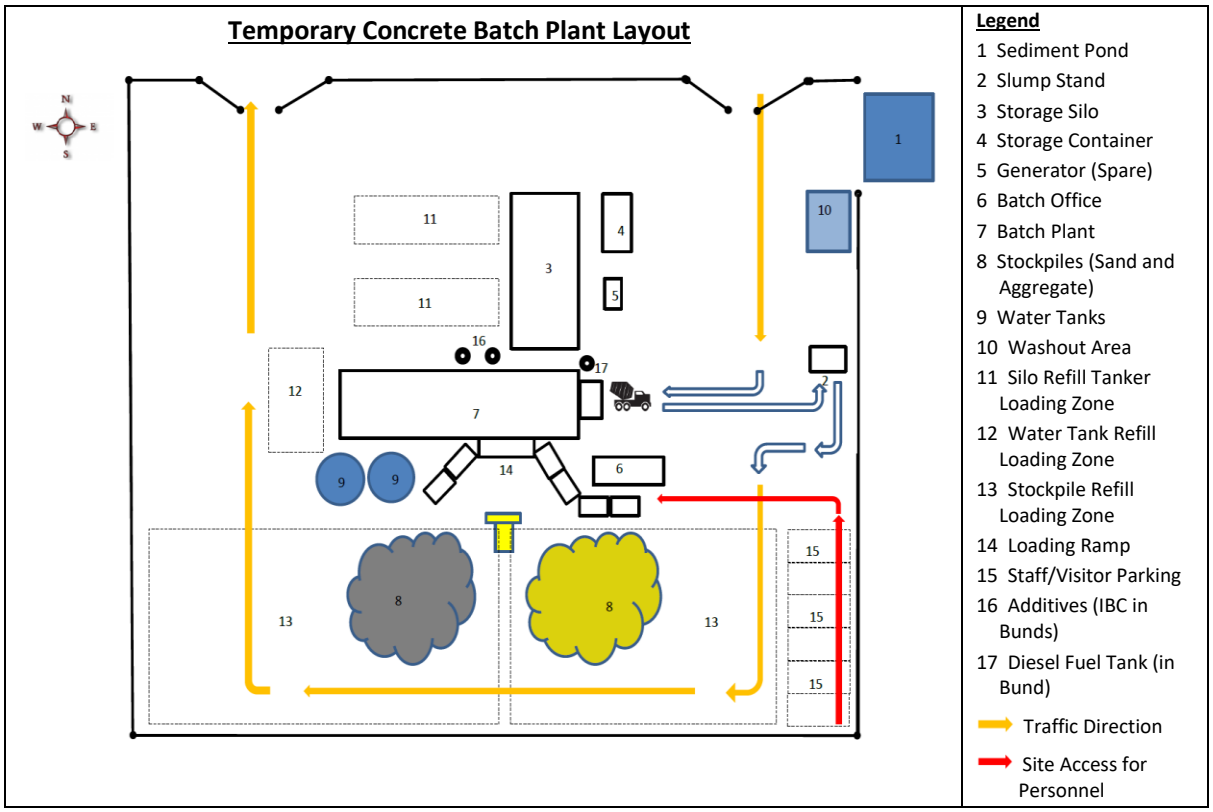


Figure 2-3 Temporary Concrete Batch Plant layout

The overall site layout has been designed to ensure that the concrete agitators can be loaded efficiently and safely while ensuring effective wastewater management to avoid sediment laden runoff from the hardstand discharging onto the surrounding land and into local waterways.

2.2 JUSTIFICATION

Extensive pre-construction planning and development by the construction contractor identified that a number of benefits would result from the use of an onsite TCBP at the Collector Wind Farm. The use of an onsite TCBP results in a number of benefits (as discussed in Section 1.1), specifically:

- Concrete pours would be able to be completed within a single day.
- Heavy vehicle movements (concrete agitators) along Hume Highway and Lerida Road South would be significantly reduced.
- Heavy vehicle (concrete agitator) mileage, fuel use and emissions, road wear and tear, and interactions with other vehicle users on the Hume Highway would be significantly reduced.

The proposed changes result in significant improvements to transport impact and constructability of the Collector Wind Farm and do not have an adverse impact on the other environmental issues considered within this modification application. As such, the modifications proposed are considered justifiable, and the associated impacts identified and assessed in this assessment are considered manageable with the implementation of specific strategies identified within the commitments of the EA, Preferred Project Report, first Modification Application Report and second Modification Application Report.

On this basis, it is considered that the changes from the batch plant proposal would be of "minimal environmental impact" in comparison to the existing approved project, and hence it can be assessed and approved under Section 4.55(1A) of the EP&A Act.

3 PLANNING CONTEXT

The project was approved under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). However, the new *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017* (Savings and Transitional Regulations) came into effect on 1 March 2018.

Accordingly, the project was transitioned to State Significant Development (SSD 3778) on 6 July 2018 via an order made under clause 6 of Schedule 2 of the Savings and Transitional Regulations. As such the Project Approval:

- will be taken to be an SSD consent; and
- may be modified in accordance with section 4.55 of the EP&A Act.

Section 4.55(1A) of the EP&A Act states that:

> *A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:*
>
> > *(a) it is satisfied that the proposed modification is of minimal environmental impact, and*
> >
> > *(b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all).*

These stipulations are addressed in this Modification Report:

- Section 2 describes the proposed modification. It is clear that the project as a whole, as modified, will remain substantially the same development as that which was originally approved.
- Section 5 assesses the nature and level of environmental impact that would result from the modification and concludes that the construction and operation of the TCBP will be of minimal additional environmental impact compared to the existing approved wind farm project. In particular, traffic & transport impacts will, overall, be reduced through a decrease in vehicle movements and associated distance travelled by those vehicles.

4 CONSULTATION

Consultation has been undertaken with stakeholders who have the potential to be affected by the proposed modification including:

- Project landowners
    - As part of the process of site selection, the proponent has consulted directly with the landowner on whose land the proposed TCBP would be located, to determine which of a number of potential options would be preferred. The preferred option is the one identified in this proposal. From this agreement, the proponent negotiated a commercial agreement with the landowner to provide compensation for the disruption from the plant and to incorporate agreed conditions for management, decommissioning and land rehabilitation. This modification reflects the agreement reached between the proponent and the landowner regarding the proposed TCBP;
    - The proponent has also shared information about the proposal with other owners who own land in close proximity to the proposed TCBP; with details of the basis, potential impacts and project benefits arising.

- Community Consultative Committee (CCC)
    - On 27th Feb 2019, the first CCC meeting for 2019 was held in Collector. As part of this meeting, the proponent provided a regular project update on status and progress. This update included discussions on approvals matters, addressing compliance with conditions as well as highlighting the forthcoming proposal for the concrete batch plant.
    - This planning modification was subsequently an agenda item which was subject to detailed discussion about the proposal, its basis and impacts / benefits, and the planning approach / requirements during the following CCC meeting on 15th May 2019.

- Community consultation
    - A community newsletter was distributed in late March / early April 2019 as part of the proponent's community engagement plan, which included information on the progress of the project and noting targeting construction commencement in April / May 2019. This also included an invitation to community engagement sessions to be held in Collector village in mid-April.
    - The proponent carried out three community information sessions at the local café in Collector on 12th and 13th April 2019, to enable community members to meet the project team and find out more about all aspects of the wind farm project, and particularly about plans / details for the construction process.
    - A subsequent project newsletter was distributed in the local area in early June 2019, as part of the proponent's community engagement plan. The newsletter summarised the proposal for the TCBP, linking to the draft MOD3 application available for review on the Collector Wind Farm website (www.collectorwindfarm.com.au); and highlighting contact details for both the proponent and the Department for any comments, questions, feedback. To date, there has been no community feedback on the proposal.

- Upper Lachlan Shire Council
    - In early 2019 the proponent shared the same information (as above) with the Upper Lachlan Shire Council (ULSC) about the project development and the proposal for use of a concrete batch plant; and the associated requirement for a planning modification. Ongoing discussions with ULSC continue, to ensure the Council is kept informed on project progress.
    - Full details of the proposal as presented in the draft modification application, was provided to relevant Council officers in June, with a particular note of the benefits arising from reduced heavy vehicle movements – no feedback has been received to date on the proposal.

- Department of Planning and Environment
    - The proponent initially raised the concept for a temporary concrete batch plant with the Department of Planning & Environment (DPE) in Jan 2019, and shared preliminary siting and assessment data. From these discussions DPE confirmed the need for a modification application to support the proposal.
    - Discussions have continued with the DPE through the further development of the proposal, with particular focus on siting to avoid impacts on sensitive biodiversity, particularly endangered ecological communities.

- Office & Environment & Heritage
    - As part of the preparation of this modification application, and the associated impact assessment, the proponent consulted with the NSW Office of Environment & Heritage (OEH) to seek feedback and comment on the proposing batch plant siting, potential biodiversity impacts, and basis of assessment for incorporation in the modification application;
    - Feedback was received from OEH in late June 2019, summarised as follows:
        - OEH noted the proposed location has previously been identified as Derived Native Grassland in low or poor condition consisting of a low diversity and cover of native species and high cover and abundance of exotic flora (assessed in the MOD2 BDAR *as Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion Derived Native Grassland – low diversity (Zone 1)*)
        - OEH agreed that the MOD2 BDAR assessed Zone 1 as being highly degraded with a vegetation integrity score of 9.3, and as such, the proposed plant would not result in any changes to the assessment or generate any additional offset obligation;
        - On that basis, OEH supported the proposed location for the plant and confirmed that there is no requirement for a BDAR for this proposal, and given the outcomes of the BAM, there is no requirement for any offset for the clearing required.

- NSW Environment Protection Authority (EPA)
    - The proponent consulted with the EPA on the proposals for the TCBP, working through the scope, size, design, management and potential impacts of the plant; as well as relevant mitigation measures to be implemented (as presented in this modification application).
    - EPA feedback noted:
        - The existing project environment protection licence (EPL) would require a minor change to the existing 'ancillary activities' section to incorporate the TCBP;
        - Modification of the EPL should follow approval of the modification by DoPE, given it is a fairly minor and straightforward change.
        - Reasonable and feasible measures should be put in place to mitigate noise impacts to sensitive receivers and mitigate dust emissions, sediment discharge and chemical spills.

No consultation has been undertaken with RMS given that the TCBP proposal will reduce the use of Hume Highway, and hence will result in a reduction of existing impacts under the current approval.

5 ENVIRONMENTAL ASSESSMENT APPROACH

5.1 SUBSTANTIALLY THE SAME PROJECT

The publicly exhibited Environmental Assessment (EA) identified the potential requirement for an onsite TCBP that would be subject to a separate development application.

This proposed modification is for the construction, operation and decommissioning of an onsite TCBP. This will comprise of site preparation, constructing relevant infrastructure, operating the plant, decommissioning the plant once it is no longer required, and rehabilitating the land to its original condition. The TCBP is proposed to improve the construction efficiency of the project, with resulting benefits from significant reductions in heavy vehicle movements.

As noted in the following sections, the TCBP will be installed and operated in a manner consistent and compliant with existing conditions of consent, and with the associated management plans (revised and / or updated as required).

5.2 ENVIRONMENTAL IMPACTS OF THE APPROVED PROJECT

The key environmental impacts for the Approved Project included:

- Landscape and visual
- Noise
- Biodiversity
- Indigenous heritage
- Traffic and Transport
- Hazards and Risks
- Water Quality

Other issues assessed for the Approved Project included:

- Climate and air quality
- Soils, Landforms and water
- Non-indigenous heritage
- Waste minimisation and management
- Property values
- Mineral exploration
- Socio-economic considerations
- Land use
- Aeronautical and telecommunications

Mitigation measures set out by the EA, Preferred Project Report, MOD 1 and MOD 2 are considered sufficient to manage all potential impacts associated with the TCBP.

5.3 ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED MODIFICATIONS

Process for identifying new or additional impacts

This modification report provides an assessment of changes to the level of environmental impact that would be associated with the modified project relative to those assessed for the approved project. The approach undertaken in identifying changes to level of impact comprised:

- A review of the environmental impacts considered for the approved project.
- Identification of environmental aspects where the modifications could result in changes in extent of impact.

The environmental aspects that could result in changes in the magnitude of impact are listed below and assessed in Section 6.

The environmental aspects are:

- Landscape and Visual
- Noise
- Air quality
- Soils, landforms and water
- Hazardous chemicals
- Biodiversity
- Traffic and transport
- Waste minimisation and management

Section 6 includes an evaluation of the proposed modification against the impacts identified and assessed in the Environmental Assessment, Preferred Project and 2016 Modification Report completed for the project.

6 ENVIRONMENTAL IMPACT ASSESSMENT

The environmental aspects that could result in a change in magnitude as a result of the construction and operation of the TCBP are assessed in Table 6-1.

Table 6-1 Assessment of changes of magnitude of environmental impact of construction and operation of temporary TCBP.

Environmental Factor	Comment
Landscape and Visual	• The proposed works are not likely to introduce visual elements which will be out of character with the wind farm site. The facility will be temporary in nature, and will only be present during the construction phase. The TCBP will be removed following decommissioning and the site revegetated. During its operation it is not anticipated that the batch plant will substantially alter the visual environment of the site. Gains associated with the proposed construction and operation of the TCBP in relation to landscape and visual amenity include a reduction in dust generated by heavy vehicle traffic, and improvements associated with reduced heavy vehicle traffic on the Hume Highway. Although some physical changes to the landscape would result from these works, most of these activities are unlikely to result in an unacceptable level of visual impact for their duration and are temporary in nature. The closest receiver to the proposed TCBP site is approximately 1.6 km south-west of the site and is an involved landowner. The property is screened from any potential visual impacts that could occur as a result of the TCBP. Construction of the TCBP would not result in any additional visual impacts for the closest receiver or for any of the non-involved receivers. Vehicle users travelling along Lerida Road South will see the TCBP, however this will be a temporary impact limited to the construction, operation and decommissioning of the TCBP (an approximate 45 week period). Landscape and visual impacts as a result of the modification will be mitigated by implementing the following existing conditions of consent: • Condition B25: "*The Proponent shall ensure that the substations and associated facility sites are designed and constructed to minimise visual intrusion to the nearest sensitive receptors as far as reasonable and feasible, including appropriate external finishes to minimise glare or reflection, landscape planting to screen views, and external lighting requirements in accordance with condition B26*" • Condition D27: *"A Design and Landscaping Plan shall be prepared to outline measures to ensure appropriate development and maintenance of landscaping on the site to achieve adequate landscape buffers and address visual impacts arising from the Project, including turbines, site access roads and associated above ground infrastructure, as far as is reasonable and feasible."* • Condition D21 (f): *"Unless otherwise approved by the Secretary, the location of ancillary facilities associated with the construction of the project shall be separated from the nearest residences by at least 200 m (or at least 300 m for a temporary batching plant)".* The consolidated Statement of Commitments lists extensive mitigation measures to ensure compliance with the conditions of the Project Approval. The existing mitigation measures to avoid and minimise landscape and visual impacts are considered sufficient.

<table>
<tr><th>Environmental Factor</th><th>Comment</th></tr>
<tr><td>Noise</td><td>
A noise assessment was undertaken for noise impacts associated with the temporary onsite TCBP (Marshall Day Acoustics, 2019) and is summarised below and provided in full as Appendix B.

The following assumptions relating to proposed work and equipment were used within the noise assessment:
• 8 cement trucks, completing 10 loadings during each Day shift (between 7 am and 6 pm daily).
• Trucks will not run outside the Day time assessment period and will only utilise internal host resident tracks/roads to avoid using local roads throughout the 40 week period.
• Maximum pour size of 500 m^3.
• Total concrete supply of 27,000 m^3
• Peak production rate of 60 – 75 m^3/hr
• Heavy truck movements of 7,620 over the 40 week duration.

Raw data from the background noise survey undertaken at the closest receiver (house ‘FF’) by Marshall Day Acoustics (2015) was re-analysed to suit the necessary background noise criteria for this assessment. Baseline ambient noise levels were measured at location ‘FF’ between 5th June 2015 to 22nd July 2015.

These baseline ambient noise levels were used to establish the existing background noise levels at the site (provided below).
<table>
<tr><th>Period</th><th>Time Period</th><th>RBL, dB L_{A90}</th><th>dB L_{Aeq}</th></tr>
<tr><td>Day</td><td>7am – 6pm</td><td>25</td><td>38</td></tr>
<tr><td>Evening</td><td>6pm – 10pm</td><td>35</td><td>41</td></tr>
<tr><td>Night</td><td>10pm – 7am</td><td>26</td><td>34</td></tr>
</table>
</td></tr>
</table>

Environmental Factor	Comment

The measured noise levels provided in the above table were used to derive *operational* noise criteria for the purpose of the onsite TCBP. The Noise Policy for Industry (NPfI) noise criteria are provided below:

Period	**Time Period**	**Intrusiveness Criteria** **dB $L_{Aeq, 15min}$**	**Amenity Criteria** **dB $L_{Aeq, period}$**	**Project Noise Trigger Levels** **$L_{Aeq, 15min}$, dB**
Residential				
Day	7am – 6pm	40*	48	40
Evening	6pm – 10pm	35*	43	35
Night	10pm – 7am	35*	38	35
Note*: The intrusiveness noise criteria have been adjusted to allow for 'typical existing background noise levels' as per Table 2.3 in the NPfI.				

A very conservative assumption that all batching plant equipment would be running 100% of the time, 24hrs/day during both day and out-of-hours work (evening and night) times was used in order to assess the 'worst case' outcomes for the purpose of this noise assessment.

The measured baseline ambient noise levels were used to derive *construction* noise criteria for the purpose of the onsite TCBP. The Interim Construction Noise Guideline (ICNG) noise criteria are provided below:

Receiver	**Type**	**Time of Day**	**Management level, dB $L_{Aeq, 15min}$**	
			"Noise Affected"	**"Highly Noise Affected"**
Nearest Receiver 1.6km	Residential	Daytime (for construction hours: • Mon – Fri 7am – 6pm • Sat 8am – 1pm	40	75

Environmental Factor	Comment

The "Noise Affected" level is the point above which there may be some community reaction to noise. The "Highly Noise Affected" level represents the point above which there may be a strong community reaction to noise.

The following assumptions were made for the purpose of calculated noise levels within this noise assessment:

- Plant items running continuously at full load over each 15-minute sample period
- Truck loading activities and associated equipment assumed to be running and working continuously at full load over each 15-minute sample period.
- Distance (1.6km) propagation between the sources and receiver
- The sound power level being generated at site from each plant item as per Table 3.
- The ground between the source and receiver - assumed to be all grass
- Metrological and atmospheric effects on outdoor noise propagation as per ISO 9613-2
  - Temperature 20^{o}C
  - Relative Humidity 50%
  - Wind speed neutral

Based on the above assumptions, the anticipated *operational* noise levels from the onsite TCBP have been calculated to the nearest residential receiver and are provided below:

Period	**Calculated noise level dB $L_{Aeq, 15min}$**	**Project Noise Trigger Levels $L_{Aeq, 15min}$, dB**	**Compliant**
Receiver 1.6km south			
Day	36	40	Yes
Evening	25*	35	Yes
Night	25*	35	Yes
Note*: No truck noise or truck loading activities have been assumed during the Evening and Night periods (out-of-hours work).			

As internal roads and tracks on 'host' residents' properties are being utilised by vehicles and concrete trucks there is no requirement by NSW legislation to assess traffic noise to these houses. There will be no truck movements during the out-of-hours and as such sleep disturbance considerations to these residents will not apply.

<table>
<tr><th>Environmental Factor</th><th>Comment</th></tr>
<tr><td></td><td>The anticipated construction noise levels from the onsite TCBP have been calculated to the nearest residential receiver and are provided below:
<table>
<tr><th rowspan="2">Period</th><th rowspan="2">Calculated noise level
dB $L_{Aeq, 15min}$</th><th colspan="2">Management level, dB $L_{Aeq, 15min}$</th><th rowspan="2">Compliant</th></tr>
<tr><th>“Noise Affected</th><th>“Highly Noise Affected</th></tr>
<tr><td colspan="5">Receiver 1.6km south</td></tr>
<tr><td>Day</td><td>33</td><td>40</td><td>75</td><td>Yes</td></tr>
</table>
Based on the vehicle volumes provided by Civilex and the proposed equipment selection proposed by the Client and data held by Marshall Day Acoustics for the plant items, noise emissions from the construction and operation of the TCBP have been calculated and demonstrates compliance with the NPfI noise level criteria at the nearest residential receiver.

Noise impacts as a result of the modification will be mitigated by implementing the following existing condition of consent (updated as required):
• Condition D25: “As part of the Construction Environmental Management Plan for the Project required under condition D24 the proponent shall prepare and submit a:
○ Construction Noise and Vibration Management Plan”

The consolidated Statement of Commitments lists extensive mitigation measures to ensure compliance with the conditions of the Project Approval, as such, mitigation measures proposed as part of the Approved Project are sufficient.</td></tr>
<tr><td>Air Quality</td><td>Air quality at the proposal area would be typical of the surrounding rural region, which is generally good and free of pollutants. Dust from the construction and operation of the batch plant would be the main source of pollutants. There is no routine air quality monitoring conducted in the area.

Potential impacts for the TCBP include:
• The proposed works at the site would result in increased vehicle emissions during construction. In view of the low background pollution levels and exposed landscape position, these increased emissions are not likely to adversely affect human amenity or the environment at the site.
• The batch plant would have a long-term positive impact on local air quality by reducing dust generated by heavy vehicle traffic using the Hume Highway.

The TCBP will be operated using wet source material and an enclosed mixing mechanism. A sock is fitted to the batch plant to ensure direct mix pour into the agitator and a reduction of dust emissions. Where required, the water truck will add moisture to the stockpiles to ensure dust emissions are negligible. Stockpiles will also be kept to a minimum, reducing the surface area affected by wind and rain. If required, stockpiles will be covered during shutdown days, ensuring dust emissions are not present over weekends or holiday periods. These controls will manage the dust emissions at the TCBP.

The silo will be filled and maintained as per the equipment manufacturer’s instructions and best practice for dust mitigation. Only competent, trained persons will be permitted to fill and maintain the silo. The silo infrastructure will be audited monthly to ensure the integrity of the</td></tr>
</table>

Environmental Factor	Comment
	Potential impacts on air quality as a result of the modification would be mitigated by implementing the following existing condition of consent and statement of commitment (updated as required): • Condition D24 requires implementation of a Construction Environmental Management Plan (CEMP) which would address air quality and dust management. • Item 16.01 commits to provision of a *Construction Dust Management Plan* as part of the *Construction Environmental Management Plan.* The consolidated Statement of Commitments lists extensive mitigation measures to ensure compliance with the conditions of the Project Approval, as such, mitigation measures proposed as part of the Approved project are considered sufficient.
Soils, landforms and water	Soils adjacent to the existing Lerida Road South road formation have generally been heavily disturbed during road construction and maintenance operations. The road generally has shallow table drains either side, discharging to irregularly spaced mitre drains. Active erosion is occurring in the table drain in some areas, and at some culvert discharge points. A search of the NSW OEH contaminated land record on 10 April 2019 did not identify any sites within the Upper Lachlan Shire Council LGA (EPA 2019). There are no sites listed on the list of NSW contaminated sites notified to the EPA. No potential sources of contamination were observed during site inspections undertaken on 23 October 2014 and 15 November 2017. The potential for contamination sources within the area affected by the proposed works is considered to be low. Potential impacts for the soils, landforms and water associated with the onsite TCBP include: • Erosion of soils by wind or water, where soils have been exposed through vegetation clearing or through general construction activities • Landform instability and ongoing erosion if landforms and drainage structures are not appropriately designed and stabilised • Mixing of different soil types or horizons if soils are inappropriately reinstated. This may retard natural regeneration of ground cover • Compaction of soils in areas of vehicle traffic, equipment laydown, stockpiling which may exacerbate erosion hazard and impede revegetation • Risk of contamination of soils through incidents such as fuel, lubricant or chemical spills. The TCBP has the potential to impact water quality in local watercourses and farm dams through: • sediment laden runoff during high rainfall events contamination of soils through incidents such as fuel, lubricant or chemical spills. • contaminated runoff from fresh road seal, wastewater releases such as cleaning or wastewater, or a pollution incident such as a hydrocarbon spill. The location of the TCBP has been chosen specifically to avoid drainage lines. The water from the catchment will be diverted away from the hard stand area in clean water drains to ensure appropriate management of stormwater runoff from the hardstand area. The stormwater runoff from this area will be managed via engineered sediment and erosion controls included in the Soil and Water Quality Management Plan (SWQMP) that follow the Blue Book requirements. This will include a first flush system capable of handling the first 10 mm of rainfall across the hardstand as per Cement Concrete and Agitators Australia (CCAA) guidelines. This will contain stormwater runoff and avoid discharge into the surrounding environment. The first flush system will be maintained daily as the water captured during rain fall events will be pumped into storage devices ready for use in the batching process.

