UCL

New Student Centre

Noise Assessment

June 2015

BDP.

New Student Centre - University College London

Plant Noise Impact Assessment Report

Prepared for	**Prepared by**
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Authored by	**Approved by**
	
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Executive summary

BDP Acoustics has been appointed to provide a noise statement for planning incorporating an emissions assessment as a result of proposed plant serving the New Student Centre at University College London.

The lowest background noise levels were measured to be L_{A90} 54 dB during the day and L_{A90} 46 dB during the night at the position representative of the nearest noise sensitive premises.

To comply with the planning policy of the London Borough of Camden, any individual items of building services plant associated with the development must be specified such that the cumulative noise ratings of all items of plant in simultaneous operation do not exceed the following at the nearest noise sensitive premises:

- Noise emissions level of $L_{Aeq,T}$ 49 dB during the day time (0700 – 2300 hrs)
- Noise emissions level of $L_{Aeq,T}$ 41 dB during the night time (2300 – 0700 hrs)

Further 5 dB reduction will be applied to the above noise emissions limit if the proposed plant items display tonal characteristics (such as whines, hisses or hums).

The cumulative noise emissions from the proposed building services plant has been calculated to fall within the noise emissions limit. Taking into account the recent application for the Node Plant Replacement, it can be observed that cumulative noise levels as a result of all plant operating at both locations are unlikely to give rise to an observable adverse effect on the health and quality of life in the vicinity of the UCL campus.

In conclusion, the proposed new building services plant presents a design scheme that is compliant with the Council's planning policy for noise emissions. As such there should be no reason why planning permission should not be granted on the basis of noise alone.

1 Introduction

1.1.1 BDP Acoustics has been appointed to provide a noise statement for planning incorporating an emissions assessment as a result of proposed plant serving the New Student Centre (referred to as NSC hereafter) at the University College London (UCL).

1.1.2 This report has been produced to inform:

- The noise emission limits for any new building services plant associated with the development based on Local Authority requirements;
- The noise impact assessment methodology and results of the new building services plant;
- Any mitigation measures as required to comply with the noise emission limits.

2 Site description

2.1.1 The proposed new external plant items are located on the third and fourth floor roof decks, on the north-western facade of the proposed NSC building, and within a covered plantroom on the fourth floor roof.

2.1.2 The plant locations are overlooked by windows on the south-east and south-west facades of the Bloomsbury Theatre, which forms part of UCL.

2.1.3 Major roads in the area include Gordon Street approximately 20 m to the east of the plant location and Euston Road (A501) approximately 160 m to the north of the site.

2.1.4 Euston Station is situated approximately 350 m to the north of the site.

2.1.5 The site layout indicating the proposed plant location is presented in Appendix A.

3 Criteria

3.1 Local Authority policy – Camden Development Policies (2010)

3.1.1 London Borough of Camden outlines its noise policy in *Camden Development Policies (2010)*, in which it stipulates the following:

CPG6: Amenity

3.1.2 The Council requires a detailed noise and vibration information in the form of a report for development which proposes:

- The installation of plant, ventilation or air conditioning equipment;
- A use that will create significant noise;
- A noise sensitive development in an area where existing noise sources are present;
- A use that will generate a significant amount of traffic.

DP28: Noise and Vibration

3.1.3 The Council will seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for:

a) development likely to generate noise pollution; or
b) development sensitive to noise in locations with noise pollution, unless appropriate attenuation measures are provided.

3.1.4 The Council also sets out the following noise levels from plant and machinery for which the grant of planning permission will be based upon:

Noise description and location of measurement	Period	Time	Noise level
Noise at 1m external to a sensitive facade	Day, evening and night	00:00 – 24:00	5 dB(A) $<L_{A90}$
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1m external to a sensitive facade	Day, evening and night	00:00 – 24:00	10 dB(A) $<L_{A90}$
Noise that has a distinguishable impulses (bangs, clicks, clatters, thumps) at 1m external to a sensitive facade	Day, evening and night	00:00 – 24:00	10 dB(A) $<L_{A90}$
Noise at 1m external to sensitive facade where $L_{A90} > 60$ dB	Day, evening and night	00:00 – 24:00	L_{Aeq} 55 dB

Table 1: London Borough of Camden Noise Policy

4 Environmental Noise Survey

4.1 Methodology

4.1.1 BDP Acoustics undertook a baseline noise survey to establish the exiting noise climate around the proposed site of the New Student Centre which would incorporate the representative locations for the site of the proposed plant locations.

4.1.2 Noise measurements comprised attended measurements at several positions around the site, the measurement locations are detailed in Appendix B at the rear of this report.

4.1.3 Attended daytime short-term noise measurements were conducted over 15 minute periods between 11:00 hrs and 12:30 hrs on 16 November 2012. Weather conditions were noted to be calm and suitable for environmental noise surveying.

4.1.4 Attended night time short-term noise measurements were conducted over 5 minute periods between 03:00 hrs and 04:00 hrs on 13 February 2013. Weather conditions were noted to be calm and suitable for environmental noise surveying.

4.1.6 The following equipment was used for both attended surveys:

- Bruel & Kjaer 2260 Modular Precision Sound Analyzer Serial No. 2447614
- Rion NA-28 Sound Level Meter Serial No. 00680883
- Bruel & Kjaer 4231 Sound calibrator Serial No. 1510643

4.1.7 The calibration of the sound level meter was checked before and after measurements were taken and no drift was observed. The microphone was positioned at a height of 1.2 m above the ground and all the measurements were free from the influence of other reflecting surfaces.

4.2 Results

4.1.1 Noise levels measured during the attended noise survey are summarised below. The summary includes the lowest measured background noise levels (L_{A90}) which are used to establish the noise emissions limit for installation of new plant items.

