Noise Assessment
Addendum to Technical Report: SHF.179.001.R.001.B
Southmoor Park, Wythenshawe.







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Addendum to Technical report SHF.179.001.R.001.B Southmoor Park, Wythenshawe

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1.0 INTRODUCTION

1.1 Project Introduction

This report forms an addendum, supplying additional information to the Enzygo Technical Report regarding noise ref: SHF.179.001.R.001.B dated: November 2011.

The original Enzygo Technical Report detailed the noise assessment undertaken as part of an application for the variance of planning conditions attached to the Southmoor Park site. The planning condition variation relates specifically to the movement of vehicles around the site and affects the permitted delivery hours. For full details of the study undertaken please reference said report.

1.2 Scope of this Addendum

The purpose of this addendum is to consider the post submission issues raised by the Environmental Health Department at the Local Planning Authority, Manchester City Council (MCC) within their e-mail dated 26th January 2012.

The issues raised by the Environmental Health Department specifically relate to the following aspects of the assessment:

- Background readings from 7-8am and 9-11pm;
- Clarification of the number of LGV deliveries throughout the night;
- Clarification of whether the unloading will be carried out inside the units; and,
- An assessment of the levels of noise created by the shutter doors

In order to address the issues raised the following additional studies have been undertaken within the scope of this addendum. These additional aspects to the assessment were discussed and agreed with the Environmental Health Department prior to undertaking[1];

- Quantification of the noise climate at the extremes of the daytime period; those being 07:00 to 08:00hrs and 21:00 to 23:00 hrs;
- Clarification of the number of vehicle deliveries during the overnight period;
- Clarification of the loading/unloading protocols. Specifically if these operations would be undertaken within the building envelope at all times; and,
- Quantification of the level of noise generated by the roller shutter doors during operation.

Each of the above issues will be addressed individually within the following sections.

[1] Telephone discussions and subsequent e-mail transmission between Enzygo and Erica Webb (MCC) dated 26th January 2012.

2.0 ADDITIONAL NOISE MONITORING

2.1 Environmental Health Department Comment

Within the formal response to the noise assessment made by the Environmental Health Department the following concern was raised:

"Background readings from 7-8am and 9-11pm"

In response to the EHO's request, further noise monitoring was undertaken at the Southmoor Site. The monitoring was undertaken as detailed below.

2.2 Additional Monitoring

2.2.1 Survey Details

It is noted that the monitoring forming the basis of the Technical Report was entirely agreed with the Environmental Health Department prior to undertaking, specifically with regard to monitoring location, durations and time periods for consideration.

However, following the concern raised by the department additional noise monitoring was undertaken at the site during the periods as detailed in Table 2-1 below. These periods relate directly to the time periods stated by the Environmental Health Department.

Table 2-1 –Noise Monitoring Periods

Location	Period	Time Period	Duration
Location 1 (as identified in Figure 2)	Early Morning	07:00 – 08:00	1 hour
	Late Evening	21:00 – 23:00	2 hours

The noise monitoring location is further presented graphically within Figure 1 below for ease of reference.



Figure 1: Monitoring Location Plan (map source Google)

As detailed in the original Technical Report, obtaining baseline ambient noise measurements at the above location on site has assisted in the assessment of potential impacts at the adjacent residential receptor locations as a result of vehicle movements around the Southmoor Park site.

The noise monitoring survey was conducted for the identified periods on the 8th February 2012.

All monitoring undertaken in conjunction with this assessment was fully attended by a competent field engineer in order to determine typical noise sources operating in the area and to observe the meteorological conditions prevalent.

Meteorological Conditions

The weather during the early morning period of the 8th February 2012 was noted to be cold, with an average temperature of -2°C. Winds were noted to be negligible. No precipitation fell during the early morning monitoring period.

During the Late evening period the weather was noted to be cold with an average temperature of 0°C. Winds were noted to be negligible and no precipitation fell during the monitoring period.

2.2.2 Monitoring Equipment

The monitoring of noise was undertaken in line with the guidance set out within BS7445: 1991. The sound level meter was programmed to monitor over 15 minute periods. The equipment used was set to record the following statistical parameters:

L_{Aeq} in dB
L_{A10} in dB
L_{A90} in dB
L_{Amax} in dB

The following sound level meter equipment was used in order to undertake the noise survey.

Table 2-2 – Noise Monitoring Equipment

Equipment	Manufacturer	Type	Serial Number
Sound Level Meter	01dB	Blue Solo	60844
Preamplifier	01dB	PRE21	13901
Microphone	GRAS	MCE212	808896
Calibrator	Norsonic	Type 1251	34683836

The sound level meter was mounted on a tripod at a height of approximately 1.5m above the ground, a minimum of 3.5m from any reflecting surfaces and was fitted with a relevant manufacturer's specification windshield.

The following set-up parameters were used on the sound level meter during all of the noise measurements undertaken:

Time Weighting: Fast
Frequency Weighting: "A"

The sound level meter used was calibrated using an electronic calibrator prior to commencement and upon completion of the surveys, no significant drift in calibration was observed. The instrumentation calibration documentation for the equipment used are contained within Appendix 2 of this report.

2.2.3 Noise Monitoring Results

Presented within Table 2-3 below, is a summary of the early morning and late evening noise levels monitored at the site. The full set of measurement data is presented within Appendix 1.

Table 2-3 below presents the 15 minute averaged data monitored during each of the identified periods.

Table 2-3 – Measured Noise Level Data

Location	Period	Statistical Parameters in dB(A)			
		$L_{eq,T}$		$L_{90,T}$	
		Range	Average	Range	Average
Location 1	07:00 – 08:00 Early Morning	48.8 – 51.6	50.5	46.9 – 48.6	48.0
	21:00 – 22:00 Late Evening	43.8 – 46.3	45.4	42.7 – 44.3	43.7
	22:00 – 23:00 Late Evening	43.1 – 47.5	45.5	40.7 – 45.1	42.6

During the early morning period it was noted that the noise climate was governed primarily by traffic noise on the surrounding road network. This was coupled with HGV movements and industrial processes (fans, cooling units, fork lift trucks etc) at the industrial units adjacent to, but not associated with, the Southmoor Park site. It was further noted that train movements were audible though these were considered to be sporadic.

