Environmental Permit Variation Application

Air Emissions Risk Assessment

Telehouse International Corporation of Europe Limited

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SLR Project No.: 410.066261.00001

10 September 2026

Revision: V2.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
V1.0	3 March 2026	MF	LB	SA
V2.0	10 September 2026	MF	LB	SA
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1.0 Introduction

SLR Consulting Ltd (SLR) has been instructed by Telehouse International Corporation of Europe Limited (TIE) to prepare an environmental permit (EP) variation application for the TIE owned Docklands Technical Centres (the Campus) (EP reference EPR/EP3507SL V0002), located at Blackwall Way, Poplar, London, E14 2EH.

1.1 Background

The Campus currently includes data centres Telehouse North (TN) located on Coriander Avenue, London E14 2AA, and Telehouse South (TS) located on Blackwall Way, Poplar, London, E14 2EH. TIE intends to develop Telehouse West 2 (TW2), a new data centre which will extend the existing TN campus (see Figure 4-2 for location of West 2).

Electricity for operation of the Campus is provided from connections to the local electricity transmission network; however, given the nature of data centres and their requirement to have an available energy supply at all times, the Campus also incorporates a number of emergency standby generators (SBGs).

TW2 will incorporate 13 new SBGs (which will be installed in phases). The EP will therefore be varied to incorporate a total of 44 SBGs at the Campus, as summarised below:

- TN:
  - Existing (comprising East, West, North and North2 data centre units): 27 SBGs with a total thermal rated input of 145 MWth; and
  - Proposed (TW2): 13 SBGs with a total thermal rated input of 97.6 MWth.
- TS (existing): 4 SBGs with a total thermal rated input of 35 MWth.

The total thermal rated input of the Campus, with the inclusion of TW2 will increase from 180 MWth to 277.6 MWth.

The proposed TW2 SBGs will be fuelled with hydrogenated vegetable oil (HVO). For the purpose of this EP variation application, the air emissions risk assessment has been based on the use of diesel fuel. These SBGs will have selective catalytic reduction (SCR) abatement to reduce emissions of oxides of nitrogen (NO_x) to air.

1.2 Scope

The scope of the assessment is limited to the point source combustion emissions to air from the Installation's emission points. Consistent with EA guidance, for SBGs fired on gas oil (diesel), the principal release of NO_x has been assessed.

The objective of the study is to assess the impact of NO_x emissions against the relevant Air Quality Standards for nitrogen dioxide (NO_2) for the protection of human health and the relevant Critical Levels (for NO_x) and Critical Loads (for nitrogen and acid deposition) for the protection of designated ecological receptors. Ammonia slip, whilst minimised as a result of the SCR dosing control has also been considered for ecological receptors given the low ammonia Critical Levels.

There are no changes associated with emissions to air proposed at the other buildings that make up the Campus. This AERA report has focused on the presentation of impacts associated with the addition of West 2, in addition to presenting the cumulative impacts with the wider Campus.

2.0 Relevant Guidance and Environmental Standards

2.1 Environmental Permitting Regulations

The Installation will be regulated under the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (EPR). Guidance produced by the Environment Agency (EA) in relation to the EPR that is of relevance to this assessment is discussed below.

2.1.1 AERA Guidance

The ‘Air emissions risk assessment for your environmental permit’ guidance[1] (termed the ‘AERA guidance’ throughout the remainder of the report) produced by the EA is intended to assist operators in assessing risks to air when applying for a permit under the EPR. This is part of the ‘Risk assessments for specific activities: environmental permits’ collection.

2.1.2 Data Centre FAQ Guidance

The EA has released draft guidance for Data Centres (the ‘Data Centre FAQ Headline Approach’[2]) which sets out their draft approach to the permitting and regulatory aspects for Data Centres within the context of EPR for 1.1A Combustion Activities ‘Chapter II’ sites aggregated to >50MWth input.

Also of relevance is the EA’s ‘Specified generators: dispersion modelling assessment’ guidance[3]. The guidance proposes methods for statistical analysis of impacts from short term operation (e.g. using hypergeometric probability distribution) and a framework for acceptable probabilities of impact.

2.2 Air Quality Assessment Levels

2.2.1 Air Quality Standards Regulations

The Air Quality Standards Regulations 2010[4] (AQSR) transpose both the EU Ambient Air Quality Directive (2008/50/EC), and the Fourth Daughter Directive (2004/107/EC) within UK legislation, in order to align and mirror European obligations. The regulations set Limit Values, Target Values, and Objectives for the protection of human health and the environment. Following the UK’s withdrawal from the EU, the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[5] was introduced to mirror revisions to supporting EU legislation.

2.2.2 Air Quality Strategy

The latest AQS for England was published in 2023[6] . The AQS provides the delivery framework for air quality management across England for local authorities and summarises

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[1] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit (accessed 22/12/2025)

[2] Environment Agency, ‘Data Centre FAQ Headline Approach’, Data Centre FAQ DRAFT version 21.0 to TechUK for Discussion 15/11/22

[3] https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment (accessed 22/12/2025)

[4] The Air Quality Standards Regulations (England) 2010, Statutory Instrument No 1001, The Stationary Office Limited

[5] The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020, Statutory Instrument No. 1313, The Stationary Office Limited

[6] Air Quality Strategy: Framework for Local Authority Delivery, Defra. April 2023

the air quality standards and objectives[7] operable within England for the protection of public health and the environment.

The ambient air quality objectives of relevance to human receptors in this assessment are provided in Table 2 1. The AQS objectives apply at locations where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period (defined as 'relevant exposure'). Table 2-2 provides an indication of those locations.

2.2.3 US-EPA AEGLs

Acute Exposure Guideline Levels (AEGLs) represent short-term exposure limits for toxic airborne chemicals and have been established for NO_2. AEGL values are developed by the National Advisory Committee for Acute Exposure Guideline Levels for Hazardous Substances, which is a US federal advisory committee. The AEGL-1 for NO_2 has been considered where appropriate, based upon the EA's 'Data Centre FAQ Headline Approach'.

2.2.4 Environmental Assessment Levels

The AERA guidance includes Environmental Assessment Levels (EALs) that are in addition the statutory standards set out in Sections 2.2.1 and 2.2.2. Those of relevance to this assessment are set out in Table 2-1.

2.2.5 Applied AQALs

The Air Quality Assessment Levels (AQALs) applied in this assessment are provided in Table 2-1.

Table 2-1: Relevant Ambient AQALs

Pollutant	AQAL ($\mu g/m^3$)	Averaging Period	Reference
Nitrogen dioxide (NO_2)	40	Annual mean	Air Quality (England) Regulations 2000
	200	1-hour mean (not to be exceeded on more than 18 occasions per annum)	Air Quality (England) Regulations 2000
	956	1-hour and 10-minute mean	US-EPA AEGL-1
Nitrogen monoxide (NO)	4400	1-hour mean	AERA Guidance EAL

Table 2-2: Human Health Relevant Exposure

AQAL Averaging Period	AQALs Should Apply At	AQALs Should Not Apply At
Annual mean	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term

[7] Air Quality (England) Regulations 2000, Statutory Instrument No. 928, The Stationary Office Limited

AQAL Averaging Period	AQALs Should Apply At	AQALs Should Not Apply At
1-hour mean	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access
10-minute mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer	-

2.2.6 Local Air Quality Management

Part IV of the Environment Act 1995 requires local authorities to undergo a process of Local Air Quality Management (LAQM). This requires local authorities to Review and Assess air quality within their boundaries to determine the likeliness of compliance, regularly and systematically.

Where any of the prescribed AQS objectives are not likely to be achieved, the authority must designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to prepare an Air Quality Action Plan (AQAP), which details measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the objective. Local authorities therefore have formal powers to control air quality through a combination of LAQM and through application of wider planning policies.

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their LAQM work[8]. This guidance, referred to in this report as LAQM.TG(22), has been used where appropriate in the assessment presented here.

2.3 Protection of Nature Conservation Sites

Sites of nature conservation importance at an international, national, and local level, are provided environmental protection from developments, including from atmospheric emissions. Standards for the protection of ecological receptors are known as Critical Levels (C_{Le}) (for airborne concentrations) and Critical Loads (C_{Lo}) (for deposition rates).

The AERA guidance requires that ecological habitats should be assessed against relevant standards if they are located within the following set distances from the Installation:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Ramsar sites within 10km of the Installation; and
- Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNR), Local Nature Reserves (LNR), Local Wildlife Sites (LWS), Ancient Woodland (AW) and Sites of Importance for Nature Conservation (SINC) within 2km of the Installation.

2.3.1 Critical Levels (C_{Le})

C_{Le} are a quantitative estimate of exposure to one or more airborne pollutants in gaseous form, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. The relevant C_{Le} for the protection of vegetation and ecosystems are presented in Table 2-3.

[8] Local Air Quality Management Technical Guidance (TG22), Published by Defra in partnership with the Scottish Government, Welsh Government and Department of Agriculture, Environment and Rural Affairs. May 2025.

Table 2-3: Critical Levels for the Protection of Vegetation and Ecosystems

Pollutant	C_{Le} ($\mu g/m^3$)	Habitat and Averaging Period
NOx	30	Annual mean (all ecosystems)
	200 (A)	Daily mean (all ecosystems)
Ammonia (NH_3)	1 – 3	Annual mean (1$\mu g/m^3$ where lichens or bryophytes are present and 3$\mu g/m^3$ elsewhere)
Table note: (A) 200$\mu g/m^3$ is accepted as the daily mean C_{Le} where the baseline ozone concentrations are below the AOT40 C_{Le} of 6000$\mu g/m^3$ and SO_2 is below the lower C_{Le} of 10$\mu g/m^3$.		

2.3.2 Critical Loads (C_{Lo})

C_{Lo} are a quantitative estimate of exposure to deposition of one or more pollutants, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. C_{Lo} are set for the deposition of various substances to sensitive ecosystems. In relation to combustion emissions C_{Lo} for acidification are relevant which can occur via both wet and dry deposition; however, on a local scale only dry (direct deposition) is considered significant. Deposition of nitrogen can cause eutrophication and acidification; the relevant C_{Lo} are presented in Section 4.3.

3.0 Assessment Methodology

3.1 Dispersion Modelling

3.1.1 Dispersion Model

The US American Meteorological Society and Environmental Protection Agency Regulatory Model (AERMOD v13) dispersion model has been used for the assessment. This model is widely used and accepted by the EA for undertaking such assessments and its predictions have been validated against real-time monitoring data.

Model validation studies for AERMOD generally suggest that for the vast majority of cases it is able to predict maximum short term high percentiles concentrations well within a factor of two; the latest evaluation study for AERMOD[9] shows the composite (geometric mean) ratio of predicted to observed short-term averages from 'test sites' (where real-time monitoring data has been undertaken to validate model performance), between 0.96 and 1.2.

