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Noise Impact Report

Project Details	
Client	Garob Oswald Road Ltd
Client Address	Alexandra Dock Business Centre Fishermans Wharf Grimsby DN31 1UL
Site Address	The Cooperative Well Street Cefn Mawr Wrexham LL14 3YE
Reference	22218E

Quality Assurance	
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1 Summary

A noise assessment has been conducted for the proposal to accommodate 10 no. industrial units on the site at the former Co-operative, Well Street, Cefn Mawr, Wrexham, LL14 3YE.

The assessment is to be submitted as part of a planning application to Wrexham County Borough Council in response to a pre-application advice.

The assessment considers the impact on potentially noise sensitive neighbouring residential premises in accordance with BS 4142: 2014.

Assessment of noise levels due to typical activity noise emissions inside the premises and delivery vans indicate no adverse impact on the amenity of the local community according to BS 4142: 2014 noise criteria.

Furthermore, once the plant and location of the proposed external plant have been determined, the rating sound level of said units should not exceed the plant noise limit level at the closest noise sensitive receptor, as calculated within this report.

2 Introduction

Garob Oswald Road Ltd has instructed Spratt and Hamer Limited to undertake an environmental noise survey in order to assess the impact of the operation of the proposed industrial units, on neighbouring residents.

The proposed development site is an industrial unit facility currently containing a former single-storey Cooperative store with an associated car park. The proposal is to convert the existing building into 5 no. industrial units and the erection of an additional building to contain 5 no. units situated at the aforementioned car parking space to be used for light industrial activity. The proposed operational hours are 07:00 – 18:00. At the time of writing, the planning use class of the building is unknown

This report is prepared solely for Garob Oswald Road Ltd. Spratt and Hamer Limited accepts no responsibility for its use by any third party.

This document has been prepared using the various documents listed within the appendices of this report, together with drawings, technical information and additional verbal representations made by third parties. We have not audited nor independently verified the content or accuracy of any of the documents and information provided to us in the preparation of this report.

If additional information comes to light subsequent to the production of this report, we reserve the right to revise our opinions and the conclusions reached within this report.

2.1 Noise Impact Assessment

Spratt and Hamer Limited has undertaken an environmental noise impact assessment at the above site with noise levels measured externally over a 3-hour period (13:40 – 16:40). The measurements were carried out during a Tuesday afternoon.

This report will state the measured noise levels and will refer to guidance relevant to the nature of this survey whilst considering Local Planning Authority guidance and conditions.



3 Assumptions, Limitations & Uncertainty

a. All suggested specifications require a good level of workmanship and for materials to be installed as the manufacturer intends. Any poor workmanship may lead to weaknesses in the sound attenuation provided by the building elements.
b. It is assumed that the sound pressure levels measured on site during the environmental noise survey are typical of the site.
c. It is assumed that drawings and all information supplied by Garob Oswald Road Ltd are up to date and correct.
d. It is assumed that the proposed units will be used for light commercial activity.

4 Planning Policies, Guidance and Criteria

The planning policies and criteria listed below are taken from associated relevant guidance documents, all of which should be considered for the internal and external noise levels.

4.1 National Planning Policy

The National Planning Policy Framework (NPPF) December 2023 set out the Government's planning policies for England and how they are expected to be applied. It provides a framework within which the Local Authorities are to prepare local plans and use their planning powers to minimise the adverse impact of noise. It should contain the following in relation to noise impacts.

180. Planning policies and decisions should contribute to and enhance the natural and local environment by:

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

191. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

'*mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life*'

NPPF previously characterised noise by grading and recommending actions and different effect levels as reproduced in Table 1.

Perception	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Table 1: Noise exposure hierarchy based on likely average response



4.2 Criteria

4.2.1 Local Planning Authority Criteria

The Local Planning Authority has provided pre-planning application advice that states:

Noise Impact Assessment - This should assess both daytime and night-time noise levels and also detail any mitigation requirements needed to prevent the occupiers of the nearest dwellings experiencing unacceptable noise nuisance.

At the time of writing the report, the consultant is unaware of any specific criteria provided by the Local Planning Authority; therefore, the following noise impact assessment will be undertaken in order to meet the criteria of BS4142:2014.

4.2.2 BS 4142+A1:2019 Method for rating and assessing industrial and commercial sound

BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound is routinely used by local authorities in assessing noise associated with industrial and/or commercial activity.

