South Tyneside College, South Shields

Plant noise impact assessment

009771-APX-XX-ZZ-RP-N-1003

18th December 2025

Revision P01

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1 Summary

1.1 This report has been prepared in response to Planning Condition no. 17 of Planning Application Ref. ST/0534/23/FUL for the construction of a new teaching facility for South Tyneside College, Sound Shields.

1.2 Condition no. 17 requires the noise impact from the proposed plant not to exceed the limits presented within the initial noise impact assessment submitted with the planning submission.

1.3 Background sound levels have been taken from the initial noise impact assessment submitted with the planning submission.

1.4 Plant details have been identified by the mechanical engineers.

1.5 Noise emission from the proposed plant has been determined and noise propagation modelled with proprietary software CadnaA.

1.6 The potential noise impact is calculated and rated in accordance with BS 4142.

1.7 Based on current proposals, the rated plant sound impact is calculated to be no higher than the background sound level during both daytime and night time assessment periods, and as such achieves the Planning Condition requirements without a scheme for the mitigation of noise.

2 Introduction

2.1 A development consisting of the construction of a new teaching facility for South Tyneside College has been proposed in South Shields; the site location is shown in Figure 1.

2.2 Apex Acoustics has been commissioned to undertake an assessment of the noise from fixed mechanical plant associated with the development to address the requirements of a Planning Condition.

2.3 The scope of our instruction includes:

- Analysis of proposed source noise levels, using manufacturers' data provided by the client;
- Calculate noise propagation using proprietary noise modelling software to the noise-sensitive receptor and assess the impact in accordance with BS 4142: 2014;
- If limits are exceeded, advise on a scheme for noise mitigation to satisfy the Planning Condition requirements;
- An assessment of road traffic / other noise sources is not included.

2.4 This report presents the evaluation of the potential noise impact from plant associated with the proposed development on the identified nearest noise-sensitive receptor (NSR), to address a Planning Condition.

2.5 Representative background sound levels at the NSR are identified within the initial noise impact assessment report produced by WSP, Reference 1.

2.6 This assessment is based on the proposed plant details identified by the mechanical engineers.

2.7 The potential noise impact from the sources identified is calculated and rated according to the BS 4142 methodology, Reference 2.

