

Project

DfE Dixons Academy
Acoustic Planning Report

Prepared for

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Summary

SRL Technical Services has been appointed by Morgan Sindall to assess the noise impact of the proposed new and refurbished buildings at Dixons Academy to support the planning application.

This report considers the impact of noise from the development on the nearest noise sensitive receptors and also the impact of noise from the local environment on the development itself.

Noise limits for building services plant associated with the development have been provided to reduce the impact of building services noise at the nearest noise-sensitive receptors.

Operational noise break-out from the school building has also been considered and are calculated to be sufficiently low at the nearest noise-sensitive receptors.

The noise levels at the site are relatively low and consequently the BB93 criteria for indoor ambient noise levels can be achieved in all teaching spaces with open windows. Thermal double glazing and any typical façade and roof constructions will therefore be capable of providing the required sound insulation performances to meet the relevant BB93 internal noise level criteria.

This report therefore demonstrates that suitable noise levels can be achieved for the school and for the nearby noise sensitive properties. Therefore, it is our view that the requirements of the relevant local and national policies have been achieved and we see no acoustics reasons to withhold planning for this development.

Contents

Summary.....	3
Contents.....	4
1.0 Introduction.....	5
2.0 Noise Criteria	7
3.0 External Noise Environment	9
4.0 Building Services Plant Noise Limits	9
5.0 Noise Break-out	11
6.0 Noise From Multi-use Games Area (MUGA)	11
7.0 Noise From Deliveries.....	11
8.0 External Noise Break-in.....	12
9.0 External Envelope Acoustic Requirements.....	14
Appendix A - Noise Measurement Parameter Definitions	15

1.0 Introduction

The existing school buildings on the former Newall High School site on Greenbrow Rd, Manchester, M23 2SX are being redeveloped into the new Dixons Manchester Academy secondary school. An image of the site and surrounding area is shown in Figure I below.

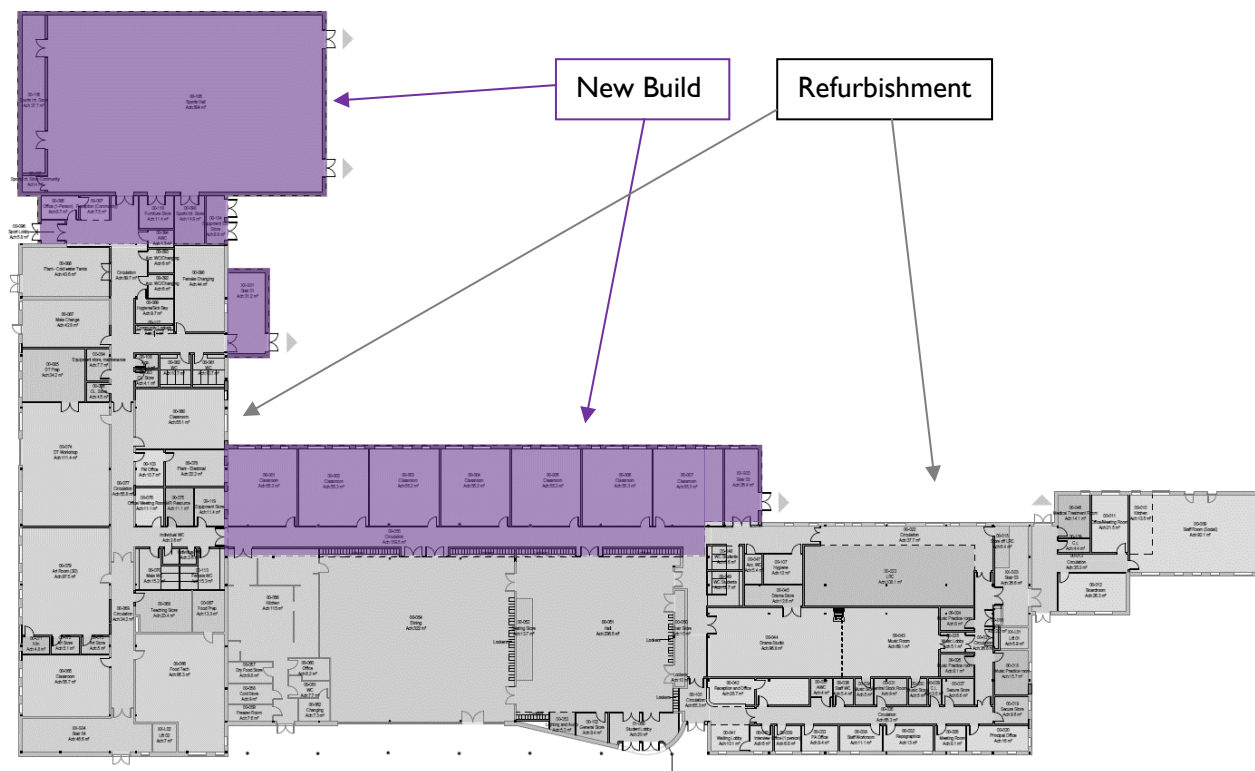
Figure I – Annotated photo of the existing school site and surrounding area



The project will largely be refurbishment and remodelling of the existing school buildings with some additional new build areas including a new sports hall, new classrooms and circulation areas as shown below.