Time period	Duration, T	Position	A-weighted sound pressure levels (dB re 2 x 10^{-5} Pa)		
			Highest $L_{A1,T}$ (dB)	Highest $L_{Aeq,T}$ (dB)	Lowest $L_{A90,T}$ (dB)
Daytime (0700 – 2300 hrs)	15 min	1	75	67	58
		2	78	69	57
		3	69	61	54
		4	72	63	59
		5	71	62	55
Night time (2300 – 0700 hrs)	5 min	6	77	63	52
		7	69	57	52
		8	74	61	46

Table 2: Attended noise measurement summary

4.1.2 Detailed background noise levels measured during the attended noise surveys are attached in Appendix C to this report.

4.1.3 The dominant noise sources during the day time attended noise surveys were that of general traffic movement on Gordon Street and general student circulation (talking, footfall). Continuous noise from the existing air handling units located on a nearby rooftops as well as distant traffic noise from Euston Road (A501) were also noted during the attended measurements.

4.1.4 The noise climate around the site during the night time period was dominated by road traffic, and primarily by traffic movements at the junction of Gower Street and Gordon Street. Additional noise sources included occasional vehicles passing by the measurement positions on Gordon Street and Gordon Place, and continuous noise from air handling units located on nearby rooftops.

4.1.5 Whilst the noise survey was undertaken two years ago, based on BDP's experience on past and current projects with UCL and others in the neighbouring area, the collected data should still be considered representative of the current baseline noise condition around the site, due to the unchanged characteristics of the neighbouring area.

4.1.6 Attended short term measurements were undertaken instead of a continuous 24 hour noise logging due to the absence of a secure location representative of the nearest noise sensitive receptor to locate the unattended logging equipment.

5 Plant Details

5.1.1 The following plant items have been proposed:

Plant item	Location	Quantity	Manufacturer	Specification
AHU 1	Fourth floor mesh roof deck	1	EcoAirBox	EAB11000-TW-CW-LPHW
AHU 2	Third floor mesh roof deck	1	EcoAirBox	EAB8000-TW-CW-LPHW
Basement Smoke Extract Fan	Fourth floor roof	1	Nuaire	AXT100Z-41A7+1A
Lobby Pressurisation Fan	Fourth floor roof	1	-	-

Table 3: Proposed new Plant items list

5.1.2 It has been confirmed that the Basement Smoke Extract Fan and the Lobby Pressurisation Fan will only be operational during testing and emergency procedures, and are therefore not considered in the following assessment.

5.1.3 The noise levels for each AHU have been provided by the equipment suppliers, and have been used in the noise impact assessment, as follows:

Plant item	Description	Measured unit	Sound Power levels, L_w (dB)								Overall
			63	125	250	500	1k	2k	4k	8k	
AHU 1	Intake	L_w	73	85	83	80	76	74	72	68	83
	Exhaust	L_w	76	88	85	85	82	77	75	72	87
	Breakout	L_w	58	70	61	55	49	42	42	41	58
AHU 2	Intake	L_w	72	85	82	78	75	73	71	66	81
	Exhaust	L_w	74	86	83	83	80	76	73	70	85
	Breakout	L_w	56	68	59	53	47	41	40	39	57

Table 4: Roof plant items noise date

5.1.3 The AHUs may be operational simultaneously, most likely in the summer months during the day-time and night-time periods, as the building is proposed to be accessible for 24 hours a day 7 days per week.

5.1.4 No acoustic attenuation has been included in this noise impact assessment.

5.1.5 A site plan showing the location of the plant items is attached in Appendix D to this report.

6 Plant Noise Assessment

6.1 Nearest Noise Sensitive Receptors

Non-UCL Owned Premises

6.1.1 There are no known non-UCL owned residential premises within close proximity of the proposed AHU location.

6.1.2 The closest residential receptors to the new plant location are:

- 140m to the north-west at 1 Taviton Street; and
- 150m to the south west on The Cloisters, Gordon Square.

6.1.3 These are indicated on the site map in Appendix A.

UCL Owned Premises

6.1.4 The closest UCL owned receptors to the AHU location are a row of windows on the south-east and south-west facades of the Bloomsbury Theatre upper levels, understood to currently be used as a gymnasium, approximately 10m from the AHU intake and exhaust grills.

6.1.5 These windows of the Bloomsbury Theatre are not considered to be a noise sensitive receptor for the purposes of planning, as the Bloomsbury Theatre forms part of the UCL campus.

6.2 Noise Emission Limits

6.2.1 Taking into the consideration the requirements to comply with the planning policy set out by the London Borough of Camden, the following plant noise emission limits have been set out for the proposed new plant:

Time period	Plant noise emissions limits at 1m external to a noise sensitive facade, $L_{Aeq,T}$
Daytime (0700 – 2300 hrs)	49 dB
Night time (2300 – 0700 hrs)	41 dB

Table 5: Noise emissions limit

6.2.2 Mitigation of noise emissions from individual items of plant should be designed such that the cumulative noise emissions of all items of plant do not exceed the values stated above.

6.2.3 A further 5 dB reduction will be applied to the above noise emissions limit if the proposed plant items display tonal characteristics (such as whines, hisses or hums).

6.3 Assessment

6.3.1 Based on the plant details presented in Section 5, and taking into consideration the attenuation across distance, and from the barrier formed by the surrounding and proposed existing buildings, the noise emission levels have been calculated and are illustrated below in Figure 1.

