Cambridge Environmental Research Consultants

Air Quality Assessment for proposed residential development, Hylands Road, Waltham Forest

Draft report

Prepared for
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CERC

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1. Summary

A residential development comprising 120 residential units is proposed for Hylands Road, E17 4AW. The proposed development is within the London Borough of Waltham Forest, the whole of which has been declared an Air Quality Management (AQMA) for nitrogen dioxide (NO_2) and small particulate matter (PM_{10}).

NPS commissioned Cambridge Environmental Research Consultants Ltd (CERC) to carry out a suitable air quality assessment for the development to support the planning application to the council.

The proposed development is essentially 'car-free'. Space heating and hot water for the development is expected to be provided by centralised Ultra Low NO_x boilers that are unlikely to give rise to air quality impacts assuming the plant room design and stack locations are designed to provide adequate dispersion of the boiler emissions. On this basis, the potential impact of proposed development on the air quality of the surrounding area is screened out as insignificant.

Although the whole of the London Borough of Waltham has been declared and Air Quality Management Area, nearby monitoring and London-wide air quality modelling by the Greater London Authority indicate that pollutant concentrations are below the air quality objectives, typically by more than 10% below the objective values, indicating that future occupants of the development will not be exposed to high pollutant concentrations within the development i.e. levels above the air objectives.

2. Introduction

The proposed development for Hylands Road, Waltham Forest is to be built on the site of an existing development of similar use. The development site currently accommodates 50 residential units, a vacant former community facility and 15 lock-up style external garages. Phases 1 and 2 of the proposed development, considered in this assessment, comprises the construction of 120 residential units. The development is essentially 'car-free', with a total of nine Blue Badge parking spaces on-site. Subject to confirmation of the Thermal Model, space heating and hot water demand for the development will be met by three gas boilers, each rated at 462 kW.

This air quality assessment is carried out in line with the Waltham Forest Local Plan *Planning Obligations Supplementary Planning Document* (Adopted May 2017), with reference to guidance listed below; the name by which the guidance is referred to throughout this report is given in square brackets.

- Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) - *Land-use planning & development control: Planning for air quality* [IAQM/EPUK Planning guidance][1]
- The Greater London Authority (GLA) – *Sustainable Design and Construction Supplementary Planning Guidance (SPG)* [GLA Design & Construction SPG][2]
- London Councils Air Quality and Planning Guidance [London Councils guidance][3]

This report describes the air quality assessment for the development. The air quality standards with which the calculated concentrations are compared are presented in Section 3. The location of the development is described in Section 4. Section 5 provides data on the existing air quality around the local area. Finally, Section 6 reports an air quality screening assessment for the operational phase of development.

[1] Moorcroft, Barrowcliffe, et al. (January 2017) *Land-use planning & Development Control: Planning for Air Quality v1.2. IAQM,*
[2] GLA *Sustainable Design and Construction SPG* (April 2014).
[3] The London Air Pollution Planning and the Local Environment (APPLE) working group *London Council Air Quality and Planning Guidance – revised version* (January 2007)

3. Air quality standards

The EU *Ambient Air Quality Directive* (2008/50/EC) sets binding limits for concentrations of air pollutants, which take into account the effects of each pollutant on the health of those who are most sensitive to air quality. The Directive has been transposed into English legislation as the *Air Quality Standards Regulations 2010* [4], which also incorporates the provisions of the *Fourth Daughter Directive* (2004/107/EC).

The Air Quality Standards Regulations 2010 include limit values and target values. Local authorities are required to work towards air quality objectives. In doing so, they assist the Government in meeting the limit values. The limit values are presented in Table 3.1.

Table 3.1: Air quality objectives

	Value ($\mu g/m^3$)	Description of standard
NO_2	200	Hourly mean not to be exceeded more than 18 times a calendar year (equivalent percentile 99.79th)
	40	Annual mean
PM_{10}	50	24-hour mean not to be exceeded more than 35 times a calendar year (equivalent percentile 90.41st)
	40	Annual mean

The short-term objectives, i.e. those measured hourly or over 24 hours, are specified in terms of the number of times during a year that a concentration measured over a short period of time is permitted to exceed a specified value. For example, the concentration of NO_2 measured as the average value recorded over a one-hour period is permitted to exceed the concentration of 200 $\mu g/m^3$ up to 18 times per year. Any more exceedences than this during a one-year period would represent a breach of the objective. These short-term objectives are also expressed as equivalent percentiles.

