Ref: PJB6614/11167

Date: 2 November 2012

Spectrum
ACOUSTIC CONSULTANTS

Nick Foyle
Willmott Dixon Housing Ltd
Hitchin Road
Shefford
Beds
SG17 5JS

Dear Nick

CHESTER BALMORE - NOISE RELATED PLANNING CONDITION NUMBER 13

As you know, Spectrum have investigated the environmental noise levels affecting the above development and analysed the requirements for discharging the Council's planning condition number 13 in relation to plant noise. This was reported in our technical letter PJB6506/11167 dated 14 August, 2012.

Following this, the Environmental Protection Department of Camden Council contacted me to say that, although they accepted the conclusions of the report, they did not accept planning submissions for plant noise that included analysis based on numerical noise models. Instead, they wished to see a 'manual' calculation of plant noise emission.

Following your instruction for us to carry out this work, we have undertaken this exercise, as detailed below.

1. PLANT DETAILS AND LAYOUT

The mechanical consultant for this project has provided noise data for the proposed equipment which was shown in Attachment 8 of our original submission and is duplicated here. This includes both overall and octave band noise levels. The plant layout is also shown in Attachment 8. All of the plant areas are at basement level in the Raydon building and have no direct air path to external areas (such as via a wall or door louvres). All ventilation for the equipment in the plant rooms is, therefore, provided by fan units ducted directly into and out of the plant rooms. Attachment 8 shows that the inlet and outlet louvres to these ducts are at high level in the ground floor façade of the building facing Raydon Street.

The nearest residences to these louvre locations are at first floor above the duct louvres, as shown in the Raydon Street façade drawing (Attachment 9 of our original submission, also attached). These are significantly acoustically screened from the louvres by elements of the building itself (such as balconies).

1.1 Calculation Method

Calculations of duct-borne noise transmission have been carried out using the methods and data described in Section 7 of "Noise Control in Building Services" by Sound Research Laboratories (Pergamon, 1988). Calculations of environmental noise emission from the louvres has taken into account:

- Sound power level emanating from each louvre
- Spherical spreading (distance attenuation)
- Directivity effects

- Diffraction effects (barrier screening)
- Reflection effects
- Sound power to sound pressure conversion

The results of this analysis are shown in Attachment 3. These agree to a good extent with the original numerical noise model calculations, despite being undertaken using a different method.

This shows that the most affected location is predicted to have an L_{Aeq} of 28 dB, which is in compliance with Condition 13's requirements. It should be remembered that the assessment procedure described above compares the noise level from all equipment operating at maximum possible duty with the minimum background noise level, as situation which would rarely occur. At other times, the difference between the noise rating level and the background noise level would be lower, leading to a lower risk of noise disturbance.

Accordingly, environmental noise from the proposed mechanical services at this development is acoustically acceptable.

2. CONCLUSION

The revised information provided above and within the attachments confirm that the acoustic requirements set out in Conditions13 of permission 2010/5478/P will be met. It is recommended that this report be forwarded to Camden Council toward discharging these conditions.

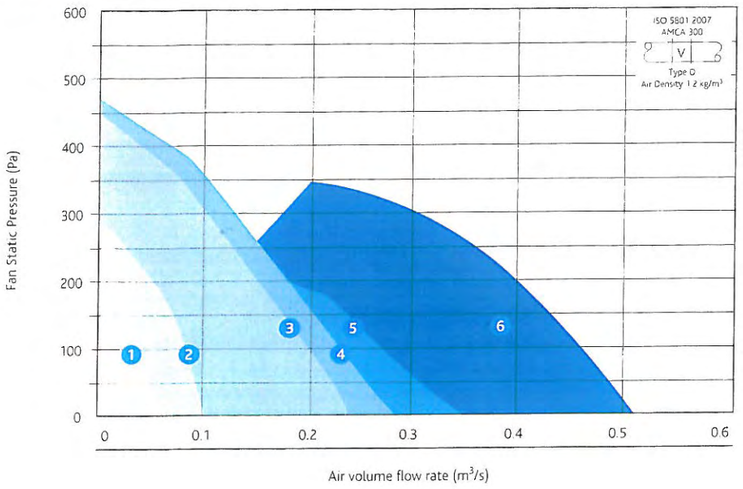
If you have any questions or require further information, please don't hesitate to contact me.

Yours sincerely

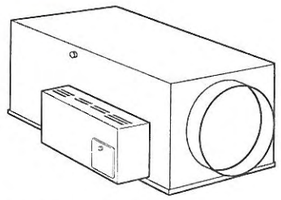
Phill Banks
Principal Consultant

PERFORMANCE - ECOSMART SQURBO EXTRACT

Ecosmart Squrbo Extract Unit



Casing



ESSE Extract units

Code descriptions

ESSE 2-WP

1 2 3

1. ESSE = Ecosmart Squrbo extract fan
2. Case Size/Curve Reference
3. WP = Weatherproof enclosure

CLEAN GAS CUPBOARD
EXTRACT FAN
EF-L-01

ECOSMART SQURBO EXTRACT UNITS

ELECTRICAL & SOUND

Curve	Code	Phase	RPM	Motor Power (kW)	FLC (amps)	SC (amps)	Data Type	Sound Power levels (dB re 10-12W) Octave Band mid frequency (Hz) 125	250	500	1K	2K	4K	8K	Breakout dBA @ 3m
1	ESSE1	1	2724	0.043	0.32	0.32	I	63	59	63	50	45	37	27	30
							O	68	62	65	51	48	44	34	30
2	ESSE2	1	2285	0.075	0.34	0.34	I	64	64	66	57	52	57	37	34
							O	71	66	68	61	56	65	44	34
3	ESSE3	1	2544	0.15	0.72	0.72	I	70	75	75	66	63	57	49	42
							O	76	75	76	70	69	66	55	42
4	ESSE4	1	2313	0.17	0.92	0.92	I	70	75	75	66	64	61	58	43
							O	76	75	79	69	69	63	65	43
5	ESSE5	1	2313	0.17	0.92	0.92	I	74	70	73	68	66	64	60	43
							O	78	69	77	73	72	70	66	43
6	ESSE6	1	1110	0.66	2.95	2.95	I	71	67	59	60	56	51	46	45
							I	76	74	73	73	71	67	62	45

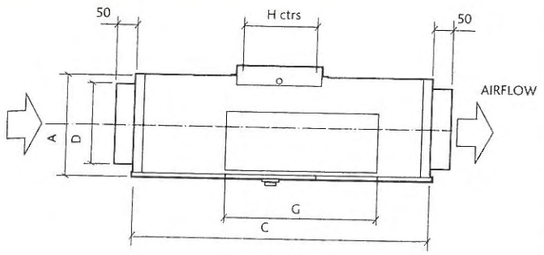
The electrical and sound information in the table is nominal. Breakout dBA@3m is spherical, free field.
SC = FLC due to soft starting control.