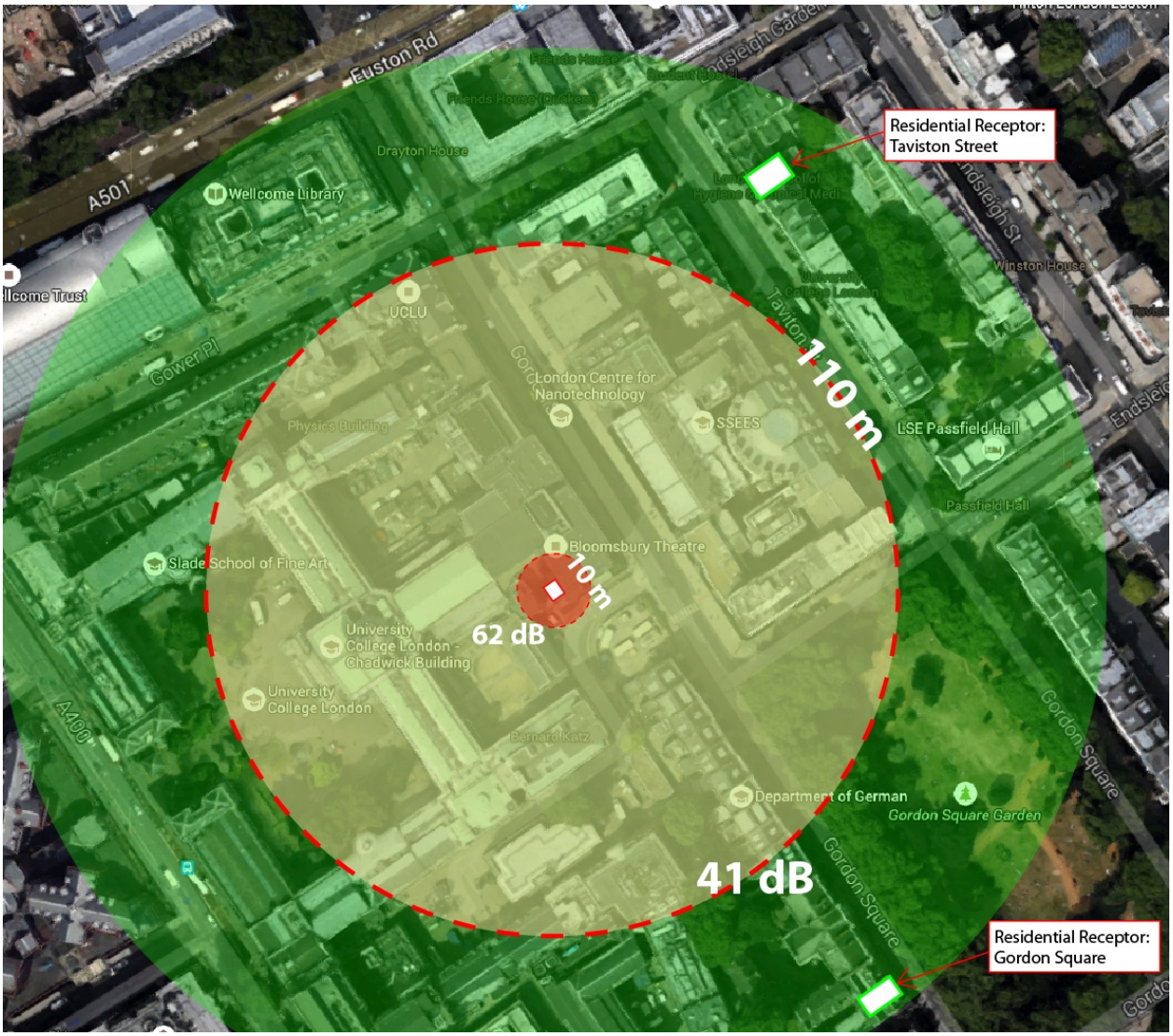


Figure 1: Calculated noise emission levels

6.3.2 Based upon current plant configurations, the noise emissions of all plant operating simultaneously has been calculated to fall below the night-time plant noise emissions limit of 41 dB at 110 m from the proposed plant location.

6.3.3 There are no known non-UCL owned noise sensitive premises within a radius of 110m from the location of the NPR, and therefore based on the calculation results from the assessment, the rooftop plant items as currently proposed will fall within the noise emissions limit at this distance during the day and night-time periods.

6.3.4 With reference to the recent application and approval for the Node Plant Replacement, it can be observed that the cumulative noise levels of all plant operating at both locations are unlikely to give rise to an observable adverse effect on the health and quality of life in the vicinity of the UCL campus.

7 Conclusion

7.1.1 BDP Acoustics has been appointed to assess the potential noise emissions from the new building services plant items proposed to be installed on the third and fourth floor roof decks and fourth floor rooftop of the proposed New Student Centre at University College London.

7.1.2 The lowest background noise levels were measured to be L_{A90} 54 dB during the day and L_{A90} 46 dB during the night at the position representative of the nearest noise sensitive premises.

7.1.3 To comply with the planning policy of the London Borough of Camden, any individual items of building services plant associated with the development must be specified such that the cumulative noise ratings of all items of plant in simultaneous operation do not exceed the following at the nearest noise sensitive premises:

- Noise emissions level of $L_{Aeq,T}$ 49 dB during the day time (0700 – 2300 hrs)
- Noise emissions level of $L_{Aeq,T}$ 41 dB during the night time (2300 – 0700 hrs).