In brief, BS 4142 provides a means of assessment whereby noise from industrial and commercial sources (the "specific sound level", $L_{Aeq,t}$) is compared with background noise ("background sound level", L_{AF90}).

The specific sound level may be corrected by a numerical penalty if it includes acoustic features that are considered to be distinctive. The corrected specific sound level is termed a "rating level" ($L_{Aeq,t}$) and is designed to reflect people's subjective reaction to noise characteristics that may be considered annoying.

The rating level is then compared to the background sound level to assess its impact. BS 4142 describes an indication of the impact according to the numerical difference between the rating level and the background sound level. This is shown below in Table 2.

Rating Level – Background Sound Level	Indication of Impact
+ 10dB	Significant Adverse Impact
+ 5dB	Adverse Impact
≤ 0dB	Low Impact

Table 2: BS 4142 Rating Level Impact

4.3 Criteria Summary

In order to meet the requirements of Wrexham County Borough Council, the assessment and recommendations will be made in accordance with *BS 4142+A1:2019 Method for rating and assessing industrial and commercial sound.*

5 Site Description

The proposed development site is located in Rhosymedre, near Cefn-mawr in Wrexham County, Wales. The site is located approximately 10km southwest of Wrexham. This small village consists of a mix of residential housing and commercial units, including a Tesco superstore, situated approximately 40 metres from the southern boundary of the site. The site currently contains a former Cooperative store.

Well Street runs along the western side of the site and provides moderate levels of 20mph traffic flow, including buses. To the east, a railway line is situated approximately 30 metres from the development site.

The nearest noise-sensitive receptors have been identified as two residential properties located on the opposite side of Well Street to the west of the site, as well as a residential property to the west of the roundabout at the junction of Well Street and Oxford Street.

The primary noise sources in the environment will be traffic at the front of the development and passing trains at the rear.

5.1 Subjective Observations

During site attendance, subjectively the main source of noise was nearby vehicular traffic, including frequent bus passes and heavy goods vehicles, mixed with distant traffic and birdsong when the nearby traffic noise was low, however secondary in nature. There were also trains passing on the line to the east of the site and the site car park was also used.

5.2 Weather

08/10/24	Average
Temperature (°C)	11.1 – 16.5
Wind Speed (ms^{-1})	0 – 0.8
Wind Direction	SSW
Precipitation (mm)	0.0 – 9.0
Damp road/ wet ground	Damp
Fog/snow/ice	None

Table 3: Weather Conditions

All weather data taken from wow.metoffice.gov.uk. The weather station was located in Newbridge at approximately 0.5 km south of the proposed development.

6 Noise Measurement Procedure

6.1 Survey Date(s)

08/10/2024

6.2 Personnel Present

Luke Owen BSc

6.3 Survey Equipment Used

Manufacturer	Model	Serial No.	Description
Pulsar	Model 105	86702	Acoustic Calibrator
Rion	NL-52	00976149	Integrating Sound Level Meter and Real Time Analyser

Table 4: Survey Equipment Used

6.4 Calibration

The sound level meter was calibrated with the field calibrator to a level of 94.0 dB @ 1 kHz prior to and on completion of the survey. No significant drift in calibration was observed. The meter used during the survey is precision grade Class 1.

Calibration certificates are available on request.

6.5 External Ambient Sound Measurements

The measurement location chosen during the survey was deemed suitable for the determination of the background sound levels of the area.

The sound level meter was set to measure broadband and A-weighted 1:1 octave centre frequency bands $L_{Aeq,}$ and L_{A90} in 5-minute periods.

6.5.1 Monitoring Position 1

A microphone was placed at approximately 1.5m above the ground surface on the existing carpark in free-field conditions. The sound level meter was set to record WAV file audio recordings for all maximum sound level events above 65 dBA. The meter was set to measure the complete 3-hour period.

6.6 Location Plan of Measurement Positions

The location plan below shows the proposed development and positions of the monitoring equipment.



Figure 1: Indicative Site Map. Image taken from www.google.com/maps

7 Results and Analysis

7.1 Background Noise Level Measurement Analysis

The following table presents the measured results from the monitoring position during the proposed operational time of the proposed development (13:40 – 16:40 Tuesday 08/10/2024).

