

# THE GOODSYARD

Environmental Statement Addendum Volume 2

September 2019 – Chapter 12 of 21

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Hammerson

# CHAPTER 12: AIR QUALITY

## 12.1 INTRODUCTION

- 12.1.1This Chapter reviews the potential impacts of the Revised Scheme with respect to air quality.
- 12.1.2The Planning Policy Documents which inform air quality impact assessment that have been updated, revised or introduced since the 2015 ES are as follows:
  - The National Planning Policy Framework;
  - The London Plan – Spatial Development Strategy for Greater London;
  - The London Environment Strategy;
  - London Borough of Tower Hamlets Local Plan 2031 (Draft); and
  - London Borough of Hackney – Hackney A Place for Everyone – Proposed Submission Local Plan.
- 12.1.3Technical guidance documents relating to air quality impact assessment which have been updated or revised since the 2015 ES are as follows:
  - EPUK/IAQM Land-use Planning & Development Control: Planning for Air Quality v1.2; and
  - Local Air Quality Management Technical Guidance (TG16).
- 12.1.4Baseline air quality conditions have been reassessed since the 2015 Proposed Development to account for the availability of more recent air quality monitoring data. Further details of baseline conditions are in **Section 12.6**.
- 12.1.5Construction dust impacts on sensitive receptors in proximity to the Revised Scheme site have been reassessed to account for the new construction schedule. Air quality impacts associated with construction traffic emissions during the construction phase have also been reassessed.
- 12.1.6Air quality impacts resulting from traffic emissions associated with the Revised Scheme when operational have been reassessed. This is to account for changes in development trip generation from the 2015 Proposed Development to the Revised Scheme.

## 12.2 SCOPE OF ASSESSMENT

- 12.2.1This chapter of the ES Addendum assesses the potential air quality effects associated with the Revised Scheme. Where the potential for impacts is identified, mitigation measures and residual impacts are presented. This chapter is supported by **ES Addendum Volume 4, Appendix H**.
- 12.2.2The scope and methodology of the air quality assessment was agreed with the relevant stakeholders as part of the consultation process.
- 12.2.3The primary pollutants of interest for this assessment are nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), as well as dust from the construction phases. Likely significant effects are identified in relation to health-based standards.

## 12.3 KEY LEGISLATION, POLICY AND GUIDANCE CONSIDERATIONS

- 12.3.1The air quality assessment was undertaken within the context of relevant planning policies, guidance documents and legislative instruments. These are summarised below.

<sup>1</sup> The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Volume 1 s.l, s.n.g/m<sup>3</sup> (2007), Department of the Environment, Food and Rural Affairs, et al.

<sup>2</sup> The Air Quality (England) Regulations 2000 (2000 No. 928).

<sup>3</sup> The Air Quality (England) (Amendment) Regulations 2002 (2002 No. 3043).

<sup>4</sup> The Air Quality Standards Regulations 2010, (2010 No. 1001).

<sup>5</sup> The Air Quality Standards (Amendment) Regulations 2016 (2016 No. 1184)

### Legislation and Regulations

#### Air Quality Strategy

- 12.3.2The Air Quality Strategy for England, Scotland, Wales and Northern Ireland<sup>1</sup> (AQS) sets the framework for government policy on air quality in the UK. Air quality objective levels are set out in legislation in the Air Quality (England) Regulations 2000<sup>2</sup>, as amended<sup>3</sup> (shown in **Table** ). In setting air quality objectives, due account was taken of health and socio-economic cost-benefit factors, together with consideration of the practicalities of achieving such targets.
- 12.3.3These air quality objectives were meant to be achieved in 2004 for PM<sub>10</sub>, and 2005 for NO<sub>2</sub>. Although achievement of air quality objectives is not a statutory requirement, they reflect statutory limits outlined in The Air Quality Standards Regulations 2010<sup>4</sup> as amended<sup>5</sup>, which require the Secretary of State to achieve EU limit values set out in EU Ambient Air Quality Directives<sup>6,7</sup>.

Table 12.1 Air quality objectives relevant to the assessment

| Pollutant                           | Air Quality Objective Levels                                           | Measured As |
|-------------------------------------|------------------------------------------------------------------------|-------------|
| Nitrogen dioxide (NO <sub>2</sub> ) | 200 µg/m <sup>3</sup> , not to be exceeded more than 18 times per year | 1-hour mean |
|                                     | 40 µg/m <sup>3</sup>                                                   | Annual mean |
| Particles (PM <sub>10</sub> )       | 50 µg/m <sup>3</sup> , not to be exceeded more than 35 times per year  | 1-hour mean |
|                                     | 40 µg/m <sup>3</sup>                                                   | Annual mean |
| Particles (PM <sub>2.5</sub> )      | 25 µg/m <sup>3</sup>                                                   | 1-hour mean |

#### Clean Air Strategy 2019

- 12.3.4The Clean Air Strategy<sup>8</sup> sets out how the UK government will work to achieve ambitious air pollution reductions in England. The Strategy supports the establishment of Clean Air Zones to lower emissions from all sources of air pollution and outlines measures to reduce emissions from transport, homes, agriculture and industry such as the introduction of new legislation, funding for research and innovation, and public engagement campaigns.

#### The Environment Act 1995

- 12.3.5The Environment Act 1995<sup>9</sup>, specifically Sections 82-84, requires all local authorities to carry out periodic reviews of air quality within their administrative areas. This review and assessment process now follows a phased approach, whereby local authorities only undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded. The aim of this review process is to assess whether the air quality objectives are likely to be achieved. Areas where objectives are likely to be exceeded are to be declared air quality management areas (AQMA) by the local authorities.

#### The Clean Air Act 1993

- 12.3.6The Clean Air Act 1993<sup>10</sup> controls small combustion plants under 20 MW net rated thermal input. Plants above 366 kW total input require the local authority to approve the chimney height.

<sup>6</sup> The European Parliament and the Council of the European Union, 2008, Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air and cleaner air for Europe. Official Journal of the European Union L152/2 11.6.2008.

<sup>7</sup> The European Parliament and the Council of the European Union, 2004, Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2014 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. (Fourth Daughter Directive). Official Journal of the European Union L23/3 26.1.2005.

<sup>8</sup> Clean Air Strategy 2019 (2019), Department for Environment, Food and Rural Affairs.

<sup>9</sup> Environment Act 1995, Part IV Air Quality.

<sup>10</sup> Clean Air Act 1993, Chapter 11.

National Planning Policy Framework and Planning Practice Guidance

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| 12.3.7                        | <p>The revised National Planning Policy Framework (NPPF)<sup>11</sup> was published in February 2019. Paragraph 170 states:</p> <p><i>“Planning policies and decisions should contribute to and enhance the natural and local environment by:</i></p> <p><i>“e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions....”</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 12.3.8                        | <p>Paragraph 181 states:</p> <p><i>“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan”.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 12.3.9                        | <p>The Planning Practice Guidance (PPG)<sup>12</sup> supports the NPPF and was first published online in 2014 and will be updated in due course to reflect changes to the National Planning Policy Framework. The PPG provides <i>“guiding principles on how planning can take into account the impact of new development on air quality”</i>. This guidance highlights the role of the local air quality management (LAQM) regime in pursuing national air quality objectives and its implications for planning. It also includes recommendations on how detailed an air quality assessment should be or how impacts on air quality can be mitigated.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p><b>The London Plan</b></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 12.3.10                       | <p>The London Plan<sup>13</sup> defines the spatial development strategy for strategic planning in Greater London. It deals with issues that are of strategic importance to Greater London. Policy 7.14 (A) states:</p> <p><i>“The Mayor recognises the importance of tackling air pollution and improving air quality to London’s development and the health and wellbeing of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimize public exposure to pollution.”</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 12.3.11                       | <p>The London Plan provides a broad overarching policy for authorities in Greater London and provides a basis and direction for local polices. Regarding planning decisions, Policy 7.14 (B) states:</p> <p><i>“Development proposals should:</i></p> <p><i>“a) minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3)</i></p> <p><i>“b) promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils’ ‘The control of dust and emissions from construction and demolition’ [now superseded by planning guidance in the GLA and London Councils’ ‘The control of dust and emissions during construction and demolition’</i></p> <p><i>“c) be at least ‘air quality neutral’ and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs))</i></p> <p><i>“d) ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, and that it is possible to put in place</i></p> |

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| <p><i>measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches</i></p> <p><i>“e) where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified.”</i></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 12.3.12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>The London Plan is currently under review and a draft new Plan<sup>14</sup> has been published and consulted on. Within the new Plan, Policy GG3 concerns public health and states:</p> <p><i>“To improve Londoners’ health and reduce health inequalities, those involved in planning and development must ... seek to improve London’s air quality, reduce public exposure to poor air quality and minimise inequalities in levels of exposure to air pollution.”</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 12.3.13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>Policy D1 states:</p> <p><i>“Development Plans, area-based strategies and development proposals should ensure the design of places ... help prevent or mitigate the impacts of noise and poor air quality.”</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 12.3.14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>Policy SI1 relates specifically to air quality and states:</p> <p><i>“London’s air quality should be significantly improved and exposure to poor air quality, especially for vulnerable people, should be reduced:</i></p> <p><i>“1. Development proposals should not:</i></p> <p><i>“a. Lead to further deterioration of existing poor air quality</i></p> <p><i>“b. Create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedence of legal limits</i></p> <p><i>“c. Reduce air quality benefits that result from the Mayor’s or boroughs’ activities to improve air quality</i></p> <p><i>“2. Development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality. Particular care should be taken with developments that are in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people.</i></p> <p><i>“3. Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should propose methods of achieving an Air Quality Positive approach through the new development.</i></p> <p><i>“4. Major development proposals must be at least air quality neutral and be submitted with an Air Quality Assessment.</i></p> <p><i>“5. Development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.</i></p> <p><i>“6. Development proposals should ensure that where emissions need to be reduced, this is done on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated.”</i></p> |
| 12.3.15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>For larger-scale development areas such as Opportunity Areas, or those large enough to already require an Environmental Impact Assessment, there should be an aim to be Air Quality Positive by implementing measures across the area that will actively reduce air pollution. This could be achieved, for example, by the provision of low or zero-emission heating and energy, or improvements to public transport, walking and cycling infrastructure, and designing out features such as street canyons that prevent effective dispersion of pollutants. Data from the use of smart infrastructure such as sensors could contribute to beneficial design solutions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 12.3.16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>For major developments, a preliminary AQA should be carried out before designing the development to inform the design process. The aim of a preliminary assessment is to assess the most significant sources of pollution in the area. This will help to identify constraints imposed on the site by poor air quality; appropriate land uses for the site; and appropriate design measures that could be implemented to ensure that development reduces exposure and improves air quality.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

<sup>11</sup> National Planning Policy Framework (July 2018), DCLG.

<sup>12</sup> Planning Practice Guidance (PPG) – Air Quality, (2014), DCLG. Online guidance available at: <https://www.gov.uk/guidance/air-quality--3>.

<sup>13</sup> Greater London Authority (2016) The London Plan: The Spatial Development Strategy for Greater London Consolidated with Alterations since 2011, Greater London Authority, London.

<sup>14</sup> Greater London Authority (2018) The Draft London Plan, Greater London Authority, London.



- 12.3.17 Further assessments should then be carried out as the design evolves to ensure that impacts from emissions are prevented or minimised as far as possible, and to fully quantify the expected effect of any proposed mitigation measures, including the cumulative effect where other nearby developments are also underway or likely to come forward.
- 12.3.18 Further guidance will be published on Air Quality Neutral and Air Quality Positive standards as well as guidance on how to reduce construction and demolition impacts.

**The London Air Quality Strategy**

- 12.3.19 The current version of the Mayor's Air Quality Strategy (MAQS)<sup>15</sup> was published in 2010. Its overarching objective is *"to reduce air pollution in London so that the health of Londoners is improved [by achieving] the European Union (EU) air quality limit values as soon as possible. This will also achieve compliance with nationally prescribed air quality standards and objectives, as required by the GLA Act."*
- 12.3.20 The Strategy commits to the continuation of measures to improve air quality identified in the 2002 MAQS and sets out fifteen policy measures including:
- *"Promoting technological change and cleaner vehicles;*
  - *"Reducing emissions from construction and demolition sites;*
  - *"Using the planning process to improve air quality;*
  - *"Energy efficient buildings;*
  - *"Encouraging innovation; and*
  - *"Monitoring progress and reporting"*

**London Environment Strategy**

- 12.3.21 On 31st May 2018, the Mayor published a London Environment Strategy. It includes policies and proposals to improve air quality. The Mayor is proposing to:
- Clean up London's transport system and phase out fossil fuels including diesel, making the whole bus fleet zero emission by 2037 at the latest and introducing the Ultra Low Emission Zone by 2019 to deter the most polluting vehicles from entering London;
  - consider introducing a new Air Quality Positive standard so new building developments contribute to cleaning London's air;
  - use the planning system to help ensure that new schools and other buildings that will be used by people who are particularly vulnerable to pollutants are not located in areas of poor air quality;
  - fund the implementation of air quality plans that will help at least 50 schools in some of London's most polluted areas reduce their pupils' exposure to poor air;
  - provide more information to Londoners on when air pollution is bad, with guidance on monitors, and give people with fire places or wood burning stoves better information on which to use so they don't make air pollution worse;
  - set even tighter long-term air quality standards based on the best health evidence to make sure Londoners can breathe the cleanest air and start addressing the problem of indoor air quality; and
  - seek powers so London can enforce controls on air pollution from construction machinery, the river and other sources."

**Mayor's Transport Strategy**

- 12.3.22 The Mayor's Transport Strategy<sup>16</sup> was adopted in March 2018 and details proposed changes in London's transport network over the coming years. The Strategy particularly emphasises the potential for active travel to improve public health through increased physical activity and reduced air pollution. It recommends a London-wide strategic cycle network.
- 12.3.23 The Strategy refers directly to air quality with Policy 6, stipulating:
- "The Mayor, through TfL and the boroughs, and working with stakeholders, will take action to reduce emissions – in particular diesel emissions – from vehicles on London's streets, to improve air quality and support London reaching compliance with UK and EU legal limits as soon as possible."*
- 12.3.24 In addition, the Strategy identifies measures to be implemented in improving air quality. These include:
- expansion of the Ultra Low Emission Zone (ULEZ) and progressive tightening of vehicle criteria;

- retrofitting of existing vehicles, and purchase of electric and hydrogen vehicles to achieve a zero emission TfL bus fleet from 2037;
- expanding electric vehicle charging and hydrogen fuelling infrastructure
- introducing a 'Liveable Neighbourhoods' programme of local measures designed to target local air quality hotspots at borough level. Targeted measures may include road charges, vehicle and parking restrictions, and support for electric vehicle infrastructure and zero emission car clubs.

