27 Innerhaugh Mews
Haydon Bridge
Northumberland
NE47 6DE

SIEMENS TRANSMISSION AND DISTRIBUTION LTD

Carparking - Shop 8 Redevelopment, Hebburn

Noise Impact Assessment

Report No.	Author	Checked/Approved	Date of issue
LAE1127.1	Louise M Alderson MIOA	[redacted]	19 January 2022
	Monitoring by		**Undertaken on**
	Lucas R. Longman BSc.Hons MIOA		3rd & 4th August 2021

Tel: 01434 688425 www.laenvironmental.co.uk Mobile: 07732 660840

LA Environmental consultants

27 Innerhaugh Mews
Haydon Bridge
Northumberland
NE47 6DE

CONTENTS

1 Introduction 1
1.1 Consultants Brief 1
1.2 Site Description 1
1.3 Proposed Carparking 2

2 National Planning Policy and Guidance 3
2.1 Car Park Noise 3
2.2 Noise Policy Statement for England (NPSE): 2010 3
2.3 National Planning Policy Framework (NPPF): 2021 4
2.4 Planning Practice Guidance: Noise (PPG-N) 2012 4
2.5 WHO Guidelines for Community Noise 5
2.6 BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings 6
2.7 Guidelines for Noise Impact 7
2.8 Unsuitable Assessment Criteria 7
2.9 Assessment Criteria Summary 7

3 Baseline Noise Survey 8
3.1 Monitoring Location 8
3.2 Noise Measurement Procedure 9
3.3 Noise Instrumentation 9

4 Baseline Survey Results 10
4.1 Daytime Results 10

5 Car Park Sound Emissions 10
5.1 Noise Model Configuration 10
5.2 Predicted Car Park Sound Level Emissions 11

6 Assessment of Impacts 12
6.1 Ambient Sound Levels 12
6.2 Single Event Maxima 13
6.3 Internal Sound Levels 13

7 Conclusions 14
7.1 Planning Policy and Guidance 14
7.2 Planning Recommendations 14

Appendix A – Glossary of Acoustic Terminology
Appendix B – Noise Instrumentation
Appendix C – Noise Monitoring Results and Observations
Appendix D – Noise Contours

1 INTRODUCTION

1.1 Consultants Brief

1.1.1 LA Environmental Ltd have been appointed by Lambert Smith Hampton, on behalf of Siemens Transmission and Distribution Ltd (Siemens), to undertake a noise assessment to support the use of visitor carparking associated with the redevelopment of Shop 8, Hebburn.

1.1.2 The impacts of noise from proposed carpark use upon existing residential receptors have been assessed in accordance with relevant standards and guidance documents for residential amenity.

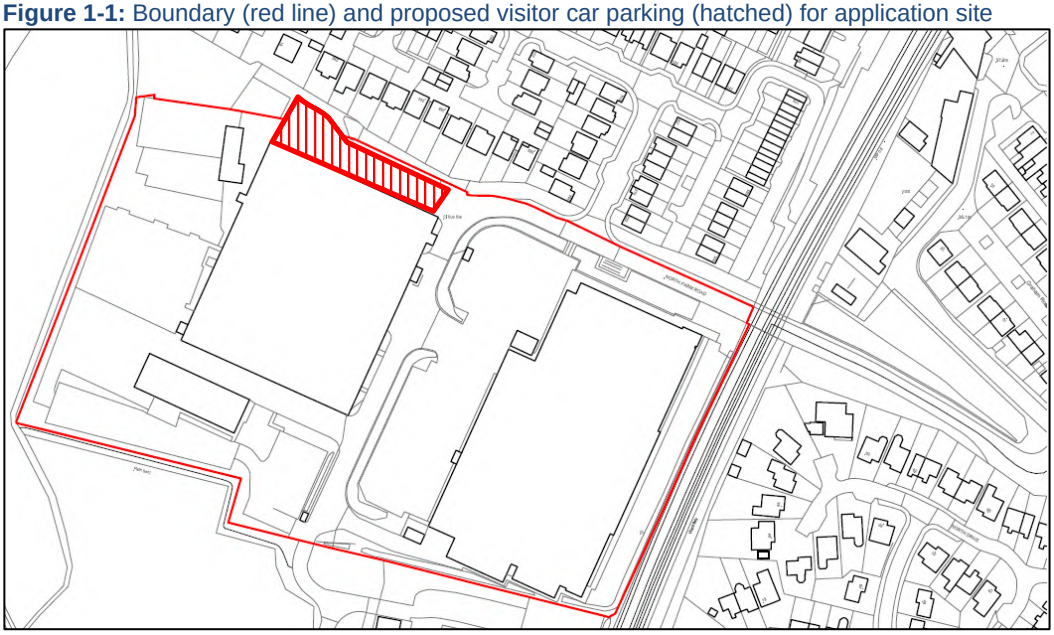
1.1.3 Whilst this report has been written in plain English the use of specialised terms and abbreviations is unavoidable. A glossary of all Acoustic Terminology used in this assessment is therefore provided in Appendix A, of this report, for reference.

1.2 Site Description

1.2.1 The Siemens site is located on North Farm Road, approximately 600 metres to the southwest of Hebburn Town centre and 300 metres to the east of the River Tyne.

1.2.2 Existing residential dwellings on St Aloysius View are situated to the north of the site with associated gardens backing onto the proposed carparking area. The eastern boundary of the site abuts the Tyne & Wear Metro line with allotments plots and Hebburn Riverside Park to the south and west, respectively. The site boundary and proposed car parking area are detailed in Figure 1-1.

Figure 1-1: Boundary (red line) and proposed visitor car parking (hatched) for application site



1.2.3 The proposed carparking area is located directly to the north of Shop 8 at an elevation of approximately +35.3m AOD. An engineered and retained rock wall of approximately 2.5m elevation is located on the northern site boundary, identified in Figure 1-2. The gardens of St Aloysius View slope from +38m AOD at the boundary down to approximately +36m nearest the residential dwellings.

Figure 1-2: Existing Shop 8 with hardstanding for proposed parking and engineered rock wall



1.2.4 In addition to the North Farm Road more distant sources of transport related noise include the A185, Glen Street and B1297 to the north and east.

