

**Global Academy UTC,
The Old Vinyl Factory
Hayes**

Air Quality Assessment



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Revision	Date	Notes	Author	Checked	Approved
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1 INTRODUCTION

1.1 Entran Limited has been commissioned to undertake an assessment of air quality impacts associated with the development of a new University Technical College (UTC) on the Old Vinyl Factory site on Blyth Road, Hayes. The college is planned for one of the development plots (specifically 'The Picturehouse' site) within the approved masterplan for the site, which comprises a largely residential-led development with commercial employment uses. The Picturehouse site was originally earmarked for a cinema, but it is now proposed to construct a new university technical college on the site and use the land for a more beneficial use.

1.2 The proposed college would offer vocational skills for working in the broadcast and media industry for up to 800 students, aged 14-19. The location of the site is shown in Figure 1 and an indicative layout of the ground floor of the development is shown in Figure 2.

1.3 The site falls within the London Borough of Hillingdon (LBH) who has declared the southern portion of the borough an Air Quality Management Area (AQMA) due to exceedences of the annual mean NO₂ objective. The site falls within the AQMA and impacts in relation to local air quality need to be considered.

1.4 This report presents the findings of a detailed air quality assessment of the potential impacts associated with the proposed development on local air quality during both construction and operational phases. For both phases the type, source and significance of potential impacts are identified and the measures that should be employed to minimise these impacts are described.

1.5 As requested by LBH, the development has also been assessed in relation to the Air Quality Neutral (AQN) policies set out in the London Plan¹ and the Mayor of London's Air Quality Strategy².

1.6 A glossary of common air quality terminology is provided in **Appendix A**.

¹ Greater London Authority (July 2011) The London Plan: Spatial development Strategy for Greater London

² Mayor of London (2010) Clearing the Air, The Mayor's Air Quality Strategy, December 2010



Figure 1: Site Location Plan

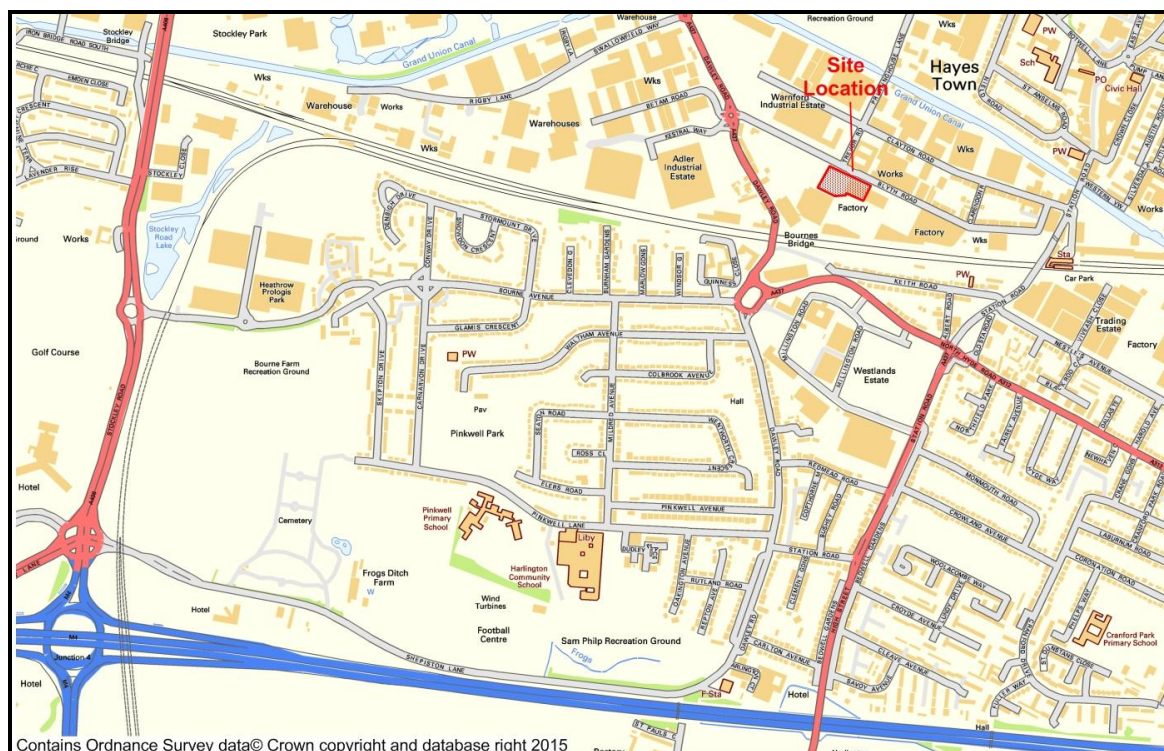


Figure 2: Indicative Layout of Proposed Development at Ground Floor Level



2 LEGISLATION AND POLICY

Air Quality Strategy for England, Scotland, Wales & Northern Ireland

2.1 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007³, pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

2.2 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene (C₆H₆), 1,3-butadiene (C₄H₆), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), particulate matter (PM₁₀, PM_{2.5}), sulphur dioxide (SO₂), ozone (O₃) and polycyclic aromatic hydrocarbons (PAHs).

2.3 The air quality standards are long-term benchmarks for ambient pollutant concentrations, which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

2.4 The air quality objectives are medium-term policy based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

2.5 For some pollutants there is both a long-term (annual mean) standard and a short-term standard. In the case of nitrogen dioxide (NO₂), the short-term standard is for a 1-hour averaging period, whereas for fine particulates (PM₁₀) it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

³ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – July 2007.



2.6 The current statutory standards and objectives are set out in the table presented in **Appendix B**.

2.7 Of the pollutants included in the AQS, NO₂ and PM₁₀ will be particularly relevant to this project, as these are the primary pollutants associated with road traffic.

Local Air Quality Management (LAQM)

2.8 Part IV of the Environment Act 1995 also requires local authorities to periodically Review and Assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

2.9 Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate that part an Air Quality Management Area (AQMA).

2.10 For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

2.11 The Department of Environment, Food and Rural Affairs (DEFRA) has published technical guidance for use by local authorities in their Review and Assessment work⁴. This guidance, referred to in this chapter as LAQM.TG(09), has been used where appropriate in the assessment.

National Planning Policy Framework

2.12 Published on 27th March 2012, the National Planning Policy Framework (NPPF)⁵ sets out the Government's planning policies for England and how these are expected to be applied. It replaces Planning Policy Statement 23: Planning and Pollution Control⁶, which provided planning guidance for local authorities with regards to air quality.