Table 3.2 gives examples from the Defra TG(16) guidance of where the air quality objectives should apply.

[4] http://www.legislation.gov.uk/uksi/2010/1001/contents/made

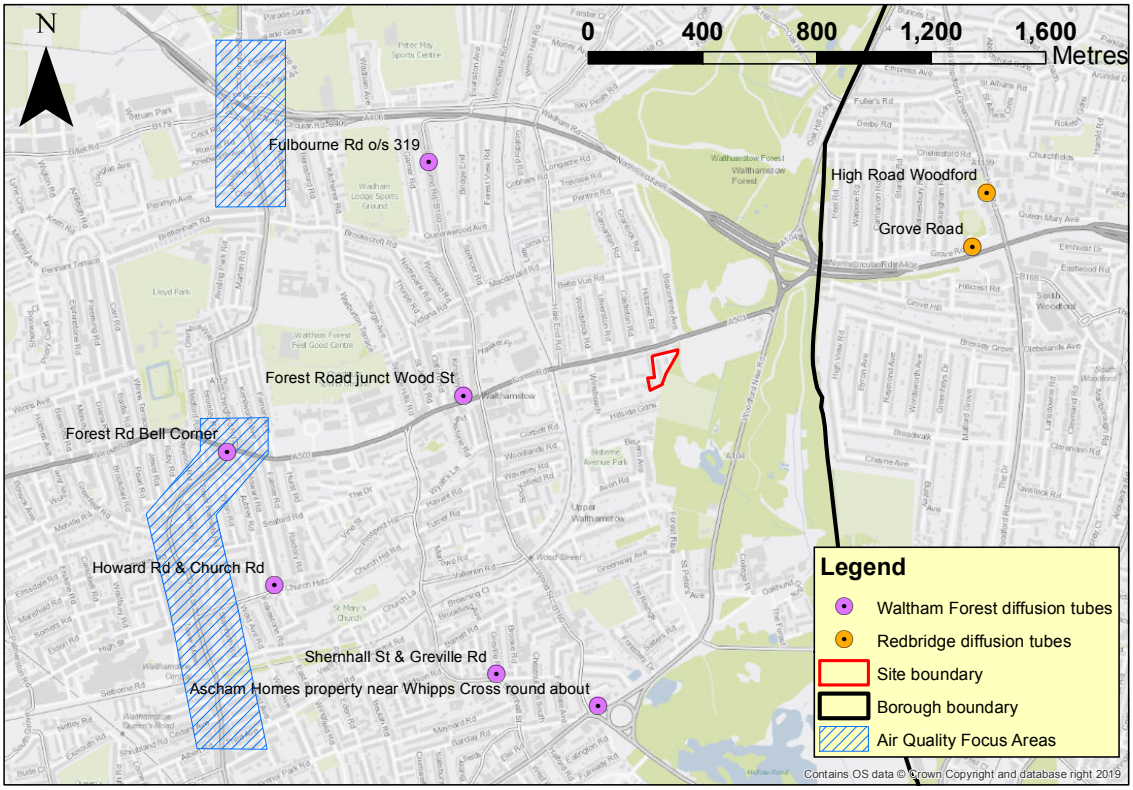
Table 3.2: Examples of where the air quality objectives should apply

Averaging period	Objectives should apply at:	Objectives should generally not apply at:
Annual average	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties (where relevant for public exposure e.g. seating or play areas)	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.
Hourly average	All locations where the annual mean and 24-hour mean objectives apply and: Kerbside sites (for example pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

4. Development location

The development site, covering an area of approximately 0.7 ha, is located within the London Borough of Waltham Forest approximately 500 m from the boundary with the London Borough of Redbridge. The development site is shown in Figure 4.1 along with locations of nearby local authority air quality monitoring and GLA Air Quality Focus Areas, for which further details are provided in Section 5. The development is located on the residential street Hyland Roads; the nearest major road is A503 Forest Road, approximately 35 metres north of the development site.

Figure 4.1: Location of the development.



5. Local air quality

5.1. AQMAs and air quality monitoring

The London Borough of Waltham Forest declared a borough-wide Air Quality Management Area (AQMA) for the following pollutants and objectives:

- Nitrogen dioxide (NO_2) – annual mean
- Particulate matter (PM_{10}) – 24-hour mean

The neighbouring London Borough of Redbridge has also declared a borough-wide AQMA for the above pollutants and objectives.

