

LHU/CIR.P16-0421PL

14th February 2017

Mr D Innes
Planning Department
Arun District Council
Maltravers Road
Littlehampton
West Sussex
BN17 5LF

Dear Mr Innes,

**Application for Full Planning Permission for Demolition of vacant office building & erection of 7 No. dwellings with associated garaging & landscaping
Land at Former Pollards Nursery, Lake Lane, Barnham (LPA reference BN/19/16)**

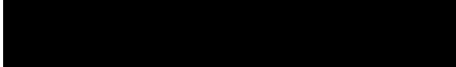
I write on behalf of my client Redrow Homes in respect of the above application. Following the discussions on the wider site and the comments of the Environmental Health Officer to this application, I am instructed to formally submit a revised Noise Report as part of this application.

Accordingly, please find enclosed the following document;

- Noise Assessment for Proposed Residential Development at Lake Lane, Barnham - Report No. JAE9392-REPT03-R0 dated 19 January 2017

I trust that this addresses the concerns previously raised by the Environmental Health Officer. However, but should you require any further information, please do not hesitate to contact me at the above address.

Yours sincerely,


Laura Humphries
Associate Planner

CC: David Lee, Redrow Homes

Encs:

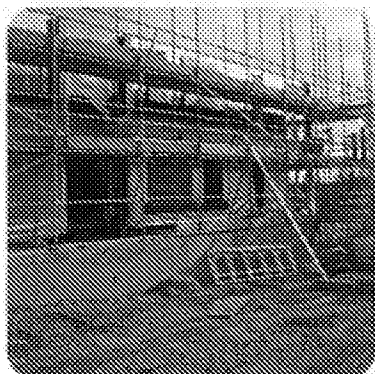
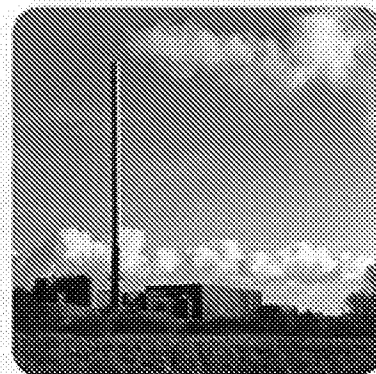
RPS

**Noise Assessment for Proposed Residential Development at Lake Lane,
Barnham, Bognor Regis, PO22 0AF**

For Redrow

Report No. JAE9392-REPT03-R0

19 January 2017



Quality Management

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1 Introduction

- 1.1 The Acoustics Team at RPS Planning and Environment (RPS) has been appointed by Redrow to undertake a noise assessment to accompany a planning application for an additional seven residential dwellings at the current approved residential development at Lake Lane, Barnham, Bognor Regis, PO22 0AF. The site is located within the administrative area of Arun District Council (ADC). The additional residential dwellings are located to the north east of the site, adjacent to Pollards Nursery.
- 1.2 The assessment has been undertaken based upon appropriate information on the proposed development provided by the project team. RPS is a member of the Association of Noise Consultants (ANC), the representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. The assessment has been undertaken with integrity, objectivity and honesty in accordance with the Code of Conduct of the Institute of Acoustics (IOA) and ethically, professionally and lawfully in accordance with the Code of Ethics of the ANC.
- 1.3 The technical content of this assessment has been provided by RPS personnel, all of whom are corporate (MIOA) or non-corporate, associate (AMIOA) or TechIOA members of the IOA (the UK's professional body for those working in acoustics, noise and vibration). This report has been peer reviewed within the RPS team to ensure that it is technically robust and meets the requirements of our Quality Management System.

2 Assessment Methodology, Policy, Standards and Guidance

Basis for the Assessment

- 2.1 The basis of the assessment is to establish existing baseline conditions at the site and to assess the required levels of attenuation to be provided by the glazing and ventilation systems such that suitable internal environments can be provided in residential habitable rooms, and to assess the suitability of the external amenity spaces (i.e. gardens) with respect to noise. The assessment has been carried out with reference to the guideline noise levels for residential habitable rooms and external living spaces contained within BS 6233:2014 'Guidance on sound insulation and noise reduction for buildings' [1]. On the basis that acceptable noise environments within the development will be achieved, the site will be in compliance with requirements of the Noise Policy Statement for England (NPSE) [2], National Planning Policy Framework (NPPF) [3], Planning Practice Guidance on Noise (PPG-N) [4] and local noise and vibration planning policy.
- 2.2 A summary of relevant national and local planning policy and their relationship to BSs is provided below.

National Planning Policy

- 2.3 Appendix A provides a complete summary of the relevant guidance contained within national planning policy in the NPSE, the NPPF and the PPG-N. These documents do not contain guidance in terms of numerical noise levels. Guidance is provided descriptively, which may be transposed to numerical noise levels for site-specific situations, using the methods contained within BSs. However, there is no specific guidance on this; the research that Defra promoted has apparently been inconclusive and is likely to vary by source.
- 2.4 Relevant experience and professional judgment are fundamental to all stages of the assessment that leads to the determination of the significance of a noise effect. The non-numeric guidance contained within the PPG-N, based upon the initial advice in the NPSE, is summarised in Table 2, below.

Table 2.1 Summary of Guidance from NPSE and PPG-N

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level (LOAEL)	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level (SOAEL)	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

- 2.5 The PPG-N states that there are many factors which should be considered when determining if a noise is of concern; one factor is the number of noise events and the frequency and pattern of occurrence of the noise.
- 2.6 The PPG-N provides further information on the adverse effects of noise and how it can be mitigated. For noise sensitive development, mitigation measures can include: avoiding noisy locations; designing the development to reduce the impact of noise from the local environment, including noise barriers; and optimising the sound insulation provided by the building envelope including through noise insulation.

Local Planning Policy

- 2.7 The current Development Plan for the administrative area of ADC includes Policy GEN32 of the ADC Local Plan (2003) [5]. Policy GEN32 relates to residential development and noise and states the following:

"Noise sensitive development will not be permitted if its users would be affected adversely by noise from existing or proposed noise-generating uses."

Development which is a potential source of significant noise pollution will not be permitted unless the Council is satisfied that appropriate measures have been included in the proposal to reduce noise pollution to acceptable levels. Details of such measures will be required as part of the planning application."

British Standard (BS) 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

- 2.8 BS 8233:2014 provides guideline values for internal ambient noise levels in spaces when they are unoccupied. A summary of the levels recommended in paragraph 7.7.1 of sub clause 7.7 and Table 4 of BS 8233:2014 for rooms used for resting, dining and sleeping is provided in Table 2.2 below. The guideline values in Table 2.2 are annual average values and do not have to be achieved in all circumstances.

- 2.9 The guidance in paragraph 7.7.1 of Section 7.7 of BS 8233:2014 applies to external noise as it affects the internal acoustic environment from sources without a specific character. The paragraph states, including the accompanying note:

"... Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. ..."

"NOTE Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."

Table 2.2 BS 8233:2014 Indoor Ambient Noise Levels for Dwellings

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,10h}$	-
Dining	Dining room / area	40 dB $L_{Aeq,10h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,10h}$	30 dB $L_{Aeq,10h}$

- 2.10 Note 4 of the following texts states the following:

Note 4 regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on

the character and number of events per night. Sporadic noise events could require separate values.'

- 2.11 Although a guideline internal noise limit for the night-time $L_{Amax,F}$ is not provided in BS 8233:2014, a limit of 45 dB is commonly adopted for events occurring several times a night. This is based on the guidance in the World Health Organisation Guidelines for Community Noise [6].
- 2.12 In relation to external noise levels, the second paragraph of 7.7.3.2 states that:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."

Consultation

- 2.13 Prior to undertaking the assessment (29 November 2016), RPS consulted with Fiona Fitzgerald, an EHO from ADC, regarding the assessment. It was agreed that baseline sound monitoring would be carried out on the site, in order to determine the contribution of noise from trains on the railway line, road traffic on the local network and industrial noise sources within the vicinity of the site. It was agreed that the mitigation scheme would be designed to achieve the criteria for internal noise levels in habitable rooms and amenity areas from BS 8233:2014..
- 2.14 It was noted that there was the potential for construction works that are currently taking place on site to influence measured noise levels and, therefore, that the levels in some periods would not reflect the levels of noise expected to occur on site when the development has been completed. Therefore, some discretion would be required for the interpretation of the data to determine the noise mitigation requirements.

3 Baseline Conditions

Site Description

- 3.1 The development site is bordered by Lake Lane and residential land to the north, residential land of the approved scheme to the west and the Pollards Nursery site to the south and east. The West Coastway railway line is approximately 200 m to the south of the site, the site is located approximately 870 m east of Barnham railway station. There are between approximately 180 and 230 train pass-bys each 24 hour period, with the majority of pass-bys occurring between 06:00 and 00:00.
- 3.2 The main noise sources to be considered are road traffic movements on Yapton Road (B2233, approximately 270 m south of the site), Lake Lane (immediately north of the northern boundary of the site), train movements on the railway line to the south of the site, and static plant and HGV noise from the adjacent nursery to contribute to the sound environment within the development.
- 3.3 RPS contacted Pollards Nursery prior to carrying out site work and identified that there were two boilers on site which may contribute to noise in the area. The peak number of HGV deliveries per day is six; however, at the time of surveys there were no deliveries expected. Therefore, noise from deliveries by HGV has been accounted for through prediction.
- 3.4 In addition to the above sources of noise, there were construction works being carried out on the adjacent consented residential site at the time of the surveys which had a potential influence on the noise levels experienced, and does not reflect future levels expected to occur on site. Therefore, site observations and data interpretation have been used to consider the degree of influence of noise from construction works at the survey location. Data have been removed from the analysis, where appropriate, as agreed during the consultation with ADC.

Baseline Surveys

- 3.5 A long term baseline sound level survey was deployed on site and ran from 11:30 hours on Thursday 8 December 2016 until 12:00 hours on Thursday 15 December 2016. The survey was carried out to determine the existing levels of environmental sound affecting the development. In addition to the long term survey, a series of short-term attended surveys were carried out on 15 December 2016 between 10:30 and 12:30 in order to quantify and characterise the sound emitted from the boilers located on the Pollards Nursery site. A plan showing the approximate location of the measurement positions is provided in Figure 1.
- 3.6 The long term survey (LT1) was located on the Pollards Nursery site on the north-eastern corner of the small reservoir, approximately 25 m east of the site boundary and 115 m south of Lake Lane. The microphone was mounted on a pole approximately 1.2 m above the ground level and placed in a free field location. It was noted that the ground level adjacent to the reservoir was approximately 1.5 m above that of the surrounding area. During the time spent on site at LT1,

construction works on the adjacent consented residential site were the main source of sound; however, car movements on the nursery site, air traffic, passing trains and wind rustling in trees were also audible.