⁴ Department for Environment, Food and Rural Affairs (DEFRA), (2009): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(09).

⁵ Communities and Local Government: *National Planning Policy Framework* (March 2012)

⁶ Office of the Deputy Prime Minister: *Planning Policy Statement 23: Planning and Pollution Control* (Oct 2004).



2.13 At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the Framework with the objective of contributing to the achievement of sustainable development.

2.14 Current planning law requires that applications for planning permission must be determined in accordance with the relevant development plan (i.e. Local Plan or Neighbourhood Plan). The NPPF should be taken into account in the preparation of development plans and therefore the policies set out within the Framework are a material consideration in planning decisions.

2.15 The NPPF identifies 12 core planning principles that should underpin both plan-making and decision-taking, including a requirement for planning to *'contribute to conserving and enhancing the natural environment and reducing pollution'*.

2.16 Under Policy 11: Conserving and Enhancing the Natural Environment, the Framework requires the planning system to *'prevent both new and existing developments from contributing to or being put at unacceptable risk or being adversely affected by unacceptable levels of air pollution'*.

2.17 In dealing specifically with air quality the Framework states that *'planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan'*.

Control of dust and particulates associated with construction

2.18 Section 79 of the *Environmental Protection Act (1990)* states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Statutory nuisance is defined as:

- 'Any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance', and
- 'any accumulation or deposit which is prejudicial to health or a nuisance'.

2.19 Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.



2.20 In the context of the proposed development, the main potential for nuisance of this nature will arise during the construction phase – potential sources being the clearance, earthworks, construction and landscaping processes.

2.21 There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist – 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates.

The Mayor of London's Air Quality Strategy

2.22 The Mayor of London's AQS⁷ sets out a series of policies and proposals for the implementation of the UK AQS and for the achievement of the air quality standards and objectives in Greater London. With regards new developments the following policies are of relevance:

2.23 Policy '1 - Encouraging smarter choices and sustainable travel': *The Mayor will support a shift to public transport, by only supporting developments that generate high levels of trips in locations with good public transport accessibility, by supporting car free developments and encouraging the inclusion of infrastructure to support sustainable travel, such as cycling, electric vehicle recharging points and car clubs;*

2.24 Policy '6 - Reducing emissions from construction and demolition sites': *The London Council's Best Practice guidance will be reviewed and updated, and more vigorously implemented;*

2.25 Policy '7 - Using the planning process to improve air quality - new developments in London as a minimum shall be 'air quality neutral': *The Mayor will encourage boroughs to require emissions assessments to be carried out alongside conventional air quality assessments. Where air quality impacts are predicted to arise from developments these will have to be offset by developer contributions and mitigation measures secured through planning conditions, section 106 agreements or the Community Infrastructure Levy;*

2.26 Policy '8 - Maximising the air quality benefits of low to zero carbon energy supply': *The Mayor will apply emission limits for both PM and NOx for new biomass boilers and NOx emission*

⁷ Mayor of London (2010) Clearing the Air, The Mayor's Air Quality Strategy, December 2010



limits for Combined Heat and Power Plant (CHPP). Air quality assessments will be required for all developments proposing biomass boilers or CHPPs and operators will be required to provide evidence yearly to demonstrate compliance with the emission limits;

2.27 Policy '9 - Energy efficient buildings': *The Mayor will set CO₂ reduction targets for new developments which will be achieved using the Mayor's Energy Hierarchy. These measures will result in reductions of NO_x emissions; and*

2.28 Policy '10 - Improved air quality in the public realm': *The Mayor will encourage the improvement of air quality in the public realm by planting vegetation to trap particulate matter. Through the planning system the Mayor will increase the number of green roofs and living walls across London. Additionally, he will encourage the planting of trees in areas of poor air quality.*

The London Plan 2015

2.29 The London Plan 2015⁸ was published in March and consolidated the London Plan 2011 with the Revised Early Minor Alterations to the London Plan⁹ and the Further Alterations to the London Plan also published in March 2015. The Plan is the overall strategic plan for London setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. It specifically addresses how development can help support the implementation of the Mayor's Air Quality Strategy and achieve a reduction in pollutant emissions and public exposure to pollution.

2.30 Policy 5.7 deals with renewable energy and states that '*all renewable energy systems should be located and designed to avoid any adverse impacts on air quality*'.

2.31 In dealing specifically with air quality from development Policy 7.14 - Improving Air Quality requires all development proposals to:

- *Minimise increased exposure to existing poor air quality, make provision to address local problems of air quality (particularly within AQMAs) and promote greater use of sustainable transport modes through travel plans;*

⁸ Greater London Authority (March 2015) The London Plan: The Spatial Development Strategy for London Consolidated with Alterations Since 2011

⁹ Mayor of London (2013) The London Plan Spatial Development Strategy for Greater London, Revised Early Minor Alterations Consistency with the National Planning Policy Framework



- *Promote sustainable design and construction to reduce emissions from demolition and construction of buildings including following current best practice guidance;*
- *Be at least 'air quality neutral' and therefore not leading to further deterioration of existing poor air quality;*
- *Look, in the first instance, to implement measures on-site to reduce emissions from a development. If inappropriate or impractical, other measures should be considered and where found to provide equivalent air quality benefits, planning obligations or planning conditions should be used to ensure their implementation;*
- *Permission will only be granted where a detailed assessment of biomass boilers shows no adverse impact from emissions.*

Mayor of London Sustainable Design and Construction SPG

2.32 The Mayor's Sustainable Design and Construction Supplementary Planning Guidance (SPG)¹⁰ sets out guidance on meeting the London Plan Policy on sustainable design and construction.

2.33 In relation to air quality the SPG sets out guidance on the following key areas:

- assessment requirements;
- construction and demolition;
- design and occupation;
- air quality neutral policy for buildings and transport; and
- emissions standards for combustion plant.

2.34 Reference has been made to the guidance set out within the SPG when undertaking this assessment.

¹⁰ Mayor of London (2014) Sustainable Design and Construction Supplementary Planning Guidance



Hillingdon Local Plan: Part 1

2.35 The Hillingdon Local Plan Part 1¹¹ sets out the vision and strategy for development within the borough until 2026.

2.36 Within the Plan Policy E2: Location of Employment Growth states that the Council will *'promote development in highly accessible locations that delivers sustainable travel patterns and contributes to the improvement of existing networks to reduce emissions and impacts on air quality'*.

