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NEW FARM STOR SITE, BURTON-ON-TRENT

NOISE ASSESSMENT FOR PLANNING

Acoustics Report A1030 05 R01
4th August 2016

Report for:

New Farm Energy Ltd
Burton Road
Burton-on-Trent
DE13 9NF

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1 Introduction

Ion Acoustics is appointed by ADAS UK Ltd on behalf of New Farm Energy Ltd to advise on operational noise from a proposed STOR power generation facility on land at New Farm, Burton-on-Trent. The proposed facility comprises 25 No. 400kW diesel generators with associated transformers and fuel storage and is intended to provide power to the national grid during periods of short-term peak demand, for a Short Term Operating Reserve (STOR) contract.

This assessment has been prepared in support of a planning application which will be submitted to East Staffordshire Borough Council. The assessment has considered the potential noise impact of the generator site on the nearest noise sensitive receptor locations in the area.

Ion Acoustics carried out a noise survey in the area between 13th and 15th July 2016 to quantify the existing baseline noise climate. The results have been used to determine noise limits for the proposed facility. Computer modelling has been used to predict the noise impact at nearby receptor locations.

2 Scheme Details

2.1 Site Location

The proposed site is located on land owned by New Farm, Burton Road, near Tutbury. The site is located approximately 240m from the nearest third-party residential locations, and 215m east of the A511 Burton Road. The nearest noise-sensitive receptors are considered to be the residential properties at Doves Keep, a new residential development, Lane End Farm and Burton Road Farm. The land-owner's property New Farm is north of the site, near the roundabout between Burton Road and Rolleston Lane. Figure 1 below indicates the location of the proposed power generation site, the nearest existing noise sensitive receptor locations and the two noise monitoring locations chosen to determine the baseline noise climate.

It is noted, with reference to Figure 1 below that the aerial mapping is out of date and that the receptor identified as Doves Keep is now a new housing development.



Figure 1 – Site location showing power generation facility, monitoring locations and nearest receptor locations (Map Ref: Google Earth)

For clarity, the receptor locations are detailed in Table 1 below:

Table 1: Receptor Locations

Receptor	Approximate Ordnance Survey Co-ordinates (E,N)	Distance to Site, m
New Farm	421680, 328485	360
Doves Keep	421629, 328161	240
Burton Road Farm	421891, 327785	380
Lane End Farm	422320, 328079	340

New Farm is owned by the land-owner's family and as such has been omitted from the impact assessment undertaken below.

2.2 Generation Facility

The proposed development is an electricity generation facility to work within a STOR contract supplying additional power during periods of peak electricity demand as and when necessary.



The operating hours for the facility would generally occur between 07:00 and 22:00 hours daily, depending on the season and weather conditions. However, the more likely scenario would be that operation of the facility would be contained to within periods of short-term peak demand, within the periods summarised below:

- AM Peak Operation: between 07:00 and 14:00 approx.; and,
- PM Peak Operation: between 16:30 and 22:00 approx.

These peak periods typically occur during a weekday period when greater demand is put on the electricity network. Typically 100 to 200 hours operation per year within the periods above is envisaged up to two hours at any time. Operation during the early evening peak is the most likely scenario. Operation after 9pm would be unusual and would be outside what would be considered the normal operational mode of the facility.

There is no anticipated use during the night-time period 23.00 to 07.00 hours. Note also the generators would not be used every day, only at periods when a short-fall in power generator is anticipated during a peak period.

The proposed site would contain 25 No. 400kW diesel generator sets with associated transformers and fuel storage. An outline plan of the proposed facility is presented in Figure 2 below. The generators will be housed in appropriate enclosures which would attenuate the overall sound level generated by the units. The facility would be located to the south east of the New Farm buildings, between Burton Road and Rolleston Lane.

The area in which the facility is to be located slopes from Burton Road down towards Lane End Farm. The site area is to be levelled to accommodate the engines which will make the best use of the existing ground contours to provide additional screening towards the west (Doves Keep). In addition, the site is to be bounded on all sides by an acoustic barrier which would form a complete barrier along these site elevations with an appropriate gate. The barrier height would vary around the site relative to the local ground height with a maximum height of 3m to the east of the site and 2m to the west. The fence would be constructed with solid panels achieving a surface mass of at least 10 kg/m².

Site access would be gained by an access road to the west running perpendicular to Burton Road between the road and the site area.

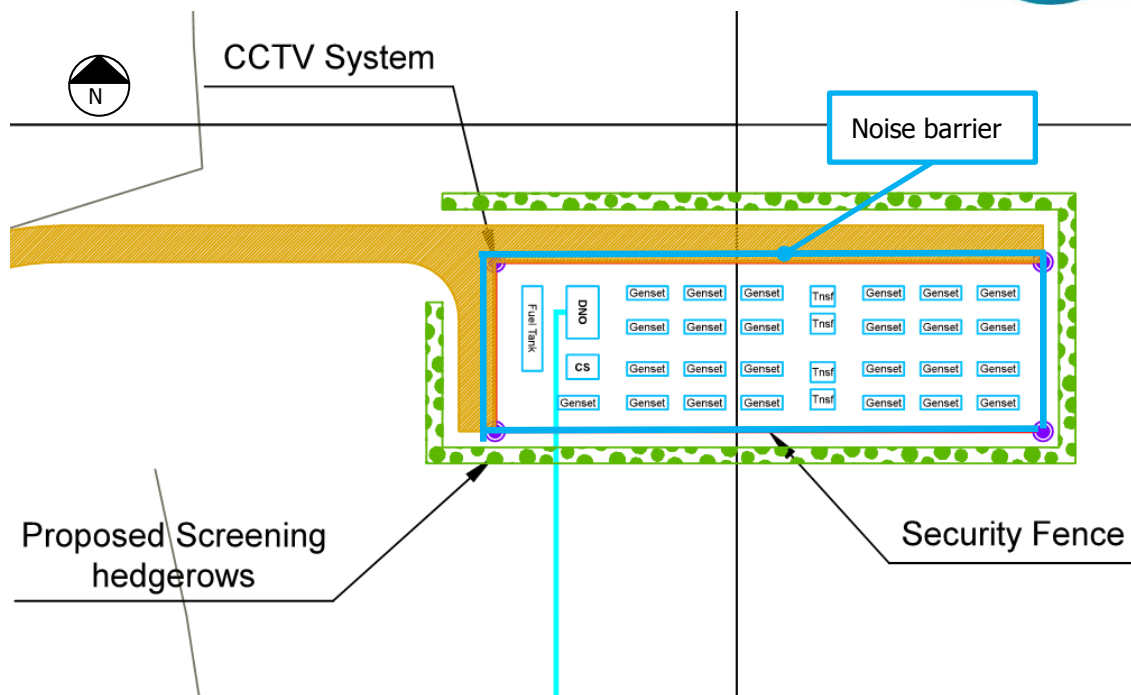


Figure 2 – Development Site Plan

Aside from the diesel generators detailed above, there are no on-site noise sources which would generate significant levels of noise. The transformers and staff welfare facilities generate very low noise levels and are unlikely to be noticeable beyond the proposed site boundary.