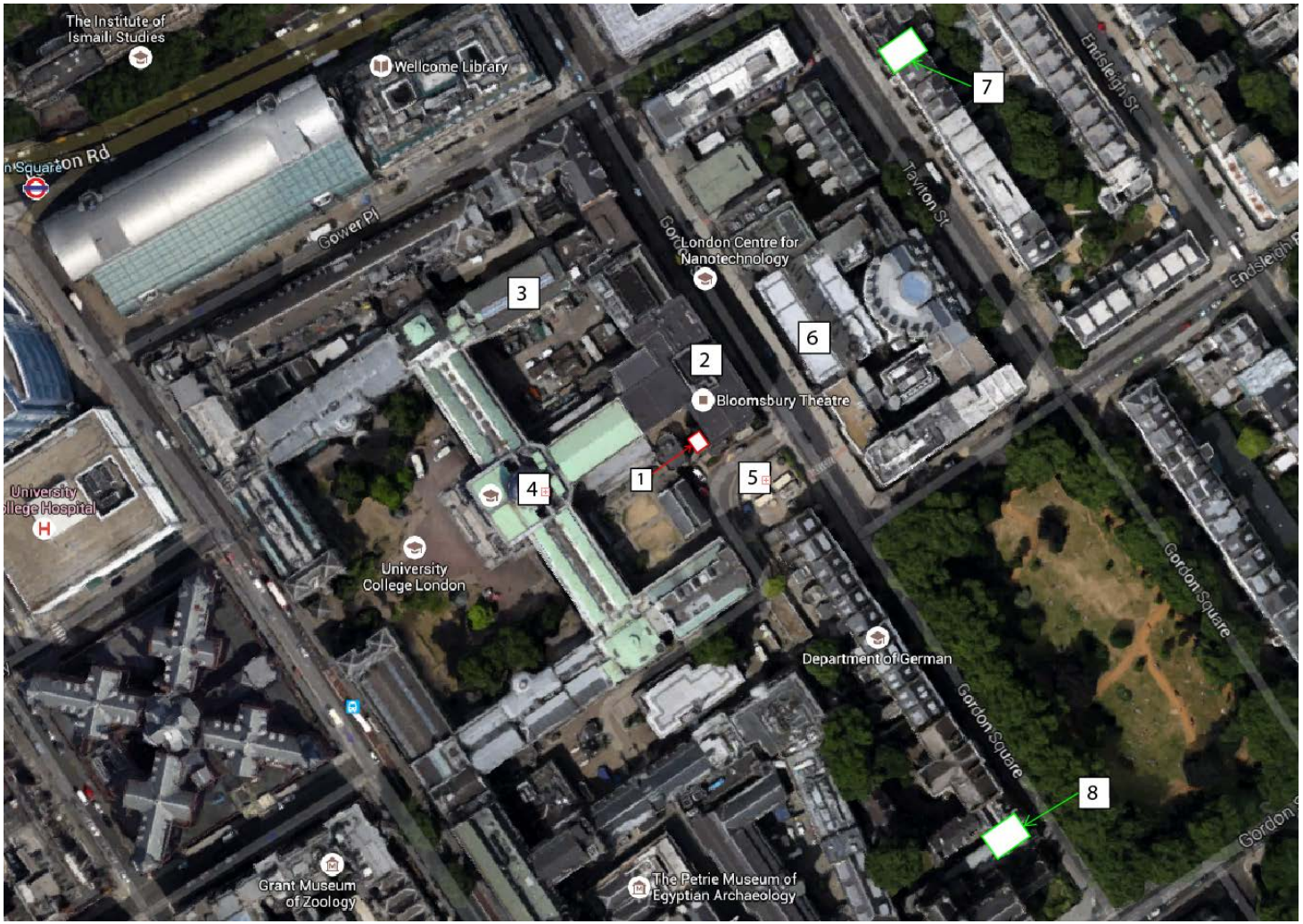
7.1.4 Further 5 dB reduction will be applied to the above noise emissions limit if the proposed plant items display tonal characteristics (such as whines, hisses or hums).

7.1.5 The cumulative noise emissions from the proposed building services plant has been calculated to fall within the noise emissions limit.

7.1.6 With reference to the recent application and approval for the Node Plant Replacement, it can be observed that the cumulative noise levels of all plant operating at both locations are unlikely to give rise to an observable adverse effect on the health and quality of life in the vicinity of the UCL campus.

7.1.7 In conclusion, the new building services plant presents a design scheme that is compliant with the Council's planning policy for noise emissions. As such there should be no reason why planning permission should not be granted on the basis of noise alone.

Appendix A - Site plan indicating the neighbouring buildings



Key

1: Proposed location of the new plant installation

2: Bloomsbury Theatre

3: Physics Building

4: Wilkins Building

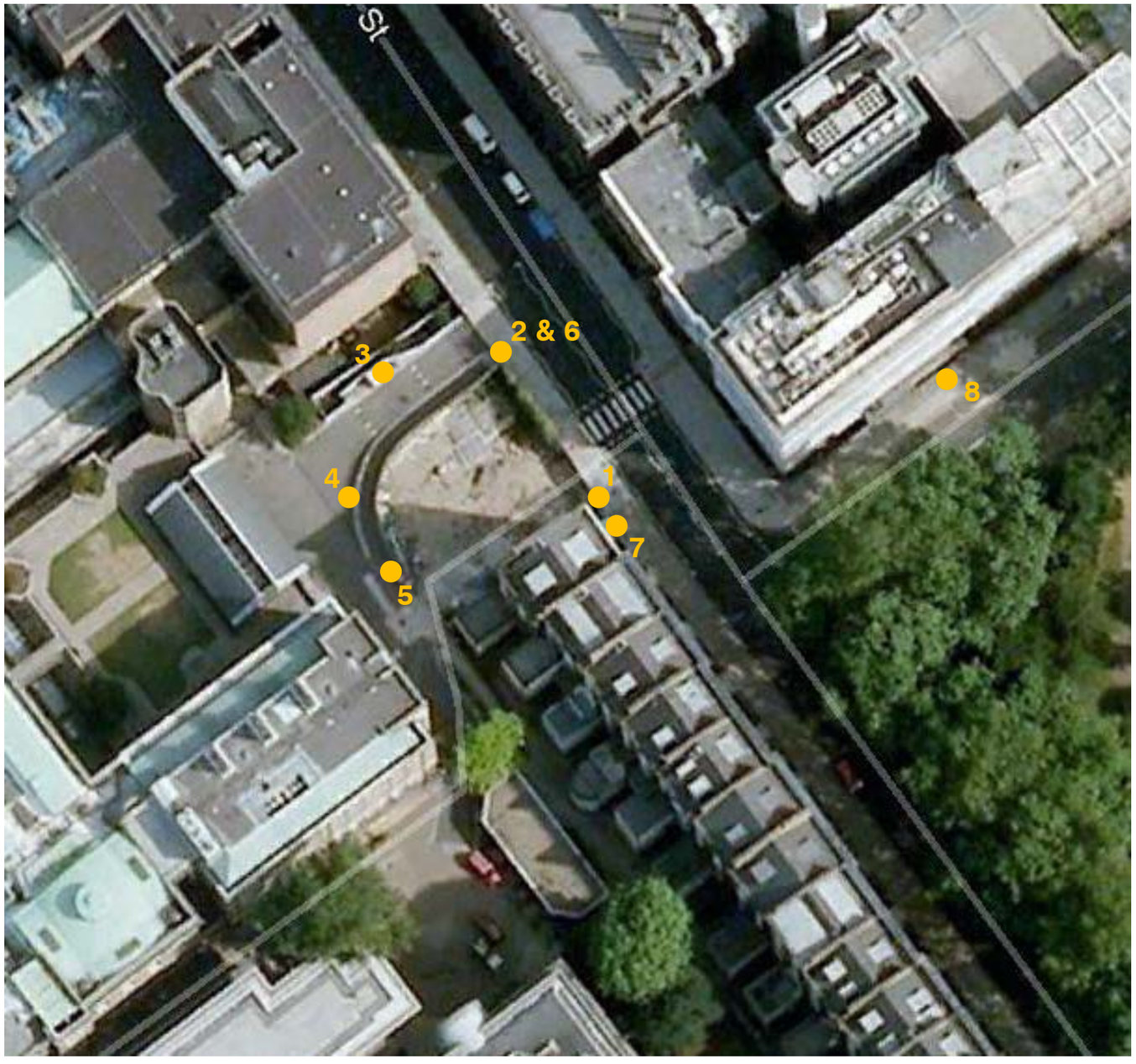
5: Proposed location for the New Student Centre