Environmental Factor	Comment
	Wastewater will be captured in a fully sealed cavity that will be separate to the first flush system. During rain events it will be covered to ensure no overflow occurs. Water for the TCBP operations will initially be sourced from Gunning and brought onto site to be stored in water tanks that will be located within the TCBP hardstand. After this, CCAA guidelines for reuse of concrete water will be followed wherever possible to meet the client specifications for the concrete batch footings. This will enable reuse of the wastewater on site from the operations and reduce the use of potable water. In the event that recycling of waste water on site is not achievable, an estimated 350,000 L of water will be required and will be commercially sourced from Gunning. Any excess wastewater will be transferred off site and reused, recycled or disposed of as per the regulatory requirements, following recognised practices considered acceptable for the management of concrete water by NSW Environmental Protection Authority (EPA). These risk associated with soils, landforms and water are considered to be manageable with the use of good practice prevention measures. Impacts on soil as a result of the modification will be mitigated by implementing the following existing conditions of consent (updated as required): • Condition D25 requires: *'As part of the Construction Environmental Management Plan for the Project required under condition D24 the proponent shall prepare and submit a Construction Traffic and Access Management Plan and Construction Soil and Water Quality Management Plan* • Condition D27: "*Soil and water management measures consistent with Managing Urban Stormwater – Soils and Construction Volumes 1 and 2, 4th Edition (Landcom, 2004) shall be employed during the construction of the Project to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters."* The consolidated Statement of Commitments lists extensive mitigation measures to ensure compliance with the conditions of the Project Approval, as such, the existing mitigation measures to avoid and minimise impacts on soil, landforms and water are considered sufficient.
Hazardous chemicals	Hazardous chemicals will be stored on the proposed site. This has the potential to impact the site and contaminate the land through spills or leaks of fuel, concrete or other chemicals. Impacts of hazardous chemicals as a result of the modification will be mitigated by implementing the following existing condition of consent: • Condition B11: *"Dangerous goods, as defined by the Australian Dangerous Goods Code, shall be stored and handled strictly in accordance with:* *a) all relevant Australian Standards;* *b) for liquids, a minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bund; and* *c) the' Environment Protection Manual for Authorised Officers: Bunding and Spill Management,' technical bulletin (Environment Protection Authority, 1997).* *In the event of an inconsistency between the requirements listed in (a) to (c) above, the most stringent requirement shall prevail to the extent of the inconsistency.* The consolidated Statement of Commitments lists extensive mitigation measures to ensure compliance with the conditions of the Project Approval, as such, the existing mitigation measures to avoid and minimise impacts on soil, landforms and water are considered sufficient.

Environmental Factor	Comment
Biodiversity	A Modification Application (Modification 2) was prepared to assess the impacts associated with the upgrade of Lerida Road South (NGH Environmental, 2018). The Submissions Report for Modification 2 included a Biodiversity Assessment Development Report (NGH Environmental, 2019). The proposed site of the TCBP is within an area (of the Development Site) that was assessed as part of the BDAR on land mapped as *Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion Derived Native Grassland – low diversity (Zone 1).* This area is identified as Derived Native Grassland in low or poor condition consisting of a low diversity and cover of native species and high cover and abundance of exotic flora, heavily modified from historical agricultural use. Canopy and midstorey species are largely absent. Disturbed remnants are still considered to form part of the community including remnants where the vegetation, either understorey, overstorey or both, would, under appropriate management, respond to assisted natural regeneration, such as where the natural soil and associated seed bank are still at least partially intact', due to the low perennial native cover and abundance, historical land use and improved pasture management in association with the low site vegetation integrity score (9.3) within the BAM Calculator assessment. This area of grassland is NOT considered to meet the determination of Box-gum Woodland TEC listed under the *Biodiversity Conservation Act 2016* or the *Environment Protection and Biodiversity Conservation Act 1999*. The proposed works would result in an additional 0.7 ha of native vegetation clearing, however given that the Modification 2 BDAR assessed Zone 1 as being highly degraded with a vegetation integrity score of 9.3, as such, the proposed TCBP would not result in any changes to the assessment or generate any additional offset obligation. This has been reviewed and confirmed through consultation with OEH, as outlined in Section 4 above. **Management of biodiversity impacts** Impacts on biodiversity as a result of the modification will be mitigated by implementing the following existing conditions of consent and statement of commitments: • Condition B1: "*The clearing of all native vegetation is to be limited to the minimal extent practicably required. Details regarding the procedures for clearing vegetation and minimising the extent of clearing shall be clearly included in the Construction Flora and Fauna Management Plan contained in condition D25 (f). The Proponent shall ensure that no more than 42 hectares of EEC is cleared for the project, unless the Secretary agrees otherwise in consultation with OEH.* • Condition D25 of the Project Approval requires: *'As part of the Construction Environmental Management Plan for the Project required under condition D24 the proponent shall prepare and implement a Construction Flora and Fauna Management Plan.* The consolidated Statement of Commitments lists extensive mitigation measures to ensure compliance with the conditions of the Project Approval, as such, mitigation measures proposed as part of the Approved Project are sufficient.
Traffic and Transport	Construction access to the Collector Wind Farm project site and the onsite TCBP will be via the Hume Highway and Lerida Road South, in accordance with the existing project approval. The highway is signed at 110 km/h. The highway has two lanes in each direction at the site. The Windmills Rest Area is located on both sides of the highway on the west side of the intersection. The existing intersection has sufficient space to manoeuvre for normal heavy vehicles. The proposed onsite TCBP will not require any change to the existing approved approach for the project where no permanent alterations or modifications will be made to the intersection between the Hume Highway and Lerida Road South (as determined by RMS). The installation and operation of the proposed batch plant will result in a net reduction of approximately 3,750 heavy vehicle movements along Hume Highway and Lerida Road South, as concrete will no longer be sourced from Goulburn. This reduction is made up of the following:

Environmental Factor	Comment
	• Decrease in concrete agitator movements: ~4,000 • Increase in material delivery vehicle movements (cement, aggregate): ~206 • Increase in water delivery vehicle movements: ~30 • Increase in wastewater removal vehicle movements (agitator & plant washout): ~14 Cement deliveries from the TCBP to point of use will largely be via the existing approved wind farm road network, with the plant location centrally placed to facilitate ease of access. Any potential effects on the current traffic management approach will be mitigated by updating the approved Construction Traffic & Access Management Plan, as required under the following existing condition of consent: • Condition D25 requires: *'As part of the Construction Environmental Management Plan for the Project required under condition D24 the proponent shall prepare and submit a Construction Traffic and Access Management Plan.*
Waste minimisation and management	Potential waste streams generated by the onsite TCBP include: • green waste (vegetation removal) and topsoils cleared / excavated for installation • unused imported materials • out-of-spec concrete • paper and office waste from project management • general waste from staff. Waste that is not adequately managed can have a range of potential impacts, including: • loss of potentially recoverable resources • contamination of the site and surrounding environment (including potential visual and ecological impacts) • offsite contamination due to inappropriate disposal or handling by unlicensed operators. The use of the TCBP is likely to reduce the potential for waste concrete slurry from out-of-spec material, as there is less likelihood of such material being generated given the much closer proximity of point of production and point of use. Hence, given that these waste streams are essentially the same or less likely than those generated from the current approved project, measures to maximise waste minimisation and management as a result of the modification will be implemented through the following existing condition of consent and statement of commitment (updated as required): • Condition D24 requires implementation a *Construction Environmental Management Plan* which would address hazardous material and waste management.

Environmental Factor	Comment
	• Item 13.01 of the Statement of Commitments requires the provision of a *Waste Management Plan* The consolidated Statement of Commitments lists extensive mitigation measures to ensure compliance with the conditions of the Project Approval, as such, the existing mitigation measures to avoid and minimise impacts on waste minimisation and management are considered sufficient.

7 IMPACT SUMMARY

Section 5 of this report assessed the environmental impact of key issues relevant to the proposed modifications to the Approved Project. The assessment identified that no changes to the proposed mitigation measures are required for the proposed works.

Environmental factor	Any additional, increased or decreased impacts of the modified project?	Any changes to the mitigation strategies required? (Y/N)	Any changes to consent condition? (Y/N)
Landscape and visual	No	N	N
Noise	No	N	N
Air quality	No	N	N
Soil, landforms and water	No	N	N
Hazardous chemicals	Yes – limited increase amount of hazardous chemicals on site	N	N
Biodiversity	*Clearing of 0.7 ha of Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion Derived Native Grassland – low diversity (Zone 1).* No – given that Zone 1 has a vegetation integrity score of less than 17 (based on MOD2 completed BDAR) then there is no requirement for additional offset for proposed clearing.	N	N
Traffic and transport	Yes – net decrease heavy vehicle traffic and associated improvements to traffic movements and road safety; and associated reductions in impacts from vehicle emissions	N	N
Waste minimisation and management	No – all potential waste streams from TCBP are essentially the same as the waste streams generated by the approved project	N	N

8 SUMMARY AND CONCLUSION

8.1 CONDITIONS OF CONSENT

The Project Approval Conditions of Consent includes reference to potential development of a temporary batch plant. Condition D21 states that;

> *Unless otherwise approved by the Secretary, the location of ancillary facilities associated with the construction of the Project shall:*
>
> *(f) be separated from nearest residences by at least 200 metres (or at least 300 metres for a temporary batching plant).*

This assessment has been undertaken following consultation with DPE who confirmed that a modification application was required to support the proposal. The proposed TCBP meets condition D21(f) given the nearest residence is more than 1.5km from the proposed TCBP location.

Similarly, the proposed installation and operation of the TCBP would be undertaken in compliance with all the other existing conditions of consent (with updates to required management plans etc undertaken as required); and no changes to the existing Statement of Commitments are required or proposed as part of this modification.

8.2 CONCLUSION

Based on the assessment presented in Section 6, the proposed modification to construct and operate a temporary onsite concrete batch plant would result in:

- A decreased impact on the following environmental aspects:
  - Traffic and Transport
- An equivalent impact on the following environmental aspects:
  - Landscape and visual
  - Noise
  - Air quality
  - Soils, Landform and Water
- A limited increased impact on the following environmental aspects:
  - Hazardous chemicals
  - Biodiversity

However, on balance, given the work undertaken in siting of the TCBP to avoid any sensitive vegetation, and to the limited increase in presence of hazardous chemicals (which would be effectively managed through existing management / mitigation measures), it can be concluded that the proposal for the use on an onsite TCBP will result in, at worst, no increased environmental impact.

The use of the TCBP would result in an improved construction efficiency with local concrete production lessening the likelihood of material becoming 'out-of-spec', as well as resulting in a significant net reduction in heavy vehicle movements (~3,750) along both the Hume Highway and Lerida Road South.

In turn, such a net reduction in movements would reduce wear on local roads, as well as reduce the hazards and risks to other road users compared to the approved project, thus resulting in a gain to the local

community. Where there are potential impacts, these have either been managed through the design (ie siting to avoid biodiversity impacts) or will be managed through the existing consent conditions with relevant management plans updated as required to incorporate the TCBP.

Hence this conclusion of "minimal environmental impact" confirms the approach that this modification application can be made and assessed under Section 4.55 (1A) of the EP&A Act.

9 REFERENCES

AECOM (2012) Collector Wind Farm Traffic and Transport Assessment. February 2012. Prepared for RATCH-Australia Corporation Limited.

APP Corporation (2012) Collector Wind Farm Environmental Assessment. June 2012. Prepared for RATCH-Australia Corporation Limited.

AAP Corporation (2013) Collector Wind Farm Preferred Project and Submissions Report, report prepared for RATCH-Australia Wind Developments Pty Ltd

Environment Protection Authority (NSW) (EPA) (2017) NSW Policy for Industry, Sydney: EPA

Environment Protection Authority (NSW) (EPA) (2018) Search the contaminated land record <http://app.epa.nsw.gov.au/prclmapp/searchregister.aspx>

Landcom (2004) Managing Urban Stormwater: Soils and Construction, Volume 1, 4th edition.

Marshall Day Acoustics (2012) Collector Wind Farm Noise Impact Assessment, report prepared for RATCH-Australia Wind Developments Pty Ltd

Marshall Day Acoustics (2019) Collector Wind Farm Batch Plant Noise Assessment, report prepared for RATCH-Australia Wind Developments Pty Ltd

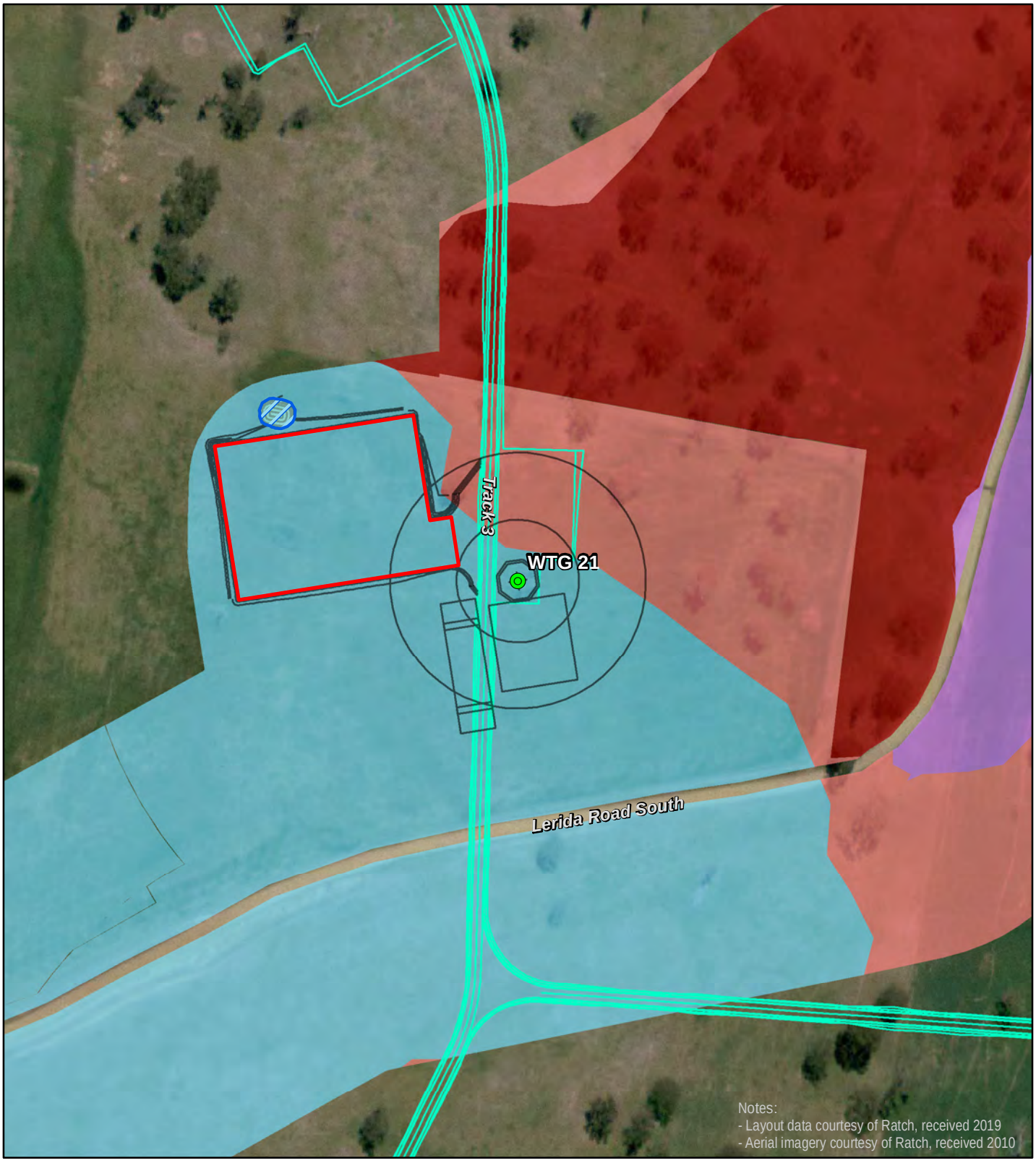
NGH Environmental (2015) Collector Wind Farm Modification Report, report prepared for RATCH-Australia Wind Developments Pty Ltd

NGH Environmental (2018) Collector Wind Farm Second Modification Application, report prepared for RATCH-Australia Wind Developments Pty Ltd

NSW Government (2018) SEED portal <https://geo.seed.nsw.gov.au/Public_Viewer/index.html?viewer=Public_Viewer&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED_Catalog.114.SpeciesSightings>

Office of Environment and Heritage (OEH) (2012) The Land and Soil Capability Assessment Scheme. <http://www.environment.nsw.gov.au/resources/soils/20120394lsc2s.pdf>

APPENDIX A ONSITE CONCRETE BATCH PLANT SITE VEGETATION MAP



PROPOSED BATCH PLANT

Collector Wind Farm Modification Application

0 20 40 80 Meters

A4 @ 1:2500
Ref: 5541-7
Author: BH

- Temporary Concrete Batch Plant
- Temporary Sediment Basin
- Approved Wind Turbine Location
- Road Layout

Vegetation Communities

- Box-Gum Woodland (tree cover) (high diversity, NSW EEC, CW CEEC)
- Box-Gum Woodland (tree cover) (low-mod diversity, NSW EEC, CW CEEC)
- Box-Gum Woodland Secondary Grassland (low-mod diversity, NSW EEC)
- Exotic dominated pasture

ngh environmental

www.nghenvironmental.com.au

APPENDIX B NOISE ASSESSMENT

MARSHALL DAY Acoustics

COLLECTOR WIND FARM
BATCH PLANT NOISE ASSESSMENT

Rp 002 R02 20181163 | 16 May 2019

MARSHALL DAY Acoustics

4/46 Balfour St
Chippendale NSW 2008
Australia
T: +612 9282 9422
ABN: 53 470 077 191
www.marshallday.com

Project: **COLLECTOR WIND FARM**

Prepared for: **RATCH Australia Corporation Pty Ltd**
Level 7,111 Pacific Highway
North Sydney NSW 2059

Attention: **Niel Weston**

Report No.: **Rp 002 R02 20181163**

Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Issued			14 Feb 2019	N. Lynar	S. Connolly
Issued	01	Text updates	13 May 2019	N. Lynar	S. Connolly
Issued	02	Graphics and text updates	16 July 2019	N. Lynar	S. Connolly

TABLE OF CONTENTS

1.0 INTRODUCTION

Marshall Day Acoustics (MDA) has been engaged to conduct an acoustic assessment of the noise emission associated with a mobile batching plant to be located at Collector Wind Farm, NSW.

The mobile batching plant would be located on site for 40 weeks which includes 8 weeks for construction, mobilisation & testing prior to use and 4 weeks of demobilisation and rehabilitation of the area.

The purpose of the batching plant is to minimise Heavy vehicle traffic along Lerida Road South and the Hume Highway. Therefore, where possible vehicle movements will be maintained along internal construction access tracks to minimise exposure to the local road network.

2.0 SITE DESCRIPTION

The onsite Batch Plant is proposed to be located Just to the north of WTF 21, on the western side of the access track as depicted in Figure 1 & Figure 2 below. Just to the north of WTF 21, on the western side of the access track, the approximate area required to accommodate the batch plant is 90m x75m (6,750m^2), which will be constructed with a crushed rock temporary hardstand.

The nearest residential receiver is located approximately 1.6km south of the proposed site. Where possible movements of concrete agitators from the batch plant to point of use will travel via the site access roads rather than on Lerida Road South.

Figure 1: Proposed site location mark-up

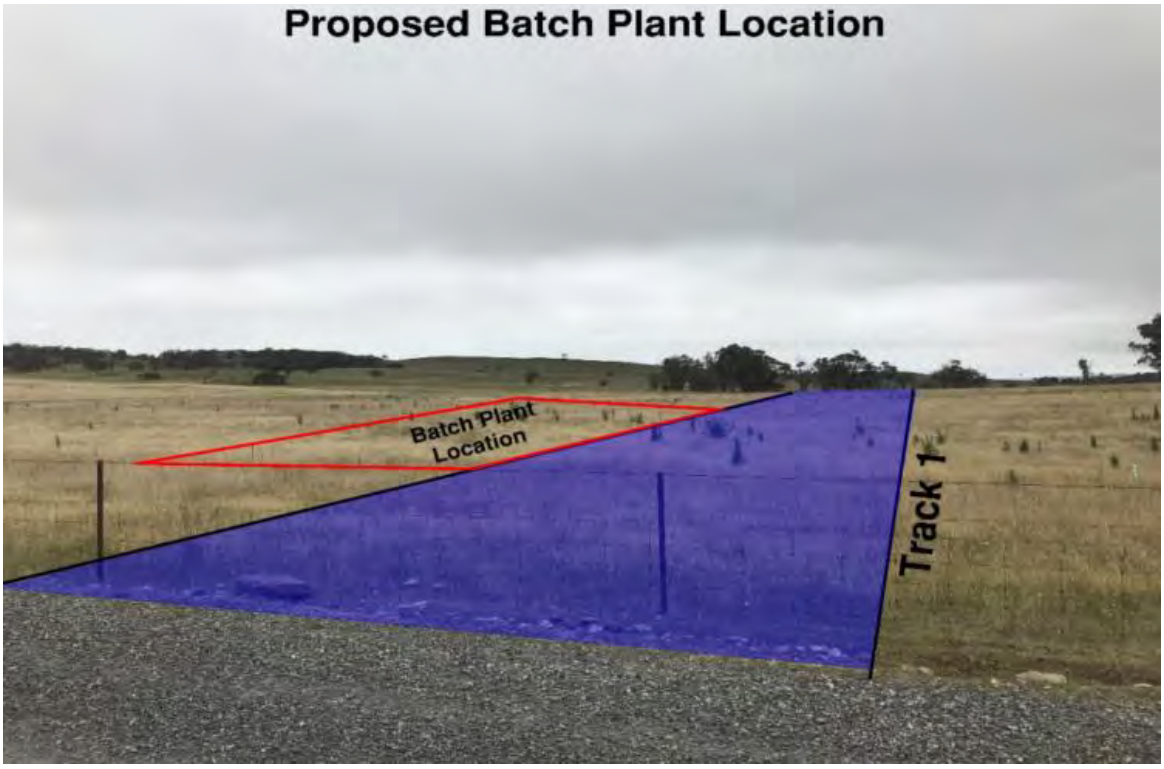
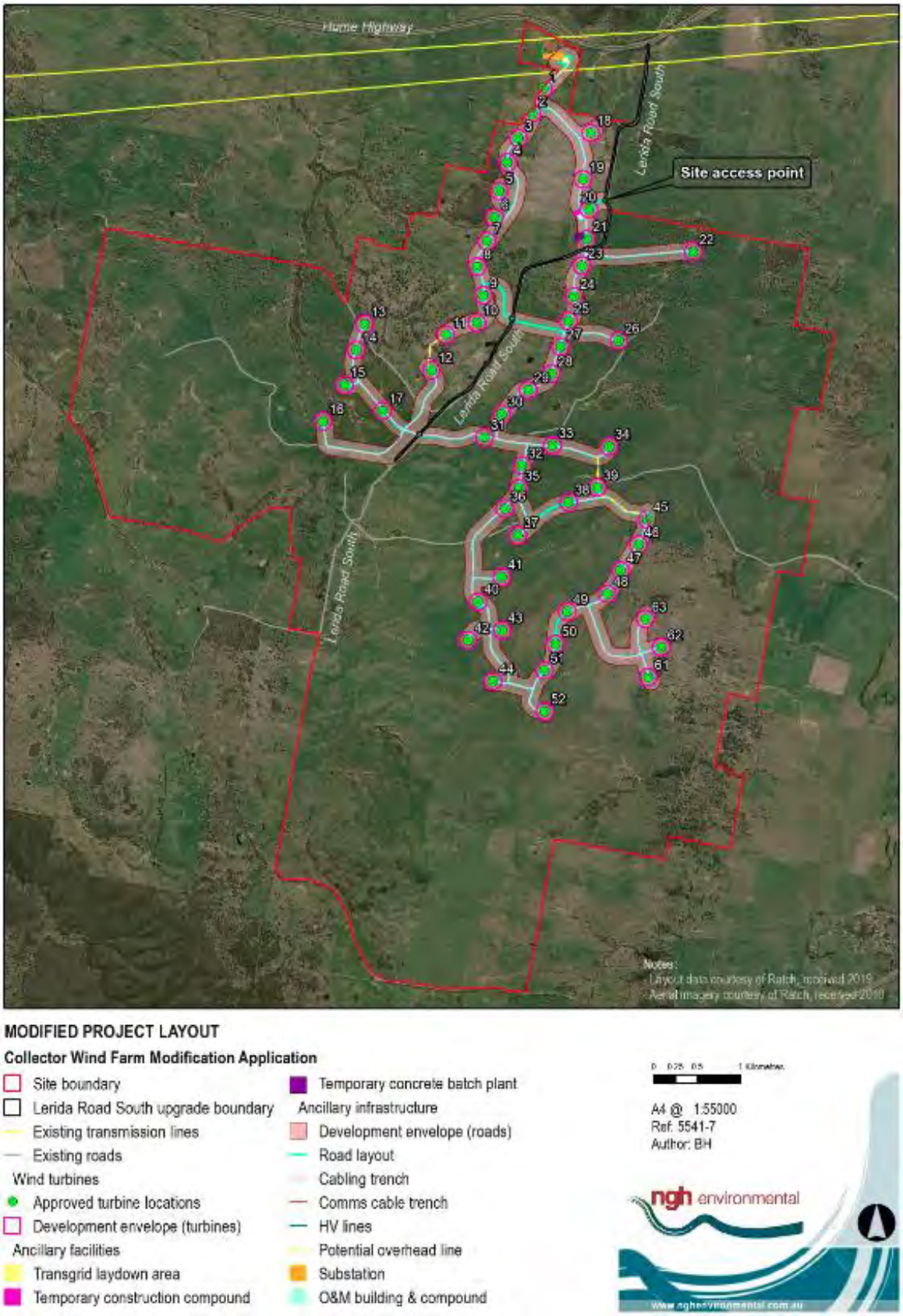


Figure 2: Site location



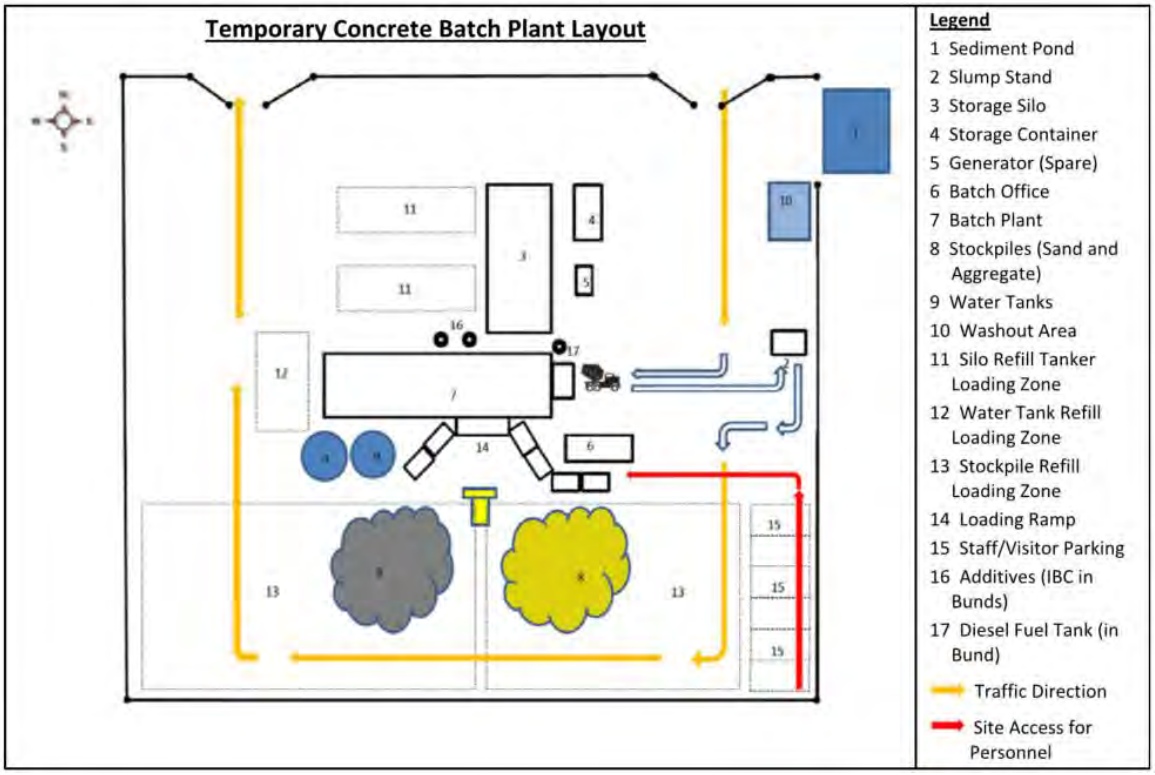
2.1 Proposed Works & Vehicle Movements

As advised by the Client the proposed works and equipment include the following:

- 8 cement trucks, completing 10 loadings during each Day shift between 0700-1800hrs daily
    - Trucks will not run outside the Day time assessment period and will only utilise internal host resident tracks/roads to avoid using local roads throughout the 40-week period.
- Max pour size 500m^3
- Total Concrete supply 27,500m^3
- Peak production rate of 60~75m^3/h
- Heavy Truck Movements 7,620 no.

