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MIDLAND CRESCENT CONDITION NO 23 – PERMISSION REF: 2014/ 5527/P – AIR QUALITY

**MIDLAND CRESCENT
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5527/P – AIR QUALITY**

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1. INTRODUCTION

- 1.0.1 Ramboll UK Limited (Ramboll) has been commissioned by Stadium Capital Holdings to undertake an air quality assessment in order to discharge Condition number 23 set out in the Planning Permission Ref 2014/5527/P - 279 Finchley Road, 'Midland Crescent'.
- 1.0.2 This report has been prepared by Ramboll solely for the benefit of Stadium Capital Holdings. It shall not be relied upon or transferred to any third party, without the prior written authorisation of Ramboll, with the exception of its use in connection with the planning application which this report supports. Any liability arising out of the use by Stadium Capital Holdings or any third party of this report for purposes not wholly connected with the above shall be the responsibility of Stadium Capital Holdings and such third party who shall indemnify Ramboll against all claims, costs, damages and losses arising out of such use.
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1.1 Site Description and Location

- 1.0.5 The Site is centred approximately at Grid Reference 526089,184872 within the London Borough of Camden (LBC).
- 1.0.6 The Site is triangular in shape and is approximately 0.16ha in area. It is bounded by railway lines to the north and the south. Finchley Road (A41) at the eastern boundary is elevated by approximately 7m above the western corner of the site. A shopping centre is located beyond the railway lines immediately south of the site. Other commercial businesses and residential properties are located along Finchley Road.

1.2 Development Permission 2014/5527/P

- 1.0.7 The proposed development for which planning permission was granted in 2014 is detailed as: "Redevelopment of the site by the erection of a part 3, part 4 and part 5 storey building with a double level basement comprising flexible commercial space (Use Classes A1/A2/A3/A4/B1/D1 & D2) at lower basement and ground floor levels, 60 student bedrooms with communal kitchen, lounge and common room areas, and 9 residential dwellings (Class C3)".
- 1.2.1 Condition number 23 assigned to the permission is as follows: "*Dispersion modelling shall be undertaken to identify the optimum location for the inlet for mechanical ventilation, carbon filters must be added to the inlet. Details of the final location and filters must be submitted to and approved by LBC*".
- 1.2.2 Correspondence from Tessa Craig, Planning Officer at Camden Council, to Oliver Carr of HGH Planning, on the 10th January 2018, stated that "*We would normally state NO_x filtration equipment or similar nowadays. Air filters these days can contain both activated carbon and G3. Either way, the filters should be specified by an expert to ensure adequate removal of NO_x from the intake air.*"

2. AIR QUALITY AND PLANNING POLICIES

2.0.1 Ramboll submitted an Air Quality Assessment Report (Document Ref 30030/ENV/R01)¹ in August 2014 to support the planning submission.

2.0.2 No changes to international or national policies have taken place since this report was submitted.

1.3 Camden Local Plan 2016-2031

1.3.1 The Camden Local Plan replaces the Core Strategy and Development Policies planning documents (adopted in 2010)². The Local Plan covers the period from 2016-2031 and was adopted by LBC on 3rd July 2017.

2.0.3 Policy CC4 Air Quality within the Local Plan is detailed below:

“The Council will ensure that the impact of development on air quality is mitigated and ensure that exposure to poor air quality is reduced in the borough.

The Council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Council’s Air Quality Action Plan.

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e. housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact.

Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan”.

2.2 Camden Clean Air Action Plan 2016 – 2018

2.0.1 LBC published a Clean Air Action Plan³ in 2016 which replaced the draft Clean Air Action Plan 2013-2015. The Plan is divided into five sections: 1) Monitoring Air Quality in Camden; 2) Reducing emissions from buildings and new developments; 3) Reducing emissions from transport; 4) Raising awareness of air quality and 5) Lobbying and partnership working.

2.0.2 Table 2.1 below shows the relevant action included within Section 2 of the Clean Air Action Plan on reducing emissions associated with new developments. No other actions are included within the plan which are of relevance to this report.

Table 2.1: Camden Clean Air Action Plan Section 2 Reducing Emissions from Buildings and New Developments

Action	Detail	Timeframe	Outcome
16. Require developers to undertake an air quality assessment (AQA) in	Update planning policies where necessary to ensure that developers designate these sites with	Ongoing	- Reduces emissions (air pollutants) - Minimise exposure of sensitive

¹ Midland Crescent, Air Quality Assessment, Ramboll, 2014

² Camden Development Policies 2010-2025. London Borough of Camden, November 2010

³ Camden’s Clean Air Action Plan 2016-2018, London Borough of Camden, 2016

Action	Detail	Timeframe	Outcome
circumstances where a new development could have a negative impact on air quality where the development is adjacent to sensitive receptors such as schools, nurseries, hospitals and doctors' surgeries, or where the development will introduce new receptors into an area of existing poor air quality.	the correct risk level, and undertake mitigation and monitoring measures accordingly in subsequent Construction and/or Demolition Management Plans.		receptors near developments

3. METHODOLOGY

3.1 Scope of Report

3.0.1 The scope of this report is detailed below:

- Review of appropriate baseline and background air quality data and comparison to baseline conditions to standards;
- ADMS dispersion model calculations of NO₂ concentrations at various locations to identify the optimum location for the inlets for the mechanical ventilation (MVHR) units. Both the long term and short term concentrations of these pollutants to be assessed;
- Comparison of modelled pollutant concentrations to relevant national standards, to confirm suitability of the MVHR inlet locations; and
- Provision of information regarding inlet filters to be used within the building.

3.0.2 Emissions from the railway line have not been modelled as these emissions are included within the background concentrations used within the assessment.

3.2 Baseline Data Collation

3.0.1 Data has been collected from the following sources:

- DEFRA's UK Ambient Air Quality Interactive Map⁴; and
- London Air Website⁵.

3.3 Prediction of Pollutant Concentrations

3.0.1 Pollutant concentrations have been predicted using ADMS Roads air quality dispersion model. The model uses traffic survey data and digitised meteorological observation data collected at a Met Office observation station representative of conditions at the site itself.

3.0.2 In accordance with DEFRA guidance, modelled baseline concentrations have been compared to measured concentrations and the modelled results adjusted accordingly. This process is known as model verification, and details of the procedure together with further details regarding the modelling calculations and methodology are given in Appendix A.

⁴ <https://uk-air.defra.gov.uk/data/gis-mapping>

⁵ <http://www.londonair.org.uk/>

- 3.0.3 A summary of the traffic data used in the assessment, detailing the annual average daily traffic (AADT) flows, average vehicle speeds and HGV percentages are presented in Appendix B.
- 3.0.4 For the development scheme scenario, conversion of NO_x to NO₂ has been undertaken using Version 6.1 of the NO_x to NO₂ conversion spread sheet released in November 2017 by AEA Technology PLC. Version 7.0 emissions factors have been used to calculate vehicle emissions of NO_x within ADMS. A worst-case emission year of 2016 has been utilised along with a road type of London (inner). City Airport 2016 has been used for the scheme modelling scenarios.
- 3.0.5 Background pollutant data from DEFRA's GIS Interactive Mapping⁴ have been used to establish total pollutant concentrations.
- 3.0.6 Research ^{6,7}, has concluded that exceedances of the one-hour mean objective are unlikely to occur where annual mean concentrations do not exceed 60µg/m³. This relationship has been used to assess whether exceedances of the hourly mean objective are likely.