**London Borough of Tower Hamlets Local Plan**

- 12.3.25 The London Borough of Tower Hamlets (LBTH) Local Plan consists of a Core Strategy<sup>17</sup> adopted in September 2010 and the Managing Development Document adopted in April 2013<sup>18</sup>. Policy SP03 of the Core Strategy states that the Council will:

*"Address the impact of noise and air pollution in the borough by:*

- *Continuing to promote the use of public transport and reducing reliance on private motor vehicles.*
- *Managing and improving air quality along transport corridors and traffic-congestion points by working with Transport for London.*
- *Implementing a 'Clean Zone' in the borough to improve air quality"*

- 12.3.26 Policy DM9 of the Managing Development Document concerns air quality, stating:

*"1. Major development will be required to submit an Air Quality Assessment demonstrating how it will prevent or reduce associated air pollution during construction or demolition. Minor development will be required to submit details outlining practices to prevent or reduce associated air pollution during construction or demolition.*

*"2. Development located in the Tower Hamlets Clear Zone will need to demonstrate consideration of the Clear Zone objectives."*

- 12.3.27 LBTH is currently developing a new Local Plan. A draft Local Plan document<sup>19</sup> has been submitted to the government. Policy D.SG4 relates to construction and states:

*"All major development should sign up to the considerate constructors scheme and where appropriate a constructors forum. During construction, major development is required to minimise levels of noise, vibration, artificial light, odour, air quality, fumes or dust pollution."*

- 12.3.28 Policy D.ES2 relates to air quality and states:

*"Development is required to meet or exceed the 'air quality neutral' standard, including promoting the use of low or zero emission transport and reducing the reliance on private motor vehicles.*

*"An air quality impact assessment, based on current best practice, is required as part of the planning application for:*

- *"Major developments;*
- *"Developments which will require substantial earthworks or demolition;*
- *"Developments which include education and health facilities or open space (including child play space); and*
- *"New build developments in areas of sub-standard air quality (as shown on the Policies Map).*

*"Where an air quality assessment indicates that a development will cause harm to air quality or where end users could be exposed to poor air quality, development will be resisted unless mitigation measures are adopted to reduce the impact to acceptable levels.*

*"New build developments which propose to provide any private, communal, publicly accessible open space or child play space in areas of sub-standard air quality are required to demonstrate that they have considered the positioning and design of the open space to reduce exposure of future users to air pollution."*

**London Borough of Hackney Local Plan**

- 12.3.29 The London Borough of Hackney (LBH) is currently consulting on a draft Local Plan<sup>20</sup>. Within this, Policy LP41 relates to Liveable Neighbourhoods and states:

<sup>15</sup> Greater London Authority (2010) Cleaning the Air – The Mayor's Air Quality Strategy, Greater London Authority, London.

<sup>16</sup> Greater London Authority (2018) Mayor's Transport Strategy, Greater London Authority, London.

<sup>17</sup> London Borough of Tower Hamlets (2010) Core Strategy Development Plan Document 2025, London Borough of Tower Hamlets, London.

<sup>18</sup> London Borough of Tower Hamlets (2013) Managing Development Document, London Borough of Tower Hamlets, London.

<sup>19</sup> London Borough of Tower Hamlets (2017) Tower Hamlets Draft Local Plan 2031, London Borough of Tower Hamlets, London.

<sup>20</sup> London Borough of Hackney (2018) Hackney A Place for Everyone Draft Local Plan 2033 (LP33), London Borough of Hackney, London.

- “All new development must:...
- Contribute to the Healthy Streets approach to improve air quality, reduce congestion and make Hackney’s diverse communities become greener, healthier and more attractive places in which to live, play and do business...
  - Tackle poor air quality, seeking to reduce NOx emissions to achieve the National Air Quality objective and in particular reduce the exposure of children and vulnerable people to transport-related air pollution.”
- 12.3.30 Policy LP43 concerns Transport and Development and states:
- “The transport and environmental impacts of development and construction must be minimised and mitigated through Constructions and Logistics Plans (CLPs) incorporating adherence to the Construction and Logistics Community Safety Scheme (CLOCS) and the Freight Operator Recognition Scheme (FORS)<sup>21</sup>. On-site machinery and vehicles used should comply with industry best-practice emission standards contributing to the Council’s air quality objectives.”
- 12.3.31 Policy LP58 refers specifically to Air Pollution:
- “All new development must not exceed air quality neutral standards or contribute to a worsening of air quality at the construction or operation stage, over the lifetime of the development. They should consider the existing air quality and not locate sensitive uses in areas that are exposed. New development, especially those catering for vulnerable people and uses such as elderly and children should be sited and designed to minimise exposure to air pollution.”

London Borough of Tower Hamlets Air Quality Action Plan

- 12.3.32 Following the designation of a borough-wide AQMA in 2000 for exceedances of the NO<sub>2</sub> annual mean objective and the PM<sub>10</sub> 24-hour mean objective, LBTH adopted an air quality action plan<sup>22</sup> (AQAP) in October 2017 to promote better air quality conditions. Measures in the AQAP include:
- Promoting retrofitting schemes for old domestic boilers;
  - Providing air quality advice to support patients with heart and lung conditions;
  - Encouraging accredited active travel schemes at schools;
  - Tackling vehicle idling; and
  - Accelerating the uptake of electric, hybrid and Euro VI vehicles in the Council fleet.

London Borough of Hackney Air Quality Action Plan

- 12.3.33 The LBH declared a borough-wide AQMA in 2006 for exceedances of the NO<sub>2</sub> 1-hour and annual mean objectives and the PM<sub>10</sub> 24-hour mean objective. The LBH adopted an AQAP<sup>23</sup> in November 2015 which outlines measures aimed at improving air quality, including:
- Incorporating air quality issues into the planning system;
  - Enhancing the borough’s air quality monitoring network;
  - Expanding and improving cycling and walking infrastructure; and
  - Implementing anti-idling measures targeted at taxis.

<sup>21</sup> Developers are expected to meet as a minimum FORS Silver standard and comply with best-practice contained in any superseding guidance.

<sup>22</sup> London Borough of Tower Hamlets (2017) London Borough of Tower Hamlets Air Quality Action Plan 2017-2022, London Borough of Tower Hamlets, London.

<sup>23</sup> London Borough of Hackney (2015) Hackney Council Air Quality Action Plan 2015-2019, London Borough of Hackney, London.

<sup>24</sup> Moorcroft and Barrowcliffe et al. (2017) Land-use Planning & Development Control: Planning for Air Quality. V1.2. Environmental Protection UK and the Institute of Air Quality Management, London.

<sup>25</sup> Holman et al. (2014) IAQM Guidance on the assessment of dust from demolition and construction (Version1.1), Institute of Air Quality Management, London.

<sup>26</sup> Greater London Authority (2014) The Control of Dust and Emissions during Construction and Demolition - Supplementary Planning Guidance, GLA & London Councils, London.

Technical Standards and Guidance

Land-Use Planning & Development Control: Planning for Air Quality

- 12.3.34 Environmental Protection UK (EPUK) and the IAQM have developed a procedure for assessing the significance of changes in traffic volume on local air quality in their guidance document, ‘Land-Use Planning & Development Control: Planning for Air Quality’<sup>24</sup>. The procedure is designed to assess potential impacts resulting from changes in road use, including realignment, expansion and increased traffic flow. It can also be used to assess the potential air quality impacts of future combined heat and power (CHP) plant or boilers.

Guidance on the Assessment of Dust from Construction and Demolition

- 12.3.35 The IAQM has produced guidance on the assessment of air quality impacts from construction activities<sup>25</sup>. This guidance provides a framework for assessing the risk of dust effects that may arise and suggests appropriate dust and air emissions mitigation measures for sites according to the level of risk.
- 12.3.36 The GLA and London Councils produced supplementary planning guidance on controlling dust and emissions during construction and demolition in 2014<sup>26</sup>. The guidance identifies mitigation measures for a range of different sites. This guidance is widely referred to in assessments of construction impacts in London.

Local Air Quality Management: Technical Guidance LAQM TG(16)

- 12.3.37 The Defra technical guidance note LAQM.TG(16)<sup>27</sup> is intended to provide guidance to local authorities undertaking the local review and assessment process. They are also used in developing methods for air quality assessments.

Sustainable Design and Construction: Supplementary Planning Guidance (GLA)

- 12.3.38 The London Plan Sustainable Design and Construction Supplementary Planning Guidance (SD&C SPG)<sup>28</sup> includes guidance on how boroughs can take forward the ‘air quality neutral’ approach set out in the London Plan. It identifies emission benchmarks that have been produced for buildings’ operation and for transport across London, based on the latest technology. The Air Quality Neutral Planning Support document<sup>29</sup> further defines these emission benchmarks.

Sustainable Design and Construction: Supplementary Planning Document (LBH)

- 12.3.39 The LBH has produced a Sustainable Design and Construction Supplementary Planning Document<sup>30</sup>. This outlines the potential for air quality impacts associated with different development types and identifies design interventions that can mitigate impacts. These technologies include the use of ground source heat pumps to meet energy demand, mechanical ventilation to improve indoor air quality and implementation of CHP to recover waste heat generated by electricity generation.

Pollution Control Air Quality Planning Guidance (LBH)

- 12.3.40 The LBH has produced a Pollution Control Air Quality Planning Guidance document<sup>31</sup>. This outlines the Council’s technical requirements for air quality modelling and monitoring undertaken in support of planning applications.

London Borough of Tower Hamlets Code of Construction Practice

- 12.3.41 LBTH has developed a Code of Construction Practice<sup>32</sup> (CoCP) which outlines contractor responsibilities during construction and demolition works. The document also outlines practices to be adopted in order to prevent dust nuisance and air quality impacts. These include:
- Enclosure of dusty material stockpiles, fitting covers to skips and use of water sprays during episodes of dry weather;

<sup>27</sup> Department for Environment, Food and Rural Affairs (2018) Local Air Quality Management: Technical Guidance LAQM.TG(16), Department for Environment, Food and Rural Affairs, London.

<sup>28</sup> Greater London Authority (2014) Sustainable Design and Construction, The London Plan Supplementary Planning Guidance, Greater London Authority, London.

<sup>29</sup> Air Quality Neutral Planning Support: GLA 80371 (2014), Air Quality Consultants, Environ.

<sup>30</sup> London Borough of Hackney (2016) Sustainable Design and Construction Supplementary Planning Document, London Borough of Hackney, London.

<sup>31</sup> London Borough of Hackney (2013) Pollution Control Air Quality Planning Guidance, London Borough of Hackney, London.

<sup>32</sup> Code of Construction Practice, London Borough of Tower Hamlets, London.

- The use of vacuums and other control mechanisms during cutting and grinding;
- Prohibiting burning of materials;
- Use of low-sulphur diesel for off-road mobile vehicles; and
- Ensuring on-road vehicle catalysts are working efficiently.

## 12.4 CONSULTATION

12.4.1 In January 2014 a Scoping Opinion was issued jointly by the LBTH (Ref: PA/14/107) and LBH (Ref: 2014/0249) on the Revised Scheme (see **ES Addendum Volume 4 - Appendix A Scoping**). A review of the Scoping Opinion was provided in April 2019 subject to the Revised Scheme. **Table 12.2** outlines the comments received in the 2014 Scoping Opinion and the 2019 Scoping Opinion Review and where they have been addressed within the documentation.

Table 12.2: Scoping Opinion Comments and Responses

| Topic / Section                      | Summary of Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Location within the ES Addendum where comments are addressed                                                                                     |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 2014 Scoping Opinion Paragraph 4.104 | "The ES should provide a transparent account of the modelling undertaken, all assumptions made and all input data (for example, traffic flows) used."                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Section 12.8 and Volume 4, Appendix H                                                                                                            |
| 2019 Scoping Opinion Review          | <p>"Confirmation that the Applicant will assess the scheme's impact upon the long- and short-term air quality objectives (AQOs) for NO2 and PM10, as well as the impact upon the PM2.5 air quality objective.</p> <p>Further information on the screening of odour impacts from A3 properties.</p> <p>Consideration for adjustment for future trends in emission projections and baseline air quality for the scheme opening year.</p> <p>Inclusion of intermediate years in modelling assessment to adequately reflect the risk posed to new points of exposure, as they're introduced.</p> <p>It would be prudent for the Applicant to include justifications for the fleet mixes adopted in the modelling of construction vehicles."</p> | <p>Section 12.8</p> <p>Paragraph 12.8.50</p> <p>Section 12.6</p> <p>Paragraph 12.8.6 to Table 12.6.6</p> <p>ES Addendum Volume 4, Appendix H</p> |

## 12.5 ASSESSMENT METHODOLOGY

12.5.1 This section describes the assessment methodology, including data collation and impact assessment criteria that were used in the air quality assessment. The approach outlined below was agreed via telephone and email correspondence with Stephen Inch, Senior Policy and Program Officer in the Air Quality team at the GLA.

### Study Area

12.5.2 The study area for the baseline assessment extended to include appropriate local monitoring sites shown in **Figure 12.1**.

12.5.3 Potential construction dust risk during the construction phase were considered in line with the IAQM guidance document<sup>25</sup>, at human receptor locations up to 350 m from the site boundary or within 50 m of the route used by construction vehicles on a public highway, up to 500 m from the site entrance. The study areas for the construction phase assessment are shown in **ES Addendum Volume 4, Appendix H**.

12.5.4 The study area for air quality impacts for the operational and construction phase assessments includes roads located in close proximity to the site as well as roads affected by the Revised Scheme and selected sensitive receptors within 200 m of these roads. Affected roads were identified by qualifying criteria detailed in the EPUK/ IAQM guidance<sup>24</sup>, based on changes between Do Minimum (DM) and Do Something (DS) scenarios, as follows:

- A change in light duty vehicle (LDV) flows of >100 annual average daily traffic (AADT);
- A change in heavy duty vehicle (HDV) flows of >25 AADT; and
- Road alignment will change by 5 m or more.

12.5.5 A zone of 50 m surrounding the modelled road network has been modelled as a grid with a spacing of 10 m. In addition to the modelled grid, several discrete receptors were included in the model. These receptors comprise nearby locations which are sensitive to the relevant annual air quality objectives (to determine the impact of road traffic emissions associated with the Revised Scheme) and locations on the site (to determine the suitability of the site for intended use). These locations are detailed in **ES Addendum Volume 4, Appendix H**.

### Determination of Baseline

12.5.6 LBTH and LBH publish a series of Annual Status Reports (ASR) for air quality, in accordance with the local air quality management (LAQM) process. The LBTH 2018 ASR and LBH 2017 ASR (the latest available reports at the time of this assessment) were obtained and reviewed to establish the existing conditions at, and in proximity to, the site.

12.5.7 Background air pollution concentrations corresponding to the 1 km x 1 km grid squares covering the site and identified receptor locations were obtained from the LAQM support tools provided by Defra for use in air quality assessment. Background concentrations for all years considered in this assessment were obtained in order to establish baseline air quality concentrations within the study area.

### Prediction Methodology

#### Construction Phase Dust Risk Assessment

12.5.8 An assessment of potential impacts associated with the construction phase was undertaken in accordance with the IAQM guidance<sup>25</sup> upon which the GLA and London Councils supplementary planning guidance on controlling dust and emissions during construction<sup>26</sup> is based. Full details of the assessment methodology, including consideration of significance, is provided in **ES Addendum Volume 4, Appendix H**.

12.5.9 The Revised Scheme will be constructed over a 13-year period between 2021 and 2034. A dust risk assessment was undertaken for the peak construction phase, involving construction of Phases 1, 2 and 3. This represents the worst-case dust impacts associated with construction activities associated with the Revised Scheme. The mitigation measures recommended on the basis of this assessment are applicable to other construction phases.

