ACOUSTIC CONSULTANTS LTD

RALEIGH HOUSE
WELLSWAY
KEYNSHAM
BRISTOL BS31 1HS

TELEPHONE 0117 - 9862956
FACSIMILE 0117 - 9860554
EMAIL mail@acoustic-ltd.co.uk
WEBSITE www.acoustic-ltd.co.uk

Lidl
Botwell Lane
Hayes
Middlesex

Noise Impact Assessment

Reference: 6085/P/BL/pw **March 2016**

Lidl, Botwell Lane, Hayes
Noise Impact Assessment

Client	Lidl London North West Property Office 4-14 Blackbird Hill, Wembley, London, NW9 8SD
Noise & Acoustic Consultant	Acoustic Consultants Limited Raleigh House Wellsway Keynsham Bristol BS31 1HS

Prepared By	**Checked By**
	
Blake Lucas BEng. (Hons), MIOA	Daniel Oldaker BSc. (Hons) MIOA

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1.0 INTRODUCTION

Lidl appointed Acoustic Consultants Limited to undertake a noise survey and an assessment of noise from the plant, delivery operation and car park activities for the proposed Lidl Food Store, Botwell Lane, Hayes.

This report is based on the information and layout contained on the ACD Environmental drawings entitled "Landscape Proposals" with the drawing number LIDL18911-11 and dated June 2015.

This report is an updated noise assessment based on the revised scheme, weekend noise survey data and British Standard 4142:2014.

The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above.

2.0 PROPOSED SCHEME

The Lidl Food Store is to be located on the former site of a public swimming baths which have now been demolished leaving a vacant site. The site is on the corner of Botwell Lane and Central Avenue.

The proposal is for a new build two storey Lidl Food Store on the site. The store will have the retail area/warehouse at ground level with offices/welfare spaces on the upper floor.

The Lidl Food Store will have two dry coolers and two heat pumps located at ground level on the northern elevation of the building adjacent to the delivery bay.

The most sensitive residential properties, in terms of plant and delivery noise are the existing dwellings along Holmbury Gardens (Location R1) to the north with their rear amenity area boundary fence approximately 30 metres to the north of the proposed plant and delivery bay location.

The proposed delivery hours are between 07:00 to 23:00 hours Monday to Saturday and 09:00 to 18:00 hours on Sundays and Bank Holidays.

A planning application was submitted and approved by the local authority with conditions on the 11th September 2014 with the application reference 1942/APP/2013/3565. The scheme has now changed and a new application has been submitted to the Local Authority.

3.0 ASSESSMENT CRITERIA

3.1 National Planning Policy Framework

The National Planning Policy Framework was published in March 2012 and replaces Planning Policy Guidance Document 24. This is a significantly shortened document. Section 11 entitled 'Conserving and enhancing the natural environment' addresses noise as a requirement of planning.

Paragraph 109 states:

"109. The planning system should contribute to and enhance the natural and local environment by:

- *preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability."*

Paragraph 123 states:

"123. 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;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

The document does not prescribe any assessment methodology or criteria to assess the adverse effect of noise.

3.2 Noise Policy Statement for England

The NPPF refers to the Noise Policy Statement for England (NPSE). This was published in March 2010 by DEFRA and aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion. It applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

The NPSE introduces the concept of "Significant Adverse" and "Adverse" impacts of noise. These are applied as follows:

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.

The NPSE does not provide any assessment criteria for the noted effect levels.

3.3 National Planning Practice Guidance, Noise

The National Planning Practice Guidance on noise referred to here is based on the current version as provided on the Planning Guidance Website.

It states that *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. In both cases, the potential noise impact needs to be addressed. Opportunities should also be taken, where possible, to achieve improvements to the acoustic environment".*

It provides generic guidance on how to determine the noise impact and what factors could be a concern.

It includes the option types to mitigate any adverse effects of noise stating that there are four broad types of mitigation. These are engineering, layout, using planning conditions or obligations and noise insulation.

This document does not provide any assessment criteria.

3.4 British Standard 4142:2014 – Plant Noise

The British Standard 4142:2014 entitled "Method for rating and assessing industrial and commercial sound" was published on the 31st October 2014. The methods described in the British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon. The principle is that of establishing the "difference" between the "rating level" and the "background sound level".

The "rating level" is the "specific sound level" of the source over a period of 1 hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours). Section 9 entitled "Rating Level" states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."

An acoustic character correction should be added to the "specific sound level" if the "specific sound level" exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies dependant on the prominence of the character of the noise source at the assessment location.

In Section 11 of the Standard, under "Assessment of the Impacts", it states:

*"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause **8**) from the rating level (see Clause **9**), and consider the following.*

a) *Typically, the greater this difference, the greater the magnitude of the impact.*
b) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
c) *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
d) *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source 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."*

As such where assessments differences of 0 dB or less the impact is likely to be low depending on the context.

We have been advised Hillingdon Borough Council require plant noise to be no more than 5 dB below the background sound level. As such this is the criteria we have worked to in our plant assessment.

3.5 Delivery Noise

3.5.1 Unloading

We consider British Standard 4142:2014 the most appropriate assessment methodology for determining the impact of the unloading and loading of a delivery vehicle. The assessment method is as stated above.

3.5.2 Arrival/Departure of Vehicles

There is no specific planning guidance in relation to the arrival and departure of the site vehicles. We would consider the arrival and departure of site vehicles to be outside the scope of British Standard 4142:2014. As such we have followed a common sense approach.

The main source of noise from is the movement of the vehicles. The character of this noise is similar to road traffic and not specifically of an industrial nature.

We therefore consider it appropriate to determine the impact on the noise sensitive receivers around the site by comparing existing equivalent noise levels (Daytime $L_{Aeq\ (1\ hour)}$) determined by road traffic on the surrounding highway network to the predicted equivalent noise levels of the vehicles arriving/departing ($L_{Aeq\ (1\ hour)}$).

The overall impact is then determined by the change in noise levels as a result of these vehicles. In terms of noise level changes, the former Planning Policy Guidance 24 states in the Glossary under dB (A) the following:

"Measurements in dB (A) broadly agree with people's assessment of loudness. A change of 3 dB (A) is the minimum perceptible under normal conditions, and a change of 10 dB (A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB (A); normal conversation about 60 dB (A) at 1 metre; heavy road traffic about 80 dB (A) at 10 metres; the level near a pneumatic drill about 100 dB (A)."

The Institute of Acoustics (IOA) and Institute of Environmental Management and Assessment (IEMA) Working Party Consultation Draft 2002 categorises the significant of a change in noise level. Although this is currently at a draft stage it provides some helpful guidance on the impact on the change in noise levels. The significant of changes in noise levels from the IOA/IEMA draft is as follows:

Table 1: IOA/IEMA Noise Level Changes

Noise Change (dB)	Category
0	No Impact
0 – 2.9	Slight Impact
3.0 –5.9	Moderate Impact
6.0 –9.9	Substantial Impact
10.0 and more	Severe Impact

A slight impact is considered for an increase less than 3 decibels. This generally conforms with the former Planning Policy Guidance 24 that a change of 3 dB(A) is the minimum perceptible under normal conditions.