- 3.7 The first set of short-term attended measurements (ST1) were taken next to the boiler located on the east side of the large greenhouse which borders the southern boundary of the site and is approximately 65 m north of the railway line. The boiler is housed within a greenhouse and measurements were taken at three locations around the greenhouse each 5 m from the greenhouse wall. The microphone was mounted on a tripod 1.5 m above ground level and in a free field location.
- 3.8 The second set of short-term attended measurements (ST2) were taken next to the boiler located approximately 115 m east of the site boundary, due east of the reservoir at which LT3 was located. The boiler is housed within a greenhouse and measurements were taken at four locations around the greenhouse each 2 m from the greenhouse wall. The microphone was mounted on a tripod 1.5 m above ground level and in a free field location.
- 3.9 All sound level measurements were made using a 'Class 1' Rion NL-52 sound level meter (SLM) in accordance with BS 7445-2:1991 [7]. The SLM was calibrated before and checked after use with a Rion NC-74 calibrator with no significant drift occurring.
- 3.10 Meteorological conditions were monitored and logged with a data logging meteorological station installed at a location approximately 5 m from the edge of the railway line on the southern perimeter of the approved site. Measured wind speeds were varied throughout the survey period, ranging between 0.0 and 5.2 m/s for the entire period however for the majority of time the wind speed was below 3 m/s and, on inspection of the data, high wind speeds do not appear to have affected the measured noise levels. The wind was predominantly in an easterly direction and survey period was dry. On this basis, no data have been excluded from the analysis due to meteorological conditions.
- 3.11 During the survey, construction works were taking place on the development site. Measured noise levels on site were elevated during construction hours and it is therefore considered that the daytime noise levels ($L_{Aeq,10h}$) measured at LT1, where construction noise was dominant, are not representative of the baseline noise environment which will be experienced at the proposed residential dwellings. Therefore, the representative daytime levels at LT1 have been taken from the highest level of the full daytime $L_{Aeq,10h}$ on Sunday 11th December and the average weekday level between 16:30 and 19:00 (when construction works had ended but before noise levels began to become lower in the evening).
- 3.12 A summary of the long term measured data which is considered to be representative of the on-site baseline noise environment is provided in Table 3.1 below; further details are provided in Appendix B.

Table 3.1 Summary of Long Term Baseline Sound Level Data

Period	Baseline Noise Levels, dB	
	$L_{Aeq, T}$	$L_{Amax, T}$
Daytime (0700 – 2300)	44	-
Night-time (2300 – 0700)	36	37-67 ¹

1) These values indicate the range of night-time maximum noise levels per 15-minute measurement at each survey location during the duration of the survey.

Short Term Measurements of Sound from Boilers

3.13 Table 3.2 below contains a summary of the short-term measurements taken at the boilers.

Table 3.2 Summary of Long Term Baseline Sound Level Data

Position	ST1		ST2	
	Distance from Boiler, m	Noise Level, dB $L_{Aeq, 30s}$	Distance from Boiler, m	Noise Level, dB $L_{Aeq, 30s}$
1	5	41	2	54
2	5	44	2	49
3	5	41	2	50
4	-	-	2	49

3.14 With reference to Table 3.2, the measured levels from the boilers are, at most, 44 dB $L_{Aeq, 30s}$ at 5 m from the boilers on the east side of the large greenhouse, at approximately 125 m from the nearest dwelling in the development (ST1) and 54 dB $L_{Aeq, 30s}$ at the boiler located approximately 175 m east of the site boundary (ST2). Ignoring screening effects, attenuation of the boiler sound over the distance to the closest proposed dwelling will result in noise levels from the boilers significantly lower than the existing ambient noise levels at the location of the proposed dwellings. Therefore, it is considered that sound from boilers on the nursery site will not contribute significantly to sound levels on site and it is likely that they will be inaudible.

HGV Movements on Nursery Site

3.15 During the surveying period, Pollards Nursery was in a period of low activity and therefore there were not the usual HGV movements on the site. In order to account for this, a calculation has been made to predict the $L_{Aeq, 16h}$ level due to HGV movements at the nearest proposed dwelling using the haul road method in Section F.2.5.2 of BS 5228-1:2009+A1:2014 [8]. The assessment assumes a sound power level of 110 dB L_{WA} and a vehicle speed of 10 km/h. The calculation has been based on 6 HGVs (12 one-way movements) over a 16-hour period. The resulting sound level is 56 dB $L_{Aeq, 16h}$ which, when added to the existing measured ambient sound level, results in a total ambient sound level of 56 dB $L_{Aeq, 16h}$ for the proposed dwelling closest to the road on the eastern boundary of the site.

4 Assessment

Internal Sound Levels

- 4.1 With reference to paragraph G.1 of BS 8233:2014, an estimate of the internal sound levels within typical dwellings may be determined on the basis of the sound reduction provided by the windows as they are generally the weakest part of any façade in terms of noise attenuation. Research contained within Report NANR 116 [9] finds that a window partially open to provide background ventilation provides approximately 15 dB $D_{A,road}$ of attenuation to road traffic noise.
- 4.2 On this basis, and with reference to the design targets contained within BS 8233:2014 that are reproduced in Table 2.1 of this report, satisfactory internal acoustic environments are likely to be achievable with no acoustic treatments in areas of the site where the external environmental noise level is no greater than 50 dB $L_{Aeq,15h}$ and 45 dB $L_{Aeq,9h}$ during the daytime and night-time periods, respectively. Where external sound levels exceed these criteria, habitable rooms (living rooms and bedrooms) are likely to require suitable ventilation systems as an alternative to opening the windows. For this site, the three most eastern dwellings, with façades of which comprise of habitable rooms that have line-of-sight to the entrance road of the nursery would be exposed to noise levels above these criteria.
- 4.3 The specific acoustic performance requirements of the glazing and ventilation system are dependent on the exact layout and orientation of the buildings, room size, wall and roof design etc. However, an estimation of the sound level difference across a 'standard' façade design¹ for a typical dwelling room type and size is around 25 dB $D_{200,0}$. For dwellings built with this façade type, satisfactory internal acoustic environments are likely to be achieved with standard double glazing and trickle ventilators where the external sound level is no greater than 60 dB $L_{Aeq,15h}$ and 55 dB $L_{Aeq,9h}$ during the daytime and night-time periods, respectively. All areas of the site are exposed to noise levels that are within these criteria.
- 4.4 Table 4.1 below provides a summary of external sound levels and the façade type required to achieve suitable internal sound levels for typical habitable room types and sizes. Figure 2 provides a presentation of areas of the proposed site requiring either an enhanced or standard façade design.

Table 4.1 Façade Reduction with Various Façade Elements

External Sound Level (Day / Night)	Façade Type	Façade Sound Reduction, dB
50 – 60 dB $L_{Aeq,15h}$ or 45 – 55 dB $L_{Aeq,9h}$	Standard ¹	25
<50 dB $L_{Aeq,15h}$ and < 45 dB $L_{Aeq,9h}$	Partially Open Windows	15

NOTES:
¹ Based on brick and block external wall; '6-(12)-6 double glazing'; and 0.08 m² standard trickle ventilator 27 dB $D_{100,w}$.

¹ 'Brick and block' external wall; '6-(12)-6 double glazing'; and 0.08 m² trickle ventilator.

- 4.5 With referenced to Table 3.1, for dwellings built in the centre and western side of the site, away from the main entrance road, external sound levels will not exceed 50 dB $L_{Aeq,16h}$ during the daytime and 45 dB $L_{Aeq,8h}$ during the night-time and, therefore, for facades of habitable rooms in these areas, openable windows will provide sufficient attenuation to ensure suitable sound levels and no alternative form of ventilation will be required. For dwellings on the eastern boundary of the site, facades of habitable rooms facing north, east and south should be provided with an alternative method of ventilation, such as standard trickle ventilators, as indicated as a "Standard" façade type in Table 4.1.
- 4.6 On the basis of the above, through appropriate design, internal sound levels will meet the guideline values contained within BS 8233:2014.

External Sound Levels

- 4.7 With reference to paragraph 3.15, external amenity areas of the dwellings in the south east corner of the site may experience levels in exceedance of the desirable guideline value for external amenity areas of 50 dB $L_{Aeq,16h}$ as well as the upper guideline value of 55 dB $L_{Aeq,16h}$ with no screening. It is recommended that a 2 m high solid, closed board fence is erected along the eastern perimeter boundary of the gardens and the garden of the most north east dwelling with 10-12 kg/m² of superficial mass. This will provide sufficient screening to the gardens to bring levels below the desirable level of 50 dB $L_{Aeq,16h}$. Figure 3 illustrates the area requiring the mitigation.
- 4.8 For gardens associated with all other dwellings on the site, sound levels will be below the upper guideline value (55 dB $L_{Aeq,16h}$) and it is likely that sound levels will be below the desirable level of 50 dB $L_{Aeq,16h}$.
- 4.9 On this basis, and with reference to paragraph 2.15, it is considered that sound levels within the proposed gardens would not exceed the BS 8233:2014 upper guideline value of 55 dB $L_{Aeq,16h}$ and, for the majority of areas, sound levels would be below the desirable level of 50 dB $L_{Aeq,16h}$.

