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NOISE ASSESSMENT

DRY AD, HEALTHCARE WASTE ENERGY RECOVERY, PELLET FERTILISER PLANT, CNG RE-FUELLING, WTS & BIOMASS FUEL STORAGE

ENVAR COMPOSTING LIMITED

APRIL 2021

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Status	Prepared By	Date
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1. Introduction

LF Acoustics Limited have been appointed by EnVar Composting Limited to carry out a noise assessment in support of the operation of a proposed Dry Anaerobic Digestion (AD) facility, Healthcare Waste Energy Recovery Facility (which will provide heat to the AD facility), Pellet Fertiliser Plant, Waste Transfer Station and a Woodchip Biomass Fuel Storage Building at the Applicant's existing waste management facility The Heath, Woodhurst, Huntingdon, PE28 3BS.

The Applicant's existing waste management facility has a long and complex planning history, which has resulted in the granting of planning permissions in relation to a number of development proposals across the site. A noise assessment was most recently prepared in 2017 to accompany a planning application for a biomass boiler, which considered noise from the existing operations and those proposed with the boiler in operation.

This report presents an assessment of the noise levels attributable to the operation of the proposed development and makes recommendations for measures to be considered during the detailed design to the proposed plant to ensure that the cumulative operation of the site does not result in adverse noise impacts at surrounding properties.

2. Applicable Standards and Guidance

A description of the noise units referred to in this report is given in Appendix A.

2.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF), revised in February 2019 [1], sets out the Government's planning policies for England and how these should be applied. It provides a framework upon which locally-prepared plans for housing and other development can be produced.

The purpose of the planning system is to contribute to the achievement of sustainable development and at the heart of the Framework is a presumption in favour of sustainable development.

With regards noise, local planning policies and decisions should contribute to and enhance the natural and local environment by:

- preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels noise pollution.
- mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development (including cumulative effects) – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Reference is made within the NPPF to the Noise Policy Statement for England [2] (NPSE), which sets out the long term vision of the Government noise policy. Further information has been provided on the assessment of noise within recent Planning Practice Guidance, updated in July 2019 and available on the Government planning web site. Whilst this guidance does not provide any objective criteria upon which to base noise assessments, the guidance provides a description of the relevant Effects Levels identified within the NPPF and NPSE and this is reproduced in Table 2.1.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect (NOEL)	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

Table 2.1 Significance Criteria

The NPPF advises that development should seek to ensure that noise from proposed developments does not give rise to significant impacts, i.e. a level identified as a Significant Observed Adverse Effect (SOAEL), which is at a level where the noise would cause a material change in behaviour.

2.2. British Standard BS 4142

BS 4142 [3] is the British Standard for rating and assessing noise of a commercial or industrial nature and is relevant to the noise associated with the operation of the proposed plant.

BS 4142 is a comparative standard in which the estimated noise levels from the proposed development are compared to the representative / typical background noise level from existing uses.

BS 4142 relates the likelihood of complaint to the difference between the Rating Level of the noise being assessed and the background noise level.

The background noise level is the L_{A90} noise level, usually measured in the absence of noise from the source being assessed, but may include other existing industrial or commercial sounds. The background noise levels should generally be obtained from a series of measurements each of not less than 15 minute duration.

The Rating Level of the noise being assessed is defined as its L_{Aeq} noise level (the 'specific noise level'), with the addition of appropriate corrections should the noise exhibit a marked impulsive and/or tonal component or should the noise be irregular enough in character to attract attention. The extent of the correction is dependent upon the degree of tonality or character in the noise and is determined either by professional judgement, where the plant is not operational at present, or by measurement.

Where the noise is tonal in nature, the standard imposes the following penalties when assessing the rating level:

- 2 dB for a tone which is just perceptible;
- 4 dB where the tone is clearly perceptible; and
- 6 dB where the tone is highly perceptible.

Methods for identifying whether noise is tonal in nature are provided within BS 4142.

Where noise exhibits other sound characteristics, the Standard advises a penalty of 3 dB should be applied.

During the daytime, the specified noise levels are determined over a reference time interval of 1 hour, with a 15 minute reference period adopted when assessing night-time noise.

If the Rating Level of the noise being assessed exceeds the background level by 10 dB or more BS 4142 advises that there is likely to be an indication of a significant adverse impact, depending upon context. A difference between background level and Rating Level of around 5 dB is likely to be an indication of an adverse impact, depending upon context. The lower the Rating Level is, relative to the background noise level, the less likely the specific source will have an adverse or significant adverse impact. Where the Rating Level does not exceed the background noise level is an indication of a low impact, depending upon context.

The assessment method outlined above is intended for the assessment of external noise levels and is not intended to assess the extent of impact at internal locations.

Where the initial assessment of impact, based upon and assessment of the external noise levels, needs to be modified due to the context, all pertinent factors should be taken into account, including:

- The absolute level of sound;
- Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night; and

The sensitivity of the receptor and whether the premises will already incorporate measures to ensure good internal and/or external acoustic conditions.

2.3. British Standard BS 8233

British Standard BS 8233 [4] principally provides design guidance for new buildings. For residential premises, the guidance advises for steady external noise sources, levels of noise internally not exceeding 30 dB $L_{Aeq,\ 8\ hour}$ within bedrooms at night are desirable, with a level of 35 dB $L_{Aeq,\ 16\ hour}$ representing a desirable standard of noise within living rooms and bedrooms for resting purposes during daytime periods.

Assuming an open window, equivalent external noise levels would be 10 – 15 dB(A) higher.

2.4. World Health Organisation Guidelines

The World Health Organisation guidance [5] provides additional guidance upon potential effects in relation to noise.

The guidance advises:

- few people are moderately annoyed by noise levels of below 50 dB L_{Aeq} during the daytime;
- for a good night's sleep, noise levels within bedrooms should not exceed 30 dB L_{Aeq}, with individual noise events not exceeding 45 dB L_{Amax}; and
- special attention should be given to noise sources in an environment with low background noise levels and to noise sources with low frequency components.

Assuming an open window provides a reduction in noise levels of between 10 – 15 dB(A), during the night-time the WHO guidance indicates that external noise levels should remain below 40 – 45 dB L_{Aeq} to maintain the restorative processes of sleep.

The WHO produced additional noise guidance in relation specifically to night-time noise in 2009 [6]. This report provides a description of the no observed adverse effect level (which is equivalent to NOEL) and advises for night-time noise (which is considered to be the most sensitive period of the day) that this concept is less useful, as the adversity of effects are less clear. Instead, it advises the use of the observed effects thresholds, above which an effect starts to occur or shows itself to be dependent upon the exposure level.

The guidance is presented in terms of external and internal recommendations to minimise any potential adverse effects. Externally, the guidance advises that an average night-time noise level L_{night} (the $L_{Aeq,\ 8\ hour}$) of 40 dB is equivalent to the lowest observed adverse effect level and advises this guideline value is recommended for the protection of public health from night-noise. However, below this level there was no change in the small number of awakenings identified and hence a reason for considering that the NOEL was not an appropriate descriptor in noise terms

for identifying adverse effects and hence recommend the use of the observed effects threshold as an appropriate descriptor to identify the potential for the onset of adverse effects.

The guidance, however, advises that an external night-time noise level of 30 $L_{Aeq,\ 8\ hour}$ would be equivalent to the NOEL, as their research indicated that there were no detectable effects internally, below a level of 32 dB L_{Amax}, with no physical awakenings identified below a level of 42 dB L_{Amax} internally.

3. Site Description and Identification of Noise Sensitive Receptors

The site is located to the north of St Ives and is situated to the east of the B1040 and north of Bluntisham Road.

There are no residential properties in close proximity to the site, with the closest dwellings identified below:

- Heathfields, located adjacent to the B1040, approximately 530 metres from the southern site boundary, with the property located adjacent to commercial premises and set down below the ground level at the site;

- Rectory Farm Cottages and the travellers caravan site located to the north of the site, adjacent to the B1030, approximately 230 metres from the closest proposed building. The ground level at the properties are approximately 10 metres below the ground level at the site, with the buildings effectively screened; and

- Bridge Farm adjacent to Bluntisham Heath Road, approximately 750 metres from the eastern site boundary.

The location of the site and surrounding properties is indicated on Figure 1.

4. Noise Monitoring

4.1. Introduction

Baseline noise monitoring exercises were carried out during 2016 and 2017 to establish the prevailing background noise levels used within the noise assessment which accompanied the planning application for the proposed biomass boiler.

Given that the boiler is now operational on a 24 hour basis, it has been considered appropriate to use the results from the previous monitoring exercise, as the baseline for the current assessment, as the noise levels monitored at that time did not include any effect of the operation of the boiler. Given that there have been no other changes in the noise environment in the surrounding area, the previous monitored background noise levels are likely to be lower than at present and will thus provide for a worst case assessment, when considering noise from the cumulative operation of the site.

The baseline noise monitoring exercise comprised unattended noise surveys used to establish the noise environment, both during the day and night-time periods, which were carried out during 2017.

A description of the noise survey undertaken is provided in the following subsections.

4.2. Unattended Noise Surveys

Unattended noise surveys were carried out between Friday 31st March 2017 and Sunday 9th April 2017 at positions adjacent to the closest properties located at Rectory Farm to the south and Bridge Farm to the east.

Weather conditions for the survey remained good, with dry conditions and either calm conditions or light winds throughout the survey period.

Two Rion NL-52 Class 1 Sound Level meters were used for the survey, which were calibrated before and after the exercise using a Rion NC-74 Class 1 Acoustic Calibrator, with the instruments reading 94.0 dB on each occasion. At each position, the microphone was positioned freefield and at a height of 1.3 metres above local ground level. The instruments were configured to monitor over 15 minute periods throughout the survey period, in accordance with the requirements of BS 4142.

The instrument adjacent to Rectory Farm was positioned on the boundary of the former mushroom farm to the east of the B1030, with the microphone set back an equivalent distance from the road as the property opposite.

The monitoring equipment adjacent to Bridge Farm, was positioned within the hedgerow adjacent to the road, again with the microphone set at an equivalent position back from the road.

The monitoring positions are indicated on Figure 1.

The results of the monitoring are presented graphically within Appendices B and C.

At each location, it was clear from the results, that the noise levels during the daytime periods were principally influenced by traffic travelling along the local roads, with the plant operating at Envar not generally audible.

During the night-time periods, the results also indicated that there were regular vehicle movements along the roads, with only a small number of periods identified when vehicles did not pass during a 15 minute monitoring period. It was, however, noted that the background (L_{A90}) noise levels decreased substantially overnight, once traffic flows reduced sufficiently.

To determine the typical background noise levels at the two monitoring positions, a statistical analysis of the measured noise levels for the day, evening and night-time periods has been undertaken.

Note that the site was operational during the daytime periods during the survey period, with the plant operating within the composting tunnels operational on a 24 hour basis.

The results of the analysis are provided in Appendices B and C and are summarised below.

Rectory Farm

- 48 – 52 dB L_{A90} during the daytime (07:00 – 18:00) period;
- 38 – 51 dB L_{A90} during the evening (18:00 – 22:00) period (broad spread of data recorded, with an average level of 44 dB L_{A90});
- 32 - 34 dB L_{A90} during the night-time (22:00 – 07:00) period; and
- 47 – 50 dB L_{A90} during the early morning (05:00 – 07:00) period.

Bridge Farm

- 40 – 42 dB L_{A90} during the daytime (07:00 – 18:00) period;
- 36 dB L_{A90} during the evening (18:00 – 22:00) period;
- 30 dB L_{A90} during the night-time (22:00 – 07:00) period; and
- 35 dB L_{A90} during the early morning (05:00 – 07:00) period.

5. Description of Proposed Development

It is proposed to extend the existing operations carried out on the Envar site, with additional development, which would include the following elements:

- A dry anaerobic digestion (AD) plant;
- A healthcare heat recovery plant;
- A waste transfer building;
- Biomass Woodchip Fuel Store;
- A pellet fertiliser production facility.

The proposed layout of the site is indicated on Figure 2.

At this stage of the development, the plant requirements for each element of the proposals are still being developed and would be finalised during the detailed design stage, should planning permission be granted, and a further assessment would be undertaken at that stage to ensure that the operation resulted in acceptable noise levels at the surrounding properties.

Sufficient information on the main plant requirements was, however, available at this stage, which has allowed a preliminary assessment of the noise levels to be carried out and to determine likely noise mitigation requirements, which would be developed fully at a later stage.

A description of the main plant is provided below.

AD Plant

This plant would comprise a number of elements, including plant and equipment within the main AD building, two digesters located externally, two CHP units, located externally and biogas storage facilities.

Noise levels for the principal items of plant operating within this area have been provided by the supplier, as follows:

Plant	Sound Power Level [dB(A)]
Waste Bunker (Reception Area)	110.0
Mixer (Digester Area) x 2	93.0
Fermenter (Digester Area) x 2	89.0
Piston Pumps (Digester Area) x 2	85.0
Centrifuge (Dewatering Area) x 2	100.7
Ventilator Driers (Drying Area) x 2	105.1
Air Blower (Biogas Storage)	78.3
Biogas Upgrading (BUG)	91.8
HP Biomethane Compressor (Biomethane Storage)	99.6
Decompression Unit (Biomethane Storage)	100.0
HP Biomethane Compressor (CNG Filling Station)	99.6
CHP Plant x 2	104.0

Pump Scrubber x 2	83.3
Air Treatment System Equipment	101.4
Biofilter Ventilators x 4	96.8

Table 5.1 Noise Levels for Principal Items of Equipment Associated with AD Plant

The driers, dewatering and reception area would be located within the Dry AD building. For the purposes of the initial modelling / assessment, it has been assumed that this building would be of standard construction, comprising Kingspan cladding or equivalent, with a Sound Reduction Index (SRI) of 24 dB.

This plant would be operational on a 24 hour basis. Deliveries of feedstock and the export of digestate would take place between 05:00 – 22:00 hours.

Healthcare Waste Energy Recovery Plant

This plant would be contained with a building. The main sources of noise associated with the operation of this facility would be attributable to the operation of the main plant and associated with the handling of bins and deliveries.

The main plant would be operational on a 24 hour basis, with deliveries made to the site between 05:00 – 22:00 hours, as permitted within the current permission.

Noise levels attributable to the operation of this facility have been obtained from a similar plant already in operation, which indicated an internal level associated with the operation of the plant and handling of bins of 75.3 dB L_{Aeq}. The construction of the building has been assumed to be of standard construction utilising a cladding with an SRI of 24 dB.

Generally, the doors to this facility would remain closed, opening for short periods to allow vehicles to enter and depart.

Waste Transfer Building

The applicant is seeking to relocate the existing waste transfer operations presently carried out on site within a new purpose built building. The waste transfer operation would only involve the transfer and bulking of waste from their other operations carried out on site and would not include any treatment or processing operations. It is anticipated that the main plant requirements for this facility would be the use of a single loading shovel or telehandler.

An internal noise level of 75 dB L_{Aeq} has been assumed for operations carried out within the building, which would be of standard construction with steel cladding.

The waste transfer station would be operational between 05:00 – 22:00 hours.

Biomass Woodchip Fuel Store

The biomass for the existing biomass boilers, is presently shredded and stored outside and is subject to weather, with the feedstock getting wet at times, thus degrading its performance.

It is proposed to construct a new building to store the feedstock.

The biomass would be shredded periodically and stored within the building, resulting in a reduction in noise compared to the present external operations. A loading shovel / telehandler

would also operate within the building and would be used to transport the material to the feed hoppers of the boilers.

The principal source of noise would be associated with the use of the shredder. Measurements obtained previously on an equivalent shredder operating within a building on site indicated a level of 91.4 dB L_{Aeq}.

The store would be operational between 05:00 – 22:00 hours, with shredding of wood only carried out between 07:00 – 18:00 hours as per the current planning permission.

Pellet Fertiliser Production Building

The operation of this building would further enhance the scope of products offered by the applicant, utilising the materials available on site.

This plant would dry product to pellet fertiliser. The plant would be located within a building, with the main plant comprising dryers and the pellet production plant.

At this stage, the plant requirements within the building have not been finalised, however, the plant is understood to generate low levels of noise and an internal level of 75 dB L_{Aeq} has been assumed.

The doors to the building would remain closed at all times during production, with the exception of short periods for vehicle movements.

This plant would operate between 05:00 – 22:00 hours.

Vehicle Movements

The new facilities would require periodic vehicle movements for deliveries and collection of materials.

The additional facilities would not result in any additional vehicle movements to and from the site compared to the vehicle movements presently permitted under the current planning permissions.

On this basis, there would be no change in the noise levels attributable to the vehicle movements at the surrounding properties.

6. Noise Levels Attributable to Existing Site Operations

6.1. Source Term Noise Levels

As indicated previously, noise assessments have been preprepared for the site previously, to consider noise from the presently permitted operations.

Measurements of the principal items of plant operating on site have been measured previously, with the noise levels obtained presented below.

Activity	Measurement Distance [m]	Measured Noise Levels [dB]	
		L_{Aeq}	$L_{Amax,F}$
Menart Windrow Straddle Turner	10	76.0	-
Doppstadt shredder within building with loader operating	10 (Internal)	91.4	101.2
Side of building housing shredder – adjacent to plant	10	62.1	-
Side of building housing shredder – adjacent to plant	30	56.3	-
Front of building housing generator for screening plant	10	75.2	-
Outside main screening building adjacent to feed	25	64.5	-
Outside main screening building adjacent to feed – hopper being loaded using L120E	25 / 10	70.6	-
Outside main screening building – B1040 side	25	65.2	-
IVC External Fans	10	61.8	-
Biomass Boilers	1	75.0	-
Biomass Drying Plant Building	Internal	78.0	-

Table 6.1 Noise Levels Attributable to Operation of Existing Plant

6.2. Calculation of Present Noise Levels

Noise levels attributable to the operation of the site have been calculated utilising the Soundplan modelling package, which implements the calculation methodology from ISO 9613.

