EQUINIX

Equinix LD9 Environmental Permit Variation Application

Air Quality Impact Assessment

03 October 2022

Project No.: 0630390

The business of sustainability

ERM

Document details	The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.
Document title	Equinix LD9 Environmental Permit Variation Application
Document subtitle	Air Quality Impact Assessment
Project No.	0630390
Date	03 October 2022
Version	1.0
Author	Jordan Eastwood
Client Name	Equinix Inc.

Document history

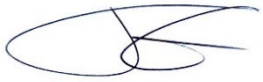
				ERM approval to issue		
Version	Revision	Author	Reviewed by	Name	Date	Comments
Draft	01	Jordan Eastwood	Dr. Chris Hazell-Marshall	David Pollok	04/08/2022	-
Draft	02	Jordan Eastwood	Dr. Chris Hazell-Marshall	David Pollock	21/09/2022	Draft for client approval
Final	03	Jordan Eastwood	Dr. Chris Hazell-Marshall	David Pollock	03/10/2022	For EA issue

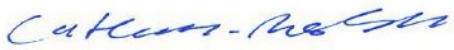
Signature Page

03 October 2022

Equinix LD9 Environmental Permit Variation Application

Air Quality Impact Assessment





Jordan Eastwood
Environmental Consultant

Chris HazellMarshall
Technical Director, Air Quality

Environmental Resources Management Ltd.

2nd Floor Exchequer Court

33 St Mary Axe

London

United Kingdom

EC3A 8AA

CONTENTS

List of Tables

List of Figures

Acronyms and Abbreviations

Name	Description
AQS	Air Quality Standard
AQMA	Air Quality Management Area
AW	Ancient Woodland
Breached, breaching, breach	Used when the 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 predicted to be exceeded 20 times at a receptor, a breach of the NO_2 1-hour mean is therefore predicted as there would be more than the 18 allowed exceedances of this standard.
CL	Critical Load
DEFRA	Department for Environment, Food & Rural Affairs
EA	Environment Agency
HV	High Voltage
LNR	Local Nature Reserve
LWS	Local Wildlife Site
NNR	National Nature Reserve
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen (mixture of NO and NO_2)
PC	Process Contribution
PEC	Predicted Environmental Concentration
PG1	Powergate 1 – Southern building of the datacentre, opened in 2008
PG2	Powergate 2 – Northern building of the datacentre, opened in 2012
PM_{10}	Particulate Matter of diameter below or equal to 10 µm
SAC	Special Area of Conservation
SO_2	Sulphur dioxide
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

APPLICATION CHECKLIST

For ease of reference, the table below sets out all of the information required for the Permit application by the Environment Agency guidance “Environmental permitting: air dispersion modelling reports”, and the relevant section in this report.

Requirement	Location in Report
Purpose of the study	Section 1 Introduction
Describe the site	Section 2 Site Description
Modelled scenarios	Section 2.2 Engines Operation
Location map	Figure 2.1: Site Location Plan
Surrounding land use map	Figure 2.2 in the Supporting Information Document
Modelled scenarios	Table 2.1: Modelled Engine Operations
Relevant environmental standards	Section 3.1 Applicable air quality standards
Background level	Section 4 Air Quality Background Concentrations
Explain the model	Section 5.1 Model Parameters
Emission parameters	Section 5.2 Emissions Parameters
Stack location	Figure 5.1 and Appendix A
Modelled domain and receptors	Sections 5.1 and 5.3. Figure of the modelled domain in Appendix A.
Weather and surface characteristics	Section 5.1 Model Parameters. Wind Roses in Appendix A.
Terrain and building treatments	Section 5.1 Model Parameters. Buildings details in Appendix A.
Special treatments	Section 5.1 Model Parameters for NO_x to NO_2 conversion
Sensitivity analysis	Section 5.4 Sensitivity Analysis
Impact Assessment	PM_{10} Screening: Section 6.2 NO_2 and NO_x Detailed Assessment: For testing of engine, Section 6.3.1 For emergency operation: Section 6.3.2
Isopleths/Contour plots	Appendix B
Model input files	Sent with application electronically

1. INTRODUCTION

Equinix (UK) Ltd (Equinix) operates a data centre on the Powergate Business Park in north west London (the Site), for which it has an Environmental Permit (EP, Permit reference: EPR/TP3500PB). The listed activity for this EP is the combustion of diesel in an appliance(s) with an aggregated thermal input of more than 50 megawatts (MWth). The current EP relates to the operation of 29 standby emergency generators as part of its testing regime and for backup power supply. An application for a variation to the EP is being made for the operation of four additional generators to be housed in a new building in the north of the Site. This report contains an associated assessment of the potential effect of emissions to air from the operation of the four additional generators both independently and in-combination with the existing 29 generators.

The air quality assessment that was submitted as part of the original EP application (in February 2019) and subsequently amended to include seven additional generators (in December 2020) has been reviewed and further updated to reflect the addition of the four new PG2 generators (which will operate in-combination with the permitted 29 generators) and to accommodate changes in the testing regime. The assessment methodology, baseline data, meteorology data, remain largely as reported in the original air quality assessment that was reviewed and approved as part of the existing EP application, however some refinements pertaining to the statistical analysis have been made.

As per the original EP application and the Environment Agency working draft guidance[1], the main potential impact from the diesel engines used for the generators is the exceedance of the short-term ambient air quality standard for hourly mean NO_2 more than 18 times in a calendar year. This report presents the assessment of potential impacts to air quality from the NO_x emissions generated by the Site's existing and proposed new engines.

This impact assessment has been carried out using an air dispersion model to predict the potential impact of the Site's emissions relative to human health protective standards (short-term and long-term NO_2 standards) and protected conservation areas (short-term and long-term NO_x, nitrogen deposition and acid deposition standards). The assessment and report have been prepared following the relevant guidance and published documents:

- Environment Agency, 2016, Air emissions risk assessment for your environmental permit, https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit ;
- Environment Agency, 2014, Environmental permitting: air dispersion modelling reports, https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports ;
- Environment Agency, 2018, Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators, given by a Senior Permitting Officer, and available at: https://consult.environment-agency.gov.uk/psc/mcp-and-sg-regulations/supporting_documents/Specified%20Generators%20Modelling%20GuidanceINTERIM%20FINAL.pdf ;
- 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, 2017, Data Centre FAQ Headline Approach DRAFT version 8.0, provided by Tech UK.

For the Site, sulphur dioxide (SO_2) emissions are not expected to be a material issue since all fuel oil is specified as ultra-low sulphur.

[1] Data Centre FAQ Headline Approach, DRAFT version 10.0 H.Tee 01/06/18 – Release to Industry

Particulate matter emissions have been considered in the H1 screening model and found to require modelling. A screening exercise has been undertaken for the potential short-term impact of PM_{10} [2]. Long term PM_{10} and $PM_{2.5}$ have not been assessed as the engines only operate for a small number of hours per year.

[2] PM_{10} is the particulate matter in the air that is less than or equal to 10 µm in diameter

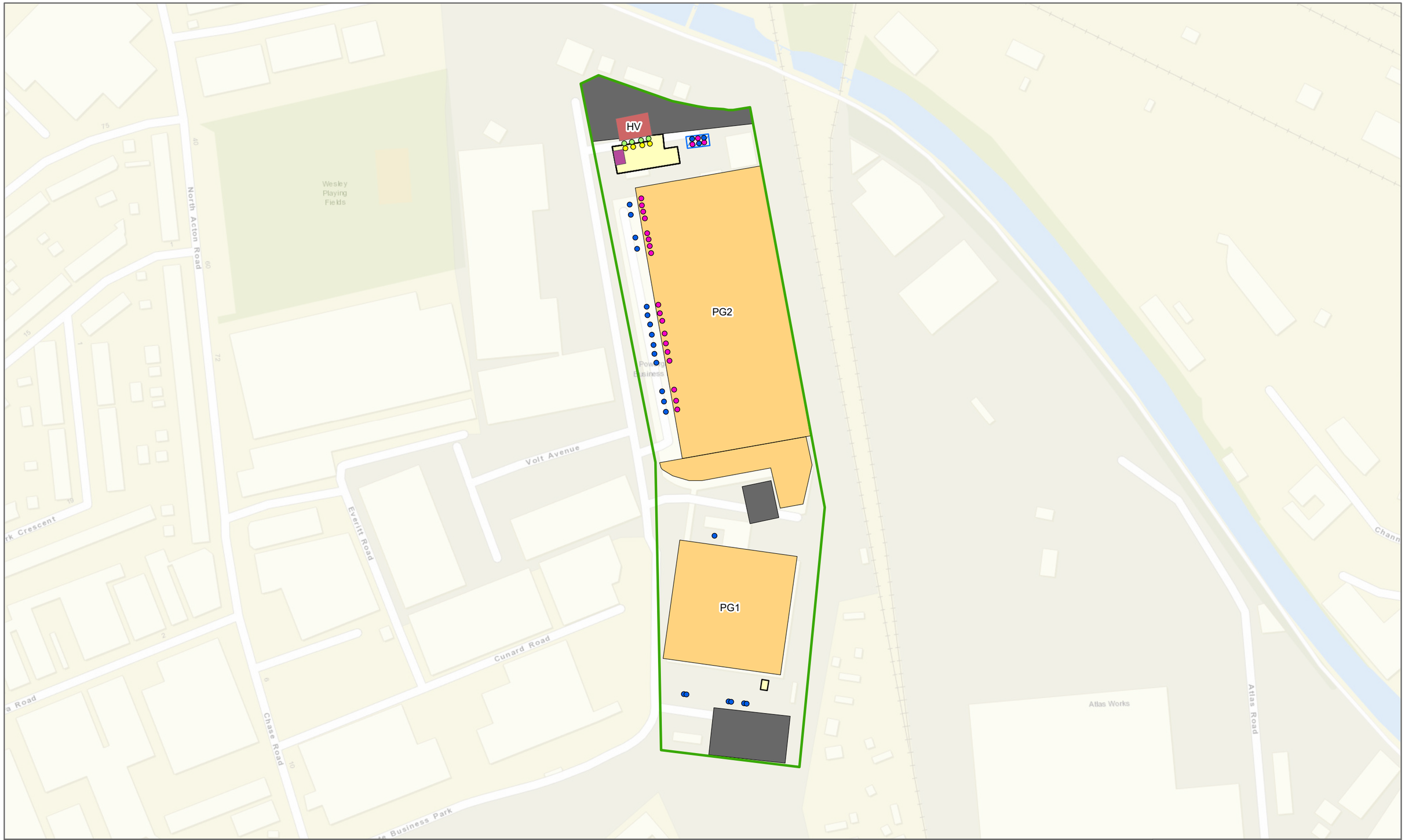
2. SITE DESCRIPTION

2.1 Site Location and Description

The Site location and boundary has not changed since submission of the original EP application (in February 2019). The Site is located on the Powergate Business Park in north west London, just south of Harlesden station. The land immediately surrounding the Site is generally used for industrial, commercial or rail transport purposes, however, the Bashley Road Travellers' site is located along the south east border of the datacentre. There is a public park to the west and residential areas nearby in all directions. The closest waterbody is the Paddington Arm of the Grand Union Canal, approximately 35 m north of the Site. A map showing the detailed land use within 2 km of the data centre is presented in *Figure 2.2* of the Supporting Information Document. The terrain in the area is flat with no steep slopes in the close vicinity of the data centres.

The data centre comprises two warehouse-style buildings containing the data storage equipment. They are named as follows, and their location is presented in ***Figure 2.1*** below:

- Powergate 1 (PG1) at the south; and
- Powergate 2 (PG2) in the centre.
- A new building, the 'HV' building will be added to house the new generators and associated equipment.



- New Day tanks
- Existing Day Tanks
- New Generator Locations
- Existing Generator Locations
- Site Boundary
- Existing Bulk Storage Area
- Car Park
- Data Centre
- HV Building
- New Bulk Tank Storage
- Acoustic Container

0 10 20 30 40 50
Meters

N

Figure 2.1
Site Layout
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: See Scale Bar	VERSION: A02
SIZE: A3	DRAWN: CB
PROJECT: 0630390	CHECKED: LB
DATE: 02/12/2020	APPROVED:

ERM

EQUINIX

PROJECTION: British National Grid

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9.aprx

2.2 Engine Operation

The number of generators will increase from 29 to 33 as part of the project to which this EP variation application relates. The testing scenarios have been amended as part of the EP variation application to accommodate the four new generators. The changes are described in detail in *section 3 of the EP Variation: Supporting Document.*

The data centre will now have 33 diesel backup generators installed to provide emergency power in the event of a grid supply failure. In the period since PG1 opened in 2008 and PG2 in 2012, there has been only a single event where backup generators have started in an emergency power supply capacity. With the exception of this single event, during which one generator operated for approx. 2 hours due to an issue with the site's uninterruptable power supply (UPS), all starts have been for maintenance and testing purposes, which is an integral part of Equinix's service commitment to their clients. The engines are tested regularly to ensure that they are capable of reliably fulfilling the backup supply requirements. The engines in each building are tested separately, using three types of tests. All three tests and a potential emergency power scenario have been included in the impact assessment. The modelled scenarios for the assessment have been updated for the EP variation assessment and are presented in ***Table 2.1.***

Table 2.1: Modelled Engine Operations

Regime	Frequency	Duration	Scheduling	Number of Engines	Load
Testing Regime – All tests					
Start-up test	Bi-monthly [a]	5-min per generator	Weekdays	One engine after the other.	No electrical load. Modelled as 30% load on engine
Building load test	Quarterly [b]	1 hour per generator group	Weekends	Groups of up to 17 engines as per Table 2.2. One group after the other.	60% engine load
Load bank test	Annually	1 hour per generator	Weekends	Groups of up to seven engines as per Table 2.2. One group per day. One engine after the other.	100% engine load
Emergency Power					
Emergency power	Unpredictable	1 hour all generators together	Any time	All 33 engines together.	60% engine load [c]