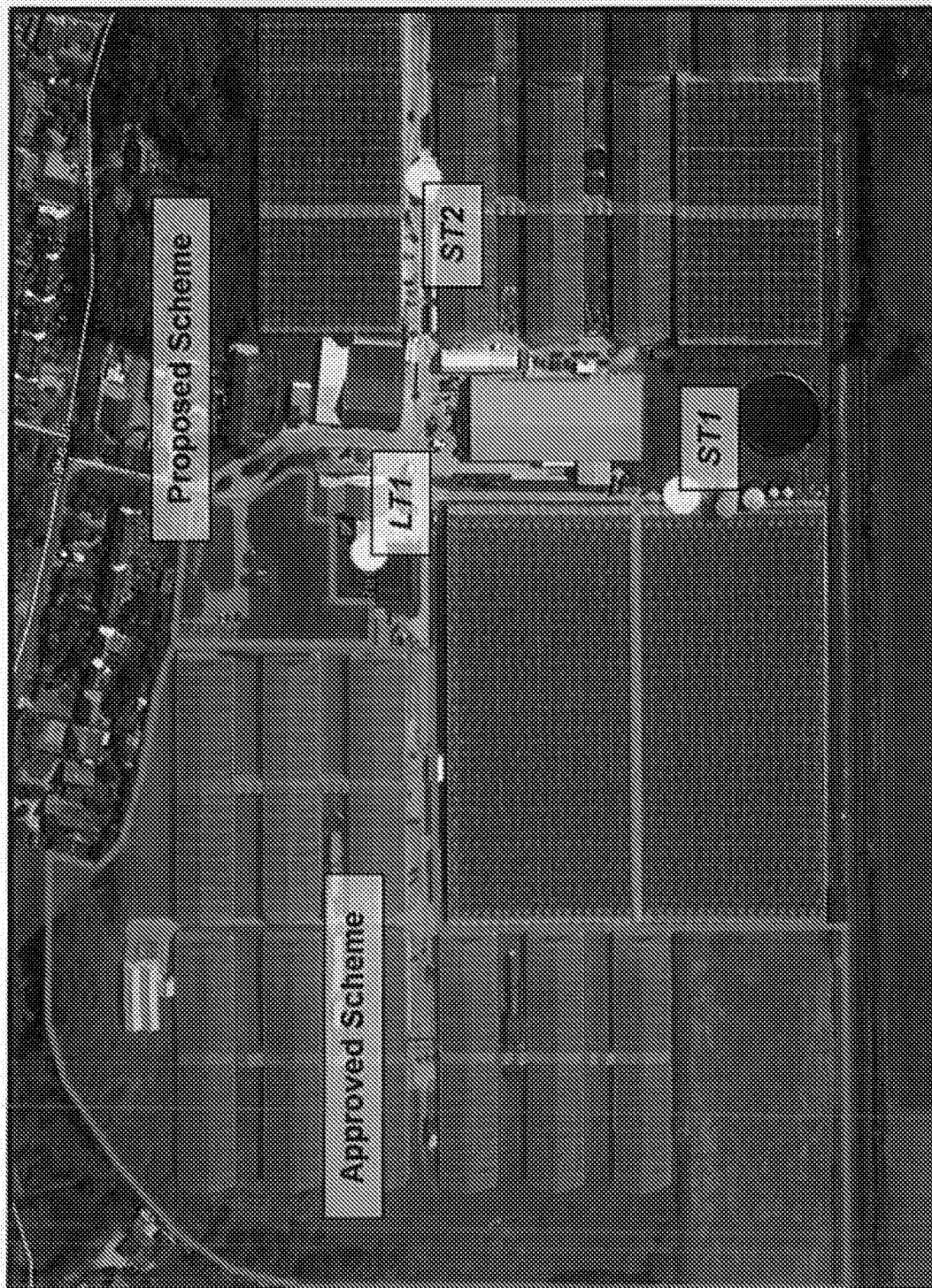
Night-time Maximum Noise Levels

- 4.10 On the basis that facades of habitable rooms closest to, and facing the eastern boundary of the site, will be designed such that they meet the criteria detailed in Table 2.1, internal levels will not exceed 45 dB L_{AFmax} unless the external sound level exceeds 60 dB L_{AFmax} .
- 4.11 Analysis of the 15-minute survey data shows that, during the night-time period, the maximum sound level during a 15-minute period at the eastern boundary of the site exceeded 60 dB L_{AFmax} on average once per night, although it is not known if this was due to local activity such as animals near the measurement system. Therefore, it is considered that the internal maximum levels during the night-time do not normally exceed 45 dB L_{AFmax} and such instances are limited.

5 Summary and Conclusions

- 5.1 The Acoustics Team of RPS Planning and Development (RPS) has been appointed by Redrow to undertake a noise assessment to accompany a planning application for an additional seven residential dwellings at the current approved residential development at Lake Lane, Barnham, Bognor Regis.
- 5.2 Environmental sound levels were determined from one long term survey. The main sound sources affecting the site are from passing trains on the West Coastway Line, road traffic on Lake Lane and Yapton Road, and predicted HGV movements on the Pollards Nursery site. Further measurements were taken in order to quantify sound from the boilers on Pollards Nursery site.
- 5.3 Sound from the boilers will result in levels significantly lower than the existing measured ambient noise levels at the nearest proposed dwellings and it is considered unlikely that this sound will be audible at the dwellings.
- 5.4 Through appropriate design, the proposed residential development would be subject to satisfactory internal and external acoustic environments with respect to BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'.
- 5.5 On the basis of the above, with the inclusion of the standard mitigation detailed herein, suitable internal and external acoustic environments will be achieved, and hence planning permission should be acceptable in relation to noise.

Figures



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Notes

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Client: Redrow

Project: Residential Development on Land off Lake Lane, Barnham

Job Ref: JAE3192

File location:

Date: 13/01/2017 Rev: 0

Drawn: JW Checked: SH

Figure 1: Baseline Survey Monitoring Locations

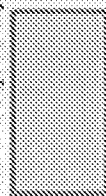
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Key

Standard Façade Type



No Treatment



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Client: Redrow

Project: Residential Development on Land off Lake Lane, Barnham

Job Ref: JAE5192

File location:

Date: 12/01/2017 Rev: 0

Drawn: JW Checked: SH

Figure 2: Façade Treatment Plan for proposed scheme

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Noise Assessment for Proposed Residential Development at Lake Lane, Barnham, Bognor Regis, PO22 0AF

Appendices

Appendix A: National Planning Policy & Guidance

1 National Planning Policy

National Planning Policy Framework

A.1 The National Planning Policy Framework (NPPF) [1], published in March 2012, sets out the Government's planning policies for England. The document does not contain any specific noise policy, or noise limits but it provides a framework for local people and local authorities to produce their own local and neighbourhood plans, which reflect the needs and priorities of their communities.

A.2 In Section 11, 'Conserving and enhancing the natural environment', paragraph 123 relates to noise and states:

'123. Planning policies and decisions should aim to:

- * avoid noise from giving rise to significant adverse impacts²⁷ on health and quality of life as a result of new development;*
- * mitigate and reduce to a minimum other adverse impacts²⁷ on health and quality of life arising from noise from new development, including through the use of conditions;*
- * recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established;²⁸ and*
- * identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'*

27 See Explanatory Note to the Noise Policy Statement for England (Department for the Environment, Food and Rural Affairs).

28 Subject to the provisions of the Environmental Protection Act 1990 and other relevant law.'

A.3 The first bullet point refers to 'significant adverse impacts' which relates to the 'significant observed adverse effect level' (SOAEL) in the Noise Policy Statement for England (NPSE) [2], though the term 'effect' is used instead of the term 'impact' although these have been deemed to be interchangeable in this context. Therefore, given the comments above on the NPSE with regard to assessment methods and criteria, the current content of the NPPF does not require any change in previously adopted approaches.

Noise Policy Statement for England

A.4 The NPSE, published in March 2010 by Defra, aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.

A.5 Paragraph 1.6 of the NPSE sets out the long-term vision and aims of Government noise policy.

'Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

'Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- * avoid significant adverse impacts on health and quality of life;*
- * mitigate and minimise adverse impacts on health and quality of life; and*
- * where possible, contribute to the improvement of health and quality of life."*

A.6 The aims require that all reasonable steps should be taken to avoid, mitigate and minimise adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development, which include social, economic, environmental and health considerations.

A.7 With regard to the terms 'significant adverse' and 'adverse' included in the 'Noise Policy Aims', these are explained further in the 'Explanatory Note' as relating to established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation which are:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on human health and quality of life due to noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.'

A.8 Defra has then extended these concepts for the purpose of the NPSE to introduce the concept of:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.'

A.9 The accompanying explanation states:

'It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available'.

Planning Practice Guidance - Noise (PPGN)

A.10 The Government has published Planning Practice Guidance on a range of subjects including noise [3]. The guidance forms part of the NPPF and provides advice on how to deliver its policies. The PPGN reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards (BSs) and contains examples of acoustic environments commensurate with various effect levels. Paragraph 006 of the PPGN explains that:

'The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.'

A.11 According to the PPGN, factors that can influence whether noise could be of concern include:

- the source and absolute level of the noise together with the time of day it occurs;
- for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content and the general character of the noise;
- the local topology and topography along with the existing and, where appropriate, the planned character of the area;
- where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time;
- in cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur;
- where relevant, Noise Action Plans, and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations;
- the effect of noise on wildlife;
- if external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces; and
- the potential effect of a new residential development being located close to an existing business that gives rise to noise should be carefully considered. This is because existing noise levels from the business even if intermittent (for example, a live music venue) may be regarded as unacceptable by the new residents and subject to enforcement action. To help

avoid such instances, appropriate mitigation should be considered, including optimising the sound insulation provided by the new development's building envelope. In the case of an established business, the policy set out in the third bullet of paragraph 123 of the NPPF should be followed.

- A.12 The PPGN provides a relationship between various perceptions of noise, effect level and required action in accordance with the NPPF. This is reproduced in Table 1, below.

Table 1: Noise Exposure Hierarchy Based On the Likely Average Response

Perception	Increasing Effect Level	Action
Not noticeable	No Observed Effect	No specific measures required
Noticeable and not intrusive	No Observed Adverse Effect	No specific measures required
LOAEL		
Noticeable and intrusive	Observed Adverse Effect	Mitigate and reduce to a minimum
SOAEL		
Noticeable and disruptive	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Unacceptable Adverse Effect	Prevent

- A.13 The PPGN describes sound that is not noticeable to be at levels below the NOEL. It describes exposures that are noticeable but not to the extent there is a perceived change in quality of life as below the LOAEL and need no mitigation. With reference to the definition of noise in the NPSE, such immissions are 'sound' and not 'noise'. On this basis, the audibility of sound from a development is not, in itself, a criterion to judge noise effects that is commensurate with national planning policy.
- A.14 The PPGN suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPGN is having to turn up the volume on the television; needing to speak more loudly to be heard; where there is no alternative ventilation, closing windows for some of the time because of the noise; or, a potential for some reported sleep disturbance. In line with the NPPF and NPSE, the PPGN states that consideration needs to be given to mitigating and minimising effects above the LOAEL but taking account of the economic and social benefits being derived from the activity causing the noise.
- A.15 The PPGN suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL provided in the PPGN are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present; and/or there is a potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. In line with the NPPF and NPSE, the PPGN states that effects above the SOAEL should be avoided and that whilst the economic and social benefits being derived from the activity causing the noise must be taken into account, such exposures are undesirable.

2 Local Planning Policy

The Arun District Local Plan 2003

- A.16 The Arun District Local Plan [4], published on 17 April 2003 outlines a development and pollution policy with regard to noise.
- A.17 Policy GEN32 Noise Pollution states:

"POLICY GEN32 Noise Pollution

Noise sensitive development will not be permitted if its users would be affected adversely by noise from existing or proposed noise-generating uses.

Development which is a potential source of significant noise pollution will not be permitted unless the Council is satisfied that appropriate measures have been included in the proposal to reduce noise pollution to acceptable levels. Details of such measures will be required as part of the planning application.

Reason

To protect the quality of the environment and the amenity of new development.

Explanation

1.81 PPG24, Planning and Noise, gives advice on how the planning system can be used to reduce the impact of noise on people. A combination of noise reduction measures, including engineering, layout and administrative measures, may be utilised to protect sensitive areas from noise pollution. Noise levels will be measured against national standards established in policy guidance."

3 Appendix A: References

- 1 Department for Communities and Local Government. National Planning Policy Framework: HMSO. March 2012.
- 2 Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. Defra. 2010.
- 3 Department for Communities and Local Government. National Planning Practice Guidance
- 4 Arun District Council. The Arun District Local Plan 2003.

