



**Independent Acoustic
Consultancy Practice**

Stage 3 - Acoustic Design Review

**New Skills Centre, ELRS
Port Talbot**

7597/ADR1_Stage 3_Preliminary

Stage 3 - Acoustic Design Review

Project:	New Skills Centre, ELRS
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1. INTRODUCTION

The former two-storey ELRS, Port Talbot, SA13 1YY is to be redeveloped to create a new Skills Training Centre for 11-16 year olds.

Proposed accommodation includes:

- Flexible Teaching/Training Rooms
- Engineering/Construction Skills Zones
- Creative Media, Retail
- Travel & Tourism, Careers & Esports
- Hairdressing, Beauty & Wellbeing
- Animal Care
- Child Care
- Kitchen and Café
- Offices
- Courtyard (Social Space)

The project is to be covered under the requirements of Building Bulletin 93. We understand the project is to achieve “excellent” under BREEAM.

Appendix A explains acoustic terminology used in this report.

2. RELEVANT REGULATIONS, STANDARDS AND GUIDANCE

2.1 Building Regulations Approved Document Part E

Requirement E4 from Part E of Schedule 1 to 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 BREEAM

We understand the scheme is to be assessed under BREEAM Refurbishment & Fit-out 2014: Public (non-housing) -Education. The following acoustic credits are available as outlined in Technical Manual SD5079 2.0 2023:

2.2.1 BREEAM Hea 05

BREEAM Hea 05 defines criteria for the acoustic principles of:

- Sound insulation
- Indoor ambient noise level
- Room acoustics

For 'Education Buildings', Table 5.14 of Hea 05 covers three available credits;

Table 2.1 – BREEAM Hea 05 for Education Buildings

Education buildings (three credits)	
First credit – Sound insulation	
Criteria	Achieve the performance standards set out in Section 1 of Building Bulletin 93: Acoustic design of schools: performance standards, February 2015 (BB93) relating to airborne sound insulation between spaces and impact sound insulation of floors.
Testing requirement	A programme of acoustic measurements is carried out by a compliant test body in accordance with the ANC Good Practice Guide, Acoustic testing of schools.
Second credit – Indoor ambient noise levels	
Criteria	Achieve the indoor ambient noise level standards set out within Section 1 of BB93 for all room types.
Testing requirement	A programme of acoustic measurements is carried out by a compliant test body in accordance with the ANC Good Practice Guide, Acoustic testing of schools.
Third credit – Indoor ambient noise levels	
Criteria	Room acoustics (Control of reverberation, sound absorption and speech transmission index (STI)): Teaching and study spaces achieve the requirements relating to reverberation time for teaching and study spaces set out within Section 1 of BB93. Open plan teaching spaces achieve the performance requirements relating to reverberation time and STI set out within Section 1 of BB93. Corridor and stairwells, for those that give direct access to teaching and study spaces, achieve the performance requirements relating to sound absorption.
Testing requirement	Teaching and study spaces: A programme of acoustic measurements is carried out by a compliant test body in accordance with the requirements of BB93 and ANC Good Practice Guide, Acoustic testing of schools.

	Open plan teaching spaces: A programme of acoustic measurements of reverberation time is carried out within open plan teaching spaces. The measurement is carried out by a compliant test body in accordance with the requirements of BB93 and ANC Good Practice Guide, Acoustic testing of schools. STI testing is not required. To demonstrate compliance the SQA shall undertake measurements of reverberation times to compare against the STI model. The SQA should provide a report confirming that the surface finishes and distribution of sound absorption within the completed space is in line with the design intent implemented within the STI model. Where significant changes or differences are observed, the SQA shall re-model the space accordingly to demonstrate that the STI measurement is met by the completed spaces. Corridors and stairwells: Installation of a specification compliant with the BB93 criteria demonstrates compliance. A site inspection by the developer or SQA is required to confirm that a compliant specification has been installed.
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2.2.2 BREEAM Pol 05

BREEAM Pol 05 aims to reduce the likelihood of noise arising from fixed installations on the new development affecting nearby sound sensitive receivers.

One credit is available, when assessed against the following criteria;

“

- 1 *There are no noise-sensitive areas within the assessed building or within 800 m radius of the assessed site.*

OR

2. *Alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the site, one credit can be awarded as follows:*

- a. *Where a noise impact assessment in compliance with BS 74451 has been carried out and the following noise levels measured/determined:*

- i. *Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar.*
- ii. *The rating noise level resulting from the new noise source (see CN7).*

3. *The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body (see Relevant definitions in the Additional information section).*

4. The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise-sensitive development, is a difference no greater than +5dB during the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00) compared to the background noise level.

5. Where the noise source(s) from the proposed site/building is greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with criterion 4.

2.3 Building Bulletin 93

The following Building Bulletin 93 performance standards were set out for each area in the Stage 2 Acoustic Specification as follows.