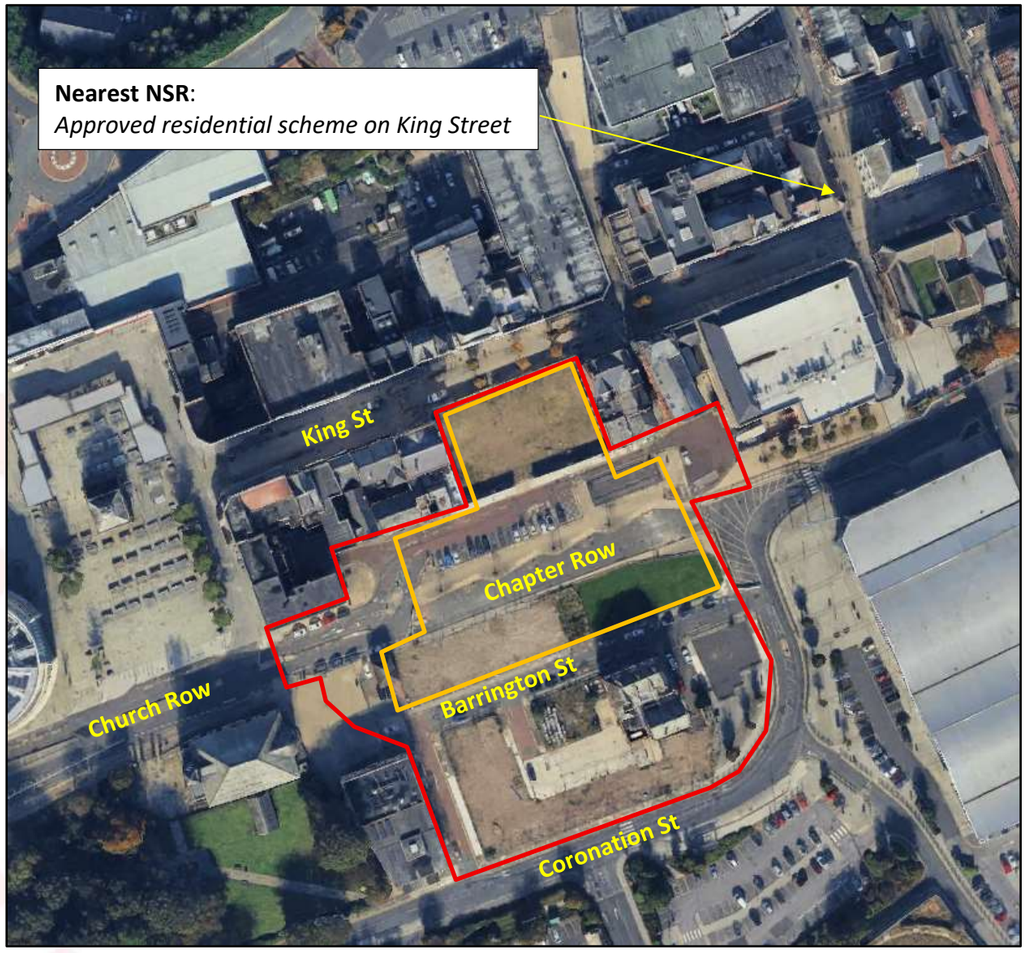


Figure 1: Proposed site shown in red, approximate building position shown in orange, and identified NSR

3 Planning condition

3.1 Planning Condition no. 17 associated with Application ref. ST/0534/23/FUL for this development is shown in Figure 2.

> 17 No mechanical plant shall be installed within the application site internal or external to the new build campus building hereby permitted unless and until a further Noise Assessment has been submitted to and approved in writing by the Local Planning Authority which demonstrates that noise levels from such mechanical plant at residential receptors within the vicinity of the application site would not exceed the rating levels as specified in table 6.1 of the Noise Assessment received 17/07/2023 which forms part of the submitted application documentation. Thereafter, any mechanical plant installed shall comply fully at all times with the noise levels as specified in that approved further Noise Assessment.
>
> In the interests of residential amenity in accordance with Policies DM1(B) and EA5 of the South Tyneside LDF and the NPPF.

Figure 2: Planning Condition no. 17

3.2 The background sound levels and proposed rating noise limits for plant from the initial noise impact assessment are reproduced in Figure 3 below.

Table 6-1 – Rating level limits – plant and activity noise

Location	Period	Rating level limit, dB $L_{Ar,Tr}$
NSR 1 – Consented dwellings at 54-56 King Street	Daytime	51
NSR 2 – Dwellings on Coble Landing	Night-time	38
NSR 3 – Dwellings east of the A183	Daytime	43
	Night-time	36
NSR 4 – Dwellings south of Saville Street	Daytime	43
	Night-time	36

Figure 3: Rated plant noise limits from initial noise impact assessment

4 Noise sources

4.1 **Proposed plant and associated noise levels**

4.2 The mechanical plant is assessed based on plant details supplied by the mechanical engineers.

4.3 The locations of all the units have been taken from the mechanical engineers' drawings, Reference 5.

4.4 The proposed plant is understood to comprise of that summarised in Table 1.

Plant	No. proposed
Air handling unit (AHU)	9
Variable refrigerant units (OU)	27
Air source heat pumps (ASHP)	3
Extract (TE)	3
Extract (LE)	1
Extract (CE)	1
Welding extract fan (WEF)	3
Grinding extract fan (GEF)	1
Kitchen extract fan (KEF)	1
Kitchen supply fan (KSF)	1

Table 1: Proposed plant

4.5 Supplied noise levels from the mechanical engineers, taken from manufacturers information, are shown in Table 2.

Plant	dB(A)	Single-octave band centre frequency (Hz) Linear noise levels (dB)						
		63	125	250	500	1k	2k	4k
AHU 01 SUR	**53**	68	62	57	45	45	41	36
AHU 01 FAI	**54**	61	57	55	54	47	39	30
AHU 01 EXH	**76**	69	67	74	71	73	68	64
AHU 02 SUR	**60**	71	70	57	52	52	51	51
AHU 02 FAI	**62**	62	66	63	61	55	52	50