Appendix B: Baseline Survey Details

Sound Level Survey Record

Location			LT1, near north-eastern boundary of site										
Purpose of Monitoring			Baseline										
Relevant Guidance / Standard			BS 7445-1:2003 / BS 7445-2:1991 / BS 4142:2014 / BS 8233:2014										
Sound Measurement System													
RPS ID	Manufacturer / Model		Serial Number	Last Lab Verification	Filename	Memory Card ID							
124	Rion NL-52		164421	03/03/2016	Auto_0001								
Microphone Height	Measurement Interval	Dynamic Range	Time Weighting	Frequency Weighting	Façade / Freefield	Photo?							
~ 1.2m	100 ms	25 - 138	Fast	A	Freefield	x							
START				END									
Personnel				JW									
Date / time				09/12/2016 11:30									
Date / time				15/12/2016 12:00									
Calibrator	RPS ID		15		15								
	Manufacturer / Model		RION NC-74		RION NC-74								
	Serial Number		110090		110090								
	Date last verification		09/11/2016		09/11/2016								
	Reference level		94		94								
	Meter reading		94		94.5								
	Wind speed (m/s) & dir'n Av.		0.3	S	2.4	SW							
	Cloud cover (100% = 8 oktas)		8		8								
	Temperature (degrees Celsius)		~ 12		~ 10								
	Relative Humidity (%)		~		~								
Likely temp. inversion / Precipitation / Fog / Wet ground / Frozen ground / Snow cover? (tick boxes)		Ti	P	F	W	Fr	Sn	Ti	P	F	W	Fr	Sn
Subjective description / additional details													
Photographs of Measurement Location													
													
Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))													
On NE corner of reservoir on Pollards Nursery site approximately 25 m east of site, reservoir approximately 1.5 m higher than surrounding ground													
Description of sound environment at start of survey (principal environmental and natural sound sources, which sources are dominant; character of the sound environment cf. to the character of the new source)													
Construction noise dominant, traffic on nursery site, distant aircraft noise, trains passing to S, trees rustling													
Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant; character of the sound environment cf. to the character of the new source)													
Construction noise dominant, traffic on nursery site, distant aircraft noise, trains passing to S, trees rustling													

LT1

Daytime (0700 - 2300)

Start Date/ Time	Duration	LAeq,16h	LA10,16h	LA90,16h
09/12/2016 07:00	16:00	55	56	37
10/12/2016 07:00	16:00	50	53	39
11/12/2016 07:00	16:00	44	45	37
12/12/2016 07:00	16:00	53	56	36
13/12/2016 07:00	16:00	50	53	37
14/12/2016 07:00	16:00	51	52	35
Average LAeq,16h, all periods:	16:00	50	52	37

Daytime (1630 - 1900) - Outside Construction Hours

Start Date/ Time	Duration	LAeq,16h
08/12/2016 16:30	02:30	40
09/12/2016 16:30	02:30	45
10/12/2016 16:30	02:30	48
11/12/2016 16:30	02:30	45
12/12/2016 16:30	02:30	47
13/12/2016 16:30	02:30	43
14/12/2016 16:30	02:30	42
Average LAeq,16h, all periods:	02:30	44

Night-time (2300 - 0700)

Start Date/ Time	Duration	LAeq,8h	LA10,8h	LA90,8h
08/12/2016 23:00	08:00	37	41	28
09/12/2016 23:00	08:00	37	40	32
10/12/2016 23:00	08:00	35	38	29
11/12/2016 23:00	08:00	35	38	28
12/12/2016 23:00	08:00	33	37	27
13/12/2016 23:00	08:00	35	38	29
14/12/2016 23:00	08:00	36	42	27
Average LAeq,8h, all periods:	08:00	36	39	28

Boiler A - 119 m from boundary of residential development

The duration of each measurement was 30 seconds.

Each measurement was taken at 5m from the outside of the greenhouse.

Boiler was operating as normal with greenhouse doors closed. However there were a number of louvres and holes in the greenhouse.

Table 1: Measurements taken outside the green house enclosing the boiler (A).

Position	$L_{Aeq, 30s}$	$L_{A90, 30s}$	$L_{Amax, 30s}$	$L_{Aeq, 30s}$ Arithmetic Average
1	40	39	45	41
	41	39	52	
2	44	42	53	44
	44	43	47	
3	41	39	49	41
	42	41	46	

Note: This measurement was directly opposite a louvre.

Table 2: Background measurements.

Position	$L_{Aeq, 30s}$	$L_{A90, 30s}$	$L_{Amax, 30s}$
1	41	39	51
2	43	42	47
3	44	42	47

Boiler B - 175 m from boundary of residential development

The duration of each measurement was 30 seconds.

Each measurement was taken at 2m from the outside of the greenhouse.

Boiler was operating as normal with greenhouse doors closed. However there were a number of louvres and holes in the greenhouse.

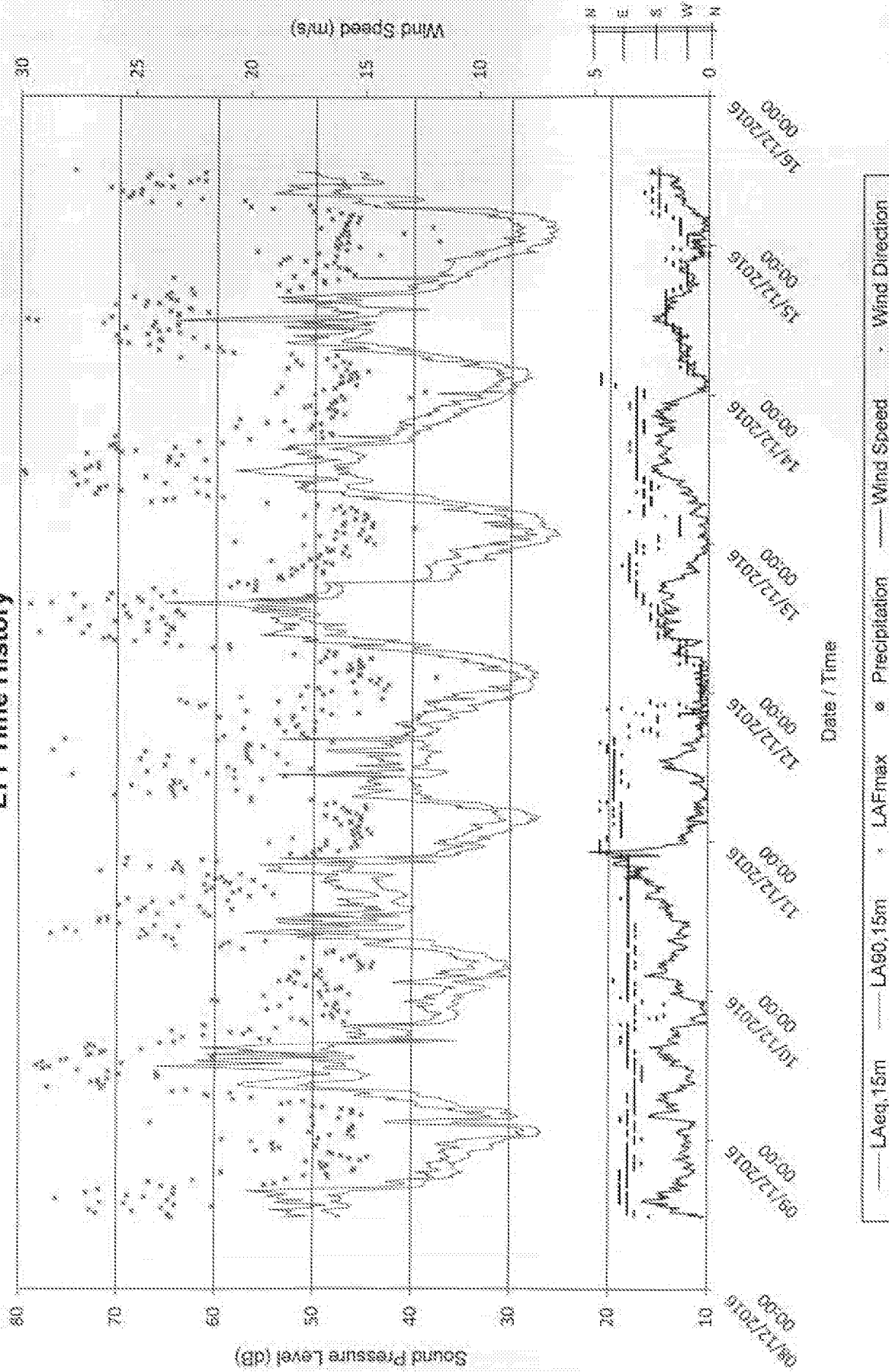
Table 3: Measurements taken outside the green house enclosing the boiler (B).

Position	$L_{Aeq, 30s}$	$L_{A90, 30s}$	$L_{Amax, 30s}$	$L_{Aeq, 30s}$ Arithmetic Average
1	54	53	62	54
	54	53	58	
	53	53	55	
2	51	48	63	49
	48	48	50	
	49	48	53	
3	49	48	56	50
	49	48	56	
	53	48	67	
4	49	48	54	49
	49	48	57	
	50	47	57	

Table 4: Background measurements.

Position	$L_{Aeq, 30s}$	$L_{A90, 30s}$	$L_{Amax, 30s}$
1	47	45	51
2	46	45	49
3	47	45	56
4	46	45	54

LT1 Time History



Appendix A - Baseline Survey Details

RPS

Baseline Survey Results - 15 min

Start	LT1			
	L _{Aeq}	L _{Afmax}	L _{A10}	L _{A90}
08/12/2016 11:30	53.2	64.4	55.8	47.6
08/12/2016 11:45	50.5	64.7	52.6	47.2
08/12/2016 12:00	52.7	64.8	55.4	47.9
08/12/2016 12:15	52.6	72.1	55.1	48.3
08/12/2016 12:30	51.9	68.4	54.1	49.0
08/12/2016 12:45	54.4	72.7	56.2	48.8
08/12/2016 13:00	50.1	65.4	52.7	46.5
08/12/2016 13:15	50.1	60.3	52.9	46.3
08/12/2016 13:30	48.5	64.1	50.6	46.1
08/12/2016 13:45	52.3	69.2	54.6	47.0
08/12/2016 14:00	53.9	71.7	55.1	48.1
08/12/2016 14:15	50.9	64.8	52.9	47.1
08/12/2016 14:30	53.1	76.2	54.3	47.3
08/12/2016 14:45	53.6	67.2	56.0	47.0
08/12/2016 15:00	54.7	68.9	56.8	48.4
08/12/2016 15:15	52.6	64.2	55.4	47.1
08/12/2016 15:30	53.8	73.1	55.3	46.4
08/12/2016 15:45	56.8	80.6	57.5	46.3
08/12/2016 16:00	52.6	71.8	55.6	43.4
08/12/2016 16:15	45.6	64.1	47.9	40.0
08/12/2016 16:30	42.6	65.4	43.5	38.8
08/12/2016 16:45	40.8	54.9	42.3	38.8
08/12/2016 17:00	40.6	53.9	42.0	38.5
08/12/2016 17:15	42.7	66.7	44.6	38.7
08/12/2016 17:30	41.5	62.2	43.1	38.3
08/12/2016 17:45	38.7	52.7	40.1	36.9
08/12/2016 18:00	37.6	48.5	39.5	35.7
08/12/2016 18:15	38.6	50.9	40.3	36.0
08/12/2016 18:30	39.1	48.6	40.0	35.5
08/12/2016 18:45	39.6	59.3	40.5	34.7
08/12/2016 19:00	37.3	46.0	39.1	35.3
08/12/2016 19:15	37.0	45.8	38.3	35.5
08/12/2016 19:30	38.3	49.1	40.2	35.8
08/12/2016 19:45	38.0	48.6	40.1	35.7
08/12/2016 20:00	38.1	48.7	40.2	35.5
08/12/2016 20:15	38.4	49.2	40.4	36.2
08/12/2016 20:30	37.3	50.7	39.1	35.2
08/12/2016 20:45	36.3	45.2	37.5	34.8
08/12/2016 21:00	37.1	46.3	39.3	34.5
08/12/2016 21:15	36.0	44.5	37.6	33.9
08/12/2016 21:30	36.3	47.2	37.8	34.0
08/12/2016 21:45	36.5	48.0	37.8	34.1
08/12/2016 22:00	37.2	48.4	40.0	34.2
08/12/2016 22:15	36.5	55.8	37.5	33.7
08/12/2016 22:30	36.9	54.0	40.0	31.7
08/12/2016 22:45	34.9	53.4	37.2	31.8