2.3.1 Internal Noise Levels

The following internal noise criteria from external noise and proposed mechanical ventilation sources are recommended in BB93 for the proposed spaces on the development:

Table 2.2 – Internal Ambient Noise Criteria

Area type	Upper limit for the indoor ambient noise level $L_{Aeq,30mins}$ dB
Retail, Travel & Tourism, Careers & Esports, Animal Care, Child Care, CSCS	35
Flexible Training Rooms, Flexible Space	35
Engineering/Construction,	40
Creative Media, Beauty, Hairdressing, Well-being	40
Reception, Staff, Offices	40
Café	45
Courtyard	45 - 50
Kitchen	50
Stairwells & Circulation	45
WCs	50

For new lightweight roof sections, the following rain noise criteria apply:

Table 2.3 – Rain Noise Criteria

Area type	Upper limit for the rain noise level L_{Aeq} dB
Courtyard	65 – 70*

**This is likely to be practical limit of the proposed roof system (see ??)*

Rain noise to existing pitched/tiled roofs is not a significant issue.

2.3.2 Sound Insulation

Table 2.4 - Partition Performance Requirements

Areas	BB93 level difference, $D_{nT,w}$ for separating wall (dB)
CSCS / Animal Care / Child Care	45
Staircases to Flexible Training / Flexible Spaces	45
Construction to WCs	45
Kitchen to Entrance Lobby	45
Courtyard to Hairdressing/Beauty, Creative Media and Retail	45
Accessible WCs to Creative Media, Retail, Travel/Tourism	45
Travel & Tourism / Careers & Esports / Office	45
Teaching/training spaces to Corridors (with entrance doors)	R_w40
Beauty/Hairdressing, Creative Media, Retail to Corridors (with entrance doors)	R_w40
Engineering, Construction to Corridors (with entrance doors)	R_w45
Between Flexible Spaces	40*
Café, Kitchen to WCs	40
Beauty to Office	40
Wellbeing to Staircase	40
Reflection to Wellbeing & Hairdressing	40
Offices to Staircase	40
Between WCs	35

*operable partitions

Table.2.5 – Floor Sound Performance Requirements

Areas	BB93 level difference, $D_{nT,w}$ for floor (dB)	BB93 impact sound level, $L'_{nT,w}$ for floor (dB)
Between Flexible Spaces and Flexible Training	45	60
Between Creative Media, Retail and Engineering/Construction	50	60
Hairdressing to Café Kitchen to Beauty	50	65
Travel & Tourism, Careers & Esports and Offices to CSCS, Animal Care and Child Care	45	60
Between Offices, Reception	40	65

2.4 Reverberation Times

The following reverberation times for teaching areas are recommended in BB93:

Table 2.6 - Reverberation Time Requirements

Area type	BB93 Recommended mid-frequency (T_{mf}) Reverberation Time (s)
Flexible Spaces	≤ 0.8
Engineering/Construction, Animal Care, Child Care, CSCS, Beauty, Hairdressing, Wellbeing, Travel & Tourism, Retail, Careers and Esports, Creative Media	≤ 0.8
Café*, Kitchen	≤ 1.5
Courtyard	≤ 1.5
Offices, Reception, Staff	≤ 1.0

**based on refurbishment standard*

3. ACOUSTIC REVIEW

Figure B.1 and Figure B.2 show floor plans marked up with acoustic performance requirements, based on achieving new-build performance standards where indicated practicable.

3.1 External Building Fabric – Main Building

Based on measured external sound levels, the following external façade sound reduction performance specifications are indicated:

3.1.1 Glazing

New windows are proposed throughout. Proposed triple glazing is indicated sufficient to control road traffic noise intrusion.

3.1.2 External Wall Construction

Existing solid brick walls are indicated sufficient. No acoustic upgrades required.

3.1.3 Roof Construction

It is understood that the existing pitched roof tiles are to be replaced. Please confirm proposed structure. *If tiles are replaced with roofing tiles – this is indicated sufficient based on existing roof.*

3.2 External Building Fabric – Courtyard

3.2.1 External Noise Intrusion

EFTE Roofs have a low sound transmission performance due to their lightweight structure – typically only around 10dB R_w . It is not indicated practical to improve the sound insulation performance of the EFTE Roof.

Measured noise levels from the M4 are in the region of 60dB L_{Aeq} which would result in internal noise levels of up to 50dB L_{Aeq} which we would suggest are likely to be the highest acceptable for a Social Space, based on BB93 Refurbishment Standards. However, these internal sound levels are likely to be too high for Lectures/Presentations.

It is also understood that 50% open area louvres are required at high level to mitigate overheating during summer months. An acoustic louvre should be allowed for to control road traffic noise intrusion and plant noise intrusion, meeting a minimum sound reduction performance of R_w 14dB.

3.2.2 Rain Noise Intrusion

The proposed Novum EFTE Roof system is incorporate a rain noise suppression layer. Novum advises rain noise intensity of 62-64dB L_{IA} .

This is likely to result in sound levels during heavy rain of around 70dB L_{Aeq} .

Noise levels during heavy rain are likely to be very intrusive for presentations/event, and theaching/training (although we understand that teaching is not proposed to take place in the courtyard). *The Client should confirm this is understood and acceptable.*

3.3 Internal Partitions, Floors and Doors

3.3.1 Existing Brick Partitions

Existing masonry partitions are indicated sufficient as per preliminary tests discussed in the Stage 2 report.