[a] *For the avoidance of doubt, bi-monthly referrers here to twice a month.*
[b] *The quarterly test is undertaken three times. The fourth test is replaced by the annual load bank test.*
[c] *It has been assumed that all engines would be running at % load in case of emergency. This is an conservative scenario as there is an excess of generating capacity (as discussed earlier the data centre is equipped with twice the required building load capacity) and in practice only some of the engines would be running, with others in standby in case of failure.*

Table 2.2: Test Groups

Test	Group	Schedule
Building Load Test, Engines in a group tested simultaneously for 1 hour	Group 1 (2 engines): PG1_1, PG1_2	Weekend 1 Saturday
	Group 2 (3 engines): PG1_3, PG1_4, PG1_6	Weekend 1 Saturday
	Group 3 (3 engines): PG1_5, PG1_7, PG1_8	Weekend 1 Sunday; or Weekend 2 Saturday/Sunday
	Group 4 (1 engine): PG2_3	Weekend 3 Saturday
	Group 5 (3 engines): PG2_1, PG2_2, PG2_4	Weekend 3 Saturday
	Group 6 (3 engines): PG2_5. PG2_7, PG2_8	Weekend 3 Saturday
	Group 7 (1 engine): PG2_6	Weekend 3 Saturday
	Group 8 (17 engines): PG2_9-PG2_21, and HV building engines PG2_21-PG2_25	Weekend 3 Sunday or Weekend 4 Saturday/Sunday
Load Bank Test, Engines in a group tested for 1 hour, one group per day, one engine after the other	Group 1 (2 engines): PG1_1, PG1_2	Weekend 2 Saturday or Sunday
	Group 2 (6 engines): PG1_3, PG1_4, PG1_5, PG1_6, PG1_7, PG1_8	Weekend 1 Saturday or Sunday
	Group 3 (2 engines): PG2_3, PG2_4	Weekend 3 Saturday
	Group 4 (2 engines): PG2_1, PG2_2	Weekend 3 Sunday
	Group 5 (2 engines): PG2_7, PG2_8	Weekend 4 Saturday
	Group 6 (2 engines): PG2_5, PG2_6	Weekend 4 Sunday
	Group 7 (9 engines): PG2_9-PG2_13, PG2_15-PG2_18	Weekend 5 Saturday
	Group 8 (8 engines): PG2_14, PG2_19-PG2_21 & HV Building engines PG2_22-PG2_25	Weekend 5 Sunday

3. LEGAL FRAMEWORK

3.1 Applicable Air Quality Standards

The protection of human health and of designated conservation areas from adverse air quality is regulated through the use of Air Quality Standards (AQS) transposed in UK law[3] from EU standards[4]. The AQS for sensitive human receptors have not changed since submission of the original EP application. The AQS for sensitive ecological receptors for 24-hour mean NO_x was updated in June 2022 and is reflected below. The statutory criteria of relevance for this assessment are set out in ***Table 3.1***. As the engines are only operated for a few hours per year, only short-term air quality standards have been scoped in for PM_{10}.

Table 3.1: 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
Sensitive Ecological Receptor	NO_x	24-hour mean	200[a]	100th
		Annual mean	30	N/A

[a] The EPA H1 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.

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[5], consulted June 2022) website, based on the site relevant critical loads tool. ***Table 3.3*** presents the critical loads which were used in this impact assessment and the impact assessment for the original EP application.

3.2 Significance of Impact

The impact of the emissions from the Site are assessed on the basis of the:

- Process Contribution (PC); and
- Predicted Environmental Concentration (PEC), the PEC being the Process Contribution (PC) added to the baseline

The criteria for significance of the impact on sensitive human and ecological receptors are presented in ***Table 3.2***.

[3] The Air Quality Standards Regulations 2010 Statutory Instrument 2008/301, http://www.legislation.gov.uk/uksi/2010/1001/contents/made

[4] European Union Air Quality Standards, http://ec.europa.eu/environment/air/quality/standards.htm

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

Table 3.2: Significance Criteria for Impacts on Receptors

Receptor	PC, as % of AQS or CL	PEC, as % of AQS or CL	Significance
Sensitive Human Receptors			
Short-term Impact			
Any sensitive human receptor	<10%	-	Insignificant
	>10%	<100%	Insignificant
	>10%	>100%	Potentially significant
Long-term Impact			
Any sensitive human receptor	<1%	-	Insignificant
	>1%	<100%	Insignificant
	>1%	>100%	Potentially significant
Sensitive Ecological Receptors			
Short-term Impact			
Ramsar, SAC, SPA or SSSI	<10%	-	Insignificant
	>10%	-	Potentially significant
AW, LWS, LNR or NNR	<100%	-	Insignificant
	>100%	-	Potentially significant
Long-term Impact			
Ramsar, SAC, SPA or SSSI	<1%	-	Insignificant
	>1%	<70%	Potentially significant
	>1%	>70%	Potentially significant
AW, LWS, LNR or NNR	<100%	-	Insignificant
	>100%	-	Potentially significant

As per the original EP assessment, if the PEC at specified receptors indicates that the short-term hourly standard for NO_2 has the potential to be exceeded more than 18 times a year, then the Environment Agency guidance on dispersion modelling for oxides of nitrogen assessment from specified generators[6] (pages 5-6) requires a statistical analysis to be performed. 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.

[6] 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

Table 3.3: Applicable Critical Loads for Nitrogen and Acid Deposition

Site Name and Designation	Site Feature	Nitrogen Deposition	Acid Deposition					
		kgN/ha/yr	Low range (min), keq/ha/yr			High range (max), keq/ha/yr		
			CLmaxS	CLmaxS	CLmaxS	CLminN	CLminN	CLminN
Richmond Park (SAC)	Stag beetle	10-20	0.724	0.142	1.009	1.718	0.357	2.075
Wimbledon Common (SAC)	European dry heaths	10-20	0.23	0.642	0.872	0.88	0.714	1.594
	Stag beetle	10-20	0.723	0.285	1.008	1.717	0.357	2.074
	Northern Atlantic wet heaths with Erica tetralix	10-20	0.23	0.642	0.872	0.88	0.714	1.594

4. AIR QUALITY BACKGROUND CONCENTRATIONS

As per the original EP application, there are four London Borough Councils located within 2 km of the Site. They have all declared Air Quality Management Areas (AQMA) as described in ***Table 4.1***.

Table 4.1: Local Air Quality Management Areas (AQMA)

London Borough	Size of AQMA	Distance from Site	Pollutants
Ealing	Whole Borough	Site is within the AQMA	NO_2 annual mean PM_{10} 24-hour mean
Brent	Most of the Borough	350 m North	NO_2 annual mean PM_{10} 24-hour mean
Hammersmith and Fulham	Whole Borough	500 m East	NO_2 annual mean PM_{10} 24-hour mean
Kensington and Chelsea	Whole Borough	1.9 km East	NO_2 1-hour and annual mean PM_{10} 24-hour and annual mean

According to the London Atmospheric Emissions Inventory[7], road transport emissions contribute around 50% towards NO_x and PM_{10} concentrations. The air quality monitoring undertaken in the vicinity of the Site is therefore focused on roads emissions, with monitoring sites concentrated alongside busy roads. However, these data are not considered directly relevant to this assessment as they are not representative of the Site location or nearby sensitive receptors.

The DEFRA background maps[8] for 2015 provide information on annual mean NO_2 concentrations for each 1km x 1km square covered by the four local London Boroughs. The data for the four squares covering the Site's surroundings is presented in ***Table 4.2***. The location of the DEFRA grid squares are presented in ***Figure 4.1***.

Table 4.2: DEFRA 2015 Background Map Concentrations

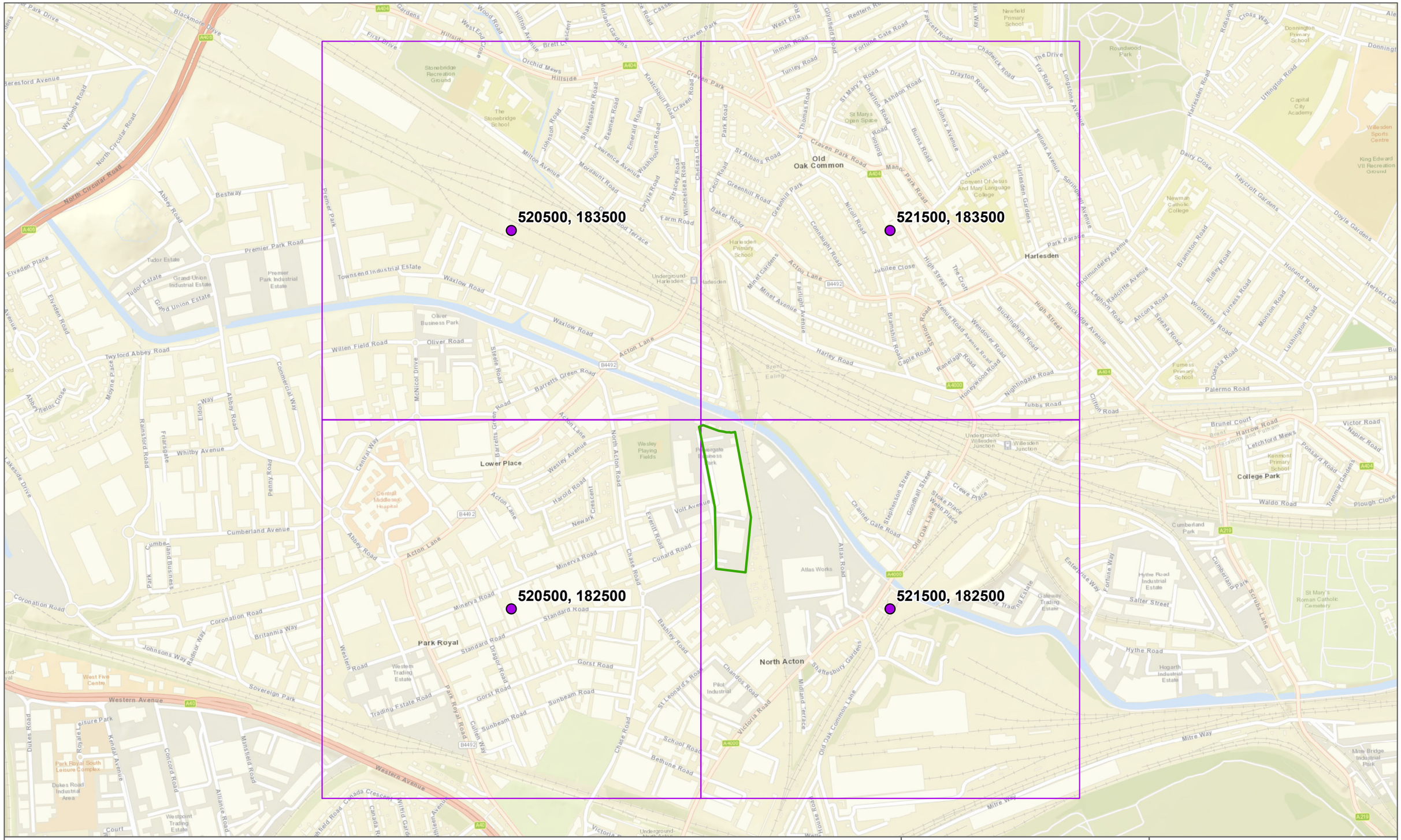
Grid Square (X,Y in National Grid)	NO_2 annual mean ($\mu g/m^3$)	NO_x annual mean ($\mu g/m^3$)	PM_{10} annual mean ($\mu g/m^3$)
520500,182500	32.28	52.95	18.79
521500,182500	30.82	50.08	17.75
520500,183500	33.43	55.92	18.78
521500,183500	31.07	50.24	19.14
Maximum, rounded up	*33.5*	*56.0*	*19.2*

In the absence of relevant air quality monitoring sites, the rounded maxima of the 2015 DEFRA background maps have been used as background concentrations in the impact assessment. It is noted that more recent (2018) background maps are available, however, for consistency with the original application and previous permit application, the 2015 map data has been re-used for the current application. For short-term averages, the long-term background has been multiplied by two, as per Environment Agency guidance[9].

[7] Greater London Authority, 2017, London Atmospheric Inventory 2013 updated April 2017, https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory-2013

[8] DEFRA, 2017, Background Mapping data for local authorities – 2015, https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015

[9] Environment Agency, Last updated 7 October 2020, Air emissions risk assessment for your environmental permit, https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit



DEFRA Background Map

DEFRA Monitoring Square

Site Boundary

PROJECTION: British National Grid

0 50 100 150 200

Metres

N

Figure 4.1
Location of Source of Information on Background Concentrations
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:5000	VERSION: A01
SIZE: A3	DRAWN: OB
PROJECT: 0425532	CHECKED: WB
DATE: 21/01/2019	APPROVED: HB

ERM

EQUINIX

Path: \\ukoxfdc01\DATA\Oxford\Projects\0425532 Equinix Park Royal Permit.GB\Second Application - Jan19\AQ\GIS\MAPS\Figure4.1_SourceInformation_A01.mxd

5. METHODOLOGY

5.1 Model Parameters

The key elements of the methodology used for carrying out the air dispersion modelling are set out in ***Table 5.1***. Most of these elements have remained identical to the original EP application. Where changes are relevant these are mentioned in **bold**.

Table 5.1: Air Dispersion Model Methodology and Parameters

Parameter	Approach	Notes
Dispersion model	Lakes AERMOD View 9.9.0	-
Number of sources	**33** spread across **three** buildings	See details in *Section 5.2*
Model domain	6km x 6km centred on Site	**Indicative Human receptor points were also included (see Figure 5.2).** Ecological receptors within a radius of 10 km were also included. Map in **Figure 5.2**
Receptor grid resolution	25 m up to 3km; 100 m for ecological receptors beyond 3km	Stack heights range from 5 m to 17 m, so 25 m was considered adequate for the first 3km from the Site. Potential impacts at nearby receptors were identified from the grid results **and the indicative human receptor points as presented in Figure 5.2.**
Buildings	**11** buildings, on Site or in Powergate Business Park	All buildings that are greater than one third of the stack height, within five stack heights of the stack, are included. Buildings dimensions and location presented in **Figure 5.2**
Terrain	Not required	There is no sustained gradients of >1:10 in the vicinity of the Site, and therefore terrain was not required
Surface Characteristics	Albedo: 0.222 Bowen Ratio: 1.45 Surface Roughness: 1.00	
Meteorological data	London Heathrow, 2012-2016 inclusive	Hour-sequential data. Wind roses are presented in *Appendix A*.
NO_x to NO_2 conversion ratio	- Short-term concentrations: 15% up to 500 m from sources; 35% anywhere else. - Long-term concentrations:	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 another Environment Agency guidance[b].