3.1.2 Model Domain / Receptors

The modelling of discrete sensitive receptor locations as described in Section 4.2 was undertaken to assess long-term impacts and the probability of short-term impacts at relevant exposure locations.

The modelling has been undertaken using a receptor grid across OpenSource mapping data of the study area. Impact isopleths have been generated by interpolation between receptor points and superimposed onto the map. A receptor grid was applied extending 2km from the Site as follows:

- 200m x 200m at 20m grid resolution;
- 500m x 500m at 50m grid resolution;
- 1000m x 1000m at 100m grid resolution; and
- 2000m x 2000m at 200m grid resolution.

3.1.3 Topography

The presence of elevated terrain can significantly affect the dispersion of pollutants and the resulting ground level concentration in a number of ways. Elevated terrain reduces the distance between the plume centre line and the ground level, thereby increasing ground level concentrations. Elevated terrain can also increase turbulence and, hence, plume mixing with the effect of increasing concentrations near to a source and reducing concentrations further away.

AERMOD utilises digital elevation terrain data to determine the impact of topography on dispersion from a source. Topography was incorporated within the modelling using UK National Transfer Format (NTF) terrain data. Data was processed by the AERMAP function within AERMOD to calculate terrain heights (see Figure 4-4).

3.1.4 Building Downwash

Building downwash occurs when turbulence, induced by nearby structures, causes pollutants emitted from an elevated source to be displaced and dispersed rapidly towards the ground, resulting in elevated ground level concentrations. Building downwash has been

[9] U.S. Environmental Protection Agency AERMOD Model Formulation and Evaluation EPA-454/R-18-003 (April, 2018).

considered for buildings that have a maximum height equivalent to at least 40% of the emission height and which are within a distance defined as five times the lesser of the height or maximum projected width of the building.

The integrated Building Profile Input Programme (BPIP) module within AERMOD was used to assess the potential impact of building downwash upon predicted dispersion characteristics. Buildings input to the model are represented in Figure 3-1.

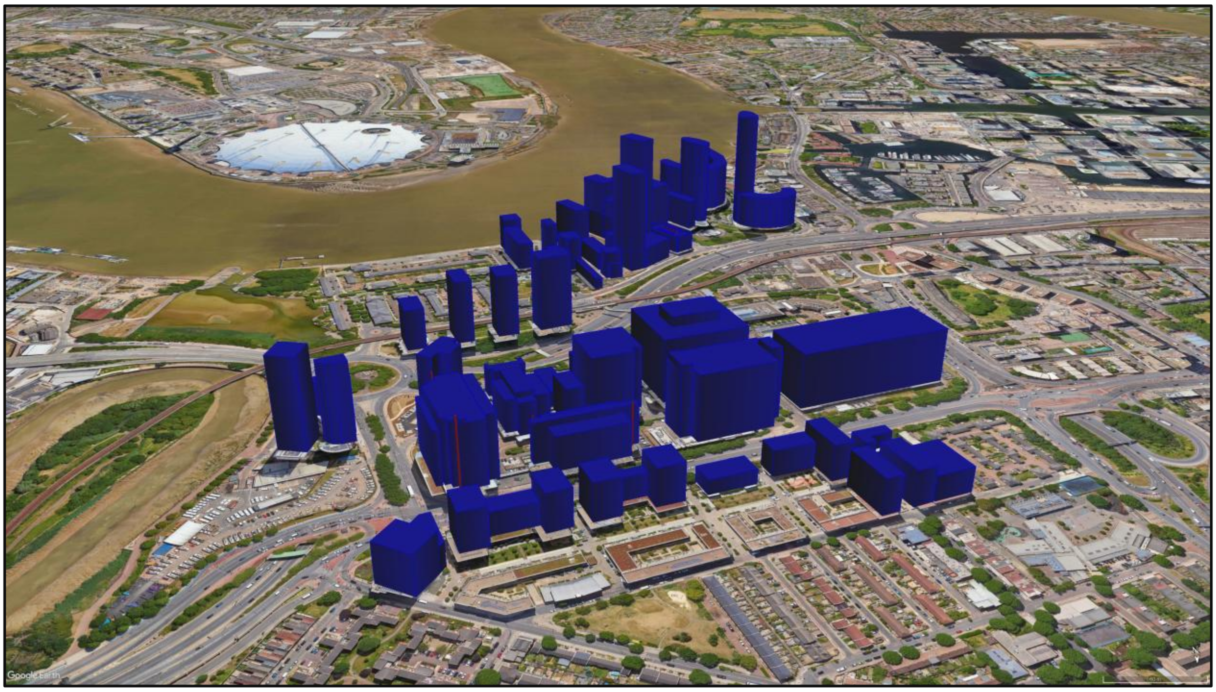

Figure 3-1: Modelled Buildings

3.1.5 Dispersion Coefficients

The 'urban' option for dispersion coefficients was selected in accordance with AERMOD guidance[10].

3.1.6 Meteorological Data and Preparation

London City Airport station, located approximately 4.8km to the east of the Installation, provides a representative data set for the purposes of this assessment. A windrose is presented in Figure 4-3.

The meteorological data (covering the period 2020 to 2024 inclusive) was obtained in .met format and converted to the required surface and profile formats for use in AERMOD using AERMET View meteorological pre-processor. Details specific to the meteorological station location were used to define surface roughness, albedo and bowen ratio in the conversion (Table 3-1).

Table 3-1: Applied Surface Characteristics

Albedo	Bowen Ratio	Surface Roughness (m) (A)
0.17	0.93	1.0
Table note: (A) Default value of 1.0m defined by urban dispersion coefficient		

[10] EPA, AERMOD Implementation Workgroup, Aermod Implementation Guide (August 3, 2015).

3.1.7 NO_x Conversion Ratios

The conversion ratios of NO_x to NO_2 have been applied considering the NO_x emission concentration per SBG and the total number of SBGs operating, as follows:

- West 2 SBGs operating alone (see Table 3-2): The West 2 building is fitted with SCR abatement reducing NO_x concentrations to approximately 500mg/Nm^3 (at 5% O_2). For West 2 SBG emissions with SCR fully effective the Specified Generator modelling guidance[3] conversion ratio of 35% has been applied. When SCR is not fully effective and emissions are initially ~3000mg/Nm^3 (at 5% O_2), a conversion ratio of 15% of NO_x to NO_2 has been applied as described in an EA research publication[11]. As per the EA research, the conversion has been applied as an indicative worst case, and fits within the EA sensitivity analysis parameters, i.e. NO_2 and ozone based on London urban industrial site, key impacts of concern are within 500m, and high NO_x emissions.
- 'Whole campus' outage scenario (see Table 3-2): due to the SBGs operating totalling ~124MWth input, and including SBGs with high NOx emissions, a conversion ratio of 15% of NO_x to NO_2 has been applied at TN, and 35% at the more remote TS.
- NO impacts: a short term conversion ratio of NOx to NO of 90% has been applied following an EA decision document[12].
- Annual mean NO_2 impacts: assessed by applying a NO_x to NO_2 conversion ratio of 70% following EA guidance[3].

Table 3-2: Short-term NO_x : NO_2 Ratios

Scenario / SBG Operating Condition	NOx : NO_2 Conversion Ratio	Rationale
West 2 SBGs operating alone with SCR fully effective	35%	SBGs in operation at NOx concentrations ~500mg/Nm^3 (at 5% O_2).
West 2 SBGs operating alone with SCR not fully effective / warm-up.	15%	Approximately 90MWth input of SBGs in operation at NOx concentrations ~3000mg/Nm^3 (at 5% O_2).
TN Data Centres - Outage	15%	Approximately ~124MWth input of SBGs in operation at NOx concentrations >2000mg/Nm^3 (at 5% O_2) within ~150m radius from each other, and receptors within 100m.
TS - Outage	35%	Situated ~400m south of TN with SCR reducing concentrations to 236mg/Nm^3 (at 5% O_2).

3.1.8 Deposition Modelling

Deposition rates were calculated using empirical methods recommended by the EA AQTAG06[13]. Dry deposition flux was calculated using the following equation:

Dry deposition flux (µg/m^2/s) = ground level concentration (µg/m^3) x deposition velocity (m/s)

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[11] AQMAU reference: AQMAU-C1457-RP01. Project title: Diesel generator short term NO2 impact Assessment (01/11/2016)

[12] Permitting Decisions- Variation EPR/EP3507SL/V002 (19/12/2024)

[13] AQTAG06 – Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air. Environment Agency, March 2014 version.

Wet deposition occurs via the incorporation of the pollutant into water droplets which are then removed in rain or snow, and is not considered significant over short distances (AQTAG06) compared with dry deposition and therefore for the purposes of this assessment, wet deposition has not been considered consistent with AQTAG06.

The applied deposition velocities for the relevant chemical species are as shown in Table 3-3.

Table 3-3: Applied Deposition Velocities

Chemical Species	Recommended deposition velocity (m/s)	
NO_2	Grassland	0.0015
	Woodland	0.0030

The predicted deposition rates were converted from µg/m^2/s to units of nitrogen deposition and acid equivalent deposition as detailed in Table 3-4.

Table 3-4: Applied Deposition Conversion Factors

	Conversion from NO_2 µg/m^2/s to:	Factor
N deposition	N kg/ha/year	95.9
Acid deposition	kg_{eq}/ha/year	6.84

3.2 Assessment of Impacts

3.2.1 Treatment of Model Output

The assessment of impacts against the AQALs as defined in Section 2.2 has been undertaken using model output as described in Table 3-5 below.