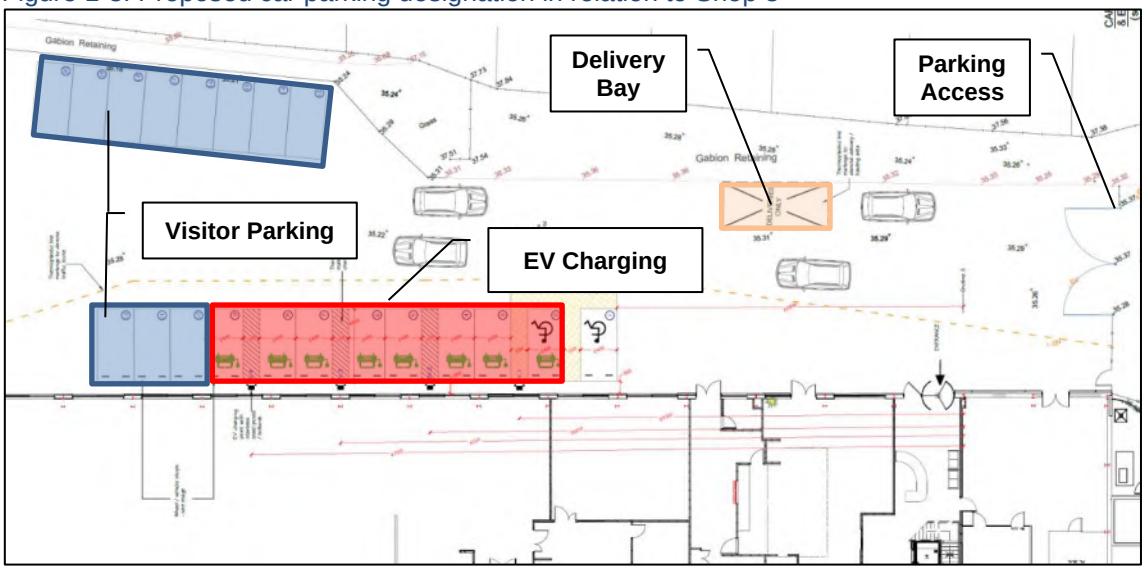
1.3 Proposed Carparking

1.3.1 It is proposed that 20 car parking spaces will be designated to the north of Shop 8:

- 1 x accessible space
- 8 x Electric Vehicle (EV) Charging spaces (including 1 x accessible space with EV charging) and;
- 11 x spaces for ICE vehicle parking

1.3.2 In addition to visitor parking there will be one dedicated space for the delivery of catering supplies utilising vehicles no greater than 7.5t

Figure 1-3: Proposed car parking designation in relation to Shop 8



1.3.3 Access will be via a separate gated entrance from North Farm Road, prior to the main site gatehouse. The car parking will be solely for visitors with the intended hours of use typically between 07:00 and 20:00, Monday to Friday with no use on Saturday or Sundays.

1.3.4 Delivery of catering supplies will be limited to the same hours as visitor parking (07:00 – 20:00 Monday to Friday) with typically only three deliveries per week for bread, milk and fruit.

2 NATIONAL PLANNING POLICY AND GUIDANCE

2.1 Car Park Noise

2.1.1 There are no specific criteria or standards within England that relate specifically to noise emitted from car parks. However, there are qualitative and quantitative criteria for external residential amenity contained within relevant Planning Policy and guidance documents, summarised in the following sections.

2.2 Noise Policy Statement for England (NPSE): 2010

2.2.1 NPSE sets out the long term aims of Government noise policy to

- *"Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development".*

2.2.2 The main aims of the Noise Policy are:

- Avoid significant adverse impacts on health and quality of life.
- Mitigate and minimise adverse impacts on health and quality of life.
- Where possible contribute to improvements of health and quality of life through the effective management of noise.

2.2.3 The NPSE explanatory Note provides the concept of adverse effects and the relevant definition for the significance of the development.

- 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 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.

2.3 National Planning Policy Framework (NPPF): 2021

2.3.1 Incorporating the aims of the NPSE, the revised National Planning Policy Framework (NPPF) sets out the Government's planning policies to achieve sustainable development, including minimising the impacts of noise.

2.3.2 In relation to the potential impacts of noise, paragraph 185 of the NPPF states that planning policies and decisions should:

> "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:
>
> a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
>
> b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
>
> c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

2.4 Planning Practice Guidance: Noise (PPG-N) 2012

2.4.1 Building on the qualitative criteria outlined in the NPSE, the Planning Practice Guidance: Noise (PPG-N) provides a hierarchy of exposure response relationships, qualitative effect levels and associated actions for noise for residential settings.

Table 2-1: Planning Practice Guidance Noise exposure hierarchy			
Perception	**Outcome**	**Effect Level**	**Action**
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life	No Observed Effect	No specific measures required
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour, e.g., turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude e.g., avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance results in difficulty in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g., regular sleep deprivation/awakening; loss of appetitive, significant medically definable harm e.g., auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.5 WHO Guidelines for Community Noise

2.5.1 In 1999 the World Health Organisation proposed Guidelines for Community Noise. The scope of WHO's effort to derive guidelines for community noise was to consolidate actual scientific knowledge on the health impacts of community noise and to provide guidance to environmental health authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments.

2.5.2 The guidelines suggest that during the daytime, few people are highly annoyed at L_{Aeq} levels below 55 dB(A), and few are moderately annoyed at L_{Aeq} levels below 50 dB(A).

Table 2-2: WHO guidance limit criteria			
Specific environment	**Health effects(s)**	**dB $L_{Aeq,T}$**	**Hours**
Daytime – Outdoor living areas	Few people are highly annoyed, daytime and evening	<55	16 (07:00 – 23:00)
	Few people are moderately annoyed, daytime and evening	<50	16 (07:00 – 23:00)

2.6 BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings

2.6.1 This code of practice is mainly concerned with the control of indoor ambient noise from sources such as traffic or mechanical services and suggests appropriate criteria and limits for different situations.

2.6.2 To achieve a satisfactory noise environment inside the building it is necessary to know how each internal space will be used so that appropriate criteria can be chosen which then leads to noise limits being set for each specific situation.

2.6.3 Guidance on internal ambient noise levels for three types of residential rooms with different functions is provided in Table 2-3.