Baseline Survey Results - 15 min

Start	LT1			
	L _{Aeq}	L _A F _{max}	L _{A10}	L _{A90}
08/12/2016 23:00	35.8	49.7	38.6	31.6
08/12/2016 23:15	37.5	54.2	40.4	32.0
08/12/2016 23:30	37.0	54.1	40.1	31.3
08/12/2016 23:45	35.3	56.3	37.3	30.6
09/12/2016 00:00	35.4	59.3	38.1	30.6
09/12/2016 00:15	33.4	49.5	35.1	29.8
09/12/2016 00:30	31.1	46.0	32.7	28.4
09/12/2016 00:45	28.6	48.3	29.2	27.0
09/12/2016 01:00	29.2	46.4	30.5	27.3
09/12/2016 01:15	29.4	50.4	30.0	26.8
09/12/2016 01:30	28.5	46.3	29.1	26.9
09/12/2016 01:45	28.8	46.3	29.7	27.1
09/12/2016 02:00	29.3	46.0	30.5	27.2
09/12/2016 02:15	33.5	46.0	36.6	28.2
09/12/2016 02:30	38.3	50.0	41.7	30.9
09/12/2016 02:45	42.8	66.6	45.7	35.9
09/12/2016 03:00	42.5	53.2	45.9	35.3
09/12/2016 03:15	38.1	53.2	41.2	32.4
09/12/2016 03:30	33.2	47.4	35.2	29.7
09/12/2016 03:45	31.8	50.1	33.8	29.1
09/12/2016 04:00	33.1	45.1	35.8	29.4
09/12/2016 04:15	34.5	46.1	36.7	30.9
09/12/2016 04:30	32.5	46.0	34.4	29.9
09/12/2016 04:45	36.3	46.1	39.7	30.1
09/12/2016 05:00	35.6	47.1	38.6	30.8
09/12/2016 05:15	38.7	49.1	41.8	34.3
09/12/2016 05:30	39.7	50.0	42.3	35.4
09/12/2016 05:45	39.4	53.2	41.6	35.3
09/12/2016 06:00	39.5	52.4	42.2	35.5
09/12/2016 06:15	39.9	51.0	42.1	36.4
09/12/2016 06:30	42.6	58.1	45.1	36.7
09/12/2016 06:45	41.5	56.3	44.2	37.1
09/12/2016 07:00	45.0	60.7	47.5	39.2
09/12/2016 07:15	45.8	61.0	49.3	39.4
09/12/2016 07:30	44.0	58.4	47.0	39.3
09/12/2016 07:45	45.6	64.3	48.4	40.0
09/12/2016 08:00	47.4	62.9	50.1	43.0
09/12/2016 08:15	53.5	71.6	55.4	47.7
09/12/2016 08:30	56.0	77.1	58.1	49.6
09/12/2016 08:45	57.6	71.3	60.5	51.7
09/12/2016 09:00	57.5	71.8	60.6	49.8
09/12/2016 09:15	56.6	72.6	59.2	50.3
09/12/2016 09:30	54.5	71.9	57.5	48.4
09/12/2016 09:45	53.8	71.0	55.5	45.0
09/12/2016 10:00	51.3	65.9	54.3	45.2
09/12/2016 10:15	51.4	65.8	55.5	44.7

Appendix A - Baseline Survey Details

RPS

Baseline Survey Results - 15 min

Start	LT1			
	L _{50q}	L _{AFmax}	L _{A10}	L _{A95}
09/12/2016 10:30	48.3	69.8	50.5	44.1
09/12/2016 10:45	48.3	66.0	50.5	45.2
09/12/2016 11:00	51.4	70.9	53.7	45.6
09/12/2016 11:15	54.0	74.0	55.6	45.4
09/12/2016 11:30	59.2	77.5	58.8	49.0
09/12/2016 11:45	66.0	76.9	70.8	48.8
09/12/2016 12:00	62.2	78.2	66.6	46.7
09/12/2016 12:15	53.0	69.5	54.9	46.7
09/12/2016 12:30	61.5	77.6	65.1	48.8
09/12/2016 12:45	61.9	75.7	66.6	50.1
09/12/2016 13:00	57.5	75.1	58.1	46.3
09/12/2016 13:15	48.4	60.3	49.9	45.8
09/12/2016 13:30	53.7	72.9	54.1	46.0
09/12/2016 13:45	60.9	72.6	67.2	53.2
09/12/2016 14:00	51.7	71.6	54.4	46.9
09/12/2016 14:15	57.6	71.2	59.1	48.3
09/12/2016 14:30	56.0	67.5	58.5	49.4
09/12/2016 14:45	61.8	73.1	68.4	48.5
09/12/2016 15:00	57.3	72.3	60.4	47.9
09/12/2016 15:15	55.7	72.8	58.2	48.6
09/12/2016 15:30	50.1	65.6	52.8	43.8
09/12/2016 15:45	43.8	64.2	45.1	38.5
09/12/2016 16:00	38.9	54.5	40.9	35.4
09/12/2016 16:15	45.0	55.4	47.9	40.7
09/12/2016 16:30	46.5	63.3	48.9	42.2
09/12/2016 16:45	45.1	61.2	47.3	40.0
09/12/2016 17:00	44.6	57.1	47.0	40.5
09/12/2016 17:15	46.7	58.4	49.3	40.4
09/12/2016 17:30	45.3	64.4	48.5	39.9
09/12/2016 17:45	45.1	56.5	46.8	41.0
09/12/2016 18:00	45.5	53.8	47.2	42.0
09/12/2016 18:15	47.1	61.0	48.9	45.3
09/12/2016 18:30	45.7	61.2	48.5	39.5
09/12/2016 18:45	39.8	50.7	41.7	36.9
09/12/2016 19:00	39.5	46.9	41.9	36.7
09/12/2016 19:15	38.3	51.2	39.4	36.1
09/12/2016 19:30	37.8	52.2	39.6	35.6
09/12/2016 19:45	37.5	46.0	38.8	35.4
09/12/2016 20:00	38.0	49.0	39.6	35.5
09/12/2016 20:15	36.9	48.2	38.0	35.1
09/12/2016 20:30	37.3	46.5	38.8	35.5
09/12/2016 20:45	38.8	47.5	41.0	35.3
09/12/2016 21:00	38.5	54.7	40.0	36.0
09/12/2016 21:15	38.8	47.9	40.7	36.4
09/12/2016 21:30	39.5	53.4	42.0	36.0
09/12/2016 21:45	37.7	48.7	39.6	35.3

Appendix A - Baseline Survey Details

RPS

Baseline Survey Results - 15 min

Start	LT1			
	L _{Aeq}	L _{Amax}	L _{A10}	L _{A95}
09/12/2016 22:00	38.3	47.7	40.6	35.2
09/12/2016 22:15	40.8	59.7	42.8	35.9
09/12/2016 22:30	39.4	60.2	41.1	35.7
09/12/2016 22:45	37.6	52.3	39.4	35.0
09/12/2016 23:00	38.8	49.2	42.3	34.7
09/12/2016 23:15	38.1	55.0	39.6	35.6
09/12/2016 23:30	37.2	46.4	39.3	34.7
09/12/2016 23:45	36.8	49.4	39.1	34.0
10/12/2016 00:00	36.7	48.6	38.9	33.8
10/12/2016 00:15	36.6	47.7	39.3	32.7
10/12/2016 00:30	35.6	47.2	37.7	32.6
10/12/2016 00:45	36.7	50.8	38.9	32.4
10/12/2016 01:00	37.6	48.8	40.1	33.5
10/12/2016 01:15	42.0	51.9	46.0	35.0
10/12/2016 01:30	41.2	53.5	44.4	35.8
10/12/2016 01:45	38.7	52.5	42.1	32.7
10/12/2016 02:00	37.9	49.2	39.9	34.6
10/12/2016 02:15	35.5	52.4	38.6	30.6
10/12/2016 02:30	34.4	49.7	36.5	30.4
10/12/2016 02:45	37.5	51.6	40.5	32.3
10/12/2016 03:00	36.3	51.9	39.1	30.9
10/12/2016 03:15	37.0	49.3	40.3	31.4
10/12/2016 03:30	33.5	45.3	36.1	29.9
10/12/2016 03:45	33.6	44.2	36.1	30.1
10/12/2016 04:00	34.3	45.0	37.4	30.7
10/12/2016 04:15	34.0	45.3	36.3	30.5
10/12/2016 04:30	33.8	44.0	36.6	30.3
10/12/2016 04:45	33.1	45.5	35.4	30.3
10/12/2016 05:00	34.8	47.1	37.0	31.8
10/12/2016 05:15	35.7	51.1	38.1	31.8
10/12/2016 05:30	35.3	46.3	37.7	32.5
10/12/2016 05:45	36.1	45.9	39.3	32.4
10/12/2016 06:00	35.9	48.7	37.9	32.6
10/12/2016 06:15	37.0	48.0	39.4	34.2
10/12/2016 06:30	37.4	48.1	39.3	35.1
10/12/2016 06:45	39.7	57.2	40.5	35.6
10/12/2016 07:00	42.3	59.5	44.5	36.4
10/12/2016 07:15	44.6	64.1	48.4	38.1
10/12/2016 07:30	44.9	59.1	48.6	37.9
10/12/2016 07:45	43.1	58.6	46.0	37.7
10/12/2016 08:00	41.9	54.9	44.7	37.6
10/12/2016 08:15	44.7	64.4	47.3	38.4
10/12/2016 08:30	51.7	67.7	53.8	45.8
10/12/2016 08:45	51.0	65.1	53.5	45.5
10/12/2016 09:00	49.0	67.0	51.4	45.4
10/12/2016 09:15	57.0	76.8	60.1	49.6

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Baseline Survey Results - 15 min