Table 3-5: Model Outputs

AQAL being assessed	Model Output – Process Contribution (PC)	Predicted Environmental Concentration (PEC)
NO_2 1-hour mean. Not to be exceeded more than 18 times a calendar year	99.79%ile of 1-hour means. Sources modelled as NO_2 based on NO_x:NO_2 conversion ratio (Section 3.1.7). Threshold violation file (threshold set at 200µg/m^3 minus 2x annual mean background) counts number of hours per annum exceeding threshold.	Probability of exceedance calculated as per Section 3.2.2.
NO_2 1-hour mean (US AEGL-1)	Sources modelled as NO_2 based on NO_x:NO_2 conversion ratio (Section 3.1.7). Threshold violation file (threshold set at 956µg/m^3 minus 2x annual mean background) counts number of hours per annum exceeding threshold.	Probability of exceedance calculated as per Section 3.2.2.
NO_2 10-min mean (US AEGL-1)	As above. PC and threshold violation file factored by 1.34	Probability of exceedance calculated as per Section 3.2.2.
NO 1-hour mean (EAL)	Modelled as NOx. PC factored for NO_x:NO_2 conversion ratio (Section 3.1.7).	PC + 2 x annual mean background

AQAL being assessed	Model Output – Process Contribution (PC)	Predicted Environmental Concentration (PEC)
NO_2 Annual Mean	Annual mean from 5 met. years (factored for operational hours) PC factored for 70% of NO_x present as NO_2	PC + annual mean background
NO_x Daily Mean C_{Le}	1-hour NO_x 100%ile factored to length of test.	PC + 2 x annual mean background
NO_x Annual Mean C_{Le}/C_{Lo}	Annual mean from 5 met. years (factored for operational hours)	PC + annual mean background

3.2.2 Statistical Analysis of Short-Term Impacts

To assess the likelihood of exceedances of the standards occurring from the infrequent operation of the SBGs, the following approach has been adopted:

- The impact of the SBGs has been modelled for 8,760 hours of the year to ensure that the operating hours coincide with the worst-case dispersal conditions with the model set to count the number of exceedance hours (threshold violation file in AERMOD).
- For the 1-hour mean 99.79%ile, the 'hypergeometric probability distribution' approach as defined in EA guidance[3] has been applied. The cumulative distribution factor of 2.5 is applied in the case of consecutive operating hours.
- For the 1-hour maximum (and 10-minute maximum) averaging periods, the cumulative probability has been applied (number of exceedances / valid meteorological hours x number of operating hours or start-up events).

The EA guidance provides the following framework to apply to the calculated probability of impacts occurring:

- Probabilities of 1% or less indicate exceedances are highly unlikely;
- Probabilities of less than 5% indicate exceedances are unlikely; and
- Probabilities of 5% or more indicate there is potential for the exceedances and may not be considered acceptable on a case-by-case basis.

3.2.3 Assessment of Annual Mean Impact

In accordance with the EA's AERA guidance, the impact is considered to be insignificant or negligible if the long-term process contribution is <1% of the long term AQAL. For process contributions that cannot be considered insignificant further assessment has been undertaken and the Predicted Environmental Concentration (PEC: PC + existing background pollutant concentration) is determined for comparison as a percentage of the relevant AQAL.

3.2.4 Assessment of Impacts on Vegetation and Ecosystems

3.2.4.1 Calculation of PC as a percentage of Acid Critical Load Function

The calculation of the process contribution of N to the acid CLo function has been carried out according to the guidance on the Air Pollution Information System (APIS), which is as follows:

> "*The potential impacts of additional sulphur and/or nitrogen deposition from a source are partly determined by PEC, because only if PEC of nitrogen deposition is greater than CLminN will the additional nitrogen deposition from the source*

contribute to acidity. Consequently, if PEC is less that CLminN only the acidifying affects of sulphur from the process need to be considered:

Where PEC N Deposition < CLminN

*PC as % CL function = (PC S deposition/CLmaxS)*100*

Where PEC is greater than CLminN (the majority of cases), the combined inputs of sulphur and nitrogen need to be considered. In such cases, the total acidity input should be calculated as a proportion of the CLmaxN.

Where PEC N Deposition > CLminN

*PC as %CL function = ((PC of S+N deposition)/CLmaxN)*100"*

3.2.4.2 Significance of Effect on Ecological Receptors

In addition to the AERA guidance, the EA's Operational Instruction 66_12[14] details how the air quality impacts on ecological sites should be assessed. This guidance provides risk-based screening criteria to determine whether impacts will have 'no likely significant effects (alone and in-combination)' for International sites, 'no likely damage' for SSSIs, or 'no significant pollution' for other sites, as follows:

- PC does not exceed 1% long-term C_{Le} and/or C_{Lo} or that the PEC does not exceed 70% long-term C_{Le} and/or C_{Lo} for International sites and SSSIs;
- PC does not exceed 10% short-term C_{Le} for NOx for International sites and SSSIs;
- PC does not exceed 100% long-term C_{Le} and/or C_{Lo} for other conservation sites; and
- PC does not exceed 100% short-term C_{Le} for NO_x (if applicable) for other conservation sites.

Where impacts cannot be classified as resulting in 'no likely significant effect', more detailed assessment may be required depending on the sensitivity of the feature in accordance with the EA's Operational Instruction 67_12[15]. This can require the consideration of the potential for in-combination effects, the actual distribution of sensitive features within the site, and local factors (such as the water table).

The guidance provides the following further criteria:

- If the PEC does not exceed 100% of the appropriate limit it can be assumed there will be no adverse effect;
- If the background is below the limit, but a small PC leads to an exceedance – decision based on local considerations;
- If the background is currently above the limit and the additional PC will cause a small increase – decision based on local considerations;
- If the background is below the limit, but a significant PC leads to an exceedance – cannot conclude no adverse effect; and
- If the background is currently above the limit and the additional PC is large – cannot conclude no adverse effect.

[14] EA Working Instruction 66_12 – Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation.

[15] EA Working Instruction 67_12 – Detailed assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation.

4.0 Baseline Environment

4.1 Baseline Air Quality

4.1.1 LAQM Review and Assessment

The Installation is located within the administrative boundary of the London Borough of Tower Hamlets (LBoTH). In December 2000, the whole borough was declared an AQMA for the annual mean NO_2 AQAL, known as the 'Tower Hamlets AQMA'.

The administrative boundaries of the London Borough of Newham and the Royal Borough of Greenwich are located within 200m of the Installation. As with LBoTH, the whole boroughs are declared as AQMAs for the annual mean NO_2 AQAL.

4.1.2 Review of Air Quality Monitoring

The Air Quality Annual Status Reports for the boroughs[16,17] have been reviewed and the results from nearby monitors are presented in Table 4-1 and Table 4-2. Results from background automatic monitors are also presented. The locations of the monitors relative to the Installation are displayed in Figure 4-1.

Annual mean NO_2 concentrations at the automatic monitors were well below (i.e. <75%) the AQAL in 2023 and 2024 and there were no exceedances of the hourly limit (200µg/m^3). Only one monitoring location (kerbside site 74) has recorded an annual mean NO_2 concentration above the AQAL (40µg/m^3).

Table 4-1: LAQM Air Quality Monitoring Annual Mean Results

ID	Site Type	Annual Mean NO_2 Concentration (µg/m^3)	
		2023	2024
Automatic			
TH001	Background	17.0	14.0
TH004	Roadside	28.0	30.6
NEW3	Background	20.0	17.0
Diffusion Tube			
72	Kerbside	28.5	25.3
73	Kerbside	21.6	16.9
74	Kerbside	50.4	42.5
76	Kerbside	31.4	25.8
84	Roadside	27.5	24.7
85	Kerbside	29.7	28.2
86	Kerbside	21.4	16.8
91	Kerbside	23.6	23.8
92	Roadside	29.2	20.8

[16] London Borough of Tower Hamlets Air Quality Annual Status Report for 2024, June 2025.

[17] London Borough of Newham Air Quality Annual Status Report for 2024, June 2025.

Table 4-2: LAQM Air Quality Monitoring 1-Hour Mean Results

ID	Site Type	Number of Hourly NO_2 Means >200µg/m³	
		2023	2024
TH001	Background	0	0
TH004	Background	0	0
NEW3	Roadside	0	0

4.1.3 Defra Mapped Background Concentrations

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution which is routinely used to support LAQM requirements and air quality assessments. The data sets include annual average background concentration estimates for NO_2 using a reference year of 2021 (the year in which comparisons between modelled and monitored concentrations are made), which can be projected to future years. The 2025 projections for the grid squares covering the Installation and human receptor locations are presented in Table 4-3.

Table 4-3: Defra Modelled 2025 Background Concentrations

Grid Square (X, Y)	Annual Mean NO_2 Background Concentration (µg/m³)
538500, 180500	25.3
538500, 181500	22.6
539500, 181500	22.3

4.1.4 Application of Baseline Data

Following initial modelling it is evident that the greatest process contributions from the SBGs occur at the upper stories of multi-storey buildings. Background concentrations reduce with height, particularly where local pollution sources are at ground level (i.e. roads). This has been demonstrated in research[18], in which diffusion tubes placed from ground floor to seventh floor found a ground floor annual mean of 50µg/m³, with incremental reductions to third floor at which point concentrations varied but remained below 31.5µg/m³, i.e. approximately 65% of the ground floor concentration.

On this basis, the highest 2025 Defra mapped background concentration (25.3µg/m³) has been applied, which is precautionary considering the background concentrations from Local Authority monitoring data (i.e. 20µg/m³ or less at background sites), with a reduction applied to account for the height of receptors resulting in an annual mean of 16.4µg/m³ for receptors at 10.5m and above. This value has been used in the threshold violation files calculation for assessment of the probability of exceedance of the 1-hour AQAL and AEGL-1.

[18] Air Quality Consultants, Variation in NO_2 Concentrations with Height, and Implications for Planning, Ricky Gellatly, IAPSC Conference, 9th June 2015.