Typical batch plant equipment and indicative layout are provided in Figure 3.

Figure 3: Temporary Concrete Batch Plant Layout



3.0 EXISTING ACOUSTIC ENVIRONMENT

In order to set appropriate noise design targets for impacts from the batching plant to the nearest affected residents, the existing acoustic environment of the site must be quantified. A background noise survey was previously carried out by MDA at a location House 'FF' near to the proposed site as part of the background noise survey for the Collector Wind Farm in 2015. The raw data from this survey has been re-analysed to suit the necessary background noise criteria for this assessment. We have looked into all survey locations and found House 'FF' to be the most representative of a residential receiver for the purpose of this assessment.

An unattended 01dB noise logger was deployed at House 'FF', the logger location is marked in Figure 4. Baseline ambient noise levels were measured between 05 June 2015 through to 22 July 2015. Ambient noise levels measured at this location were used to establish the existing background noise levels at site.

The noise logger was calibrated before and after the survey period, showing no significant signs of calibration drift.

In order to accurately determine existing ambient noise levels, any data affected by extraneous weather events including rainfall and heavy winds has been excluded in accordance with EPA NPfI requirements. A local weather station was installed along side the noise logger.

The NPfI defines the background noise level as the Rating Background Level (RBL). The RBL is calculated for the Day, Evening and Night-time periods, as defined in the NPfI.

A summary of the measured ambient background noise levels have been provided in Table 1.

Table 1: Ambient noise level summary

Period	Time Period	RBL, dB L_{A90}	dB L_{Aeq}
Day	0700-1800hrs	25	38
Evening	1800-2200hrs	35	41
Night	2200hrs-0700hrs	26	34

Figure 4: Unattended noise logger location

4.0 ENVIRONMENTAL NOISE CRITERIA

4.1 Batch Plant Operational - Noise Criteria

Noise criteria have been derived for the purpose of operation of the proposed batching plant based on the measured noise levels presented in Table 1. These are summarised in Table 2 below with a full derivation found in Appendix B.

Table 2: NPfI Noise Criteria

Period	Time Period	Intrusiveness Criteria, dB $L_{Aeq, 15min}$	Amenity Criteria, dB $L_{Aeq, period}$	Project Noise Trigger Levels, $L_{Aeq, 15min}$, dB
Residential				
Day	0700-1800hrs	40	48	40
Evening	1800-2200hrs	35	43	35
Night	2200-0700hrs	35	38	35

4.2 Batch Plant Construction Noise Criteria

Construction noise criteria have been developed based on guidance provided in the NSW EPA Interim Construction Noise Guideline. The noise criteria for the permitted hours of construction are summarised in Table 3 with a full derivation presented in Appendix B.

Table 3: Construction noise management levels

Receiver	Type	Time of day	Management level, dB $L_{Aeq\ 15min}$	
			"Noise Affected"	"Highly Noise Affected"
Nearest Receiver 1.6km	Residential	Daytime (for construction hours Mon-Fri 0700-1800hrs & Sat 0800-1300hrs)	45	75

The "Noise Affected" level is the point above which there may be some community reaction to noise. The "Highly Noise Affected" level represents the point above which there may be a strong community reaction to noise. Where the "Noise Affected" management level is predicted to be exceeded, the ICNG requires that all feasible and reasonable work practices be employed. Where it is predicted that the "Highly Noise Affected" management level will be exceeded, respite periods may need to be considered.

4.3 Calculation methodology

On site activities have been calculated to the nearest affected residential receiver located 1.6km from the site.

- As a worst-case scenario we have assumed that all batching plant equipment will be running 100% of the time 24hrs/day during the Day/Evening and Night-time assessment periods.
- Truck operations and equipment used for loading trucks has been assumed to be carried out during the Day time assessment period only (between 0700-1800hrs).

Calculations of noise levels at key receptor locations have been conducted in accordance with the standard ISO 9613-2:1996 *Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613-2). The ISO 9613-2 propagation model is a general purpose noise

propagation method that has become established as the primary international standard for calculation of industrial noise into the environment.

4.4 Noise source data – Concrete batching equipment

MDA has previously measured noise levels from commercial concrete batching plants on a number of occasions. The measured levels have been used as the basis of deriving sound power data for this assessment for similar items of equipment.

Sound power data derived from previous measurement results for various items of equipment (verified by MDA) are presented in Table 4 for operational noise and Table 5 for construction noise data.

Table 4: Concrete Batching Plant measured noise levels

Description	Sound Power Level (SWL)
Trucks - Concrete Agitators	109dB L_{Aeq}
Trucks - Cement Tankers	106dB L_{Aeq}
Trucks - Road Truck (sand, cement etc)	106dB L_{Aeq}
Front-end Loader	86dB L_{Aeq}
Aggregate Incline Conveyor /Tripper conveyor	86dB L_{Aeq}
Loading/unloading material into bins	105dB L_{Aeq}
Loading cement into agitators	105dB L_{Aeq}
Materials conveyor to load out	86dB L_{Aeq}
Truck washout bays	102dB L_{Aeq}
Mechanical Cement Auger	86dB L_{Aeq}
Slump Stands	109dB L_{Aeq}

Table 5: Construction noise plant measured noise levels

Activity	Equipment	Power rating Kw	Equipment size	Sound Power Level (SWL)
Ground excavation/earthworks	Dozer	179	28t	109dB L_{Aeq}
Ground excavation/earthworks	Tracked excavator	170	30t	106dB L_{Aeq}

4.5 Calculated Noise Levels

The noise levels in this section have been calculated in 15-minute segments as per the requirements of the NPfI. This includes the following (worst case) components and assumptions:

- Plant items running continuously at full load over each 15-minute sample period
- Truck loading activities and associated equipment assumed to be running and working continuously at full load over each 15-minute sample period.
- Distance (1.6km) propagation between the sources and receiver
- The sound power level being generated at site from each plant item as per Table 3.

- The ground between the source and receiver - assumed to be all grass
- Metrological and atmospheric effects on outdoor noise propagation as per ISO 9613-2 with
    - o Temperature 20°C
    - o Relative Humidity 50%
    - o Moderate wind blowing from the source toward the receiver

Based on the above assumptions, the anticipated noise levels from the proposed batching plant have been calculated to the nearest residential receiver and are detailed in Table 6.

Table 6: Predicted noise levels – NPfI Assessment

Period	Calculated noise level dB $L_{Aeq, 15mins}$	Project Noise Trigger Level, $L_{Aeq, 15min}$, dB	Compliance
Receiver 1.6km South			
Day	36	40	✓
Evening	25*	35	✓
Night	25*	30	✓

Note*: No truck noise or truck loading activities have been assumed during the Evening and Night periods.

4.5.1 Vehicle Noise Calculations

As internal roads and tracks on 'host' residents properties are being utilised by vehicles and concrete trucks there is no requirement by NSW legislation to assess traffic noise impacts to these houses. There will be no truck movements during the Night-time hours and as such there will be no sleep disturbance impacts to residents to be considered.

4.6 Construction Noise

Construction noise criteria has been provided in Table 3. We have conducted indicative construction noise calculations based on a "worst case" construction scenario as discussed with the Client and utilised previously measured noise levels from a 28t dozer and a 30t excavator as presented in Table 5. For the purpose of our assessment and calculations, these plant items are assumed to be the loudest noise sources during construction and to be working simultaneously throughout a 'worst case' 15-minute period.

Based on the assumptions above, 'worst case' construction noise levels have been calculated to the nearest residential receiver at 1.6km. The calculated 'worst case' noise levels will be in the order of 33dB $L_{Aeq\ 15min}$ at the nearest resident and therefore under the "Noise Affected" goals for "worst case" construction noise activities Monday-Friday 0700-1800hrs and Saturday 0800-1300hrs.

We note that these construction noise calculations are indicative and based on assumptions provided by the Client. However, construction noise and vehicle volumes to and from the site during construction are likely to be lower than the operational noise from the site.

5.0 CONCLUSION

As outlined above, noise emissions from the construction and operation of the proposed batching plant have been calculated to the nearest noise sensitive residential receiver. Based on the vehicle volumes provided by Civilex and the proposed equipment selection proposed by the Client and data held by MDA for the plant items, noise emissions from the use of the batching plant have been calculated and demonstrates compliance with the EPA Noise Policy for Industry and Interim Construction Noise Guideline noise level criteria at the nearest residential receiver.

APPENDIX A GLOSSARY OF TERMINOLOGY

Ambient	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
dB	Decibel The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 μPa i.e. dB = 20 x log(P/Pr)
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
$L_{Aeq\ (t)}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{A90}	The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
L_{A01}	The A-weighted noise level which is equalled or exceeded for 1% of the measurement period. This is sometimes referred to as the typical maximum noise level.
RBL	The NPfI defines the background noise level as the Rating Background Level (RBL). The RBL is calculated for the Day, Evening and Night-time periods, as defined in the NPfI.

APPENDIX B ENVIRONMENTAL NOISE CRITERIA

B1 NSW noise policy for industry

In NSW, the NPfI is the guideline for assessing noise emissions from industrial facilities and other developments with noise sources that may be considered to be industrial in nature.

The NPfI sets out a procedure where a noise source can be evaluated against a series of noise assessment levels. In the NPfI, these project specific noise levels are derived from an analysis of the ambient noise environment and zoning information.

The background noise levels for this project are summarised in Table 7 below. In the NPfI, the background noise level is called the Rating Background Level (RBL).

Table 7: NPfI time periods and measured Rating Background Levels

Period	Time Period	RBL, dB L_{A90}	dB L_{Aeq}
Day	0700-1800hrs	25	38
Evening	1800-2200hrs	35	41
Night	2200hrs-0700hrs	26	34

Intrusiveness noise levels

The intrusiveness noise assessment is applicable to residential receivers and is based on knowledge of the background noise level at the receiver location. The Intrusiveness Noise Level is the background noise level at the nearest noise sensitive location plus 5dB. Therefore, the noise emissions from the premises are considered to be intrusive if the A-weighted source noise level ($L_{Aeq, 15min}$) is greater than the background noise level (L_{A90}) plus 5dB.

In this instance the measured RBL levels are below the minimum RBL noise levels for a Rural area as per Section 2.3 of the NPfI. As a result the RBL levels have been adjusted in accordance with Table 2.1 of the NPfI.

Based upon the data for summarised in Table 7, the Intrusiveness Noise Levels have been calculated in accordance with the NPfI and are presented

Table 8: Derived Intrusiveness Noise levels

Period	Measured RBL, $L_{A90, 15min}$ dB	Adjusted RBL, $L_{A90, 15min}$ dB	Intrusiveness Noise Level (RBL + 5 dB), $L_{Aeq, 15\ min}$ dB
Day	25	35	40
Evening	35	30	35
Night	26	30	35

Amenity noise levels

The Amenity Noise Levels are designed to prevent industrial noise continually increasing above an acceptable level. The initial stage in determining the amenity level is to correct the acceptable noise levels set for the appropriate amenity area with the baseline noise monitoring.

A review of the noise levels measured indicates that the residential noise environment is typical of a Rural area with mostly traffic related noise sources. Further modification is undertaken to account for standardisation of the assessment time periods (as detailed in Section 2.2 of the NPfI). The resultant levels and the relevant modifications are detailed in Table 9.

Table 9: Derived Amenity Noise Levels

Receiver	Period	Recommended Amenity Noise Level $L_{Aeq,\ Period}$ dB	Modified Amenity Noise Level $L_{Aeq,\ 15min}$ dB
Residential (Rural)	Day	50	48
	Evening	45	43
	Night	40	38

Source: Table 2.2 NSW Noise Policy for Industry

Determination of Project Noise Trigger Levels

The final process in determining the operational noise limits for the development is to derive the Project Noise Trigger Levels. The Project Noise Trigger Levels are levels that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.

The Project Noise Trigger Levels are derived by selecting the more stringent of either the Intrusiveness or Amenity noise levels. For residential receivers each assessment time period is evaluated individually. For commercial receivers, only the Amenity noise level applies. The Project Noise Trigger Levels applicable to the subject site are shown in Table 10.

Table 10: Project Noise Trigger Levels

Receiver	Period	Project Noise Trigger Level, $L_{Aeq,\ 15min}$, dB
Residential	Day	40
	Evening	35
	Night	35

The NPfI Project Trigger Noise Levels are applicable at the property boundary of the nearest affected receivers, or if that point is more than 30m from the residence, the most affected point within 30m of the residence.

B2 Construction Noise Criteria

The NSW EPA Interim Construction Noise Guideline (ICNG) provides guidance for assessing noise associated with construction activities. The ICNG sets out management levels above which there may be community reaction to construction noise. A "Noise Affected" level is derived which is a level above which there may be some community reaction to noise". A "Highly Noise Affected" level is also nominated for residents, which "represents the point above which there may be a strong community reaction to noise".

The noise management levels for receivers affected by construction noise are derived from a combination of background noise levels, referred in the ICNG as rating background levels, RBL, and the time period at which the construction work occurs.

The ICNG sets out recommended standard hours for construction work, these are:

- Monday to Friday 0700-1800hrs
- Saturdays 0800-1300hrs
- No work on Sundays or public holidays

The ICNG "Noise Affected" management level can then be derived by addressing the RBL values and hours at which construction work occurs; by adding 10dB for work during the recommended hours or adding 5dB outside these recommended hours.

The "Highly Noise Affected" level for residents is 75dB $L_{Aeq, 15mins}$.

Based on the data provided in the DA Noise Emission Assessment, noise logging was conducted between 05 June 2015 and 22 July 2015.

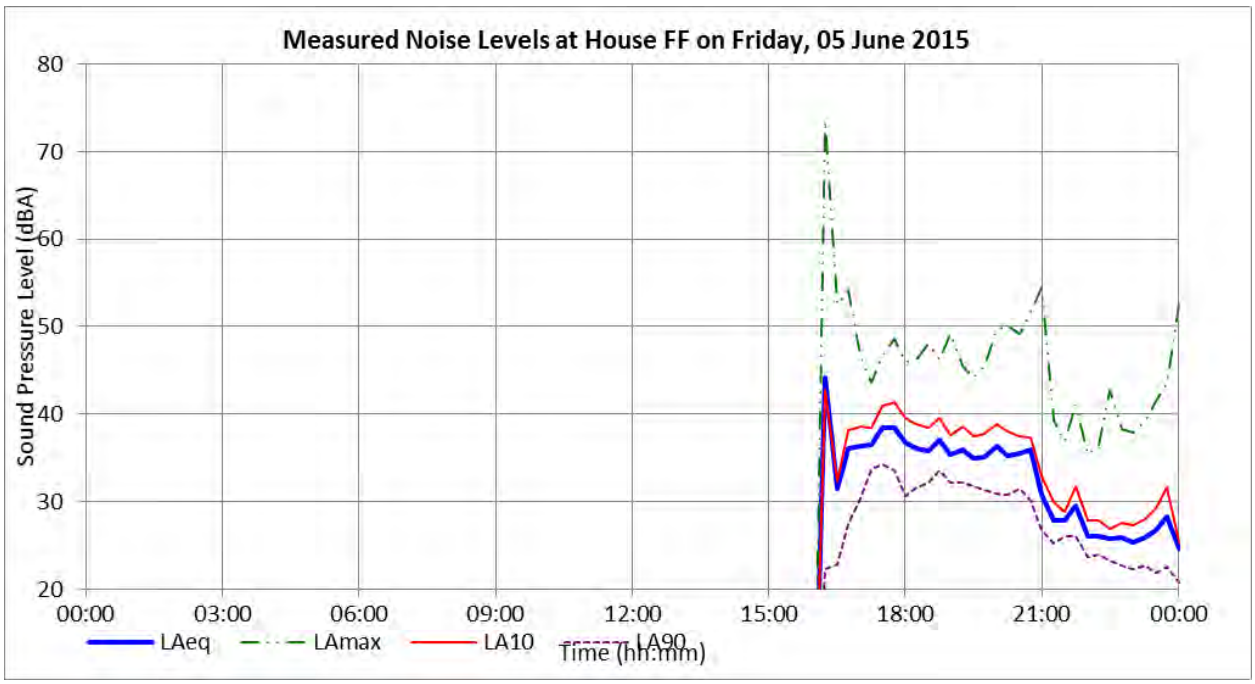
The derived Rating Background Levels for the site are presented in Table 8, with a Daytime RBL of 35 dB. Only the Day period is considered as no construction work is expected outside of this period.

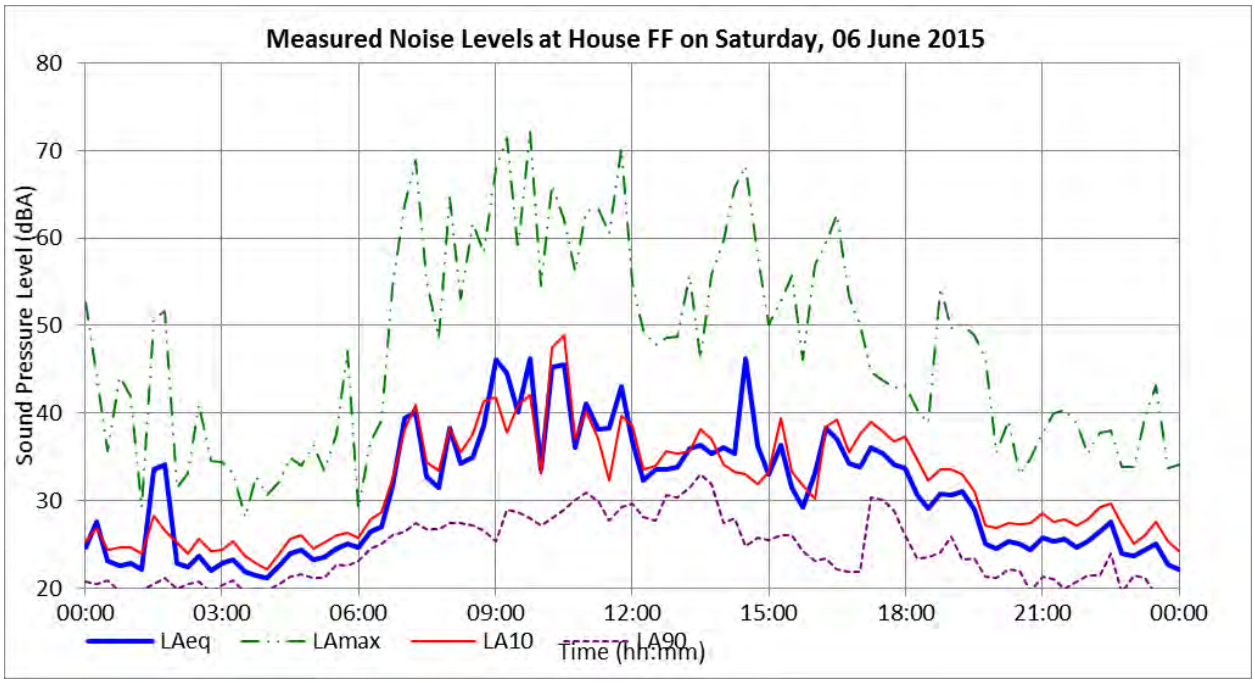
Based on the RBL of 35 dB the construction noise management levels have been derived and presented in Table B2 below.