2.37 More specifically policy EM8 deals with pollution and in relation to air quality requires all major development to:

- *not cause deterioration of the local air quality levels and should ensure the protection of both existing and new sensitive receptors;*
- *if located within the AQMA demonstrate air quality neutrality (no worsening of impacts) where appropriate;*
- *actively contribute to the promotion of sustainable transport measures such as vehicle charging points and the increased provision for vehicles with cleaner transport fuels;*
- *deliver increased planting through soft landscaping and living walls and roofs; and*
- *provide a management plan for ensuring air quality impacts can be kept to a minimum.*

London Borough of Hillingdon Unitary Development Plan Saved Policies

2.38 A number of policies within the Hillingdon Unitary Development Plan (UDP)¹² have been saved and will continue to be used in making planning decisions within the borough until the Local Plan: Part 2 is published.

2.39 There are no saved policies within the UDP that deal with air quality.

¹¹ London Borough of Hillingdon (2012) A Vision for 2026, Local Plan: Part 1, Strategic Policies, Adopted November 2012

¹² London Borough of Hillingdon (2007) Unitary Development Plan (adopted 1998) Saved Policies

3 METHODOLOGY

Scope of Assessment

3.1 The scope of the assessment has been determined in the following way:

- Discussions with the air quality officer, Val Beale, at the local planning authority;
- Review of air quality data for the area surrounding the site and background pollutant maps; and
- Review of the traffic flow data, which has been used as an input to the air quality modelling assessment.

3.2 As previously discussed, the development site benefits from an extant outline planning permission for a cinema development (with an element of Class A3 use), but it is now intended to construct the now proposed university technical college. Based on data provided by the transport consultants, Campbell Reith, the proposed UTC would result in an overall reduction in annual average daily traffic (AADT) compared to the consented cinema. The impact of the proposed UTC would therefore result in a positive impact on local air quality compared to the consented scheme and therefore impacts on local air quality during operation of the development have been scoped out of this assessment. However, the site is located in an AQMA and local monitoring shows NO₂ concentrations at roadside locations to be above the annual mean air quality objective. An assessment of air quality at the site has therefore been carried out to assess the suitability of the Site for educational development and to inform an appropriate mitigation strategy, if required.

3.3 The site also lies in close proximity to the London Paddington to Swansea railway line which has been identified as having a high usage of diesel locomotive movements. LAQM.TG(09) requires emissions of NO₂ and PM₁₀ from heavily trafficked railway lines to be assessed due to the risk of breaches of the relevant objective limits in close proximity these railway routes. However, as part of the Government's investment in rail infrastructure the Great Western route is due to be electrified. The modernisation of this route is currently on schedule and is due to be completed by 2016¹³, prior to occupation of the proposed UTC building. Emissions of NO_x and PM₁₀ from the railway line would be negligible following electrification therefore once the UTC building is occupied the railway line is unlikely to have a significant impact on air quality at the Site and emissions from the line have not been considered any further within this assessment.

¹³ <http://www.networkrail.co.uk/great-western-route-modernisation/>



3.4 The local planning authority has also requested that the proposed development be assessed against the air quality neutral policy set out within the London Plan and Mayor of London's sustainable design and construction SPG. As detailed above, the proposed UTC would result in an overall reduction in AADT, resulting in an overall reduction in NO_x and PM₁₀ emissions compared to the consented scheme. Furthermore, a review of the energy strategy for the site indicates that both electricity and heating for the new building would be from the nearby CHP district heating system proposed as part of the wider site masterplan. With the exception of a small amount of gas supplied to the few science labs, there would be no requirement for any other energy supply to the site. On this basis the proposed UTC development is considered to be air quality neutral compared to the existing consented scheme and no further assessment against the relevant policy and SPG has been undertaken.

3.5 There is also the potential for impacts on local air quality during the construction phase of the development, which has also been considered as part of the assessment. Details of the assessment methodology and the specific issues considered are set out below.

Construction Phase Methodology

Construction Traffic

3.6 During construction of the proposed development, lorries will require access to the site to deliver and remove materials; earthmoving plant and other mobile machinery may also work on site including generators and cranes. These machines produce exhaust emissions; of particular concern are emissions of NO₂ and PM₁₀.

3.7 Based on the size of the development proposals it is anticipated that there will be less than 10 additional HGV vehicles generated on the adjacent road network on any given day.

3.8 The EPUK air quality guidance¹⁴ sets out criteria to assist in establishing when an air quality assessment will be required. These criteria indicate that significant impacts on air quality are likely to occur where a development results in greater than 200 HGV movements per day during a construction period of a year or more. It is therefore anticipated that construction traffic generated by the proposed development would result in a negligible impact on local NO₂ and PM₁₀ concentrations and has not been considered any further in this assessment.

¹⁴ EPUK (April 2010), Development Control: Planning for Air Quality (2010 Update).

Construction Dust

3.9 To assess the potential impacts associated with dust and PM₁₀ releases during the construction phase and to determine any necessary mitigation measures, an assessment based on the latest guidance from the Mayor of London¹⁵ has been undertaken.

3.10 This approach divides construction activities into the following four categories:

- demolition;
- earthworks;
- construction; and
- trackout.

3.11 The assessment methodology requires consideration of dust effects arising from three potential impacts:

- annoyance due to dust soiling;
- harm to ecological receptors; and
- the risk of health effects due to a significant increase in exposure to PM₁₀.

3.12 The three impacts are assessed taking into account the sensitivity of the area likely to experience these effects, with the results of the assessment being used to define appropriate mitigation measures to prevent any significant effects at nearby receptors.

3.13 The IAQM guidance sets out the assessment into a number of steps. The first is an initial screening assessment to determine if there are any sensitive receptors (both human and ecological) within 50 m of the site boundary or within 50m of the proposed construction haulage routes, thus determining the requirement for a more detailed evaluation.

3.14 Step 2 of the methodology assesses the risk of dust impacts for each construction activity and takes account of:

- the scale and nature of the works, which determines the potential dust emission magnitude (step 2a); and
- the sensitivity of the area (step 2b).

¹⁵ Mayor of London (2014) The Control of Dust and Emissions from Construction and Demolition



3.15 Risks are described in terms of there being a low, medium or high risk of dust effects for each of the four separate potential activities. This assessment is based on both IAQM criteria and professional judgement.

3.16 The outcome of the above two steps are then combined (step 2c) to identify the risk of dust impacts, which are described in terms of there being a low, medium or high risk of dust effects for each of the four activity groups and assuming no mitigation measures are in place.

3.17 Based on the identified risk, appropriate mitigation measures are identified as set out in the IAQM guidance.

3.18 All construction sites are different and the potential for dust impacts are dependent on a number of local factors. The methodology set out in the IAQM guidance is therefore considered as a framework for assessing dust impacts and a certain level of professional judgement is required in determining the effects from each site.