The use of the site is not changing and the noise sources of a typical school will remain unchanged from those previously approved. This assessment will therefore focus on any new noise sources or new noise generated as a result of the proposals.

Figure 2 – Proposed ground floor with new build areas shown in purple



This assessment does not include the temporary accommodation, as these are covered in a separate planning application (ref: I35845/FO/2022).

Noise levels at the site of the proposed school building were measured by Pace Consult in April 2022 (contained in report reference: PC-22-0086-RPI). Our acoustic design is based on the measurements detailed in that report.

We have also used this survey data to set plant noise limits in accordance with BS 4142:2014+A1:2019 *'Methods for rating and assessing industrial and commercial sound'* and the expected requirements of Manchester City Council.

2.0 Noise Criteria

Our acoustic advice for the development considers Approved Document E of the Building Regulations 2010, guidance from the following local and national authorities, and noise criteria from relevant British Standards.

2.1 Building Regulations Approved Document E and Building Bulletin 93 – Acoustic Design of Schools (BB93)

Requirement E4 from Part E of Schedule 1 of the Building Regulations 2010 (as amended by Statutory Instrument, SI 2002/2871) states:

“Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use.”

Approved Document E in support of the Building Regulations gives the following guidance:

“In the Secretary of State’s view the normal way of satisfying Requirement E4 will be to meet the values for sound insulation, reverberation time and internal ambient noise which are given in section 1 of Building Bulletin 93 ‘The Acoustic Design of Schools’, produced by DfES.”

2.2 National Planning Guidance: National Planning Policy Framework (NPPF)

The NPPF does not provide any quantifiable limits relating to noise impacting on (or generated by) new developments. However, Section 11 “Conserving and enhancing the natural environment” does state the following:

“109. The planning system should contribute to and enhance the natural and local environment by: preventing both new and existing development from... being adversely affected by unacceptable levels of [noise] pollution.”

2.3 Local Planning Guidance

Manchester City Council’s Technical Guidance (October 2022) provides further guidance on carrying out plant noise assessments.

Section DC26.2 and DC26.3 state the following in relation to noise from new developments:

DC26.2 New noise-sensitive developments (including large-scale changes of use of existing land or buildings), such as housing, schools, hospitals or similar activities, will be permitted subject to their not being in locations which would expose them to high noise levels from existing uses or operations, unless the effects of the noise can realistically be reduced. In giving effect to this policy, the Council will take account both of noise exposure at the time of receiving a planning application and of any increase that may reasonably be expected in the foreseeable future.

DC26.3 Developments likely to result in unacceptably high levels of noises will not be permitted:

- a) in residential areas;*
- b) near schools, hospitals, nursing homes and similar institutions; and*

c) near open land used frequently for recreational purposes.

Section 3.7.1.5 adds the following in relation to mechanical plant noise levels:

“Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.”

2.4 British Standards

BS4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ (BS4142) provides a method to assess the significance of impact from “sound of an industrial and/or commercial nature” at the nearest noise-sensitive receptors.

BS4142’s assessment methodology has been applied to our assessment and this considers the level and character of the noise (such as tonality, irregularity, and intermittency) and the existing background noise level at the receptor being assessed.

3.0 External Noise Environment

As mentioned in the introduction, noise levels were measured at the site by Pace Consult in April 2022 (contained in report reference: PC-22-0086-RPI). These noise levels have been used to set plant noise limits and to assess the noise levels breaking in through the external building fabric in the sections below.

4.0 Building Services Plant Noise Limits

Noise from fixed plant and equipment needs to be related to background noise. Based on Manchester City Council's requirements, we have designed noise from any fixed plant and equipment to have a rating level which is no higher than 5 dBA below the existing typical background L_{A90} noise level, measured at the nearest noise sensitive receptors as shown in Figure 3 below.

Figure 3 – Site location and nearby noise sensitive receptors – Site boundary approximate



Rating level is defined in BS4142:2014+AI:2019. Note that the rating level includes penalties for any noticeable characteristics of the noise including tonality, impulsivity and intermittency.

Pace Consult measured background noise levels on the site in April 2022. We have used the results of these measurements to set limits for noise from plant and services at the nearest and most affected residential properties to the proposed school building.