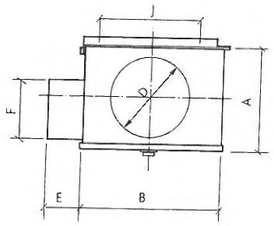
* Motor electrical supply, 1=1 phase (230V, 50Hz) 3=3phase (400V, 50Hz)

Unit has facility to operate motorised damper fan frost protection. I = Induct inlet. O = Induct outlet.

Please note: With Ecosmart, Ecosmart BMS & Ecosmart Commissioning options the units are pre-programmed with a soft start facility.

DIMENSIONS - ECOSMART SQURBO EXTRACT





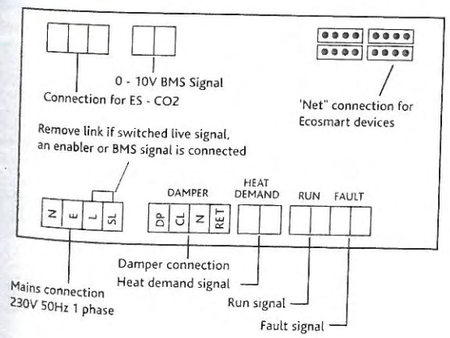
Extract - No heater

DIMENSIONS (mm) & WEIGHTS

	Dia A	B	C	D	E	F	G	Fixing ctrs H	J	Weight (Kg)
ESSE1	160	230	640	125	150	150	330	140	115	7.4
ESSE2	185	302	630	150	150	150	330	140	150	8.1
ESSE3	235	350	700	200	150	150	330	140	170	13
ESSE4	285	350	672	250	150	150	330	140	170	13.8
ESSE5	350	400	726	315	150	150	330	140	200	15.2
ESSE6	430	682	700	400	175	150	330	140	200	38

WIRING - ECOSMART SQURBO EXTRACT

ESSE1-5 Extract



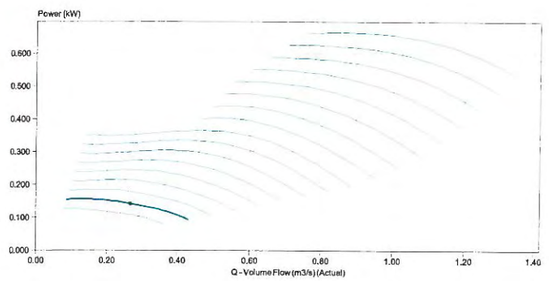
Fläkt Woods Limited

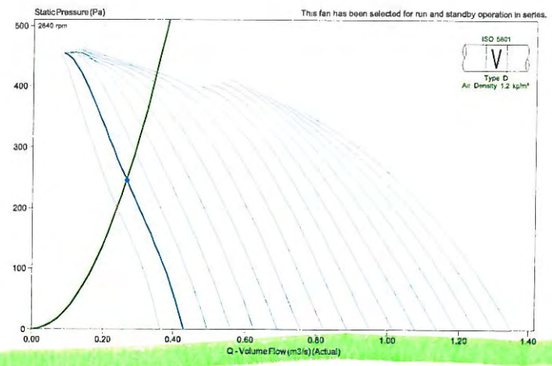
Combination Data Sheet

JM Aerofoil

Project Name	: Chester Balmore		Date:	: Friday, February 3, 2012
Quotation Number	: JH442-Chester Balmore		Fan Code	: 31JM/16/2/5/10
Customer	: Couch Perry Wilkes Birmingham		Item Reference:	:
Fan Code	31JM/16/2/5/10			
Fan Diameter / Size	315 mm			
Blades	5			
Fan Speed	2840 rpm			
Velocity	3.4 m/s			
Blade Angle	10°			
Form of Running	B			
Fan Casing	Long			
Requested Duty	0.25m³/s @ 150 Pa (static)			
Actual Duty	0.27m³/s @ 245 Pa (static)			
Outlet Dynamic Pressure	7 Pa			
Idling Loss*	66 Pa			
Duty Shaft Power	0.142 kW			
Max Shaft Power	0.181 kW			
Total Efficiency	47 %			
Motor Frame	BT9			
Motor Efficiency	IE1			
Motor Rating	0.580 kW			
Full Load Current	1.45 A			
Starting Current	5.7 A			
Motor Mounting	Pad			
Electrical Supply	380-420 Volts 50 Hz 3 Phase			
Start Type	DOL			
Motor Winding	Standard			
Enclosure	Standard All			
Fan Efficiency	47.2%			
Fan +Motor Efficiency	26.7%			
SFP value	0.94 W/(l/s)			
Energy Consumption	502 kWh (2000 h/year)			
Running Cost / Year	£45			
Air Density	1.2 kg/m³ / 20 °C / 0 m / 50% RH			
Smoke Venting	Non Smoke Venting			
Product Number	DX341202			

EXTRACT FANS EF-2-02 2 No





Sound Spectrum (Hz)									Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	71	75	80	79	83	76	71	63	87	65
Outlet*	73	75	82	79	83	76	71	65	87	65
Breakout*	63	61	62	59	59	47	45	41	68	41

* Lw dB re 10^{-12} W ** dBA re $2x10^{-5}$ Pa

Selection includes run / standby in series losses. Sound levels could be up to 5 dB higher than those stated, dependant on fan spacing.

Terms and Conditions: This offer is made subject to the terms and conditions detailed on the accompanying letter.

Description	Qty	Unit Price	Price
Fan			
31JM/16/2/5/10	2	£ 568	£ 1136
Fan Accessories (Quantities per Fan)			
Set of Mounting Feet (2) (AS021102)	1	£ 12	£ 24
Rubber in Shear Anti Vibration Mounts (set of 4) (AS032422)	1	£ 15	£ 30
Matching Flange (DA408238)	2	£ 20	£ 80
Flex connector c/w2 clips (less Flanges) (AS040315)	2	£ 27	£ 108
Thermostat	1	included	included
Estimated Despatch : 1 Days			
TOTAL PRICE FAN AND ACCESSORIES (leadtimes subject to parts availability)			£ 1378

Axial Way
Colchester, Essex, CO4 5ZD
Tel: +44 (0) 1206 222555 Fax: +44 (0) 1206 222777