Exceedences of the NO_2 annual mean objective are measured along the busiest roads in both boroughs. Local authority air quality monitoring within 1500 m of the development site is shown in Figure 4.1 and details of the sites are summarised in Table 5.1. All monitoring at these locations is carried out using diffusion tubes, measuring NO_2 concentrations.

Table 5.1: Diffusion tube monitoring within 1500 m of the development site

Borough	Site ID	Name	Site type	x,y location
Waltham Forest	21	Howard Road & Church Street	Roadside	537538, 189310
	26	Shernhall St & Greville Rd	Roadside	538359, 188999
	27	Ascham Homes property near Whipps Cross roundabout	Roadside	538716, 188888
	34	Fulbourne Road	Kerbside	538637, 191998
	39	Forest Road Bell Corner	Roadside	537418, 189776
	40	Forest Road junction Wood St	Roadside	538243, 189974
Redbridge	DT O	Grove Road	Roadside	540026, 190494
	DT P	High Road Woodford	Roadside	540076, 190683

Air quality monitoring at the nearby diffusion tubes is summarised in Table 5.2, exceedences of the annual mean NO_2 objective of 40 µg/m³ are highlighted in **bold** text. The data in this table is from the local authority air quality Annual Status Reports (ASRs): Waltham Forest provided draft data tables for their 2018 ASR; for Redbridge, data from the 2017 ASR was used, this is the most recent publicly available version, therefore concentrations measured for 2018 are not currently available for Redbridge diffusion tubes.

Table 5.2: Monitoring annual mean NO_2 concentrations (µg/m³) at nearby diffusion tubes

Borough	Site ID	Name	2015	2016	2017	2018 (draft)
Waltham Forest	21	Howard Road & Church Street	-	37	35	31
	26	Shernhall St & Greville Rd	-	36	33	30
	27	Ascham Homes property near Whipps Cross roundabout	-	**41**	38	38
	34	Fulbourne Road	-	-	-	38
	39	Forest Road Bell Corner	-	-	-	**49**
	40	Forest Road junction Wood St	-	-	-	45
Redbridge	DT O	Grove Road	**46**	**50**	**47**	Not available
	DT P	High Road Woodford	38	39	38	Not available

The monitoring shows exceedences of the air quality objective for annual mean NO_2 concentrations at roadside locations along Forest Road; at locations along smaller / less busy roads in Waltham Forest the air quality objective is met.

5.2. GLA modelling

Based on air quality modelling, as part of the London Atmospheric Emissions Inventory (LAEI) 2016[5], the GLA have identified Air Quality Focus Areas (AQFAs) across London. The Draft London Plan (*consolidated changes version – Clean July 2019*), describes AQFAs as:

locations that not only exceed the EU annual mean limit value for nitrogen dioxide (NO2) but are also locations with high human exposure. AQFAs are not the only areas with poor air quality but they have been defined to identify areas where currently planned national, regional and local measures to reduce air pollution may not fully resolve poor air quality issues.

The development site is not located within AQFA. As shown in Figure 4.1, there are two AQFAs within 1500 m of the development site:

- Walthamstow Central and Hoe Street to junction with Forest Road; and
- Walthamstow Crooked Billet Junction and Chingford Road

[5] https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2016

LAEI air quality modelling for 2016 is shown in Figures 5.1 to 5.3, showing maps of annual mean NO_2 concentrations, annual mean PM_{10} concentrations and the number of exceedences of the 24-hour average PM_{10} objective of 50 µg/m³ around the development site. The range of values across the site are summarised in Table 5.3.