Ground level information for the surrounding area has been obtained from Google mapping, with the surrounding fields assumed to be soft ground.

Calculations of the existing day and night-time operations have been made During the daytime period, the modelling has assumed that all plant would be operational, with regular vehicle movements delivering and collecting material. At night, only the plant required to operate the composting tunnels and drying plant run.

The plant is not fully operational during these periods and generally the following operational pattern is followed:

- Between 05:00 – 07:00 Monday to Sunday waste deliveries and removals are accepted into the site, material for composting, biomass, drying etc on site. This time frame also allows for maintenance of the plant, loading vehicles, operation, and the loading and unloading of the biomass facility.
- Between 07:00 – 18:00 Monday to Friday standard the site is fully operational.
- Between 18:00 – 22:00 Monday to Friday there may be a small number of waste deliveries and removals from the site. Compost input material shredding (within the building), turning of the compost pad may occur over this time (although would not generally continue throughout the evening), screening operations, biomass operations and standard site activities. Generally, the plant operating tends to wind down after 20:00 hours.
- Saturday, Sunday and Bank Holidays all standard site operations as stated above would occur. However, these operations would only occur when there was demand and generally during these periods less plant would be operational on site.

The noise levels calculated from the present operations, based upon the previous assessments, are presented in the following table.

Location	Calculated Noise Levels [dB $L_{Aeq,T}$]			
	Early Morning (05:00 – 07:00)	Daytime (07:00 – 18:00)	Evening (18:00 – 22:00)	Night-time (22:00 – 05:00)
Rectory Farm	41	42	41	28
Travellers Site	40	44	40	30
Bridge Farm	36	38	36	25
Heathfields	39	39	39	25

Table 6.2 Calculated Noise Levels from Existing Permitted Operations

7. Calculation and Assessment of Noise Levels from Proposed Operations

7.1. Calculation of Noise Levels

The proposed development would require the demolition of some of the existing building located on the site, with amendments to other operations, which would primarily see the existing external biomass shredding operations located within a new purpose built building.

To assess the noise levels attributable to the operation of the site, it has been considered appropriate to consider noise from both the presently permitted operations and those proposed, to ensure that the overall noise levels attributable to the operation of the site.

As indicated previously, the design of the new facilities is still being progressed and the final plant / building construction information is not known at this stage.

To facilitate an appropriate assessment, it has been assumed that the proposed buildings would be constructed utilising standard steel cladding, which provides a sound reduction of 24 dB (e.g. Kingspan AWP/60).

For the purposes of the initial assessment, it has been assumed that the plant would be fully operational during each assessment period, with no additional mitigation measures provided. This approach provides for a worst case assessment.

Calculations have been made for the main operational periods throughout the day, i.e. the early morning / evening periods, daytime and overnight, on the basis of the plant which would be operational during each period, as described previously.

The results of the modelling are presented on Figures 3 – 5 and summarised below.

Location	Calculated Noise Levels [dB $L_{Aeq,T}$]			
	Early Morning (05:00 – 07:00)	Daytime (07:00 – 18:00)	Evening (18:00 – 22:00)	Night-time (22:00 – 05:00)
Rectory Farm	40	41	40	36
Travellers Site	37	41	37	35
Bridge Farm	36	39	36	32
Heathfields	39	40	39	35

Table 7.1 Calculated Noise Levels from Proposed Future Operations

7.2. Assessment

An assessment of the noise levels attributable to the future operation of the site has been made against the requirements of BS 4142.

Whilst the noise associated with the operation of the proposed plant is unlikely to be impulsive or characteristic when compared to the present site operations, there is a potential for the proposed plant to be tonal in nature, which is most likely to be audible overnight, when background noise levels are low. The majority of the plant would be screened, by appropriate location within the site, utilising buildings etc to screen it from the neighbouring properties, there is potential for some tonal noise to be audible at the properties, without appropriate mitigation measures.

On this basis, for the purposes of the preliminary assessment, no correction has been made when assessing the early morning, daytime and evening operations, as the character of the noise would be equivalent to the present operations. For the night-time period when the Dry AD and Healthcare Waste energy recovery plants would be operational, it has been considered appropriate at this stage to apply a 4 dB(A) correction for clearly perceptible tonal noise when determining the rating level upon which the initial BS 4142 assessment has been based.

The initial BS 4142 assessment of each time period is considered below.

Early Morning Operations (05:00 – 07:00 hours)

Noise levels attributable to the proposed site operations during the early morning periods would remain virtually unchanged from the noise levels attributable to the presently permitted operations, with the calculations indicating differences of up to 1 dB(A).

The initial BS 4142 assessment for this time period is provided below.

Location	Calculated Noise Levels [dB $L_{Aeq,T}$]			Typical Background Noise Level [dB L_{A90}]	Difference re Background
	Specific Noise Level	Correction	Rating Level		
Rectory Farm	40	0	40	47	-7
Travellers Site	37	0	37	47	-10
Bridge Farm	36	0	36	35	+1
Heathfields	39	0	39	47	-8

Table 7.2 Assessment of Noise Levels from Early Morning Operations

The assessment for this period indicates that the noise levels attributable to the operation of the site would remain generally below the prevailing background noise levels, providing a positive indication that adverse impacts were unlikely.

Daytime Operations (07:00 – 18:00 hours)

The daytime noise levels would also remain equivalent to the present operations or reduce slightly, as a result of the additional mitigation afforded by the new buildings and the fact that the biomass shredding operations would be located internally.

The initial BS 4142 assessment for this time period is provided below.

Location	Calculated Noise Levels [dB $L_{Aeq,T}$]			Typical Background Noise Level [dB L_{A90}]	Difference re Background
	Specific Noise Level	Correction	Rating Level		
Rectory Farm	41	0	41	48	-7
Travellers Site	41	0	41	48	-7
Bridge Farm	39	0	39	40	-1
Heathfields	40	0	40	48	-8

Table 7.3 Assessment of Noise Levels from Daytime Operations

The assessment above indicates that the noise levels attributable to the daytime operations would remain below the prevailing background noise levels during the daytime period. On this basis, the BS 4142 assessment would indicate a low potential for an adverse noise impact.

Given that noise levels would not increase during the daytime period, provides a good indication that the proposed operations would not result in adverse noise impacts at surrounding properties.

Evening Operations (18:00 – 22:00 hours)

Again, noise levels associated with the proposed evening operations would remain generally equivalent to those associated with the presently permitted operations.

The initial BS 4142 assessment for this time period is provided below.

Location	Calculated Noise Levels [dB $L_{Aeq,T}$]			Typical Background Noise Level [dB L_{A90}]	Difference re Background
	Specific Noise Level	Correction	Rating Level		
Rectory Farm	40	0	40	44	-4
Travellers Site	37	0	37	44	-7
Bridge Farm	36	0	36	36	0
Heathfields	39	0	39	44	-5

Table 7.4 Assessment of Noise Levels from Evening Operations

The assessment for this period indicates that the noise levels attributable to the operation of the site would remain below the prevailing background noise levels, providing a positive indication that adverse impacts were unlikely.

Night-time Operations (22:00 – 05:00 hours)

The calculations indicate that the night-time noise levels associated with the operation of the site would increase compared to the existing situation, as a result primarily of the operation of the AD plant.

The initial BS 4142 assessment, made on the basis of a likely worst case operating scenario for this period is provided below.

Location	Calculated Noise Levels [dB $L_{Aeq,T}$]			Typical Background Noise Level [dB L_{A90}]	Difference re Background
	Specific Noise Level	Correction	Rating Level		
Rectory Farm	36	4	40	32	+8
Travellers Site	35	4	39	32	+7
Bridge Farm	32	4	36	30	+6
Heathfields	35	4	39	32	+7

Table 7.5 Assessment of Noise Levels from Night-time Operations

The initial assessment indicates that the rating level of noise would be between 6 – 8 dB(A) above the prevailing background noise levels at the surrounding properties. An assessment made on this basis would indicate the potential for adverse noise impacts, depending upon context.

Background noise levels within the surrounding area are noted to be low during the night-time period. Where background noise levels are low, BS 4142 advises that it is often more important to consider the absolute level of noise rather than just the difference between the rating level and background noise levels.

With regards to night-time noise levels consideration has been given to the guidance within WHO and BS 8233. The WHO guidance advises that a level of 40 dB L_{Aeq} externally, which is equivalent to an internal level of 30 dB L_{Aeq} internally assuming an open window, is a level which would represent the Lowest Observed Effects Level.

The calculations above, indicate that without appropriate mitigation, noise levels have the potential to be at this level and thus potentially result in adverse impacts.

To ensure adverse impacts are minimised, it is recommended that noise levels attributable to the night-time operation of the plant do not exceed a rating level of 35 dB $L_{Aeq,T}$. This would ensure noise levels remained below the Lowest Observed Effects Level with regards the WHO guidelines and also below the threshold specified within BS 8233 as maintaining a good standard of noise. Whilst the current revision of BS 4142 does not specify a lower limit, simply referring to other guidelines, a rating level of 35 dB $L_{Aeq, T}$ was also specified in a previous revision of the Standard as representing a very low level of noise. Furthermore, specifying a night-time rating level of 35 dB $L_{Aeq, T}$ would ensure that the rating level did not exceed a level of more than 5 dB(A) above the prevailing background noise levels overnight, thus seeking to minimise any potential adverse impacts when assessed against the requirements of BS 4142.

To ensure any adverse noise impacts associated with the night-time operation of the plant are minimised, appropriate noise mitigation measures would be incorporated into the final design of the plant. Indicative mitigation measures and an assessment with mitigation are presented in the following section.

Reducing noise levels attributable to the night-time operation would also seek to further reduce noise levels during other times of the day.

8. Assessment of Indicative Noise Mitigation Measures

The calculations undertaken to derive the noise levels presented in Section 7 indicate that the main sources of noise during the night-time period would be attributable to the plant operating within the Dry AD building and associated external plant, including the air treatment system, biomethane compressor, mixers and plant associated with the operation of the biofilter.

Noise levels attributable to the plant operating within the Dry AD building could be reduced utilising cladding with a higher acoustic specification, such as EuroClad Elite 51.3, which provides a sound reduction of 41 dB, significantly higher than standard cladding.

Externally, mitigation would be provided for the external plant, generating the highest noise levels, which based upon the initial modelling would include the air treatment system, mixers and biofilter plant. By the use of appropriate mitigation, such as enclosures, noise levels from these items of plant would be reduced by at least 10 dB(A). The mitigation measures would also seek to reduce any potential tonality associated with the operation of the plant, such that any tonality was either not audible at the surrounding properties or barely audible.

Calculations based upon the indicative mitigation measures which would be considered for the Dry AD plant during the detailed design have been made. The results of the calculations are presented on Figure 6, which presents the graphical representation of the night-time noise levels. The calculations indicate the following noise level at the surrounding properties.

Location	Calculated Noise Levels [dB $L_{Aeq,T}$]			
	Early Morning (05:00 – 07:00)	Daytime (07:00 – 18:00)	Evening (18:00 – 22:00)	Night-time (22:00 – 05:00)
Rectory Farm	38	40	38	30
Travellers Site	36	40	36	31
Bridge Farm	34	38	34	28
Heathfields	37	39	37	29

Table 8.1 Calculated Noise Levels from Proposed Future Operations With Indicative Mitigation for AD Plant

The results above indicate a small reduction in the site noise levels during the early morning, daytime and evening periods and the additional mitigation would provide an additional small benefit during these periods.

The revised BS 4142 assessment based upon the indicative mitigation is provided below for the night-time periods.

Location	Calculated Noise Levels [dB $L_{Aeq,T}$]			Typical Background Noise Level [dB L_{A90}]	Difference re Background
	Specific Noise Level	Correction	Rating Level		
Rectory Farm	30	2	32	32	0
Travellers Site	31	2	33	32	+1
Bridge Farm	28	2	30	30	0
Heathfields	29	2	31	32	-1

Table 8.2 Assessment of Noise Levels from Night-time Operations With Mitigation

The assessment with the additional mitigation measures provided, indicates that the rating noise levels would generally not exceed the prevailing background noise levels, thus the initial BS 4142 assessment would conclude a low potential for adverse impacts.

The noise levels would additional achieve a no observed effects levels when assessed against the requirements of the WHO guidelines and ensure a good standard of noise is maintained internally with regards to the requirements of BS 8233.

With appropriate mitigation measures, which would be fully developed during the detailed design stage, the operation of the site would not result in any adverse noise impacts at surrounding properties throughout the day and night-time periods.

To ensure that appropriate mitigation is incorporated into the final design, it is considered that a planning condition would be appropriate, requiring details of the final plant / mitigation and a further assessment of the noise levels to be made during detailed design, to be agreed with the local planning authority and implemented prior to the new plant becoming operational.

9. Summary

LF Acoustics Limited have been appointed by EnVar Composting Limited to carry out a noise assessment in support of the operation of a proposed Dry Anaerobic Digestion (AD) facility, Healthcare Waste Energy Recovery Facility (which will provide heat to the AD facility), Pellet Fertiliser Plant, Waste Transfer Station and a Woodchip Biomass Fuel Storage Building at the Applicant's existing waste management facility The Heath, Woodhurst, Huntingdon, PE28 3BS.

The Applicant's existing waste management facility has a long and complex planning history, which has resulted in the granting of planning permissions in relation to a number of development proposals across the site. A noise assessment was most recently prepared in 2017 to accompany a planning application for a biomass boiler, which considered noise from the existing operations and those proposed with the boiler in operation.

Calculations and an assessment of the noise levels has been made at the surrounding properties, attributable to the future operation of the site, with the new plant operational.

The assessment concluded that the operations during the early morning, daytime and evening period would result in noise levels equivalent to the present operations and would not result in adverse noise impacts during these periods.

Overnight, the Dry AD and Healthcare Waste energy recovery plant would continue to operate. The preliminary calculations indicated that the night-time operation of the plant, would have the potential to result in adverse impacts at surrounding properties.

Additional mitigation measures would therefore be incorporated into the final design of the plant, to ensure noise levels were reduced to a satisfactory standard to minimise the potential for adverse impacts. Calculations made on the basis of likely mitigation measures demonstrated that it would be possible to reduce noise levels satisfactorily. The plant and mitigation measures would be developed during the detailed design stage, should planning permission be granted and it is proposed that a further assessment would be carried out at that stage to demonstrate that the operation of the new plant would not result in adverse noise impacts.

References

1. Ministry of Housing, Communities and Local Government. National Planning Policy Framework. February 2019.

2. Department for Communities and Local Government. Noise Policy Statement for England. 2010.

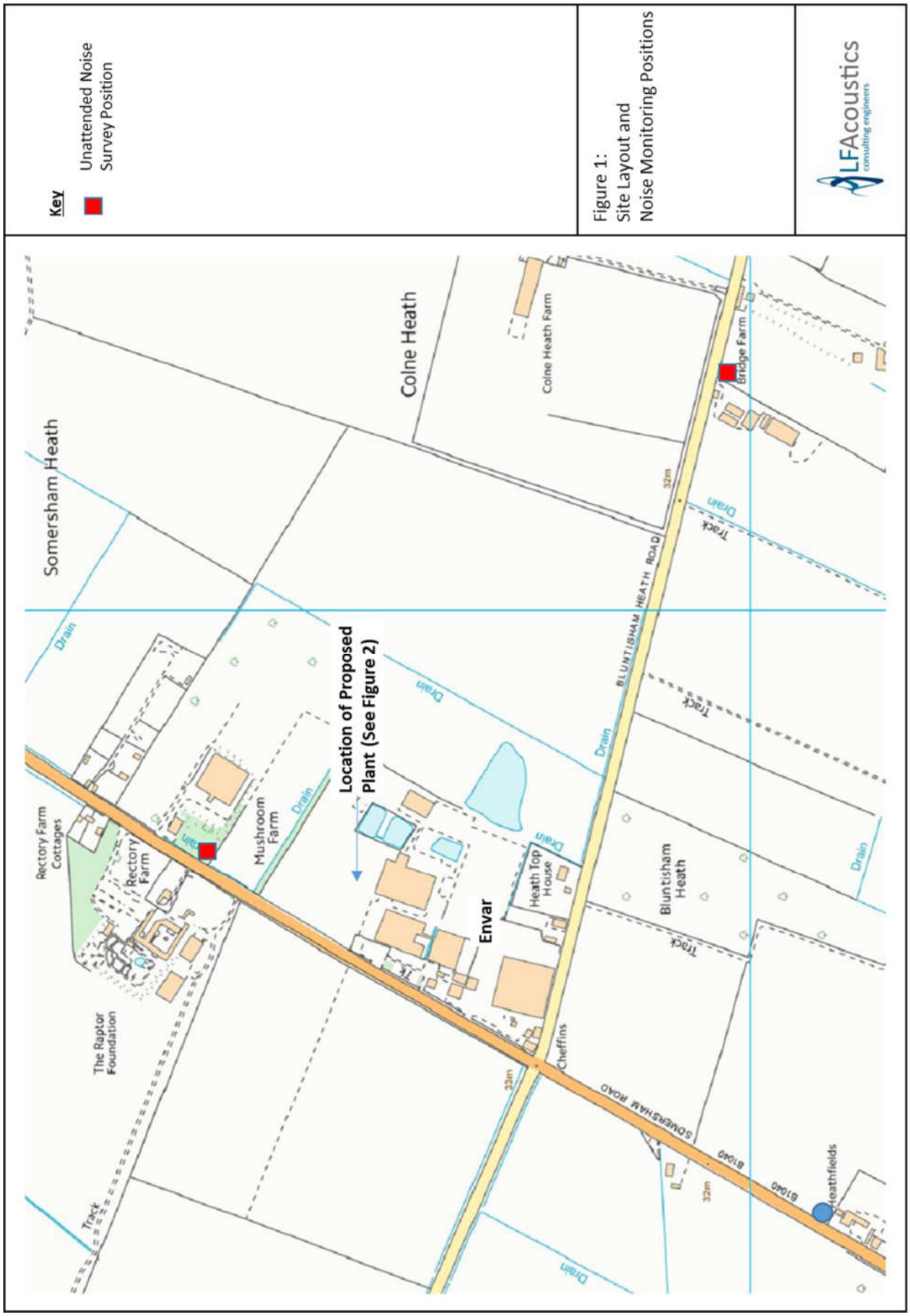
3. British Standards Institute. Methods for Rating and Assessing Industrial and Commercial Sound. BS 4142:2014 + A1:2019.

