TOPIC	AIR QUALITY
AUTHOR	Air Quality Consultants Ltd
SUPPORTING APPENDIX	ES Volume 3: Appendix Air Quality: Annex 1: Glossary; Annex 2: Legislative and Planning Policy Context; Annex 3: Construction Dust Assessment Procedure; Annex 4: EPUK & IAQM Planning for Air Quality Guidance; Annex 5: Professional Experience; Annex 6: Modelling Methodology; Annex 7: London Vehicle Fleet Projections; Annex 8: Air Quality Neutral Assessment; and Annex 9: Construction Mitigation.
KEY CONSIDERATIONS	The London Borough of Tower Hamlets (the LBTH) has declared a borough wide Air Quality Management Area (AQMA), due to exceedances of the annual mean nitrogen dioxide (NO_2) and 24-hour mean particulate matter (PM_{10}) objectives. Activities associated with the enabling and construction works of the Proposed Development will give rise to a risk of dust impacts at existing sensitive receptors during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. A qualitative construction dust risk assessment has thus been carried out. In addition, the potential for construction vehicles to impact upon local air quality has been quantitatively considered. During the operational phase, the Proposed Development will lead to changes in vehicle flows on local roads, which may impact on air quality at existing properties. The proposed residential apartments and playspace will also be subject to the impacts of road traffic emissions from the adjacent road network. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$). In terms of the potential air quality effects, the assessment will consider: • the impacts of the enabling and construction phase of the Proposed Development on dust soiling and concentrations of PM_{10} at existing sensitive receptors during the enabling and construction period; • the impact of the construction of the Proposed Development on concentrations of NO_2, PM_{10} and $PM_{2.5}$ from heavy duty construction traffic; • the impacts of the operation of the Proposed Development on concentrations of NO_2, PM_{10} and $PM_{2.5}$ from road traffic at existing local sensitive receptors in the proposed year of opening; • the impacts of existing and proposed emission sources of NO_2, PM_{10} and $PM_{2.5}$ on future residents and users of the Proposed Development; • whether or not the Proposed Development is 'air quality neutral'; and • the cumulative impacts on air quality of the Proposed Development in combination with Cumulative Schemes identified in the local area.
CONSULTATION	The EIA Scoping Opinion generally confirmed acceptability of the scope and method proposed for the air quality assessment. Where comments were made, these have either been accepted and addressed in this ES chapter or were subject to responses, which have been accepted by the LBTH. The assessment follows a technical methodology further discussed and agreed with the LBTH via email correspondence (12.05.2020) between Muhammad Islam (Air Quality Officer at the LBTH) and Suzanne Hodgson (Air Quality Consultants). The methodology is consistent with that set out in the Scoping Report.

ASSESSMENT METHODOLOGY

Outline Application Methodology

9.1 The Applicant is seeking flexibility within the OPA on how the Site is developed, with the application establishing parameters of the scale and nature of the Proposed Development through the Control Documents. The OPA allows flexibility to deliver a range of quanta of residential and commercial space within the scheme, with a set of maximum parameters in terms of GIAs for each land use type. For the air quality assessment, there are three key considerations; the impacts of the Proposed Development on local air quality from road traffic emissions generated by the Proposed Development both during construction and operation; the suitability of the Site itself for development with respect to air quality; and the potential for impacts resulting from construction activities.

9.2 For the assessment of road traffic emissions, the assessment set out in this ES chapter is based on 'the Maximum Transport Generating Scheme' (as set out in **ES Volume 1, Chapter 2: EIA Methodology**) to allow the assessment to assess the reasonable worst case effects of road traffic. This scenario comprised the maximum amount of commercial and retail uses with the rest of the permissible total floorspace allocated to serviced apartments, as this produces the most road traffic from deliveries and servicing.

9.3 For the site suitability assessment, the key area of concern is the proposed facades in closest proximity to Aspen Way, as this is where air pollutant concentrations at the Site will be highest as a result of emissions from large volumes of traffic on Aspen Way. The approach to the assessment of site suitability is to use a series of indicative receptors along the Aspen Way façade, which represent worst-case exposure to air quality for future users of the Proposed Development. The Aspen Way-facing façade is the same distance from the road in both the Indicative Scheme (Scenario 5, as set out in **ES Volume 1, Chapter 2: EIA Methodology**) and the scheme built out to its maximum parameters (Scenario 1, as set out in **ES Volume 1, Chapter 2: EIA Methodology**), therefore the site suitability receptors represent both the Indicative Scheme and the maximum parameters. In terms of land uses, as residential development and residential amenity uses have higher sensitivity to air quality than commercial space, the assessment set out in this ES chapter assumes that any buildings which may be occupied by residential dwellings or residential amenity space, are occupied by these land uses and built out to their maximum parameters (the 'Maximum Population Generating Scheme' (**ES Volume 1, Chapter 2: EIA Methodology**)).

9.4 The assessment of potential impacts during construction works, including on-site activities and construction traffic is based on the Indicative Scheme. This is consistent with the approach adopted in **ES Volume 1, Chapter 5: Enabling and Construction Works.**

9.5 In addition, as air quality is predicted to improve in the future, the assessment is based on an opening year of 2025. This is the year in which first occupation of any of the buildings proposed within the OPA is anticipated, as set out with **ES Volume 1, Chapter 5: Enabling and Construction Works**. As air quality is expected to improve in the future, the assumption that each element of the Proposed Development will be operational in the earliest possible year provides a worst-case assessment of the air quality impacts on each element, covering all possible phasing options.

9.6 The Proposed Development would include life-safety emergency generators, which would operate only under emergency situations and for routine testing. The technical details of the generators, including their locations, will be submitted to the LBTH as part of any Reserved Matters Application (RMA) for the Proposed Development. The flues serving the generators will be designed based on best practice, such that the flues will be located to ensure adequate dispersion of any emissions from the flue/s to prevent significant air quality impacts. On this basis, the assessment of impacts from the life-safety generators are not considered with the air quality assessment and was scoped out of the air quality assessment through the EIA scoping process (see **ES Volume 3: Introduction and EIA Methodology – Annex 2**). It is considered the LBTH will provide a suitably worded planning condition requesting further assessment on the impact of the diesel backup generators on local air quality as part of any Reserved Matters Application.

Assessment Criteria

9.7 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations 2000[1] and the Air Quality (England) (Amendment) Regulations 2002[2].

9.8 The UK-wide objectives for NO_2 and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour NO_2 objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 [3]. Where relevant, this value has been used as an indication of the likelihood of the 1-hour mean NO_2 objective to be exceeded in the study area. Measurements have also shown that the 24-hour PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m^3 [3]. The predicted annual mean PM_{10} concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean PM_{10} objective. Where predicted annual mean concentrations are below 32 µg/m^3 it is unlikely that the 24-hour mean objective will be exceeded.

9.9 The European Union has also set limit values for NO_2, PM_{10} and $PM_{2.5}$. The limit values for NO_2 are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one[4]. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

9.10 The relevant air quality criteria for this assessment are provided in Table 9.1:

Table 9.1 Air Quality Criteria for NO_2, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide (NO_2)	1-hour mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual mean	40 µg/m^3 [a]
Fine Particles (PM_{10})	24-hour mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual mean	40 µg/m^3 [b]
Fine Particles ($PM_{2.5}$)[c]	Annual mean	25 µg/m^3
[a] A proxy value of 60 µg/m^3 as an annual mean can be used to assess the likelihood of the 1-hour mean NO_2 objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 1-hour mean NO_2 objective are possible[3]		
[b] A proxy value of 32 µg/m^3 as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM_{10} objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM_{10} objective are possible[3]		
[c] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.		

Screening Criteria

9.11 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)[5] recommend a two-stage screening approach to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in **ES Volume 3, Appendix: Air Quality - Annex 4**, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment. The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. Where these criteria are exceeded, a detailed assessment is required, although the guidance advises that "*the criteria provided are precautionary and should be treated as indicative*", and "*it may be appropriate to amend them on the basis of professional judgement*". As shown in **ES Volume 3, Appendix: Air Quality - Annex 4**, the Proposed Development exceeds the criteria and as such a detailed assessment has been undertaken, as presented in this ES chapter.

Defining the Baseline

Current Baseline Conditions

9.12 Existing sources of emissions within the study area (as defined in Figure A6.1 in **ES Volume 3, Appendix: Air Quality - Annex 3**) have been defined using a number of approaches. Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register[6]. Local sources have also been identified through examination of the Council's Air Quality Review and Assessment reports.

9.13 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. This covers both the study area and nearby sites; the latter being used to provide context for the assessment. Background concentrations have been defined using the national pollution maps published by Defra[7]. These cover the whole country on a 1x1 km grid.

9.14 Exceedances of the annual mean EU limit value for NO_2 in the study area have been identified using the maps of roadside concentrations published by Defra[8], as well as from any nearby Automatic Urban and Rural Network (AURN) monitoring sites (which operate to EU data quality standards). These are the maps used by the UK Government, together with the AURN results, to report exceedances of the limit value to the EU. The national

[1] *The Air Quality (England) Regulations, 2000, Statutory Instrument 928 (2000), HMSO, Available: http://www.legislation.gov.uk/uksi/2000/928/contents/made.*
[2] *The Air Quality (England) (Amendment) Regulations, 2002, Statutory Instrument 3043 (2002), HMSO, Available: https://www.legislation.gov.uk/uksi/2002/3043/contents/made.*
[3] *Defra (2018) Review & Assessment: Technical Guidance LAQM.TG16 February 2018 Version, Defra, Available: https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf.*
[4] *European Parliament and the Council of the European Union (2008) Directive 2008/50/EC of the European Parliament and of the Council, Available: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0050.*
[5] *Moorcroft and Barrowcliffe et al (2017) Land-Use Planning & Development Control: Planning For Air Quality v1.2, IAQM, London, Available: http://iaqm.co.uk/guidance/.*
[6] *Defra (2020) UK Pollutant Release and Transfer Register, [Online], Available: prtr.defra.gov.uk.*
[7] *Defra (2020) Local Air Quality Management (LAQM) Support Website, [Online], Available: http://laqm.defra.gov.uk/.*
[8] *Defra (2019) 2019 NO_2 projections data (2017 reference year), [Online], Available: https://uk-air.defra.gov.uk/library/no2ten/2019-no2-pm-projections-from-2017-data*

maps of roadside PM_{10} and $PM_{2.5}$ concentrations[9], which are available for the years 2009 to 2017, show no exceedances of the limit values anywhere in the UK in 2017.

9.15 Current baseline concentrations have also been modelled using the ADMS-Roads dispersion model. Details of the model inputs, assumptions and verification are provided in **ES Volume 3, Appendix: Air Quality - Annex 6**, together with the method used to derive baseline year background concentrations. Where assumptions have been made, a reasonable worst-case approach has been adopted.

Future Baseline Conditions

9.16 Future baseline concentrations have been predicted using the ADMS-Roads dispersion model. These predictions are based on the predicted future baseline traffic flows in the first year of occupation (2025) and completion year (2029), including flows from any cumulative schemes, but without the additional traffic generated by the Proposed Development. Details of the model inputs, assumptions and verification are provided in **ES Volume 3, Appendix: Air Quality - Annex 6**, together with the method used to derive future year background concentrations. Where assumptions have been made, a reasonable worst-case approach has been adopted.

Evolution of the Baseline

9.17 If the Proposed Development does not come forward, it is expected that the Site would remain in its current state. Air quality is generally expected to improve with time, due for example, to more stringent emissions standards for motor vehicles. The likely evolution of the baseline conditions if the Proposed Development did not come forward has been considered in this assessment, and is hereafter referred to as '2025 Without Development'. Baseline conditions in the absence of the Proposed Development, but allowing for natural evolution and the inclusion of all Cumulative Schemes in the surrounding area, are provided in **Table 9.8** and **Table 9.9.**

Impact Assessment Methodology

Enabling and Construction

9.18 As described in Paragraph 9.4 above, the assessment of impacts from dust emissions during enabling and construction works is based on the Indicative Scheme. Nonetheless, the potential implications of the maximum parameters of the scheme on construction dust impacts is discussed in paragraph 9.103.

9.19 The enabling and construction dust assessment considers the potential for impacts for human receptors within 350m of the Site boundary; or within 50m of roads used by construction vehicles up to 500m from the Site entrance; and for ecological receptors within 50m of the boundary of the Site; or within 50m of roads used by construction vehicles up to 500m from the Site entrance. The assessment methodology follows the GLA's Supplementary Planning Guidance (SPG) on the Control of Dust and Emissions During Construction and Demolition[10], which is based on that provided by IAQM[11]. This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the Site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant effects. **ES Volume 3, Appendix - Air Quality - Annex 3** explains the approach in more detail.

9.20 It is assumed that the construction works would be carried out as described in **ES Volume 1, Chapter 5: Enabling and Construction Works**.