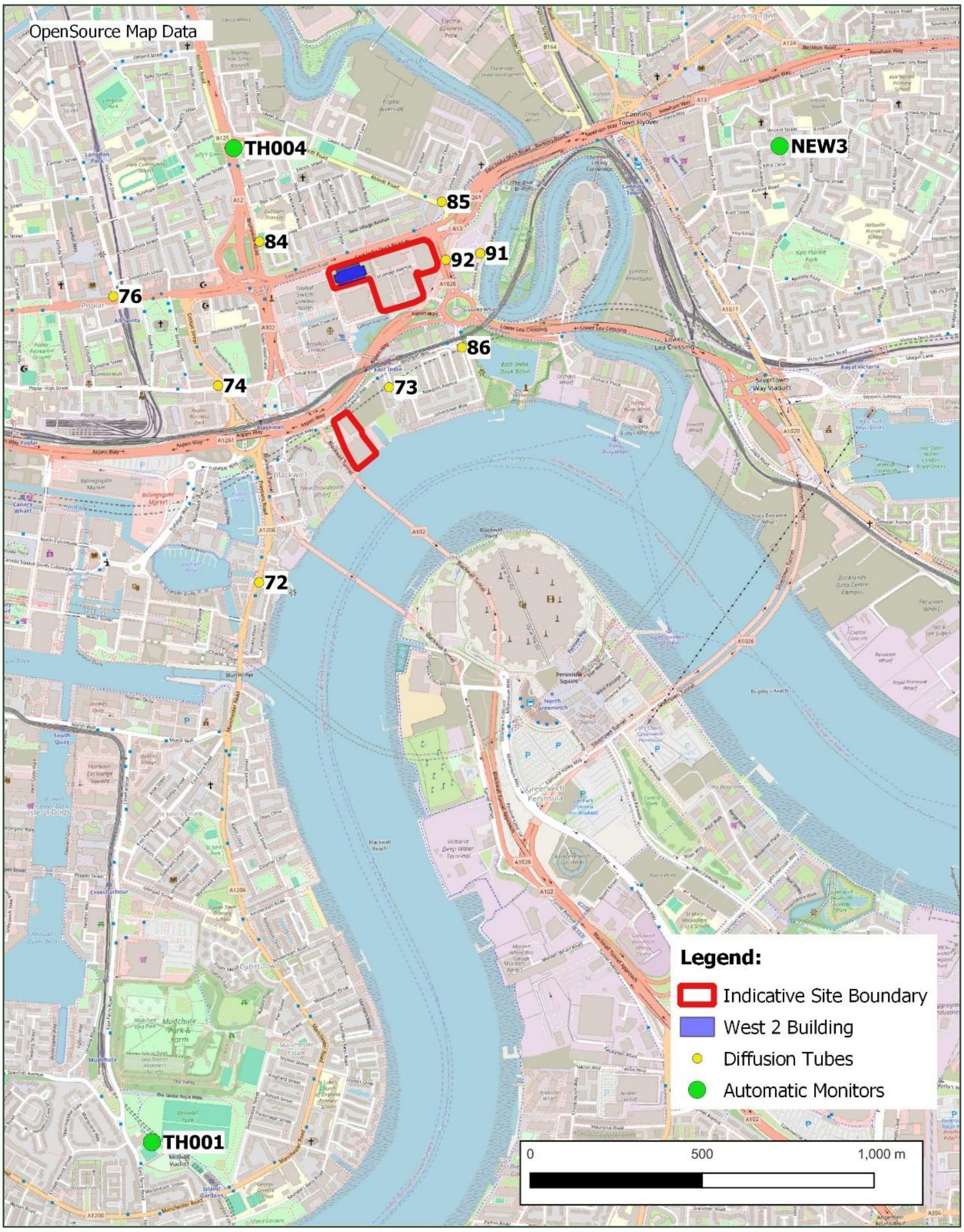

Figure 4-1: Site Setting and Air Quality Monitoring Locations

4.2 Sensitive Receptors

4.2.1 Human Receptors

The site surroundings include residential buildings, both standard 2-storey houses predominantly in the urban area to the north, and multi-storey residential buildings in all directions. These residential receptors were modelled at 1.5m above ground level (if relevant), and at subsequent intervals representative of floor levels. In addition, there are amenity areas at ground level that are relevant short-term receptor locations. A total of 1053 individual human receptor locations were modelled.

Table 4-4: Modelled Human Receptor Locations

Report Ref.	Model Ref.	Description	Flagpole Heights (Min. to Max. m Above Ground Level)	Relevant Averaging Period
HR1	DR1-2	Aberfeldy E14	1.5 – 18.0	All (Long and Short-term)
HR2	DR3-4	Waterman's House	1.5 – 27.0	All (Long and Short-term)
HR3	DR5-6	Sailors House	1.5 – 27.0	All (Long and Short-term)
HR4	DR7-10	Glass Blower's House	1.5 – 27.0	All (Long and Short-term)
HR5	DR11-12	Julius House	1.5 – 12.0	All (Long and Short-term)
HR6	DR13-14	Jones House	1.5 – 12.0	All (Long and Short-term)
HR7	DR15-16, DR1043	Culloden School	1.5 – 6.0	All (Long and Short-term)
HR8	DR17-22, DR581-603	Elektron Tower	1.5 – 67.5	All (Long and Short-term)
HR9	DR23-30, DR604-624	Proton Tower	1.5 – 70.0	All (Long and Short-term)
HR10	DR31-37	Neutron Tower	1.5 – 60.0	All (Long and Short-term)
HR11	DR38-43	Switch Tower	1.5 – 60.0	All (Long and Short-term)
HR12	DR44-52, DR1052	Saffron Avenue (amenity space)	1.5	Short-term only
HR13	DR53	Train Station	1.5	Short-term only
HR14	DR54-109	Travel Lodge (new)	1.5 – 60.0	Short-term only
HR15	DR110-172	Orchard Wharf (new)	1.5 – 80.0	All (Long and Short-term)
HR16	DR173-192	Radisson Blu Edwardian	4.5 – 31.5	Short-term only
HR17	DR193-258	Ontario Tower	1.5 – 97.5	All (Long and Short-term)
HR18	DR259-312	Radisson Blu Edwardian New Providence Wharf	1.5 – 52.5	Short-term only
HR19	DR313-383	Charrington Tower	1.5 – 133.5	All (Long and Short-term)
HR20	DR384-401	Michigan Building	1.5 – 25.5	All (Long and Short-term)
HR21	DR402-426	Streamlight Tower	1.5 – 73.5	All (Long and Short-term)
HR22	DR427-452	Royal Captain Court	1.5 – 76.5	All (Long and Short-term)
HR23	DR453-477	Prestons Road	1.5 – 73.5	All (Long and Short-term)
HR24	DR478-481	Naval House	1.5 – 10.5	All (Long and Short-term)
HR25	DR482-485	Pumping House	1.5 – 10.5	All (Long and Short-term)
HR26	DR486-493	Newport Avenue	1.5 – 10.5	All (Long and Short-term)
HR27	DR494-505	Wingfield Court	1.5 – 34.5	All (Long and Short-term)
HR28	DR506-517	Longitude House	1.5 – 34.5	All (Long and Short-term)
HR29	DR518-529	Wotton Court	1.5 – 34.5	All (Long and Short-term)

Report Ref.	Model Ref.	Description	Flagpole Heights (Min. to Max. m Above Ground Level)	Relevant Averaging Period
HR30	DR530-539	Studley Court	1.5 – 28.5	All (Long and Short-term)
HR31	DR540-548	Explorers Court	1.5 – 25.5	All (Long and Short-term)
HR32	DR549-552	Sexton Court	1.5 – 10.5	All (Long and Short-term)
HR33	DR553-560	Bartholomew Court	1.5 – 22.5	All (Long and Short-term)
HR34	DR561-565	Bridge Court	1.5 – 13.5	All (Long and Short-term)
HR35	DR566-570	Settlers Court	1.5 – 13.5	All (Long and Short-term)
HR36	DR571-580	Adventurers Court	1.5 – 28.5	All (Long and Short-term)
HR37	DR625-1018	Hadley Application	1.5 – 133.5	All (Long and Short-term)
HR38	DR1019-1020	Artisans House	1.5 – 27.0	All (Long and Short-term)
HR39	DR1021-1022	Traders House	1.5 – 27.0	All (Long and Short-term)
HR40	DR1023-1024	Landing Waters House	1.5 – 27.0	All (Long and Short-term)
HR41	DR1025-1026	Chain Makers House	1.5 – 12.0	All (Long and Short-term)
HR42	DR1027-1028	Drum Makers House	1.5 – 12.0	All (Long and Short-term)
HR43	DR1029-1030	Accra Close	1.5 – 12.0	All (Long and Short-term)
HR44	DR1031	DLR Station Blackwall	1.5	Short-term only
HR45	DR1032	DLR Station East India	1.5	Short-term only
HR46	DR1033	Virginia Quay Park	1.5	Short-term only
HR47	DR1034	Outdoor Eating	1.5	Short-term only
HR48	DR1035-1036	Flour Millers House	1.5 – 30.0	All (Long and Short-term)
HR49	DR1037-1038	Franklin House	1.5 – 12.0	All (Long and Short-term)
HR50	DR1039-1040	Wharf View Court	1.5 – 12.0	All (Long and Short-term)
HR51	DR1041-1042	Aberfeldy Street	1.5 – 30.0	All (Long and Short-term)
HR52	DR1044	Braithwaite Park	1.5	Short-term only
HR53	DR1045	Bow Creek Ecology Park	1.5	Short-term only
HR54	DR1046-1047	Woolmore Primary School	1.5 – 12.0	All (Long and Short-term)
HR55	DR1048	Robin Hood Lane	1.5	All (Long and Short-term)
HR56	DR1049	Robin Hood Gardens	1.5	Short-term only
HR57	DR1050	Jessop Building Playpark	1.5	Short-term only
HR58	DR1051	Fortrose Close Park	1.5	Short-term only
HR59	DR1053	Athol Square	1.5	All (Long and Short-term)