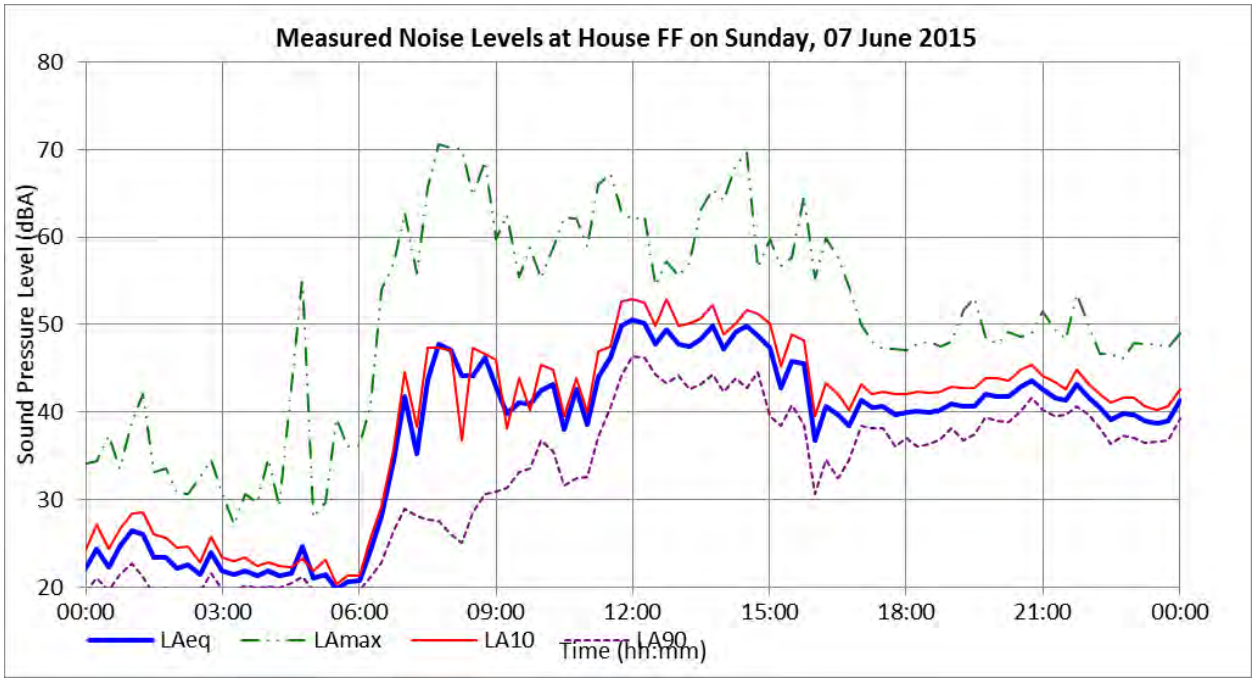
Table B2: Construction noise management levels

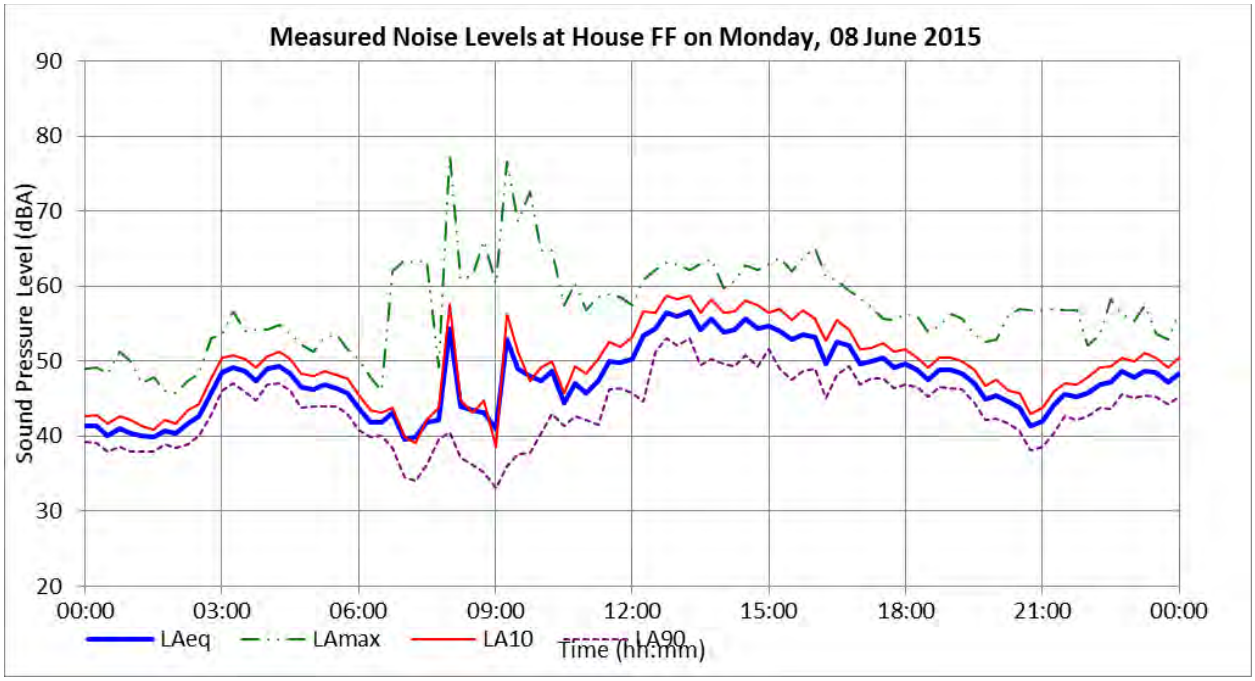
Receiver	Type	Time of day	Management level, dB $L_{Aeq\ 15min}$	
			"Noise Affected"	"Highly Noise Affected"
Nearest Receiver 1.6km	Residential	Daytime (for construction hours Mon-Fri 0700-1800hrs & Sat 0800-1300hrs)	45	75

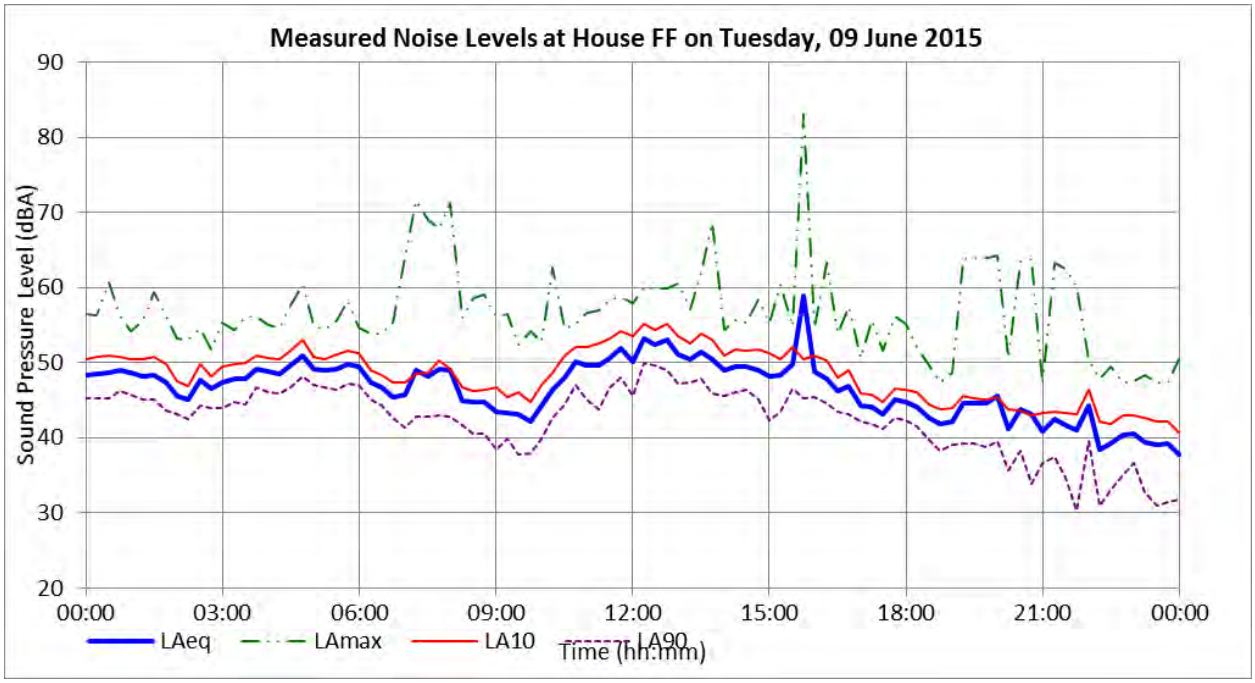
APPENDIX C NOISE LOGGING DATA

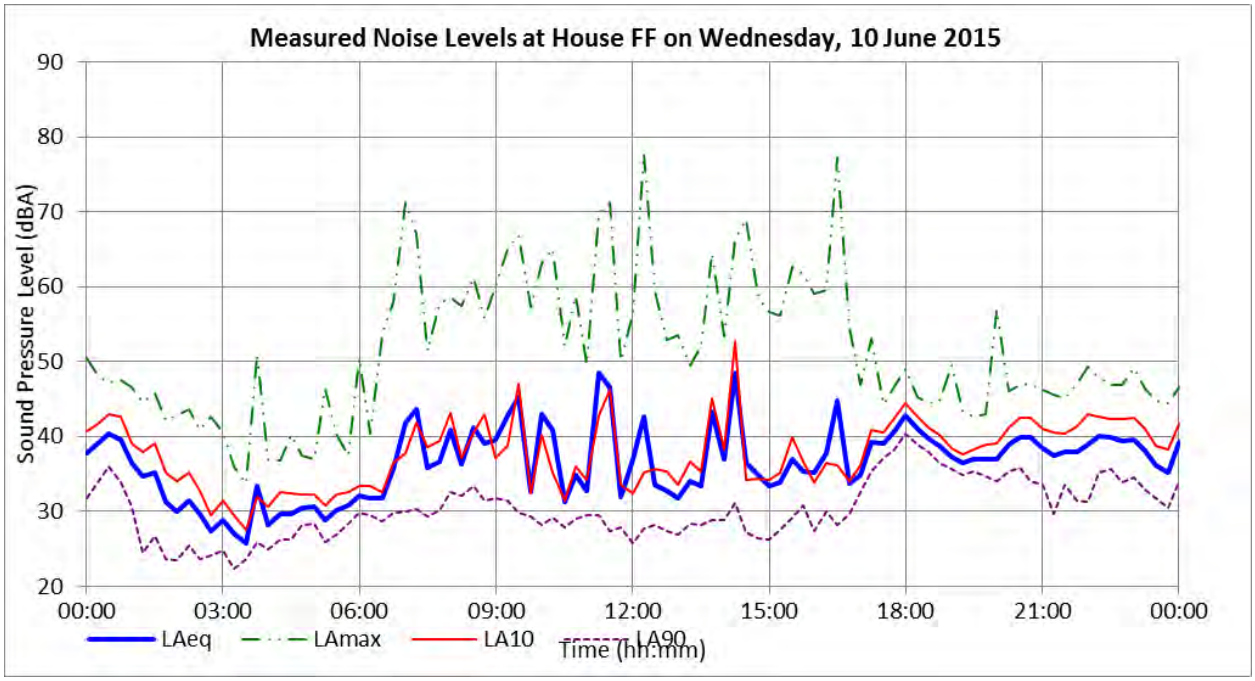


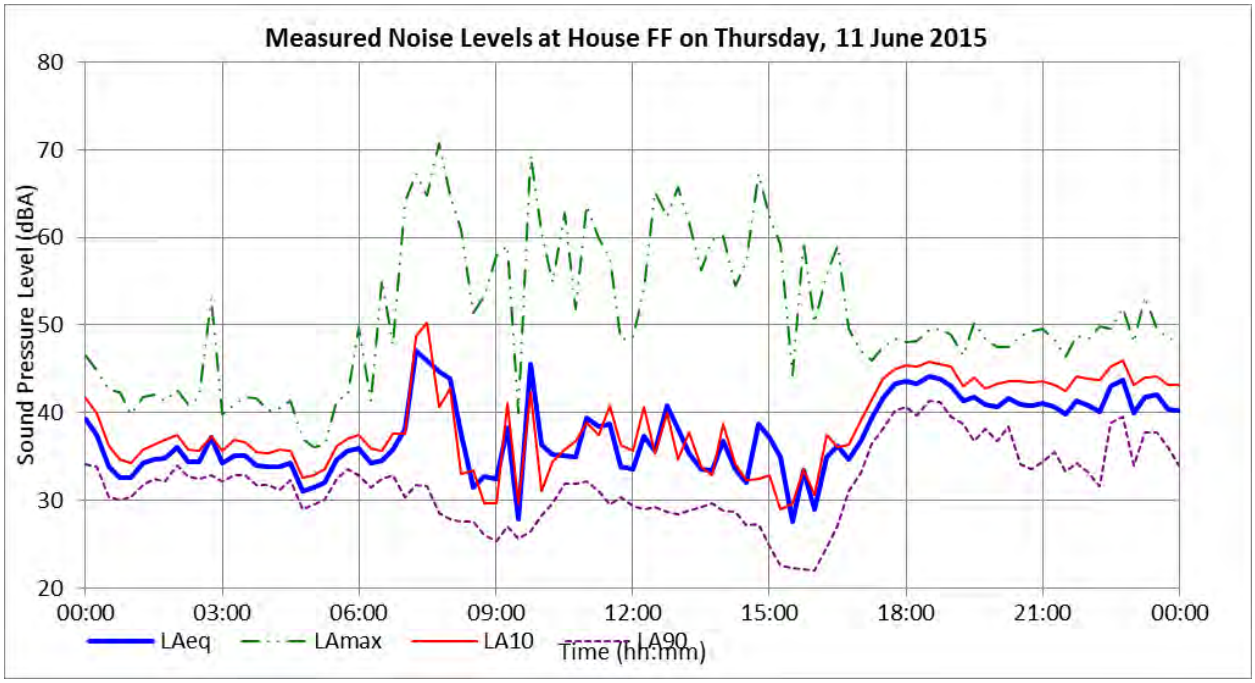


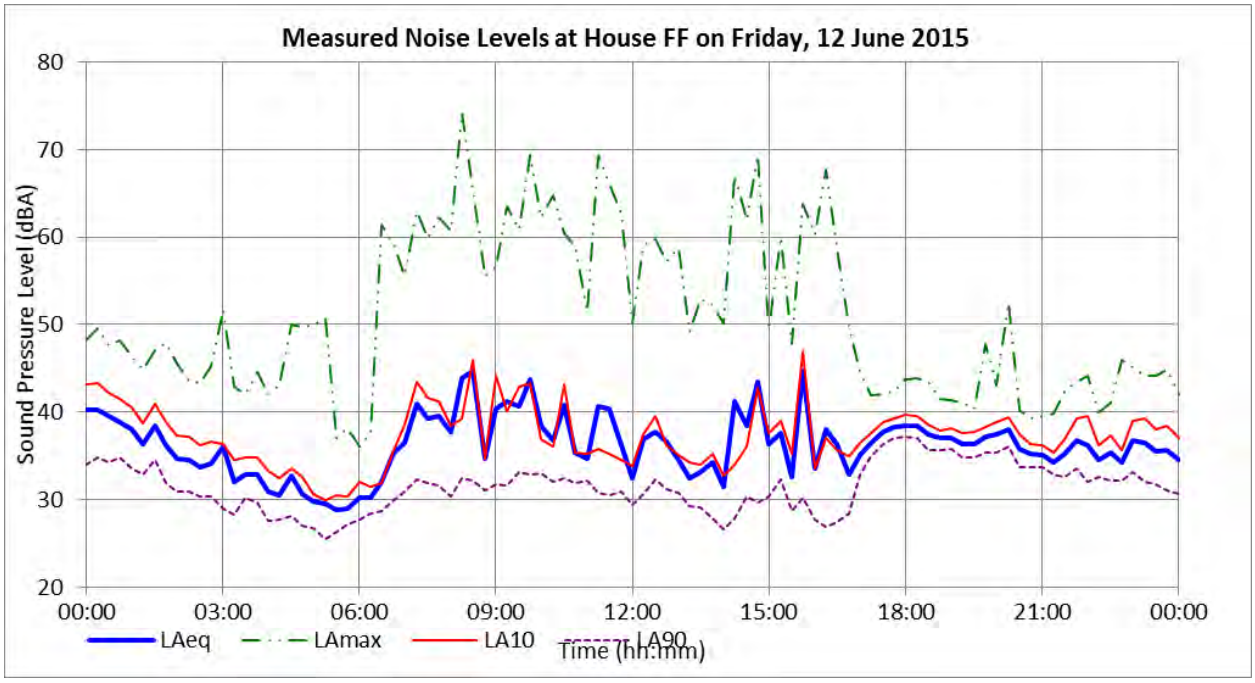

Measured Noise Levels at House FF on Sunday, 07 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

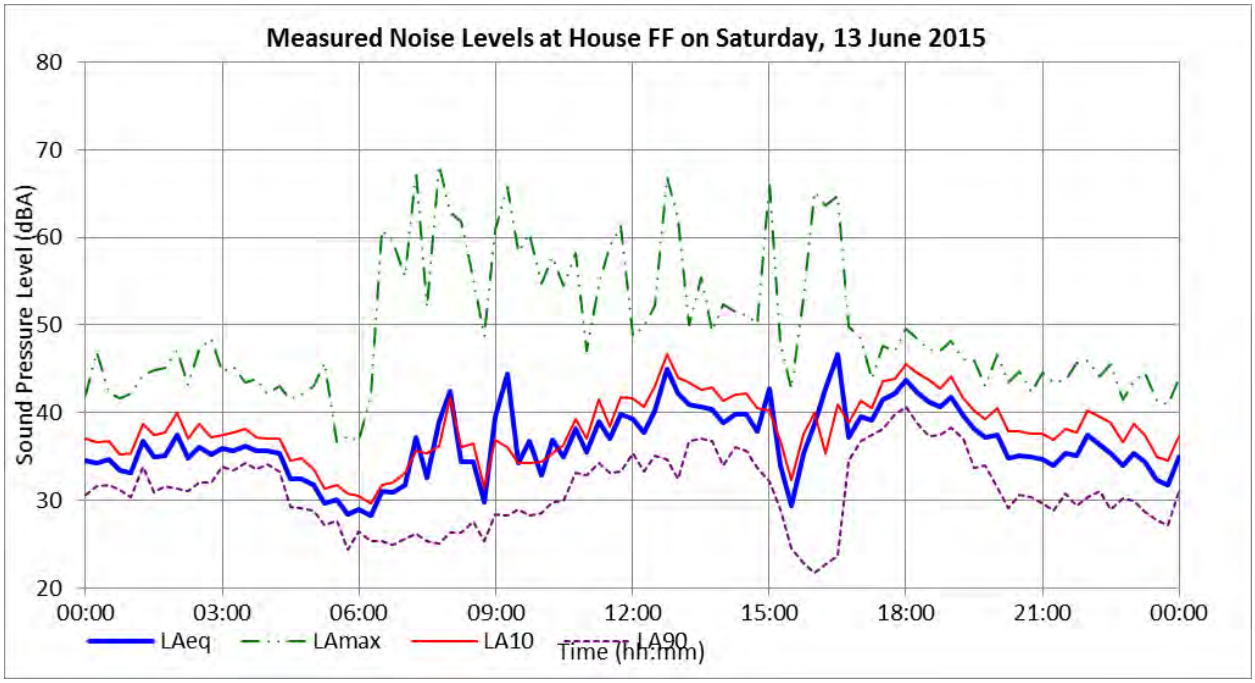

Measured Noise Levels at House FF on Monday, 08 June 2015
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

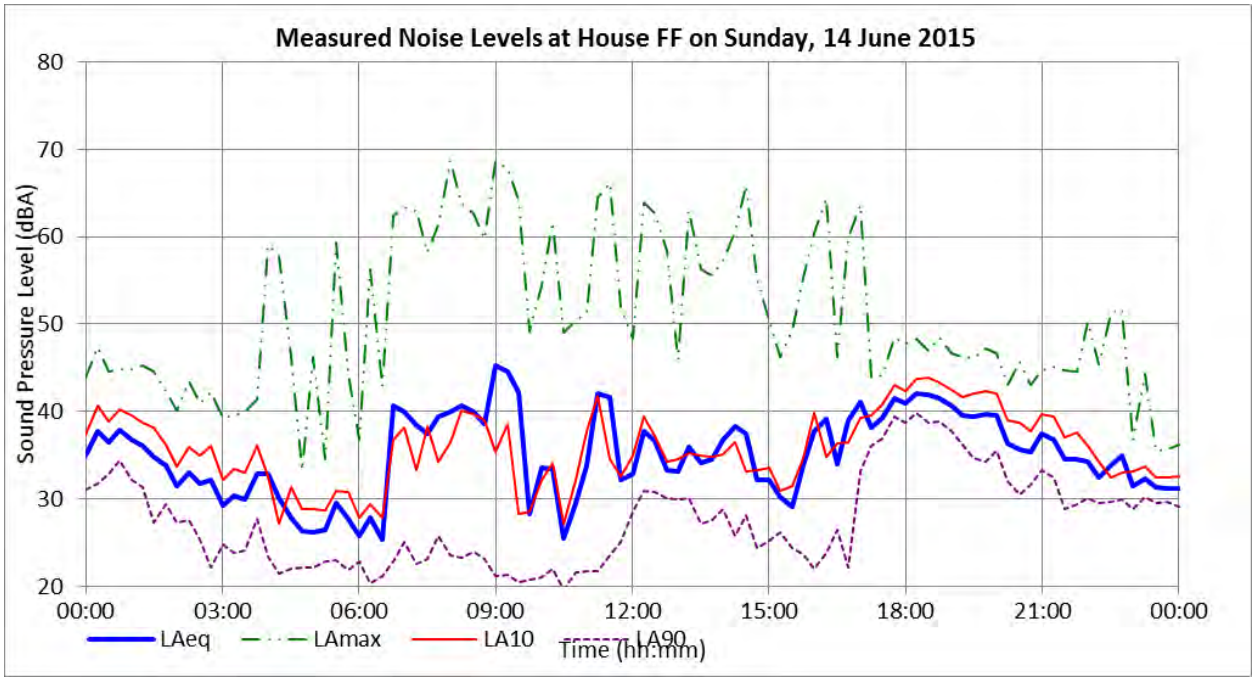

Measured Noise Levels at House FF on Tuesday, 09 June 2015
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

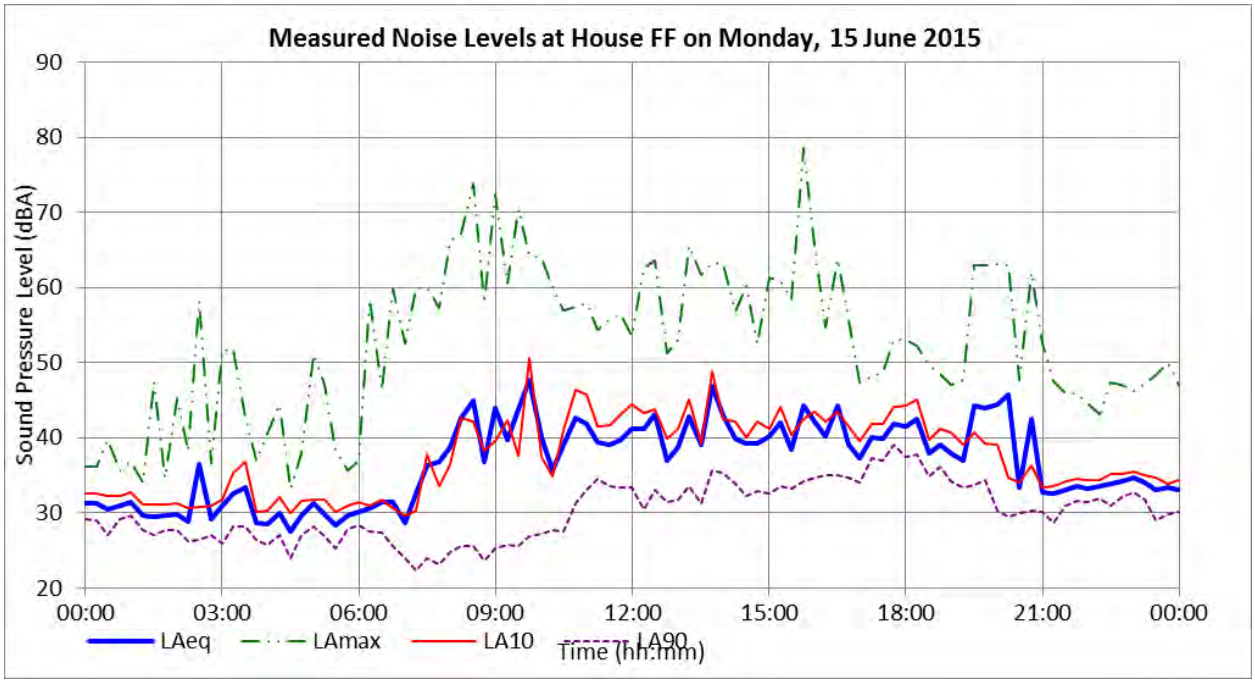

Measured Noise Levels at House FF on Wednesday, 10 June 2015
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

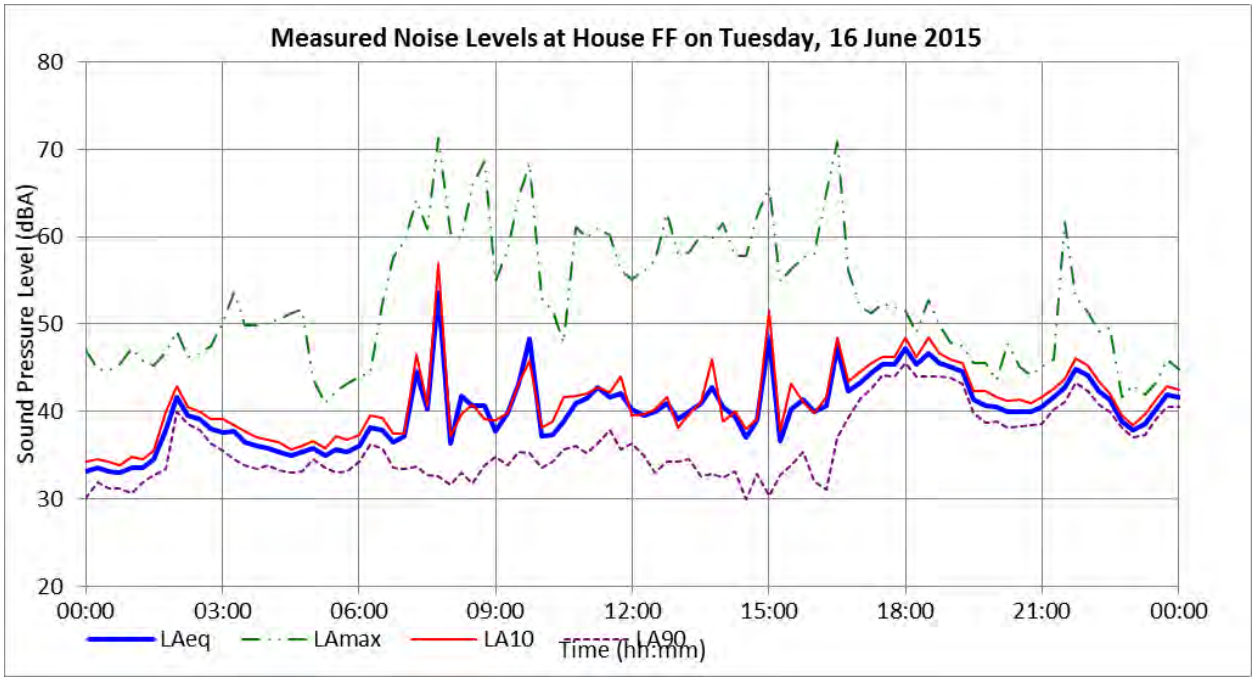

Measured Noise Levels at House FF on Thursday, 11 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

