

## Section 1

### Technical Submission

Technical Submission Ref No: **32396-6000-TS-ZZ-M-0017**

Revision: BIW ref: 32396-6000-TS-ZZ-M-0017

Date Issued: 28/07/2016

Title: **Attenuators**

*Includes fan noise criteria  
on back & 2 pages*

**Issue & Approval dates:**

**Planned**

**Actual**

Trade contractor name to consultant

Status by Lead Reviewer

Review by Tenant Team

Drawing Commencement Date:

Trade Contractor Manager:

| Revision No. | Date       | Prepared By  | Comments |
|--------------|------------|--------------|----------|
| 01           | 28/07/2016 | Andrew Tsang |          |
|              |            |              |          |
|              |            |              |          |
|              |            |              |          |
|              |            |              |          |
|              |            |              |          |
|              |            |              |          |
|              |            |              |          |
|              |            |              |          |

Section 2

**Design Information and Technical Data used to prepare submittal**

- ✓ Equipment Data Sheets / Schedules (Project Status A manufacturers' details for AHUs, Fans and MVHR)
- ✓ Particular Specification (Sandy Brown Acoustic Report 14027-R01-C1 Dated 08/01/2016)
- ☐ Materials & Workmanship
- ✓ Drawings
- ☐ Schematics/Diagrammatics
- ☐ Supplementary Specs

**Document Ref:** 71461/2/9/2

26 July 2016

## DESIGN APPRAISAL

Project: Commonwealth House New Oxford Street

### Enquiry Data

Our product selections are based on the following information as provided by yourselves:

- Specification sections : Sandy Brown Acoustic Report 14027-R01-C1 Dated 08/01/2016
- Schedule numbers : ~~Un referenced AHU schedule. Extract Fan Schedule M23 Rev C1~~
- Drawing numbers : 4931/M/1000 through to 1012 and 4931/M/1506 & 1504 All Rev C1
- Fan Noise data : As attached schedule

~~Please ensure that this is the correct data and advise of any subsequent revisions as this may affect the performance of our products.~~

### Project Design Criteria

|                                                               |
|---------------------------------------------------------------|
| i.e. Based on Status A AHUs, Fans & MVHR manufacturers' data. |
|---------------------------------------------------------------|

The following Internal and External Noise Criteria have been used as the basis of our Design Appraisal:

#### **Internal:**

- Sandy Brown Acoustic Report 14027-R01-C1 Dated 08/01/2016

#### **External:**

- 43 dB(A) at a distance of 5 metres from intake or discharge openings. This distance has been increased to 10m for the main plant located on the roof. This night time level of 43 dB(A) is detailed within the Sandy Brown Acoustic Report 14027-R01-C1 Dated 08/01/2016.

### **Attenuator Selection**

The attenuators have been selected to achieve the design criteria as listed previously. The following noise paths have been taken into account:

- Primary fan noise transmission through the ductwork distribution system to internal occupied areas via grills/diffusers.
- Fan noise transmission through the ductwork distribution system to external areas, via the intake and discharge openings (where attenuators are proposed).
- Crosstalk noise transmission between adjacent rooms via the ductwork distribution system in areas (where crosstalk attenuators are proposed). Primary fan noise transmission through the ductwork distribution system to internal occupied areas.

### **Attenuator Location**

To comply with BS EN ISO7235:2009, all our attenuator pressure losses are stated assuming laminar inlet and outlet airflow. Where unfavourable inlet and outlet conditions exist, allowance should be made in the system pressure for increased attenuator resistances. Please be aware that actual resistances measured across attenuators installed in poorly designed ductwork arrangements can be 3-4 times higher than that shown on our schedules.

Where attenuators are located outside the building, we would suggest that they are treated to the same specification as any associated external ductwork.

### **Acoustic Treatment to ductwork**

Where attenuators are located in plantroom areas, it is good design practice to acoustically lag the ductwork from the attenuator to the point at which the duct penetrates and exits the plantroom structure. This is particularly appropriate in noisy plantrooms, to reduce the possibility of noise re-entry into the duct on the "quiet" side of the attenuator.

It is not recommended that main plant attenuators be installed in or above areas with specified noise design criteria. If this situation is unavoidable, then additional acoustic treatment (such as double skinning of attenuators) may be required in order to achieve a satisfactory noise climate.

### **Radiated Noise from Equipment Casings**

Where mechanical equipment is located in or above areas with specified noise criteria, it is essential that the level of noise radiated from the equipment casings is controlled to an appropriate level.

As radiated noise levels from plant and equipment are not affected by in-duct attenuation, additional acoustic treatment (such as bulkheads or enclosures) may be required in order to achieve a satisfactory noise climate.

The responsibility for achievement of criteria due to noise radiation from equipment casings should be placed upon the relevant manufacturers. The manufacturers should be issued with sufficient design information to enable them to underwrite the acoustic performance of their products relative to this particular application.

Please note that manufacturers' radiated noise data is often stated in free field conditions and can sometimes provide a misleading indication of the resulting noise level in the installed condition. In our experience, we have seen noise level differences as high as 20dB between manufacturers' stated sound pressure level and actual noise levels measured on site.

## **Ductwork Systems**

To reduce the possibility of airflow generated noise exceeding the specified design criteria, good design practice (with reference to DW/144, HVAC and CIBSE recommendations) should be adopted when considering ductwork geometry and fittings.