3.3.2 New Partitions

Where new partitions are proposed lightweight or masonry structures may be used meeting the following sound reduction performance requirements set out in the tables below, which also give typical constructions capable of meeting the acoustic performance requirements:

Table 3.1 – Steel Wall Constructions to Achieve Acoustic Requirements

Partition Colour	Required $D_{nT,w}$ (dB)	Example Lightweight Partition Construction	R_w Rating (dB)
	-	1no layer of gypsum based board (8kg/m ²) either side of 48mm metal C stud, with 25mm mineral wool insulation	40
	35	1no layer of gypsum based board (10kg/m ²) either side of 70mm metal C stud with 25mm mineral wool insulation	45
	40	2no layers of gypsum based board (10kg/m ²) either side of 70mm metal C stud with 25mm mineral wool insulation	49
	45	2no layers of gypsum based board (12kg/m ²) either side of 70mm metal C stud with 25mm mineral wool insulation	53

Table 3.2 – Masonry Wall Constructions to Achieve Acoustic Requirements

Partition Colour	Required $D_{nT,w}$ (dB)	Example Masonry Partition Construction	R_w Rating (dB)
	-	100mm medium-dense concrete block (1250-1400kg/m ³) fair faced	42
	35	140mm medium-dense concrete block (1250-1400kg/m ³) plastered both sides	46
	40		
	45	215mm dense concrete block (1850-2300kg/m ³) with 13mm dense plaster/render both sides	60

3.3.3 Operable Partitions

BB93 states that “Where there is an operable wall or folding partition between a teaching area and a hall, the $D_{nT,w}$ between the spaces should be at least 40dB. The end user should be made aware that the sound insulation performance of the operable wall may not facilitate simultaneous independent use of the spaces on either side”.

Operable Partitions are proposed between Flexible Spaces at both ground floor and first floor. An operable partition with a minimum performance rating of 53dB R_w should be selected.

Any bulk-head sections required in the ceiling void above the operable partition should be constructed using 2no layers of 15mm gypsum-based board (min 12kg/m² per layer) either side of metal frame with 50mm (min) mineral wool. The system should be sufficient of achieving minimum R_w 52dB.

3.3.4 Existing Floor

Based on results of preliminary sound insulation tests the existing floor does not meet BB93 airborne and impact sound insulation requirements.

It is understood that it is desirable to retain the existing parquet flooring and not install a soft or resilient floor finish.

An upgrade to the underside of the floor is therefore proposed to improve both the impact and airborne sound insulation performance – to be applied to the following ground floor spaces:

- Construction, Engineering
- Kitchen, Café
- CSCS, Animal Care & Childcare
- Flexible Training

Allow for a minimum 12.5mm acoustic or fire board on mf suspension with a minimum 100mm void filled with mineral wool insulation.

Offices, WCs reception and circulation areas do not require acoustic upgrades.

3.3.5 New Floor / Hellerup Stairs

Final construction of the Hellerup stairs to be confirmed. It is understood that this is likely to be a steel frame construction.

Allow for plasterboard underlinings/ceilings to WCs beneath the stairs with mineral wool in the void to minimise noise intrusion from WCs to the Courtyard.

3.3.6 Doors

Door performance requirements are shown on Figure B.1 and Figure B.2

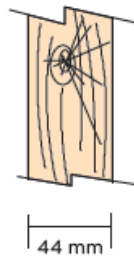
Entrance doors to teaching/training areas to meet R_w30 , with upgraded R_w35 doors recommended to higher noise Engineering/Construction Zone.

Interconnecting door between Creative Media and Retail shall be $R_w 35$ dB.

R_w35 doorsets are advised for access doors onto the Café from the Construction Zone. *It is understood that that courtyard and engineering spaces are to be timetabled to avoid concurrent uses.*

Figure 3.1 – Airborne Sound Insulation for Typical Door Constructions

30 dB R_w



44 mm thick timber door, half hour fire rated

This acoustic performance can be achieved by a well-fitted solid core door-set where the door is sealed effectively around its perimeter in a substantial frame with an effective stop. A 30 minute fire doorset (FD30) can be suitable.

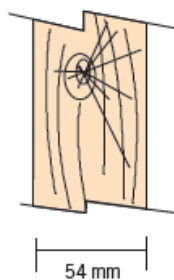
Timber FD30 doors often have particle cores or laminated softwood cores with a mass per unit area $\approx 27 \text{ kg/m}^2$ and a thickness of $\approx 44 \text{ mm}$.

Frames for FD30 doors often have a 90 mm x 40 mm section with a stop of at least 15 mm.

Compression or wipe seals should be used around the door's perimeter along with a threshold seal beneath. A drop-down or wipe type threshold seal is suitable.

Doors incorporating 900 mm x 175 mm vision panels comprising 7 mm fire resistant glass can typically meet this acoustic performance.

35 dB R_w



54 mm thick timber door, one hour fire rated

This acoustic performance can be achieved by specialist doorsets although it can also be achieved by a well-fitted FD60 fire doorset where the door is sealed effectively around its perimeter in a substantial frame with an effective stop.

