APPENDIX 11.9
AIR QUALITY NEUTRAL ASSESSMENT

Appendix 11.9 - Air Quality Neutral Assessment

Methodology

The principle of 'air quality neutral' is to ensure that the cumulative impact from a large number of developments, which may have a small impact on air quality, does not lead to an incremental increase in background concentrations (or 'background creep'). This is proposed by the introduction of standards, or benchmarks, for building and transport emissions, for which all new major developments in London should adhere to. Developments which cannot meet these benchmarks should offset emissions in agreement with the local planning authority (LPA).

Both the London Plan and the Mayors Air Quality Status [1] (MAQS) include reference to new developments being air quality neutral. The London Plan states that development proposals should be at least air quality neutral and not lead to any further deterioration of existing poor air quality. The MAQS includes a policy which states that new developments in London shall, as a minimum, be 'air quality neutral' through the adoption of best practice in the management and mitigation of emissions.

Air Quality Neutral Planning Support[2] has been published in order to accompany the Sustainable Design, Supplementary Planning Guidance[3]. This document provides a methodology for carrying out an air quality neutral assessment, calculating total building and transport emissions associated with the development, and gives benchmarks for transport and building emissions.

Each of the three phases of the project have been assessed separately, and then the emissions from each of the phases have been summed to assess whether the project as a whole is air quality neutral. The three phases, with a brief description of their proposed use are outlined in Table 1.

Operational road traffic emissions

Air quality neutral Traffic Emissions Benchmarks (TEBs) for various land uses are presented in Table 1

Table 1 Air quality neutral Transport Emissions Benchmarks (TEBs)

Land use	CAZ (Central Activity Zone)	Inner London	Outer London
NOx ($g/m^2/annum$)			
Retail (A1)	169	219	249
Office (B1)	1.27	11.4	68.5
NOx (g/dwelling/annum)			
Residential (C3)	234	558	1553
PM_{10} ($g/m^2/annum$)			
Retail (A1)	29.3	39.3	42.9
Office (B1)	0.22	2.05	11.8
PM_{10} (g/dwelling/annum)			
Residential (C3)	40.7	100	267

Traffic emissions from the proposed development are calculated using the following information:

[1] Mayor of London, 2010. Clearing the Air, The Mayors Air Quality Strategy,

[2] Air Quality Consultants and Environ (2014), Air Quality Neutral Planning Support Update: GLA 80371

[3] Mayor of London, 2014. Sustainable design and construction; supplementary planning guidance.

- Land use area/number of dwellings
- Development trip rate
- Average distance travelled per land use class
- Emissions of NOx and PM_{10} per kilometre

In order to compare transport emissions from the development with air quality neutral TEBs, benchmarked emissions are calculated for the development for NO_x and PM_{10} (see Table 2). Total Transport emissions are then calculated for the development (see Table 2 and Table 3). Benchmarked emissions are then subtracted from the total transport emissions for the development (Table 4) if the outcome is negative, transport emissions are within the benchmark. If positive, further mitigation will be required.

Table 2 Total Transport Emissions Benchmarks for NOx and PM_{10}

Land use	Area (m^2)/No. dwellings	NOx Transport Emissions Benchmarks	Total NOx Benchmarked Emissions (kg/annum)	PM_{10} Transport Emissions Benchmarks	Total PM_{10} Benchmarked Emissions (kg/annum)
A1	10550	249.0	2627.0	42.9	452.6
B1	135	68.5	9.2	11.8	1.6
C3	473	1553.0	2950.7	267.0	126.3
Total			**5586.9**		**580.5**

Table 3 Calculation of average distance travelled per year for land use categories

Land use	Area (m^2)/No. dwellings	Number of trips per year	Average distance travelled per trip (km)	Distance travelled per year (km)
A1	10550.0	493948	5.9	2914293.2
B1	135.0	58	7.7	447.0
C3	473.0	143319	3.7	530280.3
Total				**3445020.5**