Plant	dB(A)	Single-octave band centre frequency (Hz) Linear noise levels (dB)						
		63	125	250	500	1k	2k	4k
AHU 02 EXH	**76**	69	67	74	71	73	68	64
AHU 03 SUR	**57**	67	72	56	50	44	42	36
AHU 03 FAI	**55**	61	62	58	55	46	40	31
AHU 03 EXH	**78**	69	77	73	76	73	69	64
AHU 04 SUR	**58**	71	70	56	52	48	49	45
AHU 04 FAI	**60**	63	63	60	60	53	51	41
AHU 04 EXH	**81**	72	75	73	78	76	75	71
AHU 05 FAI	**57**	69	68	55	48	49	49	49
AHU 05 EXH	**59**	61	62	59	58	53	49	47
AHU 05 SUR	**82**	70	73	72	74	77	75	75
AHU 06 FAI	**54**	62	69	50	44	40	39	34
AHU 06 EXH	**51**	55	62	51	51	42	36	25
AHU 06 SUR	**73**	63	74	67	69	69	66	61
AHU 07 FAI	**59**	71	70	55	52	51	50	48
AHU 07 EXH	**61**	63	66	59	60	54	51	43
AHU 07 SUR	**82**	72	75	72	78	77	75	72
AHU 08 FAI	**58**	71	70	56	52	48	49	45
AHU 08 EXH	**61**	63	63	60	61	53	51	42
AHU 08 SUR	**81**	72	75	73	78	76	75	71
AHU 09 FAI	**56**	67	69	53	46	45	46	42
AHU 09 EXH	**56**	59	64	54	55	50	46	40
AHU 09 SUR	**79**	68	74	70	72	74	73	70
TE 01 SUR	**53**	52	63	53	52	43	38	33
TE 01 FAI	**68**	75	81	66	60	54	59	53
TE 01 EXH	**65**	74	76	65	61	59	56	48
TE 02 SUR	**54**	63	66	58	50	45	37	31

Plant	dB(A)	Single-octave band centre frequency (Hz) Linear noise levels (dB)						
		63	125	250	500	1k	2k	4k
TE 02 FAI	**68**	74	83	69	57	53	53	51
TE 02 EXH	**70**	75	82	71	65	61	58	53
TE 03 SUR	**53**	53	63	54	53	44	39	34
TE 03 FAI	**68**	75	81	67	61	55	59	54
TE 03 EXH	**66**	75	76	66	62	60	57	49
CE 01 SUR	**51**	50	51	55	50	42	37	35
CE 01 FAI	**66**	68	71	70	63	57	55	57
CE 01 EXH	**67**	71	71	70	65	61	55	53
LE 01 SUR	**53**	53	63	54	53	44	39	34
LE 01 FAI	**65**	74	76	65	61	59	56	47
LE 01 EXH	**65**	74	76	65	61	59	56	47
KEF 01 SUR	**70**	87	84	71	62	56	51	46
KEF 01 EXH	**82**	88	86	79	78	78	72	71
KSF 01 SUR	**53**	64	68	51	46	41	37	33
KSF 01 FAI	**64**	66	69	66	64	56	53	46
WEF 01-03 SUR	**81**	-	-	-	-	-	-	-
WEF 01-03 EXH	**74**	-	-	-	-	-	-	-
GEF 01 SUR	**68**	-	-	-	-	-	-	-
GEF 01 EXH	**72**	-	-	-	-	-	-	-
OU*	**84**	79	84	85	83	79	72	62
OU (nighttime setback*)*	**76**	71	76	77	75	71	64	54
ASHP	**80**	-	-	-	-	-	-	-

Table 2: Manufacturers sound power levels, L_w

**manufacturers information presents an 8 dB reduction in noise emissions for night time setback mode. Assumed even reduction across spectral source data provided.*

See markup in Appendix B, provided by the mechanical engineers indicating which OU units service the various parts of the building. To note, units servicing the marine college only (marked green) are understood to not to operate during the night time assessment period (23:00 – 07:00 hours).

4.6 The in-duct attenuator insertion losses provided by the mechanical engineers used in the calculations are shown in Table 3.

Location	Single-octave band centre frequency (Hz) In-duct attenuator insertion losses (dB)						
	63	125	250	500	1k	2k	4k
AHU 02 Intake	8	11	23	38	38	31	27
AHU 02 Exhaust	8	11	23	38	38	31	27
AHU 03 Intake	4	13	18	30	32	24	18
AHU 03 Exhaust	4	13	18	30	32	24	18
AHU 04 Intake	8	11	22	25	17	12	12
AHU 04 Exhaust	8	11	22	25	17	12	12
AHU 05 Intake	6	13	22	31	28	22	18
AHU 05 Exhaust	6	13	22	31	28	22	18
AHU 06 Intake	6	15	23	35	41	38	27
AHU 06 Exhaust	6	15	23	35	41	38	27
AHU 07 Intake	8	11	23	38	38	31	27
AHU 07 Exhaust	8	11	23	38	38	31	27
AHU 08 Intake	6	10	21	35	39	31	27
AHU 08 Exhaust	6	10	21	35	39	31	27
AHU 09 Intake	8	11	23	38	38	31	27
AHU 09 Exhaust	8	11	23	38	38	31	27
KEF 01 Exhaust	8	13	20	27	35	28	22
KSF 01 Intake	8	13	20	27	35	28	22

Table 3: Proposed in-duct insertion loss

4.7 If plant emitting higher noise levels than those accounted for in this report is proposed, or additional plant is also proposed, the impact should be reassessed to check compliance with the Planning Condition limits.