The significance of identified effects is evaluated post mitigation using professional judgement and assuming that the mitigation measures identified and set out within the assessment are implemented by way of a Dust Management Plan (DMP).

Operational Phase Methodology

Traffic Emissions

3.19 The prediction of local air quality has been undertaken using the ADMS Roads dispersion model. This is a commercially available dispersion model and has been widely validated for this type of assessment and used extensively in the Air Quality Review and Assessment process.

3.20 The model uses detailed information regarding traffic flows on the local road network and local meteorological conditions to predict pollution concentrations at specific locations selected by the user. Meteorological data from Heathrow Airport for 2013 has been used for the assessment.

3.21 The model has been used to predict road specific concentrations of oxides of nitrogen (NO_x) and Particulate Matter (PM₁₀) at selected receptors. The predicted concentrations of NO_x

have been converted to NO₂ using the LAQM calculator available on the DEFRA air quality website¹⁶.

3.22 Traffic data for use in the model has been extracted from the previous ES (Environmental Statement) undertaken for the site wide development of The Old Vinyl Factory. A summary of the traffic data used in the assessment can be found in **Appendix C**. The data includes details of annual average daily traffic flows (AADT), vehicle speeds and percentage HGV for the assessment years considered.

3.23 The emission factors released by DEFRA in July 2014, provided in the emissions factor toolkit EFT2014_6.0.2 have been used to within the ADMS model (Version 3.2.4) to predict existing and future traffic emissions.

3.24 To predict local air quality, traffic emissions predicted by the model must be added to local background concentrations. Background concentrations of NO₂ have been taken from the Harold Avenue background diffusion tube site which is the closest background monitoring site to Blyth Road. PM₁₀ background concentrations have been taken from the DEFRA background maps. The maps provide an estimate of background concentrations between 2011 and 2030. The background concentrations used in the assessment are set out in Table 7 for NO₂ and Table 8 for PM₁₀.

3.25 It is recommended, following guidance set out in LAQM.TG(09), that the model results are compared with measured data to determine whether the model results need adjusting to more accurately reflect local air quality. This process is known as verification.

3.26 LAQM.TG(09) recommends that model predictions should be within 25% (preferably 10%) of monitored concentrations for the model to be predicting with any degree of accuracy. The ADMS model has been used to predict NO₂ concentrations at the Blyth Road monitoring site located approximately 0.4 km to the east. The results of the comparison are presented below in Table 1.

¹⁶ <http://uk-air.defra.gov.uk>

Table 1: Comparison of Modelled and Monitored Nitrogen Dioxide Concentrations ($\mu\text{g}/\text{m}^3$)

Monitoring Locations	Measured Concentration	Modelled Concentration	% Difference
HD203 - Blyth Road	43.0	42.5	-1.3

3.27 The verification process shows that the model is predicting NO_2 concentrations within 2% of monitored concentrations. This is well within the preferred 10% and no adjustment of the model results is considered necessary.

3.28 LAQM.TG(09) does not provide a method for the conversion of annual mean NO_2 concentrations to 1-hour mean NO_2 concentrations. However, research¹⁷ has concluded that exceedences of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed $60 \mu\text{g}/\text{m}^3$. Care has been taken to ensure that locations where the 1-hour mean objective is relevant are included in the assessment.

3.29 Quantitative assessment of the impacts on local air quality from road traffic emissions associated with the operation of the development have been completed against the current statutory standards and objectives set out in **Appendix B** for NO_2 and PM_{10} .

Sensitive Receptors

3.30 LAQM.TG(09) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations '*where members of the public are regularly present*' should be considered. At such locations, members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

3.31 For instance, on a footpath, where exposure will be transient (for the duration of passage along that path) comparison with short-term standards (i.e. 15 minute mean or 1 hour mean) may be relevant. In a school, or adjacent to a private dwelling, however; where exposure may be for longer periods, comparison with long-term standards (such as 24 hour mean or annual mean) may be most appropriate. In general terms, concentrations associated with long-term standards are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

¹⁷ D Laxen and B Marner: *Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites* (July 2003).

3.32 To assess air quality at the Site NO₂ and PM₁₀ concentrations have been predicted at four receptor locations which represent the facades of the proposed building. Concentrations at each receptor location have been predicted at different heights to represent each floor of the proposed building. The following heights above ground level have been assumed for each floor:

- Ground floor – 1.5 m
- 1st floor – 4.5 m;
- 2nd floor – 7.5 m;
- 3rd floor – 10.5 m

3.33 The location of each receptor is shown in Figure 3.

Figure 3: Existing Receptor Locations used in Modelling Assessment



4 BASELINE CONDITIONS

Hillingdon Review and Assessment of Air Quality

4.1 The local planning authority has carried out detailed assessments of air quality and as a result has declared the southern two-thirds of the borough an AQMA due to exceedences of the annual mean NO₂ objective. The site therefore falls within the AQMA.

Automatic Local Monitoring Data

4.2 The Council currently operates ten automatic monitoring sites in the borough; one of these is located on North Hyde Road approximately 1.2 km to the south-east of the development site. The site is a roadside site monitoring both NO₂ and PM₁₀ concentrations.

4.3 Details of the site are provided below in Table 2 and data recorded at the site provided in Tables 3 and 4 for NO₂ and Tables 5 and 6 for PM₁₀.

Table 2: Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	Relevant Exposure	Distance to Kerb of nearest road
Hillingdon Hayes	Roadside	510303, 178882	NO ₂ , PM ₁₀	Yes (15 m)	5 m

Table 3: Annual Average NO₂ Concentrations Recorded at the Automatic Monitoring Site

Site ID	Annual mean concentrations (µg/m ³)				
	2009	2010	2011	2012	2013
Hillingdon Hayes	55.6	54.3	55.0	45.9	47.0

Table 4: Number of Exceedences of the 1-hour NO₂ objective limit of 200 µg/m³ Recorded at the Automatic Monitoring Site

Site ID	Number of exceedences of hourly mean (200 µg/m ³)				
	2009	2010	2011	2012	2013
Hillingdon Hayes	7	15	15	2	4

4.4 Annual mean NO₂ concentrations have exceeded the 40 µg/m³ objective limit at the Hillingdon Hayes automatic monitoring site since 2009, although the data shows a gradual decline in concentrations over the five year period.

4.5 The site has also recorded exceedences of the 1-hour objective limit of 200 µg/m³, however the objective allows for up to 18 exceedences of the limit in any given year therefore the objective has not been breached over the last five years.

