Greenhead College, Huddersfield

Plant noise impact assessment for Planning Conditions 22 & 26

NE8659-APX-ZZ-ZZ-RP-YA-0004

17th March 2023

Revision P01

ANC ACOUSTICS & NOISE CONSULTANTS

Institute of Acoustics sponsoring organisation

Greenhead College, Huddersfield

Plant noise impact assessment for Planning Conditions 22 & 26

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1 Contents

2 Summary

2.1 This report has been prepared in response to Planning Condition 22 and relevant requirements Condition 26 of Planning Application 2021/62/93674/W for the partial redevelopment of Greenhead College, Huddersfield, HD1 4ES.

2.2 Condition 22 requires that '*Prior to…the 'new main build'…and the 'courtyard infill' being brought into use, all works which form part of the sound attenuation scheme for that building as specified in Apex Noise Impact Assessment…shall be completed and written evidence to demonstrate that the specified noise levels have been achieved shall be submitted…'.*

2.3 Condition 26 includes a requirement for the 'new main build' of details of the noise mitigation measures incorporated in the kitchen extract system and likely resulting noise levels at nearby noise sensitive locations.

2.4 Apex Acoustics Noise Impact Assessment report referenced in Condition 22 includes noise impact assessment relating to the 'new main build' and 'courtyard infill', setting noise limits for fixed plant to meet at nearby noise-sensitive receptors, including for the new main build Kitchen extract.

2.5 The specified cumulative noise level limits included in the NIA report Table 5 for fixed plant, including Kitchen extract plant, are 45 dB L_{Aeq} in the daytime and 35 dB L_{Aeq} in the night-time.

2.6 The 'new main build' building is due to be brought into use in September 2023. The 'courtyard infill' is due to be brought into use in early 2025.

2.7 Details of the existing noise environment are included in the report based on site surveys carried out for the purposes of the redevelopment of the site included in this assessment.

2.8 All plant details included in the assessment have been provided by the mechanical engineers.

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

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

2.11 Based on the identified plant details, it is calculated that the 2021/62/93674/W Planning Condition 22 requirements for the 'new main build' and 'courtyard infill' and relevant requirements of Condition 26 for the 'new main build' are satisfied without requiring any further scheme for the mitigation of noise.

3 Introduction

3.1 This report relates to the proposed development at the existing Greenhead College site at Greenhead Road, Huddersfield, Kirklees, HD1 4ES. The development consists of a new teaching block, courtyard infill, relocation of existing car parking and reorientation of the existing sports pitch.

3.2 Apex Acoustics has been appointed to undertake a noise impact assessment to address Planning Condition 22 and the relevant requirements of Condition 26 of Kirklees Council Planning Permission for Development for the above scheme reference Application 2021/62/93674/W.

3.3 Condition 22 requires that '*Prior to…the 'new main build' as shown on plan ref. 'NE8659-RYD-01-ZZ-DR-A-3600 rev. P8…and the 'courtyard infill' as shown on plan ref NE8659-RYD-02-ZZ-DR-A-3602 rev. P7 being brought into use, all works which form part of the sound attenuation scheme for that building as specified in Apex Noise Impact Assessment…shall be completed and written evidence to demonstrate that the specified noise levels have been achieved shall be submitted…'.*

3.4 Condition 26 includes prior to the 'new main build' as shown on plan ref. NE8659-RYD-01-ZZ-DR-A-3600 rev. P8 being brought into use, details shall be submitted of the noise mitigation measures incorporated for the kitchen extract system and likely resulting noise levels at nearby noise sensitive locations. The kitchen extract fan is included in the assessment of fixed plant, as item EF.03 in Table 2.

3.5 The 'new main build' building is due to be brought into use in September 2023. The 'courtyard infill' is due to be brought into use in early 2025.

3.6 Apex Acoustics carried out a Noise Impact Assessment (NIA report), Reference 5, for the proposed redevelopment, as referenced in Condition 22.

3.7 The scope of the assessment included within this report is a fixed plant noise impact assessment carried out following the methodology of BS 4142, Reference 1.