	70% everywhere	
Statistical method	Cumulative hypergeometric distribution	The statistical method was used following the Environment Agency guidance[c].

[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*
[c] *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 ;*

5.2 Emissions Parameters

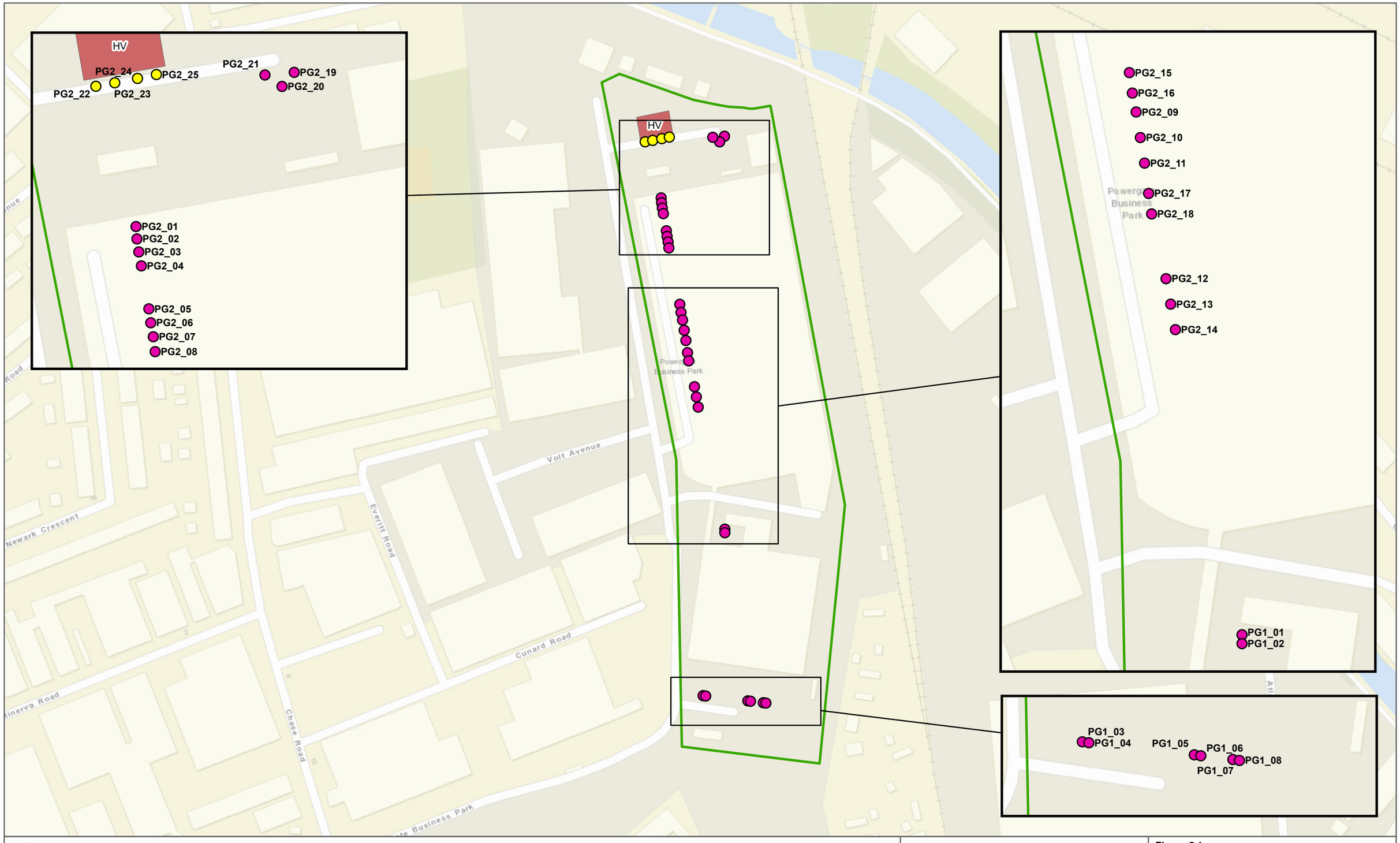
The emission parameters for each modelled source are presented in ***Table 5.2***. A map showing the stack locations is presented in ***Figure 5.1***. The emissions parameters have been updated to include the four new generators, all of which are the same model but new to the assessment (MTU 20V4000G24F-6ETC). The new generators are emission points PG2 22 to PG2 25, located in the HV building.

Table 5.2: Modelled Emissions Parameters

Building	PG1			PG2			HV
Engine Make/Model	CAT 3516B-HD	CAT 3516B-HD	SDMO X2500C	SDMO X2800C	CAT 3516B-HD	CAT 3516B-HD	MTU 20V4000G24F-6ETC
Emission Point[a]	PG1_01, PG1_02	PG1_03, PG1_04, PG1_07, PG1_08	PG1_05_PG1_06	PG2_01 to PG2_08	PG2_09 to PG2_18	PG2_19 to PG2_21	PG2_22 to PG2_25
Stack Orientation	Vertical	Vertical	Vertical	Horizontal	Horizontal	Vertical	Vertical
Stack Height (m)	5.10	7.48	7.48	16.7	16.7	PG2_19 & PG2_21: 10.3 m PG2_20: 5.3 m	14.25
Flue Diameter (m)	0.495 [b]	0.495 [b]	0.35	0.35	0.35	0.35	0.65
Emission Velocity (m/s)	39.3 [b]	39.3 [b]	85.2	90.4	78.6	78.6	28.6

Actual Flow Rate (m^3/s)	7.6	7.6	8.2	8.7	7.6	7.6	9.5
Emission Temperature (°K)	813	813	783	803	813	813	786
NO_x Concentration [c] (mg/m^3, 100% load)	3,059	3,059	1,700	1,700	3,059	3,059	1,542
NO_x Emission Rate (g/s, 100% load)	4.95	4.95	2.64	2.96	4.95	4.95	3.03
PM_{10} Concentration [c] (mg/m^3, 100% load)	12.6	12.6	50.0	50.0	12.6	12.6	19.0
PM_{10} Emission Rate (g/s, 100% load)	0.020	0.020	0.078	0.087	0.020	0.020	0.047
Sulphur Emission Rate [d] (g/s, 100% load)	0.0024	0.0024	0.0023	0.0026	0.0024	0.0024	0.0013

[a] The grid references of each stack can be found in Appendix A.
[b] Those stacks are fitted with a lid which is opened by the air flow when the engines turn on. To take into account this configuration, the emission velocity has been divided by two and a proxy flue diameter has been calculated to maintain the actual flow rate.
[c] Concentrations were obtained from the engines' datasheets and are at standard conditions: 25°C, dry, 5% O_2 content
[d] SO_2 emission rates were estimated using the engine's fuel consumption, a sulphur content in the ultra low sulphur diesel of 10ppm (legal maximum) and assuming that all of the sulphur in the diesel is converted to SO_2



- New Emission Points to Air
- Existing Emission Points to Air
- Site Boundary
- HV Building

0 20 40 60 80 100 Metres

N

Figure 5.1
EP Variation – Air Emission Point Locations
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:5000	VERSION: A02
SIZE: A3	DRAWN: CB
PROJECT: 0630390	CHECKED: LB
DATE: 21/09/2022	APPROVED:

ERM

EQUINIX

PROJECTION: British National Grid

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9.aprx

5.3 Receptor Parameters

5.3.1 Human Receptors

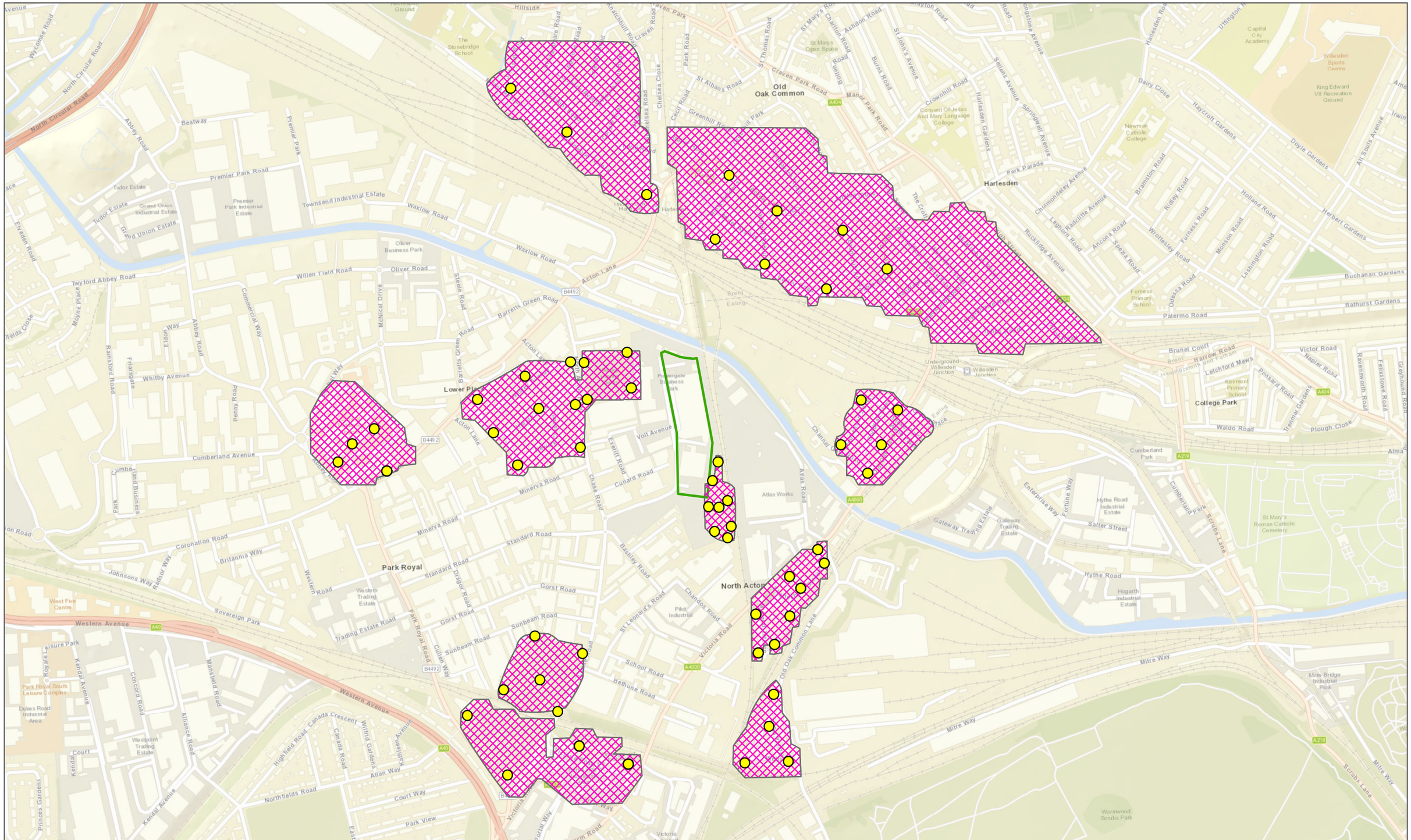
As per the original EP application, a 6km x 6km receptor grid, with a spacing of 25 m was set up to produce contour plots output from the model. A map of the modelled domain is presented in ***Appendix A***. Following Environment Agency guidance[10], to allow for further refinement of the assessment, additional, indicative receptors (presented in the table below) have been added at the locations presented in ***Figure 5.2***. This includes locations where the public may plausibly be present for one hour, including the closest residential receptors, parks, train stations and hospital. The assessment considers the potential impacts at these locations, rather than the maximum off-site impact as was the case previously.

Table 5.3: Indicative Sensitive Receptors

	x	y	z		x	y	z		x	y	z		x	y	z
01	521148	182691	ground level	**22**	521298	182205	3.5	**43**	521298	182205	3.5	**64**	520588	181857	ground level
02	521173	182588	ground level	**23**	521255	182183	3.5	**44**	521255	182183	3.5	**65**	520721	182027	ground level
03	521183	182520	ground level	**24**	521248	182286	3.5	**45**	521248	182286	3.5	**66**	520674	182111	ground level
04	521173	182490	ground level	**25**	521296	182073	ground level	**46**	521296	182073	ground level	**67**	520906	182983	ground level
05	521139	182506	ground level	**26**	521335	181894	ground level	**47**	521335	181894	ground level	**68**	520917	182888	ground level
06	521123	182572	ground level	**27**	521219	181890	ground level	**48**	521219	181890	ground level	**69**	520791	182956	ground level
07	521133	182641	ground level	**28**	521284	181988	ground level	**49**	521284	181988	ground level	**70**	520800	182858	ground level
08	521150	182570	ground level	**29**	520909	181887	ground level	**50**	520909	181887	ground level	**71**	520755	182957	ground level
09	521338	182386	ground level	**30**	520909	181887	3.5	**51**	520909	181887	3.5	**72**	520768	182844	ground level
10	521413	182458	ground level	**31**	520909	181887	15	**52**	520909	181887	15	**73**	520781	182730	ground level
11	521431	182422	ground level	**32**	520909	181887	25	**53**	520909	181887	25	**74**	520614	182683	ground level
12	521368	182355	ground level	**33**	520909	181887	50	**54**	520909	181887	50	**75**	520550	182769	ground level
13	521339	182281	ground level	**34**	520778	181935	ground level	**55**	520778	181935	ground level	**76**	520507	182857	ground level
14	521298	182205	ground level	**35**	520778	181935	3.5	**56**	520778	181935	3.5	**77**	520634	182919	ground level

[10] 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

15	521255	182183	ground level	**36**	520778	181935	15	**57**	520778	181935	15	**78**	520671	182833	ground level
16	521248	182286	ground level	**37**	520778	181935	25	**58**	520778	181935	25	**79**	520233	182780	ground level
17	521338	182386	3.5	**38**	520778	181935	50	**59**	520778	181935	50	**80**	520233	182780	10
18	521413	182458	3.5	**39**	520787	182181	ground level	**60**	520787	182181	ground level	**81**	520175	182739	ground level
19	521431	182422	3.5	**40**	520660	182228	ground level	**61**	520660	182228	ground level	**82**	520175	182739	10
20	521368	182355	3.5	**41**	520577	182084	ground level	**62**	520577	182084	ground level				
21	521339	182281	3.5	**42**	520481	182016	ground level	**63**	520481	182016	ground level				



Path: Q:\Oxford\Projects\0425532 Equinix Park Royal Permit.GB\2nd App - Jan19\AQ\GIS\MAPS\Figure5.2_SensitiveAreasModelled Grid_A03.mxd

5.3.2 Ecological Receptors

As per Environment Agency guidance[11], protected conservation areas within 10 km of the Site 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[12], the following sites have been included:

- Wormwood Scrubs (LNR), 1 km South East of the Site;
- Richmond Park (SAC), 8 km South of the Site and
- Wimbledon Common (SAC), 9.5 km South-South East of Site.