#### Construction Traffic Emissions

12.5.10 A screening assessment was undertaken following the methodology detailed in EPUK/IAQM guidance<sup>24</sup>. This determined whether significant air quality effects associated with construction traffic emissions during the construction phase of the Revised Scheme will be likely.

12.5.11 The ADMS-Roads Extra v4.1.1 Gaussian dispersion model was used to assess emissions from construction vehicles associated with the Revised Scheme during the construction phase. Full details of the assessment methodology and model input data are provided in **ES Addendum Volume 4, Appendix H**.

#### Operational Phase Assessment

12.5.12 A screening assessment was undertaken, following the methodology detailed in the EPUK/IAQM guidance<sup>24</sup>, to determine whether significant air quality effects associated with operational traffic during operation of the Revised Scheme will be likely.

12.5.13 The Revised Scheme will be heated using air source heat pumps. There is no combustion plant within the Revised Scheme. As such, no combustion plant have been assessed.

12.5.14 The ADMS-Roads Extra v4.1.1 Gaussian dispersion model was used to assess the potential impact of emissions from vehicles associated with the Revised Scheme during the operational phase. It was also used to assess the exposure of future residents of the Revised Scheme to air pollution and to establish if the site is suitable for the proposed use. The ADMS-Roads Extra model considers the key variables that influence pollutant emission and dispersion (meteorology, surface roughness, diurnal traffic flows, predicted future traffic mixes and predicted future engine emission standard mixes).

12.5.15 Full details of the assessment methodology and model input data are provided in **ES Addendum Volume 4, Appendix H**.



Assessment Scenarios

- 12.5.16
- The Revised Scheme will be constructed through multiple phases, with peak construction activities anticipated in 2027. To consider the combined impacts of operational and construction phases, the following scenarios were assessed:
- Do Minimum 2027: Represents the earliest occupation of constructed Phases 1, 2 and 3 *Without Development*;
  - Do Something 2027: Earliest occupation of constructed Phases 1, 2 and 3 *With Development*. Includes road traffic associated with the occupation of Phases 1, 2 and 3 and construction traffic associated with the construction of Phase 4.
- 12.5.17
- To consider the impact of the Revised Scheme during the first year of the fully operational phase, the following scenarios were assessed:
- Do-Minimum 2034: Represents the first year that all Phases of the Revised Scheme are fully operational *Without Development*; and
  - Do-Something 2034: All Phases of the Revised Scheme fully operational *With Development*. Includes road traffic associated with the occupation of all Phases.

Assessment of Results and Significance Criteria – Construction Phase

- 12.5.18
- The assessment criteria associated with the construction phase impacts on local air quality and dust were based on the EPUK/ IAQM guidance<sup>24</sup>. Full details of the construction phase assessment methodology including consideration of significance are provided in **ES Addendum Volume 4, Appendix H**.
- 12.5.19
- The relevant air quality objectives for NO<sub>2</sub> and PM<sub>10</sub> in the latest National Air Quality Strategy, shown in **Table 12.1**, were used as benchmarks in the assessment of NO<sub>2</sub> and PM<sub>10</sub> monitoring data and Defra background concentrations. These objectives are health based and therefore the assessment is in relation to health-based objectives.

Assessment of Results and Significance Criteria – Operational Phase

- 12.5.20
- The potential impacts of the Revised Scheme were assessed by comparing predicted pollutant concentrations with the air quality objectives (**Table** ), with and without the Revised Scheme in place.
- 12.5.21
- In addition to the air quality objectives, the EPUK/ IAQM guidance<sup>24</sup> descriptors for magnitude of impact were used, primarily because they consider effects in terms of the magnitude of change from existing concentrations, relative to the air quality objectives. The impact magnitudes were used to determine the significance of effects. In this assessment, a moderate or substantial impact is considered significant.

Impact Magnitude

- 12.5.22
- The EPUK/ IAQM guidance document<sup>24</sup> provides criteria for describing impacts as a result of a development. In the absence of other specific guidance, it forms the basis for this assessment.
- 12.5.23
- Table 12.3** shows the impact descriptors that take account of the percentage change in concentration relative to the air quality objective and the annual mean concentration at the receptor during the assessment year.

Table 12.5: Air quality impact descriptors for changes to annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations

| 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                                            | Negligible                                                                | Negligible  | Slight      | Moderate    |
| 76 – 94% of AQAL                                               | Negligible                                                                | Slight      | Moderate    | Moderate    |
| 95 – 102% of AQAL                                              | Slight                                                                    | Moderate    | Moderate    | Substantial |
| 103 – 109% of AQAL                                             | Moderate                                                                  | Moderate    | Substantial | Substantial |
| 110% or more of AQAL                                           | Moderate                                                                  | Substantial | Substantial | Substantial |

<sup>33</sup> As defined in the London Plan.

Note: The AQAL is the relevant air quality objective. For annual mean NO<sub>2</sub>, for instance, the air quality objective 40 µg/m<sup>3</sup>. The AQAL is therefore 40 µg/m<sup>3</sup> for annual mean NO<sub>2</sub>.

- 12.5.24
- The EPUK impact descriptors in **Table 12.3** were used to determine air quality effect descriptors for specific receptors considered in this assessment. Because all the receptors considered for the roads assessment have the same sensitivity, in this case high as they are human receptors, there is a direct correspondence between impact descriptors and effect descriptors as shown in **Table 12.4**. Moderate or major effects are considered potentially significant, and minor and negligible effects are considered not significant.

Table 12.4: Air quality effect descriptors for receptors considered

| Impact Descriptor | Effects Descriptor |
|-------------------|--------------------|
| Negligible        | Negligible         |
| Slight            | Minor              |
| Moderate          | Moderate           |
| Substantial       | Major              |

- 12.5.25
- The overall significance of predicted changes in local air quality, including background pollutant concentrations, has been established through the consideration of the following factors:
- The existing and future air quality in the absence of the Revised Scheme;
  - Duration (temporary or long term);
  - Reversibility (reversible or permanent);
  - The extent of current and future population exposure to the impacts; and
  - The influence and validity of any assumptions adopted when undertaking the prediction of impacts.
- 12.5.26
- The impact descriptors used in this air quality assessment relate to the national air quality objectives i.e. the air quality assessment levels used are the air quality objectives, which are shown in **Table 12.1**.

Air Quality Neutral Assessment

- 12.5.27
- The GLA SD&C SPG<sup>28</sup> and associated air quality neutral guidance<sup>29</sup> sets out benchmarks that major developments<sup>33</sup> must meet to be considered air quality neutral. Comparison with these benchmarks was made to determine whether the Revised Scheme will meet these requirements. Total building emissions and transport emissions for the appropriate land-use classes of the Revised Scheme were calculated and compared against the benchmarks.

Limitations and Assumptions

- 12.5.28
- Likely air quality effects of the Revised Scheme were determined using best-practice modelling techniques. However, dispersion models provide an estimate of concentrations arising from input emissions and historical meteorological data. Modelling techniques themselves, whilst complex in structure, considering all influencing factors and undertaking many thousands of individual calculations, remain a simplified reconstruction of the real-world air quality climate. The estimates produced, while appropriately representing the complex factors involved in atmospheric dispersion, have inherent uncertainty.
- 12.5.29
- Whilst the predictions provided by the models should not be regarded as definitive statements of concentrations that will arise in the future, they are the most reasonable, robust and representative estimates available. The estimates are composed of calculations made at a single point on each sensitive receptor.
- 12.5.30
- There are uncertainties associated with Defra’s modelled background pollutant maps and Emissions Factors Toolkit. To address the uncertainty in predicted decreases in background concentrations and emissions factors in the future, a conservative approach has been adopted whereby 2025 background concentrations and emissions factors have been used for 2027 scenarios, and 2028 background concentrations and emissions factors have been used for 2034 scenarios.
- 12.5.31
- Uncertainties outlined above are unlikely to result in substantial deviations from predicted NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations or change predicted effects.



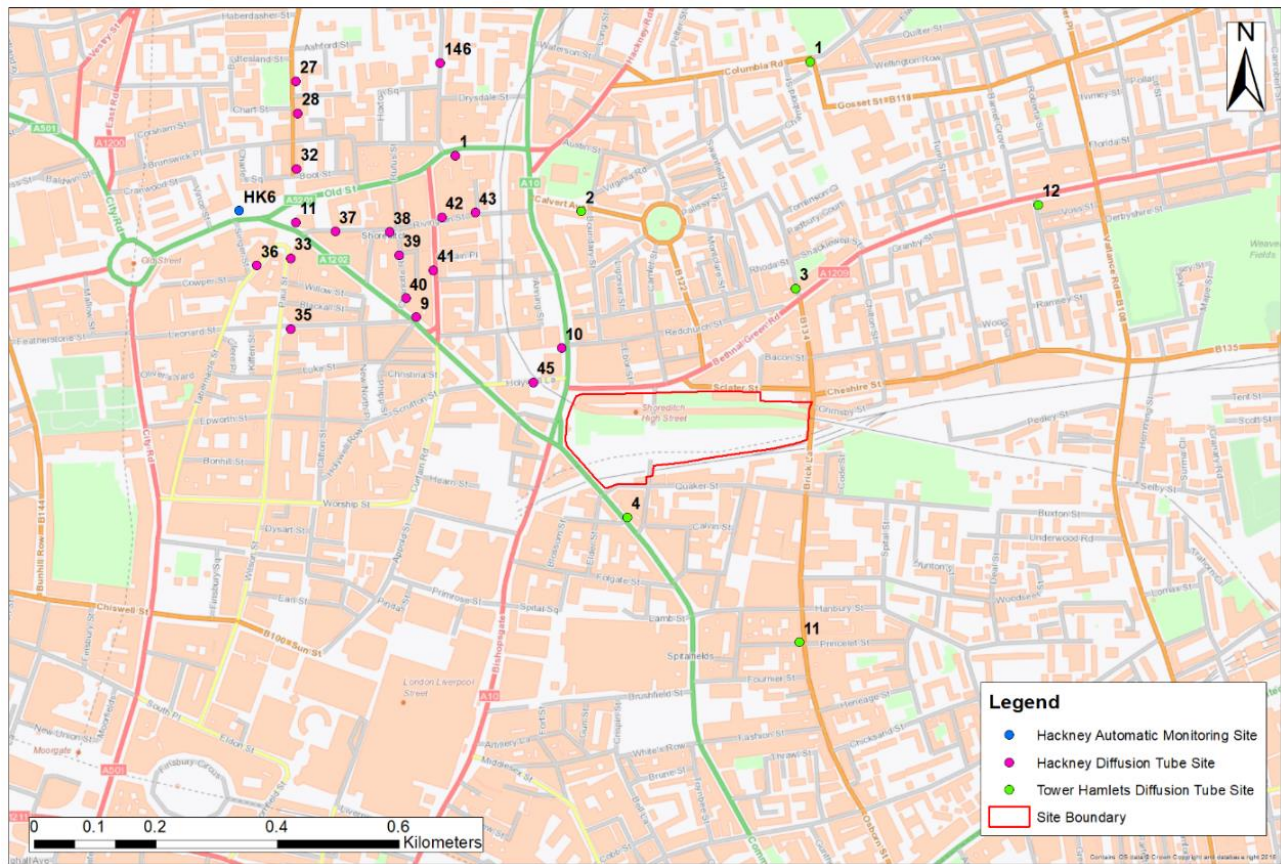
# 12.6 BASELINE ASSESSMENT AND IDENTIFICATION OF KEY RECEPTORS

## Site Description

- 12.6.1
- The Revised Scheme is located on the boundary between the LBTH and the LBH. The site falls within the borough-wide AQMAs and is partly within the Old Street City Road/Old Street/Great Eastern Street/Shoreditch High Street<sup>34</sup> Focus Area. The site is bounded by the A1209 and B135 to the north, the A1202 to the west and south, Quaker Street to the south and Brick Lane to the east.

- 12.6.2
- Figure 12.1** shows the site and air quality monitoring locations, the data from which was considered in this assessment.

Figure 12.1 Study Area and Local Monitoring Locations



## Local Authority Review and Assessment Information

- 12.6.3
- LBTH declared a borough-wide AQMA in 2000 for exceedances of the annual mean NO<sub>2</sub> and 24-hour PM<sub>10</sub> objectives, while the LBH declared a borough-wide AQMA in 2006 for exceedances of the annual mean and one-hour mean NO<sub>2</sub> objectives and the 24-hour mean PM<sub>10</sub> objective. The LBTH and LBH subsequently adopted AQAPs in October 2017<sup>22</sup> and November 2015<sup>23</sup> respectively.
- 12.6.4
- The most recent LBTH Air Quality Annual Status Report (ASR)<sup>35</sup> available at the time of writing confirmed that the national annual mean air quality objective (AQO) for NO<sub>2</sub> is currently not met in the Borough. However, monitoring data suggest that the annual mean objective and short-term objectives for PM<sub>10</sub> and PM<sub>2.5</sub> are being met. The most recent ASR prepared by the LBH<sup>36</sup> indicates continued exceedances of the annual mean NO<sub>2</sub> objective in the Borough and no exceedances of the PM<sub>10</sub> and annual mean PM<sub>2.5</sub> objectives.

<sup>34</sup> The Greater London Authorities have identified areas where NO<sub>2</sub> limit value exceedances coincide with high human exposure. These 'focus areas' include the area Old Street City Road/Old Street/Great Eastern Street/Shoreditch High Street.

## Automatic Monitoring Sites

- 12.6.5
- Continuous monitoring is undertaken at six sites across the LBTH and the LBH. One of these sites, HK6, at the junction between Great Eastern Street and Old Street, is located approximately 650 m to the northwest of the site, as shown in **Figure 12.1**. As such the concentrations recorded at this site provide an indication of the air quality in the local area.
- 12.6.6
- Table 12.5** shows NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> monitoring results from the HK6 roadside monitoring site. The NO<sub>2</sub> annual mean objective has been consistently exceeded at this monitoring site and has not been met for the past seven years. The one-hour mean NO<sub>2</sub> objective, however, was not exceeded and was therefore met during this period. Concentrations of PM<sub>10</sub> at this monitoring location did not exceed the annual or 24-hour mean objectives between 2011 and 2017 and therefore met the objectives. Annual mean PM<sub>2.5</sub> concentrations were also below the annual mean objective and was therefore met during this period.

Table 12.5: Monitoring results for the HK6 Old Street monitoring station

| Year | Annual mean NO <sub>2</sub> (µg/m <sup>3</sup> ) | No. of 1-hour exceedances NO <sub>2</sub> | Annual mean PM <sub>10</sub> (µg/m <sup>3</sup> ) | No. of 24-hour exceedances PM <sub>10</sub> | Annual mean PM <sub>2.5</sub> (µg/m <sup>3</sup> ) |
|------|--------------------------------------------------|-------------------------------------------|---------------------------------------------------|---------------------------------------------|----------------------------------------------------|
| 2011 | <b>60</b>                                        | 0                                         | 31                                                | 33                                          | 15                                                 |
| 2012 | <b>63</b>                                        | 0                                         | 29                                                | 21                                          | 14                                                 |
| 2013 | <b>64</b>                                        | 1                                         | 28                                                | 19                                          | 14                                                 |
| 2014 | <b>66</b>                                        | 2                                         | 25                                                | 10                                          | 14                                                 |
| 2015 | <b>60</b>                                        | 0                                         | 23                                                | 1                                           | 12                                                 |
| 2016 | <b>57</b>                                        | 0                                         | 20                                                | 2                                           | 12                                                 |
| 2017 | <b>57</b>                                        | 0                                         | 23                                                | 7                                           | 12                                                 |
| AQO  | <b>40</b>                                        | <b>18</b>                                 | <b>40</b>                                         | <b>35</b>                                   | <b>25</b>                                          |

**Bold** indicates exceedances of the objectives, i.e. that they were not met. **Underlined Bold** indicates a potential exceedance (i.e. that the objective was not met) of the one-hour objective due to recorded annual mean concentrations exceeding 60 µg/m<sup>3</sup>.