Table 5: Annual Mean PM₁₀ Concentrations Recorded at Automatic Monitoring Site

Site ID	Annual mean concentrations (µg/m ³)				
	2009	2010	2011	2012	2013
Hillingdon Hayes	16.3	23.5	25.0	25.4	29.4

Table 6: PM₁₀ automatic monitoring: Comparison with 24-hour mean objective.

Site ID	Number of Exceedences of 24-hour mean (50 µg/m ³)				
	2009	2010	2011	2012	2013
Hillingdon Hayes	6	7	18	15 (47)	17 (46)
If data capture less than 90% the 90.4 th percentile is shown in brackets (µg/m ³)					

4.6 With regards to PM₁₀, annual mean concentrations have been consistently below the objective since 2009. The data shows a gradual increase in concentrations over the five year period however during 2013 concentrations remained 'well below' the objective (<30 µg/m³).

4.7 Exceedence of the 24-hour objective limit of 50 µg/m³ has been recorded at the site since 2009, however the objective allows for 35 exceedences of the limit in any given year. The objective has not therefore been breached during the last five years.

Non-Automatic Monitoring

4.8 The Council operates an extensive network of diffusion tubes across the borough monitoring concentrations of NO₂. There are four sites within close proximity to the development site, the closest being approximately 0.4 km to the east on Blyth Road. Details of these sites are provided in Table 7 along with concentrations recorded between 2009 and 2013.

Table 7: Annual Mean NO₂ Concentrations Measured by Diffusion Tube (µg/m³)

Site Name	Site Type	OS Grid Reference	Annual mean concentrations (µg/m ³)					
			2008	2009	2010	2011	2012	2013
HD203 – Blyth Road	R	509683, 179486	-	-	-	-	48.1	43.0
HD55 – Harold Avenue	UB	509917, 179015	41.7	40.5	40.2	37.8	38.0	38.5
HD56 – 15 Phelps Way	UB	509796, 178633	38.5	35.2	35.8	35.2	36.7	35.1
HD202 – 49 Silverdale Gardens	UB	510361, 179820	-	-	-	-	33.3	35.5
R – roadside								
UB – Urban Background								

4.9 Historically, the diffusion tube results have been adjusted for bias using a factor derived from co-location studies carried out between diffusion tubes and automatic monitoring sites. However, the 2013 results were bias corrected using the factor for Gradko Tubes prepared in 50% TEA within the National Bias Adjustment Spreadsheet, available on the UK-Air website. A factor of 1.00 was applied to the 2013 data.

4.10 The diffusion tube data provided in Table 6 shows annual mean NO₂ concentrations are exceeding the objective of 40 µg/m³ at the roadside of Blyth Road. Concentrations declined significantly between 2012 and 2013, but remained above the objective.

4.11 The data from the other three sites indicated background concentrations below the annual mean objective in the vicinity of the development site. The closest background site is HD55, Harold Avenue, therefore it is expected that background concentrations in the vicinity of The Old Vinyl Factory would be similar to those recorded at this monitoring site i.e. 'just below' the objective.

4.12 The data shows a gradual decline in concentrations at background locations in the borough.

4.13 Diffusion tubes cannot monitor short-term NO₂ concentrations, however, as previously discussed, research has concluded that exceedences of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m³. Annual mean NO₂ concentrations along Blyth Road are below 60 µg/m³ therefore it is considered unlikely that the 1 hour objective is being exceeded in the vicinity of the development site.

DEFRA Background Maps

4.14 Background concentrations have also been obtained from the 2011 DEFRA background pollutant maps. The maps provide an estimate of background concentrations between 2011 and 2030. The average background concentrations for the grid square 509500, 179500, which includes the development site and adjacent road network, are presented in Table 8.

Table 8: Estimated background concentrations from DEFRA maps (µg/m³)

Pollutant	2013
NO_x	57.5
NO₂	33.8
PM₁₀	21.4

4.15 The data presented in Table 8 shows that annual mean background concentrations of NO₂ and PM₁₀ are estimated to be below the 40 µg/m³ annual mean limit in the vicinity of the Site.

5 ASSESSMENT OF IMPACT, MITIGATION AND RESIDUAL EFFECTS

IMPACT – CONSTRUCTION PHASE

Site and Surroundings

5.1 The site has previously been cleared and there are no buildings on site requiring demolition. An assessment of activities associated with demolition activities have not been included in this assessment.

5.2 The main land uses surrounding the site are currently industrial/commercial premises. However, Waterside House is located to the north of the development site and houses a number of residential units. An assessment of construction related impacts in relation to human receptors has been carried out.