3.6 Car Park Activities

There is no specific planning guidance as such it is appropriate to use a common sense approach.

Generally acceptable levels are achieved if the equivalent noise level (Daytime $L_{Aeq\ (1\ hour)}$) from the proposed car park activity are of the same order as the current equivalent noise levels (Daytime $L_{Aeq\ (1\ hour)}$) experienced around the site.

4.0 NOISE MONITORING

A noise monitoring survey was originally undertaken to British Standard 4142:1997 to support the former permitted Lidl scheme. We were not made aware of any issues with the noise data for the former permitted scheme. The survey was undertaken before the release of British Standard 4142:2014 for the former scheme. The former British Standard 4142 did not request weekend noise surveys however the new survey does state weekend surveys should be considered and the Environmental Protection department has requested Sundays be considered.

As such and upon the request of the local environmental health department a new survey was undertaken in March 2016. The results are provided below. This reports addresses the noise impact based on the new survey results, the former survey results are not considered in this assessment.

4.1 Monitoring Equipment

Sound Pressure Levels were measured using a Class 1 Sound Level Meter with half-inch condenser microphones using the "fast" setting.

The equipment is checked annually using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2005 and in accordance with British Standard EN 10012:2003 and traceable to the National Standards. This equipment was checked and calibrated as noted below and the certificates are available for inspection. The table below provides the equipment and calibration status:

Table 2: Monitoring Equipment

Equipment Description / Manufacturer / Type	Serial number	Date of calibration	Calibration Certification Number
Sound Level Meter, Svantek 959	14784	19/05/15	K144617
Microphone, GRAS 40AE	98073	19/05/15	K144617
Calibrator, CEL, Type 177	424062	19/05/15	K144618

The measuring systems were checked for calibration before and after the tests and no significant drift was detected.

The monitoring was carried out in generally clear and calm conditions with a daytime air temperature of about 8 degrees Centigrade with little or no wind. These conditions are not expected to have a significant adverse effect on the measured levels.

4.2 Monitoring Procedure

An assessment to British Standard 414:2014 requires that the "Background Sound Level" typical for the area, be established. The plant operates 24-hours a day according to demand. As such, a long term noise weekend monitoring exercise was carried out to determine the baseline noise conditions.

Noise monitoring was undertaken commencing at 13:29 hours on Friday the 11th March 2016 and finishing at 12.29 hours on Monday the 14th March 2016. The monitoring location was at ground level in a free field position to the north of the site. The monitoring location was partially shielded from the main roads around the site by the site hoarding and is considered representative of the sensitive receivers in the vicinity.

Figure 1: Monitoring Location & Noise Sensitive Receiver Location

The measured baseline noise levels were determined by road traffic on the surrounding highway network and aircraft overhead.

4.3 Measured Data

The measured data consists of the Equivalent Noise Level ($L_{Aeq\ (15minute)}$), maximum noise level ($L_{Amax(fast)}$) and Background Sound Level ($L_{A90\ (15minute)}$) in dB (A). The results are provided in Appendix 1/6085 for 15-minute measurement time intervals and are free field levels.

The measured equivalent and background sound level are summarised below. These are the modal average background sound levels over the daytime and night-time periods and typical equivalent noise level.

Table 3: Summary of Measured Noise Levels

Start Day	Period	$L_{Aeq\ (15\ minutes)}$ dB	$L_{A90\ (15\ minutes)}$ dB
Friday	Daytime (1pm-11pm)	50	45
	Night-time (11pm-7am)	44	38
Saturday	Daytime (7am-11pm)	48	44
	Night-time (11pm-7am)	45	36
Sunday	Daytime (7am-11pm)	48	44
	Night-time (11pm-7am)	39	32
Monday	Daytime (7am to 12pm)	49	46

From the measured data we have determined the design daytime background sound level is 44 dB $L_{A90\ (15\ minutes)}$ (free field level) and the design night-time background sound level is 32 dB $L_{A90\ (15\ minutes)}$ (free field level).

In addition the typical daytime equivalent noise level is 48 dB $L_{Aeq\ (15\ minutes)}$ (free field level).

5.0 PLANT NOISE ASSESSMENT

The following section provides the plant noise assessment for the store. The assessment is based on the current Lidl store specification as provided by the client.

5.1 Proposed Plant

The plant is to be located on the northern elevation of the store at ground level. The heat pumps will operate during the day only, the dry coolers will operate at night. We have been advised there are four items of plant only, two dry coolers and two heat pumps. If additional plant is proposed it will need to be assessed.

5.1.1 Dry Coolers

The dry coolers are the Guntner units model number "GFW 090.1/3-E(J)-F4/06/6P". These units will be located on the western elevation of the store and at ground level. The top of the unit will be approximately 2 metres above the ground. It is proposed to install two dry coolers.

The following table provides the supplied octave band sound power level of the plant, the octave band noise data is 'A weighted' and taken directly from the manufacturer's noise data.

Table 4: Dry Cooler 'A Weighted' Sound Power Level

Frequency (Hz)	125	250	500	1k	2k	4k	8k
L_{wA} (dB)	48	55	59	59	58	50	43

Any alternative plant should have an equal or lower noise emission level (dB) in a hemispherical free-field.

5.1.2 Heat Pumps

The heat pumps are the Dimplex units and will be located on the southern elevation of the store and at ground level. The top of the units will be approximately 2.3 metres above the ground. It is proposed to install two heat pump units.

The following table provides the supplied octave band sound power level of the plant, the octave band noise data is 'A weighted' and has been converted directly from the supplied manufacturers third octave noise data.

Table 5: Heat Pump 'A Weighted' Sound Power Level

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
L_{wA} (dB)	56	61	67	68	68	65	63	55

Any alternative plant should have an equal or lower noise emission level (dB) in a hemispherical free-field.

5.2 Predicted Noise Level

The proposed plant noise emission has been modelled in the noise modelling software CadnaA by Datakustik. The noise prediction software bases its industrial noise predictions on the International Standard ISO 9613 entitled "Acoustics – Attenuation of sound during propagation outdoors" published in 1996.

The night-time noise levels have been predicted to a height of 4.5 metres above the ground at 1 metre from the façade of Receiver R1.

The daytime noise levels have been predicted to the centre of the external amenity area of Receiver R1.

The receiver building have not been included as reflective and as such the predicted level is a free-field level.

Along the site boundary between the plant and the sensitive receivers, it is proposed to install a 2.4 metre high close boarded timber fence. The fence must have a density of at least 10 kilograms per metre squared. This barrier has been included in the noise model.

The daytime prediction is based on all plant operating continuously. The night-time prediction is based on the dry cooler plant operating only. We have been advised that the heat pumps will be controlled by the building management system and will not operate outside of the store opening hours. The noise levels of the plant are as stated above.