The data was processed as $L_{A90,15min}$ instead of $L_{A90,1h}$ in a 3-hour measurement, as it captures more detailed fluctuations in background noise. This methodology gives a clearer view of noise variability than hourly averaging would allow.

Time Period *t*	$L_{Aeq,t}$ (dB)	Modal $L_{A90,15min}$ (dB)	Highest $L_{A90,15min}$ (dB)	Lowest $L_{A90,15min}$ (dB)
13:40 – 16:40	55.4	44	46	43

Table 5: Measurement Results

Data charts and tables can be found in the appendix.

8 Noise Impact Assessment

8.1 Noise Breakout and Delivery Impact Assessment – CadnaA model

It has been advised by the client that the proposed development will operate only during daytime hours, from 07:00 to 18:00. It is anticipated that the 10 industrial units will be used as storage facilities or small workshops. Based on this information, it is assumed that a typical activity within the units will involve an electric forklift truck movement. It is assumed that a similar model to Hyster J2.0XTLG model will be used, therefore, a sound power level of 82 dBA taken from manufacturer data, has been used.

Additionally, as a worst-case scenario, the noise assessment for external delivery lorry movements assumes a sound power level of 90 dB(A) (based on data from Engineeringtoolbox.com for a heavy diesel vehicle). The assessment considers up to 2 deliveries per hour for each building, totalling 4 deliveries per hour, along with the associated loading and unloading activities (Sound Power Level of 88dBA taken from unrelated Spratt and Hamer report). Time corrections have been applied to account for the number of deliveries and the duration of these activities.

8.2 Subjective Assessment

BS 4142:2014 states that where appropriate a rating penalty should be established for a sound on a subjective assessment of its characteristics and to correct the Specific Sound Level if a tone, impulse or other characteristics occur e.g intermittency.

BS4142:2014 says of Impulsivity:

"A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible."

BS4142 says of tonality:

"... a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible."

BS4142 says of intermittency:

"... If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

At the time of writing the information with respect to the use of the units is not available, however, it is typical for these types of buildings to be used for storage including deliveries via goods vehicles entering and exiting the site. Delivery vehicles typically have reverse warning tones and therefore a correction of 2dB for a tonal character will be applied in the assessment.

8.3 CadnaA Modelling – Assumptions

The following considerations and assumptions have been taken into account when modelling the proposed site:

- It is assumed that the external walls will be constructed using Kingspan AWP/60 + F, with a sound reduction index of R_w 43dB.
- The shutter door is assumed to have a minimum sound reduction index of R_w 24dB.



- The roof is assumed to be made of Kingspan KS1000 RT, without any lining, offering a sound reduction index of R_w 25dB.
- The nearest residential dwelling (noise-sensitive receptor) is the house (NSR1) situated to the northwest and the house (NSR2) situated to the southwest of the proposed development
- The internal noise level within the proposed development is assumed to be L_w 82 dBA associated with electric forklift movement. The noise level for delivery heavy diesel trucks is expected to be L_w 90 dBA and from associated loading and unloading is expected to be L_w 88 dBA.
- A 2 dB correction has been applied to account for the tonal characteristics of the delivery lorry movements.

Based on the information provided and the assumptions made, the following table presents the highest predicted Rating Level at the closest façades of NSR1 and NSR2, compared against the lowest background noise level of $L_{A90,15\text{-}mins}$ 44 dB.

Description	Sound Level at NSR1 (dB)	Sound Level at NSR2 (dB)
Sound level at the NSR	41	39
BS4142 penalty correction	2	2
Rating Level at the NSR	43	41
Background Noise Level L_{A90}	44	44
Exceedance	-1	-3

Table 6: BS4142 Impact Assessment

The assessment indicates the noise impact of the proposed industrial units is estimated to be at least 1 dB below the background noise level, equating to Low Impact according to BS 4142 definitions reproduced in Table 2, Section 3.2.2. and No Observed Adverse Effect Level (NOEL) in accordance with NPPF.