Sources: London Borough of Tower Hamlets (2018) London Borough of Tower Hamlets Air Quality Annual Status Report for 2017 and London Borough of Hackney (2018) London Borough of Hackney Air Quality Annual Status Report for 2017.

## Diffusion Tube Monitoring sites

- 12.6.7
- LBTH and LBH carry out monitoring surveys using diffusion tubes to measure NO<sub>2</sub> concentrations at kerbside, urban centre and urban background locations. There are 25 monitoring locations relatively close to the site within the LBTH and the LBH, as shown in **Figure 12.1**.
- 12.6.8
- The results of NO<sub>2</sub> diffusion tube monitoring at locations nearest to the site are shown in **Table 12.6**. These results indicate that the annual mean NO<sub>2</sub> objective was consistently not met at the majority of sites considered. In addition, concentrations at LBTH location 4 and LBH locations 1, 9, 10 and 11 were greater than 60 µg/m<sup>3</sup> in past years, indicating that the NO<sub>2</sub> hourly mean objective may not have been met at these locations.

Table 12.6: Annual mean NO<sub>2</sub> concentrations at diffusion tube sites (µg/m<sup>3</sup>)

| site name | Location               | site type | 2011 | 2012 | 2013 | 2014 | 2015 | 2016      | 2017      |
|-----------|------------------------|-----------|------|------|------|------|------|-----------|-----------|
| 1 (LBTH)  | Colombia Rd/Gossett St | Roadside  | -    | -    | -    | -    | 38   | <b>37</b> | <b>39</b> |

<sup>35</sup> London Borough of Tower Hamlets (2018) London Borough of Tower Hamlets Air Quality Annual Status Report for 2017, London Borough of Tower Hamlets, London.

<sup>36</sup> London Borough of Hackney (2018) London Borough of Hackney Air Quality Annual Status Report for 2017, London Borough of Hackney, London.

| site name | Location                     | site type | 2011      | 2012      | 2013      | 2014 | 2015        | 2016        | 2017      |
|-----------|------------------------------|-----------|-----------|-----------|-----------|------|-------------|-------------|-----------|
| 2 (LBTH)  | Calvert Ave/Boundary Street  | Roadside  | -         | -         | -         | -    | -           | 42          | 41        |
| 3 (LBTH)  | Bethnal Grn Rd/Brick Lane    | Roadside  | -         | -         | -         | -    | -           | 47          | 46        |
| 4 (LBTH)  | Commercial St/Calvin St      | Roadside  | -         | -         | -         | -    | -           | <b>66</b>   | <b>60</b> |
| 11 (LBTH) | Brick Lane/Princelet Street  | Roadside  | -         | -         | -         | -    | -           | 42          | 44        |
| 12 (LBTH) | Buckfast St/Bethnal Green Rd | Roadside  | -         | -         | -         | -    | -           | 42          | 42        |
| 1 (LBH)   | Old Street                   | Kerbside  | <b>77</b> | <b>69</b> | <b>62</b> | 58   | <b>67.5</b> | <b>61.3</b> | <b>61</b> |
| 9 (LBH)   | 44 Great Eastern Street      | Kerbside  | <b>68</b> | 59        | 58        | 51   | <b>64.0</b> | <b>61.9</b> | <b>66</b> |
| 10 (LBH)  | Shoreditch High Street       | Kerbside  | <b>63</b> | 58        | <b>60</b> | 51   | <b>64.0</b> | 57.2        | 57        |
| 11 (LBH)  | 84 Great Eastern Street      | Kerbside  | <b>68</b> | 54        | 59        | 49   | <b>61.3</b> | <b>62.4</b> | <b>67</b> |
| 27 (LBH)  | Pitfield Street 2            | Roadside  | -         | -         | -         | 36   | 40.1        | 41.1        | 38        |
| 28 (LBH)  | Pitfield Street 3            | Roadside  | -         | -         | -         | 38   | 44.0        | 39.4        | 42        |
| 32 (LBH)  | Pitfield Street 4            | Roadside  | -         | -         | -         | 46   | 52.1        | 50.8        | 50        |
| 33 (LBH)  | Paul Street 1                | Roadside  | -         | -         | -         | 37   | 41.0        | 44.9        | 44        |
| 35 (LBH)  | Leonard Square               | Roadside  | -         | -         | -         | 35   | 40.5        | 43.1        | 42        |
| 36 (LBH)  | Tabernacle Street            | Roadside  | -         | -         | -         | 34   | 42.5        | 44.4        | 44        |
| 37 (LBH)  | Rivington Street 1           | Roadside  | -         | -         | -         | 46   | 46.8        | 45.5        | 48        |
| 38 (LBH)  | Rivington Street 2           | Roadside  | -         | -         | -         | 43   | 53.6        | 47.4        | 48        |
| 39 (LBH)  | Charlotte Road 1             | Roadside  | -         | -         | -         | 41   | 51.9        | 51.0        | 46        |
| 40 (LBH)  | Charlotte Road 2             | Roadside  | -         | -         | -         | 42   | 54.7        | 51.9        | 46        |

<sup>37</sup> GLA (2016), London Atmospheric Emissions Inventory 2013.

| site name | Location                   | site type | 2011 | 2012 | 2013 | 2014 | 2015        | 2016 | 2017 |
|-----------|----------------------------|-----------|------|------|------|------|-------------|------|------|
| 41 (LBH)  | Curtain Road 1             | Roadside  | -    | -    | -    | 49   | 58.2        | 55.9 | 59   |
| 42 (LBH)  | Rivington Street 3         | Roadside  | -    | -    | -    | 37   | 46.4        | 48.0 | 44   |
| 43 (LBH)  | Rivington Street 4         | Roadside  | -    | -    | -    | 34   | 43.7        | 42.3 | 39   |
| 45 (LBH)  | Holywell Lane              | Roadside  | -    | -    | -    | 45   | <b>60.2</b> | 55.8 | 55   |
| 146 (LBH) | St Monica's Primary School | Roadside  | -    | -    | -    | -    | -           | -    | 36   |

**Bold** indicates exceedances of the objectives, i.e. that they were not met. **Underlined Bold** indicates a potential exceedance (i.e. that the objective was not met) of the one-hour objective due to recorded annual mean concentrations exceeding 60 µg/m<sup>3</sup>. Sources: London Borough of Tower Hamlets (2018) London Borough of Tower Hamlets Air Quality Annual Status Report for 2017 and London Borough of Hackney (2018) London Borough of Hackney Air Quality Annual Status Report for 2017.

#### London Atmospheric Emissions Inventory

12.6.9 The LAEI<sup>37</sup> and associated pollution maps, produced by the GLA, provide detailed estimates of pollution levels London-wide. The 2017 update provides modelled pollutant concentrations for 2013, 2020, 2025 and 2030. LAEI modelled pollutant concentrations corresponding to the location of the site are shown below in **Table 12.7**. The facades are representative of the highest concentrations for future receptors within the Revised Scheme, due to their proximity to the road. Concentrations for 2017 and 2028 were determined through linear interpolation between 2013-2020 and 2025-2030, respectively.

Table 12.7: Modelled pollution concentrations at the Revised Scheme, taken from London Atmospheric Emissions Inventory pollution maps (µg/m<sup>3</sup>)

| Pollutant         | 2017 | 2025 | 2028 | Objective |
|-------------------|------|------|------|-----------|
| NO <sub>2</sub>   | 51.4 | 33.3 | 31.9 | 40.0      |
| PM <sub>10</sub>  | 29.2 | 27.8 | 27.9 | 40.0      |
| PM <sub>2.5</sub> | 17.3 | 16.0 | 15.8 | 25.0      |

#### Pollutant Background Concentrations

12.6.10 Background concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> were obtained from the Defra background maps<sup>38</sup> for the 1 km x 1 km grid square centred on OS co-ordinates 533500, 182500, corresponding to the location of the Revised Scheme. Background NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations for all years considered in this assessment are shown in **Table 12.8**.

Table 12.8: Defra modelled annual background pollutant concentrations at the Revised Scheme (µg/m<sup>3</sup>)

| Pollutant         | 2017 | 2025 | 2028 | Objective |
|-------------------|------|------|------|-----------|
| NO <sub>2</sub>   | 40.7 | 27.8 | 25.8 | 40.0      |
| PM <sub>10</sub>  | 20.8 | 19.7 | 19.7 | 40.0      |
| PM <sub>2.5</sub> | 13.0 | 11.9 | 11.8 | 25.0      |

All background concentrations obtained from the latest 2015 background maps.

<sup>38</sup> Defra Background mapping data for local authorities - 2015 <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015>.



Receptors

- 12.6.11
- There are several sensitive human receptor locations within the study area which may be affected by the Revised Scheme during the construction and operational phases, including residential properties to the north, south and east of the site boundary, and along the proposed route used by construction vehicles.
- 12.6.12
- There are no statutory or designated sites of nature conservation value (European or national), or dust sensitive species within 50 m of the site boundary or routes used by construction vehicles on the public highway, or within 200 m of the affected road network during either the construction or operational phases.

Overall Baseline

- 12.6.13
- The site is located within the borough-wide LBH and LBTH AQMAs declared for exceedances of the 24-hour mean PM<sub>10</sub> objective and annual and one-hour mean NO<sub>2</sub> objectives, and the annual mean NO<sub>2</sub> and 24-hour mean PM<sub>10</sub> objectives respectively. Available monitoring data from representative diffusion tube monitoring sites nearby indicate that annual mean concentrations of NO<sub>2</sub> are likely to exceed and therefore not meet the NO<sub>2</sub> annual mean objective at some roadside and kerbside locations within the study area. Exceedance of the short-term NO<sub>2</sub> objective is unlikely as the site is not in the immediate vicinity of a busy road, therefore this objective is likely to be met. PM<sub>10</sub> and PM<sub>2.5</sub> monitoring undertaken at the HK6 monitoring station indicates that PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are likely to meet the annual mean and 24-hour mean (for PM<sub>10</sub>) AQOs at the site.
- 12.6.14
- Defra background maps and LAEI modelled concentrations indicate that existing annual mean NO<sub>2</sub> concentrations exceed the annual AQO at the site. In future years the NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are anticipated to be below long term AQOs at the site.

12.7 IDENTIFICATION AND DESCRIPTION OF CHANGES LIKELY TO GENERATE EFFECT

Construction Phase

- 12.7.1
- During the construction phase, construction activities have the potential to generate fugitive dust emissions which may give rise to annoyance due to the soiling of surfaces. Emissions of this nature can also pose a risk of human health effects due to the increase in exposure to PM<sub>10</sub> concentrations.
- 12.7.2
- Emissions from heavy-duty vehicles (HDVs) and Non-Road Mobile Machinery (NRMM) associated with the construction phase of the Revised Scheme may affect local air quality.

Operational Phase

- 12.7.3
- Emissions from vehicles associated with the Revised Scheme during the operational phase may affect local air quality. In addition, future residents of the Revised Scheme will be impacted upon by existing local air quality, including contributions from road traffic emissions.

12.8 ASSESSMENT OF LIKELY SIGNIFICANT EFFECT

Construction Phase

Embedded Mitigation

- 12.8.1
- Construction of the Revised Scheme will be managed using a Code of Construction Practice (CoCP) which will be subject to regular monitoring. The CoCP will include standard good-practice measures to mitigate dust emissions from the Revised Scheme to prevent or reduce fugitive dust emissions and/or being deposited on nearby receptors. The CoCP will be secured through planning condition. A CoCP (Part A) has been submitted in support of the Application.
- 12.8.2
- All NRMM such as generators, construction machinery and mobile cranes must meet statutory requirements.

Anticipated Effects – Construction Dust

- 12.8.3
- The Revised Scheme consists of ten plots which will be developed in eight construction phases, which are illustrated in **Figure 12.2** and outlined in **Table 12.9**. Construction activity is anticipated to peak when Phases 1, 2 and 3 are under development.

Figure 12.2: Construction Phases

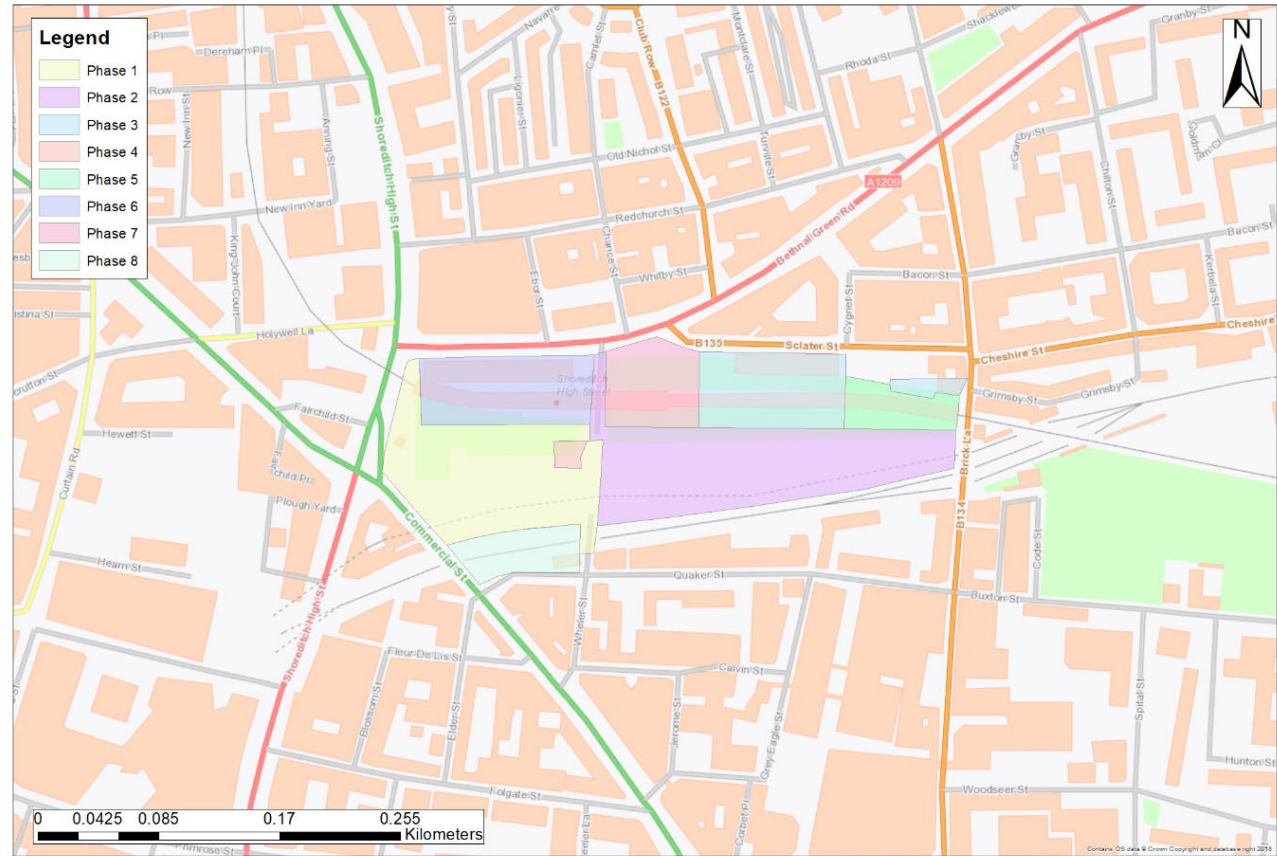


Table 12.9 Construction Activity Phasing

| Construction Phase | Period of Development          | Buildings Included                                                              |
|--------------------|--------------------------------|---------------------------------------------------------------------------------|
| Phase 1            | January 2021 to June 2024      | Building 2 (Public realm and podium including Plot 11 up to Braithwaite Street) |
| Phase 2            | November 2021 to November 2022 | Building 7 – Retail units and Arches                                            |
| Phase 3            | November 2022 to March 2025    | Buildings 5, 6 and 10B                                                          |
| Phase 4            | August 2025 to September 2028  | Buildings 8A, 8B and 8C and 11                                                  |
| Phase 5            | July 2028 to August 2031       | Building 10C                                                                    |
| Phase 6            | October 2028 to September 2031 | Building 1                                                                      |
| Phase 7            | June 2030 to January 2033      | Buildings 4 and 10A                                                             |
| Phase 8            | September 2031 to January 2034 | Building 3                                                                      |

- 12.8.4
- Construction works are anticipated to include the peak of dust generating activities during the development of Phases 1, 2 and 3. The construction dust risk assessment has been undertaken with a focus on this period of intense activity. This is likely to overestimate the dust risk associated with subsequent smaller scale phases, and therefore represents a conservative approach to the assessment.