A noise map of the predicted daytime and night-time plant specific sound levels across the site is provided in Figures 2 and 3 below.

Figure 2: CadnaA Daytime Noise Map of Plant Specific Sound Levels $L_{Aeq\ (1\ hour)}$

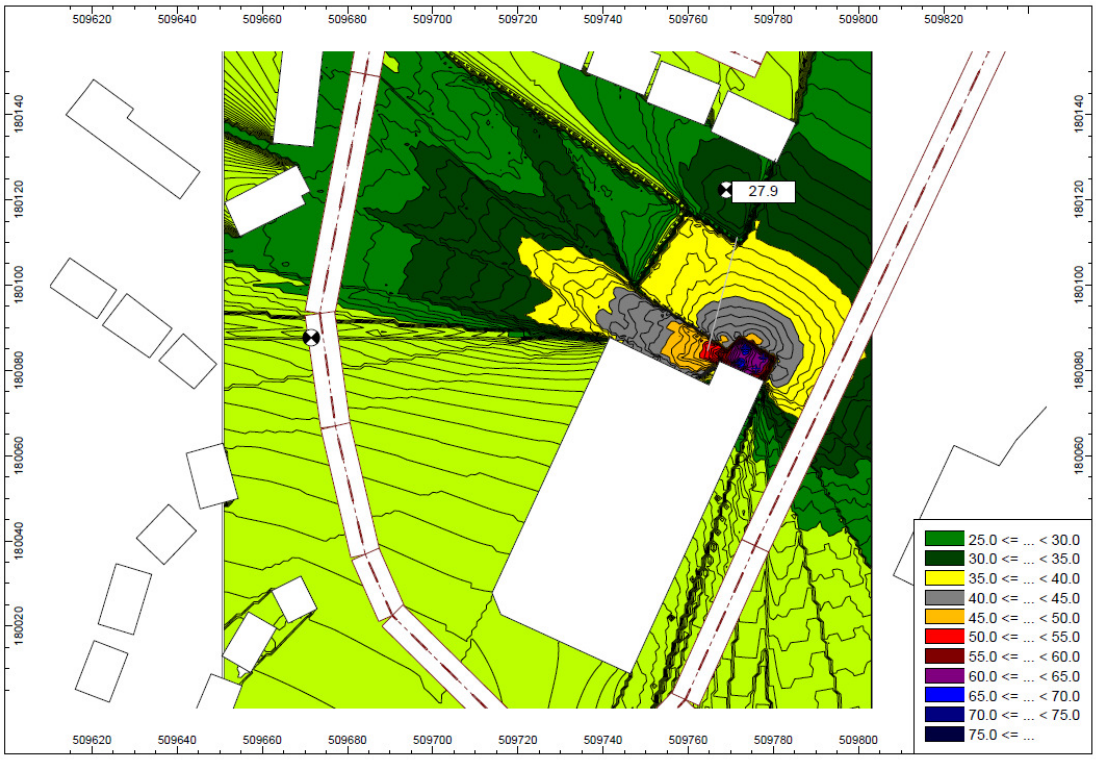
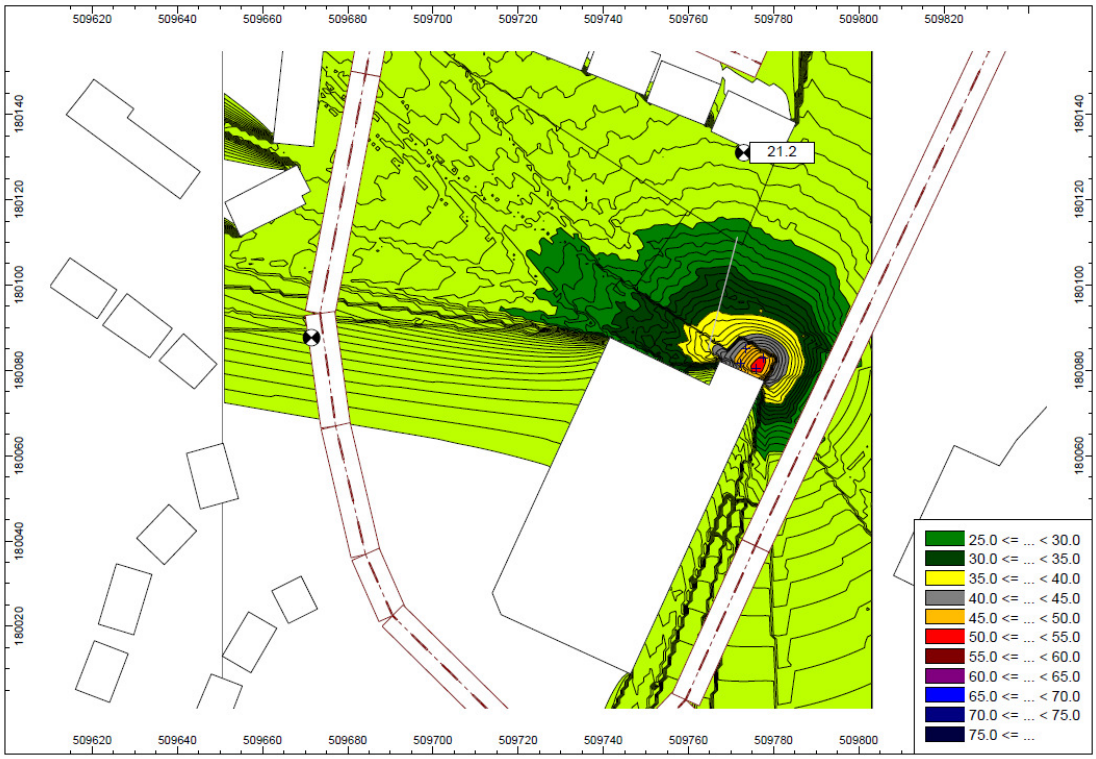


Figure 3: CadnaA Night-time Noise Map of Plant Specific Sound Level $L_{Aeq\ (15\ min)}$



The free-field specific sound levels are as follows at the worst case receiver location:

- 28 dB $L_{Aeq\ (1\ hour)}$ during the day
- 21 dB $L_{Aeq\ (15\ minutes)}$ during the night

5.3 Plant Noise Assessment

5.3.1 Initial Estimate

All plant will operate during the daytime period. The dry coolers will operate during the night only. A British Standard 4142:2014 initial estimate of the impact has been undertaken near the sensitive receivers around the site. The design background sound levels are as follows:

- Daytime is assumed to be 44 dB $L_{A90\ (1\ hour)}$
- Night-time is measured to be 32 dB $L_{A90\ (15\ minutes)}$

To determine the rating sound level of the operation it is necessary to apply acoustic character corrections based on the character of the sound. This includes corrections for tonality, impulsivity, other sound characteristics and intermittency.