Deliveries to the facility (i.e. fuel) are entirely governed by the level of operational demand placed on the facility and would be made via the existing road network and the proposed access track which runs perpendicular with the Burton road.

3 Planning Policy and Other Guidance on Noise

3.1 National Planning Policy Framework (NPPF)

In March 2012 the National Planning Policy Framework (NPPF) replaced a number of Planning Policy Statements with a single document which is intended to promote sustainable development. The NPPF sets out the Government's policies for the planning system in England. The document is generally not prescriptive and does not provide noise criteria. Instead, it places the onus on local authorities to develop their own local plans and policies. *"In preparing Local Plans, local planning authorities should: ...set out environmental criteria, in line with the policies in this Framework, against which planning applications will be assessed so as to ensure that permitted operations do not have unacceptable adverse impacts on the natural and historic environment or human health, including from noise..."*

The document further states that: *"Planning policies and decisions should aim to:*

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions".*



3.2 Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE)¹ sets out the government's policy on environmental, neighbourhood and neighbour noise for England. The policy sets out three aims:

- "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.

The NPSE introduces the following terms which are also used in the NPPF Planning Practice Guidance:

"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 health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

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

SOAEL – Significant Observed Adverse Effect Level

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

However, neither the NPSE nor the NPPF Planning Practice Guidance defines numeric bounds for NOEL, LOAEL or SOAEL. The limits of each effect level should be defined for each situation and location.

3.3 Government Online Planning Guidance

Government planning advice is available online². The online guidance refers to the NPPF and NPSE and presents a noise assessment hierarchy table shown below.

¹ Noise Policy Statement for England (DEFRA) available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf
² See <http://planningguidance.communities.gov.uk/blog/guidance/noise/noise-guidance/>

Table 2 Noise Assessment Hierarchy Table

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			
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			
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

3.4 Local Authority Liaison

Ion Acoustics telephoned Chris Humphries at East Staffordshire Borough Council to discuss the project. The noise monitoring locations and the use of BS 4142 for the assessment was discussed. The new housing development at Doves Keep was highlighted as the nearest receptor.

3.5 BS4142: 2014 – Assessment Principles

The standard method for assessing noise of an industrial nature affecting nearby housing is British Standard BS 4142 "Method for rating and assessing industrial and commercial sound". A BS 4142 assessment is made by determining the difference between the intrusive noise under consideration and the background sound level as represented by the L_{A90} parameter, determined in the absence of the intrusive noise. The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time. Therefore, it represents the underlying noise in the absence of short-term events.

BS4142: 2014 states: *'In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods'*

The intrusive noise under consideration is assessed in terms of the ambient noise level, L_{Aeq} , but a character correction penalty can be applied where the noise exhibits certain characteristics such as distinguishable tones, impulsiveness or, if the noise is distinctively intermittent. The ambient noise level, L_{Aeq} is defined as the steady-state noise level with the same energy as the actual fluctuating sound over the same time period. It is effectively the average noise level during the period. The plant noise level (L_{Aeq}) with the character correction (if necessary) is known as rating level, L_{Ar} , and the difference between the background noise and the rating level is determined to make the BS 4142 assessment. The standard then states:

- *"Typically, the greater the difference, the greater the magnitude of the impact.*
- *A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

The standard outlines a number of methods for defining appropriate 'character corrections' to determine the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency.

BS 4142 states that the 'typical' background noise level should be used, in making the assessment specifically:

"In using the background sound level ... it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."

The standard also highlights the importance of considering the context in which a sound occurs. The standard indicates that factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact.

"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."

4 Noise Survey

A baseline noise survey was carried out between 13th and 15th July 2016, to determine the baseline noise climate of the area. Noise measurements were made at two locations within the land holdings of New Farm. The locations were identified as being representative of the noise climate at the nearest third-party noise sensitive receptor locations.

The monitoring locations are identified on Figure 1 above and detailed in Table 3 below:

Table 3: Noise Monitoring Locations

Location Reference	Description	Approximate Ordnance Survey Co-ordinates (E,N)
M01	Located in the field to the east of Burton Road, approximately 25m from the carriageway edge.	421688, 328177
M02	Located in the field to the south-east of the farm, approximately 140m from Lane End Farm.	422171, 328116

4.1 Location M01 – Doves Keep

Location M01 was chosen to represent noise levels at Doves Keep, a large residential development to the west of Burton Road. The monitoring location was on the other side of the road from the housing but at a similar distance and elevation to the new housing. The A511 runs in a cutting in this location and there was no direct line of sight from the monitoring position to the road. The noise monitoring at this location was undertaken using a Rion NL52 sound level meter fitted with a WS-15 windshield and calibrated at the start and finish using a Brüel & Kjær 4231 sound level calibrator. The meter was set up to log various noise parameters in 15-minute periods and was unattended for the duration of the survey except during the set up and collection.

The noise monitor was situated at the location identified in Figure 3 below.



Figure 3: Monitoring Location M01 Detail

4.2 Location M02 – Lane End Farm

This monitoring location was chosen as a proxy for Lane End Farm and was located approximately 140m to the west of the residential properties. The noise monitoring at this location was undertaken using a Rion NL52 sound level meter fitted with a WS-15 windshield and calibrated at the start and finish using a Brüel & Kjær 4231 sound level calibrator. The meter was again set up to measure various noise parameters in 15 minute periods and was unattended for the duration of the survey except at set up and collection.



Figure 4: Monitoring Location M02 Detail

5 Survey Results

5.1 Weather Conditions

While no direct weather monitoring was undertaken at the New Farm site, Ion Acoustics had a small weather station and rain gauge located approximately 10.5km to the north west of this location, in the vicinity of Doveridge. It is possible that there were some minor variations in the



weather conditions between the two locations, however it is considered that the weather recorded at the Doveridge site is a reasonable representation of the weather at New Farm.

Wind speeds were low, with a maximum recorded wind speed of 3.9m/s measured during the evening of the 14th July. Wind speeds during the night-time were very low, with only occasional gusts of up to 1.2m/s recorded. The prevailing wind direction on the Wednesday (13th) and Thursday (14th) was from the WNW while on the Friday (15th) the direction changed to the WSW. The wind direction was therefore broadly representative of the prevailing wind. The ambient air temperature ranged between 23°C during the daytime period and lows of 8°C during the night-time. No rain fall was recorded during the noise monitoring survey period.