The location of these statutory protected conservation areas is presented in ***Figure 5.3***.

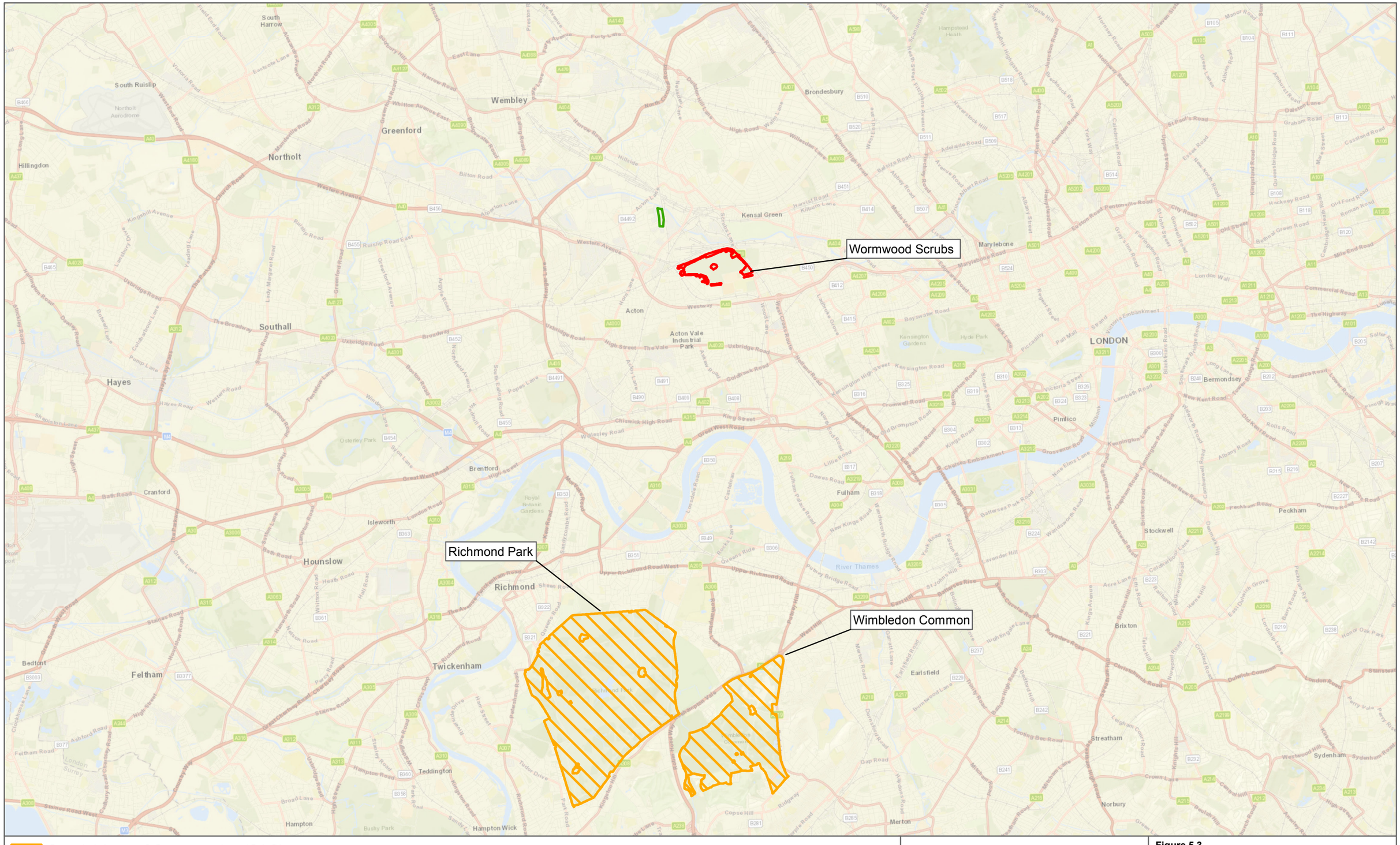
Non-statutory sites such as Local Wildlife Sites (LWS) within 2 km of the Site also have to be included. ***Figure 5.4*** shows the numerous non-statutory sites within 2 km of the Site. The data was obtained from the Greenspace Information for Greater London CIC[13].

The EP variation assessment has included the same ecological receptors as per the original EP application (in February 2019).

[11] Environment Agency, 2016, Air emissions risk assessment for your environmental permit, https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

[12] Natural England, 2018, MAGIC interactive map, https://magic.defra.gov.uk/MagicMap.aspx

[13] GiGL, https://www.gigl.org.uk/



Special Area of Conservation (SAC)

Local Nature Reserve (LNR)

Site Boundary

0 1 2
Kilometers

N

Figure 5.3
Assessed Protected Conservation Areas
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:5000	VERSION: A01
SIZE: A3	DRAWN: OB
PROJECT: 0425532	CHECKED: WB
DATE: 21/01/2019	APPROVED: HB

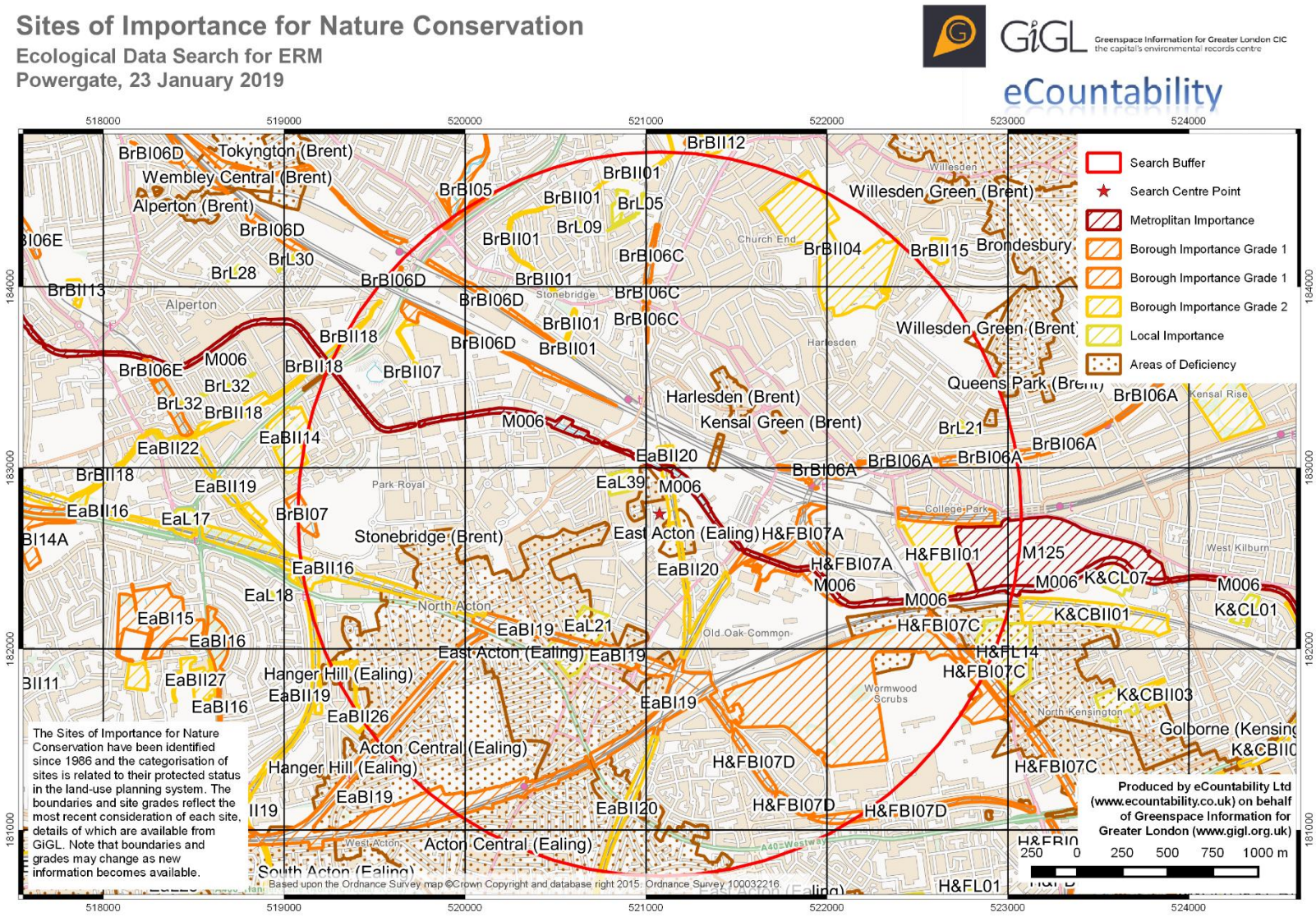
ERM

EQUINIX

PROJECTION: British National Grid

Path: \\ukoxfdc01\DATA\Oxford\Projects\0425532 Equinix Park Royal Permit.GB\Second Application - Jan19\AQ\GIS\MAPS\Figure5.3_EcologicalReceptors_A01.mxd

Figure 5.4: Assessed Non-Statutory Protected Conservation Areas



5.4 Sensitivity Analysis

This current assessment is based in the conclusions of the original EP application (February 2019) and the permit variation application (December 2020) with regards to sensitivity analysis on:

- Meteorological variation: Meteorological data recorded at London Heathrow from 2012 – 2016 was tested in the original application. The data for the year 2016 resulted in the highest predicted concentrations, so the impact assessment was carried out on model results for that year to be conservative.
- Effect of building downwash: The model proposed, with building downwash is considered robust and not prone to under-estimating the impacts.

6. IMPACT ASSESSMENT

6.1 Introduction

As per the original EP application, the assessment considers the potential impact of the following scenarios:

- Start-up test;
- Building load test;
- Annual load bank test; and
- Emergency power generation

A screening assessment was undertaken for PM_{10} in ***Section 6.2***. A detailed assessment was undertaken in ***Section 6.3*** for NO_2 and NO_x, for human health and habitats respectively.

The assessment has been updated to reflect the potential in-combination effects of the four new generators together with the permitted 29 generators (i.e 33 generators in total). The results of the updated assessment are presented in the following sections.

All presented results show the modelled maximum at indicative sensitive receptors (see ***Table 5.3***) unless specifically mentioned.

6.2 PM_{10} Screening

The H1 tool assessment screened-in short-term PM_{10} emissions from the Site for detailed dispersion modelling.

As the Site is located in the vicinity of four AQMAs for 24-hour mean PM_{10}, a screening exercise has been undertaken. The basis of the screening exercise considers the following test regime which represents the highest expected emissions in any one 24 hour period:

- Of the 33 installed engines, a maximum of 17 will operate in any one 24 hour period
- The engines operate for no more than 1 hour each
- The engines operate on a maximum load of 60%

The results of the modelling for this worst-case scenario off site are presented in ***Table 6.1***.

Table 6.1: Modelled 24-hour Mean Concentrations for PM_{10}

Source	Particulates (PM_{10}) Concentration ($\mu g/m^3$), Maximum Anywhere on the Grid					
	24-hour maximum (100^{th} %ile)			24-hour 36^{th} highest hour (90.4^{th} %ile)		
	AQS	PC	PC as % of AQS	PC	PC as % of AQS	Significance (>10%?)
All Site[a]	50	0.87	0.79	0.39	1.7	Not significant

The results in ***Table 6.1*** suggest that the PM_{10} PC is not significant. Therefore, no further detailed assessment of PM_{10} for testing is required.

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

6.3 Detailed Assessment for NO_2 and NO_x

6.3.1 Testing Regimes

6.3.1.1 Start-up Test, Bi-Monthly

As described in ***Table 2.1***, a start-up test is undertaken as follows:

- Undertaken bi-monthly (24 times per year) during the weekend;
- Running each engine individually, one after the other, for 5-minutes;
- No electrical load corresponding to load and NOx emissions 30% of maximum; and
- The Site is tested for a maximum of 72 hours per year (three hours per test).

The predicted maximum concentrations at indicative sensitive receptors (see ***Table 5.3***) resulting from emissions of any of the Sites engines are presented in ***Table 6.2***.

Table 6.2: Modelled Hourly Concentrations for Start-up Test

Source	Nitrogen Dioxide (NO_2) Concentration ($\mu g/m^3$), Maximum at indicative sensitive 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
Maximum of any single engine	8.1	75	38%	7.6	75	37%

The results presented in ***Table 6.2*** suggest that there should be no exceedance of the NO_2 hourly AQS as a result of the start-up test.