Table 2-3: Indoor ambient noise levels for dwellings			
Location	**Typical situations**	**Daytime**	**Night-time**
		07:00 to 23:00	**23:00 to 07:00**
Living Room	Resting	35 dB $L_{Aeq,\ 16hour}$	-
Dining room / area	Dining	40 dB $L_{Aeq,\ 16hour}$	-
Bedroom	Sleeping (daytime resting)	35 dB $L_{Aeq,\ 16\ hour}$	30 dB $L_{Aeq,\ 8\ hour}$
Note: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.			

2.6.4 For dwellings, the main criteria are reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms.

2.6.5 BS8233 also provides guidance for acceptable levels of noise for outside areas, such as gardens and balconies in line with WHO guidance i.e., 50dB $L_{Aeq,T}$ during the daytime with an upper limit of 55dB $L_{Aeq,T}$.

2.7 Guidelines for Noise Impact

2.7.1 Draft guidance produced by a working party of the Institute of Acoustics (IOA) and Institute of Environmental Management and Assessment (IEMA) proposed the subjective response associated with a change in sound level. From the change in sound level a descriptor is also assigned to provide a level of impact for the change, as detailed within Table 2-4.

Table 2-4: Change in Noise Impact Criteria (IOA/IEMA guidance)

Sound Level Change dB(A)	Subjective Response	Impact Description
0.0	No Change	None
0.1 – 2.9	Imperceptible change in loudness	Slight
3.0 – 4.9	Perceptible change in loudness	Moderate
5.0 – 9.9	Up to a doubling or halving of loudness	Substantial
10.0 or more	More than doubling or halving in loudness	Severe

2.7.2 A ±3dB(A) change in sound level is taken to be the smallest perceptible change to the human ear with a ±10dB(A) change perceived as a doubling or halving of the loudness of sound source.

2.8 Unsuitable Assessment Criteria

2.8.1 For the avoidance of doubt the use of British Standard BS4142: 2014 + A1:2109 'Methods for rating industrial and commercial sound' is deemed inappropriate, as carparking and limited deliveries by light vehicles that are not intrinsically part of Siemens manufacturing operations are outside of the scope of this standard.

2.9 Assessment Criteria Summary

2.9.1 Based on the criteria contained within national policy and guidance, the significance of the impact of ambient internal and external noise levels upon development and planning decisions adopted within this assessment is detailed in Table 2- 5.

Table 2-5: Summary of assessment criteria to be adopted				
	Noise level dB (A)			
NPSE/NPSE Observed Effect Level & Actions	No specific measures required	Mitigate and reduce to a minimum	Avoid	Prevent
	NOAEL	LOAEL	SOAEL	UAEL
External day time sound level	<50	50 – 55	55 – 60	>60
Internal sound level: Living rooms & Bedrooms (day time)	<35	35 – 38	38 – 40	>40
Change in sound level (IOA/IEMA)	0 – 2.9 None to Slight	3.0 – 4.9 moderate	5.0 – 9.9 Substantial	10.0 or more Severe

3 BASELINE NOISE SURVEY

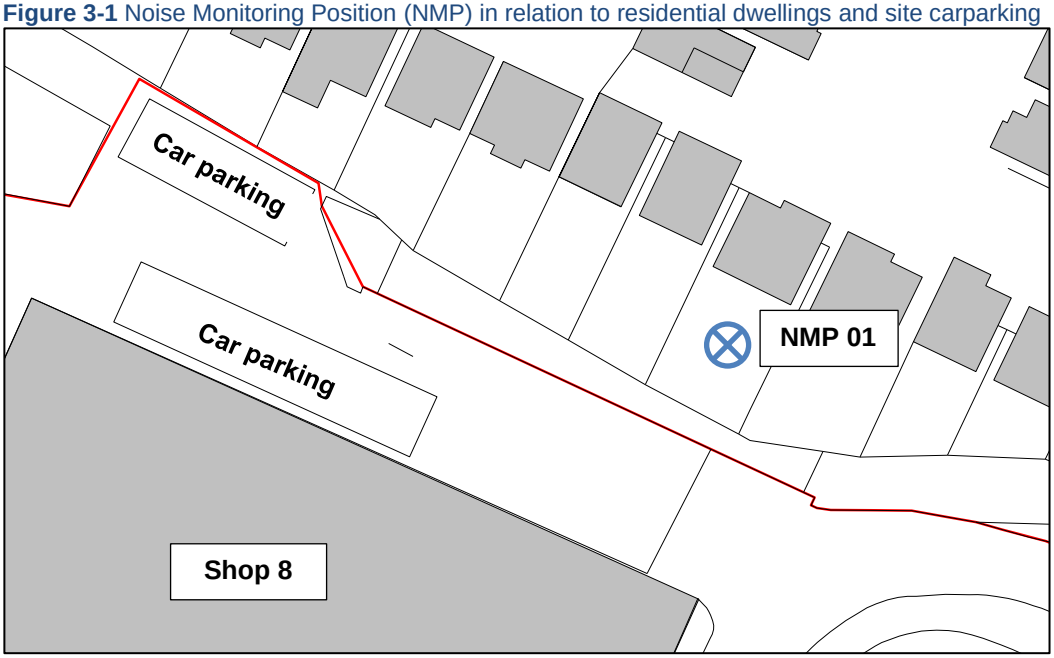
3.1 Monitoring Location

3.1.1 Sound level measurements were undertaken in the garden of a property on Aloysius View to establish the existing noise climate at the nearest noise sensitive receptor detailed in Table 3-1 and Figure 3-1.

Table 3-1: Noise Monitoring Position (NMP) details		
Noise Monitoring Position (NMP)	**Property**	**Description**
01	260 Aloysius View	Garden of property >3.5 metres to nearest façade

3.1.1 The microphone was positioned in a level area of the garden of No. 260 Aloysius View, representative of the location utilised by the residents for external amenity.

Figure 3-1 Noise Monitoring Position (NMP) in relation to residential dwellings and site carparking



3.2 Noise Measurement Procedure

3.2.1 The existing daytime noise climate was measured over a long-term 24-hour period between 13:40 on the 3rd August and 13:20 on 4th August 2021. Apart from the start and end of monitoring the measurements were unattended.

3.2.2 The microphone was protected by an all-weather enclosure and positioned in free-field conditions i.e., more than 3.5m from any reflecting surface and at 1.5 metres above existing ground level.