4. BASELINE

- 4.0.1 The whole of the LBC has been designated as an Air Quality Management Area (AQMA) due to poor air quality. The eastern façade of the development fronts on to the A41 Finchley Road where air quality is likely to be heavily influenced from traffic. There are no industrial pollution sources in the immediate vicinity of the application site that will affect air quality.

4.1 Local Authority Monitoring Data

- 4.0.1 There are a number of monitoring stations operated by the LBC. The nearest automatic monitoring station is Swiss Cottage located approximately 650 m to the south east. This measures kerbside concentrations and is located at the kerb of the junction of three busy roads: Finchley Road; College Crescent and Swiss Cottage.
- 4.0.2 2016 annual mean data from London Air⁵ shows concentrations at Swiss Cottage to be 66 µg/m³ for NO₂ which is above the UK Air Quality Objective Level of 40 µg/m³.

4.2 London Atmospheric Emissions Inventory (LAEI) 2013

- 4.0.1 The LAEI provides maps that estimate key pollutants (NO_x, PM₁₀, PM_{2.5} and CO₂) for the base year of 2013 and projected forward years of 2020, 2025, and 2030. Figure 4.1 below shows the 2013 LAEI map for the development site location.

⁶ D Laxen and B Marner, Analysis of the relationship between one-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites, July 2003

⁷ Cook A, Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedances of the one-hour mean AQS, May 2008

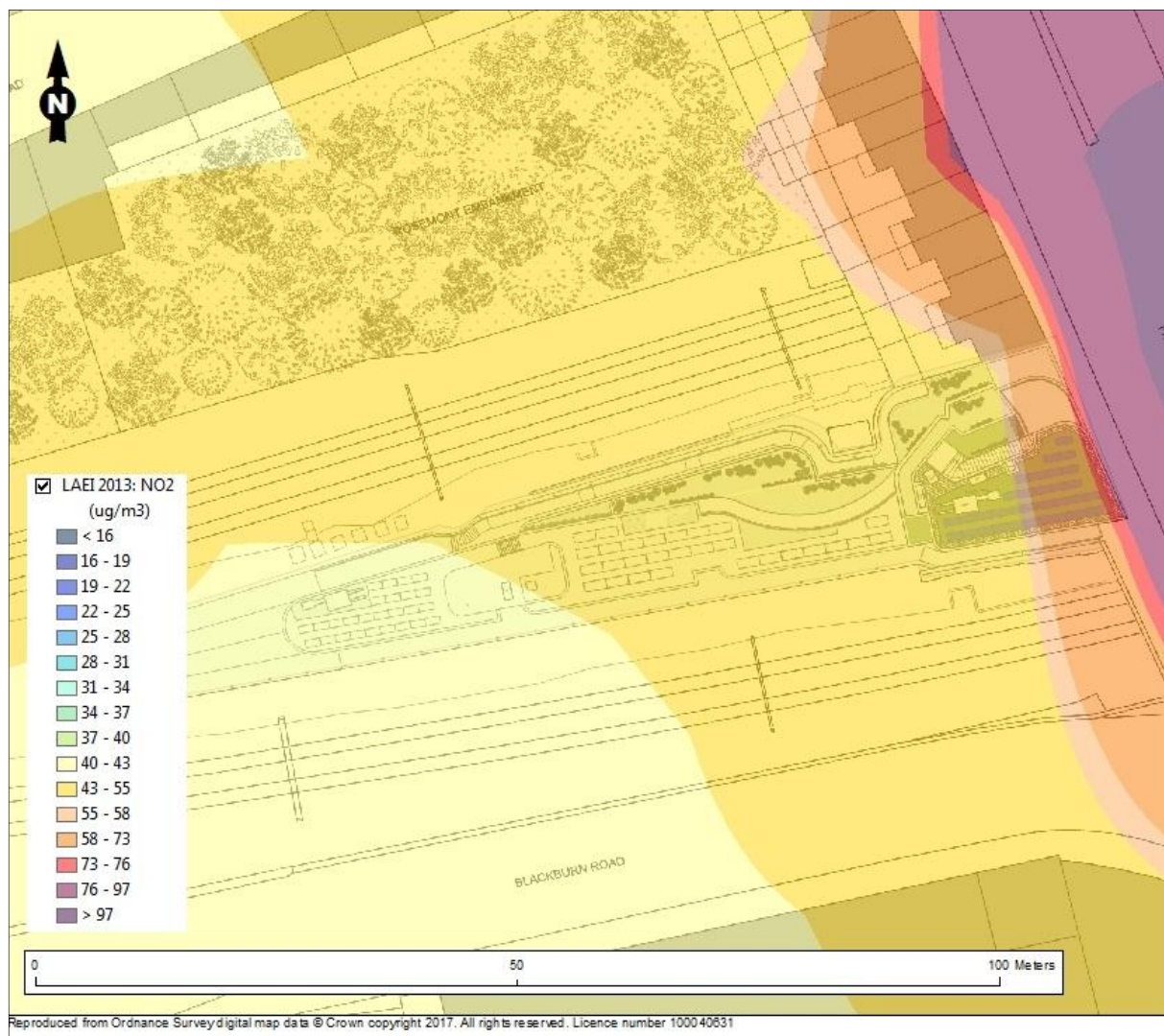
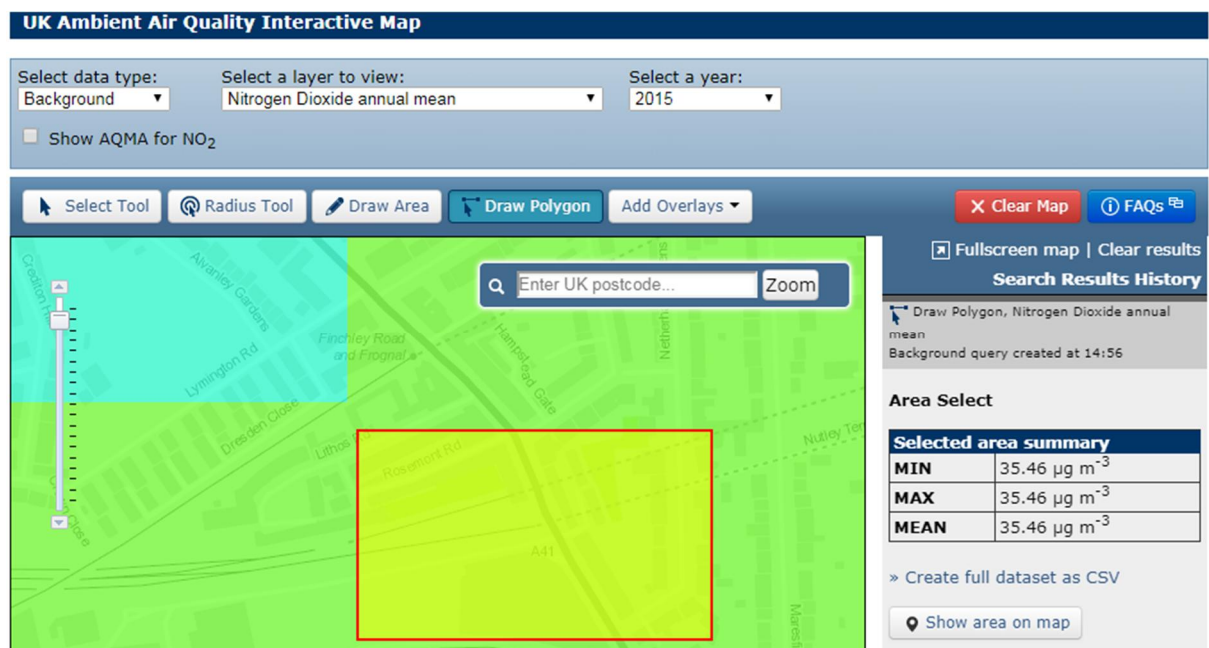
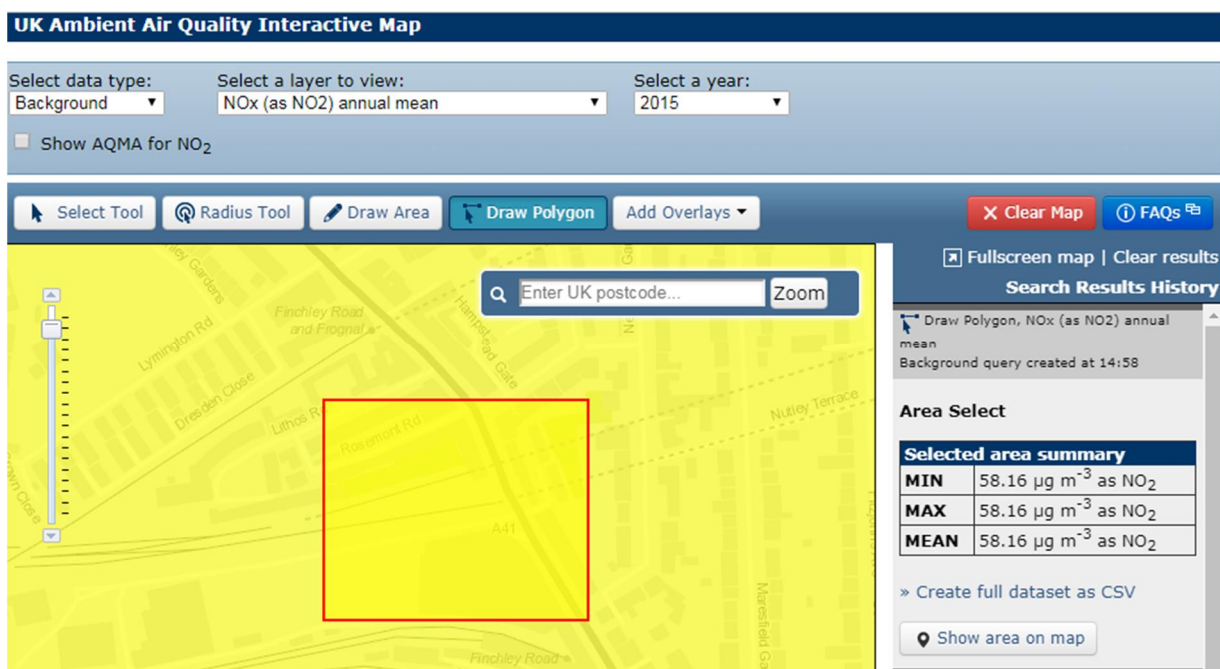