We would consider a 3 dB correction for 'intermittency' to be applicable when determining the rating level of the plant, this is as per the methodology of British Standard 4142:2014.

It is not possible to determine whether the plant will be 'tonal' or 'impulsive' or have 'other sound characteristics'. The supplier should ensure that the plant is selected such that these characteristics are not clearly distinguishable at the noise-sensitive receivers.

Therefore the British Standard 4142:2014 initial estimate is as follows:

Table 6: British Standard 4142:2014 Initial Estimate at R1

Parameter	Daytime	Night-time
Background Sound Level, $L_{A90\ (T)}$	44 dB	32 dB
Specific Sound Level, $L_{Aeq\ (T)}$	28 dB	21 dB
Character Correction	+3 dB	+3 dB
Rating Sound Level $L_{Ar\ (T)}$	31 dB	24 dB
Excess of rating over background level	-13 dB	-8 dB

This means that the plant rating noise level will result in a British Standard 4142:2014 "difference" of -8 to -13 dB at Receiver R1 and it is an initial estimate that the plant will be of a low impact on the most sensitive receivers.

In addition the assessment difference is within the Local Authority criteria of at least -5 dB below the background sound level.

5.3.2 Context of Site

British Standard 4142:2014 states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration."

Following the "initial estimate" we consider that there is no significant alteration to the assessment due to the context implication and once all pertinent factors (i.e. context) are taken into account it is an indication that plant noise will be of a low impact when assessed to British Standard 4142:2014.

In environmental noise terms (affecting the residential premises in the vicinity) the proposals are considered acceptable in terms of noise emission to the dwellings in the vicinity during the day and night.

6.0 DELIVERY NOISE ASSESSMENT

The arrival and departure of a delivery vehicle has the potential to affect the receivers around the site. The noise assessment is provided below.

6.1 Summary of Delivery Operation

The proposed delivery hours are between 07:00 hours and 23:00 hours only. The delivery yard will be located to the northern elevation of the building. The vehicle will access and exit the site via Church Road.

We understand that the deliveries are contained to an articulated vehicle with refrigeration. The vehicle includes a refrigerated section with condensing unit. This can normally be turned off during the delivery operation. The vehicle arrives on site and reverses up to the enclosed loading bay dock. The engine is then turned off and the goods are moved internally from the trailer into the store. The goods are mostly on pallets and an electric pallet truck is used. The operation takes place internally and the vehicle departs after about one hour.

The most sensitive residential properties, in terms of delivery noise are the existing receivers to the north, Receiver R1. All other residential dwellings are either at a further distance away from the delivery activities or shielded from the noise by the store and boundary fencing.

6.2 Delivery Noise Monitoring

Acoustic Consultants Limited have measured the delivery operation from Lidl Food Stores over a number of years at a number of different sites.

Our most recent noise survey was undertaken at the Lidl Food Store delivery operation at the existing Lidl Wonford Store on the 18th September 2014. The noise monitoring location was set 50 metres back from the delivery activities and in line with the vehicle. The arrival and departure of the vehicle was measured at a distance of 10 metres from the HGV. The delivery yard was open at this store and located within an undercroft.

The measured noise levels are as follows, the measured levels are free-field levels and have been corrected to a distance of 10 metres where appropriate. The measured levels include reflections off the Lidl Food Store.

Table 7: Delivery Operation Noise Emission

Start Time	Duration	$L_{Aeq(T)}$ (dB)	Activity at 10 metres
23:23	347 seconds	61	HGV Arrive
23:30	57 minutes	57	HGV unloading
00:30	120 seconds	63	HGV Depart

6.3 Delivery Operation Noise Predictions

Noise emission prediction calculations have been carried out for the potentially most sensitive locations to delivery noise (as stated above).

The delivery operation has been modelled in the noise modelling software Cadna:A by Datakustik. The model allows for the prediction of noise levels to be undertaken for a high number of receiver locations and different noise emission scenarios. The modelling software calculates noise levels based on the inputted noise emission values, source and receiver locations, and primarily distance, barrier and ground attenuation. Calculations are undertaken using the General Method of Calculation from ISO 9613.

Along the boundary, it is proposed to install a 2.4 metre high close boarded barrier and it is included in the noise modelling.

The predictions are based on the measured delivery noise emission levels, the delivery time as detailed above, a vehicle speed of 10 miles per hour and on the basis that the refrigeration unit is turned off upon arrival. The delivery vehicle path has been based on reasonable assumptions.

A noise map of the equivalent noise levels from the unloading/loading, HGV arrival and HGV departure are provided in Figures 4 and 5 below:

Figure 4: Specific Sound Level of Unloading Activities $L_{Aeq\ (1\ hour)}$

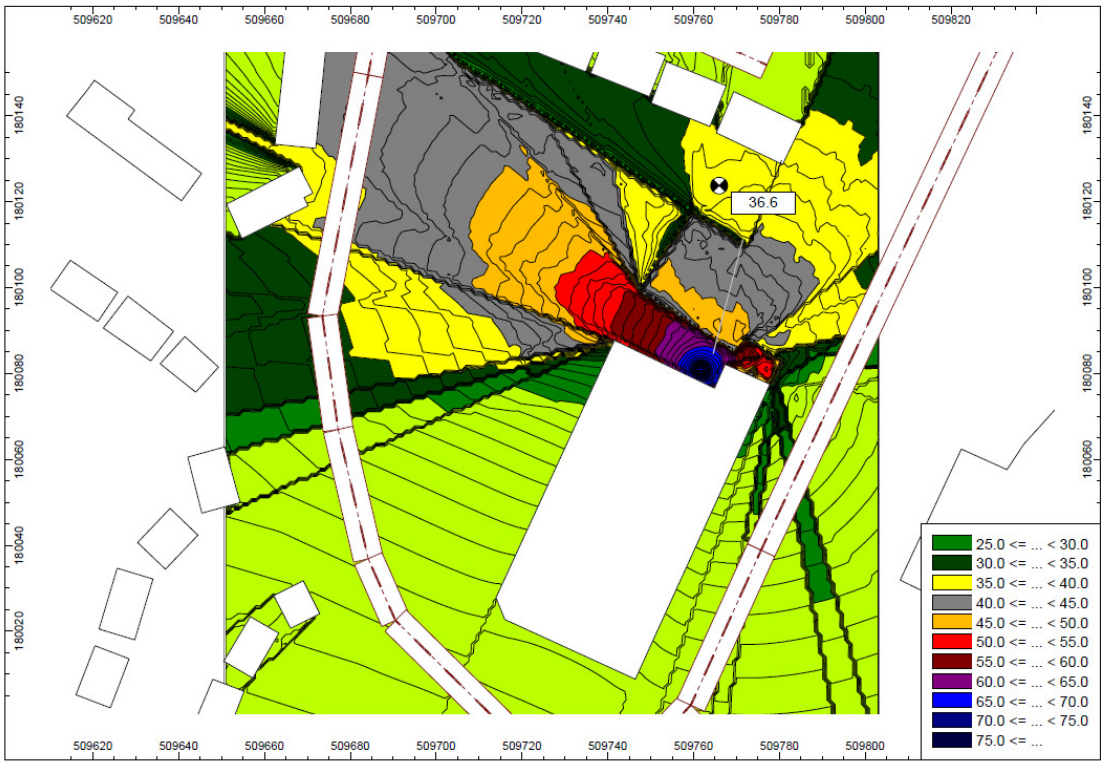
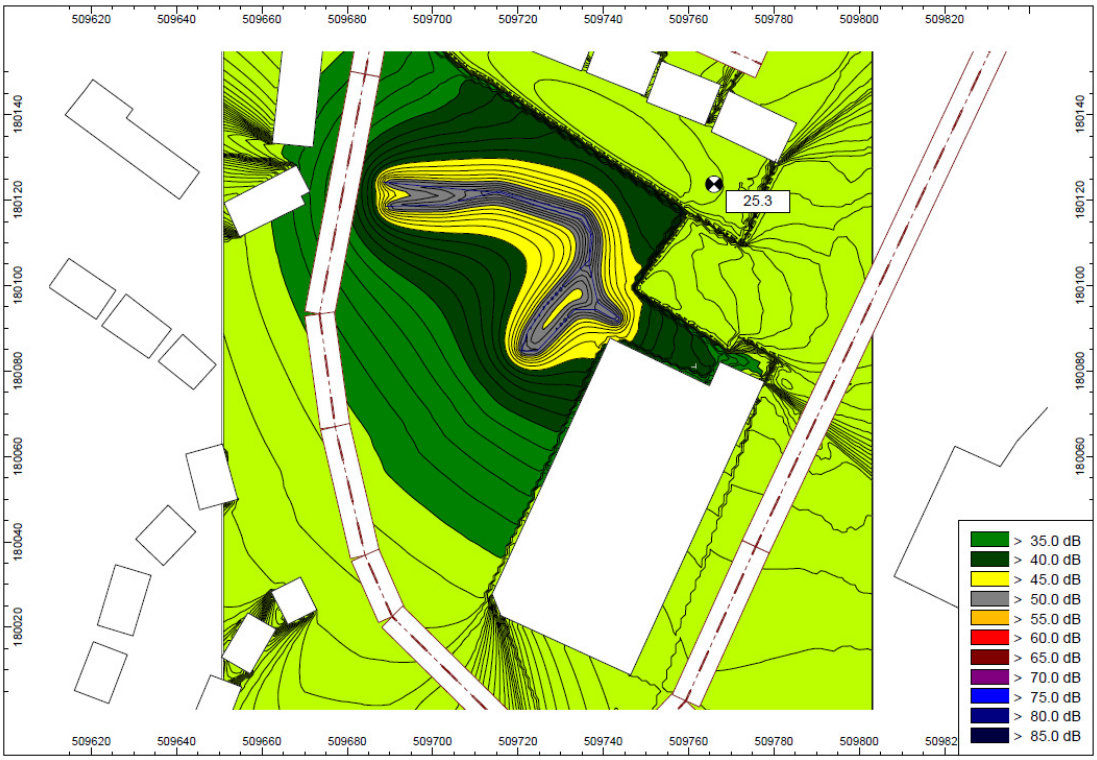


Figure 5: Equivalent Noise Level of Arrival and Departure $L_{Aeq\ (1\ hour)}$



The results are summarised below:

Table 8: Predicted Free-field Delivery Noise Levels $L_{Aeq(1\ hour)}$

Parameter	Receiver R1
Unloading	37 dB $L_{Aeq(1\ hour)}$
Arrival and Departure	25 dB $L_{Aeq(1\ hour)}$

6.4 Delivery Noise Assessment

6.4.1 Assessment of Unloading/Loading Activities

It is considered appropriate to assess the impact of loading/unloading of deliveries in accordance with the methodology of British Standard 4142:2014.

Initial Estimate

A British Standard 4142:2014 assessment has been undertaken at the sensitive receivers around the site for the loading/unloading activities associated with deliveries to the store.

As can be seen from the measurement data the typical measured modal daytime background sound level during the store opening and proposed delivery hours (07:00 and 23:00 hours) is 44 dB $L_{A90\ (1\ hour)}$ (free-field level).

The following assessment includes a 3 dB correction for "intermittency" and a 3 dB correction for "impulsivity" as per British Standard 4142:2014. This character correction is based on our experience of similar sites. The above correction is considered a reasonable approach.

Table 9: British Standard 4142:2014 Initial Estimate

Parameter	Receiver R1
Background Sound Level, $L_{A90\ (1\ hour)}$	44 dB
Specific Sound Level, $L_{Aeq\ (1\ hour)}$	37 dB
Acoustic Character Correction	+6 dB
Rating Sound Level $L_{Ar\ (1\ hour)}$	43 dB
Excess of rating over background level	-1 dB

This means that the delivery rating noise level will result in a British Standard 4142:2014 assessment "difference" of -1 dB at the most sensitive receiver.

With a difference of -1 dB the initial estimate of impact is considered to be of a low impact at the noise sensitive receivers in terms of a British Standard 4142:2014 assessment. However the context of the site and the receivers needs to be taken into account.

Context of Site

British Standard 4142:2014 states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration."

Following the "initial estimate" we consider that there is no significant alteration to the assessment due to the context implication and once all pertinent factors (i.e. context) are taken into account it is an indication that unloading activities associated with deliveries will be of a low impact when assessed to British Standard 4142:2014.

6.4.2 Arrival/Departure of HGV

There is no specific planning guidance in relation to the arrival and departure of the delivery vehicles.

We therefore consider it appropriate to determine the impact on the noise sensitive receivers around the site by comparing existing equivalent noise levels (Daytime $L_{Aeq\ (1\ hour)}$,), to the cumulative equivalent noise levels due to both the existing noise climate and the vehicles arriving/departing ($L_{Aeq\ (1\ hour)}$).

The typical baseline equivalent noise levels is 48 dB $L_{Aeq\ (1\ hour)}$.

The table below shows a summary of the baseline sound levels, the predicted vehicle sound levels, the cumulative of the two and the difference between the baseline and cumulative.

Table 10: Difference in Baseline and Predicted Delivery Arrival Noise Levels

Location	Baseline $L_{Aeq(1hour)}$	Delivery $L_{Aeq(1hour)}$	Cumulative (Baseline + Delivery) $L_{Aeq(1hour)}$	Change in Noise Level
Receiver R1	48 dB	25 dB	48 dB	0 dB

As can be seen in the table above the difference between the cumulative equivalent noise levels (due to baseline conditions and vehicle movements) and the ambient baseline equivalent sound levels is between no more than 0 dB.

Based on the generally accepted noise level change scale of IOA/IEMA draft report this would equate to an imperceptible change in noise levels with no impact on the receivers around the site during the typical 1 hour daytime period.