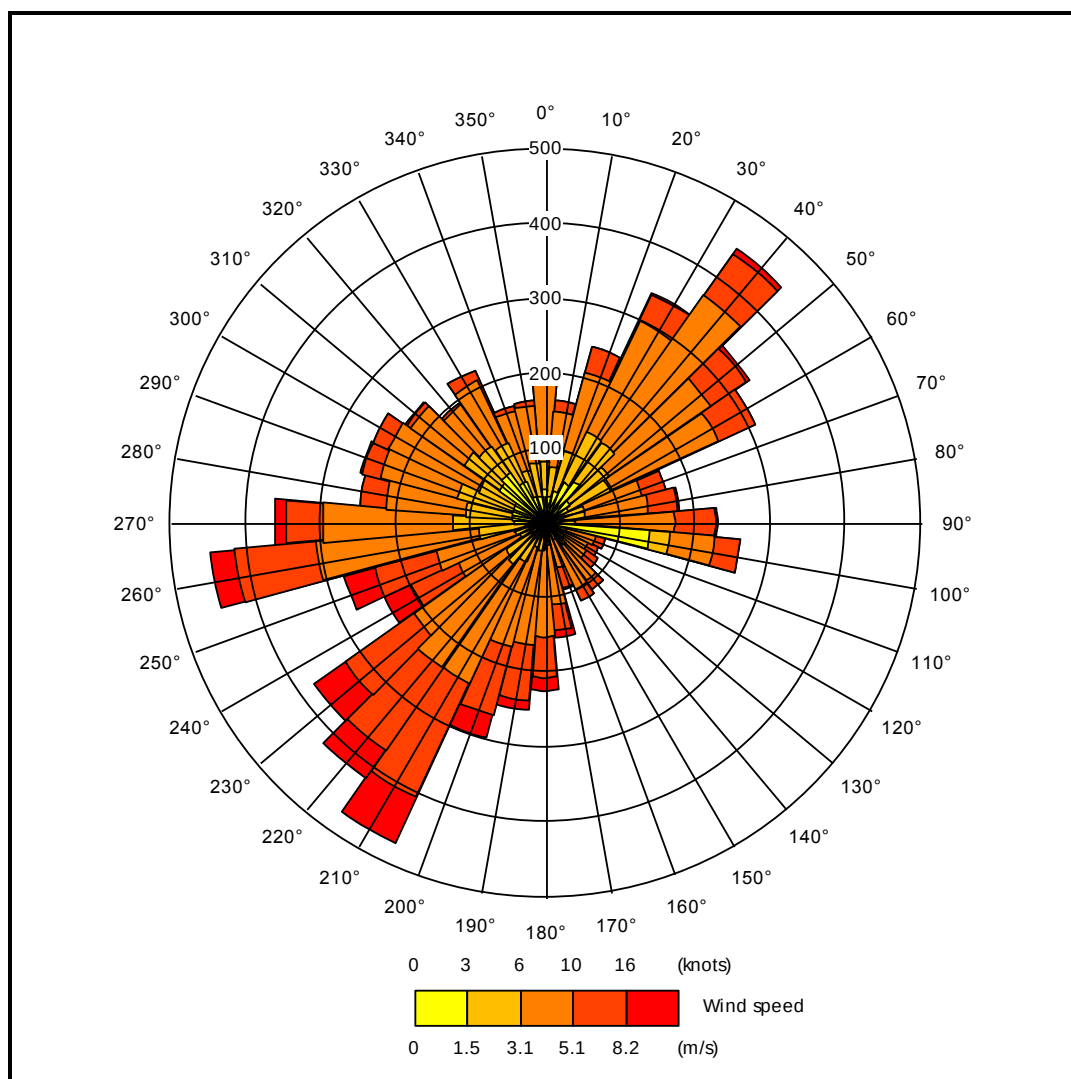
5.3 Dust emissions from construction activities are unlikely to result in significant impacts on ecologically sensitive receptors beyond 50 m from the site boundary. There are no sites designated as important for wildlife within 50 m of the Site therefore impacts on ecological receptors has not been considered within this assessment.

5.4 As detailed in section 4, there is limited monitoring of PM₁₀ carried out within the vicinity of the development site. However, based on the data presented in Table 5, annual mean PM₁₀ concentrations are expected be in the region of 28-29 µg/m³.

5.5 The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited would depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

5.6 A windrose from the Heathrow Airport Meteorological Station (2013) is provided below in Figure 5, which shows that the prevailing wind is from the south-west, however there were also strong winds from the north-east. Based on the windrose, there is a higher risk of impacts occurring at the properties to the north-east and south-west of any construction activities. The adjacent residential units lie to the north-east of where some construction activities would take place, increasing the risk of impacts at these properties.

Figure 5: Windrose for Heathrow Airport meteorological Station (2013)



Potential Dust Emission Magnitude

5.7 The dust emission magnitude is based on the scale of anticipated works at the Site and has been defined as small, medium or large for each of the four activities, demolition, earthworks, construction and trackout. A summary of the dust emission magnitude for each activity is set out in Table 9.

Earthworks

5.8 Earthworks are those activities involved in preparing the Site for construction such as excavation of material, haulage, tipping, stockpiling and leveling.



5.9 Based on the size of the site, it is anticipated that there would be 5-6 earth moving vehicles on site at any given time. The site is therefore considered to have a dust emission class of 'medium' with regards to earthwork activities.

Construction

5.10 There are a number of issues that can impact the dust emission class during construction activities including the size of the building, materials used for construction, the method of construction and the duration of the build.

5.11 The majority of construction materials would be brick and concrete, potentially dusty materials. Based on the size of the site, it is therefore considered to have a dust emission class of 'medium' with regards to construction activities.

Trackout

5.12 The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the site as a result of trackout.

5.13 Given the size of the proposed development it is expected that there would be no more than 20 Heavy Duty Vehicles (HDV) accessing the site each day. Vehicles visiting and leaving the Site would have limited scope for traveling within the site and therefore would not be travelling over any unpaved haulage roads. The site is therefore classed as 'small' with regards to trackout activities.

Table 9: Summary of Dust Emissions Magnitude for Each Activity

Source	Magnitude
Earthworks	Medium
Construction	Medium
Trackout	Small



Sensitivity of Surrounding Area

5.14 The sensitivity of the surrounding area takes account of the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM₁₀, the local background concentrations; and
- site-specific factors i.e. whether there are natural shelters such as trees, to reduce the risk of wind-blown dust.

5.15 The main sensitive receptors adjacent to the site are currently industrial and commercial premises, which would not be particularly sensitive to dust emissions from the proposed development construction. However, as discussed above there are a number of residential units located within Waterside House to the north. Based on the Mayor's guidance residential receptors are considered as high sensitivity receptors in relation to both dust soiling and health effects of PM₁₀. Some of the properties within Waterside House are within 20 m of the site and anticipated construction activities, however as there are less than 10 sensitive receptors within 20m and less than 100 within 50 m the overall sensitivity of the surrounding area is considered to be 'medium' in relation to dust soiling.

5.16 As detailed above, PM₁₀ concentrations in the vicinity of the site are expected to be in the region of 28-29 µg/m³. Based on the proximity of the residential receptors to the site boundary and the local concentrations of PM₁₀ the sensitivity of the surrounding area is considered to be 'high' with regards human health impacts.

5.17 In relation to trackout, vehicles accessing and leaving the site would travel along Blyth Road either to the east or west. As the site is classed as 'small' in relation to trackout, the risk of impacts is limited to within 50 m of the site access point. The only sensitive receptors likely to experience significant impacts are those located at Waterside House. The overall sensitivity of these receptors would be 'medium' in relation to dust soiling and 'high' for human health (PM₁₀).

5.18 A summary of the sensitivity of the area surrounding the Site in relation to each activity is provided below in Table 10.

Table 10: Summary of Sensitivity of Surrounding Receptors

Source	Sensitivity of Surrounding Area	
	Dust Soiling	Human Health
Earthworks	Medium	High
Construction	Medium	High
Trackout	Medium	High

Defining the Risk of Impacts

5.19 The dust emission magnitude as set out in Table 9 is combined with the sensitivity of the area (Table 10) to determine the risk of both dust soiling and human health impacts, assuming no mitigation measures have been applied at site. The risk of impacts associated with each activity is provided in Table 11 below and has been used to identify specific mitigation measures, which are set out later in this chapter.