5.2 Noise Results

The baseline survey data is summarised in Tables 4 and 5. For the ambient sound level, the logarithmic average L_{Aeq} is shown. For the background sound levels, L_{A90} , the arithmetic mean and the mode (most common) values are reported. Table 4 shows the data for the standard 12-hour day, 4-hour evening and 8-hour night. Table 5 shows the data for the likely operating hours.

The data is plotted graphically in Appendix A of this document. This shows the typical diurnal peaks during the morning and afternoon / early evening rush hour periods. Noise levels are fairly steady in between the rush-hour periods. After the evening rush-hour, noise levels gradually decline until a minimum is achieved in the dead of night.

At Lane End Farm there are unusually high noise levels just after the PM peak on the 14th July. This is likely to be related to farming activity close to the microphone. Whilst farming activity is a feature of the area, it is possible that the activity was much closer to the microphone which was in a field than the actual residential location. Therefore, these three samples (shaded in the time history plot) have been removed from the analysis.

Table 4: Noise Monitoring Data Summary

Location	Period	Duration hh:mm	L _{Aeq} , dB	Mean L _{A90} , dB	Mode (Most Common) L _{A90} , dB
M01 Doves Keep	Evening (13 th July) 19:00 to 23:00	04:00	53	42	43
	Night-time (13 th / 14 th) 23:00 to 07:00	08:00	50	38	33
	Daytime (14 th July) 07:00 to 19:00	12:00	55	47	45
	Evening (14 th July) 19:00 to 23:00	04:00	53	42	43
	Night-time (14 th / 15 th) 23:00 to 07:00	08:00	50	35	32
	Part Day (13 th July) 07:00 to 14:00	07:00	56	48	48
M02 Lane End Farm	Evening (13 th July) 19:00 to 23:00	04:00	48	40	42
	Night-time (13 th / 14 th) 23:00 to 07:00	08:00	47	38	34
	Daytime (14 th July) 07:00 to 19:00*	11:15*	51	42	41
	Evening (14 th July) 19:00 to 23:00	04:00	49	37	40
	Night-time (14 th / 15 th) 23:00 to 07:00	08:00	46	35	37
	Part Day (15 th July) 07:00 to 14:00	07:00	48	42	41
* Note: Period Shortened due to extraneous noise events					

During the site visit, the noise climate of the area was considered to be dominated by road traffic movements on Burton Road (A511) with occasional vehicle movements on Rolleston Lane. Both roads are single carriageway roads with free flowing traffic. Traffic noise was more evident at M01 which was closer to Burton Road than at M02.

At location M02 a low level industrial whine was perceived but only became evident when the noise ceased at approximately 17:30 hours. The source of the noise could not be accurately determined but was considered to be coming from a north west of location 2, towards Tutbury.

Other sources of noise in the area were general environmental factors including bird song, low level wind noise and livestock in nearby fields.

Table 5: Noise Climate During Typical STOR Operating Periods

Location	Period	Duration hh:mm	Measured Ambient Noise Level dB L _{Aeq}	Measured Background	
				Mean L _{A90} , dB	Mode (Most Common) L _{A90} , dB
M01 Doves Keep	PM Peak 13 th July (17:00 to 22:00)	05:00	55	46	45
	AM Peak 14 th July (07:00 to 14:00)	07:00	55	47	47
	PM Peak 14 th July (16:30 to 22:00)	05:30	55	45	43
	AM Peak 15 th July* 07:00 to 14:00	07:00	56	48	48
M02 Lane end Farm	PM Peak 13 th July (17:30 to 22:00)	04:30	50	42	42
	AM Peak 14 th July (07:00 to 14:00)	07:00	50	41	41
	PM Peak 14 th July (16:30 to 22:00)	04:45*	52	41	40
	AM Peak 15 th July 07:00 to 14:00	07:00	48	42	41
* Note: Period Shortened due to extraneous noise events					

5.3 Noise Limits

The facility is a source of short-term noise which is required to regulate peaks in power demand. As detailed above it would operate most typically during the evening peak for between 100 and 200 hours per year. Noise limits must be set at a level which avoid adverse impacts in line with the Government's noise assessment hierarchy and BS 4142. As such, it is considered that the rating level generated by operational noise from the facility should target parity with the existing background (L_{A90}+/-0dB).

Analysis of the measured data indicates very little variation between the average and mode (most common value) of the background sound levels during the likely operational periods. To that end it is considered that the average of the L_{A90} parameter is representative of the typical background sound level. A value towards the lowest L_{A90} value during the operational periods has been chosen. The proposed limits are shown below together with the appropriate property locations.

Table 6: Proposed Plant Noise Limits

Locations	Typical L _{A90} , dB	Noise Limits L _{Ar} , dB
M01 (Doves Keep, and Burton Road Farm)	46	46
M02 (Lane End Farm)	42	42

These noise limits are lower than the ambient noise measured over the likely operating periods.



The rating level will apply to the plant noise level plus any specific character corrections which need to be applied in line with BS4142:2014.

6 Noise Predictions

A noise model was constructed using IMMI³ noise modelling software to predict noise levels to the nearest noise sensitive receptor locations. Within the modelling software, propagation of noise has been calculated in accordance with ISO 9613-2⁴.

6.1 Candidate Generators

The site will accommodate up to 25 No. 400kW diesel powered generators which are to be enclosed in suitably designed, sound attenuating enclosures. These generators will comply with EC Directive 2000/14/EC and 2005/88/EC which sets noise limits for outdoor equipment including generators. Under this directive, the maximum sound power for a 400kW generator is 98 dB L_{WA}. Discussions with the generator supplier indicated that further noise attenuation is possible through consideration of exhaust silencers and attenuated inlet fans. Given this, a source level of 94dB L_{WA} has been used in the calculations.

6.2 Onsite Mitigation

The site is to be enclosed by a robust wooden noise barrier fence as a means reducing the noise emissions of the generator sets. The fence would vary in height round the site relative to the existing ground contours; from a maximum of 3m to the above ground level to the east of the site to 12m above local ground to the west. The fence will form a complete barrier against the passage of sound and provide a minimum surface density of 10kg/m². The barrier should be lined on the internal faces with acoustic absorption, e.g. 50mm mineral fibre faced with perforated metal (25% open area or an expanded metal mesh).

6.3 Operational Assessment

The frequency and duration of the operational periods are dictated by the demands of the national grid and, it is understood, are considered to be more likely to occur during the winter months.

The indicative noise contours presented below assume that all engines operate for one or two hours within the assessment period.