Therefore we would consider the arrival/departure of deliveries to be acceptable in terms of environmental noise emission to the sensitive receiver in the area over the daytime period until 23:00 hours, Monday to Sunday.

7.0 CAR PARK ACTIVITIES

The proposed car park opening hours are 07:00 hours to 23:00 hours, one hour after the store opening hours. From the measurement data the typical one hour equivalent noise level during this period is 48 dB $L_{Aeq\ (1\ hour)}$ (free field level).

Generally acceptable levels are achieved if the equivalent noise level from the proposed car park activity are of the same order as the current equivalent noise levels experienced around the site, or the increase is not more than 3 decibels.

The nearest noise sensitive properties to car park activity are residential dwellings to the north (R1).

The car park is located to the north and west of the proposed store, the entrance to the store is on the south west corner and we would expect this to be the busiest area of the car park.

From our experience and noise measurements recorded over a number of years of car parking in a number of different car parks, we have established that the equivalent noise levels due to car park activity at the boundary of car park sites are about 45 to 50 $L_{Aeq(1\ hour)}$ decibels. This includes parking, manoeuvring and closing doors and does not appear to be very sensitive to the number of movements.

The residential dwellings to the north of the site (R1) are approximately 30 metres from the closest car parking space with the majority of spaces further away.

Due to the increased distance from the site boundary the equivalent noise level due to car park activity is expected to be reduced by about 10 decibels resulting in car park noise levels of approximately 40 $L_{Aeq(1\ hour)}$ decibels (free field) at the residential properties.

The predicted car park noise level at the noise sensitive residential properties is considerably lower than the existing equivalent noise levels on site during the proposed hours of use.

As such car park noise is not expected to result in a perceptible increase in the equivalent noise level at the façade of the residential properties and is considered acceptable.

8.0 LIMITATIONS

The report limits itself to addressing solely on the noise control and acoustic aspects as included in this report. We provide advice only in relation to noise and acoustics.

The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

It should be noted that noise predictions are based on the current information as we understand it and on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

9.0 SUMMARY AND CONCLUSIONS

Lidl UK Limited appointed Acoustic Consultants Limited to undertake a noise survey and an assessment of noise from the plant, delivery operation and car park activities for the proposed Lidl Food Store, Botwell Lane, Hayes in support of a planning application.

A noise survey was undertaken to determine the existing baseline noise climate. In addition a noise modelling exercise has been undertaken to determine the plant and delivery noise levels at the façade of the nearby noise sensitive receivers.

Plant noise levels at the nearest existing and proposed noise sensitive residential properties have been predicted. The plant rating sound level will result in a British Standard 4142 assessment “difference” of -8 to -13 decibel at the most noise sensitive receivers R1. As such in terms of a British Standard 4142:2014 assessment the impact will be low at the most sensitive receiver. In addition the local authority requirements is also achieved.

Delivery noise has also been assessed, with the proposed delivery times of during the daytime hours only, the noise emission of the deliveries are contained to acceptable levels.

Noise from car park activities has also been considered. The predicted noise levels due to car park activity is not expected to result in an increase in the equivalent noise level at the façade of the residential properties and is considered acceptable.

In environmental noise terms (affecting the residential premises in the vicinity) the proposed plant, delivery operation and car park activities is considered acceptable in terms of noise emission to the dwellings in the vicinity.

Appendix 1: Measured Baseline Noise Levels March 2016

Finish Date & time	$L_{Amax(Fast)}$ dB	$L_{Aeq\ (15\ min)}$ dB	$L_{Aeq\ (15\ min)}$ dB
11/03/2016 13:44:12	84.4	54	46.3
11/03/2016 13:59:12	68.1	48.7	44.8
11/03/2016 14:14:12	63.7	49	44.6
11/03/2016 14:29:12	62.7	47.2	44
11/03/2016 14:44:12	72.2	49.6	43.7
11/03/2016 14:59:12	60.4	47.3	43.3
11/03/2016 15:14:12	56.9	46.8	43.9
11/03/2016 15:29:12	65.6	49.5	43.8
11/03/2016 15:44:12	68	50.4	44.7
11/03/2016 15:59:12	69.7	49.6	44.3
11/03/2016 16:14:12	70.4	51.9	44.9
11/03/2016 16:29:12	64.7	47.7	43.7
11/03/2016 16:44:12	64	49	44
11/03/2016 16:59:12	64.7	48.1	44
11/03/2016 17:14:12	62.6	48.2	44.7
11/03/2016 17:29:12	60.6	48.1	44.8
11/03/2016 17:44:12	58.4	47.9	45.1
11/03/2016 17:59:12	75.1	53.8	46
11/03/2016 18:14:12	63.2	50.8	47.2
11/03/2016 18:29:12	69.7	51	47.1
11/03/2016 18:44:12	64.3	50	47.2
11/03/2016 18:59:12	60.4	49.9	47.4
11/03/2016 19:14:12	59.6	50.1	48.2
11/03/2016 19:29:12	64.2	50.1	47.8
11/03/2016 19:44:12	59.6	50.4	48.1
11/03/2016 19:59:12	57.8	50.2	48.2
11/03/2016 20:14:12	67.3	50.6	47.3
11/03/2016 20:29:12	57.2	49.7	47.5
11/03/2016 20:44:12	68.8	50.8	47.1
11/03/2016 20:59:12	61.6	49.3	46.7
11/03/2016 21:14:12	60.3	48.8	46.2
11/03/2016 21:29:12	58.1	49	46
11/03/2016 21:44:12	60.4	48.8	45.4
11/03/2016 21:59:12	60.2	48.7	46.1
11/03/2016 22:14:12	59.9	49.5	46.8
11/03/2016 22:29:12	64.1	48.9	46
11/03/2016 22:44:12	73.1	50.8	45.7
11/03/2016 22:59:12	71.8	50.3	45.2
11/03/2016 23:14:12	59.6	47.6	43.7
11/03/2016 23:29:12	54.9	46	43
11/03/2016 23:44:12	63.9	46.2	43.2