Contour plots for the predicted 1-hour maximum have also been created and are presented in *Appendix B*.

6.3.1.2 Building Load Test, Quarterly

As described in ***Table 2.1***, a building load is undertaken as follows:

- Undertaken three times a year during the weekend;
- Running all the generators at 60% load in eight groups of up to 17 engines (see ***Table 2.2***);
- Electrical load corresponding to load and NOx emissions 60% of maximum; and
- The Site is tested for a maximum of 24 hours per year (three hours per year per group).

The predicted maximum concentrations at indicative sensitive receptors in the vicinity of the Site (presented in ***Figure 5.2*** and ***Table 5.3***) are presented in ***Table 6.3***.

Table 6.3: Modelled Hourly Concentrations for Building Load Test

Source	Nitrogen Dioxide (NO_2) Concentration ($\mu g/m^3$), Maximum at indicative sensitive 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
Group 1	292	359	179%	216	283	141%
Group 2	277	344	172%	202	269	135%

Group 3	447	514	257%	354	421	211%
Group 4	34.9	102	51%	28.5	95	48%
Group 5	109	176	88%	84.6	152	76%
Group 6	96.4	163	82%	81.3	148	74%
Group 7	32.4	99	50%	26.9	94	47%
Group 8	675	742	371%	516	583	291%

The results presented in ***Table 6.3*** suggest that the building load test has the potential to create up to 12 exceedances of the NO_2 hourly standard per year. This is fewer than the 18 exceedances predicted for the original EP application and is a result mainly of the amended building load test scenario assumptions. Where the original building load test scenario used six groups of three or four engines together, this has changed to eight groups of between one and seventeen engines.

Contour plots for the predicted 1-hour maximum have also been created and are presented in *Appendix B*.

6.3.1.3 Annual Load Bank Test

As described in ***Table 2.1***, a load bank test is undertaken as follows:

- Once per year during the weekend;
- Running one generator at a time, sequentially, for 1 hour. Different groups of engines on one day as per ***Table 2.2***;
- Electrical load corresponding to load and NO_x emissions 100% of maximum; and
- The Site is tested for a maximum of 33 hours per year.

The predicted maximum concentrations at indicative sensitive receptors in the vicinity of the Site (shown in ***Figure 5.2***) are presented in ***Table 6.4.***

Table 6.4: Modelled Hourly Concentrations for Load Bank Test

Source	Nitrogen Dioxide (NO_2) Concentration ($\mu g/m^3$), Maximum at indicative sensitive 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
Maximum of any PG1 engine (PG1_08)	324	391	196%	306	373	186%
PG2_01	59	126	63%	47	114	57%
PG2_02	62	129	64%	47	114	57%
PG2_03	58	125	63%	47	114	57%
PG2_04	57	124	62%	48	115	57%
PG2_05	54	121	61%	46	113	56%
PG2_06	54	121	60%	45	112	56%
PG2_07	54	121	60%	45	112	56%
PG2_08	53	120	60%	45	112	56%
PG2_09	103	170	85%	69	136	68%

PG2_10	103	170	85%	69	136	68%
PG2_11	101	168	84%	70	137	68%
PG2_12	95	162	81%	63	130	65%
PG2_13	94	161	81%	64	131	66%
PG2_14	99	166	83%	61	128	64%
PG2_15	102	169	85%	68	135	68%
PG2_16	102	169	85%	70	137	68%
PG2_17	98	165	83%	70	137	69%
PG2_18	96	163	81%	67	134	67%
PG2_19	112	179	90%	91	158	79%
PG2_20	221	288	144%	170	237	118%
PG2_21	111	178	89%	91	158	79%
PG2_22	50	117	58%	21	88	44%
PG2_23	50	117	58%	21	88	44%
PG2_24	50	117	59%	21	88	44%
PG2_25	50	117	58%	21	88	44%

The results presented in ***Table 6.4*** suggest that the load bank test has the potential to create up to seven exceedances of the NO_2 hourly standard per year, corresponding to six of the eight engines located in the PG1 building. There are no exceedances of the AQS predicted as a result of the annual testing of the engines in the PG2 building or the HV building, except for engine PG2_20. This includes the four new engines being incorporated as part of this assessment.

Contour plots for the predicted 1-hour maximum for representative engines have also been created and are presented in *Appendix B*.

6.3.1.4 Impact of Testing Regime Effects on Hourly NO_2 Standard

The results at indicative sensitive receptors, as presented in *Sections 6.3.1.1 to 6.3.1.3* predict that the:

- building load test may lead to NO_2 PCs which exceed the 200 µg/m^3 hourly standard twelve times a year;
- annual load-bank test may lead to NO_2 PCs which exceed the 200 µg/m^3 hourly standard seven times a year;

The testing regime of the Site therefore has been predicted to have the potential to exceed the 200 µg/m^3 hourly NO_2 standard a maximum of 19 times a year at these indicative sensitive receptors, i.e. there is the potential in principle to breach the hourly air quality standard, for which 18 exceedances of the hourly limit are allowed annually. The potential total number of exceedances from the testing regime was assessed for each of these indicative receptors individually. There are only two[14] indicative sensitive receptors for which more than 18 exceedances in a year are predicted to occur.

[14] These are elevated receptors (50 m high) to the south of the site, representing the residential apartments at Victoria Road. Because these are elevated receptors they do not show as exceedances on the contour plots which show ground level concentrations.

As the maximum predicted number of exceedances for those points is 19 times a year a statistical analysis was undertaken, following Environment Agency guidance[15] to estimate how likely it is that the engine tests will actually coincide with unfavourable meteorological conditions, and therefore lead to the AQS actually being exceeded.

The following formula, extracted from the guidance document, was used:

$$\sum_{i=0}^{N-19} \frac{\binom{K}{i}\binom{M-K}{N-i}}{\binom{M}{N}}$$

The parameters are defined as follows:

- N: Number of operational hours, 19 (number of hours of testing which could create an exceedance);
- M: Operating envelope, 8784 hours (2016 is a leap year); and
- K: Number of non-exceedance hours: 8700 hours (model predicts 84 hours of exceedances).

As the operating hours are not fully random, the calculated probability was multiplied by 2.5, as recommended in the guidance document.

The probability of the testing regime breaching the hourly NO_2 standard is predicted to be 4.3×10^{-33} %, i.e. it is expected to be highly unlikely in practice that the hourly standard will be breached. Therefore, no further proposals to reduce the risk of exceedance are recommended.

6.3.1.5 Impact of Testing Regime on Annual Mean NO_2 Standard

The potential to exceed the annual mean NO_2 standard due to the Site undertaking the three tests described in ***Table 2.1*** has been evaluated based upon the total cumulative modelled impacts of all tests undertaken. The criteria outlined in *Section 3.2* were used to assess the potential significance of the impact.

The predicted annual mean concentrations modelled for off site locations are presented in ***Table 6.5***.

Table 6.5: Modelled Annual Mean Concentrations for the Testing Regime

Source	Nitrogen Dioxide (NO_2) Concentration (µg/m^3), Maximum at indicative sensitive receptors				
	Annual Mean				
	AQS	PC	PC as % of AQS	PEC	PEC as % of AQS
All Site	40	0.252	0.63%	33.8	84%

The results presented in ***Table 6.5*** suggest that the impacts of the testing regime of the Site will be insignificant, being below the 1% threshold of significance.

6.3.1.6 Impact of Testing Regimes on Protected Conservation Areas

For the annual mean, the potential impact of NO_x emissions from the Site's testing regime on the surrounding protected conservation areas has been assessed based upon the predicted total cumulative impacts of all tests undertaken as described in ***Table 2.1.*** For LWS's, as there are many sites surrounding the data centre, the maximum PC arising at any LWS is presented, rather than present results for every LWS. The results are presented in ***Table 6.6.***

[15] 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

Table 6.6: Modelled NO_x Annual Mean Concentrations (µg/m^3)

Site	PC	PC as % of AQS	Background	PEC	PEC as % of AQS	Significance
Maximum anywhere on grid (any LWS)	0.58	1.9%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Wormwood Scrubs (LNR)	0.014	0.0%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Richmond Park (SAC)	0.0007	0.0%	39.9	39.9	133%	Insignificant
Wimbledon Common (SAC)	0.0005	0.0%	39.9	39.9	133%	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.*

Although predicted impacts have marginally increased when compared to the original application, there are still no significant effects predicted on protected conservation areas for the NO_x annual mean.

For the 24-hour mean concentrations, the building load test and the load bank test are predicted to potentially create significant NO_x impacts as several groups of engines are running in the same day. ***Table 6.7*** presents the predicted impacts for the worst-case scenario out of both testing regimes.

Table 6.7: NO_x 24-hour Mean Concentrations

Site	AQS (µg/m^3)	PC (µg/m^3)	PC as % of AQS	Background	PEC (µg/m^3)	PEC as % of AQS	Significance
Silverlink Metro & Dudding Hill Loop (LWS, Borough Importance Grade II) (Load Bank Test)	200	127	64%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Wesley Playing Fields (LWS, Local Importance)		54	27%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Wormwood Scrubs (LNR) (Building Load Test)		7.06	3.5%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Richmond Park (SAC) (Building Load Test)		0.722	0.4%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Wimbledon Common (SAC) (Building Load Test)		0.395	0.2%	N/A [a]	N/A [a]	N/A [a]	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 modelling suggests there is no potential for significant effects to occur at local sensitive ecological sites. Of note is that the NO_x AQS used in this assessment has been amended to 200µg/m^3, from the 75 µg/m^3 used in the original Permit application. This change reflects the fact that the higher NO_x AQS is applicable at sites with low SO_2 and ozone.

The nitrogen deposition and acid deposition were modelled using AQTAG06 guidance[16], based on the annual mean NO_x concentrations presented in ***Table 6.6.*** The results are presented in ***Table 6.8*** and ***Table 6.9***.

[16] Habitats Directive, 2014, AQTAG06 Technical guidance on detailed modelling approach for an appropriate assessment for emissions to air, http://bailey.persona-pi.com/Public-Inquiries/A465-English/8%20Air%20Quality/8.2.2%20-%20AQTAG06_Technical%20Guidance%20Assessment%20emissions%20to%20air%20Mar2014.pdf

Table 6.8: Modelled Nutrient Nitrogen Deposition (kgN/ha/yr)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Richmond Park (SAC)	Lucanus cervus - Stag beetle	10	6.54E-04	0.0%	27.0	27.0	270%	Not significant
Wimbledon Common (SAC)	European dry heaths	10	5.42E-04	0.0%	15.3	15.3	153%	Not significant
	Lucanus cervus - Stag beetle	10	5.42E-04	0.0%	27.0	27.0	270%	Not significant
	Northern Atlantic wet heaths with Erica tetralix	10	5.42E-04	0.0%	15.3	15.3	153%	Not significant

Table 6.9: Acid Deposition (keq/ha/yr)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Richmond Park (SAC)	Lucanus cervus - Stag beetle	Cf. **Table 3.3**	1.34E-05	0.0%	S:0.20 N:1.93	2.13	211%	Not significant
Wimbledon Common (SAC)	European dry heaths	Cf. **Table 3.3**	5.57E-06	0.0%	S:0.16 N:1.09	1.25	143%	Not significant
	Lucanus cervus - Stag beetle	Cf. **Table 3.3**	1.11E-05	0.0%	S:0.19 N:1.93	2.12	210%	Not significant
	Northern Atlantic wet heaths with Erica tetralix	Cf. **Table 3.3**	5.57E-06	0.0%	S:0.16 N:1.09	1.25	143%	Not significant

All the modelled impacts from the testing regime of the Site on nutrient nitrogen deposition and acid deposition are considered to be insignificant.

6.3.1.7 Summary of Assessment of Testing Regime

The testing regime described in ***Table 2.1*** and ***Table 2.2*** has been modelled at indicative sensitive receptors (see Table 5.3) to assess the number of hours per year that the NO_2 PEC may exceed the human health protective 200 µg/m^3 hourly standard. Results are shown below:

- Bi-monthly start-up test: zero hours where PEC >200 µg/m^3;
- Quarterly building load test: twelve hours >200 µg/m^3. This has decreased from 18 hours in the original application due to the change in the testing regime;
- Annual load bank test: seven hours >200 µg/m^3. This has increased from six hours in the original application due to the change in the testing regime.

Therefore there is a total of 19 hours in a year where modelling suggest the PEC may in principle exceed 200 µg/m^3.

The Environment Agency Statistical Test has been applied to estimate the probability of the NO_2 1-hour air quality standard actually being exceeded due to the tests coinciding with poor dispersion conditions. This suggests a probability of $4.3x10^{-33}$ %, i.e. far below the 1% threshold of significance defined by the Environment Agency. Therefore, the testing undertaken at the Site is expected to, have negligible risk of breaching the NO_2 1-hour standard and to be compliant with the air quality standard.

A graphic summary of the results is presented in ***Figure 6.1***.