Construction Dust Screening Assessment

- 12.8.5 An assessment of construction dust effects is normally required if there are:
- Human receptors within 350 m of the site boundary, or within 50 m of the route used by construction vehicles on a public highway, up to 500 m from the site entrance; or
  - Ecological receptors within 50 m of the site boundary; or within 50 m of the route used by construction vehicles on a public highway, up to 500 m from the site entrance.
- 12.8.6 If these criteria are not met, it can be assumed that the level of risk from dust amenity will be negligible and any effects will be not significant.
- 12.8.7 As human receptors are within 350 m of the site boundary of the Revised Scheme, a dust risk assessment has been undertaken. Ecological receptors are not present within 50 m of the site boundary or likely track-out route and ecological impacts have therefore been scoped out of this assessment.

**Construction Dust Assessment**

*Demolition*

- 12.8.8 The dust emission class for demolition has been determined through taking into account the total building volume and type of building material to be demolished.
- 12.8.9 The volume of structures to be demolished is 9,846 m<sup>3</sup>, consisting primarily of brickwork. This indicates that the potential dust emission magnitude from demolition is likely to be small.

*Earthworks*

- 12.8.10 The total area of Phases 1, 2 and 3 of the site is greater than 10,000 m<sup>2</sup>. According to the British Geological Survey<sup>39</sup> the soil material found at the site is river terrace sand and gravel, which is not a dusty soil type, due to large grain size. The potential emission magnitude from earthworks is likely to be large.

*Construction*

- 12.8.11 Phases 1, 2 and 3 involve the construction of buildings 2, 5, 6, 7 and 10B which have a combined total building volume greater than 100,000 m<sup>3</sup>. Based on this, the potential dust emission magnitude for this activity is likely to be large.

*Track-out*

- 12.8.12 Site access and egress during Phases 1, 2 and 3 is expected to take place to the north on Bethnal Green Lane and to the south on Wheler Street. There will be an estimated average of 65 one-way vehicle movements from the site per day during Phase 3 of construction alone, putting the potential dust emission magnitude as large.

**Risk of Dust Impacts**

- 12.8.13 The surrounding area has a medium density of residential properties, which have a high sensitivity to dust soiling and health effects. Between 10 and 100 residential properties are located within 20 m of the site. The distance bands for the site are shown in **Figure 12.3**.

Figure 12.3: Construction Distance Bands around the site Boundary



- 12.8.14 Using the IAQM<sup>25</sup> and GLA<sup>26</sup> guidance, the sensitivity of the surrounding area has been determined for dust soiling effects and health effects. This is shown in **Table 12.10**. The sensitivity to dust soiling has been found to be high due to the close proximity of residential properties to the site. The sensitivity to health effects has been found to be high for demolition, earthworks and construction operations due to the proximity of residential properties combined with the predicted 2027 LAEI PM<sub>10</sub> concentration of 28.1 µg/m<sup>3</sup> (derived through linear interpolation of 2025 and 2030 data).
- 12.8.15 In order to determine the dust soiling and health effects from track-out, 500 m of the length of the likely site exit route along the public highway has been assessed, in line with the IAQM and GLA guidance corresponding to large sites. The number of high-sensitivity receptors within 20 m of the route was more than 100; the track-out distance bands are shown in **Figure 12.4**. The sensitivity to dust soiling and health effects are therefore likely to be high.

<sup>39</sup> British Geological Survey – Geology of Britain viewer. Available at: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>



Figure 12.4: Distance Bands around Construction Traffic Access Routes

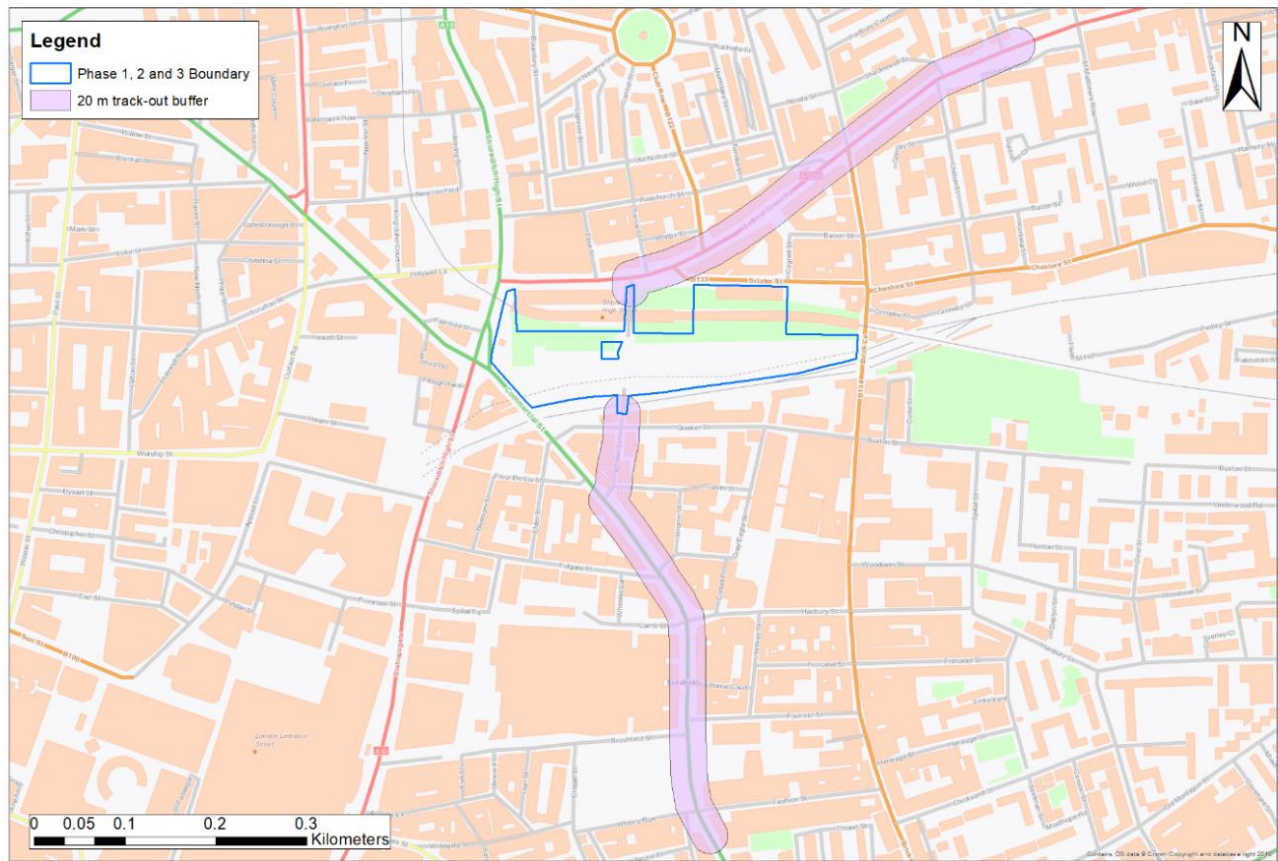


Table 12.10: Sensitivity of the Surrounding Area

| Potential Impact | Sensitivity of the Surrounding Area |            |              |           |
|------------------|-------------------------------------|------------|--------------|-----------|
|                  | Demolition                          | Earthworks | Construction | Track-out |
| Dust Soiling     | High                                | High       | High         | High      |
| Human Health     | High                                | High       | High         | High      |

12.8.16 The construction dust risks shown in **Table 12.11** have been assigned based on the dust emission magnitude associated with each on-site activity and the sensitivity of the surrounding area.

Table 12.11: Summary of the Dust Risk from site Activities

| Potential Impact | Risk of Dust Impacts |            |              |           |
|------------------|----------------------|------------|--------------|-----------|
|                  | Demolition           | Earthworks | Construction | Track-out |
| Dust Soiling     | Medium Risk          | High Risk  | High Risk    | High Risk |
| Human Health     | Medium Risk          | High Risk  | High Risk    | High Risk |

12.8.17 The overall dust risk from the site is predicted to be high for dust soiling and human health effects in relation to earthworks, construction and track-out and medium in relation to demolition. This is due to the scale of operations and the high density of sensitive receptors in the surrounding area, combined with the high ambient concentration of PM<sub>10</sub>.

12.8.18 The risk of disamenity dust and health effects is highest for earthworks, construction and track-out. Common disamenity dust effects may include the soiling of neighbouring windows, cars and street furniture.

12.8.19 Appropriate mitigation measures will help to negate most of the potential negative air quality impacts resulting from the construction phase of the Revised Scheme and will avoid significant dust effects. This is further discussed in **Section 12.9**.

**Construction Phase Traffic Emissions**

12.8.20 Construction traffic associated with the Revised Scheme meets the criteria for further assessment set out in the EPUK/IAQM guidance<sup>24</sup>, and described in **ES Addendum Volume 4, Appendix H**. However, due to the long construction period (13 years), phases under construction and phases becoming operational overlap. AADT construction flows were therefore combined with AADT flows generated by the Revised Scheme for the 2027 'Do-Something' scenario detailed in **ES Addendum Volume 4, Appendix H** and modelled using ADMS-Roads Extra v4.1.1. This scenario represents greatest combined operational and construction traffic generation associated with the Revised Scheme.

**Anticipated Effects of Applying the Development Parameter Range**

12.8.21 The scale and location of the outline elements of the Revised Scheme have been defined by a maximum development parameter submitted in support of the Application. The assessment of construction phase effects has therefore been based upon application of the maximum parameter. This will give rise to the largest developable area and therefore provides a conservative assessment of the likely residual effects. If the illustrative development parameter is applied this would not result in any difference to the identified residual effects.

**Operational Phase**

**Embedded Mitigation**

12.8.22 The following measures incorporated into the Revised Scheme will reduce potential adverse air quality effects locally:

- Use of air source heat pumps to heat the development, avoiding the need for boilers and other combustion processes; and
- The Revised Scheme will have no on-site parking, thereby encouraging use of the local public transport infrastructure and active travel modes.

**Anticipated Effects – Impacts of the Revised Scheme**

12.8.23 Due to the large size of the Revised Scheme (up to 500 residential dwellings and over 135,000 m<sup>2</sup> of office space and other land uses), a detailed assessment of operational phase air quality impacts was undertaken.

12.8.24 Air quality effects were assessed for emissions from road traffic associated with the Revised Scheme during operational and construction phases.

12.8.25 Contour plots have been produced for the 'Do-Something' scenarios assessed covering the modelled local road network. These are displayed in **ES Addendum Volume 4, Appendix H**. The results of the detailed assessment are described below.

**2027 Construction and Operational Phase Scenario**

12.8.26 The results of the modelling and the impact of the 2027 construction and operation phases of the Revised Scheme on NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations at each receptor (based on EPUK/ IAQM guidance) are presented in **Table 12.12**, **Table 12.13** and **Table 12.14**. The predicted concentrations in this table are rounded to one decimal place. The change in concentration (the Do-Something concentration minus the Do-Minimum concentration at each receptor) is calculated based on modelled data to two decimal places, rounded to one decimal place, and therefore may differ slightly to a change in concentration derived from the rounded predicted Do-Something and Do-Minimum concentrations presented in the tables.

12.8.27 Annual mean NO<sub>2</sub> concentrations are predicted to meet the AQO at all modelled receptors for both the 2027 Do-Minimum (without development) and 2027 Do-Something (with partly operational, partly under construction development) scenarios, except for receptor E14. The predicted NO<sub>2</sub> concentration is above, and therefore does not meet, the AQO at receptor E14 for the 2027 Do-Something scenario.

12.8.28 Annual mean PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are predicted to meet the AQOs at all modelled receptors for both the 2027 Do-Minimum (without development) and 2027 Do-Something (with partly operational, partly under construction development) scenarios.

