

# Greenwood Place Resource Centre Kentish Town

## External Building Fabric Report

22766/EBF1-Rev1

01 February 2017

For:  
Kier Construction  
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Loughton  
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**Hann Tucker Associates**

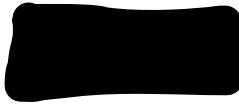

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## External Building Fabric Report 22766/EBF1-Rev1

### Document Control

Rev	Date	Comment	Prepared by	Authorised by
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1	01/02/2017	Updated drawing numbers		
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This report has been prepared by Hann Tucker Associates Limited (HTA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between HTA and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by HTA unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.



## **External Building Fabric Report 22766/EBF1-Rev1**

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## **Attachments**

Acoustic Specification



## 1.0 Introduction

A new community resource centre has been proposed at Greenwood Place, Kentish Town.

It has been proposed that internal noise criteria be based upon the advice contained within the *Specialist Services Health Technical Memorandum (HTM) 08-01: Acoustics*, within *Building Bulletin 93 (BB93) Acoustic Design of Schools - Performance Standards, BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings'* and *BREEAM*.

Hann Tucker Associates has reviewed these documents and have proposed Internal Ambient Noise Level (IANL) limits from external sources that should not be exceeded in any noise sensitive room. This has been detailed in our Project Technical Memorandum PTM/22766/RPB/mju *Acoustic Criteria*, dated 01 June 2016.

Furthermore, we also understand that sound mitigation measures will need to be incorporated to terraces and balconies to prevent the external noise climate exceeding 55dB  $L_{Aeq,t}$ .

An environmental noise survey has recently been undertaken by ourselves, to establish the existing airborne noise levels due to traffic and other environmental sources around the proposed development.

The data obtained from our environmental survey has subsequently been used to undertake a detailed acoustic analysis to determine the sound insulation requirements of the external building fabric in order to control airborne environmental noise intrusion levels in line with the proposed acoustic design criteria. Our findings and recommendations are presented herein.

## 2.0 Objectives

To propose internal acoustic design criteria which the levels of airborne road traffic and other noise intrusion should not exceed.

To specify the required external acoustic design criteria which the levels of airborne road traffic and other noise intrusion should not exceed.

To undertake detailed acoustic analysis of airborne noise intrusion due to traffic and other environmental sources into the building through the external building fabric.

To undertake detailed acoustic analysis of airborne noise intrusion due to traffic and other environmental sources to the external areas of the building.



To subsequently prepare sound reduction performance specifications for the external building fabric in order to achieve the specified internal acoustic design criteria.

To prepare a specification for the required height of external balustrades in order to achieve the specified external acoustic design criteria.

### 3.0 External Noise Levels

The results of our survey are presented in our Baseline Environmental Noise Survey Report 22766/BENS1-Rev1, dated 25 May 2016. The results presented therein, with suitable corrections applied, form the source noise data upon which our analysis and recommendations are based.

## 4.0 Architectural Assumptions

### 4.1 Room Finishes

We have assumed that all occupied areas within the Greenwood Place Resource Centre will be finished as per the advice received thus far from the Client. The finishing details assumed can be found in our Project Technical Memorandum PTM/22766/RPB/mju *Reverberation Criteria*, dated 08 July 2016

### 4.2 Drawings

Our calculations have been based on the following drawings:

Drawing No.	Drawing Title	Revision
1213_PL_261	Proposed Rear Elevation	B
1213_PL_265	Proposed Sections	B
1213_PL_160	Ground Floor Plan	E
1213_PL_161	First Floor Plan	C
1213_PL_162	Second Floor Plan	B
1213_PL_163	Roof Plan	B

## 5.0 Acoustic Design Criteria

Internal noise criteria has been based upon the advice contained within the *Specialist Services Health Technical Memorandum (HTM) 08-01: Acoustics*, within *Building Bulletin 93 (BB93) Acoustic Design of Schools - Performance Standards, BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings'* and *BREEAM*.