Timber FD60 doors often have particle core or laminated softwood cores with a mass per unit area $\approx 29 \text{ kg/m}^2$ and a thickness of $\approx 54 \text{ mm}$. Using a core material with greater density than particle or laminated softwood can result in a door thickness of $\approx 44 \text{ mm}$.

Frames for FD60 doors can have a 90 mm x 40 mm section with stops of at least 15 mm.

Compression or wipe seals should be used around the door's perimeter along with a threshold seal beneath. A drop-down or wipe type threshold seal is suitable.

Doors incorporating 900 mm x 175 mm vision panels comprising 7 mm fire resistant glass can typically meet this performance.

Should proprietary doorsets be used, manufacturer/suppliers shall provide independent laboratory test data confirming their proposed systems (including door leaf, frame and seals) meet the quoted performance requirements.

3.3.7 Internal Glazed Screens

Performance requirements for internal glazed screens are shown on Figure B.1 and Figure B.2.

Include R_w 40dB glazed screens between the Courtyard and to hairdressing/ beauty, Creative Media and Retail, Engineering, and Café.

3.4 Reverberation Times

The following reviews the indicative absorptive treatments to each space:

3.4.1 Teaching/Training Spaces

An exposed soffit and suspended absorptive raft strategy is proposed to all teaching areas (included below mf plasterboard soffit lining discussed above).

The following reviews the indicative suspended raft area; where additional absorption is required amount of additional wall panel coverage is given:

Table 3.3 Absorptive Finish Requirements

Space	Proposed Rafts (approx. area)	Wall Panels required
Construction	14.4m ²	8m ²
Engineering	28.8m ²	12m ²
Beauty, Retail	14.4m ²	8m ²
Hairdressing, Creative Media	19.2m ²	12m ²
Animal Care, Child Care, Careers & Esports	14.4m ²	8m ²
Office	14.4m ²	-
CSCS, Travel & Tourism	9.6m ²	4m ²
Flexible Training	20.2m ²	10m ²

Based on Ecophon Solo rafts and Class A wall panels.

3.4.2 Café

A solid plasterboard ceiling is indicated to the café.

Our Stage 2 specification indicated 8.6m² rafts with 11.5m² panels would be required. Alternatively a Class C perforated plasterboard ceiling or ceiling tile (below sound insulating mf ceiling) could be used.

3.4.3 *Training Reception & Interview*

A solid plasterboard ceiling is indicated to the Reception.

A minim Class C absorptive ceiling finish should be introduced to these spaces.

3.4.4 *Well-being*

Wellbeing is proposed to be a plasterboard perimeter with central ceiling tile area. Ceiling tile shall meet Class A. 8m² of Class A wall panels is also indicated to be required.

3.4.5 *Flexible Space*

Suspended vertical baffles are proposed to the first floor Flexible Space.

Allow for 58m² of baffles spaced at 400mm or 600mm centres. Additional wall panels may be required. Detailed assessment to be carried out at Stage 4.

3.4.6 *Courtyard*

Absorptive timber slat panelling is proposed to the entire wall area of the Courtyard.

Proposed panelling shall meet a minimum Class C absorption.

3.4.7 *Corridors/Circulation*

Circulation areas are assessed in line with Building Regulations Approved Document E (ADE2003) following guidance given in Section 7 as required under BB93 section 1.1.6.

For entrance halls, corridors or hallways, cover an area equal to or greater than the floor area, with a Class C absorber or better. It will normally be convenient to cover the ceiling area with the additional absorption

Suspended ceiling tiles are proposed. These shall meet a minimum Class C absorption.

3.4.8 *General*

Table 3.4 below gives octave band sound absorption coefficients for proprietary lay-in ceiling tile systems - your preferred ceiling suppliers shall provide independent laboratory data showing their proposed systems meet the appropriate octave band sound absorption coefficients quoted.

Table 3.4 - Octave band centre frequency minimum sound absorption coefficients

Absorber Type	α_p , practical sound absorption coefficient Octave Band Centre Frequency, Hz					
	125	250	500	1000	2000	4000
<i>Class A Absorber</i>	-	0.70	0.90	0.90	0.90	0.80
<i>Class C Absorber</i>	-	0.40	0.60	0.60	0.60	0.50

3.5 Lift

A Platform lift is proposed adjacent/within the Courtyard space.

The lift shaft is understood to be existing masonry – approx. 300mm thick. This is likely to be sufficient to control noise intrusion into the Courtyard.

If automatic lift announcements are required, they should be set at the minimum volume allowed so as to avoid disturbing occupants. The lift should include a volume limiter on lift announcements as these frequently cause annoyance.

Lift installation shall be fitted with adequate vibration isolation to control transmission of structure-borne noise.

Further advice on controlling lift noise and vibration is included in CIBSE Guide B4.

3.6 Mechanical Ventilation

3.6.1 Teaching / Training & Admin Spaces

It is understood that Mechanical Ventilation with Heat Recovery (MVHR) is proposed to all spaces.

No suspended lay-in grid ceilings are proposed and MVHR units would typically be exposed therefore, requiring very tight noise limits.