4.8 **Operation times**

4.9 All plant is assumed to operate continuously during the daytime 1-hour assessment period; this is a prudent assumption.

4.10 Based on information provided by the mechanical engineers, it is understood that during the night time, only units associated with the main college will be in operation and such all plant associated with the marine college elements are excluded from the assessment. It is also understood that VRF units will operate in a night time setback mode and such losses quoted by the manufacturers have been included within the assessment.

4.11 **Noise transmission and propagation**

4.12 Noise transmission and propagation are modelled to the NSR based on the noise source data detailed, using proprietary software, CadnaA, Reference 6.

4.13 This model's noise propagation outdoors according to ISO 9613, Reference 7.

4.14 The model parameters and assumptions are summarised in Appendix B.

5 Assessment results – based on mechanical engineers proposals

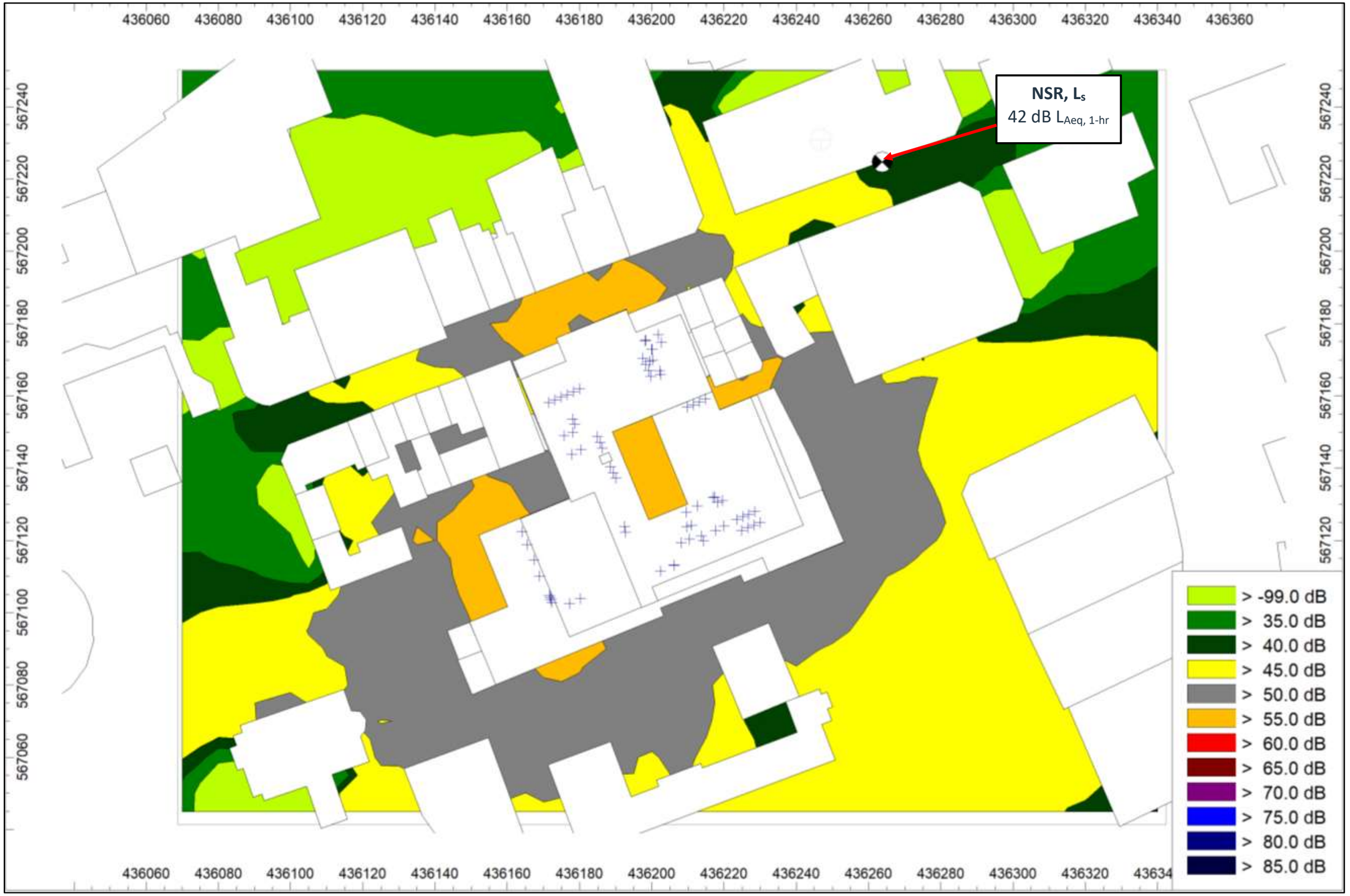


Figure 4: Daytime sound contours at 15 m, showing the calculated specific sound level, $L_{Aeq\ 1\ hr}$ based on current proposals

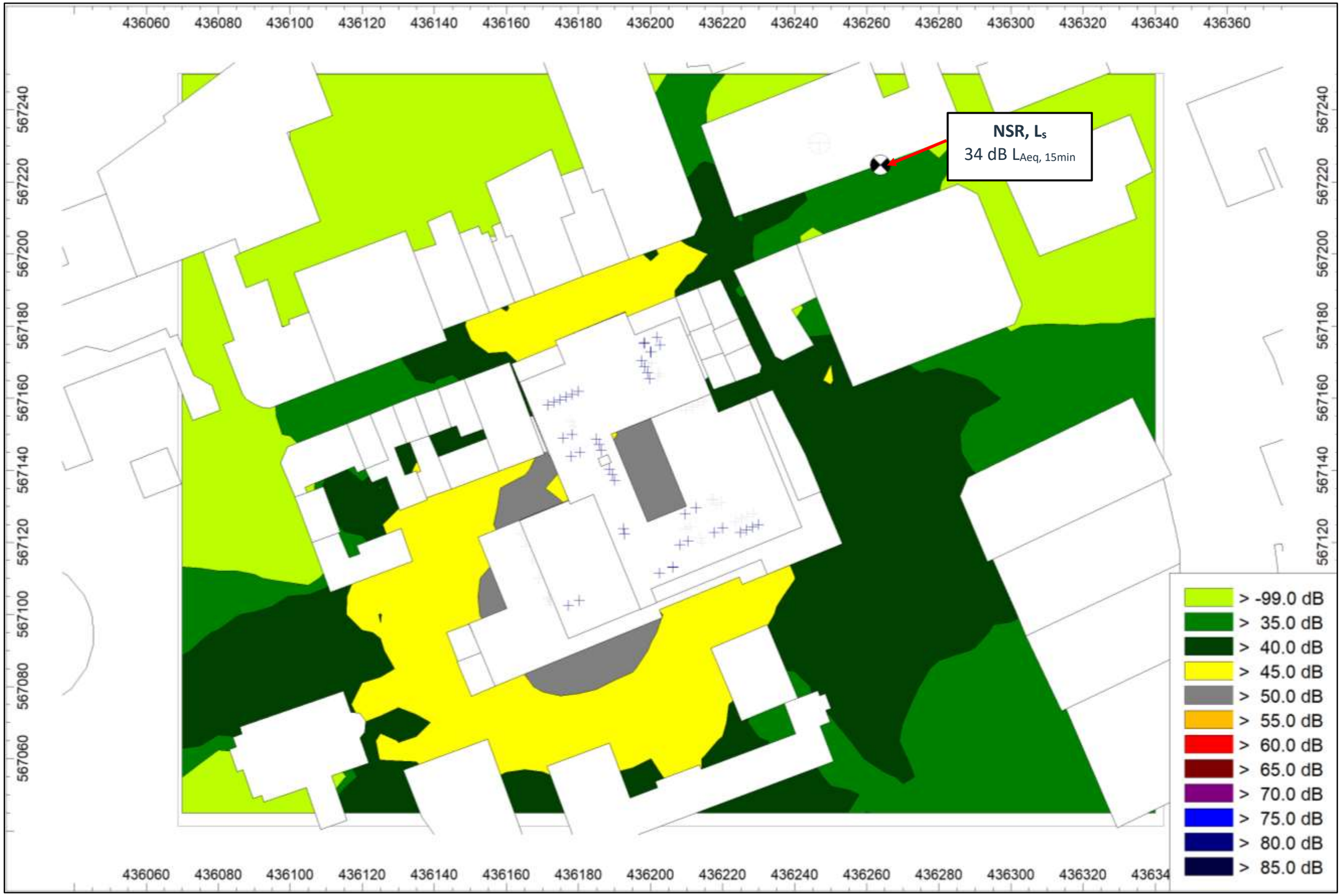


Figure 5: Night time sound contours at 15 m, showing the calculated specific sound level, $L_{Aeq\ 15\ min}$ based on current proposals