Figure 4-1: LAEI 2013 NO₂ Concentration Map 2013

4.3 DEFRA's UK Ambient Air Quality Interactive Map

- 4.0.1 DEFRA's interactive tool allows exploration of ambient air quality concentration data from DEFRA's national Pollution Climate Mapping modelling.
- 4.0.2 Background pollutant concentrations have been utilised within the modelling for the most recent year (2015). The development site area for NO₂ and NO_x are displayed below in Figures 4.2 and 4.3:

Figure 4-2: Background NO₂ Annual MeanFigure 4-3: Background NO_x Annual Mean

5. MVHR UNIT LOCATION OPTIMISATION

- 5.0.1 The model was run to predict concentrations at the proposed vents for the ventilation system which are to be located at roof level within the proposed development.
- 5.0.2 A long section of the proposed building is provided in Appendix C.
- 5.0.3 The following three locations are where NO₂ concentrations are predicted to be within the UK Air Quality Objective Level.

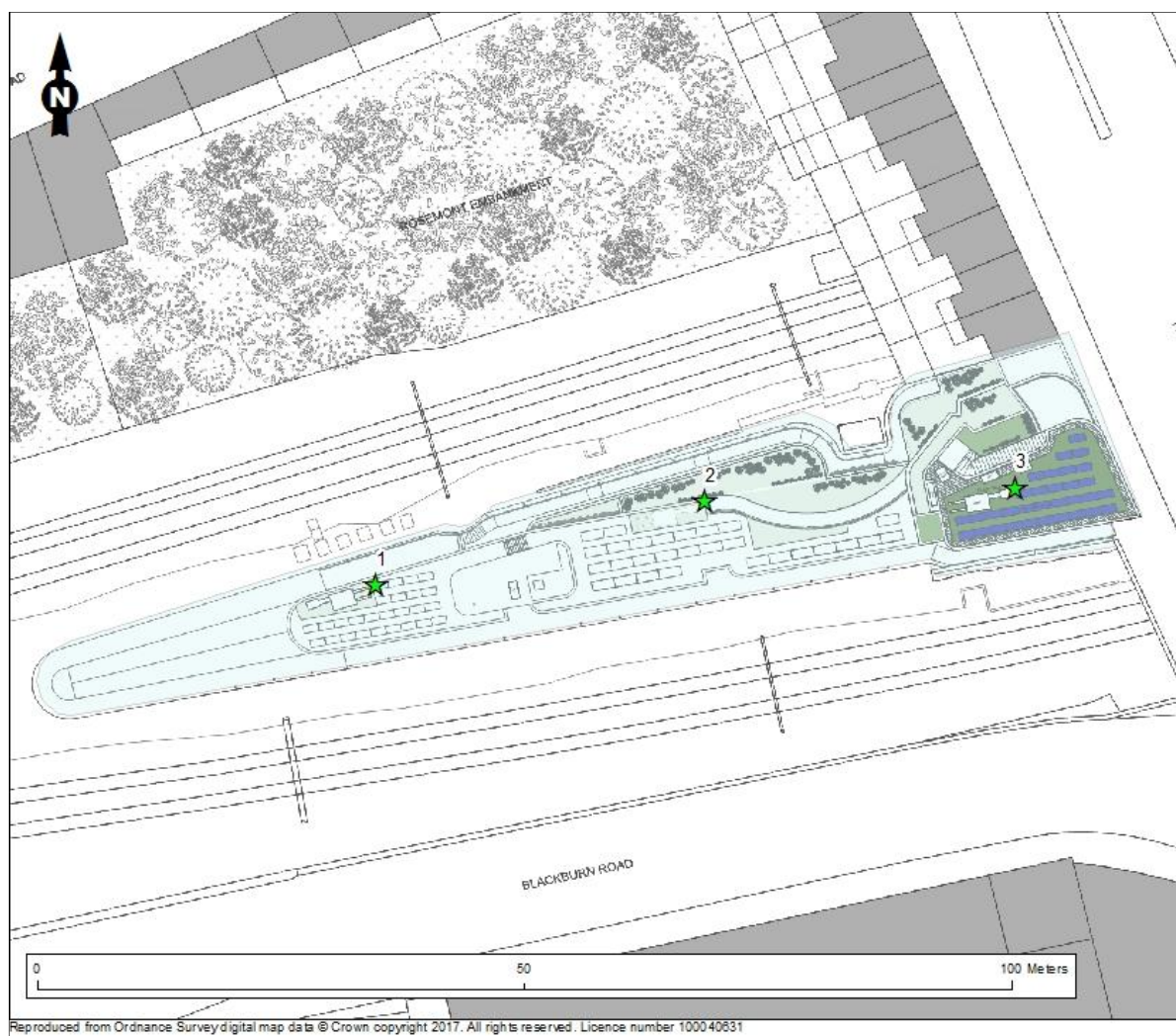


Figure 5-1: MVHR Locations within the UK Air Quality Objective Level for NO₂.

5.0.4 The results of the modelling are provided in Table 5.2 below. Ground level at Finchley Road is 57.2 m AOD.

Table 5.1: ADMS Modelling Results

Location	MVHR Inlet Height	Height in Model with Ground at Zero	Total NO ₂ Concentration
1	64.7 m AOD	7.5 m	38.8 µg/m ³
2	66.2 m AOD	9 m	39.9 µg/m ³
3	73.7 m AOD	16.5 m	37.3 µg/m ³

5.0.5 The predicted concentrations at the roof heights where the MVHR Inlets will be positioned are within the UK Air Quality Objective of 40 µg/m³. As the levels are also below 60 µg/m³ it is unlikely that the hourly mean would be exceeded at these locations. Therefore, there is no requirement for NO_x filters to be fitted onto the MVHR units.

6. FILTER INFORMATION

6.0.1 KUT submitted a Planning document for the Mechanical and Electrical Services for Midland Crescent at the planning stage⁸.

6.0.2 Within this document it is stated that “*Mechanical supply and extract ventilation with heat recovery (MVHR) shall be provided to the student accommodation. The MVHR air handling units shall be located on the roof. Special NO_x filters shall be installed in-line with the air intake duct into the MVHR air handling units.*

The ventilation system shall be equivalent to a category Type 4 ventilation system with regards to Part F of the Building Regulations.”

6.0.3 At the time of writing no detailed design regarding the mechanical ventilation is complete. However, if NO_x filters are deemed necessary by LBC it is likely that Nitrosorb units will be utilised and information relating to these units are provided in Appendix D.

⁸ Planning brief for the mechanical and electrical services at Midland Crescent London NW3, RFB/CMW/6000/9 26th August 2014 - Revision A

APPENDIX A MODEL VERIFICATION

It is recommended by DEFRA's Technical Guidance (TG.16) that model results are compared with measured data to determine whether the model results need adjusting to more accurately reflect local air quality.

The roadside site Swiss Cottage was used for model verification purposes. Background data from the DEFRA GIS website were used to provide background NO_x and NO₂ concentrations.

The monitored roadside NO_x was derived by using the diffusion tube tab of the NO_x to NO₂ calculator. As the verification year used was 2013, Version 5.1 of the calculator was used.

The modelled and monitored roadside NO_x contribution values were compared and a factor was obtained. The modelled roadside NO_x contribution values were adjusted by the corresponding factor. The adjusted modelled roadside NO_x contribution values were converted to roadside NO₂ by using the NO_x to NO₂ Calculator. The modelled roadside NO₂ is then compared to the monitored roadside NO₂ and another factor is obtained. This factor is applied to the corresponding modelled roadside NO₂ value and then a total NO₂ value is obtained by adding the background NO₂.

This is outcome of the verification process is provided below:

Met Data Year	YEAR STATION	London City 2016												ADMS
Monitoring data year	2016	CA15	Site ID	DT / Monitor NO ₂ conc µg m ⁻³	Background NO _x and NO ₂ taken from Bloomsbury (UB) 2016		Road NO _x µg m ⁻³	Total NO ₂ µg m ⁻³	Road NO ₂ µg m ⁻³					
				NO _x	NO ₂									
			Swiss Cottage CA15	66.00	75.00	42.00	59.21	66	24					18.50
Monitoring locations		Monitored Total NO ₂ (µg/m ³) annual mean	Monitored Total NO _x (µg/m ³) annual mean	Monitored B/G NO ₂ (µg/m ³)	Monitored B/G NO _x (µg/m ³)	Monitored Road NO _x (µg/m ³)	Modelle d Road NO _x (µg/m ³)	Road NO _x Verification factor	Adjusted Modelled Road NO _x Conc	Monitored Road NO ₂	Adjusted Modelled Road NO ₂	Road NO ₂ Verificati on factor	Adjusted Road NO ₂ Conc	Final Total NO ₂
1	Swiss Cottage CA15	66.0	134.2	42.0	75.0	59.2	18.5	3.2	59.21	24.00	24.00	1.000	24.0	66.0
		66.0					Average =	3.2			Average =	1.00		66.0

A comparison of the LAEI map (2013) was also undertaken. The comparison shows that the ADMS model is broadly similar to the LAEI 2013 map. The LAEI map and ADMS model outputs and results are provided below:



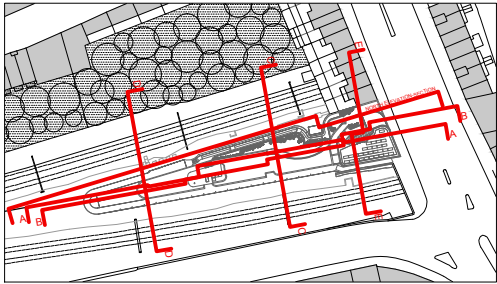
Receptor name	X(m)	Y(m)	Z(m)	Conc ug/ m3 NOx <All sources> - 1hr	NOX VERI FACTOR	ADJ NOX	CONVERT NO2	TOTAL NO2 (+B/G) defra GIS 2015	2013	2013 NOX	NO2
LAEI_1_0	526189.9	184890.9	0	21.88	3.2	70.0	26.45	63.5			
LAEI_2_0	526188.6	184890.5	0	20.25	3.2	64.8	24.75	61.8	2013 site area	Defra GIS	56.33
LAEI_3_0	526182.3	184889.2	0	15.09	3.2	48.3	19.13	56.2			37.07
LAEI_4_0	526181.2	184888.8	0	14.39	3.2	46.0	18.33	55.4			

