9. Air Quality

Introduction

9.1 This chapter, supersedes and replaces Chapter 9 of the December 2018 ES. This updated chapter, prepared by Waterman Infrastructure & Environment (Waterman IE), presents an assessment of the likely air quality effects of the Development from changes in transport emissions and emissions from the proposed heating and energy plant associated with the operational Development. Information on the transport trips have been provided by Transport Planning Practice Limited, and information on the heating and energy plant during the operation of the completed Development have been provided by Chapman BDSP (the project's building services engineer).

9.2 This chapter provides a description of the assessment methodology, a description of the relevant baseline conditions of the Site and surrounding area and an assessment of the likely significant effects of the Development, that could arise during demolition, deconstruction, refurbishment and construction (the 'Works') and once the Development is completed and operational. Where appropriate, mitigation measures are identified to avoid, reduce or offset adverse effects and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are also described.

9.3 This chapter is accompanied by the following appendices, presented in **ES Part 4**:

- **Appendix 9.1**: Correspondence with Southwark Council;
- **Appendix 9.2**: Air Quality Assessment Detailed Methodology; and
- **Appendix 9.3**: Air Quality Neutral Assessment.

9.4 Please note that for the purposes of this ES Chapter, the demolition, deconstruction, refurbishment and construction works will be referred to as 'the Works'. Where required, specific reference to the deconstruction and refurbishment works will be made.

Assessment Methodology and Significance Criteria

Assessment Methodology

Consultation

9.5 As well as the EIA Scoping Report (submitted in August 2018) and EIA Scoping Opinion (dated 4 October 2018) (described in **Chapter 2: EIA Methodology**), consultation was undertaken with the Environmental Health Department at Southwark Council (SC) to confirm the methodology to be used within the air quality assessment (see **Appendix 9.1**).

Establishing Baseline Conditions

9.6 To establish baseline conditions at and around the Site, information has been taken from a review of SC's Air Quality Updating and Screening Assessment and Progress Reports, published as part of the Local Air Quality Management (LAQM) regime. It was agreed with the Principal Enforcement Officer within the Environmental Health Department at SC that site specific diffusion tube baseline NO_2 monitoring was not required (see **Appendix 9.1**).

Assessment of Likely Significant Air Quality Effects

9.7 This section of this chapter outlines the methodology used to assess the likely significant air quality effects arising from the Works and the completed and operational Development.

9.8 This air quality assessment has been undertaken using a variety of information and procedures, and professional judgement, as follows:

- review of the local area to identify potentially sensitive receptor locations that could be affected by changes in air quality due to the Development;
- identification of air quality sensitive receptors within the Site, to determine the air quality conditions to which future users of the Development would be exposed;
- review and use of relevant traffic flow and car park data from the Applicant's transport consultant (Transport Planning Practice Ltd), which inherently accounts for traffic flows relating to the schemes considered within the cumulative effect's assessment (**Chapter 14**);
- Dispersion modelling of pollutant emissions using the ADMS-Roads model[1] to predict the likely pollutant concentrations at the Site and surrounding area; and the likely effect of the complete and operational Development on local air quality from additional traffic emissions and the two proposed car parks. Version 7.1 of the NO_X Calculator, is available from the LAQM Support website[2] and has been applied to derive the road-related NO_2 concentrations from the modelled NO_X concentrations;
- review and use of relevant heating and energy plant data from the Applicant's building services engineer (Chapman BDSP);
- application of atmospheric dispersion modelling using the ADMS 5™ model to predict the likely pollutant concentrations at the Site and the effects of the Development on local air quality due to the additional emissions that would be generated by the proposed energy and heating plant when operational;
- comparison of the predicted air pollutant concentrations with monitored concentrations from three SC diffusion tubes. The tubes are located on Lamppost No 02 on Borough High Street (SDT 81), Lamppost No 01 Adjacent to 125 Borough High St (SDT 82), and Little Dorritt Park Entrance Lamppost No 8 (SDT 84) located approximately 45m, 170m and 360m from the Site boundary respectively. Adjustment of the model results was then undertaken, details are provided in **Appendix 9.2**);
- determination of the effects of the operational phase of the Development on air quality, based on the application of the Environmental Protection UK and Institute of Air Quality Management significance criteria to modelled results;
- qualitative assessment of the likely effects of the proposed activities during the Works;
- an Air Quality Neutral Assessment has been completed which compares the Development against the relevant building emissions benchmarks to determine whether the Development is Air Quality Neutral. This concludes the Development would be Air Quality Neutral and that no further mitigation measures are required. Details are provided in **Appendix 9.3**; and
- identification of mitigation measures, where appropriate.

9.9 The UK Air Quality Strategy (AQS) identifies the pollutants associated with road traffic emissions and local air quality as:

- Nitrogen oxides (NOx);

- Particulate matter (as PM_{10} (particles with a diameter up to 10µm) and $PM_{2.5}$ (particles with a diameter up to 2.5µm));
- Carbon monoxide (CO);
- 1, 3-butadiene (C_4H_6); and
- Benzene (C_6H_6).

9.10 Emissions of total NO_x from motor vehicle exhausts comprise nitric oxide (NO) and nitrogen dioxide (NO_2). NO oxidises in the atmosphere to form NO_2. The most significant pollutants associated with road traffic emissions, in relation to human health, are NO_2 and particulate matter (PM_{10} and $PM_{2.5}$). This assessment therefore focuses on NO_2 and particulate matter (PM_{10} and $PM_{2.5}$).

The Works

Dust Emissions

9.11 In line with the Mayor of London Control of Dust and Emissions Supplementary Planning Guidance (SPG)[3], the assessment of the effects of the activities undertaken during the Works in relation to dust has been based on the IAQM's Guidance on the Assessment of Dust from Demolition and Construction[4] and the following:

- Consideration of planned construction activities and their phasing; and
- A review of the sensitive uses in the area immediately surrounding the Site in relation to their distance from the Site.

9.12 The SPG identifies receptors within 350m of the Site boundary, and within 50m of construction routes would be sensitive to emissions and nuisance dust from construction activities. **Figure 9.1** shows the area surrounding the Site where sensitive receptors could be affected. **Table 9.3** presents the location of individual sensitive receptors assessed for the operational phase of the Development.

9.13 Following the SPG, construction activities can be divided into the following four distinct activities:

- Demolition - any activity involved in the removal of an existing building, including any deconstruction;
- Earthworks – the excavation, haulage, tipping and stockpiling of material, but may also involve levelling the site and landscaping;
- Construction – any activity involved with the provision of a new structure; and
- Trackout – the movement of vehicles from unpaved ground on a site, where they can accumulate mud and dirt, onto the public road network where dust might be deposited.

9.14 The SPG considers three separate dust effects, within proximity of sensitive receptors being taken into consideration for:

- annoyance due to dust soiling;
- potential effects on human health due to significant increase in exposure to PM_{10}; and
- harm to ecological receptors.