4. British Standards Institute. Guidance on Sound Insulation and Noise Reduction in Buildings. BS 8233: 2014.

5. World Health Organisation. Guidelines for Community Noise. 1999. WHO Geneva.

6. World Health Organisation. Night Noise Guidelines for Europe. 2009.

Figures


Key
Unattended Noise Survey Position
Figure 1:
Site Layout and
Noise Monitoring Positions
LFAcoustics
consulting engineers
Somersham Heath
Colne Heath
Colne Heath Farm
Bridge Farm
BLUNTISHAM HEATH ROAD
Location of Proposed Plant (See Figure 2)
Envar
Heath Top House
Bluntisham Heath
Rectory Farm Cottages
Rectory Farm
Mushroom Farm
The Raptor Foundation
Cheffins
SOMERSHAM ROAD
B1040
Heathfields
Track
Drain
32m

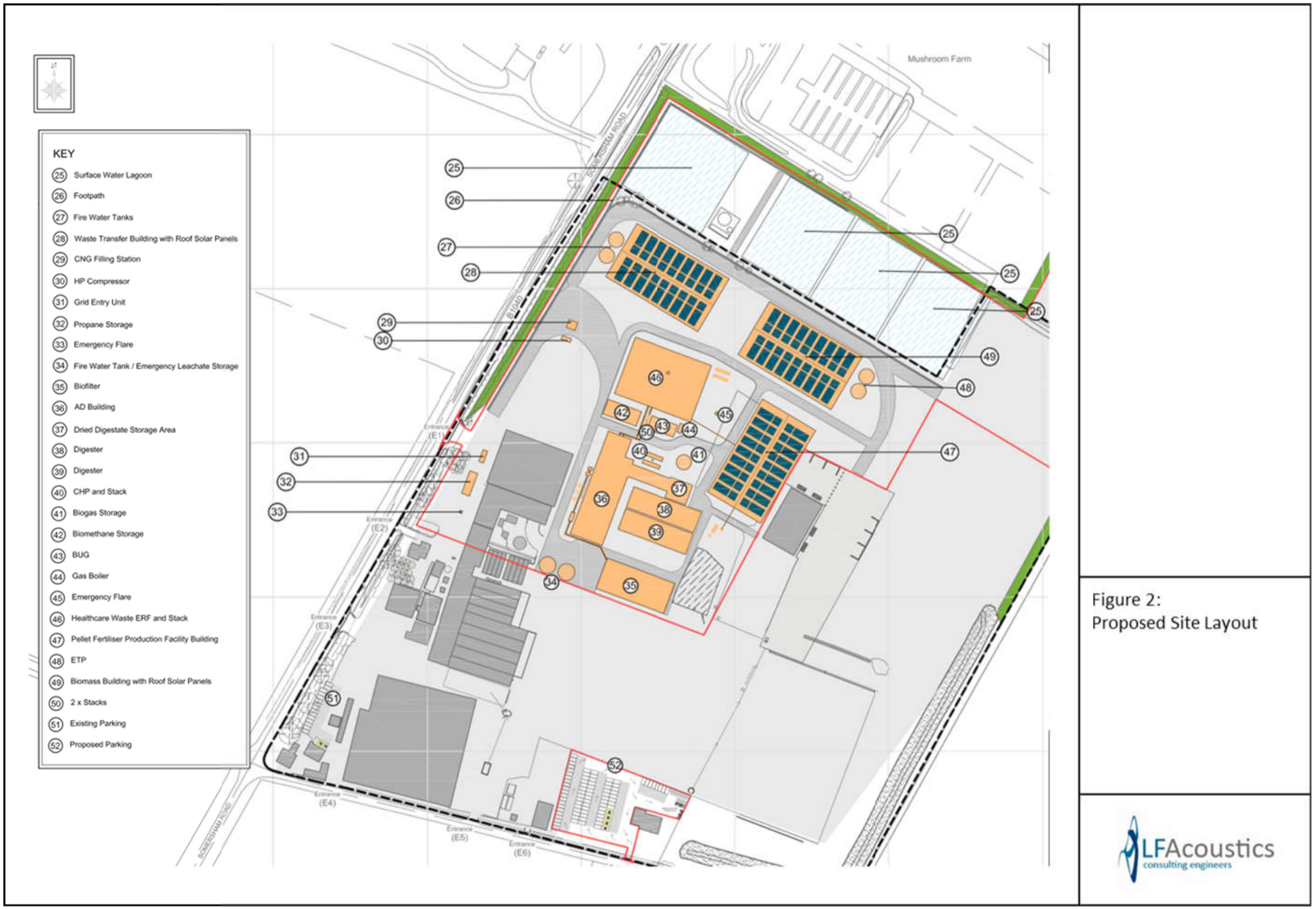
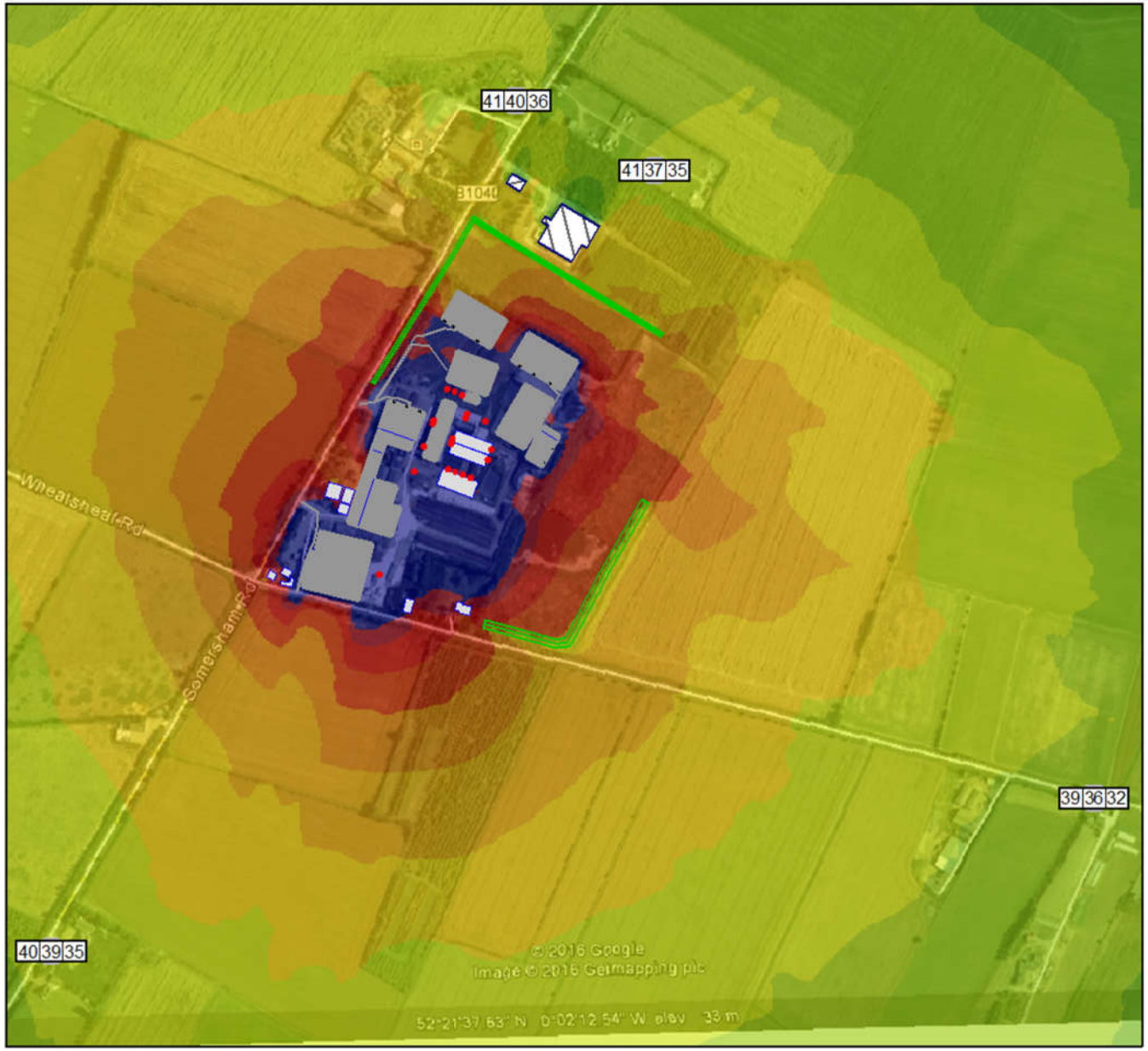


Figure 2:
Proposed Site Layout

LFAcoustics
consulting engineers

LFAcoustics
consulting engineers



Noise Level LAeq,T
in dB(A)

< 30
30 - 33
33 - 36
36 - 39
39 - 42
42 - 45
45 - 48
48 - 51
51 - 54
54 - 57
57 - 60
>= 60

Façade $L_{Aeq,T}$

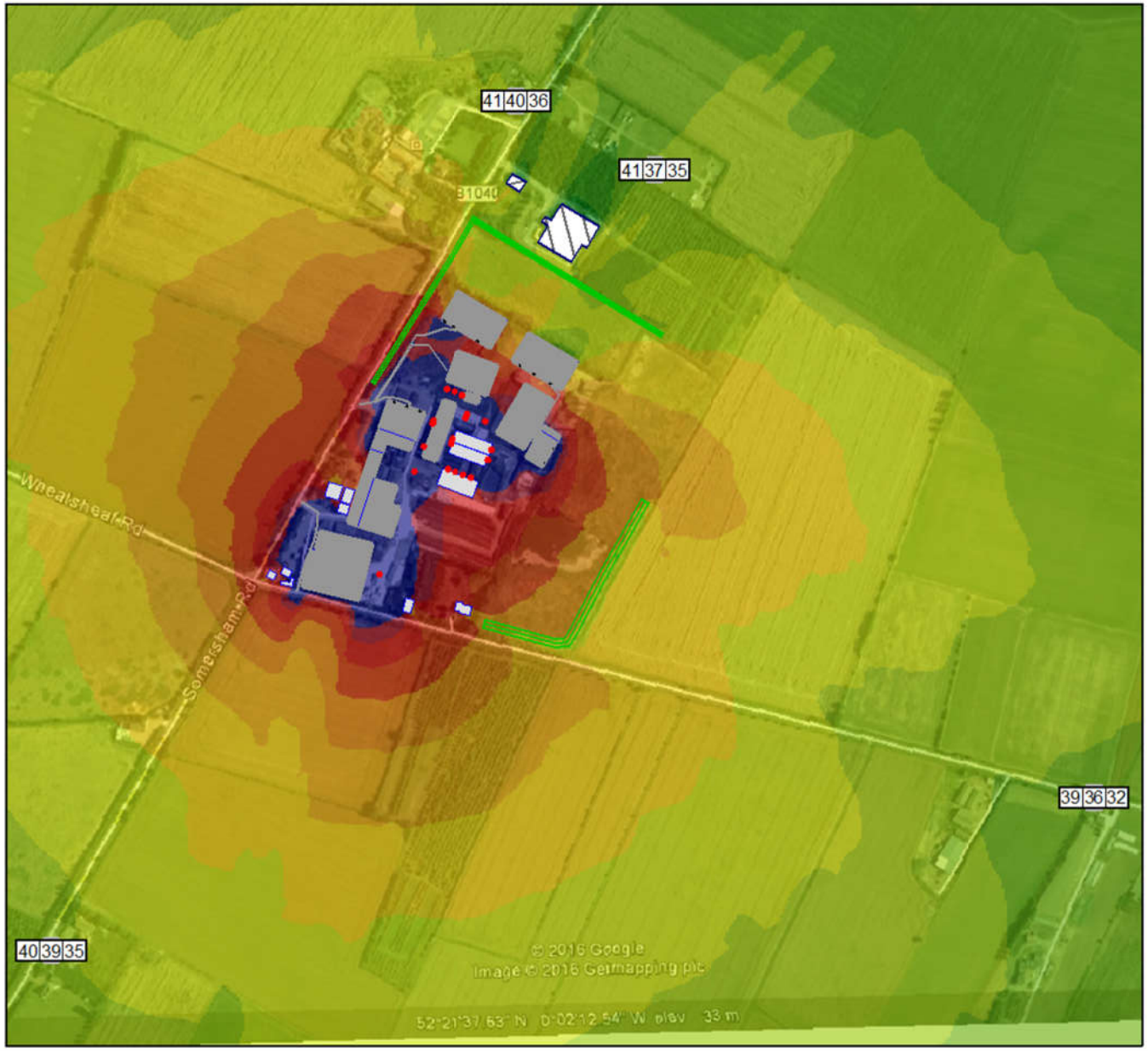
40	32	26

Daytime
Early Morning / Evening
Night

Figure 3:
Calculated Noise Levels
Daytime Operations

LFAcoustics
consulting engineers

LFAcoustics
consulting engineers



Noise Level LAeq,T
in dB(A)

< 30
30 - 33
33 - 36
36 - 39
39 - 42
42 - 45
45 - 48
48 - 51
51 - 54
54 - 57
57 - 60
>= 60

Façade $L_{Aeq,T}$

40	32	26

Daytime — Night

Early Morning / Evening

Figure 4:
Calculated Noise Levels
Early Morning / Evening

LFAcoustics
consulting engineers

LFAcoustics
consulting engineers

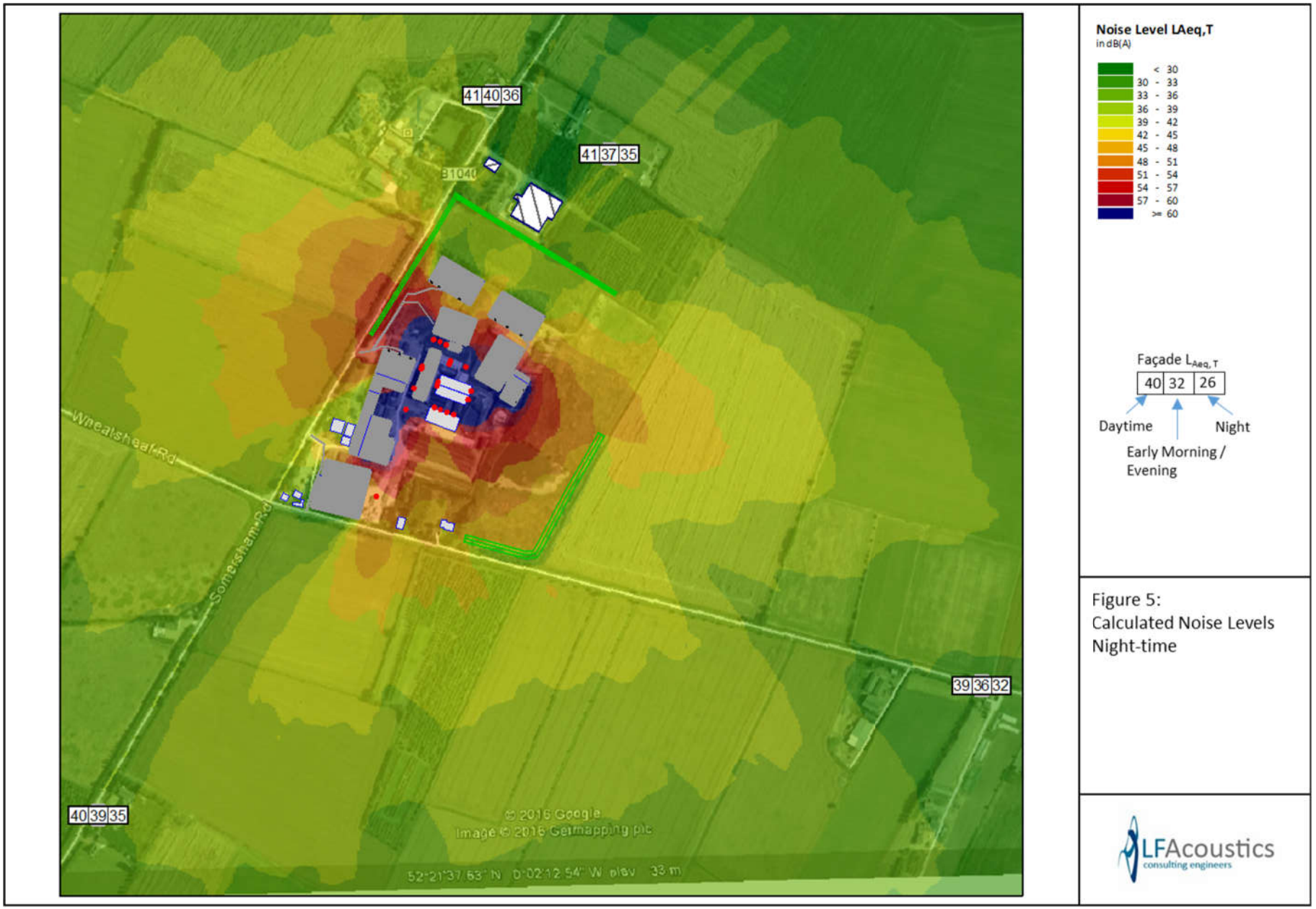
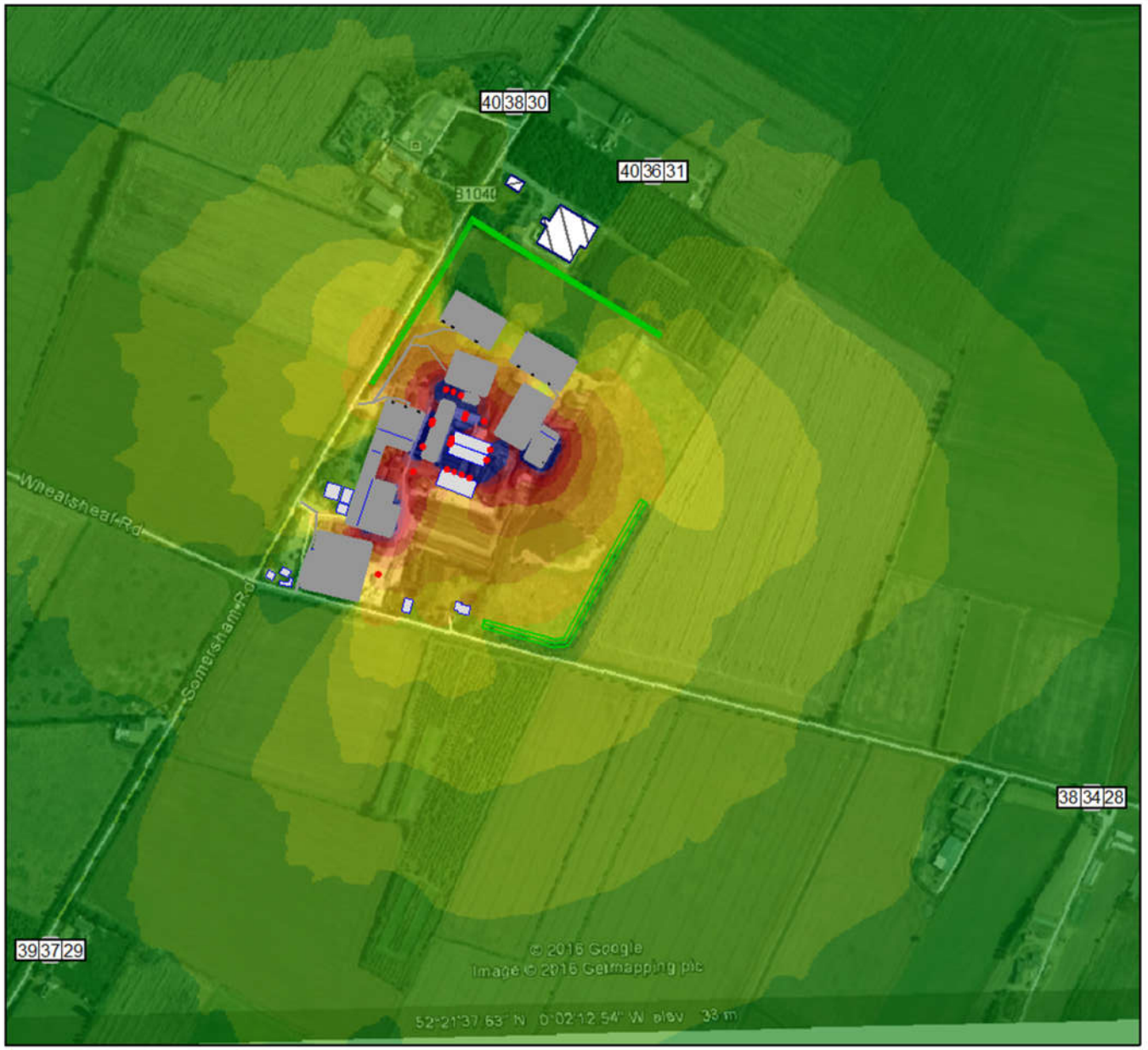