It is therefore proposed to enclose MVHR Units within plasterboard bulkheads in each space. At this stage therefore, the following indicative MVHR sound power limits are indicated, allowing for plasterboard bulkhead:

Table 3.5 – MVHR Casing Radiated Limiting Sound Power Levels

Space	Limiting Sound Power L_w at Octave Band Centre Frequencies, Hz (dB)					
	125	250	500	1k	2k	4k
Engineering, Creative Media [2no]	61	58	58	60	61	61
Construction	61	58	58	60	61	61
CSCS, Animal Care, Child Care	58	55	54	55	56	56
Travel & Tourism, Careers & Esports, Retail	58	55	54	55	56	56
Beauty, Hairdressing, Wellbeing	62	59	58	60	61	61
Flexible Training	58	55	54	55	56	56
Café	66	64	63	64	66	66
Office	62	59	58	60	61	61
Flexible Space*	48	41	36	33	30	28

*Exposed units (no bulkhead)

MVHR Units may need to be “oversized” to allow required duties at a lower noise level

Allow for room-side and atmospheric side attenuators on all systems.

3.6.2 Kitchen

A detailed assessment of kitchen air handling plant is to be carried out at Stage 4.

Allow for room-side and atmospheric side attenuators on all systems.

3.6.3 WCs

A detailed assessment of WC extract fans is to be carried out at Stage 4.

Additional sound attenuation measures may be required to minimise WC fan noise transmitting through the Hellerup Stairs structure.

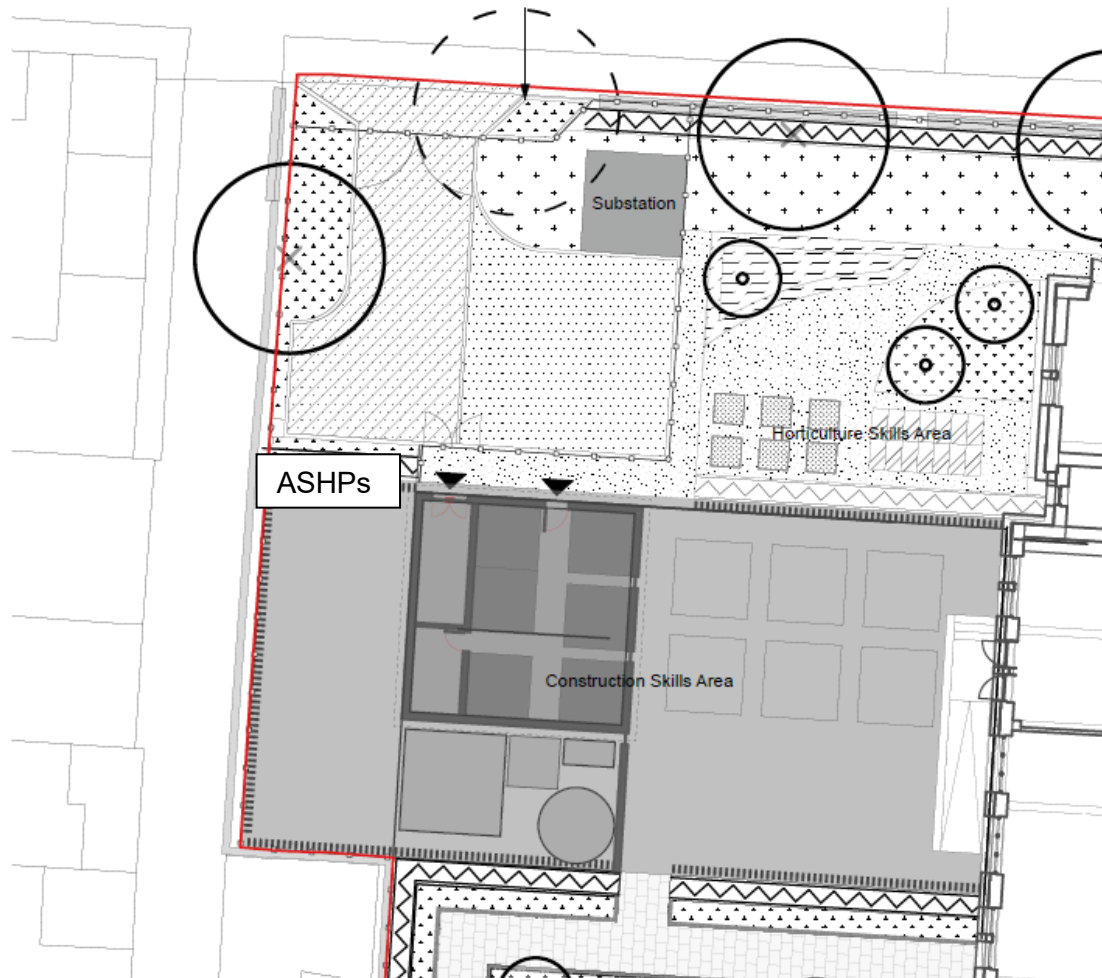
3.6.4 Services Routes

Please forward Electrical Distribution / Containment routes. **Services including cable trays should not be taken through partitions, but should be routed via circulation spaces.**

4. NOISE IMPACT ASSESSMENT

The following external sound sources and activities have been reviewed with regards to their potential noise impact on nearby sound sensitive receptors.