9.21 EPUK & IAQM[5] consider that a detailed assessment is required where a development leads to an increase in Heavy Duty Vehicles (HDVs) of more than 25 Annual Average Daily Traffic (AADT) movements in an AQMA. The provided number of HDVs accessing the Site per day throughout the enabling and construction phase was multiplied by two to obtain the daily number of trips and averaged over a calendar year to obtain the HDV AADT flows. It was determined that the construction phase of the Proposed Development will generate a maximum of 126 HDV AADT movements in a single calendar year, which is expected to be 2024, which is the peak year and therefore considered to represent the worst case impacts. A quantitative assessment of construction vehicle emission impacts has been carried out to determine the impacts that construction traffic emissions could have on existing sensitive receptors located along the affected routes. The main air pollutants of concern related to traffic emissions are NO_2 and fine particulate matter (PM_{10} and $PM_{2.5}$). The methodology employed to quantify impacts from construction vehicles emissions is similar to that employed to determine operational road traffic impacts, described in the *'Road Traffic Impacts'* section below.

Assumptions and Limitations

9.22 The enabling and construction dust risk assessment has assumed that measures described in **ES Volume 1, Chapter 16: Mitigation and Monitoring** and set out within **ES Volume 3, Appendix: Air Quality- Annex 9** will be in place and secured via an appropriately worded planning condition.

Phasing

9.23 The impacts of peak construction traffic, predicted to be in 2024, has been assessed. This is a worst case approach and, consequently, no further assessment of different phases of the construction phase is required.

9.24 The assessment of construction dust impacts from site activities takes account of the phasing that may result in some buildings being occupied whilst others are under construction, and therefore become sensitive receptors to dust soiling.

Completed Development

9.25 Once operational, the Proposed Development will lead to an increase in traffic on the local roads, which may affect air quality at existing properties (including residential, schools and commercial properties). Emissions associated with road traffic on local roads may also impact on air quality for future users and occupants of the Proposed Development itself (i.e. potential residential properties and play spaces). The main air pollutants of concern related to traffic emissions are NO_2 and fine particulate matter (PM_{10} and $PM_{2.5}$). An assessment of the operational impacts that the Proposed Development will have on concentrations of these pollutants has been carried out following the methodology presented below.

[9] *Defra (2020) UK Ambient Air Quality Interactive Map, [Online], Available: https://uk-air.defra.gov.uk/data/gis-mapping.*
[10] *GLA (2014) The Control of Dust and Emissions from Construction and Demolition SPG, Available: https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/control-dust-and.*
[11] *IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction v1.1, Available: http://iaqm.co.uk/guidance/.*

Road Traffic Impacts

Screening Stage

9.26 The first step in considering the road traffic impacts of the Proposed Development has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance[5], as described in **ES Volume 3, Appendix: Air Quality - Annex 4**. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Assessment Scenarios

9.27 NO_2, PM_{10} and $PM_{2.5}$ concentrations have been predicted for a base year of 2018 (the most recent full calendar year of monitoring data available) and the proposed year of opening (2025). For 2025, predictions have been made assuming both that the Proposed Development does proceed (With Scheme), and does not proceed (Without Scheme).

Modelling Methodology

9.28 Concentrations have been predicted using the ADMS-Roads dispersion model, with vehicle emissions derived using Defra's latest Emission Factor Toolkit (EFT) (v9.0)[7]. Details of the model inputs, assumptions and the verification are provided in **ES Volume 3, Appendix: Air Quality - Annex 6**, together with the method used to derive base and future year background concentrations. Where assumptions have been made, a reasonable worst-case approach has been adopted.

Traffic Data

9.29 Traffic data for the assessment have been provided by Steer Group, who have undertaken the Transport Assessment (TA) for the Proposed Development. The traffic data is based on a worst-case scenario for traffic generation, which is the Proposed Development with a maximum provision for commercial use (Maximum Transport Scenario), which generates more traffic than residential uses. Where necessary, this has been supplemented with traffic data from the London Atmospheric Emissions Inventory[12]. Further details of the traffic data used in this assessment are provided in **ES Volume 3, Appendix: Air Quality -Annex 6**.

Uncertainty

9.30 There are many components that contribute to the uncertainty of modelling predictions. The road traffic emissions dispersion model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms.

9.31 An important stage in the process is model verification, which involves comparing the model output with measured concentrations (see **ES Volume 3, Appendix: Air Quality - Annex 6**). The level of confidence in the verification process is necessarily enhanced when data from an automatic analyser have been used, as has been the case for this assessment (see **ES Volume 3, Appendix Air Quality - Annex 6**). Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of base year (2018) concentrations.

9.32 For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions.

9.33 It must also be borne in mind that the predictions in 2025 are based on worst-case assumptions regarding the increase in traffic flows, such that all cumulative schemes and the Proposed Development, are assumed to be fully operational. This assumption will have overestimated the traffic emissions and hence the concentrations in 2025.

9.34 The Mayor of London confirmed in June 2018 that changes will be made to the existing Low Emission Zone (LEZ) in 2020, and that the Ultra Low Emission Zone (ULEZ) will be expanded in 2021. The changes are described in detail in **ES Volume 3, Appendix: Air Quality - Annex 2**, and can be expected to significantly reduce NOx emissions in London from 2020 onwards; however, they are not reflected in Defra's latest EFT, or the CURED model, and thus have not been considered in this assessment. The assessment presented in this report is, therefore, very much worst-case, and it is expected that background concentrations, baseline concentrations, and the impacts of the Proposed Development, will be lower than described in this report. **ES Volume 3, Appendix: Air Quality- Annex 7** discusses uncertainties regarding the future fleet mix in London and the scale of the reduction in NOx emissions that can be expected with the adoption of these changes.

Site Suitability

9.35 Site suitability has been determined using dispersion modelling, applying the same modelling methodology for road traffic as described in paragraphs 9.28 to 9.34.

'Air Quality Neutral'

9.36 Compliance with 'air quality neutral' is founded on emissions benchmarks that have been derived for both building (energy) use and road transport in different areas of London. Developments that exceed the benchmarks are required to implement on-site or off-site mitigation to offset the excess emissions[13].

9.37 **ES Volume 3, Appendix: Air Quality - Annex 8** sets out the emissions benchmarks. The approach has been to calculate the emissions from the Proposed Development and to compare them with these benchmarks.

'Air Quality Positive'

9.38 The London Environment Strategy[14] and the Draft New London Plan[15] include reference to the need for all new large-scale developments in London to be 'Air Quality Positive', making sure that emissions and exposure to pollution are reduced. An 'Air Quality Positive' development is described as "*one that is not only working towards being "zero emission" but is also making positive contributions towards improving air quality beyond the immediate site boundary and reducing public exposure to air pollution, both on and offsite.*" Whilst guidance on the approach to ensuring a development is 'Air Quality Positive' has not yet been published, consideration has been given to the measures designed into the Proposed Development to reduce both emissions and exposure.

[12] *GLA (2019) London Atmospheric Emissions Inventory (LAEI) 2016, Available: https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2016.*
[13] *GLA (2014) Sustainable Design and Construction Supplementary Planning Guidance, Available: https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/sustainable-design-and.*
[14] *GLA (2018) London Environment Strategy, Available: https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf*
[15] *GLA (2019) Draft London Plan – Intent to Publish*

Methodology for Defining Effects

Receptors and Receptor Sensitivity

Enabling and Construction

9.39 The IAQM, in their guidance on construction dust[11], provides criteria to define receptor sensitivity to dust soiling or health effects of PM_{10} (See Table A3.2 in **ES Volume 3, Appendix: Air Quality - Annex 3**). Residential properties are considered as high sensitivity receptors to both dust soiling and health effects of PM_{10}, while places of work are defined as medium sensitivity receptors.

Construction Traffic

9.40 Receptor sensitivities for construction traffic emissions have been defined in the same way as the receptor sensitivity for the assessment of impacts from the Completed Development, as described in paragraphs 9.41 and 9.42.

Completed Development

9.41 The 2007 Air Quality Strategy[16] explains that air quality standards and objectives were determined based on expert recommendations, and represent *"levels at which no significant health effects would be expected in the population as a whole"*. The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance[3]. The annual mean objectives for NO_2 and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels, retail areas or residential amenity areas. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in residential amenity areas and at hotels. The 1-hour mean objective for NO_2 applies wherever members of the public might regularly spend 1-hour or more, including retail areas, residential amenity areas, community land uses and anywhere else members of the public might reasonably be expected to regularly spend an hour or more. The air quality objectives do not apply at places of work, so are not applicable to office development[17].

9.42 Within this chapter, all receptors where the air quality objectives apply are considered to be of high sensitivity. Locations where the objectives do not apply must be considered not to be sensitive, therefore there are no medium or low sensitivity receptors within the context of this assessment.

Magnitude of Impact

Enabling and Construction

9.43 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management (IAQM) has been used (the GLA's SPG[10] recommends that the assessment be based on the latest version of the IAQM guidance). Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2 consists in determining the risk of dust impacts for each activity (i.e. demolition, earthworks, construction and the trackout of material from the Site onto the local road network). First, the 'dust emission magnitude' is determined for each of the four activities listed above, and is defined as 'small', 'medium' or 'large' (Step 2A, see Table A3.1 in **ES Volume 3, Appendix: Air Quality - Annex 3)**. Then, the sensitivity of the area to dust soiling and human health effects is determined based on the number of receptors located within certain distances from the Site, and their sensitivity (Step 2B, see Tables A3.3 and A3.4 in **ES Volume 3, Appendix: Air Quality - Annex 3)**. Area sensitivities are defined for each type of effect (dust soiling or human health) and are described as 'low', 'medium' or 'high'. The dust emission magnitudes determined at Step 2A are combined with the sensitivities of the area determined at Step 2B to determine the risk of dust soiling and human health impacts for each activity, with no mitigation applied. Risks are defined as 'negligible', 'low', 'medium' or 'high'. Full details of this approach are provided in **ES Volume 3, Appendix: Air Quality - Annex 3**.

Construction Traffic

9.44 The magnitude of air quality impacts from construction traffic emissions are defined using the approach described in guidance developed jointly by EPUK & IAQM[5], as set out for the Completed Development in paragraphs 9.45 and 9.46 and Table 9.2.

Completed Development

9.45 There is no official guidance in the UK in relation to development control on how to describe air quality impacts and effects, nor how to assess their significance. The approach developed jointly by EPUK & IAQM[5] has therefore been used. This includes defining descriptors of the impacts at individual receptors, which take account of the percentage change in concentrations relative to the relevant air quality objective, rounded to the nearest whole number, and the absolute concentration relative to the objective.

9.46 Table 9.2 sets out how impact descriptors have been determined within this assessment, being an adapted version of the table presented in **ES Volume 3, Appendix: Air Quality - Annex 4**. Impacts can be beneficial or adverse in nature.

Table 9.2 Air Quality Impact Scale Descriptors for Individual Receptors for All Pollutants [a]

Long-term average concentration at receptor in assessment year[b,c]				Change in concentration relative to AQAL[c,d]				
% of AQAL	Annual Mean NO_2 ($\mu g/m^3$)	Annual Mean PM_{10} ($\mu g/m^3$)	Annual Mean $PM_{2.5}$ ($\mu g/m^3$)	0%	1%	2-5%	6-10%	>10%
75% or less of AQAL	Less than 30.2	Less than 30.2	Less than 18.9	Negligible	Negligible	Negligible	Minor	Moderate
76-94% of AQAL	30.2 – 37.8	30.2 – 37.8	18.9 – 23.6	Negligible	Negligible	Minor	Moderate	Moderate
95-102% of AQAL	37.8 – 41.0	37.8 – 41.0	23.6 – 25.6	Negligible	Minor	Moderate	Moderate	Major
103-109% of AQAL	41.0 – 43.8	41.0 – 43.8	25.6 – 27.4	Negligible	Moderate	Moderate	Major	Major
110% or more of AQAL	More than 43.8	More than 43.8	More than 27.4	Negligible	Moderate	Major	Major	Major

[a] Values are rounded to the nearest whole number

[b] This is the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme' concentration where there is an increase.

[c] AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

[d] Minor and Major are used as standard EIA terminology, and correspond to Slight and Substantial respectively in relevant guidance[5]

[16] *Defra (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Defra.*

[17] *Workplaces are covered by occupational air quality standards. Details of the relationship between air quality objective and occupational air quality standards can be found here: https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=18a226ab-99c6-47f9-a947-301800d7da1f*

Defining the Effect

Enabling and Construction

9.47 Dust generated by the Proposed Development during enabling and construction has the potential to cause effects at a local and borough level (up to 350m from the Site boundary). This is discussed at paragraph 9.93 and visualised in Figure 9.4.

Construction Traffic

9.48 Emissions of pollutants from traffic associated with construction of the Proposed Development have the potential to cause air quality effects at a local and borough level (refer to receptor locations in Table 9.3, and Figure 9.5 which defines the study area).

Completed Development

9.49 Emissions of pollutants from road traffic associated with operation of the Proposed Development have the potential to cause air quality effects at a local and borough level (refer to receptor locations in Table 9.3, and Figure A6.1 in **ES Volume 3, Appendix: Air Quality - Annex 6** which defines the study area).