- 12.8.29 The highest annual mean NO<sub>2</sub> concentration (54.2 µg/m<sup>3</sup>) and the largest change in NO<sub>2</sub> concentrations (17.9 µg/m<sup>3</sup>) are predicted at receptor E14 located on Commercial Street.
- 12.8.30 All predicted annual mean NO<sub>2</sub> concentrations are well below 60 µg/m<sup>3</sup> and therefore, in accordance with Defra guidance<sup>27</sup>, the one-hour mean objective is likely to be met (these criteria are normally applied to roadside locations).
- 12.8.31 The highest annual mean PM<sub>10</sub> concentration (32.8 µg/m<sup>3</sup>) and the largest change in PM<sub>10</sub> concentrations (9.3 µg/m<sup>3</sup>) is predicted at receptor E14 located on Commercial Street.
- 12.8.32 Large increases in NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are predicted at receptor E14 as a result of the construction and operation of the Revised Scheme in 2027. Increases in traffic flows in the vicinity of this receptor are comparable to changes in traffic flows adjacent to receptor E22. The residential property at receptor E14 is directly opposite Building 2 of the Revised Scheme. With a planned 27 floors, Building 2 this will introduce a new street canyon on Commercial Street adjacent to receptor E14. This will likely limit dispersion of pollutants from Commercial Street and explains the predicted increases in pollutant concentrations at receptor E14.
- 12.8.33 Correspondence with Cambridge Environmental Research Consultants Ltd (CERC), who develop and support the use of the ADMS-Roads Extra v4.1.1 dispersion model, indicated that there is uncertainty associated with the modelling of new street canyons as modelling the impact of very tall buildings is difficult which leads to greater uncertainty in the results, however the predicted increases at receptor E14 are consistent with canyoning monitoring studies conducted by CERC in other locations. The conservative approach to emissions factors and background concentrations discussed in **Paragraph 12.5.30** means that the concentrations and increases predicted at all receptors, including E14, are likely to be overestimates.
- 12.8.34 Based on the EPUK/ IAQM guidance<sup>24</sup>, the change in annual mean NO<sub>2</sub> concentrations associated with operational and construction traffic in 2027 results in the air quality impact being classified as **substantial adverse** at receptor E14, **slight adverse** at receptors E7 and E8 and **negligible** at all other receptors. The change in annual mean PM<sub>10</sub> concentrations results in the air quality impact being classified as **substantial adverse** at receptor E14 and **negligible** at all other receptors. The change in annual mean PM<sub>2.5</sub> concentrations results in the air quality impact being classified as **slight adverse** at receptor E14 and **negligible** at all other receptors.
- 12.8.35 EPUK/IAQM guidance<sup>24</sup> states that the judgement on the overall significance of effect should take consideration of the population exposure. While **slight adverse** and **substantial adverse** impacts are predicted as a result of the 2027 construction and operational phase of the Revised Scheme, these are at isolated locations representing limited population exposure. Predicted impacts at all other assessed receptors are **negligible**. The effect of road traffic emissions associated with the 2027 construction and operational phase of the Revised Scheme on local air quality will therefore be **negligible** overall.

Table 12.12: Estimated 2027 Annual Mean NO<sub>2</sub> at Existing Receptors (µg/m<sup>3</sup>) – 2027 Construction and Operational Scenarios

| Receptor | 2017 Baseline | Do-Minimum (Without Development) | Do-Something (With Development) | Change in Concentration (Do-Something – Do-Minimum) | Impact Descriptor |
|----------|---------------|----------------------------------|---------------------------------|-----------------------------------------------------|-------------------|
| E1       | 44.1          | 28.7                             | 28.7                            | 0.0                                                 | Negligible        |
| E2       | 52.9          | 31.8                             | 31.9                            | 0.1                                                 | Negligible        |
| E3       | 51.9          | 31.4                             | 31.5                            | 0.1                                                 | Negligible        |
| E4       | 49.8          | 30.8                             | 30.8                            | 0.0                                                 | Negligible        |
| E5       | 51.8          | 31.4                             | 31.5                            | 0.0                                                 | Negligible        |
| E6       | 51.1          | 31.2                             | 31.2                            | 0.0                                                 | Negligible        |
| E7       | 47.4          | 29.8                             | 31.2                            | 1.4                                                 | Slight Adverse    |
| E8       | 47.1          | 29.7                             | 31.2                            | 1.4                                                 | Slight Adverse    |
| E9       | 43.3          | 28.5                             | 28.5                            | 0.0                                                 | Negligible        |
| E10      | 46.8          | 29.5                             | 29.6                            | 0.1                                                 | Negligible        |

| Receptor | 2017 Baseline | Do-Minimum (Without Development) | Do-Something (With Development) | Change in Concentration (Do-Something – Do-Minimum) | Impact Descriptor   |
|----------|---------------|----------------------------------|---------------------------------|-----------------------------------------------------|---------------------|
| E11      | 48.8          | 30.1                             | 30.3                            | 0.2                                                 | Negligible          |
| E12      | 46.2          | 29.4                             | 29.5                            | 0.1                                                 | Negligible          |
| E13      | 43.3          | 28.5                             | 28.5                            | 0.1                                                 | Negligible          |
| E14      | <b>66.0</b>   | 36.3                             | <b>54.2</b>                     | 17.9                                                | Substantial Adverse |
| E15      | <b>67.9</b>   | 37.3                             | 37.4                            | 0.2                                                 | Negligible          |
| E16      | 55.9          | 32.0                             | 32.1                            | 0.1                                                 | Negligible          |
| E17      | 51.4          | 30.7                             | 30.7                            | 0.0                                                 | Negligible          |
| E18      | 46.0          | 29.3                             | 29.4                            | 0.1                                                 | Negligible          |
| E19      | 47.0          | 29.6                             | 29.6                            | 0.0                                                 | Negligible          |
| E20      | 56.4          | 32.2                             | 32.2                            | 0.0                                                 | Negligible          |
| E21      | 52.2          | 31.4                             | 31.4                            | 0.0                                                 | Negligible          |
| E22      | 60.0          | 34.4                             | 34.7                            | 0.2                                                 | Negligible          |

**Bold** indicates exceedances of the objectives, i.e. that they were not met. **Underlined Bold** indicates a potential exceedance (i.e. that the objective was not met) of the one-hour objective due to recorded annual mean concentrations exceeding 60 µg/m<sup>3</sup>.

The predicted concentrations in this table are rounded to one decimal place. The change in concentration (the Do-Something concentration minus the Do-Minimum concentration at each receptor) is calculated based on modelled data to two decimal places, rounded to one decimal place, and therefore may differ slightly to a change in concentration derived from the rounded predicted Do-Something and Do-Minimum rounded concentrations in the table.

Table 12.13: Estimated 2027 Annual Mean PM<sub>10</sub> at Existing Receptors (µg/m<sup>3</sup>) – 2027 Construction and Operational Scenarios

| Receptor | 2017 Baseline | Do-Minimum (Without Development) | Do-Something (With Development) | Change in Concentration (Do-Something – Do-Minimum) | Impact Descriptor |
|----------|---------------|----------------------------------|---------------------------------|-----------------------------------------------------|-------------------|
| E1       | 21.3          | 20.1                             | 20.1                            | 0.0                                                 | Negligible        |
| E2       | 22.9          | 21.4                             | 21.4                            | 0.0                                                 | Negligible        |
| E3       | 22.8          | 21.3                             | 21.3                            | 0.0                                                 | Negligible        |
| E4       | 22.5          | 21.1                             | 21.1                            | 0.0                                                 | Negligible        |
| E5       | 22.7          | 21.2                             | 21.3                            | 0.0                                                 | Negligible        |
| E6       | 22.6          | 21.1                             | 21.2                            | 0.0                                                 | Negligible        |
| E7       | 21.9          | 20.6                             | 21.3                            | 0.7                                                 | Negligible        |

| Receptor | 2017 Baseline | Do-Minimum<br>(Without<br>Development) | Do-Something<br>(With<br>Development) | Change in<br>Concentration<br>(Do-Something<br>– Do-Minimum) | Impact<br>Descriptor   |
|----------|---------------|----------------------------------------|---------------------------------------|--------------------------------------------------------------|------------------------|
| E8       | 21.9          | 20.6                                   | 21.2                                  | 0.7                                                          | Negligible             |
| E9       | 21.2          | 20.0                                   | 20.1                                  | 0.0                                                          | Negligible             |
| E10      | 21.8          | 20.5                                   | 20.5                                  | 0.0                                                          | Negligible             |
| E11      | 22.1          | 20.8                                   | 20.9                                  | 0.1                                                          | Negligible             |
| E12      | 21.7          | 20.4                                   | 20.5                                  | 0.1                                                          | Negligible             |
| E13      | 21.2          | 20.1                                   | 20.0                                  | 0.0                                                          | Negligible             |
| E14      | 25.6          | 23.5                                   | 32.8                                  | 9.3                                                          | Substantial<br>Adverse |
| E15      | 26.1          | 23.8                                   | 23.9                                  | 0.1                                                          | Negligible             |
| E16      | 23.2          | 21.6                                   | 21.6                                  | 0.0                                                          | Negligible             |
| E17      | 22.4          | 21.0                                   | 21.0                                  | 0.0                                                          | Negligible             |
| E18      | 21.6          | 20.4                                   | 20.4                                  | 0.0                                                          | Negligible             |
| E19      | 21.8          | 20.5                                   | 20.5                                  | 0.0                                                          | Negligible             |
| E20      | 23.3          | 21.7                                   | 21.7                                  | 0.0                                                          | Negligible             |
| E21      | 22.8          | 21.2                                   | 21.3                                  | 0.0                                                          | Negligible             |
| E22      | 25.0          | 23.2                                   | 23.3                                  | 0.1                                                          | Negligible             |

The predicted concentrations in this table are rounded to one decimal place. The change in concentration (the Do-Something concentration minus the Do-Minimum concentration at each receptor) is calculated based on modelled data to two decimal places, rounded to one decimal place, and therefore may differ slightly to a change in concentration derived from the rounded predicted Do-Something and Do-Minimum rounded concentrations in the table.

Table 12.14: Estimated 2027 Annual Mean PM<sub>2.5</sub> at Existing Receptors (µg/m<sup>3</sup>) – 2027 Construction and Operational Scenarios

| Receptor | 2017 Baseline | Do-Minimum<br>(Without<br>Development) | Do-Something<br>(With<br>Development) | Change in<br>Concentration<br>(Do-Something<br>– Do-Minimum) | Impact<br>Descriptor |
|----------|---------------|----------------------------------------|---------------------------------------|--------------------------------------------------------------|----------------------|
| E1       | 13.2          | 12.0                                   | 12.0                                  | 0.0                                                          | Negligible           |
| E2       | 13.6          | 12.3                                   | 12.3                                  | 0.0                                                          | Negligible           |
| E3       | 13.6          | 12.2                                   | 12.3                                  | 0.0                                                          | Negligible           |
| E4       | 13.5          | 12.2                                   | 12.2                                  | 0.0                                                          | Negligible           |
| E5       | 13.6          | 12.2                                   | 12.3                                  | 0.0                                                          | Negligible           |

| Receptor | 2017 Baseline | Do-Minimum<br>(Without<br>Development) | Do-Something<br>(With<br>Development) | Change in<br>Concentration<br>(Do-Something<br>– Do-Minimum) | Impact<br>Descriptor |
|----------|---------------|----------------------------------------|---------------------------------------|--------------------------------------------------------------|----------------------|
| E6       | 13.5          | 12.2                                   | 12.2                                  | 0.0                                                          | Negligible           |
| E7       | 13.3          | 12.1                                   | 12.3                                  | 0.2                                                          | Negligible           |
| E8       | 13.3          | 12.1                                   | 12.2                                  | 0.2                                                          | Negligible           |
| E9       | 13.1          | 12.0                                   | 12.0                                  | 0.0                                                          | Negligible           |
| E10      | 13.3          | 12.1                                   | 12.1                                  | 0.0                                                          | Negligible           |
| E11      | 13.4          | 12.1                                   | 12.2                                  | 0.0                                                          | Negligible           |
| E12      | 13.3          | 12.1                                   | 12.1                                  | 0.0                                                          | Negligible           |
| E13      | 13.1          | 12.0                                   | 12.0                                  | 0.0                                                          | Negligible           |
| E14      | 14.3          | 12.8                                   | 15.0                                  | 2.2                                                          | Slight Adverse       |
| E15      | 14.5          | 12.9                                   | 12.9                                  | 0.0                                                          | Negligible           |
| E16      | 13.7          | 12.3                                   | 12.3                                  | 0.0                                                          | Negligible           |
| E17      | 13.5          | 12.2                                   | 12.2                                  | 0.0                                                          | Negligible           |
| E18      | 13.3          | 12.0                                   | 12.1                                  | 0.0                                                          | Negligible           |
| E19      | 13.3          | 12.1                                   | 12.1                                  | 0.0                                                          | Negligible           |
| E20      | 13.7          | 12.4                                   | 12.4                                  | 0.0                                                          | Negligible           |
| E21      | 13.6          | 12.2                                   | 12.3                                  | 0.0                                                          | Negligible           |
| E22      | 14.2          | 12.7                                   | 12.7                                  | 0.0                                                          | Negligible           |

The predicted concentrations in this table are rounded to one decimal place. The change in concentration (the Do-Something concentration minus the Do-Minimum concentration at each receptor) is calculated based on modelled data to two decimal places, rounded to one decimal place, and therefore may differ slightly to a change in concentration derived from the rounded predicted Do-Something and Do-Minimum rounded concentrations in the table.

#### 2034 Operational Phase Scenario

- 12.8.36 The results of the modelling and the impact of the 2034 operational phase of the Revised Scheme on NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations at each receptor (based on EPUK guidance) are presented in **Table 12.15**, **Table 12.16** and **12.17**.
- 12.8.37 Annual mean NO<sub>2</sub> concentrations are predicted to meet the AQO at all modelled receptors for both the 2034 Do-Minimum (without development) and 2034 Do-Something (with a fully operational development) scenarios, except for receptor E14. The predicted NO<sub>2</sub> concentration is predicted to be above (i.e. not meet) the AQO at receptor E14 for the 2034 Do-Something scenario.
- 12.8.38 Annual mean PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are predicted to meet the AQOs at all modelled receptors for both the 2034 Do-Minimum (without development) and 2034 Do-Something (with development) scenarios.
- 12.8.39 The highest annual mean NO<sub>2</sub> concentration (48.2 µg/m<sup>3</sup>) and the largest change in NO<sub>2</sub> concentrations (15.3 µg/m<sup>3</sup>) are predicted at receptor E14 located on Commercial Street.



- 12.8.40 All predicted annual mean NO<sub>2</sub> concentrations are below 60 µg/m<sup>3</sup> and therefore, in accordance with Defra guidance<sup>27</sup>, the one-hour mean objective is likely to be met (these criteria are normally applied to roadside locations).
- 12.8.41 The highest annual mean PM<sub>10</sub> concentration (32.8 µg/m<sup>3</sup>) and the largest change in PM10 concentrations (9.3 µg/m<sup>3</sup>) is predicted at receptor E14 located on Commercial Street.
- 12.8.42 Large increases in NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are predicted at receptor E14 as a result of the operation of the Revised Scheme in 2034. Increases in traffic flows in the vicinity of this receptor are comparable to changes in traffic flows adjacent to receptor E22. The residential property at receptor E14 is directly opposite Building 2 of the Revised Scheme. With a planned 27 floors, Building 2 will introduce a new street canyon on Commercial Street adjacent to receptor E14. This will likely limit dispersion of pollutants from Commercial Street and explains the predicted increases in pollutant concentrations at receptor E14.
- 12.8.43 Correspondence with Cambridge Environmental Research Consultants Ltd (CERC), who develop and support the use of the ADMS-Roads Extra v4.1.1 dispersion model, indicated that there is uncertainty associated with the modelling of new street canyons as modelling the impact of very tall buildings is difficult which leads to greater uncertainty in the results, however the predicted increases at receptor E14 are consistent with canyoning monitoring studies conducted by CERC in other locations. The conservative approach to emissions factors and background concentrations discussed in **Paragraph 12.5.30** means that the concentrations and increases predicted at all receptors, including E14, are likely to be overestimates.
- 12.8.44 Based on the EPUK/ IAQM guidance<sup>24</sup>, the change in annual mean NO<sub>2</sub> concentrations associated with operational and construction traffic in 2027 results in the air quality impact being classified as **substantial adverse** at receptor E14 and **negligible** at all other receptors. The change in annual mean PM<sub>10</sub> concentrations results in the air quality impact being classified as **substantial adverse** at receptor E14 and **negligible** at all other receptors. The change in annual mean PM<sub>2.5</sub> concentrations results in the air quality impact being classified as **slight adverse** at receptor E14 and **negligible** at all other receptors.
- 12.8.45 EPUK/ IAQM guidance<sup>24</sup> states that the judgement on the overall significance of effect should take consideration of the population exposure. While **slight adverse** and **substantial adverse** impacts are predicted as a result of the 2034 operational phase of the Revised Scheme, these are restricted to a single location representing limited population exposure. Predicted impacts at all other assessed receptors are **negligible**. The effect of road traffic emissions associated with the 2034 operational phase of the Revised Scheme on local air quality will therefore be **negligible** overall.