Table 5.3: LAEI 2016 mapped concentrations at the development site

Pollutant	Range	Metric
NO_2	33.8 – 36.0	Annual mean (µg/m³)
PM_{10}	21.2 – 21.9	Annual mean (µg/m³)
PM_{10}	6 – 7	Number of days > 50 µg/m³

Figure 5.3: LAEI 2016 maps: annual mean NO_2 concentrations (µg/m³)

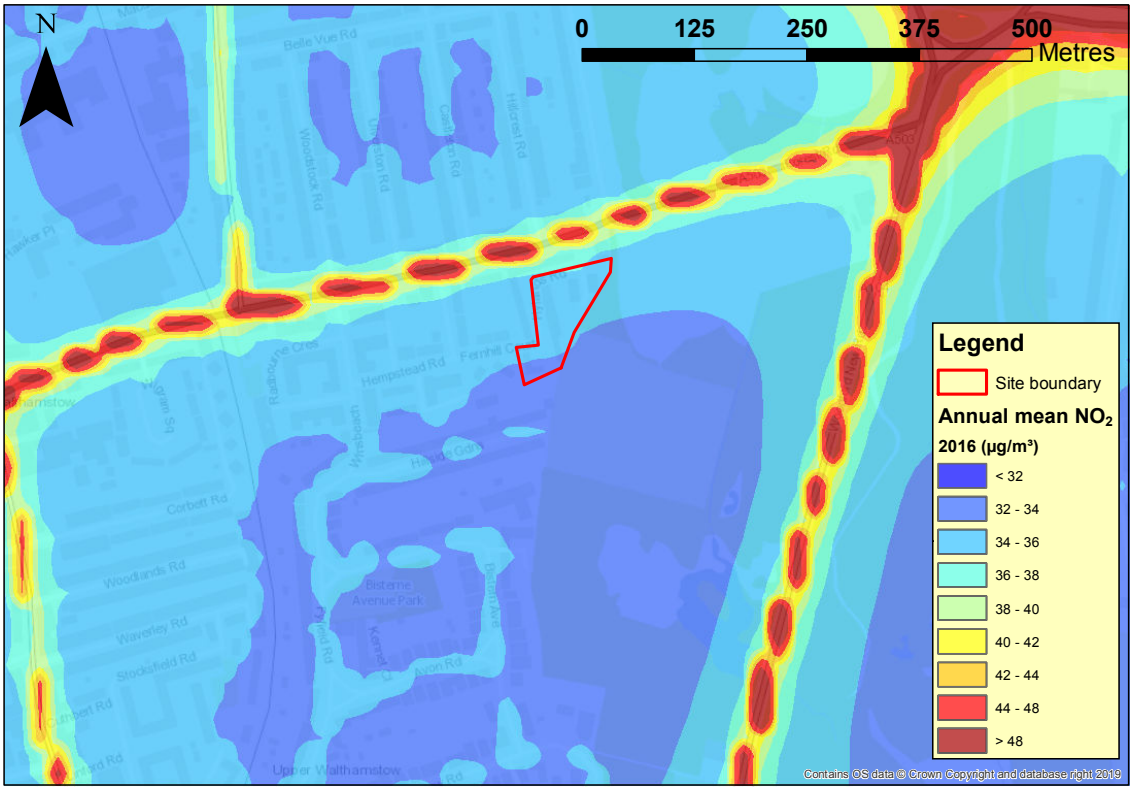


Figure 5.3: LAEI 2016 maps: annual mean PM_{10} concentrations (µg/m³)