During the late evening period the noise climate was dominated by distant traffic noise from the surrounding road network. Also noticeable were noises from around the wider Roundthorne industrial estate including HGV movements, reversing alarms and unloading activities. Occasional train movements were also noted.

2.3 Additional Assessment

Following on from the additional monitoring it was considered pertinent to assess the impact of the proposed operations during these periods in accordance with the procedures as detailed in the Technical Report.

Details of the 3D noise modelling undertaken within the scope of these assessments are presented within Section 6 of the Technical Report. All assumptions and methodologies detailed within the Technical Report are consistent within the scope of this addendum. The locations used for the prediction of noise are consistent with those from the Technical Report and are presented within Figure 2 below.



Figure 2:Receptor Location Plan (map source Google)

As detailed in the technical report, the noise impact has been assessed in line with the methodology of BS4142.

As with the original report, within the scope of the assessments undertaken below the quietest measured L_{A90} has been compared to a peak hour modelled period.

2.3.1 Early Morning Assessment (07:00 – 08:00)

The assessment presented in Table 2-4 details the potential impact generated by the movement of HGVs around the site during the early morning period 07:00 – 08:00. The assessment assumes 1 HGV delivery to each unit during the hour under investigation.

Table 2-4 – BS4142 Noise Impact Assessment 07:00 – 08:00

Location	Period	Measured L_{90} 'background noise level'*	Predicted BS4142 Rating Level*	Difference	Impact Significance Criteria
M01	Morning	47	33	-14	*"Positive indication that Complaints are unlikely"*
M02	Morning	47	39	-8	*"Less than Marginal significance"*
M03	Morning	47	44	-3	*"Less than Marginal significance"*
M04	Morning	47	45	-2	*"Less than Marginal significance"*
M05	Morning	47	44	-3	*"Less than Marginal significance"*
M06	Morning	47	42	-5	*"Less than Marginal significance"*
M07	Morning	47	37	-10	*"Positive indication that Complaints are unlikely"*
M08	Morning	47	33	-14	*"Positive indication that Complaints are unlikely"*

***Note:** Noise levels rounded to nearest whole dB in accordance with the guidance of BS4142

Early Morning Period- *Between -14dB and -2dB below the existing background noise climate of the area.*

This would be considered by the standard to be of less than "marginal Significance" and in some instances provide a "positive indication that complaints are unlikely"

2.3.2 Late Evening Assessment (21:00 – 23:00)

For the purposes of this assessment the late evening period has been further divided into two discrete periods. Those being:

- 21:00hrs to 22:00hrs, and,
- 22:00hrs to 23:00hrs.

2.3.2.1 21:00 – 22:00 Period

As with the assessment undertaken within section 2.3.1 of this addendum, the assessment of the period 21:00 to 22:00, as detailed in Table 2-5 below, is based on the assumption of one delivery vehicle (HGV) to each unit during the assessment period of 1 hour.

Table 2-5 – BS4142 Noise Impact Assessment 21:00 – 22:00 – HGV's

Location	Period	Measured L_{90} 'background noise level'*	Predicted BS4142 Rating Level*	Difference	Impact Significance Criteria
M01	Evening	43	33	-10	*"Positive indication that Complaints are unlikely"*
M02	Evening	43	39	-4	*"Less than Marginal significance"*
M03	Evening	43	44	+1	*"Less than Marginal significance"*
M04	Evening	43	45	+2	*"Less than Marginal significance"*
M05	Evening	43	44	+1	*"Less than Marginal significance"*
M06	Evening	43	42	-1	*"Less than Marginal significance"*
M07	Evening	43	37	-6	*"Less than Marginal significance"*
M08	Evening	43	33	-10	*"Positive indication that Complaints are unlikely"*

***Note:** Noise levels rounded to nearest whole dB in accordance with the guidance of BS4142

Late Evening Period- *Between -10dB below and +2 above the existing background noise climate of the area.*

This would be considered by the standard to be of less than "marginal Significance" for the majority of receptors and provide "Positive indication that complaints are unlikely" at two receptor locations.

2.3.2.2 22:00 – 23:00 Period

The assessment undertaken in Table 2-6 below details the assessment of the period 22:00 to 23:00hrs assuming 1 delivery vehicle (HGV) to each unit during the one hour assessment period.

Table 2-6 – BS4142 Noise Impact Assessment 22:00 – 23:00 – HGV's

Location	Period	Measured L_{90} 'background noise level'*	Predicted BS4142 Rating Level*	Difference	Impact Significance Criteria
M01	Evening	41	33	-8	*"Less than Marginal significance"*
M02	Evening	41	39	-2	*"Less than Marginal significance"*
M03	Evening	41	44	+3	*"Less than Marginal significance"*
M04	Evening	41	45	+4	*"Less than Marginal significance"*
M05	Evening	41	44	+3	*"Less than Marginal significance"*
M06	Evening	41	42	+1	*"Less than Marginal significance"*
M07	Evening	41	37	-4	*"Less than Marginal significance"*
M08	Evening	41	33	-8	*"Less than Marginal significance"*

***Note:** Noise levels rounded to nearest whole dB in accordance with the guidance of BS4142

Late Evening Period- *Between -8dB below and +4 above the existing background noise climate of the area.*

This would be considered by the standard to be of less than "marginal Significance".

Given the predicted noise impact detailed within Table 2-6 above, it is considered pertinent to consider the merits of restricting the movement of delivery vehicles to 1 light delivery vehicle (LDV) per unit, per hour during the period 22:00 to 23:00.

Table 2-7 below presents the 1 hour assessment of the movement of LDVs around the Southmoor site between the hours of 22:00 and 23:00.

The assumed noise emissions of the LDV are as detailed in the appropriate section of the technical report.