9.15 In accordance with the SPG, to determine the risk of the Works phase, the following four step process, as set out in **Table 9.1**, has been undertaken.

Table 9.1: Summary of the Guidance for Undertaking a Construction Dust Assessment

Step		Description
1.	Screen the Need for a Detailed Assessment	Simple distance based criteria are used to determine the requirement for a detailed dust assessment. An assessment would normally be required where there are 'human receptors' within 50m of the boundary of the site and / or within 50m of the route(s) used by construction vehicles on public highway, up to 350m from the site entrance or 'ecological receptors' within 50m of the boundary of the site and/or within 50m of the route(s) used by construction vehicles on public highway, up to 500m from the site entrance.
2.	Assess the Risk of Dust Impacts	The risk of dust arising in sufficient quantities to cause annoyance and/or health or ecological effects should be determined using four risk categories: insignificant, low, medium and high based on the following factors: • the scale and nature of the works, which determines the risk of dust arising (i.e. the magnitude of potential dust emissions) classed as small, medium or large; and • the sensitivity of the area to dust effects, considered separately for ecological and human receptors (i.e. the potential for effects) defined as low, medium or high.
	a. Define the potential Dust Emission Magnitude	Classify the magnitude of the likely risk as small, medium or large for the four activities.
	b. Define the Sensitivity of the Areas	Define the sensitivity of receptors as High, Medium or Low. Define sensitivity of people to Dust Soiling Effects and define the sensitivities of people to the health effects of PM10.
	c. Define the Risk of Impacts	Combine the magnitude (as detailed in 2a) and the sensitivity (in 2b) to determine the risk of impacts with no mitigation applied. Summarise the risk of dusts impacts for the four activities in a table

9.16 Following the above air quality dust risk assessment, appropriate dust and pollution measures are provided to ensure the air quality impacts of construction are minimised and any mitigation measures employed are effective.

9.17 The potential impacts and effects of construction activities on local air quality were based on professional judgement and reference to the criteria set out in the SPG. This includes an assessment of the risk of dust effects arising from the likely construction activities, based on the magnitude of potential dust emissions and the sensitivity of the area.

Construction Vehicle Exhaust Emissions

9.18 The IAQM guidance on assessing construction effects states that:

"Experience of assessing the exhaust emissions from on-site plant and site traffic suggests that they are unlikely to make a significant effect on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed."

9.19 The Applicant's construction advisors have stated the peak daily number of Heavy Goods Vehicles (HGVs) trips during construction are likely to be 28. Although this could increase to 44 during excavation and piling these 44 trips would be represent a short term situation (piling is only anticipated to occur for a period of 19 weeks)in relation to the overall programme of the Works, and the average number of construction vehicles would be significantly less. As such, in line with the EPUK/IAQM guidance, it is considered that a quantitative assessment of the exhaust emissions from construction traffic is not required, and a qualitative assessment is appropriate.

Construction Plant Emissions

9.20 In accordance with Part 7 of the Mayor of London Control of Dust and Emissions SPG, all construction plant would need to adhere to the emissions standards for NO_2 and PM_{10} set out for Non-Road Mobile Machinery (NRMM). As such, in line with the IAQM guidance on assessing construction effects, it is considered that an assessment is not required.

Completed and Operational Development

ADMS Model

9.21 The likely impacts on local air quality from traffic movements and heating and energy plant emissions have been assessed using the atmospheric dispersion model ADMS-Roads and ADMS 5 respectively. **Appendix 9.2** presents the details of the dispersion modelling.

9.22 For the purposes of modelling, traffic data for the relevant local road network and car park trips, was provided by the Applicant's transport consultant. Further details are provided in **Appendix 9.2**. The year 2017 has been used to assess the baseline, as this is the latest year of available air quality monitoring data available from SC contained in the public domain. The year 2026 was used for the 'without Development' and 'with Development' scenarios, which is the anticipated year of completion of the Development.

9.23 The ADMS-Roads dispersion model predicts how emissions from roads combine with local background pollution levels, taking account of meteorological conditions, to affect local air quality. The model has been run for the completion year, using background data and vehicle emission rates for 2026 as inputs. For the verification assessment (referred to later in this Chapter), background data and vehicle emission rates for 2017 have been used, which would be higher than the 2026 data. Pollutant concentrations have been modelled at locations representative of nearby sensitive receptors.

9.24 Data relating to the proposed heating plant for the Development has been provided by the Applicant's Building Services Engineers. The proposed heating plant includes five 665kW gas-fired boilers and two gas fired water heaters. Emissions from heating plant was modelled using the detailed dispersion model ADMS 5, which has been designed for small scale and large industrial stack emissions. The contribution from the energy plant was added to the predicted road traffic contributions and background concentrations.

9.25 Full details of the dispersion modelling study, including the road traffic and heating plant data used in the assessment, are presented within **Appendix 9.2**.

Model Uncertainty

9.26 Analyses of historical monitoring data by Defra[5] have identified a disparity between actual measured NO_x and NO_2 concentrations and the expected decline associated with emission forecasts which form the basis of air quality modelling as described above. The reason is related to the on-road performance of certain vehicles compared to calculations based on Euro emission standards which inform emission forecasts.

9.27 The note 'Projecting NO_2 Concentrations'[6] published by Defra provides alternative approaches that can be followed in air quality assessments, in relation to the modelling of future NO_2 concentrations, considering that future NO_x / NO_2 road-traffic emissions and background concentrations may not reduce as previously expected. This includes the use of revised background pollution maps, alternative projection factors and revised vehicle emission factors. However, the Defra note does not form part of statutory guidance and no prescriptive method is recommended for use in an air quality assessment.

9.28 This air quality assessment has been based on current guidance, which assumes a progressive reduction in forecast emission rates and background concentrations from 2017 to 2026. In addition, a sensitivity analysis has been undertaken.

9.29 The sensitivity analysis assumes no reduction in NO_x and NO_2 background concentrations or road-traffic emissions rates between 2017 and 2026. Therefore, assessing the likely significant effect of the Development against baseline 2017 conditions. The sensitivity approach presented in this air quality assessment is now typically agreed and accepted by local authorities as being robust, and provides a clear method to account for the uncertainty in future NO_X and NO_2 concentrations in air quality assessments. The results of this sensitivity analysis, which represent a more conservative assessment scenario, are presented in **Table 9.18**.

9.30 The UK government's announcement in July 2017 that no new diesel or petrol vehicles will be sold in the UK from 2040 reflects the national measures being taken to improve background air quality. In addition, the Development is located in the operational Ultra Low Emission Zone (ULEZ); anticipated to be fully operational. Transport for London have predicted the ULEZ will decrease NO_x emissions from vehicles by 31% in Inner London and by 28% in outer London by 2021[7]. As such it is considered the emissions factors and background concentrations used present a reasonable worst-case assessment of future concentrations.

Background Pollutant Concentrations

9.31 To estimate the total concentrations due to the contribution of any other nearby sources of pollution, background pollutant concentrations need to be added to the modelled concentrations. Full details of the background pollution data used within the air quality assessment are included in **Appendix 9.2**.