APPENDIX B TRAFFIC DATA

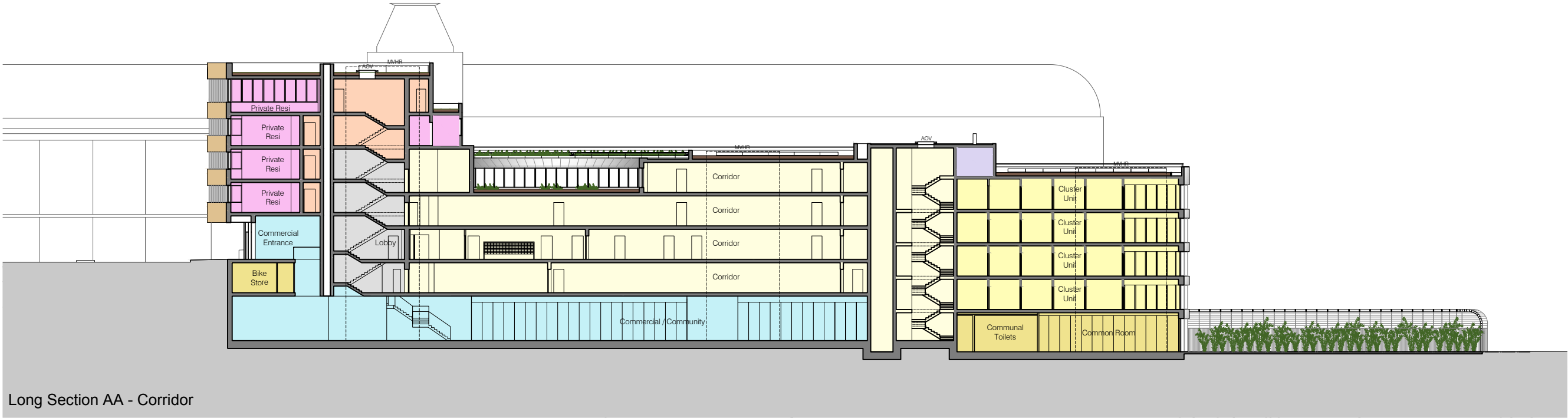
AADT	Year	CP	Estimate	Estimate	Region	Local Authority	Road	Road	Category	Eastings	Northing	Start Junction	End Junction	Link Length	Link Length	Pedal Cycl	Motorcycl	Cars	Taxis	Buses	Coe	Light	Goods	V2	Motor	V3	Motor	V4	Motor	V5	Motor	V6	Motor	V7	Motor	V8	Motor	V9	Motor	V10	Motor	V11	Motor	V12	Motor	V13	Motor	V14	Motor	V15	Motor	V16	Motor	V17	Motor	V18	Motor	V19	Motor	V20	Motor	V21	Motor	V22	Motor	V23	Motor	V24	Motor	V25	Motor	V26	Motor	V27	Motor	V28	Motor	V29	Motor	V30	Motor	V31	Motor	V32	Motor	V33	Motor	V34	Motor	V35	Motor	V36	Motor	V37	Motor	V38	Motor	V39	Motor	V40	Motor	V41	Motor	V42	Motor	V43	Motor	V44	Motor	V45	Motor	V46	Motor	V47	Motor	V48	Motor	V49	Motor	V50	Motor	V51	Motor	V52	Motor	V53	Motor	V54	Motor	V55	Motor	V56	Motor	V57	Motor	V58	Motor	V59	Motor	V60	Motor	V61	Motor	V62	Motor	V63	Motor	V64	Motor	V65	Motor	V66	Motor	V67	Motor	V68	Motor	V69	Motor	V70	Motor	V71	Motor	V72	Motor	V73	Motor	V74	Motor	V75	Motor	V76	Motor	V77	Motor	V78	Motor	V79	Motor	V80	Motor	V81	Motor	V82	Motor	V83	Motor	V84	Motor	V85	Motor	V86	Motor	V87	Motor	V88	Motor	V89	Motor	V90	Motor	V91	Motor	V92	Motor	V93	Motor	V94	Motor	V95	Motor	V96	Motor	V97	Motor	V98	Motor	V99	Motor	V100	Motor	V101	Motor	V102	Motor	V103	Motor	V104	Motor	V105	Motor	V106	Motor	V107	Motor	V108	Motor	V109	Motor	V110	Motor	V111	Motor	V112	Motor	V113	Motor	V114	Motor	V115	Motor	V116	Motor	V117	Motor	V118	Motor	V119	Motor	V120	Motor	V121	Motor	V122	Motor	V123	Motor	V124	Motor	V125	Motor	V126	Motor	V127	Motor	V128	Motor	V129	Motor	V130	Motor	V131	Motor	V132	Motor	V133	Motor	V134	Motor	V135	Motor	V136	Motor	V137	Motor	V138	Motor	V139	Motor	V140	Motor	V141	Motor	V142	Motor	V143	Motor	V144	Motor	V145	Motor	V146	Motor	V147	Motor	V148	Motor	V149	Motor	V150	Motor	V151	Motor	V152	Motor	V153	Motor	V154	Motor	V155	Motor	V156	Motor	V157	Motor	V158	Motor	V159	Motor	V160	Motor	V161	Motor	V162	Motor	V163	Motor	V164	Motor	V165	Motor	V166	Motor	V167	Motor	V168	Motor	V169	Motor	V170	Motor	V171	Motor	V172	Motor	V173	Motor	V174	Motor	V175	Motor	V176	Motor	V177	Motor	V178	Motor	V179	Motor	V180	Motor	V181	Motor	V182	Motor	V183	Motor	V184	Motor	V185	Motor	V186	Motor	V187	Motor	V188	Motor	V189	Motor	V190	Motor	V191	Motor	V192	Motor	V193	Motor	V194	Motor	V195	Motor	V196	Motor	V197	Motor	V198	Motor	V199	Motor	V200	Motor	V201	Motor	V202	Motor	V203	Motor	V204	Motor	V205	Motor	V206	Motor	V207	Motor	V208	Motor	V209	Motor	V210	Motor	V211	Motor	V212	Motor	V213	Motor	V214	Motor	V215	Motor	V216	Motor	V217	Motor	V218	Motor	V219	Motor	V220	Motor	V221	Motor	V222	Motor	V223	Motor	V224	Motor	V225	Motor	V226	Motor	V227	Motor	V228	Motor	V229	Motor	V230	Motor	V231	Motor	V232	Motor	V233	Motor	V234	Motor	V235	Motor	V236	Motor	V237	Motor	V238	Motor	V239	Motor	V240	Motor	V241	Motor	V242	Motor	V243	Motor	V244	Motor	V245	Motor	V246	Motor	V247	Motor	V248	Motor	V249	Motor	V250	Motor	V251	Motor	V252	Motor	V253	Motor	V254	Motor	V255	Motor	V256	Motor	V257	Motor	V258	Motor	V259	Motor	V260	Motor	V261	Motor	V262	Motor	V263	Motor	V264	Motor	V265	Motor	V266	Motor	V267	Motor	V268	Motor	V269	Motor	V270	Motor	V271	Motor	V272	Motor	V273	Motor	V274	Motor	V275	Motor	V276	Motor	V277	Motor	V278	Motor	V279	Motor	V280	Motor	V281	Motor	V282	Motor	V283	Motor	