Table 2-7 – BS4142 Noise Impact Assessment 22:00 – 23:00 – LDV's

Location	Period	Measured L_{90} 'background noise level'*	Predicted BS4142 Rating Level*	Difference	Impact Significance Criteria
M01	Evening	41	27	-14	*"Positive indication that Complaints are unlikely"*
M02	Evening	41	31	-10	*"Positive indication that Complaints are unlikely"*
M03	Evening	41	36	-5	*"Less than Marginal significance"*
M04	Evening	41	37	-4	*"Less than Marginal significance"*
M05	Evening	41	37	-4	*"Less than Marginal significance"*
M06	Evening	41	35	-6	*"Less than Marginal significance"*
M07	Evening	41	30	-11	*"Positive indication that Complaints are unlikely"*
M08	Evening	41	26	-15	*"Positive indication that Complaints are unlikely"*

***Note:** Noise levels rounded to nearest whole dB in accordance with the guidance of BS4142

Late Evening Period- *Between -4 and -14dB below the existing background noise climate of the area.*

This would be considered by the standard to be of less than "marginal Significance" at four of the assessment locations and provide "Positive indication that complaints are unlikely" at the remaining four locations.

2.4 Conclusions

The following conclusions have been drawn from the assessment based upon the additional baseline noise data.

All conclusions drawn are based upon the modelled scenario of 1 HGV to and from each unit within the site in the assessment period of 1 hour.

Early Morning Period (07:00 to 08:00)

The assessment detailed in Table 2-4 concludes that during this period the movement of vehicles around the site would generate noise levels below the existing background climate of the area and of at worst *"less than marginal significance"* in accordance with the criteria defined by the British Standard 4142.

As such operation of vehicles at the site during this time period should not cause undue impacts on the adjacent residential dwellings.

Late Evening Period (21:00 to 22:00)

The assessment detailed in Table 2-5 concludes that during this period the movement of vehicles around the site would generate noise levels either slightly above (+2dB(A)) to significantly below the existing background climate of the area, depending upon location. However, the assessment concludes levels which at worst are of *"less than marginal significance"* in accordance with the criteria defined by the British Standard 4142.

As such operation of vehicles at the site during this time period should not cause undue impacts on the adjacent residential dwellings.

Late Evening Period (22:00 to 23:00)

The assessment detailed in Table 2-6 concludes that during this period the movement of vehicles around the site would generate noise levels either marginally above (+4dB(A)) to significantly below the existing background climate of the area, depending upon location. However, the assessment concludes levels which at worst are of *"less than marginal significance"* in accordance with the criteria defined by the British Standard 4142.

Given the potential level of increase above the measured background and the sensitivity of this particular time of day, it was considered pertinent to assess the potential impact generated by the restriction to Light Delivery Vehicles (LDV) during this period.

The assessment undertaken in Table 2-7 details the potential impact generated by 1 LDV movement to and from each unit within the site area within the hour assessment period. The assessment predicted a change of between -4dB and -14dB below the measured background level during this period as a result of the lower noise levels generated by the lighter vehicle classification. This level of change is considered by the standard to be of *"less than marginal significance"*.

As such operation of vehicles at the site during this time period should not cause undue impacts on the adjacent residential dwellings.

3.0 VEHICLE MOVEMENTS DURING THE OVERNIGHT PERIOD

3.1 Environmental Health Department Comment

Within the formal response to the noise assessment made by the Environmental Health Department the following concern was raised:

"Clarification of the number of LGV deliveries throughout the night"

In response to the EHO's request, further noise assessment was undertaken as detailed below.

3.2 Additional Assessment

3.2.1 Delivery Assumptions

Within the scope of the Technical Report, the assumption was made that 1 vehicle would attend (enter and leave) each unit on the site in each hour of the overnight period.

However, the methodology of BS4142 requires that the overnight assessment is based upon a representative 5 minute period. Therefore, based upon the above assumption (1 vehicle/unit/hour), it is reasonable to conclude that in any one 5minute period one vehicle will either access or leave one of the units, but it is unlikely that more movements than this would occur within such a short period of time.

Furthermore it was assumed that this 1 vehicle in the 5 minute assessment period would access Unit B1 as this is the closest and most exposed unit to the sensitive receptors on Tottenham Drive.

In relation to the number of deliveries to each unit during the overnight period, as the units are currently unoccupied and no occupiers are identified it is not possible to accurately specify this information. However, it is considered that to assume each unit will receive 1 delivery vehicle per hour during the overnight period, resulting in a total of 8 deliveries (16 movements) per unit between the hours of 23:00 and 07:00, is potentially an over-estimation but is a reasonable assumption to make within the scope of any assessment.

3.2.2 1 Hour Overnight Assessment

However, to provide further clarification with regard to the expected overnight noise levels from the site the following 1 hour assessment has been undertaken.

In the following scenario the above (Section 3.2.1) assumptions have been maintained with regard to the number of vehicles accessing each unit per hour during the overnight period. The assumption maintained is that 1 vehicle would access and leave each unit within the 1 hour assessment period (accounting for a total of 14 movements (7 in, 7 out) on the site in the assessment period).

Table 3-1 – BS8233 One Hour Overnight Noise Impact Assessment – LDV Movements

Location	Period	Facade corrected Predicted External noise Level in dB (Predicted LAeq +3dB(A))	Predicted internal noise level in dB LAeq (assuming -13dB façade attenuation)	BS8233 Conditions in dB LAeq Good <30dB Reasonable <35dB
M01	Night-time	29	16	'Good'
M02	Night-time	34	21	'Good'
M03	Night-time	39	26	'Good'
M04	Night-time	40	27	'Good'
M05	Night-time	40	27	'Good'
M06	Night-time	38	25	'Good'
M07	Night-time	33	20	'Good'
M08	Night-time	29	16	'Good'

All assumptions made within the scope of the predictions informing the above assessment are as detailed in Section 6 of the Technical Report.