³ IMMI noise mapping <http://www.woelfel.de/en/industries/civil-engineering/room-and-electroacoustics/immi.html>

⁴ ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors: Part 2: General method of calculation

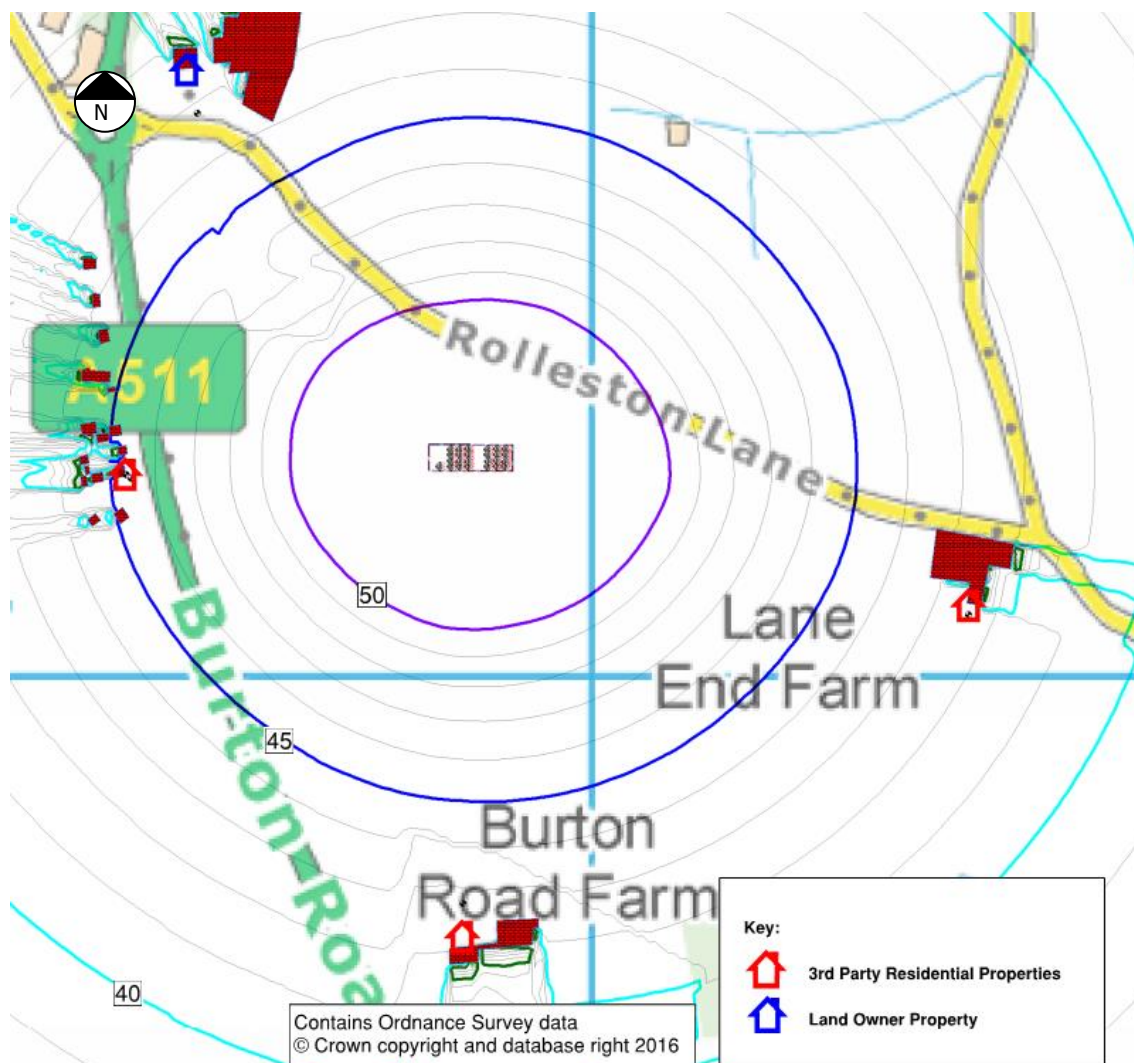


Figure 3 – Indicative Noise Contour Plot

Using the noise model, levels have been calculated to the third-party receptor locations detailed above. These predicted levels have been used to evaluate the noise impact in accordance with the methodology detailed in BS 4142: 2014.

The noise emitted by the generators is considered to be broadband in nature with no distinguishable tones or impulsive characteristics. In addition, when the site is operational, the engines operate at a constant output with no intermittency in the operational characteristics. Given this there are no feature corrections applied to the calculation of the rating level.

Table 7: Noise Impact Assessment

Receptor Location	Predicted (Specific) level, dB(A)	Noise Limit (ref Table 6), dB(A) L _{Ar}	Difference, dB
Doves Keep	46	46	0
Burton Road Farm	42	46	-4
Lane End Farm	42	42	0

The predicted levels detailed in Table 7 above indicate that noise generated by the proposed facility would generally fall below the typical background sound level for the area which would indicate the sound source having a low impact.

The predicted level for Lane End Farm and Doves Keep just meets the proposed noise limits based on the L_{A90} but noise levels are below the measured ambient noise levels. Nevertheless, noise will be occasional audible. Given the context of the area, it is considered that the predicted level of would be occasionally noticeable but not intrusive and therefore consistent with the advice of the noise assessment hierarchy which states: *"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."*

7 Summary

A noise assessment has been carried out for a proposed STOR power generation facility at New Farm, Burton-on-Trent to assess the potential noise impacts arising from the siting of up to 25 No. diesel-powered generators.

Appropriate noise limits have been derived in accordance with BS 4142: 2014 to minimise adverse impact. The generators must be provided in an acoustic enclosure to ensure each generators meets a maximum sound power level of 94 dB L_{WA}. A noise barrier should be provided around the scheme. With these measures in place, the noise of the generators would not result in any adverse impacts at the nearest noise sensitive receptor locations.

