Air Quality Assessment LD14

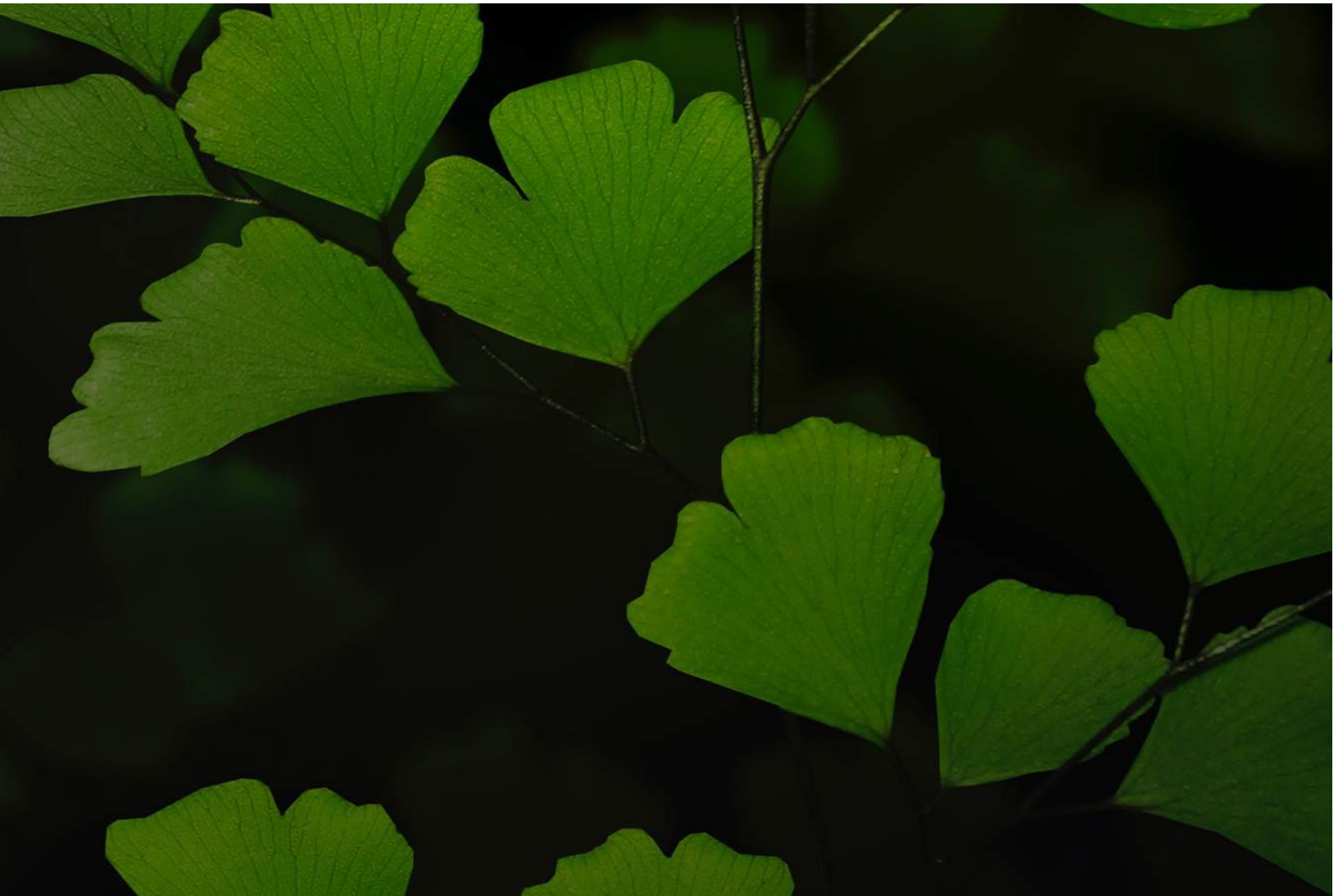
Equinix Slough Campus Environmental Permit Assessment – Permit Variation

PREPARED FOR

Equinix (UK) Limited

DATE
29 April 2024

REFERENCE
0664507



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SIGNATURE PAGE

Air Quality Assessment LD14

Equinix Slough Campus Environmental Permit Assessment – Permit Variation

0664507

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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
APIS	Air Pollution Information System
AQS	Air Quality Standard
AQMA	Air Quality Management Area

Acronyms	Description
BHP	Brake Horsepower (unit)
Breached, breaching, breach	Used when the model predicted ambient concentration of a pollutant at a receptor will not comply with the air quality standard. For example, if the 1-hour mean NO_2 standard is expected to be exceeded 19 times at a receptor, a breach of the NO_2 1-hour mean is therefore expected as there would be more than the 18 allowed exceedances of this standard.
^oC	Degrees Celsius
Slough Campus	The Slough Campus is used to mean the five data centres (LD4, LD5, LD6, LD7 and LD14) operated by Equinix (UK) Ltd on the Slough Trading Estate under the Campus Environmental Permit number EPR/LP3303PR. It does not include LD11x or LD13x (formerly LD10) which are covered under separate Environmental Permits.
CL	Critical Load
DEFRA	Department for Environment, Food & Rural Affairs
EA	Environment Agency
EP	Environmental Permit
EP Regulations	Environmental Permitting (England and Wales) Regulations 2016 (as amended)
ERM	Environmental Resources Management Limited
Equinix	Equinix (UK) Limited
Exceeded, exceedance, exceed	Used when a model predicted concentration is above an air quality standard threshold. For example, a 1-hour mean NO_2 predicted environmental contribution of 220 $\mu g/m^3$ exceeds the 200 $\mu g/m^3$ air quality standard.
Extended Campus	The Extended Campus is used to mean the seven data centres (LD4, LD5, LD6, LD7, LD11x, LD13x and LD14) operated by Equinix (UK) Ltd on the Slough Trading Estate under the Environmental Permits; EPR/LP3303PR, EPR/CP3409BH and EPR/LP3205LW. It is used as a collective term for when all data centres are potentially operating together under an emergency outage scenario.
g/s	Grams per second
K	Degrees Kelvin
Keq/ha/yr	Kiloequivalents per hectare per year
LNR	Local Nature Reserve
LWS	Local Wildlife Site
m/s	Metres per second
m^3/s	Cubic metres per second
mg/m^3	Milligrams per cubic metre
NH_3	Ammonia
N/ha/yr	Potential surplus of nitrogen on agricultural land in hectares per year
NNR	National Nature Reserve
NO	Nitric Oxide
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen (mixture of NO and NO_2)

Acronyms	Description
PC	Process Contribution
PEC	Predicted Environmental Concentration
$PM_{2.5}$	Particulate Matter of diameter below or equal to 2.5 µm
PM_{10}	Particulate Matter of diameter below or equal to 10 µm
SAC	Special Area of Conservation
SBC	Slough Borough Council
SO_2	Sulphur dioxide
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STE	Slough Trading Estate
UPS	Uninterrupted Power Supply
$\mu g/m^3$	Micrograms per cubic metre

APPLICATION CHECKLIST

Requirement	Location in Report
Purpose of the study	**Section 1** and **Section 3.1**
Describe the site	**Section 3.3**
Modelled scenarios	**Section 3.2**
Location map	**Appendix A**
Surrounding land use map	**Appendix A**
Relevant environmental standards	**Section 4.1**
Background level	**Section 5**
Explain the model	**Section 4** and **Appendix A**
Emission parameters	**Section 6.2** and **Appendix A**
Stack location	**Figure 6.1 to Figure 6.6 and Appendix A**
Modelled domain and receptors	**Section 6.1 and Appendix A**
Weather and surface characteristics	**Section 6.1** **Wind Roses in Appendix A**
Terrain and building treatments	**Section 6.1 and Appendix A**
Special treatments	**Section 6.1**
Impact Assessment	**Section 7**
Sensitivity analysis	**Section 6.4**
Isopleths/Contour plots	**Appendix B**
Model input files	Sent with application electronically

EXECUTIVE SUMMARY

CONTEXT

Equinix (UK) Limited (Equinix) is proposing to develop a new data centre, LD14 (the Site), located on the Slough Trading Estate, Slough. 12 new diesel-powered emergency backup generators and one currently permitted generator from the adjacent existing LD7 data centre are to be installed and operated at the Site, for the provision of back-up power in the event of a grid outage. It is proposed that the Site is included in the current Equinix Slough Campus environment permit (EP, ref. EPR/LP3303PR), which was last varied in November 2021. The Slough Campus EP currently comprises four component data centres, these are LD4, LD5, LD6 and LD7 with an existing combined thermal input capacity of 399 MW across 77 engines. The addition of LD14 will mean five sites are authorized under the combined Campus permit, with an aggregated thermal input capacity of 502 MW from 89 engines. As well as the Slough Campus, Equinix operates under two additional data centres on the Slough Trading Estate (STE) – these are LD11x (EP ref. EPR/CP3409BH) and LD13 (EP ref. EPR/LP3205LW).

This Air Quality Impact Assessment (AQIA) report has been prepared by Environmental Resources Management Limited (ERM) using information about current and expected future operations supplied by Equinix as part of Equinix's application to vary the Slough Campus permit. The assessment principally considers the potential impacts of the emissions of the LD14 generators alone. However, data on in-combination impacts with the other Equinix operated data centres on the Slough Trading Estate is provided, please refer to **Section 5.2** and **Section 6** for a summary of this and detailed results in **Appendix B**.

The information provided in this report follows Environment Agency (EA) guidelines for the requirements for dispersion modelling of emissions to air and guidelines for assessing the impacts of emissions from generators. The EA requires evidence that emissions from the installation are not expected to result in applicable air quality standards (AQS) being exceeded. This evidence is provided in this document.

This assessment has been undertaken with an intentionally conservative selection of meteorological data, in accordance with EA guidance. The effects of actual site operations on air quality are expected to be typically less than suggested by modelling.

The emergency back-up generators, which are all diesel powered, will be tested periodically during the year, as part of Equinix's engine testing regime.

This report covers:

- Modelling the 12 new LD14 generators fitted with Selective Catalytic Reduction (SCR).
- Revision of an emission point location, which has been relocated from its currently modelled placement at LD7 to its new installed location at LD14.
- Consideration of in-combination impacts with other Equinix operated Slough Trading Estate data centres (previously reported in the most recent AQIA for the Slough Campus, titled "Air Quality Impact Assessment, Equinix EPR/LP3303PR Variation and LD13x Partial Transfer with Variation," dated 14th October 2020 and AQIA for LD11x, titled "LD11x – Air Dispersion Modelling" and dated 20th December 2019).

Also of note:

- The SCR manufacturer, Agriemach Ltd, has confirmed that negligible ammonia 'slip' (fugitive emission) is expected from the SCRs (see **Appendix G** of the Supporting Document for the original statement).
- LD14 has been assessed using its anticipated, bespoke testing regime.

FINDINGS – ROUTINE TESTING

The assessment findings are that there are no expected exceedances of the hourly nitrogen dioxide (NO_2) standard in any testing scenario for LD14. Therefore, no further mitigation is required.

The assessed testing regime scenarios were not modelled to have the potential to exceed the annual mean NO_2 standard for the protection of human health, including at the Air Quality Management Areas in Slough Borough. LD14 is not expected to significantly contribute to in-combination effected with the other Campus or Extended Campus data centres.

There are no significant impacts modelled for any protected conservation areas.

FINDINGS – EMERGENCY OPERATIONS

At the current Slough Campus data centres, no periods of off-grid operation have been recorded since the original permit application, except for a regional power outage mid-2019 during which generators at LD6 and LD7 ran for a a few hours.

One hour and 72 hour long hypothetical emergency power generation scenarios were assessed with LD14 generators running on their own at 60% load and concurrently with all seven Equinix data centres on the Slough Trading Estate. On its own, LD14 is not modelled to exceed any AQS (short or long term) in either of the one hour or 72 hour long emergency scenarios. For the in-combination emergency scenarios, modelling suggests the potential for the hourly NO_2 standard to be exceeded. More than 18 running hours would however be required for a breach of the AQS to occur. The AEGL-1 thresholds (10 minute, 30 minute, 1 hour, 4 hour and 8 hour) are modelled to be exceeded by approximately 500% in this scenario, however, the AEGL-2 threshold is not (approximately 12% of the AEGL-2).

There were no modelled exceedances of the 24-hour NO_x standard at any of the assessed sensitive habitat areas.

PM_{10} AND SO_2

The assessment found that the particulate emissions from the LD14 engines are not expected to breach the AQS for PM_{10} or $PM_{2.5}$.

Sulphur dioxide (SO_2) emissions were not assessed since the Extended Campus uses ultra-low-sulphur diesel. As such, SO_2 impacts are anticipated to be insignificant.

1. INTRODUCTION

The following assessment has been prepared by Environmental Resources Management Limited (ERM) on behalf of Equinix (UK) Limited (Equinix), based on data for both current and future anticipated operations provided Equinix.

Equinix currently operates six data centres at the Slough Trading Estate (STE). These data centres are subject to Environmental Permit (EP) requirements due to the use of diesel engines at the data centres for the provision of back-up power in the event of a grid outage. The installed thermal capacity of these generators exceeds 50MWth and therefore their operation requires an EP under Schedule 1, Part 2 of The Environmental Permitting (England and Wales) Regulations 2016 (as amended) (EP Regulations).

Currently Equinix holds three Eps for the operation of its six data centres at the STE. Details of the Eps are as follows:

- EPR/LP3303PR, which covers four data centres (collectively known as the Slough Campus):
  - LD4;
  - LD5;
  - LD6; and
  - LD7.
- EPR/CP3409BH, which covers LD11x.
- EPR/LP3205LW, which covers LD13x (formerly LD10).

Equinix is proposing to vary the Slough Campus EP to include a new Site currently under development, LD14. The AQIA presented in this report provides a detailed technical assessment to support the proposed variation to the Slough Campus (EPR/LP3303PR), this includes an assessment of the potential effects on air quality of:

- The addition of the 12 new SCR abated generators at LD14; and
- The transfer of an already permitted generator at LD7 to LD14.

For this assessment, the hypothetical operation of all existing data centres and the new LD14 Site at once (for example during an emergency outage period) is referred to collectively as operation of the 'Extended Campus'.

The methodology of this assessment is the same as that used in the most recent previous ERM AQIA for the Slough Campus: "Air Quality Impact Assessment, Equinix EPR/LP3303PR Variation and LD13x Partial Transfer with Variation," dated 14th October 2020 and "LD11x – Air Dispersion Modelling" and dated 20th December 2019. This previous air quality impact assessment should also be referenced with regards to the potential impacts associated with the existing Permitted data centres.

In accordance with EA guidance, the modelling is based on an intentionally conservative choice of meteorological data in order to provide a conservative basis for regulation and management. Actual day-to-day effects on air quality due to site operations are expected to be more favourable than the model output.

The main potential environmental impacts from the operation of diesel engines are emissions to air. As per the EA working draft guidance[1] the most important consideration is the potential to breach the short-term ambient air quality standard (AQS) for hourly mean nitrogen dioxide (NO_2). This standard allows the threshold to be exceeded 18 times in a calendar year before a breach of the standard is recorded.

The impact assessment has been carried out using an air dispersion model to assess the potential impact of the engines' emissions. The model is based on current and expected future operational data provided by Equinix, as well as publicly available environmental data.

In the context of this report, the assessment considers the following definitions:

- Exceeded, exceedance, exceed: Used when a modelled concentration is above an air quality standard threshold. For example, a 1-hour mean NO_2 predicted environmental concentration of 220 µg/m^3 would be a modelled exceedance of the 200 µg/m^3 air quality standard;
- Breached, breaching, breach: Used when the modelled ambient concentration of a pollutant at a receptor will not comply with the air quality standard. For example, the 1-hour mean NO_2 standard is expected to be exceeded 19 times at a receptor, resulting in an expected breach on account of being more than the 18 allowed exceedances of the standard;
- Slough Campus: Equinix data centres to be permitted under Slough Campus EP: LD4, LD5, LD6, LD7 and LD14; and
- Extended Campus: all Equinix data centres located at Slough Trading Estate: Slough Campus, LD13x and LD11x.