Model Verification

9.32 Model verification is the process of comparing monitored and modelled pollutant concentrations and, if necessary, adjusting the modelled results to reflect actual measured concentrations, to improve the accuracy of the modelling results. The model has been verified by comparing the predicted annual mean NO_2 concentrations for the baseline 2017, with the 2017 results from the SC diffusion tubes on Lamppost No 02 on Borough High Street (SDT 81); Lamppost 01 Adjacent to 125 Borough High St (SDT 82); and Lamppost 8 Little Dorritt Park Entrance (SDT 84). Modelled concentrations have then been adjusted accordingly. The verification and adjustment process are described in detail in **Appendix 9.2**.

UK Air Quality Strategy Objectives

9.33 The Government has established a set of air quality standards and objectives to protect human health. The current AQS objectives was published in July 2007[8] and sets out the objectives for Local Planning Authorities (LPA) in undertaking their LAQM duties. The AQS 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. Box 1.1 of Defra's Local Air Quality Management Technical Guidance (LAQM.TG16)[9] explains the locations where these objectives apply.

9.34 The European Union (EU) also sets Limit Values for NO_2, PM_{10} and $PM_{2.5}$[10], which have been adopted by the UK[11]. The Limit Value for NO_2 is the same numerical level but the target date differs. Achievement of these values is a national obligation rather than a local obligation. In the UK, only monitoring and modelling carried out by Defra and Central Government meets the specification required to assess compliance with the Limit Values. Further, Defra and Central Government does not recognise local authority monitoring or local modelling studies when determining the likelihood of the Limit Values being exceeded. As such the Limit Values have not been considered further in the Air Quality Assessment.

9.35 The UK AQS objectives in relation to air pollutants relevant to this assessment are summarised in **Table 9.2**.

Table 9.2: National Air Quality Strategy Objectives

Pollutant	Objective		Date by Which Objective is to be Met
	Concentration	Measured As	
Nitrogen Dioxide (NO_2)	200µg/m^3	1 hour mean not to be exceeded more than 18 times per year	31/12/2005
	40µg/m^3	Annual Mean	31/12/2005
Particulate Matter (PM_{10}) (a)	50µg/m^3	24 hour mean not to be exceeded more than 35 times per year	31/12/2004
	40µg/m^3	Annual Mean	31/12/2004

Pollutant	Objective		Date by Which Objective is to be Met
	Concentration	Measured As	
Particulate Matter ($PM_{2.5}$) (b)	Target of 15% reduction in concentrations at urban background locations	Annual Mean	Between 2010 and 2020
	25µg/m^3	Annual Mean	01/01/2020

Note: (a) Particulate matter with a mean aerodynamic diameter less than 10 microns (or micrometres – µm)
(b) Particulate matter with a mean aerodynamic diameter less than 2.5 microns

Potentially Sensitive Receptors

9.36 The approach adopted by the UK AQS is to focus on locations at, and close to, ground level where members of the public (in a non-workplace area) are likely to be exposed over the averaging time of the objective in question (i.e. over 1-hour, 24-hour or annual periods). Objective exceedances principally relate to the annual mean NO_2 and concentrations, so that associated potentially sensitive locations relate mainly to residential properties and other sensitive locations (such as schools) where the public may be exposed for prolonged periods.

9.37 **Table 9.3** presents worst-case existing (R) and proposed (P) sensitive receptors selected due to their proximity to the road network and location of the proposed heating and energy plant flues. The locations of the selected receptors assessed are located at ground floor level and presented in **Figure 9.2**.

Table 9.3: Selected Receptor Locations

Receptor		Classification	Grid Reference	Height Above Ground (m)	Approximate Distance and Direction from Stack
ID	Address				
R1	Orchard Lisle House	Student	532749, 180109	20	30m South
R2	Orchard Lisle House	Student	532708, 180105	20	50m South
R3	Boland House	Student	532821, 180095	18.4	85m Southeast
R4	Guy's Hospital	Hospital	532857, 180054	124	135m Southeast
R5	The Shard	Residential	532863, 180114	310	115m East
R6	Nuffield House	Residential	532724, 179952	22.5	190m South
R7	26 Park Street	Residential	532472, 180261	11.6	280m West
R8	21 Park Street	Residential	532475, 180218	14.4	265m West
R9	31-41 Park Street	Residential	532446, 180288	9.1	315m West
R10	St. Thomas Church	Residential	532748,180184	28.3	15m North
R11	2 St. Thomas Street	Residential	532714,180174	21.6	5m West
R12	70 Southwark Bridge Road	Residential	532248, 179980	0	500m Southwest
R13	Ilfracombe Flats	Residential	532770, 179867	0	525m Southwest
R14	Maple Building	Residential	532504, 179922	3	300m Southwest

Receptor		Classification	Grid Reference	Height Above Ground (m)	Approximate Distance and Direction from Stack
ID	Address				
R15	57 Borough High Street	Residential	532659, 180146	3	60m Southwest
P1	Proposed: West Tower	Office	532717, 180152	137.7	-
P2	Proposed: Georgian Terrace	Office	532733, 180162	21.6	-
P3	Proposed: Terrace Level 34	Office	532760, 180126	131.3	-

Note: The heights presented in Table 9.3 are taken from Promap (www.promap.co.uk) and represent the roof level of the buildings, the closest point to the heating plant emissions. The floor heights of the receptors in Table 9.3 are modelled at 3m intervals
Receptors R2, R16, P1, and P2 are located within the London Bridge at Borough High Street TfL NO2 Focus Area.

9.38 The public exposure of the office and retail uses of the proposed Development are only subject to short-term AQS objectives, as stated in the LLAQM Technical Guidance[1].

Significance Criteria

The Works

Dust Emissions

9.39 The potential effects of the Works on local air quality were based on professional judgement and with reference to the criteria in the Mayor of London Control of Dust and Emissions (SPG) set out in **Appendix 9.2**. Details of the assessor's experience and competence to undertake the dust assessment is provided in **Appendix 9.2**.

9.40 The assessment of the risk of dust effects arising from each of the construction activities as part of the Works, as identified by the SPG, is based on the magnitude of potential dust emission and the sensitivity of the area. The risk category matrix for each of the construction activity types, taken from the criteria set out in the SPG, are presented in **Table 9.4** to **Table 9.7**. Examples of the magnitude of potential dust emissions for each construction activity and factors defining the sensitivity of an area are provided in **Appendix 9.2**.

Table 9.4: Risk Category from Demolition Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Insignificant

Table 9.5: Risk Category from Earthworks Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk

1 Defra (2016), 'London Local Air Quality Management (LLAQM) Technical Guidance 2016 (LLAQM.PG (16))', DEFRA, London.

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Insignificant

Table 9.6: Risk Category from Construction Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Insignificant

Table 9.7: Risk Category from Trackout Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Insignificant
Low	Low Risk	Low Risk	Insignificant

9.41 The risk category determined for each of the construction activity types is used to define the appropriate and Site-specific mitigation measures that should be applied. The IAQM guidance recommends that significance is only assigned to the effect after considering mitigation because it assumes that all actions to avoid or reduce the environmental effects are an inherent part of the Development, and that, in the case of demolition / construction, mitigation measures (secured through planning conditions, legal requirements or required by regulations) would ensure that likely significant adverse residual effects would not occur.