Figure 4.1 External Construction Skills, Plastering and ASHP Compound



4.1 External Plastering Building and Construction Skills Area

A new external workshop building (semi-enclosed) is to be used for plastering and tiling, with the Outdoor Construction Zone to be used for bricklaying and carpentry. The Client has advised there are to be no noisy power tools or activities. Noisy activities from power tools in the external areas should be avoided in order to minimise the impact on nearby residents.

However, possible noise generating activities could still include the following:

- Cement / mortar mixers (Typical manufacturer's noise level 100dB L_{wA})
- Hammers/chisels (if used for deconstructing brick walls) producing loud impact noises
- Saws, drills, hammering

Each of these activities could still produce adverse noise impacts at the residents which are in the immediate vicinity if carried out for significant periods during the day. External activities may also affect users in Creative Media rooms overlooking the area.

A noise management strategy should be developed by the Client to ensure noise from external activities is minimised. This could include mixing cement and mortar indoors – however this is typically a short process (≈5mins?) so if it is done infrequently, this should reduce the impact.

Quiet methods of wall deconstruction, tile and plaster removal should be utilised where this activity is required.

Power tools for carpentry including circular/bench saws, electric drills and screwdrivers, nail guns should be used indoors, with hand tools used only externally.

Users/students should be made aware of the residential surroundings.

4.2 External Plant Noise Emissions

At this stage, based on results of daytime noise monitoring, the following plant rating limits are proposed for services plant at the nearest sound sensitive receivers (SSRs), set in accordance with BREEAM Pol 05 (see Section 2.2.2 - rating level 5dB below background).

Table 4.1 – Proposed Plant Rating Limits at Nearest SSRs

Period		Plant Rating Limits
		$L_{Ar,Tr}$
Daytime	(0700-2300hrs)	50dB
Night-time	(2300-0700hrs)	n/a *

** We understand that no fixed services plant are scheduled to run on the building overnight – please confirm if ASHPs are required to switch on to heat the building before 0700hrs. Early morning background sound levels would still be controlled by the M4 and likely to be similar to daytime.*

The noise rating level of the proposed plant should be assessed in accordance with BS 4142:2014 by a suitably qualified acoustic consultant to ensure the above criteria are met. These criteria require corrections for tonality, impulsivity and intermittency to be included in the analysis.

These criteria are to apply at the closest sound sensitive receivers (including residential dwellings and adjacent school) with all plant operating normally. These proposed limits shall be confirmed acceptable with the Local Planning Authority/Environmental Health Officer and/or any planning conditions prior to any orders being placed.

4.2.1 ASHPs

It is understood that ASHPs are to be located in an external compound on the western site boundary, 5-10m from the closest residences. Total ASHP noise levels should not exceed the plant rating noise levels quoted above.

6no Mitsubishi CAVH-R450YA-HPB units are proposed at this stage, quoted at 64dB(A) @1m.

In order to meet the plant noise limits the following ASHP noise mitigation measures are indicated:

Acoustic Kits

The following acoustic attenuation kits designed for CAHV units, and manufactured by Ambient Acoustics, shall be installed to the ASHPs. The full acoustic kit shall be fitted.



Acoustic Kits

Up to an 8dBA Noise Reduction



■ Example of a CAHV Acoustic Kit

Mitsubishi Electric offer a range of Acoustic Kits designed for noise reduction. An industry first, these kits offer up to an 8dBA noise level reduction and are available to use with both our CAHV and CHU Ecodan models.

The sound levels of our kit are already class leading, but with local planning regulations tightening with regards to equipment sound levels, especially in urban environments or in residential areas close to commercial estates, Acoustic Kits can provide the answer.

Noise level requirements at neighbouring facades also need to be met in order for planning permission to be granted and to further assist with this, as well as the option of Acoustic Kits, the CAHV systems also have a built in noise reduction input to help in the most extreme cases.

Both 'full kits' and 'top only' kits are available. The 'full kit' comprises of left, right and rear louvres with top attenuator(s). The 'top only' kit has top attenuator(s) only. If space is an issue then the 'top only' kit is still able to reduce the noise level by up to 4dBA.

The sound pressure level is calculated from an average of the noise at a height of 1m above the unit and at a distance of 1m from the front, sides and rear of the unit. All noise measurements are performed in an anechoic chamber.

Acoustic Screening

A minimum 2.5m high solid imperforate fence shall be included around the ASHP compound. The fence shall have a minimum mass per unit area of 10kg/m² for the lifetime of the product, and shall include an absorbent inner facing:

Recommended systems include:

- Jacksons *Jakoustic Absorptive* (Contact 0800 4084331)
- Gramm *NATURAL SoundBlok Absorptive* (Contact 08442 259002)

4.2.2 Substation

An electrical substation is proposed on the northern boundary of the site, approx. 15m from the nearest residences on Villiers St. Substation noise levels should not exceed the plant rating noise levels quoted above at the nearest residences. A detailed assessment is to be carried out at Stage 4.

4.2.3 Roof Plant

Kitchen AHU and EFTE Ventilation plant is proposed to be located at roof level.