Ductwork configurations that promote turbulent airflow must be avoided, particularly in close proximity to acoustically critical components such as attenuators, grilles, diffusers, dampers etc. In some cases, excessive resistances arising from poor ductwork design may prevent ventilation systems from achieving their full design duty.

Dampers should be installed as far away from air terminals as possible, and used only for fine trimming. Where major reductions in airflow or pressure are required, then fan speed reduction or system design should be considered.

## **Ductwork Velocities**

With consideration to acoustics, the following guide duct velocities (m/s) should be adhered to where possible:

| <b>Description</b>          | <b>NR40</b> | <b>NR35</b> | <b>NR30</b> | <b>NR25</b> |
|-----------------------------|-------------|-------------|-------------|-------------|
| Riser                       | 9.0         | 7.5         | 6.0         | 5.0         |
| Main Branch (above ceiling) | 6.0         | 5.0         | 4.0         | 3.0         |
| Grille                      | 3.0         | 2.5         | 2.0         | 1.5         |
| Diffuser                    | 2.5         | 2.0         | 1.5         | 1.0         |
| Stub duct (above ceiling)   | 4.0         | 3.0         | 2.0         | 1.5         |

# Attenuator Schedule

| Ref.   | Description                      | Type and Model Code | Dimensions (mm) |   |   | Free Area | Vol (m³/s) | PL (Pa) | Qty | Features |
|--------|----------------------------------|---------------------|-----------------|---|---|-----------|------------|---------|-----|----------|
| ATT/1  | TYPE 1 T1/01 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/2  | TYPE 1 T1/01 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/3  | TYPE 1 T1/01 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/4  | TYPE 1 T1/01 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/5  | TYPE 1 T1/01 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/6  | TYPE 1 T1/07 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/7  | TYPE 1 T1/07 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/8  | TYPE 1 T1/07 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/9  | TYPE 1 T1/07 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/10 | TYPE 1 T1/07 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/11 | TYPE 2 T1/02 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/12 | TYPE 2 T1/02 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/13 | TYPE 2 T1/02 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/14 | TYPE 2 T1/02 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/15 | TYPE 2 T1/02 FAI Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |

on-floor units. Mainly air handling

Tenants fresh air supply units

# Attenuator Schedule

| Ref.   | Description                         | Type and Model Code | Dimensions (mm) |   |   | Free Area | Vol (m³/s) | PL (Pa) | Qty | Features |
|--------|-------------------------------------|---------------------|-----------------|---|---|-----------|------------|---------|-----|----------|
| ATT/16 | TYPE 2 T2/04 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/17 | TYPE 2 T2/04 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/18 | TYPE 2 T2/04 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/19 | TYPE 2 T2/04 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/20 | TYPE 2 T2/04 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/21 | TYPE 2 T2/06 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/22 | TYPE 2 T2/06 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/23 | TYPE 2 T2/06 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/24 | TYPE 2 T2/06 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/25 | TYPE 2 T2/06 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/26 | TYPE 3 T2/03 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/27 | TYPE 3 T2/03 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/28 | TYPE 3 T2/03 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/29 | TYPE 3 T2/03 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |
| ATT/30 | TYPE 3 T2/03 FAI<br>Atmosphere side | NOT REQUIRED        | -               | - | - | -         | -          | -       | -   | -        |

on-floor May air handling units.

Tenants fresh air supply units

# Attenuator Schedule

| Ref.   | Description                         | Type and Model Code      | Dimensions (mm) |     |     | Free Area | Vol (m³/s) | PL (Pa) | Qty | Features |
|--------|-------------------------------------|--------------------------|-----------------|-----|-----|-----------|------------|---------|-----|----------|
| ATT/31 | TYPE 4 T2/05 FAI Atmosphere side    | NOT REQUIRED             | -               | -   | -   | -         | -          | -       | -   | -        |
| ATT/32 | TYPE 4 T2/05 FAI Atmosphere side    | NOT REQUIRED             | -               | -   | -   | -         | -          | -       | -   | -        |
| ATT/33 | TYPE 4 T2/05 FAI Atmosphere side    | NOT REQUIRED             | -               | -   | -   | -         | -          | -       | -   | -        |
| ATT/34 | TYPE 4 T2/05 FAI Atmosphere side    | NOT REQUIRED             | -               | -   | -   | -         | -          | -       | -   | -        |
| ATT/35 | TYPE 4 T2/05 FAI Atmosphere side    | NOT REQUIRED             | -               | -   | -   | -         | -          | -       | -   | -        |
| ATT/36 | AHU 2 9TH FLOOR FAI Atmosphere side | NOT REQUIRED             | -               | -   | -   | -         | -          | -       | -   | -        |
| ATT/37 | AHU 2 9TH FLOOR SUP Room side       | Rectangular LG01V/3C/L/S | 550             | 550 | 750 | 37.5%     | 0.90       | 23      | 1   | -        |
| ATT/38 | AHU 2 9TH FLOOR EXT Room side       | Rectangular LG01V/3C/L/S | 550             | 550 | 750 | 37.5%     | 0.90       | 23      | 1   | -        |
| ATT/39 | AHU 2 9TH FLOOR EXH Atmosphere side | NOT REQUIRED             | -               | -   | -   | -         | -          | -       | -   | -        |
| ATT/40 | TEF1 DISCHARGE Atmosphere side      | NOT REQUIRED             | -               | -   | -   | -         | -          | -       | -   | -        |
| ATT/41 | TEF1 EXTRACT Room side              | Rectangular SG01H/3C/L/S | 500             | 300 | 600 | 32.5%     | 0.36       | 18      | 1   | -        |
| ATT/42 | TEF2 DISCHARGE Atmosphere side      | NOT REQUIRED             | -               | -   | -   | -         | -          | -       | -   | -        |
| ATT/43 | TEF2 EXTRACT Room side              | Rectangular SG01H/3C/L/S | 700             | 400 | 750 | 37.5%     | 0.94       | 24      | 1   | -        |
| ATT/44 | TEF3 DISCHARGE Atmosphere side      | NOT REQUIRED             | -               | -   | -   | -         | -          | -       | -   | -        |
| ATT/45 | TEF3 EXTRACT Room side              | Rectangular LG01H/3C/L/S | 400             | 400 | 900 | 37.5%     | 0.50       | 32      | 1   | -        |