9.42 However, to maintain consistency with the structure of this EIA and ES, as outlined in **Chapter 2: EIA Methodology**, pre-mitigation significance criteria as outlined in **Table 9.8** have been applied which are based on professional judgement.

Table 9.8: Pre-Mitigation Significance Criteria for the Works

Significance Criteria	Definition
Adverse effect of major significance	Receptor is less than 20m from an active construction or demolition site.
Adverse effect of moderate significance	Receptor is 20m to 100m from an active construction or demolition site.
Adverse effect of minor significance	Receptor is between 100m and 350m from an active construction or demolition site.
Insignificant	Receptor is over 350m from an active construction or demolition site.

9.43 IAQM outlines that experience of implementing mitigation measures for construction activities demonstrates that total mitigation is normally possible such that residual effects would not be 'significant'. Therefore, it follows that, within this assessment, no post-mitigation matrix of significance criteria are provided for the likely residual effects of the Works.

Construction Vehicle Exhaust Emissions

9.44 The significance of the effects from construction vehicle exhaust emissions on air quality were based on the EPUK / IAQM methodology described below under the Completed and Operational Development methodology below.

Construction Plant Emissions

9.45 The significance of the effects from construction plant emissions on air quality is also based on professional judgement, because all construction plant is required to meet the NRMM emissions standards for NO_2 and PM_{10} as set out in Part 7 of the Mayor of London Control of Dust and Emissions SPG.

Completed and Operational Development

9.46 The EPUK / IAQM guidance provides an approach to assigning the magnitude of changes because of a development as a proportion of a relevant assessment level, followed by examining this change in the context of the new total concentration and its relationship with the assessment criterion to provide a description of the impact at selected receptor locations.

9.47 **Table 9.9** presents the IAQM framework for describing the impacts (the change in concentration of an air pollutant) at individual receptors. The term Air Quality Assessment Level (AQAL) is used to include air quality objectives or limit values, where these exist.

Table 9.9: Impact Descriptors for Individual Receptors for Annual Mean Objective

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Insignificant	Insignificant	Minor	Moderate
76-94% of AQAL	Insignificant	Minor	Moderate	Moderate
95-102% of AQAL	Minor	Moderate	Moderate	Major
103-109% of AQAL	Moderate	Moderate	Major	Major
110% or more of AQAL	Moderate	Major	Major	Major

Note: AQAL may be an air quality objective, EU limit value, or an Environment Agency 'Environmental Assessment Level (EAL)'
The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers. Changes of 0% (i.e. less than 0.5%) are described as Insignificant.
The table is only to be used with annual mean concentrations

9.48 For the determination of the short-term impact, the EPUK / IAQM guidance considers that the threshold criterion, as used by the Environment Agency, of 10% of the short term AQAL (200µg/m^3) is a reasonable value to take for defining an impact that is sufficiently small in

magnitude to be regarded as having an insignificant effect. The criteria in **Table 9.10** have been used to describe the impact on the short-term concentrations.

Table 9.10: Impact Descriptors for Individual Receptors of the Short-Term Objective

% Change in concentration relative to Air Quality Assessment Level (AQAL)			
≤10	**11-20**	**21-50**	**≥51**
Insignificant	Minor	Moderate	Major

9.49 The approach set out in the EPUK / IAQM Guidance provides a method for describing the impact magnitude at individual receptors only. The Guidance outlines that this change may have an effect on the receptor depending on the severity if the impact and other factors that may need to be considered. The assessment framework for describing impacts can be used as a starting point to make a judgement on significance of effect. However, whilst there may be 'slight', 'moderate' or 'substantial' impacts described at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

9.50 Following the approach to assessing significance outlined in the EPUK / IAQM Guidance, the significance of likely residual effects of the completed Development on air quality has been established through professional judgement and the consideration of the following factors:

- the geographical extent (local, district or regional) of effects;
- their duration (temporary or long term);
- their reversibility (reversible or permanent);
- the magnitude of changes in pollution concentrations;
- the exceedance of standards (e.g. AQS objectives); and
- changes in pollutant exposure.

Limitations and Assumptions

9.51 For the purposes of the assessment of dust nuisance during the Works it has been assumed that the works would be carried out at the boundary of the Site to provide a worst-case assessment.

9.52 Currently there is no methodology to assess and determine the impact of a development against the EU Limit Values. In addition, compliance with the EU Limit Values is the UK Government's responsibility given that national measures (such as vehicle scrappage schemes and increased diesel fuel prices) would be required to meet compliance. As such the effect of the Development has been assessed against the UK AQS objectives rather than the EU Limit Values. To demonstrate that the Development would have a positive influence on air quality, a summary of measures which are likely to lead to a benefit to air quality have been outlined.

9.53 There is no standard or recognised methodology to predict the reduction in pollutant concentrations from all air quality mitigation measures or measures likely to have a positive impact on local air quality (such as cycle spaces, electric charging points, sustainable transport options, green infrastructure etc) as these measures are either based on holistic behavioural changes and/or there is a lack of real-world quantifiable data (in $\mu g/m^3$). However, the mitigation measure and measures to benefit air quality proposed as part of the Development are consistent

with those identified by SC in their Air Quality Action Plan (discussed below) and Defra's Air Quality Plan[12]. As such the results presented in the assessment do not consider the potential reduction from these mitigation measures and are therefore considered to be worst-case.

9.54 The sensitivity assessment for NO_x and NO_2 is conservative as the air quality assessment does not take account of older vehicles being replaced by the newest vehicles with lower emissions or the ban and phasing out of the sale of diesel and petrol vehicles by 2040; or the potential improvements to air quality as a result of the ULEZ and its extension in 2021.

Baseline Conditions

London Borough of Southwark's Review and Assessment of Existing Air Quality

9.55 Because of work undertaken to date as part of their review and assessment of air quality process, SC has declared the entire northern part of its Borough, from the A205 north to the boundary with the River Thames, as an Air Quality Management Area (AQMA)[2] for both annual mean NO_2 and 24-hour mean PM_{10} which are attributable to road traffic emissions. The Site is located within this AQMA.

9.56 The Site is also located in London Bridge at Borough High Street Transport for London (TfL) nitrogen dioxide (NO_2) Focus Area.

London Borough of Southwark's Local Air Quality Monitoring

9.57 SC currently undertakes monitoring of NO_2 and PM_{10} at one roadside location and one urban background location within the Borough using automatic monitors. NO_2 is also measured at 45 locations by SC using diffusion tubes. The nearest monitor to the Site is the kerbside diffusion tube on Borough High Street (ID – SDT81), located approximately 0.08km from the Site. The 2017 mean monitored NO_2 concentration at the SDT81 Borough High Street diffusion tube was 82.3µg/m^3, indicating the annual mean NO_2 objective of 40µg/m^3 was exceeded at the diffusion tube closest to the Site in 2017.