The assessment undertaken in Table 3-1 above indicates that given an assessment period of 1 hour during the overnight period, the predicted internal noise level at the nearest residential receptors would meet the "Good" internal design criteria as defined by BS8233 even when assuming that windows are open for ventilation purposes.

3.3 Conclusions

The assessment presented within Table 3-1 demonstrates the impact of the the movement of delivery vehicles to all units within the Southmoor facility within any one hour period of the overnight. The assessment is based upon a total of 14 movements around the site based upon 1 vehicle accessing and leaving (2 movements) each unit.

The assessment has concluded that the predicted internal noise levels at the nearest residential receptors, as a result of vehicle movements within the Southmoor Park facility, would be within the 'Good' design range criteria of BS8233 and as such are not considered to result in undue impacts to residents.

4.0 LOADING/UNLOADING PRACTICES

4.1 Environmental Health Department Comment

Within the formal response to the noise assessment made by the Environmental Health Department the following concern was raised:

"Clarification of whether the unloading will be carried out inside the units"

4.2 Additional Assessment

In the interest of minimising the noise impact on the surrounding residential properties, particularly during the sensitive overnight periods (23:00 – 07:00), it is considered best practise to encourage loading/unloading activities to be undertaken within the building envelope.

This would be controlled by management and operational practices at the site which any potential operators would require to sign agreement with prior to occupancy.

Furthermore this could be controlled by a suitably worded condition within the planning permission ensuring that during the more sensitive periods of the day (late evening from 22:00 – 23:00 and overnight between 23:00 – 07:00) no loading or unloading is undertaken externally to the buildings. Below is an example of a condition that could be included within the planning permission;

"During the following detailed periods all site activities (including loading and unloading of vehicles etc) are to be undertaken solely within the building space. Any deviation from this condition would require prior agreement with the Environmental Health Department of the LPA and may require to include a detailed noise assessment to quantify any potential impacts at nearby noise sensitive receptors and detail, where appropriate, noise reduction measures in order to minimise these effects.

- *between late evening hours of 22:00 and 23:00hrs; and,*
- *between the overnight hours of 23:00 and 07:00hrs.*

This acoustic assessment would require to be signed off by the Local Planning Authority and the findings of such implemented prior to any activities being undertaken.

Reason: For the protection of residential amenity in the vicinity of the site"

5.0 NOISE IMPACT ASSESSMENT – ROLLER SHUTTER DOORS

5.1 Environmental Health Department Comment

Within the formal response to the noise assessment made by the Environmental Health Department the following concern was raised:

"An assessment of the levels of noise created by the shutter doors"

5.2 Additional Assessment

In response to the Environmental Health Departments query regarding the noise generated by the operation of the roller shutter doors on the site, an assessment has been undertaken. The assessment has been based upon the source noise levels for the doors in operation measured at the Southmoor Park site and as such is specific to the site under consideration.

5.2.1 Roller Shutter Description

From the visual inspection of the doors, it was possible to ascertain that the doors are approximately 6m high by 4m wide, and constructed from articulated metal panels (roller shutters). The shutters are manually operated by the use of a metal chain located adjacent to the door within the building. All mechanical components of the door units are located within the buildings.

The opening of the shutter doors took approximately 1 minute from fully closed to fully open, and approximately the same amount of time to close again.

5.2.2 Noise Monitoring Methodology

Noise measurements were undertaken at the site in close proximity of the shutters as they were both opened and closed a total of three times.

A type 1 sound level meter (SLM as specified for the environmental survey within Section 2.2.2) was positioned approximately 1.5m from the outside of the shutters adjacent to the side runners. This location was selected following on site investigation as it represented the point of contact between the moving metal elements of the shutters and the metal guide way attached to the building, and as such was the point where most noise from the shutter operation would be generated.

To establish a representative noise generated by the operational shutter, three measurements were taken of the shutters being opened and closed.

5.2.3 Noise Monitoring Results

The following table presents the results of the monitoring undertaken. For clarity the survey was undertaken as detailed below:

SLM Position: 1.5m from the outside of the shutters adjacent to the side runners;

Survey Duration: Each cycle (open and close) took 100 – 140 seconds

Table 5-1 – Roller Shutter Noise Measurements

Measurement	Duration (Sec)	L_{Aeq}	L_{Amax}
1	122	62.4	78.0
2	102	60.1	70.1
3	138	59.1	69.6
Average	**121**	**60.8**	**78.0**