Table 11: Summary of Dust Risk Effects to Define Site Specific Mitigation

Source	Sensitivity of Surrounding Area	
	Dust Soiling	Human Health
Earthworks	Medium Risk	Medium Risk
Construction	Medium Risk	Medium Risk
Trackout	Low Risk	Medium Risk

IMPACT - OPERATIONAL PHASE

NO₂ Concentrations

5.20 Annual mean NO₂ concentrations predicted at the Site are presented below in Table 13.

5.21 The ADMS model is predicting annual mean NO₂ concentrations above the 40 µg/m³ objective limit at receptors 1 and 2 at ground and 1st floor level. Receptors 1 and 2 represent the northern façade of the proposed UTC building. At floors 2 and 3 concentrations are predicted to be just below the objective.



5.22 The assessment is predicting a decline in concentrations away from Blyth Road with concentrations 'just below' (36-40 $\mu\text{g}/\text{m}^3$) the annual mean objective at receptors 3 and 4, the southern façade of the building.

5.23 As detailed previously, the ADMS model cannot predict short-term NO_2 concentrations, however research has found that where NO_2 concentrations fall below 60 $\mu\text{g}/\text{m}^3$ the 1-hour objective is unlikely to be exceeded. Predicted NO_2 concentrations at the Site are considerably below 60 $\mu\text{g}/\text{m}^3$ therefore exceedence of the 1-hour objective at the Site is considered unlikely.

5.24 Due to concentrations exceeding the annual mean objective along the northern façade of the building mitigation is considered necessary for receptors at ground and 1st floor level to reduce exposure of future occupants to long-term NO_2 concentrations.

Table 12: Predicted annual mean nitrogen dioxide concentrations ($\mu\text{g}/\text{m}^3$)

Receptor ID	2013 Base
1 – ground floor	42.5
1 – 1 st floor	41.2
1 – 2 nd floor	40.0
1 – 3 rd floor	39.3
2 – ground floor	41.7
2 – 1 st floor	40.7
2 – 2 nd floor	39.7
2 – 3 rd floor	39.2
3 – ground floor	39.9
3 – 1 st floor	39.8
3 – 2 nd floor	39.5
3 – 3 rd floor	39.2
4 – ground floor	39.7
4 – 1 st floor	39.5
4 – 2 nd floor	39.3
4 – 3 rd floor	39.1

PM₁₀ Concentrations

5.25 Predicted annual mean PM₁₀ concentrations at the selected receptors are set out in Table 13.

5.26 The predicted annual mean PM₁₀ concentrations are 'well below' the annual mean 40 µg/m³ objective at the facades of the proposed new buildings at all floor levels.

5.27 The number of exceedences of 50 µg/m³, as a 24-hour mean PM₁₀ concentration, has been calculated from the annual mean following the approach set out by DEFRA in LAQM.TG(09):

$$A = -18.5 + 0.00145 \times \text{annual mean}^3 + (206/\text{annual mean})$$

where A is the number of exceedences of 50 µg/m³ as a 24-hour mean PM₁₀ concentration.

5.28 Based on the above approach, the maximum number of days >50 µg/m³ PM₁₀ is predicted to be in the region of 6 at all facades of the building. The objective for this pollutant permits up to 35-days per annum and therefore exceedence of this objective is highly unlikely.

5.29 Future occupants of the site would not be exposed to PM₁₀ concentrations above the relevant air quality objectives therefore the impact of the development with regards new exposure to this pollutant is considered to be negligible.

Table 13: Predicted annual mean PM₁₀ concentrations (µg/m³)

Receptor ID	2013 Base
1 – ground floor	22.0
1 – 1 st floor	21.8
1 – 2 nd floor	21.6
1 – 3 rd floor	21.5
2 – ground floor	21.9
2 – 1 st floor	21.7
2 – 2 nd floor	21.6
2 – 3 rd floor	21.5
3 – ground floor	21.6
3 – 1 st floor	21.6
3 – 2 nd floor	21.6
3 – 3 rd floor	21.5
4 – ground floor	21.6
4 – 1 st floor	21.6
4 – 2 nd floor	21.5
4 – 3 rd floor	21.5

MITIGATION

Construction Phase

5.30 The control of dust emissions from construction site activities relies upon management provision and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, large-scale operations have been successfully undertaken without impacts to nearby properties.

5.31 An overall medium risk of impacts is predicted at adjacent residential properties during construction of the proposed development. Appropriate mitigation measures for the site have been identified following the Mayor of London's SPG and based on the risk effects presented in Table 11. It is recommended that the 'highly recommended' measures set out in **Appendix D** are incorporated into a DMP and approved by LBH prior to commencement of any work on site.

5.32 The LAQM guidance recommends that where there is a medium/high risk of impacts at nearby residential receptors that monitoring of dust or PM₁₀ is carried out throughout the construction period. The requirement for monitoring should be discussed and agreed with LBH and if required baseline monitoring should commence at least three months before construction work commences on site.

5.33 In addition to the 'recommended' measures, the IAQM guidance also sets out a number of 'desirable' measures which should also be considered for inclusion within the DMP. These are also set out in **Appendix D**.

5.34 Following implementation of the measures recommended for inclusion within the DMP the impact of emissions during construction of the proposed development would be negligible.

Operational Phase

5.35 The modelling assessment predicts an exceedence of the annual mean NO₂ objective along the northern façade of the UTC building at ground and 1st floor level. Appropriate mitigation measures are therefore considered necessary to reduce exposure of future occupants of the building to elevated NO₂ concentrations.

5.36

5.37 The main uses within the UTC building will include a communal atrium, hall/dining area, classrooms and teaching areas, theatres and TV studios, a sports hall, science lab, kitchen and toilets/changing areas. The modelling assessment found that the 1-hour NO₂ objective would not be exceeded at the site. Any mitigation should therefore be targeted to exposure in relation to the long-term annual mean objective. On this basis in the following areas, where exposure would be transient in nature and relatively short-term, the annual mean objective is not considered relevant and therefore these areas do not require mitigation:

- Atrium;
- Hall/dining area;
- Kitchen; and
- Toilet/changing areas.

5.38 Occupants of the UTC building would spend longer periods within the main teaching areas which includes classrooms, sports hall, science lab and theatres therefore these areas are

considered more relevant with regards long-term exposure in relation to the annual mean objective. At ground and 1st floor level this includes the music classrooms, theatre, science labs and music hub. The sports hall is located at 3rd floor level where NO₂ concentrations are predicted to be below the annual mean objective. Mitigation at this level is not considered necessary.