on-floor May air handling units

Tenants supply fresh air units

9th floor fresh air AHU located on roof level,

Toilet extract North core  
Toilet extract South core  
Toilet extract West core



# Attenuator Schedule

| Ref.              | Description                           | Type and Model Code                 | Dimensions (mm) |              |              | Free Area       | Vol (m³/s)      | PL (Pa)      | Qty          | Features                                                                              |
|-------------------|---------------------------------------|-------------------------------------|-----------------|--------------|--------------|-----------------|-----------------|--------------|--------------|---------------------------------------------------------------------------------------|
| ATT/46            | EF1 DISCHARGE Atmosphere side         | NOT REQUIRED                        | -               | -            | -            | -               | -               | -            | -            | -                                                                                     |
| ATT/47            | EF1 EXTRACT Room side                 | Rectangular LG01H/3C/L/S            | 500             | 300          | 600          | 50.0%           | 0.45            | 12           | 1            | Horizontal elements.                                                                  |
| ATT/48            | EF2 DISCHARGE Atmosphere side         | NOT REQUIRED                        | -               | -            | -            | -               | -               | -            | -            | -                                                                                     |
| ATT/49            | EF2 EXTRACT Room side                 | Rectangular LG01H/3C/L/S            | 500             | 300          | 600          | 50.0%           | 0.47            | 13           | 1            | Horizontal elements.                                                                  |
| ATT/50            | MVHR INTAKE Room side                 | Rectangular LG01V/3C/L/S            | 475             | 300          | 750          | 27.5%           | 0.24            | 19           | 1            | -                                                                                     |
| ATT/51            | MVHR DISCHARGE Room side              | Rectangular LG01V/3C/L/S            | 475             | 300          | 750          | 27.5%           | 0.24            | 19           | 1            | -                                                                                     |
| ATT/52            | MVHR SUPPLY Room side                 | Rectangular LG01V/3C/L/S            | 475             | 300          | 900          | 27.5%           | 0.24            | 19           | 1            | -                                                                                     |
| ATT/53            | MVHR EXTRACT Room side                | Rectangular LG01V/3C/L/S            | 475             | 300          | 900          | 27.5%           | 0.24            | 19           | 1            | -                                                                                     |
| <del>ATT/54</del> | <del>AHU04 FAI NOT REQ.</del>         | <del>Rectangular LG01H/3C/L/S</del> | <del>0</del>    | <del>0</del> | <del>0</del> | <del>0.0%</del> | <del>0.00</del> | <del>0</del> | <del>1</del> | <del>-</del>                                                                          |
| <del>ATT/55</del> | <del>AHU04 SUPPLY NOT REQ.</del>      | <del>Rectangular LG01V/3C/L/S</del> | <del>0</del>    | <del>0</del> | <del>0</del> | <del>0.0%</del> | <del>0.00</del> | <del>0</del> | <del>1</del> | <del>-</del>                                                                          |
| ATT/56            | AHU05 SUPPLY NOT REQ.                 | Rectangular LG01H/3C/L/S            | 0               | 0            | 0            | 0.0%            | 0.00            | 0            | 1            | -                                                                                     |
| ATT/57            | AHU 05 FAI Atmosphere side            | Rectangular LG01H/3C/L/S            | 600             | 600          | 600          | 42.5%           | 1.20            | 19           | 1            | Horizontal elements.                                                                  |
| ATT/58            | AHU 03 ATRIUM EXTRACT Room side       | Rectangular SG02V/2C/L/S            | 2250            | 2000         | 2100         | 30.0%           | 14.00           | 54           | 1            | Unit delivered in 2 sections, split in length. Medium pressure rating (+1000/-750Pa). |
| ATT/59            | AHU 03 ATRIUM EXHAUST Atmosphere side | Rectangular SG02V/2C/L/S            | 2250            | 2000         | 2100         | 30.0%           | 14.00           | 54           | 1            | Unit delivered in 2 sections, split in length. Medium pressure rating (+1000/-750Pa). |