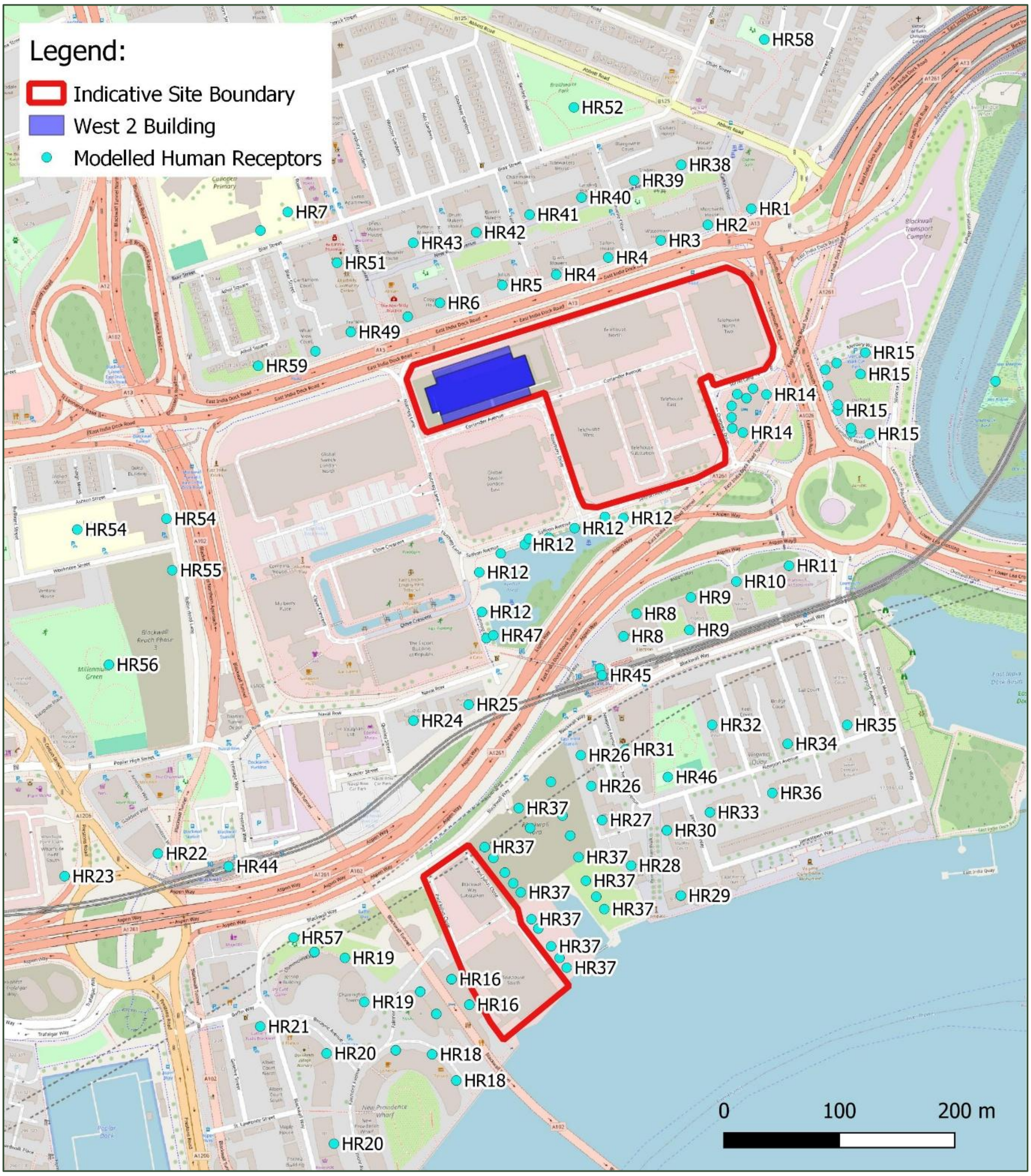

Figure 4-2: Modelled Human Receptors

4.2.2 Ecological Receptors

Designated sites within the set screening distance are presented in Table 4-5. These sites have been informed by the Nature and Heritage Conservation Screening Report received from the EA.

Table 4-5: Ecological Receptors

Interest Status	Site (Designation)	Ref.
European	Lee Valley (SPA and Ramsar)	ER1
European	Epping Forest (SAC)	ER2

Interest Status	Site (Designation)	Ref.
Local	Cameron Community Garden (SINC / LWS)	ER3
	Poplar Dock (SINC / LWS)	ER4
	Blackwall Basin (SINC / LWS)	ER5
	Millwall and West India Docks (SINC / LWS)	ER6
	Millwall Park (SINC / LWS)	ER7
	Mudchute Park Farm / Mudchute Farm and Park (LNR and SINC) [A]	ER8
	East India Dock Basin (SINC / LWS)	ER9
	Saffron Avenue Pond (SINC / LWS)	ER10
	Robin Hood Gardens (SINC / LWS)	ER11
	Cyril Jackson School Nature Area (SINC / LWS)	ER12
	St Anne’s Churchyard, Limehouse (SINC / LWS)	ER13
	London’s Canals (SINC / LWS)	ER14
	Mile End Park (SINC / LWS)	ER15
	Bromley-by-Bow War Memorial Wood (SINC / LWS)	ER16
	Lea Valley (SINC / LWS)	ER17
	River Thames and tidal tributaries (SINC / LWS)	ER18
	Greenwich Ecology Park and Southern Park (SINC / LWS)	ER19
	Bow Creek Ecology Park (SINC / LWS)	ER20
	Thames Wharf (SINC / LWS)	ER21
	Royal Docks (SINC / LWS)	ER22
	Lyle Park (SINC / LWS)	ER23
	Fun Forest (SINC / LWS)	ER24
	Star Park (SINC / LWS)	ER25
	Durand’s Wharf (SINC / LWS)	ER26
	Transco Rough (SINC / LWS)	ER27
	DLR Corridor (SINC / LWS)	ER28
	East London Cemetery (SINC / LWS)	ER29
	DLR Corridor (SINC / LWS)	ER30
	Bow Creek/River Lea (SINC / LWS)	ER31
	Channelsea Island (SINC / LWS)	ER32
	The Greenway and Old Ford Nature Reserve (SINC / LWS)	ER33
	Ackroyd Drive LNR	ER34
	Tower Hamlets Cemetery Park / Ackroyd Drive Link (LNR)	ER35
	Bow Back River	ER36
	Old Railway at Fairfoot Road	ER37
Table note: [A] These sites fully overlap and therefore have been assessed together.		

4.3 Baseline Conditions at Ecological Receptors

The APIS is a support tool for assessment of potential effects of air pollutants on habitats and species developed in partnership by the UK conservation agencies and regulatory agencies and the Centre for Ecology and Hydrology.

APIS, and the UK-AIR website[19], in addition to online literature sources and satellite imagery has been used to provide information on:

- Identification of whether the habitats present are sensitive to effects caused by potential emissions;
- Current baseline concentrations, C_{Lo} and current deposition rates (Table 4-6 and Table 4-7); and
- Baseline ozone concentration for the area (2024 AOT of 4388 µg/m^3 hours / AOT of 3985 µg/m^3 hours averaged over 5 years for LBoTH and therefore compliant).

For locally designated ecological sites, the APIS 'Search by Location' function was utilised to obtain the above information. The NGR of maximum impact on the NO_x C_{Le} during testing and maintenance was used as the input.

On the basis that annual mean SO_2 and ozone concentrations are below their respective C_{Le}, the 24-hour mean C_{Le} of 200µg/m^3 has been applied in the assessment in line with AERA guidance.

Table 4-6: NO_x, SO_2, Nitrogen Critical Loads and Current Loads

Ref.	Habitat Critical Load Class (most sensitive)	APIS Background (µg/m^3)			Critical Load Applied (kgN/ha/yr)	Current Load (kgN/ha/yr)
		NO_x	SO_2	NH_3		
ER1	Rich fens	33.60	2.10	1.20	15	14.3
ER2	Fagus woodland	30.48	1.95	1.17	10	26.3
ER3	Low and medium altitude hay meadows	40.50	2.49	1.19	10	13.9
ER4	Broadleaved deciduous woodland	52.55	2.53	1.17	10	25.5
ER5	Low and medium altitude hay meadows	52.55	2.53	1.17	10	13.9
ER6	Low and medium altitude hay meadows	47.24	3.10	1.18	10	13.9
ER7	Low and medium altitude hay meadows	35.94	2.21	1.16	10	13.3
ER8	Broadleaved deciduous woodland	41.54	2.40	1.17	10	25.4
ER9	Low and medium altitude hay meadows	52.55	2.53	1.17	10	13.9
ER10	Broadleaved deciduous woodland	52.55	2.53	1.17	10	25.5
ER11	Low and medium altitude hay meadows	52.55	2.53	1.17	10	13.9
ER12	Low and medium altitude hay meadows	41.47	2.27	1.19	10	13.9
ER13	Broadleaved deciduous woodland	41.47	2.27	1.19	10	25.5
ER14	Low and medium altitude hay meadows	40.50	2.49	1.19	10	13.9
ER15	Low and medium altitude hay meadows	41.57	2.36	1.20	10	13.9
ER16	Broadleaved deciduous woodland	39.71	2.34	1.19	10	25.5

[19] https://uk-air.defra.gov.uk/data/compliance-map/ (accessed 20/02/2026)

Ref.	Habitat Critical Load Class (most sensitive)	APIS Background ($\mu g/m^3$)			Critical Load Applied (kgN/ha/yr)	Current Load (kgN/ha/yr)
		NO_x	SO_2	NH_3		
ER17	Low and medium altitude hay meadows	39.71	2.34	1.19	10	13.9
ER18	Low and medium altitude hay meadows	52.55	2.53	1.17	10	13.9
ER19	Broadleaved deciduous woodland	41.48	2.44	1.15	10	25.0
ER20	Broadleaved deciduous woodland	44.62	2.37	1.17	10	25.5
ER21	Low and medium altitude hay meadows	41.16	2.35	1.16	10	13.9
ER22	Low and medium altitude hay meadows	37.93	2.50	1.19	10	13.6
ER23	Low and medium altitude hay meadows	37.84	2.73	1.19	10	13.6
ER24	Broadleaved deciduous woodland	38.24	2.57	1.15	10	25.2
ER25	Low and medium altitude hay meadows	44.62	2.37	1.17	10	13.9
ER26	Low and medium altitude hay meadows	37.73	2.26	1.18	10	13.6
ER27	Broadleaved deciduous woodland	39.71	2.34	1.19	10	25.5
ER28	Low and medium altitude hay meadows	44.62	2.37	1.17	10	13.9
ER29	Low and medium altitude hay meadows	35.69	2.65	1.17	10	13.5
ER30	Low and medium altitude hay meadows	41.16	2.35	1.16	10	13.9
ER31	Low and medium altitude hay meadows	45.36	2.44	1.18	10	13.8
ER32	Broadleaved deciduous woodland	39.71	2.34	1.19	10	25.5
ER33	Low and medium altitude hay meadows	35.69	2.65	1.17	10	13.5
ER34	Low and medium altitude hay meadows	41.57	2.36	1.20	10	14.0
ER35	Broadleaved deciduous woodland	40.10	2.33	1.21	10	26.6
ER36	Low and medium altitude hay meadows	39.61	2.28	1.20	10	13.9
ER37	Broadleaved deciduous woodland	40.38	2.39	1.20	10	14.2

Table 4-7: Acid Critical Load Functions and Current Loads

Ref.	Habitat Critical Load Class (most sensitive)	Critical Load Function (kg_{eq}/ha/yr)			Current Load (kg_{eq}/ha/yr)	
		CLmaxS	CLminN	CLmaxN	N	S
ER1	Calcareous grassland	4.13	0.44	4.57	1.02	0.20
ER2	Unmanaged Broadleafed/Coniferous Woodland	2.65	0.36	3.01	1.88	0.22
ER3	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER4	Broadleafed/Coniferous unmanaged woodland	8.32	0.36	8.67	1.82	0.23
ER5	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER6	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER7	Calcareous grassland (using base cation)	4.00	1.07	5.07	0.95	0.17
ER8	Broadleafed/Coniferous unmanaged woodland	8.32	0.36	8.67	1.82	0.23
ER9	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19