V284	Motor	V285	Motor	V286	Motor	V287	Motor	V288	Motor	V289	Motor	V290	Motor	V291	Motor	V292	Motor	V293	Motor	V294	Motor	V295	Motor	V296	Motor	V297	Motor	V298	Motor	V299	Motor	V300	Motor	V301	Motor	V302	Motor	V303	Motor	V304	Motor	V305	Motor	V306	Motor	V307	Motor	V308	Motor	V309	Motor	V310	Motor	V311	Motor	V312	Motor	V313	Motor	V314	Motor	V315	Motor	V316	Motor	V317	Motor	V318	Motor	V319	Motor	V320	Motor	V321	Motor	V322	Motor	V323	Motor	V324	Motor	V325	Motor	V326	Motor	V327	Motor	V328	Motor	V329	Motor	V330	Motor	V331	Motor	V332	Motor	V333	Motor	V334	Motor	V335	Motor	V336	Motor	V337	Motor	V338	Motor	V339	Motor	V340	Motor	V341	Motor	V342	Motor	V343	Motor	V344	Motor	V345	Motor	V346	Motor	V347	Motor	V348	Motor	V349	Motor	V350	Motor	V351	Motor	V352	Motor	V353	Motor	V354	Motor	V355	Motor	V356	Motor	V357	Motor	V358	Motor	V359	Motor	V360	Motor	V361	Motor	V362	Motor	V363	Motor	V364	Motor	V365	Motor	V366	Motor	V367	Motor	V368	Motor	V369	Motor	V370	Motor	V371	Motor	V372	Motor	V373	Motor	V374	Motor	V375	Motor	V376	Motor	V377	Motor	V378	Motor	V379	Motor	V380	Motor	V381	Motor	V382	Motor	V383	Motor	V384	Motor	V385	Motor	V386	Motor	V387	Motor	V388	Motor	V389	Motor	V390	Motor	V391	Motor	V392	Motor	V393	Motor	V394	Motor	V395	Motor	V396	Motor	V397	Motor	V398	Motor	V399	Motor	V400	Motor	V401	Motor	V402	Motor	V403	Motor	V404	Motor	V405	Motor	V406	Motor	V407	Motor	V408	Motor	V409	Motor	V410	Motor	V411	Motor	V412	Motor	V413	Motor	V414	Motor	V415	Motor	V416	Motor	V417	Motor	V418	Motor	V419	Motor	V420	Motor	V421	Motor	V422	Motor	V423	Motor	V424	Motor	V425	Motor	V426	Motor	V427	Motor	V428	Motor	V429	Motor	V430	Motor	V431	Motor	V432	Motor	V433	Motor	V434	Motor	V435	Motor	V436	Motor	V437	Motor	V438	Motor	V439	Motor	V440	Motor	V441	Motor	V442	Motor	V443	Motor	V444	Motor	V445	Motor	V446	Motor	V447	Motor	V448	Motor	V449	Motor	V450	Motor	V451	Motor	V452	Motor	V453	Motor	V454	Motor	V455	Motor	V456	Motor	V457	Motor	V458	Motor	V459	Motor	V460	Motor	V461	Motor	V462	Motor	V463	Motor	V464	Motor	V465	Motor	V466	Motor	V467	Motor	V468	Motor	V469	Motor	V470	Motor	V471	Motor	V472	Motor	V473	Motor	V474	Motor	V475	Motor	V476	Motor	V477	Motor	V478	Motor	V479	Motor	V480	Motor	V481	Motor	V482	Motor	V483	Motor	V484	Motor	V485	Motor	V486	Motor	V487	Motor	V488	Motor	V489	Motor	V490	Motor	V491	Motor	V492	Motor	V493	Motor	V494	Motor	V495	Motor	V496	Motor	V497	Motor	V498	Motor	V499	Motor	V500	Motor	V501	Motor	V502	Motor	V503	Motor	V504	Motor	V505	Motor	V506	Motor	V507	Motor	V508	Motor	V509	Motor	V510	Motor	V511	Motor	V512	Motor	V513	Motor	V514	Motor	V515	Motor	V516	Motor	V517	Motor	V518	Motor	V519	Motor	V520	Motor	V521	Motor	V522	Motor	V523	Motor	V524	Motor	V525	Motor	V526	Motor	V527	Motor	V528	Motor	V529	Motor	V530	Motor	V531	Motor	V532	Motor	V533	Motor	V534	Motor	V535	Motor	V536	Motor	V537	Motor	V538	Motor	V539	Motor	V540	Motor	V541	Motor	V542	Motor	V543	Motor	V544	Motor	V545	Motor	V546	Motor	V547	Motor	V548	Motor	V549	Motor	V550	Motor	V551	Motor	V552	Motor	V553	Motor	V554	Motor	V555	Motor	V556	Motor	V557	Motor	V558	Motor	V559	Motor	V560	Motor	V561	Motor	V562	Motor	V563	Motor	V564	Motor	V565	Motor	V566	Motor	V567	Motor	V568	Motor	V569	Motor	V570	Motor	V571	Motor	V572	Motor	V573	Motor	V574	Motor	V575	Motor	V576	Motor	V577	Motor	V578	Motor	V579	Motor	V580	