3.8 The noise sensitive receptors are identified as shown in Figure 1.

3.9 The assessment is based on the finalised plant details provided by the mechanical engineers.

Figure 1: Location of Greenhead College and identified noise sensitive receptors (NSRs)

4 Planning condition

4.1 Planning Condition 22 associated with Application ref. 2021/62/93674/W for this development is shown in Figure 2.

> 22. Prior to each of the hereby approved 'new main build' as shown on plan ref. 'NE8659-RYD-01-ZZ-DR-A-3600 rev. P8', and the 'courtyard infill' as shown on plan ref. NE8659-RYD-02-ZZ-DR-A-3602 rev. P7 being brought into use, all works which form part of the sound attenuation scheme for that building, as specified in the Apex Acoustics Noise Impact Assessment dated 26th November 2021 (ref: NE8659-APX-ZZ-ZZ-RP-YA-0002 rev. P06) shall be completed and written evidence to demonstrate that the specified noise levels have been achieved shall be submitted to and approved in writing by the Local Planning Authority. If it cannot be demonstrated that the noise levels specified in the aforementioned Noise Report have been achieved, then a further scheme shall be submitted for the written approval of the Local Planning Authority incorporating further measures to achieve those noise levels. All works comprised within those further measures shall be completed and written evidence to demonstrate that the aforementioned noise levels have been achieved shall be submitted to and approved in writing by the Local Planning Authority before each building is first brought into use
> **Reason**: To protect the amenity of neighbouring residents through managing noise pollution, in accordance with Policies LP24 and LP52 of the Kirklees Local Plan.

Figure 2: Planning Condition 22

4.2 **Background sound level and plant noise level limits**

4.3 Condition 22 references noise level limits from the previous Apex report which are based on the background noise level measurements reported in Section 5.

4.4 The limits were determined in accordance with West Yorkshire Planning Consultation Guidance Criteria, Reference 4, and are reproduced in Table 1. The limits proposed are based on 0 dB below the background L_{A90} and 10 dB below the ambient L_{Aeq}.

Assessment period	Representative Background Sound level, L_{A90} (dB)	Representative Ambient Sound Level, L_{Aeq} (dB)	BS 4142 Rating Level Limit, L_r (dB)
Daytime (07:00 – 23:00 hrs)	46	55	45
Night time (23:00 – 07:00 hrs)	35	45	35

Table 1: Background sound levels representative of the assessment periods

5 Existing acoustic environment

5.1 The existing acoustic environment was measured by Hepworth Acoustics for a continuous 24-hour period between the 8th and 9th September 2020.

5.2 An extract from the report by Hepworth Acoustics is shown in Figure 3, which indicates the noise survey locations.

5.3 The survey data is used to determine the representative background noise levels at nearby noise sensitive receptors. It is considered this is likely a prudent approach, given the measurement position is further from the main road sources than the noise sensitive receptors and that the noise climate during the survey period may be affected by lockdown measures affecting road traffic noise levels during the 2020 measurement period.

Figure 3: Extract from the DfE provided noise survey report by Hepworth Acoustics, showing the 24-hour measurement location (x) with Apex Acoustics supplementary short term measurement positions 1 – 5 in red.

6 Noise sources

6.1 **Proposed plant and associated noise levels**

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

6.3 The location of the all the units have been taken from the mechanical engineers' drawings, Reference 6.

6.4 The proposed plant considered in the assessment is summarised in Table 2.

6.5 NVHR, VAV and CAV units are not considered to have a significant contribution and are not included in the assessment.