Start	LT1			
	L _{Aeq}	L _{Afmax}	L _{A10}	L _{A90}
10/12/2016 09:30	55.9	74.2	58.0	51.7
10/12/2016 09:45	51.7	67.4	54.0	42.2
10/12/2016 10:00	50.0	75.2	51.6	41.2
10/12/2016 10:15	46.3	63.8	48.4	41.0
10/12/2016 10:30	47.2	66.2	50.8	40.8
10/12/2016 10:45	53.0	69.8	54.5	49.7
10/12/2016 11:00	53.7	71.9	55.4	47.5
10/12/2016 11:15	48.9	71.0	51.0	43.6
10/12/2016 11:30	53.9	71.7	57.2	43.5
10/12/2016 11:45	52.5	71.0	54.8	45.9
10/12/2016 12:00	45.8	60.6	48.2	41.2
10/12/2016 12:15	51.1	65.9	54.1	45.1
10/12/2016 12:30	47.7	61.1	51.6	41.5
10/12/2016 12:45	44.9	67.6	47.2	39.9
10/12/2016 13:00	42.8	58.3	44.2	40.2
10/12/2016 13:15	44.9	67.2	45.0	39.9
10/12/2016 13:30	43.4	61.6	45.5	39.8
10/12/2016 13:45	47.7	69.8	48.7	41.5
10/12/2016 14:00	45.0	64.4	47.1	41.4
10/12/2016 14:15	46.6	66.4	49.0	42.1
10/12/2016 14:30	46.4	58.7	49.7	41.8
10/12/2016 14:45	47.6	68.9	48.3	41.5
10/12/2016 15:00	44.6	63.4	46.5	41.2
10/12/2016 15:15	43.4	56.5	45.4	40.4
10/12/2016 15:30	43.7	54.1	46.0	40.7
10/12/2016 15:45	44.1	58.2	46.2	41.0
10/12/2016 16:00	44.9	60.9	47.4	41.3
10/12/2016 16:15	46.5	57.5	49.2	42.7
10/12/2016 16:30	47.9	60.4	50.5	43.0
10/12/2016 16:45	47.0	55.0	49.2	43.2
10/12/2016 17:00	48.0	61.1	51.3	43.2
10/12/2016 17:15	48.2	58.5	51.2	43.6
10/12/2016 17:30	49.3	59.0	52.7	44.0
10/12/2016 17:45	47.4	56.1	50.4	43.1
10/12/2016 18:00	48.9	60.0	51.8	44.2
10/12/2016 18:15	48.7	59.4	51.8	43.6
10/12/2016 18:30	47.7	60.8	50.2	42.2
10/12/2016 18:45	47.5	57.4	50.6	41.8
10/12/2016 19:00	52.4	63.4	56.0	45.5
10/12/2016 19:15	54.9	71.7	58.1	48.1
10/12/2016 19:30	53.6	64.3	57.1	46.3
10/12/2016 19:45	53.2	63.5	56.4	46.4
10/12/2016 20:00	53.7	66.7	56.9	45.9
10/12/2016 20:15	55.7	69.2	58.9	49.0
10/12/2016 20:30	50.7	63.9	53.8	42.2
10/12/2016 20:45	45.6	59.9	49.1	37.5

Baseline Survey Results - 15 min

Start	LT1			
	L _{Aeq}	L _{Afmax}	L _{A10}	L _{A90}
10/12/2016 21:00	47.9	61.4	51.9	41.0
10/12/2016 21:15	53.6	69.0	57.4	42.8
10/12/2016 21:30	42.6	50.8	46.1	38.2
10/12/2016 21:45	39.1	49.9	41.3	35.9
10/12/2016 22:00	37.5	52.4	39.3	35.1
10/12/2016 22:15	37.5	50.1	39.0	35.6
10/12/2016 22:30	37.3	47.6	39.1	34.8
10/12/2016 22:45	36.4	49.4	38.0	34.3
10/12/2016 23:00	35.9	46.2	37.9	33.1
10/12/2016 23:15	34.7	45.6	36.5	32.6
10/12/2016 23:30	36.1	48.8	38.2	33.1
10/12/2016 23:45	37.8	54.6	39.4	35.2
11/12/2016 00:00	36.5	45.8	38.7	33.4
11/12/2016 00:15	37.2	48.7	39.6	33.2
11/12/2016 00:30	35.4	52.2	37.8	32.1
11/12/2016 00:45	35.6	45.2	37.2	33.3
11/12/2016 01:00	34.6	46.0	36.6	31.8
11/12/2016 01:15	34.8	44.2	36.8	31.7
11/12/2016 01:30	34.2	45.5	36.5	30.6
11/12/2016 01:45	34.0	46.1	36.2	30.5
11/12/2016 02:00	33.4	44.6	36.0	29.7
11/12/2016 02:15	32.9	45.7	35.0	29.9
11/12/2016 02:30	33.5	45.4	35.7	30.1
11/12/2016 02:45	34.0	47.3	36.7	29.5
11/12/2016 03:00	31.7	46.2	33.9	28.0
11/12/2016 03:15	31.2	46.3	33.1	28.3
11/12/2016 03:30	30.4	45.3	32.4	27.2
11/12/2016 03:45	31.2	47.8	32.9	28.2
11/12/2016 04:00	31.1	45.2	34.1	26.9
11/12/2016 04:15	31.1	48.8	33.1	27.2
11/12/2016 04:30	31.6	45.7	33.6	28.4
11/12/2016 04:45	31.9	46.4	34.1	28.2
11/12/2016 05:00	31.2	46.7	32.4	28.9
11/12/2016 05:15	32.8	44.7	35.7	28.9
11/12/2016 05:30	36.5	47.1	38.2	32.0
11/12/2016 05:45	34.8	44.8	37.3	31.7
11/12/2016 06:00	36.0	48.7	38.1	32.6
11/12/2016 06:15	37.7	47.9	40.4	33.0
11/12/2016 06:30	39.9	56.4	41.3	36.0
11/12/2016 06:45	40.5	50.3	42.5	37.6
11/12/2016 07:00	43.9	56.4	47.4	39.1
11/12/2016 07:15	46.1	64.2	49.5	38.1
11/12/2016 07:30	45.3	70.3	48.2	38.7
11/12/2016 07:45	44.5	66.8	47.1	39.7
11/12/2016 08:00	43.5	64.4	45.8	39.2
11/12/2016 08:15	42.0	57.9	43.6	39.2

Appendix A - Baseline Survey Details

RPS

Baseline Survey Results - 15 min

Start	LTI			
	L _{Aeq}	L _{Afmax}	L _{A10}	L _{A90}
11/12/2016 08:30	45.2	63.1	48.2	39.8
11/12/2016 08:45	45.4	64.6	46.6	39.8
11/12/2016 09:00	43.8	68.6	44.9	39.2
11/12/2016 09:15	43.1	64.2	43.4	39.6
11/12/2016 09:30	44.3	63.6	44.6	40.0
11/12/2016 09:45	44.7	64.3	45.8	40.2
11/12/2016 10:00	43.6	55.3	46.9	40.3
11/12/2016 10:15	44.5	58.1	46.7	40.5
11/12/2016 10:30	40.8	53.0	42.6	38.1
11/12/2016 10:45	53.7	74.6	52.1	37.7
11/12/2016 11:00	43.1	60.9	43.8	36.9
11/12/2016 11:15	48.6	67.0	47.6	36.4
11/12/2016 11:30	40.8	58.1	43.1	36.6
11/12/2016 11:45	41.1	50.4	42.3	39.6
11/12/2016 12:00	42.2	58.8	44.0	40.0
11/12/2016 12:15	45.7	65.2	45.0	39.5
11/12/2016 12:30	41.1	52.8	42.2	38.8
11/12/2016 12:45	41.8	56.4	44.3	38.3
11/12/2016 13:00	43.6	62.4	45.9	38.6
11/12/2016 13:15	42.8	67.7	42.6	38.7
11/12/2016 13:30	43.8	56.8	47.6	38.7
11/12/2016 13:45	44.6	64.9	47.0	38.1
11/12/2016 14:00	41.2	53.8	42.7	38.5
11/12/2016 14:15	41.8	58.9	43.7	38.2
11/12/2016 14:30	48.4	67.2	50.5	36.9
11/12/2016 14:45	48.8	76.6	49.1	38.4
11/12/2016 15:00	43.4	57.0	45.3	39.4
11/12/2016 15:15	41.9	55.2	43.6	39.0
11/12/2016 15:30	42.1	56.5	44.8	38.3
11/12/2016 15:45	43.1	56.6	44.3	38.8
11/12/2016 16:00	41.0	48.2	42.8	39.0
11/12/2016 16:15	42.3	59.9	44.5	38.8
11/12/2016 16:30	53.6	75.4	57.6	42.3
11/12/2016 16:45	43.6	50.8	45.7	41.5
11/12/2016 17:00	41.6	59.2	42.9	39.4
11/12/2016 17:15	40.4	51.2	42.3	38.0
11/12/2016 17:30	40.8	51.2	42.6	38.6
11/12/2016 17:45	39.9	53.0	41.6	37.4
11/12/2016 18:00	39.8	50.0	41.9	37.5
11/12/2016 18:15	39.8	67.2	40.8	37.1
11/12/2016 18:30	41.0	51.9	43.1	38.3
11/12/2016 18:45	40.0	51.7	41.3	38.2
11/12/2016 19:00	41.9	53.7	43.4	39.5
11/12/2016 19:15	41.2	49.9	43.4	38.0
11/12/2016 19:30	39.7	53.8	41.5	36.5
11/12/2016 19:45	39.2	52.2	40.9	36.0

Baseline Survey Results - 15 min

Start	LT1			
	L _{Aeq}	L _{Afmax}	L _{A10}	L _{A95}
11/12/2016 20:00	39.8	59.7	42.7	35.3
11/12/2016 20:15	38.9	52.1	41.0	36.2
11/12/2016 20:30	39.7	48.3	42.3	36.3
11/12/2016 20:45	38.5	45.5	40.5	36.0
11/12/2016 21:00	39.0	56.9	40.7	34.5
11/12/2016 21:15	36.0	49.2	37.6	33.2
11/12/2016 21:30	37.6	51.1	39.8	33.7
11/12/2016 21:45	37.6	61.6	38.7	33.5
11/12/2016 22:00	38.1	61.1	38.8	34.4
11/12/2016 22:15	38.6	63.0	39.2	32.9
11/12/2016 22:30	37.1	53.7	39.8	31.9
11/12/2016 22:45	38.9	63.7	40.5	32.6
11/12/2016 23:00	33.5	43.1	36.4	29.7
11/12/2016 23:15	36.9	57.5	40.2	30.7
11/12/2016 23:30	35.4	51.4	37.9	29.7
11/12/2016 23:45	36.0	49.1	39.4	29.8
12/12/2016 00:00	34.9	45.8	38.5	29.3
12/12/2016 00:15	33.1	48.3	36.3	28.5
12/12/2016 00:30	30.0	42.9	31.9	28.0
12/12/2016 00:45	31.1	49.6	32.7	28.0
12/12/2016 01:00	32.3	50.8	33.8	28.0
12/12/2016 01:15	29.7	42.5	30.4	27.7
12/12/2016 01:30	30.0	43.7	31.4	27.8
12/12/2016 01:45	30.1	46.1	31.5	28.1
12/12/2016 02:00	29.6	44.3	30.5	28.0
12/12/2016 02:15	29.6	43.4	30.6	28.1
12/12/2016 02:30	28.4	37.6	29.5	27.3
12/12/2016 02:45	29.6	45.4	30.8	27.8
12/12/2016 03:00	29.6	45.5	30.8	27.8
12/12/2016 03:15	29.3	47.9	30.5	27.2
12/12/2016 03:30	30.1	46.6	31.4	27.6
12/12/2016 03:45	33.3	46.2	36.5	28.3
12/12/2016 04:00	32.5	45.4	35.5	28.7
12/12/2016 04:15	31.0	45.1	32.8	28.0
12/12/2016 04:30	33.0	46.4	36.0	28.6
12/12/2016 04:45	32.7	45.4	34.9	29.5
12/12/2016 05:00	35.1	49.4	38.3	29.8
12/12/2016 05:15	34.3	45.5	37.0	30.9
12/12/2016 05:30	34.5	44.3	37.4	30.6
12/12/2016 05:45	37.4	48.9	40.5	32.2
12/12/2016 06:00	37.0	48.0	40.4	31.9
12/12/2016 06:15	38.6	52.1	42.1	33.4
12/12/2016 06:30	39.7	47.9	42.3	35.1
12/12/2016 06:45	40.6	48.6	43.4	36.3
12/12/2016 07:00	43.3	58.6	45.8	39.6
12/12/2016 07:15	46.0	60.4	49.4	39.9