[1] Data Centre FAQ, 15/11/2022-DRAFT version 21.0 to TechUK for Discussion

2. LEGAL FRAMEWORK

2.1 GUIDANCE

The assessment and report have been prepared following the relevant guidance and published documents:

- Environment Agency, last updated December 2023, Air emissions risk assessment for your environmental permit, https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit;
- Environment Agency, last updated January 2021, Environmental permitting: air dispersion modelling reports, https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports;
- Environment Agency, last updated March 2023, Guidance, Specified generators: dispersion modelling assessment, Specified generators: dispersion modelling assessment– - GOV.UK (www.gov.uk);
- Environment Agency AQMAU, 2016, Diesel generator short term NO_2 impact assessment; https://consult.defra.gov.uk/airquality/medium-combustion-plant-and-controls-on-generators/supporting_documents/Generator%20EA%20air%20dispersion%20modelling%20report.pdf; and
- Environment Agency, 2022, Data Centre FAQ, 15/11/2022- DRAFT version 21.0 to Tech UK for Discussion.

2.2 APPLICABLE AIR QUALITY STANDARDS

The protection of human health and of protected conservation areas from adverse air quality is regulated through the use of Air Quality Standards (AQS) transposed in UK law[2] from EU standards[3].

The statutory criteria of relevance for this assessment are set out in Table 2.1. As the engines are only operated for a few hours per year, only short-term AQS have been scoped in for PM_{10}.

To assist in the assessment of significance of short-term process contributions, Table 2.2 presents acute exposure guideline levels (AEGL) defined by the United States Environmental Protection Agency (EPA).

TABLE 2.1 APPLICABLE AIR QUALITY STANDARDS

Applicability	Pollutant	Averaging Period	Assessment Criterion (µg/m³)	Percentile
Sensitive Human Receptor	NO_2	1-hour mean, not to be exceeded more than 18 times per year	200	99.79th
		Annual mean	40	N/A
	PM_{10}	24-h mean, not to be exceeded more than 35 times a year	50	90.4th
	NO	1-hour mean	4,400	N/A

[2] The Air Quality Standards Regulations 2010 Statutory Instrument 2008/301, http://www.legislation.gov.uk/uksi/2010/1001/contents/made
[3] European Union Air Quality Standards, http://ec.europa.eu/environment/air/quality/standards.htm

Applicability	Pollutant	Averaging Period	Assessment Criterion (µg/m³)	Percentile
		Annual mean	310	N/A
Sensitive Ecological Receptor	NO_x	24-hour mean	200[a]	100th
		Annual mean	30	N/A

[a] The EA Permitting guidance for air emissions risk assessments for environmental permits advises that for detailed assessments where ozone is below the AOT40 critical level and sulphur dioxide is below the lower critical level of 10 µg/m³, a higher AQS of 200 µg/m³ should be used compared to the recommended 75 µg/m³.

TABLE 2.2 ACUTE EXPOSURE GUIDELINE LEVELS FOR NO_2

AEGL[a]	10 min (µg/m³)	30 min (µg/m³)	1 hour (µg/m³)	4 hour (µg/m³)	8 hour (µg/m³)
AEGL-1 (non-disabling)	940	940	940	940	940
AEGL-2 (disabling)	38,000	28,000	23,000	15,000	13,000
AEGL-3 (lethal)	64,000	47,000	38,000	26,000	21,000

[a] The AEGL thresholds are sourced from the US Environment Protection Agency (US EPA) and have no regulatory significance in the UK. The results of the air quality assessment have been compared against the AEGL thresholds for illustration only as part of a request by the EA.

For sensitive ecological receptors, nutrient nitrogen and acid depositions are assessed against site-specific critical loads. These were obtained from the Air Pollution Information System (APIS[4] consulted June 2022) website, based on the site relevant critical loads tool. APIS is an online database detailing critical loads and background concentrations for sensitive ecological sites, developed in partnership by the UK conservation agencies and regulatory agencies and the Centre for Ecology and Hydrology. Table 2.3 presents the obtained critical loads which were used in the impact assessment and the impact assessment for the original EP application.

[4] UK Air Pollution Information System, www.apis.ac.uk

TABLE 2.3 APPLICABLE CRITICAL LOADS FOR NITROGEN AND ACID DEPOSITION

Site Name and Designation	Site Feature	Nitrogen Deposition N/ha/yr	Acid deposition					
			Low Range (min), keg/ha/yr			High Range (max), keg/ha/yr		
			CLmaxS	CLminN	CLmaxN	CLmaxS	CLminN	CLmaxN
Burnham Beeches (Special Area of Conservation, SAC)	Atlantic acidophilous beech forests […]	10-20	1.699	0.142	2.056	2.544	0.357	2.686
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]	10-20	0.759	0.142	1.044	2.406	0.357	2.763
	Violet click beetle	10-20	0.759	0.142	1.044	2.406	0.357	2.763
	Old acidophilous oak woods […]	10-15	0.759	0.142	1.044	2.406	0.357	2.763
South West London Waterbodies (Special Protection Area, SPA & Ramsar)	Northern shoveler	No CLa	No CL					
	Gadwall	No CL	No CL					
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests	10-20	1.505	0.142	1.647	11.382	0.357	11.182
	Stag beetle	10-20	1.505	0.142	1.647	11.382	0.357	11.182
	Semi-natural dry grasslands and scrubland […]	15-25	4.00	0.856	4.856	4.00	1.071	5.071

[a] CL stands for Critical Load. The APIS database states that those features are sensitive, but no critical loads have been determined.

2.3 SIGNIFICANCE OF IMPACT

The impacts of the emissions from the Extended Campus, including LD14, are assessed based on the:

- Process Contribution (PC); and
- Predicted Environmental Concentration (PEC), the PEC being the PC added to the ambient background (i.e. baseline).

The adopted criteria for significance of the potential impact on sensitive human and ecological receptors are presented in Table 2.4, based on EA guidance[5].

TABLE 2.4 SIGNIFICANCE CRITERIA FOR IMPACTS ON RECEPTORS

Site Designation	PC, as % of AQS or CL	PEC, as % of AQS of CL	Significance
Sensitive Human Receptors			
Short Term			
Any sensitive human receptor	<10%	-	Insignificant
	>10%	<100%	Insignificant
	>10%	>100%	Potentially significant
Long Term			
Any sensitive human receptor	<1%		Insignificant
	>1%	<100%	Insignificant
	>1%	>100%	Potentially significant
Sensitive Ecological Receptors			
Short-term Impact			
Ramsar, SAC, SPA or Site of Special Scientific Interest (SSSI)	<10%	-	Insignificant
	>10%	-	Potentially significant
Ancient Woodland (AW), Local Wildlife Site (LWS), Local Nature Reserve (LNR) or National Nature Reserve (NNR)	<100%	-	Insignificant
	>100%	-	Potentially significant
Long-term Impact			
Ramsar, SAC, SPA or SSSI	<1%	-	Insignificant
	>1%	<70%	Insignificant
	>1%	>70%	Potentially significant
AW, LWS, LNR or NNR	<100%	-	Insignificant
	>100%	-	Potentially significant

[5] Environment Agency 2023. Guidance: Air emissions risk assessment for your environmental permit. Accessed March 2024. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#environmental-standards-for-air-emissions

If the PEC at specified receptors indicates that the short-term hourly standard for NO_2 has the potential to be breached more than 18 times a year, then the EA guidance on dispersion modelling for oxides of nitrogen assessment from specified generators requests to perform a statistical analysis. The likelihood of actual exceedances is classified as follows:

- ≤1%, highly unlikely;
- <5%, unlikely within 20 years of operation; and
- ≥5%, likely potential for significance. In this case, further proposals to reduce the risk of the exceedance are required.

3. AIR QUALITY BACKGROUND CONCENTRATIONS

Slough Borough Council (SBC) has declared four Air Quality Management Areas (AQMA) related to breaches of the NO_2 annual mean AQS. According to the latest Air Quality Annual Status Report[6], local road traffic contributes around 50% towards NO_2 concentrations. The air quality monitoring undertaken in Slough is therefore focused on roads emissions, with many kerbside and roadside sites. However, these data are not particularly relevant for this assessment, as they are not representative of the immediate environment of the Slough Campus emission sources. The Slough Campus will not create significant additional traffic on the local roads and traffic emissions are not expected to be the main source of NO_2 emissions in STE during the weekends when the majority of tests will be undertaken. The closest relevant monitoring sites and their monitored concentrations are presented in Table 3.1.

The DEFRA background maps[7] for 2015[8] also provide information on annual mean NO_2 concentrations for each 1km x 1km square covered by SBC. The data for the two squares covering the Campus is presented in Table 3.2.

For NO background concentrations were not available from DEFRA mapping therefore information from the local monitoring site 'Slough Town Centre Wellington Street' was used. An annual average concentration (from 2023) of 17.1 µg/m^3 was used and an hourly of 34.2 µg/m^3.

The location of the monitoring sites and of the DEFRA grid squares is presented in Figure 3.1.

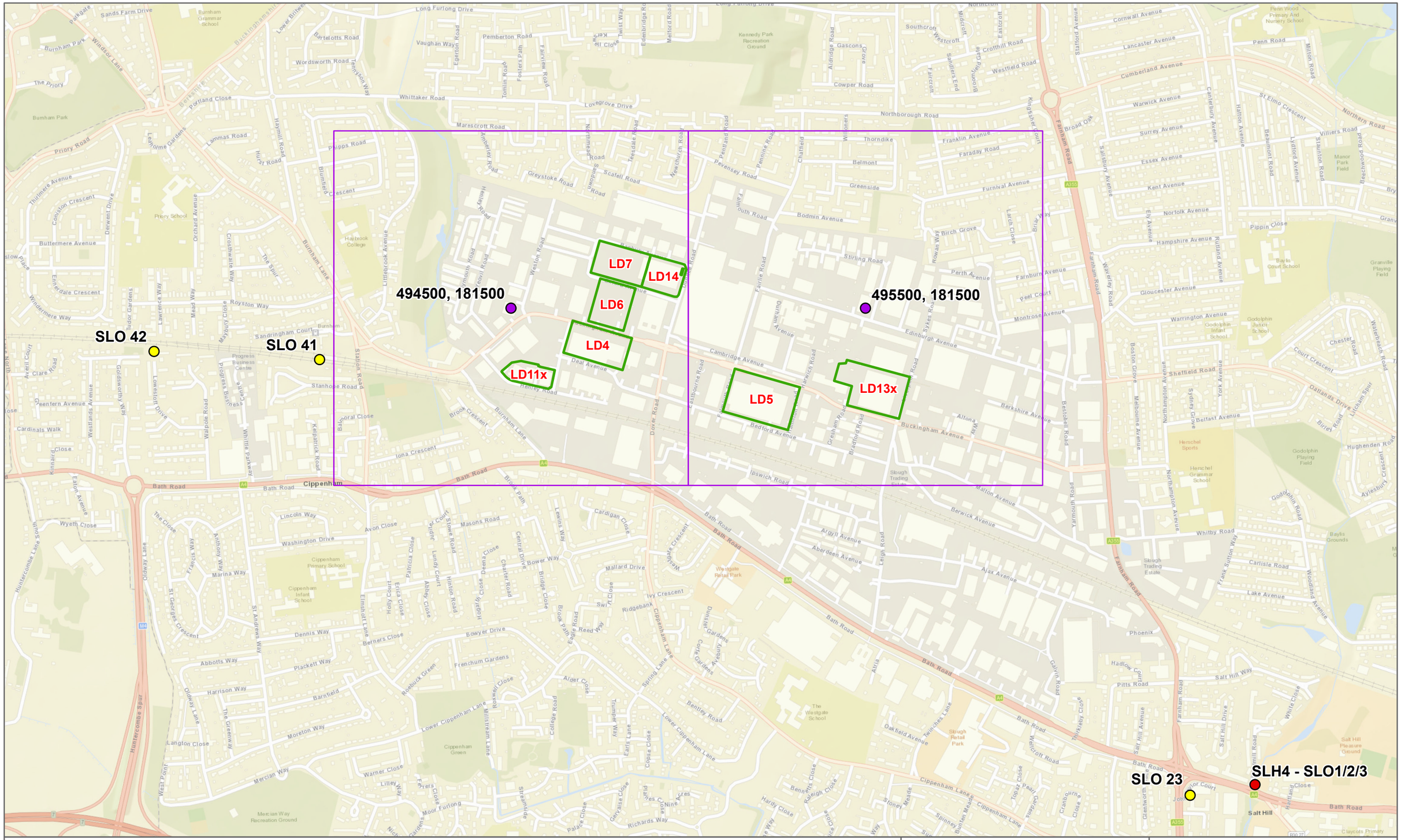
TABLE 3.1 LOCAL MONITORING DATA

Site	Type	Type	NO_2 Annual Mean (µg/m^3)				
			2013	2014	2015	2016	2017
SLH 4 – Salt Hill	12.5m away from road	Automated	35.9	35.5	30.3	30.0	33.0
SLO 1/2/3 – Salt Hill	12.5m away from road	Diffusion Tube	34.3	33.7	35.6	32.3	31.1
SLO 23 – Tuns Lane	17.5m away from road	Diffusion Tube	40.7	36.4	36.1	36.4	33.6
SLO 41 – Sandringham Court	Close to railway	Diffusion Tube	27.9	28.1	32.3	25.9	25.9
SLO 42 – Walpole Rd	Close to railway	Diffusion Tube	29.0	28.4	24.9	28.4	23.1

[6] Slough Borough Council, June 2023, 2023 Air Quality Annual Status Report, http://www.slough.gov.uk/downloads/ASR2018.pdf
[7] DEFRA, 2017, Background Mapping data for local authorities – 2015, https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015
[8] Note: 2015 data used to ensure historical consistency with previous Slough Campus permitting AQAs. NO2 and NOx data from 2018 Defra mapping would show lower baseline levels and therefore lower PECs. The 2015 baseline data can be considered a more conservative baseline.

TABLE 3.2 DEFRA 2015 BACKGROUND MAP CONCENTRATIONS

Grid Square (X,Y in National Grid)	NO_2 annual mean ($\mu g/m^3$)	NO_x annual mean ($\mu g/m^3$)	PM_{10} annual mean ($\mu g/m^3$)
494500, 181500	24.81	38.30	15.70
495500, 181500	28.05	45.04	16.80
Average	26.43	41.67	16.30



- Automatic and Diffusion Tube
- DEFRA Background Map
- Diffusion Tube
- Monitoring Square
- Site Installation Boundary

The background concentration of NO2 used was 26µg/m3, based on the average of Defra mapping and Salt Hill, and multiplied by 2 to provide the short-term baseline.

0 50 100 150 200 250
Metres

N

Figure 3.1
Monitoring Site Locations
Slough Trading Estate, 765 Henley Road
Slough SL1 4JW

SCALE: See Scale Bar	VERSION: A01
SIZE: A3	DRAWN: JG
PROJECT: 0664507	CHECKED: JE
DATE: 27/03/2023	APPROVED: DP

PROJECTION: British National Grid

Service Layer Credits: World Street Map: OS, Esri, HERE, Garmin, INCREMENT P, NGA, USGS

Path: \\UKSPRDGISFS01\Data\London\Confidential Projects\0664507 Equinix UK LD14x application\MAPS\0664507 - Equinix UK LD14x\0664507 - Equinix UK LD14x.aprx\0664507_MonitoringSiteLocations_A01

4. ASSESSMENT METHODOLOGY

4.1 ENGINE OPERATIONS

The engines are not used to routinely provide power. However, the engines are tested regularly to ensure that they are capable of reliably fulfilling the backup supply requirements. For LD14, five types of tests will be carried out on an annual basis. All the different tests and a potential emergency power scenario have been included in the impact assessment. The engine tests used to generate the model scenarios for the assessment are presented in Table 4.1.