A detailed assessment of air handling plant to be carried out at Stage 4. Allow for room-side and atmospheric side attenuators on all systems.

Kitchen AHU is likely to be located in the immediate vicinity of external louvres to Courtyard. Acoustic louvres have been recommended for the Courtyard. In order to minimise any additional plant noise break-in to the Courtyard Kitchen, AHU break-out sound levels should be limited to 50dB(A) @3m. A plant screen may be required between the AHU and Courtyard roof.

4.2.4 Sub-Basement Plant Room

Additional plant is to be located in an external compound outside the kitchen. Details TBC.

Total plant noise break-out levels should not exceed 60dB L_{Aeq} outside the first floor Hairdressing windows above.

5. CONCLUSION

A Stage 3 acoustic review has been carried out for the proposed New Skills Centre, ELRS, Port Talbot.

Stage 3 Architectural and MEP information has been reviewed against performance criteria in accordance set out in the Stage 2 Acoustic Specification to meet the requirements of Building Bulletin 93 and BREEAM.

This review provides acoustic advice on:

- External building fabric, including new EFTE roof to Courtyard
- Internal Partitions, Floor Upgrades, Door and Glazed Screen performance
- Absorptive treatment requirements to spaces
- Control of MVHR noise to internal spaces
- Control of noise emissions from external ASHPs
- Activity noise from external construction and plastering

APPENDIX A - ACOUSTIC TERMINOLOGY

Human response to noise depends on a number of factors including loudness, frequency content and variations in level with time. Various frequency weightings and statistical indices have been developed in order to objectively quantify 'annoyance'.

The following units have been used in this report:

dB(A)	The sound pressure level A-weighted to correspond with the frequency response of the human ear and therefore a persons' subjective response to frequency content.
L_{eq}	The equivalent continuous sound level is a notional steady state level which over a quoted time period would have the same acoustic energy content as the actual fluctuating noise measured over that period.
L_{90}	The sound level which is exceeded for 90% of the measurement period. i.e. The level exceeded for 54 minutes of a 1 hour measurement (used as a measure of background noise).
$L_{A,T,r}$	The 'rating' level, as described in BS 4142:2014 – the specific noise plus any adjustment for the characteristic features of the noise.
SSR	Sound sensitive receiver
D_{nT}	Standardised level difference corresponding to a reference value of the reverberation time in a receiver room.
D_{w}	Single number 'weighted level difference'.
R_w	Weighted Sound Reduction Index. R_w is a single number (dB) referring to the ability of a wall or other building structure to provide sound insulation. The higher the number, the better the sound insulation. R_w refers to sound insulation achieved in an acoustic testing laboratory.
L'_w	Single number 'weighted impact sound pressure level'.
T_{60}	Reverberation time - the time taken for a steady state sound to drop by 60 dB. A reference reverberation time of $T_0 = 0.5$ second is used during sound insulation calculations representing average room reverberation time.

APPENDIX B – ACOUSTIC PERFORMANCE MARK-UPS

Drawing Key



Indoor ambient noise criterion, $L_{Aeq,30min}$ (dB)



Reverberation criterion - mid-frequency reverberation time, T_{mf} (seconds)

Partition Sound Insulation performance key (dB)

	$D_{nT,w}$ 50
	$D_{nT,w}$ 45
	$D_{nT,w}$ 40
	$D_{nT,w}$ 35 / R_w 45dB
	R_w 40dB Corridor Wall



Doorset acoustic performance, R_w (dB)



Glazed Screen acoustic performance, R_w (dB)

Notes: Allow +7dB margin between on site $D_{nT,w}$ and manufacturers laboratory R_w partition performance.