3.2.3 During the survey the winds speeds remained below 3 m/s, within the acceptable limit of 5m/s, and ground conditions stayed dry throughout.

3.2.4 The L_{Aeq}, L_{AFmin}, L_{AFmax}, L_{A10} and L_{A90} indices were recorded during the survey.

3.3 Noise Instrumentation

3.3.1 The noise monitoring equipment used in the surveys is listed in Appendix B. All equipment is fully compliant with that specified as Type 1 in British Standard BS EN61672 - 1: 2003: “Electroacoustics. Sound level meters Specifications.”

3.3.2 On site calibration was undertaken on the instrumentation prior to and on completion of each survey to check the sensitivity of the measuring equipment. The drift in level was always within acceptable tolerance, i.e., <0.5dB.

3.3.3 In addition to field calibration, an accredited laboratory calibrates the instrumentation used. BS7580 - 1:1997 “Specification for the verification of sound level meters” requires that sound level meters should be verified every 2 years and therefore traceable to national standards. As recommended in BS4142:2014 sound calibrators are calibrated every 12 months.

3.3.4 Copies of the relevant calibration certificates for the instrumentation used in the assessment are available on request.

4 BASELINE SURVEY RESULTS

4.1 Daytime Results

4.1.1 The full details from the monitoring surveys including meteorological conditions and brief observations are provided in Appendix C. A summary of the results obtained during the noise surveys for the proposed hours of car park use is provided in Table 4-1. All values have been rounded to the nearest whole decibel with logarithmic averages provided for $L_{Aeq,T}$ values and arithmetic averages for all other indices.

Table 4-1: Daytime monitoring results (07:00-20:00)

Noise Monitoring Position	Monitoring duration (hours)	Existing Noise Levels (dB)		
		L_{Aeq}	L_{Amax}	L_{A90}
01	11	43	72	34

4.1.2 From observations at the start and end of the monitoring the noise climate was influenced by occasional vehicles on North Farm Road accessing Aloysius View, more distant transport sources, i.e. A185 and Tyne & Wear Metro line, and occasional vehicle movements at the existing Siemens site.

5 CAR PARK SOUND EMISSIONS

5.1 Noise Model Configuration

5.1.1 A noise model using CadnaA software has been constructed incorporating German guidance RLS-90 ‘Guidelines for Noise Prediction on Roads’ for carpark noise emissions, to assess the noise levels at the nearest residential receptors.

5.1.2 The car park has been modelled as a horizontal area source covering the proposed parking spaces and access routes. The sound emission is based on the number of events per hour per parking space from the most appropriate predefined intended use categories within the noise model, Table 5-1.

Table 5-1: Car Park Configuration Assumptions

Car parking spaces	Adopted Car parking use category	Events/Hour/Car parking space	Sound Emission L*m,E dB(A)
20	Consumer market small	1.050	50.2

5.1.1 To calculate a worst case, all car parking spaces have been assumed to be occupied at least once an hour. However, this will not be the case during typical use with visitors either staying for longer than an hour and not all spaces necessarily being utilised.

5.1.2 The sound that will be generated from vehicle doors closing, single event maxima $L_{AFmax,}$ has also been modelled as a point source with a Sound Power Level of 94 dB(A) at an elevation of 1.5 metres.

5.1.3 Other configuration parameters and the data source utilised within the noise model are provided in Table 5-2.

Table 5–2: Modelling Assumptions/Information

Item	Source	Details
Carpark emissions	Cadna A	Area source with parameters from RLS-90
Existing building and ground feature layout	Ordnance Survey	Ordnance Survey Detail
Off-site building & elevation	Ordnance Survey	Residential buildings = 8m Garages = 4m
Site Building/Feature elevations	Ordnance Survey and site observations	Siemens's buildings 18 and 15 metres
Barriers	Site Observations	Close boarded fence 1.8m elevation
Ground elevation	Ordnance Survey	LIDAR 0.5m Contours – 1m resolution topographic data
Order of reflection from buildings	Cadna A	Max order of reflection = 2
Modelling configuration	Cadna A	ISO 9163 Attenuation of sound during propagation outdoors
Ground absorption	Cadna A	Absorbent ground = 0.75 Hard standing on site = 0

5.1.1 From observations at both the Siemens site and within residential garden areas a 1.8 metre close boarded boundary fence is in place for all properties on Aloysius View. The boundary treatment has been modelled as a reflective barrier in order to accurately predict the sound level at noise sensitive receptor locations, i.e., gardens of Aloysius View.

5.2 Predicted Car Park Sound Level Emissions

5.2.1 The sound levels and single event maxima from proposed carpark use predicted at ground and first floor elevation of the nearest residential receptors are detailed in Table 5-3 and Table 5-4, respectively.

Table 5-3: Predicted Sound Levels at Nearest Receptors – Garden (1.5m elevation)		
Noise Sensitive Receptor	**Sound Level dB(A)**	
	Steady State $L_{eq,1h}$	**Single Event Maxima L_{Fmax}**
240 Aloysius View	37.1	45
260 Aloysius View	36.4	44

Table 5-4: Predicted Sound Levels at Nearest Receptors – First Floor (4.5m elevation)		
Noise Sensitive Receptor	**Sound Level dB(A)**	
	Steady State $L_{eq,1h}$	**Single Event Maxima L_{Fmax}**
240 Aloysius View	39.0	48.7
260 Aloysius View	37.9	45.8

5.2.2 To aid in the visualisation of the sound levels from car park use and subsequent assessment of potential impacts, noise contours have been modelled and are provided in Appendix D.

6 ASSESSMENT OF IMPACTS

6.1 Ambient Sound Levels

6.1.1 The cumulative impact from car park use plus existing ambient sound level and resultant change in sound level are provided in Table 6-1. Due to the small difference between the sound levels predicted at No. 240 and No. 260 Aloysius View the change in ambient sound level have been undertaken utilising 36 dB from carpark use.

Table 6-1: Predicted Sound Levels and Change at Nearest Receptors			
Impact Upon Existing Ambient	**Sound Level dB(A)**		
	Existing Ambient $L_{Aeq,1h}$	**Ambient + Carpark $L_{Aeq,1h}$**	**Change**
Average	42.7	43.8	+1.1
Largest (11:00-12:00)	36.9	40.0	+3.1
Lowest (17:00-18:00)	45.2	45.8	+0.6

6.1.2 The predicted sound levels due to worst case car parking use for all garden areas of properties on Aloysius View, that overlook the Siemens site, will be below WHO/BS8233 guidance criteria of 50 dBLAeq,1h throughout the proposed hours of use 08:00 to 20:00.