TABLE 4.1 ANTICIPATED ENGINE OPERATIONS

Regime	Expected Frequency	Representative Duration	Scheduling[e]	Number of Engines	Load	Number of Tests per Year
Off-Load test	Monthly (LD14)	5-min	Weekdays	All engines individually [a]	No electrical load. Modelled as 30% load on engine	12
Load Bank Test	Monthly [b]	30-min	Weekends	All engines one engine after the other	100% engine load	8
	Quarterly	1 hour	Weekends	All engines individually	100% engine load	3
	Annually	2 hours	Weekends	One engine after the other	100% engine load	1
Building Load test	Annually	1 hour	Weekends	All engines at once	78% engine load	1
Emergency Power						
Emergency power	Unpredictable, infrequent	1 hour	Any time	All	60% engine load [c]	n/a
Emergency power		72 hours	Any time	All	60% engine load [c]	n/a

a: Tests to occur in sequential hours, not in the same hour
b: The monthly 30 minute load bank test is to be to be undertaken eight times a year at the LD14 site.
c: It has been assumed that all engines would be running at 60% load in case of emergency. This is a reasonable worst-case scenario and in reality, it is expected that only some of the engines would be running, with others in standby in case of failure.

SCR systems will be installed on the 12 new generators at the LD14 data centre. The twelve generators that will have SCR systems fitted are LD14_2 to LD14_13.

The operation of the SCR is designed to meet a 190 mg/Nm^3 emissions limit value (ELV) for NO_x (at 15% O_2 conditions). The SCR systems are expected to need a warm-up period of up to 5 minutes prior to being fully operational. During this warm-up period, NO_x emissions from the generators are not expected to be fully abated. To account for this in the assessment, multiple models have been set up in which the generators with SCR systems have different assumed NO_x emission rates:

- A model assuming 5 minutes of unabated NO_x emissions and 5 minutes of SCR-abated NO_x emissions (for comparison against the 10-minute AEGL);
- A model assuming 5 minutes of unabated NO_x emissions and 25 minutes of SCR-abated NO_x emissions (for comparison against the 30-minute AEGL);
- A model assuming 5 minutes of unabated NO_x emissions and 55 minutes of SCR-abated NO_x emissions (for comparison against the 1-hour and annual AQS, and the 1-hour, 4-hour and 8-hour AEGLs).

The SCR supplier has confirmed that there should be no ammonia 'slip' (fugitive emission) from the SCR, therefore modelling of ammonia emissions has not been covered in this assessment. Please refer to **Appendix G** of the Supporting Document for the SCR supplier's original statement regarding the ammonia slip performance.

4.2 MODEL PARAMETERS AND INPUTS

The key elements of the methodology used for carrying out the air dispersion modelling are set out in Table 4.2.

TABLE 4.2 AIR DISPERSION MODEL METHODOLOGY AND PARAMETERS

Parameter	Approach	Notes
Dispersion model	Lakes AERMOD View 11.2.0	
Number of sources	13	Fire pump engine at LD14 considered a small emitter and was no included in the modelling
Model domain	20 km x 20 km	Radius from Campus of 10 km to cover protected conservation areas. Map in **Appendix A.**
Receptor grid resolution	25 m up to 2 km from centre; 200 m between 2 km and 10 km from centre	
Discrete sensitive receptors	37	Detailed information in **Section 6.3.1**
Buildings	LD14 buildings	The LD14 building is greater than one third of the stack height, within five stack heights of the stack and therefore included. Buildings dimensions and location presented in **Appendix A.**
Terrain	Not included	There are no sustained gradients of >1:10 in the vicinity of the Campus, and therefore terrain was not included

Parameter	Approach	Notes
Surface Characteristics	Albedo: 0.222 Bowen Ratio: 1.45 Surface Roughness: 1.00	As provided with met data
Meteorological data	London Heathrow, 2017-2021 inclusive	Hour-sequential data. Five years of meteorological data (2017 to 2021) were assessed. The year giving the highest modelled concentration of NO_x for the Slough Campus was 2021 and therefore this year was chosen as the worst-case year and used for the impact assessment. Wind roses are presented in *Appendix A*.
NO_x to NO_2 conversion ratio	Short-term concentrations: <500m from source 15% >500m from source 35% Long-term concentrations: 70%	The Environment Agency[a] states that a short-term conversion ratio of 15% is reasonable within 500 m of a source. For distances of >500 m ratios are taken from other Environment Agency guidance[b].
Averaging period conversion rates	1-hour maximum NO_x concentration to 10-minute maximum NO_x concentration factor: 1.431 1-hour maximum NO_x concentration to 30-minute maximum NO_x concentration factor: 1.149	AERMOD does not allow for modelling shorter averaging periods than 1 hour. To estimate maximum NO_2 concentrations for comparison against the 10-minute and 30-minute AEGLs, the power law was used to calculate a factor. These factors were applied to the expected maximum 1-hour NO_2 concentration to determine a expected maximum 10-minute and 30-minute NO_2 concentration.

[a] Environment Agency AQMAU, 2016, Diesel generator short term NO_2 impact assessment, https://consult.defra.gov.uk/airquality/medium-combustion-plant-and-controls-on-generators/supporting_documents/Generator%20EA%20air%20dispersion%20modelling%20report.pdf
[b] Environment Agency, 2007, Review of methods for NO to NO_2 conversion in plumes at short ranges, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/290985/scho0907bnhi-e-e.pdf

4.3 EMISSION PARAMETERS

The modelled emission parameters for each source are presented in Table 4.3.

TABLE 4.3 MODELLED EMISSIONS PARAMETERS LD14

Data Centre	LD14	
Engine Make/Model	Cummins C3000-D5e	Kohler KD3500-E + SCR
Emission Points [a]	LD14_01[b]	LD14_02 to LD14_12
Number of engines	1	12
Stack Orientation	Vertical	Vertical
Stack Height above ground level (m)	40.2	67.2
Flue Diameter (m)	0.6	0.6
Emission Velocity (m/s)	43.8	36.3
Actual Flow Rate (m^3/s)	7.2	10.3
Emission Temperature (K)	754	778

Data Centre	LD14	
NO_x Concentration[c] (mg/m^3, 100% load) (unabated)	2,091	1,784
NO_x Concentration[c] (mg/m^3, 100% load) (SCR abated) (5% O_2)	N/A	506
NO_x Concentration[d] (mg/m^3, 100% load) (SCR abated) (15% O_2)	N/A	190
Actual NO_x Emission Rate w/SCR (g/s, 100% load) (1 hr)[f]	4.04	0.953
Actual NO_x Emission Rate w/SCR (g/s, 100% load) (10 min)[f]	*N/A*	*2.58*
Actual NO_x Emission Rate with SCR (g/s, 100% load) (30 min)[f]	*N/A*	*1.28*
PM_{10} Concentration[c] (mg/m^3, 100% load)	*23*	*20*
PM_{10} Emission Rate (g/s, 100% load)	*0.04*	*0.051*
Sulphur Emission Rate[e] (g/s, 100% load)	*0.0029*	*N/A*

[b] The generator for point LD14_01 was formerly located at LD7.2 but will be relocated to LD14
[c] Concentrations were obtained from the engines' datasheets and are at standard conditions: 25°C, dry, 5% O_2 content
[d] Concentrations were obtained from the engines' datasheets and are at standard conditions: 25°C, dry, 15% O_2 content[e] SO_2 emission rates were estimated using the engine's fuel consumption, a sulphur content in the ultra-low sulphur diesel of 10 ppm (legal maximum) and assuming that all of the sulphur in the diesel is converted to SO_2
[f] Actual emission rate calculated from unabated and SCR abated NO_x concentrations on an averaging time basis and taking into account 5 minute warm up time for SCR.

As discussed in Section 4.1, Equinix will install SCR systems to twelve generators at LD14. The SCR system manufacturer, Agriemach, has provided expected NO_x emission rates for the generators when the SCR are operational. Based on communications with the system manufacturer the ammonia emissions are assumed to be negligible. The concentrations and emissions rates for NO_x are detailed in Table 4.4.

TABLE 4.4 SCR SYSTEM NO_X EMISSION RATES

Equinix ID	Generator	NO_x Concentration (mg/Nm^3)		NO_x Emission Rate (g/s)	
		Non-Abated Concentration (5% O_2)	*SCR-Abated Concentration*	*Non-Abated Emission Rate (5% O_2)*	*SCR-Abated Emission Rate (5% O_2)*
LD14_02 to LD_13	Kohler KD3500-E	1,784	506 (at 5% O_2) 190 (at 15% O_2)	4.53	0.63

To represent the operation of the SCRs in the testing regime, multiple models have been developed to approximate the effects of the 5-minute warm up time. Potential NO_x emissions rates were developed for the twelve generators with SCR systems for each averaging period being assessed (10-minute, 30 minute and 1 hour maximum). The emission rates assumed for the testing regime are shown in Table 4.5.

TABLE 4.5 SCR SYSTEMS MODELLED EMISSION RATES

Equinix ID	Generator Make and Model	Average NO_x Emission Rate (g/s)		
		10-Minute	*30-Minute*	*1-Hour*
LD14_02 to LD_13	Kohler KD3500-E	2.577	1.278	0.953

4.4 RECEPTOR PARAMETERS

4.4.1 HUMAN RECEPTORS

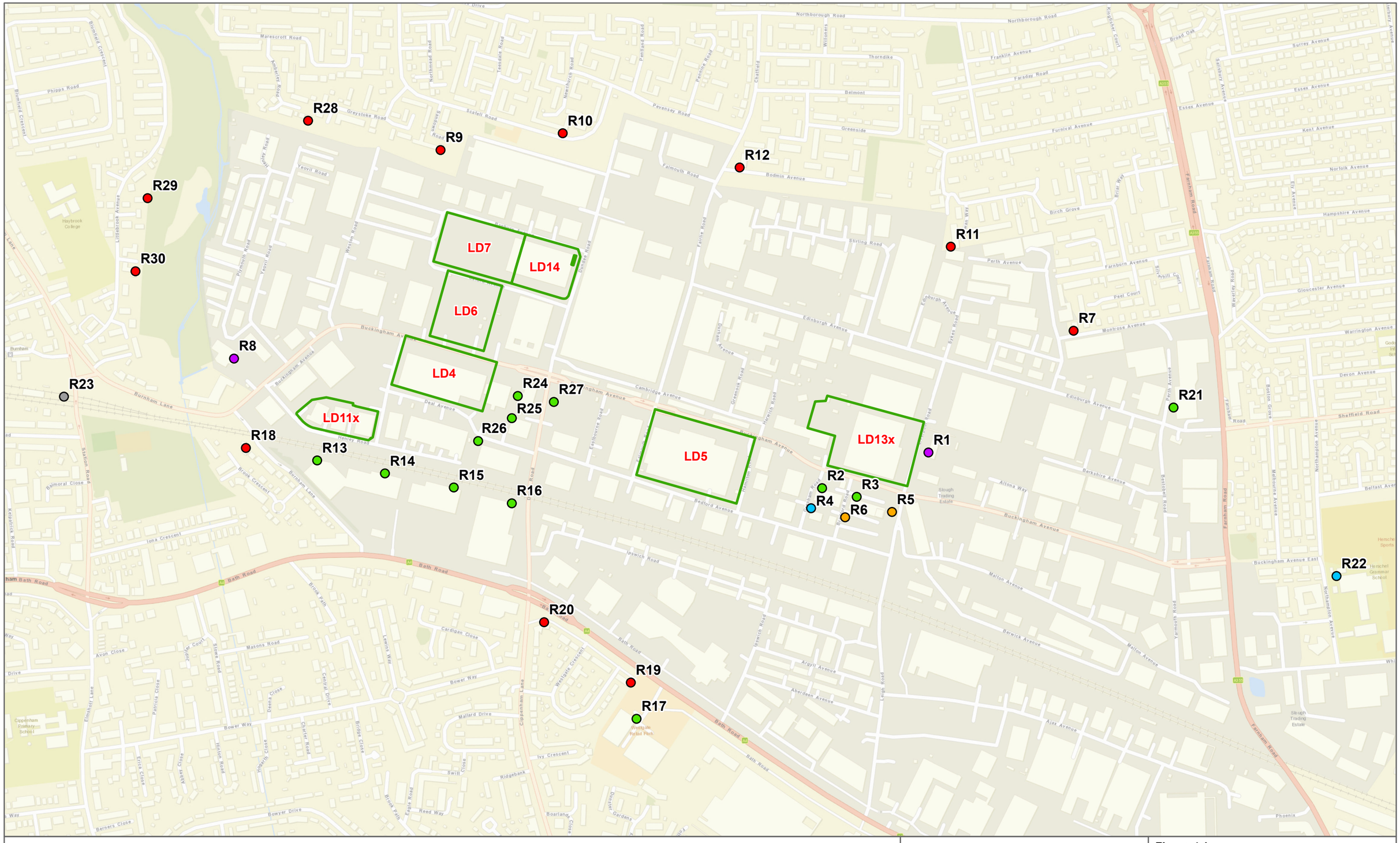
A 20 km x 20 km modelled receptor grid, with a spacing of 25 m up to 2 km from LD14 and 200 m thereafter was set up and results are presented in interpolated contour plots on this grid. A map of the modelled domain is presented in **Appendix A**. Following EA guidance[9], the impact assessment was carried out for discrete potential sensitive receptor locations at which the public could be expected to be present for one hour, including the closest identified residential receptors. Table 4.6 presents the selected receptors and Figure 4.1 their location.

TABLE 4.6 MODELLED SENSITIVE POTENTIAL RECEPTORS

Receptor	Name	Type	X (National Grid)	Y (National Grid)
R1	Absolutely Fitness	Gym	495633	181250
R2	Buckingham Centre 1	Shops	495438	181184
R3	Buckingham Centre 2	Shops	495502	181169
R4	Cherry Tree Day Nursery	School	495418	181148
R5	Premier Inn Slough West 1	Hotel	495566	181141
R6	Premier Inn Slough West 2	Hotel	495480	181131
R7	5 Montrose Avenue	Residential	495900	181473
R8	PureGym Burnham	Gym	494359	181422
R9	22 Sandown Road	Residential	494738	181805
R10	27 Newchurch Road	Residential	494962	181836
R11	16 Rowan Way	Residential	495674	181628
R12	Bodmin Avenue	Residential	495287	181773
R13	Bath Road Shopping Park 1	Shops	494512	181235
R14	Bath Road Shopping Park 2	Shops	494636	181212
R15	Bath Road Shopping Park 3	Shops	494762	181186
R16	Bath Road Shopping Park 4	Shops	494869	181157
R17	Westgate Retail Park	Shops	495098	180761
R18	Compton Court	Residential	494381	181258

[9] Environment Agency, 2018, Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators, https://consult.environment-agency.gov.uk/psc/mcp-and-sg-regulations/supporting_documents/Specified%20Generators%20Modelling%20GuidanceINTERIM%20FINAL.pdf

Receptor	Name	Type	X (National Grid)	Y (National Grid)
R19	231 Cippenham	Residential	495087	180828
R20	271 Bath Road	Residential	494928	180939
R21	141 Farnham Road	Shops	496083	181332
R22	Herschel Grammar School	School	496382	181023
R23	Burnham Train Station	Train Station	494047	181352
R24	Car retailers 1	Shops	494880	181354
R25	Car retailers 2	Shops	494869	181313
R26	Car retailers 3	Shops	494807	181271
R27	Trading Depot	Shops	494946	181343
R28	60 Amberley Road	Residential	494495	181859
R29	39 to 77 Littlebrook Avenue	Residential	494200	181716
R30	153 Littlebrook Avenue	Residential	494178	181582



- Gym
- Hotel
- Residential
- School
- Shops
- Train Station
- Site Installation Boundary

0 50 100 150 200 250
Metres

N

Figure 4.1
Modelled Sensitive Receptors
Slough Trading Estate, 765 Henley Road
Slough SL1 4JW

SCALE: See Scale Bar	VERSION: A01
SIZE: A3	DRAWN: JG
PROJECT: 0664507	CHECKED: JE
DATE: 27/03/2023	APPROVED: DP

ERM

EQUINIX

PROJECTION: British National Grid

Service Layer Credits: World Street Map: OS, Esri, HERE, Garmin, INCREMENT P, Intermap, NGA, USGS

Path: \\UKSPRDGISFS01\Data\London\Confidential Projects\0664507 Equinix UK LD14x application\MAPS\0664507 - Equinix UK LD14x\0664507 - Equinix UK LD14x.aprx\0664507_ModelledSensitiveReceptors_A01

4.4.2 ECOLOGICAL RECEPTORS

As per EA guidance[10], protected conservation areas within 10 km of the Campus for SACs, SPAs and Ramsar sites and within 2 km for LNRs, NNRs and SSSIs were included in the impact assessment. Using the website MAGIC[11], the following sites have been included:

- Haymill Valley (LNR)
- Cocksherd Wood (LNR)
- Burnham Beeches (SAC)
- Windsor Forest & Great Park (SAC)
- South West London Waterbodies (SPA & Ramsar)
- Chilterns Beechwoods (SAC)

Their location is presented in Figure 4.2.