Table 12.15: Estimated 2034 Annual Mean NO<sub>2</sub> at Existing Receptors (µg/m<sup>3</sup>) – 2034 Operational Scenarios

| Receptor | 2017 Baseline | Do-Minimum<br>(Without<br>Development) | Do-Something<br>(With<br>Development) | Change in<br>Concentration<br>(Do-Something<br>– Do-Minimum) | Impact<br>Descriptor |
|----------|---------------|----------------------------------------|---------------------------------------|--------------------------------------------------------------|----------------------|
| E1       | 44.1          | 26.6                                   | 26.7                                  | 0.0                                                          | Negligible           |
| E2       | 52.9          | 29.1                                   | 29.2                                  | 0.1                                                          | Negligible           |
| E3       | 51.9          | 28.8                                   | 28.9                                  | 0.1                                                          | Negligible           |
| E4       | 49.8          | 28.3                                   | 28.3                                  | 0.0                                                          | Negligible           |
| E5       | 51.8          | 28.8                                   | 28.8                                  | 0.0                                                          | Negligible           |
| E6       | 51.1          | 28.6                                   | 28.6                                  | 0.0                                                          | Negligible           |
| E7       | 47.4          | 27.5                                   | 28.8                                  | 1.3                                                          | Negligible           |
| E8       | 47.1          | 27.4                                   | 28.7                                  | 1.3                                                          | Negligible           |
| E9       | 43.3          | 26.4                                   | 26.6                                  | 0.1                                                          | Negligible           |
| E10      | 46.8          | 27.3                                   | 27.7                                  | 0.4                                                          | Negligible           |
| E11      | 48.8          | 27.8                                   | 28.0                                  | 0.2                                                          | Negligible           |

| Receptor | 2017 Baseline | Do-Minimum<br>(Without<br>Development) | Do-Something<br>(With<br>Development) | Change in<br>Concentration<br>(Do-Something<br>– Do-Minimum) | Impact<br>Descriptor   |
|----------|---------------|----------------------------------------|---------------------------------------|--------------------------------------------------------------|------------------------|
| E12      | 46.2          | 27.1                                   | 27.2                                  | 0.1                                                          | Negligible             |
| E13      | 43.3          | 26.4                                   | 26.3                                  | 0.2                                                          | Negligible             |
| E14      | <b>66.0</b>   | 32.9                                   | <b>48.2</b>                           | 15.3                                                         | Substantial<br>Adverse |
| E15      | <b>67.9</b>   | 33.6                                   | 33.8                                  | 0.2                                                          | Negligible             |
| E16      | 55.9          | 29.5                                   | 29.5                                  | 0.0                                                          | Negligible             |
| E17      | 51.4          | 28.3                                   | 28.3                                  | 0.0                                                          | Negligible             |
| E18      | 46.0          | 27.1                                   | 27.3                                  | 0.2                                                          | Negligible             |
| E19      | 47.0          | 27.3                                   | 27.3                                  | 0.0                                                          | Negligible             |
| E20      | 56.4          | 29.7                                   | 29.6                                  | 0.0                                                          | Negligible             |
| E21      | 52.2          | 28.8                                   | 28.8                                  | 0.0                                                          | Negligible             |
| E22      | 60.0          | 31.2                                   | 31.3                                  | 0.1                                                          | Negligible             |

**Bold** indicates exceedances of the objectives, i.e. that they were not met. **Underlined Bold** indicates a potential exceedance (i.e. that the objective was not met) of the one-hour objective due to recorded annual mean concentrations exceeding 60 µg/m<sup>3</sup>. The predicted concentrations in this table are rounded to one decimal place. The change in concentration (the Do-Something concentration minus the Do-Minimum concentration at each receptor) is calculated based on modelled data to two decimal places, rounded to one decimal place, and therefore may differ slightly to a change in concentration derived from the rounded predicted Do-Something and Do-Minimum rounded concentrations in the table.

Table 12.16: Estimated 2034 Annual Mean PM<sub>10</sub> at Existing Receptors (µg/m<sup>3</sup>) – 2034 Operational Scenarios

| Receptor | 2017 Baseline | Do-Minimum<br>(Without<br>Development) | Do-Something<br>(With<br>Development) | Change in<br>Concentration<br>(Do-Something<br>– Do-Minimum) | Impact<br>Descriptor |
|----------|---------------|----------------------------------------|---------------------------------------|--------------------------------------------------------------|----------------------|
| E1       | 21.3          | 20.2                                   | 20.2                                  | 0.0                                                          | Negligible           |
| E2       | 22.9          | 21.4                                   | 21.4                                  | 0.0                                                          | Negligible           |
| E3       | 22.8          | 21.3                                   | 21.3                                  | 0.0                                                          | Negligible           |
| E4       | 22.5          | 21.1                                   | 21.1                                  | 0.0                                                          | Negligible           |
| E5       | 22.7          | 21.2                                   | 21.3                                  | 0.0                                                          | Negligible           |
| E6       | 22.6          | 21.1                                   | 21.2                                  | 0.0                                                          | Negligible           |
| E7       | 21.9          | 20.6                                   | 21.3                                  | 0.7                                                          | Negligible           |
| E8       | 21.9          | 20.6                                   | 21.3                                  | 0.7                                                          | Negligible           |



| Receptor | 2017 Baseline | Do-Minimum<br>(Without<br>Development) | Do-Something<br>(With<br>Development) | Change in<br>Concentration<br>(Do-Something<br>– Do-Minimum) | Impact<br>Descriptor   |
|----------|---------------|----------------------------------------|---------------------------------------|--------------------------------------------------------------|------------------------|
| E9       | 21.2          | 20.1                                   | 20.1                                  | 0.1                                                          | Negligible             |
| E10      | 21.8          | 20.5                                   | 20.7                                  | 0.2                                                          | Negligible             |
| E11      | 22.1          | 20.8                                   | 20.9                                  | 0.1                                                          | Negligible             |
| E12      | 21.7          | 20.4                                   | 20.5                                  | 0.0                                                          | Negligible             |
| E13      | 21.2          | 20.1                                   | 20.0                                  | 0.1                                                          | Negligible             |
| E14      | 25.6          | 23.5                                   | 32.8                                  | 9.3                                                          | Substantial<br>Adverse |
| E15      | 26.1          | 23.8                                   | 23.9                                  | 0.1                                                          | Negligible             |
| E16      | 23.2          | 21.6                                   | 21.6                                  | 0.0                                                          | Negligible             |
| E17      | 22.4          | 21.0                                   | 21.0                                  | 0.0                                                          | Negligible             |
| E18      | 21.6          | 20.4                                   | 20.5                                  | 0.1                                                          | Negligible             |
| E19      | 21.8          | 20.5                                   | 20.5                                  | 0.0                                                          | Negligible             |
| E20      | 23.3          | 21.7                                   | 21.7                                  | 0.0                                                          | Negligible             |
| E21      | 22.8          | 21.2                                   | 21.3                                  | 0.0                                                          | Negligible             |
| E22      | 25.0          | 23.2                                   | 23.3                                  | 0.1                                                          | Negligible             |

The predicted concentrations in this table are rounded to one decimal place. The change in concentration (the Do-Something concentration minus the Do-Minimum concentration at each receptor) is calculated based on modelled data to two decimal places, rounded to one decimal place, and therefore may differ slightly to a change in concentration derived from the rounded predicted Do-Something and Do-Minimum rounded concentrations in the table.

Table 12.17: Estimated 2034 Annual Mean PM<sub>2.5</sub> at Existing Receptors (µg/m<sup>3</sup>) – 2034 Operational Scenarios

| Receptor | 2017 Baseline | Do-Minimum<br>(Without<br>Development) | Do-Something<br>(With<br>Development) | Change in<br>Concentration<br>(Do-Something<br>– Do-Minimum) | Impact<br>Descriptor |
|----------|---------------|----------------------------------------|---------------------------------------|--------------------------------------------------------------|----------------------|
| E1       | 13.2          | 11.9                                   | 11.9                                  | 0.0                                                          | Negligible           |
| E2       | 13.6          | 12.2                                   | 12.2                                  | 0.0                                                          | Negligible           |
| E3       | 13.6          | 12.2                                   | 12.2                                  | 0.0                                                          | Negligible           |
| E4       | 13.5          | 12.1                                   | 12.1                                  | 0.0                                                          | Negligible           |
| E5       | 13.6          | 12.2                                   | 12.2                                  | 0.0                                                          | Negligible           |
| E6       | 13.5          | 12.2                                   | 12.2                                  | 0.0                                                          | Negligible           |

| Receptor | 2017 Baseline | Do-Minimum<br>(Without<br>Development) | Do-Something<br>(With<br>Development) | Change in<br>Concentration<br>(Do-Something<br>– Do-Minimum) | Impact<br>Descriptor |
|----------|---------------|----------------------------------------|---------------------------------------|--------------------------------------------------------------|----------------------|
| E7       | 13.3          | 12.0                                   | 12.2                                  | 0.2                                                          | Negligible           |
| E8       | 13.3          | 12.0                                   | 12.2                                  | 0.2                                                          | Negligible           |
| E9       | 13.1          | 11.9                                   | 11.9                                  | 0.0                                                          | Negligible           |
| E10      | 13.3          | 12.0                                   | 12.0                                  | 0.0                                                          | Negligible           |
| E11      | 13.4          | 12.1                                   | 12.1                                  | 0.0                                                          | Negligible           |
| E12      | 13.3          | 12.0                                   | 12.0                                  | 0.0                                                          | Negligible           |
| E13      | 13.1          | 11.9                                   | 11.9                                  | 0.0                                                          | Negligible           |
| E14      | 14.3          | 12.7                                   | 14.9                                  | 2.2                                                          | Slight Adverse       |
| E15      | 14.5          | 12.8                                   | 12.8                                  | 0.0                                                          | Negligible           |
| E16      | 13.7          | 12.3                                   | 12.3                                  | 0.0                                                          | Negligible           |
| E17      | 13.5          | 12.1                                   | 12.1                                  | 0.0                                                          | Negligible           |
| E18      | 13.3          | 12.0                                   | 12.0                                  | 0.0                                                          | Negligible           |
| E19      | 13.3          | 12.0                                   | 12.0                                  | 0.0                                                          | Negligible           |
| E20      | 13.7          | 12.3                                   | 12.3                                  | 0.0                                                          | Negligible           |
| E21      | 13.6          | 12.2                                   | 12.2                                  | 0.0                                                          | Negligible           |
| E22      | 14.2          | 12.6                                   | 12.6                                  | 0.0                                                          | Negligible           |

The predicted concentrations in this table are rounded to one decimal place. The change in concentration (the Do-Something concentration minus the Do-Minimum concentration at each receptor) is calculated based on modelled data to two decimal places, rounded to one decimal place, and therefore may differ slightly to a change in concentration derived from the rounded predicted Do-Something and Do-Minimum rounded concentrations in the table.

#### Impacts on Future Receptors

- 12.8.46 An assessment was undertaken using the ADMS-Roads Extra dispersion model to assess the effect of traffic and background pollutant sources on new receptors introduced by the Revised Scheme.
- 12.8.47 The modelled results displayed in **ES Addendum Volume 4, Appendix H** show the predicted impacts of the emissions from the above sources during the operational stages for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> respectively.
- 12.8.48 Predicted concentrations indicate that the Revised Scheme will not introduce new sensitive receptors in areas where the NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> AQOs are not met during the 2027 construction and operational phase and the 2034 operational phase.
- 12.8.49 The site is intersected by London Overground rail lines entering and departing Shoreditch High Street Station. These railway lines are not identified in LAQM.TG(16) as lines with a heavy traffic of diesel passenger trains. Consequently, in line with this guidance, the railway will not have an impact on air quality experienced by future occupants of the Revised Scheme.

Odour Impacts

12.8.50 The Revised Scheme incorporates A3 land use which includes restaurants and cafés. Odour risk assessment procedures for commercial kitchens are outlined in Defra's 'Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems'<sup>40</sup>, which was withdrawn on 15<sup>th</sup> September 2017, and the IAQM's 'Guidance on the Assessment of Odour for Planning'<sup>41</sup>. The approach recommended by the Defra guidance requires information about the location of odour extraction vents, the size of the kitchen and the cooking type (greasy, frying, pub food, etc.). The approach recommended by the IAQM guidance requires information relating to facility material usage and extraction vent height, location and dispersion effectiveness. The exact nature of the A3 land use is not known and so it is not possible to accurately assess the associated odour impacts. Additional odour risk assessment will be conducted when details emerge of specific A3 land use – additional assessment can be secured through planning conditions.

Anticipated Effects of Applying the Development Parameter Range

12.8.51 The scale and location of the outline element of the Revised Scheme has been defined by a maximum development parameter submitted in support of the Application. The assessment of the operational phase effects has therefore been based upon application of the maximum parameter. This will give rise to the largest developable area and therefore be a conservative (i.e. pessimistic) assessment of the likely residual effects. If the illustrative development parameter is applied this would not result in any difference in the assessed effects.

Air Quality Neutral Assessment

12.8.52 An air quality neutral assessment of the building and transport emissions has been undertaken in line with the Air Quality Neutral Planning Support guidance<sup>29</sup> published in support of the GLA SPG<sup>28</sup> in 2014. This has been undertaken on the minimum development scenario as this will provide the most conservative result.

Building Emissions Benchmarks (BEBs)

12.8.53 The Revised Scheme will not feature any boilers or centralised combustion processes, with heating provided by air source heat pumps. There will be no emissions from Revised Scheme buildings. Therefore, the Revised Scheme is fully compliant with the requirement for air quality neutrality for pollutant emissions associated with buildings.

Transport Emission benchmarks (TEBs)

12.8.54 Benchmarked transport emissions were calculated using Transport Emissions Benchmarks (TEBs) and the gross floor area of different components of the Revised Scheme, as well as the number of residential units and development trip rates, provided by the Transport Consultant. Trip rate calculations are shown in **Table 12.18** (residential) and in **Table 12.19**. TEBs are not available for plant and ancillary space, therefore floor area designated to these classes has been redistributed to other land use classes within the development based on their proportions of the total floor area.