Effect Duration

Enabling and Construction

9.50 Dust generated by the Proposed Development during enabling and construction has the potential to cause temporary medium-term effects.

Construction Traffic

9.51 Emissions of pollutants from road traffic associated with construction of the Proposed Development have the potential to cause temporary medium-term effects.

Completed Development

9.52 Emissions of pollutants from road traffic associated with operation of the Proposed Development have the potential to cause permanent long-term effects.

Direct and Indirect Effects

Enabling and Construction

9.53 Dust generated by the Proposed Development during enabling and construction has the potential to cause direct effects.

9.54 Emissions of pollutants from road traffic associated with construction of the Proposed Development have the potential to cause direct effects.

Completed Development

9.55 Emissions of pollutants from road traffic associated with operation of the Proposed Development have the potential to cause direct effects.

Categorising Likely Significant Effects

Enabling and Construction

9.56 Guidance from IAQM[11] is that, with appropriate mitigation in place, the effects of construction dust will be 'not significant'. This is the latest version of the guidance upon which the assessment methodology set out in the GLA guidance[10] is based (the GLA guidance advises that the latest version of the IAQM guidance should always be used). The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that effects will normally be 'not significant'.

Construction Traffic

9.57 The likely significant effects from construction traffic emissions have been determined following the approach recommended in EPUK & IAQM guidance. This approach is also applied for the assessment of likely significant effects for the Completed Development as described in paragraph 9.58 below.

Completed Development

9.58 It is important to differentiate between the terms impact and effect with respect to the assessment of air quality. The term impact is used to describe a change in pollutant concentration at a specific location. The term effect is used to describe an environmental response resulting from an impact, or series of impacts. Within this chapter, the air quality assessment has used published guidance and criteria to determine the likely air quality impacts at a number of sensitive locations (See Table 9.2). The overall significance of the air quality effects is then determined using professional judgement, giving consideration to various factors including the magnitude of the predicted impacts and the presence of any objective exceedances; full details of the EPUK/IAQM approach are provided in **ES Volume 3, Appendix: Air Quality - Annex 4**. The experience of the consultants who have prepared this chapter is set out in **ES Volume 3, Appendix: Air Quality - Annex 5**.

RECEPTORS AND RECEPTOR SENSITIVITY

Existing

Enabling and Construction

9.59 The guidance followed when carrying out the construction dust assessment requires the number of receptors within certain distance bands to be established in order to determine the sensitivity of the surrounding area, rather than focussing on impacts at individual receptors. It is, therefore, not necessary to set out specific receptors for the assessment of dust impacts during the enabling and construction works. This is discussed further in paragraph 9.93 and visualised in Figure 9.4.

Construction Traffic

9.60 The assessment of impacts from construction traffic emissions has used the same sensitive receptor locations as have been determined for the assessment of operational road traffic emissions from the Completed Development, as set out in Table 9.3 and Figure 9.1.

Completed Development

9.61 Concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been predicted at 21 locations close to the Proposed Development. Receptors have been identified to represent worst-case exposure within these locations, being located on the façades of the residential properties closest to the sources. In addition, relevant locations within the identified Cumulative Schemes have also been identified as receptors for the assessment. When selecting roadside receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links. Each receptor location was modelled at the lowest level with relevant exposure, where road traffic impacts will be the greatest. All receptors considered in the operational impact assessment are of high sensitivity, as set out in Paragraph 9.42. The existing receptor locations are described in Table 9.3 and shown in Figure 9.1.

Table 9.3 Description of Existing Receptor Locations

Receptor	Description	Receptor Height
Existing Receptors		
R1	36 Dingle Gardens	1.5 m
R2	Billingsgate Market [a]	1.5 m
R3	Billingsgate Market School	1.5 m
R4	Residential property on Birchfield Street	4.5 m
R5	Residential property on Naval Row	1.5 m
R6	Residential property on Blackwall Way	1.5 m
R7	Residential property on Blackwall Way	1.5 m
R8	Residential property in Roosevelt Tower	1.5 m
R9	Residential property on Williamsberg Plaza	1.5 m
R10	Residential property on Grenade Street	1.5 m
R11	Horizon Building	4.5 m [b]
R12	1 West India Quay [c]	Hotel GF (1.5 m) [a], Serviced Apartment 9F (28.5 m), Residential 13F (40.5 m)
R13	Residential property on Ming Street	1.5 m
R14	Residential property on Pennyfields	1.5 m
R15	New City College	1.5 m
Cumulative Receptors [d]		
R16	Residential property at 82 West India Dock Road	4.5 m
R17	Residential property in Blackwall Yard Development	1.5 m
R18	Residential property in Poplar Business Park Development	1.5 m
R19	2 Trafalgar Way Infinity Towers	4.5 m

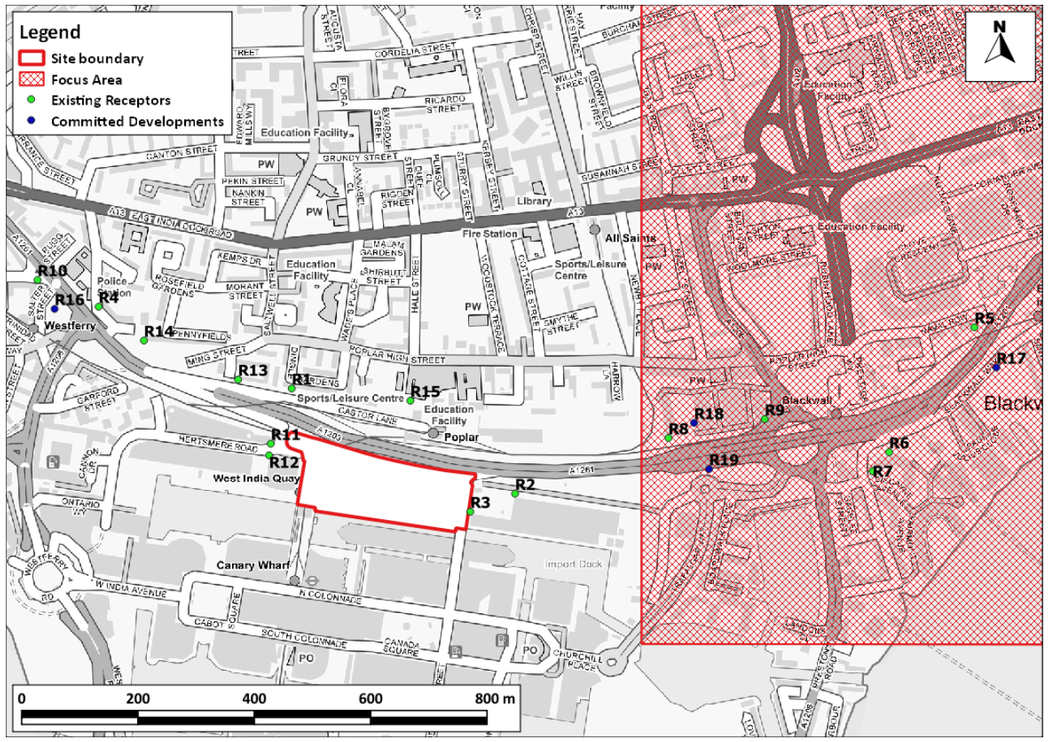
[a] Billingsgate Market and the Marriot Hotel at 1 West India Quay are relevant exposure to short-term objectives only (see paragraph 9.41).

[b] Horizon building residential apartments start at first floor level.

[c] 1 West India Quay consists of a Marriot hotel at ground to 8th floor, serviced apartments on floors 9-12 and residential apartments from 13th floor level.

[d] Cumulative developments that have planning consent and are likely to be built and occupied by the year of opening of the Proposed Development.

Figure 9.1 Existing Receptor Locations



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Note: Further detail of the Air Quality Focus Area is provided at paragraph 9.72

9.62 The Millwall & West India Docks Site of Nature Conservation Interest (SINC) is located on the southern boundary of the Site. The IAQM Guidance for assessing air quality impacts on designated nature conservation sites[18] provides a screening criterion (based on the Design Manual for Roads and Bridges (DMRB)) for when likely impacts from traffic emissions are likely on designated sites. This states a quantitative assessment is required if there is a change in AADT flows on a given road within 200m of a designated site of 1,000 vehicles or 200 heavy duty vehicles (HDVs).

9.63 As discussed in paragraph 9.21, the construction phase of the Proposed Development will generate a maximum of 126 HDV AADT movements in a single calendar year, which is expected to be 2024, which is the peak year. Given the maximum number HDVs is below the above criteria, the impact of the construction phase on the Millwall & West India Docks SINC is likely to be 'not significant'.

9.64 Whilst the Millwall & West India Docks SINC is within 200m of the A1261, the buildings of the Proposed Development will act as screen from traffic emissions, therefore changes of traffic emissions on the A1261 on the SINC are likely to be 'not significant'. Furthermore, whilst the Proposed Development results in an AADT change of 668 LDVs and 52 HDVs on Upper Bank Street, given this change is associated with access to the

[18] *IAQM (2019) A guide to the assessment of air quality impacts on designated nature conservation sites., Available: https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf*

Site and taking account of the characteristics of Upper Bank Street, the in combination effects are likely to be below the DRMB criterion at the SINC. As such the air quality impacts from the operation of the Proposed Development on the Millwall & West India Docks SINC have not been considered any further.

Introduced

Enabling and Construction

9.65 The construction dust assessment has given consideration to the potential for new receptors to be introduced within the Proposed Development while works are ongoing. As explained in Paragraph 9.59, it is not necessary to set out specific receptors for the assessment of impacts during the enabling and construction works.

Completed Development

9.66 Sixteen receptor locations have been identified within the Proposed Development, which represent exposure to existing and proposed sources. The receptor locations are based on the Indicative Scheme, but take account of the Parameter Plans, which divide the development into 'Development Zones'. There are two parameter plans, one showing possible land uses within each of the Development Zones at ground and first floor level, and the other showing the possible land uses within each Development Zone above first floor level. The land uses are described as either B1 (office); A1-A5 (retail) / D1, D2 (community) / sui generis; or All Permitted Uses, which includes residential (C3) and residential amenity or hotel (C1) uses. In terms of relevant receptors for the air quality assessment, office uses are not sensitive to the air quality objectives, so are not included as receptors (see paragraph 9.41), retail, community, hotel, residential amenity and sui generis uses are sensitive to the short-term air quality objectives for NO_2 and PM_{10} (see paragraph 9.41) and the residential uses are relevant exposure to both short-term and annual mean objectives (see paragraph 9.41). Receptors have therefore been selected around the Site based on the 'maximum population scheme' at either ground-floor level (1.5m) to represent relevant land use sensitivity at ground and first-floor level, and at 2nd floor level (7.5m) to represent relevant land use sensitivity above ground floor level. These receptors are the closest to vehicle emissions, and therefore considered worst case. All receptors are considered to be of high sensitivity to relevant objectives.

9.67 Introduced receptor locations are described in Table 9.4 and shown in Figure 9.2.

Table 9.4 Description of Introduced Receptor Locations

Receptor	Description	Height	Receptor Type [a]
A	Building NQ.A1 – Ground and 1st Floor	1.5 m	Residential
	Building NQ.A1 – Above 1st Floor	7.5 m	Residential
B	Building NQ.A1 – Ground and 1st Floor	1.5 m	Residential
	Building NQ.A1 – Above 1st Floor	7.5 m	Residential
C	Building NQ.A4/Dock Square – Ground and 1st Floor	1.5 m	Amenity/Retail
	Building NQ.A4 – Above 1st Floor	7.5 m	Residential
D	Building NQ.A4 – Ground and 1st Floor	1.5 m	Retail
	Building NQ.A4 – Above 1st Floor	7.5 m	Residential
E [b]	Building NQ.A5/Quay Square – Ground and 1st Floor	1.5 m	Amenity/Retail
	Building NQ.A5 – Above 1st Floor	7.5 m	Retail
F [b]	Building NQ.A5/Dock Square – Ground and 1st Floor	1.5 m	Amenity/Retail
	Building NQ.A5 – Above 1st Floor	7.5 m	Retail
G [c]	Building NQ.B1 – Ground and 1st Floor	1.5 m	Retail
H [c]	Building NQ.B1 – Ground and 1st Floor	1.5 m	Retail
I [c]	Building NQ.D1 – Ground and 1st Floor	1.5 m	Retail
J [c]	Building NQ.D1 – Ground and 1st Floor	1.5 m	Retail
K [c]	Building NQ.D1 – Ground and 1st Floor	1.5 m	Retail
L	Poplar Plaza – Ground and 1st Floor	1.5 m	Residential
	Poplar Plaza – Above 1st Floor	7.5 m	Residential
M [c]	Building NQ.D3/Dock Square – Ground and 1st Floor	1.5 m	Amenity/Retail
N [c]	Building NQ.D3/Quay Square – Ground and 1st Floor	1.5 m	Amenity/Retail
O	Building NQ.D4 – Ground and 1st Floor	1.5 m	Retail
	Building NQ.D4 – Above 1st Floor	7.5 m	Residential
P	Building NQ.D4/Dock Square – Ground and 1st Floor	1.5 m	Amenity/Retail
	Building NQ.D4 – Above 1st Floor	7.5 m	Residential
Q	Poplar Plaza – Ground and 1st Floor	1.5 m	Residential
	Poplar Plaza – Above 1st Floor	7.5 m	Residential
R [c]	Building NQ.B1 – Ground and 1st Floor	1.5 m	Retail
S	Delta Skate[d]	1.5 m	Amenity
T	Delta Skate[d]	1.5 m	Amenity