Appendix A - Baseline Survey Details

RPS

Baseline Survey Results - 15 min

Start	LT1			
	L _{avg}	L _{AFmax}	L _{A10}	L _{A95}
12/12/2016 07:30	46.4	63.6	50.1	39.2
12/12/2016 07:45	42.8	58.7	44.9	38.2
12/12/2016 08:00	47.8	65.2	50.7	40.4
12/12/2016 08:15	51.2	68.3	54.1	42.9
12/12/2016 08:30	49.5	70.4	50.8	41.3
12/12/2016 08:45	51.2	71.5	52.5	46.1
12/12/2016 09:00	50.3	70.9	52.4	45.8
12/12/2016 09:15	55.6	65.0	59.3	49.0
12/12/2016 09:30	54.0	73.6	56.5	48.0
12/12/2016 09:45	54.0	78.0	55.1	46.8
12/12/2016 10:00	53.4	67.0	56.5	46.8
12/12/2016 10:15	52.0	64.4	54.4	48.9
12/12/2016 10:30	53.0	64.6	55.8	49.1
12/12/2016 10:45	53.0	73.0	55.2	48.9
12/12/2016 11:00	51.5	65.1	54.4	46.9
12/12/2016 11:15	54.1	67.0	56.3	50.5
12/12/2016 11:30	53.8	70.3	56.0	50.2
12/12/2016 11:45	53.6	74.9	55.4	51.1
12/12/2016 12:00	54.5	65.5	56.6	51.5
12/12/2016 12:15	53.4	68.8	55.1	51.1
12/12/2016 12:30	51.5	63.4	53.0	49.6
12/12/2016 12:45	52.8	69.1	54.9	49.5
12/12/2016 13:00	55.6	64.1	57.0	50.6
12/12/2016 13:15	56.5	63.9	58.0	54.8
12/12/2016 13:30	53.8	66.6	56.2	50.5
12/12/2016 13:45	56.9	73.5	58.6	51.4
12/12/2016 14:00	58.0	69.4	59.4	56.0
12/12/2016 14:15	62.8	78.9	66.0	55.5
12/12/2016 14:30	65.2	76.8	70.1	52.2
12/12/2016 14:45	52.8	67.8	55.0	49.7
12/12/2016 15:00	56.7	71.1	57.4	53.5
12/12/2016 15:15	52.5	68.0	54.6	48.6
12/12/2016 15:30	49.7	65.6	50.9	47.7
12/12/2016 15:45	51.2	74.5	53.2	47.7
12/12/2016 16:00	49.6	70.7	50.7	47.6
12/12/2016 16:15	49.8	64.3	49.5	47.1
12/12/2016 16:30	48.5	56.1	49.6	47.2
12/12/2016 16:45	48.7	66.4	49.9	47.2
12/12/2016 17:00	48.4	58.6	49.4	47.2
12/12/2016 17:15	48.3	56.0	49.3	47.2
12/12/2016 17:30	49.0	56.8	49.7	48.1
12/12/2016 17:45	49.0	57.8	49.7	48.1
12/12/2016 18:00	40.3	56.0	42.2	37.7
12/12/2016 18:15	39.3	53.3	41.3	36.4
12/12/2016 18:30	38.2	53.7	40.0	35.9
12/12/2016 18:45	38.2	53.5	39.9	36.0

Appendix A - Baseline Survey Details

RPS

Baseline Survey Results - 15 min

Start	LT1			
	L _{avg}	L _{AF-max}	L _{A15}	L _{A90}
12/12/2016 19:00	38.4	52.4	40.0	36.2
12/12/2016 19:15	38.1	49.2	39.5	35.9
12/12/2016 19:30	38.2	49.2	40.2	35.2
12/12/2016 19:45	38.3	51.9	40.1	35.7
12/12/2016 20:00	38.4	52.4	40.9	35.3
12/12/2016 20:15	38.3	49.9	40.3	35.6
12/12/2016 20:30	38.9	51.3	40.8	36.1
12/12/2016 20:45	38.0	48.3	40.0	35.2
12/12/2016 21:00	37.6	49.0	40.0	34.1
12/12/2016 21:15	37.9	54.5	40.0	34.7
12/12/2016 21:30	36.3	50.5	39.0	31.6
12/12/2016 21:45	35.9	49.7	38.1	32.8
12/12/2016 22:00	35.0	46.6	36.8	32.4
12/12/2016 22:15	35.8	49.5	38.2	32.8
12/12/2016 22:30	35.3	47.2	37.3	32.1
12/12/2016 22:45	35.9	48.6	39.3	30.0
12/12/2016 23:00	36.3	48.2	39.6	31.3
12/12/2016 23:15	35.3	48.8	37.6	30.5
12/12/2016 23:30	33.2	46.9	35.9	29.2
12/12/2016 23:45	34.0	51.2	33.7	28.4
13/12/2016 00:00	30.4	44.0	32.2	27.5
13/12/2016 00:15	32.2	58.2	34.4	26.7
13/12/2016 00:30	30.4	44.8	33.1	26.3
13/12/2016 00:45	28.0	48.0	28.5	26.1
13/12/2016 01:00	29.1	44.5	31.0	26.5
13/12/2016 01:15	30.2	49.6	30.9	26.2
13/12/2016 01:30	27.3	45.5	27.8	25.1
13/12/2016 01:45	28.4	47.1	30.1	25.2
13/12/2016 02:00	28.6	47.9	29.9	25.7
13/12/2016 02:15	27.7	45.2	29.0	25.4
13/12/2016 02:30	28.0	39.9	29.2	26.1
13/12/2016 02:45	30.8	44.2	33.5	26.7
13/12/2016 03:00	32.1	47.2	33.9	27.1
13/12/2016 03:15	28.7	44.1	29.8	26.4
13/12/2016 03:30	32.9	47.0	36.3	27.1
13/12/2016 03:45	29.9	45.0	32.1	26.7
13/12/2016 04:00	29.9	45.9	31.5	26.8
13/12/2016 04:15	30.5	44.7	32.9	27.0
13/12/2016 04:30	30.9	51.1	33.4	27.6
13/12/2016 04:45	30.5	44.9	32.9	27.3
13/12/2016 05:00	33.7	47.1	37.1	28.3
13/12/2016 05:15	33.5	45.6	36.7	28.8
13/12/2016 05:30	37.0	48.1	40.1	31.8
13/12/2016 05:45	35.4	46.3	38.0	30.3
13/12/2016 06:00	34.4	47.5	37.5	30.2
13/12/2016 06:15	36.2	49.8	38.4	32.8

Appendix A - Baseline Survey Details

RPS

Baseline Survey Results - 15 min

Start	LT1			
	L _{avg}	L _{AF-max}	L _{A15}	L _{A90}
13/12/2016 06:30	37.4	54.9	39.1	34.2
13/12/2016 06:45	40.2	66.7	43.1	35.1
13/12/2016 07:00	41.5	65.3	43.8	37.0
13/12/2016 07:15	45.1	64.4	48.4	37.8
13/12/2016 07:30	43.4	59.4	46.7	37.8
13/12/2016 07:45	46.9	61.0	51.6	38.5
13/12/2016 08:00	47.4	72.4	49.7	39.7
13/12/2016 08:15	47.0	62.0	49.1	44.1
13/12/2016 08:30	51.1	69.8	53.6	45.3
13/12/2016 08:45	50.9	72.0	51.5	45.6
13/12/2016 09:00	51.9	72.0	53.1	46.9
13/12/2016 09:15	50.7	71.3	53.1	46.6
13/12/2016 09:30	51.6	74.2	53.3	46.9
13/12/2016 09:45	49.9	65.3	52.6	45.5
13/12/2016 10:00	52.2	73.3	53.9	44.4
13/12/2016 10:15	47.6	61.0	49.7	44.2
13/12/2016 10:30	47.8	62.2	49.9	44.7
13/12/2016 10:45	49.4	67.3	51.0	46.0
13/12/2016 11:00	52.7	74.5	54.3	46.9
13/12/2016 11:15	55.4	79.5	57.1	47.8
13/12/2016 11:30	56.3	74.8	61.5	46.5
13/12/2016 11:45	58.3	79.7	63.1	47.0
13/12/2016 12:00	55.6	73.4	58.0	48.1
13/12/2016 12:15	53.8	72.1	53.6	46.6
13/12/2016 12:30	52.8	72.9	53.7	48.2
13/12/2016 12:45	53.3	64.1	56.0	47.6
13/12/2016 13:00	49.6	72.1	51.4	46.0
13/12/2016 13:15	49.2	65.0	50.2	45.5
13/12/2016 13:30	47.5	61.2	49.0	45.5
13/12/2016 13:45	50.9	64.9	53.6	45.7
13/12/2016 14:00	49.2	64.9	51.7	45.1
13/12/2016 14:15	50.4	63.6	53.8	44.9
13/12/2016 14:30	52.0	73.3	54.1	45.7
13/12/2016 14:45	50.4	69.7	52.5	46.2
13/12/2016 15:00	50.4	68.3	52.6	46.4
13/12/2016 15:15	53.7	70.3	55.7	48.7
13/12/2016 15:30	51.8	64.3	54.4	46.9
13/12/2016 15:45	52.9	70.9	54.1	46.5
13/12/2016 16:00	50.3	70.5	50.3	43.8
13/12/2016 16:15	45.6	59.5	47.6	41.7
13/12/2016 16:30	44.0	61.9	46.2	40.2
13/12/2016 16:45	42.6	56.7	44.0	40.0
13/12/2016 17:00	42.5	49.3	44.0	40.6
13/12/2016 17:15	47.7	70.4	44.5	40.3
13/12/2016 17:30	42.1	48.3	43.5	40.3
13/12/2016 17:45	41.5	48.5	43.2	39.4

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Appendix A - Baseline Survey Details