Website: www.flaktwoods.com
Email: jo.hook@flaktwoods.com

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Fläkt Woods Limited

Combination Data Sheet

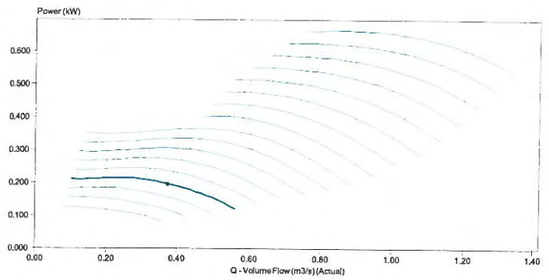
JM Aerofoil

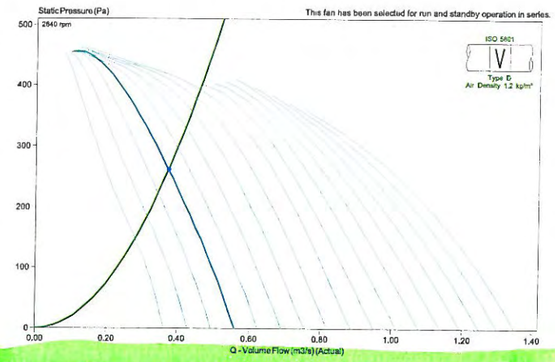
Project Name	:	Chester Balmore	Date:	: Friday, February 3, 2012
Quotation Number	:	JH442-Chester Balmore	Fan Code	: 31JM/16/2/5/14
Customer	:	Couch Perry WIlkes Birmingham	Item Reference:	:

Fan Code	31JM/16/2/5/14
Fan Diameter / Size	315 mm
Blades	5
Fan Speed	2840 rpm
Velocity	4.8 m/s
Blade Angle	14°
Form of Running	B
Fan Casing	Long
Requested Duty	0.35m³/s @ 150 Pa (static)
Actual Duty	0.37m³/s @ 260 Pa (static)
Outlet Dynamic Pressure	14 Pa
Idling Loss*	79 Pa
Duty Shaft Power	0.196 kW
Max Shaft Power	0.229 kW
Total Efficiency	52 %
Motor Frame	BT9
Motor Efficiency	IE1
Motor Rating	0.580 kW
Full Load Current	1.45 A
Starting Current	5.7 A
Motor Mounting	Pad
Electrical Supply	380-420 Volts 50 Hz 3 Phase
Start Type	DOL
Motor Winding	Standard
Enclosure	Standard All
Fan Efficiency	52.2%
Fan +Motor Efficiency	31.7%
SFP value	0.86 W/(l/s)
Energy Consumption	645 kWh (2000 h/year)
Running Cost / Year	£58
Air Density	1.2 kg/m³ / 20 °C / 0 m / 50% RH
Smoke Venting	Non Smoke Venting
Product Number	DX341202

SUPPLY FANS

SF-201 2 No





Sound Spectrum (Hz)									Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	70	74	79	78	79	74	69	63	85	62
Outlet*	72	75	82	78	80	74	70	63	86	62
Breakout*	62	61	62	58	56	45	44	39	67	40

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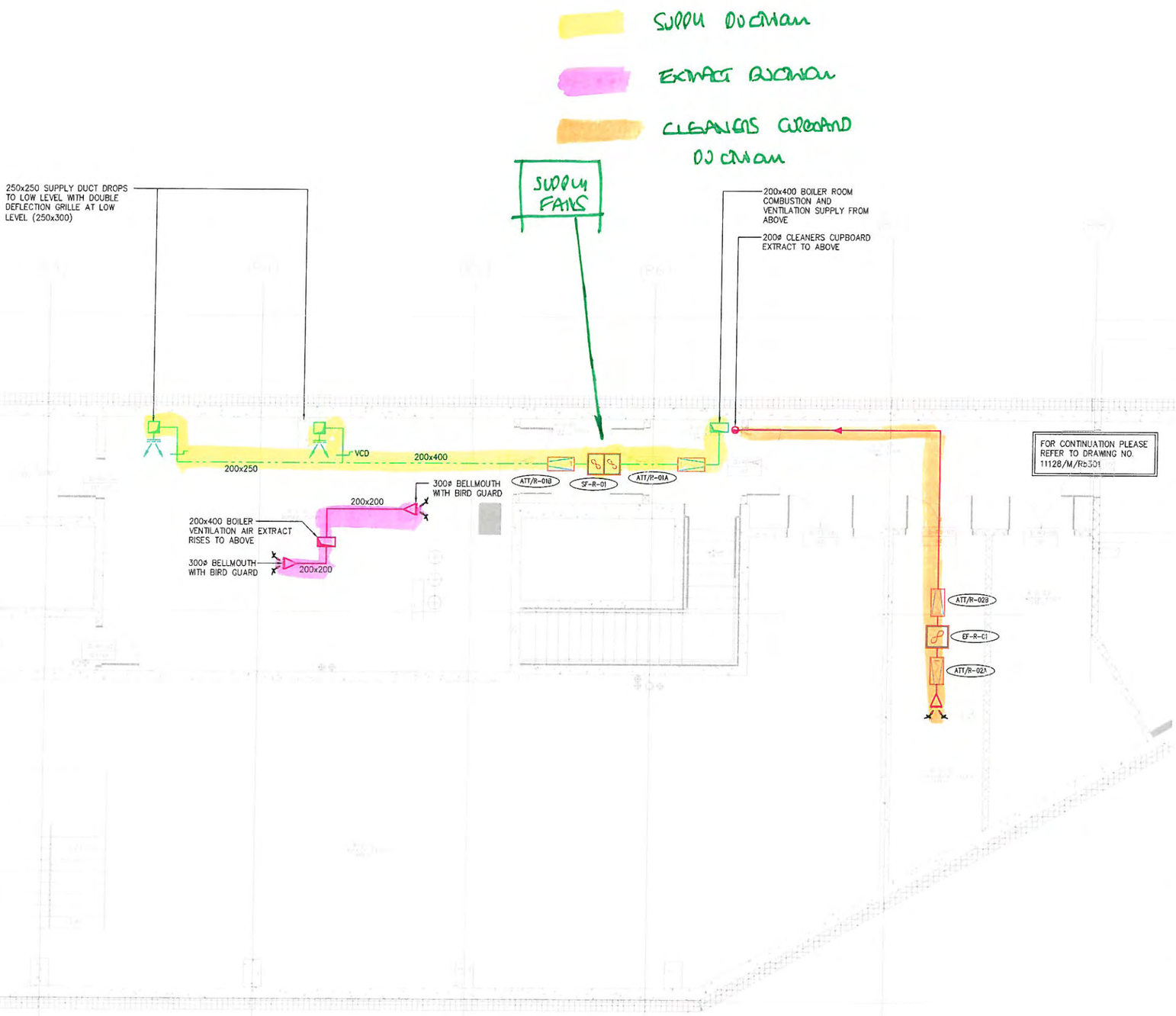
LEGEND