Figure 5:
Calculated Noise Levels
Night-time

LFAcoustics
consulting engineers

LFAcoustics
consulting engineers



Noise Level LAeq,T
in dB(A)

< 30
30 - 33
33 - 36
36 - 39
39 - 42
42 - 45
45 - 48
48 - 51
51 - 54
54 - 57
57 - 60
>= 60

Façade $L_{Aeq,T}$

40	32	26
Daytime	Early Morning / Evening	Night

Figure 6:
Calculated Noise Levels
Night-time
With Indicative Mitigation for AD Plant

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LFAcoustics
consulting engineers

Appendix A
Noise Units

Decibels (dB)

Noise can be defined as unwanted sound. Sound in air can be considered as the propagation of energy through the air in the form of oscillatory changes in pressure. The size of the pressure changes in acoustic waves is quantified on a logarithmic decibel (dB) scale firstly because the range of audible sound pressures is very great, and secondly because the loudness function of the human auditory system is approximately logarithmic.

The dynamic range of the auditory system is generally taken to be 0 dB to 140 dB. Generally, the addition of noise from two sources producing the same sound pressure level will lead to an increase in sound pressure level of 3 dB. A 3 dB noise change is generally considered to be just noticeable, a 5 dB change is generally considered to be clearly discernible and a 10 dB change is generally accepted as leading to the subjective impression of a doubling or halving of loudness.

A-Weighting

The bandwidth of the frequency response of the ear is usually taken to be from about 18 Hz to 18,000 Hz. The auditory system is not equally sensitive throughout this frequency range. This is taken into account when making acoustic measurements by the use of A-weighting, a filter circuit which has a frequency response similar to the human auditory system. All the measurement results referred to in this report are A-weighted.

Units Used to Describe Time-Varying Noise Sources (L_{Aeq}, L_{A10}, L_{A90} and L_{Amax})

Instantaneous A-weighted sound pressure level is not generally considered as an adequate indicator of subjective response to noise because levels of noise usually vary with time.

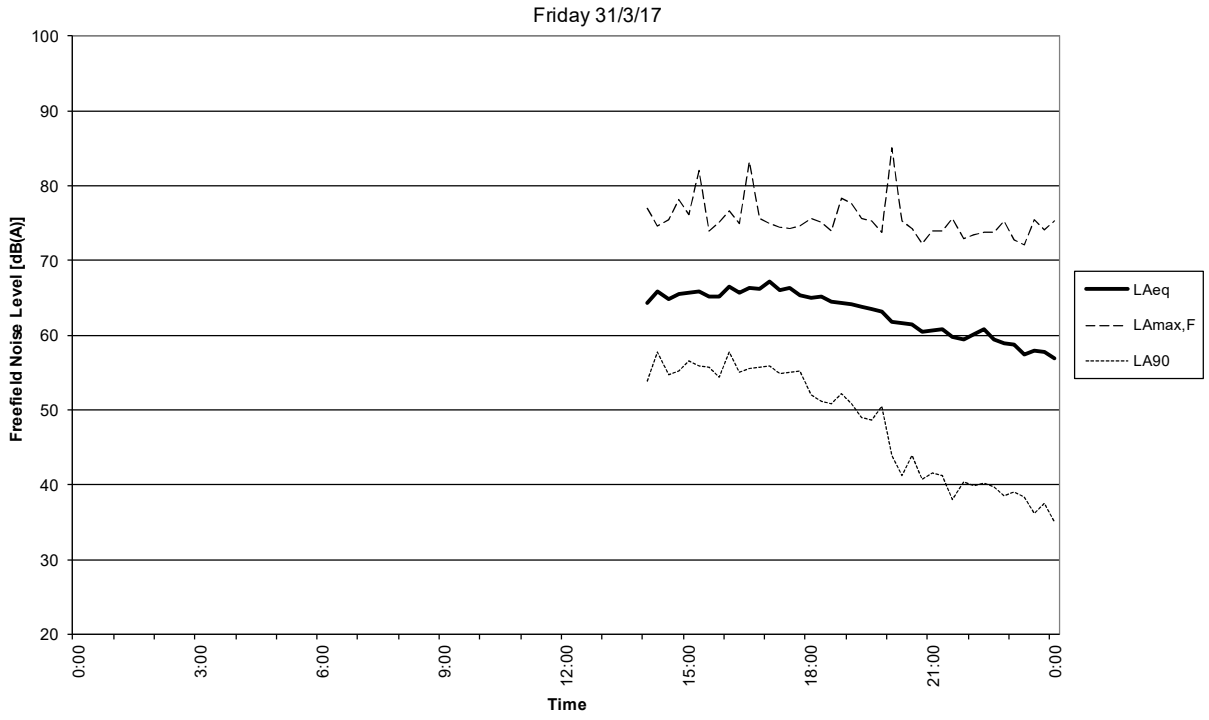
For many types of noise the Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$) is used as the basis of determining community response. The $L_{Aeq,T}$ is defined as the A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period, T.

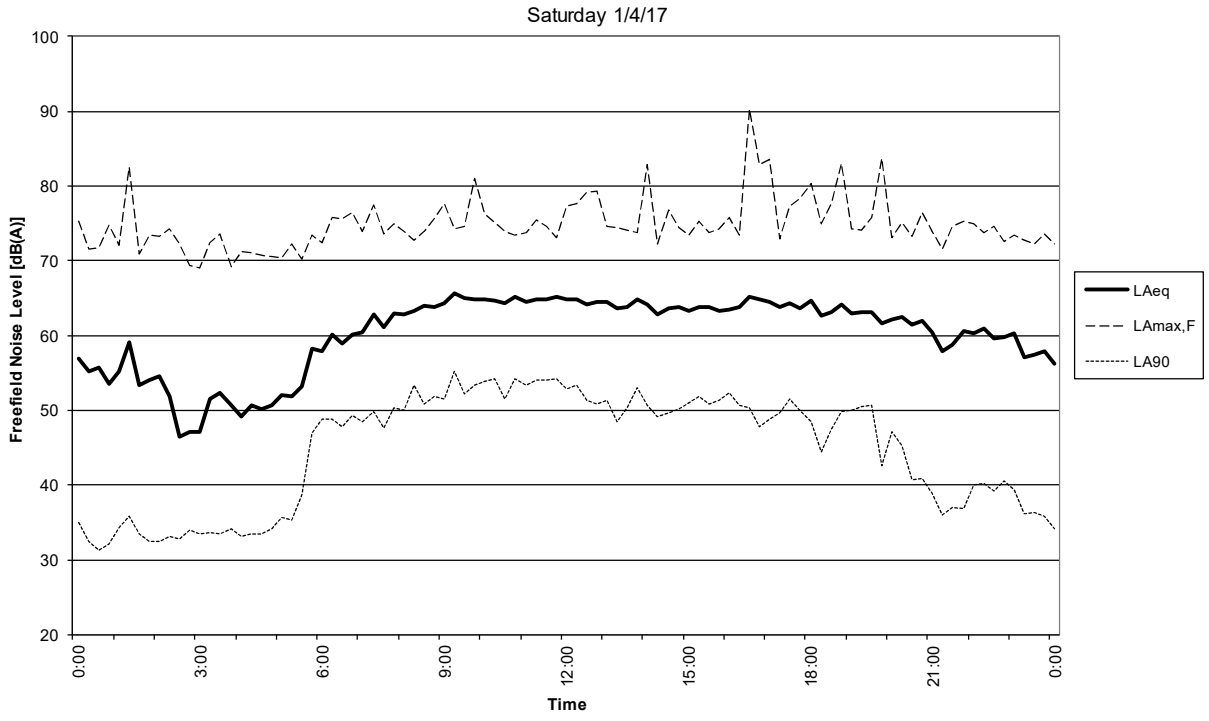
The L_{A10} is the noise level exceeded for 10% of the measurement period. It has been used in the UK for the assessment of road traffic noise.

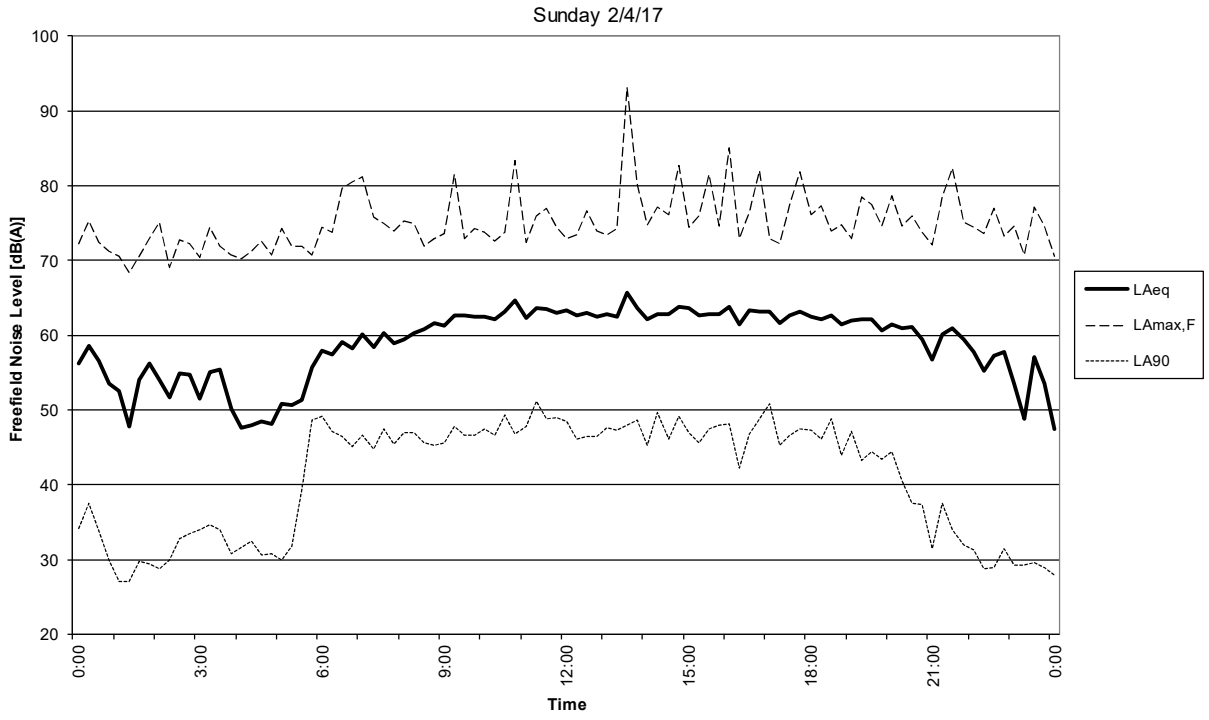
The L_{A90} is the noise level exceeded for 90% of the measurement period. It is generally used to quantify the background noise level, the underlying level of noise, which is present even during the quieter parts of the measurement period.

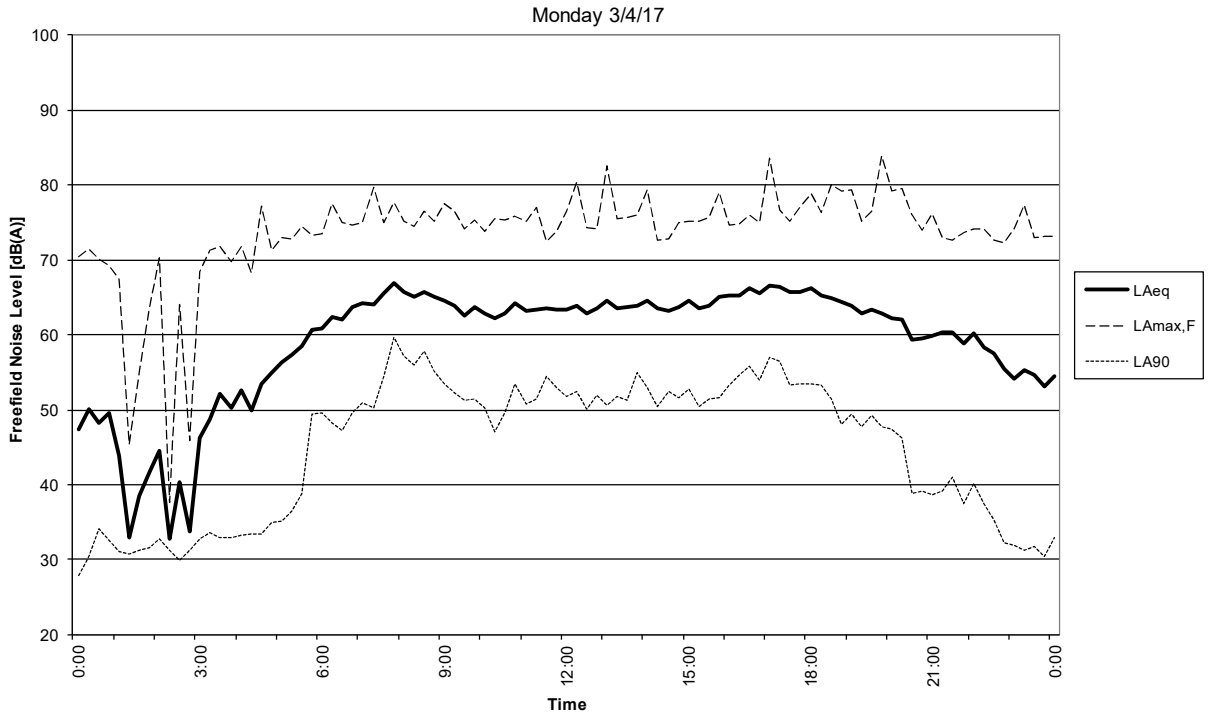
The L_{Amax} is the maximum value that the A-weighted sound pressure level reaches during a measurement period. $L_{Amax\,F}$, or Fast, is averaged over 0.125 of a second and $L_{Amax\,S}$, or Slow, is averaged over 1 second.