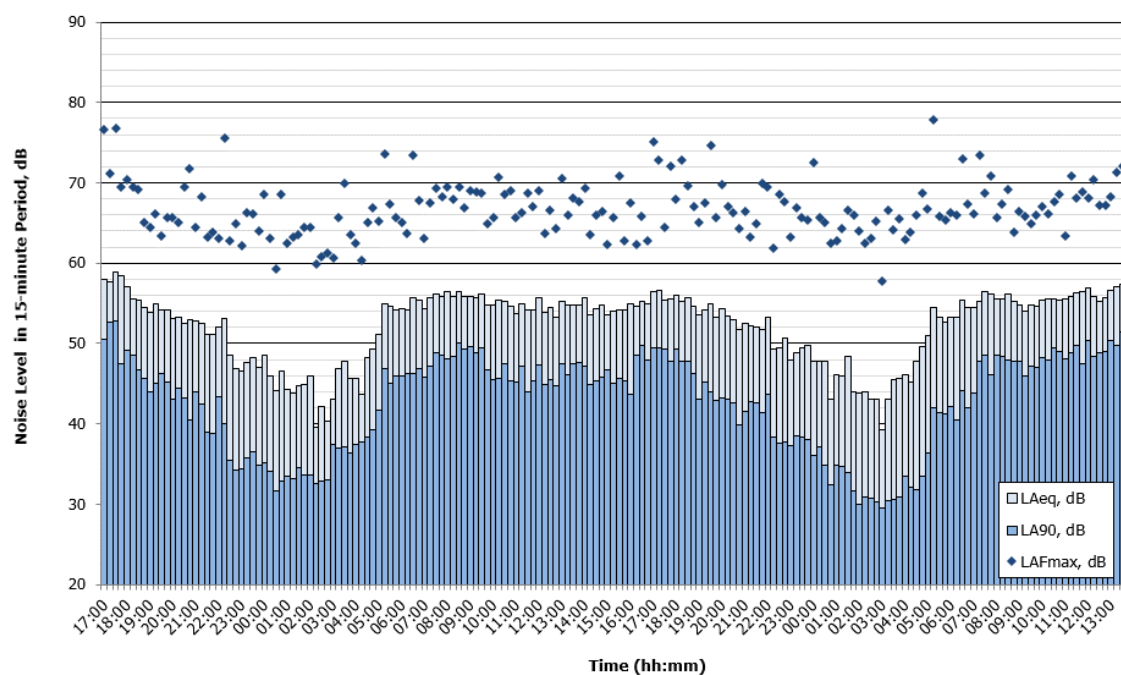
Based on the above, it is considered that there are no noise-related issues associated with the proposed power generation facility at New Farm which cannot be controlled by a suitably worded condition attached to the planning permission for the site.

NEW FARM STOR SITE, BURTON-ON-TRENT
Noise Assessment for Planning
Appendix A – Measured Noise Data in Time History Charts



Location M01 – Doves Keep Proxy Location

Noise Levels Measured from
 New Farm - M01
 Wednesday 13th - Friday 15th July 2016



NEW FARM STOR SITE, BURTON-ON-TRENT
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Appendix A – Measured Noise Data in Time History Charts



Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB	Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB
13/07/2016 17:00	58.0	76.6	50.5	14/07/2016 05:00	51.1	65.2	41.7
13/07/2016 17:15	57.6	71.1	52.6	14/07/2016 05:15	55.0	73.5	46.9
13/07/2016 17:30	58.9	76.7	52.8	14/07/2016 05:30	54.6	67.4	45.1
13/07/2016 17:45	58.4	69.5	47.5	14/07/2016 05:45	54.1	65.6	46.0
13/07/2016 18:00	57.0	70.4	49.2	14/07/2016 06:00	54.3	65.1	45.9
13/07/2016 18:15	55.6	69.4	48.5	14/07/2016 06:15	54.2	63.6	46.3
13/07/2016 18:30	55.4	69.2	46.7	14/07/2016 06:30	55.7	73.4	46.3
13/07/2016 18:45	54.5	65.0	45.6	14/07/2016 06:45	55.4	67.8	46.8
13/07/2016 19:00	53.9	64.5	43.9	14/07/2016 07:00	54.3	63.1	45.8
13/07/2016 19:15	54.9	66.1	45.1	14/07/2016 07:15	55.7	67.5	47.2
13/07/2016 19:30	54.1	63.4	46.2	14/07/2016 07:30	56.2	69.3	48.9
13/07/2016 19:45	54.1	65.7	45.2	14/07/2016 07:45	55.8	68.3	48.6
13/07/2016 20:00	53.1	65.7	43.1	14/07/2016 08:00	56.4	69.5	48.1
13/07/2016 20:15	53.3	65.0	44.5	14/07/2016 08:15	55.8	67.9	48.4
13/07/2016 20:30	52.5	69.5	43.2	14/07/2016 08:30	56.5	69.5	50.0
13/07/2016 20:45	53.0	71.8	40.5	14/07/2016 08:45	55.9	66.9	49.3
13/07/2016 21:00	52.8	64.4	43.9	14/07/2016 09:00	55.8	69.0	49.6
13/07/2016 21:15	52.5	68.2	42.5	14/07/2016 09:15	55.7	68.9	48.8
13/07/2016 21:30	51.1	63.2	38.9	14/07/2016 09:30	56.2	68.7	49.5
13/07/2016 21:45	51.1	63.8	38.8	14/07/2016 09:45	54.7	64.9	46.7
13/07/2016 22:00	52.1	63.1	43.4	14/07/2016 10:00	54.7	65.6	45.5
13/07/2016 22:15	53.1	75.5	40.0	14/07/2016 10:15	55.4	70.7	45.6
13/07/2016 22:30	48.5	62.7	35.5	14/07/2016 10:30	55.2	68.6	47.4
13/07/2016 22:45	46.9	64.9	34.2	14/07/2016 10:45	54.6	69.0	45.4
13/07/2016 23:00	46.5	62.1	34.4	14/07/2016 11:00	53.7	65.7	45.2
13/07/2016 23:15	47.6	66.3	35.8	14/07/2016 11:15	55.0	66.3	47.1
13/07/2016 23:30	48.2	66.1	36.5	14/07/2016 11:30	54.2	68.7	44.0
13/07/2016 23:45	47.0	64.0	34.9	14/07/2016 11:45	54.2	67.0	45.3
14/07/2016 00:00	48.6	68.5	35.1	14/07/2016 12:00	55.7	69.0	47.3
14/07/2016 00:15	45.9	63.1	34.1	14/07/2016 12:15	53.9	63.6	44.9
14/07/2016 00:30	44.1	59.3	31.7	14/07/2016 12:30	54.4	66.6	45.5
14/07/2016 00:45	46.5	68.6	32.9	14/07/2016 12:45	53.2	64.3	44.8
14/07/2016 01:00	44.2	62.4	33.4	14/07/2016 13:00	55.2	70.5	47.5
14/07/2016 01:15	43.8	63.2	33.2	14/07/2016 13:15	54.8	65.9	46.1
14/07/2016 01:30	44.7	63.5	34.5	14/07/2016 13:30	54.8	68.1	47.4
14/07/2016 01:45	44.9	64.5	33.6	14/07/2016 13:45	54.7	67.7	47.6
14/07/2016 02:00	45.9	64.4	33.6	14/07/2016 14:00	55.7	69.3	47.1
14/07/2016 02:15	39.6	59.9	32.6	14/07/2016 14:15	53.6	63.5	44.9
14/07/2016 02:30	42.1	60.8	32.9	14/07/2016 14:30	54.3	65.9	45.4
14/07/2016 02:45	40.3	61.3	33.0	14/07/2016 14:45	54.7	66.4	45.8
14/07/2016 03:00	43.0	60.6	37.4	14/07/2016 15:00	53.5	62.3	46.7
14/07/2016 03:15	46.8	65.7	37.0	14/07/2016 15:15	54.0	65.6	45.1
14/07/2016 03:30	47.7	69.9	37.1	14/07/2016 15:30	54.1	70.8	45.6
14/07/2016 03:45	45.6	63.5	36.3	14/07/2016 15:45	54.2	62.8	45.3
14/07/2016 04:00	45.7	62.5	37.4	14/07/2016 16:00	54.9	67.5	43.7
14/07/2016 04:15	43.7	60.4	37.8	14/07/2016 16:15	54.6	62.3	48.5
14/07/2016 04:30	48.2	65.0	38.4	14/07/2016 16:30	55.3	65.8	49.8
14/07/2016 04:45	49.3	66.9	39.3	14/07/2016 16:45	55.0	62.7	47.9