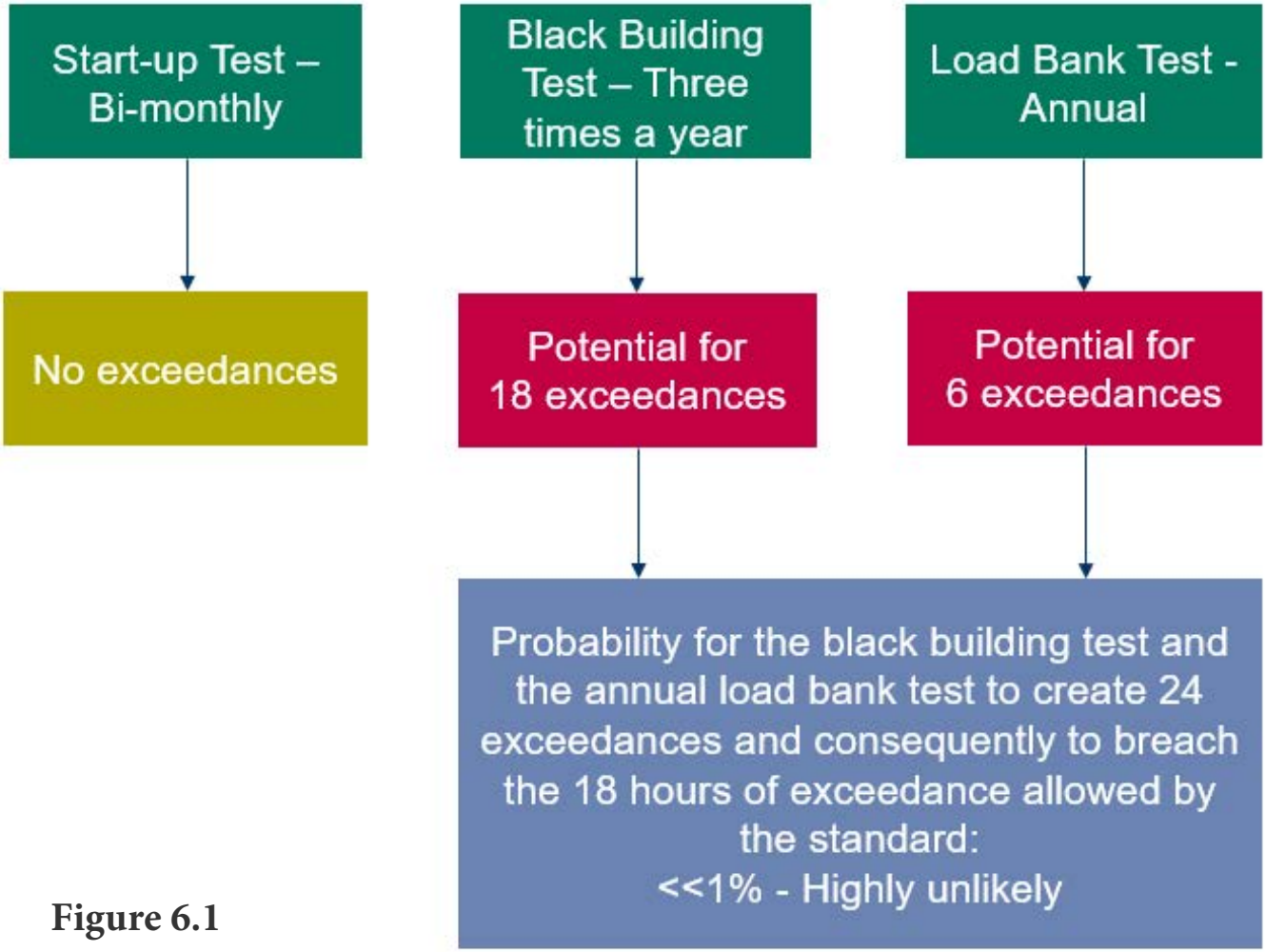

Start-up Test – Bi-monthly
Black Building Test – Three times a year
Load Bank Test - Annual
No exceedances
Potential for 18 exceedances
Potential for 6 exceedances
Probability for the black building test and the annual load bank test to create 24 exceedances and consequently to breach the 18 hours of exceedance allowed by the standard:
<<1% - Highly unlikely

Figure 6.1

6.3.2 Emergency Operation

6.3.2.1 Potential Impact of Emergency Operation on Human Health

As described in **Table 2.1,** an emergency power scenario in which all of the Site's engines would run together at 60% load for an assumed outage duration of 1 hour has been modelled. This is expected to be a highly unlikely scenario as in practice as:

- Not all the engines would be running the whole time as installed generating capacity intentionally exceeds expected site demand;
- The assumed duration of the outage would likely be less than one hour in total; and
- It should also be noted that since the data centre was built (2008 for PG1 and 2012 for PG2), there has been only a single event where backup generators have started in an emergency power supply capacity. With the exception of this single event, during which one generator operated for approx. 2 hours due to an issue with the site's uninterruptable power supply (UPS), all starts have been for maintenance and testing purposes.

The modelled maximum concentrations at selected sensitive receptors in the vicinity of the Site (shown in ***Figure 5.2***) are presented in ***Table 6.10*****.**

Table 6.10: Modelled NO_2 Concentrations for Emergency Operations

Source	Nitrogen Dioxide (NO_2) Concentration (µg/m^3), Maximum at indicative sensitive receptors								
	1-hour maximum (100th %ile)			1-hour 19th highest hour (99.79th %ile)			Annual mean		
	PC	PEC	PEC as % of AQS	PC	PEC	PEC as % of AQS	PC	PEC	PEC as % of AQS
All Site	1,546	1,613	773%	1,063	1,130	565%	0.07	33.6	84%

The modelling results presented in ***Table 6.10*** show that in case of the Site needing emergency power and operating as assumed, the 200 µg/m^3 threshold of the NO_2 hourly AQS is expected to be exceeded. Whether the hourly AQS would actually be exceeded would depend on how many hours the engine operated for, noting that 18 hourly exceedances are allowed in any one year. As per the original application, no exceedances of the annual mean AQS are expected on the basis of this assessment.

A contour plot for the modelled 1-hour maximum and annual mean have been created and are presented in *Appendix B*.

6.3.2.2 Impacts of Emergency Operation on Protected Conservation Areas

The potential impact of NO_x emissions from the Site's emergency power operation, assuming 1 hour of continuous emissions from all 33 engines at 60% load, on the surrounding protected conservation areas has been assessed. Potential NO_x ambient concentrations, nutrient nitrogen deposition and acid deposition have been modelled and are presented in

Table 6.11 to ***Table 6.14***. These concentrations were assessed against the standards and critical loads presented in *Section 3.1.* The criteria outlined in *Section 3.2* were used to determine the significance of the potential impact.

Table 6.11: Modelled NO_x Annual Mean Concentrations (µg/m^3)

Site	PC	PC as % of AQS	Background	PEC	PEC as % of AQS	Significance
Maximum anywhere on grid (any LWS)	0.103	0.3%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Wormwood Scrubs (LNR)	0.002	0.0%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Richmond Park (SAC)	0.00012	0.0%	39.9	39.9	133%	Insignificant
Wimbledon Common (SAC)	0.00010	0.0%	39.9	39.9	133%	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 6.12*** assume all the engines running for one hour during the same 24-hour period of continuous emergency power generation.

Table 6.12: Modelled NO_x 24-hour Mean Concentrations (µg/m^3)

Site	PC	PC as % of AQS	Background	PEC	PEC as % of AQS	Significance
Silverlink Metro & Dudding Hill Loop (LWS, Borough Importance Grade II) (Load Bank Test)	55.7	28%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Wesley Playing Fields (LWS, Local Importance)	50.9	25%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Wormwood Scrubs (LNR) (Building Load Test)	10.4	5.2%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Richmond Park (SAC) (Building Load Test)	1.3	0.7%	N/A [a]	N/A [a]	N/A [a]	Insignificant
Wimbledon Common (SAC) (Building Load Test)	1.4	0.7%	N/A [a]	N/A [a]	N/A [a]	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 predicted 24-hour mean NO_x impacts have slightly increased when compared to the predicted impacts for the original application.

The potential nitrogen deposition and acid deposition were calculated using AQTAG06 guidance[17], based on the annual mean NO_x concentrations presented in ***Table 6.6.*** The results are presented in ***Table 6.13*** and ***Table 6.14***.

[17] Habitats Directive, 2014, AQTAG06 Technical guidance on detailed modelling approach for an appropriate assessment for emissions to air, http://bailey.persona-pi.com/Public-Inquiries/A465-English/8%20Air%20Quality/8.2.2%20-%20AQTAG06_Technical%20Guidance%20Assessment%20emissions%20to%20air%20Mar2014.pdf

Table 6.13: Nutrient Nitrogen Deposition (kgN/ha/yr)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Richmond Park (SAC)	Lucanus cervus - Stag beetle	10	115-04	0.0%	27.02	27.0	270%	Not Significant
Wimbledon Common (SAC)	European dry heaths	10	9.57E-04	0.0%	15.26	15.3	153%	Not Significant
	Lucanus cervus - Stag beetle	10	9.57E-04	0.0%	27.02	27.0	270%	Not Significant
	Northern Atlantic wet heaths with Erica tetralix	10	9.57E-04	0.0%	15.26	15.3	153%	Not Significant

Table 6.14: Acid Deposition (keq/ha/yr)

Site	Habitat	Minimum Critical Load	PC	PC as % of CL	Background	PEC	PEC as % of CL	Significance
Richmond Park (SAC)	Lucanus cervus - Stag beetle	Cf. **Table 3.3**	2.37E-06	0.0%	S:0.20 N:1.93	2.13	211%	Not Significant
Wimbledon Common (SAC)	European dry heaths	Cf. **Table 3.3**	9.82E-07	0.0%	S:0.16 N:1.09	1.25	143%	Not Significant
	Lucanus cervus - Stag beetle	Cf. **Table 3.3**	1.96E-06	0.0%	S:0.19 N:1.93	2.12	210%	Not Significant
	Northern Atlantic wet heaths with Erica tetralix	Cf. **Table 3.3**	9.82E-07	0.0%	S:0.16 N:1.09	1.25	143%	Not Significant

Modelling of effects of the emergency operations of the Site on nutrient nitrogen deposition and acid deposition suggest these will be insignificant.

6.3.2.3 Summary of Potential Impacts from Emergency Operation

- In case of emergency power being required for an hour or more, and making conservative operating assumptions, the human health protective AQS for NO_2 of 200 µg/m^3 is expected to be exceeded. This was also the case for the original application and the first permit variation, dated December 2020. As per the original application, no exceedance of the long-term human health protective NO_2 annual mean standard is expected.
- The AQS for protected conservation areas for 24-hour NO_x is not expected to be exceeded. This differs to earlier applications due to changes to the AQS for protected conservation sites. No significant long-term effects on protected conservation areas are expected by comparison with standards for annual mean NO_x, nutrient nitrogen and acid deposition.
- The modelled emergency scenario assumed that all the Site's engines would be running at a 60% load, all at the same time. In practice, in an emergency power event, the requirement may be lower depending on the nature of the outage.

7. CONCLUSION

The air quality assessment that was submitted as part of the original EP application (in February 2019) and amended to include seven additional generators (in December 2020) has been reviewed and updated to reflect the addition of the four new PG2 generators which will operate in combination with the existing 29 generators and to reflect changes in the generator testing regime. The assessment methodology, baseline data, meteorology data, remain largely as reported in the original air quality assessment that was reviewed and approved as part of the existing EP application, however some refinements pertaining to the statistical analysis have been made.

The testing regime of the generators at the Equinix Powergate Site is not predicted to result in a significant adverse impact on air quality at sensitive human receptors by comparison with relevant health protective standards. Whilst the assessment predicts that there is a marginal increase in principle in the potential for the total number of hours exceeding the hourly NO_2 standard to be greater than the 18 allowed, a statistical assessment suggests that the chance of this happening in practice is highly unlikely ($4.3x10^{-33}$ %); far below the tolerable 1% probability threshold.

With reference to potential ecological receptors, it is not expected that the testing regime will have a significant effect by comparison with the annual mean NO_x standard and it is not expected that the testing regime of the Site will have any significant effects by comparison with the 24-hour mean or annual mean NO_x, nitrogen deposition and acid deposition standards.

An assessment of potential PM_{10} emissions from the engines concluded that these are not expected to breach the air quality standard for PM_{10}. Sulphur dioxide emissions were not assessed as the Site uses ultra-low-sulphur diesel.

An emergency power generation scenario with all the Site's generators running at the same time at 60% for an assumed outage duration of an hour was also assessed. In this case, an exceedance of the hourly NO_2 standard is expected to occur; whether the standard would be breached would depend on the duration of operations. In the period since PG1 opened in 2008 and PG2 in 2012, there has been only a single event where backup generators have started in an emergency power supply capacity. With the exception of this single event, during which one generator operated for approx. 2 hours due to an issue with the site's uninterruptable power supply (UPS). Also, not all the engines should be used in practice for emergency power generation as the Site is designed with greater generator capacity than required to meet the data centre load. This modelled scenario and exceedance of the hourly air quality standards is therefore considered unlikely to happen in practice. Emergency power generation would not be expected to significantly affect ecological receptors by comparison with the annual mean NO_2 standard or the annual mean NO_x, nutrient nitrogen deposition or acid deposition standards.