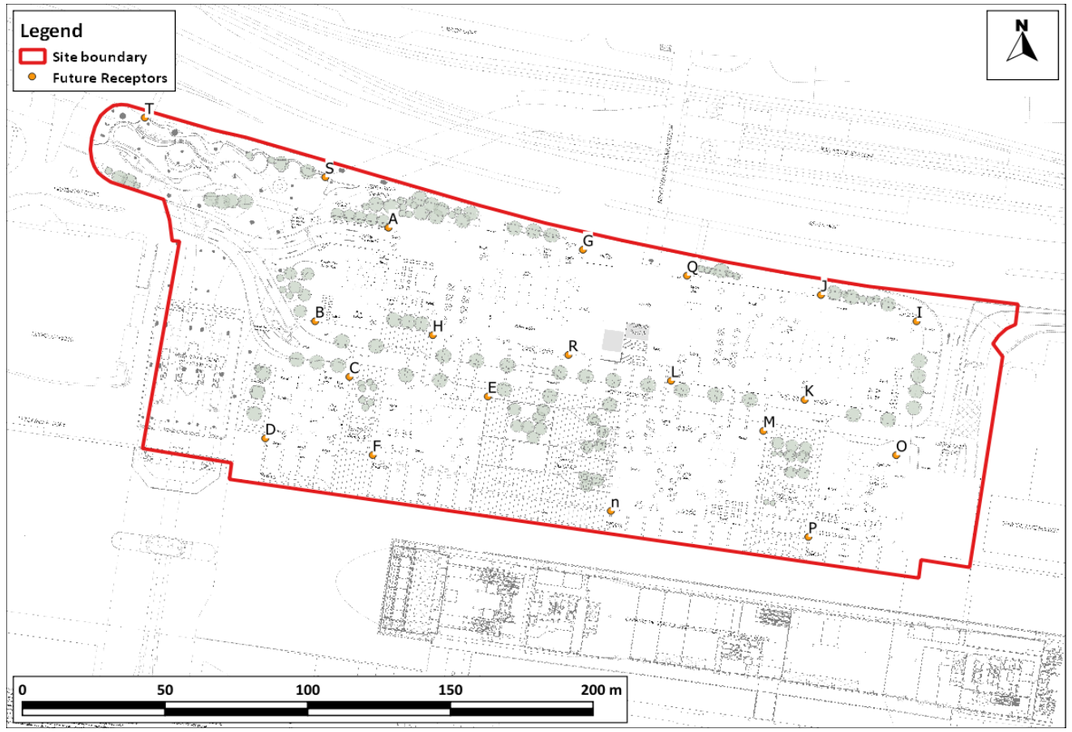
[a] Residential indicates either residential dwellings and residential amenity for children (child play space) which are relevant receptors for annual mean objectives. Retail and amenity indicates either retail (or community/sui generis) uses, or general amenity areas, which are relevant receptors to the short-term objectives only.

[b] Parameter plans show retail, office, community or sui generis uses above 1st floor.

[c] Parameter plans show office only above 1st floor, so are not relevant receptors to the air quality objectives (see paragraph 9.41) and therefore do not require inclusion in the assessment.

[d] Delta skate considered as play space

Figure 9.2 Introduced Receptor Locations



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BASELINE CONDITIONS

Current Baseline Conditions

9.68 The Site is located in Canary Wharf, approximately 40m to the south of Poplar Docklands Light Railway (DLR) Station. The Site is bounded by Aspen Way (A1261) to the north, Billingsgate Market to the east, North Dock and Canary Wharf Crossrail Station to the south and Hertsmere Road and the Marriot Hotel to the west. The Site currently consists of mostly cleared land comprising hardstanding, being previously used as a construction laydown site for the Canary Wharf Crossrail Station. There are some temporary uses currently on site, including the Tower Hamlets Employment and Training Services, WorkPath and advertising structures.

9.69 There is an existing residential estate to the north west, on the other side of Aspen Way, and the entrance to the Limehouse Link Tunnel lies approximately 200m to the north west. The majority of the Canary Wharf business district lies to the south of the Site, across North Dock.

Industrial Sources

9.70 A search of the UK Pollutant Release and Transfer Register website[6] has not identified any significant industrial or waste management sources that are likely to affect the Proposed Development, in terms of air quality.

Air Quality Management Areas

9.71 The LBTH has investigated air quality within its area as part of its responsibilities under the LAQM regime. In December 2010 an AQMA was declared covering the whole borough for exceedances of the annual mean NO_2 and 24-hour PM_{10} objectives.

Air Quality Focus Areas

9.72 The Proposed Development is located close to the Blackwall A13 East India Dock Road / Aspen Way / Blackwall Tunnel air quality focus area, one of 187 air quality focus areas in London, these being locations that not only exceed the EU annual mean limit value for NO_2 but are also locations with high levels of human exposure. Impacts of the Proposed Development on air quality in this air quality focus area has been assessed through the inclusion of a number of receptors, as shown in Figure 9.2.

Local Air Quality Monitoring

9.73 The LBTH operates four automatic monitoring stations within its area, two of which are close to the Site. The Council also operates a number of NO_2 monitoring sites using diffusion tubes prepared and analysed by Socotec (using the 50% TEA in acetone method). Results for the years 2013 to 2018 are summarised in Table 9.5 and the monitoring locations are shown in Figure 9.4.

Table 9.5 Summary of NO_2 Monitoring (2013-2018)[a,b]

Site No.	Site Type	Location	2013	2014	2015	2016	2017	2018
Automatic Monitors - Annual Mean (µg/m³)								
TH2	Roadside	Mile End	**57**	**62**	**53**	**52**	**48**	**47**
TH4	Roadside	Blackwall	**58**	**58**	**58**	**59**	**56**	**51**
Objective			40					
Automatic Monitors - No. of Hours > 200 µg/m³								
TH2	Roadside	Mile End	1	1	0	0	2	0
TH4	Roadside	Blackwall	0	0	0	9	0	0
Objective			18					
Diffusion Tubes – Annual Mean (µg/m³)								
50	Roadside	Rich Street	-	-	**42**	**45**	**42**	**42**
58	Kerbside	Dolphin Lane	**-**	**-**	33	36	32	29
59	Kerbside	Westferry Road/Limehouse Link Junction	**-**	**-**	40	39	40	37
74	Kerbside	Poplar High Street/ Cotton Street	-	-	-	-	-	**64**
75	Kerbside	Hale Street	**-**	**-**	31	33	34	34
76	Kerbside	Chrisp Street/ E India Dock Road	**-**	**-**	**51**	**48**	**49**	**45**
88	Kerbside	Shirbutt Street o/s Holy Family School	**-**	**-**	**-**	**-**	**-**	28
Objective			40					

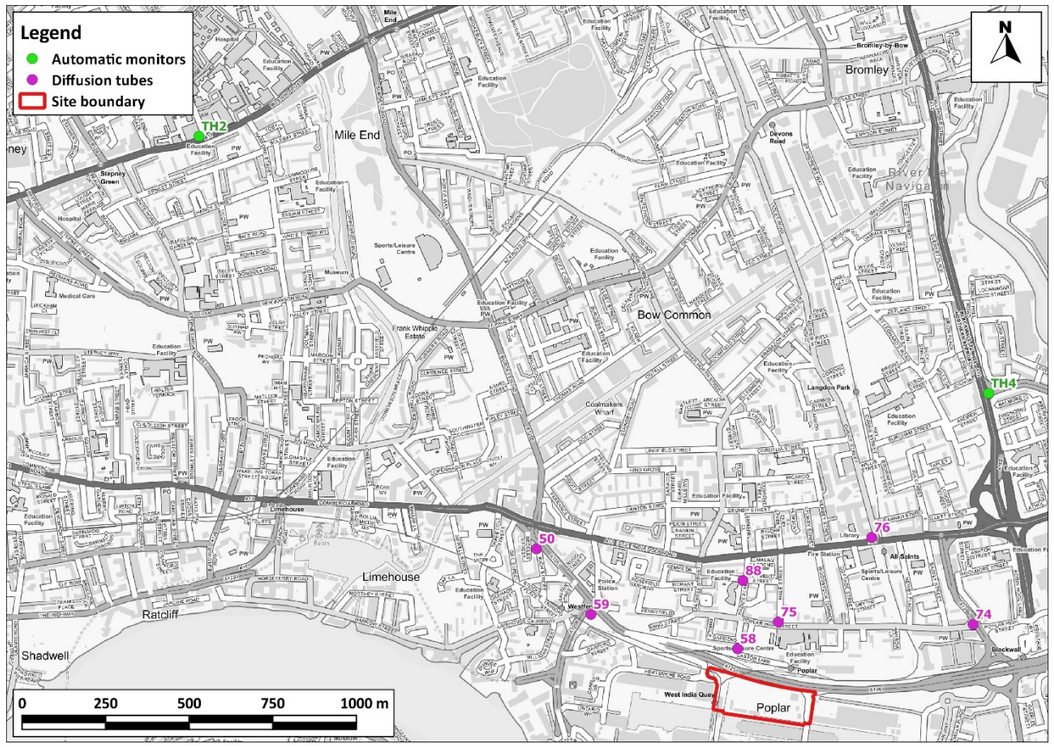
[a] Sourced from LBTH 2019 Annual Status Report[19]
[b] Exceedances of the objectives are shown in bold. Values greater than 60 µg/m^3 are also underlined.

9.74 The automatic monitors (TH2 and TH4) close to the Site and several of the nearby roadside diffusion tube monitoring sites (sites 50, 74 and 76) have consistently measured exceedances of the nitrogen dioxide annual mean objective. These monitoring sites are located adjacent to busy A-Roads. At the other nearby diffusion tube locations (site 58, 59, 75 and 88), measured annual mean concentrations have remained consistently below the objective. The TH2 and TH4 automatic monitors have not recorded exceedances of the 1-hour objective in recent years. Defra guidance advises that where annual mean concentrations are above 60 µg/m^3 there is a possibility that the 1-hour mean nitrogen dioxide objective could be exceeded. One location near to the Site (site 74) measured an annual mean nitrogen dioxide concentration that exceeded 60 µg/m^3 in 2018, thus there is a chance the 1-hour mean objective may also have been exceeded.

9.75 There is a downward trend in monitoring results at the automatic monitoring sites over the past six years. There are no clear trends at the diffusion tube monitoring sites.

9.76 The Scoping Opinion requested that monitoring sites at Millwall Park and Victoria Park are considered for potential use within the models. These sites are both background monitoring sites, and their use in the model is discussed in the background concentrations section in paragraph 9.78 and in **ES Volume 3, Appendix: Air Quality - Annex 6**.

Figure 9.3 Monitoring Locations



[19] *London Borough of Tower Hamlets (2019) London Borough of Tower Hamlets Air Quality Annual Status Report for 2018*

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9.77 The TH4 Blackwall automatic monitor also measures concentrations of PM_{10} and $PM_{2.5}$. Results for the years 2013 to 2018 are summarised in Table 9.6. Results show that annual mean and 24-hour mean concentrations are well below the objectives in the study area.

Table 9.6 Summary of PM_{10} and $PM_{2.5}$ Monitoring (2013-2018)[a]

Site No.	Site Type	Location	2013	2014	2015	2016	2017	2018
PM_{10} Annual Mean (µg/m^3)								
TH4	Roadside	Blackwall	28	29	22	23	25	20
Objective			40					
PM_{10} - No. of Days > 50 µg/m^3								
TH4	Roadside	Blackwall	24	16	8	10	10	10
Objective			35					
$PM_{2.5}$ Annual Mean (µg/m^3)								
TH4	Roadside	Blackwall	16	16	14	20	13	13
Objective			25[b]					

[a] Sourced from Sourced from LBTH 2019 Annual Status Report[19]
[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Exceedances of EU Limit Values

9.78 There are several AURN monitoring sites within the Greater London Urban Area that have measured exceedances of the annual mean NO_2 limit value. Furthermore, Defra's roadside annual mean NO_2 concentrations[8], which are used to report exceedances of the limit value to the EU, identify exceedances of this limit value in 2018 along many roads in London, including Aspen Way adjacent to the Proposed Development. The Greater London Urban Area has thus been reported to the EU as exceeding the limit value for annual mean NO_2 concentrations. Defra's predicted concentrations for 2025 identify continued exceedances of the limit value along Aspen Way. As such, there is considered to be a risk of a limit value exceedance in the vicinity of the Proposed Development at the time that it is operational.