Assessment of Likely Significant Effects

The Works

Nuisance Dust

9.58 The following construction dust assessment follows the methodology set out in **Table 9.1**.

Step 1- Site Evaluation / Screen the Need

9.59 The nearest sensitive receptors are residential properties on Borough High Street and student accommodation at White Hart Yard, located within 20m of the Site boundary. There are also residential and commercial receptors located further afield and Guy's Hospital is located approximately 100m to the east of the Site boundary. Therefore, in accordance with **Table 9.1** the assessment would proceed to detailed assessment. There are no ecological receptors within 50m of the Site boundary or the routes used by construction vehicles, therefore ecological effects have not been considered further.

[2] AQMA's are declared if a local authority finds any places where the national air quality objectives are not likely to be achieved

Step 2 - Potential Dust Emission Magnitude

9.60 The risk of dust impacts from the Works has been considered based upon the magnitude of works as detailed in **Table A1** in **Appendix 9.2**. This includes:

- Demolition and deconstruction – It is estimated the total volume of building to be demolished would be between 20,000m^3 and 50,000m^3. Based on this and considering the criteria in **Table A1** in **Appendix 9.2**, the potential dust emissions during demolition activities would be of medium magnitude.
- Earthworks – **ES Chapter 6** states an approximate total of 13,450m^3 of excavated material is expected to be removed from the Site. Based on this and considering the criteria in **Table A1** in **Appendix 9.2**, the potential dust emissions during earthworks activities would be of large magnitude.
- Construction– the total volume of building to be constructed is greater than 100,000m^3. Based on the criteria in **Table A1** in **Appendix 9.2**, the potential dust emissions during construction activities would be of large magnitude.
- Trackout – the Applicant's construction advisors (Gardiner & Theobald) estimated the number of HGV trips during the construction period would peak at 28 outward daily trips. Based on this and considering the criteria in **Table A1** in **Appendix 9.2**, the potential for dust emissions due to trackout activities would be of medium magnitude.

9.61 A summary of the potential dust emission magnitude is presented in **Table 9.11**.

Table 9.11: Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	Medium
Earthworks	Large
Construction	Large
Trackout	Medium

Step 3 - Sensitivity of the Area

9.62 In accordance with the Mayor of London Control of Dust and Emissions SPG (paragraph 4.36 of the SPG, Step 2B: Define the Sensitivity of the Area), the sensitivity of the area has taken account of the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- the local background PM_{10} concentration; and
- Site-specific factors, such as whether there are trees or other vegetation to reduce the risk of wind-blown dust.

Step 4 - Sensitivity of the Area to Dust and Soiling Effects on People and Property

9.63 As discussed above, the nearest sensitive receptors are residential properties located within 20m of the Site boundary. Based on **Table A3** in **Appendix 9.2**, given that there are 10-100 high sensitivity receptors within 50m, it is considered the area would be of medium sensitivity to dust and soiling effects on people and property.

9.64 The summary of the sensitivity of people to dust and soiling effects is detailed in **Table 9.12**.

Table 9.12: Sensitivity of the Area to Dust and Soiling Effects on People and Property

Activity	Sensitivity of Area to Dust and Soiling Effects
Demolition	Medium
Earthworks	Medium
Construction	Medium
Trackout	Medium

Step 5 - Sensitivity of the Area to Human Health Impacts

9.65 As shown in **Table A8** of **Appendix 9.2**, the annual mean PM_{10} concentration at the Old Kent Road monitor, the closest monitoring location to the Site, was 22.0µg/m^3 in 2017. This is below the annual mean AQS objective for PM_{10} of 40ug/m^3.

9.66 Based on **Table A4** in **Appendix 9.2**, given that there are estimated to be 10-100 receptors within 50m and that PM_{10} concentrations are 22ug/m^3, it is considered the area is of low sensitivity to human health impacts.

9.67 The summary of the sensitivity of people to the health effects of particulate matter is detailed in **Table 9.13** below.

Table 9.13: Sensitivity of the Area to Human Health Effects

Activity	Sensitivity of Area to Human Health Effects
Demolition and deconstruction	Low
Earthworks	Low
Construction and refurbishment	Low
Trackout	Low

Step 6 - Risk of Impacts

9.68 Based on the dust emissions magnitude as set out in **Table 9.11** and taking account of the sensitivity of the area as detailed in **Tables 9.12** and **9.13**, the overall risk impacts have been identified and presented in **Table 9.14**. This is based on the matrices set out in **Tables 9.4** to **9.7**. The predicted risks are prior to, and do not take account of, mitigation applied.

Table 9.14: Summary of Risk

Potential Effect	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Medium Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk

9.69 As outlined in **Table 9.14**, the Site is a **medium risk** site, due to dust soiling effects. Therefore, Site specific mitigation measures would be required to ensure that there are no adverse effects from the Works. However, based on the criteria in **Table 9.8**, in the absence of mitigation, the worst-case nuisance dust from the Works would give rise to:

- short-term, local effects of major adverse significance at receptors within 20m from the Site boundary;
- short-term, local effects of moderate adverse significance at receptors between 20m and 100m of the Site boundary;
- short-term, local effects of minor adverse significance at receptors between 100m and 350m of the Site boundary; and
- insignificant effects at receptors over 350m from the Site boundary.

Construction Vehicle Exhaust Emissions

9.70 Emissions from Works traffic (44 HGVs peak daily) would be relatively small compared to existing road traffic emissions on St. Thomas Street (6,874 daily vehicles including 8.2% HDVs) and on Borough High Street (25,930 daily vehicles including 14.9% HDVs)[13]. Therefore, the likely effect of construction vehicles entering and egressing the Site on air quality would be **insignificant** during the Works.

Construction Plant Emissions

9.71 In accordance with Part 7 of the Mayor of London Control of Dust and Emissions SPG, all construction plant would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM. It is therefore considered the likely effect of construction plant on local air quality would be **insignificant**.

Completed and Operational Development

Nitrogen Dioxide (NO_2)

9.72 **Table 9.15**presents the predicted worst-case NO_2 concentrations at relevant existing receptors and receptors introduced as part of the Development, assuming a progressive reduction in forecast emission rates and background concentrations from 2017 to 2026.