6.1.3 The largest change in ambient sound level will be +3.1dB, which is at the lower range of moderate impact in terms of IEMA guidance. It must be acknowledged that this is only for one hour during the middle of the day, a period considered less sensitive due to other ambient sources of sound.

6.1.4 Due to the predicted sound level and degree of change the impact of car park use will be of No Observed Adverse Effect Level (NOAEL) in relation to Planning Policy Guidance – Noise. No specific measures are therefore required to achieve suitable residential amenity of the nearest identified receptors.

6.2 Single Event Maxima

6.2.1 The predicted maxima from car park use at the nearest residential receptors will be 46dB L_{AFmax} for garden areas and 48dB L_{AFmax} for first floor elevations and therefore significantly below the existing single event maxima during the proposed hours of use.

6.3 Internal Sound Levels

6.3.1 Based on an open window at the receiver location providing -13dB(A) reduction between inside and outside the resultant noise level within residential dwellings will be 25dB $L_{Aeq,1h}$ due to car park use.

6.3.2 There is no specific guidance for internal L_{AFmax} events during the daytime, but consideration should be given to Building Bulletin 93, which outlines that noisy event exceeding 55dB L_{A1} are likely to lead to disrupted concentration. Assuming that L_{A1} and L_{AFmax} are equal then typical maximum noise level due to car park use should not ideally exceed 55 L_{AFmax} within the nearest residential property.

6.3.3 Applying a conservative reduction due to an open window, the internal single event maxima due to proposed car park use will be 35 dB L_{AFmax} and therefore below the adopted criteria in this instance.

6.3.4 As the proposed car park use will not cause internal acoustic criteria to be exceeded the impact will be NOAEL and therefore requires no specific measures for existing residential amenity to be achieved.

7 CONCLUSIONS

7.1 Planning Policy and Guidance

7.1.1 The impact of proposed car park use at Siemens, Hebburn have been calculated. The worst case predicted noise levels at the nearest dwellings on Aloysius View are below guidance criteria for both external and internal residential amenity.

7.1.2 As guidance criteria will not be exceeded and only a slight change in the existing ambient sound climate is predicted for the majority of the time, the impacts are likely to be of No Observed Adverse Effect Level (NOAEL) in terms of Planning Policy Guidance – Noise criteria. No specific measures are therefore required for residential amenity to be met with no detectable effect on health and quality of life due to noise.

7.2 Planning Recommendations

7.2.1 Based on the outcomes of assessment against national policy and guidance, existing residents will not be subject to significant or other adverse impacts on the health and/or quality of life due to noise from the proposed car park use.

7.2.2 It is therefore concluded that noise associated with the proposed car parking should not pose a constraint to redevelopment of Shop 8 at Siemens, Hebburn.

Appendix A: Glossary of Acoustic Terminology

Equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$)
The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T has the same mean-squared sound pressure as a sound that varies with time. It is given by the following equation:

$$L_{Aeq,T} = 10\ lg_{10}\left\{(1/T)\int_{t_1}^{t_2}\left(\frac{p_A(t)}{p_0}\right)^2 dt\right\}$$

Where $L_{Aeq,T}$ is the equivalent continuous A-weighted sound pressure level determined over time interval $T = t_2 - t_1$; p_0 is the reference sound pressure (20μ p_A); $p_A(t)$ is the instantaneous A-weighted sound pressure (p_A).

Maximum and Minimum (L_{Amax} and L_{Amin})
The simplest statistical parameters are the maximum level (L_{Amax}) and the minimum level (L_{Amin}) during the measurement period. The L_{Amax} is often used as a measure of the most obtrusive facet of the noise, even though it may only occur for a very short time and is the level of the maximum Root Mean Square reading. L_{Amin} is rarely used, but can be a useful way of identifying a constant noise amongst other intermittent noises.

Fast Time-weighting: An averaging time used in sound level meters, equivalent to 1/8 second.

Slow Time-weighting: An averaging time used in sound level meters, equivalent to 1 second.

Percentile Parameters ($L_{n,T}$)
Percentile parameters, L_n values, are useful descriptors of noise. The L_n value is the noise level exceeded for n per cent of the measurement period, which must be stated. The L_n value can be anywhere between 0 and 100. The two common ones are discussed below, but sometimes other values will be encountered.

Background Noise ($L_{A90,T}$)
The most commonly used percentile level is the $L_{A90,T}$, which is the 90th percentile level and is the level exceeded for 90 per cent of the time, T. It will be above the L_{min} and has been adopted as a good indicator of the "background" noise level. It is specified in BS 4142:1997 as the parameter to assess background noise levels. Whilst it is not the absolute lowest level measured in any of the short samples, it gives a clear indication of the underlying noise level, or the level that is almost always there in between intermittent noisy events. BS4142:1997 advises that the measurement period should be long enough to obtain a representative sample of the background level.

Level exceeded for 10% of the Time ($L_{A10,T}$)
$L_{A10,t}$ is the 10th percentile, or the level exceeded for 10 per cent of the time, and was used for road traffic noise assessments since it had been shown to give a good indication of people's subjective response to noise. Although the L_{Aeq} has largely superseded its use for traffic, $L_{A10,T}$ may still be found in acoustic reports discussing road traffic. It is still used to assess traffic noise to determine eligibility for noise-insulation grants where a road is altered or a new one proposed. The $L_{A10,T}$ can be useful in assessing the overall noise climate, for example, if the $L_{A90,T}$, $L_{A10,T}$ and $L_{Aeq,T}$ are all within a few dB, then this indicates that the noise source is fairly constant.

Specific Noise Source
The noise source under investigation for assessing the likelihood of complaints.

Specific Noise Level ($L_{Aeq,Tr}$)
The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval.

Ambient Noise
Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far.

Residual Noise
The ambient noise remaining at a given position in a given situation when the specific noise source is suppressed to a degree such that it does not contribute to the ambient noise.

Residual Noise Level ($L_{Aeq,Tr}$)
The equivalent continuous A-weighted sound pressure level of the residual noise.

