Teddington Direct River Abstraction

Preliminary Environmental Information Report
Chapter 13 – Air Quality

Volume: 1

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13. Air Quality

13.1 Introduction

13.1.1 This chapter presents the Preliminary Environmental Information (PEI) relating to air quality and odour for the Teddington Direct River Abstraction (TDRA) Project (hereafter referred to as 'the Project') and summarises the likely significant effects. It should be read in conjunction with the description of the Project as presented in Chapter 2: Project Description.

13.1.2 This chapter is supported by the following Volume 2 PEI Report Figures:

a. Figure 13.1 Air Quality Ecological Receptors
b. Figure 13.2 Air Quality Human Receptors
c. Figure 13.3 Air Quality Study Area
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13.1.3 This chapter is supported by the following Volume 3 PEI Report Appendices:

a. Appendix 13.1 – Construction Dust Assessment Methodology
b. Appendix 13.2 – Construction Dust Mitigation
c. Appendix 13.3 – Odour Risk Assessment Methodology
d. Appendix 13.4 – Air Quality Baseline Data
e. Appendix 13.5 – Air Quality Positive Statement

13.1.4 As a result of scoping and consultation, the potential impacts associated with the Project that will be assessed in respect of air quality and odour are:

a. Impact of fugitive dust emissions from construction activities (i.e. earthworks, shaft construction, trackout, tunnelling, storage and handling of spoil)
b. Impact of exhaust emissions to air from additional construction traffic on the local road network, construction plant herein referred to as Non-Road Mobile Machinery (NRMM) on haul routes, and generators, during the construction phase
c. Impact of fugitive odour emissions during the construction phase (i.e. during earthworks on historical landfill site and the temporary suspended operation of storm tanks and construction of the new tertiary treatment plant (TTP)
d. Impact of fugitive odour emissions during the operation of the TTP

13.1.5 The assessment focuses on the potential human health, dust and odour nuisance and ecological impacts of the Project on the sensitive nearby receptors (i.e. the closest residential properties and designated ecological sites) during the construction phase.

13.1.6 During the operation of the Project, vehicle emissions are not expected to be significant and as such are not considered any further in the PEI Report.

13.2 Legislation, policy and guidance

Legislation

13.2.1 A summary of the legislation that is relevant to the impact assessment for air quality is detailed below.

The Environment Act 2021

13.2.2 The Environment Act 2021 provided a framework to establish a legally-binding duty on the Government to bring forward at least two new air quality targets for fine particulate matter ($PM_{2.5}$). These targets have now been legally enshrined in The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 and the air quality targets are as follows:

a. Annual Mean Concentration Target 'concentration target' – a maximum $PM_{2.5}$ concentration of 10µg/m^3 to be met across England by 2040

b. Population Exposure Reduction Target 'exposure target' – a 35% reduction in population exposure to $PM_{2.5}$ by 2040 (compared to a base year of 2018)

The Environmental Improvement Plan 2023

13.2.3 The Environmental Improvement Plan 2023 (Defra, 2023a) for England sets an interim target date of January 2028 for $PM_{2.5}$ but is not legally binding. The interim targets include:

a. An annual average of 12µg/m^3 for $PM_{2.5}$ is not exceeded at any monitoring station

b. Population exposure to $PM_{2.5}$ is at least 22% less than in 2018

Environmental Protection Act 1990

13.2.4 Environmental Protection Act 1990 Part III – concerns the prevention of nuisance dust and odour by using Best Practicable Means.

Air Quality Standards Regulations 2010

13.2.5 The Air Quality Standards Regulations 2010 (AQSR) and Air Quality Standards (amendment) Regulations 2016 transposed the Ambient Air Quality Directive (2008/50/EC) into UK law. The Regulations set legally binding limit values for several pollutants for the protection of public health and sensitive habitats. The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 amended the annual mean $PM_{2.5}$ limit value in the AQSR from 25µg/m^3 to 20µg/m^3.

Environment Act 1995

13.2.6 Part IV of the Environment Act 1995 requires local authorities to periodically review and assess the quality of air within their administrative area. The technical guidance Local Air Quality Management Technical Guidance LAQM.TG (22) (Department for Environment, Food and Rural Affairs (Defra), 2022) and London Local Air Quality Management Framework Technical

Guidance (LLAQM.TG (19)) (Mayor of London, 2019a) is used by local authorities in their review and assessment work. The air quality objectives specifically for use by local authorities in carrying out their air quality management duties are set out in the Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002. In most cases, the air quality objectives are set at the same pollutant concentrations as the limit values set out in the AQSR, although compliance dates differ.

13.2.7 Where any of the prescribed national air quality objectives (NAQO) are not likely to be achieved, the authority concerned must designate that part an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives.

13.2.8 The relevant NAQOs applicable to this assessment are provided in Table 13.1.

Table 13.1 Relevant national air quality objectives

Pollutant	Measured as	Objectives
Nitrogen dioxide (NO_2) (a)	Annual mean	40µg/m^3
Nitrogen dioxide (NO_2) (a)	1-hour mean	200µg/m^3 not to be exceeded more than 18 times a year
Particulate matter (PM_{10}) (a)	Annual mean	40µg/m^3
Particulate matter (PM_{10}) (a)	24-hour mean	50µg/m^3 not be exceeded more than 35 times a year
Fine particulate matter ($PM_{2.5}$) (a)	Annual mean	20µg/m^3
Oxides of nitrogen (NOx) (b)	Annual mean	30µg/m^3
Ammonia (NH_3) (b) (c)	Annual mean	1µg/m^3 (for lichens and bryophytes)
Ammonia (NH_3) (b) (c)	Annual mean	3µg/m^3 (for higher plants)

Note: (a) – only applies to human receptors

(b) – only applies to ecological receptors and known as critical level

(c) – these critical levels are established by the Convention on Long-Range Transboundary Air Pollution (United Nations Economic Commission for Europe, 2007)

Source: Air Quality (England) Regulations 2000 (2002 as amended) & Air Quality Strategy 2007 and 2023

13.2.9 These air quality objectives are aimed at the protection of human health and ecological receptors.

13.2.10 The critical levels for the protection of vegetation and ecosystems apply regardless of the habitat type present at the ecological receptor. In the case of ammonia (NH_3), the greater sensitivity of lichens and bryophytes to these

pollutants is reflected in the application of two critical levels, with a stricter critical level to be applied to locations where such species are present.

13.2.11 The annual mean NAQOs for human health apply at locations where the public may be regularly exposed, such as building façades of residential properties, schools, hospitals and care homes. The 1-hour and 24-hour mean NAQOs apply at locations where it is reasonable to expect members of the public to spend at least these periods of time, such as busy shopping streets and school playgrounds for the 1-hour mean, and hotels or residential gardens for the 24-hour mean. For full details, see Box 1.1 of the London Local Air Quality Management Technical Guidance (19) (LAQM.TG(19)) (Mayor of London, 2019b).

13.2.12 Air quality standards are concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment. They can also be used as a benchmark to indicate whether air pollution is getting better or worse.

13.2.13 An exceedance is a period of time (defined for each standard) where the concentration is higher than the NAQO and in a location of relevant exposure. In order to make useful comparisons between pollutants (the standards may be expressed in terms of different averaging times), the number of occasions on which an exceedance has been recorded is often reported.

National policy

National Policy Statement for Water Resources Infrastructure

Key policies relevant to air quality set out in the National Policy Statement (NPS) for Water Resources infrastructure (Defra, 2023b) are provided in Table 13.2.

Table 13.2 NPS requirements for air quality

Paragraph	Requirement	How the Project addressed this
4.2.3	Requires the applicant, through design, to minimise the emissions of air pollutants as far as reasonably practicable. Requires the applicant to undertake an assessment of impacts of the proposed development as part of the ES where the air pollution impacts of the proposed development are likely to be significant and could, either singly or cumulatively lead to a breach of any relevant statutory air quality limits or statutory air quality objectives, or impede the attainment of statutory targets.	The design measures in Appendix 13.5: Air Quality Positive Statement aim to minimise emissions of air pollutants through design. It has been proposed that the air quality assessment will consider impacts of the Project and the significance of the air quality effects will be determined using the Institute of Air Quality Management (IAQM) (IAQM, 2017, IAQM, 2018, IAQM 2020) criteria definitions based on the magnitude of change relative to the relevant standards in Table 13.1. See Section 13.5 Assessment methodology.
4.2.4	Air quality considerations are likely to be particularly relevant where water resources infrastructure is proposed within or adjacent to Air Quality Management Areas or any road links exceeding limit values according to Defra's assessments, or near to densely populated areas or where they may have potential impacts on habitats sites, including those outside England. Air quality considerations are also likely to be relevant where a proposal is nearby to an education site (such as a school), or a healthcare site (such as a hospital). Consideration should also be given to disparity of exposure and whether any air pollution generated by a proposed scheme will exacerbate already-high levels of exposure.	The Project is located within an AQMA and there are several sensitive receptors (schools, residential properties and hospitals) identified. The assessment would take these into consideration and ensure that impacts are determined in accordance with appropriate methods. See identified sensitive receptors in Table 13.7.