Tea point extract  
West core roof

Tea point extract  
South core roof

AHU 4 deleted from  
scheme

Meeting room supply  
West core roof

# Attenuator Schedule

| Ref.   | Description                     | Type and Model Code      | Dimensions (mm) |     |      | Free Area | Vol (m³/s) | PL (Pa) | Qty | Features                                                                                           |
|--------|---------------------------------|--------------------------|-----------------|-----|------|-----------|------------|---------|-----|----------------------------------------------------------------------------------------------------|
| CTA-01 | TEF/03 WEST Room side           | Circular PG01U/1K/L/     | 100             | dia | 615  | 100.0%    | 0.01       | 0       | 15  | Un-podded. 38mm long spigots. Low pressure rating (+500/-500Pa). <i>toilet extract - West Core</i> |
| CTA-02 | TEF/03 WEST TRANSFER Room side  | Rectangular LG01H/3A/L/S | 300             | 100 | 1215 | 50.0%     | 0.06       | 9       | 4   | Horizontal elements. Spigot end connections.                                                       |
| CTA-03 | TEF/01 NORTH Room side          | Circular PG01U/1K/L/     | 100             | dia | 615  | 100.0%    | 0.03       | 0       | 21  | Un-podded. 38mm long spigots. Low pressure rating (+500/-500Pa). <i>toilet extract North core</i>  |
| CTA-04 | TEF/01 NORTH TRANSFER Room side | Rectangular LG01H/3A/L/S | 300             | 100 | 1215 | 50.0%     | 0.07       | 12      | 5   | Horizontal elements. Spigot end connections.                                                       |
| CTA-05 | TEF/02 SOUTH Room side          | Circular PG01U/1K/L/     | 100             | dia | 615  | 100.0%    | 0.03       | 0       | 29  | Un-podded. 38mm long spigots. Low pressure rating (+500/-500Pa). <i>toilet extract South Core</i>  |
| CTA-06 | TEF/02 SOUTH TRANSFER Room side | Rectangular LG01H/3A/L/S | 300             | 100 | 1215 | 50.0%     | 0.06       | 9       | 8   | Horizontal elements. Spigot end connections.                                                       |
| CTA-07 | TEF/02 SOUTH SHOWER Room side   | Rectangular LG01H/3C/L/S | 700             | 200 | 900  | 37.5%     | 0.27       | 14      | 1   | Horizontal elements.                                                                               |

# Attenuator Drawings

Project: Commonwealth House New Oxford Street

Date: 26/07/2016

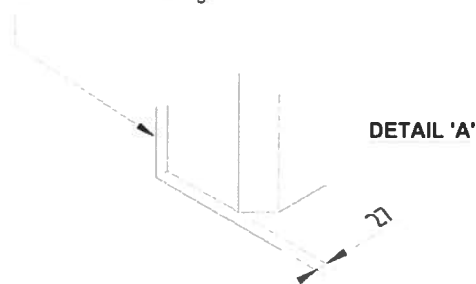
Construction Codes confirm the physical properties of each item. This drawing must therefore be read in conjunction with the Construction Code Definitions.  
Dimensions W1, H1, W2, H2, WD1, HD1 are always shown as "inside-duct". Dimensions L1, L2, LD1 are always shown as "over connections".

## LG lining attenuator - with spigot ends

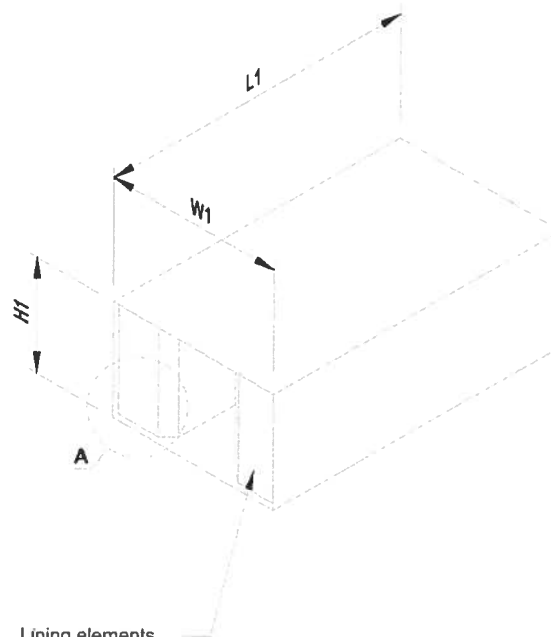
### Notes:

1. Identification labels stating item reference and description to be provided on all items.
2. All dimensions in mm.
3. Tolerance on W1, H1 and L1 +/- 2mm

Plain spigot end connections.  
Adjoining duct to be slip jointed  
inside attenuator casing.



Lining elements set back in casing by 27mm and provided with aerodynamic fairings on inlet and outlet as shown. However if item has non-standard elements refer to Attenuator Model Code Definitions for details.



Lining elements shown installed in the vertical plane. Refer to item Model Code for actual orientation.

| Ref.   | Construction Code | Primary Dimensions |     |      | Paint Colour | Wt (Kg) | No. Off |
|--------|-------------------|--------------------|-----|------|--------------|---------|---------|
|        |                   | W1                 | H1  | L1   |              |         |         |
| CTA-02 | LG01H/3A/L/S      | 300                | 100 | 1215 |              | 12      | 4       |
| CTA-04 | LG01H/3A/L/S      | 300                | 100 | 1215 |              | 12      | 5       |
| CTA-06 | LG01H/3A/L/S      | 300                | 100 | 1215 |              | 12      | 8       |

# Attenuator Drawings

Project: Commonwealth House New Oxford Street

Date: 26/07/2016

Construction Codes confirm the physical properties of each item. This drawing must therefore be read in conjunction with the Construction Code Definitions.  
Dimensions W1, H1, W2, H2, WD1, HD1 are always shown as "inside-duct". Dimensions L1, L2, LD1 are always shown as "over connections".