We would recommend the following IANL limits be achieved in each of the following spaces in terms of dB  $L_{Aeq,1hr}$ . It should be noted that the targets below assume that the background ventilation strategy would allow for a partially opened window for cooling purposes (where appropriate):

**Ground Floor**

Greenwood Place Resource Centre Space	Criteria for noise intrusion to be met inside the spaces from external sources (dB $L_{Aeq,1hr}$ )	Most Relevant Alternative Standard	Achievable with Background Ventilation Strategy
0.2 Multi-Purpose Room	40 dB	BB93: Open plan: Resource/breakout area	No
0.36 Dementia Meeting Room		HTM 08-01: Small meeting rooms	
0.37 Dementia Meeting Room			
0.16 PMLD Common/Day Room	45 dB	HTM 08-01: Open clinical areas	Yes
0.17 PMLD Activity Room			
0.32 Dementia Common/Day Room		BS8233 & BREEAM: Large offices	
0.33 Dementia Common/Day Room			
0.35 Dementia Office	50 dB	HTM 08-01: Small food-preparation areas	
0.21 PMLD Kitchen		HTM 08-01: Public areas	
0.26 PMLD Dining			
0.27 Dementia Dining Room	55 dB	HTM 08-01: Circulation spaces	
0.1 CIL Foyer		HTM 08-01: Personal hygiene (public and staff )	
0.9 Changing Places W.C			
0.10 Accessible W.C			
0.11 Accessible W.C			
0.12 Unisex W.C			
0.13 Unisex W.C		HTM 08-01: Large food-preparation areas	
0.14 Kitchen			
0.38 Dementia Main Entrance/Access Lift		HTM 08-01: Circulation spaces	
0.40 Stair 3			
0.42 PMLD Entrance Lobby			
0.43 Glazed Access Link			
0.47 Reception Desk			
0.53 Access Corridor			



**1<sup>st</sup> Floor**

Greenwood Place Resource Centre Space	Criteria for noise intrusion to be met inside the spaces from external sources (dB L <sub>Aeq,1hr</sub> )	Most Relevant Alternative Standard	Achievable with Background Ventilation Strategy
1.1 Office	40 dB	HTM 08-01: Small office-type spaces	No
1.2 Office			
1.3 Meeting Room			
1.4 Meeting Room			
1.5 Meeting Room			
1.7 Large Meeting Room			
1.19 ASC Base Room		BB93: Open plan: Resource/breakout area	No Façade Windows
1.22 Mental Health Activity Room 1			No
1.24 Mental Health Activity Room 2			
1.25 Mental Health Activity Room 3			
1.37 Mental Health Activity Room 4	No Façade Windows		
1.16 ASC Activity Room	45 dB	HTM 08-01: Open clinical areas	Yes
1.21 ASC Day Room		BS8233 & BREEAM: Large offices	
1.28 Office			
1.30 Office			
1.31 Mental Health Common/Day Room	HTM 08-01: Open clinical areas		
1.8 Waiting Area	50 dB	HTM 08-01: Public areas	
1.20 ASC Base Room			
1.32 Mental Health Dining Room		HTM 08-01: Small food-preparation areas	
1.33 Mental Health Kitchen			
1.9 Accessible W.C	55 dB	HTM 08-01: Personal hygiene (public and staff )	
1.10 Accessible W.C		HTM 08-01: Circulation spaces	
1.13 ASC Entrance			
1.14 ASC Unisex Changing Area		HTM 08-01: Personal hygiene (public and staff )	
1.15 ASC Accessible Shower			
1.35 Mental Health Entrance		HTM 08-01: Circulation spaces	
1.38 Access Gallery			



**2<sup>nd</sup> Floor**

Greenwood Place Resource Centre Space	Criteria for noise intrusion to be met inside the spaces from external sources (dB L <sub>Aeq,1hr</sub> )	Most Relevant Alternative Standard	Achievable with Background Ventilation Strategy	
2.1 IT Room	40 dB	BB93: Design and technology: ICT room, art	No	
2.10 Art Room		HTM 08-01: Small meeting rooms	Yes	
2.11 Music Studio		HTM 08-01: Small office-type spaces	No	
2.12 Music Room	45 dB	BS8233 & BREEAM: Large offices	Yes	
2.5 Demonstration Flat		50 dB		HTM 08-01: Public areas
2.9 Office				HTM 08-01: Small food-preparation areas
2.13 New Shoots Space				HTM 08-01: Circulation spaces
2.18 New Shoots Office	55 dB	HTM 08-01: Personal hygiene (public and staff )	Yes	
2.2 Waiting Area/Breakout Space		HTM 08-01: Circulation spaces		
2.17 New Shoots Space		HTM 08-01: Personal hygiene (public and staff )		
2.3 Access Gallery		HTM 08-01: Circulation spaces		
2.14 New Shoots Changing Places W.C	55 dB	HTM 08-01: Personal hygiene (public and staff )	Yes	
2.20 New Shoots Entrance		HTM 08-01: Circulation spaces		
2.21 Demonstration Flat Accessible W.C		HTM 08-01: Personal hygiene (public and staff )		

**6.0 Specification For Glazing Systems**

The levels of noise incident upon each façade of the building are different. Consequently, each façade has its own unique sound insulation requirement. In our experience, however, it is not appropriate to prepare numerous specifications. In this instance, for the sake of simplicity, we have prepared a single specification with two different performance levels, each of which correspond to appropriate notional glazing configurations.