Parameter	Daytime assessment	Night-time assessment	Relevant clause of BS 4142	Commentary
Background sound level	51 dB $L_{A90, 1hr}$	38 dB $L_{A90, 15min}$	8.1.4	Background sound levels taken from initial noise impact assessment produced by others. Understood to be via data obtained over a long time period.
Specific sound level $L_{s,}$ due to all sources for the required assessment interval	42 dB $L_{Aeq, 1hr}$	34 dB $L_{Aeq, 15-min}$	7.2 7.3.6	The on-time for the sources during the assessment period are discussed in Section 4.8. The calculated L_s contours across the site due to all sources during the assessment period are shown in Figure 4; the L_s assessed is the highest calculated level at the NSR to the north.
Acoustic feature correction	+3 dB	+ 3 dB	9.2	No information is provided by the manufacturers in relation to source characteristics. Due to the large amount of plans proposed, the soundscape is likely to be generally broadband and continuous. A 3 dB penalty is applied for any potential tonal characteristics for prudence in the assessment.
Rating level, $L_{Ar,Tr}$	45 dB	37 dB		
Uncertainty of assessment			10	Background data was obtained by others over a long time period, accounting for the changing acoustic environment. Uncertainty in the calculated impact has been reduced by the use of a calculation method in accordance with ISO 9613-2.
Excess of $L_{Ar,Tr}$ over background sound level	**-6 dB**	**-1 dB**	11	The results of the assessment indicate compliance with the most onerous limits in Table 6.1 of the initial noise impact assessment report, and such satisfies the requirements of the planning condition without further mitigation. Other receivers are noted to be further away from the development, and such impacts will be suitably controlled at these locations.

Table 4: BS 4142 assessment results, based on current proposals

6 Conclusion

6.1 Based on the current development proposals, it is calculated that the requirements of the Planning Condition are met.

6.2 The calculated BS 4142 Rating level at the NSR is no higher than the representative background levels during the day or night, and therefore complies with the Planning Condition noise limits.

7 References

1 WSP, South Tyneside College, 70084288, RP AC 01. Noise impact assessment, July 2023.

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

3 National Planning Policy Framework, Ministry of Housing, Communities & Local Government, December 2024.

4 Noise Policy Statement for England, Department for Environment, Food and Rural Affairs, March 2010.

5 Castle Building Services, South Tyneside College, Level R1 - Ventilation – Roof & Level R1 – Cooling – Roof, April 2023. *Acoustic Information marked up.*