## LG lining attenuator - with profile flanges

### Notes:

1. Attenuators may be delivered in 1, 2, 3 or 4 sections in length (3 shown opposite).
2. See **NDL** in table below for number of delivery sections in length per item.
3. Assembly of multiple piece items must be in accordance with the delivery section and airflow label layouts, typically as shown opposite. Assembly by others.
4. Nuts, bolts, flange clamps and gasket between flanges by others.
5. Delivery section and airflow labels only provided on multiple piece items.
6. Identification labels stating item reference and description provided on all delivery sections.
7. Where **LD1** exceeds 1250 each delivery section has an intermediate central flange.
8. All dimensions in mm.
9. Tolerances on **W1** & **H1** +/- 2mm.
10. Tolerances on **LD1** +/- 3mm

Profile flanges suitable for MEZ, DOBY or METU flanging systems. See table below for flange size.

### DETAIL 'A'

Lining elements set back in casing by 20mm and provided with aerodynamic fairings on inlet and outlet as shown. However if item has non-standard elements refer to Attenuator Model Code Definitions for details.

Lining elements shown installed in the vertical plane. Refer to item Model Code for actual orientation.

| Ref.   | Construction Code | Primary Dimensions |     |     | Delivery Data |     | Flange Size | Paint Colour | Wt (Kg) | No. Off |
|--------|-------------------|--------------------|-----|-----|---------------|-----|-------------|--------------|---------|---------|
|        |                   | W1                 | H1  | L1  | LD1           | NDL |             |              |         |         |
| ATT/37 | LG01V/3C/L/S      | 550                | 550 | 750 | 750           | 1   | 30mm        |              | 29      | 1       |
| ATT/38 | LG01V/3C/L/S      | 550                | 550 | 750 | 750           | 1   | 30mm        |              | 29      | 1       |
| ATT/45 | LG01H/3C/L/S      | 400                | 400 | 900 | 900           | 1   | 30mm        |              | 22      | 1       |
| ATT/47 | LG01H/3C/L/S      | 500                | 300 | 600 | 600           | 1   | 30mm        |              | 16      | 1       |
| ATT/49 | LG01H/3C/L/S      | 500                | 300 | 600 | 600           | 1   | 30mm        |              | 16      | 1       |
| ATT/50 | LG01V/3C/L/S      | 475                | 300 | 750 | 750           | 1   | 30mm        |              | 19      | 1       |
| ATT/51 | LG01V/3C/L/S      | 475                | 300 | 750 | 750           | 1   | 30mm        |              | 19      | 1       |
| ATT/52 | LG01V/3C/L/S      | 475                | 300 | 900 | 900           | 1   | 30mm        |              | 21      | 1       |
| ATT/53 | LG01V/3C/L/S      | 475                | 300 | 900 | 900           | 1   | 30mm        |              | 21      | 1       |
| ATT/57 | LG01H/3C/L/S      | 600                | 600 | 600 | 600           | 1   | 30mm        |              | 24      | 1       |
| CTA-07 | LG01H/3C/L/S      | 700                | 200 | 900 | 900           | 1   | 30mm        |              | 25      | 1       |

# Attenuator Drawings

Project: Commonwealth House New Oxford Street

Date: 26/07/2016

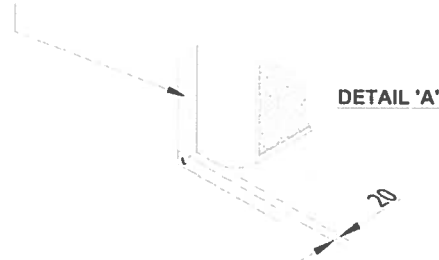
Construction Codes confirm the physical properties of each item. This drawing must therefore be read in conjunction with the Construction Code Definitions.  
Dimensions W1, H1, W2, H2, WD1, HD1 are always shown as "inside-duct". Dimensions L1, L2, LD1 are always shown as "over connections".

## SG Splitter attenuator - with profile flanges

### Notes:

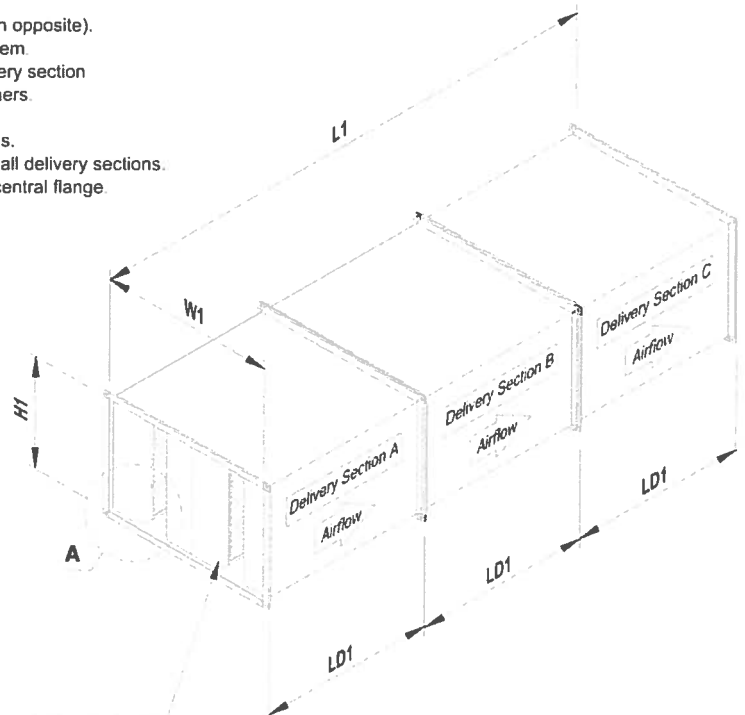
1. Attenuators may be delivered in 1, 2, 3 or 4 sections in length (3 shown opposite).
2. See **NDL** in table below for number of delivery sections in length per item.
3. Assembly of multiple piece items must be in accordance with the delivery section and airflow label layouts, typically as shown opposite. Assembly by others.
4. Nuts, bolts, flange clamps and gasket between flanges by others.
5. Delivery section and airflow labels only provided on multiple piece items.
6. Identification labels stating item reference and description provided on all delivery sections.
7. Where **LD1** exceeds 1250 each delivery section has an intermediate central flange.
8. All dimensions in mm.
9. Tolerances on **W1** & **H1** +/- 2mm.
10. Tolerances on **LD1** +/- 3mm.