The following figure presents a noise propagation map created in CadnaA:

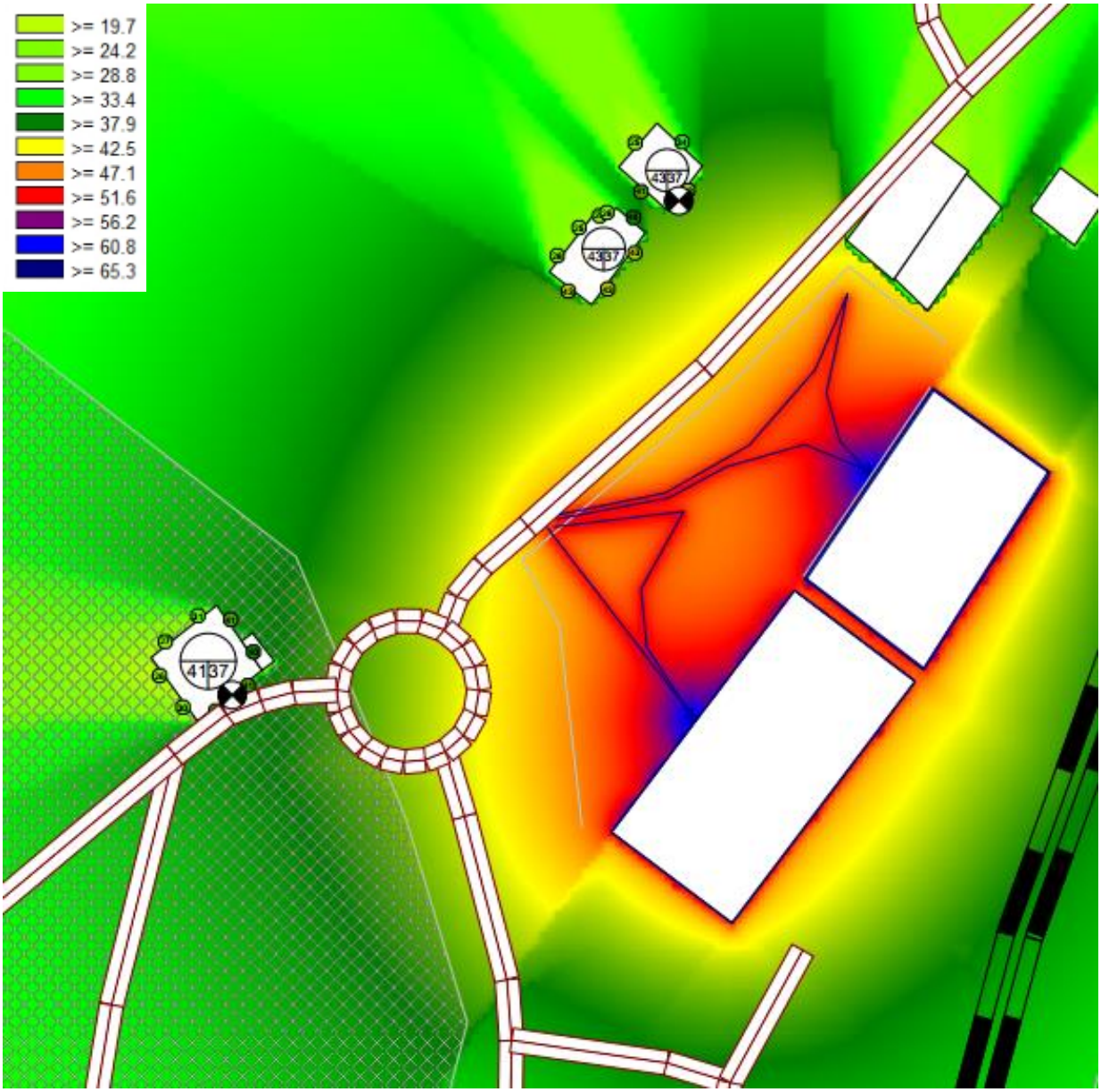


Figure 2: CadnaA – Noise Map

8.4 Context

The noise levels used in the assessment are based on the forklift operating at full capacity and assume continuous operation throughout the entire period. It also factors in a total of 4 deliveries per hour (2 per unit).

As such, it is likely that the difference between the noise emissions of the proposed development and background noise will be even greater for the majority of time provided the doors remain closed when the forklift is operating, thus resulting in an even lower level of impact on the nearby receptors.

9 Plant Noise Assessment

9.1 Assessment of Mechanical Plant in Accordance with BS4142:2014+A1:2019

We have been advised that an external mechanical plant may be installed at the proposed development. However, at the time of this report, the location and make and model of any proposed unit/s have not been determined. As such, a plant noise limit level will be defined in order to achieve the Local Planning Authority criteria.