Motor	V581	Motor	V582	Motor	V583	Motor	V584	Motor	V585	Motor	V586	Motor	V587	Motor	V588	Motor	V589	Motor	V590	Motor	V591	Motor	V592	Motor	V593	Motor	V594	Motor	V595	Motor	V596	Motor	V597	Motor	V598	Motor	V599	Motor	V600	Motor	V601	Motor	V602	Motor	V603	Motor	V604	Motor	V605	Motor	V606	Motor	V607	Motor	V608	Motor	V609	Motor	V610	Motor	V611	Motor	V612	Motor	V613	Motor	V614	Motor	V615	Motor	V616	Motor	V617	Motor	V618	Motor	V619	Motor	V620	Motor	V621	Motor	V622	Motor	V623	Motor	V624	Motor	V625	Motor	V626	Motor	V627	Motor	V628	Motor	V629	Motor	V630	Motor	V631	Motor	V632	Motor	V633	Motor	V634	Motor	V635	Motor	V636	Motor	V637	Motor	V638	Motor	V639	Motor	V640	Motor	V641	Motor	V642	Motor	V643	Motor	V644	Motor	V645	Motor	V646	Motor	V647	Motor	V648	Motor	V649	Motor	V650	Motor	V651	Motor	V652	Motor	V653	Motor	V654	Motor	V655	Motor	V656	Motor	V657	Motor	V658	Motor	V659	Motor	V660	Motor	V661	Motor	V662	Motor	V663	Motor	V664	Motor	V665	Motor	V666	Motor	V667	Motor	V668	Motor	V669	Motor	V670	Motor	V671	Motor	V672	Motor	V673	Motor	V674	Motor	V675	Motor	V676	Motor	V677	Motor	V678	Motor	V679	Motor	V680	Motor	V681	Motor	V682	Motor	V683	Motor	V684	Motor	V685	Motor	V686	Motor	V687	Motor	V688	Motor	V689	Motor	V690	Motor	V691	Motor	V692	Motor	V693	Motor	V694	Motor	V695	Motor	V696	Motor	V697	Motor	V698	Motor	V699	Motor	V700	Motor	V701	Motor	V702	Motor	V703	Motor	V704	Motor	V705	Motor	V706	Motor	V707	Motor	V708	Motor	V709	Motor	V710	Motor	V711	Motor	V712	Motor	V713	Motor	V714	Motor	V715	Motor	V716	Motor	V717	Motor	V718	Motor	V719	Motor	V720	Motor	V721	Motor	V722	Motor	V723	Motor	V724	Motor	V725	Motor	V726	Motor	V727	Motor	V728	Motor	V729	Motor	V730	Motor	V731	Motor	V732	Motor	V733	Motor	V734	Motor	V735	Motor	V736	Motor	V737	Motor	V738	Motor	V739	Motor	V740	Motor	V741	Motor	V742	Motor	V743	Motor	V744	Motor	V745	Motor	V746	Motor	V747	Motor	V748	Motor	V749	Motor	V750	Motor	V751	Motor	V752	Motor	V753	Motor	V754	Motor	V755	Motor	V756	Motor	V757	Motor	V758	Motor	V759	Motor	V760	Motor	V761	Motor	V762	Motor	V763	Motor	V764	Motor	V765	Motor	V766	Motor	V767	Motor	V768	Motor	V769	Motor	V770	Motor	V771	Motor	V772	Motor	V773	Motor	V774	Motor	V775	Motor	V776	Motor	V777	Motor	V778	Motor	V779	Motor	V780	Motor	V781	Motor	V782	Motor	V783	Motor	V784	Motor	V785	Motor	V786	Motor	V787	Motor	V788	Motor	V789	Motor	V790	Motor	V791	Motor	V792	Motor	V793	Motor	V794	Motor	V795	Motor	V796	Motor	V797	Motor	V798	Motor	V799	Motor	V800	Motor	V801	Motor	V802	Motor	V803	Motor	V804	Motor	V805	Motor	V806	Motor	V807	Motor	V808	Motor	V809	Motor	V810	Motor	V811	Motor	V812	Motor	V813	Motor	V814	Motor	V815	Motor	V816	Motor	V817	Motor	V818	Motor	V819	Motor	V820	Motor	V821	Motor	V822	Motor	V823	Motor	V824	Motor	V825	Motor	V826	Motor	V827	Motor	V828	Motor	V829	Motor	V830	Motor	V831	Motor	V832	Motor	V833	Motor	V834	Motor	V835	Motor	V836	Motor	V837	Motor	V838	Motor	V839	Motor	V840	Motor	V841	Motor	V842	Motor	V843	Motor	V844	Motor	V845	Motor	V846	Motor	V847	Motor	V848	Motor	V849	Motor	V850	Motor	V851	Motor	V852	Motor	V853	Motor	V854	Motor	V855	Motor	V856	Motor	V857	Motor	V858	Motor	V859	Motor	V860	Motor	V861	Motor	V862	Motor	V863	Motor	V864	Motor	V865	Motor	V866	Motor	V867	Motor	V868	Motor	V869	Motor	V870	Motor
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APPENDIX C