Table 1 shows our interpretation of the 'lowest typical' background noise levels at the noise sensitive receptors (NSRs) based on the Pace Consult measured data and the resulting plant noise limits.

Table I - Plant noise limits

NSR	Period	Typical Lowest Background Noise Level, dB L _{A90}	Plant Noise Limit, dB L _{Ar,Tr}
Neighbouring residential properties to the south or east of the site	Daytime (07:00 - 23:00)	41	36
	Night-time (07:00 - 23:00)	33	30 ¹
Neighbouring residential properties to the north or west of the site	Daytime (07:00 - 23:00)	37	33
	Night-time (07:00 - 23:00)	30	30 ¹

¹ Based on guidance in the Association of Noise Consultants' Technical Note on 'BS 4142:2014+A1:2019', a plant noise limit of 30 dB is considered low, Therefore, I propose a cumulative noise limit of 30dB L_{Ar,Tr} at the nearest noise sensitive receptors for any plant which operates between 2300hrs and 0700hrs. These limits apply to the total plant noise level with all plant running.

In addition, plant noise must be controlled to ≤50 dB L_{Aeq} in external teaching areas and outside any windows or ventilation paths where the ventilation strategy relies on them being open. This is for the total level of plant noise outside any window or rooflight.

5.0 Noise Break-out

Noise breaking through the windows and doors of the music practice room and DT workshop have been calculated at the nearby noise sensitive receptors in the area.

The nearest noise sensitive receptors to the DT workshop are residential buildings around 40m away, whereas the only music practice room on the outer facade of the building is around 90m from the nearest residential dwelling and 55m from the neighbouring education buildings.

Our calculations are based on the following assumptions:

- Glazing sound insulation performance of 26 dB $R_w + C_{tr}$
- External wall sound insulation performance of 36 dB $R_w + C_{tr}$
- External doors sound insulation performance of 27 dB $R_w + C_{tr}$

I have calculated the predicted noise break-out from the ground floor DT workshop and music practice room based on a maximum operational noise level of 90dB $L_{Aeq,T}$. In reality, this level is unlikely to be achieved in practice as it exceeds the 'Control of Noise at Work Regulations 2005' daily exposure limit of 87dBA.

With DT workshop windows open, predicted noise break-out levels from the workshop are around the same level as the noise from other ambient sources (e.g. roads) at the nearest receptor. With windows closed, the predicted noise break-out levels are significantly lower (around 20dB below background noise levels) at the nearest sensitive receptor.

With the music practice room windows open, breakout levels were calculated to be below the typical noise from other ambient sources (e.g. roads) at the nearest sensitive receptor (neighbouring education building), and significantly lower at the nearest residential receptors further away. With the music practice room windows closed, the calculated noise levels are significantly lower (around 20dB below background noise levels) at the nearest sensitive receptors.

This is a positive indication that noise from school can be suitably controlled to avoid adverse noise impacts at all nearby noise sensitive receptors. On this basis, we would not expect break-out noise from teaching activity within the building to be a consideration for planning.

6.0 Noise From Multi-use Games Area (MUGA)

The external sports area, or Multi-use Games Area (MUGA) is an existing facility at the school. The proposals do not represent a change in noise levels from this area and thus the noise levels will not significantly increase compared to previous use of the area. The noise from the MUGA is therefore considered to have already been adequately assessed and controlled, and this assessment does not require any further consideration of MUGA noise levels.

7.0 Noise From Deliveries

The proposed development is situated on the site of the existing school. As such, any traffic movements associated with deliveries to this school are unlikely to be significantly different to those previously

experienced at the site. It is also understood that deliveries will only take place in the daytime. Therefore, the proposed development does not result in an increase of noise impact associated with traffic movements from deliveries and this has not been assessed further.

8.0 External Noise Break-in

8.1 Internal Noise Criteria

Building Bulletin 93 - Acoustic design of schools: performance standards, February 2015 (BB93) specifies indoor ambient noise levels of 35 dB $L_{Aeq,30mins}$ for standard new build teaching rooms with windows or natural ventilation paths shut, and 40 dB $L_{Aeq,30mins}$ for refurbished standard teaching rooms. Alternative criteria are given for other specific room types and circulation spaces e.g. sports hall, toilets, kitchen, offices etc.

When rooms are naturally ventilated (including hybrid ventilation systems), BB93 allows a 5 dB(A) relaxation for indoor ambient noise levels when windows and ventilators are set to provide a carbon dioxide concentration of 1,500 ppm or less for the design mid-season weather condition (which approximately equates to 5 l/s per person).

The design mid-season weather condition is defined as an inside air temperature of 20°C and an outside air temperature of 11°C with no external wind effect. The 5 dB(A) relaxation applies to the total noise level in the room, including external noise ingress and mechanical services noise (if applicable).