[10] Environment Agency, accessed February 2024, Air emissions risk assessment for your environmental permit, https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit
[11] Natural England, 2018, MAGIC interactive map, https://magic.defra.gov.uk/MagicMap.aspx

Burnham Beeches

Chilterns Beechwoods

Cocksherd Wood

Haymill Valley

Windsor Forest and Great Park

South West London Waterbodies

Site Installation Boundary

Special Area of Conservation (SAC)

Local Nature Reserve (LNR)

Special Protected Area (SPA) and RAMSAR

0 1 2

Kilometers

N

Figure 4.2
Assessed Protected Conservation Areas
Slough Trading Estate, 8 Buckingham Ave
Slough SL1 4AX

SCALE: See Scale Bar	VERSION: A01
SIZE: A3	DRAWN: OB
PROJECT: 0420743	CHECKED: CG
DATE: 11/12/2018	APPROVED: HB

ERM

EQUINIX

PROJECTION: British National Grid

Path: \\ukoxfdc01\DATA\Oxford\Projects\0420743 Equinix Slough Permit.GB\Working folder\GIS\MAPS\AQ\Figure5.3_Ecological Receptors_A01.mxd

5. IMPACT ASSESSMENT

5.1 INTRODUCTION

The assessment considers the potential impact of the testing routine outlined in Table 3.1. In addition, the potential impacts of two emergency power generation scenarios are assessed, noting the likely rarity of these events. A screening assessment was undertaken for PM_{10} in Section 5.2. A detailed assessment was undertaken in Section 5.3 for NO_2, NO and NO_x for human health and habitats respectively.

5.2 IN-COMBINATION ASSESSMENT

The impacts of LD14 are also considered in combination with the activities and operations of the other data centres in the Campus and Extended Campus. A summary of this assessment is included in the conclusions in **Section 6.** Detailed results for these are presented in **Appendix B**.

- LD14 test-regime has not been considered in combination with the hourly AQS for human health:
  - The engines at LD14 are not to be run at the same time as other data centres in the Campus and Extended Campus and will therefore not have in combination effects.
  - LD14 testing is not expected to result in the 1-hour NO_2 air quality standard being exceeded, and therefore is not expected to not contribute to any overall exceedances of the 1-hour standard that would require statistical analysis.
- Testing and Emergency Scenarios are included as LD14 operations will have a small additive effect to the overall in combination impact of the Campus and Extended Campus against the NO_2 annual mean and, in emergency operations, the potential exceedance of the NO_2 1 hour standard and AEGLs.

The details of the other data centres and the assessment methodologies used in the in-combination alongside LD14 are set out in the following documents:

- Most recent AQIA for the Slough Campus, titled "Air Quality Impact Assessment, Equinix EPR/LP3303PR Variation and LD13x Partial Transfer with Variation," dated 14th October 2020.
- LD11x application AQIA, titled "LD11x – Air Dispersion Modelling" and dated 20th December 2019.

5.3 PM_{10} SCREENING

A screening exercise has been undertaken on the basis that all of the engines in the extended Campus are running at the same time at 100% load for eight continuous hours in a day. This is not reflective of the actual testing regime. This is also an unlikely case for an emergency scenario as not all engines would be expected to run for the whole 8-hours and would not be at 100% load. The results of the modelling for this worst-case scenario are presented in Table 5.1. A short-term background concentration for PM_{10} of 32.6 $\mu g/m^3$ was used, based on the long-term background presented in Table 3.2.

TABLE 5.1 MODELLED 24-HOUR MEAN CONCENTRATIONS FOR PM_{10} SCREENING BASED ON 8-HOUR OF OPERATIONS, ALL ENGINES, 100% LOAD

Data Centre	Particulates (PM_{10}) Concentration ($\mu g/m^3$), Maximum at any of the Specified Receptors					
	24-hour maximum (100th %ile)			24-hour 36th highest hour (90.4th %ile)		
	PC	PEC	PEC as % of AQS	PC	PEC	PEC as % of AQS
LD14	0.3	32.9	66%	0.1	32.7	65%

[a] All Campus' engines running at 100% load for 8 hours

The modelling results presented in Table 5.1 show that the AQS is not expected to be exceeded. On this basis, the proposed LD14 testing regime is not expected to result in the AQS being exceeded. No further detailed assessment of PM_{10} for each test undertaken or emergency power operations has therefore been performed.

A contour plot of the 36th highest 24-hour mean is presented in **Appendix B**.

5.4 DETAILED ASSESSMENT OF NO_2, NO_X AND NO

5.4.1 TESTING REGIME

5.4.1.1 BI-MONTHLY START-UP/ OFF-LOAD TEST

The modelled maximum concentrations at the 37 indicative sensitive receptors resulting from emissions of any of the LD14 engines are presented in Table 5.2 compared against the AQS, EAL and AEGLs as applicable.

TABLE 5.2 MODELLED CONCENTRATIONS FOR LD14 START-UP TEST

Period	AQS/ EAL/ AEGL ($\mu g/m^3$)		Baseline ($\mu g/m^3$)	PC ($\mu g/m^3$)	PEC ($\mu g/m^3$)	PC as % of AQS/ EAL/ AEGL (%)	PEC as % of AQS/ EAL/ AEGL (%)
NO 1-hour maximum	EAL	4,400	34.2	1.10	35.3	0.55%	0.8%
NO_2 1-hour maximum	1-hour maximum	200	52.0	0.75	52.8	0.38%	26%
	1-hour 19th highest hour (99.79th %ile)	200		0.52	52.5	0.26%	26%
NO_2 10-minute maximum	AEGL-1	940	52.0	6.48	58.5	0.69%	6%
	AEGL-2	38,000				0.02%	0.15%
	AEGL-3	64,000				0.01%	0.09%
NO_2	AEGL-1	940	52.0	1.73	53.73	0.18%	5.72%

Period	AQS/ EAL/ AEGL (µg/m³)		Baseline (µg/m³)	PC (µg/m³)	PEC (µg/m³)	PC as % of AQS/ EAL/ AEGL (%)	PEC as % of AQS/ EAL/ AEGL (%)
30-minute maximum	AEGL-2	28,000				0.01%	0.19%
	AEGL-3	47,000				0.004%	0.11%
NO_2 1-hour maximum	AEGL-1	940	52.0	0.75	52.8	0.08%	0.23%
	AEGL-2	23,000				0.003%	0.23%
	AEGL-3	38,000				0.002%	0.14%
NO_2 4-hour maximum	AEGL-1	940	52.0	0.116	52.1	0.01%	5.54%
	AEGL-2	15,000				0.001%	0.35%
	AEGL-3	23,000				0.001%	0.23%
NO_2 8-hour maximum	AEGL-1	940	52.0	0.0388	52.0	0.004%	5.54%
	AEGL-2	13,000				0.0003%	0.40%
	AEGL-3	21,000				0.0002%	0.25%

The results presented in Table 5.2 predict no exceedances for any AQS or AEGL as a result of the start-up test.

5.4.1.2 MONTHLY LOAD BANK TEST

The modelled maximum concentrations at the 37 indicative sensitive receptors resulting from emissions of any of the LD14 engines are presented in Table 5.3 compared against the AQS, EAL and AEGLs as applicable.

TABLE 5.3 MODELLED CONCENTRATIONS FOR LD14 MONTHLY LOAD BANK TEST

Period	AQS/ EAL/ AEGL (µg/m³)		Baseline (µg/m³)	PC (µg/m³)	PEC (µg/m³)	PC as % of AQS/ EAL/ AEGL (%)	PEC as % of AQS/ EAL/ AEGL (%)
NO 1-hour maximum	EAL	4,400	34.2	22.0	56.2	11.0%	1.3%
NO_2 1-hour maximum	1-hour maximum	200	52.0	15.1	67.1	7.5%	34%
	1-hour 19th highest hour (99.79th %ile)	200		10.4	62.4	5.2%	31%
NO_2	AEGL-1	940	52.0	43.2	95.2	4.6%	10%
	AEGL-2	38,000				0.11%	0.25%

Period	AQS/ EAL/ AEGL (µg/m³)		Baseline (µg/m³)	PC (µg/m³)	PEC (µg/m³)	PC as % of AQS/ EAL/ AEGL (%)	PEC as % of AQS/ EAL/ AEGL (%)
10-minute maximum	AEGL-3	64,000				0.07%	0.15%
NO_2 30-minute maximum	AEGL-1	940	52.0	34.7	86.7	3.7%	9.2%
	AEGL-2	28,000				0.12%	0.31%
	AEGL-3	47,000				0.074%	0.18%
NO_2 1-hour maximum	AEGL-1	940	52.0	15.1	67.1	1.6%	0.29%
	AEGL-2	23,000				0.066%	0.29%
	AEGL-3	38,000				0.040%	0.18%
NO_2 4-hour maximum	AEGL-1	940	52.0	2.33	54.3	0.25%	5.8%
	AEGL-2	15,000				0.016%	0.36%
	AEGL-3	23,000				0.010%	0.24%
NO_2 8-hour maximum	AEGL-1	940	52.0	0.776	52.8	0.083%	5.6%
	AEGL-2	13,000				0.006%	0.41%
	AEGL-3	21,000				0.0037%	0.25%

The results presented in Table 5.3 predict no exceedances for any AQS or AEGL because of the monthly load bank test.

5.4.1.3 ANNUAL LOAD-BANK TEST

The modelled maximum concentrations at indicative sensitive receptors resulting from emissions of any of the LD14 engines are presented in Table 5.4.

TABLE 5.4 MODELLED CONCENTRATIONS FOR LD14 ANNUAL LOAD BANK TEST

Period	AQS/ EAL/ AEGL (µg/m³)		Baseline (µg/m³)	PC (µg/m³)	PEC (µg/m³)	PC as % of AQS/ EAL/ AEGL (%)	PEC as % of AQS/ EAL/ AEGL (%)
NO 1-hour maximum	EAL	4,400	34.2	44.0	78.2	1%	1.8%
NO_2 1-hour maximum	1-hour maximum	200	52.0	30.2	82.2	15%	41%
	1-hour 19th highest hour (99.79th %ile)	200		20.8	72.8	10%	36%

Period	AQS/ EAL/ AEGL (µg/m³)		Baseline (µg/m³)	PC (µg/m³)	PEC (µg/m³)	PC as % of AQS/ EAL/ AEGL (%)	PEC as % of AQS/ EAL/ AEGL (%)
NO_2 10-minute maximum	AEGL-1	940	52.0	43.2	95.2	4.6%	10%
	AEGL-2	38,000				0.11%	0.25%
	AEGL-3	64,000				0.07%	0.15%
NO_2 30-minute maximum	AEGL-1	940	52.0	34.7	86.7	3.7%	9.2%
	AEGL-2	28,000				0.12%	0.31%
	AEGL-3	47,000				0.074%	0.18%
NO_2 1-hour maximum	AEGL-1	940	52.0	30.2	82.2	3.2%	0.36%
	AEGL-2	23,000				0.13%	0.36%
	AEGL-3	38,000				0.079%	0.22%
NO_2 4-hour maximum	AEGL-1	940	52.0	4.7	56.7	0.50%	6.0%
	AEGL-2	15,000				0.031%	0.38%
	AEGL-3	23,000				0.020%	0.25%
NO_2 8-hour maximum	AEGL-1	940	52.0	1.6	53.6	0.17%	5.7%
	AEGL-2	13,000				0.012%	0.41%
	AEGL-3	21,000				0.0074%	0.26%

The results presented in Table 5.4 predict no exceedances for any AQS or AEGL because of the annual load bank test.

5.4.1.4 ANNUAL BUILDING LOAD TEST

The modelled maximum concentrations at indicative sensitive receptors resulting from emissions of any of the LD14 engines are presented in Table 5.5.

TABLE 5.5 MODELLED CONCENTRATIONS FOR LD14 ANNUAL BUILDING LOAD TEST

Period	AQS/ EAL/ AEGL (µg/m³)		Baseline (µg/m³)	PC (µg/m³)	PEC (µg/m³)	PC as % of AQS/ EAL/ AEGL (%)	PEC as % of AQS/ EAL/ AEGL (%)
NO 1-hour maximum	EAL	4,400	34.2	34.3	68.5	0.8%	1.6%
NO_2 1-hour maximum	1-hour maximum	200	52.0	24.5	76.5	12%	38%
	1-hour 19th highest hour	200		19.5	71.5	9.8%	36%

Period	AQS/ EAL/ AEGL (µg/m³)		Baseline (µg/m³)	PC (µg/m³)	PEC (µg/m³)	PC as % of AQS/ EAL/ AEGL (%)	PEC as % of AQS/ EAL/ AEGL (%)
	(99.79th %ile)						
NO_2 10-minute maximum	AEGL-1	940	52.0	52.3	104	5.6%	11%
	AEGL-2	38,000				0.14%	0.27%
	AEGL-3	64,000				0.08%	0.16%
NO_2 30-minute maximum	AEGL-1	940	52.0	28.5	80.5	3.0%	8.6%
	AEGL-2	28,000				0.10%	0.29%
	AEGL-3	47,000				0.061%	0.17%
NO_2 1-hour maximum	AEGL-1	940	52.0	24.5	76.5	2.6%	0.33%
	AEGL-2	23,000				0.11%	0.33%
	AEGL-3	38,000				0.064%	0.20%
NO_2 4-hour maximum	AEGL-1	940	52.0	5.71	57.7	0.61%	6.1%
	AEGL-2	15,000				0.038%	0.38%
	AEGL-3	23,000				0.025%	0.25%
NO_2 8-hour maximum	AEGL-1	940	52.0	1.61	53.6	0.17%	5.7%
	AEGL-2	13,000				0.012%	0.41%
	AEGL-3	21,000				0.0077%	0.26%

The results presented in Table 5.5 predict no exceedances for any AQS or AEGL because of the annual building load test.

5.4.1.5 IMPACT OF TESTING REGIME ON THE NO_2 ANNUAL MEAN STANDARD

The modelled maximum concentrations at indicative sensitive receptors resulting from emissions of any of the LD14 engines are presented in Table 5.6.