Weighted Sound Reduction for Traffic Noise (C_{tr}) A single value given to building components for reducing noise from urban road traffic, disco music, and other noises with a large component of low frequencies.

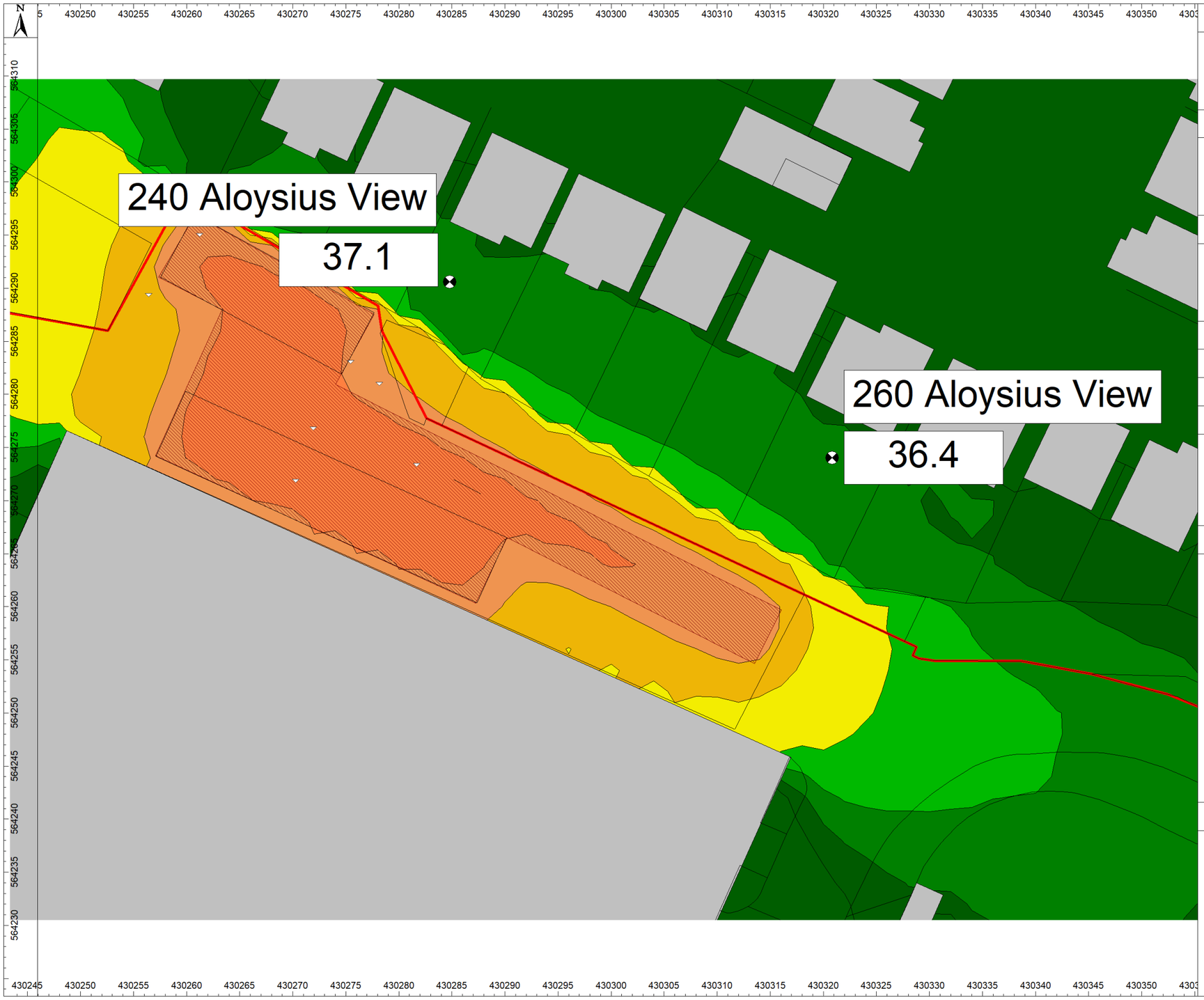
Appendix B: Survey Instrumentation

Table B-1: Noise Instrumentation and Calibration Details at time of survey				
Manufacturer	**Description**	**Model**	**Serial number**	**Calibration due**
B&K	Sound Level Meter	2250	2488374	09/11/2021
B&K	Condenser Microphone	4189	2470731	05/11/2021
Larson Davis	Noise Analyser	870	0258	17/010/2022
Larson Davis	Condenser Microphone	2541	3396	17/10/2022
CEL	Calibrator	120/1	0966335	24/10/2021
Kestrel	Pocket Weather Tracker	4500NV	579992	N/A

Appendix C: Noise Moniotring Results and Observations

Table C-1: Noise survey results from NMP 01 (Garden of No. 260 Aloysius View)											
Date:		**03/08/2021 to 04/08/2021**						**Meteorological conditions**			
Start Time	**End Time**	**L_{Aeq}**	**L_{Amin}**	**L_{Amax}**	**L_{A10}**	**L_{A50}**	**L_{A90}**	**Wind Direction & Speed (m/s)**	**Cloud cover (%)**	**Temp. ºC**	**Rain (✓ or x)**
13:38	14:00	45.3	29.4	71.9	43.3	34.4	31.4				
14:00	15:00	40.6	30.7	62.8	43.8	37.5	33.9				
15:00	16:00	43.5	30.7	65.5	46.9	39.2	34.5				
16:00	17:00	43.7	32.9	66.7	44.4	39.0	35.5				
17:00	18:00	45.2	35.2	66.3	47.9	42.2	38.4				
18:00	19:00	43.6	33.0	66.0	46.5	40.6.	37.1				
19:00	20:00	42.4	31.4	72.0	43.0	37.5	34.6				
20:00	21:00	44.9	29.1	72.2	44.8	35.9	32.3				
21:00	22:00	37.3	27..9	62.6	38.6	33.7	31.1				
22:00	23:00	33.6	27.5	48.9	35.6	32.1	29.4				
23:00	00:00	38.4	28.0	65.6	38.5	32.6	30.6				
00:00	01:00	31.8	26.2	50.2	33.3	29.7	28.1				
01:00	02:00	30.5	25.8	60.9	31.5	29.9	28.4				
02:00	03:00	30.0	26.5	57.8	31.2	29.6	28.1				
03:00	04:00	32.8	27.3	56.4	33.0	30.6	29.0				
04:00	05:00	47.1	29.3	69.4	47.9	34.5	31.4				
05:00	06:00	40.3	29.5	60.4	43.0	35.7	33.4				
06:00	07:00	41.3	33.6	66.3	43.0	38.3	36.0				
07:00	08:00	42.9	35.9	64.7	43.1	40.1	38.4				
08:00	09:00	39.5	30.2	63.7	40.7	36.1	33.3				
09:00	10:00	41.5	28.6	70.2	43.0	34.7	30.9				
10:00	11:00	40.7	28.4	61.0	43.1	34.8	30.9				
11:00	12:00	36.9	28.3	57.9	38.9	33.8	30.7				
12:00	13:00	41.5	32.1	59.4	44.1	38.9	35.6				
13:00	13:20	44.0	32.8	70.9	45.8	39.7	36.9				
General observations:											
Occasional vehicles on North Farm Road accessing Aloysius View, more distant transport sources, i.e. A185 and Tyne & Wear Metro line, and occasional vehicle movements at the existing Siemens site											