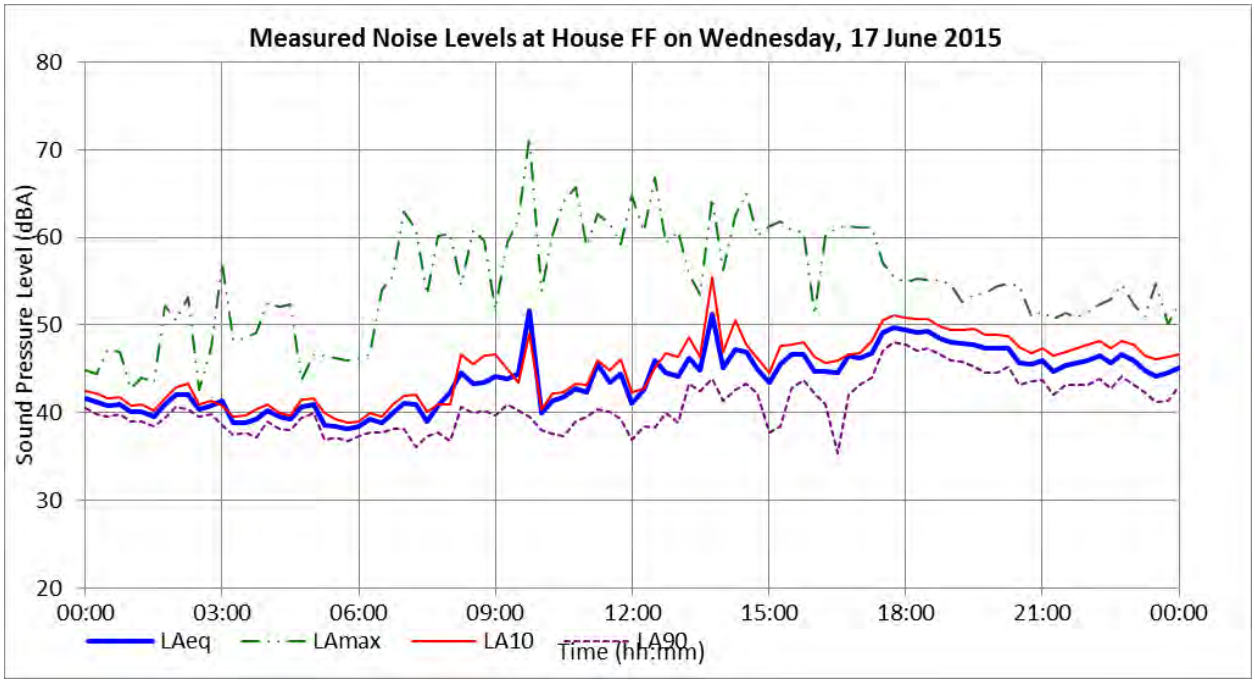

Measured Noise Levels at House FF on Friday, 12 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

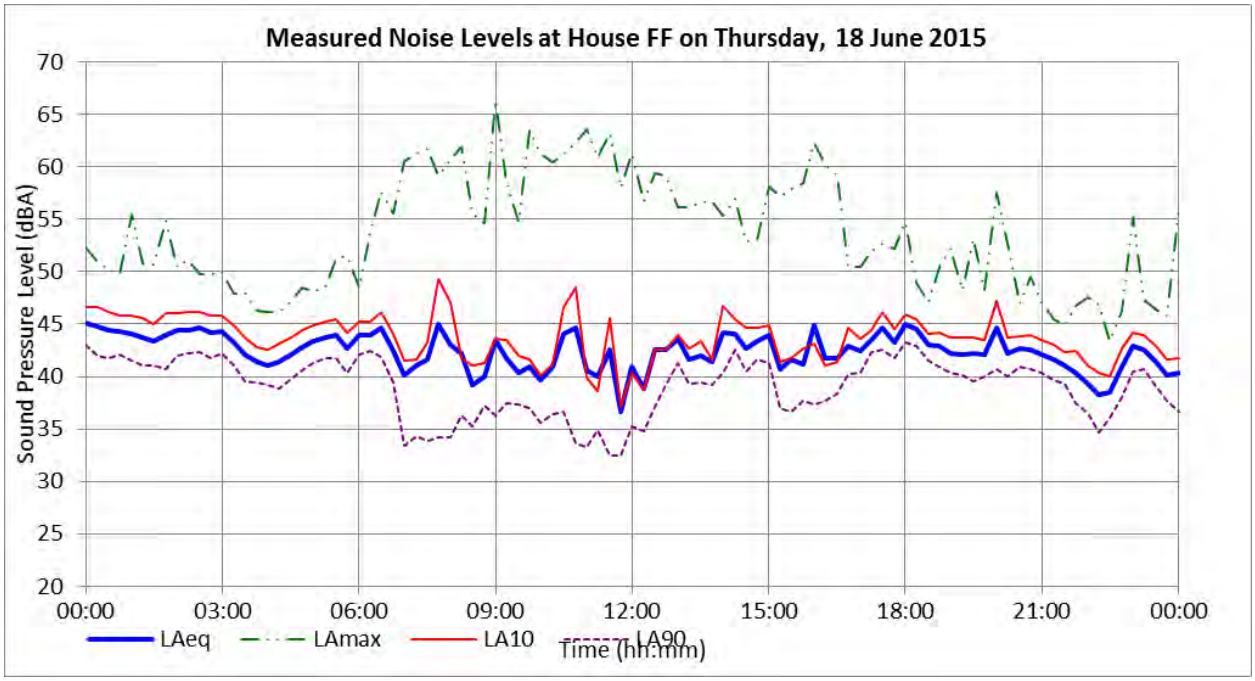

Measured Noise Levels at House FF on Saturday, 13 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

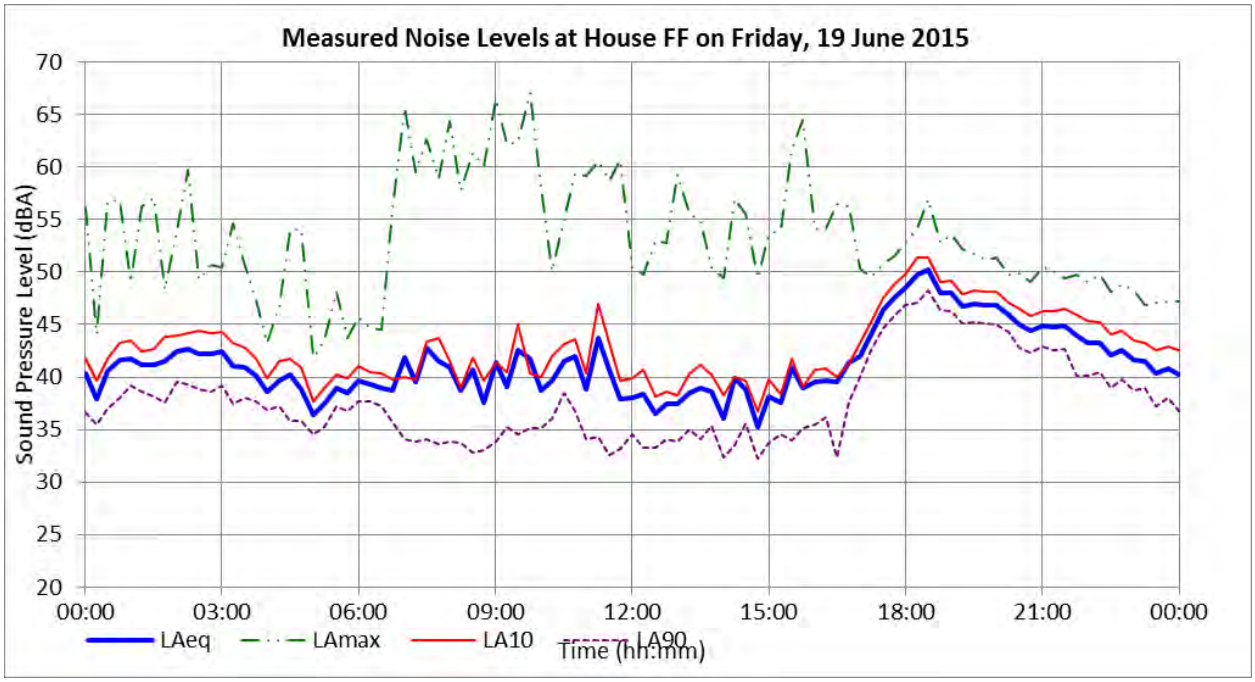

Measured Noise Levels at House FF on Sunday, 14 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

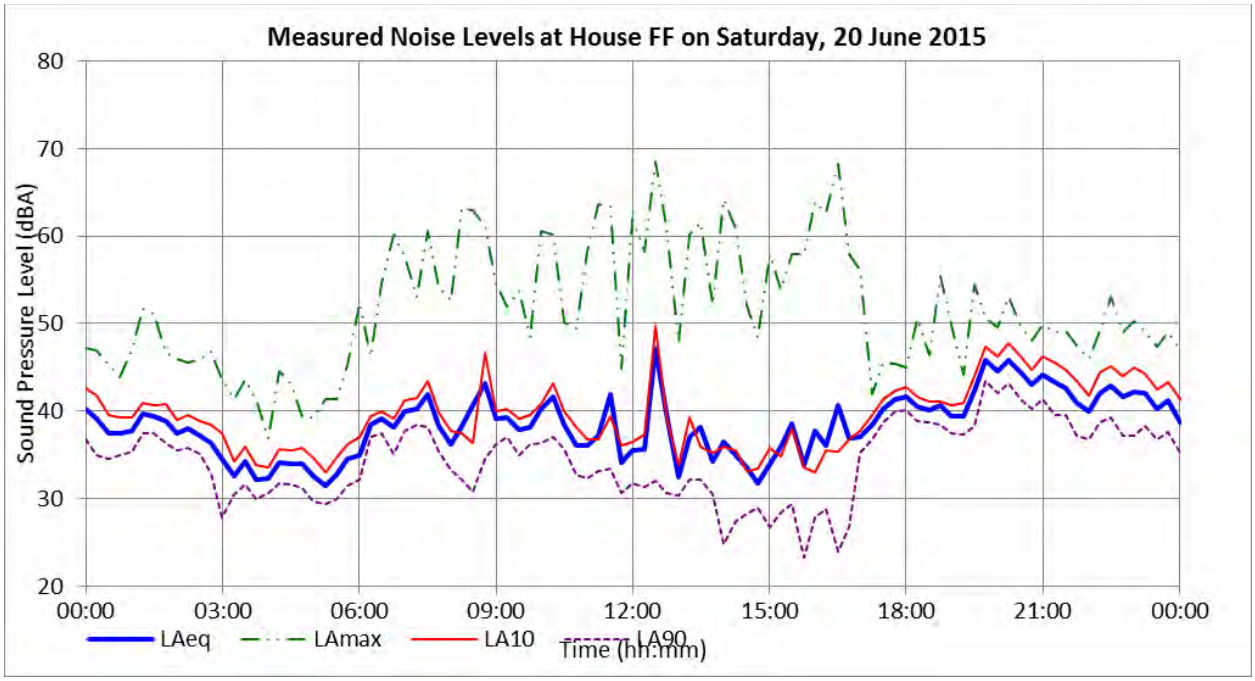

Measured Noise Levels at House FF on Monday, 15 June 2015
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

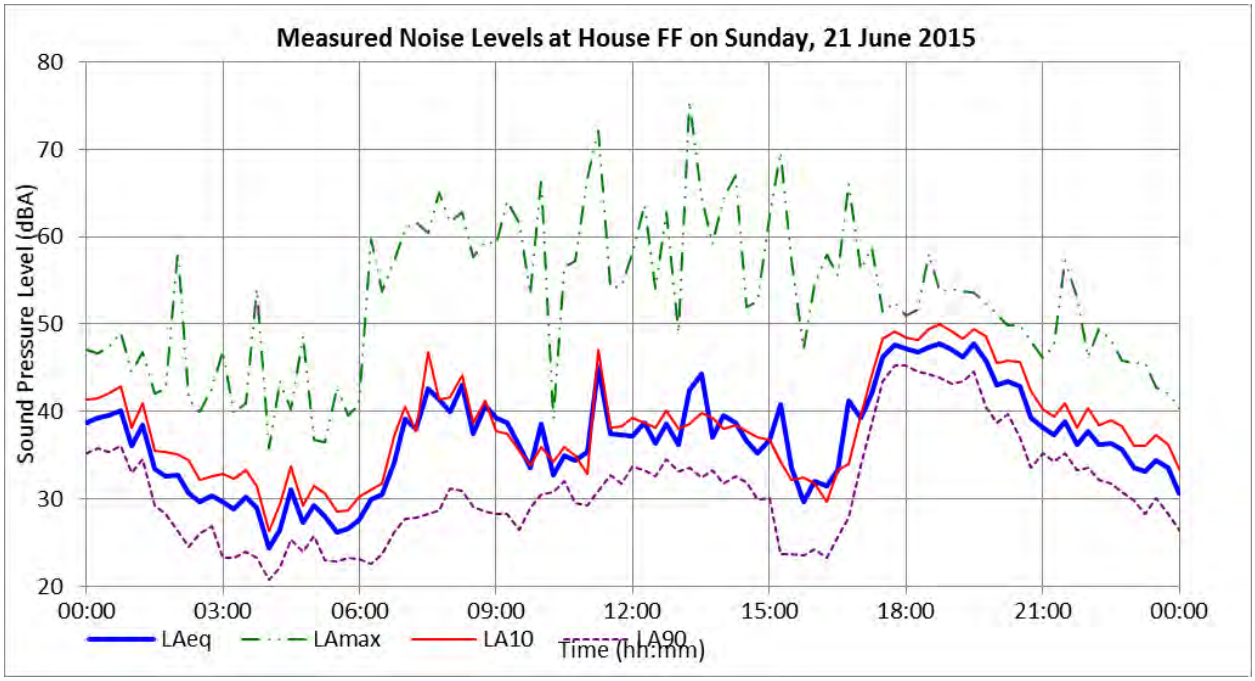

Measured Noise Levels at House FF on Tuesday, 16 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

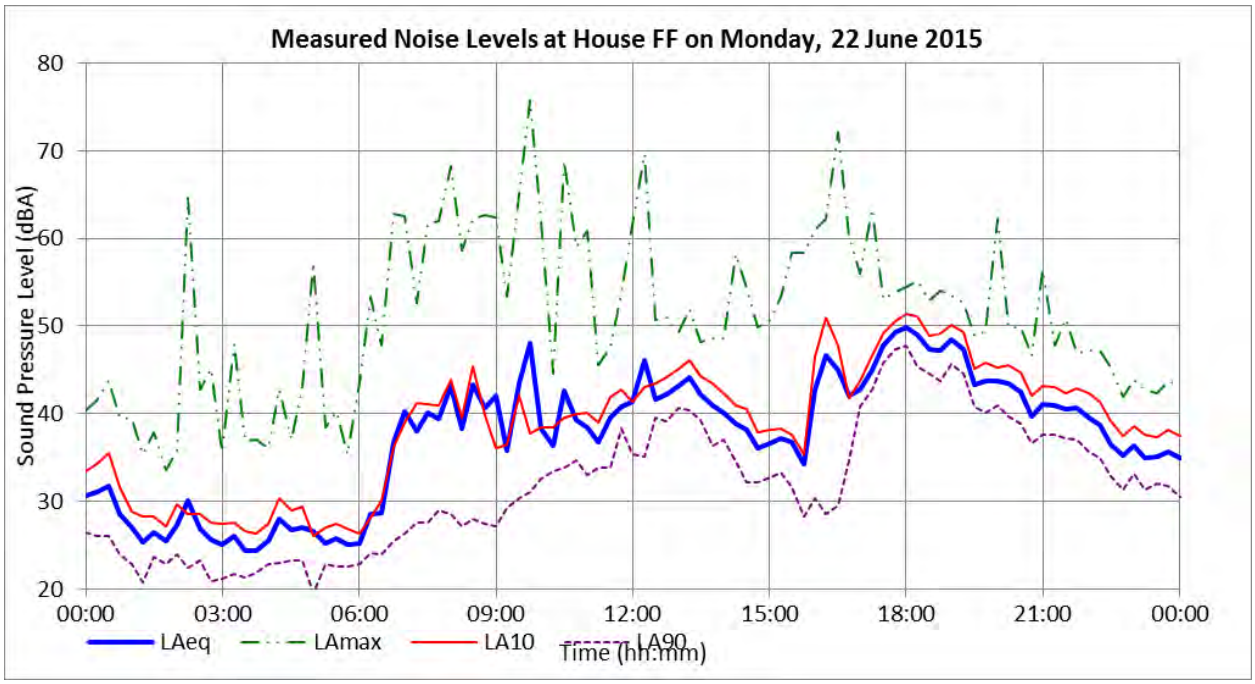

Measured Noise Levels at House FF on Wednesday, 17 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

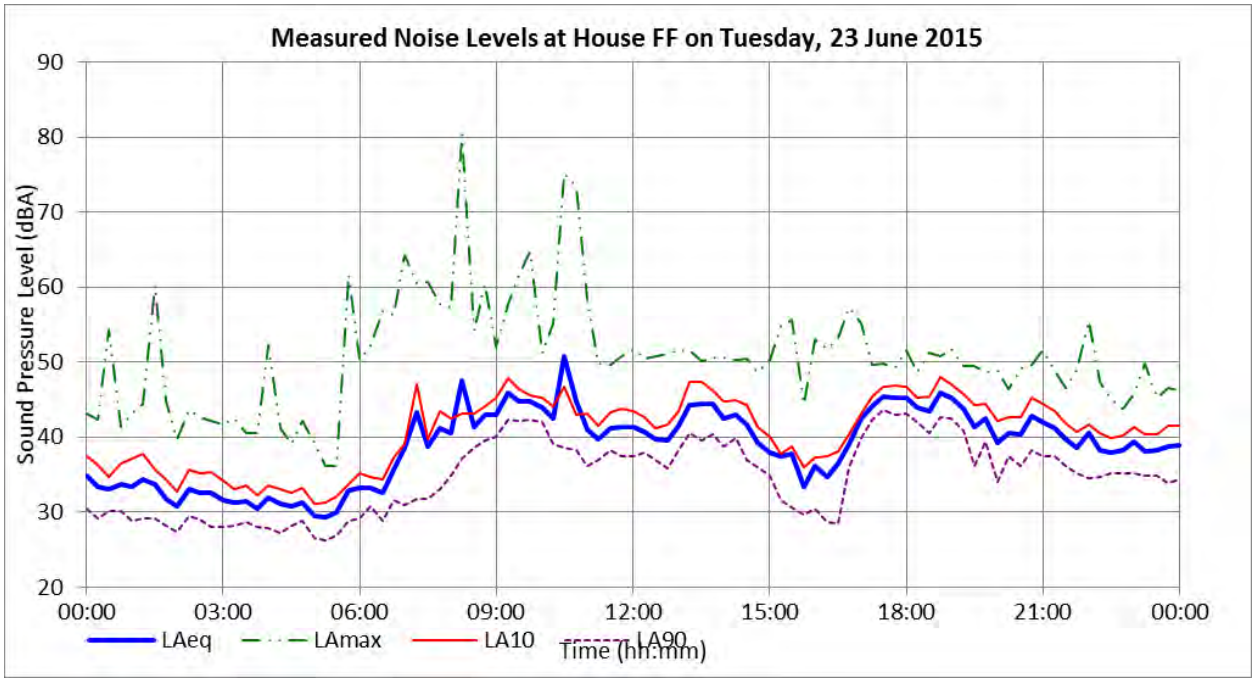

Measured Noise Levels at House FF on Thursday, 18 June 2015
Sound Pressure Level (dBA)
70
65
60
55
50
45
40
35
30
25
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

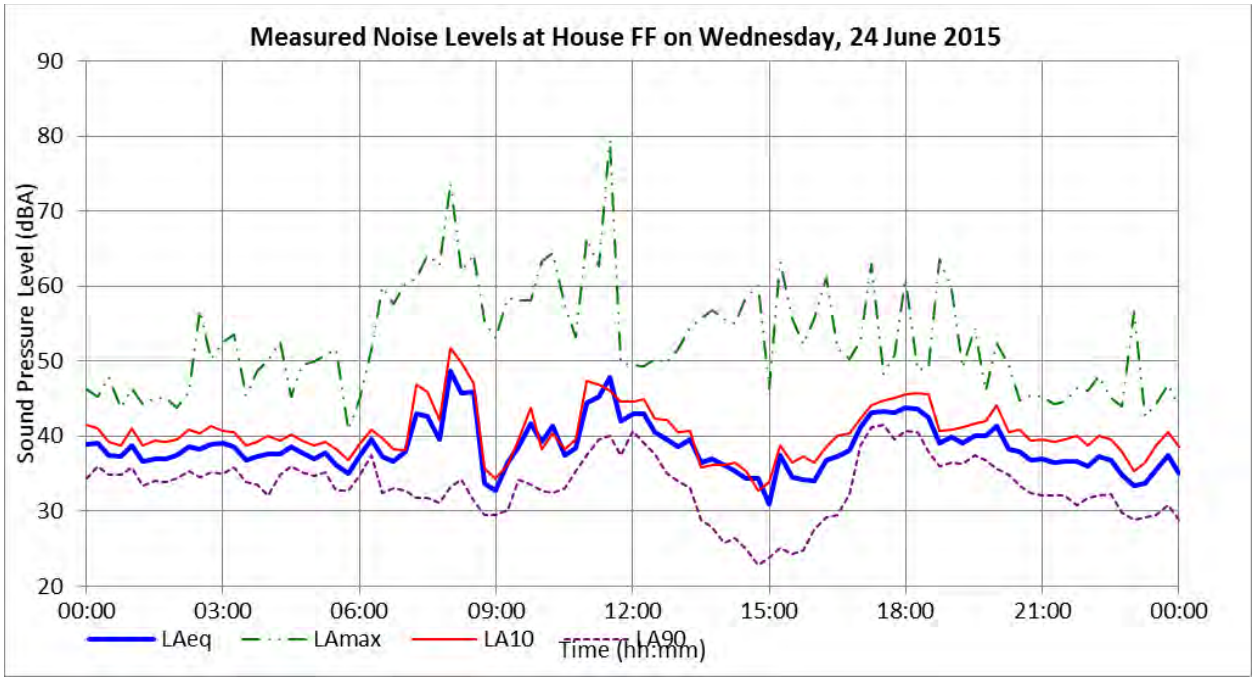

Measured Noise Levels at House FF on Friday, 19 June 2015
Sound Pressure Level (dBA)
70
65
60
55
50
45
40
35
30
25
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

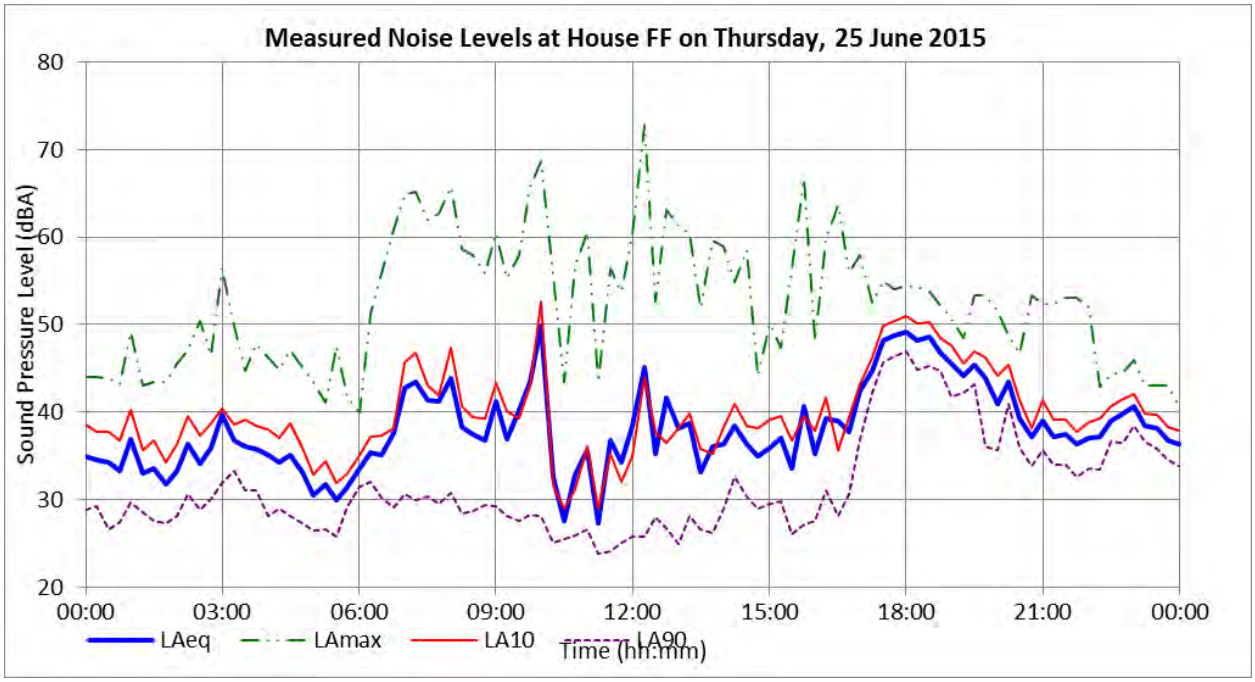

Measured Noise Levels at House FF on Saturday, 20 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