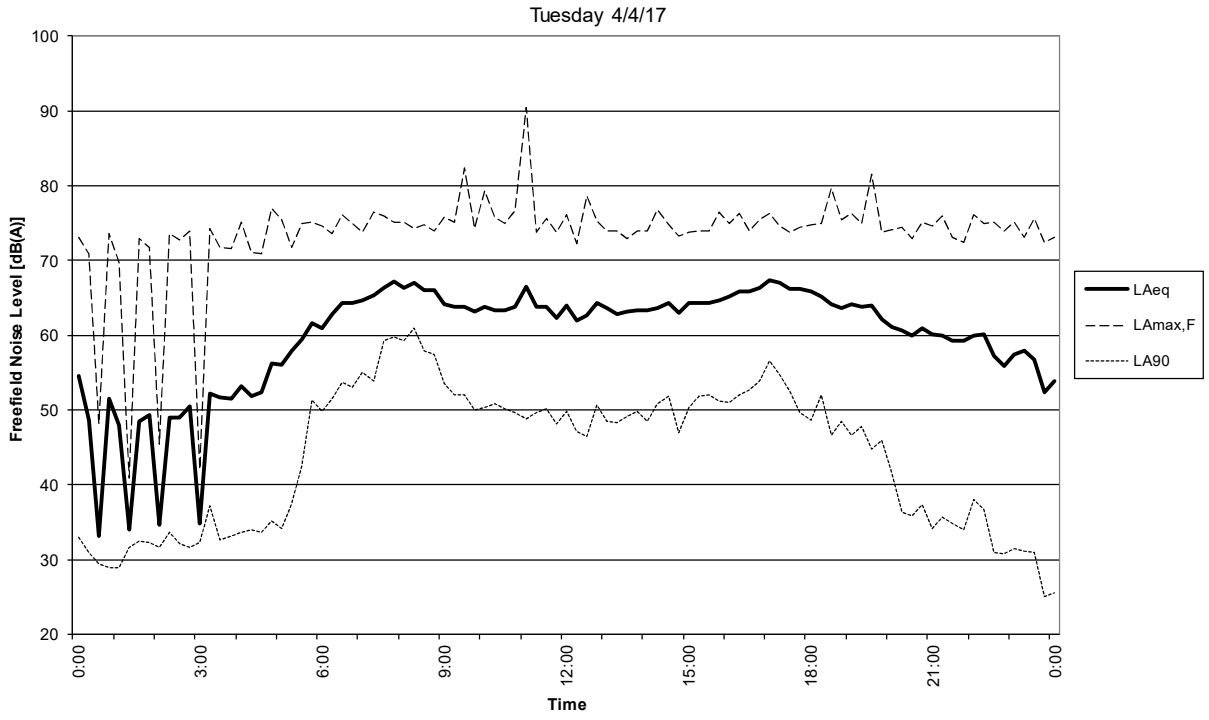
Appendix B
Results of Unattended Noise Survey at Rectory Farm

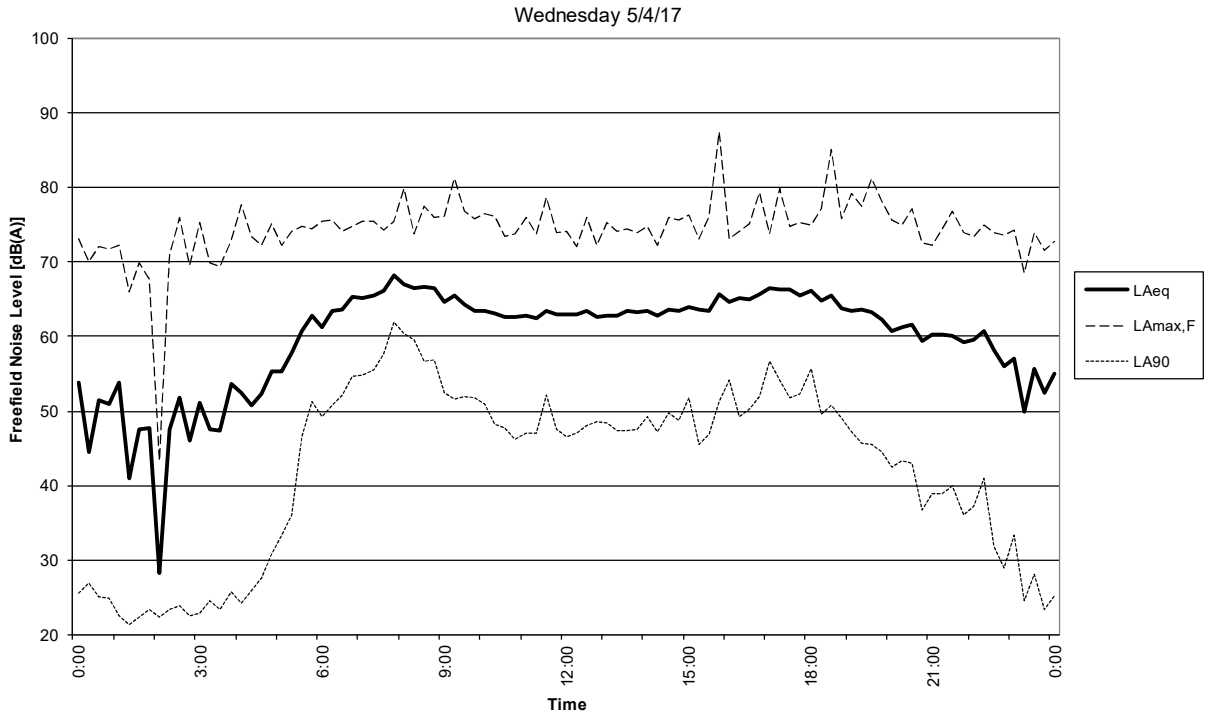

Friday 31/3/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90


Saturday 1/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90


Sunday 2/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90


Monday 3/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90


Tuesday 4/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90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Freefield Noise Level [dB(A)]
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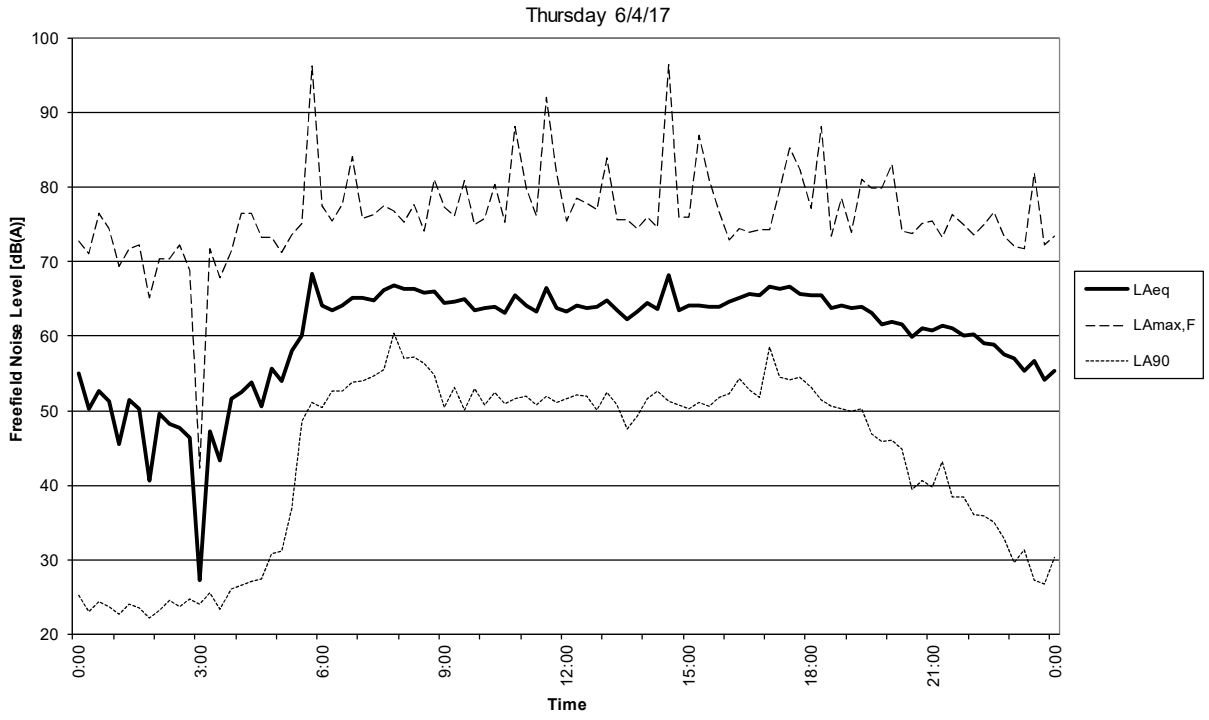
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90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Freefield Noise Level [dB(A)]
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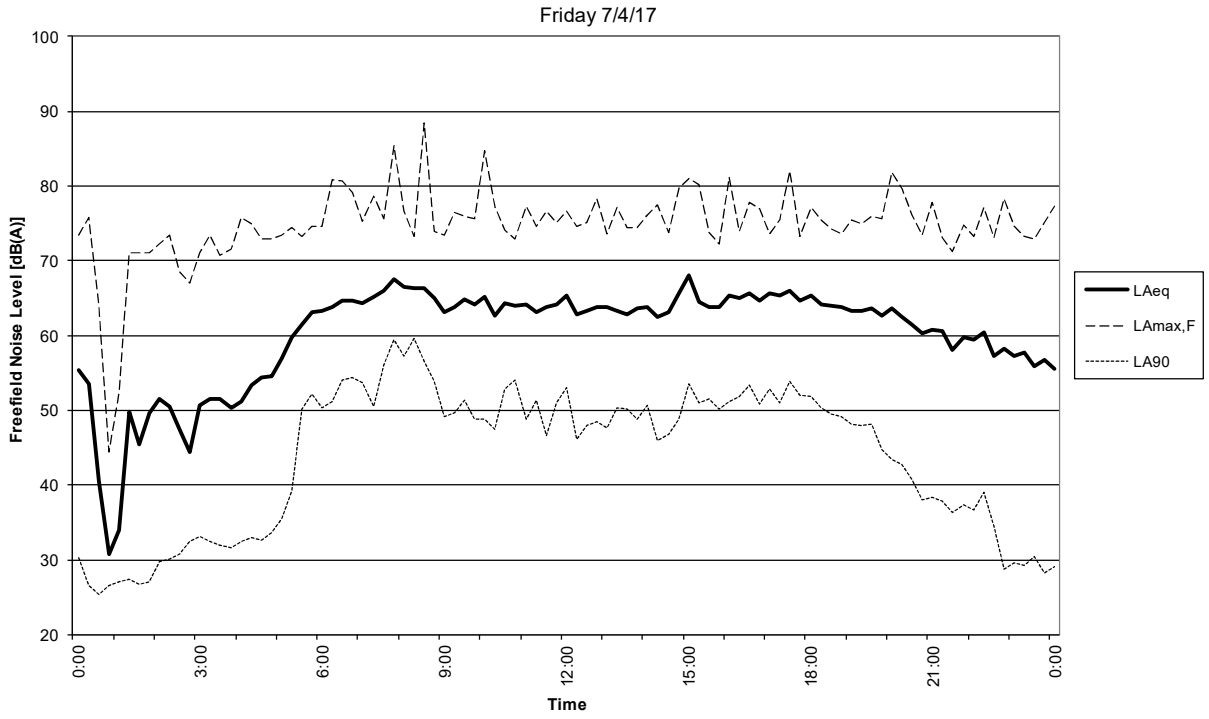
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90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Freefield Noise Level [dB(A)]
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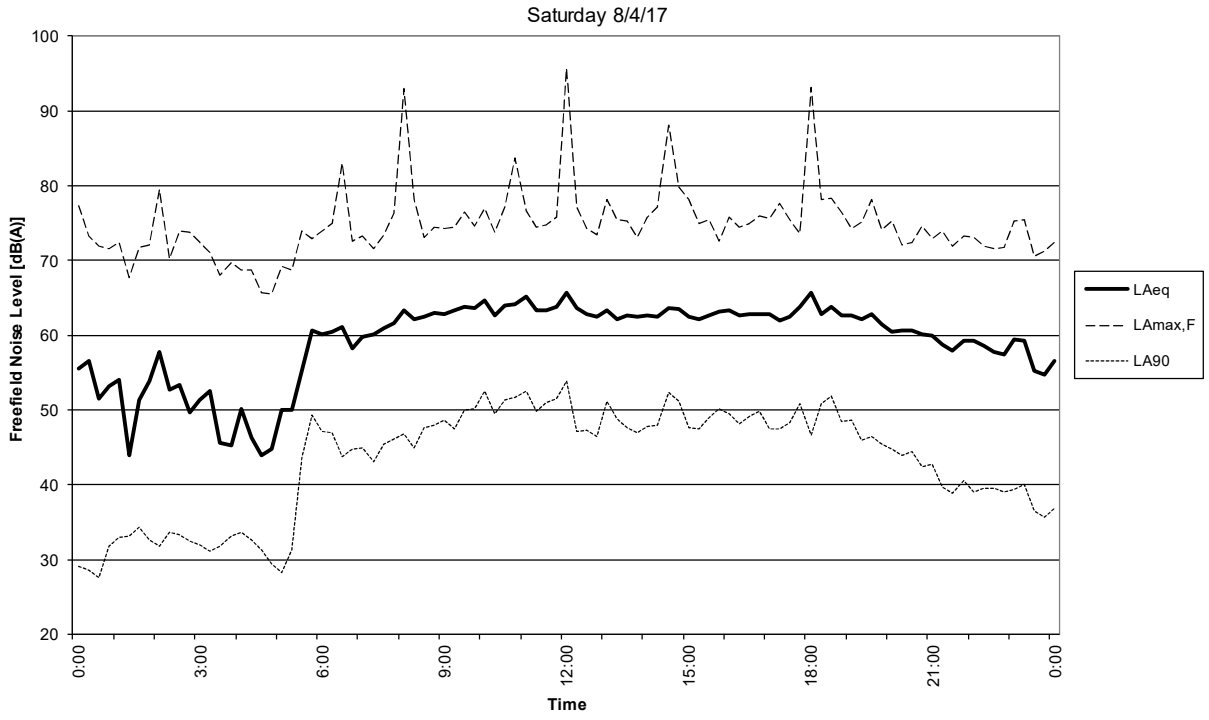
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90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Freefield Noise Level [dB(A)]
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90
80
70
60
50
40
30
20
0:00
3:00
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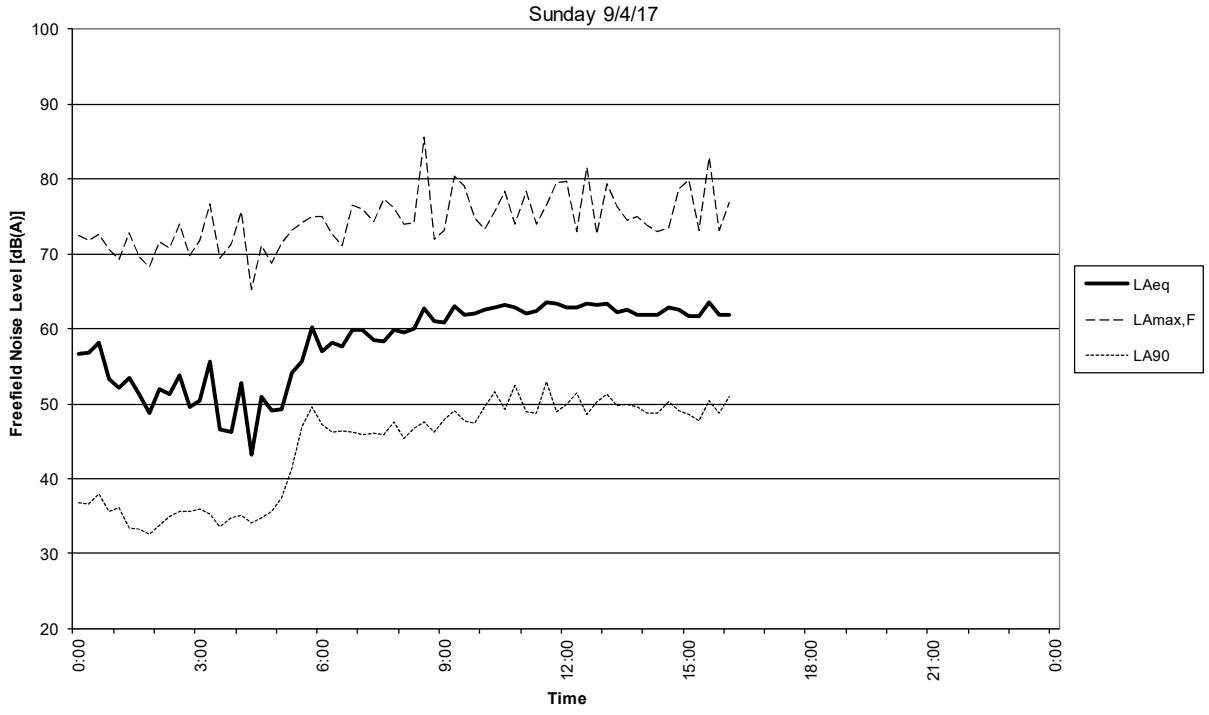
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90