Appendix D: Noise Contours



PROJECT

Carparking - Shop 8
Redevelopment, Hebburn

CLIENT

Siemens
Transmission and Distribution Ltd.

TITLE

SOUND LEVELS: Car Parking - 1.5m

DATE

19.01.2022

DRAWN BY

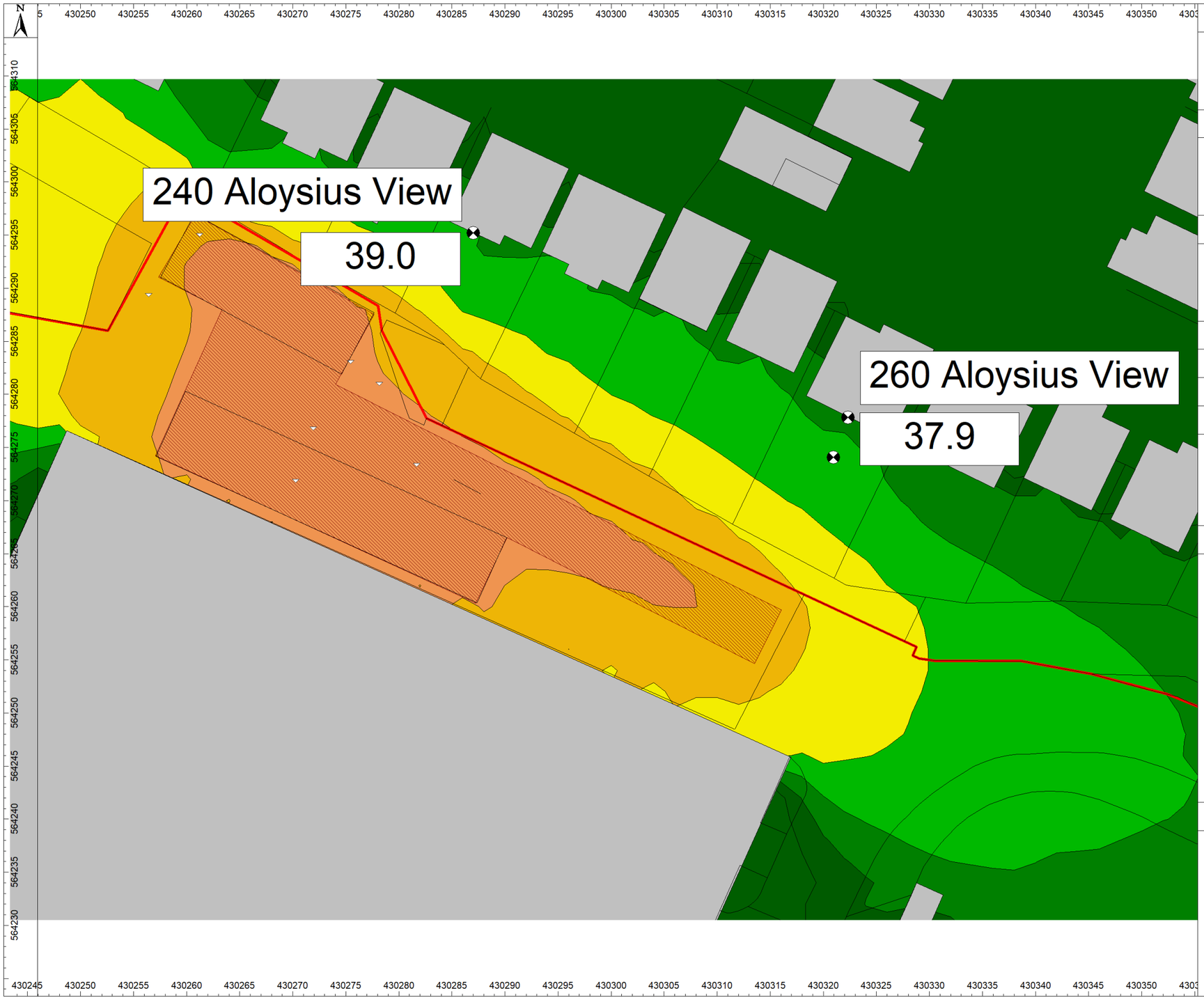
LRL

CONTOUR LEVELS

- ... < 30 dB LAFmax
- 30 <= ... < 35 dB LAFmax
- 35 <= ... < 40 dB LAFmax
- 40 <= ... < 45 dB LAFmax
- 45 <= ... < 50 dB LAFmax
- 50 <= ... < 55 dB LAFmax
- 55 <= ... < 60 dB LAFmax
- 60 <= ... < 65 dB LAFmax
- 65 <= ... < 70 dB LAFmax
- 70 <= ... < 75 dB LAFmax
- 75 <= ... < 80 dB LAFmax
- 80 <= ... < 85 dB LAFmax
- 85 <= ... < 90 dB LAFmax
- 90 <= ... dB LAFmax

LEGEND

- Point Source
- Parking Lot
- Building
- Barrier
- Height Point
- Contour Line
- Receiver
- Calculation Area
- Vertical Grid



PROJECT

Carparking - Shop 8
Redevelopment, Hebburn

CLIENT

Siemens
Transmission and Distribution Ltd.