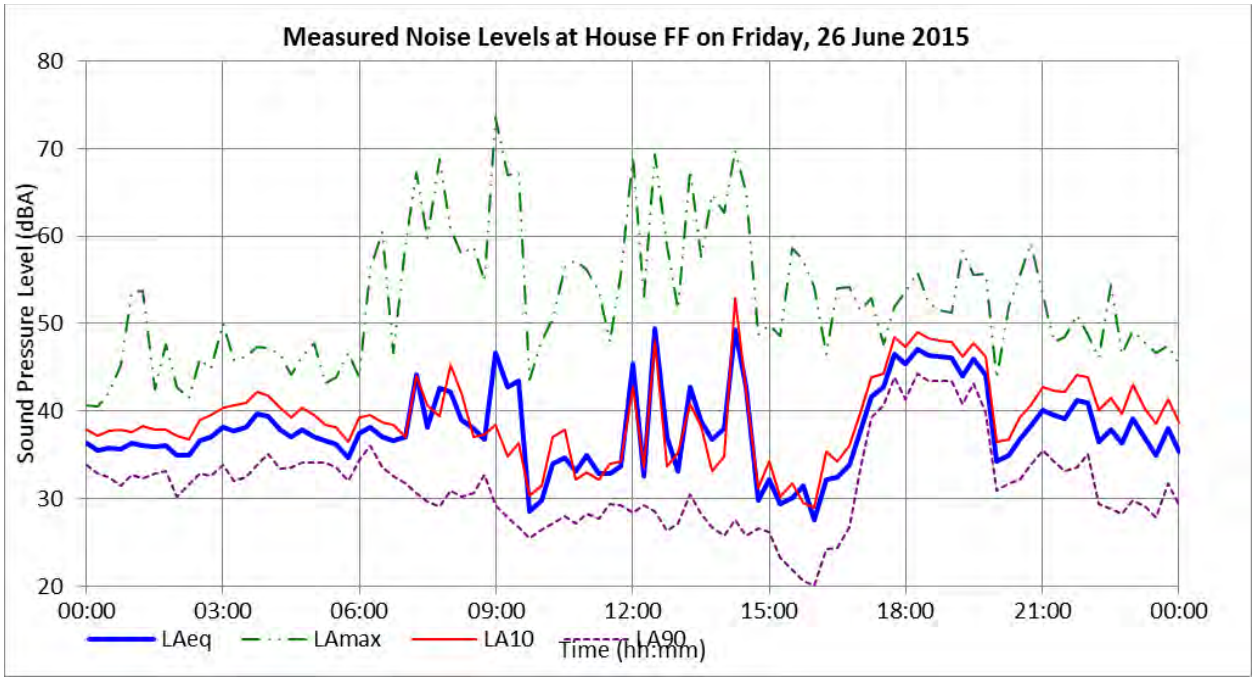

Measured Noise Levels at House FF on Sunday, 21 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

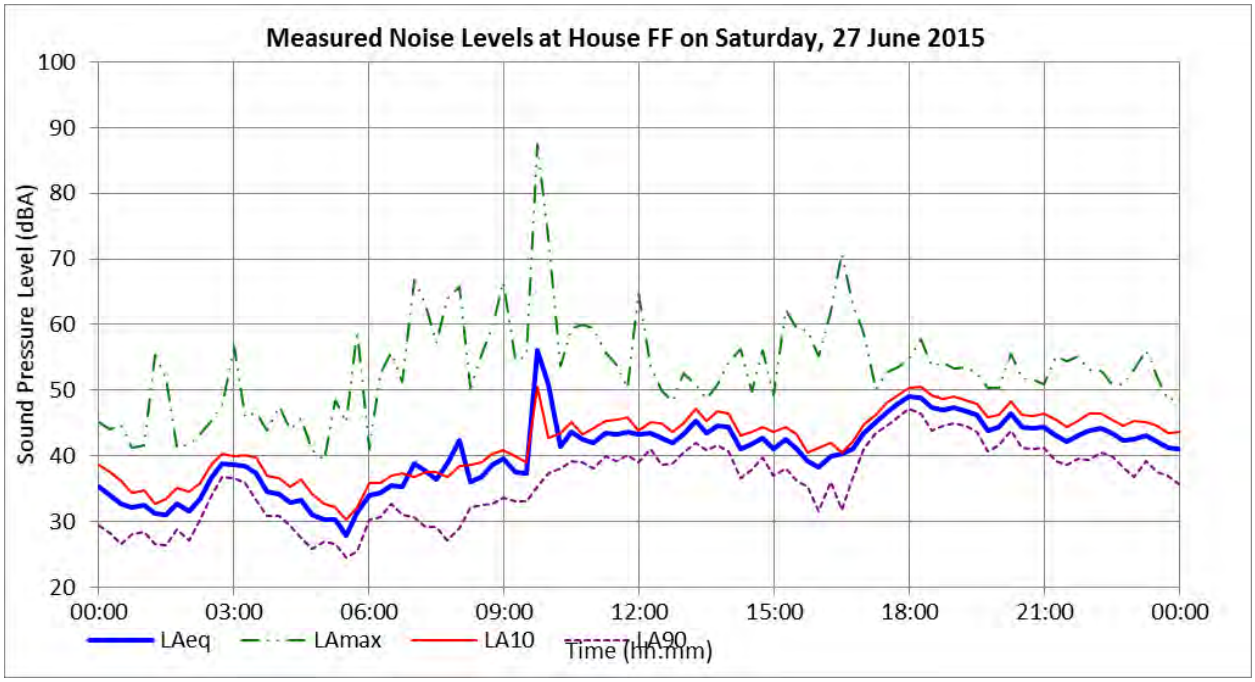

Measured Noise Levels at House FF on Monday, 22 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

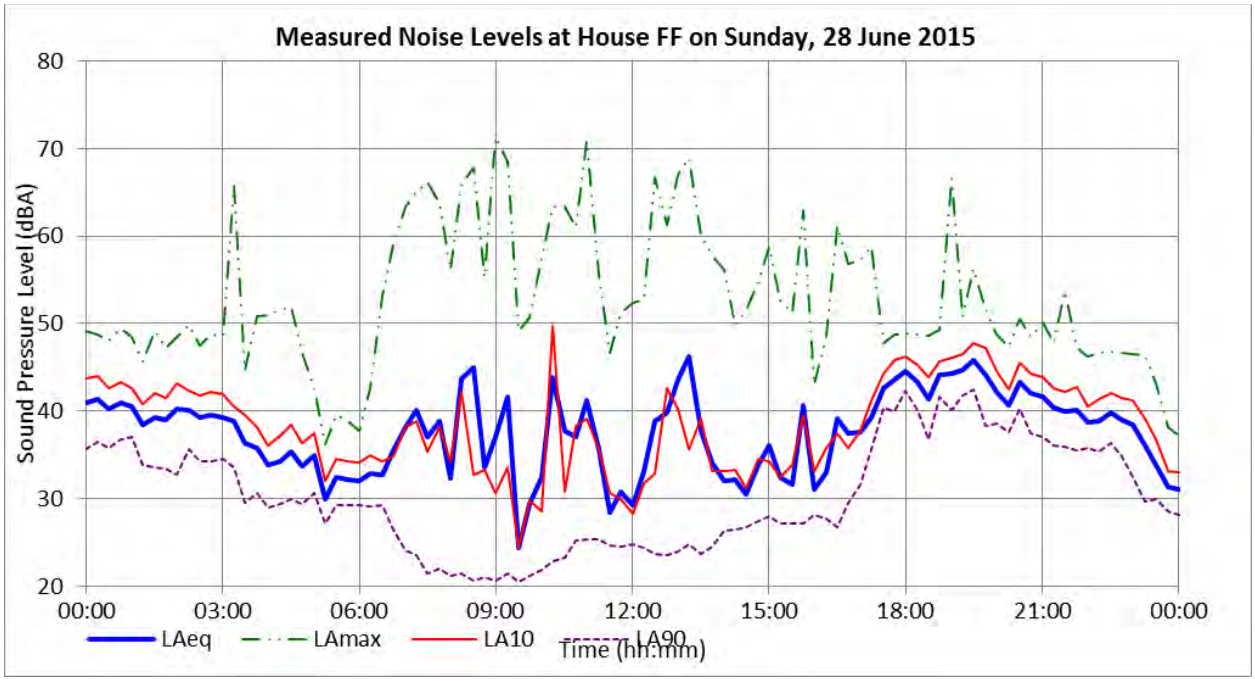

Measured Noise Levels at House FF on Tuesday, 23 June 2015
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

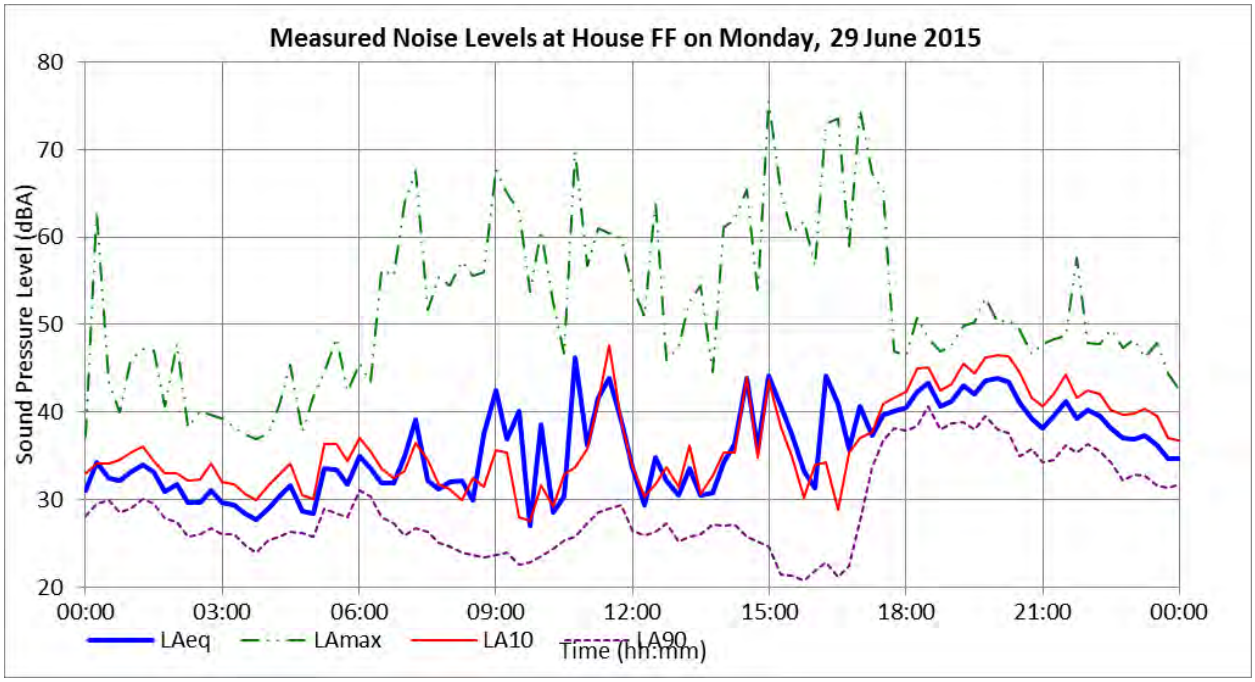

Measured Noise Levels at House FF on Wednesday, 24 June 2015
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

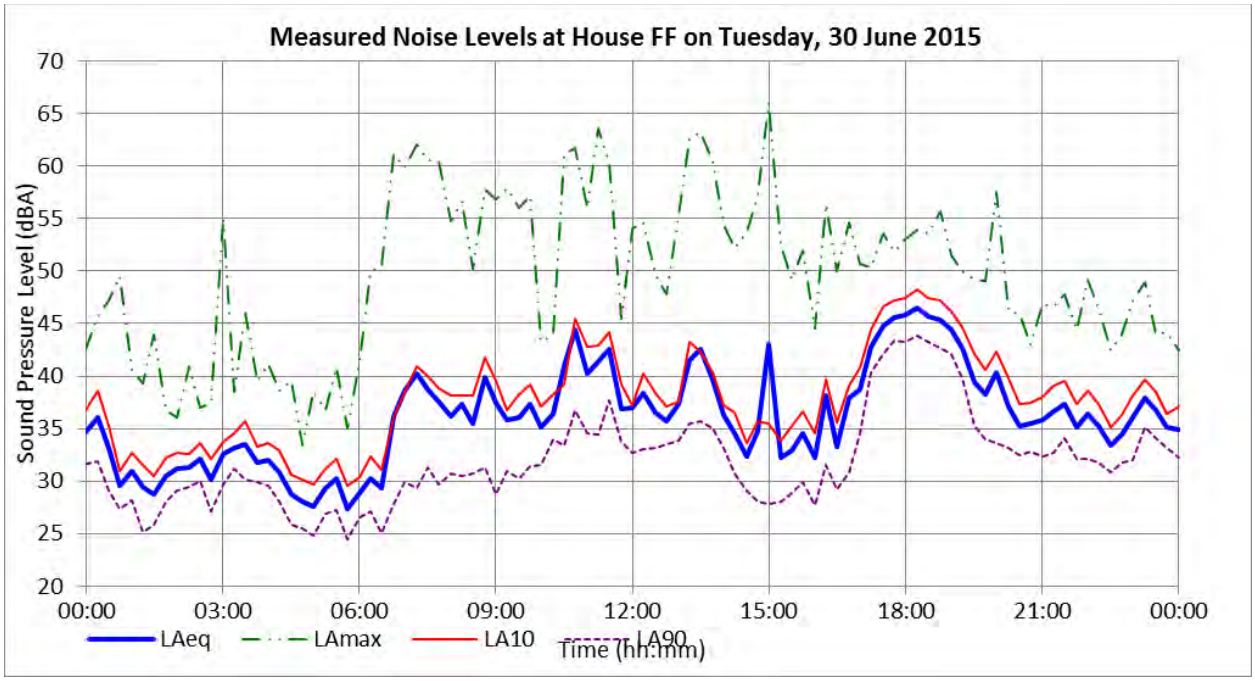

Measured Noise Levels at House FF on Thursday, 25 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

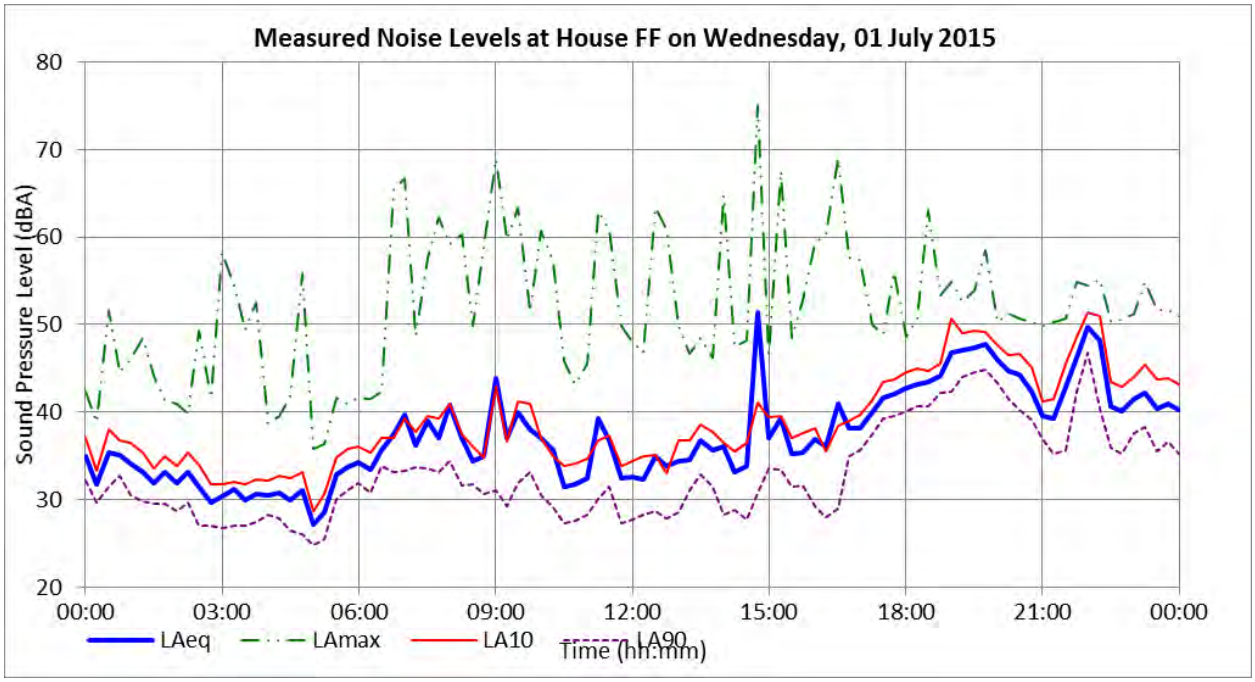

Measured Noise Levels at House FF on Friday, 26 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

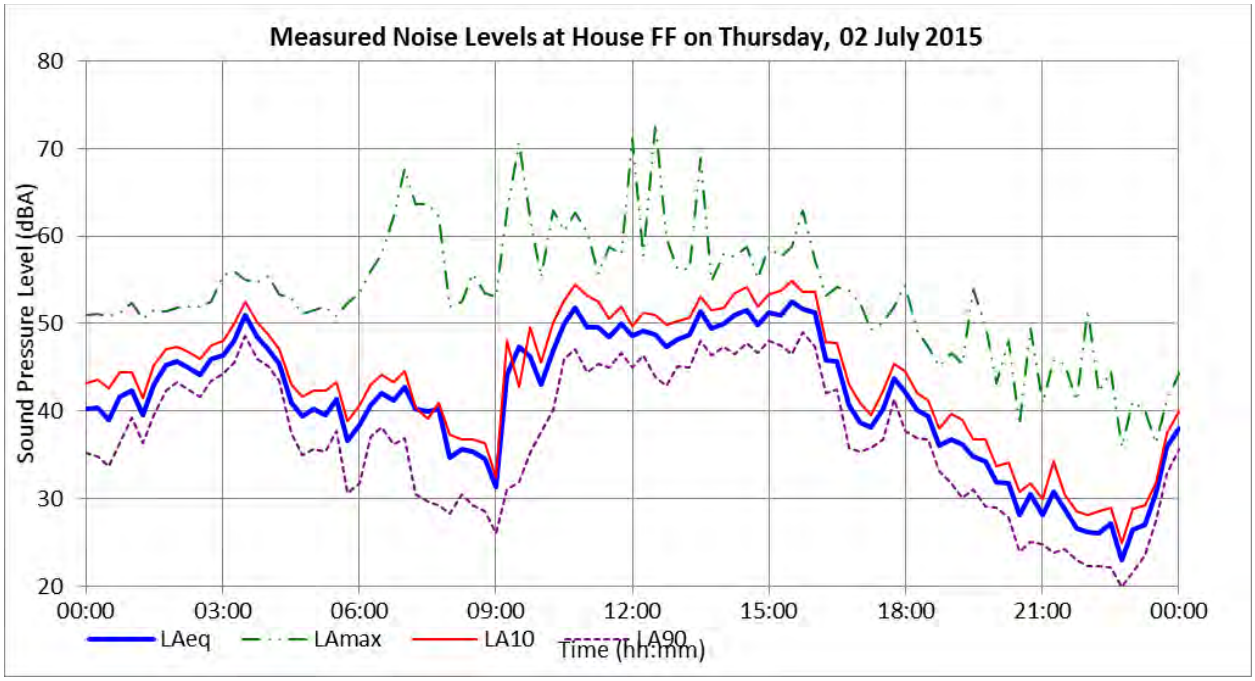

Measured Noise Levels at House FF on Saturday, 27 June 2015
Sound Pressure Level (dBA)
100
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

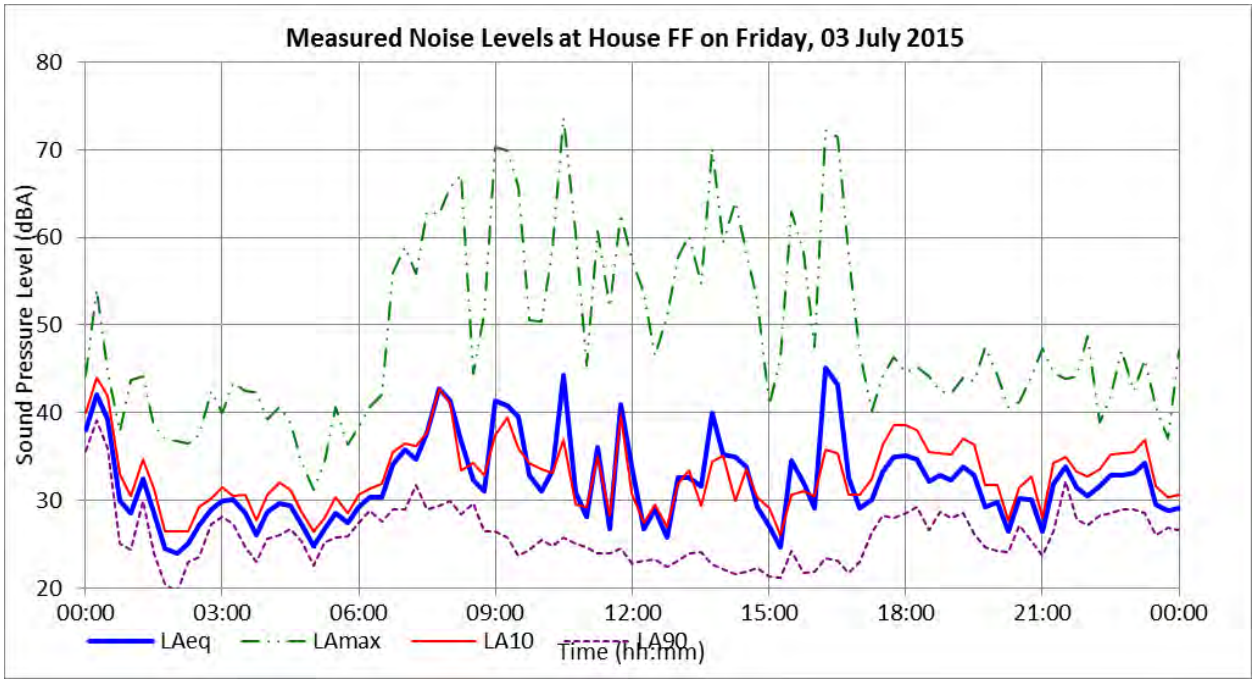

Measured Noise Levels at House FF on Sunday, 28 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

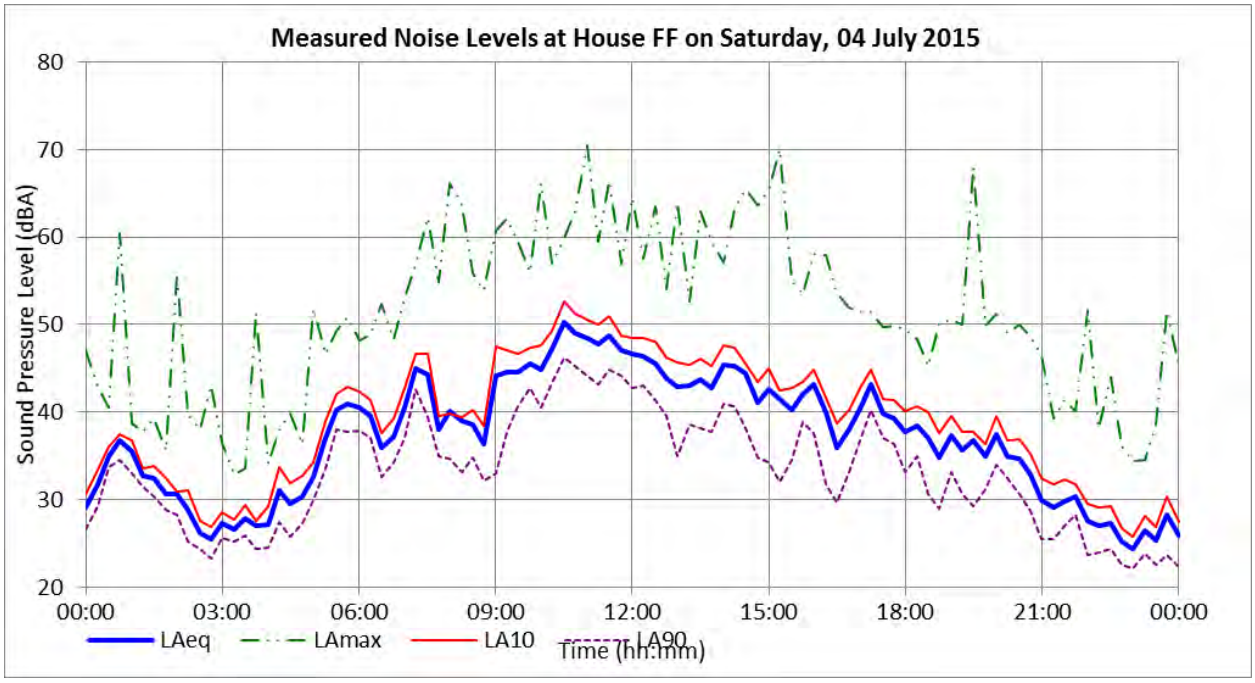

Measured Noise Levels at House FF on Monday, 29 June 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