TABLE 5.6 MODELLED ANNUAL MEAN CONCENTRATIONS FOR THE TESTING REGIME

Data Centre	NO_2 Concentration (µg/m³), Maximum at any of the Specified Receptors			
	Annual Mean			
	PC	PC as % of AQS	PEC	PEC as % of AQS
LD14	0.004	0.01%	26.0	65%

The modelled results are that the air quality impacts of the planned testing regime of LD14 are expected to be insignificant.

Please refer to **Section 6** and detailed results presented in **Appendix B** for further information of the in-combination assessment of the cumulative impact of the testing regime on the NO_2 annual AQS, which considers LD14, along with the Slough Campus and Extended Campus.

5.4.1.6 ASSESSMENT OF POTENTIAL IMPACTS ON PROTECTED CONSERVATION AREAS

The results presented in **Table 5.7**, **Table 5.8 and Table 5.9** show that the modelled impacts of the testing regime on protected conservation areas are insignificant.

TABLE 5.7 MODELLED NO_X 24-HOUR MEAN CONCENTRATIONS (µG/M^3)

Site	PC	PC as % of AQS	Background	PEC	PEC as % of AQS	Significance
Haymill Valley (LNR)	1.2	<1%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	0.73	<1%	N/A [a]	N/A	N/A	Insignificant
Burnham Beeches (SAC)	0.22	<1%	47.6	47.8	24%	Insignificant
Windsor Forest & Great Park (SAC)	0.11	<1%	46.7	46.8	23%	Insignificant
South West London Waterbodies (SPA & Ramsar)	0.09	<1%	108	109	54%	Insignificant
Chilterns Beechwoods (SAC)	0.04	<1%	46.0	46.0	23%	Insignificant

[a] The Environment Agency guidance on Air emissions risk assessment for your environmental permit states that there is no need to calculate PEC for local nature sites and short-term targets, such as 24-hour mean.

TABLE 5.8 MODELLED NUTRIENT NITROGEN DEPOSITION (KGN/HA/YR)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	10	0.000138	<1%	27.3	27.3	273%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]	10	0.00005	<1%	28.1	28.1	281%	Insignificant
	Violet click beetle	10	0.00005	<1%	28.1	28.1	281%	Insignificant
	Old acidophilous oak woods […]	10	0.00005	<1%	28.1	28.1	281%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler	No CL	0.0001	N/A	11.2	11.2	N/A	Insignificant
	Gadwall	No CL	0.0001	N/A	11.2	11.2	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests	10	<0.0001	<1%	33.5	33.5	335%	Insignificant
	Stag beetle	10	<0.0001	<1%	33.5	33.5	335%	Insignificant
	Semi-natural dry grasslands and scrubland […]	15	<0.0001	<1%	19.9	19.9	133%	Insignificant

TABLE 5.9 MODELLED ACID DEPOSITION (KEQ/HA/YR)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	See Table 3.3 in Annex C – Air Dispersion Modelling Report of the Campus Environmental Permit application (EPR/LP3303PR)	$9.8x10^{-6}$	<1%	S:0.26 N:1.95	2.21	107%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]		$3.5x10^{-6}$	<1%	S:0.23 N:2.01	2.24	215%	Insignificant
	Violet click beetle		$3.5x10^{-6}$	<1%		2.24	215%	Insignificant
	Old acidophilous oak woods […]		$3.5x10^{-6}$	<1%		2.24	215%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler		$9.4x10^{-7}$	N/A	S:0.25 N:0.8	1.05	N/A	Insignificant
	Gadwall		$9,4x10^{-7}$	N/A		1.05	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests		$7.1x10^{-7}$	<1%	S:0.27 N:2.39	2.66	162%	Insignificant
	Stag beetle		$7.1x10^{-7}$	<1%		2.66	162%	Insignificant
	Semi-natural dry grasslands and scrubland […]		$3.5x10^{-7}$	<1%	S:0.22 N:1.42	1.64	34%	Insignificant

Please refer to **Section 6** and detailed results presented in **Appendix B** for further information of the in-combination assessment, which considers the potential cumulative impacts to protected conservation areas of LD14, along with the Slough Campus and Extended Campus.

5.4.2 EMERGENCY OPERATION

The modelled impacts of the 1 hour and 72-hour emergency operations are set out in Table 5.10. The modelled impacts against the NO_2 1-hour standards remain unchanged by the hours of outage. Therefore, the only difference in modelled impacts between the 1 hour and 72 hour is against the annual mean NO_2 standard.

TABLE 5.10 MODELLED CONCENTRATIONS FOR THE 1-HOUR AND 72-HOUR EMERGENCY OUTAGE SCENARIO (EXTENDED CAMPUS)[12]

Data Centre	NO_2 Concentration (µg/m^3), Maximum at any of the Specified Receptors											
	1-hour maximum (100th %ile)*			**1-hour 19th highest hour (99.79th %ile)***			**Annual mean (1 hour emergency scenario)**			**Annual mean (72-hour emergency scenario)**		
	PC	**PEC**	**PEC as % of AQS**	**PC**	**PC**	**PEC as % of AQS**	**PC**	**PEC**	**PEC as % of AQS**	**PC**	**PEC**	**PEC as % of AQS**
Extended Campus	3,215	3,267	1,634%	1,767	1,819	910%	0.041	26.0	65%	2.97	29.0	72%
Slough Campus	2,618	2,670	1,335%	1,600	1,652	826%	0.029	26.0	65%	2.11	28.1	70%
LD14	18.8	70.8	35%	15.0	67	34%	0.0002	26.0	65%	0.017	26.0	65%

[12] Please refer to **Section 6** and detailed results presented in **Appendix B** for further information of the in-combination assessment of the 1-hour emergency scenario, which considers LD14, along with the Slough Campus and Extended Campus.

The modelling results presented in Table 5.10 show that for LD14 alone, applicable air quality standards would not be expected to be exceeded in the assumed emergency scenario.

In case of all the extended Campus and Slough Campus needing emergency power, the 200 µg/m^3 threshold is expected to be exceeded. Whether the AQS would be breached would depend on operating duration, noting that 18 exceedances are allowed in any one year.

The modelled maximum concentrations at the indicative sensitive receptors in the vicinity of the Site (shown in Figure 4.1) are presented in Table 5.10. Contour plots of the maximum modelled NO_2 concentrations from the 1-hour outage scenario can be found in **Appendix A**.

The results presented in Table 5.10 show that in the case of an emergency outage for 1 hour or 72 hours, the NO_2 1-hour air quality standard of 200 µg/m^3 is expected to be exceeded. There is also the possibility that the AEGL-1 (non-disabling) threshold could be exceeded for the 10-minute, 30-minute and 1-hour AEGLs.

Whether the hourly AQS would actually be breached would depend on how many hours the engines operated for, noting that 18 hourly exceedances are allowed in any one year, and also on the prevailing actual meteorological conditions. As per the original application, no exceedances of the annual mean AQS are expected on the basis of this assessment.

5.4.2.1 POTENTIAL IMPACTS OF EMERGENCY OPERATION ON PROTECTED CONSERVATION AREAS

The potential impact on the surrounding protected conservation areas of NO_x emissions from LD14 emergency power operation has been assessed, assuming 1-hour of operations. The resulting potential NO_x ambient concentrations, nutrient nitrogen deposition and acid deposition have been modelled and are presented in Table 5.11 to Table 5.14. They were assessed against the standards and critical loads presented in Section 2.2. The criteria outlined in Section 2.3 were used to determine the significance of the impact.

TABLE 5.11 MODELLED NO_X ANNUAL MEAN CONCENTRATIONS (µG/M^3)

Site	PC	PC as % of AQS	Background	PEC	PEC as % of AQS	Significance
Haymill Valley (LNR)	0.0001	<1%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	0.0001	<1%	N/A	N/A	N/A	Insignificant
Burnham Beeches (SAC)	0.00004	<1%	23.8	23.8	79%	Insignificant
Windsor Forest & Great Park (SAC)	0.00001	<1%	23.3	23.3	78%	Insignificant
South West London Waterbodies (SPA & Ramsar)	0.00001	<1%	54.2	54.2	181%	Insignificant
Chilterns Beechwoods (SAC)	0.000003	<1%	23.0	23.0	77%	Insignificant

[a] The Environment Agency guidance on Air emissions risk assessment for your environmental permit states that there is no need to calculate PEC for local nature sites.

For the 24-hour mean concentrations, the results in Table 5.11 illustrate that the modelled impacts are insignificant.

Table 5.12 assumes all the engines for LD14 run for 1-hour during the same 24-hour period of continuous emergency power generation.

TABLE 5.12 MODELLED NO_X 24-HOUR MEAN CONCENTRATIONS (µG/M^3)

Site	PC	PC as % of AQS	Background	PEC	PEC as % of AQS	Significance
Haymill Valley (LNR)	0.7	<1%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	0.44	<1%	N/A	N/A	N/A	Insignificant
Burnham Beeches (SAC)	0.13	<1%	47.6	47.7	24%	Insignificant
Windsor Forest & Great Park (SAC)	0.06	<1%	46.7	46.7	23%	Insignificant
South West London Waterbodies (SPA & Ramsar)	0.06	<1%	108	108	54%	Insignificant
Chilterns Beechwoods (SAC)	0.02	<1%	46.0	46.0	23%	Insignificant

[a] The Environment Agency guidance on Air emissions risk assessment for your environmental permit states that there is no need to calculate PEC for local nature sites and short-term targets, such as 24-hour mean.

The potential nitrogen deposition and acid deposition were calculating using AQTAG06 guidance, based on the annual mean NO_x concentrations presented in Table 5.11. The results are presented in Table 5.13 and Table 5.14.

All the modelled impacts from the testing regime of LD14 on protected conservation areas are insignificant. As the habitats in the South West London Waterbodies SPA and Ramsar site do not have a critical load, they have not been assessed.

TABLE 5.13 MODELLED NUTRIENT NITROGEN DEPOSITION (KGN/HA/YR)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	10	$1.2.10^{-5}$	<1%	27.3	27.3	273%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]	10	$4.2.10^{-6}$	<1%	28.1	28.1	281%	Insignificant
	Violet click beetle	10	$4.2.10^{-6}$	<1%	28.1	28.1	281%	Insignificant
	Old acidophilous oak woods […]	10	$4.2.10^{-6}$	<1%	28.1	28.1	281%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler	No CL	$1.1.10^{-6}$	N/A	11.2	11.2	N/A	Insignificant
	Gadwall	No CL	$1.1.10^{-6}$	N/A	11.2	11.2	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests	10	$8.4.10^{-7}$	<1%	33.5	33.5	335%	Insignificant
	Stag beetle	10	$8.4.10^{-7}$	<1%	33.5	33.5	335%	Insignificant
	Semi-natural dry grasslands and scrubland […]	15	$4.2.10^{-7}$	<1%	19.9	19.9	133%	Insignificant

TABLE 5.14 MODELLED ACID DEPOSITION (KEQ/HA/YR)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	See Table 3.3 in Annex C – Air Dispersion Modelling Report of the Campus Environmental Permit application (EPR/LP3303PR)	$8.4.10^{-7}$	<1%	S:0.26 N:1.95	2.21	107%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]		$3.0.10^{-7}$	<1%	S:0.23 N:2.01	2.24	215%	Insignificant
	Violet click beetle		$3.0.10^{-7}$	<1%		2.24	215%	Insignificant
	Old acidophilous oak woods […]		$3.0.10^{-7}$	<1%		2.24	215%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler		$8.0.10^{-8}$	N/A	S:0.25 N:0.8	1.05	N/A	Insignificant
	Gadwall		$8.0.10^{-8}$	N/A		1.05	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests		$6.0.10^{-8}$	<1%	S:0.27 N:2.39	2.66	162%	Insignificant
	Stag beetle		$6.0.10^{-8}$	<1%		2.66	162%	Insignificant
	Semi-natural dry grasslands and scrubland […]		$3.0.10^{-8}$	<1%	S:0.22 N:1.42	1.64	34%	Insignificant

6. CONCLUSION

The key findings of the AQIA reported above are:

- During routine testing of LD14:
  - There are no expected exceedances of any air quality standard.
  - There are no expected significant impacts at sensitive ecological receptors.

    The impacts of emissions of PM_{10} and SO_2 are not expected to be significant.
- The routine testing activities at LD14 are not expected to contribute significantly towards in-combination impacts of Campus or Extended Campus operations.
- In the case of emergency running of LD14 for 1 hour and 72 hours, the NO_2 1 hour air quality standard is not expected to be exceeded, nor are the NO_2 AEGL-1 thresholds.
- Whilst emergency operations of LD14 as modelled are not expected to result in an air quality standard exceedance when operating in isolation, in-combination with the other data centres in the Campus and Extended Campus emissions have the potential to result in the exceedance of the 1-hour NO_2 air quality standard, and the AEGL-1 threshold.

APPENDIX A MODEL INPUTS

Site Installation Boundary

4 km by 4 km grid centred on campus

20 km by 20 km grid centred on campus

0 0.5 1 1.5 2

Kilometers

N

Figure A.1
Modelled Area Around Extended Campus
Slough Trading Estate, 8 Buckingham Ave
Slough SL1 4AX

SCALE: See Scale Bar	VERSION: A01
SIZE: A3	DRAWN: OB
PROJECT: 0420743	CHECKED: CG
DATE: 11/12/2018	APPROVED: HB

ERM

EQUINIX

PROJECTION: British National Grid

Path: \\ukoxfdc01\DATA\Oxford\Projects\0420743 Equinix Slough Permit.GB\Working folder\GIS\MAPS\AQ\FigureA.1_Square_A01.mxd

A2 MODELLED BUILDINGS DATA

The location of the modelled buildings is presented in Figure A.2, while their heights are listed in Table A.1.

FIGURE A.2 LOCATION OF MODELLED BUILDINGS

TABLE A.1 HEIGHT OF MODELLED BUILDINGS

Building on Extended Campus	Height above ground level (m)	Building on Slough Trading Estate	Height above ground level (m)
LD4.1	14.0	2	8.8
LD4.2	8.25	3	12.3
LD5.1	17.4	4	11.6
LD5.2	9.8	5	12.5
LD6.1	24.0	6	10.1
LD6.2	18.0	7	8.9
LD7.1	22.1	8	9.3
LD7.2	22.1	9	9.8
LD7.2a	22.9	10	8.0
LD13x.1	17.26	11	7.2
LD13x.2	12.8	12	7.6
LD13x.3	3.2	13	10.7
LD11x.1	16.0	14	20.0
LD11x.2	16.0	15	14.0
LD14.1	34.25	16	11.0
LD14.2	19.45	-	-

A3 LONDON HEATHROW 2017-2021 WIND ROSES

The London Heathrow wind roses for years 2017 to 2021 are presented in Figures A.3 to A.7.