9.79 Defra's Air Quality Plan requires the GLA to prepare an action plan that will "deliver compliance in the shortest time possible", and the 2015 Plan assumed that a Clean Air Zone (CAZ) was required. The GLA has already implemented a LEZ and a ULEZ, thus the authority has effectively already implemented the required CAZ . These have been implemented as part of a package of measures including 12 Low Emission Bus Zones, Low Emission Neighbourhoods, the phasing out of diesel buses and taxis and other measures within the Mayor's Transport Strategy.

Background Concentrations

9.80 As discussed in paragraph 9.74, the Scoping Opinion requests consideration to the use of monitoring sites at Millwall Park and Victoria Park in the modelling. The monitoring site at Victoria Park has been discounted as it is over 3.5km from the Site, but the monitoring site at Millwall Park has been used to calibrate Defra's background pollutant maps[7]. The pollutant maps allow estimated background concentrations in the study area to be determined for 2018 and projected to the opening year 2025. The background concentrations are set out

in Table 9.7 and further details of their derivation and the calibration using Millwall Park are described in **ES Volume 3, Appendix: Air Quality - Annex 6**. The background concentrations are all below the objectives.

Table 9.7 Estimated Annual Mean Background Pollutant Concentrations in 2018 and 2025 (µg/m³)

Year	NO_2	PM_{10}	$PM_{2.5}$
2018	31.9 - 36.7	19.0 - 19.4	12.8 - 12.9
2025	23.0 - 26.9	17.4 - 17.9	11.5 - 11.7
Objectives	40	40	25 [a]

The range of values is for the different 1x1 km grid squares covering the study area.
[a] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Future Baseline Conditions

9.81 Baseline concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been modelled at each of the existing receptor locations (see Figure 9.1 and Table 9.3 for receptor locations). The results, which cover both the existing (2018) and future year (2025) baseline (Without Scheme), are set out in Tables 9.8 and 9.9. The modelled road components of nitrogen oxides, PM_{10} and $PM_{2.5}$ have been increased from those predicted by the model based on a comparison with local measurements (see **ES Volume 3, Appendix: Air Quality - Annex 6** for the verification methodology).

Table 9.8 Modelled Annual Mean Baseline Concentrations of NO_2 (µg/m³) at Existing Receptors [a]

Receptor	2018	2025 Without Scheme
Existing Receptors		
R1	46.8	32.0
R2	41.2	29.2
R3	39.3	28.2
R4	40.2	27.9
R5	49.3	34.1
R6	45.6	31.8
R7	43.6	30.6
R8	49.6	34.3
R9	57.0	38.2
R10	41.6	28.5
R11	41.4	29.2
R12 – Hotel GF	39.4	28.0
R12 – Serviced Apartment 9F	33.3	24.4
R12 – Residential 13F	32.6	24.0
R13	55.7	37.1
R14	38.7	27.3
R15	37.3	26.7
Cumulative Receptors		
R16	38.1	26.8
R17	45.6	32.0
R18	47.0	32.7
R19	47.4	32.9
Objective	40	

[a] Exceedances of the objective are shown in bold. Values greater than 60 µg/m³ are also underlined.

Table 9.9 Modelled Annual Mean Baseline Concentrations of PM_{10} and $PM_{2.5}$ (µg/m³) at Existing Receptors

Receptor	PM_{10}		$PM_{2.5}$	
	2018	2025 Without Scheme	2018	2025 Without Scheme
Existing Receptors				
R1	20.4	18.9	13.6	12.3
R2	19.9	18.3	13.3	12.0
R3	19.7	18.1	13.2	11.9
R4	19.6	18.0	13.1	11.8
R5	20.8	19.3	13.7	12.5
R6	20.3	18.8	13.4	12.2
R7	20.0	18.5	13.3	12.1
R8	20.7	19.3	13.7	12.5
R9	21.3	19.8	14.1	12.8
R10	19.7	18.2	13.2	11.9
R11	19.9	18.3	13.3	12.0
R12 – Hotel GF	19.7	18.1	13.2	11.9
R12 – Serviced Apartment 9F	19.1	17.6	12.8	11.6
R12 – Residential 13F	19.1	17.5	12.8	11.5
R13	21.4	19.8	14.2	12.8
R14	19.5	18.0	13.1	11.8
R15	19.5	17.9	13.1	11.8
Cumulative Receptors				
R16	19.5	17.9	13.0	11.7
R17	20.3	18.9	13.5	12.2
R18	20.4	18.9	13.5	12.3
R19	20.5	19.0	13.6	12.3
Objective	32 [a]		25 [b]	

[a] While the annual mean PM_{10} objective is 40 µg/m³, 32 µg/m³ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG16[3]. A value of 32 µg/m³ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance[5b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

2018 Baseline

9.82 The predicted annual mean concentrations of NO_2 are above the objective at the majority of selected existing receptor locations in 2018. The annual mean NO_2 concentrations do not exceed 60 µg/m³ at any receptors; it is, therefore, unlikely that the 1-hour mean NO_2 objective will be exceeded at any location.

9.83 Annual mean concentrations of PM_{10} and $PM_{2.5}$ are however predicted to be well below the objectives in 2018 at all receptors. The annual mean PM_{10} concentrations are below 32 µg/m³ and it is, therefore, unlikely that the 24-hour mean PM_{10} objective will be exceeded.

2025 Baseline

9.84 The predicted annual mean concentrations of NO_2 are below the objective at all receptor locations. The annual mean NO_2 concentrations are below 60 µg/m^3 at all receptors; it is, therefore, unlikely that the 1-hour mean NO_2 objective will be exceeded. All of the predictions for PM_{10} and $PM_{2.5}$ are well below the objectives. The annual mean PM_{10} concentrations are below 32 µg/m^3 and it is, therefore, unlikely that the 24-hour mean PM_{10} objective will be exceeded. The baseline concentrations are predicted to be lower in 2025 than in 2018 due to expected reductions in vehicle emissions resulting from the uptake of cleaner vehicles as well as local, regional and national policies to improve air quality, such as the planned extension of the London Ultra Low Emission Zone in 2021.

POTENTIAL EFFECTS

Enabling and Construction Traffic

9.85 The number of HDVs that will access the Site during enabling and construction has been provided for each quarter of the construction phase. EPUK and IAQM[5] considers that a detailed assessment of air quality may be required if a development leads to a change of more than 25 AADT HDV movements on roads with relevant exposure. The Proposed Development will lead to increases in HDV AADT flows greater than the screening criteria on some roads with relevant exposure throughout the enabling and construction process, with increases of up to 126 HDV AADT movements in 2024 (peak construction). As such, further assessment has been carried out to determine the impacts of the additional HDVs on air quality at receptors located along the affected roads.

9.86 The dispersion model ADMS-Roads was used for the further assessment, and it was predicted by the model that an increase in 126 HDV movements per day would lead to increases in annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations of less than 0.1 µg/m^3 at all of the selected existing receptor locations (shown on Figure 9.1) including the nearest receptor, the Horizon Building. Applying the assessment matrix presented in Table 9.2, such an increase will have a negligible impact on air quality at sensitive receptor locations, regardless of the baseline concentrations. The effects associated with off-site construction traffic emissions are, therefore, considered to be direct, temporary, 'not significant' at the local, borough and regional level.

Enabling and Construction Works

9.87 The enabling and construction works will give rise to a risk of dust impacts during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. Step 1 of the assessment procedure is to screen the need for a detailed assessment. There are receptors within the distances set out in the guidance (see **ES Volume 3, Appendix: Air Quality - Annex 3**), thus a detailed assessment is required. The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

Enabling

9.88 There will be a requirement to demolish the temporary cabins on the Site. The cabins will be dismantled using mobile cranes and access platforms. The existing false quay deck at the south of the Site will also be removed, using non-percussive demolition methods where possible. A 2.4 m high solid hoarding has been erected around the Site boundary and will remain in place at all times. The method of demolition will limit any demolition material entering the North Dock, as far as is practical. Site Preparation works are anticipated to last approximately 2 months for each of the 4 phases of the works.

9.89 Based on the example definitions set out in Table A3.1 in **ES Volume 3, Appendix: Air Quality - Annex 3**, the dust emission class for demolition is considered to be small.

Earthworks

9.90 The characteristics of the soil at the Site have been defined using the British Geological Survey's UK Soil Observatory website[20] , as set out in Table 9.10. Overall, it is considered that, when dry, this soil has the potential to be moderately dusty.

Table 9.10 Summary of Soil Characteristics

Category	Record
Soil Layer Thickness	Deep
Soil Parent Material Grain Size	Mixed (Argillaceous [a] – Arenaceous [b])
European Soil Bureau Description	Fluvial clays, silts sands and gravel
Soil Group	Heavy
Soil Texture	Peaty clay
[a] grain size <0.06 mm. [b] grain size 0.06 – 2.0 mm.	

9.91 The Site covers some 3.28 ha and most of this will be subject to earthworks, which will mainly consist of digging the basements. The solid hoarding will remain in place during earthworks. The earthworks will last around 7 months for each of the 4 phases of the works, and dust will arise mainly from vehicles travelling over unpaved ground and from the handling of dusty materials (such as dry soil).

9.92 Based on the example definitions set out in Table A3.1 in **ES Volume 3, Appendix: Air Quality - Annex 3**, the dust emission class for earthworks is considered to be large.

Construction

9.93 Construction works are anticipated to last approximately 52 months for Phase 1, 68 months for Phase 2, 57 months for Phase 3 and 59 months for Phase 4. The solid hoarding will be maintained during the construction works. Basement construction works will consist of bearing piling, capping beam construction and basement raft construction. The majority of the piles to support the buildings on the Site will be installed from within the basement excavation. Overground works will include constructing concrete cores and steel frames for the commercial buildings and reinforced concrete frames for the residential buildings. Construction quantities have been provided, including but not limited to a total of 153,000 m^3 of concrete used for pilling, substructures, and superstructures, 15,300 tonnes of reinforcement steel and fabricated steelwork used for the substructure and superstructure, 152,000 m^2 of material used for the superstructure façade, 126,175 m^2 for the internal walls and 265,000 m^2 for the ceilings. Dust will arise from vehicles travelling over unpaved ground, the handling and storage of dusty materials, and from the cutting of concrete.

9.94 Based on the example definitions set out in Table A3.1 in **ES Volume 3, Appendix: Air Quality - Annex 3**, the dust emission class for construction is considered to be large.

[20] *British Geological Survey (2020) UK Soil Observatory Map Viewer, [Online], Available: http://mapapps2.bgs.ac.uk/ukso/home.html.*

Trackout

9.95 It is anticipated that the peak number of construction vehicles will occur in 2024, with a maximum of 200 outward vehicle movements per day. As described in **ES Volume 1, Chapter 5: Enabling and Construction Works**, the primary routes for outbound construction vehicles will be to exit the Site onto Aspen Way via either Upper Bank Street or Hertsmere Road, after which they will distribute onto the road network. A secondary access is available via Westferry Circus and Hertsmere Road if access to Aspen Way is not available. Wheel washing facilities and/or manual jet washers will be provided at the Site exits.

9.96 Based on the example definitions set out in Table 3.1 in **ES Volume 3, Appendix: Air Quality - Annex 3**, the dust emission class for trackout is considered to be large.

9.97 Table 9.11 summarises the anticipated dust emission magnitude for the Proposed Development.

Table 9.11 Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Demolition	Small
Earthworks	Large
Construction	Large
Trackout	Large

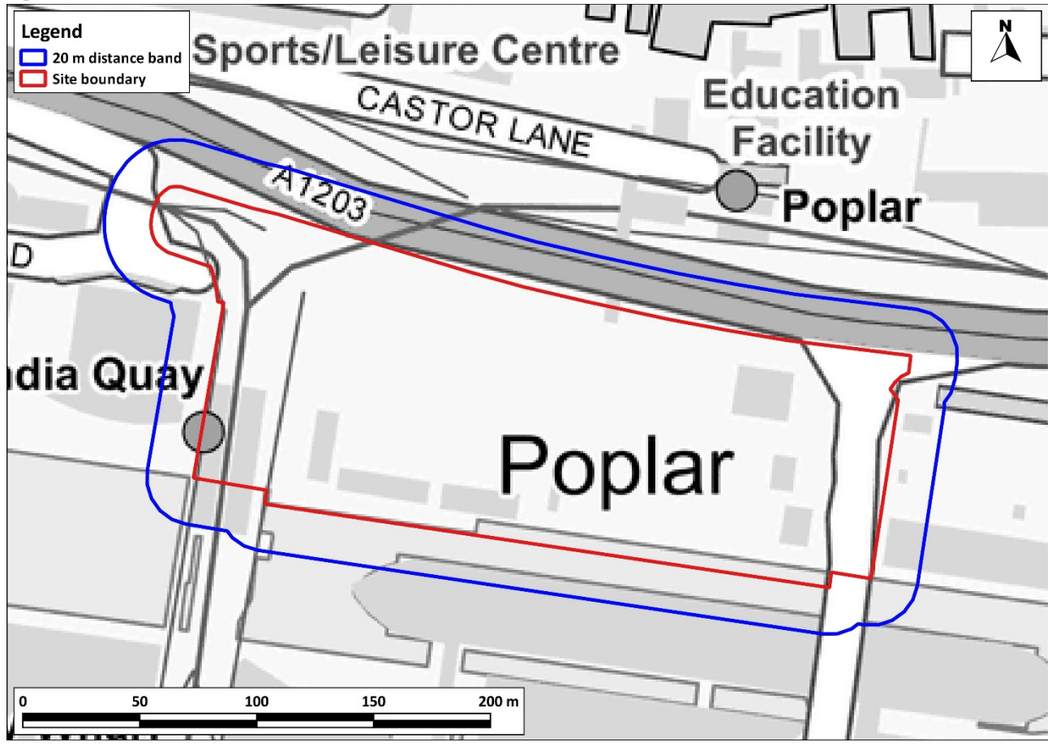
Sensitivity of the Area

9.98 This assessment step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the Site. It also considers additional site-specific factors such as topography and screening, and in the case of sensitivity to human health effects, baseline PM_{10} concentrations.