9.2 External Background Measurement Results

It will be assumed that the proposed plant will only operate during the proposed operational hours. The background sound level is 44dB, taken from the Measuring Position 1, considered to be representative of the background noise levels at the most exposed Noise Sensitive Receptor.

9.3 Plant Noise Limit Level Numerical Assessment

The following considerations have been taken into account.

- The plant and/or location have not been determined.
- The plant may operate at any time during the proposed opening times 07:00 – 18:00.
- The nature of the plant is unknown. As such, any future calculation should include any characteristic features that may incur in penalty rating, such as tonality, impulsivity, intermittency or other.
- The lowest $L_{A90,15\text{-minutes}}$ of 44 dB at Measuring Position 1 will be used for the assessment.

The following table outlines the rating sound limit level at the nearest noise sensitive dwelling.

Description	Operational Time 07:00 – 18:00 (dBA)
Background Sound Level	44
Rating Sound Limit Level	44

Table 7: BS4142 Impact Assessment

The table above indicates that the noise impact due to any proposed external plant units should not exceed 44 dB rated sound level at the nearest noise-sensitive receptor, equating to a 'Low Impact' according to BS 4142.

10 Conclusion

The report concludes that, based on the understanding of the proposed location of the site, noise from the proposed development will have a low impact on the amenity of the residents of neighbouring dwellings as long as the following conditions are met:

- The shutter doors must remain closed during noisy periods, especially when the forklifts are in operation.
- The site must not operate outside the proposed opening hours (before 07:00 or after 18:00).
- A plant noise limit level has been set for the relevant M&E specialist to calculate in order to ensure that these levels are not exceeded at the closest noise-sensitive receptor once the plant and location of the units have been determined.
- Noise Management Plan should be implemented to reduce noise emissions:
    - The site should only operate during the proposed operational hours 07:00 to 18:00.
    - Early outdoor site noisy activity should not take place before 07:00.
    - Deliveries should not take place any time before 07:00.
    - Staff should be encouraged to arrive and leave the premises quietly.
    - Engines should be switched off immediately when not manoeuvring, ensuring that the vehicle is not left idling.
    - Reversing alarms should not be used where possible (white noise alarms are preferable).
    - Shutter doors should stay closed where possible.

11 References

National Planning Policy Framework (NPPF).

BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound.

BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures.

www.google.co.uk/maps.