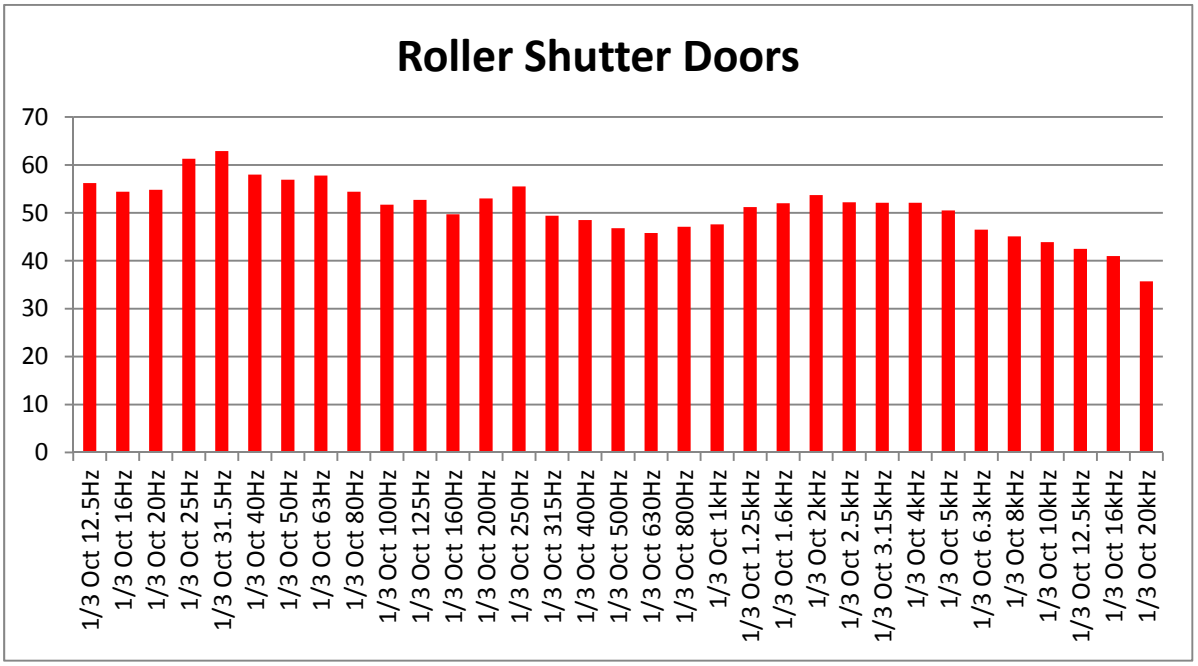

Figure 3:Roller Shutter Doors Frequency Spectrum

5.2.4 Assessment of Shutter Noise

Following on from the quantification of the roller shutter door noise at the units it was deemed appropriate to consider how this would impact on the adjacent residential receptors.

As such the acoustic model constructed within the scope of the Technical Report was amended to predict the propagation of the roller shutter door noise. Details of the 3D noise model are presented within Section 6 of the Technical Report. The locations used for the prediction of noise are consistent with those presented within Figure 2 of Section 2.3.

In order to consider of the impact of the operation of the roller shutter doors at the nearest receptors, prediction of noise was undertaken from the action of opening and shutting the door. For the purposes of the predictions the noise source was set at the door of Unit B1, being the closest to the sensitive receptors. The impact has been assessed in line with the methodology of BS4142 utilising the quietest measured L_{A90} level.

Reference to Tables 2-4 to 2-6 of Section 2 details that assessment location M04 consistently returns the highest impacts of the 8 locations considered. As such Table 5-2 below presents the data for this location alone as the other locations would return lower impacts.

Table 5-2 – BS4142 Noise Impact Assessment – Roller Shutters

Location	Period	Measured L_{90} 'background noise level'*	Predicted BS4142 Rating Level*	Difference	Impact Significance Criteria
Early Morning period – 07:00 – 08:00					
M04	Morning	47	22	-25	*"Positive indication that Complaints are unlikely"*
Evening Period - 18:00 – 20:00					
M04	Evening	46	22	-24	*"Positive indication that Complaints are unlikely"*
Late Evening period – 21:00 – 22:00					
M04	Evening	43	22	-21	*"Positive indication that Complaints are unlikely"*
Late Evening period – 22:00 – 23:00					
M04	Evening	41	22	-19	*"Positive indication that Complaints are unlikely"*
Overnight period – 23:00 – 07:00					
M04	Overnight	31	22	-9	*"Positive indication that Complaints are unlikely"*

***Note:** Noise levels rounded to nearest whole dB in accordance with the guidance of BS4142

5.3 Conclusions

Analysis of the frequency spectra, as indicated in Figure 3, indicates no discernible, discrete tones or frequencies dominating the noise emissions. As such it can be concluded that the frequency spectra of the noise generated is broadband in nature and would not warrant a rating level correction factor in line with the BS4142 methodology.

The assessments undertaken in Table 5-2 indicates that the level of noise generated by operation of the roller shutter doors is considered by the guidance of BS4142 to be at a level where it could be considered to be a "*Positive indication that Complaints are unlikely".*

Therefore any impacts associated with the operation of the roller shutter doors would not result in undue impacts at the closest noise sensitive receptors.

6.0 RECOMMENDATIONS

As a result of the assessments undertaken within this addendum, a number of variations to the recommendations have been made.

Given the additional detail on the background noise climate of the area certain alterations to the recommendations of the Technical Report have been required to be made. Therefore, the recommendations made within this addendum wholly supersede those of the Technical Report (Ref: SHF.179.001.R.001.B, dated: November 2011).

6.1 Vehicle Movements

Recommendations relating to the appropriate levels of vehicle activity at the site during the late evening and overnight periods are outlined below;

1) HGV movements around the site would require being limited to the hours between 07:00 and 22:00. This is based upon 1 HGV delivery to each unit per hour (7 HGV's (14 movements) total per hour).

2) During the late evening (22:00 – 23:00) and overnight period (23:00 – 07:00) vehicle movements around the site would require being limited to LDV/Vans. This is based upon the assumption of 1no. LDV/Van movement per hour (7 LDV/Van's (14 movements) total per hour).

In order to permit Heavy Goods Vehicles to access the site during the overnight period significant and costly levels of acoustic attenuation would require to be implemented at the site, specifically with regard to the western site boundary between the site and the residential properties on Tottenham Drive.

6.2 External Overnight Activities

As detailed within section 4.0 of this addendum, specifics relating to the level of activity undertaken external to the building envelope during the overnight period cannot accurately or robustly be determined at this time.

As such it is considered that control of these operations would be required through management protocols in conjunction with an appropriately worded condition within the planning permission. An example of such a condition is provided within Section 4 of this addendum.

REFERENCES

Department for Communities and Local Government - Planning Policy Guidance Note 24, 1994

British Standards Institution. British Standard 8233: Noise reduction and sound insulation for buildings – Code of practice', 1999.