6.6 Existing plant that has been relocated is not considered in the assessment, the changes to location are not considered likely to have a significant impact to the levels at the NSRs

Plant	Reference	Manufacturer	Model	No. proposed
Air Handling Unit	AHU.01	Flaktgroup	Recooler HP	1
	AHU.02	Flaktgroup	eQ-032	1
Air Source Heat Pump	HP.01	Mitsubishi	CAHV-P500YB-HPB	2
	HP.02	Mitsubishi	CAHV-P500YB-HPB	2
	HP.03	Mitsubishi	CAHV-P500YB-HPB	6
Extract Fan	EF.01	Nuaire	DE1-ES	1
	EF.02	Nuaire	TRAS315	1
	EF.03 (Kitchen)	Nuaire	SQFA46ES	1
	EF.04	Nuaire	X56FR	1
	EF.05	Nuaire	DE2H-ES	1
DX Unit Condenser	OU.01	Mitsubishi	PUZ-ZM100VKA	1
	OU.02	Mitsubishi	PUZ-ZM35VKA	1
	OU.03	Mitsubishi	PUZ-ZM125YKA	1
	OU.04	Mitsubishi	PUZ-ZM35VKA	1
Mechanical Vent	MVHR.03	Nuaire	XBC+	1
	MVHR.04	Nuaire	XBC+	1
	MVHR.05	Nuaire	XBC+	1
	MVHR.06	Nuaire	XBC+	1

Table 2: Proposed plant

6.7 Manufacturer supplied noise levels are taken from the Mechanical Engineers' technical submittals, References 7, 8, 9 and 10, shown in Table 3.

Plant	Data type	dB(A)	Single-octave band centre frequency (Hz) A-weighted noise levels (dB)						
			63	125	250	500	1k	2k	4k
AHU.01, Fresh Air Intake	L_w	64	44	59	60	3	57	53	44
AHU.01, Exhaust	L_w	86	54	70	74	78	81	79	77
AHU.02, Fresh Air Intake	L_w	74	36	58	62	63	66	66	71
AHU.02, Casing	L_w	57	36	53	44	44	45	45	53
HP.01	L_w	74	51	55	69	68	64	63	69
HP.02									
HP.03									
EF.01[1], Exhaust	L_w	51	42	42	48	45	35	31	31
EF.02[1], Exhaust	L_w	42	27	36	40	32	18	22	19
EF.03[1], Exhaust	L_w	60	53	55	50	47	36	46	51
EF.03, Casing	L_w	79	58	75	71	74	69	68	65
EF.04[1], Exhaust	L_w	42	16	31	38	37	31	34	28
EF.05[1], Exhaust	L_w	47	49	50	47	39	40	35	47
MVHR.03[1], Fresh Air Intake	L_w	47	39	43	34	43	33	33	33
MVHR.03[1], Exhaust	L_w	69	45	56	57	66	60	61	59
MVHR.04[1], Fresh Air Intake	L_w	66	52	54	61	56	59	58	50
MVHR.04[1], Exhaust	L_w	75	57	60	71	63	67	68	62
MVHR.05[1], Fresh Air Intake	L_w	64	50	54	59	53	58	55	46
MVHR.05[1], Exhaust	L_w	73	55	61	68	61	66	65	59
MVHR.06[1], Fresh Air Intake	L_w	62	35	35	37	44	53	47	39
MVHR.06[1], Exhaust	L_w	55	40	48	47	54	58	57	52
OU.01	L_w	69	-	-	-	-	-	-	-
OU.02	L_w	65	-	-	-	-	-	-	-
OU.03	L_w	70	-	-	-	-	-	-	-
OU.04	L_w	65	-	-	-	-	-	-	-
[1]Fan/unit located internally, or casing breakout noise not significant									

Table 3: Manufacturers noise levels

6.8 The in-duct attenuator insertion losses provided by the mechanical engineers, Reference 11 used in the calculations are shown in Table 4.

Attenuator ref.	Single-octave band centre frequency (Hz) In-duct attenuator insertion losses (dB)						
	63	125	250	500	1k	2k	4k
ATT.01 AHU.01 Fresh Air Intake	6	13	23	35	42	29	22
ATT.04 AHU.01 Exhaust	14	23	34	46	50	48	39
ATT.06 EF.03 Exhaust	11	18	27	36	46	35	30
ATT.08 AHU.02 Fresh Air Intake	9	15	23	32	41	29	25
ATT.11 MVHR.06 Fresh Air Intake	6	11	18	26	35	30	25
ATT.12 MVHR.06 Exhaust	6	11	18	26	35	30	25
ATT.15 MVHR.03 Fresh Air Intake	7	12	20	28	35	28	23
ATT.16 MVHR.03 Exhaust	7	12	20	28	35	28	23
ATT.19 MVHR.04 Exhaust	8	14	21	29	33	27	22
ATT.20 MVHR.04 Fresh Air Intake	8	14	21	29	33	27	22
ATT.23 MVHR.05 Fresh Air Intake	8	14	21	29	33	27	22
ATT.24 MVHR.05 Exhaust	8	14	21	29	33	27	22