NEW FARM STOR SITE, BURTON-ON-TRENT
Noise Assessment for Planning
Appendix A – Measured Noise Data in Time History Charts

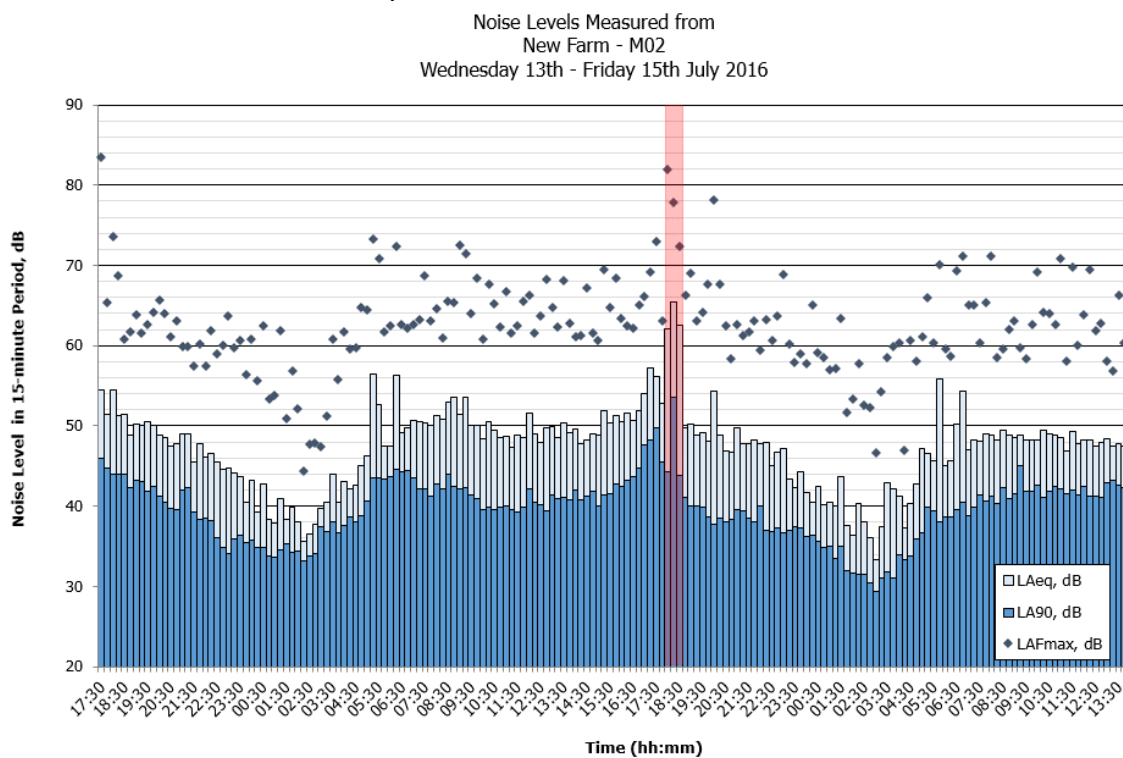


Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB	Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB
14/07/2016 17:00	56.5	75.1	49.4	15/07/2016 05:00	50.9	75.1	49.4
14/07/2016 17:15	56.6	72.8	49.5	15/07/2016 05:15	54.4	77.9	42.0
14/07/2016 17:30	55.4	64.4	49.3	15/07/2016 05:30	53.3	65.8	41.4
14/07/2016 17:45	55.5	72.1	47.8	15/07/2016 05:45	52.7	65.4	41.3
14/07/2016 18:00	56.0	67.9	49.3	15/07/2016 06:00	53.2	66.3	42.2
14/07/2016 18:15	55.2	72.8	47.7	15/07/2016 06:15	53.3	65.9	40.5
14/07/2016 18:30	55.7	69.6	47.7	15/07/2016 06:30	55.4	72.9	44.1
14/07/2016 18:45	54.6	67.0	46.2	15/07/2016 06:45	54.4	67.4	42.0
14/07/2016 19:00	53.5	65.1	43.1	15/07/2016 07:00	54.4	66.1	43.8
14/07/2016 19:15	54.1	67.5	45.2	15/07/2016 07:15	55.3	73.4	47.7
14/07/2016 19:30	54.9	74.7	43.9	15/07/2016 07:30	56.4	68.7	48.6
14/07/2016 19:45	53.2	65.6	42.9	15/07/2016 07:45	56.2	70.8	46.1
14/07/2016 20:00	54.3	69.7	43.2	15/07/2016 08:00	55.6	65.6	48.6
14/07/2016 20:15	53.4	67.0	43.1	15/07/2016 08:15	55.6	67.4	48.4
14/07/2016 20:30	53.0	66.2	42.6	15/07/2016 08:30	56.1	69.2	47.9
14/07/2016 20:45	51.7	64.3	39.9	15/07/2016 08:45	55.3	63.9	47.7
14/07/2016 21:00	52.5	66.4	41.6	15/07/2016 09:00	54.8	66.4	47.8
14/07/2016 21:15	52.2	63.2	42.8	15/07/2016 09:15	54.0	65.8	46.0
14/07/2016 21:30	52.0	64.9	42.6	15/07/2016 09:30	54.8	64.9	47.2
14/07/2016 21:45	51.8	69.9	41.4	15/07/2016 09:45	54.6	66.0	47.0
14/07/2016 22:00	53.3	69.4	43.6	15/07/2016 10:00	55.4	67.0	48.2
14/07/2016 22:15	49.3	61.9	38.4	15/07/2016 10:15	55.6	66.1	48.0
14/07/2016 22:30	49.4	68.6	37.6	15/07/2016 10:30	55.5	67.7	49.4
14/07/2016 22:45	50.6	67.7	37.7	15/07/2016 10:45	55.4	68.6	49.0
14/07/2016 23:00	47.9	63.2	37.2	15/07/2016 11:00	55.5	63.4	48.1
14/07/2016 23:15	48.8	66.9	38.5	15/07/2016 11:15	55.8	70.8	48.8
14/07/2016 23:30	49.5	65.6	38.4	15/07/2016 11:30	56.3	68.1	49.8
14/07/2016 23:45	49.7	65.4	38.1	15/07/2016 11:45	56.4	68.8	47.4
15/07/2016 00:00	47.7	72.5	36.1	15/07/2016 12:00	56.9	68.1	50.4
15/07/2016 00:15	47.8	65.7	37.1	15/07/2016 12:15	55.9	70.4	48.4
15/07/2016 00:30	47.8	65.1	34.9	15/07/2016 12:30	55.2	67.2	48.8
15/07/2016 00:45	43.0	62.5	32.4	15/07/2016 12:45	55.7	67.1	49.0
15/07/2016 01:00	46.1	62.7	34.9	15/07/2016 13:00	56.6	68.3	50.3
15/07/2016 01:15	45.9	64.3	34.7	15/07/2016 13:15	57.0	71.3	49.8
15/07/2016 01:30	48.4	66.5	34.0	15/07/2016 13:30	57.3	72.0	51.5
15/07/2016 01:45	44.0	66.0	31.7	15/07/2016 13:45	56.9	66.9	51.2
15/07/2016 02:00	43.8	64.0	29.9				
15/07/2016 02:15	44.0	62.5	30.9				
15/07/2016 02:30	43.1	63.1	30.7				
15/07/2016 02:45	43.0	65.2	30.3				
15/07/2016 03:00	39.3	57.8	29.5				
15/07/2016 03:15	43.1	66.6	30.4				
15/07/2016 03:30	45.5	64.1	30.6				
15/07/2016 03:45	45.7	65.5	30.9				
15/07/2016 04:00	46.1	62.9	33.5				
15/07/2016 04:15	45.2	63.9	32.1				
15/07/2016 04:30	47.8	66.0	31.8				
15/07/2016 04:45	49.6	68.7	33.4				

NEW FARM STOR SITE, BURTON-ON-TRENT
Noise Assessment for Planning
Appendix A – Measured Noise Data in Time History Charts



Location M02 – Lane End Farm Proxy



NEW FARM STOR SITE, BURTON-ON-TRENT
Noise Assessment for Planning