British Standards Institution. British Standard 5228: Code of practice for noise and vibration control and open sires – part 1 : Noise, 2009

International Organisation for Standardisation 9613 Acoustics – Attenuation of Sound during Propagation Outdoors, 1993

APPENDIX 1

Noise Monitoring Data

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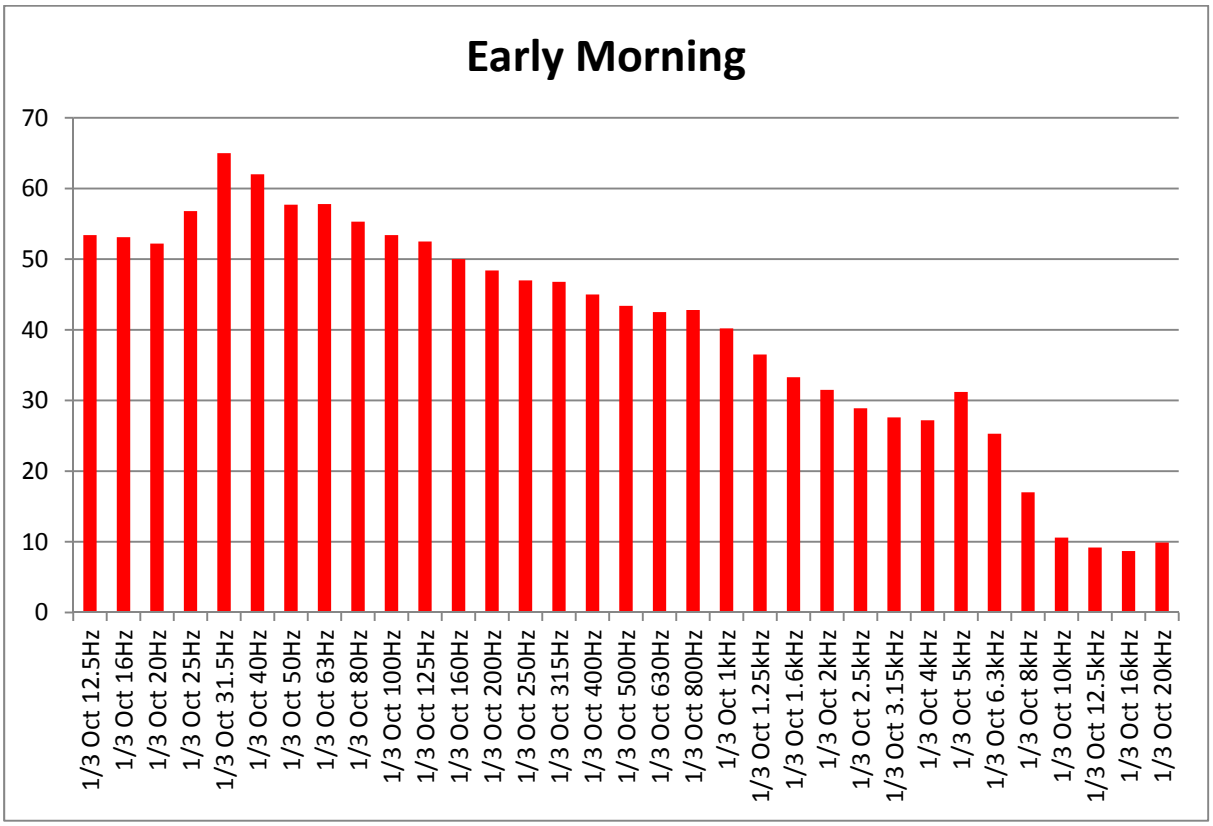
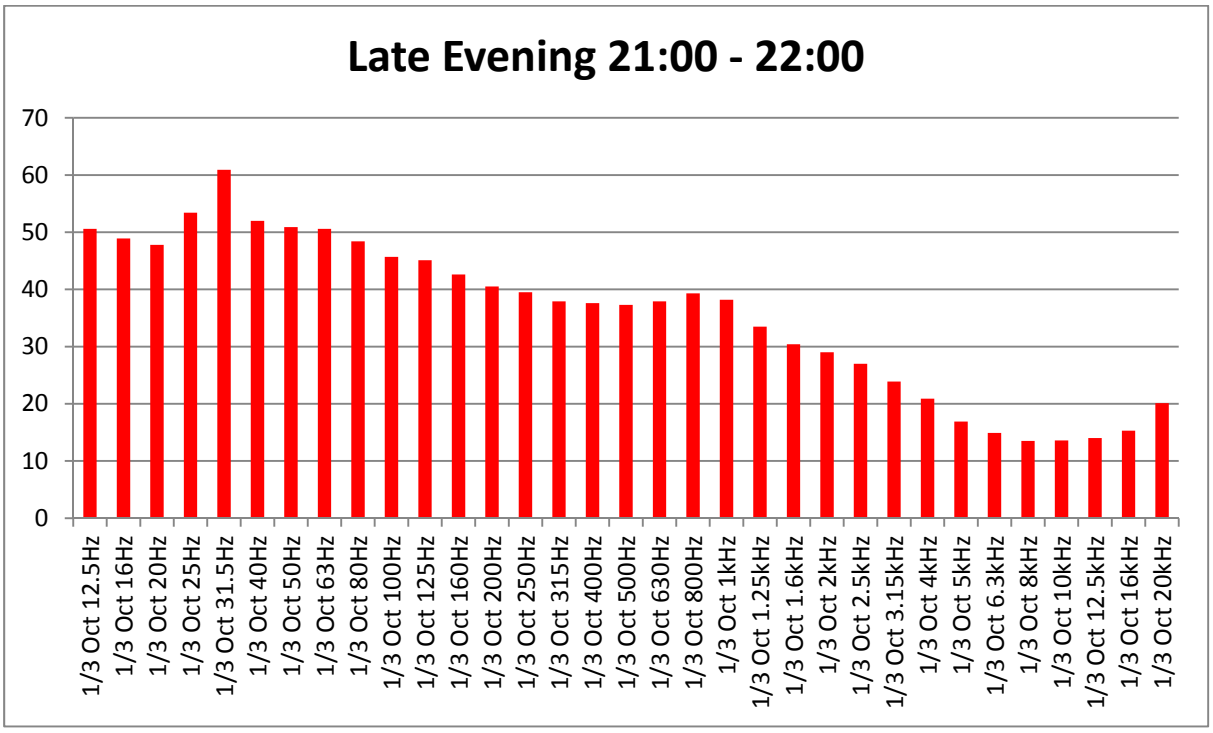
Project	Southmoor Park, Wythenshawe			
Job number	SHF.179.001			
Location	Location 1			
Start Date	8th February 2012	**End Date**	8th February 2012	
Start Time	07:10	**End Time**	08:10	
Calibrated	94.0	**File**	060844_120208_070953000.CMG	
Equipment	**Manufacturer**	**Type**	**Last Calibration Date**	**Serial Number**
Meter	01dB	Blue Solo	3rd December 2010	60844
Microphone	GRAS	MCE212	3rd December 2010	80896
Preamplifier	01dB	PRE21	3rd December 2010	13901
Calibrator	Rion	NC-74	24th October 2011	34683836