APPENDIX A MODEL PARAMETERS

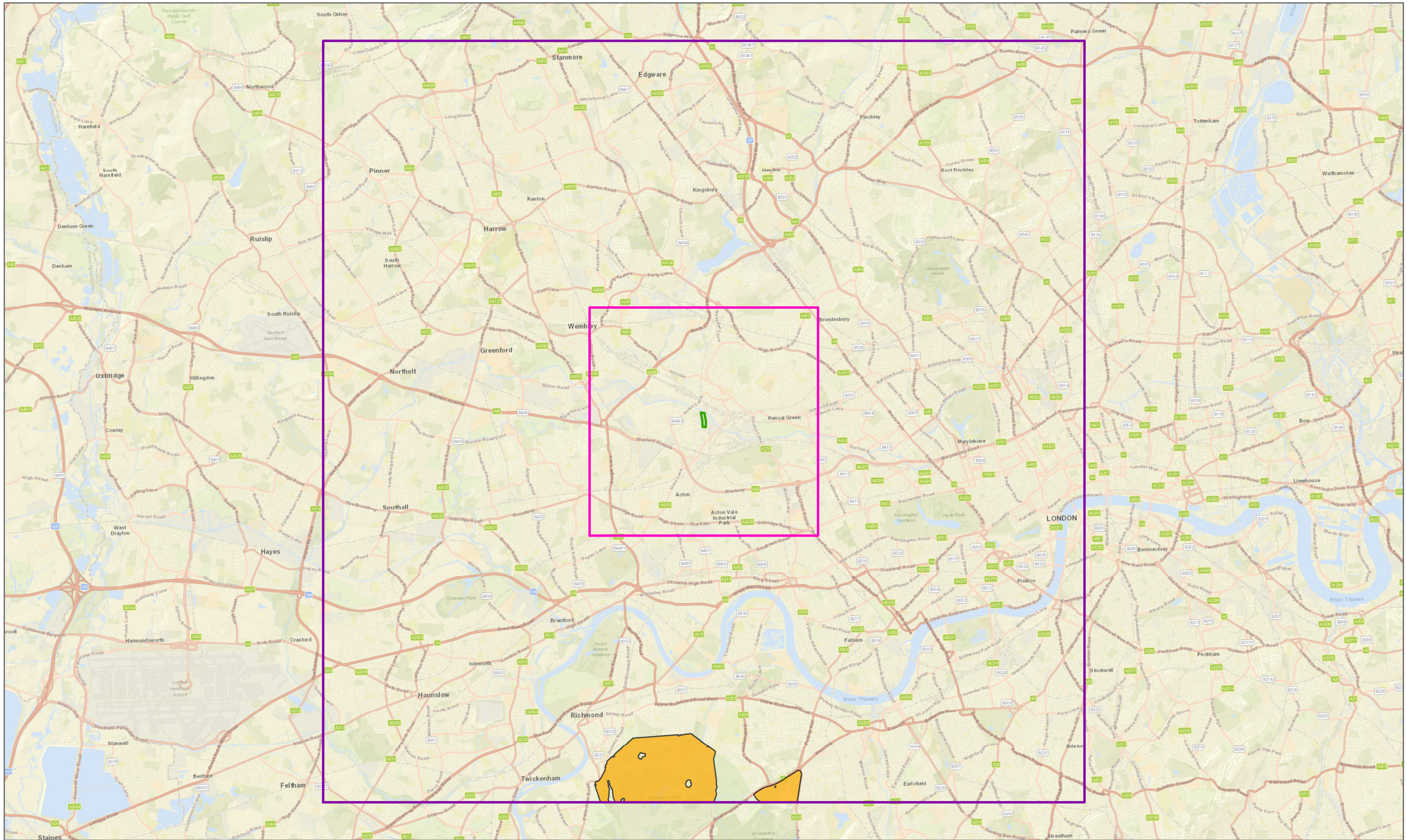


Figure A.1
Modelled Area around Site
2, Powergate Business Park, Volt Ave
London NW10 6PW

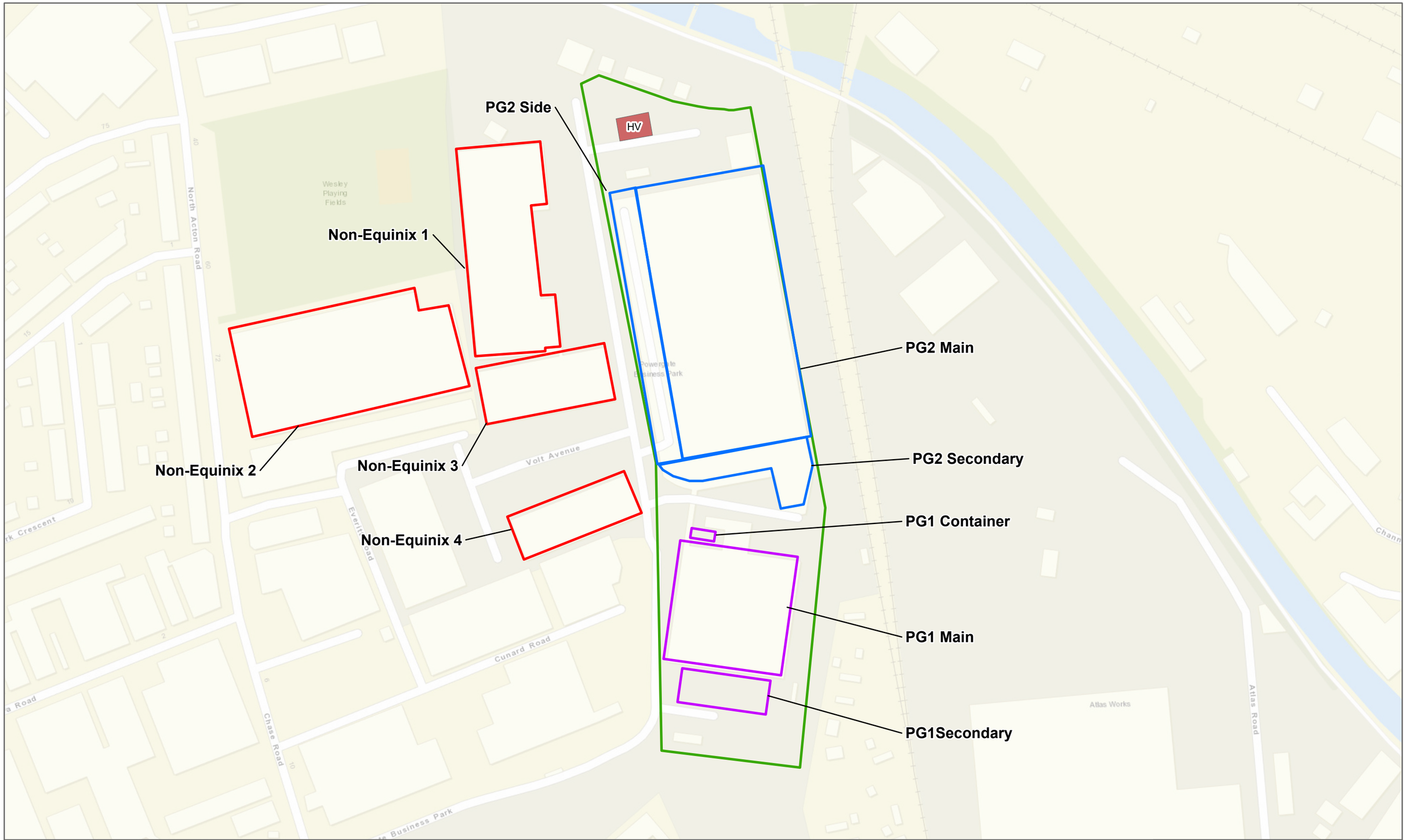
SCALE: 1:5000	VERSION: A01
SIZE: A3	DRAWN: OB
PROJECT: 0425532	CHECKED: WB
DATE: 21/01/2019	APPROVED: HB

PROJECTION: British National Grid

Path: \\ukoxfdc01\DATA\Oxford\Projects\0425532 Equinix Park Royal Permit.GB\Second Application - Jan19\AQ\GIS\MAPS\FigureA.1_ModelledArea_A01.mxd

A.2 Modelled Buildings Data

The locations of the modelled buildings are presented in *Figure A.2*, while their heights are presented in *Table A.1*.



Site Boundary
Non-Equinix Building
PG1 Building
PG2 Building
HV Building

0 10 20 30 40 50
Meters

N

Figure A.2
Location of Modelled Buildings
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:5000	VERSION: A02
SIZE: A3	DRAWN: CB
PROJECT: 0630390	CHECKED: LB
DATE: 21/01/2019	APPROVED: LB

ERM

EQUINIX

PROJECTION: British National Grid

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9.aprx

Table A.1: Height of Modelled Buildings

Buildings on Site	Height (m)	Buildings in Powergate Business Park	Height (m)
PG1 Main	10.52	Non-Equinix 1	12
PG1 Secondary	7.18	Non-Equinix 2	11
PG1 Container	4.80	Non-Equinix 3	10
PG2 Main	15.90	Non-Equinix 4	11
PG2 Secondary	13.50		
PG2 Side	17.70		
HV Building	11.3		

A.3 London Heathrow 2012-2016 Wind Roses

The London Heathrow wind roses for years 2012 to 2016 are presented in *Figures A.3 to A.7*.