Sunday 9/4/17
Freefield Noise Level [dB(A)]
100
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80
70
60
50
40
30
20
0:00
3:00
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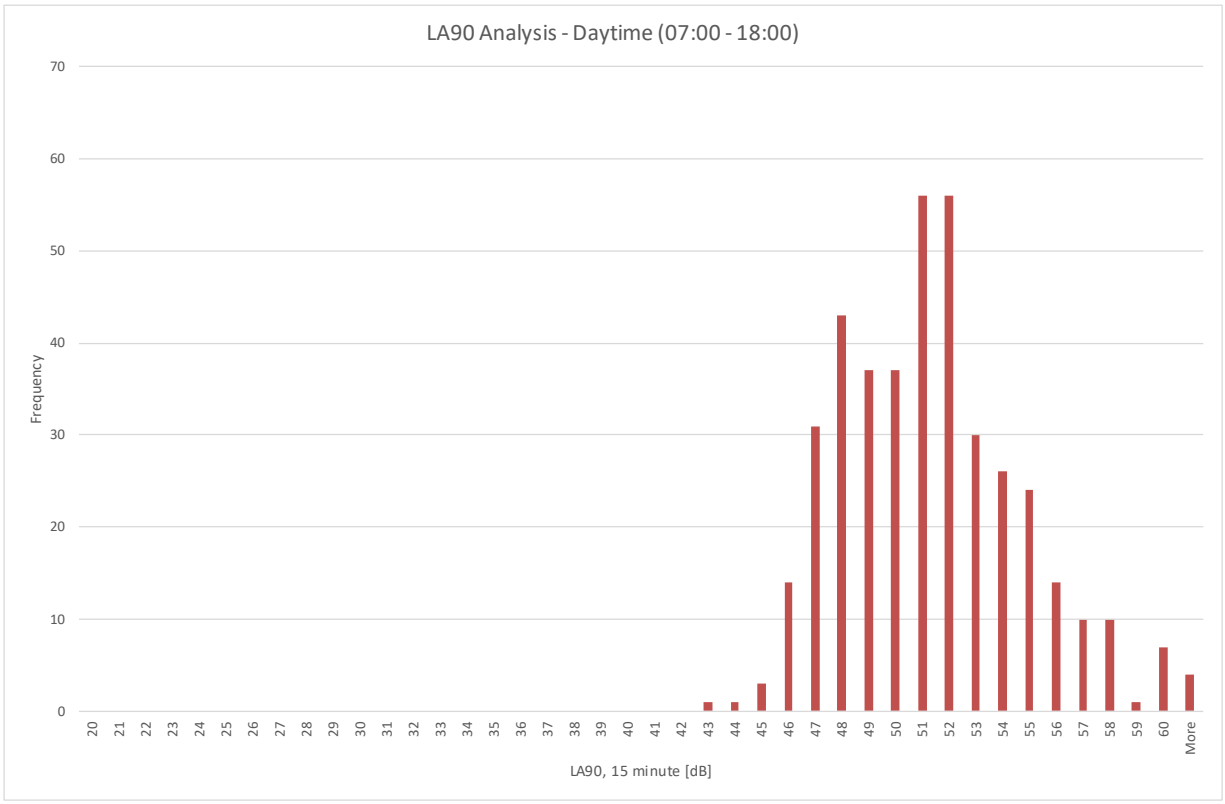
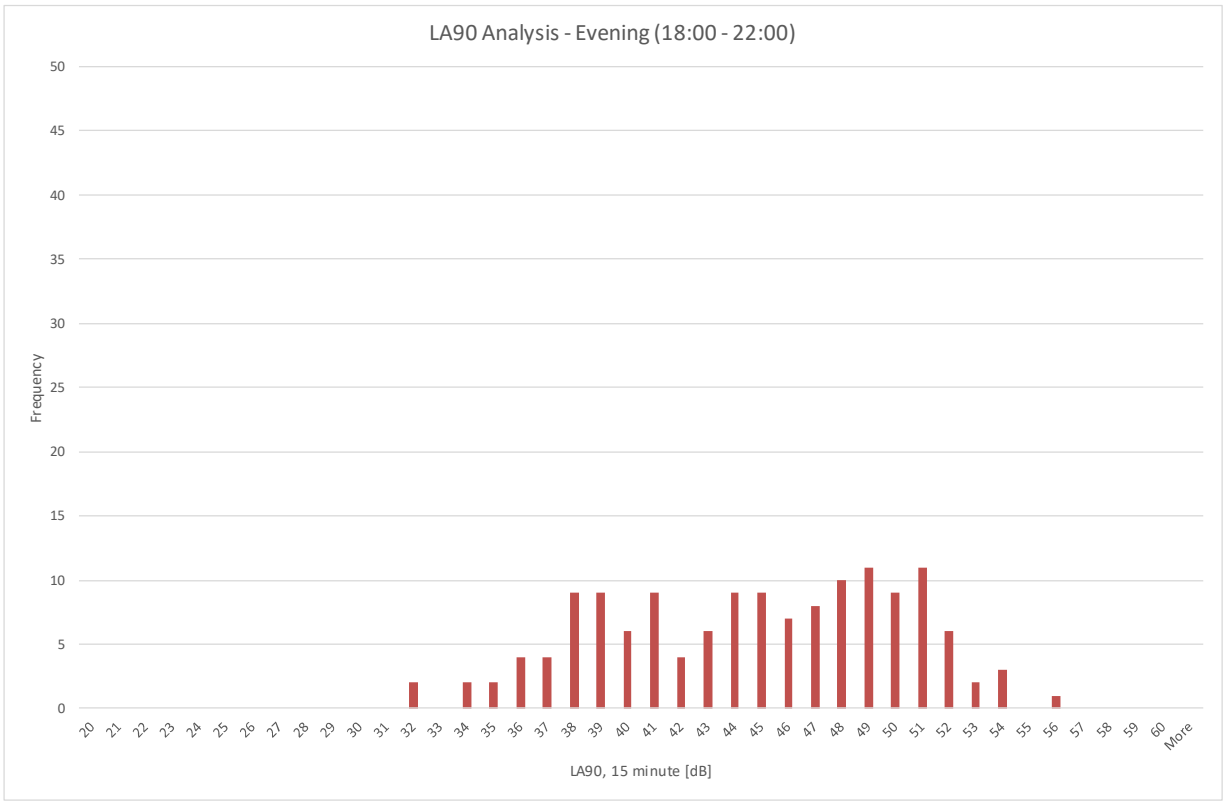
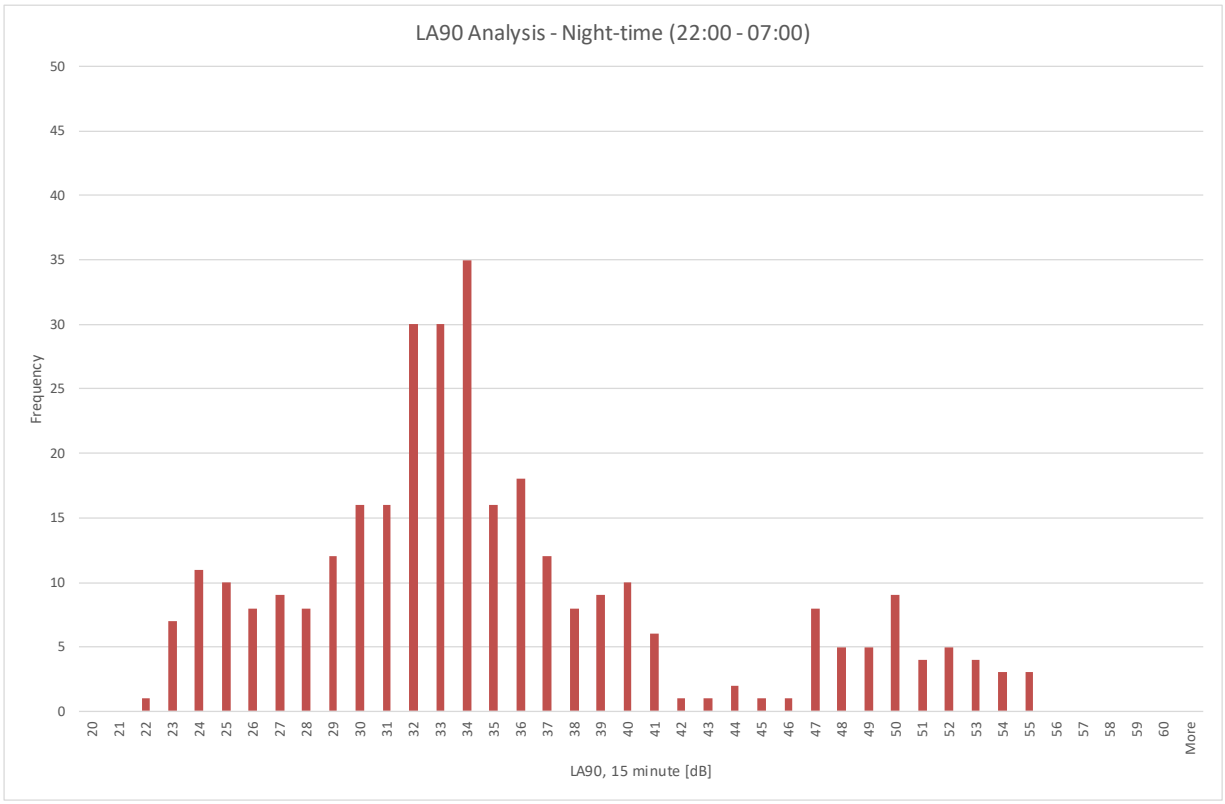
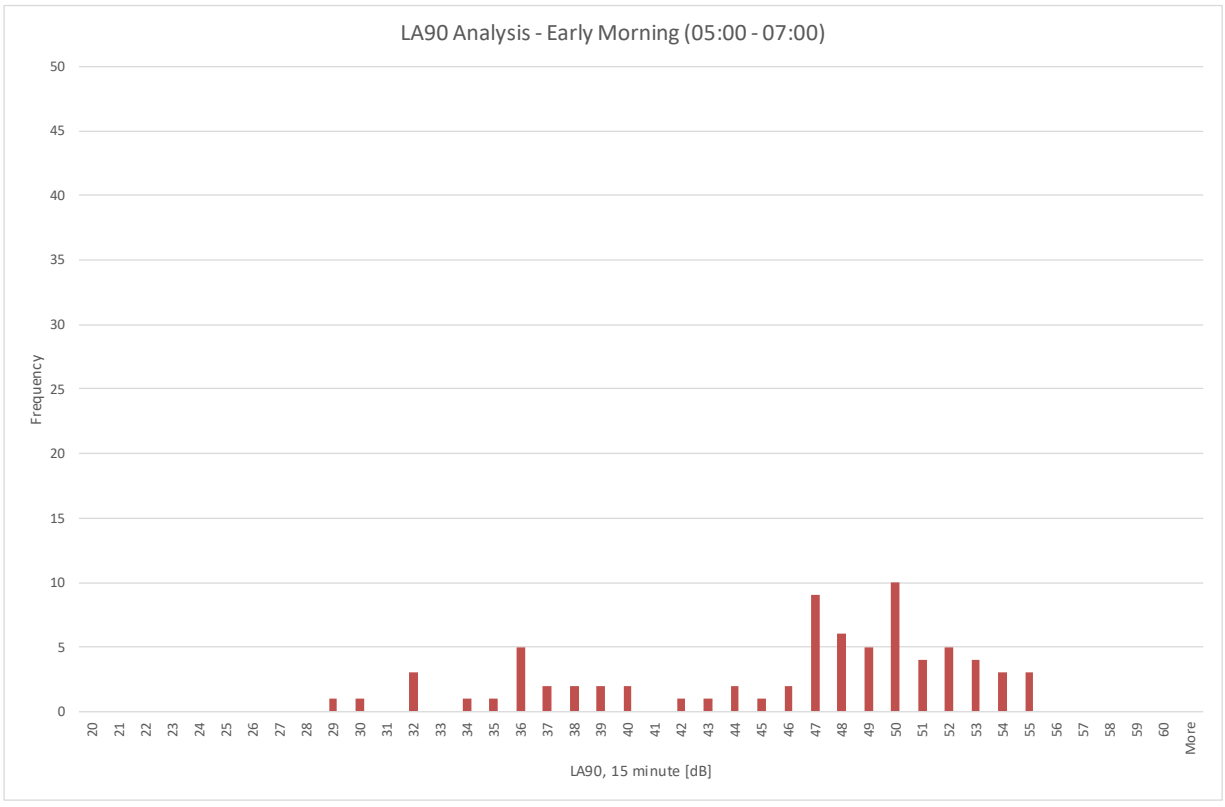
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90

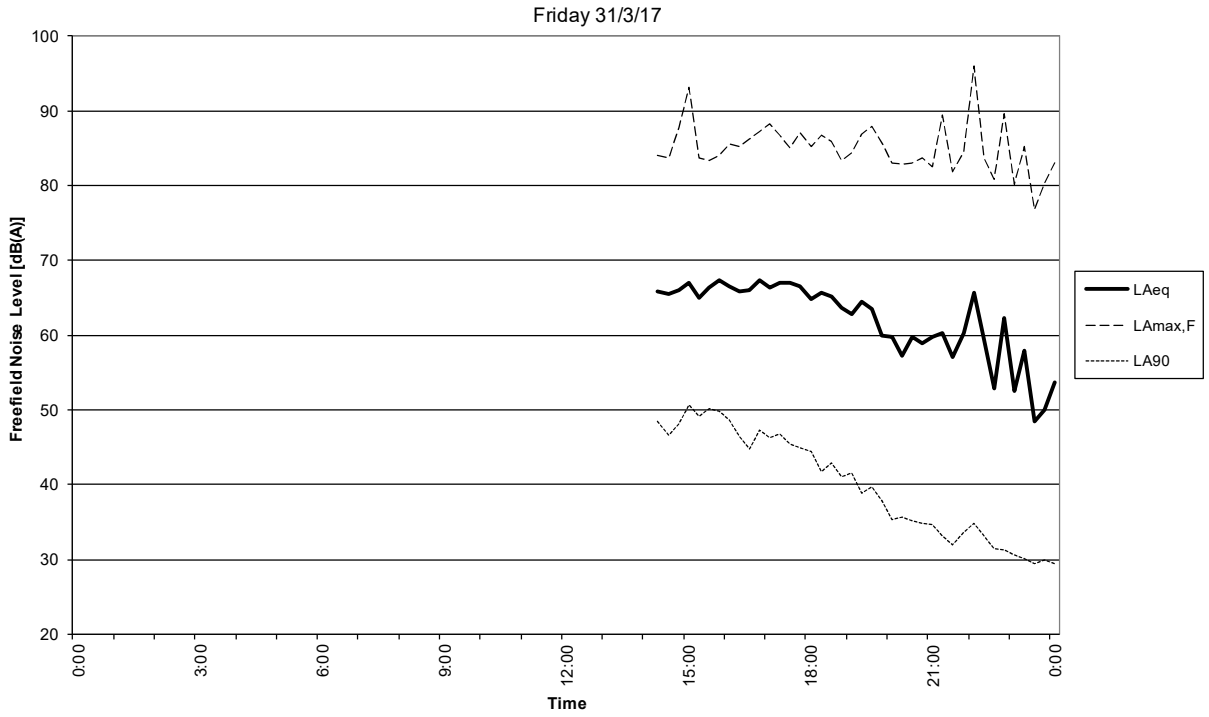

LA90 Analysis - Daytime (07:00 - 18:00)
Frequency
LA90, 15 minute [dB]
0
10
20
30
40
50
60
70
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 More

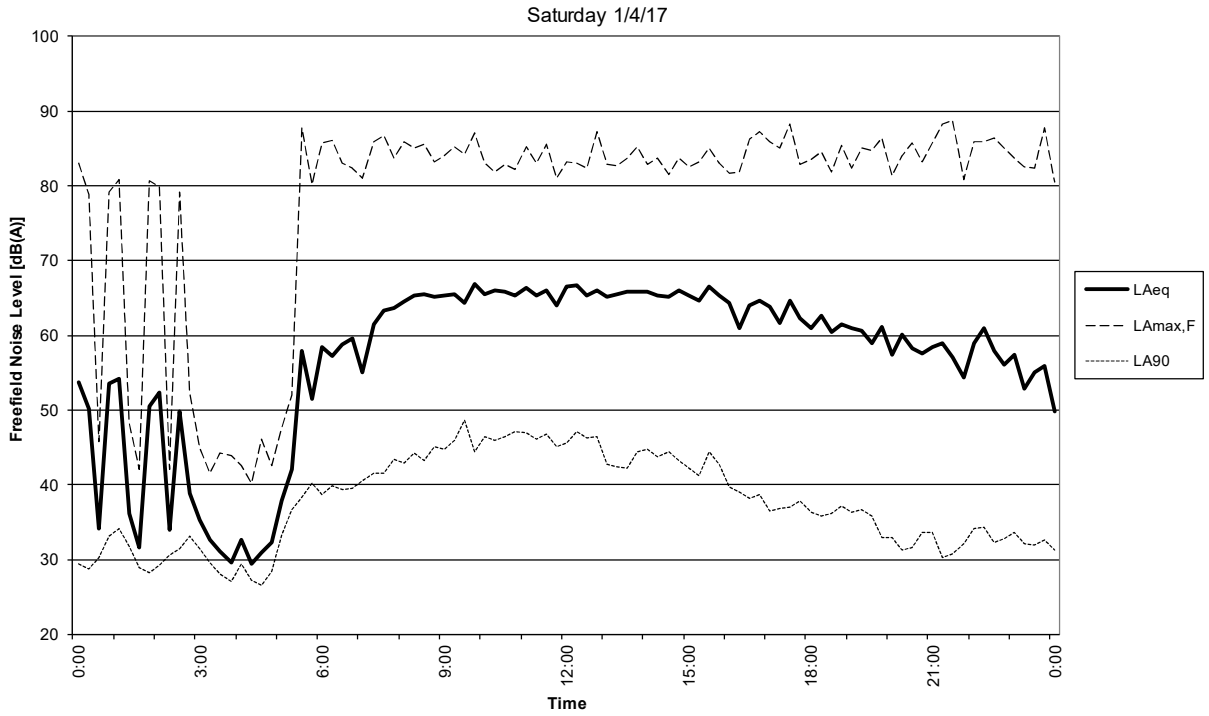

LA90 Analysis - Evening (18:00 - 22:00)
Frequency
LA90, 15 minute [dB]
0
5
10
15
20
25
30
35
40
45
50
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 More


LA90 Analysis - Night-time (22:00 - 07:00)
Frequency
LA90, 15 minute [dB]
0
5
10
15
20
25
30
35
40
45
50
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 More


LA90 Analysis - Early Morning (05:00 - 07:00)
Frequency
LA90, 15 minute [dB]
0
5
10
15
20
25
30
35
40
45
50
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 More