wow.metoffice.gov.uk

www.engineeringtoolbox.com

11.1 Drawing References

Design Option 001 A079-SK-011

Appendix

Figure 1: Picture Showing Monitoring Position 1



Figure 2: Site Plan



Figure 3: Technical Datasheets

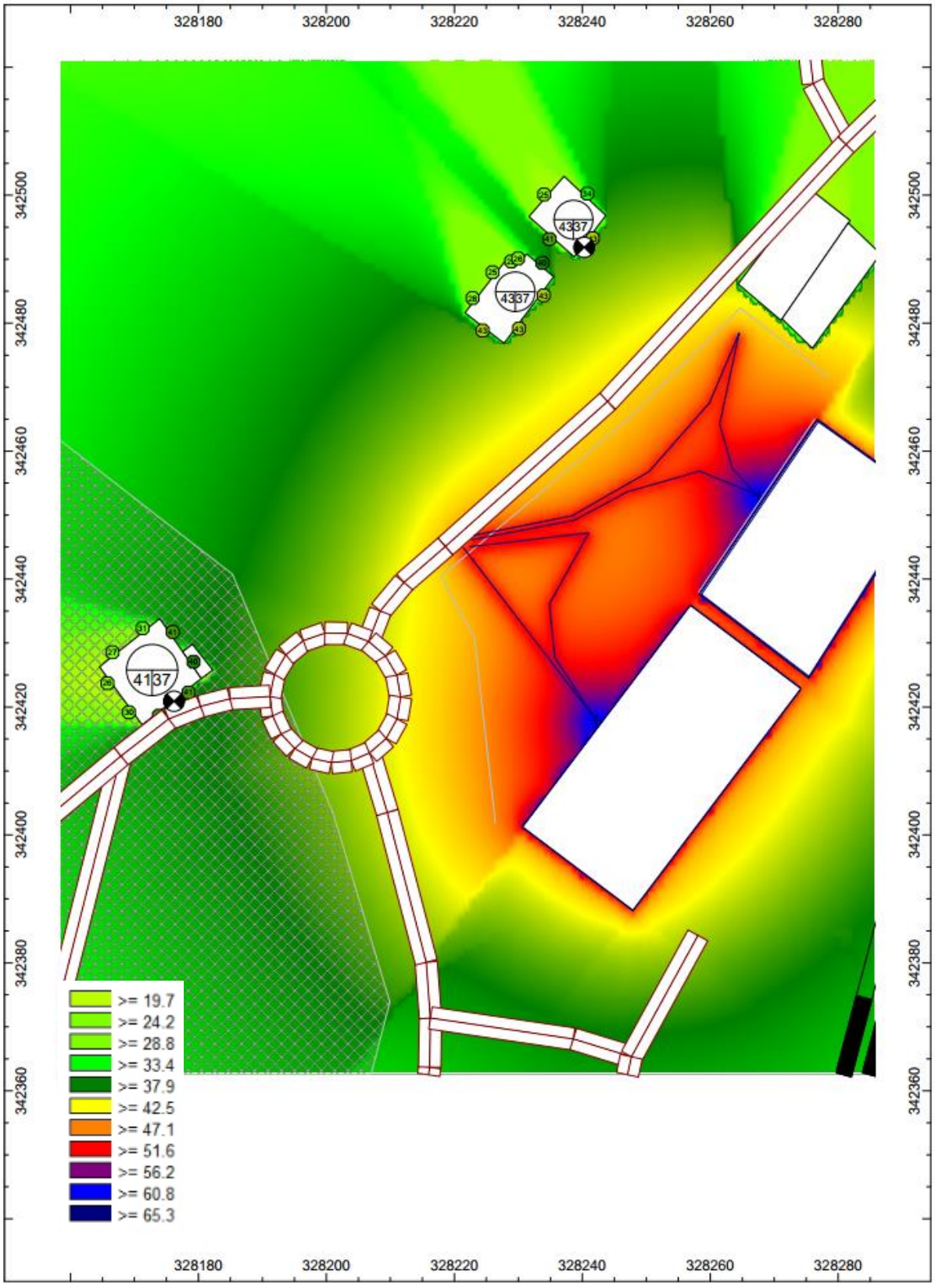
J2.0-2.5 XTLG SERIES SPECIFICATIONS

GENERAL	1-1	Manufacturer			Hyster			
	1-2	Model designation			J2.0XTLG		J2.5XTLG	
	1-3	Drive			Electric			
	1-4	Operator type			Seat			
	1-5	Rated capacity/rated load	Q	kg	2000		2500	
	1-6	Load centre distance	c	mm	500			
	1-8	Load distance, centre of drive axle to fork	x	mm	476			
	1-9	Wheelbase (with mast vertical)	y	mm	1600			
WEIGHT	2-1	Service weight	kg	kg	3515	3645	3775	3905
	2-2	Axle loading, laden front/rear	kg	kg	4865/650	4980/665	5535/740	5650/755
	2-3	Axle loading, unladen front/rear	kg	kg	1355/2160	1400/2245	1470/2305	1520/2385
WHEELS	3-1	Tyres front/rear			Pneumatic			
	3-2	Tyre size, front			7.00-12-12PR			
	3-3	Tyre size, rear			6.00-9-10PR			
	3-5	Wheels, number front/rear			2x /2			
	3-6	Tread, front	b_{10}		970			
	3-7	Tread, rear	b_{11}		980			
DIMENSIONS	4-1	Tilt of mast/fork carriage, forward /backward	α / β		6/12			
	4-2	Height, mast lowered	h_1		2010			
	4-3	Free lift	h_2		160			
	4-4	Lift	h_3		3000			
	4-5	Height, mast extended (1)	h_4		3575			
	4-7	Height of overhead guard(cabin) (2)	h_6		2180			
	4-8	Seat height/stand height (3)	h_7		1190			
	4-12	Towing coupling height	h_{10}		250			
	4-19	Overall length	l_1		3630		3692	
	4-20	Length to face of forks	l_2		2560		2622	
	4-21	Overall width	b_1		1160			
	4-22	Fork dimensions ISO2331	s/e/l		40/122/1070			
	4-23	Fork carriage ISO 2328. Class/type, A/B			IIA			
	4-24	Fork carriage width (4)	b_3	mm	1040			
	4-31	Ground clearance, laden, below mast	m_1	mm	125			
	4-32	Ground clearance, centre of wheelbase	m_2	mm	130			
	4-33	Load dimension b_{12} x l_6 crossways	b_{12} x l_6	mm	1000*1000			
	4-34	Aisle width with predetermimned load dimensions	A_{st}	mm	3966		4026	
	4-34-1	Aisle width with pallets 1000mm x 1200mm crossways	A_{st}	mm	3966		4026	