- LPHW HEATER BATTERY CONTROLLED VIA 3 PORT VALVE
- ATTENUATOR (REFER TO SPECIFICATION)
- EXTRACT VALVE
- LINEAR BAR GRILLE WITH PLENUM BOX
- FD INTUMESCENT FIRE COLLAR
- MVHR B--- MECHANICAL VENTILATION HEAT RECOVERY UNIT (REFER TO SPECIFICATION)



NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE PARTICULAR PROJECT SPECIFICATION AND ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS.
2. THIS DRAWING IS FOR DESIGN PURPOSES ONLY. THE BUILDING SERVICES SUB-CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION OF ALL INSTALLATION DRAWINGS AND BUILDER'S WORK DETAILS AS DESCRIBED WITHIN THE CPW SPECIFICATION.
3. ALL VOLUME CONTROL DAMPERS TO BE OPPOSED BLADE (UNLESS STATED OTHERWISE)
4. ALL DUCTWORK SHALL BE IN ACCORDANCE WITH DW 144/DW154
5. ALL DUCTWORK BENDS TO HAVE TURNING VANES.
6. NR RATINGS REFER TO ONE METRE FROM TERMINATION POINT WITH ALL EQUIPMENT OPERATING AT FULL CAPACITY.
7. REFER TO SPECIFICATION FOR DETAILS OF FANS, GRILLES, ATTENUATORS AND DIFFUSERS.
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14. MAX ΔP FOR LOUVRE = 15 Pa AT DESIGN/NOISE CRITERIA.
15. ALL WORKS TO CONFORM TO ISO14001.

P3 FEB 12 GA/COMMENTS AND ARCHITECTURAL UPDATES INCORPORATED
P2 09/12/11 UPDATED TO REFLECT LATEST ARCHITECTURAL LAYOUT ID PT

COUCH PERRY & WILKES
X

FOR COMMENT

WILLMOTT DIXON HOUSING

CHESTER BALMORE

RAYDON BLOCK (R1-R7) - BASEMENT (00)
VENTILATION SERVICES LAYOUT

1:50 @ A1 OCTOBER 2011

11128/M/Ra301 P3

M/Ra301 Xref-Raydon(R1-R7) 00

LEGEND

- LPHW HEATER BATTERY CONTROLLED VIA 3 PORT VALVE
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- EXTRACT VALVE
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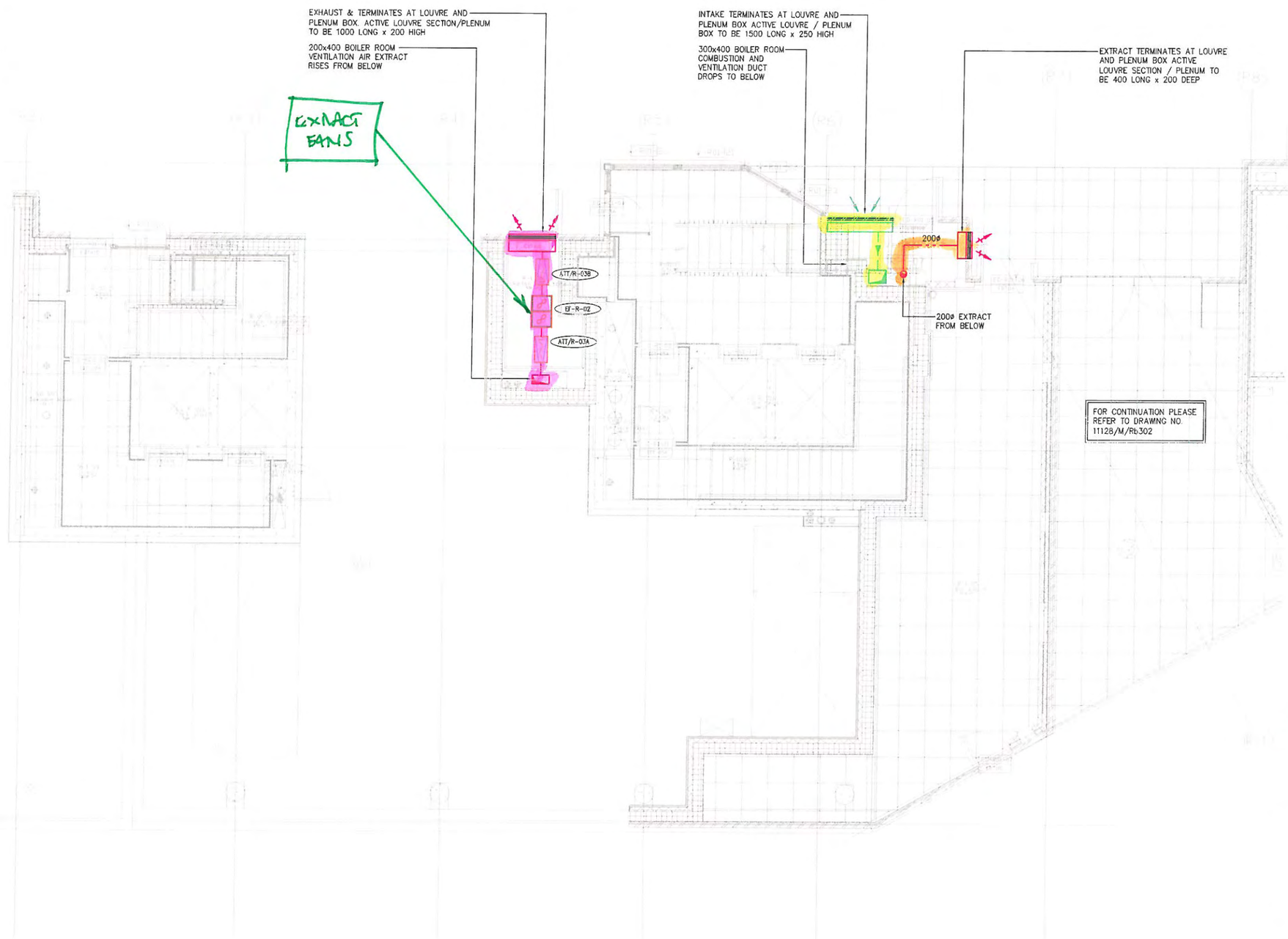
- MVHR — MECHANICAL VENTILATION HEAT RECOVERY UNIT (REFER TO SPECIFICATION)