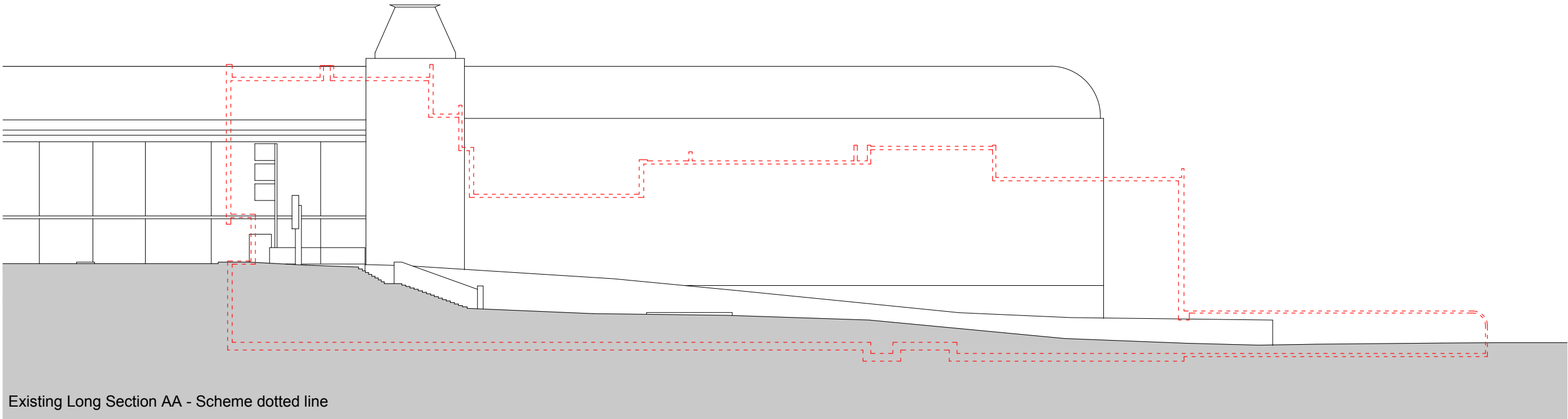
LONG SECTION DRAWING OF PROPOSED BUILDING



- Key
- Plant Space
 - Student Apartments
 - Student Circulation
 - Student Services
 - Residential Apartments
 - Residential Circulation
 - Residential Services
 - Commercial/ Community
 - Commercial Community Circulation
 - Commercial/ Community Services
 - Green Areas



Long Section AA - Corridor



Existing Long Section AA - Scheme dotted line

Rev: P01 Date: 26.08.14
Issue for Planning
Do not scale off this drawing
Report all errors and omissions to the Architect
Dimensions to be checked on site
SHEET INFORMATION:
Plotted by : S TURNER
Plot date : 26 August 2014 14:40:02

Client:
Stadium Capital Holdings

Project:
Midland Crescent

Title:
Long Section AA
Corridor
.