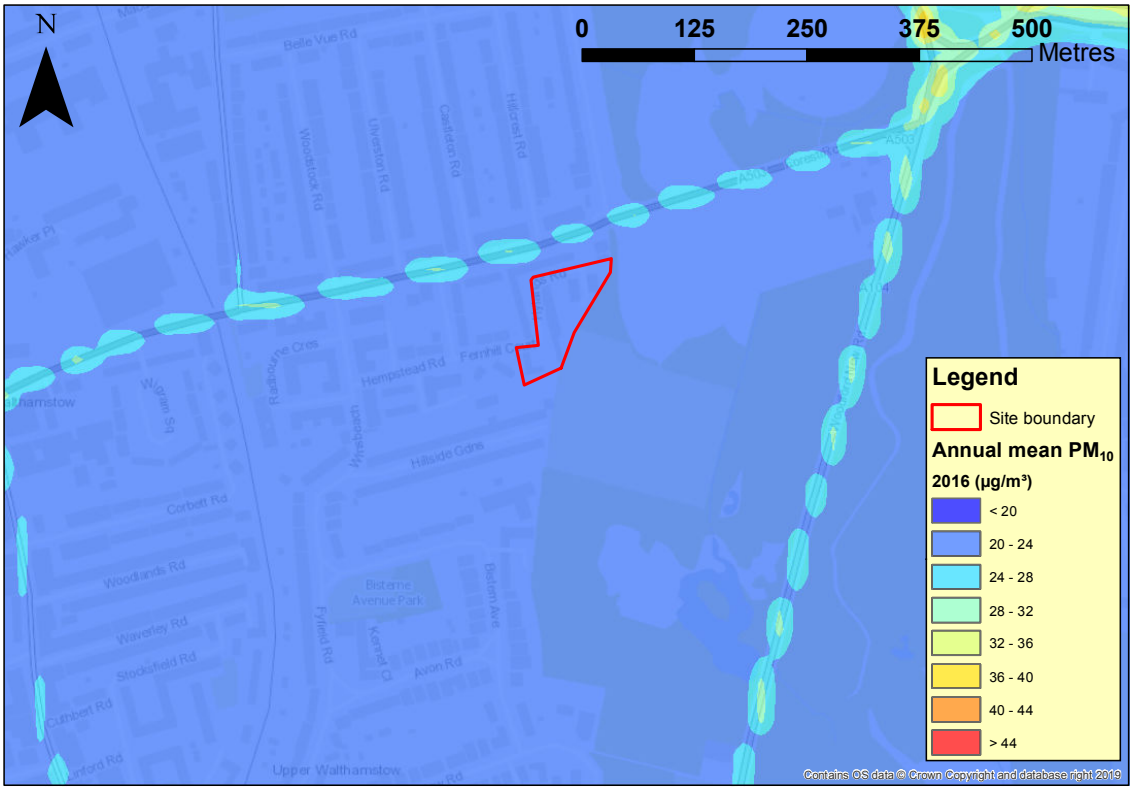
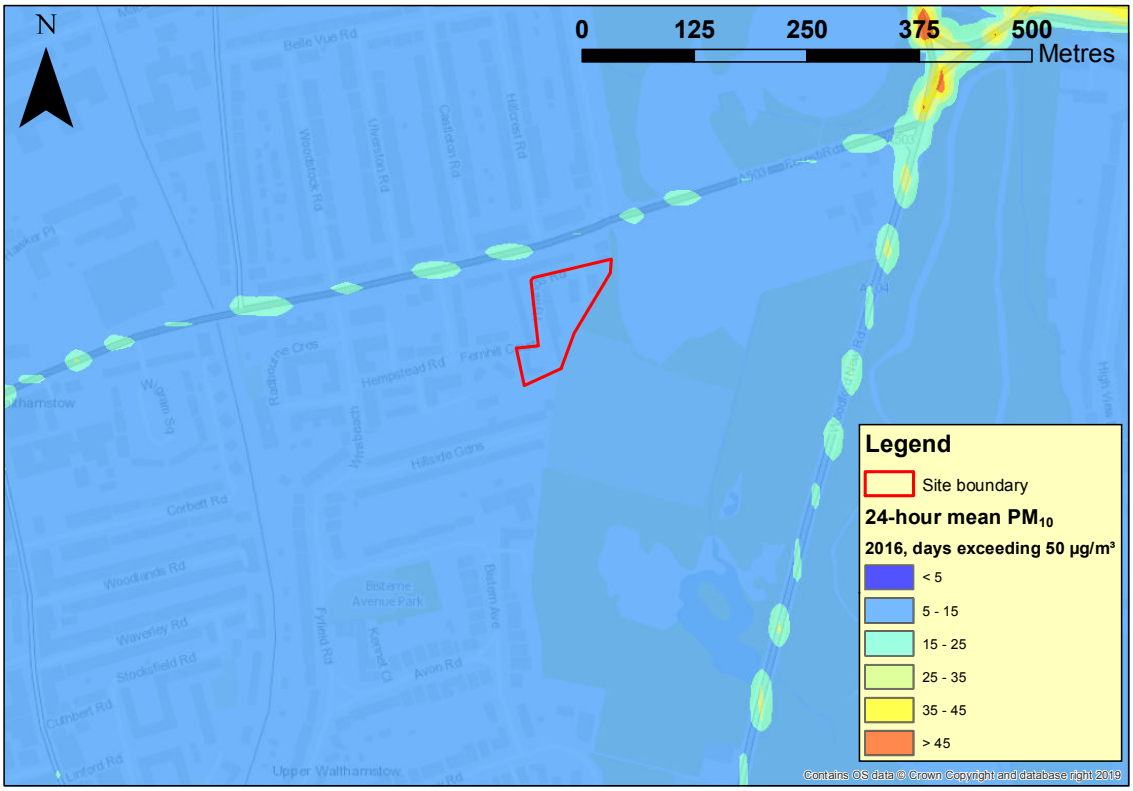


Figure 5.4: LAEI 2016 maps: number of days PM_{10} concentrations exceed 50 µg/m³



6. Screening assessment for air quality

The IAQM/EPUK Planning guidance was used to screen the need for a detailed air quality assessment for the development, and the screening process is described here. The guidance defines Simple and Detailed assessments, where the latter refers to assessments that include dispersion modelling or a similar level of quantitative prediction.