Sensitivity of the Area to Effects from Dust Soiling

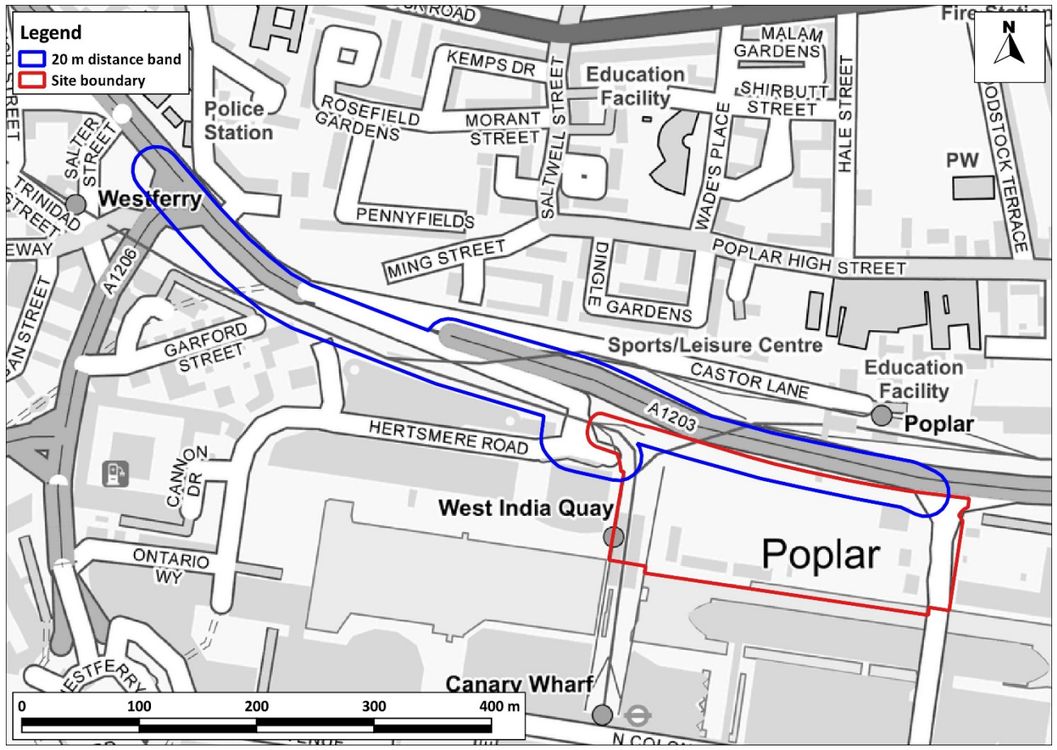
9.99 Residential properties are 'high' sensitivity receptors to dust soiling, while places of work are 'medium' sensitivity receptors (Table A3.2 in **ES Volume 3, Appendix: Air Quality - Annex 3**). 1 West India Quay (consisting of the Marriot Hotel, serviced apartments, and residential dwellings) and Billingsgate Market School is within 20m of Phase 1 of the construction works (see Figure 9.4). Furthermore, new residents within the earlier phases of the Proposed Development will also classify as sensitive receptors during construction of the later phases and will be at risk of dust nuisance. The Horizon Building lies just outside the 20m buffer. Using the matrix set out in Table A3.3 in **ES Volume 3, Appendix: Air Quality - Annex 3**, the area surrounding the onsite works is of 'high' sensitivity to dust soiling.

Figure 9.4 20 m Distance Band around Site Boundary



9.100 Table 9.11 shows that the dust emission magnitude for trackout is large and Table A3.3 in **ES Volume 3, Appendix: Air Quality - Annex 3** thus explains that there is a risk of material being tracked 500m from the Site. 1 West India Quay and the Horizon Building are within 20m of the primary construction traffic routes along which material could be tracked (see Figure 9.5). Once onto Aspen Way, there are no buildings within 20m of the road edge that could be affected. Table A3.3 in **ES Volume 3, Appendix: Air Quality - Annex 3** indicates that the area is of 'high' sensitivity to dust soiling due to trackout. The secondary route for construction traffic along Hertsmere Road to Westferry Circus is not shown in Figure 9.5, but would result in additional receptors along Hertsmere Road falling within the 20m buffer, although these are all medium and low sensitivity commercial receptors including the Museum of London Docklands, West India Quay carpark and the Ledger Building. This will not change the sensitivity of the area to dust soiling from trackout, which will remain 'high' risk in the event that the secondary route is used.

Figure 9.5 20m Distance Bands around Roads Used by Construction Traffic Within 500m of the Site Exits



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Sensitivity of the Area to any Human Health Effects

9.101 Residential properties are also classified as being of 'high' sensitivity to human health effects, while places of work are classified as being of 'medium' sensitivity. The matrix in Table A3.4 in **ES Volume 3, Appendix: Air Quality - Annex 3** requires information on the baseline annual mean PM_{10} concentration in the area. It is considered that the modelled baseline PM_{10} concentration at the Horizon Building (receptor R11 in Table 9.9), 19.9 µg/m^3, will best represent conditions near to the Site, and this value has been used. Using the matrix in Table A3.4 in **ES Volume 3, Appendix: Air Quality - Annex 3**, the area surrounding the onsite works is of 'medium' sensitivity to human health effects, as is the area surrounding roads along which material may be tracked from the Site (this is the case for both the primary construction traffic routes onto Aspen Way, and the secondary construction traffic route via Hertsmere Road to Westferry Circus).

Sensitivity of the Area to any Ecological Effects

9.102 The IAQM's guidance on the assessment of dust from demolition and construction[11] considers locally designated sites such as the Millwall & West India Docks SNCI to be of 'low' sensitivity to dust soiling. The Millwall & West India Docks SNCI is located on the southern boundary of the Site, within 20m of the Site boundary, Table A3.5 in **ES Volume 3, Appendix: Air Quality - Annex 3** shows that before mitigation the area is of 'low' sensitivity to dust soiling from on-site construction works. The SINC is more than 20m away from routes used by construction vehicles and therefore the sensitivity to dust soiling from trackout is negligible.

Summary of Area Sensitivity

9.103 Table 9.12 summarises the sensitivity of the area around the proposed construction works site.

Table 9.12 Summary of the Area Sensitivity

Effects associated with:	Sensitivity of the Surrounding Area	
	On-site works	Trackout
Dust Soiling	High	High
Human health	Medium	Medium
Ecological	Low Sensitivity	Negligible

Risk and Significance

9.104 The dust emission magnitudes in Table 9.11 have been combined with the sensitivities of the area in Table 9.12 using the matrix in Table A3.6 in **ES Volume 3, Appendix: Air Quality - Annex 3**, in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in Table 9.13. These risk categories have been used to determine the appropriate level of mitigation as set out in **ES Volume 3, Appendix: Air Quality - Annex 9** (step 3 of the assessment procedure).

9.105 It should be noted that as the risks of dust soiling are determined as being high risk during earthworks, construction, and trackout, the recommended mitigation for a high risk site have been proposed (see paragraph 9.118). This is the highest risk rating and therefore the best and most comprehensive dust mitigation measures, and means that if the maximum parameters of the Proposed Development were to be built out, the conclusions of the construction dust risk assessment and recommended mitigation measures would be the same.

Table 9.13 Summary of Risk of Impacts Without Mitigation

Source	Dust Soiling	Human Health	Ecology
Demolition	Medium Risk	Low Risk	Low Risk
Earthworks	High Risk	Medium Risk	Low Risk
Construction	High Risk	Medium Risk	Low Risk
Trackout	High Risk	Medium Risk	Negligible

9.106 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance[11] is clear that the residual effect will normally be direct, temporary, 'not significant' at the local, borough and regional level.

Completed Development

Initial Screening Assessment of Development-Generated Road Traffic Emissions

9.107 The trip generation of the Proposed Development on local roads (as provided by Steer Group) has initially been compared to the screening criteria set out in the EPUK/IAQM guidance[5] (see **ES Volume 3, Appendix: Air Quality - Annex 4**). The Proposed Development will increase AADT flows by more than 25 HDVs and 100 Light Duty Vehicles (LDVs) vehicles along the local road network, thus a detailed assessment is required.

Impacts of Development-Generated Road Traffic Emissions at Existing Properties

9.108 Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ in 2025 for existing receptors are set out in Tables 9.14 to 9.16 for both the "Without Scheme" and "With Scheme" scenarios. Predictions take account of

emissions from the adjacent road network. These tables also describe the impacts at each receptor using the impact descriptors given in Table 9.2.

Table 9.14 Predicted Impacts on Annual Mean NO_2 Concentrations in 2025 (µg/m³) [a]

Receptor	Without Scheme	With Scheme	% Change[b]	Impact Descriptor
Existing Receptors				
R1	32.0	32.2	0	Negligible
R2	29.2	29.4	0	Negligible
R3	28.2	28.4	1	Negligible
R4	27.9	28.1	0	Negligible
R5	34.1	34.2	0	Negligible
R6	31.8	31.9	0	Negligible
R7	30.6	30.7	0	Negligible
R8	34.3	34.4	0	Negligible
R9	38.2	38.3	0	Negligible
R10	28.5	28.9	1	Negligible
R11	29.2	29.5	1	Negligible
R12 – Hotel GF	28.0	28.3	n/a [c]	
R12 – Serviced Apartment 9F	24.4	24.4	0	Negligible
R12 – Residential 13F	24.0	24.0	0	Negligible
R13	37.1	37.3	1	Negligible
R14	27.3	27.5	0	Negligible
R15	26.7	26.8	0	Negligible
Cumulative Receptors				
R16	26.8	27.0	0	Negligible
R17	32.0	32.1	0	Negligible
R18	32.7	32.8	0	Negligible
R19	32.9	33	0	Negligible
Objective	40		-	-

[a] Exceedances of the objective are shown in bold.

[b] % changes are relative to the objective and have been rounded to the nearest whole number.

[c] The Marriot Hotel is not sensitive to the annual mean objectives (see paragraph 9.41) and therefore the impact assessment at this receptor is not relevant. The impacts with respect to the 1-hour mean NO2 objective is discussed in paragraph 9.109.

Table 9.15 Predicted Impacts on Annual Mean PM_{10} Concentrations in 2025 (µg/m³)

Receptor	Without Scheme	With Scheme	% Change[a]	Impact Descriptor
Existing Receptors				
R1	18.9	18.9	0	Negligible
R2	18.3	18.4	0	Negligible
R3	18.1	18.1	0	Negligible
R4	18.0	18.0	0	Negligible
R5	19.3	19.3	0	Negligible
R6	18.8	18.8	0	Negligible
R7	18.5	18.6	0	Negligible
R8	19.3	19.3	0	Negligible
R9	19.8	19.8	0	Negligible
R10	18.2	18.2	0	Negligible
R11	18.3	18.4	0	Negligible
R12 – Hotel GF	18.1	18.2	0	Negligible
R12 – Serviced Apartment 9F	17.6	17.6	0	Negligible
R12 – Residential 13F	17.5	17.5	0	Negligible
R13	19.8	19.9	0	Negligible
R14	18.0	18.0	0	Negligible
R15	17.9	17.9	0	Negligible
Cumulative Receptors				
R16	17.9	17.9	0	Negligible
R17	18.9	18.9	0	Negligible
R18	18.9	19.0	0	Negligible
R19	19.0	19.0	0	Negligible
Objective	32[b]		-	-

[a] % changes are relative to the objective and have been rounded to the nearest whole number.

[b] While the annual mean PM_{10} objective is 40 µg/m³, 32 µg/m³ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG16[3]. A value of 32 µg/m³ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance[5].