Paragraph	Requirement	How the Project addressed this
4.2.5	Details the requirements of the content of an Environmental Statement (ES) air quality chapter to include baseline and any significant effects (including mitigation and any residual effects across the project stages, taking account of any significant traffic emissions). It should also consider air quality effects associated with the development (both alone and in-combination) including the contribution of emissions to air, to site-specific critical levels and loads, for the protection of vegetation and ecosystems after mitigation methods have been applied, as well as how the scheme has been designed to prevent air pollutant emissions and the contribution of emissions to ambient air quality after mitigation.	The air quality chapter of the ES will describe the points listed in 4.2.5 of the NPS.
4.2.6	Requires the applicant to include future projections of air quality consistent with Defra's published projections, as well as more detailed modelling to demonstrate local impacts, where appropriate.	Defra's modelled background concentrations across the Project have been extracted for the most recent available year (2023) and these show that air quality objectives would be achieved. Future year projections assume a year-on-year improvement in air quality concentrations due to improved vehicle fleet emissions. As such, the air quality objectives are also expected to be met in the future year. See Section 13.6 where existing and future concentrations are provided.
4.2.7 to 4.2.9	Requires the applicant to work with the relevant authority to secure appropriate mitigation measures to ensure that any statutory air quality limits and objectives are not breached and sufficient consideration of air quality targets is made.	There are several mitigation measures inherent within the design of the Project and these are expected to reduce significant air quality effects. However, where significant effects are predicted, appropriate mitigation measures will be considered. For

Paragraph	Requirement	How the Project addressed this
		construction dust, additional (secondary) mitigation measures have been proposed based on the dust risk assessment.
4.2.11	States that the Secretary of State (SoS) should consider air quality impacts in the vicinity of the proposed development and also the wider area that is likely to be affected.	The study area where significant impacts are likely due to the Project has been identified based on guidance from the IAQM and the Environment Agency. Air quality impacts would be predicted at relevant receptors within the study area, especially to identify the areas with the highest impact. The significance of the air quality effects will be determined using the IAQM criteria definitions based on the magnitude of change relative to the statutory air quality objective. See Section 13.5 Study area.
4.2.12	States that SoS should be satisfied with the proposed construction and operational mitigation put forward by the applicant.	The minimum best practice mitigation measures to be adopted during the construction of the Project have been identified, however additional (secondary) mitigation measures are proposed based on the dust risk assessment. These measures would be suitable for informing the Code of Construction Practice.
4.2.13	States that the SoS must give air quality considerations substantial weight where, after taking into account mitigation, a development would be likely to lead to a significant adverse air quality impact.	See text contained in response to paragraph 4.2.11 above.

Paragraph	Requirement	How the Project addressed this
4.2.14	States that the SoS should refuse consent where air quality impacts of the development will result in a breach of the statutory air quality objectives or where it is likely to hinder achievement of statutory emission and concentration targets.	See text contained in response to paragraph 4.2.11 above.

Other national planning policy and guidance

A summary of the national policies that are relevant to the impact assessment for air quality is presented in Table 13.1.

Table 13.3 National policies relevant to air quality

Policy	Relevance to the impact assessment
The Clean Air Strategy (CAS) (Defra, 2019)	The CAS sets out the actions required across all parts of government and society to improve air quality. It includes new policies and commitments to ensure that the stringent reduction targets of five pollutants continue to be met in 2020 and 2030. It also includes a long-term target to reduce people's exposure to $PM_{2.5}$ and examine what action would be needed to meet the World Health Organisation (WHO) annual mean guideline limit of 10µg/m^3.
Air Quality Strategy (AQS) for England (Defra, 2023c)	The AQS sets out a framework to enable local authorities to deliver for their communities and contribute to long-term air quality goals, including the new targets for fine particulate matter ($PM_{2.5}$). It sets the priorities for clearer air which include: • Planning reforms helping to deliver better air quality • Building capacity in local councils through training, guidance and knowledge sharing • Reducing emissions from industrial sources through improved enforcement of environmental permits • Reducing pollution from domestic burning through smoke control areas and cleaner fuels • Raising awareness within local communities of air quality impacts and how to reduce them • Boosting active travel and public transport to improve air quality.
National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government (MHCLG), 2023))	The NPPF sets out the Government's economic, environmental and social planning policies for England. In relation to air quality, Section 15 on conserving and enhancing the natural environment states that the planning system should contribute to and enhance the natural and local environment by: *'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* […] *Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans'.* Paragraph 199 of the NPPF sets out how planning policy and decisions should consider air quality, look for opportunities to improve air quality or mitigate impacts and should ensure that new development in AQMAs or CAZs is consistent with local air quality action plans.

Policy	Relevance to the impact assessment
Planning Practice Guidance (MHCLG, 2019)	The Air Quality Guidance provides guidance on how planning can take account of the impact of new development on air quality. In the section 'When could air quality considerations be relevant to the development management process?' it states that: 'Whether air quality is relevant to a planning decision will depend on the Proposed Development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the Proposed Development would be particularly sensitive to poor air quality in its vicinity. Where air quality is a relevant consideration the local planning authority may need to establish: • the 'baseline' local air quality, including what would happen to air quality in the absence of the development; • whether the Proposed Development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and • whether occupiers or users of the development could experience poor living conditions or health due to poor air quality.'

Regional policy

13.2.14 In addition to the national policy set out above, the Project must also have regard to relevant regional plans and policy. A summary of relevant regional policy is provided in Table 13.4.

Table 13.4 Regional policies relevant to air quality

Policy	Relevance to the impact assessment
The London Plan 2021 (Greater London Authority (GLA), 2021)	Policy SI1 Improving air quality sets out that development proposals should not lead to further deterioration, should reduce the impact on air quality during construction and as a minimum be at least Air Quality Neutral. Development proposals should consider how local air quality can be improved, employing an air quality positive approach and also plan to comply with the NRMM Low Emission Zone.

Local policy

13.2.15 In addition to the national and regional policy set out above, the Project must also have regard to relevant local plans and policy. A summary of relevant local policy is provided in Table 13.5 and Appendix 1.1: Relevant Legislation and Planning Policies.

Table 13.5 Local policies relevant to air quality

Policy	Relevance to the impact assessment
The London Borough of Hounslow (LBH) Local Plan 2015 - 2030 and the LBH Local Plan 2020 - 2041 (emerging policy) (LBH, 2024)	Policy EQ4 Air Quality of the 2015 to 2030 Local Plan seeks to ensure that air quality impacts of development are assessed. The policy also states that mitigation measures are to be incorporated where air quality assessments show that development could cause or exacerbate air pollution or where end users could be exposed. Developments should also seek to promote air quality across the borough in line with the Air Quality Action Plan (LBH, 2023). A similar Policy EQ4 Air Quality has also been proposed in the emerging 2020 – 2041 Local Plan and in addition to original policy, there is a requirement for developments to follow an Air Quality Positive approach.
LBH Supplementary Planning Document on Air Quality (LBH, 2008)	The Supplementary Planning Document provides the approach for undertaking an air quality assessment and emphasises that developers should demonstrate how the development would affect pollution concentrations in relation to health based statutory and proposed air quality standards and objectives.
LBH Air Quality Action Plan (LBH, 2023)	LBH Air Quality Action Plan (AQAP) sets out several measures to improve air quality. One of the measures relevant to the assessment is the enforcement of the NRMM Low Emission Zone.
The London Borough of Richmond upon Thames (LBR) Local Plan 2015 – 2018 (LBR, 2018) and the LBR Draft Local Plan (LBR, 2023)	Policy LP10 Local Environmental Impacts, Pollution and Land Contamination: Air Quality seeks to ensure good air quality to protect sensitive receptors such as schools, hospitals and homes in existing areas of poor air quality. Developers are advised to secure at least 'Emissions Neutral' development. Policy 46 Amenity and living conditions; and 53 Local environmental impacts, of the Local Environmental Impacts of the LBR ‘Pre-Publication' Draft Local Plan (2023) highlights the need for amenity (including mitigation of odour and fumes), living conditions and the local environment to be protected similar to Policy LP10.
The LBR Supplementary Planning Document on Air Quality 2020 (LBR, 2020a)	The LBR Supplementary Planning Document provides the approach for undertaking an air quality assessment and emphasises the need for consultation to agree the scope, consideration of cumulative impacts, an air quality neutral assessment, an air quality impact assessment and a dust/odour impact assessment where new exposure is anticipated in an area of poor air quality.
The LBR Air Quality Action Plan (2020-2025) (LBR, 2020b)	The LBR AQAP sets out several measures to improve air quality that are relevant to the assessment including an action to deliver cleaner construction and demolition which can have a significant impact by imposing 100% compliance rates for NRMM in the borough and an action to promote anti-idling.