Appendix A – Measured Noise Data in Time History Charts



Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB	Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB
13/07/2016 17:30	54.5	83.5	46.0	14/07/2016 05:30	52.6	70.8	43.5
13/07/2016 17:45	51.4	65.3	44.7	14/07/2016 05:45	47.5	61.7	43.4
13/07/2016 18:00	54.4	73.5	43.9	14/07/2016 06:00	47.5	62.4	43.6
13/07/2016 18:15	51.2	68.7	44.0	14/07/2016 06:15	56.3	72.4	44.6
13/07/2016 18:30	51.4	60.8	44.0	14/07/2016 06:30	49.1	62.6	44.3
13/07/2016 18:45	48.8	61.7	42.3	14/07/2016 06:45	49.7	62.1	44.4
13/07/2016 19:00	50.2	63.8	43.2	14/07/2016 07:00	50.6	62.6	43.5
13/07/2016 19:15	50.0	61.5	43.0	14/07/2016 07:15	50.5	63.2	42.2
13/07/2016 19:30	50.5	62.6	41.9	14/07/2016 07:30	50.4	68.7	42.1
13/07/2016 19:45	50.0	64.2	42.4	14/07/2016 07:45	50.0	63.0	41.2
13/07/2016 20:00	48.8	65.7	41.2	14/07/2016 08:00	51.2	64.6	42.7
13/07/2016 20:15	48.5	64.0	40.5	14/07/2016 08:15	50.8	60.9	42.2
13/07/2016 20:30	47.4	61.1	39.7	14/07/2016 08:30	52.9	65.5	43.9
13/07/2016 20:45	47.8	63.1	39.5	14/07/2016 08:45	53.5	65.3	42.4
13/07/2016 21:00	49.0	59.8	42.0	14/07/2016 09:00	51.4	72.5	42.1
13/07/2016 21:15	49.0	59.9	42.3	14/07/2016 09:15	53.5	71.5	42.3
13/07/2016 21:30	45.5	57.4	39.3	14/07/2016 09:30	50.1	64.0	41.4
13/07/2016 21:45	47.8	60.2	38.3	14/07/2016 09:45	50.0	68.4	40.9
13/07/2016 22:00	46.1	57.4	38.5	14/07/2016 10:00	48.4	60.8	39.6
13/07/2016 22:15	46.5	61.8	38.2	14/07/2016 10:15	50.5	67.6	39.9
13/07/2016 22:30	45.5	59.0	36.1	14/07/2016 10:30	49.5	65.2	39.5
13/07/2016 22:45	44.6	60.0	34.8	14/07/2016 10:45	48.6	62.3	39.9
13/07/2016 23:00	44.8	63.7	34.1	14/07/2016 11:00	48.7	66.7	40.0
13/07/2016 23:15	44.1	59.7	35.9	14/07/2016 11:15	47.3	61.6	39.6
13/07/2016 23:30	43.7	60.6	36.4	14/07/2016 11:30	48.9	62.4	39.2
13/07/2016 23:45	40.4	56.4	35.5	14/07/2016 11:45	48.6	65.5	39.9
14/07/2016 00:00	43.2	60.8	35.7	14/07/2016 12:00	51.6	66.3	42.2
14/07/2016 00:15	39.3	55.6	34.8	14/07/2016 12:15	49.0	61.5	40.5
14/07/2016 00:30	42.7	62.4	34.8	14/07/2016 12:30	48.0	63.7	40.2
14/07/2016 00:45	38.4	53.4	33.8	14/07/2016 12:45	49.8	68.3	39.4
14/07/2016 01:00	37.9	53.8	33.6	14/07/2016 13:00	49.9	64.7	41.4
14/07/2016 01:15	40.9	61.8	34.6	14/07/2016 13:15	48.5	62.3	41.0
14/07/2016 01:30	38.4	50.9	35.3	14/07/2016 13:30	50.4	68.1	41.1
14/07/2016 01:45	39.9	56.9	34.3	14/07/2016 13:45	49.2	62.7	40.7
14/07/2016 02:00	38.1	52.1	34.4	14/07/2016 14:00	49.6	61.1	42.0
14/07/2016 02:15	35.6	44.4	33.2	14/07/2016 14:15	47.8	61.3	40.8
14/07/2016 02:30	36.5	47.7	33.8	14/07/2016 14:30	48.2	67.2	41.2
14/07/2016 02:45	37.8	47.9	34.1	14/07/2016 14:45	49.0	61.5	41.8
14/07/2016 03:00	39.7	47.4	37.4	14/07/2016 15:00	48.9	60.6	40.0
14/07/2016 03:15	40.4	51.2	36.8	14/07/2016 15:15	51.9	69.4	41.4
14/07/2016 03:30	44.0	60.8	38.1	14/07/2016 15:30	50.3	64.8	41.5
14/07/2016 03:45	40.5	55.7	36.6	14/07/2016 15:45	51.3	68.4	42.8
14/07/2016 04:00	43.1	61.7	37.6	14/07/2016 16:00	50.5	63.3	42.5
14/07/2016 04:15	42.2	59.5	38.6	14/07/2016 16:15	51.6	62.5	43.2
14/07/2016 04:30	42.6	59.7	38.1	14/07/2016 16:30	50.7	62.2	43.7
14/07/2016 04:45	45.1	64.7	38.8	14/07/2016 16:45	51.9	65.1	44.7
14/07/2016 05:00	46.2	64.5	40.6	14/07/2016 17:00	54.0	66.1	47.6
14/07/2016 05:15	56.5	73.2	43.5	14/07/2016 17:15	57.2	69.1	48.3