Table 9.16 Predicted Impacts on Annual Mean $PM_{2.5}$ Concentrations in 2025 (µg/m³)

Receptor	Without Scheme	With Scheme	% Change[a]	Impact Descriptor
Existing Receptors				
R1	12.3	12.3	0	Negligible
R2	12.0	12.0	0	Negligible
R3	11.9	11.9	0	Negligible
R4	11.8	11.8	0	Negligible
R5	12.5	12.5	0	Negligible
R6	12.2	12.2	0	Negligible
R7	12.1	12.1	0	Negligible
R8	12.5	12.5	0	Negligible
R9	12.8	12.8	0	Negligible
R10	11.9	11.9	0	Negligible
R11	12.0	12.0	0	Negligible
R12 – Hotel GF	11.9	11.9	0	Negligible
R12 – Serviced Apartment 9F	11.6	11.6	0	Negligible
R12 – Residential 13F	11.5	11.5	0	Negligible
R13	12.8	12.8	0	Negligible

Receptor	Without Scheme	With Scheme	% Change[a]	Impact Descriptor
R14	11.8	11.8	0	Negligible
R15	11.8	11.8	0	Negligible
Cumulative Receptors				
R16	11.7	11.8	0	Negligible
R17	12.2	12.3	0	Negligible
R18	12.3	12.3	0	Negligible
R19	12.3	12.3	0	Negligible
Objective	25[b]		-	-

[a] % changes are relative to the objective and have been rounded to the nearest whole number.
[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

NO_2

9.109 The annual mean NO_2 concentrations are below the objective at all receptors, both with and without the Proposed Development.

9.110 The percentage changes in concentrations, relative to the air quality objective (when rounded), are predicted to be 1% at 4 of the receptors and 0% at all other receptors. Using the matrix in Table 9.2 these impacts are all described as direct, permanent, **Negligible** (not significant) at the local, borough and regional level

9.111 The annual mean NO_2 concentrations are below 60 µg/m^3 at all of the receptor locations. It is, therefore, unlikely that the 1-hour mean NO_2 objective will be exceeded. The change in concentrations at the Marriot Hotel (receptor R12 Hotel GF) is small (0.2 µg/m^3) and represents a negligible impact in terms of the 1-our mean NO_2 objective.

9.112 The changes to the LEZ and ULEZ described in **ES Volume 3, Appendix: Air Quality - Annex 2,** which the Mayor of London has confirmed are to be implemented, will result in significant reductions in NOx emissions across London. It has not, however, been possible to account for these in this assessment. Consequentially, the results for NO_2 presented in Table 9.15 are likely to represent an over-prediction both in terms of total concentrations and impact magnitude (see **ES Volume 3, Appendix: Air Quality - Annex 7**). Furthermore, the assessment has assumed that the Proposed Development is fully operational in the opening year of 2025. In reality, full operation will not occur until the completion year of 2029, by which time baseline pollutant concentrations will have reduced further. Finally, much of the traffic generated by the Proposed Development consists of servicing and delivery trips, using vehicles already on the local road network. This will also have led to an over-prediction of the impacts of the scheme.

PM_{10} and $PM_{2.5}$

9.113 The annual mean PM_{10} and $PM_{2.5}$ concentrations are well below the annual mean objectives at all receptors, with or without the Proposed Development. Furthermore, as the annual mean PM_{10} concentrations are below 32 µg/m^3, it is unlikely that the 24-hour mean PM_{10} objective will be exceeded at any of the receptors.

9.114 The percentage changes in both PM_{10} and $PM_{2.5}$ concentrations, relative to the air quality objective (when rounded), are predicted to be 0% at all of the receptors. Using the matrix in Table 9.2, these impacts are described as direct, permanent, **Negligible** (not significant) at the local, borough and regional level.

Significance of Operational Air Quality Effects

9.115 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in **ES Volume 3, Appendix: Air Quality - Annex 4**.

9.116 More specifically, the judgement that the air quality effects will be 'not significant' without mitigation takes account of the assessment that concentrations will be below the air quality objectives at all receptor locations and the Proposed Development does not result in any new exceedance of the air quality objectives, and the predicted impacts all receptor locations is direct, permanent, negligible (not significant) at the local, borough and regional level for NO_2, PM_{10} and $PM_{2.5}$.

MITIGATION MEASURES, MONITORING AND RESIDUAL EFFECTS

Embedded Mitigation

9.117 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The Proposed Development incorporates the following good design and best practice measures, which are proposed to be secured via planning conditions and the control documents:

- Adoption of a Construction Logistics Plan (CLP) to minimise the environmental and road traffic related impacts of the enabling and construction works;
- Adoption of a Construction Environmental Management Plan (CEMP) to minimise the environmental impacts of the construction works;
- There will be no provision for on-site car parking during construction, to encourage the labour force to use public transport;
- Provision of a Delivery and Servicing Plan to minimise the environmental and road traffic related impacts of deliveries to and from the Site and general development servicing;
- Construction of a green wall along Aspen Way to reduce the impacts of traffic emissions from Aspen Way on future users of the Proposed Development;
- Provision of car parking for disabled use only;
- Provision of electric vehicle charging facilities for disabled parking spaces and basement loading bays;
- Provision of a detailed travel plan setting out measures to encourage sustainable means of transport (public, cycling and walking);
- Provision of pedestrian and cycle access to the new development, including extensive secure cycle parking in the basement levels; and
- Use of air-source heating to avoid the need for on-site combustion.

Additional Mitigation

Enabling and Construction

9.118 Measures to mitigate dust emissions will be required during the enabling and construction works of the Proposed Development in order to minimise effects upon nearby sensitive receptors.

9.119 The Site has been identified as a Medium Risk site during demolition and a High Risk site during, earthworks, construction and for trackout, as set out in Table 9.13. The GLA's SPG on The Control of Dust and Emissions During Construction and Demolition[10] describes measures that should be employed, as appropriate, to reduce

the impacts, along with guidance on what monitoring should be undertaken during the construction phase. This reflects best practice experience and has been used, together with the professional experience of the consultant who has undertaken the dust impact assessment and the findings of the assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in **ES Volume 3, Appendix: Air Quality - Annex 9**.

9.120 The mitigation measures shall be written into a dust management plan (DMP). The DMP may be integrated into a Code of Construction Practice or the CEMP, and may require monitoring, which will be secured via a planning condition. The GLA's guidance suggests that, for a High Risk site, automatic monitoring of particulate matter (as PM_{10}) will be required. It also states that, on certain sites, it may be appropriate to determine the existing (baseline) pollution levels before work begins. However, the guidance is clear that the Local Authority should advise as to the appropriate air quality monitoring procedure and timescale on a case-by-case basis.

9.121 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There will not be any excessive use of water.

9.122 The effects associated with the additional mitigation are, therefore, considered to be direct, temporary, 'not significant' at the local, borough and regional level.

Completed Development

9.123 The assessment has demonstrated that the Proposed Development will not cause any exceedances of the air quality objectives and that the overall air quality effect of the Proposed Development will be 'not significant'. As such, there is no requirement for mitigation beyond the best practice design measures highlighted above.

9.124 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law). The local air quality plan that the GLA is required to produce in order to address limit value exceedances in its area will also help to improve air quality, as will the Council's Air Quality Action Plan.

9.125 Policy 6.13 of the London Plan[21] outlines that *"developments must…ensure that 1 in 5 spaces (both active and passive) provide an electrical charging point to encourage the uptake of electric vehicles"*. Table 6.2 of the London Plan further emphasises this, stating that, for retail developments, 10% of all car parking spaces must be for electric vehicles, with an additional 10% passive provision for electric vehicles, for employment (B1) developments, 20% of all car parking spaces must be for electric vehicles, with an additional 10% passive provision for electric vehicles, and for residential developments, 20% of all car parking spaces must be for electric vehicles, with an additional 20% passive provision for electric vehicles. The Proposed Development will include this allowance for electric vehicle charging points, which will assist in minimising the impacts on the development, as identified in paragraph 9.110 as the uptake of electric vehicles increases.

9.126 Whilst the improvements cannot be quantified at this stage, the predicted impacts all receptor locations are to remain as above, direct, permanent **Negligible** (not significant) at the local, borough and regional level for NO_2, PM_{10} and $PM_{2.5}$.

[21] *GLA (2016) The London Plan: The Spatial Development Strategy for London Consolidated with Alterations Since 2011*

Residual Effects

9.127 Table 9.17 provides a tabulated summary of the outcomes of the air quality impact assessment of the Proposed Development, identifying the residual effects and whether effects are significant or not.

Table 9.17 Summary of Residual Effects

Receptor	Description of the Residual Effect	Nature and Scale	Geographical Extent	Effect Significance	+ve -ve	D I	P T	St Mt Lt
Enabling and Construction								
Existing Receptors	Enabling and Construction Works - Dust	Adverse*	Site or Local	Not significant*	-	D	T	Mt
Existing Receptors	Enabling and Construction Vehicles Emissions	Negligible	District	Not significant	-	D	T	Mt
Completed Development								
Existing Receptors	Road Traffic Emissions	Negligible	District	Not significant	N/A	D	P	Lt

Notes:
Scale = Negligible / Minor / Moderate / Major Nature = Beneficial, Adverse
Geographic Extent = Site or Local, District / Borough, Regional, National. Effect Significance = Significant / Not Significant
+ve = Positive / -ve = Negative. D = Direct / I = Indirect. P = Permanent / T = Temporary.
St = Short Term / Mt = Medium Term / Lt = Long Term. n/a = not applicable / not assessed

**The scale of impacts at individual receptor locations was not determined for enabling and construction. A qualitative assessment was undertaken, and it is considered that with the application of recommended mitigation measures, residual effects will be 'not significant'.*

9.128 The Site is considered to be suitable for the proposed uses in terms of air quality conditions.

AIR QUALITY NEUTRAL ASSESSMENT

Building Emissions

9.129 The Proposed Development will be provided with heating, cooling and hot water by air source heat pumps. There will thus be no building emissions associated with the Proposed Development and the Proposed Development is better than air quality neutral in terms of building emissions.

Road Transport Emissions

9.130 The Transport Emissions Benchmarks (TEBs) are based on the number of light vehicle trips generated by different land-use classes, together with the associated trip lengths and vehicle emission rates. However, the guidance[22] only provides trip lengths and emission rates for A1, B1 and C3 uses, thus a TEB cannot be calculated for the serviced apartment (C1) element of the Proposed Development. The guidance does provide an alternative methodology, based on trip rates only, and this has been followed in considering the air quality neutrality of the Proposed Development in terms of transport emissions.

[22] *AQC (2014) Air Quality Neutral Planning Support Update: GLA 80371, Available: http://www.aqconsultants.co.uk/getattachment/Resources/Download-Reports/GLA-AQ-Neutral-Policy-Final-Report-April-2014.pdf.aspx.*

9.131 Table A8.6 in **ES Volume 3, Appendix: Air Quality - Annex 8** provides default trip rates for different development categories. This information has been used to calculate a benchmark trip rate for the Proposed Development, as shown in Table 9.18. The benchmark is calculated using the Indicative Scheme (which is conservative as the maximum parameters would generate a higher benchmark). This has then been compared with the actual trip rate of the Proposed Development, which is based on the maximum road traffic generating scenario to be worst-case in terms of generated car trips. As the final use of the retail units has not been confirmed, it has been assumed that all retail units will be A4 (bar) use, as this has the lowest benchmark trip rate of the A1-5 land uses and thus provides the most conservative assessment.

Table 9.18 Calculation of Transport Benchmark Trip Rates for the Development

Description		Value	Reference
Retail (A4)			
A	Gross Internal Floor Area of Retail (m^2)	13,681	Allies and Morrison
B	A4 Retail Benchmark Emissions (trips/m^2/annum)	8.0	Table A8.6 in **ES Volume 3, Appendix: Air Quality - Annex 8**
C	Retail Transport Benchmark Trip Rate (trips/annum)	109,448	A x B / 1000
Office (B1)			
D	Gross Internal Floor Area of Offices (m^2)	174,653	Allies and Morrison
E	B1 Office Benchmark Emissions (trips/m^2/annum)	4.0	Table A8.6 in **ES Volume 3, Appendix: Air Quality - Annex 8**
F	Office Transport Benchmark Trip Rate (trips/annum)	698,612	D x E / 1000
Residential (C1 and C3)			
G	Gross Internal Floor Area of Residential (Dwellings and Serviced Apartments) (m^2)	125,825	Allies and Morrison
H	C1 Residential Benchmark Emissions (trips/m^2/annum)	5.0	Table A8.6 in **ES Volume 3, Appendix: Air Quality - Annex 8**
I	Residential Transport Benchmark Trip Rate (trips/annum)	629,125	G x H / 1000
Entire Development			
Total Transport Benchmark Trip Rate (trips/annum)		1,437,185	C + F + I

9.132 The Total Trip Rate of 408,425, provided by Steer Group and based on the worst-case predicted trip generation, is less than the Total Transport Benchmark Trip Rate. The Proposed Development is thus better than air quality neutral.