Policy	Relevance to the impact assessment
The Royal Borough of Kingston upon Thames (RBK) Core Strategy 2012 (RBK, 2012) and Kingston's Local Plan 2019 - 2041 (emerging policy) (RBK, 2019)	RBK Core Strategy 2012 promotes sustainable development which would help improve air quality. Draft Policy KC2 Air Quality of Kingston's Local Plan 2019 - 2041 requires new developments to be at least 'air quality neutral' and 'air quality positive' for major schemes. In addition, an air quality impact assessment, based on current best practice, is required as part of a planning application.
The RBK Air Quality Action Plan (RBK, 2021)	RBK AQAP sets out several measures to improve air quality. Some of the measures relevant to the assessment are the action to enforce the NRMM low emission zone and impose the requirement for Construction Management Plans by planning obligation on all major and other sensitive development.

Guidance

13.2.16 The approach to the air quality assessment will be based on the following guidance documents relevant to air quality:

a. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

b. Land Use Planning and Development Control - Planning for Air Quality (Environmental Protection UK (EPUK), IAQM, 2017)

c. Guidance on the assessment of odour for planning (IAQM, 2018)

d. Guide to assessment of air quality impacts on designated nature conservation sites (IAQM, 2020)

e. Local Air Quality Management Technical Guidance LAQM.TG(22) (Defra, 2022)

f. London Local Air Quality Management Technical Guidance LLAQM.TG(19) (Mayor of London, 2019a)

g. London Local Plan Guidance, Air Quality Positive (Mayor of London, 2019b)

h. Air emissions risk assessment guidance (Environment Agency and Defra, 2025)

i. Air Quality Neutral guidance (GLA, 2023)

j. The Control of Dust and Emissions During Construction and Demolition - Supplementary Planning Guidance (Mayor of London, 2014)

Consultation, engagement and scoping

13.2.17 Table 13.6 presents the section of the Scoping Opinion (Planning Inspectorate, 2024) relating to air quality, and the Applicant's response to those comments.

Table 13.6 Key Scoping Opinion comments for air quality

PINS ID reference	Comment	Response
Planning Inspectorate (ID 3.1.1)	However, it is noted that there the limited details on the potential for release of odour from the historic landfill site at Mogden STW and insufficient details on the odour interaction due to proposed construction and operational phases with the existing Mogden STW.	An odour risk assessment has been undertaken in this PEI Report (see Section 13.7 Preliminary assessment of likely significant effects) and demonstrates that the construction and operation phase effects are 'negligible' and not significant when considering interaction with existing operations at the Mogden Sewage Treatment Works (STW). This aspect will be considered again at the ES to address.
Planning Inspectorate (ID 3.1.3)	Further explanation on the approach for establishing baseline for Ham Lands, Burnell, Broom Water and Tudor Drive where monitoring is absent has been requested and for the study area extent to be agreed with the local planning authorities.	An NO2 diffusion tube monitoring survey has been commissioned for the Project to support the baseline assessment. The survey utilises diffusion tubes to monitor NO2 at 11 locations where a gap in local authority data has been identified, including the areas listed in the PINS comment. The survey will last for six months with the results feeding into the assessment undertaken for the ES. The study area currently includes a large area (10km) and further discussion can be undertaken with local authorities to agree whether this is sufficient.

PINS ID reference	Comment	Response
Planning Inspectorate (ID 3.1.4)	Source of baseline data proposed to be used is acceptable but an additional baseline data source for ecological sites is recommended.	Sufficient baseline data are available from monitoring and Defra background maps, however, there are small areas around Ham Lands, Burnell Avenue, Broom Water and Tudor Drive where monitoring is absent. A six-month monitoring study would be undertaken in this area. The baseline year for the assessment would be 2023. During this year, there were no Covid-19 pandemic restrictions. Additional data for the ecological sites will be collated from Air Pollution Information System (APIS) (APIS, 2016) once more information is available on the emissions sources (traffic and point) and their proximity to the ecological sites.

13.3 Embedded design (primary) mitigation and standard good practice (tertiary)

Embedded design (primary) mitigation

13.3.1 The design process approach has sought to avoid or reduce environmental impacts through the Project design. This is referred to as embedded design (primary) mitigation. Chapter 3: Consideration of Alternatives details the design alternatives that have been considered, including the environmental factors which have influenced the decision making.

13.3.2 Embedded design (primary) mitigation relevant to this topic includes changing the mode of tunnelling from a pipe jack method to the use of a tunnel boring machine (TBM). This has resulted in:

a. A reduction of the number of shafts; as such the number of receptors exposed to dust impact is significantly reduced

b. A reduction in the duration of the construction period, as such the duration of exposure is reduced

Standard good practice (tertiary)

13.3.3 Standard good practice (tertiary) would occur as a matter of course due to legislative requirements or based on the outcome of the dust risk assessment undertaken in accordance with the guidance (IAQM, 2024). Appendix 13.2: Construction Dust Mitigation provides a full list of the relevant measures. Appendix 4.2: Commitments Register, Provisional Commitment Reference

(PCR 11a) Standard good practice (tertiary) for this aspect includes the following:

a. Vehicle and plant emissions
    i. Reducing vehicle emissions from construction vehicles, with all vehicles switching off engines when stationary – no idling (PCR 11d)
b. Dust emissions
    i. Planning the site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible (PCR 11c)
    ii. Ensuring an adequate water supply for effective dust/particulate matter suppression/mitigation (PCR 11e)
    iii. Ensuring loaded vehicles entering and leaving sites are securely covered as necessary to prevent escape of materials during transport (PCR 11j)
c. Monitoring
    i. Undertaking regular site inspections to monitor compliance with the air quality management plan (PCR 11b)

13.4 Assessment methodology

General approach

13.4.1 The potential impacts associated with the Project that will be assessed with respect to air quality and odour are:

a. Impact of fugitive dust emissions from construction activities (i.e. earthworks, shaft construction, trackout, tunnelling, storage and handling of spoil)
b. Impact of exhaust emissions to air from additional construction traffic on the local road network, construction plant (herein referred to as NRMM on haul) routes and associated generators during the construction phase
c. Impact of fugitive odour emissions during the construction phase (i.e., during earthworks on historical landfill site and the temporary suspended operation of storm tanks and construction of the TTP)
d. Impact of fugitive odour emissions during the operation of the TTP

13.4.2 The sections below describe the methodology for assessing the potential impacts of dust emissions, vehicle exhaust emissions, generator emissions and odour emissions.

Dust emissions

13.4.3 The latest guidance from the IAQM (IAQM, 2024) has been used in this PEI Report (see Section 13.7 Preliminary assessment of likely significant effects) to undertake an initial assessment of the potential impacts of the Project in relation to fugitive dust emissions (including PM_{10} releases) during construction. The potential impacts will be further assessed and confirmed in the ES, once further details on construction activities are available following design freeze.

13.4.4 The methodology under the IAQM guidance considers the potential for fugitive dust emissions to be generated from the following sources:

a. Demolition
b. Earthworks including storage and handling of spoil
c. Construction activities such as shaft construction, tunnelling, etc.
d. Trackout

13.4.5 The first stage of the assessment involves screening to determine if there are sensitive receptors within threshold distances of the activities associated with the construction phase of the Project. No further assessment is required if there are no receptors within the specified distance.

13.4.6 The IAQM guidance (IAQM, 2024) outlines that an assessment is only required in cases where there are sensitive human receptors:

a. Within 250m of the site boundary
b. Within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s)

13.4.7 An assessment should also be carried out where there are dust-sensitive ecological receptors:

a. Within 50m of the site boundary
b. Within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s)

13.4.8 The risk of impacts associated with dust soiling and PM_{10} caused by the Project has been determined based on the dust emission magnitude for each activity arising from demolition, earthworks, construction and trackout, the sensitivity or nearby receptors and the overall sensitivity of the area. The dust emission magnitude, receptor sensitivity and the overall sensitivity of the area are determined using the criteria outlined in Appendix 13.2 Construction Dust Mitigation. The risk of dust impacts arising has then been derived by combining the dust emission magnitude and the area sensitivity. The risk of dust impacts has been used to determine mitigation measures.

Vehicle exhaust emissions

13.4.9 The potential for air quality impacts due to additional traffic generated by the Project will be determined based on the planning guidance (EPUK and IAQM, 2017), which provides indicative criteria for requiring an air quality assessment as follows:

‘*A change in Light Duty Vehicle flows of:*

- *more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA*
- *more than 500 AADT elsewhere.*

A change in Heavy Duty Vehicle flows of:

- *more than 25 AADT within or adjacent to an AQMA*
- *more than 100 AADT elsewhere.*'

13.4.10 The roads which meet the above criteria are referred to as the 'affected road network'.

13.4.11 The threshold for requiring a vehicle exhaust emissions assessment summarised above will be exceeded to the north of the River Thames during the construction phase and not exceeded during the operational phase. As such, detailed dispersion modelling using ADMS-Roads (CERC, 2025) will be carried out to assess the potential air quality effects on relevant sensitive human and ecological receptors (identified in the section below) due to emissions of NOx, NO_2, NH_3, PM_{10} and $PM_{2.5}$ as a result of changes in traffic flows associated with the construction phase for the worst-case construction year. Emissions factors will be obtained from Defra's emission factors toolkit (Defra, 2025) and LAQM guidance on ammonia emissions (Defra, n.d.). The modelling would be undertaken using data from the most representative nearby meteorological station (Heathrow Airport) and representative road traffic data (flows, speeds and vehicle fleet composition) for the worst-case construction year.