11/03/2016 23:59:12	54.9	44.4	40.1
12/03/2016 00:14:12	60	43.7	39.2
12/03/2016 00:29:12	59.7	44.1	39.7
12/03/2016 00:44:12	57.2	43.7	40.5
12/03/2016 00:59:12	57.5	43	39.1
12/03/2016 01:14:12	52.6	42.7	38.1
12/03/2016 01:29:12	54.8	41.2	37.3
12/03/2016 01:44:12	50.1	40.1	35.1
12/03/2016 01:59:12	60.3	41	33.8
12/03/2016 02:14:12	55.4	39.7	32.3
12/03/2016 02:29:12	49.2	38.3	31
12/03/2016 02:44:12	54.2	38.6	31.2
12/03/2016 02:59:12	49.9	39.6	32.8
12/03/2016 03:14:12	48.9	39.6	32.7
12/03/2016 03:29:12	59.5	41.1	33.8
12/03/2016 03:44:12	56.9	40.1	32.4
12/03/2016 03:59:12	52.2	40.8	34.5
12/03/2016 04:14:12	56.2	44.2	35.2
12/03/2016 04:29:12	56	43.6	35.1
12/03/2016 04:44:12	56.1	43.5	35.1
12/03/2016 04:59:12	53.3	44.3	37.5
12/03/2016 05:14:12	55.6	44.6	38.1
12/03/2016 05:29:12	57.1	44	38.7
12/03/2016 05:44:12	63.7	47.5	39.4
12/03/2016 05:59:12	64.3	47.9	39.5
12/03/2016 06:14:12	60.5	45.7	38.1
12/03/2016 06:29:12	61.8	46.2	38
12/03/2016 06:44:12	67.1	47.7	40.4
12/03/2016 06:59:12	56.8	46.3	40.5
12/03/2016 07:14:12	59.6	46.6	40.3
12/03/2016 07:29:12	78.3	52.9	39.6
12/03/2016 07:44:12	75.3	51.6	41.9
12/03/2016 07:59:12	69.2	51	43
12/03/2016 08:14:12	65.8	50.5	43.3
12/03/2016 08:29:12	57.3	47.1	43.1
12/03/2016 08:44:12	62.7	47.1	42.4
12/03/2016 08:59:12	75.6	49.6	44
12/03/2016 09:14:12	87.3	57.2	44.3
12/03/2016 09:29:12	66.4	47	42.8
12/03/2016 09:44:12	59.7	47.6	43.6
12/03/2016 09:59:12	69.8	48.3	44.1
12/03/2016 10:14:12	65	48.4	44.4
12/03/2016 10:29:12	59.2	47.7	44.6
12/03/2016 10:44:12	68.3	49	44.8

12/03/2016 10:59:12	58.3	47.9	44.7
12/03/2016 11:14:12	84	51.7	45.2
12/03/2016 11:29:12	65.8	49	45.2
12/03/2016 11:44:12	59.3	48.5	45
12/03/2016 11:59:12	73.4	54.5	44.9
12/03/2016 12:14:12	71.4	50.3	45.2
12/03/2016 12:29:12	62.8	48.4	44.4
12/03/2016 12:44:12	80.8	60.2	45.2
12/03/2016 12:59:12	67.5	50.1	45.8
12/03/2016 13:14:12	65	50	46.1
12/03/2016 13:29:12	62.4	49.8	46.4
12/03/2016 13:44:12	75.5	51.6	46.3
12/03/2016 13:59:12	79.3	56.9	45.9
12/03/2016 14:14:12	63.6	49.5	45.6
12/03/2016 14:29:12	58.5	48.7	46.2
12/03/2016 14:44:12	62.4	48.9	45.7
12/03/2016 14:59:12	71.5	51.6	46
12/03/2016 15:14:12	77.5	56	46.2
12/03/2016 15:29:12	62	48.6	45.7
12/03/2016 15:44:12	83	55.5	45.6
12/03/2016 15:59:12	59.6	47.8	45
12/03/2016 16:14:12	61.3	47.5	44.3
12/03/2016 16:29:12	72.2	54.4	44.5
12/03/2016 16:44:12	90.6	57.9	43.6
12/03/2016 16:59:12	63	47	44.3
12/03/2016 17:14:12	63.5	48.3	44.1
12/03/2016 17:29:12	65.9	48	44
12/03/2016 17:44:12	61.6	47	44.2
12/03/2016 17:59:12	73.5	53.2	44.3
12/03/2016 18:14:12	68.2	48.3	44.2
12/03/2016 18:29:12	65.1	48.4	44.2
12/03/2016 18:44:12	63	47.4	44.2
12/03/2016 18:59:12	53.7	46	43
12/03/2016 19:14:12	57	46.1	43.2
12/03/2016 19:29:12	54	46.3	43.5
12/03/2016 19:44:12	53.8	46.5	44
12/03/2016 19:59:12	55.5	47.7	45.6
12/03/2016 20:14:12	69.9	48.1	45.1
12/03/2016 20:29:12	60.2	47.5	45.2
12/03/2016 20:44:12	68.4	47.6	45
12/03/2016 20:59:12	52	46.4	43.7
12/03/2016 21:14:12	53.3	46.1	43.2
12/03/2016 21:29:12	54.5	46	43.1
12/03/2016 21:44:12	52.2	45.8	43.1

12/03/2016 21:59:12	66	45.9	42.3
12/03/2016 22:14:12	57.7	46.3	43.2
12/03/2016 22:29:12	64.1	48.4	45.1
12/03/2016 22:44:12	64.7	48.2	45.1
12/03/2016 22:59:12	60.4	47.9	45.7
12/03/2016 23:14:12	55.1	47.8	45.6
12/03/2016 23:29:12	53.4	47.1	45
12/03/2016 23:44:12	56.2	46.2	43.6
12/03/2016 23:59:12	52.3	44.8	42.1
13/03/2016 00:14:12	51.7	44.2	41.6
13/03/2016 00:29:12	69.2	49.6	42.4
13/03/2016 00:44:12	59.8	44.3	39.7
13/03/2016 00:59:12	50.2	41.4	37.6
13/03/2016 01:14:12	50	40.5	35.1
13/03/2016 01:29:12	50.7	40.8	36.1
13/03/2016 01:44:12	71.7	46.4	35.6
13/03/2016 01:59:12	50.2	39.1	33.7
13/03/2016 02:14:12	57.3	40.4	34.4
13/03/2016 02:29:12	52.4	39.6	33.2
13/03/2016 02:44:12	50.9	39	32.5
13/03/2016 02:59:12	52.3	38.2	31.9
13/03/2016 03:14:12	52	39.2	32
13/03/2016 03:29:12	69.3	40.6	30.6
13/03/2016 03:44:12	47.9	37	30.1
13/03/2016 03:59:12	55.8	38.6	31.4
13/03/2016 04:14:12	50.3	40.8	33.3
13/03/2016 04:29:12	50	41.4	35.1
13/03/2016 04:44:12	54.9	42.9	35.8
13/03/2016 04:59:12	53.7	42	35.6
13/03/2016 05:14:12	57	44.6	37.4
13/03/2016 05:29:12	54.5	45.1	38.5
13/03/2016 05:44:12	56.5	44.1	36.5
13/03/2016 05:59:12	57.8	44.6	37
13/03/2016 06:14:12	60.2	44.9	35.5
13/03/2016 06:29:12	64.5	43.2	37
13/03/2016 06:44:12	75.1	53.6	39.2
13/03/2016 06:59:12	60.1	45.2	36.8
13/03/2016 07:14:12	74.1	49.1	38.3
13/03/2016 07:29:12	70.6	52.1	39.3
13/03/2016 07:44:12	63.3	45.8	38.2
13/03/2016 07:59:12	70.6	50.2	39.8
13/03/2016 08:14:12	73.9	51	39.5
13/03/2016 08:29:12	65.7	44.9	39.4
13/03/2016 08:44:12	56.3	44	38.9