	4-34-2	Aisle width with pallets 800mm x 1200mm crossways	A_{st}	mm	3766		3826	
	4-35	Turning radius	W_a	mm	2290		2350	
	4-36	Inner turning radius	b_{13}	mm	745			
PERFORMANCE	5-1	Travel speed, laden/unladen		km/h	15/15	19/19	15/15	19/19
	5-1-1	Travel speed, laden / unladen, backwards		km/h	12/12	16/16	12/12	16/16
	5-2	Lifting speed, laden/unladen		mm/s	400/430	510/540	400/430	510/540
	5-3	Lowering speed laden/unladen		mm/s	420/500			
	5-5	Drawbar pull laden/unladen		N	16000/13000	19000/15000	17000/15000	23000/16000
	5-8	Maximum gradeability, laden/unladen		%	15/15	20/20	15/15	20/20
	5-9	Acceleration time, laden/unladen 15m		sec	5.6/5.5			
	5-10	Service brake			Hydraulic			
ELECTRIC ENGINE	6-1	Drive motor rating S2 60 min		Kw	15	21.6	15	21.6
	6-2	Lift motor rating at S3 15 %		Kw	15	22.6	15	22.6
	6-3	Battery according to DIN 43531/35/36 A, B, C, no			No			
	6-4	Battery voltage/nominal capacity K5		(V)/(Ah)	115.2V/228Ah	153.6V/228Ah	115.2V/228Ah	153.6V/228Ah
	6-5	Battery weight		kg	235	330	235	330
	6-6	Energy consumption according to VDI cycle		kWh/h	4.75	5.4	5.1	5.78
	6-7	Turnover output		t/h	135	162	145	173
	6-8	Energy consumption at turnover output		kWh/h	5.8	5.5	6.27	5.9
ADDITIONAL DATA	8-1	Type of drive unit			PM AC			
	10-1	Operating pressure for attachments		bar	140			
	10-2	Oil volume for attachments (5)		l/min	64			
	10-7	Sound pressure level at the driver's seat		dB (A)	66			
	10-7-1	Sound power level during the workcycle (6)		dB (A)	82	81	82	81
	10-8	Towing coupling, type DIN			PIN			

(1) Without load backrest.
(2) h6 subject to +/- 5mm tolerance.
(3) Full suspension seat in depressed position.
(4) Add 32mm with load backrest.
(5) Variable.
(6) LPAZ, measured according to the test cycles and based on the weighting values contained in EN12053.

Specification sheet truck based on:
VDI 2198, with the following configuration: Complete truck with 3000mm 2-stage limited free lift mast, standard carriage and 1070mm forks, overhead guard and standard pneumatic drive and steer tyres.