13.4.12 Baseline concentrations described in this study suitable for representing future baseline will be added to modelled concentrations for comparison with the relevant air quality objectives. More details of this are provided in the subsection Assessing the Significance of Effects, below.

Traffic data

13.4.13 Traffic data will include base year and worst-case (highest number of construction movements) for both without and with the Project. The traffic data will be formatted as AADT movements and speed. The traffic data incorporate the committed development traffic for evaluating the cumulative impacts of future planned developments.

Identified receptors

Locations of receptors sensitive to changes in pollutant concentrations have been identified in Figure 13.1 and Figure 13.2. Particular attention has been paid to areas where the NAQOs have the potential to be exceeded. Full details of the existing sensitive receptor locations near the Project which would be considered within the modelling are summarised in Table 13.7. All human receptors would be modelled at a height of 1.5m while ecological receptors would be modelled at 0m.

Table 13.7 Sensitive air quality receptors[1]

Ecological receptors	Residential properties	Schools, hospitals
South West London Waterbodies Special Protection Area (SPA) (5.5km) South West London Waterbodies Ramsar (5.5km) Richmond Park Special Area of Conservation (SAC) (1.3km) Wimbledon Common SAC (4.7km) Richmond Park Site of Special Scientific Interest (SSSI) (1.3km) Bushy Park and Home Park SSSI (1.4km) Syon Park SSSI (1.5km) Barn Elms Wetland Centre SSSI (6.6km) Mogden Sewage Works Site of Importance for Nature Conservation (SINC) (0m) Ham Lands Local Nature Reserve and SINC (0m) River Thames and tidal tributaries SINC (0m) Royal Park Gate Open Space SINC (0m) Petersham Lodge Wood and Ham House Meadows SINC (0m) Duke of Northumberland's River at Woodlands SINC (16m) Cassel Hospital SINC (22m) Duke of Northumberland's River north of Kneller Road SINC (75m) Marble Hill Park and Orleans House Gardens SINC (123 m) The Copse, Holly Hedge Field and Ham Avenues SINC (158m) Ham Common west SINC (236m)	Properties in the St Margarets area and Twickenham area including: Riverside Drive Dukes Avenue Dawes Avenue Northcote Road Sidney Road Moor Mead Road Victoria Road Haggard Road Lebanon Park Burnell Avenue Woodstock Avenue Beaumont Place Trevor Close Briar Close Hillary Drive Bankside Close Haliburton Road Talbot Road Heron Road Newry Road Worple Avenue Beaufort Court Beaufort Road Broom Water West Broom Water River Reach Trowlock Island Road Lensbury Club Dysart Avenue	Orleans Park School St Mary's Primary School (juniors) Grey Court School The Cassel Hospital St Mary's University Meadlands Primary School The Tiffin Girls School St Richard's Primary and Nursery School Ivybridge Primary School Worple Primary School West Middlesex Hospital St Stephen's Junior School Chase Bridge Junior School

[1] This is not an exhaustive list of receptors, and a more detailed review will be undertaken during the assessment to identify any other nearby sensitive receptors such as hospitals, care homes etc. A full list of ecological receptors is available in Chapter 7: Terrestrial Ecology.

Model Verification

13.4.14 LAQM.TG(22) (Defra, 2022) recommends using a combination of automatic and diffusion tube monitoring data to verify modelled concentrations of NO_2 and PM_{10}. There are automatic and diffusion tube monitoring sites in the area, and where appropriate, these will be used to verify the model.

13.4.15 A verification process will be undertaken whereby an adjustment is likely to be derived from the comparison of modelled and measured air pollutant concentrations.

Non-road mobile machinery and generator emissions

13.4.16 The potential for air quality impacts due to combustion sources associated with the construction of the Project will be determined by considering whether the emissions sources exceed the NOx emissions rate of 5mg/s. This value of 5mg/s is the threshold for determining whether there is likely to be a significant impact and is recommended in the Planning Guidance (EPUK and IAQM, 2017).

13.4.17 Where this threshold is exceeded, detailed dispersion modelling (i.e. ADMS 6 or equivalent software) will be undertaken to investigate the magnitude of air quality impacts that could result from the use of NRMM and generators on site at the nearby sensitive human and ecological receptors.

13.4.18 The cumulative impact of vehicle exhaust and generator emissions will then be considered with baseline air quality concentrations together with the magnitude of change in air quality relative to the relevant NAQO to determine the significance of the impacts at sensitive receptors. More details of this are provided in the subsection Assessing the Significance of Effects from paragraph 13.4.31.

Odour emissions

13.4.19 A qualitative risk-ranking matrix has been used in this PEI Report (see Section 13.7 Preliminary assessment of likely significant effects) to assess the significance of the odour impact during the construction and operation of the Project as a result of the release of odours during:

a. The excavation or earthworks at the historical landfill at Mogden STW located on the western boundary (near Drive Shaft)

b. The temporary suspended operation of storm tanks and construction of the TTP

c. Operation of the TTP

13.4.20 The assessment uses the source-pathway-receptor concept, by considering the emission source, the prevailing wind direction relative to the locations and distances of the proposed residential receptors and their sensitivity.

13.4.21 No other odour sources are expected during the construction of the Project. The TTP will be constructed above the existing storm tanks, which will be empty prior to construction. Any cleaning of the storm tanks prior to the construction of the TTP would form part of the existing permitted operation of Mogden STW.

13.4.22 The odour risk assessment draws on the fundamental relationship underpinning odour impact assessments, namely:

odour impact = odour dose x receptor sensitivity.

13.4.23 Using this relationship, the likely odour exposure at the receptor is determined by three steps below:

a. The source odour potential. The significance of the source needs to be considered, taking into account the odour-generating potential of the site activities.

b. The pathway, in terms of effectiveness of dispersion / dilution versus transport of odour from the source to the receptor. The pollutant pathway is the transport mechanism, whereby odours that have been released from the processes and plant are transported to the receptor by dispersion in the atmosphere. Anything that increases dilution and dispersion of the odorous pollutant plume as it travels from source to receptor will reduce the concentration at the receptor and hence reduce exposure. Increasing the length of the pathway (e.g. by releasing the emissions from a high stack) will – with all other things being equal – increase the dilution and dispersion. The distance of sensitive receptors from the site, and whether these properties are in the predominant prevailing wind direction, are important factors.

c. The final odour impact then depends on the sensitivity of the receptors receiving that exposure.

13.4.24 The estimation of the odour annoyance above, assesses the key factors that contribute to odour:

a. Frequency of exposure
b. Intensity of the exposure
c. Duration of the exposure
d. Offensiveness of the odour
e. Location sensitivity

These are also known as the FIDOL factors. A full description of the odour methodology is provided in Appendix 13.3: Odour Risk Assessment Methodology.

13.4.25 The odour risk assessment will be re-presented in the ES.

Air quality neutral assessment

13.4.26 The Air Quality Neutral guidance (GLA, 2023) sets out how an 'air quality neutral' assessment should be undertaken and aims to ensure new developments meet this status. An air quality neutral development is one that meets the building emissions benchmarks and the transport emissions benchmark for its assigned land use. Building emissions are generated due to supply of heat and energy while transport emissions are generated from additional cars and light goods vehicles used by the development.

13.4.27 However, the Project is an excluded development as the guidance states that '*Developments, including major developments which do not include additional emissions sources are assumed to be Air Quality Neutral and do not need an Air Quality Neutral assessment. This would include, for example, developments that have no additional motor vehicle parking, do not lead to an increase in motor vehicle movements, and do not include new combustion plant such as gas-fired boilers*' (GLA, 2023).

13.4.28 During the operation of the Project, there are no additional motor vehicle movements, no additional vehicle parking and no proposed generators. Furthermore, there is no benchmark for this type of project. Therefore, this Project is assumed to be air quality neutral. The guidance notes, as is this case for the Project, that the assessment of any other additional vehicle trips should be captured in the wider air quality impact assessment.

Air quality positive

13.4.29 The Mayor of London and GLA have published Air Quality Positive guidance (Mayor of London, 2019b) to ensure large-scale developments deliver maximum air quality benefits and improvements and incorporate good practice and design measures to reduce exposure to air pollution as far as possible. Appendix 13.5: Air Quality Positive Statement sets out the inherent measures included within the Project design.