The enclosed Acoustic Specification for Glazing to Facades details our recommended minimum octave band sound reduction indices. In all cases, it is essential that the system is tested in accordance with BS EN ISO 10140-2:2010 and that the quoted minimum sound reduction specifications are met by the system as a whole, including frames, opening lights etc. as appropriate - not just the glass.

Where structural glass or non-vision spandrel panels are proposed, they should provide sound reduction performance at least equal to that required of the glazing in order to maintain the acoustic integrity of the building envelope.





## 7.0 Construction Guidance For Glazing

It is essential that prospective cladding suppliers can demonstrate compliance with the acoustic performance detailed in our specification rather than simply offering a generic glazing configuration. However, we would suggest that the following glazing configurations and vents could typically be expected to provide the required levels of noise insulation:

Type	Façade/Zone	Example Glazing Configuration
A	All mechanically ventilated spaces (except 0.2 Multi-Purpose Room)	6-16-6 Sealed
B	0.2 Multi-Purpose Room	10-16-6 Sealed
C	All other spaces	6-16-6

**N.B.** It is very difficult to give construction guidance regarding glass as there are so many influencing non-acoustic factors and these all need to be taken into account (by others), to a greater or lesser degree, when considering suitable specification. The above guidance is given on the basis that even if there are no acoustic requirements 6-16-6 is likely to be required to meet the non-acoustic factors. Please advise if this is not the case because a more economical construction may still be acoustically adequate.

## 8.0 Predicted Internal Noise Levels

The following tables demonstrate the Calculated Maximum Internal Break-in Noise Level (dB  $L_{Aeq,1hr}$ ) for each space within the Greenwood Place Resource Centre based upon the Measured Maximum External Noise Level (dB  $L_{Aeq,1hr}$ ) and noise attenuation through a partially opened window (where appropriate). This is then compared to the proposed Criteria for Noise Intrusion to be Met Inside Spaces from External Sources (dB  $L_{Aeq,1hr}$ ) in order to demonstrate Proposed Criteria Compliance.



**Ground Floor**

Greenwood Place Resource Centre Space	Criteria for Noise Intrusion to be Met Inside Spaces from External Sources (dB L <sub>Aeq,1hr</sub> )	Measured Maximum External Noise Level (dB L <sub>Aeq,1hr</sub> )	Ventilation Strategy	Calculated Maximum Internal Break-in Noise Level (dB L <sub>Aeq,1hr</sub> )	Proposed Criteria Compliance		
0.2 Multi-Purpose Room	40 dB	59 dB	Mechanical Ventilation	38 dB	Yes		
0.36 Dementia Meeting Room		59 dB		36 dB			
0.37 Dementia Meeting Room							
0.16 PMLD Common/Day Room	45 dB	59 dB	Openable Windows	44 dB			
0.17 PMLD Activity Room		58 dB		43 dB			
0.32 Dementia Common/Day Room							
0.33 Dementia Common/Day Room							
0.35 Dementia Office	50 dB	59 dB	Openable Windows	44 dB			
0.21 PMLD Kitchen							
0.26 PMLD Dining							
0.27 Dementia Dining Room	55 dB	56 dB	Openable Windows	41 dB			
0.1 CIL Foyer							
0.9 Changing Places W.C							
0.10 Accessible W.C							
0.11 Accessible W.C							
0.12 Unisex W.C							
0.13 Unisex W.C							
0.14 Kitchen							
0.38 Dementia Main Entrance/Access Lift						58 dB	43 dB
0.40 Stair 3							
0.42 PMLD Entrance Lobby							
0.43 Glazed Access Link							
0.47 Reception Desk	56 dB	41 dB					
0.53 Access Corridor							