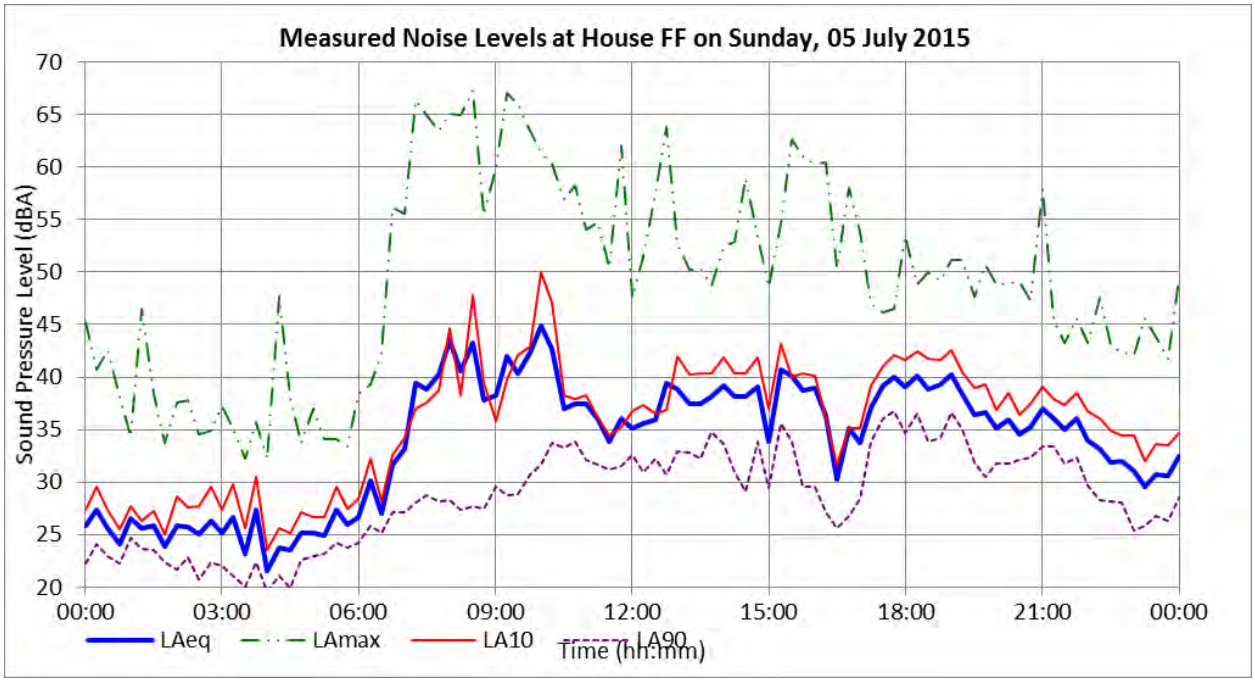

Measured Noise Levels at House FF on Tuesday, 30 June 2015
Sound Pressure Level (dBA)
70
65
60
55
50
45
40
35
30
25
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

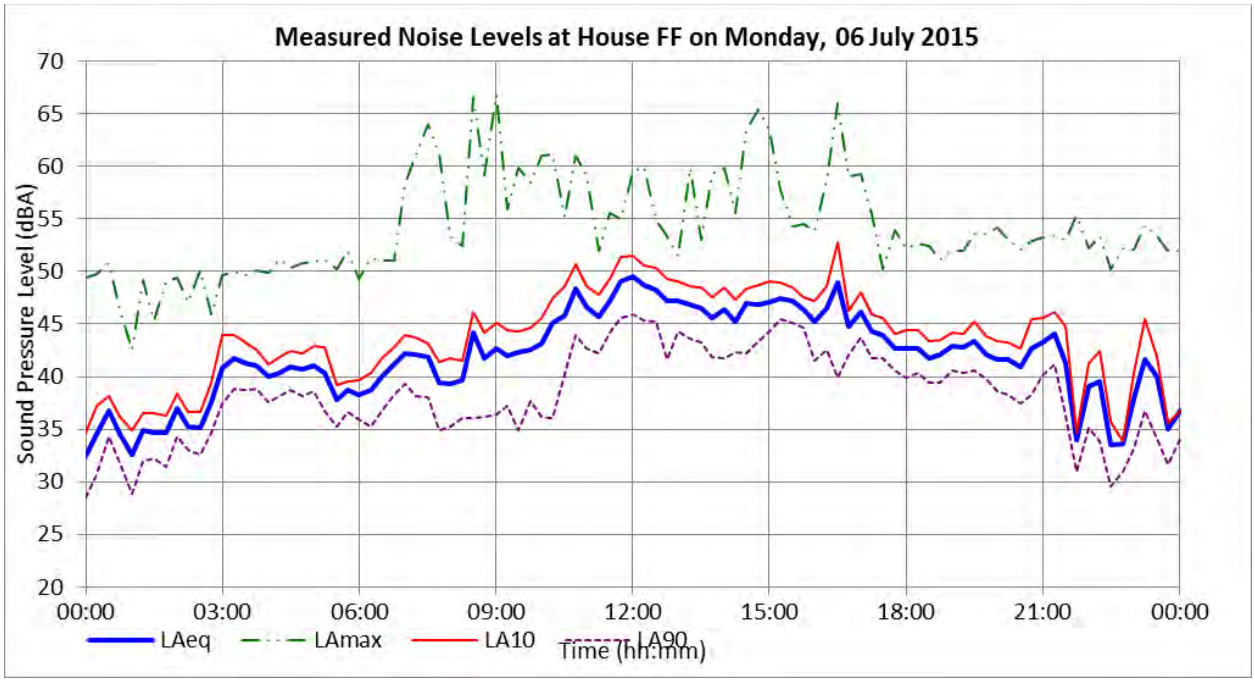

Measured Noise Levels at House FF on Wednesday, 01 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

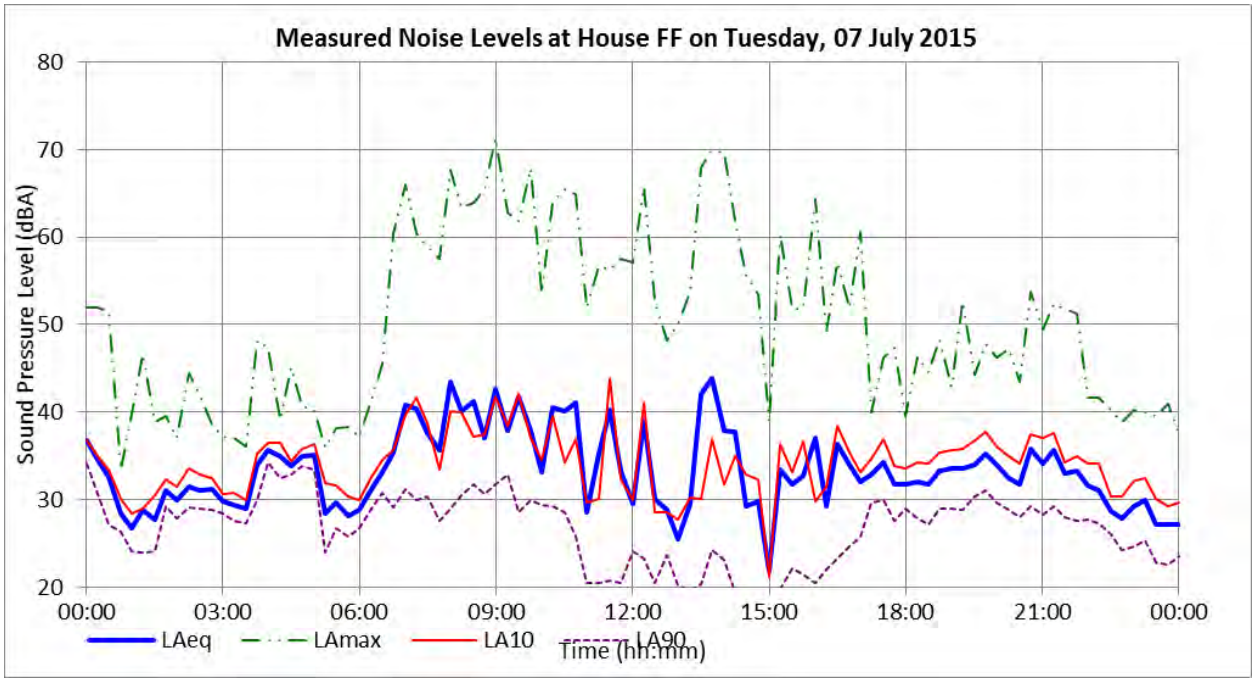

Measured Noise Levels at House FF on Thursday, 02 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

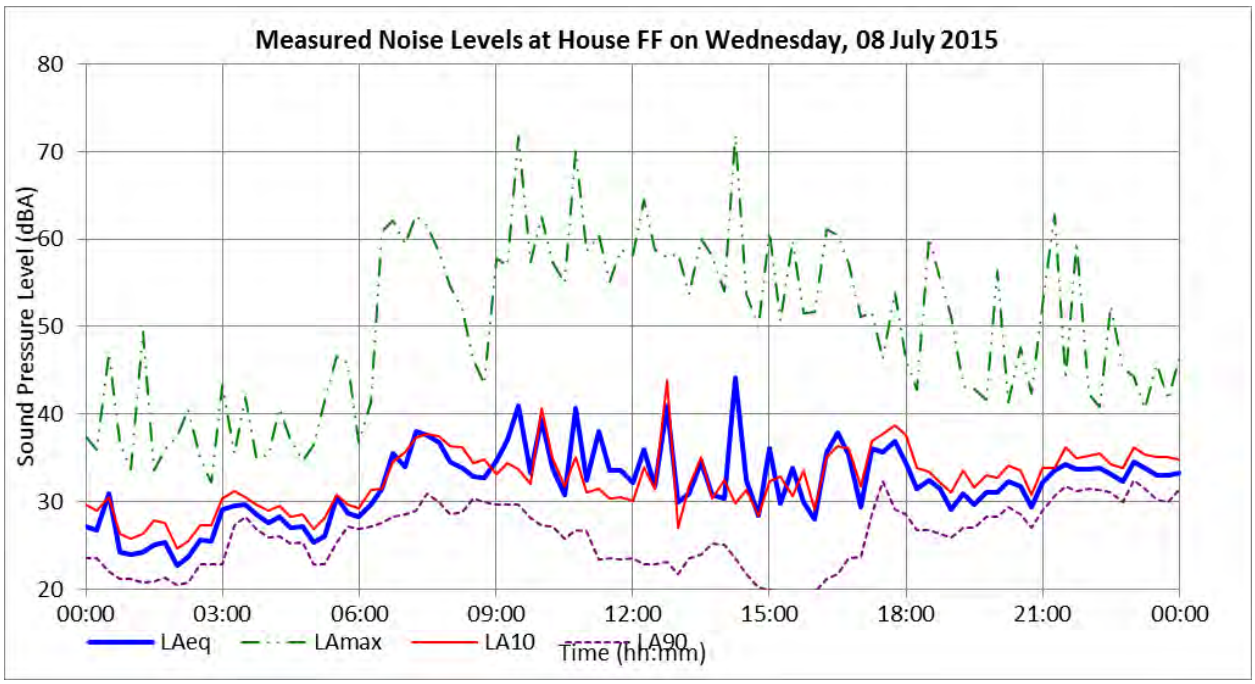

Measured Noise Levels at House FF on Friday, 03 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

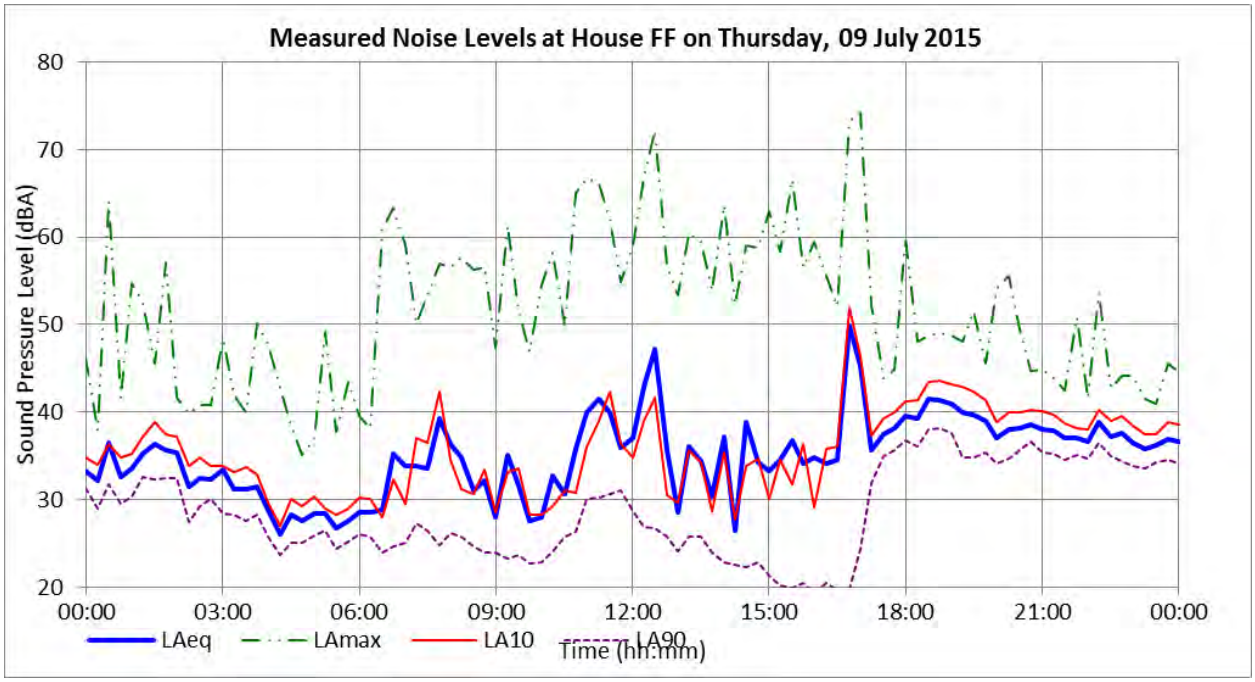

Measured Noise Levels at House FF on Saturday, 04 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

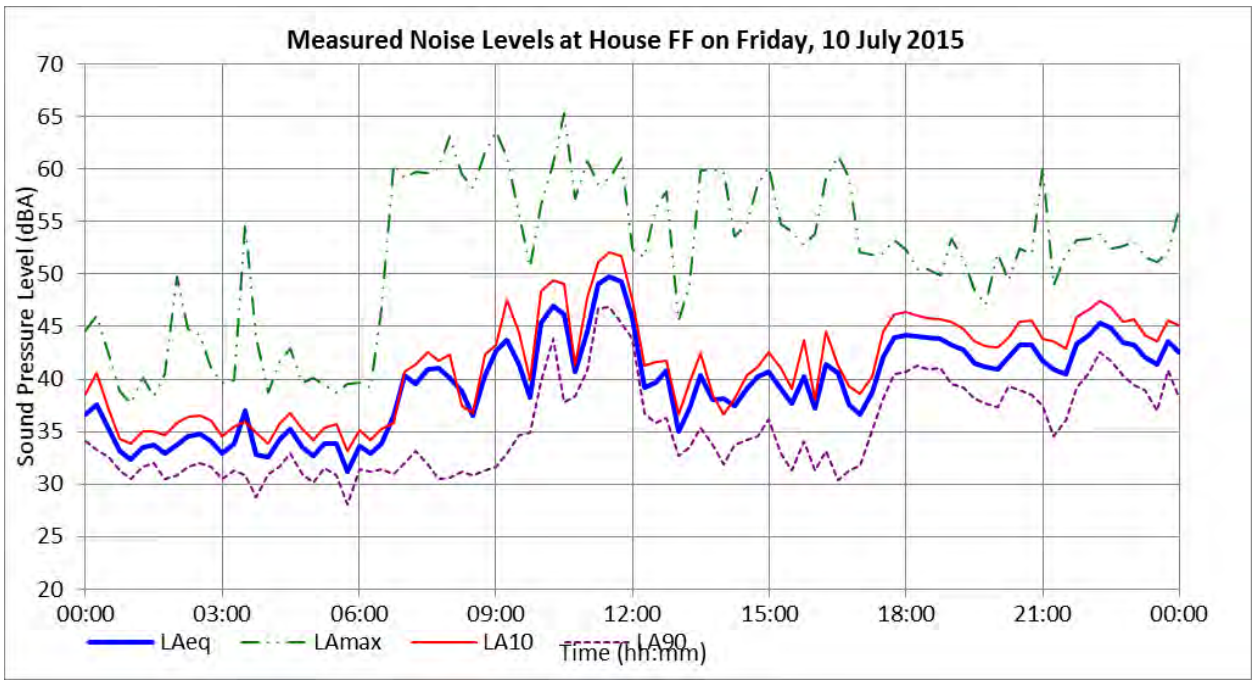

Measured Noise Levels at House FF on Sunday, 05 July 2015
Sound Pressure Level (dBA)
70
65
60
55
50
45
40
35
30
25
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

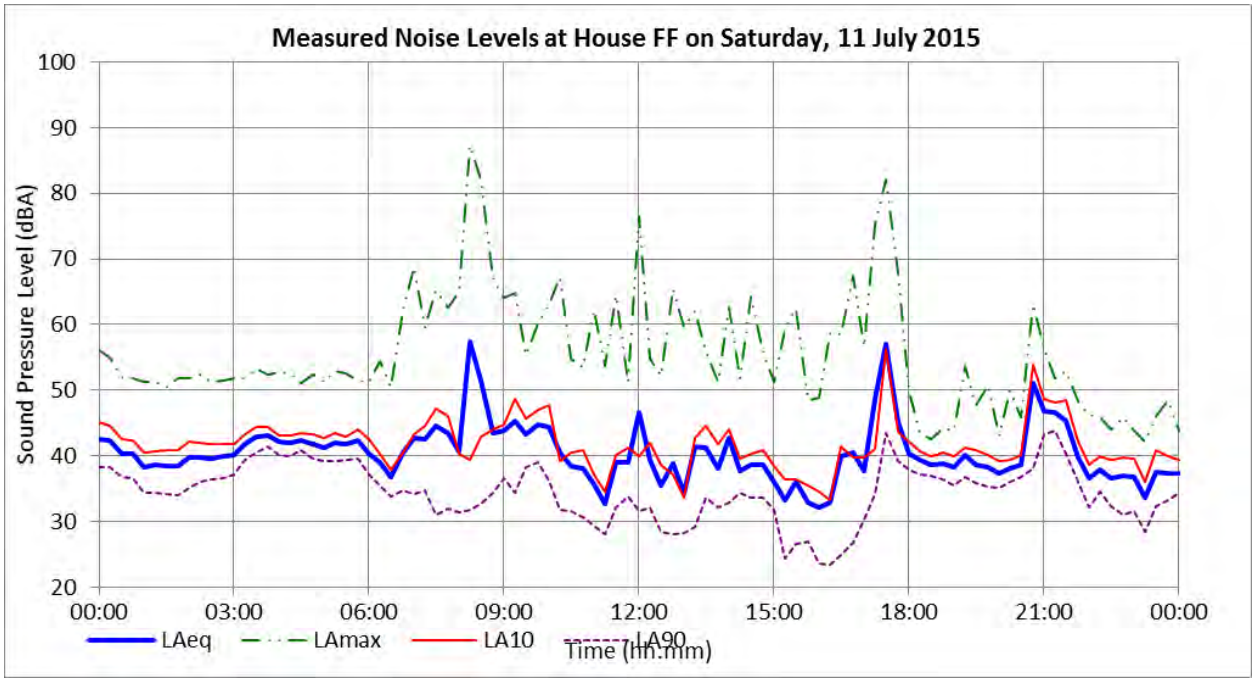

Measured Noise Levels at House FF on Monday, 06 July 2015
Sound Pressure Level (dBA)
70
65
60
55
50
45
40
35
30
25
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

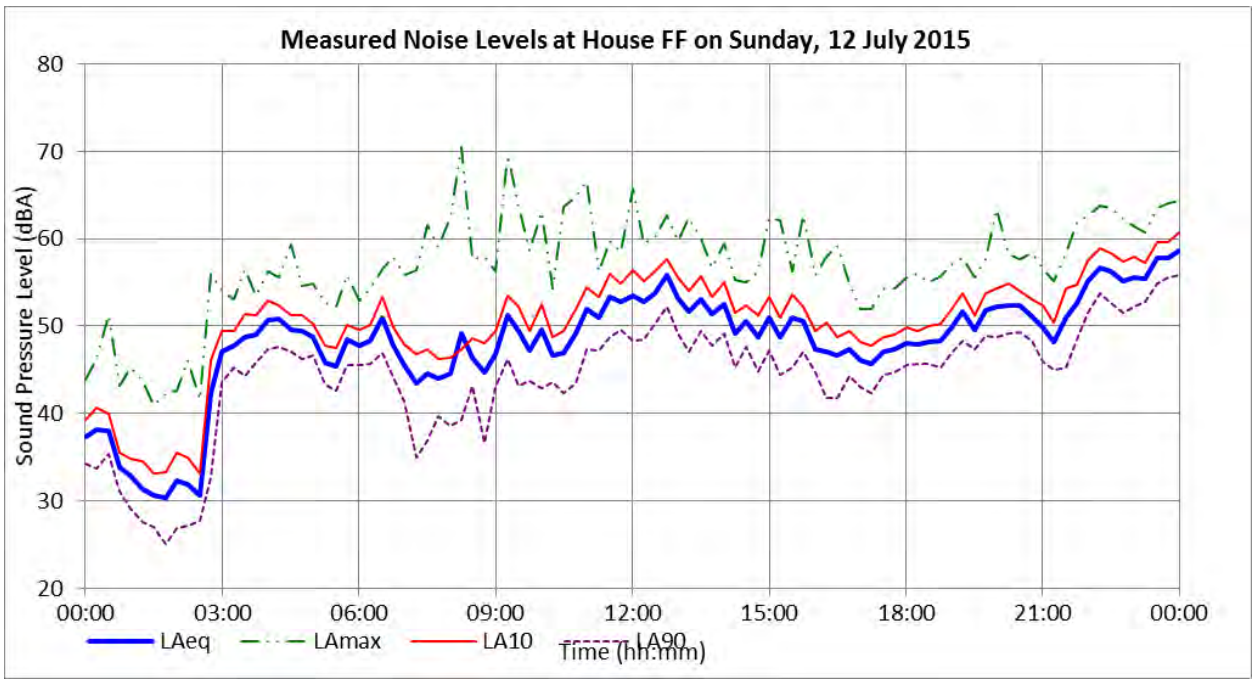

Measured Noise Levels at House FF on Tuesday, 07 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

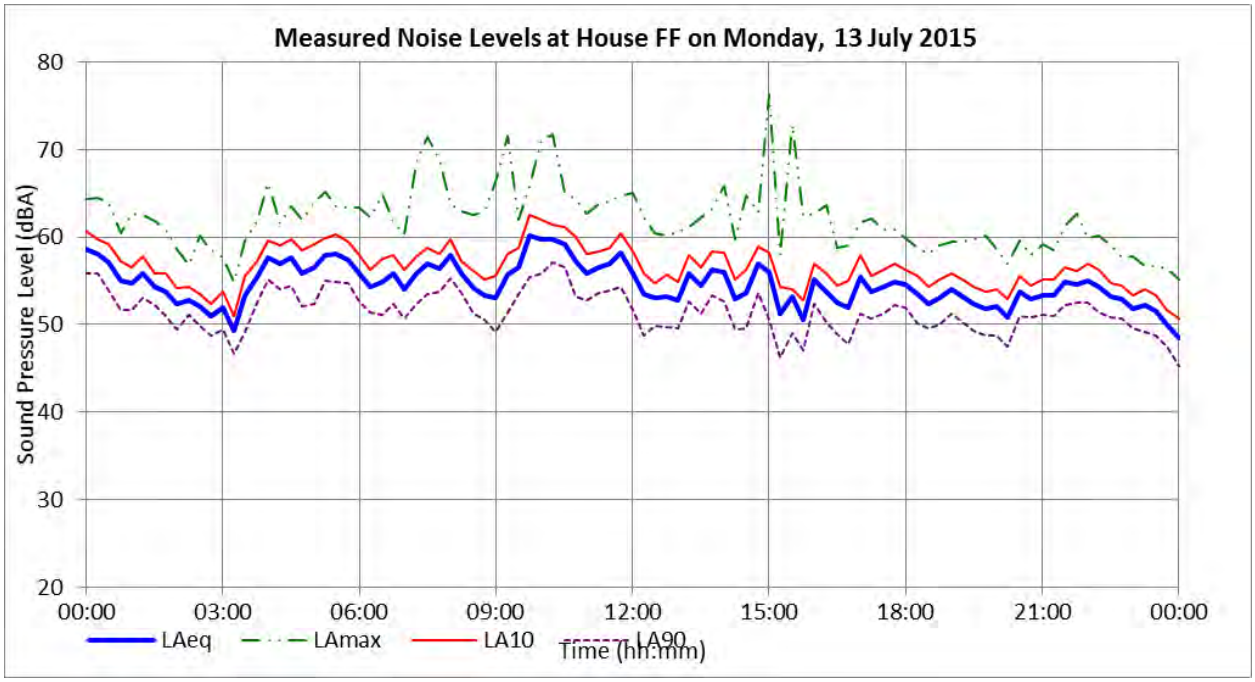

Measured Noise Levels at House FF on Wednesday, 08 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