Whereas the mechanical services noise in isolation must still meet the original criteria without the 5dB relaxation.

To protect students from regular discrete noise events (e.g. aircraft or trains), BB93 also recommends that indoor ambient noise levels should not exceed 60 dB $L_{A1, 30 mins}$.

8.2 Internal Noise Levels

Based on the noise survey data measured by Pace Consult, the predicted noise level at the site of the proposed building will be <55dB $L_{Aeq,30 mins}$ at the 'worst-case' refurbished classroom and <50dB $L_{Aeq,30 mins}$ at the 'worst-case' new build classroom during typical daytime school operating hours, depending on height and location. The highest noise levels are predicted at the facades closest to Greenbrow Rd. The highest measured $L_{A1, 30 mins}$ was also below 75 dB.

The relevant internal noise level criteria can be met in all classrooms with openable windows or other ventilation openings due to the low external noise levels measured during the site noise survey. This is based on the guidance contained in BS8233:2014 *Guidance on sound insulation and noise reduction for buildings*, for the sound reduction across an open window.

The BB93 criteria for indoor ambient noise levels can therefore be achieved in all teaching spaces with our proposed ventilation strategy.

There are no mandatory acoustic requirements for 'ancillary spaces' (e.g. kitchens, offices, staff rooms, corridors, stairwells and toilets), however the BB93 guidelines for indoor ambient noise level can also be achieved with open windows/ hybrid ventilation strategy for all areas of the building.

8.3 Mechanical Services Noise

Any noise created by building services (other than that from teaching equipment such as computers and projectors), including the mechanical part of the hybrid system or mechanical ventilation system, will meet the indoor ambient noise levels in Table 1 of BB93 when operating at the “normal” design condition. This includes noise break-in from external plant to teaching spaces. In the “summertime” condition for the hottest 200 hours of the year, BB93 allows mechanical services noise levels in all rooms (except for SEN rooms) to be relaxed (increased) by 5dB(A).

Table 2 details the upper limits for internal noise levels in some of the different learning spaces and resource areas to achieve the BB93 criteria. This depends on whether the area in question is classed as new build or refurbishment.

Table 2 - BB93 indoor ambient noise limits

Type of Room	Upper limit for indoor ambient noise level (dB L _{Aeq,30mins}) ¹	
	New build	Refurbishment
General classrooms Main hall Drama studio	35	40
Design and technology rooms (incl. resistant materials, art, graphics, food, etc) Library resource centre Science laboratories ICT-rich classrooms Conference room Study area (sixth form) Activity / Dance studio, Sports Hall Offices (inc SENCo), staff work rooms, staff areas	40	45
Dining area Corridors, stairwells	45	50
Changing area Kitchen Toilets	50	55

¹ The indoor ambient noise level in rooms with natural or hybrid ventilation can be relaxed by 5 dB(A) as described in section 1.1.3 of BB93.

9.0 External Envelope Acoustic Requirements

9.1 New Build

Our design for the building envelope is detailed in Table 3 below. This is based on our calculations for the acoustic performance needed to meet the BB93 internal ambient noise levels, from the measured and predicted external noise levels for this site.

Table 3 - Building envelope acoustic performance requirements

Building Element	Acoustic performance requirement	Typical specification
Glazing	$\geq 26 \text{ dB } R_w + C_{tr}$	4mm laminated glass / 16mm cavity / 4mm float glass
External wall	$\geq 36 \text{ dB } R_w + C_{tr}$	Facing brickwork or rainscreen cladding with internal plasterboard lining
Roof (main building)	$\geq 35 \text{ dB } R_w + C_{tr}$	Concrete roof/ lightweight alternative

Thermal double glazing (e.g. 4mm laminated glass / 16mm cavity / 4mm float glass) is capable of meeting the specified sound insulation performance. Similarly, any typical façade and roof constructions are capable of providing the required sound insulation performances to meet the BB93 criteria for indoor ambient noise levels.

9.2 Refurbishment

The above performance requirements are not overly stringent and are likely to be met by standard constructions. We therefore expect the existing building envelope to meet the above performance requirements.

Appendix A - Noise Measurement Parameter Definitions

L_{Aeq} - The "A" weighted equivalent continuous sound pressure level. A representation of a continuous sound level containing the same amount of sound energy as the measured varying noise, over the measurement period. It can be considered as the "average" noise level.

L_{A90} - The "A" weighted sound pressure level that is exceeded for 90% of the measurement period. It is commonly used as the "Background Noise Level".

L_{A1} - The A-weighted, sound level just exceeded for 1% of the measurement period, similar to the L_{Amax} .

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