Drawing status:
For Planning

APPENDIX D

FILTER INFORMATION

AAC Swiftpack® with Nitrosorb® media for - NO₂ and NO_x Removal

Can you be compliant with the EU CAFÉ DIRECTIVE?

Introduction

Environmental Pollution arising from contaminants such as Nitrogen Dioxide (NO₂) are an increasing issue to the air quality of densely populated city environments.

Problems relating to atmospheric pollution and air quality are major considerations to those involved in major construction programmes in built up areas. Consulting Engineers and Environmental Consultants are under increasing pressure from local authority planning departments to comply and conform with the EU Directive 2008/50/EC (the CAFÉ Directive), European Union Air Quality and Clean Air for Europe 2008 and to implement mitigation measures that are designed to improve the indoor air quality of their new build projects.

NITROSORB™ is an AAC Eurovent dry chemical scrubbing media product, specifically selected for its ability to efficiently remove low concentrations of Nitrogen Dioxide and NO_x at levels typically found in atmospheric pollution.

The **AAC Swiftpack®** with Nitrosorb® media provides the ideal solution as a mitigation measure accepted by Local Authority Planners in meeting stringent NO₂ levels in designated Air Quality management Areas (AQMA).

The **AAC Swiftpack®** is an effective means of reducing high NO₂ levels down to the accepted level of 40ug/m³ as a mean annual concentration level. This system has been independently performance tested with extremely good results offering low pressure drops enabling them to be used effectively with Mechanical Ventilation Heat Recovery Units (MVHR'S).

In addition the units are installed with the Patented and

unique AAC **COLOURCELL®**
MEDIA FILTER SYSTEM

The **AAC Colourcell®** media filter system provides a visual indication of the condition of media installed. It enables operatives and end users to easily determine when the media needs to be replaced simply by the colour change.



Features

- Unique **NITROSORB®** media with **AAC Colourcell®** visual condition indication
- Low pressure drop
- Long lifespan of media typically 2-5 years
- Low cost
- Optional PM10 filter can be installed into the unit

Benefits

- Accepted by planners as an acceptable AQMA NO₂ mitigation measure
- Compact size designed to enable installation into small spaces with bespoke designs.
- Independently tested
- Compatible with mechanical ventilation Heat Recovery (MVHR) Units
- Low running cost

The AAC **NITROSORB®** Filter cells can also be installed into Centralised Air Heating Plant by means of the **AAC Swiftkit®** & the AAC skeleton frame products.

Major Developers and House Builders are specifying the **AAC Swiftpack®/Nitrosorb®** media filter system as their preferred NO₂ Mitigation solution.

Address: AAC Eurovent Ltd, AAC House, Unit K Maybrook Industrial Estate, Maybrook Road, Brownhills, West Midlands WS8 7DG. UK.

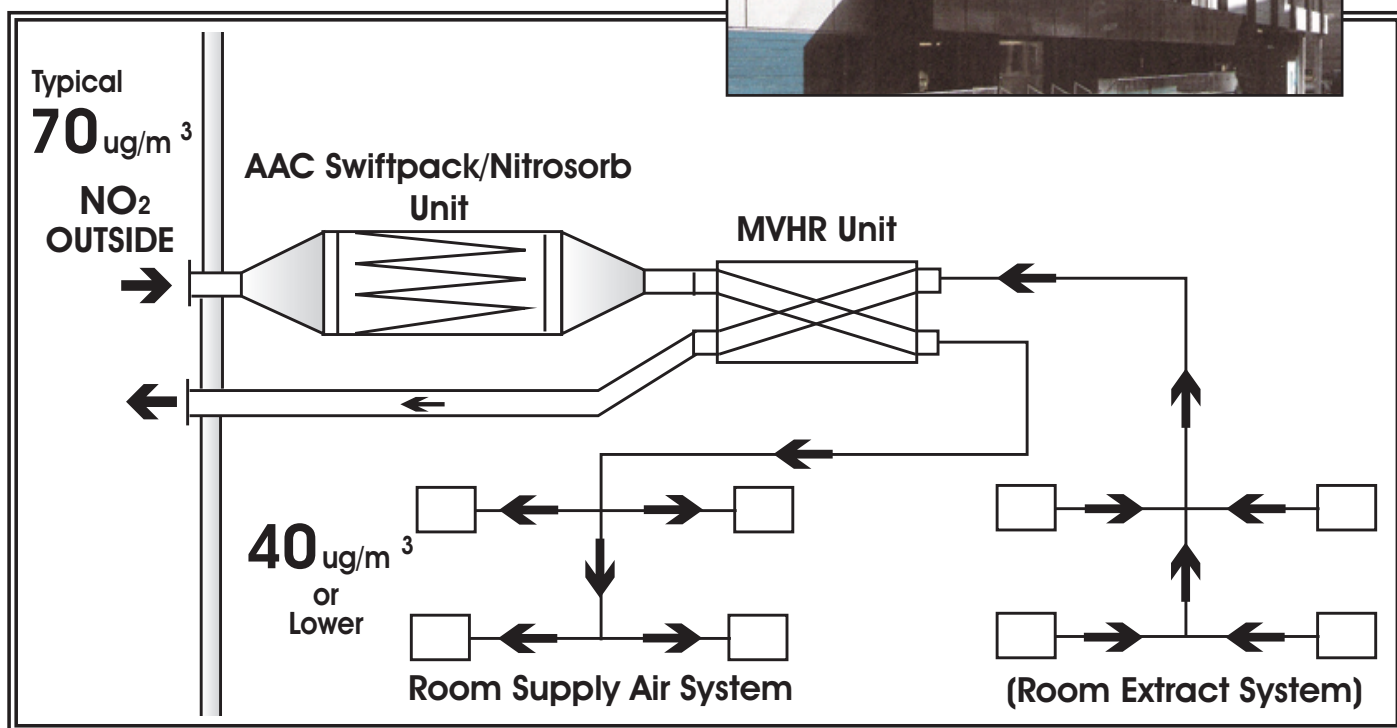
Tel: 08444 77 4884 **Fax:** 0844 77 4797 **International Callers Tel:** +44 (0) 1543 379823

Email: sales@aacurovent.co.uk **Website:** www.aacurovent.co.uk

NO₂ MITIGATION IN AQMA'S

Meets planners requirements in complying with **EU Directive 2008/50/EC** in mitigating high NO₂ levels in air quality management as (AQMA'S)

NO₂ AND NO_x REMOVAL



To find out more about the role of the AAC range of products & **NITROSORB™** media in air quality control, call **08444 77 4884**

Address: AAC Eurovent Ltd, AAC House, Unit K Maybrook Industrial Estate, Maybrook Road, Brownhills, West Midlands WS8 7DG. UK.
Tel: 08444 77 4884 **Fax:** 0844 77 4797 **International Callers Tel:** +44 (0) 1543 379823
Email: sales@aaceurovent.co.uk **Website:** www.aaceurovent.co.uk