Table 4: Attenuator in-duct insertion losses

6.9 **Operation times**

6.10 All plant is assumed to operate continuously during the daytime 1-hour and night-time 15-minute assessment periods; this is a prudent assumption. For example, the Kitchen Extract Fan (EF.03) is unlikely to normally operate when the Kitchen isn't in use.

6.11 **Noise transmission and propagation**

6.12 Noise transmission and propagation is modelled to the NSR based on the noise source data detailed, using proprietary software, CadnaA, Reference 12.

6.13 This models noise propagation outdoors according to ISO 9613, Reference 13.

6.14 The model parameters and assumptions are summarised in Appendix A.

7 Assessment results

Figure 4: Sound contours at 4 m, showing the calculated specific sound level, $L_{Aeq\,T}$

Parameter	Daytime assessment	Night-time assessment	Relevant clause of BS 4142	Commentary
Background sound level	46 dB L_{A90}	35 dB L_{A90}	8.1.2 8.1.4	Considered representative of the assessment period
Specific sound level $L_{s,}$ due to all sources for the required assessment interval	32 dB $L_{Aeq,\ 1\text{-}hr}$	32 dB $L_{Aeq,\ 15\text{-}min}$	7.2 7.3.6 7.3.7	The on-time for the sources during the assessment period are discussed in Section 6.9. 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 NSR 1 L_s is considered as separate component parts and then the total L_S for the assessment reference interval is calculated.
Acoustic feature correction	0 dB	+ 3 dB	9.2	A subjective assessment to determine acoustic features is undertaken. During the daytime, the specific sound level is more than 10 dB below the background sound level and it is not considered any characteristics would be perceptible at the receiver location. Therefore no penalty is applied during the daytime. During the night-time individual source contributions are significantly below the background sound level. However, the dominant sources are the Air Source Heat Pumps, which are the same model. Therefore, it is considered some tonal characteristic may be just perceptible from the combined contribution of the ASHPs and a 3 dB penalty is applied.
Rating level, $L_{Ar,Tr}$	32 dB	35 dB		
Required limit, $L_{Ar,Tr}$	45 dB	35 dB	-	The calculated rating level meets the proposed limits and requirement of the planning condition.

Table 5: BS 4142 assessment results, based on current proposals

8 Conclusion

8.1 This report has been prepared in response to Planning Condition 22 and relevant requirements Condition 26 of Planning Application 2021/62/93674/W for the partial redevelopment of Greenhead College, Huddersfield, HD1 4ES.

8.2 Condition 22 requires that '*Prior to…the 'new main build'…and the 'courtyard infill' being brought into use, all works which form part of the sound attenuation scheme for that building as specified in Apex Noise Impact Assessment…shall be completed and written evidence to demonstrate that the specified noise levels have been achieved shall be submitted…'.*

8.3 Condition 26 includes a requirement for the 'new main build' of details of the noise mitigation measures incorporated in the kitchen extract system and likely resulting noise levels at nearby noise sensitive locations.

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8.8 All plant details included in the assessment have been provided by the mechanical engineers.

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9 References

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

2 National Planning Policy Framework, Ministry of Housing, Communities & Local Government, July 2021.

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

4 West Yorkshire Planning Consultation Guidance (Condensed Version), Noise & Vibration, May 016.

5 Apex Acoustics, Greenhead College Noise impact assessment, NE8659-APX-ZZ-ZZ-RP-YA-0002.

6 Mechanical engineers drawings NE8659-IMT-01-04-DR-Z-5902 Rev C01, NE8659-IMT-01-04-DR-Z-5903 Rev C01, NE8659-IMT-02-01-DR-M-5622 Rev C01, NE8659-IMT-02-01-DR-M-5722 Rev C01, NE8659-IMT-ZZ-ZZ-DR-M-9005 Rev P01.