'Air Quality Positive'

9.133 The Proposed Development has taken into account the principles of the 'air quality positive' approach as follows:

- adoption of a CLP considering arrangements for freight movements to and from the Site. The CLP will set out the approaches for managing construction vehicle activity to encourage the use of sustainable freight modes, and the most efficient use of construction freight vehicles;
- adoption of an CEMP, to reduce emissions from demolition and construction activities and associated vehicles;
- sourcing construction materials locally, where possible, to minimise transport impacts;
- no new on-site combustion for the provision of energy, in line with the energy hierarchy presented in the Draft New London Plan, using heat pumps instead;
- installation of solar PV arrays that can also generate electricity;
- construction of a 'green wall' along Aspen Way to reduce the impacts of road traffic emissions from Aspen Way on future users of the Proposed Development;
- Development of amenity and landscape design to position the majority of the formal amenity areas away from Aspen Way where possible;
- provision of only car parking spaces only for disabled blue badge holders to meet policy requirements;
- provision of electric vehicle charging points on disabled parking spaces and basement loading bays;
- framework Travel Plan setting out measures to be adopted, to encourage sustainable means of transport; and
- the Site provides pedestrian and cycle access and extensive secure and covered cycle parking provision in the basement levels of the Proposed Development.

9.134 The design of the Proposed Development has thus minimised both pollutant emissions and exposure of future occupants.

SITE SUITABILITY

9.135 Predicted air quality conditions for future residents of the Proposed Development, taking account of emissions from the adjacent road network are set out in Tables 9.19 and 9.20 for Receptors A to T. Annual mean concentrations of NO2, PM10 and PM2.5 are below the objectives at all receptor locations, regardless of whether or not they apply. For those receptors where the annual mean objectives do not apply, concentrations of NO2 are below 60 µg/m^3, meaning there will be no exceedances of the 1-hour mean NO_2 objective. Air quality for future residents and users of all areas of the Proposed Development will thus be acceptable.

Table 9.19 Predicted Concentrations of NO_2 in 2025 for New Receptors in the Development Site [a]

Receptor	Description	Receptor Type [a]	Annual Mean NO_2 (µg/m^3)
A	Building NQA1 – Ground and 1st Floor	Residential	31.2
	Building NQA1 – Above 1st Floor	Residential	28.3
B	Building NQA1 – Ground and 1st Floor	Residential	27.2
	Building NQA1 – Above 1st Floor	Residential	26.6
C	Building NQA4/Dock Square – Ground and 1st Floor	Amenity/Retail	26.5
	Building NQA4 – Above 1st Floor	Residential	26.1
D	Building NQA4 – Ground and 1st Floor	Retail	25.8
	Building NQA4 – Above 1st Floor	Residential	25.6
E	Building NQA5/Quay Square – Ground and 1st Floor	Amenity/Retail	26.6
	Building NQA5 – Above 1st Floor	Retail	26.2
F	Building NQA5/Dock Square – Ground and 1st Floor	Amenity/Retail	25.8
	Building NQA5 – Above 1st Floor	Retail	25.6
G	Building NQB1 – Ground and 1st Floor	Retail	34.2
H	Building NQB1 – Ground and 1st Floor	Retail	27.3
I	Building NQD1 – Ground and 1st Floor	Retail	33.9
J	Building NQD1 – Ground and 1st Floor	Retail	34.9
K	Building NQD1 – Ground and 1st Floor	Retail	27.8
L	Poplar Plaza – Ground and 1st Floor	Residential	27.4
	Poplar Plaza – Above 1st Floor	Residential	26.8
M	Building NQD3/Dock Square – Ground and 1st Floor	Amenity/Retail	27.0

Receptor	Description	Receptor Type [a]	Annual Mean NO_2 (µg/m^3)
N	Building NQD3/Quay Square – Ground and 1st Floor	Amenity/Retail	25.8
O	Building NQD4 – Ground and 1st Floor	Retail	28.2
	Building NQD4 – Above 1st Floor	Residential	26.7
P	Building NQD4/Dock Square – Ground and 1st Floor	Amenity/Retail	26.2
	Building NQD4 – Above 1st Floor	Residential	25.9
Q	Poplar Plaza – Ground and 1st Floor	Residential	33.6
	Poplar Plaza – Above 1st Floor	Residential	28.5
R	Building NQB1 – Ground and 1st Floor	Retail	27.5
S	Delta Skate	Amenity	35.7
T	Delta Skate	Amenity	36.7
Objective			40 (60) [a]

A Where the receptor type is 'Residential' the annual mean objective of 40 µg/m^3 applies. Where the receptor type is 'Amenity/Retail' or 'Retail', the relevant objective is the 1-hour mean objective, to which a proxy concentration of 60 µg/m^3 applies (see paragraph 9.8 and footnotes to Table 9.1).

Table 9.20 Predicted Concentrations of PM_{10} and $PM_{2.5}$ in 2025 for New Receptors in the Development Site [a]

Receptor	Description	Receptor Type [a]	Annual Mean PM_{10} (µg/m^3)	Annual Mean $PM_{2.5}$ (µg/m^3)
A	Building NQA1 – Ground and 1st Floor	Residential	18.7	12.2
	Building NQA1 – Above 1st Floor	Residential	18.2	11.9
B	Building NQA1 – Ground and 1st Floor	Residential	18.0	11.8
	Building NQA1 – Above 1st Floor	Residential	17.9	11.8
C	Building NQA4/Dock Square – Ground and 1st Floor	Amenity/Retail	17.9	11.7
	Building NQA4 – Above 1st Floor	Residential	17.8	11.7
D	Building NQA4 – Ground and 1st Floor	Retail	17.8	11.7
	Building NQA4 – Above 1st Floor	Residential	17.8	11.7
E	Building NQA5/Quay Square – Ground and 1st Floor	Amenity/Retail	17.9	11.8
	Building NQA5 – Above 1st Floor	Retail	17.9	11.7
F	Building NQA5/Dock Square – Ground and 1st Floor	Amenity/Retail	17.8	11.7
	Building NQA5 – Above 1st Floor	Retail	17.8	11.7
G	Building NQB1 – Ground and 1st Floor	Retail	19.3	12.5
H	Building NQB1 – Ground and 1st Floor	Retail	18.0	11.8
I	Building NQD1 – Ground and 1st Floor	Retail	19.1	12.4
J	Building NQD1 – Ground and 1st Floor	Retail	19.4	12.6
K	Building NQD1 – Ground and 1st Floor	Retail	18.1	11.9
L	Poplar Plaza – Ground and 1st Floor	Residential	18.1	11.8
	Poplar Plaza – Above 1st Floor	Residential	17.9	11.8
M	Building NQD3/Dock Square – Ground and 1st Floor	Amenity/Retail	18.0	11.8
N	Building NQD3/Quay Square – Ground and 1st Floor	Amenity/Retail	17.8	11.7
O	Building NQD4 – Ground and 1st Floor	Retail	18.1	11.9
	Building NQD4 – Above 1st Floor	Residential	17.9	11.8
P	Building NQD4/Dock Square – Ground and 1st Floor	Amenity/Retail	17.8	11.7
	Building NQD4 – Above 1st Floor	Residential	17.8	11.7
Q	Poplar Plaza – Ground and 1st Floor	Residential	19.1	12.4
	Poplar Plaza – Above 1st Floor	Residential	18.2	11.9
R	Building NQB1 – Ground and 1st Floor	Retail	18.1	11.8
S	Delta Skate[c]	Amenity	19.6	12.7
T	Delta Skate[c]	Amenity	19.7	12.7
Objective			32[b]	25[c]

[a] While the annual mean PM_{10} objective is 40 µg/m^3, 32 µg/m^3 is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG16[3]. A value of 32 µg/m^3 is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance[5].

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

[C] To include playspace

9.136 The changes to the LEZ and ULEZ described in **ES Volume 3, Appendix: Air Quality - Annex 2**, which the Mayor of London has confirmed are to be implemented, will result in significant reductions in NOx emissions across London. It has not, however, been possible to account for these in this assessment. Consequentially, the results for NO_2 presented in Table 9.18 are likely to represent a significant over-prediction in terms of total concentrations (see **ES Volume 3, Appendix: Air Quality - Annex 7**).

Conclusion

9.137 The assessment has demonstrated that the Site allocated for the Proposed Development is suitable for residential, commercial and office land uses, with respect to air quality. New receptors introduced into the local area will experience acceptable air quality.

CLIMATE CHANGE

9.138 Air quality is predicted to improve in the future, owing to lower emissions from road vehicles and heating and cooling plant as progressively lower emission technologies become available. The assessment, therefore, focuses on the near-term (year of opening), but the outlook for the longer term is one of improvement, both in terms of local and regional air quality, but also in terms of emissions associated with the Proposed Development itself. Climate change is a long-term effect, and significant changes in climate are not expected by 2025 (the year of opening assumed by the assessment). Climate change will, therefore, not affect air quality model predictions set out in this ES chapter. In the longer term (2050 – 2080) changes in climate might affect the need for heating and cooling and, therefore, have an influence on the energy plant emissions associated with the Proposed Development, but significant effects are not expected as a result.

ASSESSMENT OF THE FUTURE ENVIRONMENT

Evolution of the Baseline Scenario

9.139 If the Proposed Development was not to come forward, it is expected that the Site would remain in its current state. Air quality is generally expected to improve with time, due to more stringent emissions standards for

motor vehicles, for example, so conditions at the Site would be expected to improve. This is reflected in the predicted future baseline concentrations presented in Tables 9.8 and 9.9.

Cumulative Effects Assessment

9.140 A total of 28 developments have been identified as cumulative schemes and outlined in **ES Volume 1 Chapter 2: EIA Methodology**.

Enabling and Construction

9.141 The IAQM guidance is clear that, with appropriate mitigation measures in place, any residual construction dust effects from an individual site will be 'not significant'. The guidance also suggests that cumulative construction dust impacts are only likely where sites are within 500 m of each other. Work would also have to be taking place in areas of both sites that are close to a receptor in order for cumulative effects to occur.

9.142 In accordance with the mitigation measures set out in **ES Volume 3, Appendix: Air Quality: Annex 9**, if there is concurrent construction work on sites within 500 m of each other, the construction contractors should *"hold regular liaison meetings with other high risk construction sites within 500 m of the Site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised"*.

9.143 Ten of the 28 sites identified are within 500 m of the Site. It is anticipated that all construction sites will adopt appropriate mitigation measures to limit emissions of dust, will hold the liaison meetings recommended above and will ensure that plans are co-ordinated to minimise impacts upon the most sensitive receptors. This will be especially important for the works for the New City College Poplar Campus development (PA/19/02067/NC – EIA Scoping Application has only been submitted at this stage) on the opposite side of Aspen Way. With these measures in place, the cumulative effect of construction activities should be 'not significant'.

Construction Traffic

9.144 The impacts of construction traffic generated by the Proposed Development has been determined to be negligible at all nearby sensitive receptors, irrespective of baseline concentrations (see paragraph 9.84). This means any additional contribution to baseline concentrations from other construction sites will not change this assessment and the cumulative impacts will be negligible and therefore not significant.

Completed Development

9.145 The traffic data used in the 2025 'Without Scheme' and 'With Scheme' scenarios incorporate traffic flows based on modelling which takes into consideration future growth in London and therefore considers traffic flows associated with all cumulative schemes which would affect flows on the roads included in this assessment. As such, predictions of future pollutant concentrations presented in this ES chapter take account of cumulative effects.

9.146 Operational impacts, which inherently include the Cumulative Schemes, have been shown to be 'not significant' in relation to road traffic emissions.

9.147 Out of the 28 Cumulative Schemes identified, a number will include an on-site energy plant. Owing to the distance between the Proposed Development and those considered as part of the cumulative assessment, and also taking into account their positions relative the prevailing wind direction and the limited impact of the Proposed Development emergency generator on local air quality (Table 9.14), cumulative impacts from multiple energy centre emissions are considered to be 'not significant'.

LIKELY SIGNIFICANT EFFECTS

9.148 The construction and operation of the Proposed Development are not predicted to result in any significant effects on the receptors considered within this assessment in relation to air quality.

9.149 Despite the adoption of a worst-case, conservative approach, the assessment showed that the increase in road traffic on the local road network would lead to Negligible impacts at all nearby existing receptors. In addition, the assessment demonstrated that air quality for future users and residents of the Proposed Development would also be acceptable and suitable.

9.150 It was also shown that with the adoption of recommended mitigation measures, the residual effects of enabling and construction dust would be 'not significant', and emissions from construction vehicles will also lead to negligible impacts at existing receptors.

9.151 Overall, the Proposed Development will have a non-significant effect on air quality, during both the construction phase and during operation.

COMPARISON AGAINST INDICATIVE SCHEME

9.152 The air quality assessment has considered the highest number of transport trips related to the maximum floor space for office use within the Proposed Development, and as such the impacts are considered conservative and the predicted impacts are therefore greater than would be generated by the Indicative Scheme.

9.153 In addition, the air quality assessment has considered sensitive locations within the Proposed Development at a range of locations, which are based on the GA plans produced for the Indicative Scheme, but take account of the parameter plans for the Site and possible land uses that will be brought forward at RMA stage. The locations of the receptors within the Proposed Development are therefore representative of the Indicative Scheme and do not identify any potential exceedances of relevant air quality objectives at the Site.