Daytime Noise Monitoring Data Data				
Period start	**L_{eq}**	**L_{max}**	**L_{90}**	**L_{10}**
08/02/2012 07:10	48.8	57.8	46.9	50.4
08/02/2012 07:25	49.8	59.8	47.7	50.6
08/02/2012 07:40	51.6	61.5	48.6	53.9
08/02/2012 07:55	51.4	62.3	48.6	52.6
Overall	**50.5**	**62.3**	**48.0**	**51.9**



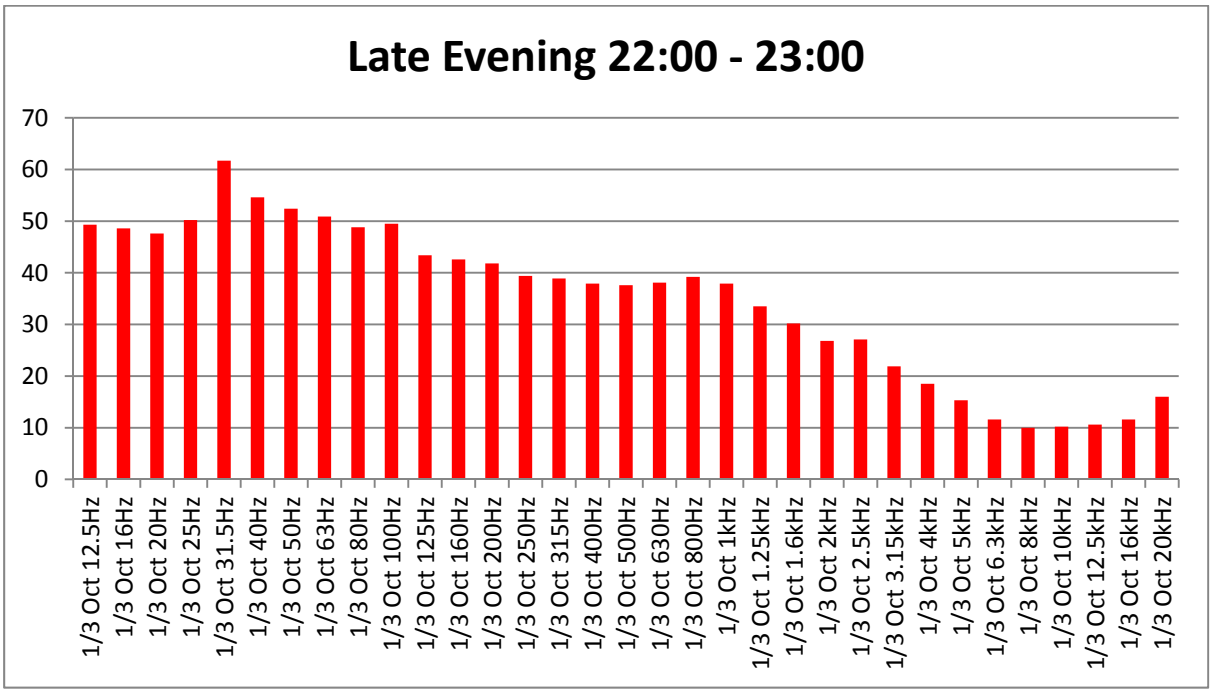
Project	Southmoor Park, Wythenshawe			
Job number	SHF.179.001			
Location	Location 1			
Start Date	8th February 2012	**End Date**	8th February 2012	
Start Time	21:00	**End Time**	22:00	
Calibrated	94.0	**File**	060844_120208_204718000.CMG	
Equipment	**Manufacturer**	**Type**	**Last Calibration Date**	**Serial Number**
Meter	01dB	Blue Solo	3rd December 2010	60844
Microphone	GRAS	MCE212	3rd December 2010	80896
Preamplifier	01dB	PRE21	3rd December 2010	13901
Calibrator	Rion	NC-74	24th October 2011	34683836

Daytime Noise Monitoring Data Data				
Period start	**L_{eq}**	**L_{max}**	**L_{90}**	**L_{10}**
08/02/2012 21:00	45.8	59.3	44.1	46.7
08/02/2012 21:15	43.8	46.6	42.7	44.6
08/02/2012 21:30	45.5	62.2	43.8	45.9
08/02/2012 21:45	46.3	67.3	44.3	46.2
Overall	**45.4**	**67.3**	**43.7**	**45.9**



Project	Southmoor Park, Wythenshawe			
Job number	SHF.179.001			
Location	Location 1			
Start Date	8th February 2012	**End Date**	8th February 2012	
Start Time	22:00	**End Time**	23:00	
Calibrated	94.0	**File**	060844_120208_204718000.CMG	
Equipment	**Manufacturer**	**Type**	**Last Calibration Date**	**Serial Number**
Meter	01dB	Blue Solo	3rd December 2010	60844
Microphone	GRAS	MCE212	3rd December 2010	80896
Preamplifier	01dB	PRE21	3rd December 2010	13901
Calibrator	Rion	NC-74	24th October 2011	34683836

Daytime Noise Monitoring Data Data				
Period start	**L_{eq}**	**L_{max}**	**L_{90}**	**L_{10}**
08/02/2012 22:00	47.5	60.6	45.1	48.5
08/02/2012 22:15	45.6	55.3	43.6	47.1
08/02/2012 22:30	44.8	63.8	41.1	45.4
08/02/2012 22:45	43.1	58.8	40.7	43.8
Overall	**45.5**	**63.8**	**42.6**	**46.2**