Table 9.15: Results of the Annual Mean NO_2 ADMS Modelling at Sensitive Receptors (µg/m^3)

ID	Receptor Location	2017 Baseline	2026 Without Development	2026 With Development	2026 Change
R1	Orchard Lisle House	**49.4**	32.2	32.2	0.0
R2	Orchard Lisle House	**50.8**	32.7	32.7	0.0
R3	Boland House	**48.2**	31.6	31.6	0.0
R4	Guy's Hospital	**47.3**	31.3	31.3	0.0
R5	The Shard	**50.7**	32.5	32.5	0.0
R6	Nuffield House	**40.5**	26.1	31.3	0.0
R7	26 Park Street	**46.3**	30.8	30.8	0.0
R8	21 Park Street	**46.4**	30.9	30.9	0.0
R9	31-41 Park Street	**46.2**	30.8	30.8	0.0
R10	St. Thomas Church	**55.3**	35.2	35.2	0.0
R11	2 St. Thomas Street	**57.0**	36.6	36.6	0.0
R12	70 Southwark Bridge Road	**47.6**	28.5	28.5	0.0
R13	Ilfracombe Flats	**44.3**	27.4	27.4	0.0
R14	Maple Building	**46.0**	28.0	28.0	0.0
R15	57 Borough High Street	**70.5**	**43.5**	**43.6**	0.1
P1	Proposed: West Tower	-	-	34.6	-
P2	Proposed: Georgian Terrace	-	-	37.8	-
P3	Proposed: Terrace Level 34	-	-	30.5	-

Note: For accuracy, the changes arising from the Development have been calculated using the exact output from the ADMS models rather than the rounded numbers within Table 9.14.

9.73 The results in **Table 9.15** indicate that for 2017, the NO_2 annual mean UK AQS objective is exceeded at all the existing 15 receptor locations. These results are consistent with the existing receptors being located within the SC AQMA declared by SC and the London Bridge at Borough High Street TfL NO_2 Focus Area. The highest concentration is predicted at Receptor 15, located on Borough High Street and within the Focus Area (70.5µg/m^3).

9.74 In 2026, both 'without' and 'with' the Development, all but one sensitive receptor modelled (Receptor 15) are predicted to be below the NO_2 annual mean objective.

9.75 As discussed in **Appendix 9.2,** the 1-hour mean AQS objective for NO_2 is unlikely to be exceeded at a roadside location where the annual mean NO_2 concentration is less than 60µg/m^3. As shown in **Table 9.15**, the predicted NO_2 annual mean concentrations in 2017 were above 60µg/m^3 at one existing receptor and as such it is likely that the 1-hour mean objective could be exceeded at this location. This result is consistent with the Development being located within the SC AQMA and the London Bridge at Borough High Street TfL NO_2 Focus Area.

9.76 In 2026, both 'without' and 'with' the Development, Receptor 16 is the only existing receptor predicted to exceed the NO_2 annual mean objective. In 2026 both 'without' and 'with' the Development were below 60µg/m^3 at all sensitive receptors modelled. It is therefore likely the 1-hour mean objective would be met. This is discussed in further detail in **Appendix 9.2**.

9.77 Using the impact descriptors outlined in **Table 9.9,** the Development is predicted to result in a 'negligible' impact on NO_2 concentrations at all existing sensitive receptors modelled. Using professional judgement, based on the magnitude of the impact and the concentrations predicted at sensitive receptors, it is considered that the effect of the Development on NO_2 concentrations would be **insignificant**.

Table 9.16: Results of the 1-hour Mean NO_2 ADMS Modelling at Sensitive Receptors (µg/m^3)

ID	Receptor Location	2026 Without Development	2026 With Development	2026 Change
R1	Orchard Lisle House	76.4	76.4	0.0
R2	Orchard Lisle House	81.9	82.0	0.1
R3	Boland House	71.0	71.1	0.1
R4	Guy's Hospital	68.2	68.2	0.0
R5	The Shard	75.8	76.0	0.2
R6	Nuffield House	58.5	58.5	0.0
R7	26 Park Street	65.5	65.5	0.0
R8	21 Park Street	65.8	65.8	0.0
R9	31-41 Park Street	64.8	64.9	0.1
R10	St. Thomas Church	100.9	101.2	0.3
R11	2 St. Thomas Street	105.4	105.6	0.2
R12	70 Southwark Bridge Road	88.7	88.9	0.2
R13	Ilfracombe Flats	74.8	75.0	0.2
R14	Maple Building	77.3	77.3	0.0
R15	57 Borough High Street	158.7	158.8	0.1
P1	Proposed: West Tower	-	97.2	-
P2	Proposed: Georgian Terrace	-	122.7	-
P3	Proposed: Terrace Level 34	-	61.2	-

9.78 Using the impact descriptors outlined in **Table 9.10,** the Development is predicted to result in an 'insignificant' impact on 1-hour mean NO_2 concentrations at all existing sensitive receptors modelled. Using professional judgement, based on the magnitude of the impact and the concentrations predicted at sensitive receptors, it is considered that the effect of the Development on 1-hour mean NO_2 concentrations would be **insignificant**.

Particulate Matter (PM_{10} and $PM_{2.5}$)

9.79 **Table 9.17** presents the predicted PM_{10} and $PM_{2.5}$ concentrations, assuming a progressive reduction in forecast emission rates and background concentrations from 2017 to 2026.

Table 9.17: Results of the PM_{10} and $PM_{2.5}$ ADMS Modelling at Sensitive Receptors

ID	PM_{10} Annual Mean (µg/m³)				PM_{10} Number of Days >50µg/m³				$PM_{2.5}$ Annual Mean (µg/m³)			
	2017 Baseline	2026 Without Development	2026 With Development	2026 Change	2017 Baseline	2026 Without Development	2026 With Development	2026 Change	2017 Baseline	2026 Without Development	2026 With Development	2026 Change
R1	19.8	17.9	17.9	0.0	3	1	1	0	13.3	11.8	11.8	0.0
R2	19.9	18.0	18.0	0.0	3	1	1	0	13.4	11.9	11.9	0.0
R3	19.7	17.8	17.8	0.0	3	1	1	0	13.2	11.8	11.8	0.0
R4	19.6	17.7	17.8	0.0	2	1	1	0	13.2	11.7	11.7	0.0
R5	20.1	18.2	18.2	0.0	3	1	1	0	13.5	12.1	12.1	0.0
R6	19.6	17.8	17.8	0.0	2	1	1	0	13.2	11.7	11.7	0.0
R7	19.5	17.7	17.7	0.0	2	1	1	0	13.1	11.6	11.6	0.0
R8	19.5	17.7	17.7	0.0	2	1	1	0	13.1	11.6	11.6	0.0
R9	19.5	17.7	17.7	0.0	2	1	1	0	13.1	11.6	11.6	0.0
R10	20.3	18.3	18.3	0.0	3	1	1	0	13.6	12.2	12.2	0.0
R11	20.3	18.2	18.2	0.0	3	1	1	0	13.6	12.2	12.2	0.0
R12	20.4	18.3	18.3	0.0	3	1	1	0	13.6	12.2	12.2	0.0
R13	20.2	18.3	18.3	0.0	3	1	1	0	13.5	12.2	12.2	0.0
R14	20.3	18.4	18.4	0.0	3	1	1	0	13.5	12.2	12.2	0.0
R15	21.5	19.2	19.2	0.0	5	2	2	0	14.5	13.1	13.1	0.0
P1	-	-	18.1	-	-	-	1	-	-	-	12.1	-
P2	-	-	18.4	-	-	-	1	-	-	-	12.3	-
P3	-	-	17.6	-	-	-	1	-	-	-	11.6	-

Note: For accuracy, the changes arising from the Development have been calculated using the exact output from the ADMS models rather than the rounded numbers within Table 9.15.