Assessing the significance of effects

Dust emissions

13.4.30 For construction dust impacts, the IAQM guidance (IAQM, 2024) recommends that '*significance is only assigned to the effect after considering the construction activity with mitigation. It is, therefore, important that the mitigation measures are defined in a form suitable for implementation by way of a planning condition or legal obligation within a section 106 agreement, and are included in a DMP* [dust management plan] *or a more general Code of Construction Practice or Construction Environmental Management Plan*'. It is expected that with the implementation of appropriate mitigation measures, consistent with the level of dust risk determined as stipulated within the IAQM guidance, the residual effect will normally be 'not significant'.

Vehicle exhaust emissions and generator emissions – human receptors

13.4.31 The general approach to assessing the significance of effects is set out in Chapter 4: Approach to Environmental Assessment.

13.4.32 Guidance is available from a range of regulatory authorities and advisory bodies on how best to determine and present the significance of effects within an air quality assessment. It is generally considered good practice that, where possible, an assessment should communicate effects both numerically and descriptively.

13.4.33 Any description of an effect of a development is informed by numerical results; however an element of professional judgement must also be involved. To ensure that the descriptions of effects used within the assessment are clear, consistent and in accordance with the latest guidance, definitions for the assessment of changes in air quality concentrations at individual human health receptors are adopted from the guidance (EPUK and IAQM, 2017) for comparison with long-term (annual mean) NAQOs.

Table 13.8 Effects descriptors for individual receptors

Long-term average concentration at receptor in assessment year	**% Change in concentration relative to National Air Quality Objective (NAQO)**			
	1%	2 – 5%	6 – 10%	>10%
75% or less of NAQO	Negligible	Negligible	Slight	Moderate
76 – 94% of NAQO	Negligible	Slight	Moderate	Moderate
95 – 102% of NAQO	Slight	Moderate	Moderate	Substantial
103 – 109% of NAQO	Moderate	Moderate	Substantial	Substantial
110% or more of NAQO	Moderate	Substantial	Substantial	Substantial

13.4.34 For short-term (hourly) NO_2, research undertaken as part of the LAQM.TG(22) (Defra, 2022) indicates that the hourly NO_2 objective is unlikely to be exceeded where the annual-mean NO_2 concentration is predicted to be less than 60µg/m^3.

13.4.35 For short-term (daily) PM_{10}, to calculate the number of exceedances of the 24-hour mean NAQO in a year, the following equation (from LAQM.TG(22)) has been applied to the total PM_{10} annual mean concentration:

$$No.of\ Exceedances = -18.5 + 0.00145 \times Annual\ Mean^3 + (\frac{206}{Annual\ Mean})$$

13.4.36 This relationship suggests that the 24-hour mean NAQO is likely to be met if the predicted annual-mean PM_{10} concentration is 31.8µg/m^3 or less. The Air Quality Strategy Volume 2: Evidence Base (Defra, 2007) states, throughout the document, that an annual-mean PM_{10} concentration of 31.5µg/m^3 is approximately equivalent to the 24-hour mean NAQO.

Vehicle exhaust emissions and generator emissions – ecological receptors

13.4.37 The significance criteria for ecological receptors (i.e. designated ecological sites) is derived from the IAQM guidance (IAQM, 2020) that establishes that an increase of up to 1% of the long-term critical level or critical load alone is insignificant, as an increase of this magnitude is not likely to be discernible from background fluctuations. However, an increase of more than 1% of the long-term critical level or critical load does not, by implication, represent a significant impact as it does not necessarily represent a threshold at which ecological damage may occur. The assessment would use this value of 1% as the threshold for establishing whether significant impact is likely. Where there is an increase of more than 1%, additional reviews would be undertaken by an ecologist to confirm the significance of impact which would rely on professional judgement and details of priority habitat.

Odour emissions

13.4.38 The conclusion on the overall significance of likely odour effects on the surrounding area is based on the outcomes of the odour risk assessment taking account of the FIDOL factors.

13.4.39 Where there are multiple receptors, an overall significance of effect on the surrounding area is required. The IAQM odour guidance states: '*this requires the competent and suitably experienced Air Quality Practitioner to apply professional judgement'* (IAQM, 2018).

13.4.40 For the purpose of this assessment, odour effects of moderate adverse or moderate beneficial and above would generally be considered to cause a significant effect, although professional judgement would be applied. It is worth noting that a single moderate adverse or moderate beneficial effect does not necessarily equate to an overall significant effect. The IAQM guidance (IAQM, 2018) also states that '*concluding that an effect is significant should not mean, of itself, that a development proposal is unacceptable and the planning application should be refused; rather, it should mean that careful consideration needs to be given to the consequences, scope for securing further mitigation, and the balance with any wider environmental, social and economic benefits that the proposal would bring*'.

Assumptions and limitations

13.4.41 For the construction dust assessment, it should be recognised that even though residual impacts are unlikely with the implementation of a rigorous management plan in place, it is not always possible to guarantee that the dust mitigation measures will be effective all the time. For example, dust emissions could occur under adverse weather conditions, or where there is an interruption to the water supply used for dust suppression. However, Appendix 4.2: Commitments Register includes provisional commitments (PCR11a to PCR 11j) to manage dust, such as daily visual inspections to monitor dust and a contact number for the public to raise their concerns. A complaints log would be in place and allow for follow-up actions which would enable effective management.

13.4.42 For the vehicle emissions modelling and assessment, there is a degree of uncertainty and limitations inherent in the modelling software and inputs parameters as well as uncertainties in vehicle emission predictions, background air quality data, traffic data, and meteorological data used.

13.4.43 However, these uncertainties are minimised by using the appropriate data and following established good practice guidance. One such practice is the model verification exercise recommended in LAQM.TG22 (Defra, 2022) and LLAQM.TG(19) (Mayor of London, 2019a), where the modelled concentration is compared with the monitored concentration and then an adjustment factor is derived to bring the modelled concentrations in line with the monitored concentrations, thus reducing the level of uncertainty.

13.5 Study area

13.5.1 The extent of the study area is determined by Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024); Design Manual for Roads and Bridges (DMRB) LA 105 Air quality (National Highways, 2024); Land Use Planning and Development Control - Planning for Air Quality (EPUK and IAQM, 2017) and Environment Agency air emissions risk assessment (Environment Agency and Defra, 2025). Each of these documents provide different distances within which air quality impacts from road traffic, construction dust and combustion sources should be considered for nearby human and ecological receptors. Table 13.9 summarises the study area criteria from the aforementioned guidance.

Table 13.9 Study area

Study area criteria	Applies to human receptors	Applies to ecological receptors
Road traffic 200m from affected road network (ARN) - DMRB LA 105 Air quality (National Highways, 2024) The ARN, according to planning guidance (EPUK and IAQM, 2017), is any area within which there is: • '*A change in Light Duty Vehicle (LDV) flows of:* - *More than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA; or* - *More than 500 AADT outside of an AQMA;* • *A change in Heavy Duty Vehicle (HDV) flows of:* - *More than 25 AADT within or adjacent to an AQMA; or* - *More than 100 AADT outside of an AQMA*'	✓	✓
Construction dust – human receptor In accordance with construction guidance (IAQM, 2024), the potential for dust impacts at human receptors should be considered for receptors within 250m of the site boundary and within 50m of the routes to be used by construction vehicles on the public highway, up to 250m from the site entrance(s).	✓	
Construction dust – ecological receptor In accordance with construction guidance (IAQM, 2024), the potential for dust impacts at ecological receptors should be considered where there are dust-sensitive ecological receptors within 50m of the site boundary; or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).		✓
Combustion sources – ecological receptor The air emissions risk assessment for environmental permits (which applies to industrial emission sources) currently identifies distances of 2km for local and nationally important sites and areas of ancient woodland, and 5km, 10km or 15km depending on the emission source for European sites*.	✓	✓
Odour The study area for the assessment of emissions of odour includes land users adjacent to the odour emission source.	✓	

**Although the criteria apply to ecological receptors, it is standard practice to consider a similar distance for combustion source impacts on both ecological and human receptors.*

13.5.2 When considering the study area for road traffic emissions, the extent would be 200m from the ARN. The ARN will be determined based on the planning guidance (EPUK and IAQM, 2017) and criteria set out in Table 13.9.

13.5.3 The furthest extent of the study area for construction dust emissions would extend up to 250m from the site boundary and 50m from the construction road network that will be used by the Project up to 250m from a site entrance. These construction routes will be determined through further assessment and engagement with the local authorities.

13.5.4 The furthest extent of the study area for the Project relates to the consideration of combustion sources. Given that generators used during construction will typically be less than 5MW thermal input, the study area will extend up to 10km. The study area for the Project in relation to the consideration of air quality aspects is set out in Figure 13.3.

13.6 Baseline conditions

Air Quality Management Areas and Air Quality Focus Areas

13.6.1 The Project is located within three different local authority areas:

a. LBH (Mogden STW site)

b. LBR (intermediate and reception shaft and outfall)

c. RBK (intake and TLT connection shaft)

13.6.2 All three local authorities have declared their entire borough as an AQMA due to exceedances of the annual mean and 24-hour mean air quality objective for nitrogen dioxide (NO_2) and/or particulate matter (PM_{10}) respectively, due to road traffic emissions. All three local authorities also have several Air Quality Focus Areas (AQFA) designated by the GLA. LBH has five AQFAs, LBR has four AQFAs, and RBK has two AQFAs. Figure 13.4 shows the locations of the AQFAs closest to the Project, the nearest being Twickenham Town Centre in LBR, 300m away from the above ground sites of the Project.