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COUCH PERRY & WILKES
X

FOR COMMENT

WILLMOTT DIXON HOUSING

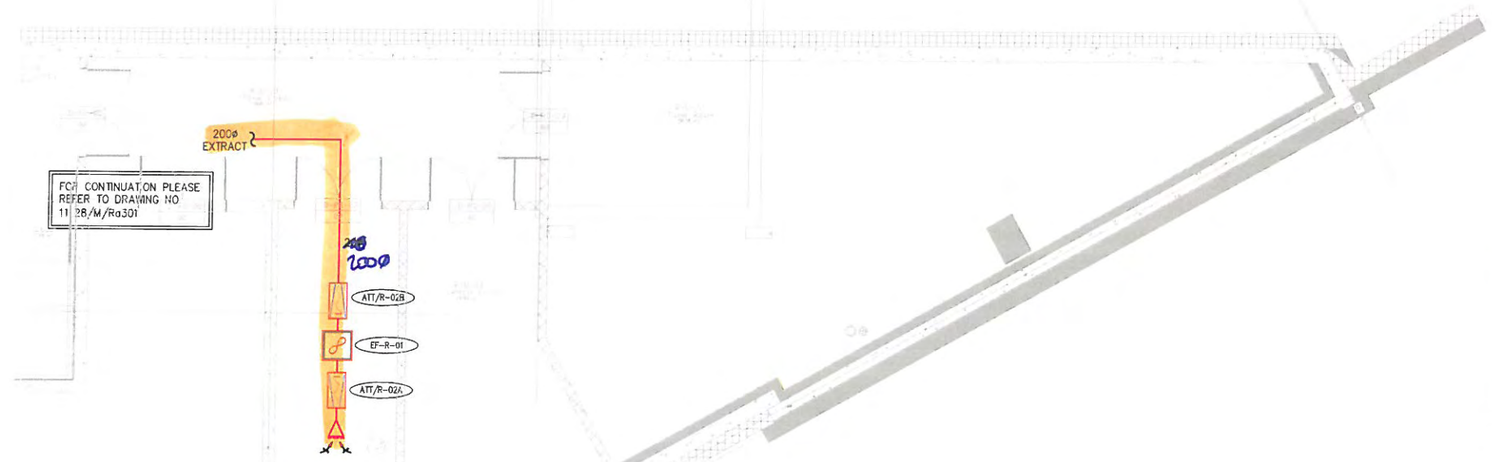
CHESTER BALMORE

RAYDON BLOCK (R1-R7) - GROUND FLOOR (01) VENTILATION SERVICES LAYOUT

1:50 @ A1 OCTOBER 2011

11128/M/Ra302 P3

M/Ra302 Xref-Raydon(R1-R7) 01



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13. ALL DUCTWORK THAT PASSES THROUGH A FIRE BARRIER/ COMPARTMENT SHALL BE COMPLETE WITH INTUMESCENT FIRE COLLAR. THE CONTRACTOR SHALL REFER TO THE FIRE PLANS FROM THE ARCHITECT, IN CONJUNCTION WITH CPW DRAWINGS.
14. MAX ΔP FOR LOUVRE = 15 Pa AT DESIGN/NOISE CRITERIA.
15. ALL WORKS TO CONFORM TO ISO14001.

P3 FEB '12 GA / COMMENTS AND ARCHITECTURAL UPDATES INCORPORATED
P2 09/12/11 UPDATED TO REFLECT LATEST ARCHITECTURAL LAYOUT ID PT