6 CadnaA environmental noise modelling software, version 2024, Datakustik GmbH.

7 ISO 9613: Acoustics - Attenuation of sound during propagation outdoors.

8 GSS Architecture. South Tyneside College. General arrangement drawings, February 2025.

9 ISO 12913-1:2014 Acoustics, Soundscape, Part 1: Definition and conceptual framework

Appendix A Noise exposure hierarchy

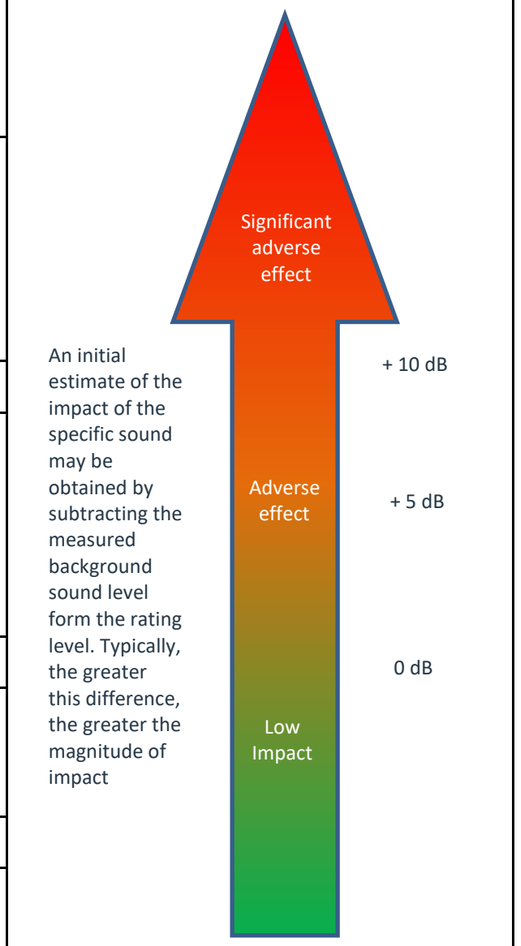
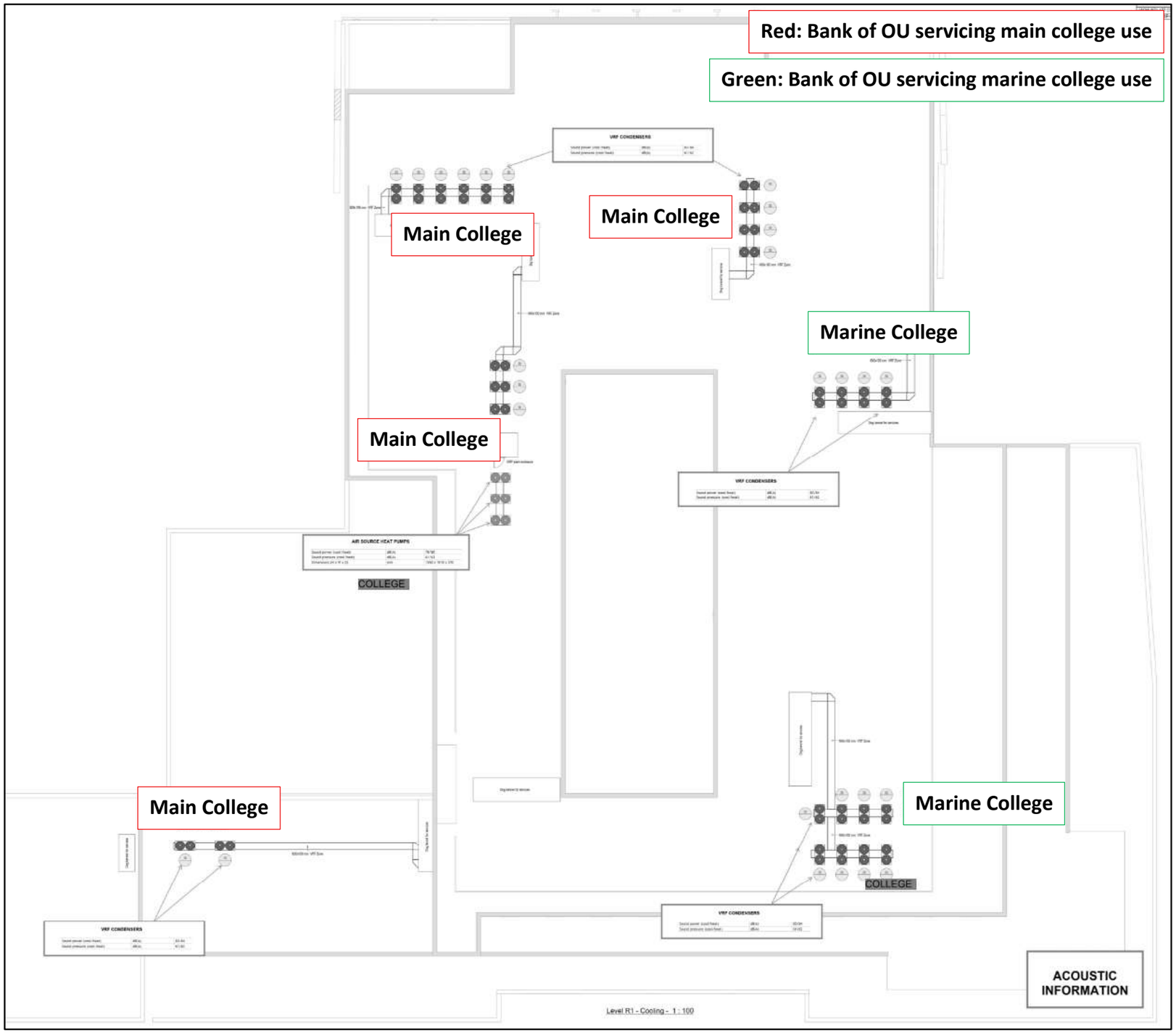
Planning Practice Guidance - Noise				BS 4142: Initial estimate of external noise risk significance
Noise	***Example of outcomes***	***Increasing effect level***	***Action***	
Present and very distributive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an 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**	
Present and distributive	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**	
Significant Observed Adverse Effect Level (SOAEL)				
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**	
Lowest Observed Adverse Effect Level (LOAEL)				
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**	
No Observed Adverse Effect Level (NOAEL)				
Not present	No effect	No Observed Effect	**No specific measures required**	
No Observed Effect Level (NOEL)				