6: London Centre for Nanotechnology

7: Residential Receptor: Taviton Street

8: Residential Receptor: Gordon Square

Appendix B - Site map indicating noise survey positions



Appendix C – Short-term survey frequency data

Day time

$L_{1, 15 mins}$

Time	Position	Sound pressure level (dB) Octave Band Centre Frequency, (Hz) 63	125	250	500	1k	2k	4k	8k	Overall A-weighted sound pressure level dB(A)
11:11 hrs	1	86	80	76	71	70	67	64	57	75
11:30 hrs	2	86	81	76	73	73	70	68	60	78
11:46 hrs	3	80	75	69	67	64	61	57	50	69
12:02 hrs	4	79	71	72	70	67	63	59	56	72
12:18 hrs	5	78	72	65	69	65	62	56	48	71

Table 6: Measured noise levels dB L_1 re 2 x 10^{-5} Pa

$L_{eq, 15 mins}$

Time	Position	Sound pressure level (dB) Octave Band Centre Frequency, (Hz) 63	125	250	500	1k	2k	4k	8k	Overall A-weighted sound pressure level dB(A)
11:11 hrs	1	76	70	66	63	62	59	54	49	67
11:30 hrs	2	75	70	67	65	64	61	57	49	69
11:46 hrs	3	70	64	60	59	56	53	48	42	61
12:02 hrs	4	70	64	63	62	58	54	49	45	63
12:18 hrs	5	69	63	60	61	56	53	47	39	62

Table 7: Measured noise levels dB L_{eq} re 2 x 10^{-5} Pa

$L_{90, 15 mins}$

Time	Position	Sound pressure level (dB) Octave Band Centre Frequency, (Hz) 63	125	250	500	1k	2k	4k	8k	Overall A-weighted sound pressure level dB(A)
11:11 hrs	1	65	60	60	55	52	48	42	33	58
11:30 hrs	2	65	61	59	54	51	47	40	31	57
11:46 hrs	3	62	57	56	52	48	44	39	29	54
12:02 hrs	4	65	61	60	58	54	48	42	35	59
12:18 hrs	5	62	57	56	53	48	43	37	29	55

Table 8: Measured noise levels dB L_{90} re 2 x 10^{-5} Pa

Night time

$L_{1, 5 mins}$

Time	Position	Sound pressure level (dB) Octave Band Centre Frequency, (Hz) 63	125	250	500	1k	2k	4k	8k	Overall A-weighted sound pressure level dB(A)
03:25 hrs	6	66	67	63	67	61	64	60	53	67
03:30 hrs		70	68	64	68	69	74	69	57	76
03:35 hrs		72	75	70	67	66	66	62	56	70
03:40 hrs		68	66	62	63	64	67	63	50	70
03:45 hrs		68	72	70	72	72	74	70	64	77
03:50 hrs		66	64	60	59	53	63	60	38	66
03:52 hrs	7	72	67	63	64	67	60	52	42	69
03:21 hrs	8	69	61	63	62	65	59	49	39	68
03:34 hrs		67	62	59	58	61	56	46	35	64
03:39 hrs		69	64	65	62	64	60	52	41	67
03:44 hrs		73	59	56	56	56	52	43	35	60
03:50 hrs		77	70	68	68	70	68	60	51	74

Table 9: Measured noise levels dB L_1 re 2 x 10^{-5} Pa

$L_{eq, 5 mins}$

Time	Position	Sound pressure level (dB) Octave Band Centre Frequency, (Hz) 63	125	250	500	1k	2k	4k	8k	Overall A-weighted sound pressure level dB(A)
03:25 hrs	6	61	58	59	52	51	47	42	32	56
03:30 hrs		62	58	59	56	59	53	41	30	61
03:35 hrs		65	60	59	54	54	50	43	34	58
03:40 hrs		61	58	58	53	54	49	39	29	57
03:45 hrs		62	60	61	58	60	56	50	42	63
03:50 hrs		60	57	57	50	52	47	29	16	55
03:52 hrs	7	62	58	58	54	54	48	39	28	57
03:21 hrs	8	59	53	51	49	51	45	37	37	54
03:34 hrs		59	54	50	47	48	43	36	36	52
03:39 hrs		59	54	53	50	52	47	39	38	55
03:44 hrs		62	53	49	46	46	40	35	35	50
03:50 hrs		64	59	56	56	57	54	46	37	61