FIGURE A.3 LONDON HEATHROW 2017 WIND ROSE

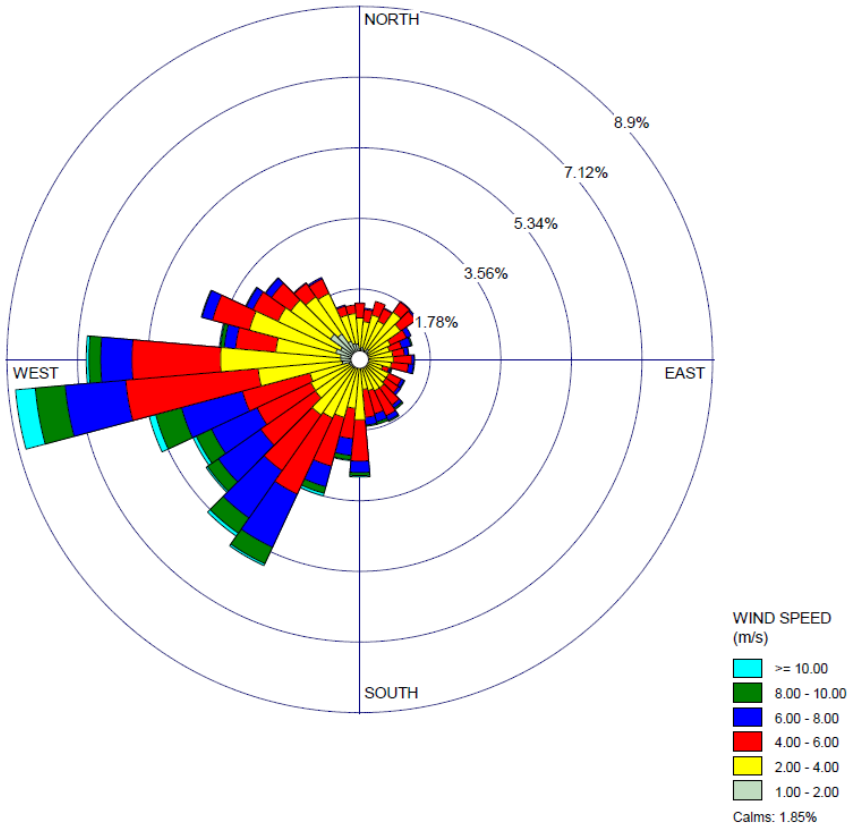


FIGURE A.4 LONDON HEATHROW WIND ROSE – 2018

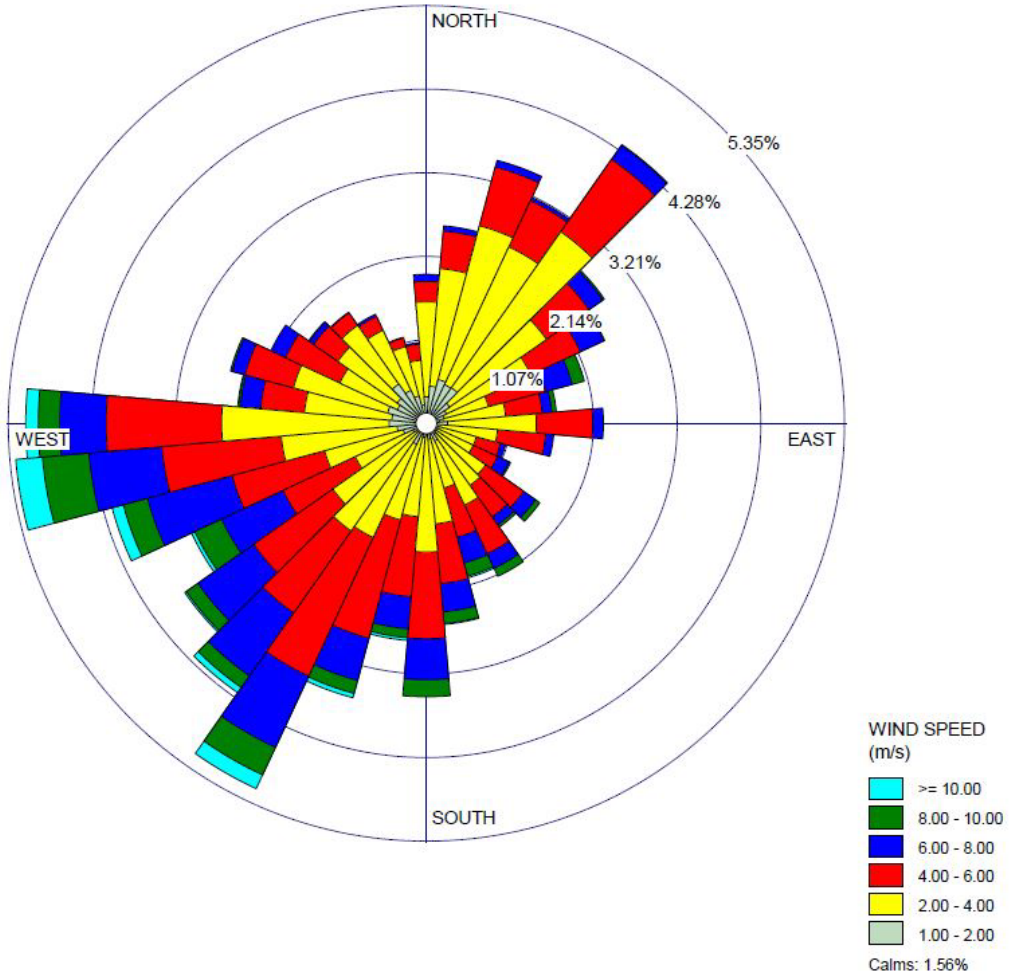


FIGURE A.5 LONDON HEATHROW WIND ROSE – 2019

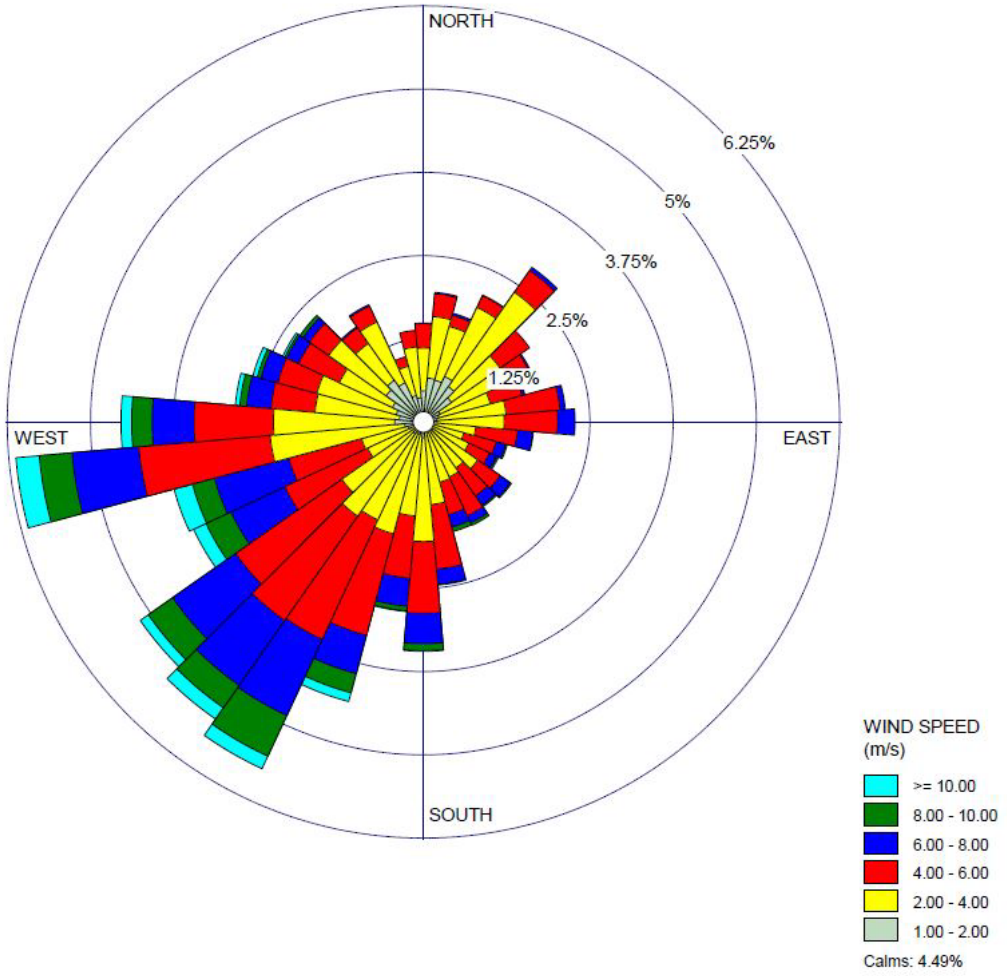


FIGURE A.6 LONDON HEATHROW WIND ROSE – 2020

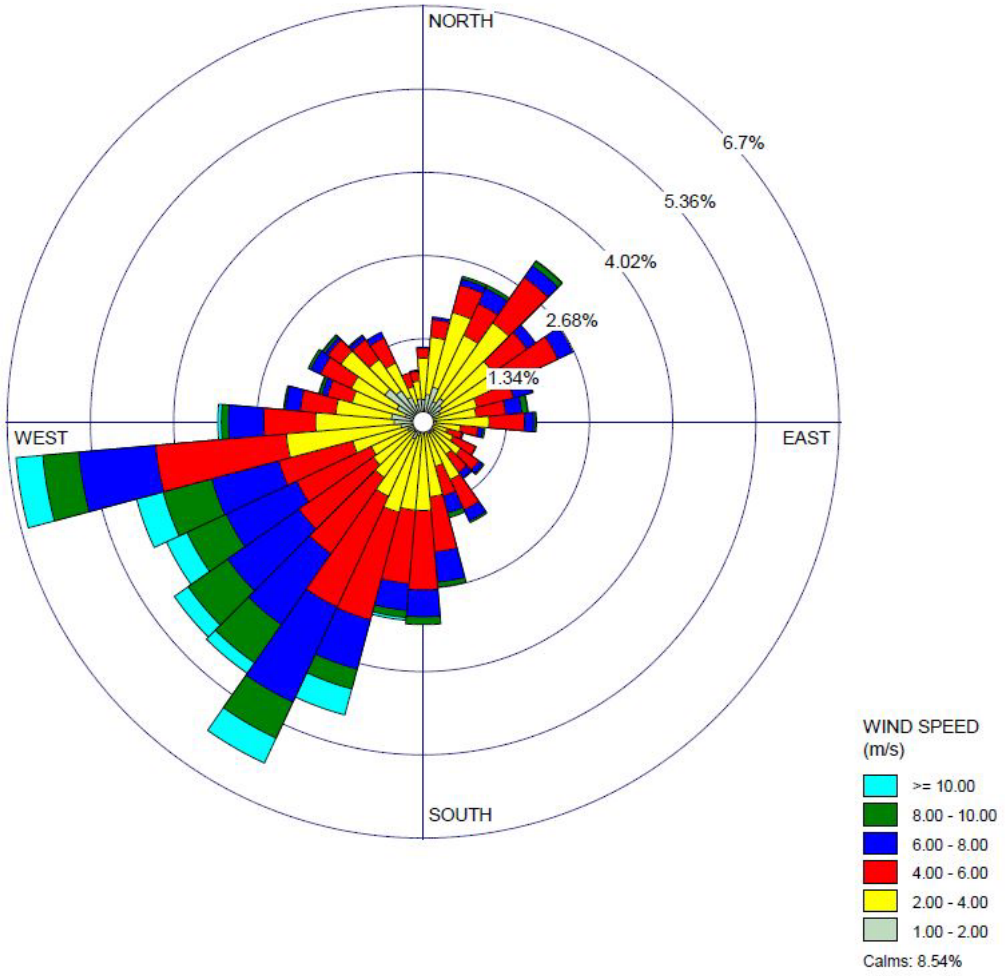
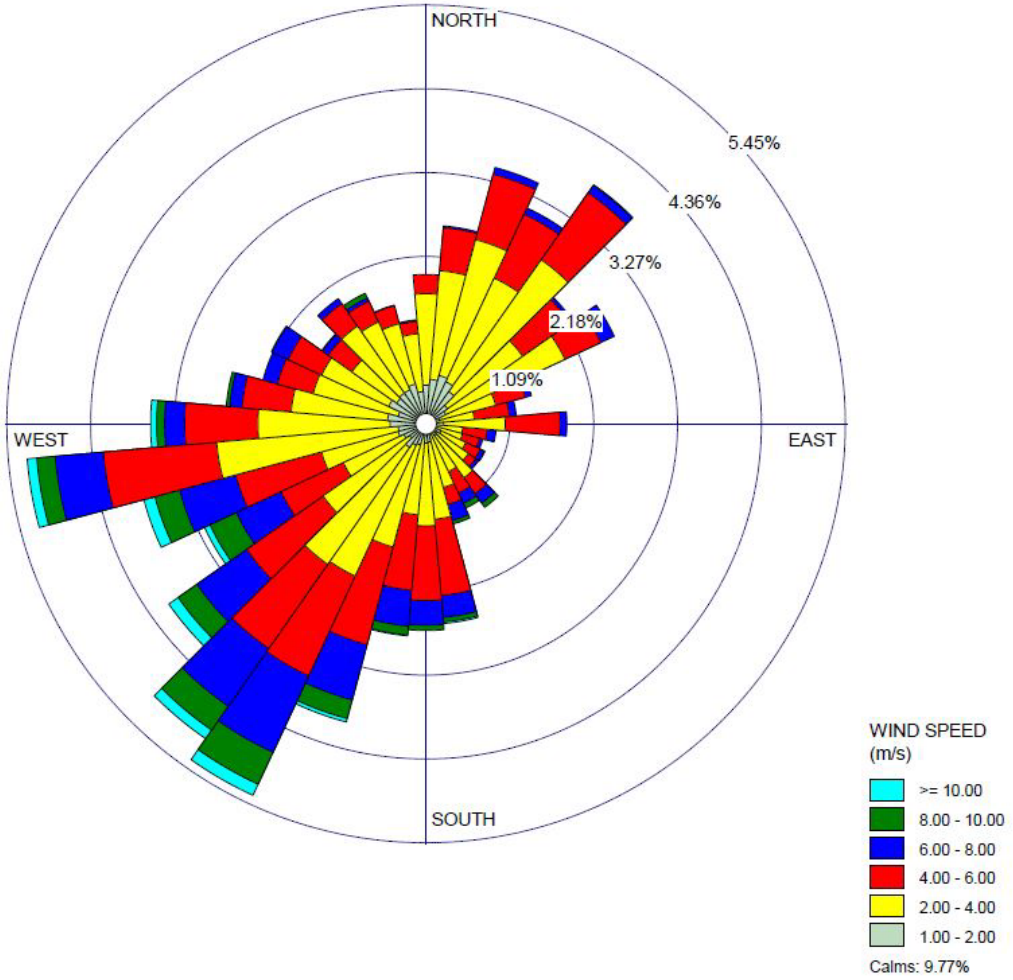


FIGURE A.7 LONDON HEATHROW WIND ROSE – 2021



A.4 EMISSION POINTS LOCATION

Table A.2 presents the coordinates used for each stack in the air dispersion model.