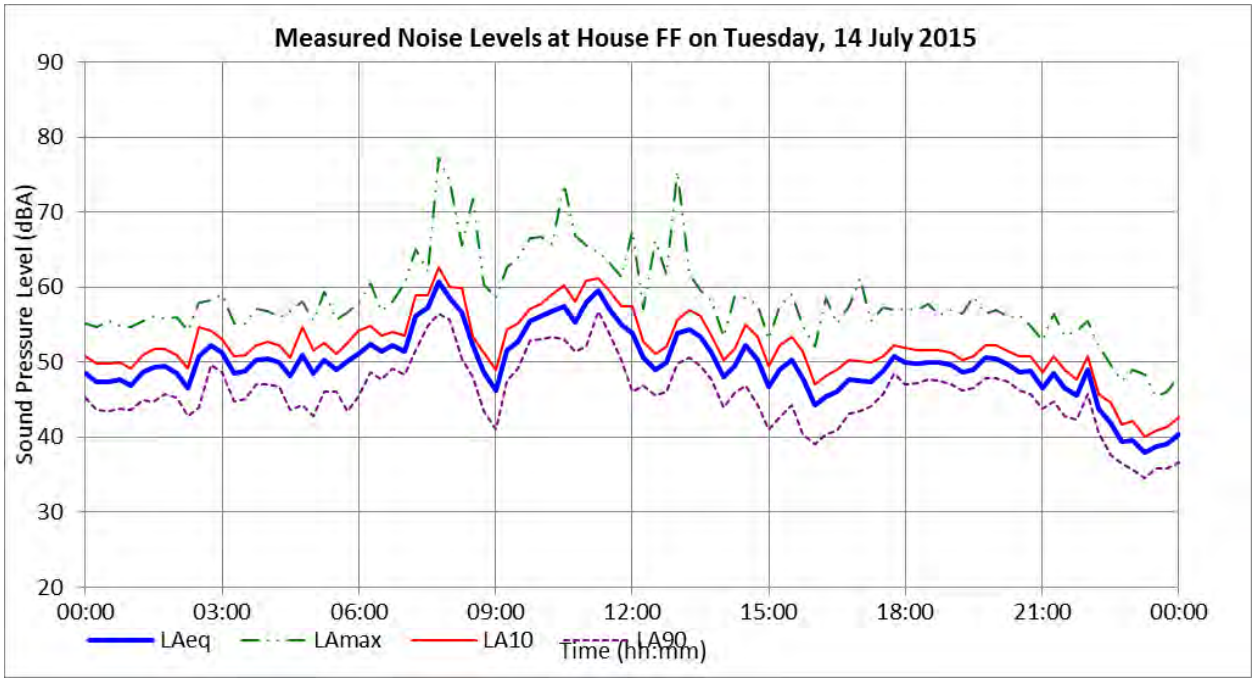

Measured Noise Levels at House FF on Thursday, 09 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

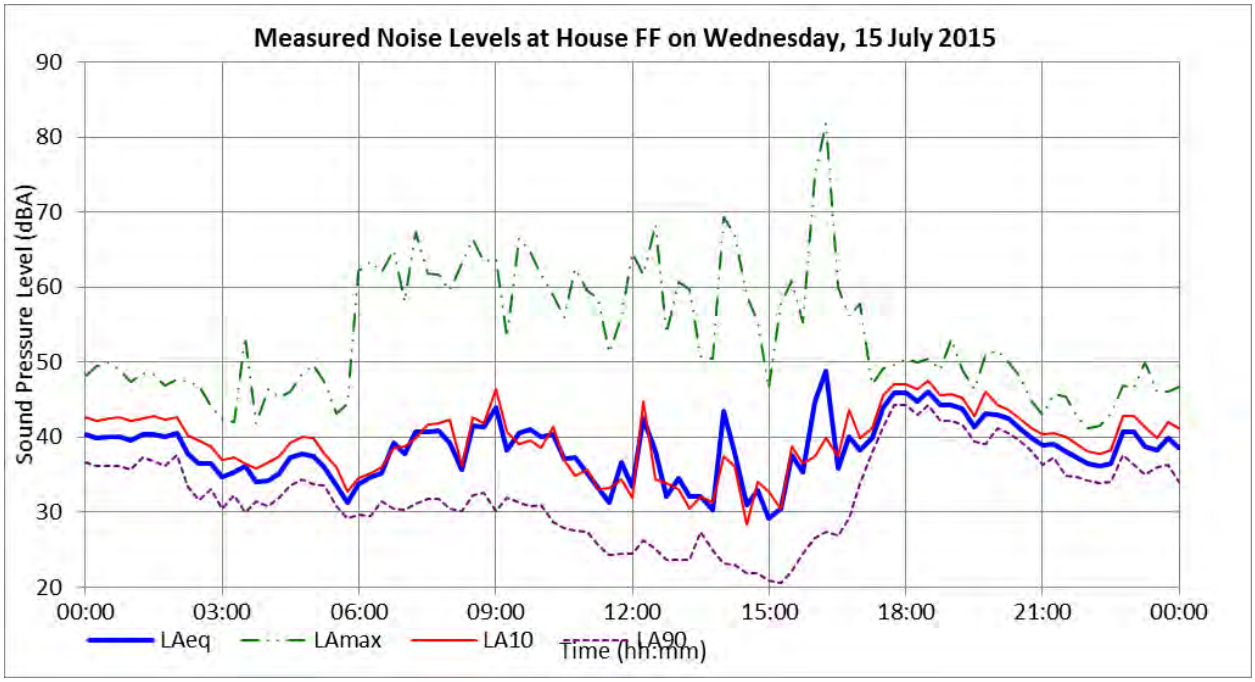

Measured Noise Levels at House FF on Friday, 10 July 2015
Sound Pressure Level (dBA)
70
65
60
55
50
45
40
35
30
25
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

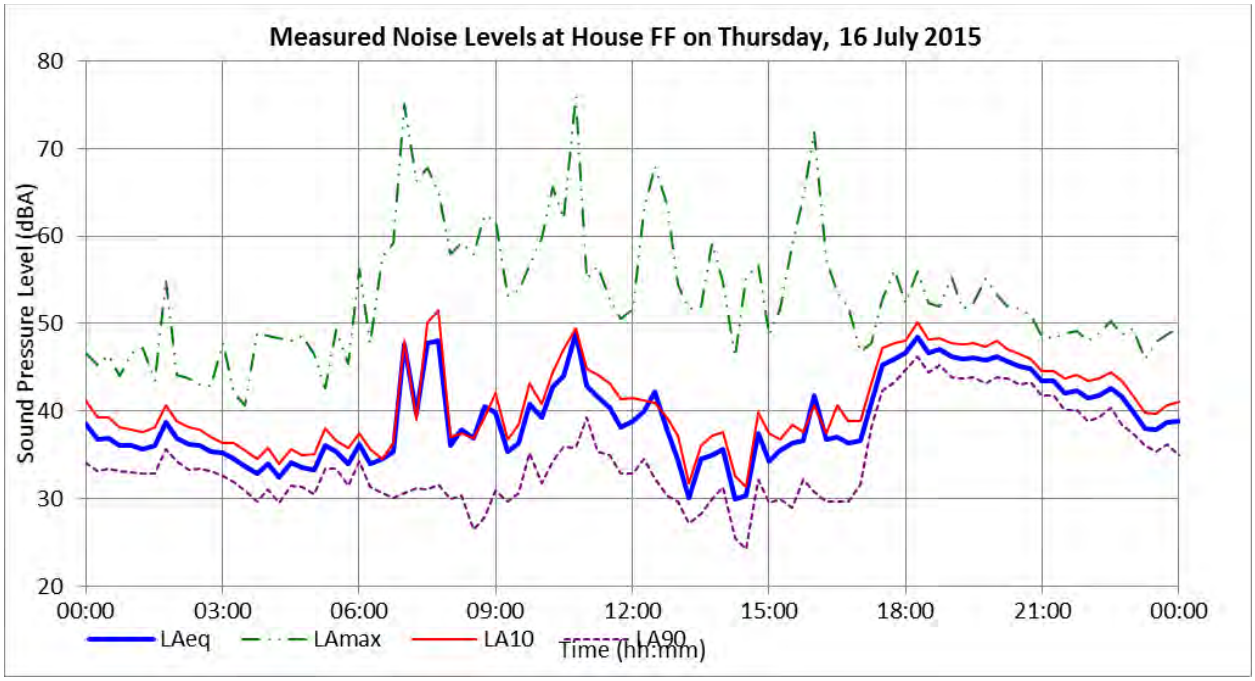

Measured Noise Levels at House FF on Saturday, 11 July 2015
Sound Pressure Level (dBA)
100
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

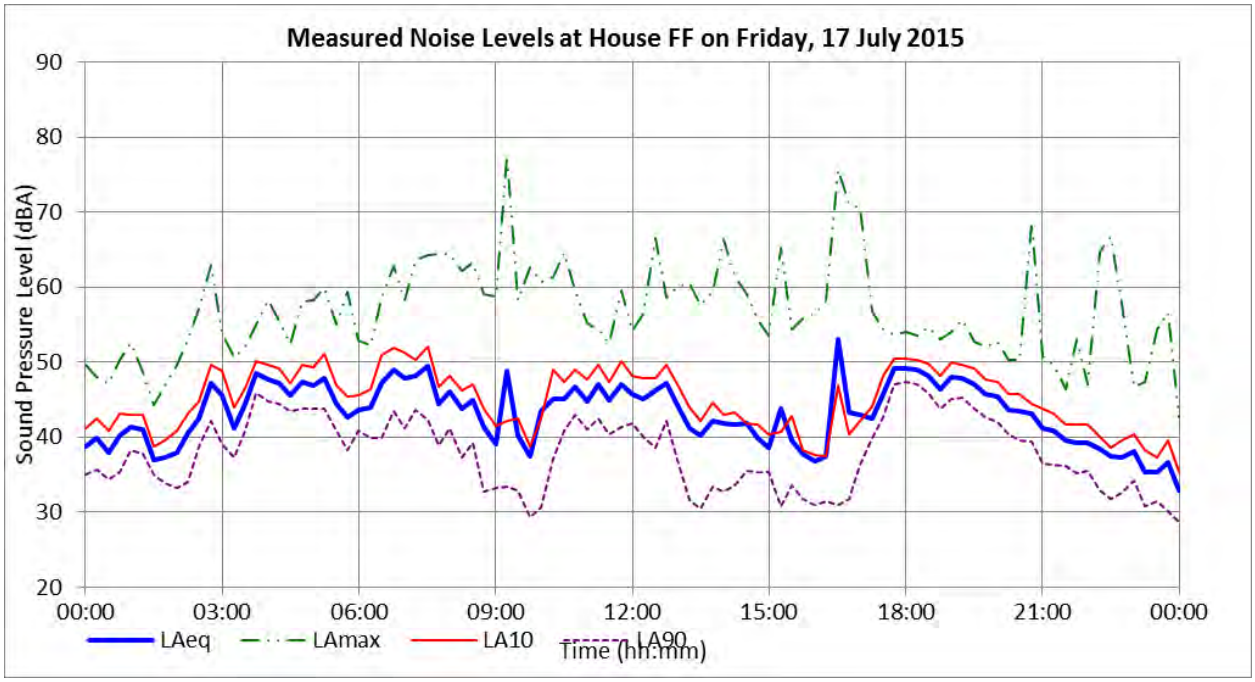

Measured Noise Levels at House FF on Sunday, 12 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

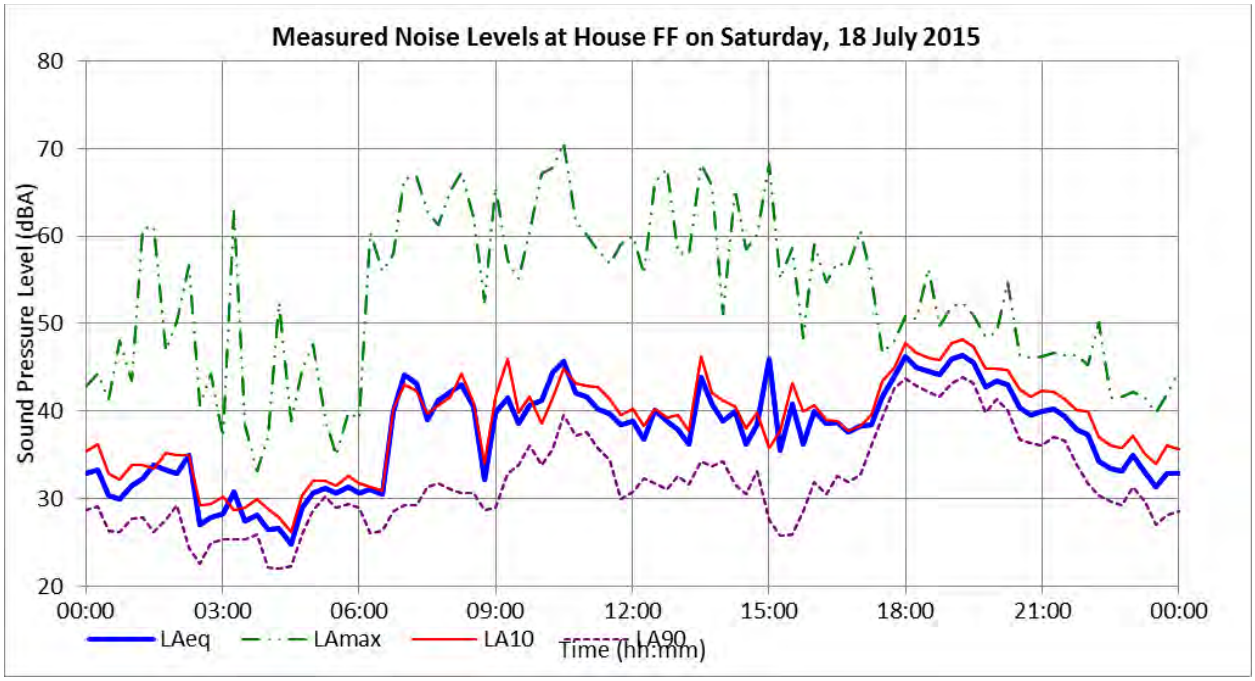

Measured Noise Levels at House FF on Monday, 13 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

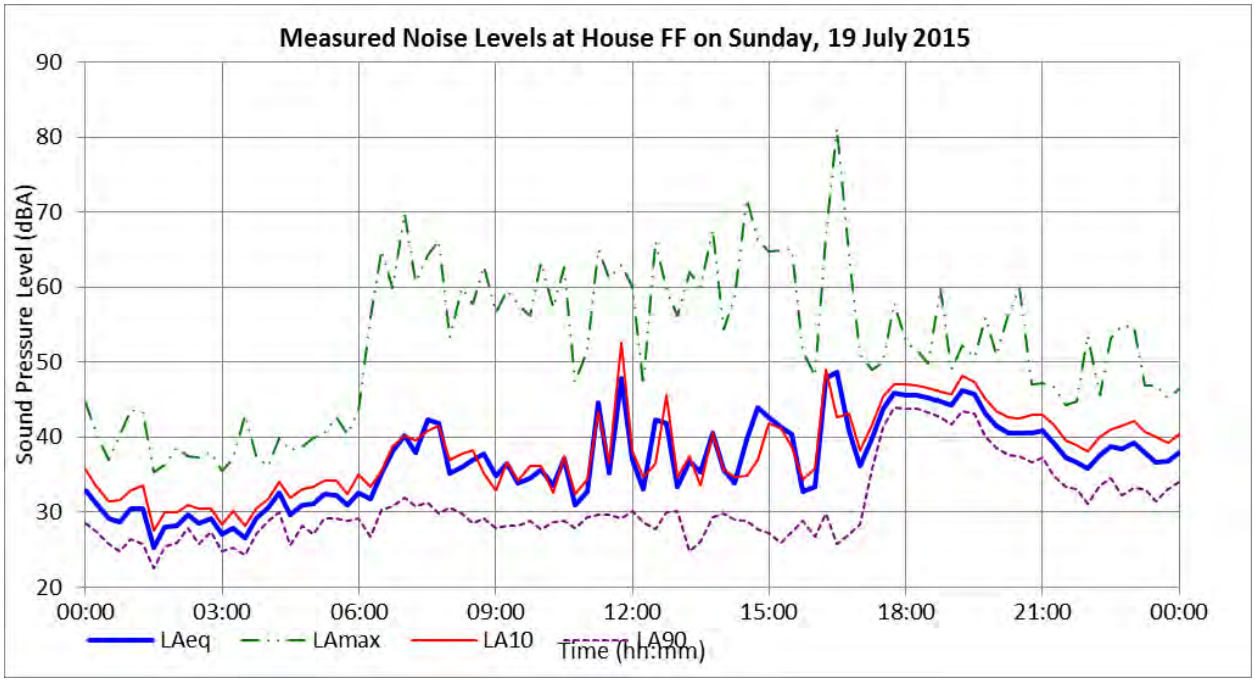

Measured Noise Levels at House FF on Tuesday, 14 July 2015
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

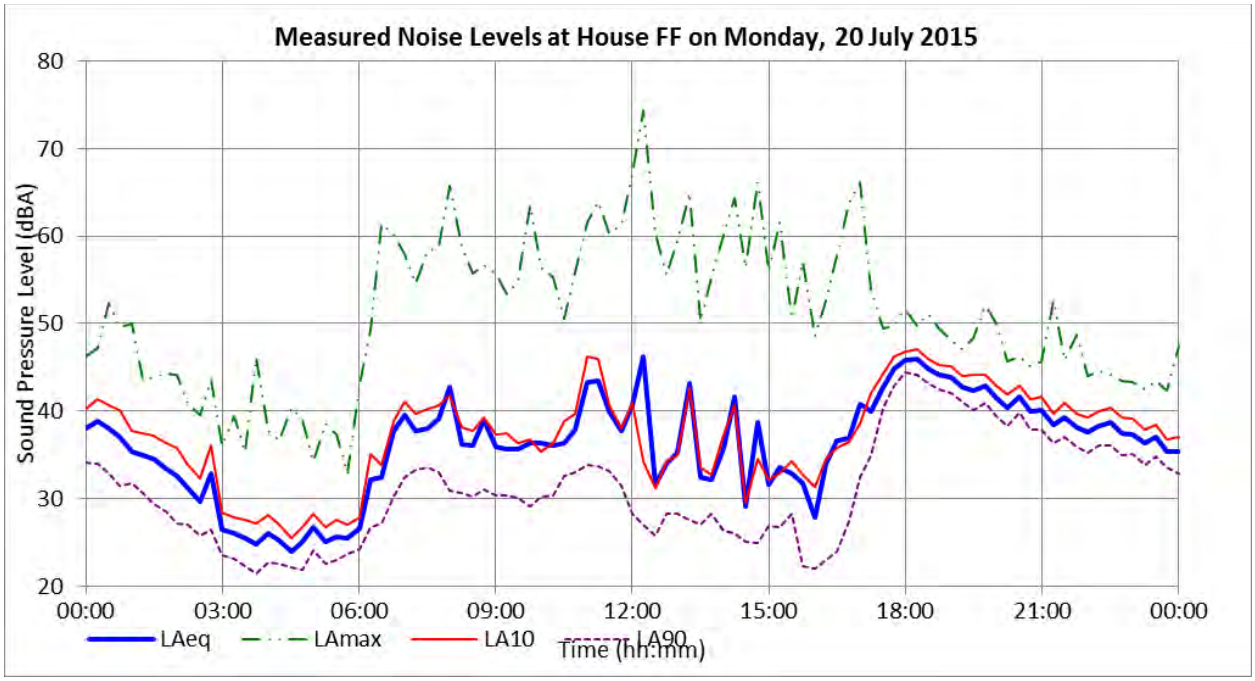

Measured Noise Levels at House FF on Wednesday, 15 July 2015
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

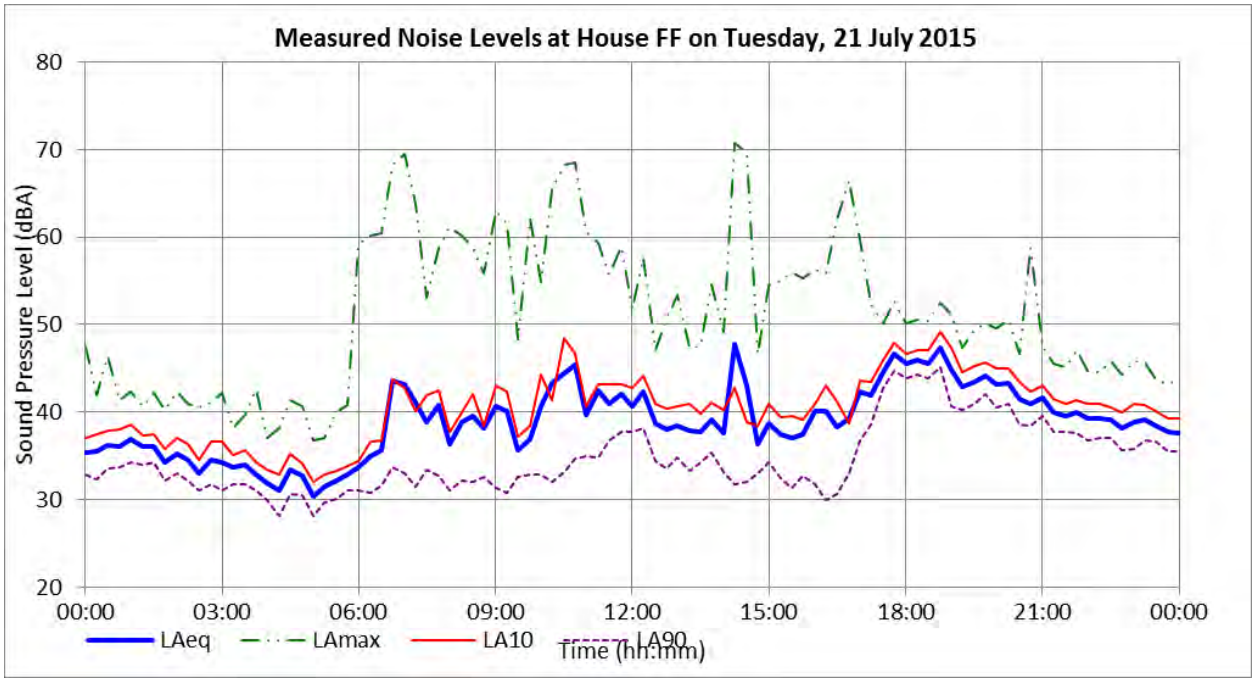

Measured Noise Levels at House FF on Thursday, 16 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)

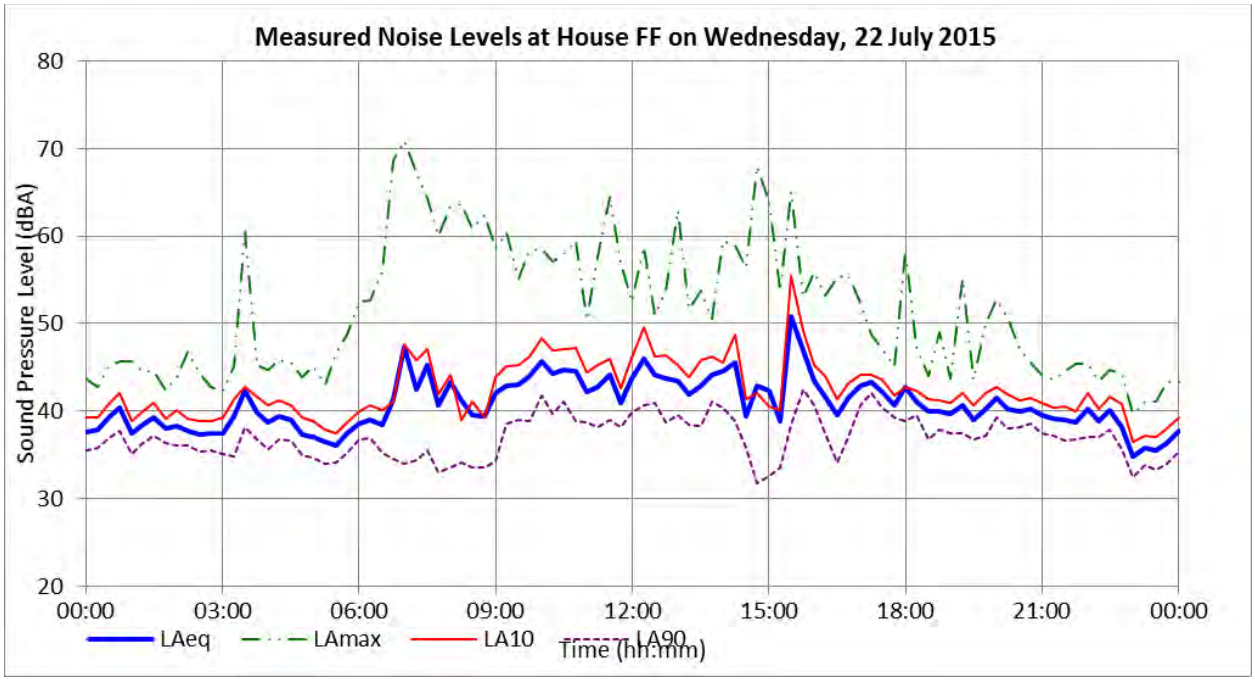

Measured Noise Levels at House FF on Friday, 17 July 2015
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)


Measured Noise Levels at House FF on Saturday, 18 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)


Measured Noise Levels at House FF on Sunday, 19 July 2015
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)


Measured Noise Levels at House FF on Monday, 20 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)


Measured Noise Levels at House FF on Tuesday, 21 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)


Measured Noise Levels at House FF on Wednesday, 22 July 2015
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
LAeq
LAmax
LA10
LA90
Time (hh:mm)