Table 10: Measured noise levels dB L_{eq} re 2 x 10^{-5} Pa

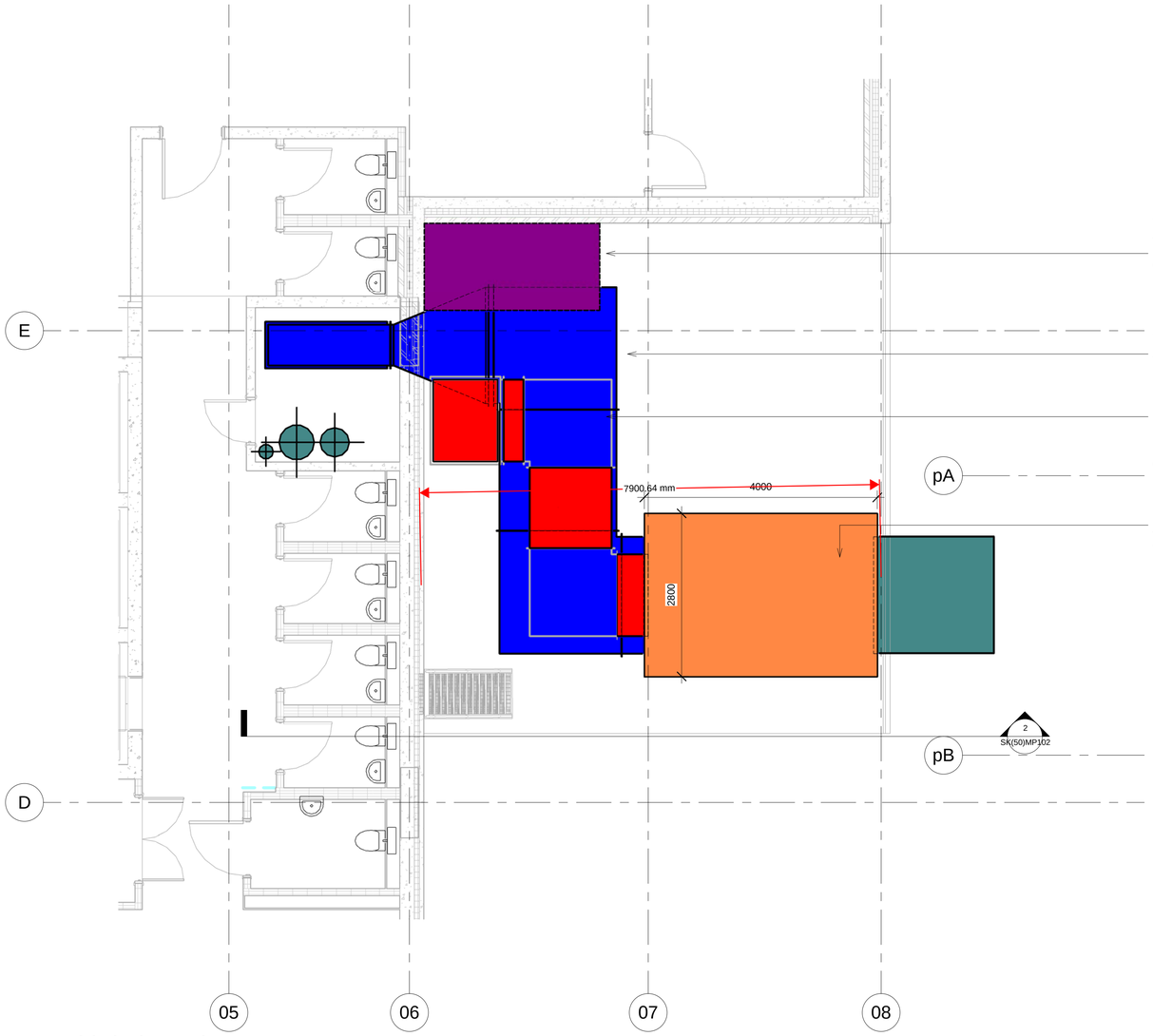
$L_{90, 5 mins}$

Time	Position	Sound pressure level (dB) Octave Band Centre Frequency, (Hz) 63	125	250	500	1k	2k	4k	8k	Overall A-weighted sound pressure level dB(A)
03:25 hrs	6	58	56	57	50	46	38	29	15	53
03:30 hrs		58	56	56	49	45	38	28	15	52
03:35 hrs		58	56	56	49	45	38	28	15	52
03:40 hrs		57	56	56	49	45	38	28	15	52
03:45 hrs		58	56	56	49	46	38	28	15	52
03:50 hrs		58	56	56	49	45	38	28	15	52
03:52 hrs	7	57	55	55	49	45	38	28	15	52
03:21 hrs	8	53	50	46	42	40	36	36	36	46
03:34 hrs		53	50	46	43	41	37	37	37	47
03:39 hrs		53	50	47	43	41	36	36	36	47
03:44 hrs		53	50	47	42	40	36	36	36	46
03:50 hrs		54	50	47	44	42	37	37	37	47

Table 11: Measured noise levels dB L_{90} re 2 x 10^{-5} Pa

Appendix D – Site plan indicating roof plant locations

NOTES



Clear access zone running from ground floor to roof level. To be used in the event of large component replacements for AHU plant on plant decks

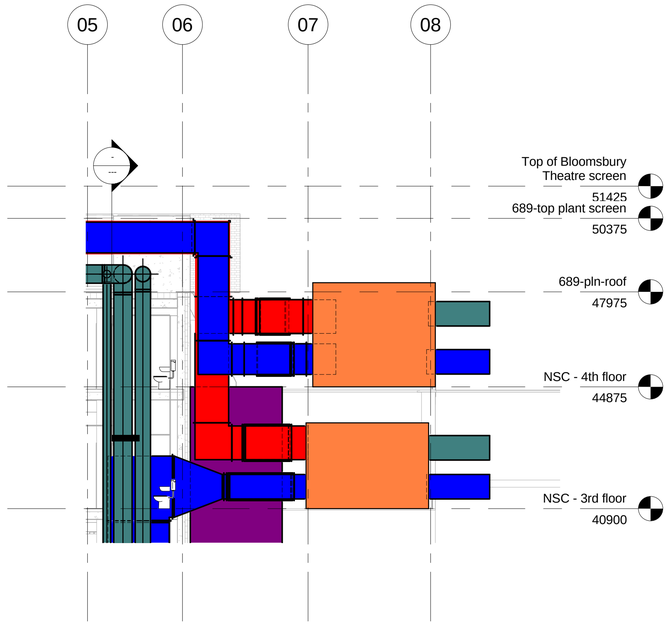
Supply air duct connecting directly into the at third floor, distributing to respective levels, as shown in section below

Return air duct rising to roof level, connecting to atrium extract plenum.