APPENDIX 2

Calibration Certificates

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Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)

APPROVED SIGNATORIES

Claire Lomax [ ] Andy Moorhouse [ ]

Gary Phillips [✓] Danny McCaul [ ]

acoustic calibration laboratory

The University of Salford, Salford, Greater Manchester, M5 4WT, UK

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t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk

Certificate Number: 00262/2 Date of Issue: 3 December 2010

VERIFICATION OF A SOUND LEVEL METER to BS7580 Part 1

FOR:	RPS Planning & Development 8 Exchange Quay Salford Manchester M5 3EJ
FOR THE ATTENTION OF:	Natalie Goward
CALIBRATION DATE:	3rd December 2010
TEST PROCEDURE:	CTP08 (Laboratory Manual)

Sound Level Meter						
Manu:	01dB	Model:	Solo Master 01	Serial No:	60844	
Microphone						
Manu:	01dB	Model:	MCE212	Serial No:	80896	
Preamp						
Manu:	01dB	Model:	PRE 21 S	Serial No:	13901	
Associated Calibrator						
Manu:	Rion	Model:	NC-74	Serial No:	34683836	Adaptor Type: NC-74-002

Test Engineer (initial): GP Name: Gary Phillips

This certificate provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)

Certificate Number: 00262/2 Date of Issue: 3 December 2010

SET-UP INFORMATION

The instrument was running software *V1.400*. The tests were performed with the pre-amplifier connected via the supplied 10 metre extension cable to the instrument's microphone input socket.The reference range, reference SPL, primary indicator range, pulse range and linearity range as specified by the manufacturer have been used. The instrument was adjusted to read 93.9 dB (A) in response to the associated calibrator. This reading was obtained from the calibration certificate of the calibrator, 00199/3 and information in the manufacturer's instruction manual. The instrument was calibrated without a windshield. Consult manufacturer's instructions if using a windshield.

MEASUREMENTS

The levels of self-generated noise were:

A:	**13.2 dB**
B:	**12.6 dB**
C:	**13.6 dB**
Z:	**18.9 dB**

At the end of the tests the indication of the sound level meter in response to the associated sound calibrator was 94.0 dB (A) which corresponds to the following level at 101.325kPa:

Sound Pressure Level 94.0 **dB (A)**

This reading should be used henceforth to set up the sound level meter for field use.

THE SOUND LEVEL METER WAS VERIFIED ACCORDING TO THE PROCEDURE GIVEN IN BS7580: Part 1 1997 WITH THE FOLLOWING EXCEPTIONS:

A stricter test than that specified in 5.5.10 and 5.5.11 of BS 7580 has been used by not applying the low level signal.

STATEMENT OF RESULT:

THE SOUND LEVEL METER CONFORMS TO BS7580: PART1 1997

The sound level meter failed the 5.5.3 Level Linearity Test at the 20 dB test point for both the SPL and Leq measurements. The indication was 20.9 dB (A) for both tests, which is outside of the ±0.7 dB tolerance at these test points. This failure is due to the combined effects of the self-generated noise of the instrument and the supplied microphone extension cable.

Instruments used in the verification procedure were traceable to National Standards. The method of acoustic calibration employed a standard sound pressure calibrator for the 1 kHz test whilst the tests at 125 Hz and 8 kHz were performed by the electrostatic actuator method. The uncertainty of the Laboratory's 1 kHz calibrator was ±0.11 dB. The uncertainty of the standard calibrator is not included in the applied tolerances. It is assumed that the sound level meter was manufactured in accordance with BSEN60651: 1994 Type 1, and BSEN60804: 1994 Type 1.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

This certificate provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)

APPROVED SIGNATORIES

Claire Lomax [✓] Andy Moorhouse [ ]

Gary Phillips [ ] Danny McCaul [ ]

acoustic calibration laboratory

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Certificate Number: 00573/1 Date of Issue: 7 November 2011

CALIBRATION OF A SOUND CALIBRATOR

FOR: RPS Planning & Development
8 Exchange Quay
Salford
Manchester
M5 3EJ

FOR THE ATTENTION OF: Natalie Goward

DESCRIPTION: Calibrator with housing for one-inch microphones and half-inch microphones with adaptor typeNC-74-002

MANUFACTURER: Rion

TYPE: NC-74

SERIAL NUMBER: 34683836

DATE OF CALIBRATION: 24/10/2011

TEST PROCEDURE: CTP06 (Laboratory Manual)

Test Engineer (initial): ..... Name: Gary Phillips

This certificate provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

Certificate Number: 00573/1 Date of Issue: 7 November 2011

MEASUREMENTS

The sound pressure level generated by the calibrator was measured using a calibrated, WS2P condenser microphone as specified in the certificate. The calibration was carried out with the calibrator in the half-inch configuration.

Five determinations of the sound pressure level, frequency and total distortion were made.

The measured sound pressure level has been corrected for the effects of the load volume of the GRAS 40AG / B&K 4192 reference microphone so that the stated output level is correct for use with a Rion UC-53A microphone. Consult the manufacturer's instruction manual for any corrections, due to slight differences in microphone load volumes, to the stated level which may be required when using this sound calibrator with other microphone models.

The manufacturer states that automatic compensation is applied for the effects of changes in atmospheric pressure.

RESULTS

Coupler configuration:	Half-inch
Microphone type:	Gras 40AG
Output level (dB re 20μPa):	94.12 dB ± 0.13 dB
Frequency (Hz):	1002.12 Hz ± 0.12 Hz
Total Harmonic Distortion (%):	1.47 % ± 0.12 %

Average environmental conditions at the time of measurement and maximum deviation from the stated average:

Pressure:	99.035 kPa ± 0.004 kPa
Temperature:	23.0 °C ± 0.2 °C
Relative humidity:	45.8 % ± 0.2 %

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

All measurement results are retained at the acoustic calibration laboratory for at least four years.

This certificate provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

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