9.80 As shown in **Table 9.17** and **Appendix 9.2**, the annual mean concentrations of PM_{10} are predicted to be below the objective of 40µg/m³ in 2017 and in 2026, both 'without' and 'with' the Development, at all sensitive receptors modelled. The maximum predicted concentration is 21.5µg/m³ at Receptor 15 in 2017.

9.81 The results in **Table 9.17** indicate that in 2017 and in 2026, both 'without' and 'with' the Development, all existing sensitive receptors are predicted to be below the 24-hour mean PM_{10} objective value of 35 days exceeding 50µg/m³.

9.82 The results in **Table 9.17** indicate that in 2017 and in 2026, both 'without' and 'with' the Development, all sensitive receptors are predicted to be below the annual mean $PM_{2.5}$ objective value of 25µg/m³. The maximum predicted concentration is 14.5µg/m³ at Receptor 15 in 2017.

9.83 Using the impact descriptors outlined in **Table 9.9,** the Development is predicted to result in a 'negligible' impact on $PM_{2.5}$ and $PM_{2.5}$ concentrations at all sensitive receptors modelled. Using professional judgement, based on the magnitude of the impact and the concentrations predicted at the existing sensitive receptors modelled, it is considered that the effect of the Development on PM_{10} and $PM_{2.5}$ concentrations would be **insignificant**.

Nitrogen Dioxide Sensitivity Analysis Results

9.84 Sensitivity analysis considers the potential effect of the Development against 2017 baseline conditions. The results of this sensitivity analysis in relation to NO_2 are presented in **Table 9.18**.

Table 9.18: Results of the ADMS Assessment Assuming No Improvement in NO_x and NO_2 (annual mean)

ID	Receptor Location	2026 Without Development	2026 With Development	2026 Change
R1	Orchard Lisle House	**49.5**	**49.5**	0.0
R2	Orchard Lisle House	**50.8**	**50.9**	0.1
R3	Boland House	**48.2**	**48.3**	0.0
R4	Guy's Hospital	**47.4**	**47.4**	0.0
R5	The Shard	**50.9**	**51.0**	0.1
R6	Nuffield House	**40.6**	**40.6**	0.0
R7	26 Park Street	**46.3**	**46.3**	0.0
R8	21 Park Street	**46.4**	**46.4**	0.0
R9	31-41 Park Street	**46.2**	**46.2**	0.0
R10	St. Thomas Church	**55.5**	**55.6**	0.1
R11	2 St. Thomas Street	**57.2**	**57.2**	0.1
R12	70 Southwark Bridge Road	**47.7**	**47.8**	0.1
R13	Ilfracombe Flats	**44.4**	**44.4**	0.0
R14	Maple Building	**46.0**	**46.1**	0.1
R15	57 Borough High Street	**70.7**	**70.7**	0.0
P1^	Proposed: West Tower	-	**54.1**	-
P2^	Proposed: Georgian Terrace	-	**59.5**	-
P3	Proposed: Terrace Level 34	-	**45.5**	-

Note: For accuracy, the changes arising from the Development have been calculated using the exact output from the ADMS models rather than the rounded numbers within Table 9.16.

9.85 The overall predicted concentrations, and changes, presented in **Table 9.18**, are higher than those presented in **Table 9.16** owing to the higher background concentrations and vehicle emissions rates in 2017 than 2026. The results in **Table 9.18** show that the NO_2 annual mean concentrations are predicted to be above the objective value of 40µg/m^3, 'without' and 'with' the Development, at all 15 existing receptor locations, when assuming no improvements to NOx and NO_2.

9.86 As shown in **Table 9.18**, assuming that NO_X and NO_2 concentrations are not declining as expected, predicted annual mean concentration, 'without' and 'with' the Development Scenario are above 60µg/m^3 at Receptor 15 and as such it is likely that the 1-hour mean objective could be exceeded at these locations. This result is consistent with the Development being located within the SC AQMA and the London Bridge at Borough High Street TfL NO_2 Focus Area.

9.87 Using the impact descriptors outlined in **Table 9.9,** the Development is predicted to result in a 'negligible' impact on NO_2 concentrations at all existing sensitive receptors modelled, when assuming no improvement to NO_x and NO_2.

9.88 Using professional judgement, based on the magnitude of the impact and the concentrations predicted at the receptor locations, it is considered that the effect of the Development on NO_2 concentrations, when assuming no improvements to NOx and NO_2, would be **insignificant**.

Table 9.19: Results of the ADMS Assessment Assuming No Improvement in NO_x and NO_2 (1-hour mean)

ID	Receptor Location	2026 Without Development	2026 With Development	2026 Change
R1	Orchard Lisle House	99.4	99.5	0.1
R2	Orchard Lisle House	111.3	111.5	0.2
R3	Boland House	87.8	88.0	0.2
R4	Guy's Hospital	80.7	80.8	0.1
R5	The Shard	104.5	105.0	0.5
R6	Nuffield House	72.5	72.6	0.1
R7	26 Park Street	71.8	71.8	0.0
R8	21 Park Street	73.0	73.1	0.1
R9	31-41 Park Street	70.5	70.5	0.0
R10	St. Thomas Church	151.9	152.6	0.7
R11	2 St. Thomas Street	159.0	159.7	0.7
R12	70 Southwark Bridge Road	154.2	154.5	0.3
R13	Ilfracombe Flats	125.1	125.6	0.5
R14	Maple Building	133.8	133.9	0.1
R15	57 Borough High Street	286.6	287.0	0.4
P1^	Proposed: West Tower	-	142.3	-
P2^	Proposed: Georgian Terrace	-	191.0	-
P3	Proposed: Terrace Level 34		61.4	

9.89 Assuming NO_X and NO_2 concentrations are not declining as expected, the predicted 99.8th percentile 1-hour mean NO_2 concentration exceeds 200µg/m^3 at Receptor 15 both 'without' and 'with' the Development Scenario. This result is consistent with the Development being located within the London Borough of Southwark AQMA and the London Bridge at Borough High Street TfL NO_2 Focus Area.

9.90 Using the impact descriptors outlined in **Table 9.10,** the Development is predicted to result in a 'insignificant' impact on 1-hour mean NO_2 concentrations at all sensitive receptors modelled, when assuming no improvement to NO_x and NO_2. Using professional judgement, based on the magnitude of the impact and the concentrations predicted at the receptor locations, it is considered that the effect of the Development on 1-hour mean NO_2 concentrations, when assuming no improvements to NOx and NO_2, would be **insignificant**.