KEY

- SVP
- RWP
- RL
- TW
- RH

SKILLS HUB ENTRANCE

COMMUNITY/ CAFE ENTRANCE

CONSTRUCTION SKILLS ACCESS

BIOPHILIC GARDEN ACCESS

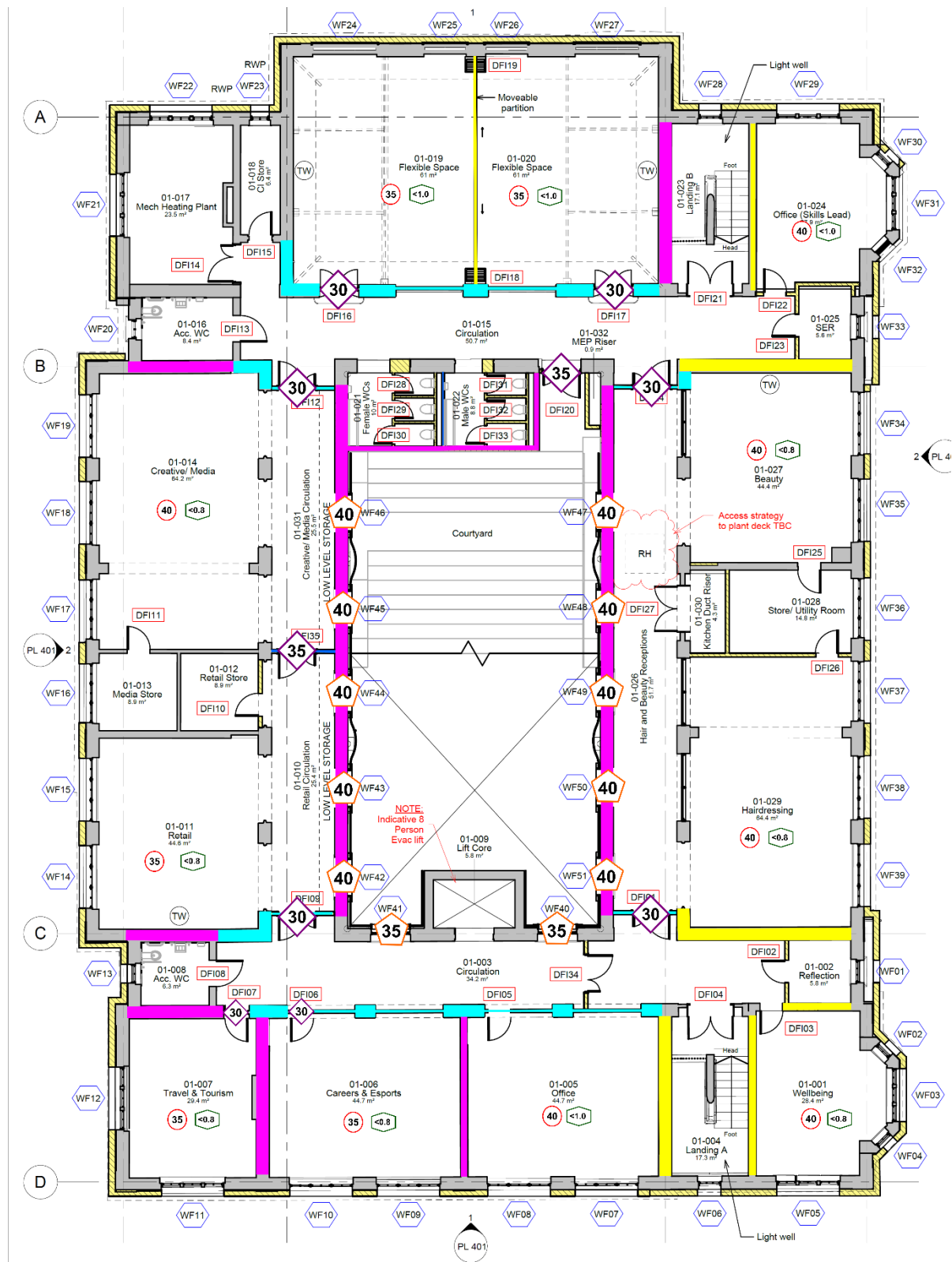
Annotations:

- Kitchen Consultant / FF&E Consultant to review possibility of retaining existing wa (Shown by red dash hatch) while fitting in storage requirement
- Serving counter indicative only - Design by FF&E designer/ kitchen designer
- Omission TBC by MEP Consultant

Room Schedule:

Room Number	Room Name	Area (m²)
00-019	LV Switchroom	24.2
00-018	Staff Kitchenette	4.5
00-017	Circulation	55.0
00-020	Males WCs	15.0
00-021	Female WCs	21.0
00-024	MER	5.2
00-031	Staff Acc. WC	4.0
00-030	Kitchen Circulation	21.5
00-032	Kitchen	3.0
00-034	MEP Riser	0.5
00-036	Acc. WC	3.1
00-037	Acc. WC	2.5
00-035	Servatory	12.8
00-038	Cafe	41.9
00-039	LV/ ELV Riser	1.5
00-001	Lobby	9.3
00-002	Circulation	11.7
00-004	Stairwell B	10.5
00-005	CI Store	5.0
00-007	Child Care	45.1
00-008	Animal Care	44.7
00-011	CSCS	201.7
00-014	Elec Cupd	0.1
00-013	Engineering	32.4
00-015	Construction	45.5
00-016	CI Store	4.2
00-018	Staff Kitchenette	4.5
00-022	Flexible Training	61.3
00-023	Flexible Training	60.8
00-025	Lobby	20.7
00-026	Stairwell A	10.5
00-027	CI Store	5.1
00-028	Interview	2.3
00-029	Training Reception	13.0

Figure B.2 - First Floor



APPENDIX C – DRAWING LISTS

The following Jon James Studio Architecture / Tilbury Douglas documents/drawings have been used in our assessment:

Table C.1 – Drawings

Drawing/Document Number	Rev	Date	Drawing Title
100654-JJA-XX-XX-D-A-0100	B	22/07/25	Proposed Illustrative Site Plan
100654-JJA-01-00-D-A-0206	P03	27/08/25	GA Ground Floor Plan
100654-JJA-01-01-D-A-0207	P02	27/08/25	GA First Floor Plan
100654-JJA-01-RF-D-A-0203	P03	18/0825	Proposed Roof Plan
100654-JJA-01-00-D-A-0211	P01	18/0825	Ground Floor Reflected Ceiling Plan
100654-JJA-01-01-D-A-0212	P01	18/0825	First Floor Reflected Ceiling Plan