Ref.	Habitat Critical Load Class (most sensitive)	Critical Load Function (kg_{eq}/ha/yr)			Current Load (kg_{eq}/ha/yr)	
		CLmaxS	CLminN	CLmaxN	N	S
ER10	Broadleafed/Coniferous unmanaged woodland	8.32	0.36	8.67	1.82	0.23
ER11	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER12	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER13	Broadleafed/Coniferous unmanaged woodland	8.32	0.36	8.68	1.87	0.24
ER14	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER15	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER16	Broadleafed/Coniferous unmanaged woodland	8.32	0.36	8.67	1.82	0.23
ER17	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER18	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER19	Broadleafed/Coniferous unmanaged woodland	8.31	0.36	8.67	1.79	0.23
ER20	Broadleafed/Coniferous unmanaged woodland	8.32	0.36	8.67	1.82	0.23
ER21	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER22	Calcareous grassland (using base cation)	4.00	1.07	5.07	0.96	0.18
ER23	Calcareous grassland (using base cation)	4.00	1.07	5.07	0.93	0.17
ER24	Broadleafed/Coniferous unmanaged woodland	8.30	0.36	8.66	1.80	0.23
ER25	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER26	Calcareous grassland (using base cation)	4.00	1.07	5.07	0.95	0.17
ER27	Broadleafed/Coniferous unmanaged woodland	8.32	0.36	8.67	1.82	0.23
ER28	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER29	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER30	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER31	Calcareous grassland (using base cation)	4.00	1.07	5.07	0.98	0.19
ER32	Broadleafed/Coniferous unmanaged woodland	8.32	0.36	8.67	1.82	0.23
ER33	Calcareous grassland (using base cation)	4.00	1.07	5.07	0.96	0.19
ER34	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.00	0.19
ER35	Broadleafed/Coniferous unmanaged woodland	1.72	0.36	2.08	1.90	0.24
ER36	Calcareous grassland (using base cation)	4.00	1.07	5.07	0.99	0.19
ER37	Calcareous grassland (using base cation)	4.00	1.07	5.07	1.01	0.19

4.4 Meteorological Conditions

A windrose for London City Airport observing station for the 5-year period (2020 to 2024), providing the frequency of wind speed and direction, is presented in Figure 4-3. The windrose shows winds from the southwest are most frequent with winds from the north and southeast least frequent.

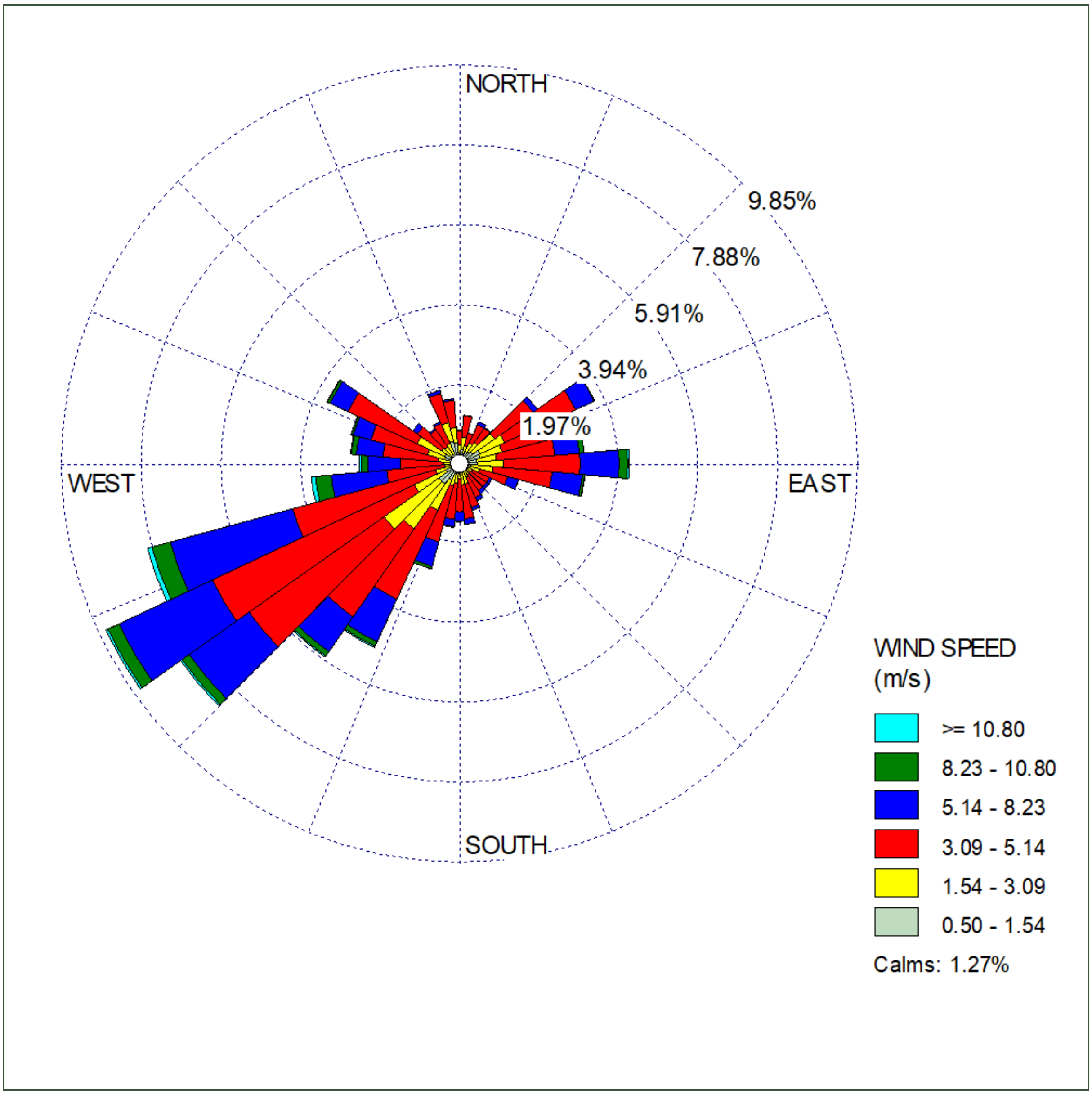

Figure 4-3: Windrose (London City 2020-2024)

4.5 Topography

The Installation lies at approximately 5-10m AOD. The topography in the surrounding area, within a 2km radius, is relatively flat with the River Thames to the south of the Installation.

The topography is considered unlikely to have a significant effect on the dispersion of emissions from the SBGs; however, it has been included within the dispersion model for receptor heights and is displayed in Figure 4-4.

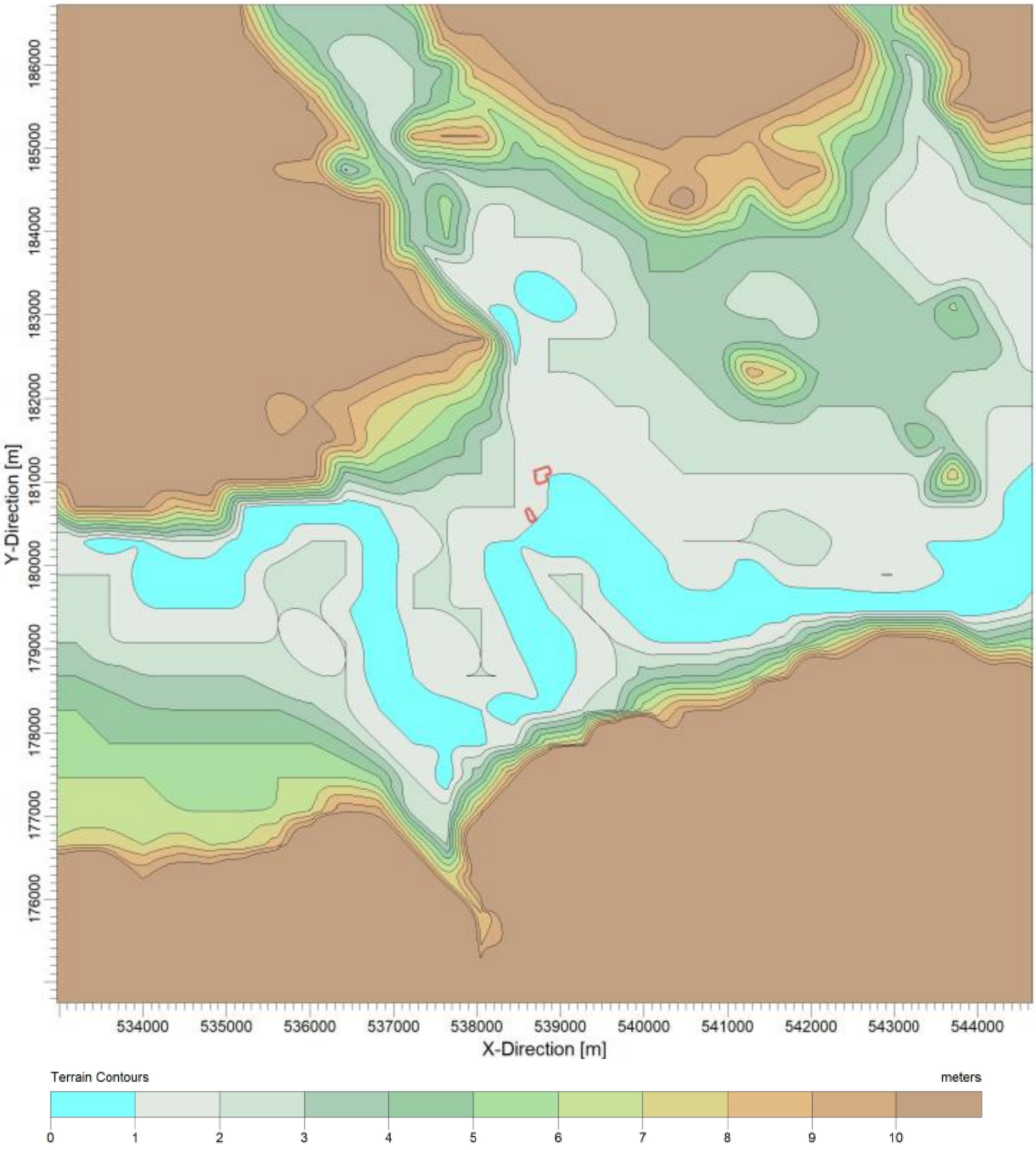

Figure 4-4: Topography

5.0 Emissions to Air

5.1 Emissions Points and Abatement

The West 2 building includes a total of 13 Cummins C3750 D5e SBGs discharging at 65m Above Ground Level (AGL). The site layout is presented in Figure 5-1.

The generator emission parameters have been based on design and manufacturer's specifications sheets and are presented in Table 5-1. The generators will be provided with a SCR system to abate NO_x emissions to 190mg/Nm^3 at 15% O_2 (507 mg/Nm^3 at 5% O_2). A precautionary assumption of a 20-minute warm-up period before the SCR reaches a fully effective operating temperature has been applied, therefore the first hour of operation applies a time-weighted average emission.

The assessment has used the highest mass emission rate (g/s) regardless of actual generator load, i.e. NO_x g/s at 100% load.