Appendix C
Results of Unattended Noise Survey at Bridge Farm


Friday 31/3/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90


Saturday 1/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
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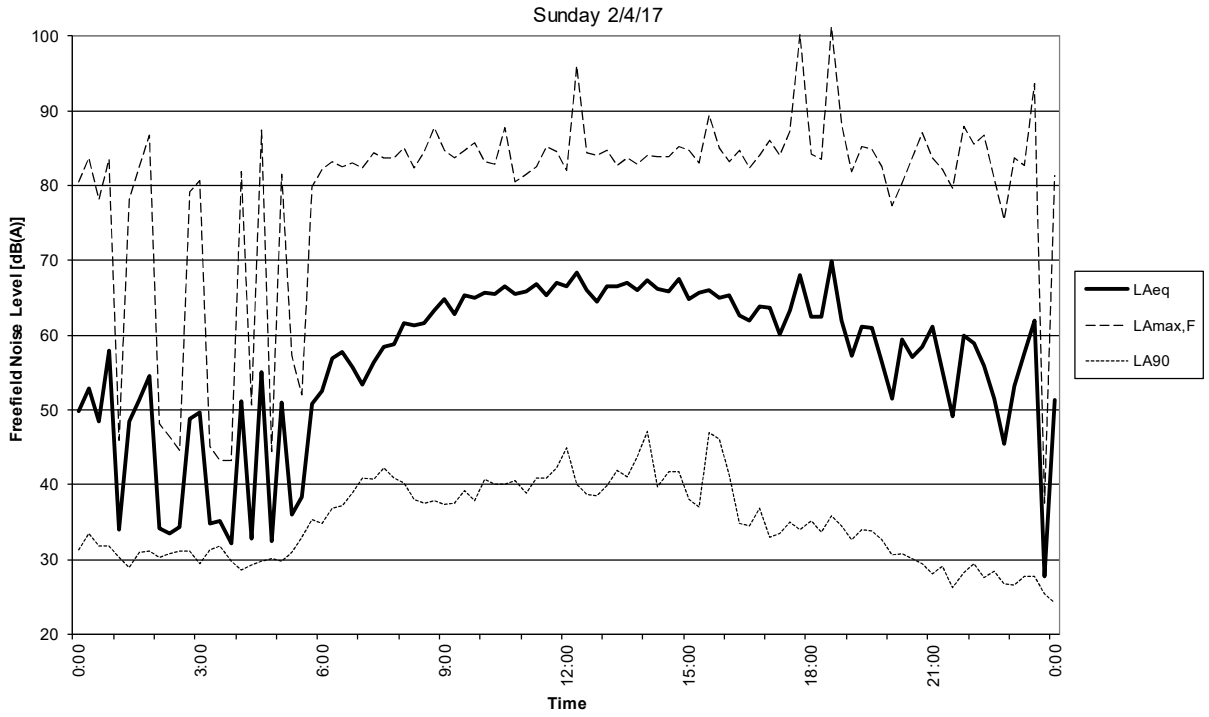
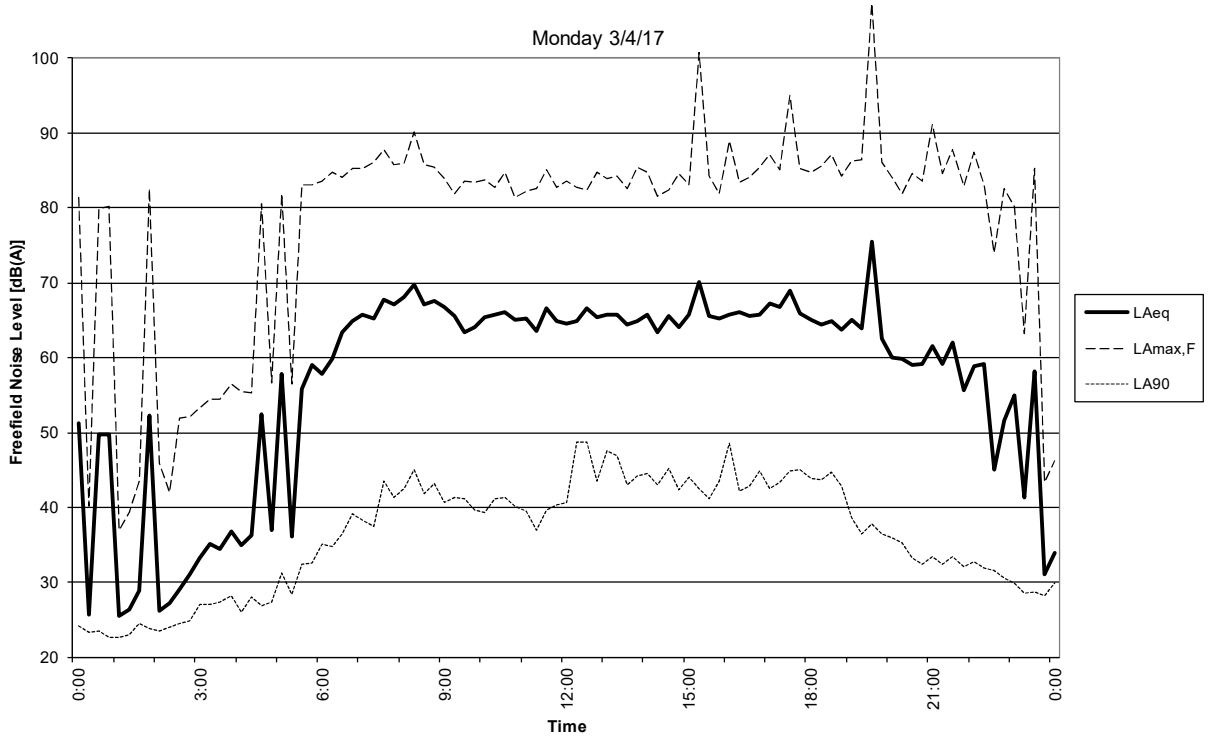
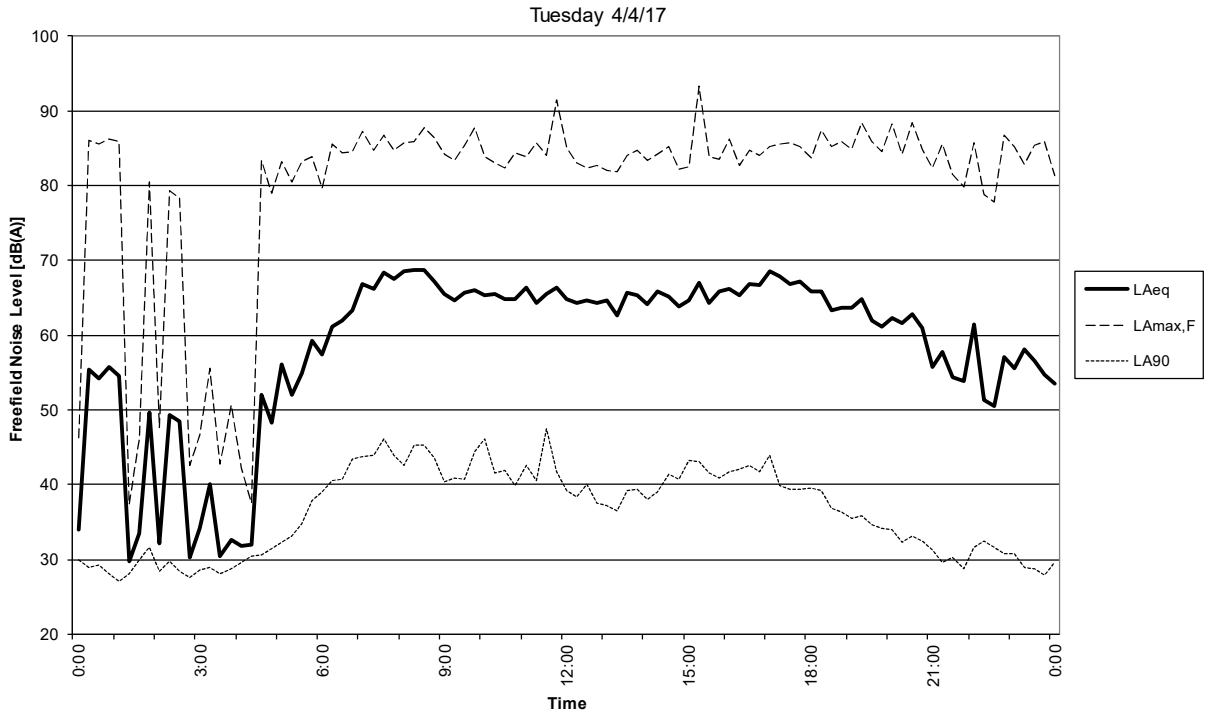
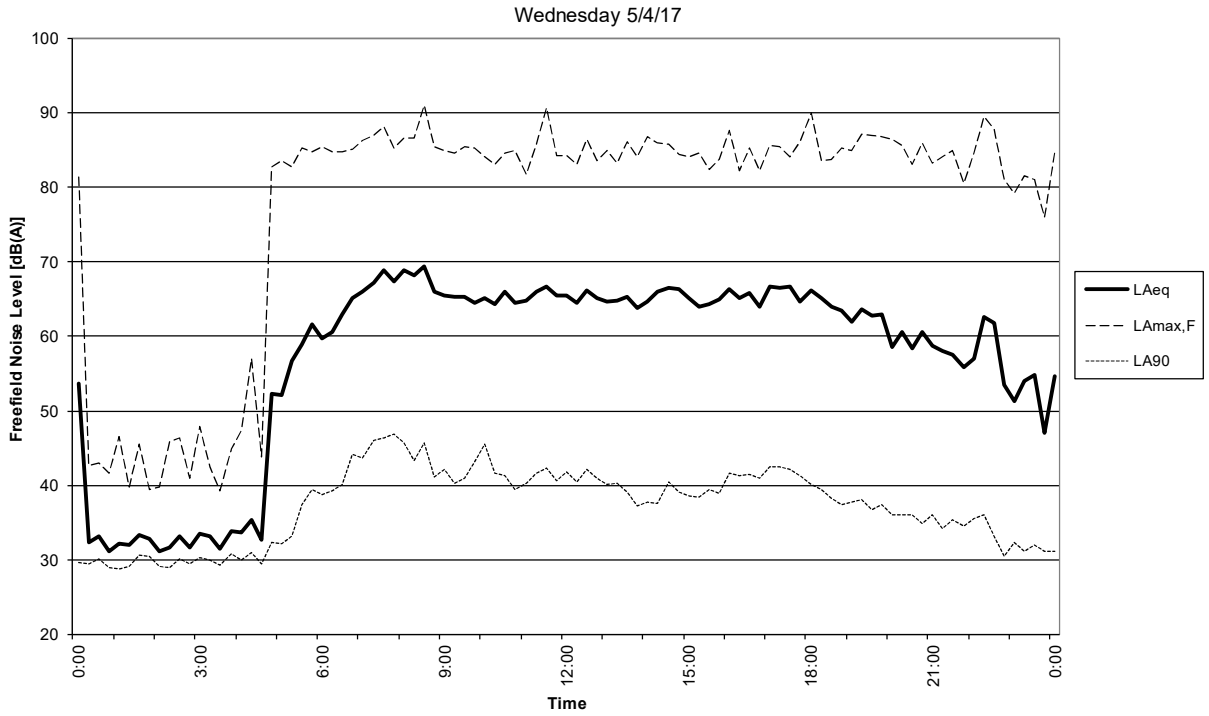
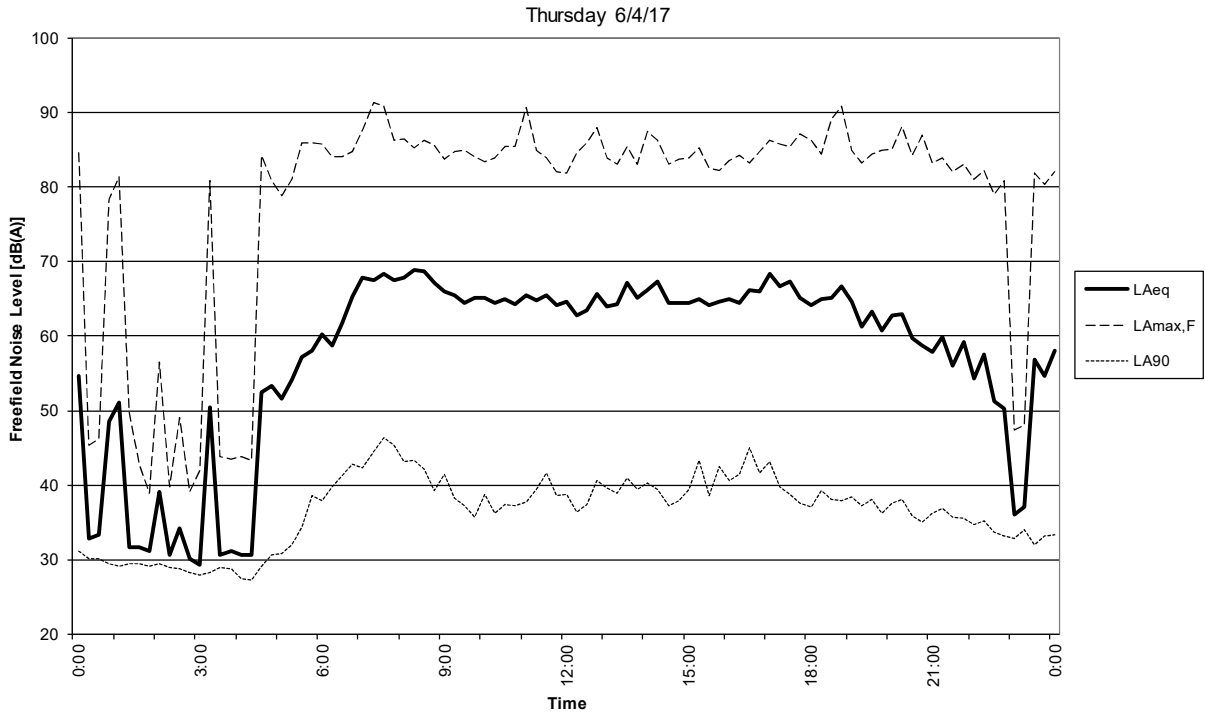
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90