13/03/2016 08:59:12	66.4	46.7	41.6
13/03/2016 09:14:12	58.2	45.9	40.6
13/03/2016 09:29:12	69.6	53.7	40.7
13/03/2016 09:44:12	72.9	54.7	42.2
13/03/2016 09:59:12	63.4	47.8	43.2
13/03/2016 10:14:12	62.1	47.4	43.3
13/03/2016 10:29:12	72.2	49.6	43.2
13/03/2016 10:44:12	69.7	48.1	43.7
13/03/2016 10:59:12	85	55.5	43.4
13/03/2016 11:14:12	81.3	59.8	43.4
13/03/2016 11:29:12	81.9	53.6	43.3
13/03/2016 11:44:12	59.1	47.4	44
13/03/2016 11:59:12	71.7	50.9	43.7
13/03/2016 12:14:12	69.1	50.1	43.4
13/03/2016 12:29:12	63.7	46.4	42.8
13/03/2016 12:44:12	66.6	47.7	43.6
13/03/2016 12:59:12	68.6	50.7	43.5
13/03/2016 13:14:12	65.5	48.8	43.5
13/03/2016 13:29:12	59.4	46.9	43.3
13/03/2016 13:44:12	69.4	48.8	43.4
13/03/2016 13:59:12	84.7	62.2	43.2
13/03/2016 14:14:12	62.3	47.6	43.4
13/03/2016 14:29:12	74.4	51.7	43.3
13/03/2016 14:44:12	64	48.3	43.3
13/03/2016 14:59:12	65.1	47.7	42.9
13/03/2016 15:14:12	66.4	48.4	43.7
13/03/2016 15:29:12	66.3	49.6	43.7
13/03/2016 15:44:12	73.7	49.4	43.4
13/03/2016 15:59:12	72	52.6	43.9
13/03/2016 16:14:12	75.4	55.2	43.9
13/03/2016 16:29:12	69.2	52	43.7
13/03/2016 16:44:12	62.3	48.7	44.5
13/03/2016 16:59:12	57.7	47.5	44.1
13/03/2016 17:14:12	65.8	47.8	43.8
13/03/2016 17:29:12	64.7	49.2	44.2
13/03/2016 17:44:12	64.6	48	44.1
13/03/2016 17:59:12	75.9	52.7	44.9
13/03/2016 18:14:12	62.9	49.2	45.1
13/03/2016 18:29:12	66.5	48.2	44.4
13/03/2016 18:44:12	65.1	48.4	44.4
13/03/2016 18:59:12	60	46.8	43.8
13/03/2016 19:14:12	73.4	52.7	43.7
13/03/2016 19:29:12	60.9	48	43.7
13/03/2016 19:44:12	63.2	48.5	44.1

13/03/2016 19:59:12	61.7	46.4	43.3
13/03/2016 20:14:12	59.4	47.2	44
13/03/2016 20:29:12	56.6	46.7	44
13/03/2016 20:44:12	61.6	48.5	44.6
13/03/2016 20:59:12	59.8	47	43.4
13/03/2016 21:14:12	62.4	48.2	43.5
13/03/2016 21:29:12	60.5	47.6	43.5
13/03/2016 21:44:12	59.7	46.5	41.5
13/03/2016 21:59:12	62.8	46.9	41.7
13/03/2016 22:14:12	58.8	45.7	41.3
13/03/2016 22:29:12	58.3	46.8	41.9
13/03/2016 22:44:12	56.1	45.5	40.5
13/03/2016 22:59:12	66.2	46.8	40.7
13/03/2016 23:14:12	61	44.1	40.3
13/03/2016 23:29:12	56.4	44.4	40
13/03/2016 23:44:12	55.1	42.6	39
13/03/2016 23:59:12	60.3	43.3	38
14/03/2016 00:14:12	54.5	42.7	38.3
14/03/2016 00:29:12	56.7	41.9	34.8
14/03/2016 00:44:12	50.5	38.6	33.5
14/03/2016 00:59:12	62.2	39.3	33.8
14/03/2016 01:14:12	55.7	38.6	33.2
14/03/2016 01:29:12	60.7	39.6	32.7
14/03/2016 01:44:12	51.1	37.3	31.3
14/03/2016 01:59:12	50.6	36.3	31.7
14/03/2016 02:14:12	63.1	38.3	32.2
14/03/2016 02:29:12	58.4	39.4	32.1
14/03/2016 02:44:12	59.1	39.1	32.3
14/03/2016 02:59:12	56.1	38	31.9
14/03/2016 03:14:12	62.5	39.2	32.1
14/03/2016 03:29:12	55	39.2	32.7
14/03/2016 03:44:12	51.4	39	34
14/03/2016 03:59:12	49.3	39.4	34
14/03/2016 04:14:12	63.3	39.8	34.3
14/03/2016 04:29:12	59.4	40.5	36.5
14/03/2016 04:44:12	58.8	42	37.4
14/03/2016 04:59:12	54.2	43.7	38.7
14/03/2016 05:14:12	54.7	43.8	39.6
14/03/2016 05:29:12	59.1	44.4	40.1
14/03/2016 05:44:12	58.1	47	41.6
14/03/2016 05:59:12	69.6	49.6	42.9
14/03/2016 06:14:12	58	46.7	42.2
14/03/2016 06:29:12	66.4	48.5	43.8
14/03/2016 06:44:12	59.4	48.2	44.5

14/03/2016 06:59:12	61.8	48.2	45.2
14/03/2016 07:14:12	63.4	49.2	45.2
14/03/2016 07:29:12	73.6	49.9	45.8
14/03/2016 07:44:12	65.2	49.3	46.4
14/03/2016 07:59:12	72.6	51.4	46.2
14/03/2016 08:14:12	64.4	49.4	46
14/03/2016 08:29:12	60	48.6	46.1
14/03/2016 08:44:12	60.3	48.6	46
14/03/2016 08:59:12	60.9	49.2	46.4
14/03/2016 09:14:12	68.4	50.4	46.3
14/03/2016 09:29:12	65.4	49.9	46.7
14/03/2016 09:44:12	74	50.5	46
14/03/2016 09:59:12	66.3	50	46.1
14/03/2016 10:14:12	73.1	51.6	45.9
14/03/2016 10:29:12	60.2	49.7	46.2
14/03/2016 10:44:12	64.6	50.2	47
14/03/2016 10:59:12	61.2	48.7	45.1
14/03/2016 11:14:12	61.6	48.9	45.9
14/03/2016 11:29:12	59.1	48.5	45.5
14/03/2016 11:44:12	74.8	51.8	45.1
14/03/2016 11:59:12	71	51.1	45.1
14/03/2016 12:14:12	68.2	49.6	45.3
14/03/2016 12:29:12	59.8	48.5	45.1