6.1. Impacts of the development on the local area

For impacts of the development, the IAQM/EPUK Planning guidance defines a two-stage screening process, where Stage 1 screens out developments where impacts can be considered to be insignificant, and Stage 2 involves looking at specific aspects of the development and its potential impacts. The criteria to proceed to Stage 2 are outlined in Table 6.1 of the guidance, as follows:

"A. If any of the following apply:

- *10 or more residential units or a site area of more than 0.5ha*
- *more than 1,000 m^2 of floor space for all other uses or a site area greater than 1ha*

B. Coupled with any of the following:

- *the development has more than 10 parking spaces*
- *the development will have a centralised energy facility or other centralised combustion process"*

The proposed development has more than 10 residential units and more than 0.5 ha, therefore meets the first criteria under A. Under B, it will not have more than 10 parking spaces, but it will have a centralised energy facility with combustion.

The more specific Stage 2 guidance, as to when an air quality assessment is likely to be required is outlined in Table 6.2 of the guidance. For this assessment, the following screening criteria for combustion sources is relevant:

"Typically, any combustion plant where the single or combined NO_x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

It also clarifies the 5mg/s value: *"As a guide, the 5 mg/s criterion equates to a 450 kW ultra low NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm^3. Users of this guidance should quantify the NO_x mass emission rate from the proposed plant, based on manufacturers specifications and operational conditions."*

The guidance then goes on to say that '*exceeding a screening criterion in Table 6.2 does not automatically lead to the requirement for a Detailed Assessment*', and that a Simple assessment may be enough. A Detailed assessment is essentially a quantitative assessment, usually by dispersion modelling, and a Simple assessment is more qualitative.

Subject to confirmation of the Thermal Model, the space heating and hot water demand of the proposed development will be met by three Hoval UltraGas 500D boilers. The boilers have rating of 462 kW and a maximum NO_x emission of 38 mg/kWh.

The NO_x rating of the boilers meets emission standard for combustion plant of less than 40 mg/kWh specified in GLA Design & Construction SPG. When considering the boiler rating, the NO_x emission rate is 4.9 mg/s per boiler. This falls below the 5 mg/s NO_x screening criteria, if the receptors are not adversely affected by poor dispersion conditions.

Details of the plant room design or location of boiler flues has not been finalised, but assuming adequate dispersion conditions, such as ensuring stack or flues are located above the height of adjacent residential buildings, then emissions from the boilers are unlikely to give rise to impacts and there is no need to proceed to a Detailed assessment.

6.2. Impacts of the local area on the development

This section considers the effect of introducing new exposure to the area. The IAQM/EPUK Planning guidance suggests that this is a matter of judgement, based on the presence of AQMAs and local air quality data.

The whole of the London Borough of Waltham Forest has been declared an AQMA, although monitoring data shows that areas of high concentrations of NO_2 are close to busy roads. Although the proposed development is close to Forest Road, along which monitoring shows exceedences of the air quality standards, it is located on a residential road, Hylands Road where concentrations are expected to be lower.

The development is not within a GLA Air Quality Focus Areas, indicating that human exposure to high concentrations is not expected within the development area. The use of the development is similar in nature to its current use, in addition LAEI maps indicate that NO_2 and PM_{10} concentrations are more than 5% below the air quality objectives or more than one day less than the 24-hour mean PM_{10} objective. These concentrations levels are equivalent to Air Pollution Expsoure Criteria (APEC) – A, as defined in the London Councils guidance. The recommendation for APEC – A is *No air quality grounds for refusal; however mitigation of any emissions should be considered*.

On this basis, and given the fact that the operational phase of the development itself is likely to have an insignificant impact on the local air quality, it is therefore considered that there is no need to proceed to a Detailed assessment of the air quality impacts on the future residents of the development