TABLE A.2 COORDINATES OF MODELLED STACKS

Data Centre	Emission Point	X (National Grid)	Y (National Grid)
LD4	LD4_01	494817.70	181386.40
	LD4_02	494816.50	181382.90
	LD4_03	494815.50	181379.20
	LD4_04	494814.40	181375.40
	LD4_05	494813.50	181372.00
	LD4_06	494812.30	181368.30
	LD4_07	494811.40	181364.50
	LD4_08	494810.40	181360.70
	LD4_09	494809.15	181356.34
	LD4_10	494807.99	181352.60
	LD4_11	494807.32	181349.53
	LD4_12	494806.48	181346.37
	LD4_13	494805.53	181343.64
LD5	LD5_01	495114.46	181214.57
	LD5_02	495118.00	181213.90
	LD5_03	495121.10	181212.60
	LD5_04	495125.10	181211.30
	LD5_05	495128.40	181210.50
	LD5_06	495132.10	181209.10
	LD5_07	495157.40	181201.90
	LD5_08	495161.60	181200.20
	LD5_09	495164.80	181199.10
	LD5_10	495169.00	181197.80
	LD5_11	495172.30	181197.30
	LD5_12	495176.50	181196.00
	LD5_13	495135.50	181208.10
	LD5_14	495153.80	181203.30
	LD5_15	495202.50	181188.10

Data Centre	Emission Point	X (National Grid)	Y (National Grid)
	LD5_16	495207.61	181185.29
	LD5_17	495210.68	181184.18
	LD5_18	495213.61	181183.38
	LD5_19	495233.75	181177.76
	LD5_20	495237.48	181176.44
	LD5_21	495240.91	181175.36
	LD5_22	495244.31	181174.20
	LD5_23	495247.79	181173.17
LD6	LD6_01	494800.12	181471.05
	LD6_02	494800.29	181471.52
	LD6_03	494800.46	181471.99
	LD6_04	494805.24	181487.94
	LD6_05	494805.39	181488.42
	LD6_06	494805.55	181488.89
	LD6_07	494817.44	181530.04
	LD6_08	494817.59	181530.52
	LD6_09	494817.74	181530.99
	LD6_10	494822.75	181547.34
	LD6_11	494822.89	181547.82
	LD6_12	494823.03	181548.30
	LD6_13	494761.83	181566.10
	LD6_14	494761.69	181565.62
	LD6_15	494761.55	181565.14
	LD6_16	494757.41	181549.10
	LD6_17	494757.29	181548.62
	LD6_18	494757.17	181548.13
	LD6_19	494744.43	181506.40
	LD6_20	494744.29	181505.92
	LD6_21	494744.16	181505.43
	LD6_22	494739.74	181489.49
	LD6_23	494739.59	181489.02
	LD6_24	494739.45	181488.54

Data Centre	Emission Point	X (National Grid)	Y (National Grid)
LD7	LD7_1_01	494790.02	181607.46
	LD7_1_02	494790.45	181607.28
	LD7_1_03	494777.91	181611.94
	LD7_1_04	494778.50	181611.70
	LD7_1_05	494789.49	181607.63
	LD7_1_06	494790.89	181607.10
	LD7_1_07	494777.48	181612.05
	LD7_1_08	494778.94	181611.59
	LD7_1_09	494766.76	181613.42
	LD7_2_01	494857.02	181588.13
	LD7_2_02	494857.46	181587.96
	LD7_2_03	494860.29	181587.27
	LD7_2_04	494860.74	181587.10
	LD7_2_05	494861.14	181586.95
	LD7_2_06	494864.07	181586.07
	LD7_2_07	494864.52	181585.90
	LD7_2_08	494866.87	181585.33
LD13x (formerly LD10)	LD10_01	495467.99	181296.68
	LD10_02	495469.02	181300.26
	LD10_03	495469.89	181303.39
	LD10_04	495472.19	181311.29
	LD10_05	495477.85	181331.04
	LD10_06	495415.89	181306.63
	LD10_07	495416.29	181307.43
	LD10_08	495417.16	181310.07
	LD10_09	495417.46	181311.57
	LD10_10	495418.93	181314.84
	LD10_11	495419.33	181316.44
	LD10_12	495421.69	181324.89
	LD10_13	495422.05	181325.82
	LD10_14	495423.70	181329.89
	LD10_15	495424.04	181330.82

Data Centre	Emission Point	X (National Grid)	Y (National Grid)
	LD10_16	495459.29	181266.29
	LD10_17	495458.02	181261.89
	LD10_18	495456.59	181257.02
	LD10_19	495467.69	181295.67
	LD10_20	495489.92	181320.34
LD11x	LD11X_01	494501.71	181344.03
	LD11X_02	494499.66	181342.36
	LD11X_03	494497.11	181340.20
	LD11X_04	494495.06	181338.54
	LD11X_05	494492.52	181336.41
	LD11X_06	494490.47	181334.68
	LD11X_07	494487.87	181332.52
	LD11X_08	494485.87	181330.85
	LD11X_09	494483.28	181328.72
	LD11X_10	494481.26	181327.06
	LD11X_11	494478.68	181324.90
	LD11X_12	494476.66	181323.18
LD14	LD14_01	494914.11	181629.90
	LD14_02	494913.77	181628.75
	LD14_03	494912.10	181623.08
	LD14_04	494911.76	181621.93
	LD14_05	494910.46	181617.53
	LD14_06	494910.12	181616.37
	LD14_07	494908.82	181611.97
	LD14_08	494908.48	181610.82
	LD14_09	494906.88	181605.39
	LD14_10	494905.18	181599.65
	LD14_11	494903.49	181593.90
	LD14_12	494901.87	181588.43
	LD14_13	494900.16	181582.62

APPENDIX B CUMULATIVE ASSESSMENT

The AQIA also considered the impacts of LD14 in combination with the other data centres in the Campus and Extended Campus.

When emergency operations of LD14 are assessed on their own, they are not expected to result in an air quality standard exceedance, however in-combination with the other data centres in the Campus and Extended Campus there is the potential to result in the exceedance of the 1 hour NO_2 air quality standard, and the AEGL-1 threshold.

Detailed results of the assessment of cumulative impacts are set out below.

TABLE B.1 MODELLED 24-HOUR MEAN CONCENTRATIONS FOR PM10 SCREENING BASED ON 8-HOUR OF OPERATIONS, ALL ENGINES, 100% LOAD

Data Centre	Particulates (PM10) Concentration (µg/m³), Maximum at any of the Specified Receptors					
	24-hour maximum (100th %ile)			24-hour 36th highest hour (90.4th %ile)		
	PC	PEC	PEC as % of AQS	PC	PEC	PEC as % of AQS
Extended Campus	27.6	60.2	120%	13.7	46.3	93%
Slough Campus	27.5	60.1	120%	13.5	46.1	92%
LD14	0.3	32.9	66%	0.1	32.7	65%

[a] All Campus' engines running at 100% load for 8 hours

TABLE B.2 MODELLED HOURLY CONCENTRATIONS OF NO_2 FOR START-UP/ OFF-LOAD TEST AT EACH DATA CENTRE ON SLOUGH CAMPUS

Data Centre	NO_2 Concentration (µg/m³), Maximum at any of the Specified Receptors					
	1-hour maximum (100th %ile)			1-hour 19th highest hour (99.79th %ile)		
	PC	PEC	PEC as % of AQS	PC	PEC	PEC as % of AQS
LD4	50.0	102	51%	27.8	80	40%
LD5	86.6	139	69%	38.6	91	45%
LD6	36.8	89	44%	25.3	77	39%
LD7	23.5	75	38%	14.6	67	33%
LD13x	39.0	91	45%	31.1	83	42%
LD11x	14.1	66	33%	11.3	63	32%
LD14	0.75	53	26%	0.52	53	26%

TABLE B.3 MODELLED HOURLY CONCENTRATIONS FOR QUARTERLY LOAD BANK TEST

Data Centre	NO_2 Concentration (µg/m³), Maximum at any of the Specified Receptors					
	1-hour maximum (100th %ile)			1-hour 19th highest hour (99.79th %ile)		
	PC	PEC	PEC as % of AQS	PC	PEC	PEC as % of AQS
LD4	1,201	1,253	627%	666	718	359%
LD5	2,078	2,130	1,065%	927	979	489%
LD6	882	934	467%	606	658	329%
LD7	564	616	308%	350	402	201%
LD13x	936	988	494%	747	799	400%
LD11x	338	390	195%	271	323	162%
LD14	30.2	82.2	41%	20.8	72.8	36%

TABLE B.4 MODELLED HOURLY CONCENTRATIONS FOR ANNUAL LOAD BANK TEST

Data Centre	NO_2 Concentration (µg/m³), Maximum at any of the Specified Receptors					
	1-hour maximum (100th %ile)			1-hour 19th highest hour (99.79th %ile)		
	PC	PEC	PEC as % of AQS	PC	PEC	PEC as % of AQS
LD4	209	261	130%	126	178	89%
LD5	211	263	131%	143	195	98%
LD6	79	131	66%	55	107	53%
LD7	275	327	163%	153	205	103%
LD13x	160	212	106%	102	154	77%
LD11x	67	119	59%	51	103	52%
LD14	30.2	82.2	41	20.8	72.8	36%

TABLE B.5 MODELLED ANNUAL MEAN CONCENTRATIONS FOR THE TESTING REGIME

Data Centre	NO_2 Concentration (µg/m³), Maximum at any of the Specified Receptors			
	1-hour maximum (100th %ile)			
	PC	PC as % of AQS	PEC	PEC as % of AQS
Extended Campus	0.99	2.5%	27.0	68%
Slough Campus	0.71	1.8%	26.7	67%
LD14	0.004	0.01%	26.0	65%

TABLE B.6 MODELLED NO_X ANNUAL MEAN CONCENTRATIONS (µg/M^3)

Site	PC	PC as % of AQS	Background	PEC	PEC as % of AQS	Significance
Extended Campus (LD4, LD5, LD6, LD7, LD11x, LD13x and LD14)						
Haymill Valley (LNR)	0.075	<1%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	0.032	<1%	N/A [a]	N/A	N/A	Insignificant
Burnham Beeches (SAC)	0.013	<1%	23.8	23.8	79%	Insignificant
Windsor Forest & Great Park (SAC)	0.007	<1%	23.3	23.3	78%	Insignificant
South West London Waterbodies (SPA & Ramsar)	0.004	<1%	54.2	54.2	181%	Insignificant
Chilterns Beechwoods (SAC)	0.001	<1%	23.0	23.0	77%	Insignificant
Slough Campus (LD4, LD5, LD6, LD7 and LD14)						
Haymill Valley (LNR)	0.063	<1%	N/A a	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	0.027	<1%	N/A a	N/A	N/A	Insignificant
Burnham Beeches (SAC)	0.010	<1%	23.8	23.8	79%	Insignificant
Windsor Forest & Great Park (SAC)	0.006	<1%	23.3	23.3	78%	Insignificant
South West London Waterbodies (SPA & Ramsar)	0.003	<1%	54.2	54.2	181%	Insignificant
Chilterns Beechwoods (SAC)	0.001	<1%	23.0	23.0	77%	Insignificant
LD14						
Haymill Valley (LNR)	0.002	<1%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	0.001	<1%	N/A [a]	N/A	N/A	Insignificant
Burnham Beeches (SAC)	0.0005	<1%	23.8	23.8	79%	Insignificant
Windsor Forest & Great Park (SAC)	0.0002	<1%	23.3	23.3	78%	Insignificant
South West London Waterbodies (SPA & Ramsar)	0.0001	<1%	54.2	54.2	181%	Insignificant
Chilterns Beechwoods (SAC)	0.00003	<1%	23.0	23.0	77%	Insignificant

[a] The Environment Agency guidance on Air emissions risk assessment for your environmental permit states that there is no need to calculate PEC for local nature sites.

TABLE B.7 MODELLED NUTRIENT NITROGEN DEPOSITION (kgN/ha/yr)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Extended Campus (LD4, LD5, LD6, LD7, LD11x, LD13x and LD14)								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	10	0.0036	<1%	27.3	27.3	273%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]	10	0.002	<1%	28.1	28.1	281%	Insignificant
	Violet click beetle	10	0.002	<1%	28.1	28.1	281%	Insignificant
	Old acidophilous oak woods […]	10	0.002	<1%	28.1	28.1	281%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler	No CL	0.0006	N/A	11.2	11.2	N/A	Insignificant
	Gadwall	No CL	0.0006	N/A	11.2	11.2	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests	10	0.0004	<1%	33.5	33.5	335%	Insignificant
	Stag beetle	10	0.0004	<1%	33.5	33.5	335%	Insignificant
	Semi-natural dry grasslands and scrubland […]	15	0.0002	<1%	19.9	19.9	133%	Insignificant
Slough Campus (LD4, LD5, LD6, LD7 and LD14)								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	10	0.0029	<1%	27.3	27.3	273%	Insignificant

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]	10	0.0016	<1%	28.1	28.1	281%	Insignificant
	Violet click beetle	10	0.0016	<1%	28.1	28.1	281%	Insignificant
	Old acidophilous oak woods […]	10	0.0016	<1%	28.1	28.1	281%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler	No CL	0.0004	N/A	11.2	11.2	N/A	Insignificant
	Gadwall	No CL	0.0004	N/A	11.2	11.2	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests	10	0.00034	<1%	33.5	33.5	335%	Insignificant
	Stag beetle	10	0.00034	<1%	33.5	33.5	335%	Insignificant
	Semi-natural dry grasslands and scrubland […]	15	0.0002	<1%	19.9	19.9	133%	Insignificant
LD14								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	10	0.000138	<1%	27.3	27.3	273%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]	10	0.00005	<1%	28.1	28.1	281%	Insignificant
	Violet click beetle	10	0.00005	<1%	28.1	28.1	281%	Insignificant
	Old acidophilous oak woods […]	10	0.00005	<1%	28.1	28.1	281%	Insignificant
	Northern shoveler	No CL	0.0001	N/A	11.2	11.2	N/A	Insignificant

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
South West London Waterbodies (SPA & Ramsar)	Gadwall	No CL	0.0001	N/A	11.2	11.2	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests	10	<0.0001	<1%	33.5	33.5	335%	Insignificant
	Stag beetle	10	<0.0001	<1%	33.5	33.5	335%	Insignificant
	Semi-natural dry grasslands and scrubland […]	15	<0.0001	<1%	19.9	19.9	133%	Insignificant

TABLE B.8 MODELLED ACID DEPOSITION (keq/ha/yr)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Extended Campus (LD4, LD5, LD6, LD7, LD11x, LD13x and LD14)								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	see Table 3.3 in Annex C – Air Dispersion Modelling Report of the Campus Environmental Permit application (EPR/LP3303PR)	$2.6x10^{-4}$	<1%	S:0.26 N:1.95	2.21	108%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]		$1.5x10^{-4}$	<1%	S:0.23 N:2.01	2.24	215%	Insignificant
	Violet click beetle		$1.5x10^{-4}$	<1%		2.24	215%	Insignificant
	Old acidophilous oak woods […]		$1.5x10^{-4}$	<1%		2.24	215%	Insignificant
	Northern shoveler		$4.0x10^{-5}$	N/A	S:0.25	1.05	N/A	Insignificant

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
South West London Waterbodies (SPA & Ramsar)	Gadwall		$4.0x10^{-5}$	N/A	N:0.8	1.05	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests		$3.1x10^{-5}$	<1%	S:0.27 N:2.39	2.66	162%	Insignificant
	Stag beetle		$3.1x10^{-5}$	<1%		2.66	162%	Insignificant
	Semi-natural dry grasslands and scrubland […]		$1.5x10^{-5}$	<1%	S:0.22 N:1.42	1.64	34%	Insignificant
Slough Campus (LD4, LD5, LD6, LD7 and LD14)								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	see Table 3.3 in Annex C – Air Dispersion Modelling Report of the Campus Environmental Permit application (EPR/LP3303PR)	$2.1x10^{-4}$	<1%	S:0.26 N:1.95	2.21	108%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]		$1.1x10^{-4}$	<1%	S:0.23 N:2.01	2.24	215%	Insignificant
	Violet click beetle		$1.1x10^{-4}$	<1%		2.24	215%	Insignificant
	Old acidophilous oak woods […]		$1.1x10^{-4}$	<1%		2.24	215%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler		$3.1x10^{-5}$	N/A	S:0.25 N:0.8	1.05	N/A	Insignificant
	Gadwall		$3.1x10^{-5}$	N/A		1.05	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests		$2.4x10^{-5}$	<1%	S:0.27 N:2.39	2.66	162%	Insignificant
	Stag beetle		$2.4x10^{-5}$	<1%		2.66	162%	Insignificant