Profile flanges suitable for MEZ, DOBY or METU flanging systems. See table below for flange size.



Splitter elements set back in casing by 20mm and provided with aerodynamic bullnoses on inlet and outlet as shown. However if item has non-standard elements refer to Attenuator Model Code Definitions for details.

Splitter elements shown installed in the vertical plane. Refer to item Model Code for actual orientation.



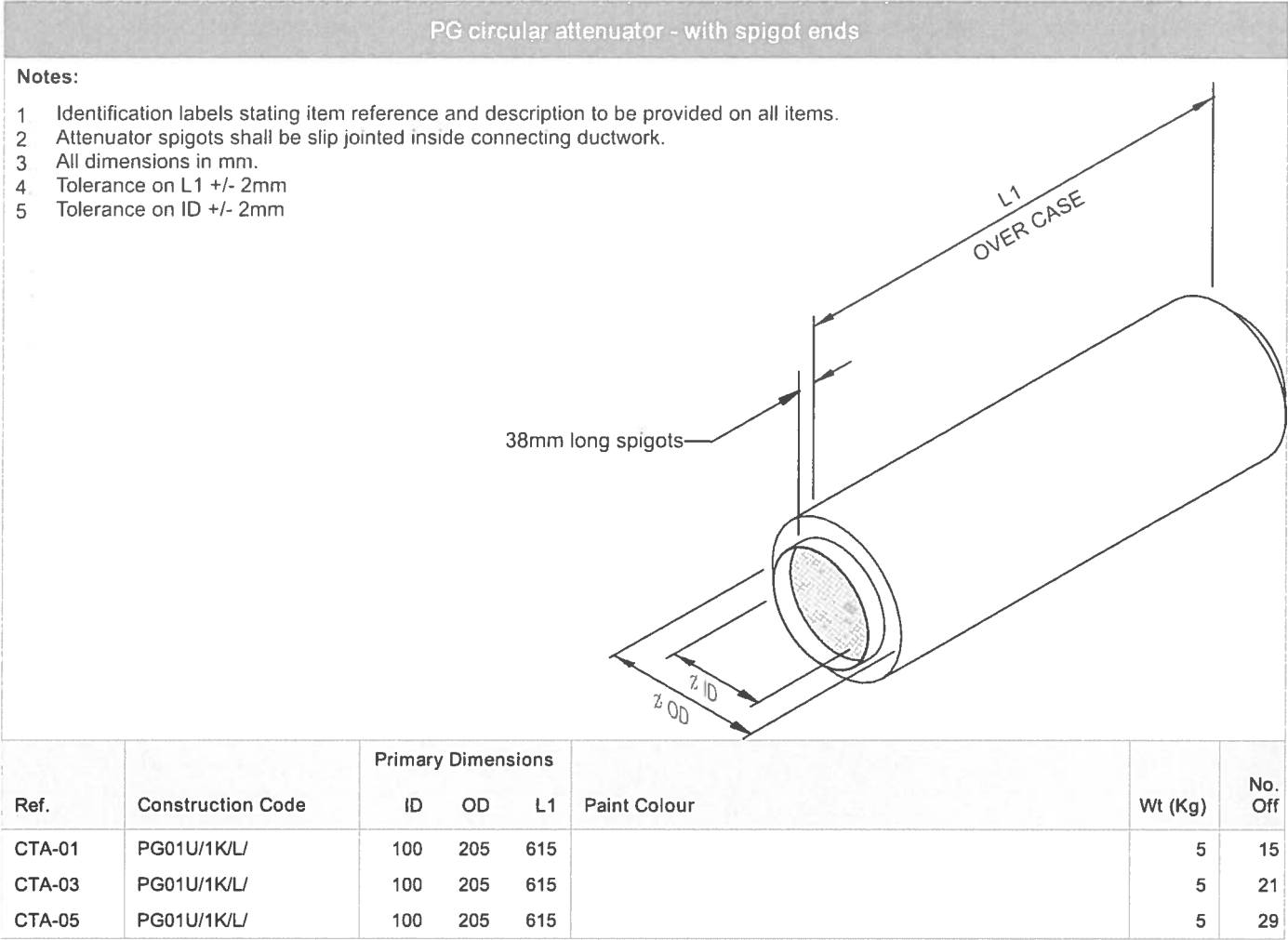
| Ref.   | Construction Code | Primary Dimensions |      |      | Delivery Data |     | Flange Size | Paint Colour | Wt (Kg) | No. Off |
|--------|-------------------|--------------------|------|------|---------------|-----|-------------|--------------|---------|---------|
|        |                   | W1                 | H1   | L1   | LD1           | NDL |             |              |         |         |
| ATT/41 | SG01H/3C/L/S      | 500                | 300  | 600  | 600           | 1   | 30mm        |              | 20      | 1       |
| ATT/43 | SG01H/3C/L/S      | 700                | 400  | 750  | 750           | 1   | 30mm        |              | 33      | 1       |
| ATT/58 | SG02V/2C/L/S      | 2250               | 2000 | 2100 | 1050          | 2   | 30mm        |              | 817     | 1       |
| ATT/59 | SG02V/2C/L/S      | 2250               | 2000 | 2100 | 1050          | 2   | 30mm        |              | 817     | 1       |