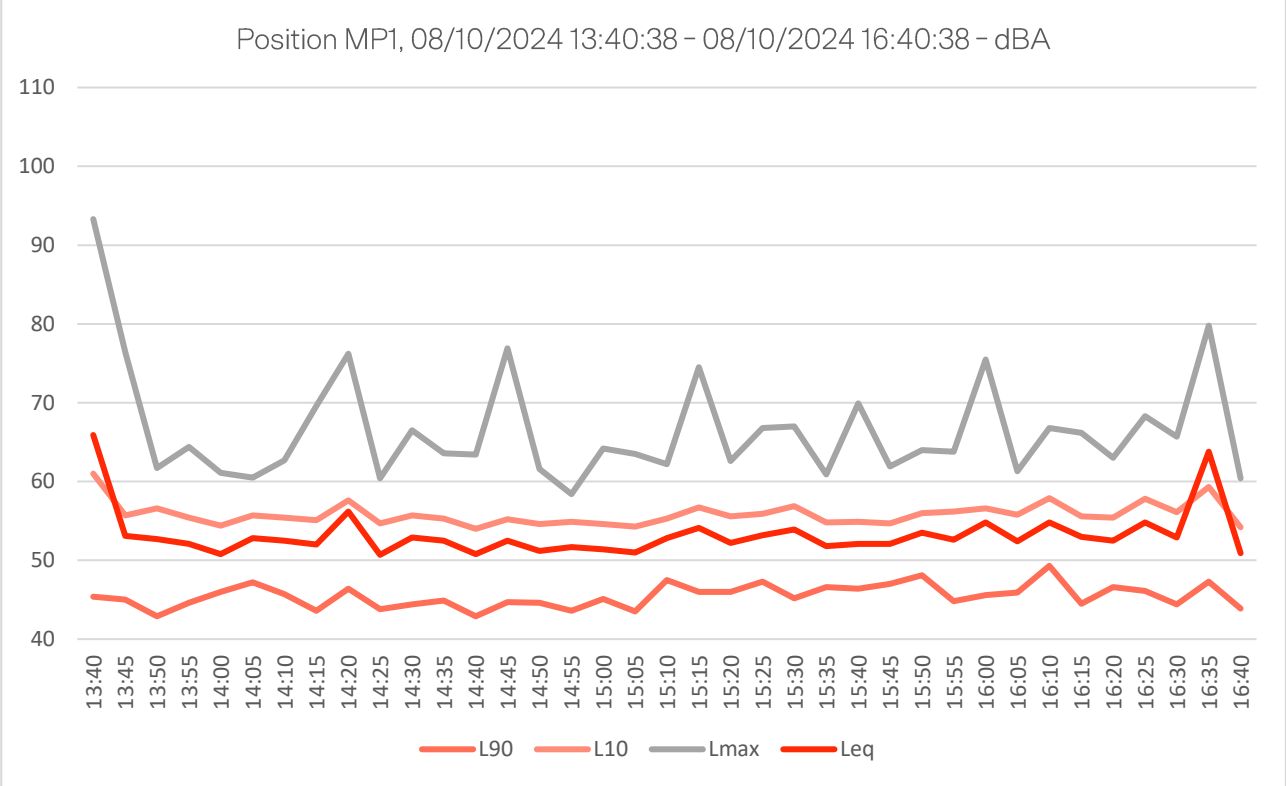
Figure 4: CadnaA Model



Measurement Results

Monitoring Position 1

Monitoring position	Time Period	Time Base T (hours)	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)	L_{A90} (dB)	L_{A10} (dB)
1	14:00	1	52.5	76.9	43.6	52.8
	15:00	1	52.7	74.5	44.8	53.5
	16:00	1	56.7	79.8	43.9	54.8



Glossary of Acoustical Terms

A-weighting

Noise levels are corrected to represent human response to sound.

L_{Aeq}

This is a continuous equivalent of time varying noise, or effectively the average measured (A weighted) noise level over a defined period of time.

$L_{Aeq,16hour}$

A 16 hour long measurement of the L_{Aeq} over the period between 07:00 and 23:00, also known as a daytime measurement.

$L_{Aeq,8hour}$

An 8 hour long measurement of the L_{Aeq} over the period between 23:00 and 07:00, also known as a night time measurement.

L_{AFmax}

The highest, or maximum A-weighted sound pressure level measured over a specified time period. The 'F' defines a time weighting in Fast.

L_{A90}

The A-weighted noise level or average level which is exceeded for 90 percent of the measured time period. Also known as a background level.

L_{A10}

The A-weighted noise level or average level which is exceeded for 10 percent of the measured time period.

1:1 & 1:3 octave spectrum analysis

A single measurement that is separated into frequency bands to allow for a more detailed analysis of the noise source in question.

R_w

The weighted sound reduction index of a partition or facade. A single number value based on the performance of a partition between two rooms across the frequency range 100Hz to 3150Hz. The level is adjusted for the effects of reverberation and background noise.

$D_{n,e,w}$

The weighted level difference of a partition or façade which takes into account a small element such as a grill or vent.

SEL (sound exposure level)

A measure of A-weighted sound energy used to describe a particular event, such as a train pass. It is the sound energy, which, if occurring over one second would contain the same energy as the event.

Free field sound pressure

Is where the radiation or spread of sound is completely unaffected by the presence of any reflecting surfaces or boundaries.

Low Frequency Noise

A term generally used for sound below a frequency of 100 to 150Hz.



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