NEW FARM STOR SITE, BURTON-ON-TRENT
Noise Assessment for Planning
Appendix A – Measured Noise Data in Time History Charts



Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB	Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB
14/07/2016 17:30	56.2	73.0	49.7	15/07/2016 05:30	45.6	60.3	39.4
14/07/2016 17:45	52.8	63.0	45.5	15/07/2016 05:45	55.9	70.0	38.1
14/07/2016 18:00	62.1	82.0	44.3	15/07/2016 06:00	45.1	59.5	38.7
14/07/2016 18:15	65.4	77.8	53.5	15/07/2016 06:15	45.6	58.7	38.7
14/07/2016 18:30	62.6	72.3	43.8	15/07/2016 06:30	50.2	69.3	39.5
14/07/2016 18:45	49.7	66.3	41.1	15/07/2016 06:45	54.3	71.2	40.4
14/07/2016 19:00	50.2	69.0	40.0	15/07/2016 07:00	47.0	65.0	38.8
14/07/2016 19:15	48.9	63.0	40.0	15/07/2016 07:15	48.2	65.0	39.8
14/07/2016 19:30	49.1	64.2	39.8	15/07/2016 07:30	48.1	60.4	41.4
14/07/2016 19:45	48.1	67.7	38.7	15/07/2016 07:45	49.0	65.4	40.6
14/07/2016 20:00	54.3	78.1	37.8	15/07/2016 08:00	48.9	71.1	41.2
14/07/2016 20:15	48.8	67.7	38.5	15/07/2016 08:15	48.2	58.5	40.3
14/07/2016 20:30	46.8	62.5	38.1	15/07/2016 08:30	49.4	59.6	42.3
14/07/2016 20:45	46.7	58.4	38.4	15/07/2016 08:45	48.9	62.0	40.9
14/07/2016 21:00	49.8	62.6	39.6	15/07/2016 09:00	48.5	63.0	41.6
14/07/2016 21:15	47.7	61.2	39.4	15/07/2016 09:15	48.8	59.7	45.0
14/07/2016 21:30	47.7	61.7	38.5	15/07/2016 09:30	48.3	58.3	41.9
14/07/2016 21:45	48.3	63.1	38.0	15/07/2016 09:45	48.2	62.6	41.8
14/07/2016 22:00	47.7	59.4	40.0	15/07/2016 10:00	48.2	69.1	42.6
14/07/2016 22:15	47.9	63.2	37.0	15/07/2016 10:15	49.4	64.2	41.1
14/07/2016 22:30	45.1	60.7	36.8	15/07/2016 10:30	49.0	64.0	41.9
14/07/2016 22:45	46.7	63.7	37.2	15/07/2016 10:45	48.8	62.6	42.5
14/07/2016 23:00	47.2	68.9	36.6	15/07/2016 11:00	48.5	70.8	42.1
14/07/2016 23:15	43.4	60.2	36.9	15/07/2016 11:15	46.8	58.1	41.6
14/07/2016 23:30	42.3	57.9	37.4	15/07/2016 11:30	49.3	69.8	42.0
14/07/2016 23:45	44.2	59.0	37.2	15/07/2016 11:45	47.7	60.0	41.4
15/07/2016 00:00	41.7	57.7	36.2	15/07/2016 12:00	48.2	63.8	42.5
15/07/2016 00:15	40.5	65.0	36.4	15/07/2016 12:15	48.3	69.4	41.3
15/07/2016 00:30	42.4	59.1	35.6	15/07/2016 12:30	47.5	61.8	41.3
15/07/2016 00:45	40.2	58.5	34.9	15/07/2016 12:45	47.9	62.7	41.1
15/07/2016 01:00	40.5	57.0	35.0	15/07/2016 13:00	48.4	58.1	42.9
15/07/2016 01:15	40.0	57.2	33.4	15/07/2016 13:15	47.5	56.8	43.2
15/07/2016 01:30	43.7	63.4	35.0	15/07/2016 13:30	47.7	66.3	42.6
15/07/2016 01:45	37.6	51.6	31.9	15/07/2016 13:45	47.4	60.3	42.3
15/07/2016 02:00	36.3	53.3	31.7				
15/07/2016 02:15	40.3	57.8	31.5				
15/07/2016 02:30	38.0	52.6	31.5				
15/07/2016 02:45	36.0	52.3	30.5				
15/07/2016 03:00	33.3	46.6	29.3				
15/07/2016 03:15	37.5	54.3	31.1				
15/07/2016 03:30	42.9	58.5	31.8				
15/07/2016 03:45	42.1	59.9	31.1				
15/07/2016 04:00	41.2	60.4	34.0				
15/07/2016 04:15	37.3	47.0	33.3				
15/07/2016 04:30	40.3	60.6	33.8				
15/07/2016 04:45	42.7	58.1	35.9				
15/07/2016 05:00	47.1	61.1	36.7				
15/07/2016 05:15	46.5	65.9	39.8				

Highlighted Periods are excluded from the processed data