TITLE

SOUND LEVELS: Car Parking - 4.5m

DATE

19.01.2022

DRAWN BY

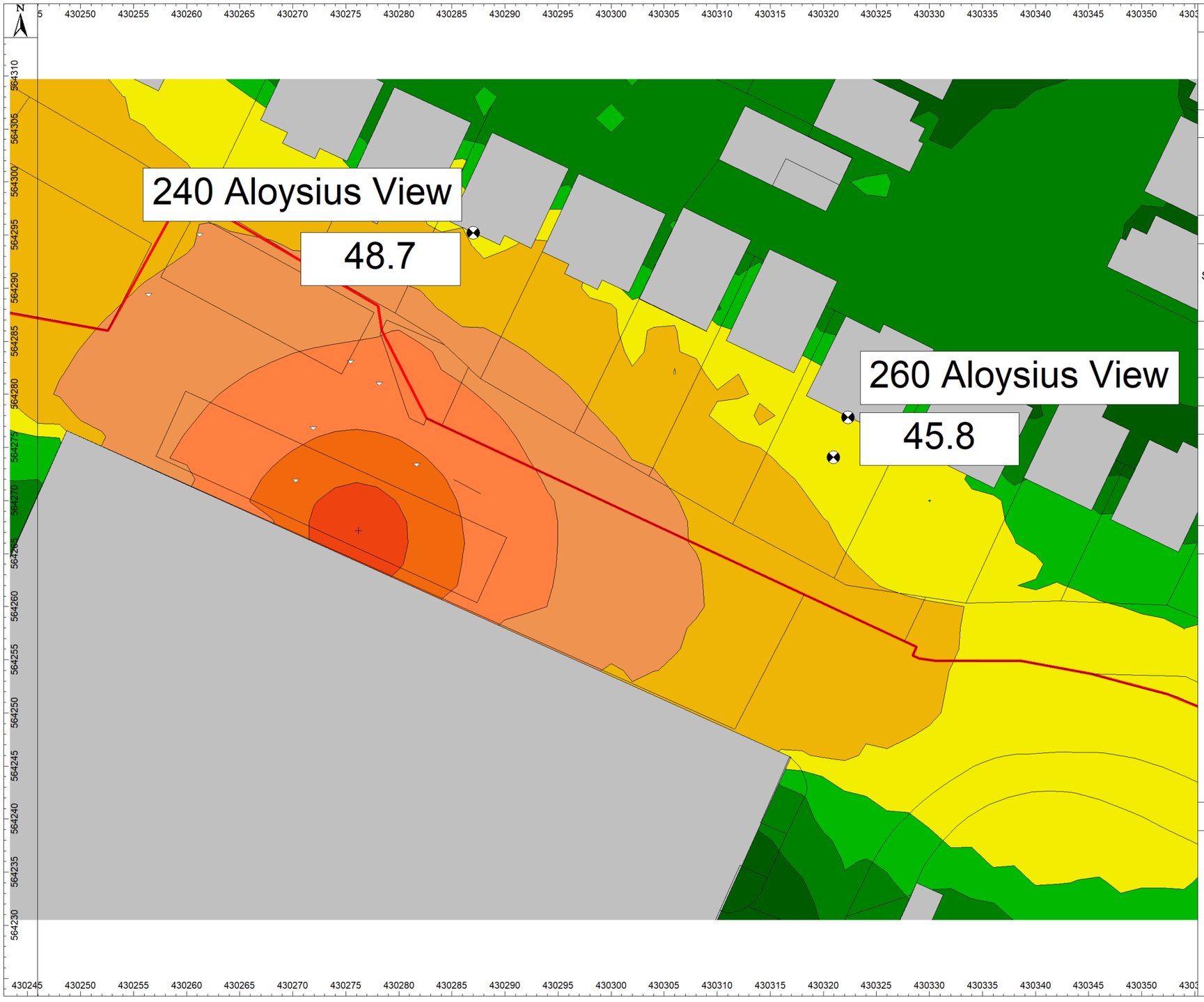
LRL

CONTOUR LEVELS

- ... < 30 dB LAFmax
- 30 <= ... < 35 dB LAFmax
- 35 <= ... < 40 dB LAFmax
- 40 <= ... < 45 dB LAFmax
- 45 <= ... < 50 dB LAFmax
- 50 <= ... < 55 dB LAFmax
- 55 <= ... < 60 dB LAFmax
- 60 <= ... < 65 dB LAFmax
- 65 <= ... < 70 dB LAFmax
- 70 <= ... < 75 dB LAFmax
- 75 <= ... < 80 dB LAFmax
- 80 <= ... < 85 dB LAFmax
- 85 <= ... < 90 dB LAFmax
- 90 <= ... dB LAFmax

LEGEND

- Point Source
- Parking Lot
- Building
- Barrier
- Height Point
- Contour Line
- Receiver
- Calculation Area
- Vertical Grid


N
430245 430250 430255 430260 430265 430270 430275 430280 430285 430290 430295 430300 430305 430310 430315 430320 430325 430330 430335 430340 430345 430350
564310 564305 564300 564295 564290 564285 564280 564275 564270 564260 564255 564250 564245 564240 564235 564230
240 Aloysius View
48.7
260 Aloysius View
45.8
PROJECT
Carparking - Shop 8 Redevelopment, Hebburn
CLIENT
Siemens Transmission and Distribution Ltd.
TITLE
SOUND LEVELS: Single Event Maxima
DATE
19.01.2022
DRAWN BY
LRL
CONTOUR LEVELS
... < 30 dB LAFmax
30 <= ... < 35 dB LAFmax
35 <= ... < 40 dB LAFmax
40 <= ... < 45 dB LAFmax
45 <= ... < 50 dB LAFmax
50 <= ... < 55 dB LAFmax
55 <= ... < 60 dB LAFmax
60 <= ... < 65 dB LAFmax
65 <= ... < 70 dB LAFmax
70 <= ... < 75 dB LAFmax
75 <= ... < 80 dB LAFmax
80 <= ... < 85 dB LAFmax
85 <= ... < 90 dB LAFmax
90 <= ... dB LAFmax
LEGEND
Point Source
Parking Lot
Building
Barrier
Height Point
Contour Line
Receiver
Calculation Area
Vertical Grid