Conditions within the Development

9.91 In accordance with LLAQM Technical Guidance only the short-term AQS objectives apply for office and retail users. The modelling undertaken in **Table 9.16** and **Table 9.19** illustrates the NO_2 concentrations are below the NO_2 short-term AQS objective. Based on the predicted future concentrations, the effect on future users of the proposed Development is **insignificant**.

Mitigation Measures and Likely Residual Effects

The Works

Nuisance Dust

9.92 An outline Construction Management Plan (CMP) has been submitted to support planning that commits the Main Contractor to dust mitigation measures. A Site Environmental Management Plan (SEMP) will be issued to any demolition or construction contractors and in line with best practice on construction sites a range of environmental management controls would be implemented. The controls, with reference to the IAQM guidance relating to medium risk sites, are set out in **Table 9.20**.

Table 9.20: Works Phase Mitigation Measures

Communications
Develop and implement a stakeholder communications plan that includes community engagement before work commences on Site.
Display the name and contact details of person(s) accountable for air quality and dust issues on the Site boundary. This may be the environment manager/engineer or the site manager.
Display the head or regional office contact information.
Dust Management
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by SC. The level of detail would depend on the risk and should include as a minimum the recommended measures as set out in this Table.
Site Management
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
Make the complaints log available to the local authority when asked.

Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.
Hold regular liaison meetings with other high-risk construction sites within 500m of the Site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.
Monitoring
Monitoring during the Works as required by the Scoping Opinion. Monitoring could include dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Agree monitoring approach and locations with SC.
Preparing and maintaining the site
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
Erect solid screens or barriers around dusty activities or the Site boundary that are at least as high as any stockpiles on Site.
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
Avoid Site runoff of water and mud.
Keep site fencing, barriers and scaffolding clean using wet methods.
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on Site. If they are being re-used on-site cover as described below.
Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/machinery and sustainable travel
Ensure all vehicles switch off engines when stationary – no idling vehicles.
Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.

Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
Use enclosed chutes and conveyors and covered skips.
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the evet using wet cleaning methods.
Waste Management
Avoid bonfires and burning of waste materials.
Demolition
Ensure effective water suppression is used during demolition operations.
Avoid explosive blasting, use appropriate manual or mechanical alternatives.
Bag and remove any biological debris or damp down such material before demolition.
Construction
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
Trackout
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
Avoid dry sweeping of large areas.
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
Record all inspections of hauls routes and any subsequent action in a site log book.
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
Implement a wheel washing system, with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
Access gates to be located at least 10m from receptors where possible.

9.93 Such measures are routinely and successfully applied to major construction projects throughout the UK and are proven to reduce significantly the potential for adverse nuisance dust effects

associated with the various stages of construction work. Therefore, it is considered that residual effects due to fugitive emissions would be **insignificant**.

Construction Vehicle Exhaust Emissions

9.94 All construction traffic logistics would be agreed with SC, as set out in **Chapter 8: Transportation and Access**. Consideration would also be given to the avoidance (or limited) use of roads during peak hours, where practicable. However, it is anticipated that the likely residual effect of construction vehicles entering and egressing the Site to air quality would remain as per the likely impact. That is, during the construction period the likely worst-case residual impact, given the impacts would be temporary, is **insignificant**.

Construction Plant Emissions

9.95 In accordance with Part 7 of the Mayor of London Control of Dust and Emissions SPG, all construction plant would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM. It is therefore considered the likely residual effects of construction plant on local air quality would be **insignificant**.

Completed and Operational Development

9.96 As identified earlier in this chapter, even in the absence of mitigation, the Development is predicted to have an insignificant effect on local air quality. Accordingly, mitigation measures would not be required so residual effects would remain as **insignificant**.

9.97 The Development incorporates a number of measures that would benefit local air quality. These include:

- ability to accommodate a new entrance/exit to the London Underground, which would reduce pedestrian footfall on Borough High Street and encourage the use of public transport;
- new open space surrounding the area identified as a potential new entrance /exit to the London Bridge Underground Station, which would be would be planted with medium and tall trees which would absorb carbon dioxide and vehicle and heating plant emissions;
- the provision of 1,310 cycle spaces, 70 showers and 447 lockers, to encourage sustainable forms of transport;
- implementation of a Delivery, Servicing and Waste Management Plan (DSWMP) to manage the arrival and departure of delivery and servicing vehicles and their activities when on-site; and
- implementation of a Travel Plan to encourage employees to move up within the sustainable transport hierarchy.

9.98 **Table 9.21** summarises the likely significant effects, mitigation measures and likely residual effects identified within this chapter.

Table 9.21: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Dust emissions arising from the demolition and construction works	**Insignificant**	None required. However, some of the routine management controls prescribed in the SEMP would relate to good practice measures to limit the impacts of construction traffic and the use of plant and machinery	**Insignificant**
Emissions from demolition and construction vehicles	**Insignificant**	None required. However, some of the routine management controls prescribed in the SEMP would relate to good practice measures to limit the impacts of construction traffic and the use of plant and machinery	**Insignificant**
Emissions from demolition and construction plant	**Insignificant**	Plant to meet standards set for NRMM	**Insignificant**
Completed and Operational Development			
Emissions from heating plant and traffic generation associated with the Development	**Insignificant**	None required.	**Insignificant**

Monitoring

9.99 Monitoring would be undertaken during the Works as required by the Scoping Opinion. Monitoring could include dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

9.100 Regular site inspections to be carried out to monitor compliance with the Dust Management Plan (DMP), record inspection results, and make an inspection log available to the local authority when asked.

9.101 The frequency of Site inspections would be increased by the person accountable for air quality and dust issues on Site when activities with a high potential to produce dust were being carried out and during prolonged dry or windy conditions.

9.102 The monitoring approach and locations for monitoring would be agreed with SC.

References

1 Cambridge Environmental Research Consultants Ltd, ADMS-Roads, 2018, Version 4.1.1.

2 AEA, NO_X to NO_2 Calculator, http://laqm1.defra.gov.uk/review/tools/monitoring/calculator.php Version 7.1, April 2019

3 Greater London Authority (2014), 'Sustainable Design and Construction - Supplementary Planning Guidance', Greater London Authority, London.

4 Institute of Air Quality Management, 2014, 'Guidance on the Assessment of dust from demolition and construction.

5 http://laqm.defra.gov.uk/faqs/faqs.html.

6 Defra, 2012, Local Air Quality Management: Note on Projecting NO_2 Concentrations

7 https://www.london.gov.uk/sites/default/files/appendix_c1_supporting_information_document_-_copy.pdf

8 Department of the Environment, Food and Rural Affairs (Defra), (2007). 'The Air Quality Strategy for England, Scotland, Wales & Northern Ireland'.

9 Local Air Quality Management Technical Guidance (TG16) February 2018

10 Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe.

11 Defra, (2010) The Air Quality Standards (England) Regulations.

12 Defra (2017) 'Air quality plan for nitrogen dioxide (NO2) in UK (2017)'

13 https://www.dft.gov.uk/traffic-counts/cp.php?la=Southwark#37699