Table 12.18: Residential Benchmarked Transport Emissions for the Revised Scheme

| Description | Land Use | Total Residential Properties | TEB (gNO <sub>x</sub> /dwelling/annum) | TEB (gPM <sub>10</sub> /dwelling/annum) | Benchmarked NO <sub>x</sub> emissions for the Revised Scheme (g NO <sub>x</sub> /annum) | Benchmarked PM <sub>10</sub> emissions for the Revised Scheme (g PM <sub>10</sub> /annum) |
|-------------|----------|------------------------------|----------------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Residential | C3       | 346                          | 234                                    | 40.7                                    | 80,964                                                                                  | 14,082                                                                                    |

Table 12.19: Non-residential Benchmarked Transport Emissions for the Revised Scheme.

| Description | Land Use | Gross Floor Area (m <sup>2</sup> ) | TEB (gNO <sub>x</sub> /m <sup>2</sup> / annum) | TEB (gPM <sub>10</sub> /m <sup>2</sup> / annum) | Benchmarked NO <sub>x</sub> emissions for the Revised Scheme (g NO <sub>x</sub> /annum) | Benchmarked PM <sub>10</sub> emissions for the Revised Scheme (g PM <sub>10</sub> /annum) |
|-------------|----------|------------------------------------|------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Shops       | A1       | 18,132                             | 169                                            | 29.3                                            | 3,064,291                                                                               | 531,265                                                                                   |

<sup>40</sup> Department for Environment, Food and Rural Affairs (2005) Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems, Department for Environment, Food and Rural Affairs, London.

| Description        | Land Use | Gross Floor Area (m <sup>2</sup> ) | TEB (gNO <sub>x</sub> /m <sup>2</sup> / annum) | TEB (gPM <sub>10</sub> /m <sup>2</sup> / annum) | Benchmarked NO <sub>x</sub> emissions for the Revised Scheme (g NO <sub>x</sub> /annum) | Benchmarked PM <sub>10</sub> emissions for the Revised Scheme (g PM <sub>10</sub> /annum) |
|--------------------|----------|------------------------------------|------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Businesses         | B1       | 110,375                            | 1.27                                           | 0.22                                            | 140,177                                                                                 | 24,283                                                                                    |
| Hotels and Hostels | C1       | 8,131                              | 234                                            | 40.7                                            | 1,902,665                                                                               | 330,934                                                                                   |
| Exhibition Space   | D2 a-d   | 3,330                              | 1.27                                           | 0.22                                            | 4,229                                                                                   | 733                                                                                       |

12.8.55 Calculated transport emissions from the trips generated by the Revised Scheme are shown in **Table 12.20**.

Table 12.20: Calculated Benchmarked and Predicted Transport Emissions for the Revised Scheme.

| Description               | Gross Floor Area (m <sup>2</sup> ) | Total Benchmarked Emissions         |                                      | Total Transport Emissions           |                                      |
|---------------------------|------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|
|                           |                                    | NO <sub>x</sub> emissions (g/annum) | PM <sub>10</sub> emissions (g/annum) | NO <sub>x</sub> emissions (g/annum) | PM <sub>10</sub> emissions (g/annum) |
| Shops (A1)                | 18,132                             | 3,064,291                           | 531,265                              | 612,248                             | 106,245                              |
| Businesses (B1)           | 110,375                            | 140,177                             | 24,283                               | 378,810                             | 65,736                               |
| Hotels and hostels (C1)   | 8,131                              | 1,902,665                           | 330,934                              | 62,318                              | 10,814                               |
| Residential (C3)          | 27,595                             | 80,964                              | 14,082                               | 84,858                              | 14,726                               |
| Exhibition space (D2 a-d) | 3,330                              | 4,229                               | 733                                  | 0                                   | 0                                    |
| Total Emissions           |                                    | 5,192,326                           | 901,296                              | 1,138,235                           | 197,520                              |

12.8.56 The trip rates provided by WSP can be found in **Table 12.21** below:

Table 12.21 Trips rates per land use

| Retail (A1) (trips/annum) | Office (B1) (trips/annum) | Hotel (C1) (trips/annum) | Residential (C3) (trips/annum) | Exhibition space (D2 a-d) (trips/annum)      |
|---------------------------|---------------------------|--------------------------|--------------------------------|----------------------------------------------|
| 155,855                   | 298,935                   | 34,310                   | 46,720                         | No associated trip generation is anticipated |

<sup>41</sup> Bull et al. (2018) IAQM Guidance on the assessment of odour for planning (Version 1.1), Institute of Air Quality Management, London.

12.8.57 The total transport emissions were calculated to be 1,138,235 g/annum for NOx and 197,520 g/annum for PM<sub>10</sub>, which are well below the benchmarked emissions. The Revised Scheme therefore meets the requirements for air quality neutrality in terms of transport emissions.

Air Quality Positive

12.8.58 The London Plan and the Mayor’s Environment Strategy require that large developments are air quality positive i.e. that they actively reduce air pollution. Guidance on Air Quality Positive standards will be published in the future.

12.8.59 The Revised Scheme actively reduces air pollution through implementation of air source heat pumps instead of combustion processes to provide heating. Overall, this means that the Revised Scheme will be air quality positive.

12.9 SCOPE FOR ADDITIONAL MITIGATION MEASURES

Potential Additional Mitigation Measures

Mitigation Measures for Construction

- 12.9.1 The Revised Scheme will constitute a high risk for construction dust.
- 12.9.2 The impacts associated with the Revised Scheme are likely to be in the form of dust generated during earthworks, construction and track-out. The highest identified level of mitigation should be applied during demolition, earthworks, construction and track-out. The use of appropriate mitigation measures throughout the construction period will ensure that impacts to sensitive receptors are minimised or removed.
- 12.9.3 The following is a set of best-practice measures from the IAQM guidance<sup>25</sup> and the GLA guidance<sup>26</sup> that should be incorporated into the specification for the works. These measures should ideally be written into a Dust Management Plan (DMP). Some of the measures may only be necessary during specific phases of work or during activities with a high potential to produce dust, and the list should be refined and expanded upon in liaison with the construction contractor when producing the DMP. Provided these measures are put in place, emissions from the site during construction will not present a significant problem to local receptors.
- 12.9.4 It is recommended that the DMP be agreed with the GLA and secured through condition.
- 12.9.5 Emissions from construction plant have not been assessed as sufficient information to model these emissions is not available. Construction plant emissions will be considered in the CoCP which will include measures for controlling on-site plant emissions (e.g. no idling, adequate catalytic converters, well-maintained plant, use of electric cranes etc. where possible). The Application site, which is classified as a major development, will also operate under mandatory GLA requirements for NRMM<sup>42</sup>. GLA requirements are set out in the Control of Dust and Emissions During Construction and Demolition SPG<sup>26</sup>. Under these requirements, NRMM at the Application site are required to meet emissions requirements set out in Stage IIIB of the Non-Road Mobile Machinery Directive as a minimum. From 01 September 2020, NRMM at the Application site will be required to meet emissions requirements set out in Stage IV of the Directive, as a minimum.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before and during work 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 environmental manager/engineer or the site manager; and
- display the head or regional office contact information.

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; and
- 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. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspections where receptors (including roads) are nearby, to monitor dust. Record inspection results and make the log available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary, with cleaning to be provided if necessary;
- 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; and
- agree dust deposition, dust flux, or real-time PM<sub>10</sub> continuous monitoring locations with the Local Authority (LA), if and where required (to be discussed with the LA). Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction<sup>43</sup>.

Preparing and Maintaining the site

- Plan the 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 or mud;
- keep site fencing, barriers and scaffolding clean using wet methods;
- remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- cover, seed, or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable;
- 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;
- impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate);
- produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials; and
- 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, 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; and
- ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- No bonfires or burning of waste materials.

Measures Specific to Demolition

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;

<sup>42</sup> Non – Road Mobile Machinery (NRMM) Practical Guidance, September 2017, Greater London Authority.

<sup>43</sup> Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction sites, IAQM, 2012.

- avoid explosive blasting, using appropriate manual or mechanical alternatives; and
- bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- only remove the cover from small areas during work, not all at once.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible;
- 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;
- ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- for smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Track-out

- 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 haul 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 bowzers 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 size and layout permits; and
- access gates to be located at least 10 m from receptors where possible.

Mitigation Measures for Operation

12.9.6 Predicted concentrations outlined in **Section 12.8** indicate that emissions from the Revised Scheme will have a **negligible** impact on annual mean concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> at all existing receptors except for E14. Mitigation could be applied in the form of sealing facades at this location and implementing mechanical ventilation with NOx filtration, with air intake from a suitable location away from the new street canyon on Commercial Street. Any mitigation in respect of this location should be agreed with the local planning authority and secured through condition.

Likely Effectiveness of Additional Mitigation Measures

12.9.7 Measures proposed to mitigate effects during the construction phase are likely to be effective if implemented and monitored effectively.

12.9.8 The effectiveness of potential measures proposed to mitigate impacts in respect of the existing residential property at receptor E14 would need to be confirmed using an air quality dispersion model such as ADMS, CFD modelling and/or monitoring.

12.10 RESIDUAL EFFECTS

Table 12.22 Significant residual effects after mitigation

| Phase        | Receptor     | Significant Effects |
|--------------|--------------|---------------------|
| Construction | Human Health | None                |
| Operation    | Human Health | None                |

Construction Phase

12.10.1 The key potential effect on local air quality associated with construction of the Revised Scheme is fugitive dust emissions.

12.10.2 The Code of Construction Practice and incorporation of mitigation measures outlined in **Section 12.9** will ensure the avoidance of significant effects in respect of construction dust. Effects are likely to be negligible with implementation of these mitigation measures, with possible short-term minor adverse effects during adverse weather conditions.

Operational Phase

12.10.3 Residual effects following implementation of mitigation measures proposed for the operational phase would need to be determined following further assessment.

12.11 COMPARISON OF THE RESIDUAL EFFECTS OF THE 2015 PROPOSED DEVELOPMENT WITH THE 2019 REVISED SCHEME

12.11.1 The overall air quality effects of the Revised Scheme are **negligible** both before and after the application of mitigation measures. The air quality assessment conducted for the 2015 Proposed Development concluded that air quality effects associated with the plans were likewise **negligible** both before and after mitigation measures are implemented.

12.12 CUMULATIVE EFFECTS

12.12.1 Cumulative effects are the combined effects of several development schemes (in conjunction with the Revised Scheme) which may, on an individual basis be insignificant but, cumulatively, have a significant effect.

12.12.2 The ES Addendum has given consideration to cumulative effects for schemes located within a 1 km radius from the boundary of the site. Traffic data used in this assessment includes traffic flows associated with these committed schemes. The air quality impacts described therefore takes into account the cumulative effects of these committed schemes.

12.13 SUMMARY AND CONCLUSIONS

12.13.1 This chapter of the ES Addendum reviewed existing air quality within the study area and assessed the potential effect of the Revised Scheme on air quality at existing and proposed sensitive receptors. The effects of dust deposition during the construction phase were also considered.

12.13.2 Annual mean concentrations of NO<sub>2</sub> are likely to be close to or exceeding (i.e. not meeting) the NO<sub>2</sub> annual mean objective at some roadside and facade locations within the study area. Exceedance of the short-term NO<sub>2</sub> objective is unlikely as the site is not in the immediate vicinity of a busy road.

12.13.3 PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are likely to be within, and therefore meet, the long and short term relevant AQOs at the Revised Scheme.



- 12.13.4 The overall dust risk for dust soiling effects is predicted to be high during the construction phase. The overall dust risk for health effects is also predicted to be high. However, standard good practice measures to mitigate dust emissions from the construction phase of the Revised Scheme would be included within a CoCP to prevent or minimise the release of dust entering the atmosphere and/or being deposited on nearby receptors. With these mitigation measures in place, residual effects on receptors are likely to be negligible, with possible short-term minor adverse effects during adverse weather conditions.
- 12.13.5 Based on the EPUK guidance and as detailed in **Section 12.8**, the change in annual mean NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations associated with the construction phase of the Revised Scheme results in the overall effect of the Scheme on air quality being classified as *negligible*.
- 12.13.6 As detailed in **Section 12.8**, the change in annual mean NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations when the Revised Scheme is operational results in the overall effect of the Scheme on air quality being classified as *negligible*.
- 12.13.7 Annual mean NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations at future receptors on the Revised Scheme were modelled at various heights representing different floor levels of the Revised Scheme. The predicted NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are all within, and therefore meet, the air quality objectives at all new receptors introduced by the Revised Scheme. Therefore, the site is considered as suitable for the proposed use.
- 12.13.8 The Revised Scheme meets the requirements for air quality neutrality in terms of building, and transport emissions.
- 12.13.9 **Table 12.25** summarises the topic effects resulting from the Revised Scheme.

Table 12.25 Summary of Residual Effects

| Receptor/Affected Group           | Value or Sensitivity (Significance) of Receptor | Activity or Impact                              | Embedded Design Mitigation    | Magnitude/Spatial Extent/ Duration/Likelihood of Occurrence | Significance of Effect                                                                                                   | Additional Mitigation                                                    | Residual Magnitude of Impact                | Significance of Residual Effect |
|-----------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------|---------------------------------|
| Construction                      |                                                 |                                                 |                               |                                                             |                                                                                                                          |                                                                          |                                             |                                 |
| Human Health                      | High                                            | Demolition, Earthworks, Construction, Track-out | Code of Construction Practice | High                                                        | Risk for dust soiling effects is predicted to be high. The overall dust risk for health effects is predicted to be high. | Best-practice measures from the IAQM and GLA guidance                    | Negligible                                  | Negligible                      |
|                                   |                                                 |                                                 |                               | Direct                                                      |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Local                                                       |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Short-term                                                  |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Likely                                                      |                                                                                                                          |                                                                          |                                             |                                 |
| Operation                         |                                                 |                                                 |                               |                                                             |                                                                                                                          |                                                                          |                                             |                                 |
| Human Health                      | High                                            | Vehicles associated with the Revised Scheme     | No on-site parking            | High                                                        | Negligible                                                                                                               | To be agreed with local planning authority and secured through condition | To be determined through further assessment | Negligible                      |
|                                   |                                                 |                                                 |                               | Direct                                                      |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Local                                                       |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Long-term                                                   |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Likely                                                      |                                                                                                                          |                                                                          |                                             |                                 |
| Cumulative Effects - Construction |                                                 |                                                 |                               |                                                             |                                                                                                                          |                                                                          |                                             |                                 |
| Human Health                      | High                                            | Demolition, Earthworks, Construction, Track-out | Code of Construction Practice | High                                                        | Risk for dust soiling effects is predicted to be high. The overall dust risk for health effects is predicted to be high. | Best-practice measures from the IAQM and GLA guidance                    | Negligible                                  | Negligible                      |
|                                   |                                                 |                                                 |                               | Direct                                                      |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Local                                                       |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Short-term                                                  |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Likely                                                      |                                                                                                                          |                                                                          |                                             |                                 |
| Cumulative Effects - Operation    |                                                 |                                                 |                               |                                                             |                                                                                                                          |                                                                          |                                             |                                 |
| Human Health                      | High                                            | Vehicles associated with the Revised Scheme     | No on-site parking            | High                                                        | Negligible                                                                                                               | To be agreed with local planning authority and secured through condition | To be determined through further assessment | Negligible                      |
|                                   |                                                 |                                                 |                               | Direct                                                      |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Local                                                       |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Long-term                                                   |                                                                                                                          |                                                                          |                                             |                                 |
|                                   |                                                 |                                                 |                               | Likely                                                      |                                                                                                                          |                                                                          |                                             |                                 |

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