COUCH PERRY & WILKES

FOR COMMENT

WILLMOTT DIXON HOUSING

CHESTER BALMORE

RAYDON BLOCK (R7-R9) - BASEMENT (00)
VENTILATION SERVICES LAYOUT

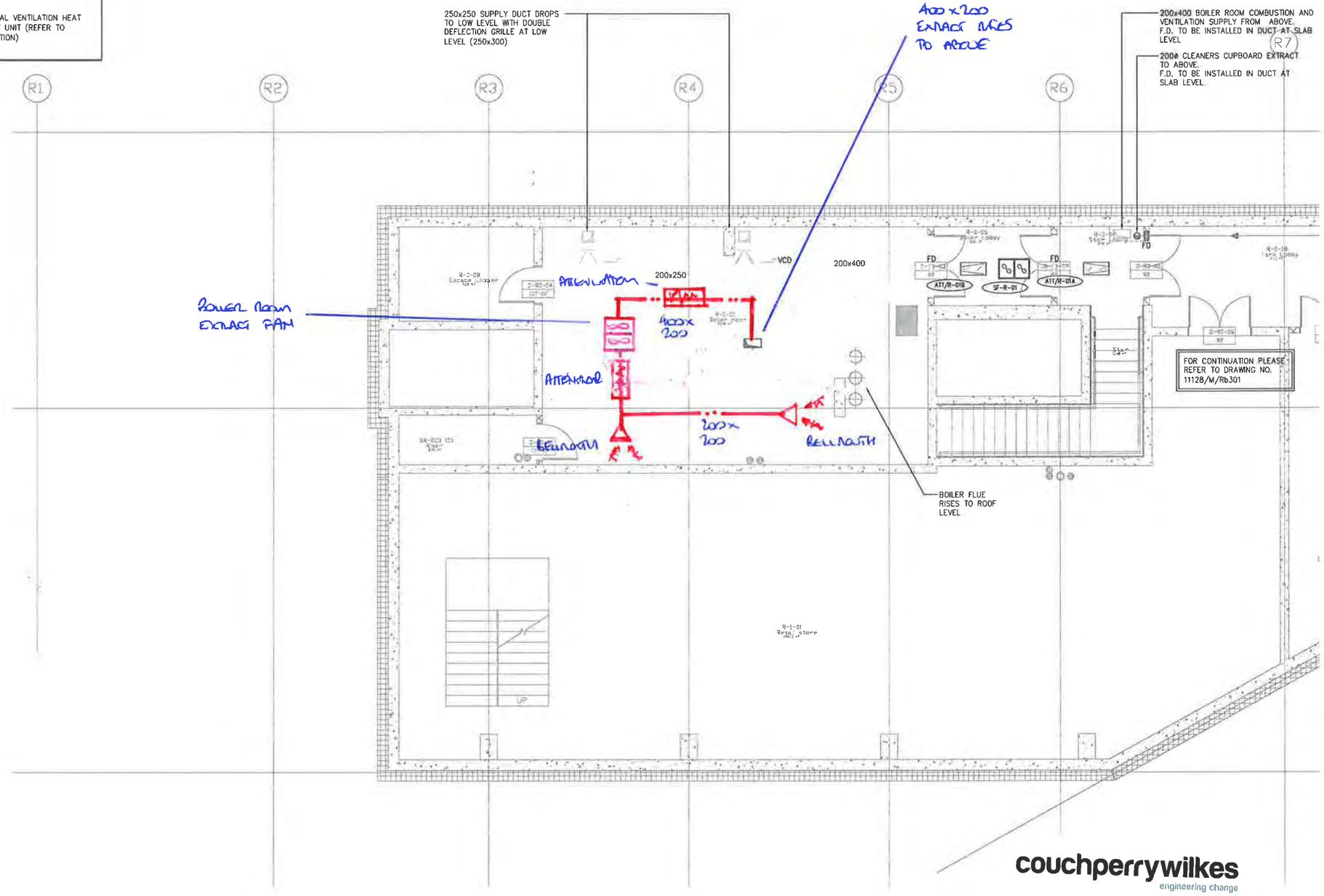
1:50 @ A1 OCTOBER 2011

11128/M/Rb301 P3

M/Rb301 Xref-Raydon(R7-R9) 00

LEGEND

- LPHW HEATER BATTERY CONTROLLED VIA 3 PORT VALVE
- ATTENUATOR (REFER TO SPECIFICATION)
- EXTRACT VALVE
- LINEAR BAR GRILLE WITH PLENUM BOX
- FD — FIRE COLLAR
- MVHR B-- — MECHANICAL VENTILATION HEAT RECOVERY UNIT (REFER TO SPECIFICATION)



NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE PARTICULAR PROJECT SPECIFICATION AND ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS.
2. THIS DRAWING IS FOR DESIGN PURPOSES ONLY. THE BUILDING SERVICES SUB-CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION OF ALL INSTALLATION DRAWINGS AND BUILDER'S WORK DETAILS AS DESCRIBED WITHIN THE CPW SPECIFICATION.
3. ALL VOLUME CONTROL DAMPERS TO BE OPPOSED BLADE (UNLESS STATED OTHERWISE)
4. ALL DUCTWORK SHALL BE IN ACCORDANCE WITH DW 144/DW154
5. ALL DUCTWORK BENDS TO HAVE TURNING VANES.
6. NR RATINGS REFER TO ONE METRE FROM TERMINATION POINT WITH ALL EQUIPMENT OPERATING AT FULL CAPACITY.
7. REFER TO SPECIFICATION FOR DETAILS OF FANS, GRILLES, ATTENUATORS AND DIFFUSERS.
8. ALL EXTERNAL LOUVRES / TERMINATIONS TO BE RAL COLOUR AND FINISH IN ACCORDANCE WITH ARCHITECTS REQUIREMENTS.
9. THE MAIN CONTRACTOR SHALL PROVIDE ACCESS PANELS WITHIN THE CEILING CONSTRUCTION TO ALLOW ACCESS (FOR COMMISSIONING AND MAINTENANCE PURPOSES) TO VCD's, SD's, FD's & AD's.
10. THE CO-ORDINATION SHOWS DESIGN INTENT FOR CRITICAL AREAS THEY ARE NOT CONSTRUCTION DRAWINGS, AND THEREFORE DO NOT SHOW ALL BENDS, TEE SETS ETC.,THAT MAY BE NECESSARY TO LOCATE SERVICES CORRECTLY TO AVOID CLASHES AND MAXIMIZE MAINTENANCE ACCESS. THE BUILDING SERVICES CONTRACTOR IS NEVERTHELESS DEEMED TO HAVE INCLUDED ALL SUCH MATERIALS ETC. AS REQUIRED TO PRODUCE A COMPLETE, FULLY CO-ORDINATED LAYOUT FOR THE MECHANICAL AND ELECTRICAL SERVICES. SHOULD ASPECT RATIO CHANGES OF DUCTWORK BE NEEDED TO ACHIEVE A FULLY CO-ORDINATED LAYOUT OR TO FIT WITHIN THE BUILDING STRUCTURE AND AVAILABLE CEILING VOID, THESE SHALL BE DEEMED TO HAVE BEEN INCLUDED WITHIN THE BUILDING SERVICES CONTRACTOR'S TENDER.
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couchperrywilkes
engineering change

14th JUNE 12

P4	MAY '12	VALUE ENGINEERING AND GENERAL UPDATES INCORPORATED	ID PT
P3	FEB 12	QA/COMMENTS AND ARCHITECTURAL UPDATES INCORPORATED	ID PT
P2	08/12/11	UPDATED TO REFLECT LATEST ARCHITECTURAL LAYOUT	ID PT