13.6.3 These AQFAs were declared because they exceeded the Air Quality Limit Values for NO_2 and had high human exposure. They were defined to address concerns raised by boroughs within the LAQM review process and forecasted air pollution trend. These AQFAs do not currently exceed the annual mean limit value for NO_2.

Baseline air quality

13.6.4 Baseline air quality data are available from the London Air Quality Monitoring Network, the local authorities' monitoring campaigns, UK Eutrophying and Acidifying Atmospheric Pollutants (UKEAP) monitoring network (Defra, 2024a), Air Pollution Information System (APIS) (2016) and Defra Background Mapping data for local authorities (Defra, 2024b). The pollutants of potential concern due to traffic and combustion sources associated with this Project are nitrogen oxides (NOx), NO_2, PM_{10}, fine particulate matter ($PM_{2.5}$) and ammonia (NH_3)).

Baseline data sourced around the Project are summarised below, and full details are provided in Appendix 13.4: Air Quality Baseline Data.

13.6.5 Air quality conditions in the Project area are influenced mostly by road traffic emissions, marine emissions and other existing commercial and industrial sources. These emissions sources are accounted for within the monitoring campaigns and Defra background mapping.

13.6.6 Odour complaints have been received regarding the existing odour around the Mogden STW. A site visit was undertaken in 2024 to understand current operations and odour sources at the STW and identify nearby receptors. During the site visit to Mogden STW particular attention was paid to the final settlement tanks, the output from which will pass into the TTP, where very little odour was detected from the multiple large surface area open tanks. The only odours that were detected in the vicinity of the tanks were of very low magnitude/intensity, of very low offensiveness, and were likened to 'fresh river' odours and described as 'nitrogenous'. On this basis it can be concluded that the effluent that will be received and treated within the planned TTP will have an extremely low (if any) odour potential.

Monitored concentrations

13.6.7 All three local authorities employ the use of NO_2 diffusion tubes (DTs) at a range of locations and some also employ the use of automatic monitoring (AM) stations which measure NO_2, PM_{10} and $PM_{2.5}$. To understand the baseline, monitoring data have been sourced from the nearest monitoring sites to the Project. These monitoring locations, which include DT sites within 1km of the EIA Scoping Boundary and AM stations within 4km of the EIA Scoping Boundary, are considered representative of the study area given their proximity to the Project.

13.6.8 Details of the closest monitoring DT sites and AM stations to the Project, which monitor annual mean NO_2, hourly mean NO_2, annual mean PM_{10}, daily mean PM_{10} and annual mean $PM_{2.5}$, are presented in Appendix 13.4 Air Quality Baseline Data. A summary of the findings of the existing baseline data review is as follows:

a. Overall, annual mean NO_2 concentrations at the monitoring sites have reduced year by year. Based on the 2023 monitoring data, the annual mean NO_2 concentrations still remain below the NAQO of 40µg/m^3 at all locations within a distance of 1km from the EIA Scoping Boundary. Monitored annual mean NO_2 concentrations in 2023 range from 11.2 to 34.8µg/m^3.

b. NO_2 hourly mean NAQOs were achieved at all the nearby AM stations. The annual mean NO_2 concentrations at the nearby diffusion tube sites are also less than 60µg/m^3, and as such it is expected that the hourly mean objective would also be achieved.

c. Annual mean PM_{10} concentrations at the AM stations are within the NAQO of 40µg/m^3 at all nearby sites. Monitored annual mean PM_{10} concentrations in 2023 range from 16 to 28.6µg/m^3.

d. PM_{10} daily mean NAQO was achieved at all the nearby AM stations with a maximum number of daily exceedances of 50µg/m^3 experienced for 16 days at Cromwell Road in 2023. This is much lower than the 35 times a year stipulated in the NAQO.

e. Annual mean $PM_{2.5}$ concentrations at the nearby AM stations are within the NAQO of 20µg/m^3 at all nearby sites with a maximum concentration of 12µg/m^3 at NPL in 2023. This is currently on track to meet the non-legally binding interim 2028 target of 12µg/m^3. However, annual mean $PM_{2.5}$ levels exceed the proposed Environment Targets (Fine Particulate Matter) (England) Regulations 2023, of 10µg/m^3 which comes into force in 2040. However, the Project will not affect the achievement of the 2040 target as the construction phase will be completed before 2040.

f. The closest station monitoring NH_3 is located at London Cromwell Road 2, approximately 10km from the Project. The most recent annual mean NH_3 concentration at this site for 2023 was 2.4µg/m^3, which is higher than the environmental standard of 1µg/m^3 where sensitive habitats such as lichens or bryophytes (including mosses, liverworts and hornwarts) are present but less than the standard of 3µg/m^3 where they are not present. Higher plants are considered to be less sensitive. For this reason, the annual critical level for higher plants is 3µg/m^3 but is reduced to 1µg/m^3 where lower plants (lichens and bryophytes) are a particular interest feature of a habitat. The presence or absence of these habitats will be confirmed through further ecological assessment.

13.6.9 An NO_2 diffusion tube monitoring survey has been commissioned for the Project to support the baseline assessment. The survey uses diffusion tubes to monitor NO_2 at 11 locations where a gap has been identified in local authority data. The survey will last for six months with the results feeding into the assessment undertaken for the ES.

Defra background concentrations

13.6.10 Defra provides modelled background air quality concentrations (Defra, 2024b) for each 1x1km grid across all local authority areas, from a base year of 2021 which is projected to provided data for all years up to 2040. Projections assume a year-on-year improvement in air quality concentrations due to improved vehicle fleet emissions.

13.6.11 The estimated Defra background concentrations within 1km of the draft Order limits for 2023 for all pollutants, including NOx set for vegetation, complies with the NAQOs.

Future baseline

13.6.12 It is expected that future baseline concentrations would decrease compared with the existing baseline concentrations due to implementation of the Ultra Low Emission Zone and vehicle emissions improvement. This improvement is reflected in the Defra background concentrations forecast. However, to provide a conservative prediction of pollutant concentrations in the future, the current baseline background concentrations will be used for the future year, assuming no decrease in background concentrations.

13.6.13 In general, climate change is expected to lead to an increase in temperatures, with a greater frequency of hotter, drier summers and warmer, wetter winters. Climate change is also expected to lead to sea level rise which will affect tide levels and associated flood risk within the tidal section of the River Thames as far west as Teddington Weir. Further information on projected changes in climate parameters is provided in Chapter 18: Climate Change. Projected future changes in climate (e.g. increase in temperatures) have the potential to interact with effects identified within some environmental aspects and exacerbate or diminish their impact. Such combined impacts are termed In-Combination Climate Impacts (ICCI). Consideration of the potential ICCI associated with air quality is provided in Section 13.7.

13.7 Preliminary assessment of likely significant effects

Construction phase

13.7.1 This section sets out the likely significant effects on air quality during construction of the Project. The assessment assumes that embedded design (primary) mitigation and standard good practice (tertiary) measures in the CoCP are in place, and the results of the assessment then inform the need for any additional (secondary) mitigation requirements during construction.

13.7.2 Using the IAQM guidance (IAQM, 2024) the risk of dust has been established based on the dust emission magnitude (for earthworks, construction and trackout) and sensitivity of the area described below. This will be further assessed and confirmed in the ES, once further details on construction activities are available following design freeze.

Dust emissions

Assessment of potential dust emission magnitude

13.7.3 The potential dust emission magnitude has been determined based on information currently available on the Project. Where data are not available, assumptions based on projects of similar size and nature have been made.

13.7.4 No demolition is anticipated for the Project; as such the dust risk for demolition is negligible.

13.7.5 The site area which covers the draft Order limits is more than 110,000m^2 and is situated on a loam soil type (Cranfield Soil and Agrifood Institute, 2025) with the potential for dust generation. It is expected that more than ten heavy earthmoving vehicles will be active at any one time. It is considered that the dust emission magnitude is high for earthworks.

13.7.6 The total building volume material that would be required for the construction of the TTP, tunnel, outfall and intake structures will be >75,000m^3. Therefore, the dust emission magnitude is high for construction.

13.7.7 It is anticipated that there will be 20 – 50 heavy duty vehicle outward movements per day during construction of the Project. Surface material will

have the potential for dust release and there will be an unpaved road length of more than 100m within the STW site. Therefore, the dust emission magnitude is likely to be high for trackout. This will be confirmed in the ES.

Sensitivity of the area

13.7.8 There are over 100 residential receptors within 20m of the above ground sites. Based on the information set out in Appendix 13.2, the area is considered to be of High sensitivity to dust soiling effects.