Table 4 Calculation of Total Transport Emissions

Land use	Total average distance travelled per kear(km)	NOx Transport Emissions Factor	Total NOx Transport Emissions (kg/annum)	PM_{10} Transport Emissions Factor	Total PM_{10} Transport Emissions (kg/annum)
A1, B1, C3	3445020.5	0.4	**1216.1**	0.1	**208.8**

Table 5 Comparison between Total Transport Emissions and Total Transport Benchmarked Emissions

NOx (g/annum)	
Total Transport Emissions	1216.1
Total Benchmarked Transport Emissions	5586.9
Difference	-4370.8
PM_{10} (g/annum)	
Total Transport Emissions	208.8
Total Benchmarked Transport Emissions	580.5
Difference	-371.7

As the Total Benchmarked Transport Emissions are higher than the Total Transport Emissions, the development transport emissions meet the air quality neutral benchmark, and therefore no further mitigation will be required.

Building emissions

Air quality neutral Building Emissions Benchmarks (BEBs) are presented in Table 6. The proposed development will be predominantly served by heat pumps, with 3 no. low NO_x boilers for use as top up or during heat pump maintenance.

Class A1 and C3 land-uses are most closely aligned with the proposed use of the buildings within the project, and therefore emissions benchmarks from these classes have been used.

Table 6 Air quality neutral Building Emissions Benchmarks (BEBs)

Land Use Class	Building emissions Benchmark NOx (g/m^2)
Class A1 (retail)	**22.6**
Class A3-A5 (restaurants, drinking establishments, hot food takeaway)	75.2
Class A2 and Class B1 (financial/professional services/businesses)	30.8
Class B2 - B7 (general industrial)	36.6
Class B8 (storage and distribution)	23.6
Class C1 (hotels)	70.9
Class C2 (residential institutions)	68.5
Class C3 (residential dwellings)	**26.2**
D1 (a) (medical and health services)	43.0
D1 (b) (crèche, day centres etc.)	75.0
Class D1 (c-h) (schools, libraries etc.)	31.0
Class D2 (a-d) (cinemas, concert halls etc.)	90.3
Class D2 (e) (Swimming pools, gymnasium etc.)	284

Building emissions from the proposed redevelopment are calculated using the following information:

- land use area; and
- on site emissions of NOx associated with building use calculated from energy use and default or site-specific emission factors.

In order to compare building emissions arising from the proposed redevelopment with air quality neutral BEBs, benchmarked emissions are calculated, for each phase of the project, for NOx (see Table 7). The total annual building NOx emissions from the redevelopment can be calculated from boiler NOx emissions and annual energy usage data (see Table 8).

Benchmark emissions are then subtracted from the total building emissions for the proposed redevelopment. If the outcome is negative, building emissions are within the benchmark. If positive, further mitigation will be required.

Table 7 Total Building Emissions Benchmarks (BEBs)

Land Use	Area (m^2)	NOx Building Emissions Benchmarks ($gNOx/m^2/annum$)	Total NOx Benchmarked Emissions (kg/annum)
A1	10,550	22.6	238.4
B1	135	30.8	4.2
C3	42,218	26.2	1106.1
Total			**1,348.70**

Table 8 Total building emissions

Boiler NOx emission factor (mg/kWh)	Annual Energy Usage (kWh)	Total NOx building emissions (kg/annum)
39.7	820,000	325.5

Table 9 Comparison between Total Building Emissions and Total Building Emissions Benchmarks

NOx (kg/annum)	
Total Building Emissions	325.540
Total Benchmarked Building Emissions	1,348.70
Difference	**-1,023.16**

As the Total Benchmarked Building Emissions are higher than the Total Building Emissions, the development building emissions meet the air quality neutral benchmark, and therefore no further mitigation will be required.

Conclusion

The calculated building and transport emissions are well below the benchmarked emissions, this is due to the low parking numbers and use of emission free heat pumps. This means the development is air quality neutral and no further mitigation is required.