AHU 2 located on the third floor roof deck.

1 *Third Floor Plant Layout

1 : 50



2 External Plant Deck Section

1 : 100

REVISION / DESCRIPTION	DRAWN	CHECKED	DATE

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PROJECT TITLE: UCL Student Centre

P2006543

DRAWING TITLE: PLANTROOM LAYOUT - THIRD FLOOR

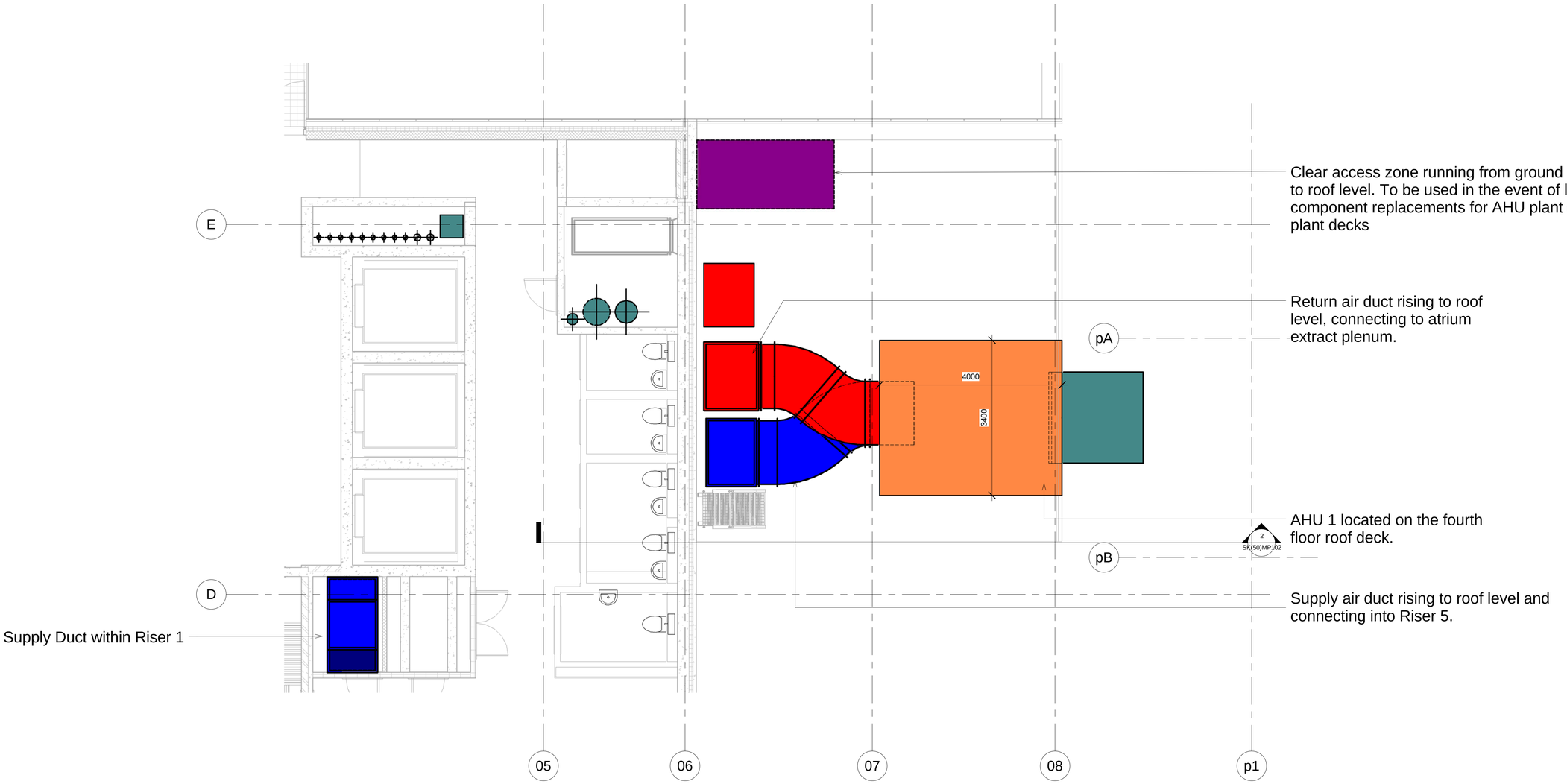
SCALE: As indicated @ A1

DATE: 17.04.2015

DRAWING NO: SK(50)MP102

REVISION: -

NOTES



1 *Fourth Floor Plant Layout

1 : 50

REVISION / DESCRIPTION	DRAWN	CHECKED	DATE

CLIENT

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PROJECT TITLE: UCL Student Centre