13.7.9 Annual mean PM_{10} concentrations in the area range from 16 to 28.6µg/m^3, and as such fall within the range 28 to 32µg/m^3 in Table 4 of Appendix 13.2. As there are between 10 and 100 sensitive receptors within 20m of the draft Order limits, the human health impacts sensitivity is High.

13.7.10 There are ecological receptors (see Table 13.7) within 50m of the draft Order limits. However, these ecological receptors all have a local non-statutory designation (SINCs) and as such are a Low dust sensitivity receptor in accordance with IAQM guidance (IAQM, 2024). There are no additional ecological receptors within 250m of the construction route or up to 250m from the draft Order limits.

Risk of Impacts

13.7.11 The risks summarised in Table 13.10 below are based on the above designations of dust emission magnitude and area sensitivity.

Table 13.10 Summary of dust risk

Potential impact	Demolition	Earthworks	Construction	Trackout
Dust soiling	N/A	High risk	High risk	High risk
Human health	N/A	High risk	High risk	High risk
Ecology	N/A	Low risk	Low risk	Low risk

13.7.12 The dust risk assessment for the construction phase of the Project concludes that there is a High risk of dust soiling and human health effects at nearby receptors and Low risk effect on ecology. As a result, High risk mitigation measures from the IAQM guidance (IAQM, 2024) have been recommended in Appendix 13.3. With the implementation of the recommended level of mitigation, it is expected that the risk will be reduced to negligible and the overall likely significance of the effect will be neutral (not significant).

Vehicle exhaust emissions

13.7.13 The construction of the Project has the potential to change air quality which may result in temporary effects for people and ecological areas nearby.

13.7.14 The access routes and number of vehicle movements expected during the construction are set out in detail in Chapter 12: Traffic and Transport. The

maximum construction vehicle flow on each route has been assumed for the assessment of likely significant effects on air quality in this PEI Report. However, this is likely an overestimate of the true number construction movements required for the construction phase of the Project.

13.7.15 The initial traffic estimates for the Project show that 2031 is the construction year with the greatest number of construction vehicle movements on the road network, with the exception of the Ham Playing Fields site located south of the River Thames, where 2030 has more construction traffic movements.

13.7.16 This section presents 'movements' of construction vehicles and refers to an individual journey. For example, 100 HGV AADT movements means there are 50 journeys to and 50 journeys away from the Project work sites.

North of the River Thames

13.7.17 As discussed in Section 12.5 of Chapter 12: Traffic and Transport, there are currently three construction vehicle routing options to and from Mogden STW, which would lead to different numbers of construction vehicles on each of the construction routes considered. Moreover, the north access gate would be used during short and occasional periods when the south access gate is not available.

13.7.18 There are expected to be approximately 62 HGV AADT movements and 142 LDV AADT movements accessing and egressing the construction works at the Mogden STW north of the River Thames. The construction traffic north of the River Thames would use Mogden Lane, Worton Road, the A316 Chertsey Road when heading to or returning from the west and the A310 Twickenham Road when heading to or returning from the north of Mogden STW.

13.7.19 The number of construction vehicle movements, on an AADT basis, on the above routes in 2031 are expected to be approximately as follows:

a. Mogden Lane: 50 HGVs and 124 LDVs
b. Worton Road: 62 HGVs and 142 LDVs
c. A316: 62 HGVs and 36 LDVs
d. A310: 62 HGVs and 60 LDVs

13.7.20 The number of HGVs and LDVs on the above routes all exceed the EPUK/IAQM indicative criteria (EPUK and IAQM, 2017) for further assessment, as set out in Table 13.9, for HDVs in an AQMA and in some cases for LDVs. The number of construction vehicles is relatively small compared to existing traffic movements on the A316 (approximately 46,000 AADT in 2023 (Department for Transport (DfT), 2023a) and A310 (approximately 21,000 AADT in 2023 (DfT, 2023b)).

13.7.21 Ambient monitoring of NO_2 at LBH sites 'HS89' located at Mogden STW south gate and 'HS61' located on the corner of A310 and South Street to the north of Mogden STW (See Appendix 13.4: Air Quality Baseline Data, and Figure 13.5 Monitoring Locations) monitored annual mean concentrations less than 50% of

the AQO of 40µg/m^3 in 2023. LBR monitored annual mean NO_2 concentrations along the A316 Chertsey Road at sites '31' and '57'. At site 31 the monitored concentration in 2023 was 77% of the AQO; at site 57 it was 58% of the AQO of 40µg/m^3.

South of the River Thames

13.7.22 As described in Chapter 12: Traffic and Transport, the worksites south of the River Thames each have one main routing option for HGVs. A key minor variation occurs for HGVs in the instance where the railhead site in Tolworth, is accessed from A240 Kingston Road.

13.7.23 The largest expected numbers of construction vehicles accessing and egressing the construction works to the south of the River Thames are located at the Burnell Avenue access. At this location there are expected to be approximately 18 HGV AADT movements and 74 LDV AADT movements in 2031. The construction traffic south of the River Thames would use local roads including Riverside Drive, Beaufort Road, Dysart Avenue, Burnell Avenue, Sandy Lane, Ham Common and Ham Street. Beyond the Ham area construction traffic would be routed along the A307 Richmond Road to the south.

13.7.24 The number of construction vehicle movements, on an AADT basis, on the above routes in 2031 are expected to be approximately as follows:

a. Dukes Avenue between A307 and Dysart Avenue: 22 HGVs and 74 LDVs
b. A307 Richmond Road: 24 HGVs and 36 LDVs
c. A3 Kingston Bypass: 48 HGVs and 18 LDVs

13.7.25 The number of HGVs and LDVs on the above routes exceed the IAQM indicative criteria for further assessment for HGVs on the A3 Kingston bypass as set out in Table 13.9. All other HGV and LDV movements are below the IAQM indicative criteria for further assessment. The number of construction vehicles are relatively small compared to existing traffic movements on the A307 Richmond Road (approximately 13,000 AADT in 2023 (DfT, 2023c)).

13.7.26 Ambient monitoring of NO_2 at RBK site '27' located at the fire station on Richmond Road (See Appendix 13.4: Air Quality Baseline Data and Figure 13.5 Monitoring Locations) monitored an annual mean NO_2 concentration less than 50% of the AQO of 40µg/m^3 in 2023. There are currently no ambient air quality monitoring data available around local roads in the Ham area although this is currently being collected by RBK and specifically by the Applicant for the Project. Nevertheless, given the suburban setting of the area it is likely that pollutant concentrations are very low when compared to the relevant air quality objectives.

Summary

13.7.27 Based on the expected numbers of construction vehicles along the construction routes both north and south of the River Thames and the 2023 ambient NO_2

monitoring, it is considered unlikely that construction traffic impacts would be greater than 'Slight Adverse' at receptors which would experience the greatest change in air quality, as defined in the guidance (EPUK and IAQM, 2017) and overall, significant effects are unlikely. This will be further assessed in the ES, using dispersion modelling where relevant, once more detailed construction phase traffic information is available.

Non-road mobile machinery and generator emissions

13.7.28 NRMM and mobile generators used to power equipment needed for construction are typically referred to collectively as construction plant. Guidance (EPUK and IAQM, 2017) notes that effects from construction plant exhaust would likely not be significant. However, given the scale of the construction works, construction plant have the potential to temporarily adversely affect air quality.

13.7.29 With respect to NRMM, the largest emissions sources are likely to be from vehicles moving materials along haul routes. A haul route is a temporary road within the construction works area for movement of equipment and materials. Whilst other construction plant, such as excavators, cranes and dumpers, all have an energy demand, the emissions from these types of construction plant on local air quality are considered of negligible significance relative to the surrounding road traffic contributions on the local road network. This is especially the case in the GLA NRMM Low Emission Zone (LEZ) where construction plant must meet stringent emissions standards.

13.7.30 The number, sizing and location of mobile generators needed to power equipment during the construction phase are not yet known, however there is potential for them to exceed the EPUK/IAQM indicative NOx mass emission rate assessment criterion of 5mg/s. However, it should be noted that 5mg/s is a low emission rate when compared to other sources, such as from road traffic emissions on the surrounding road network.

13.7.31 Potential impacts from NRMM and generators are considered in relation to baseline conditions presented in Appendix 13.4: Air Quality Baseline Data and their distance to nearby receptors using professional judgement to confirm the likeliness of significant effects occurring.

13.7.32 On the basis of the EPUK/IAQM note that construction plant exhaust would likely not be significant (EPUK and IAQM, 2017) and that Defra background mapped concentrations across the area covered by construction works and away from road sources generally shows NO_2 concentrations less than 50% of the NAQOs, it is considered unlikely that impacts would be greater than 'Slight Adverse' at receptors which would experience the greatest change in air quality, as defined in the EPUK/IAQM guidance, and overall significant effects are unlikely.

13.7.33 A more detailed assessment, using detailed modelling where relevant, would be undertaken at the ES stage when more detailed information on NRMM

(focusing on haul routes) and generators that would be used during construction are available.