Table 5-1: Proposed Generators (Cummins C3750 D5e) – Emission Parameters

Parameter	Value (per generator)
Stack Height (m Above Ground Level)	65
Stack Internal Diameter (m)	0.60
Load (%)	100
Volume Flow (Nm^3/s) (A)	2.14
Emission Temperature (^{o}C)	422
Oxygen Content (% O_2 dry gas)	10.97
Moisture content (% H_2O)	10.70
Actual Flow Rate (Am^3/s) per stack	9.73
Emission Velocity (m/s)	34.4
NO_x Concentration (mg/Nm^3)	2990
NO_x Emission (g/s) per gen-set	6.40
NOx Concentration with SCR (mg/Nm^3)	507
NOx Emission with SCR (g/s)	1.08
NOx SCR Warm-up Emission (g/s) (1hr avg.)	2.86
NH_3 Concentration (mg/Nm^3)	10
NH_3 Emission (g/s) per gen-set	0.021
Table Note: (A) Normalised to 273K, dry, 5% O_2.	

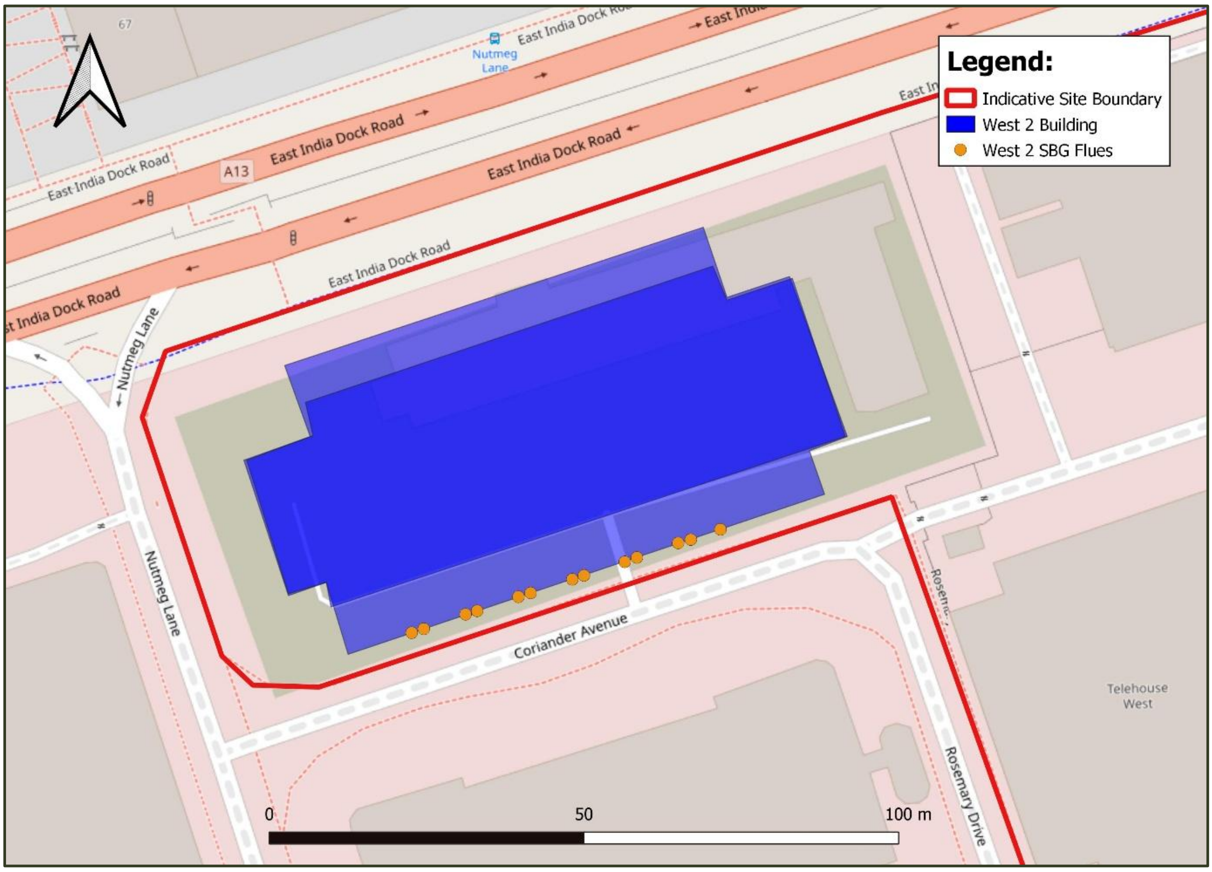

Figure 5-1: Site Layout and Emission Points

5.2 Operating Scenarios

The operating scenarios at the Site include the following:

- Routine Maintenance Schedule Operations – the predictable, managed testing and maintenance activity for the standby plant (Maintenance Schedule Model, MSM); and
- Emergency Outage Operations – the unpredictable emergency grid outage any time during the year requiring the maximum plant to operate for the required outage duration (Outage Model, OM).

5.2.1 MSM

The testing and maintenance schedule and how this has been modelled is set out in Table 5-2. West 2 will not be tested simultaneously with another data centre within the Campus.

Table 5-2: West 2 – Testing and Maintenance Schedule

Test	No. of SBGs Running Simultaneously	Conditions, hours and frequency per year	Total Hours per year per SBG	Model Scenario and Assumptions
Quarterly off-load start & run test	1	Off-load. SBG would run for between 15 and 60 minutes every three months.	4	MSM1: All hours at 100% load SBG Warm-up Emission Rate.

Test	No. of SBGs Running Simultaneously	Conditions, hours and frequency per year	Total Hours per year per SBG	Model Scenario and Assumptions
Bimonthly UPS Wrap-around maintenance	1	At approximately 100% load. Each generator would run for 3 hours every 2 months.	18	Assessment against the daily NOx Critical Level has been based on a precautionary 10 hours of operation at SCR warm-up emission rates (using 1-hour 100%ile).
Intermittent Part Load test	1	Likely at less than 100% load. Run for 2 hours, up to 10 times per year to reach a total of 20 operation hours per annum, per generator.	20	
Black Building	13	Twice per year for 4 hours at approximately 100% load.	8	MSM2: All hours at 100% load SBG Warm-up Emission Rate.

5.2.2 OM

In an outage scenario it has been assumed that 12 SBGs will operate, i.e. total SBGs minus redundancy (N+1), at 100% load.

A hypothetical outage scenario of 72 hours has been considered for an outage involving all buildings at once (i.e. TN and TS).

6.0 Results

6.1 Maintenance Schedule Model

6.1.1 Impacts on Human Receptors

6.1.1.1 West 2 Alone

Table 6-1 presents a summary of the potential impacts as a result of the routine testing and maintenance schedule (tabulated impacts at each receptor are presented in Tables C-1 to C-5 in Appendix C). There are no predicted exceedances at any receptor location as a result of West 2 operations alone.

Table 6-1: Summary of MSM Impacts from West 2

AQAL	Max PC at Rec.	PC as % of AQAL	Max PEC at Rec.	PEC as % of AQAL	No. of potential exceedances	Probability of exceedance
Condition: No SCR for first 20 minutes						
NO_2 10-min mean (US AEGL-1)	601	63%	634	66%	0	0%
Condition: time-weighted 1-hour impacts for SCR Warm-up						
NO_2 1-hour mean (99.79%ile AQAL)	150	75%	192	96%	3 (a)	0%
NO_2 1-hour mean (US AEGL-1)	200	21%	233	24%	0	0%
NO_2 10-min mean (US AEGL-1)(b)	268	28%	283	30%	0	0%
NO 1-hour mean (EAL)	1202	27%	1235	28%	0	0%
NO_2 Annual Mean	0.17	0.4%	28.37	71%	n/a	n/a
Condition: Full SCR(b)						
NO_2 1-hour mean (99.79%ile AQAL)	133	66%	175	88%	0	0%
NO_2 1-hour mean (US AEGL-1)	178	19%	210	22%	0	0%
NO_2 10-min mean (US AEGL-1)	238	25%	253	26%	0	0%
NO 1-hour mean (EAL)	457	10%	489	11%	0	0%
Table note: (a) Of an allowance of 18. (b) Results factored based on emissions and not presented in Appendix C.						

6.1.1.2 Whole Campus

The 3 potential exceedances of the 1-hour AQAL (99.79%ile) (presented in Table 6-1) are below the allowance of 18, i.e. there is no risk of exceeding the AQAL. The probability of the routine testing and maintenance schedules from the other data centre buildings within the Campus exceeding the AQAL is <1% and considered 'highly unlikely' (results as presented within application EPR/SP3237JU[20]), and the West 2 operations do not change this.

The combined annual mean impact is presented in Appendix C, Table C-11. The PC is >1% of the AQAL at a number of receptors, however the PEC is less than 75% of the AQAL.

[20] SLR Report Reference: 416.04438.00031, Version No: 3.0, December 2021

6.1.2 Impacts on Ecological Receptors

The impacts on C_{Le} and C_{Lo} are presented in Table D-1 to Table D-3 of Appendix D. The findings are that:

- At the European designated sites (ER1/ER2), the annual PC is <1% of the annual mean C_{Le}/C_{Lo} and the maximum 24-hour PC is <10% of the daily mean C_{Le} and impacts can therefore be considered ‘insignificant’.
- At the locally designated sites (ER3 to ER37), the annual PC is <100% of the annual mean C_{Le}/C_{Lo} and the maximum 24-hour PC is <100% of the daily mean C_{Le} and impacts can therefore be considered ‘insignificant’.

6.2 Outage Model

6.2.1 Impacts on Human Receptors

6.2.1.1 West 2 Alone

Table 6-2 presents a summary of the potential impacts as a result of a hypothetical 72-hours of non-consecutive outages at West 2 (tabulated impacts at each receptor are presented in Tables C-6 to C-10 in Appendix C), i.e. worst case 10-minute impacts are based on emissions assuming no reduction in NO_x from the SCR system, and 1-hour impacts are based upon time-weighted emissions considering the effect of a 20-minute warm-up of the SCR system. There are no predicted exceedances at any receptor location as a result of West 2 operations alone. Any subsequent hours with full SCR operation result in lower impacts.