Table 5: PPG-N Noise Exposure Hierarchy and BS 4142 initial estimate of impact

Appendix B Markup of roof OU plant



Appendix C Noise transmission and propagation

C.1 Noise transmission and propagation is modelled using proprietary software, CadnaA. This model's noise propagation outdoors according to ISO 9613. The parameters used, source of data and details are described in Table 6.

Parameter	Source	Details
Model dimensions	Google Earth	British Transverse Mercator coordinates
Site location and layout	Architects' drawings	Architects' drawings
Topography	Site observations and Google Street view	Modelled with no changes in topography
Building heights – proposed buildings	Drawings	Architects' drawings
Building heights – outside of site	Site observations and Google Street view	3 m per storey + 3 m roof (residential properties)
Receptor positions	Site observations and Google Street view	On the NSR façade closest to the source at a height of 1.5 m (ground floor window height) + 2.5m per storey.
Building and barrier absorption coefficient	ISO 9613-2	0.21 to represent a reflection loss of 1 dB
G, Ground factor	ISO 9613-2	Hard ground, G = 0; Porous ground, G = 1 (locally on model)
Max. order of reflections	Apex Acoustics	Three

Table 6: Modelling parameters and assumptions

C.2 A plan view and a 3D perspective of the CadnaA model are shown in Figure 6 and Figure 7 respectively.



Figure 6: Plan view of the CadnaA model

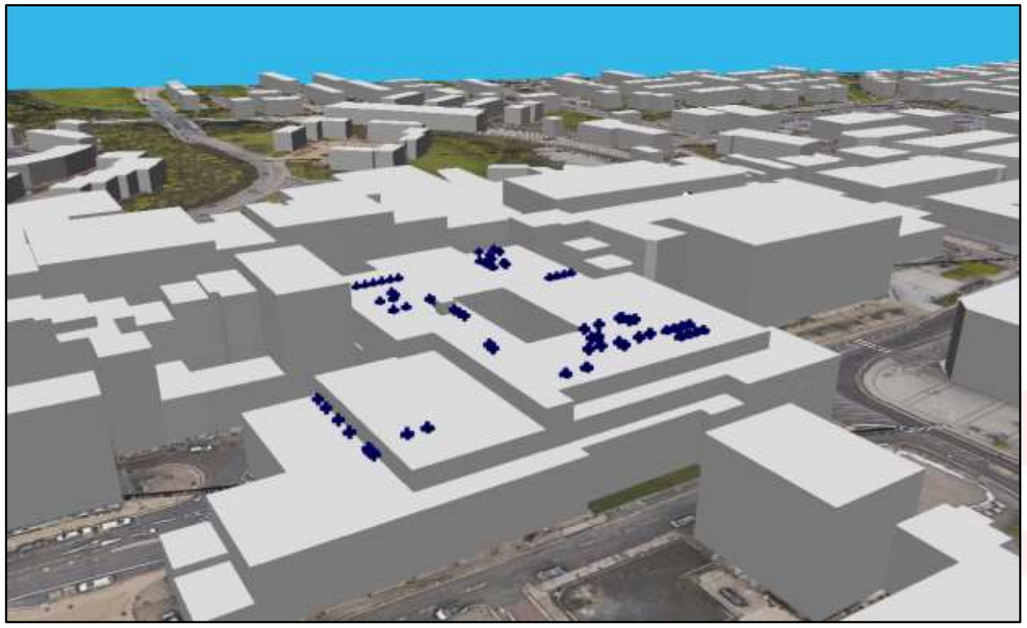


Figure 7: 3D view of the CadnaA model

Appendix D Professional qualifications and competence

D.1 All Apex Acoustics consultants work under the close supervision of a member who holds qualification in acoustics and is a member of the IOA.

D.2 This can be verified by searching the Institute of Acoustics' list of Members, available here, with the surname of the consultant.

http://www.ioa.org.uk/membership-check

D.3 Apex Acoustics is a member of the Association of Noise Consultants (ANC). The ANC is a trade organisation which seeks to raise the standards of acoustic consultancy and as such there are barriers to entry to ensure member's competency.

D.4 This report has been completed and checked by appropriately qualified and experienced acoustic consultants.