Odour emissions

Excavation or earthworks at the historical landfill at Mogden STW

13.7.34 Mogden STW historically operated a landfill site, which accepted inert waste from 1930 to 1935. The location of the historic landfill is close to the western end of Mogden STW where the Drive Shaft would be excavated. A ground investigation report was prepared (see Appendix 10.1: Teddington DRA Phase 1 Ground Investigation Factual Report), which reveals that the location of the proposed Drive Shaft has anthropogenic contents (i.e., concrete, brick, wood, glass). This confirms that the landfill accepted inert waste, which is not typically odorous in nature, and not organic waste, which has the potential to release odorous gases. Soil samples were tested for the presence of volatile organic compounds (VOC), which have the potential for odour. The results of the VOC analysis showed that the VOC levels were well below the Generic Assessment Criteria (GAC) for contaminated land although a faint hydrocarbon odour was detected during the drilling near the Drive Shaft. Taking this into consideration and the relatively small disturbance area, the odour potential from the excavation or earthworks at the historical landfill at Mogden STW has been considered to fall within the 'small odour potential' category.

13.7.35 Regarding the pathway from source to receptor, the factors that need to be considered are distance, direction and effectiveness of mitigation measures and controls. The nearest sensitive receptors to the Drive Shaft are located at Wainright Grove, Hall Road, Worton Hall Estate and Worton Road.

13.7.36 Given that the predominant wind direction in the UK is south-westerly, Wainright Grove and Hall Road are typically upwind of the source while Worton Hall Estate and Worton Road are typically downwind of the source. However, both Wainright Grove and Hall Road could be downwind of the source on the occasions when there is an easterly wind. As such, the pathway effectiveness has been conservatively assessed as moderately effective rather than ineffective.

13.7.37 All the receptors are considered to be of 'high sensitivity'. A summary of the likely odour effects based on the above analysis and using the IAQM methodology in Appendix 13.4: Air Quality Baseline Data, is provided in Table 13.11.

Table 13.11 Summary of the likely odour effects – historical landfill at Mogden STW

Receptor details and location	Source odour potential	Pathway (transport effectiveness)	Odour exposure	Receptor sensitivity	Likely odour effect
Wainright Grove	Small	Moderately effective	Negligible risk	High sensitivity	Negligible effect

Receptor details and location	Source odour potential	Pathway (transport effectiveness)	Odour exposure	Receptor sensitivity	Likely odour effect
(residential, 50m upwind)					
Hall Road (residential, 120m upwind)	Small	Moderately effective	Negligible risk	High sensitivity	Negligible effect
Worton Hall Estate (residential, 250m downwind)	Small	Moderately effective	Negligible risk	High sensitivity	Negligible effect
Worton Road (residential, 450m downwind)	Small	Ineffective	Negligible risk	High sensitivity	Negligible effect

13.7.38 The outcome of the odour risk assessment reveals that the likely odour effect at the nearest receptors due to excavation or earthworks at the historical landfill at Mogden STW, is negligible. Therefore, the odour effect at surrounding receptors further away from the source is also expected to be negligible. As such, the odour impact during the construction phase is deemed neutral (not significant). Consequently, no additional (secondary) mitigation measures are required to reduce odours during the construction phase.

13.7.39 The odour risk assessment will be re-presented in the ES.

Temporary suspended operation of storm tanks and construction of the TTP

13.7.40 The new TTP would be constructed above the existing storm tanks. The works to construct the TTP would be carried out while maintaining the existing storm tank provision on the Mogden STW site, with only one set of storm tanks suspended from operation at a time. Suspended storm tanks will be empty prior to construction. Any cleaning of the storm tanks prior to the construction of the TTP would form part of the existing permitted operation of Mogden STW. There are no proposed TTP construction activities that have the potential to emit odour. Odour impacts due to the temporary suspended operation of storm tanks and construction of the TTP are deemed negligible and have not been considered further.

13.7.41 Overall, the construction of the Project would result in a negligible odour impact.

Operation phase

Vehicle exhaust emissions

13.7.42 The PINS Scoping Opinion (Planning Inspectorate, 2024) accepted the approach to scope out operational vehicle exhaust emissions as set out in the scoping report on the basis that operational traffic would not exceed the IAQM criteria set out in Table 13.9.

Odour emissions

13.7.43 The operation of the TTP would involve the treatment of final effluent from Mogden STW, thereby producing recycled water. As the effluent is at the end of the treatment process before being discharged, it can be concluded that the effluent that will be received and treated within the proposed TTP will generate extremely low (if any) odour and would be of a similar hedonic tone to river water.

13.7.44 The TTP would be located in the south-eastern corner of the Mogden STW on a platform above two pairs of storm tanks within the Eastern Work Area.

13.7.45 Regarding the pathway from source to receptor, the factors that need to be considered are distance, direction and effectiveness of mitigation measures and controls. The nearest receptors to the Eastern Work Area are those within the predominantly residential area around Twickenham Road, the westernmost properties of which are 65m away to the western and southern boundaries of Mogden STW.

13.7.46 Current design details show that a maximum height for the proposed infrastructure in the Eastern Work Area would be 15m above ground level which will aid dispersion and dilution thus reducing the effectiveness of the pathways.

13.7.47 The predominant wind direction in the UK is south-westerly, and Twickenham Road is downwind of the source. On the basis of the above information and using professional judgement, the pathway effectiveness from the proposed TTP at the Eastern Work Area to the nearest receptors in the Twickenham Road area is considered to be ‘moderately effective’ due to the combined influence of the factors discussed above.

13.7.48 Twickenham Road area receptors are considered to be of ‘high sensitivity’. A summary of the likely odour effects based on the above analysis and using the IAQM methodology in Appendix 13.4: Air Quality Baseline Data is provided in Table 13.12.

Table 13.12 Summary of the likely odour effects – operation of TTP

Receptor details and location	Source odour potential	Pathway (transport effectiveness)	Odour exposure	Receptor sensitivity	Likely odour effect
Twickenham Road (residential, 65m downwind)	Small	Moderately effective	Low risk	High sensitivity	Negligible effect

13.7.49 The outcome of the odour risk assessment reveals that the likely odour effect at Twickenham Road due to the operation of the TTP is negligible and not significant. Therefore, no further mitigation measures are required to reduce odours during the operation phase.

13.7.50 The odour risk assessment will be re-presented in the ES.

Cumulative effects

13.7.51 A preliminary assessment of intra-project and inter-project cumulative effects (excluding climate change) for air quality is contained in Chapter 19: Cumulative Effects.

In-combination effects with climate change

13.7.52 Climate change can create hotter and drier/drought conditions which can exacerbate dust generation. Drought could also potentially impact the availability of water for dust suppression during the construction phase. However, there is sufficient water supply due to the nature and location of the Project.

13.7.53 Section 13.7 and Appendix 18.1: In-Combination Climate Impacts provides details of the potential ICCIs identified for air quality. Further consideration and assessment of the ICCI (and identification of additional (secondary) mitigation if required, or confirmation that existing mitigation is sufficient) will be undertaken for the ES.

13.7.54 No additional (secondary) mitigation is therefore required beyond that already detailed in Appendix 13.2: Construction Dust Mitigation as standard good practice (tertiary) mitigation measures are proposed to be in place for the control and suppression of dust emissions and could be adaptable to varying weather and climate conditions including contingency measures.

13.8 Air quality positive

13.8.1 An air quality positive statement is provided in Appendix 13.5: Air Quality Positive Statement and demonstrates that several measures have been incorporated into the Project design to reduce emissions and impacts on local air quality. No additional (secondary) mitigation of emissions is therefore required beyond that already incorporated into the Project design.

Additional (secondary) mitigation and enhancement measures

Additional (secondary) mitigation

13.8.2 Mitigation measures are defined in Chapter 4: Approach to Environmental Assessment. Embedded design (primary) mitigation and standard good practice (tertiary) specific to this aspect are provided in Section 13.3 of this chapter.

13.8.3 No additional (secondary) mitigations are required.

Enhancement measures

13.8.4 No additional enhancement measures are required.

13.9 Summary of residual likely significant effects

13.9.1 Table 13.13 below shows the potential effects of air and odour emissions during the construction and operational phases have been assessed to be neutral and not significant.

Table 13.13 Summary of residual likely significant effects for air quality

Site	Description of effect	Likely significance of effect	Additional (secondary) mitigation and enhancement measures	Residual effects
Construction phase				
The Project	Vehicle exhaust emissions	Neutral (Not significant)	None	Neutral (Not significant)
The Project	NRMM and generator emissions	Neutral (Not significant)	None	Neutral (Not significant)
The Project	Dust	Neutral (Not significant)	None	Neutral (Not significant)
Mogden STW	Odour	Neutral (Not significant)	None	Neutral (Not significant)
Operation phase				
Mogden STW	Odour	Neutral (Not significant)	None	Neutral (Not significant)

13.10 Next steps

13.10.1 An assessment of the potential air quality effects of the entire Project will be undertaken in the ES. This will include the results of a six-month baseline monitoring exercise.

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