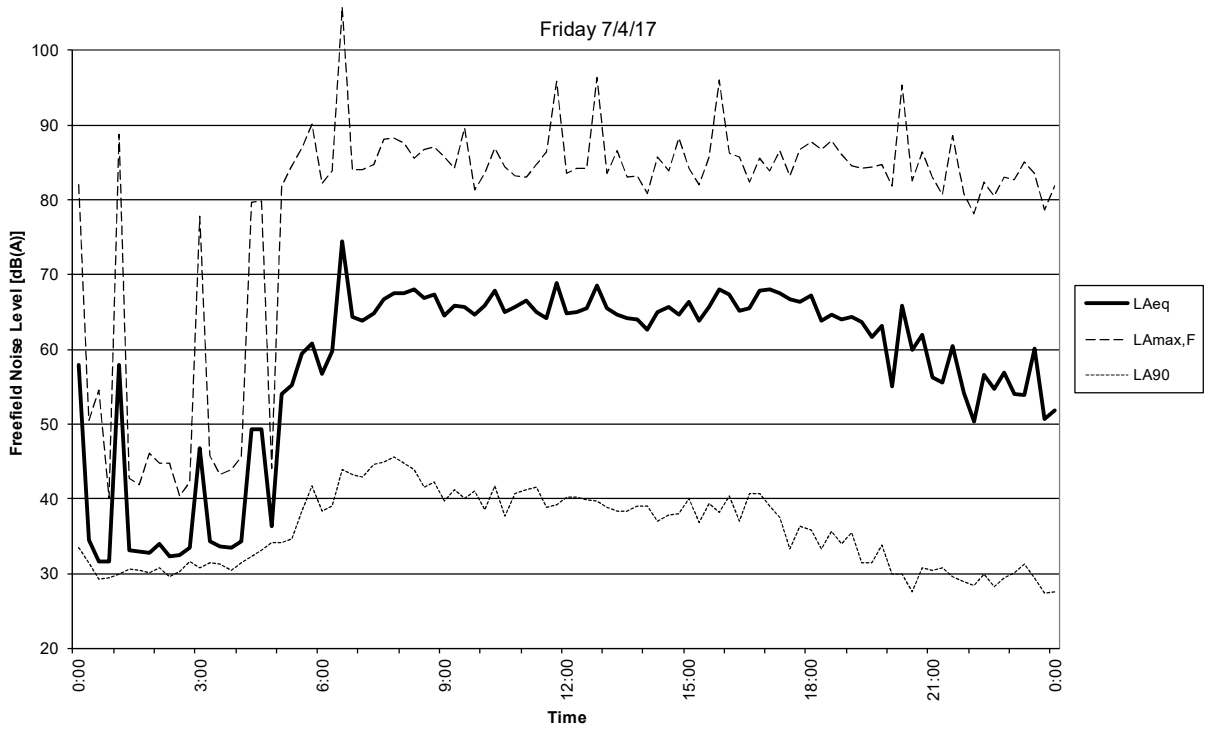

Sunday 2/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90

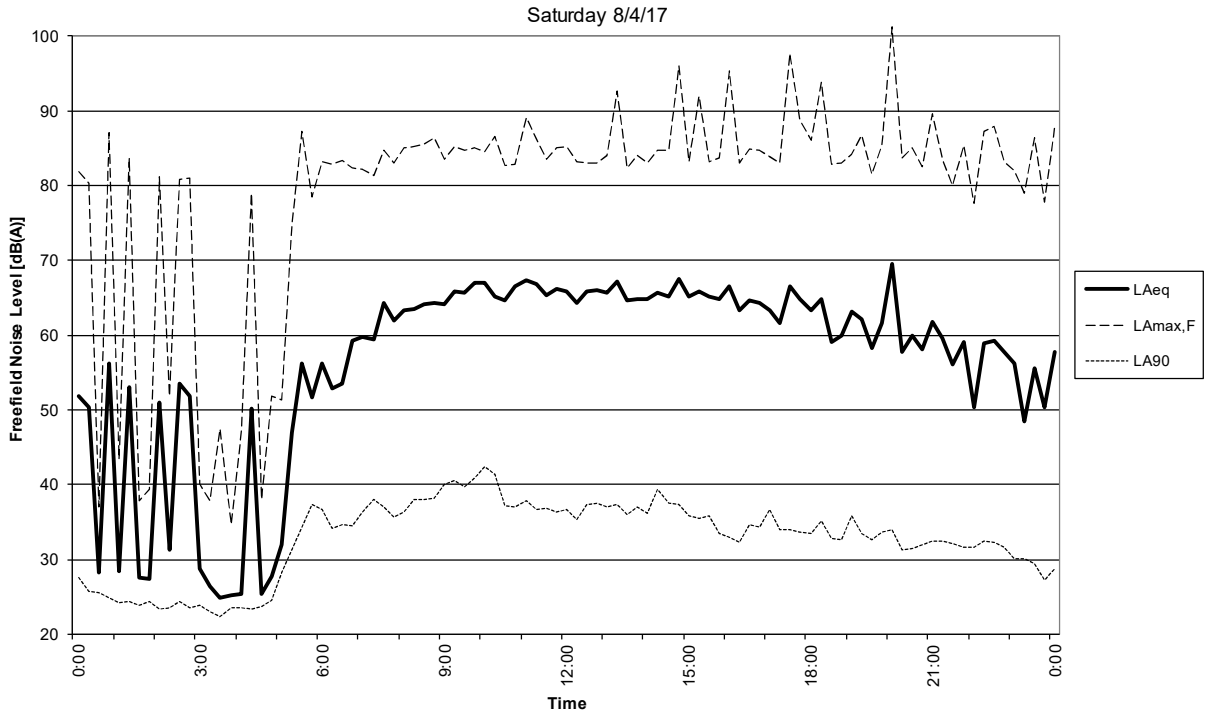

Monday 3/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90

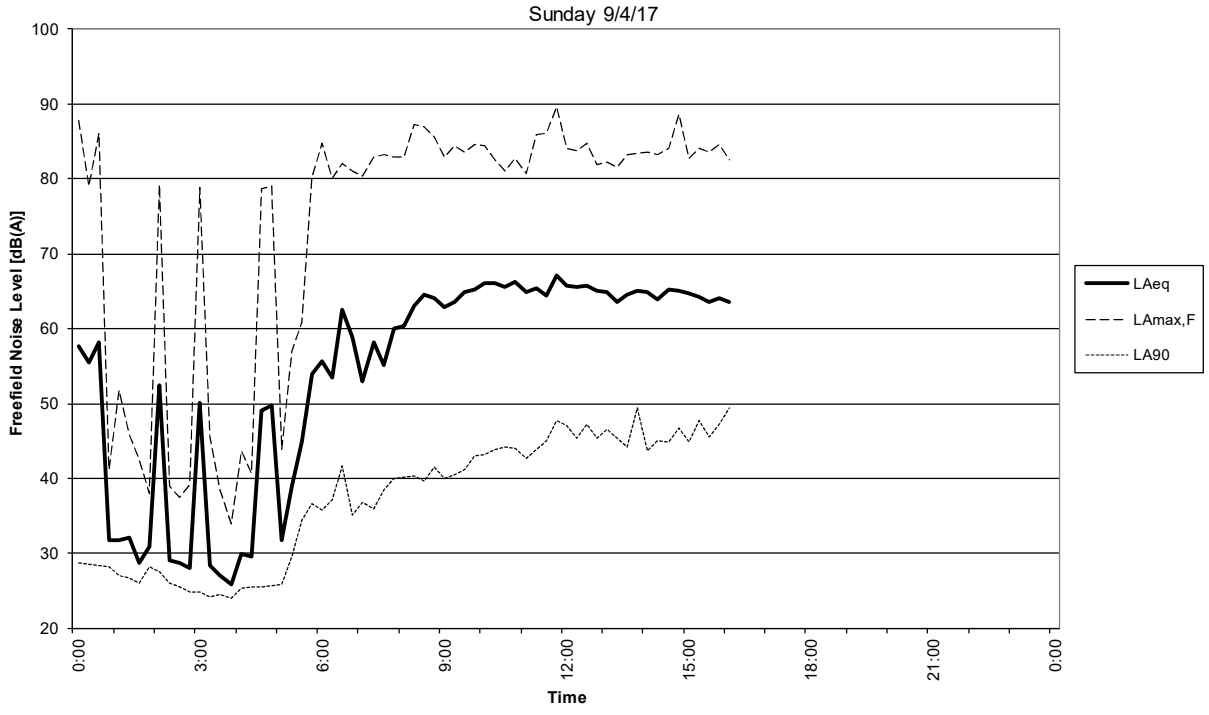

Tuesday 4/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90

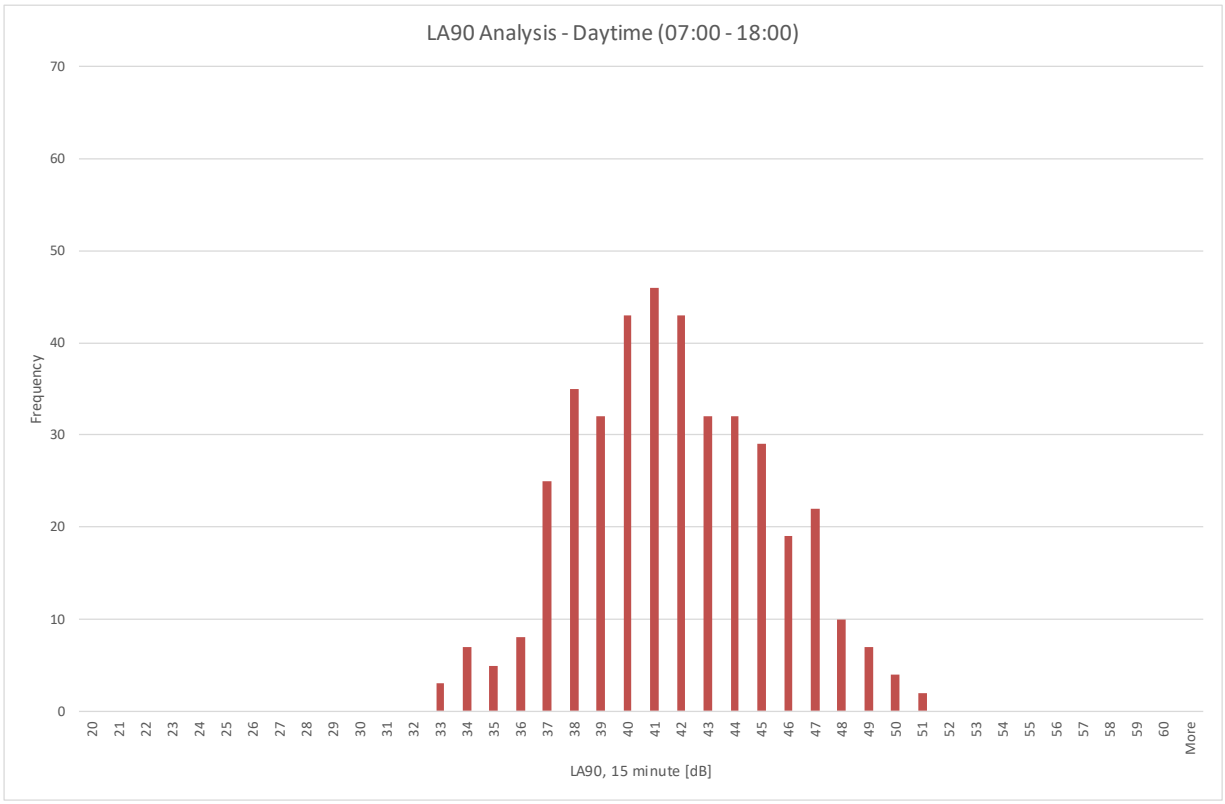

Wednesday 5/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90

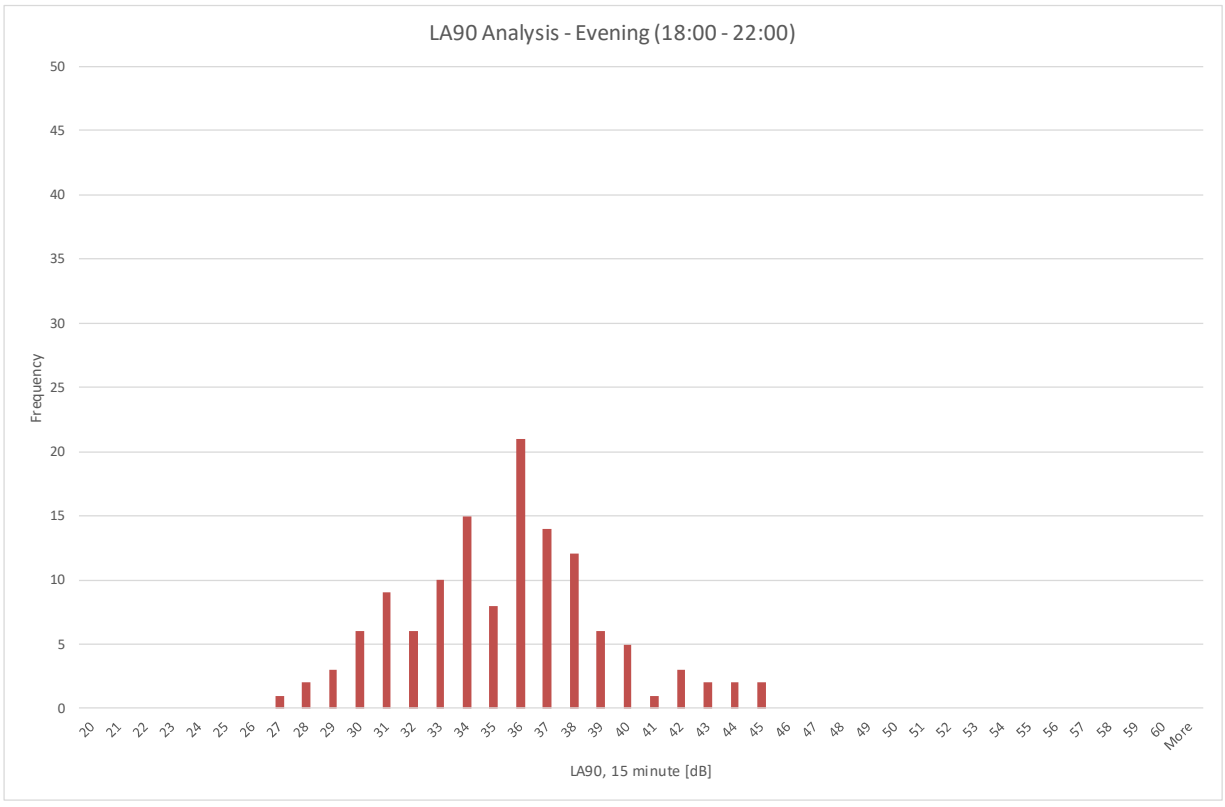

Thursday 6/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90

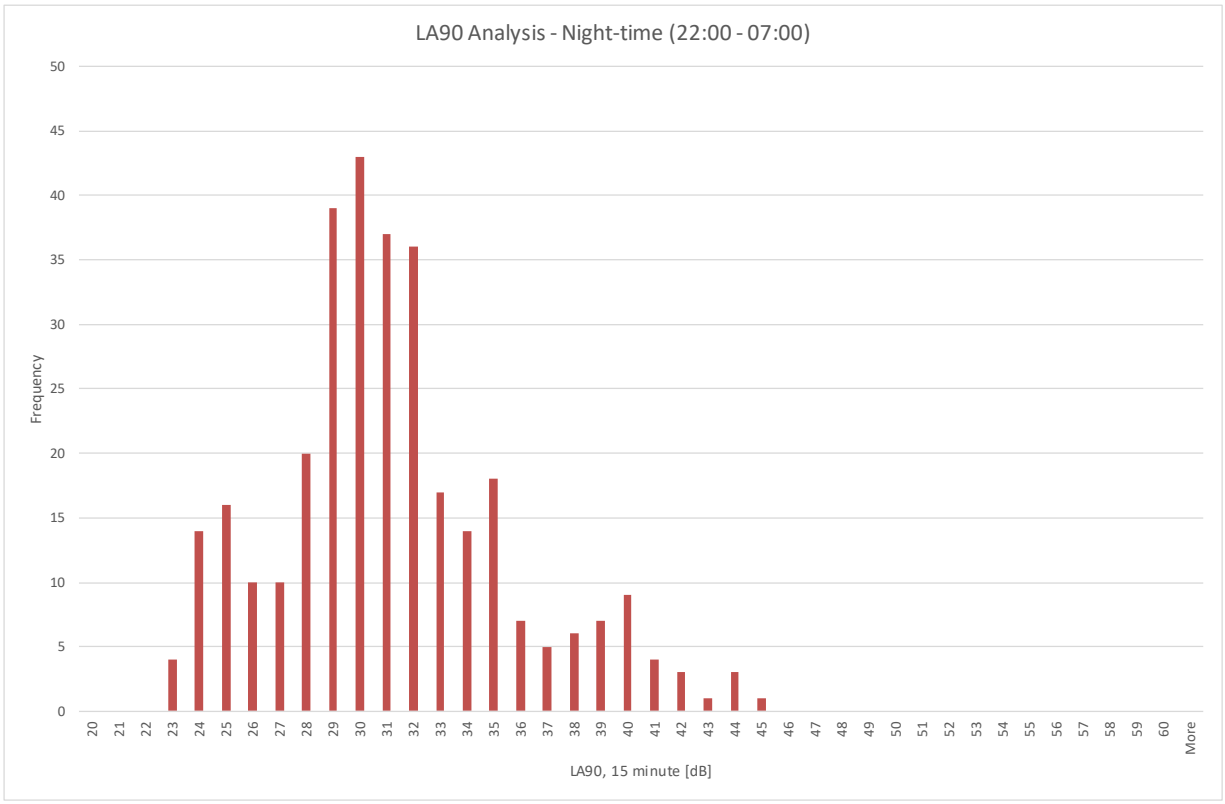

Friday 7/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90

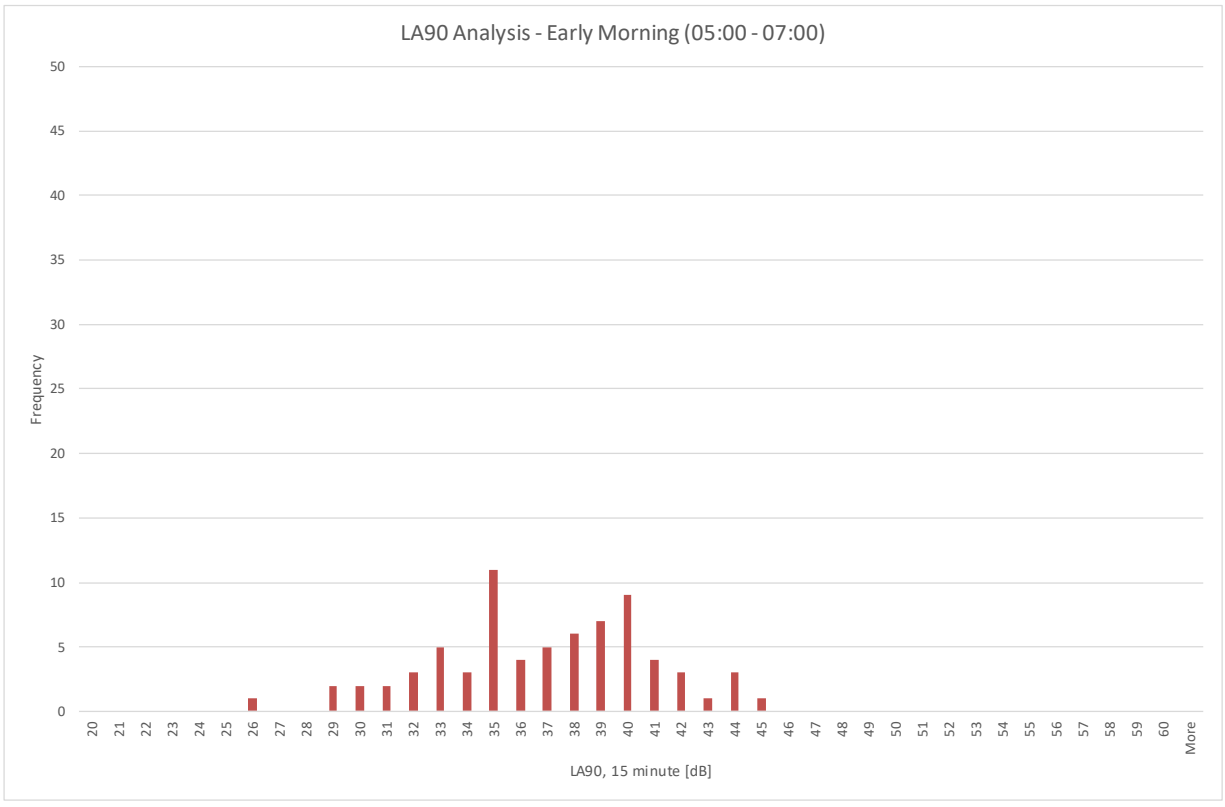

Saturday 8/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90


Sunday 9/4/17
Freefield Noise Level [dB(A)]
100
90
80
70
60
50
40
30
20
0:00
3:00
6:00
9:00
12:00
15:00
18:00
21:00
0:00
Time
LAeq
LAmax,F
LA90


LA90 Analysis - Daytime (07:00 - 18:00)
Frequency
LA90, 15 minute [dB]
0
10
20
30
40
50
60
70
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 More


LA90 Analysis - Evening (18:00 - 22:00)
Frequency
LA90, 15 minute [dB]
0
5
10
15
20
25
30
35
40
45
50
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 More


LA90 Analysis - Night-time (22:00 - 07:00)
Frequency
LA90, 15 minute [dB]
0
5
10
15
20
25
30
35
40
45
50
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 More


LA90 Analysis - Early Morning (05:00 - 07:00)
Frequency
LA90, 15 minute [dB]
0
5
10
15
20
25
30
35
40
45
50
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 More