7 Imtech Air Handling Schedule, NE8659-IMT-XX-XX-TS-M-0007 Rev P01, August 2022.

8 Imtech MVHR and Fans Schedule, NE8659-IMT-XX-XX-TS-M-0007 Rev P01, August 2022.

9 Imtech Air Source Heat Pumps Schedule, NE8659-IMT-XX-XX-TS-M-0012 Rev P01, September 2022.

10 Imtech DX Units Schedule, NE8659-IMT-XX-XX-TS-M-0020 Rev P01, February 2023.

11 Imtech Attenuators Schedule, NE8659-IMT-XX-XX-TS-M-0010 Rev P01, November 2022.

12 CadnaA environmental noise modelling software, version 2017, Datakustik GmbH.

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

14 Architects drawings, Ryder Architects, June 2022.

Appendix A Noise transmission and propagation

A.1 Noise transmission and propagation is modelled using proprietary software, CadnaA. This models 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, Reference 14
Topography – within site	DEFRA	DTM elevation data
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 and 2.5 m 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
Max. order of reflections	Apex Acoustics	Three

Table 6: Modelling parameters and assumptions

A.2 A plan view and a 3D perspective of the CadnaA model are shown in Figure 5 and Figure 6 respectively.

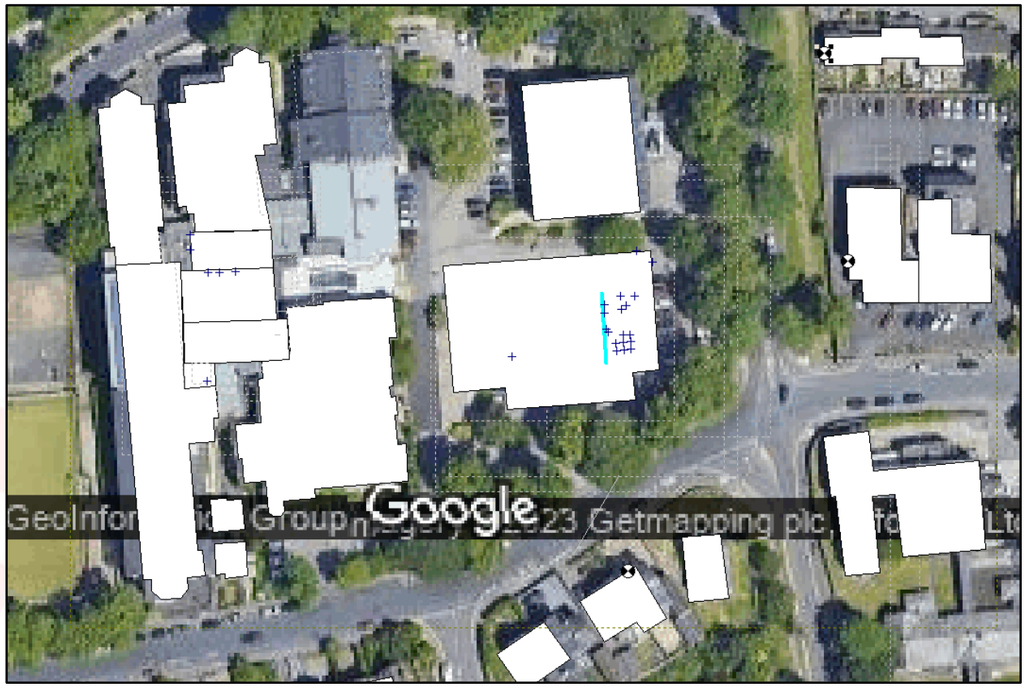

Figure 5: Plan view of the CadnaA model

Figure 6: 3D view of the CadnaA model

Appendix B Professional qualifications and competence

B.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.

B.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

B.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.

B.4 This report has been completed and checked by an appropriately qualified and experienced acoustic consultant.