Table 6-2: Summary of OM Impacts from West 2

AQAL	Max PC at Rec.	PC as % of AQAL	Max PEC at Rec.	PEC as % of AQAL	No. of potential exceedances	Probability of exceedance
Condition: No SCR for first 20 minutes						
NO_2 10-min mean (US AEGL-1)	567	59%	600	63%	0	0%
Condition: time-weighted 1-hour impacts for SCR Warm-up						
NO_2 1-hour mean (99.79%ile AQAL)	139	70%	186	93%	1 (a)	0%
NO_2 1-hour mean (US AEGL-1)	189	20%	222	23%	0	0%
NO_2 10-min mean (US AEGL-1) (b)	253	26%	268	28%	0	0%
NO 1-hour mean (EAL)	1133	26%	1166	27%	0	0%
NO_2 Annual Mean	0.96	2.4%	29.16	73%	n/a	n/a
Condition: Full SCR(b)						
NO_2 1-hour mean (99.79%ile AQAL)	123	62%	170	85%	0	0%
NO_2 1-hour mean (US AEGL-1)	167	18%	200	21%	0	0%
NO_2 10-min mean (US AEGL-1)	224	23%	239	25%	0	0%
NO 1-hour mean (EAL)	430	10%	463	11%	0	0%
Table note: (a) Of an allowance of 18. (b) Results factored based on emissions and not presented in Appendix C.						

6.2.1.2 Whole Campus

Appendix C, Tables C-12 to C-16 present the combined impacts assuming a hypothetical simultaneous outage across the whole Campus for 72 non-consecutive hours (i.e. worst case impacts assuming SCR not fully effective at West 2 and TS). The findings are:

- NO_2 1-hour mean (99.79%ile AQAL) presented in Table C-12: there are no new receptor locations at risk of exceedances (>5% probability) with West 2. At the receptor locations where a potential for exceedance exists (without West 2), the inclusion of West 2 only results in a small change in PC of +3.4%. .
- NO_2 1-hour mean (US AEGL-1) presented in Table C-13: there are no new receptor locations at risk of exceedances (>5% probability) with West 2. At the receptor locations where a potential for exceedance exists (without West 2), the inclusion of West 2 only results in a small change in PC of +1.3%.
- NO_2 10-min mean (US AEGL-1) presented in Table C-14: there is one new receptor location at which an exceedance could occur: HR49 Franklin House where the probability increases to 14.8%, the PEC at this location is 1113µg/m^3 which is significantly below AEGL-2. The assessment is precautionary based on the assumption of West 2 emissions without any abatement from SCR in 10 minutes, in reality the SCR system will begin to reduce emissions within approximately 3 minutes (as demonstrated with test data for TS SBGs as part of the EP Variation EPR/EP3507SL/V002).
- NO 1-hour mean (EAL) presented in Table C-15: there is one new receptor location at which an exceedance could occur: HR11 where the probability increases to 14%, the PEC at this location is 4905µg/m^3 which is 111% of the EAL.

6.2.2 Impacts on Ecological Receptors

The impacts on C_{Le} and C_{Lo} are presented in Tables D-4 to D-6 of Appendix D. The results are based on the hypothetical scenario of a 72-hour long outage occurring and coinciding with the worst-case conditions for dispersal of emissions. The findings are that:

- At the European designated sites (ER1 and ER2), the annual PC is <1% of the annual mean C_{Le}/C_{Lo} and maximum 24-hour PEC is <100% of the daily mean, impacts can therefore be considered to have ‘no likely significant effects’.
- At all the locally designated sites (ER3 to ER37), the annual PC is <100% of the annual mean C_{Le}/C_{Lo} and therefore considered ‘insignificant’. The maximum 24-hour PC is >100% of the daily mean C_{Le} at the majority of locally designated sites (excluding ER3, ER7, ER8, ER15, ER19, ER23, ER24, ER26, ER29, ER33-37). These exceedances potentially occur with and without West 2 and the increase is less than 10%.

7.0 Conclusions

The assessment has considered potential impacts on air quality from the Installation as a result of routine testing and maintenance operations, and non-routine emergency outage operation.

The findings of the assessment are summarised below for each scenario.

Routine Testing and Maintenance Operations:

The findings are:

- There are no predicted exceedances of AQALs, AEGL-1s, or EALs at any receptor location as a result of West 2 operations alone;
- Statistical analysis of the probability of exceedances of the 1-hour mean NO_2 AQAL as a result of the combined impact of all data centres within the Campus predicts exceedances to remain 'highly unlikely' at all of the selected human receptors; and
- Impacts on the annual mean C_{Le}/C_{Lo} and daily mean C_{Le} at all designated ecological sites are considered insignificant.

West 2 Outage Operation Scenario:

The findings are:

- There are no predicted exceedances of AQALs, AEGL-1s, or EALs at any receptor location as a result of West 2 operations alone;
- Impacts on the annual mean C_{Le}/C_{Lo} and daily mean C_{Le} at all designated ecological sites are considered insignificant.

Whole Campus Emergency Outage Operation (72-hours):

The findings are:

- There are no new receptor locations at risk of exceeding (i.e. >5% probability) the NO_2 1-hour mean (99.79%ile) AQAL;
- There are no new receptor locations at risk of exceedances (i.e. >5% probability) of the NO_2 1-hour mean (US AEGL-1) with West 2. At the receptor locations where a potential for exceedance exists (without West 2), the inclusion of West 2 only results in a small change in PC of +1.3%;
- There is one new receptor locations at which an exceedance of the NO_2 10-min mean (US AEGL-1) could occur (i.e. >5% probability), the PEC at this location is significantly below AEGL-2. The assessment is precautionary based on the assumption of West 2 emissions without any abatement from SCR in 10 minutes, in reality the SCR system will begin to reduce emissions within approximately 3 minutes. This is a highly unlikely scenario, for which the Air Quality Action Plan has been updated; and
- there is one new receptor location at risk of exceedances of the NO 1-hour mean (EAL) with West 2. The probability increases to 14%, the PEC at this location is 4905µg/m^3 which is 111% of the EAL.

The Installation's AQAP has been updated to include West 2.

Appendix A Existing Campus Emissions

Environmental Permit Variation Application

Air Emissions Risk Assessment

Telehouse International Corporation of Europe Limited

SLR Project No.: 410.066261.00001

10 September 2026

A.1 Emission Parameters

Table A-1: Currently Permitted Emission Parameters

Parameter	North Building		East Building		West Building	North 2 Building		South
Type (MTU model)	16V 4000	16V 396	16V 396	16V 4000	20V 4000 G23	20V 4000 G63L	20V 4000G34F (EO)	20V4000 G94LF
Number of SBGs	4	2	2	3	7 (+1 future)	4	2 (+2 future)	4
Base Elevation (m AOD)	2	2	2	2	2	2	2	2
Stack Release Height (m)	39.1	39.1	27.3	27.3	28.5	62.0	62.0	20
Stack Orientation	Vertical	Vertical	Vertical	Vertical	Horizontal (3.5-3.8 Vertical)	Vertical	Vertical	Vertical
Emission Temperature (K)	758	758	758	758	833	833	833	755
Stack Internal Diameter (m)	0.45	0.45	0.45	0.45	0.55	0.55	0.55	0.8
Velocity (m/s)	36.47	36.47	36.47	36.47	29.88	37.04	43.35	23.67
Actual Flow Rate (Am^3/s)	5.80	5.80	5.80	5.80	7.10	8.80	10.3	11.9
Normalised Flow (Nm^3/s)	1.06	1.06	1.06	1.06	1.18	1.47	2.30	2.4
NOx Conc. (mg/Nm^3)	4000	4000	4000	4000	4634	2000	2000	2362
NOx Emission Rate (g/s) per SBG	4.25	4.25	4.25	4.25	8.40	2.93	4.61	5.69
NOx Conc. (mg/Nm^3) with SCR	n/a							236
NOx Emission Rate (g/s) with SCR	n/a							0.57
NOx Emission Rate (g/s) SCR Warm-up	n/a							0.93
NH_3 Concentration (mg/Nm^3)	n/a							10
NH_3 Emission (g/s) per gen-set	n/a							0.024

A.2 Currently Permitted SBGs Testing Schedule

Table A-2: TN Testing and Maintenance Schedule

Test	North	East	North2	West
3-monthly off-load testing during maintenance (maximum 1 hour per test)	4	4	4	4
UPS wrap around maintenance (frequency varies, 3 hours per test)	15	15	39	18
Part Load test (frequency varies, 2 hours per test)	18	18	2	18
Black Building test (twice per year, 4 hours per test)	8	8	8	8
Total	45	45	53	48

Table A-3: TS Testing and Maintenance Schedule

Test	No. of SBGs Running	Hours and Occasions per year	Total Hours per year per SBG	Modelled As
Quarterly maintenance (off load)	1	Testing for each SBG will be for 15 minutes per quarter. Testing is following routine maintenance and therefore only a single SBG is started during any 1-hour. Testing may take place between 10am and 6pm, 7 days per week.	1	16 (all at SCR-warm-up emission rates time-weighted for 15-minutes)
Part load test	4	Testing for each SBG will be for 1 hour per month. Part load testing will not be undertaken during those 4 months when a quarterly off load test is undertaken – so will only occur during 8 months of the year. Number of SBGs tested simultaneously will depend upon building load, therefore modelled as 4 as a precautionary approach. Testing may take place between 10am and 6pm, 7 days per week.	8	8 (all at SCR-warm-up emission rates time-weighted for 1-hour)
Black-building (quarterly)	4	Testing for each SBG will be for 4 hours per quarter. Testing may take place between 10am and 6pm, 7 days per week.	16	16 (including 4 hours at SCR-warm-up emission rates)

Appendix B Model Checklist

Environmental Permit Variation Application

Air Emissions Risk Assessment

Telehouse International Corporation of Europe Limited

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Table B-1: Model Checklist

Item	Yes/No	Details
Location map	Y	Figure 4-1
Site plan	Y	Figure 5-1
Pollutants modelled and relevant AQALs	Y	Appendix A and Table 2-1
Details of modelled scenarios	Y	Section 5.2
Details of relevant ambient concentrations	Y	Section 4.1
Model description and justification	Y	Section 3.1.1
Special model treatment used	Y	Section 3.1
Table of emission parameters used	Y	Table 5-1 and Appendix A
Details of modelled domain and receptors	Y	Section 3.1.2
Details of meteorological data used	Y	Section 3.1.6
Details of terrain treatment	Y	Section 3.1.3
Details of building treatment	Y	Section 3.1.4
Details of modelling deposition	Y	Section 3.1.8
Model uncertainty and sensitivity	Y	Section 3.1.1
Assessment of impacts	Y	Section 3.2
Contour plots	N	n/a – as impacts are limited to upper stories of buildings, isopleths of ground level impacts have been omitted.
Model files	Y	Appendix E

Appendix C Human Receptor Impacts

Environmental Permit Variation Application

Air Emissions Risk Assessment

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Appendix C embedded Excel file

Appendix D Ecological Receptor Impacts

Environmental Permit Variation Application

Air Emissions Risk Assessment

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Appendix D embedded Excel file

Appendix E Model Files

Environmental Permit Variation Application

Air Emissions Risk Assessment

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Appendix E – separate Zip File

Making Sustainability Happen