5.39 All classrooms and teaching areas will be fitted with highly controllable integrated mechanical ventilation which will utilise PIR and be fitted with a CO₂ detector. The air intakes for the HVAC system will be located above 1st floor level where NO₂ concentrations are below the annual mean objective. The science labs will be fitted with a similar ventilation system although the ventilation rates will be different according to the use of each room.

5.40 Ventilation within the Theatres and TV Studios will be via a central Air Handling Unit located at roof height where NO₂ concentrations will be below the annual mean objective.

5.41 The proposed ventilation strategies, as set out above, would provide appropriate mitigation against external NO₂ concentrations. No further mitigation is considered necessary.

RESIDUAL EFFECTS

Construction phase

5.42 The greatest potential for dust nuisance problems to occur will generally be within 200m of the construction site perimeter. There may be limited incidences of increased dust deposited on property beyond this distance.

5.43 By following the mitigation measures outlined within this appraisal the impact will be substantially minimised. Residual impacts are therefore considered to be negligible.

Operational Phase

5.44 Mechanical ventilation systems will be fitted to all teaching areas at ground and 1st floor level therefore future occupants would not be exposed to pollutant concentrations above the relevant objectives. Residual impacts are therefore considered to be negligible.

6 CONCLUSIONS

6.1 An air quality impact assessment has been carried out to assess both construction and operational impacts of the proposed development.

6.2 An assessment of the potential impacts during the construction phase has been carried out. This has shown that during this phase of the proposed development releases of dust and PM₁₀ are likely to occur during site activities. Through good site practice and the implementation of suitable mitigation measures, the impact of dust and PM₁₀ releases may be effectively mitigated and the resultant impacts are considered to be negligible.

6.3 The ADMS Roads dispersion model has been used to predict NO₂ concentrations above the annual mean objective at ground and 1st floor level, although the 1-hour NO₂ objective and both the annual mean and 24-hour PM₁₀ would be met at all locations within the Site.

6.4 The ventilation strategy for the site includes the provision of mechanical ventilation to all teaching areas and air handling units for the theatres and TV studios, with air intakes for all systems being located above 1st floor level. These systems would provide appropriate mitigation against external NO₂ concentrations therefore no further mitigation is considered necessary.

6.5 The development has been assessed against the Air Quality Neutral Policy. The development would result in a reduction in AADT compared to the consented scheme and all energy requirements would come from the nearby district CHP system. The development is therefore considered to be Air Quality Neutral compared to the consented scheme and meets the requirements of policy 7.14 of the London Plan.



APPENDIX A - AIR QUALITY TERMINOLOGY

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO₂	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O₃	Ozone.
Percentile	The percentage of results below a given value.
PM₁₀	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
ppb parts per billion	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppb means that for every billion (10 ⁹) units of air, there is one unit of pollutant present.
ppm parts per million	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppm means that for every billion (10 ⁶) units of air, there is one unit of pollutant present.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
µg/m³ micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1µg/m ³ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.



APPENDIX B - AIR QUALITY STANDARDS AND OBJECTIVES

Air Quality Objectives currently included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management (LAQM)						
Pollutant	Applies to	Standard		Objective		EU AQ Daughter Directive
		<i>Concentration</i>	<i>Measured as</i>	<i>Annual exceedances allowed</i>	Target date	
Nitrogen dioxide (NO ₂)	All UK	200 µg/m ³	1 hour mean	18	31.12.2005	As objective. target: 01.01.2010
	All UK	40 µg/m ³	annual mean		31.12.2005	As standard. target: 01.01.2010
Particulate Matter (PM ₁₀) (gravimetric)	All UK	40 µg/m ³	annual mean		31.12.2004	As standard. target: 01.01.2005
	All UK	50 µg/m ³	24 hour mean	35	31.12.2004	As objective. target: 01.01.2005
	Scotland	50 µg/m ³	24 hour mean	7	31.12.2010	As objective. target: 01.01.2010
	Scotland	18 µg/m ³	annual mean		31.12.2010	



APPENDIX C - SUMMARY OF TRAFFIC DATA

Traffic data utilised for the air quality assessment (AADT)

Road Link	Speed (kph)	% HGV	2013 base
Blyth Road – between A437 and Trevor Road	48	9.8	5298
Blyth Road – east of Trevor Road	48	9.8	4875
Blyth Road – west of Clarendon Road	48	9.8	3419
Blyth Road – east of Clarendon Road	48	9.8	10690
Blyth Road – south of Clayton Road	48	9.8	14437
Station Road	48	9.8	13107
Trevor Road	48	9.8	11851
Clayton Road	48	9.8	6121



APPENDIX D – CONSTRUCTION MITIGATION MEASURES

It is recommended that the 'highly recommended' measures set out below are incorporated into a DMP and approved by LBH prior to commencement of any work on site:

- develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- display the head or regional office contact information on the site boundary;
- record all dust and air quality complaints, identify cause, take appropriate measures to reduce emissions in a timely manner and record the measures taken;
- make the complaints log available to the local authority when asked;
- record any exceptional incidents that cause dust and/or air emissions, either on- or off- site and the action taken to resolve the situation in the log book;
- carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to LBH when asked;
- increase frequency of site inspection by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged periods of dry or windy conditions;
- plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- erect solid screens or barriers around dusty activities or the site boundary as necessary that are at least as high as any stockpiles;
- avoid site runoff of water or mud;
- keep site fencing, barriers and scaffolding clean using wet methods;
- remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If being re-used on site, cover as detailed below;
- cover, seed or fence stockpiles to prevent wind whipping;
- ensure all vehicles switch off engines when stationary - no idling vehicles;
- avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;
- only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction e.g. suitable local exhaust ventilation systems;
- ensure an adequate water supply on site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;



- use enclosed chutes and conveyors and covered skips;
- minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- avoid bonfires and burning of waste materials;
- ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;

The following 'desirable' measures should also be considered for inclusion within the DMP:

- undertake daily on-site and off-site inspection, where receptors area nearby, to monitor, record inspection results and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary;
- impose and signpost a maximum speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas;
- re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- use hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable;
- only remove the cover in small areas during work and not all at once;
- avoid scabbling (roughening of concrete surfaces) if possible;
- ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
- for smaller supplied of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
- use water-assisted dust sweepers on the access and local roads, to remove, as necessary, any material tracked out of the site;
- avoid dry sweeping of large areas;
- ensure vehicles entering and leaving the site are covered to prevent the escape of materials during transport;
- record all inspections of haul routes and any subsequent action in a site log book;



-
- implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud) as required;