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
	Semi-natural dry grasslands and scrubland […]		$1.2x10^{-5}$	<1%	S:0.22 N:1.42	1.64	34%	Insignificant
LD14								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	see Table 3.3 in Annex C – Air Dispersion Modelling Report of the Campus Environmental Permit application (EPR/LP3303PR)	$9.8x10^{-6}$	<1%	S:0.26 N:1.95	2.21	107%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]		$3.5x10^{-6}$	<1%	S:0.23 N:2.01	2.24	215%	Insignificant
	Violet click beetle		$3.5x10^{-6}$	<1%		2.24	215%	Insignificant
	Old acidophilous oak woods […]		$3.5x10^{-6}$	<1%		2.24	215%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler		$9.4x10^{-7}$	N/A	S:0.25 N:0.8	1.05	N/A	Insignificant
	Gadwall		$9,4x10^{-7}$	N/A		1.05	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests		$7.1x10^{-7}$	<1%	S:0.27 N:2.39	2.66	162%	Insignificant
	Stag beetle		$7.1x10^{-7}$	<1%		2.66	162%	Insignificant
	Semi-natural dry grasslands and scrubland […]		$3.5x10^{-7}$	<1%	S:0.22 N:1.42	1.64	34%	Insignificant

TABLE B.9 MODELLED CONCENTRATIONS FOR THE 1-HOUR EMERGENCY OUTAGE SCENARIO (EXTENDED CAMPUS)

Period	AQS/ EAL/ AEGL (µg/m³)		Baseline (µg/m³)	PC (µg/m³)	PEC (µg/m³)	PC as % of AQS/ EAL/ AEGL (%)	PEC as % of AQS/ EAL/ AEGL (%)
NO 1-hour maximum	EAL	4,400	34.2	26.4	60.6	0.6%	1.4%
NO annual-mean	EAL	310	17.1	0.0001	17.1	0.000003 %	5.5%
NO_2 1-hour maximum	1-hour maximum	200	52.0	3,215	3,267	1608%	1634%
	1-hour 19th highest hour (99.79th %ile)	200		1,767	1,819	884%	910%
NO_2 10-minute maximum	AEGL-1	940	52.0	4,601	4,653	489%	495%
	AEGL-2	38,000				12.1%	12.2%
	AEGL-3	64,000				7.19%	7.27%
NO_2 30-minute maximum	AEGL-1	940	52.0	3,693	3,745	393%	398%
	AEGL-2	28,000				13.1%	13.4%
	AEGL-3	47,000				7.86%	7.97%
NO_2 1-hour maximum	AEGL-1	940	52.0	3,215	3,267	342%	14.2%
	AEGL-2	23,000				14.0%	14.2%
	AEGL-3	38,000				8.46%	8.60%
NO_2 4-hour maximum	AEGL-1	940	52.0	415	467	44.1%	49.7%
	AEGL-2	15,000				2.77%	3.11%
	AEGL-3	23,000				1.80%	2.03%
NO_2 8-hour maximum	AEGL-1	940	52.0	173	225	18.4%	23.9%
	AEGL-2	13,000				1.33%	1.73%
	AEGL-3	21,000				0.823%	1.07%
NO_2 Annual mean	AQS	40	26	0.0687	26.1	0.17%	65.17%

TABLE B.10 MODELLED CONCENTRATIONS FOR THE 72-HOUR EMERGENCY OUTAGE SCENARIO (EXTENDED CAMPUS)

Period	AQS/ EAL/ AEGL (µg/m³)		Baseline (µg/m³)	PC (µg/m³)	PEC (µg/m³)	PC as % of AQS/ EAL/ AEGL (%)	PEC as % of AQS/ EAL/ AEGL (%)
NO 1-hour maximum	EAL	4,400	34.2	26.4	60.6	0.6%	1.4%
NO annual-mean	EAL	310	17.1	0.0044	17.1	0.0014%	5.5%
NO_2 1-hour maximum	1-hour maximum	200	52.0	3,215	3,267	1608%	1634%
	1-hour 19th highest hour (99.79th %ile)	200		1,767	1,819	884%	910%
NO_2 10-minute maximum	AEGL-1	940	52.0	4,601	4,653	489%	495%
	AEGL-2	38,000				12.1%	12.2%
	AEGL-3	64,000				7.19%	7.27%
NO_2 30-minute maximum	AEGL-1	940	52.0	3,693	3,745	393%	398%
	AEGL-2	28,000				13.1%	13.4%
	AEGL-3	47,000				7.86%	7.97%
NO_2 1-hour maximum	AEGL-1	940	52.0	3,215	3,267	342%	14.2%
	AEGL-2	23,000				14.0%	14.2%
	AEGL-3	38,000				8.46%	8.60%
NO_2 4-hour maximum	AEGL-1	940	52.0	1,659	1,711	177%	182%
	AEGL-2	15,000				11.1%	11.4%
	AEGL-3	23,000				7.21%	7.44%
NO_2 8-hour maximum	AEGL-1	940	52.0	1,382	1,434	147%	153%
	AEGL-2	13,000				10.6%	11.0%
	AEGL-3	21,000				6.58%	6.83%
NO_2 Annual mean	AQS	40	26	2.96	29.0	7.41%	72.4%

TABLE B.11 NO_X MODELLED ANNUAL MEAN CONCENTRATIONS (µG/M^3)

Site	PC	PC as % of AQS	Background	PEC	PEC as % of AQS	Significance
Extended Campus (LD4, LD5, LD6, LD7, LD11x, LD13x and LD14)						
Haymill Valley (LNR)	0.012	<1%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	0.005	<1%	N/A	N/A	N/A	Insignificant
Burnham Beeches (SAC)	0.002	<1%	23.8	23.8	79%	Insignificant
Windsor Forest & Great Park (SAC)	0.001	<1%	23.3	23.3	78%	Insignificant
South West London Waterbodies (SPA & Ramsar)	0.001	<1%	54.2	54.2	181%	Insignificant
Chilterns Beechwoods (SAC)	0.0002	<1%	23.0	23.0	77%	Insignificant
Slough Campus (LD4, LD5, LD6, LD7 and LD14)						
Haymill Valley (LNR)	0.009	<1%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	0.004	<1%	N/A	N/A	N/A	Insignificant
Burnham Beeches (SAC)	0.001	<1%	23.8	23.8	79%	Insignificant
Windsor Forest & Great Park (SAC)	0.001	<1%	23.3	23.3	78%	Insignificant
South West London Waterbodies (SPA & Ramsar)	0.0004	<1%	54.2	54.2	181%	Insignificant
Chilterns Beechwoods (SAC)	0.0002	<1%	23.0	23.0	77%	Insignificant
LD14						
Haymill Valley (LNR)	0.0001	<1%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	0.0001	<1%	N/A	N/A	N/A	Insignificant
Burnham Beeches (SAC)	0.00004	<1%	23.8	23.8	79%	Insignificant
Windsor Forest & Great Park (SAC)	0.00001	<1%	23.3	23.3	78%	Insignificant
South West London Waterbodies (SPA & Ramsar)	0.00001	<1%	54.2	54.2	181%	Insignificant
Chilterns Beechwoods (SAC)	0.000003	<1%	23.0	23.0	77%	Insignificant

TABLE B.12 NO_X MODELLED 24-HOUR MEAN CONCENTRATIONS (µG/M^3)

Site	PC	PC as % of AQS	Background	PEC	PEC as % of AQS	Significance
Extended Campus (LD4, LD5, LD6, LD7, LD11x, LD13x and LD14)						
Haymill Valley (LNR)	38.2	19.1%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	15.2	7.6%	N/A	N/A	N/A	Insignificant
Burnham Beeches (SAC)	5.61	2.8%	47.6	53.2	27%	Insignificant
Windsor Forest & Great Park (SAC)	6.70	3.4%	46.7	53.4	56%	Insignificant
South West London Waterbodies (SPA & Ramsar)	3.01	1.5%	108	111	24%	Insignificant
Chilterns Beechwoods (SAC)	2.52	1.3%	46.0	48.5	24%	Insignificant
Slough Campus (LD4, LD5, LD6, LD7 and LD14)						
Haymill Valley (LNR)	35.3	17.6%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	13.1	6.5%	N/A	N/A	N/A	Insignificant
Burnham Beeches (SAC)	4.27	2.1%	47.6	51.9	26%	Insignificant
Windsor Forest & Great Park (SAC)	5.02	2.5%	46.7	51.7	26%	Insignificant
South West London Waterbodies (SPA & Ramsar)	2.19	1.1%	108	111	55%	Insignificant
Chilterns Beechwoods (SAC)	1.82	<1%	46.0	47.8	24%	Insignificant
LD14						
Haymill Valley (LNR)	0.7	<1%	N/A [a]	N/A	N/A	Insignificant
Cocksherd Wood (LNR)	0.44	<1%	N/A	N/A	N/A	Insignificant
Burnham Beeches (SAC)	0.13	<1%	47.6	47.7	24%	Insignificant
Windsor Forest & Great Park (SAC)	0.06	<1%	46.7	46.7	23%	Insignificant
South West London Waterbodies (SPA & Ramsar)	0.06	<1%	108	108	54%	Insignificant
Chilterns Beechwoods (SAC)	0.02	<1%	46.0	46.0	23%	Insignificant

TABLE B.12 Modelled Nutrient Nitrogen Deposition (KgN/ha/yr)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Extended Campus (LD4, LD5, LD6, LD7, LD11x, LD13x and LD14)								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	10	$5.7.10^{-4}$	<1%	27.3	27.3	273%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]	10	$3.2.10^{-4}$	<1%	28.1	28.1	281%	Insignificant
	Violet click beetle	10	$3.2.10^{-4}$	<1%	28.1	28.1	281%	Insignificant
	Old acidophilous oak woods […]	10	$3.2.10^{-4}$	<1%	28.1	28.1	281%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler	No CL	$8.9.10^{-5}$	N/A	11.2	11.2	N/A	Insignificant
	Gadwall	No CL	$8.9.10^{-5}$	N/A	11.2	11.2	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests	10	$7.1.10^{-5}$	<1%	33.5	33.5	335%	Insignificant
	Stag beetle	10	$7.1.10^{-5}$	<1%	33.5	33.5	335%	Insignificant
	Semi-natural dry grasslands and scrubland […]	15	$3.6.10^{-5}$	<1%	19.9	19.9	133%	Insignificant
Slough Campus (LD4, LD5, LD6, LD7 and LD14)								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	10	$4.2.10^{-4}$	<1%	27.3	27.3	273%	Insignificant

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]	10	$2.3.10^{-4}$	<1%	28.1	28.1	281%	Insignificant
	Violet click beetle	10	$2.3.10^{-4}$	<1%	28.1	28.1	281%	Insignificant
	Old acidophilous oak woods […]	10	$2.3.10^{-4}$	<1%	28.1	28.1	281%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler	No CL	$6.3.10^{-5}$	N/A	11.2	11.2	N/A	Insignificant
	Gadwall	No CL	$6.3.10^{-5}$	N/A	11.2	11.2	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests	10	$4.9.10^{-5}$	<1%	33.5	33.5	335%	Insignificant
	Stag beetle	10	$4.9.10^{-5}$	<1%	33.5	33.5	335%	Insignificant
	Semi-natural dry grasslands and scrubland […]	15	$2.4.10^{-5}$	<1%	19.9	19.9	133%	Insignificant
LD14								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	10	$1.2.10^{-5}$	<1%	27.3	27.3	273%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]	10	$4.2.10^{-6}$	<1%	28.1	28.1	281%	Insignificant
	Violet click beetle	10	$4.2.10^{-6}$	<1%	28.1	28.1	281%	Insignificant
	Old acidophilous oak woods […]	10	$4.2.10^{-6}$	<1%	28.1	28.1	281%	Insignificant
	Northern shoveler	No CL	$1.1.10^{-6}$	N/A	11.2	11.2	N/A	Insignificant

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
South West London Waterbodies (SPA & Ramsar)	Gadwall	No CL	$1.1.10^{-6}$	N/A	11.2	11.2	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests	10	$8.4.10^{-7}$	<1%	33.5	33.5	335%	Insignificant
	Stag beetle	10	$8.4.10^{-7}$	<1%	33.5	33.5	335%	Insignificant
	Semi-natural dry grasslands and scrubland […]	15	$4.2.10^{-7}$	<1%	19.9	19.9	133%	Insignificant

TABLE B.12 Modelled Acid Deposition (Keq/ha/yr)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Extended Campus (LD4, LD5, LD6, LD7, LD11x, LD13x and LD14)								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	see Table 3.3 in Annex C – Air Dispersion Modelling Report of the Campus Environmental Permit application (EPR/LP3303PR)	$4.1.10^{-5}$	<1%	S:0.26 N:1.95	2.21	107%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]		$2.3.10^{-5}$	<1%	S:0.23 N:2.01	2.24	215%	Insignificant
	Violet click beetle		$2.3.10^{-5}$	<1%		2.24	215%	Insignificant
	Old acidophilous oak woods […]		$2.3.10^{-5}$	<1%		2.24	215%	Insignificant
	Northern shoveler		$6.3.10^{-6}$	N/A	S:0.25 N:0.8	1.05	N/A	Insignificant

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
South West London Waterbodies (SPA & Ramsar)	Gadwall		$6.3.10^{-6}$	N/A		1.05	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests		$4.8.10^{-6}$	<1%	S:0.27 N:2.39	2.66	162%	Insignificant
	Stag beetle		$4.8.10^{-6}$	<1%		2.66	162%	Insignificant
	Semi-natural dry grasslands and scrubland […]		$2.4.10^{-6}$	<1%	S:0.22 N:1.42	1.64	34%	Insignificant
Slough Campus (LD4, LD5, LD6, LD7 and LD14)								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	see Table 3.3 in Annex C – Air Dispersion Modelling Report of the Campus Environmental Permit application (EPR/LP3303PR)	$3.0.10^{-5}$	<1%	S:0.26 N:1.95	2.21	107%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]		$1.7.10^{-5}$	<1%	S:0.23 N:2.01	2.24	215%	Insignificant
	Violet click beetle		$1.7.10^{-5}$	<1%		2.24	215%	Insignificant
	Old acidophilous oak woods […]		$1.7.10^{-5}$	<1%		2.24	215%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler		$4.5.10^{-6}$	N/A	S:0.25 N:0.8	1.05	N/A	Insignificant
	Gadwall		$4.5.10^{-6}$	N/A		1.05	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests		$3.5.10^{-6}$	<1%	S:0.27 N:2.39	2.66	162%	Insignificant
	Stag beetle		$3.5.10^{-6}$	<1%		2.66	162%	Insignificant

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
	Semi-natural dry grasslands and scrubland […]		$1.7.10^{-6}$	<1%	S:0.22 N:1.42	1.64	34%	Insignificant
LD14								
Burnham Beeches (SAC)	Atlantic acidophilous beech forests […]	see Table 3.3 in Annex C – Air Dispersion Modelling Report of the Campus Environmental Permit application (EPR/LP3303PR)	$8.4.10^{-7}$	<1%	S:0.26 N:1.95	2.21	107%	Insignificant
Windsor Forest & Great Park (SAC)	Atlantic acidophilous beech forests […]		$3.0.10^{-7}$	<1%	S:0.23 N:2.01	2.24	215%	Insignificant
	Violet click beetle		$3.0.10^{-7}$	<1%		2.24	215%	Insignificant
	Old acidophilous oak woods […]		$3.0.10^{-7}$	<1%		2.24	215%	Insignificant
South West London Waterbodies (SPA & Ramsar)	Northern shoveler		$8.0.10^{-8}$	N/A	S:0.25 N:0.8	1.05	N/A	Insignificant
	Gadwall		$8.0.10^{-8}$	N/A		1.05	N/A	Insignificant
Chilterns Beechwoods (SAC)	Asperulo-Fagetum beech forests		$6.0.10^{-8}$	<1%	S:0.27 N:2.39	2.66	162%	Insignificant
	Stag beetle		$6.0.10^{-8}$	<1%		2.66	162%	Insignificant
	Semi-natural dry grasslands and scrubland […]		$3.0.10^{-8}$	<1%	S:0.22 N:1.42	1.64	34%	Insignificant

APPENDIX C CONTOUR PLOTS

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