**1<sup>st</sup> Floor**

Greenwood Place Resource Centre Space	Criteria for Noise Intrusion to be Met Inside Spaces from External Sources (dB L <sub>Aeq,1hr</sub> )	Measured Maximum External Noise Level (dB L <sub>Aeq,15min</sub> )	Ventilation Strategy	Calculated Maximum Internal Break-in Noise Level (dB L <sub>Aeq,1hr</sub> )	Proposed Criteria Compliance	
1.1 Office	40 dB	58 dB	Mechanical Ventilation	36 dB	Yes	
1.2 Office				29 dB		
1.3 Meeting Room						
1.4 Meeting Room		56 dB		34 dB		
1.5 Meeting Room				No Façade Windows		
1.7 Large Meeting Room		58 dB		39 dB		
1.19 ASC Base Room				No Façade Windows		
1.22 Mental Health Activity Room 1				33 dB		
1.24 Mental Health Activity Room 2						
1.25 Mental Health Activity Room 3		45 dB		56 dB		41 dB
1.37 Mental Health Activity Room 4				59 dB		44 dB
1.16 ASC Activity Room						
1.21 ASC Day Room						
1.30 Office	50 dB	56 dB	Openable Windows	41 dB		
1.31 Mental Health Common/Day Room				59 dB		44 dB
1.8 Waiting Area		59 dB				44 dB
1.20 ASC Base Room						
1.32 Mental Health Dining Room						
1.33 Mental Health Kitchen	55 dB	56 dB	Openable Windows	41 dB		
1.9 Accessible W.C				58 dB		43 dB
1.10 Accessible W.C		No Façade Windows				
1.13 ASC Entrance		43 dB				
1.14 ASC Unisex Changing Area						
1.15 ASC Accessible Shower						
1.35 Mental Health Entrance	43 dB					
1.38 Access Gallery						



**2<sup>nd</sup> Floor**

Greenwood Place Resource Centre Space	Criteria for Noise Intrusion to be Met Inside Spaces from External Sources (dB L <sub>Aeq,1hr</sub> )	Measured Maximum External Noise Level (dB L <sub>Aeq,15min</sub> )	Ventilation Strategy	Calculated Maximum Internal Break-in Noise Level (dB L <sub>Aeq,1hr</sub> )	Proposed Criteria Compliance
2.1 IT Room	40 dB	56 dB	Mechanical Ventilation	38 dB	Yes
2.10 Art Room		59 dB		35 dB	
2.11 Music Studio		58 dB	Openable Windows	40 dB	
2.12 Music Room			Mechanical Ventilation	35 dB	
2.5 Demonstration Flat	45 dB	56 dB	Openable Windows	41 dB	
2.9 Office		58 dB		43 dB	
2.13 New Shoots Space				59 dB	
2.18 New Shoots Office	50 dB	56 dB		41 dB	
2.17 New Shoots Space		59 dB			
2.3 Access Gallery	55 dB	58 dB		43 dB	
2.14 New Shoots Changing Places W.C		59 dB		44 dB	
2.20 New Shoots Entrance		58 dB		No Façade Windows	
2.21 Demonstration Flat Accessible W.C		56 dB		41 dB	

**9.0 Flanking Transmission**

*Specialist Services Health Technical Memorandum (HTM) 08-01: Acoustics* gives the following guidance:

*Sound-flanking around partitions should be controlled so that sound-insulation requirements between rooms can be met. Vertical and horizontal flanking routes should be considered, including the effect of junction details on the overall sound insulation between spaces. Junctions*



*of acoustic partitions with other walls are common potential weaknesses because of flanking sound transfer along the inner skin.*

*Similar problems can occur with external walls, particularly where partitions and floors abut glazing/curtain walling. The internal lining to a lightweight external wall should not be continuous across an acoustic partition or floor. Ribbon or shared windows or full-height glazing cause particular problems and are not recommended for “private” or “confidential” privacy rooms and/or “high” or “very high noise” generation rooms.*

To comply with the above we recommend the cladding specification includes the following form of words:

*The cladding system shall incorporate suitable elements on partitioning lines. The complete system shall be tested for flanking transmission at a junction with partitions and with floor slabs. The cladding system shall provide a weighted normalised flanking level difference of at least  $D_{nf,w}$  47 dB when tested in a laboratory in general accordance with BS EN ISO 10848-2:2006 and rated in accordance with BS EN ISO 717-1:2013.*

## 10.0 Rain Noise

For roofs with a mass per unit area less than 150kg/m<sup>2</sup> (lightweight roofs) or any roofs with glazing or rooflights, calculations using laboratory data with ‘heavy’ rain noise excitation as defined in BS EN ISO 140-18 are to demonstrate that the reverberant sound pressure level in these rooms are not more than 20 dB above the appropriate limits presented in Section 5.0, with a maximum criteria of 65 dBA.

The roof above the 0.1 CIL Foyer is to be a concrete roof and as such needs no further assessment for rain noise.

The roof above the 0.2 Multi-Purpose Room is to be a steel deck roof finished with 50mm minimum thickness layer of gravel on 240mm modified EPS insulation on 18mm WBP ply. As this roof contains three roof lights it will need to meet a criterion for “heavy” rain noise of ≤60 dBA.