CPW CHARTERED BUILDING SERVICES ENGINEERS

COUCH PERRY & WILKES

FOR COMMENT

WILLMOTT DIXON HOUSING

CHESTER BALMORE

RAYDON BLOCK (R1-R7) - BASEMENT (00) VENTILATION SERVICES LAYOUT

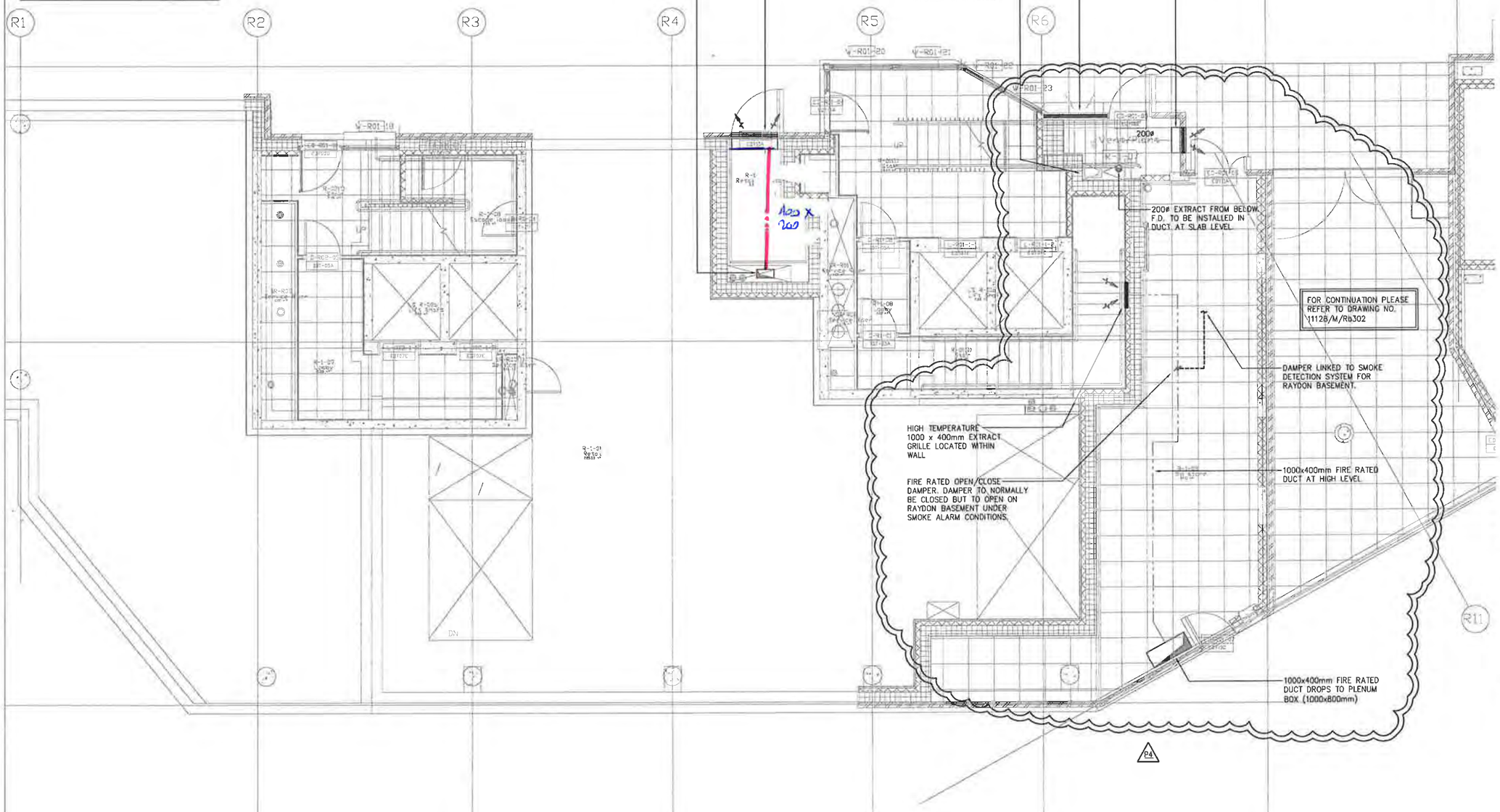
1:50 @ A1 OCTOBER 2011 ID PT

11128/M/Ra301 P4

M/Ra301 Xref-Raydon(R1-R7) 00

LEGEND

- LPHW HEATER BATTERY CONTROLLED VIA 3 PORT VALVE
- ATTENUATOR (REFER TO SPECIFICATION)
- EXTRACT VALVE
- LINEAR BAR GRILLE WITH PLENUM BOX
- INTUMESCENT FIRE COLLAR (FD)
- MECHANICAL VENTILATION HEAT RECOVERY UNIT (REFER TO SPECIFICATION) (MVHR B--)



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P2	08/12/11	UPDATED TO REFLECT LATEST ARCHITECTURAL LAYOUT	ID PT

COUCH PERRY & WILKES

FOR COMMENT

WILLMOTT DIXON HOUSING

CHESTER BALMORE

RAYDON BLOCK (R1-R7) - GROUND FLOOR (01) VENTILATION SERVICES LAYOUT

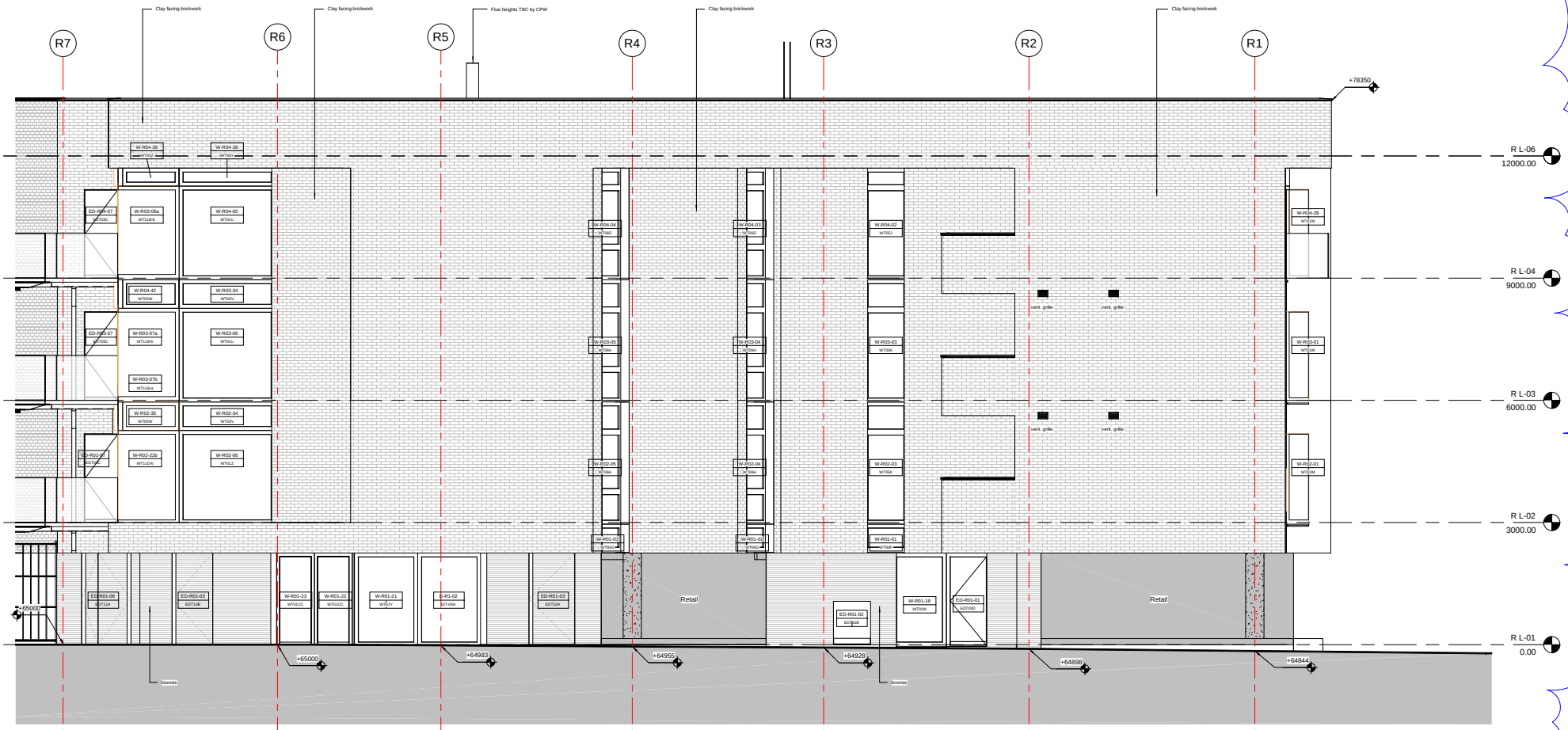
1:50 @ A1 OCTOBER 2011 ID PT

11128/M/Ra302 P4

M/Ra302 Xref-Raydon(R1-R7) 01

couchperrywilkes
engineering change

Jan 12



WILLMOTT DIXON HOUSING

REVIEWED

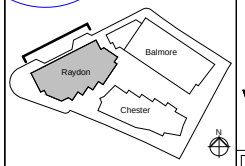
		STATUS
	PRELIMINARY	
	FOR COMMENT	A
	FOR CONSTRUCTION	B
SIGNED	Sarah	C
DATE	7/2/12	