RPS

Baseline Survey Results - 15 min

Start	LT1			
	L _{avg}	L _{AFmax}	L _{A10}	L _{A95}
13/12/2016 18:00	41.9	49.4	43.6	40.0
13/12/2016 18:15	41.7	52.4	43.5	39.6
13/12/2016 18:30	40.7	50.5	42.5	38.3
13/12/2016 18:45	41.6	58.1	43.6	38.2
13/12/2016 19:00	41.3	50.3	42.9	39.3
13/12/2016 19:15	39.9	49.5	41.8	37.5
13/12/2016 19:30	41.6	54.9	43.8	37.6
13/12/2016 19:45	41.1	53.2	43.9	36.2
13/12/2016 20:00	41.0	57.7	43.1	36.8
13/12/2016 20:15	39.7	48.4	42.1	36.4
13/12/2016 20:30	39.5	48.2	41.8	35.7
13/12/2016 20:45	38.2	47.1	40.1	35.3
13/12/2016 21:00	38.7	50.0	40.7	36.0
13/12/2016 21:15	38.2	47.9	40.8	34.8
13/12/2016 21:30	37.3	48.2	39.4	34.4
13/12/2016 21:45	38.0	48.7	39.8	35.3
13/12/2016 22:00	37.5	51.1	38.8	34.3
13/12/2016 22:15	37.3	50.6	39.8	33.6
13/12/2016 22:30	36.2	48.4	37.1	32.8
13/12/2016 22:45	35.8	48.1	38.2	32.1
13/12/2016 23:00	36.3	48.0	38.7	31.9
13/12/2016 23:15	34.3	47.1	36.5	31.4
13/12/2016 23:30	32.8	40.4	34.3	31.1
13/12/2016 23:45	33.5	47.4	34.9	31.0
14/12/2016 00:00	33.1	50.1	34.3	30.8
14/12/2016 00:15	37.6	54.0	36.7	30.5
14/12/2016 00:30	30.9	38.9	32.0	29.6
14/12/2016 00:45	32.9	49.2	34.1	30.5
14/12/2016 01:00	32.6	48.1	34.3	29.8
14/12/2016 01:15	32.3	53.5	33.0	29.6
14/12/2016 01:30	31.2	45.9	32.2	29.3
14/12/2016 01:45	31.8	47.6	32.8	30.2
14/12/2016 02:00	31.8	47.3	33.1	29.7
14/12/2016 02:15	30.8	46.7	31.7	28.5
14/12/2016 02:30	31.3	46.4	32.3	28.7
14/12/2016 02:45	30.1	45.8	31.8	27.9
14/12/2016 03:00	31.2	47.4	32.4	28.6
14/12/2016 03:15	31.6	46.5	33.7	28.4
14/12/2016 03:30	30.7	46.0	32.2	28.3
14/12/2016 03:45	31.6	44.7	32.9	28.4
14/12/2016 04:00	31.2	46.9	32.7	28.4
14/12/2016 04:15	31.7	52.9	33.1	28.6
14/12/2016 04:30	33.1	48.1	34.6	30.8
14/12/2016 04:45	35.2	51.5	36.8	30.3
14/12/2016 05:00	33.3	46.6	35.2	31.1
14/12/2016 05:15	33.8	47.2	35.3	31.9

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Baseline Survey Results - 15 min

Start	LT1			
	L _{Aeq}	L _{AFFmax}	L _{A10}	L _{A90}
14/12/2016 05:30	37.8	52.0	40.4	33.8
14/12/2016 05:45	39.3	48.9	42.5	35.2
14/12/2016 06:00	38.2	63.8	39.5	35.0
14/12/2016 06:15	38.9	47.9	40.9	36.7
14/12/2016 06:30	40.3	52.5	43.1	37.4
14/12/2016 06:45	42.6	58.4	44.8	38.8
14/12/2016 07:00	44.7	59.5	47.5	39.8
14/12/2016 07:15	48.4	66.0	51.2	42.1
14/12/2016 07:30	44.6	59.8	47.9	40.3
14/12/2016 07:45	45.5	61.1	48.1	42.1
14/12/2016 08:00	48.9	67.0	50.5	43.9
14/12/2016 08:15	52.3	69.1	55.0	43.8
14/12/2016 08:30	53.1	70.0	55.2	47.4
14/12/2016 08:45	49.9	65.7	51.8	47.4
14/12/2016 09:00	50.6	65.9	52.1	46.8
14/12/2016 09:15	48.7	62.5	51.1	45.7
14/12/2016 09:30	52.3	70.3	53.0	45.6
14/12/2016 09:45	47.6	67.1	49.0	45.3
14/12/2016 10:00	47.2	63.9	49.1	44.6
14/12/2016 10:15	46.4	66.0	47.1	44.3
14/12/2016 10:30	46.1	65.0	47.6	44.2
14/12/2016 10:45	51.9	69.4	53.7	46.1
14/12/2016 11:00	53.2	66.6	54.2	51.1
14/12/2016 11:15	47.1	64.0	49.4	44.3
14/12/2016 11:30	51.5	71.6	54.3	45.2
14/12/2016 11:45	49.2	66.4	51.3	43.9
14/12/2016 12:00	64.4	78.4	68.3	52.0
14/12/2016 12:15	60.8	79.3	63.0	46.4
14/12/2016 12:30	55.8	70.8	59.1	46.0
14/12/2016 12:45	47.7	64.0	50.2	43.8
14/12/2016 13:00	47.7	64.0	48.1	43.5
14/12/2016 13:15	45.6	61.0	47.4	43.4
14/12/2016 13:30	48.4	64.8	50.6	43.5
14/12/2016 13:45	47.8	62.7	50.7	38.6
14/12/2016 14:00	48.0	62.9	51.8	41.3
14/12/2016 14:15	50.2	67.4	52.5	45.7
14/12/2016 14:30	50.0	70.4	50.9	45.6
14/12/2016 14:45	48.4	66.0	50.1	45.8
14/12/2016 15:00	53.5	67.2	54.8	51.1
14/12/2016 15:15	50.2	64.2	53.6	45.3
14/12/2016 15:30	51.3	64.8	54.1	46.6
14/12/2016 15:45	54.0	68.5	55.1	47.9
14/12/2016 16:00	49.1	65.2	51.1	44.9
14/12/2016 16:15	47.2	62.5	49.2	40.2
14/12/2016 16:30	44.2	64.8	45.6	39.6
14/12/2016 16:45	40.8	52.8	42.9	38.6

Baseline Survey Results - 15 min

Start	LTI			
	L _{Aeq}	L _{Afmax}	L _{A10}	L _{A90}
14/12/2016 17:00	40.2	62.7	41.2	37.7
14/12/2016 17:15	39.7	51.5	41.5	37.3
14/12/2016 17:30	40.7	51.6	42.9	37.0
14/12/2016 17:45	40.4	53.9	42.7	37.5
14/12/2016 18:00	39.3	49.2	41.1	36.9
14/12/2016 18:15	38.1	49.2	40.1	35.8
14/12/2016 18:30	37.5	47.8	38.8	35.4
14/12/2016 18:45	46.3	64.5	44.2	35.5
14/12/2016 19:00	37.9	52.3	39.3	35.1
14/12/2016 19:15	35.9	46.1	37.5	34.1
14/12/2016 19:30	37.5	50.3	39.7	34.6
14/12/2016 19:45	37.2	50.1	38.8	34.7
14/12/2016 20:00	36.5	46.7	38.1	34.1
14/12/2016 20:15	36.5	47.1	38.2	33.9
14/12/2016 20:30	36.3	47.7	38.4	33.5
14/12/2016 20:45	36.1	49.0	38.1	32.8
14/12/2016 21:00	36.1	53.7	37.7	32.7
14/12/2016 21:15	36.0	48.2	37.8	32.9
14/12/2016 21:30	35.8	51.1	37.5	32.4
14/12/2016 21:45	36.9	53.3	39.3	31.4
14/12/2016 22:00	35.8	52.8	37.9	31.8
14/12/2016 22:15	34.9	48.0	37.7	30.3
14/12/2016 22:30	33.0	43.5	35.1	30.4
14/12/2016 22:45	32.8	49.8	34.6	29.1
14/12/2016 23:00	34.0	56.0	34.5	27.4
14/12/2016 23:15	32.7	46.9	34.8	28.6
14/12/2016 23:30	31.7	47.8	33.4	28.5
14/12/2016 23:45	31.4	45.6	33.7	28.2
15/12/2016 00:00	31.0	48.0	32.7	28.1
15/12/2016 00:15	30.0	47.5	31.5	26.9
15/12/2016 00:30	30.4	46.8	32.7	26.2
15/12/2016 00:45	28.6	37.4	30.4	26.0
15/12/2016 01:00	29.8	47.8	31.2	26.9
15/12/2016 01:15	31.0	47.8	32.0	25.7
15/12/2016 01:30	29.2	46.8	31.0	25.8
15/12/2016 01:45	29.3	47.4	31.1	25.9
15/12/2016 02:00	28.8	41.1	30.6	26.2
15/12/2016 02:15	29.7	46.8	31.4	26.5
15/12/2016 02:30	29.4	47.2	31.1	25.3
15/12/2016 02:45	29.2	49.6	30.7	25.7
15/12/2016 03:00	28.7	38.1	30.5	26.5
15/12/2016 03:15	29.6	47.0	31.2	25.6
15/12/2016 03:30	29.3	46.9	31.0	25.6
15/12/2016 03:45	30.0	45.8	32.5	25.6
15/12/2016 04:00	30.1	46.7	32.1	26.6
15/12/2016 04:15	30.4	48.4	32.5	27.3

Baseline Survey Results - 15 min

Start	LT1			
	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
15/12/2016 04:30	30.2	45.6	32.2	26.6
15/12/2016 04:45	32.6	46.6	35.4	27.4
15/12/2016 05:00	31.3	46.3	33.5	27.7
15/12/2016 05:15	33.1	47.5	35.4	29.3
15/12/2016 05:30	35.2	50.3	37.6	31.2
15/12/2016 05:45	36.2	48.8	39.1	32.0
15/12/2016 06:00	40.5	54.4	42.1	31.6
15/12/2016 06:15	44.2	56.7	44.9	42.2
15/12/2016 06:30	43.7	50.7	44.6	42.2
15/12/2016 06:45	45.2	64.0	45.9	42.7
15/12/2016 07:00	46.3	66.8	47.7	43.1
15/12/2016 07:15	45.3	57.3	48.6	39.4
15/12/2016 07:30	45.3	61.7	49.2	39.1
15/12/2016 07:45	45.7	69.1	47.1	39.6
15/12/2016 08:00	48.7	68.8	51.7	41.9
15/12/2016 08:15	52.5	67.9	54.2	47.0
15/12/2016 08:30	54.3	68.7	56.4	48.5
15/12/2016 08:45	52.5	69.8	55.0	47.6
15/12/2016 09:00	52.9	67.8	55.0	48.3
15/12/2016 09:15	50.8	70.9	52.6	46.6
15/12/2016 09:30	52.2	64.7	54.5	46.9
15/12/2016 09:45	52.9	65.8	53.9	48.0
15/12/2016 10:00	46.9	66.3	48.6	43.3
15/12/2016 10:15	47.5	62.9	49.7	43.3
15/12/2016 10:30	47.1	61.3	49.2	43.7
15/12/2016 10:45	47.3	62.1	48.9	44.9
15/12/2016 11:00	48.8	67.2	50.7	45.5
15/12/2016 11:15	49.3	64.9	51.4	45.2
15/12/2016 11:30	50.2	66.9	54.1	44.7
15/12/2016 11:45	49.8	61.3	52.8	45.0
15/12/2016 12:00	52.0	74.5	52.2	45.7

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