The roof above the 2.9 Office and the 2.10 Art Room is to be 40mm paving slabs on supports on 240mm modified EPS insulation on 250mm RC concrete. As this roof contains a roof light (including photovoltaics) it will need to meet a criterion for “heavy” rain noise of ≤60 dBA for the 2.10 Art Room and ≤65dBA for the 2.9 Office.



It is our understanding that the roof above the remaining second floor spaces is a concrete roof and as such needs no further assessment for rain noise.

## 11.0 Balustrade Heights

Planning Condition 12 of the Decision Notice (2013/5947/P, dated 18 June 2014) states the following:

- b) *sound mitigation measures to be incorporated to terraces and balconies such that the external noise climate does not exceed 55 dB  $L_{Aeq,T}$ ;*

*Reason: To safeguard the premises against the transmission of external noise in accordance with the requirements of policy CS5 of the London Borough of Camden Local Development Framework Core Strategy and policies DP26 and DP28 of the London Borough of Camden Local Development Framework Development Policies*

The noise levels measured during our environmental noise survey are detailed within our Report 22766/BENS1-Rev1, dated 25 May 2016. It can be seen from this report that noise levels on any terraces and balconies are likely to exceed the criterion stated above without the use of balustrades.

The predominant noise sources at Greenwood Place Resource Centre were noted to be road traffic noise from the nearby Highgate Road and train noise from the tracks located to the south of the site.

We understand that a balustrade of 1.5m has been proposed. Based upon a person in a seated position on a balcony, these noise sources should be suitably attenuated to meet the above criterion with the use of a balustrade or wall with a height 1.5m.

## 12.0 Conclusion

The existing environmental noise levels due to traffic and other environmental noise sources have been previously established and presented in our Report 22766/BENS1-Rev1, dated 25 May 2016.

Suitable environmental noise intrusion criteria have been proposed on the basis of the *Specialist Services Health Technical Memorandum (HTM) 08-01: Acoustics*, within *Building Bulletin 93 (BB93) Acoustic Design of Schools - Performance Standards, BS8233: 2014* 'Guidance on sound insulation and noise reduction for buildings' and *BREEAM*.



Detailed acoustic analysis has been undertaken to assess the sound insulation requirements of the external building fabric.

Where the internal noise criteria can be met through a partially opened window, as indicated in Section 8.0, a sound reduction performance specification for the external glazing has been specified to meet the likely non-acoustic minimum requirements for the project. If the specified glazing construction type is not the minimum required, then a more economical construction may be acoustically adequate and can be examined upon request.

A sound reduction performance specification has also been prepared for the external glazing of spaces with mechanical ventilation, along with advice on the types of constructions we would typically expect to provide the required acoustic performance.

We would stress however, that the proposed glazing system (including frames) must comply with the relevant enclosed performance specification.

An analysis of the likely noise levels on terraces and balconies has been performed and a minimum balustrade/wall height has been detailed.

The analysis carried out within this report indicates that the proposed internal noise levels should be met using the external glazing specification enclosed herein and that external noise levels to terraces and balconies should meet the criterion described in Planning Condition 12 of the Decision Notice (2013/5947/P, dated 18 June 2014).

## Acoustic Specification For Glazing To Façades

### Acoustic Performance

The cladding system shall achieve the following minimum sound reduction indices when tested in accordance with BS EN ISO 10140-2:2010.

Type	Façade/Zone	Minimum Sound Reduction Index (dB) @ Octave Band Centre Frequency (Hz)					
		125	250	500	1k	2k	4k
A	All mechanically ventilated spaces (except 0.2 Multi-Purpose Room)	24	25	30	33	29	34
B	0.2 Multi-Purpose Room	26	27	34	40	38	-
C	All other spaces	24	25	30	33	29	34

The cladding system shall incorporate suitable elements on partitioning lines. The complete system shall be tested for flanking transmission at a junction with partitions and with floor slabs. The cladding system shall provide a weighted normalised flanking level difference of at least  $D_{nf,w}$  47 dB when tested in a laboratory in general accordance with BS EN ISO 10848-2:2006 and rated in accordance with BS EN ISO 717-1:2013.

### Test Data

Fully detailed test reports from independent acoustic test authorities shall be supplied. All test reports shall be in English or, a full English translation.

Test data should include the  $\frac{1}{3}$  octave band results from 100Hz to 3150Hz inclusive, together with the corresponding octave band results from 125Hz to 4000Hz inclusive.

The test report shall be provided for test samples which are representation of the complete system for the relevant facades - including frames, joints, seals, spandrel panels and opening lights and trickle vents (as appropriate). The samples proposed should be approved by Hann Tucker Associates.