Notes

Check this drawing is the latest revision.
Do not scale from this drawing.
Do not use the information on this drawing without checking all dimensions on site.
Do not use any areas indicated for either valuation, puchase, sale or any other form of legally binding contract.
Do not reproduce any part of this drawing without prior written consent.
Equivalent products/materials may be Approved where the Employer's Requirements, Thermal Performance, Airtightness and any other specified performance requirements are met.
All materials to be certified to comply with BS 14001/or BES6001 or be able to provide a Chain of Custody certificate in order to comply Code for Sustainable Homes
All timber species and sources used in this development are not to be listed on the CITES appendices for endangered or threatened species (appendix I, II or III)

Rev	Date	Description	Drawn	Checked
1	06 Feb 12	Minor amendments, material notes and levels indicated. Issued for construction	PN	EB

Revision Schedule



Model Ref: Raydon | ER Ref: 540 - 12100 T2

WILLMOTT DIXON HOUSING

FOR CONSTRUCTION

Project	Chester Balmore
Client	Willmott Dixon Housing
Dwg Title	Raydon Block (R1-R7) - Raydon St Elev
Dwg no.	6700 GA620
Revision	1
Scale	1 : 50 @ A1
Date	09 Sep 11
Drawn by	TMc
Checked by	EB

Attachment 3 - 2 pages

Environmental Noise Propagation Model

Total plant noise level outside residence

Model Description : Chester Balmore - Plant room extract / inlet noise breakout

Receptor Location : First floor of Raydon Block - As indicated

Plant Ducted To External Louvres	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	dB(A)
Cleaners Cupboard Extract Fan							
Type ESSE 2							
Sound Power Level as per manuf. data	71	66	68	61	56	65	
Right angle bend losses			4	16	16	14	
Termination loss	8	4	1				
Duct Loss	6	5	3	2	2	2	
Sound power at louvre	65	61	61	43	38	49	60
Basement Plantroom Input Fans							
Type 31JM/16/2/5/14							
Sound Power Level (per unit)	75	82	78	80	74	70	
Total Sound Power Level with manuf. spectrum	78	85	81	83	77	73	
Right angle bend losses	0	0	25	40	20	15	
Termination loss	8	4	1				
Silencer Insertion Loss	4	8	13	16	13	10	
Duct Loss	3	2	1	1	1	1	
Sound power at louvre	63	71	41	26	43	47	63
Basement Plantroom Extract Fans							
Type 31JM/16/2/5/10							
Sound Power Level (per unit)	75	82	79	83	76	71	
Total Sound Power Level with manuf. spectrum	78	85	82	86	79	74	
Right angle bend losses			3	15	15	12	
Termination loss	8	4	1				
Silencer Insertion Loss	9	29	32	44	46	38	
Duct Loss	6	5	3	2	2	2	
Sound power at louvre	55	47	43	25	16	22	44

Noise propagation from louvres to residence - Receiver 1A as per original report

	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	dB(A)
Component 1 - Source A							
Cleaners Cupboard Extract Fan							
Sound power at louvre	65	61	61	43	38	49	
Directivity Loss	2	4	5	6	7	7	
Screening Loss	6	8	10	12	13	16	
Distance loss (13m)	23	23	23	23	23	23	
Sound Power to Sound Pressure Conversion	8	8	8	8	8	8	
Subtotal	26	18	15	-6	-13	-5	15
Component 2 - Source B							
Basement Plantroom Input Fans							
Sound power at louvre	63	71	41	26	43	47	
Directivity Loss	2	3	4	5	6	6	
Screening Loss	5	6	8	10	12	14	
Distance loss (10m)	20	20	20	20	20	20	
Sound Power to Sound Pressure Conversion	8	8	8	8	8	8	
Subtotal	28	34	1	-17	-3	-1	26
Component 3 - Source C							
Basement Plantroom Extract Fans							
Sound power at louvre	55	47	43	25	16	22	
Directivity Loss	2	3	4	5	6	6	
Screening Loss	2	4	6	7	8	8	
Distance loss (3m)	10	10	10	10	10	10	
Sound Power to Sound Pressure Conversion	5	5	5	5	5	5	
Subtotal	36	25	18	-2	-13	-7	22
Overall Lp at Residence	**37.0**	**34.6**	**19.8**	**-0.4**	**-2.2**	**1.2**	**27**
Noise Level criterion at Residence (LA90,5min - 5 dB)							**28**
Excess over criterion							**-1**

Attachment 3 - 2 pages

Noise propagation from louvres to residence - Receiver 2A as per original report

	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	dB(A)
Component 1 - Source A							
Cleaners Cupboard Extract Fan							
Sound power at louvre	65	61	61	43	38	49	
Directivity Loss	2	3	4	5	6	6	
Screening Loss	6	8	10	13	16	18	
Distance loss (5m)	14	14	14	14	14	14	
Sound Power to Sound Pressure Conversion	8	8	8	8	8	8	
Subtotal	35	28	25	3	-6	3	25
Component 2 - Source B							
Basement Plantroom Input Fans							
Sound power at louvre	63	71	41	26	43	47	
Directivity Loss	2	4	5	6	7	7	
Screening Loss	6	8	10	13	16	18	
Distance loss (8m)	18	18	18	18	18	18	
Sound Power to Sound Pressure Conversion	8	8	8	8	8	8	
Subtotal	29	33	0	-19	-6	-4	25
Component 3 - Source C							
Basement Plantroom Extract Fans							
Sound power at louvre	55	47	43	25	16	22	
Directivity Loss	2	4	5	6	7	7	
Screening Loss	6	8	10	12	13	16	
Distance loss (13m)	23	23	23	23	23	23	
Sound Power to Sound Pressure Conversion	8	8	8	8	8	8	
Subtotal	16	4	-3	-24	-35	-32	2
Overall Lp at Residence	**36.0**	**34.2**	**25.0**	**3.0**	**-3.0**	**3.8**	**28**
Noise Level criterion at Residence (LA90,5min - 5 dB)							**28**
Excess over criterion							**0**