P2006543

DRAWING TITLE: PLANTROOM LAYOUT - FOURTH FLOOR PLANT

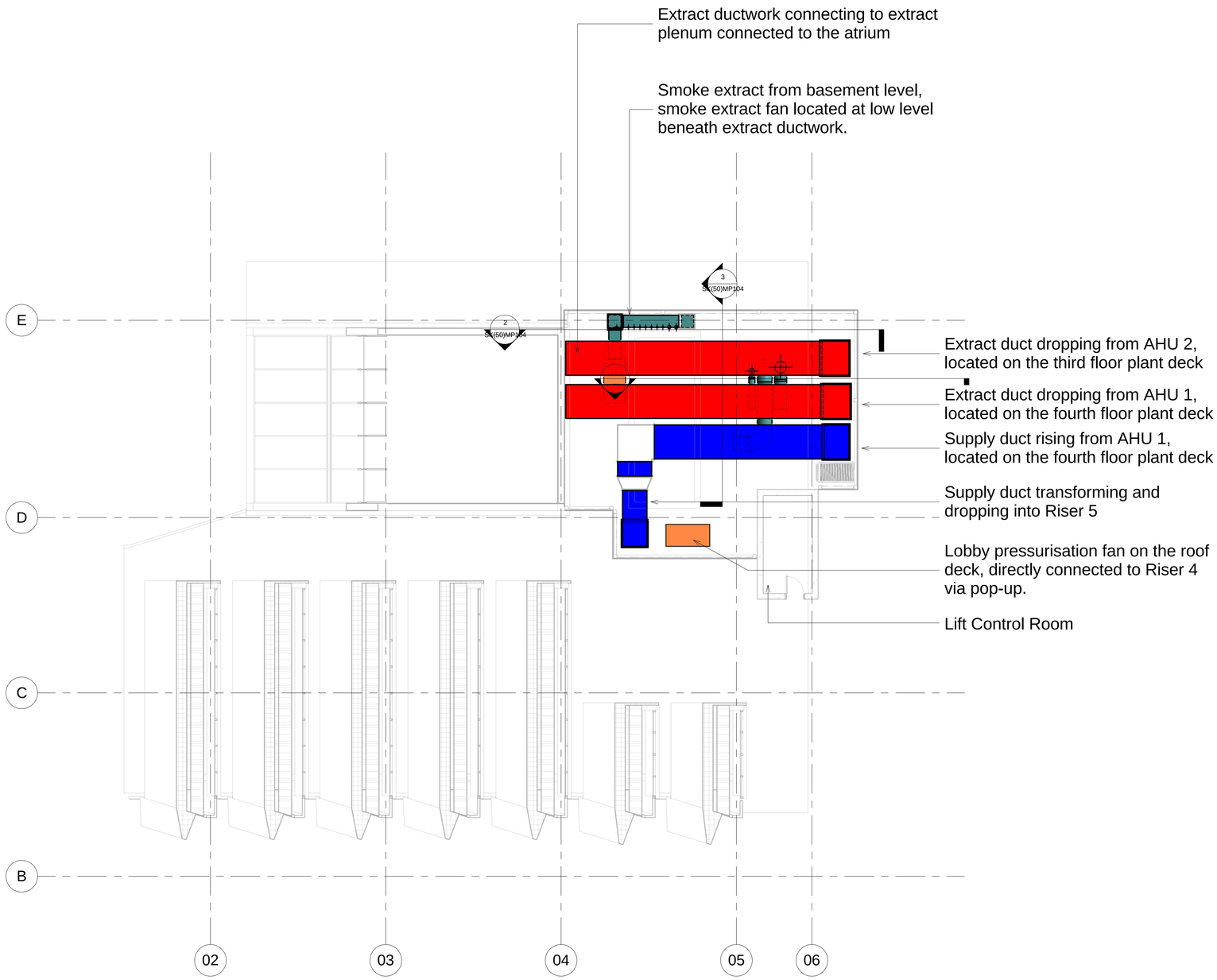
SCALE: @ A1, 1 : 50

DATE: 17.04.2015

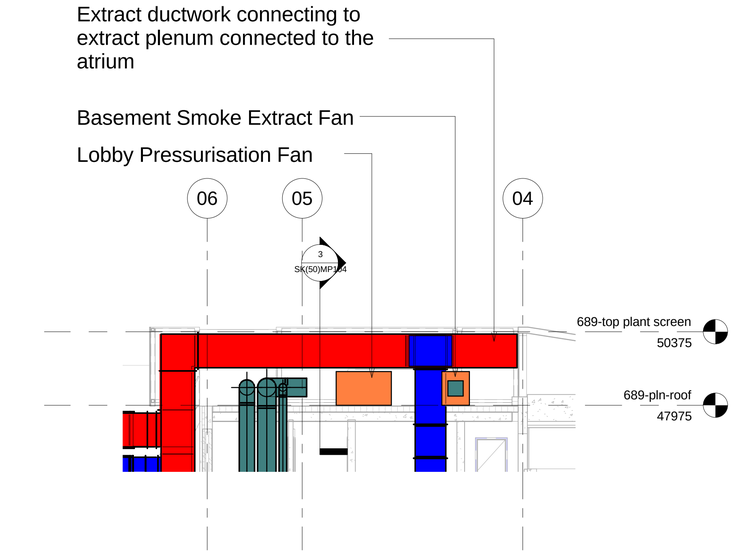
DRAWING No.: SK(50)MP103

REVISION: -

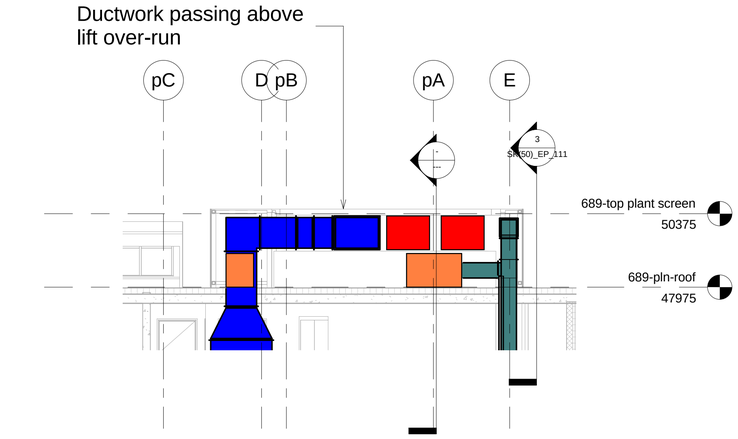
NOTES



1 *Roof Plant Layout
1 : 100



2 Roof Plant Section 1
1 : 100



3 Roof Plant Section 2
1 : 100

REVISION / DESCRIPTION	DRAWN	CHECKED	DATE

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PROJECT TITLE: UCL Student Centre

P2006543

DRAWING TITLE: PLANTROOM LAYOUT - ROOF

SCALE: @ A1 1 : 100

DATE: 17.04.2015

DRAWING No: SK(50)MP104

REVISION: -