# Attenuator Drawings

Project: Commonwealth House New Oxford Street

Date: 26/07/2016

Construction Codes confirm the physical properties of each item. This drawing must therefore be read in conjunction with the Construction Code Definitions.  
Dimensions W1, H1, W2, H2, WD1, HD1 are always shown as "inside-duct". Dimensions L1, L2, LD1 are always shown as "over connections".



# Equipment Noise Data Schedule

Project: Commonwealth House New Oxford Street

Date:

26/07/2016

| Ref.   | Description      | Noise Data Source | Vol<br>(m³/s) | Total Static<br>Pressure (Pa) | Octave band mid frequency (Hz) |     |     |     |    |    |    |    | Noise Data Type  |
|--------|------------------|-------------------|---------------|-------------------------------|--------------------------------|-----|-----|-----|----|----|----|----|------------------|
|        |                  |                   |               |                               | 63                             | 125 | 250 | 500 | 1k | 2k | 4k | 8k |                  |
| ATT/1  | TYPE 1 T1/01 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/2  | TYPE 1 T1/01 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/3  | TYPE 1 T1/01 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/4  | TYPE 1 T1/01 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/5  | TYPE 1 T1/01 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/6  | TYPE 1 T1/07 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/7  | TYPE 1 T1/07 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/8  | TYPE 1 T1/07 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/9  | TYPE 1 T1/07 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/10 | TYPE 1 T1/07 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/11 | TYPE 2 T1/02 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/12 | TYPE 2 T1/02 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/13 | TYPE 2 T1/02 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/14 | TYPE 2 T1/02 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/15 | TYPE 2 T1/02 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/16 | TYPE 2 T2/04 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/17 | TYPE 2 T2/04 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/18 | TYPE 2 T2/04 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/19 | TYPE 2 T2/04 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/20 | TYPE 2 T2/04 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/21 | TYPE 2 T2/06 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/22 | TYPE 2 T2/06 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/23 | TYPE 2 T2/06 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |
| ATT/24 | TYPE 2 T2/06 FAI | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49 | In-duct Inlet Lw |

on-floor tenant  
fresh air  
handling units

# Equipment Noise Data Schedule

Project: Commonwealth House New Oxford Street

Date:

26/07/2016

| Ref.   | Description         | Noise Data Source | Vol<br>(m³/s) | Total Static<br>Pressure (Pa) | Octave band mid frequency (Hz) |     |     |     |    |    |    | Noise Data Type |
|--------|---------------------|-------------------|---------------|-------------------------------|--------------------------------|-----|-----|-----|----|----|----|-----------------|
|        |                     |                   |               |                               | 63                             | 125 | 250 | 500 | 1k | 2k | 4k | 8k              |
| ATT/25 | TYPE 2 T2/06 FAI    | Manufacturer      | 0.20          | 0                             | 73                             | 69  | 70  | 64  | 59 | 56 | 53 | 49              |
| ATT/26 | TYPE 3 T2/03 FAI    | Manufacturer      | 0.30          | 0                             | 69                             | 63  | 74  | 65  | 61 | 57 | 55 | 52              |
| ATT/27 | TYPE 3 T2/03 FAI    | Manufacturer      | 0.30          | 0                             | 69                             | 63  | 74  | 65  | 61 | 57 | 55 | 52              |
| ATT/28 | TYPE 3 T2/03 FAI    | Manufacturer      | 0.30          | 0                             | 69                             | 63  | 74  | 65  | 61 | 57 | 55 | 52              |
| ATT/29 | TYPE 3 T2/03 FAI    | Manufacturer      | 0.30          | 0                             | 69                             | 63  | 74  | 65  | 61 | 57 | 55 | 52              |
| ATT/30 | TYPE 3 T2/03 FAI    | Manufacturer      | 0.30          | 0                             | 69                             | 63  | 74  | 65  | 61 | 57 | 55 | 52              |
| ATT/31 | TYPE 4 T2/05 FAI    | Manufacturer      | 0.36          | 0                             | 67                             | 62  | 75  | 67  | 63 | 59 | 57 | 54              |
| ATT/32 | TYPE 4 T2/05 FAI    | Manufacturer      | 0.36          | 0                             | 67                             | 62  | 75  | 67  | 63 | 59 | 57 | 54              |
| ATT/33 | TYPE 4 T2/05 FAI    | Manufacturer      | 0.36          | 0                             | 67                             | 62  | 75  | 67  | 63 | 59 | 57 | 54              |
| ATT/34 | TYPE 4 T2/05 FAI    | Manufacturer      | 0.36          | 0                             | 67                             | 62  | 75  | 67  | 63 | 59 | 57 | 54              |
| ATT/35 | TYPE 4 T2/05 FAI    | Manufacturer      | 0.36          | 0                             | 67                             | 62  | 75  | 67  | 63 | 59 | 57 | 54              |
| ATT/36 | AHU 2 9TH FLOOR FAI | Manufacturer      | 0.90          | 0                             | 59                             | 65  | 66  | 65  | 61 | 61 | 58 | 52              |
| ATT/37 | AHU 2 9TH FLOOR SUP | Manufacturer      | 0.90          | 0                             | 63                             | 69  | 70  | 70  | 71 | 67 | 64 | 57              |
| ATT/38 | AHU 2 9TH FLOOR EXT | Manufacturer      | 0.90          | 0                             | 58                             | 65  | 65  | 64  | 60 | 60 | 58 | 52              |
| ATT/39 | AHU 2 9TH FLOOR EXH | Manufacturer      | 0.90          | 0                             | 62                             | 69  | 69  | 69  | 71 | 66 | 62 | 55              |
| ATT/40 | TEF1 DISCHARGE      | Manufacturer      | 0.40          | 0                             | 74                             | 77  | 77  | 69  | 63 | 56 | 47 | 38              |
| ATT/41 | TEF1 EXTRACT        | Manufacturer      | 0.40          | 0                             | 72                             | 80  | 76  | 75  | 71 | 67 | 61 | 53              |
| ATT/42 | TEF2 DISCHARGE      | Manufacturer      | 1.05          | 0                             | 76                             | 80  | 73  | 71  | 66 | 61 | 61 | 56              |
| ATT/43 | TEF2 EXTRACT        | Manufacturer      | 1.05          | 0                             | 76                             | 95  | 88  | 86  | 81 | 76 | 76 | 71              |
| ATT/44 | TEF3 DISCHARGE      | Manufacturer      | 0.60          | 0                             | 74                             | 76  | 68  | 66  | 61 | 57 | 54 | 50              |
| ATT/45 | TEF3 EXTRACT        | Manufacturer      | 0.60          | 0                             | 74                             | 91  | 83  | 81  | 76 | 72 | 69 | 65              |
| ATT/46 | EF1 DISCHARGE       | Manufacturer      | 0.50          | 0                             | 47                             | 62  | 59  | 60  | 62 | 62 | 58 | 52              |
| ATT/47 | EF1 EXTRACT         | Manufacturer      | 0.50          | 0                             | 46                             | 62  | 69  | 69  | 70 | 67 | 62 | 55              |
| ATT/48 | EF2 DISCHARGE       | Manufacturer      | 0.50          | 0                             | 47                             | 62  | 59  | 60  | 62 | 62 | 58 | 52              |

on-floor tenant  
fresh air handling  
unit.

9th floor fresh air  
handling unit.

Toilet extract North core

Toilet extract South core

Toilet extract West core

Test-point extract West

Test-point South core



# Equipment Noise Data Schedule

Project: Commonwealth House New Oxford Street

Date:

26/07/2016

| Ref.   | Description           | Noise Data Source | Vol<br>(m³/s) | Total Static<br>Pressure (Pa) | Octave band mid frequency (Hz) |     |     |     |     |    |    |    | Noise Data Type |
|--------|-----------------------|-------------------|---------------|-------------------------------|--------------------------------|-----|-----|-----|-----|----|----|----|-----------------|
| ATT/49 | EF2 EXTRACT           | Manufacturer      | 0.50          | 0                             | 63                             | 125 | 250 | 500 | 1k  | 2k | 4k | 8k | In-duct Lw      |
| ATT/50 | MVHR INTAKE           | Manufacturer      | 0.24          | 0                             | 80                             | 79  | 75  | 74  | 73  | 64 | 61 | 57 | In-duct Lw      |
| ATT/51 | MVHR DISCHARGE        | Manufacturer      | 0.24          | 0                             | 78                             | 77  | 74  | 77  | 74  | 72 | 67 | 60 | In-duct Lw      |
| ATT/52 | MVHR SUPPLY           | Manufacturer      | 0.24          | 0                             | 68                             | 66  | 67  | 65  | 63  | 60 | 50 | 40 | In-duct Lw      |
| ATT/53 | MVHR EXTRACT          | Manufacturer      | 0.24          | 0                             | 68                             | 66  | 67  | 65  | 63  | 60 | 50 | 40 | In-duct Lw      |
| ATT/57 | AHU 05 FAI            | Manufacturer      | 1.20          | 0                             | 67                             | 64  | 76  | 72  | 69  | 68 | 66 | 64 | In-duct Lw      |
| ATT/58 | AHU 03 ATRIUM EXTRACT | Manufacturer      | 14.00         | 0                             | 100                            | 96  | 98  | 100 | 101 | 97 | 94 | 92 | In-duct Lw      |
| ATT/59 | AHU 03 ATRIUM EXHAUST | Manufacturer      | 14.00         | 0                             | 97                             | 96  | 100 | 101 | 101 | 98 | 94 | 89 | In-duct Lw      |

Lower ground floor  
facilities office