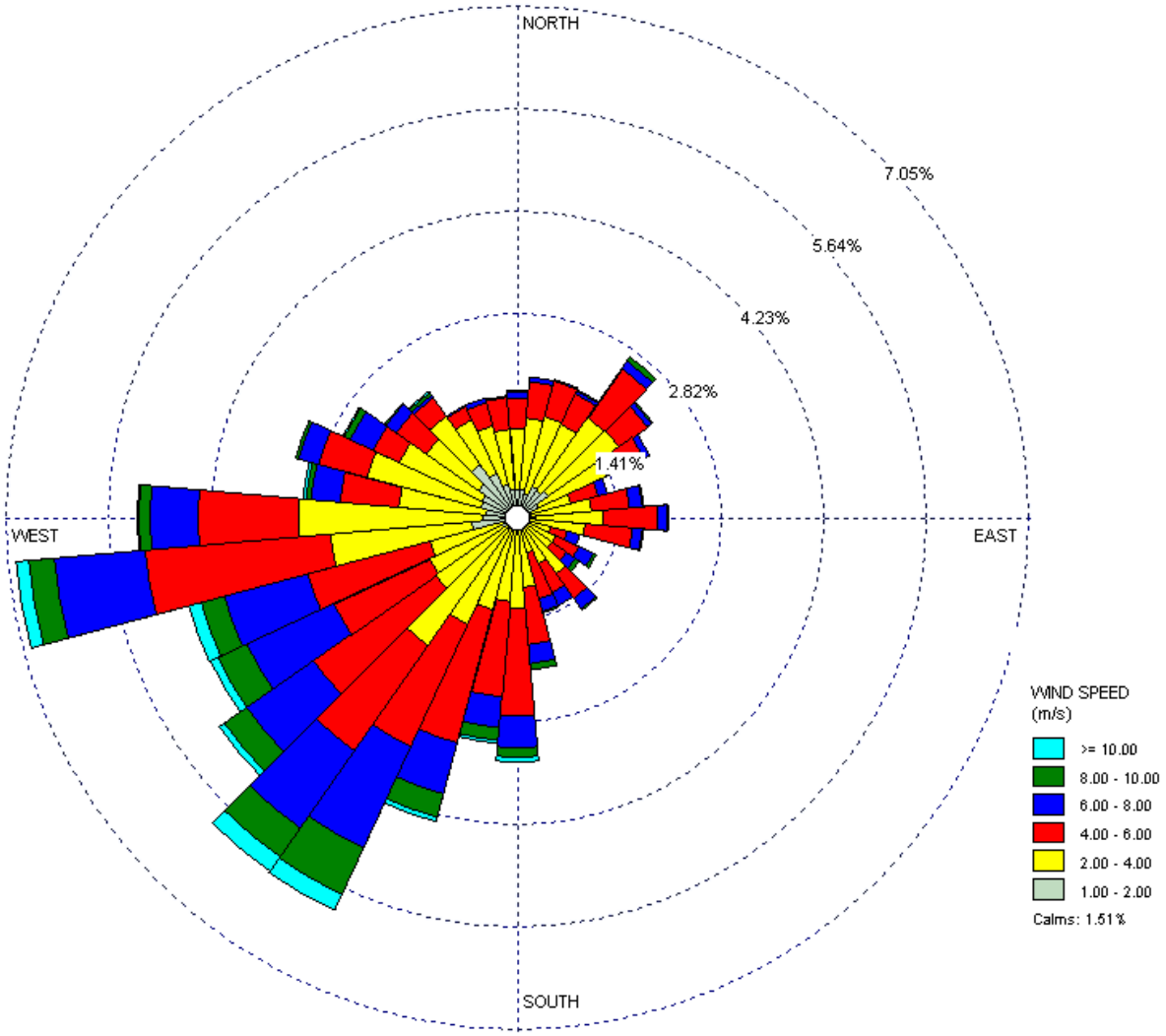


Figure A.3: London Heathrow Wind Rose - 2012

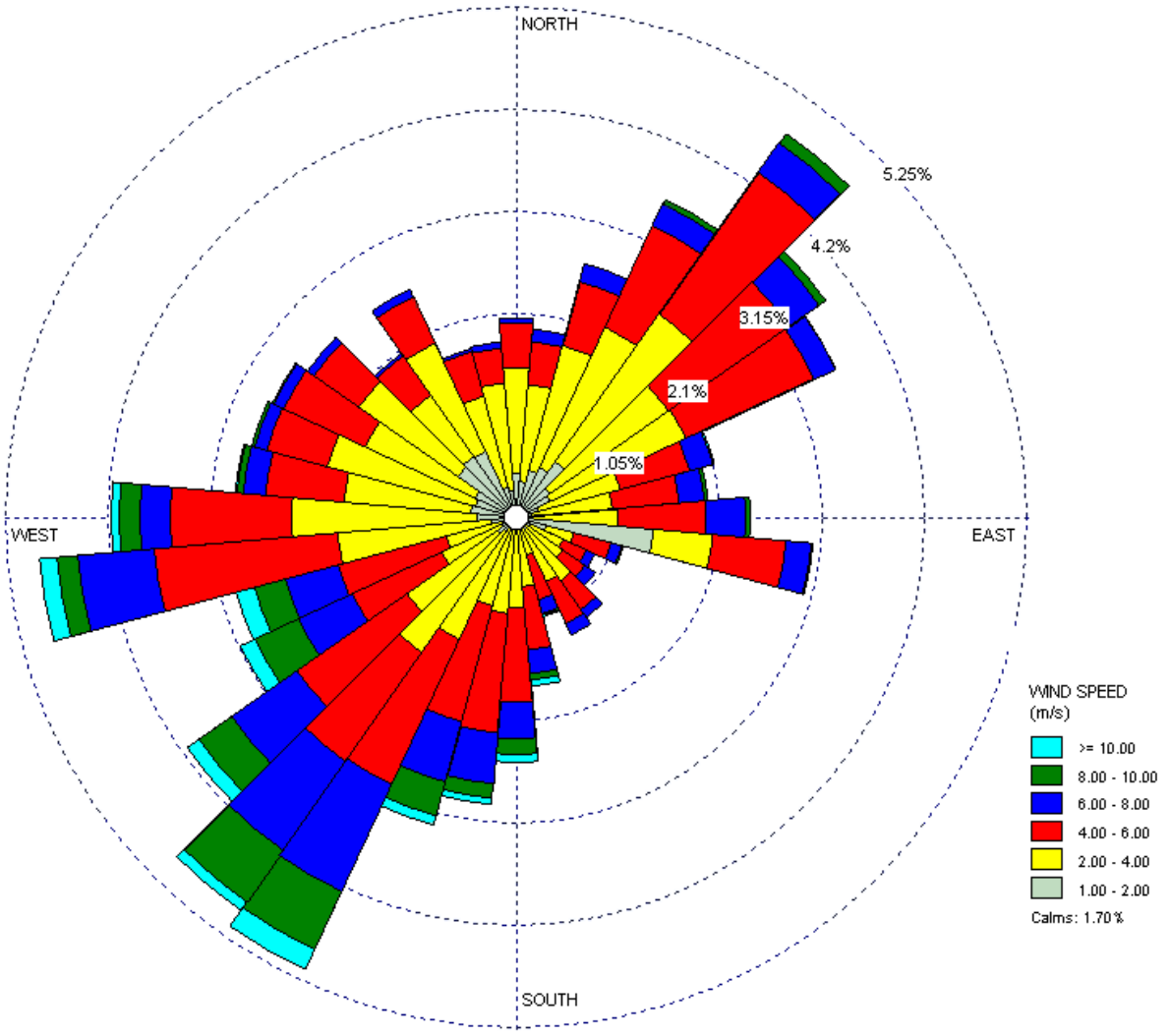


Figure A.4: London Heathrow Wind Rose - 2013

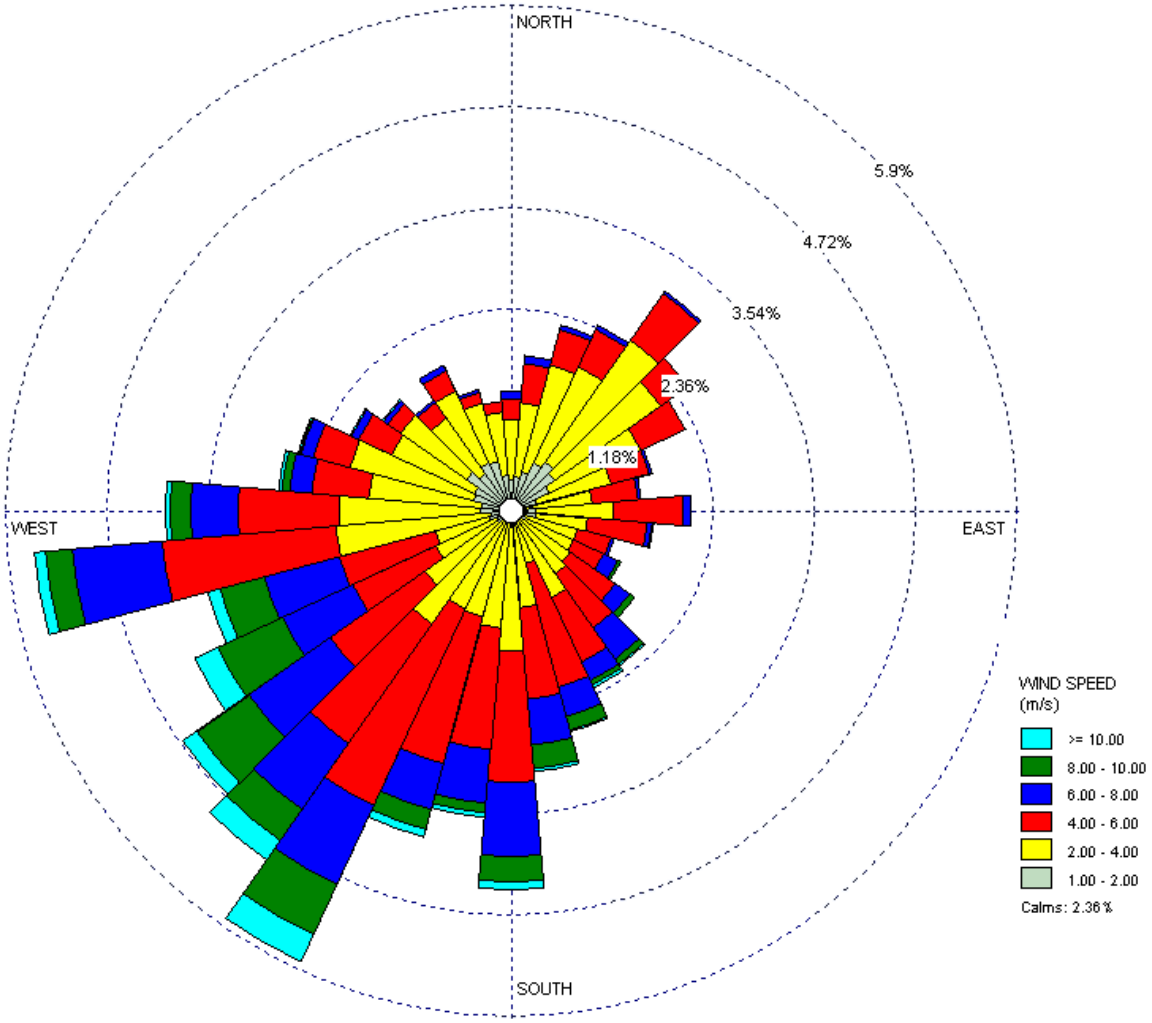


Figure A.5: London Heathrow Wind Rose – 2014

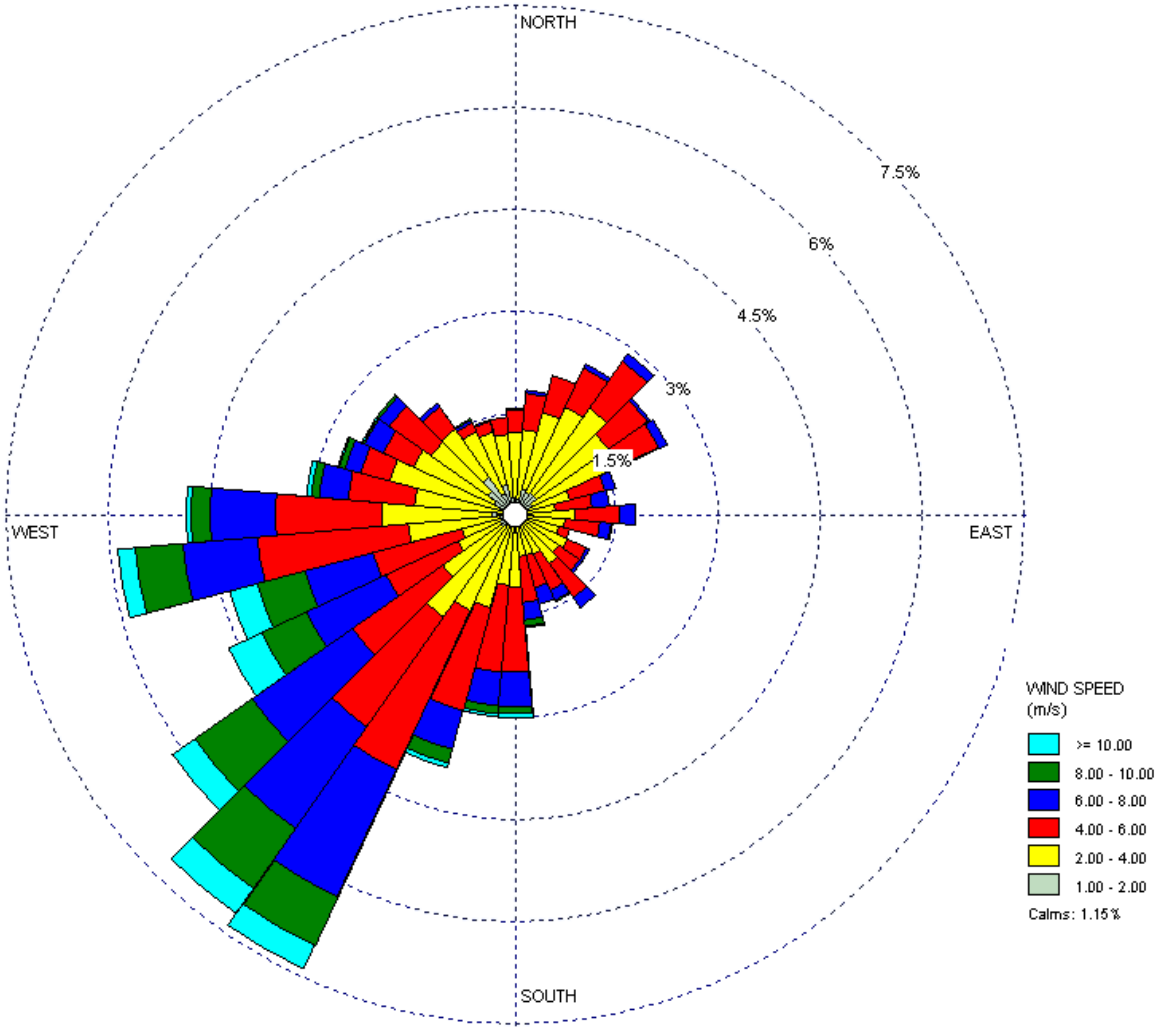


Figure A.6: London Heathrow Wind Rose - 2015

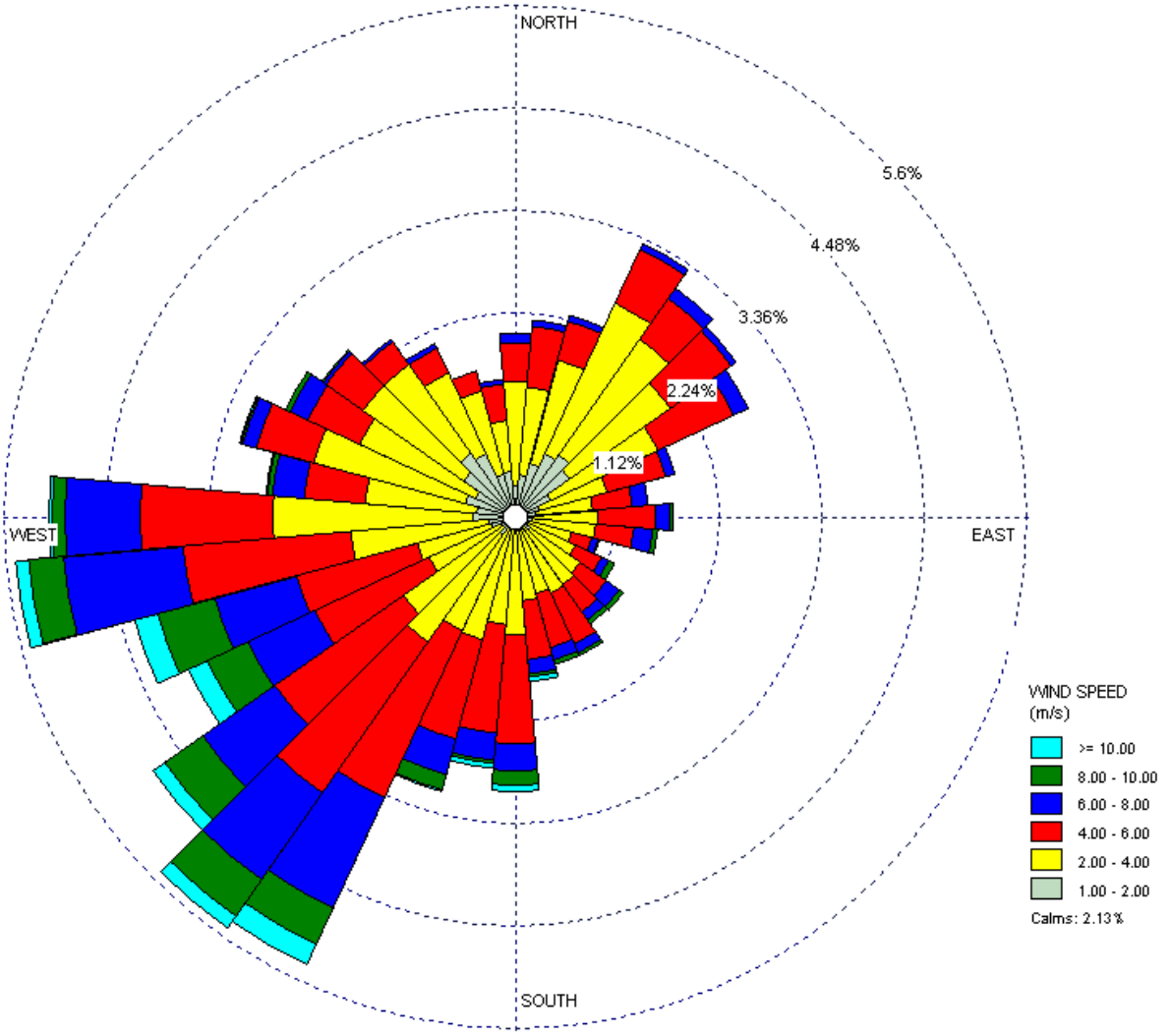


Figure A.7: London Heathrow Wind Rose – 2016

A.4 Emission Points Locations

Table 4.2 presents the coordinates used for each stack in the air dispersion model.

Table A.2: Coordinates of Modelled Stacks

Building	Emission Point	X (National Grid)	Y (National Grid)
PG1	PG1_01	521064.9	182729.0
	PG1_02	521064.9	182727.0
	PG1_03	521052.6	182635.0
	PG1_04	521054.1	182634.8
	PG1_05	521077.9	182632.1
	PG1_06	521079.4	182631.9
	PG1_07	521086.6	182631.0
	PG1_08	521088.1	182630.8
PG2	PG2_01	521029.0	182916.0
	PG2_02	521029.2	182913.2
	PG2_03	521029.6	182910.3
	PG2_04	521030.2	182907.1
	PG2_05	521031.9	182897.4
	PG2_06	521032.3	182894.3
	PG2_07	521032.9	182891.1
	PG2_08	521033.3	182887.8
	PG2_09	521041.0	182847.1
	PG2_10	521042.0	182841.3
	PG2_11	521042.9	182835.5
	PG2_12	521047.8	182809.4
	PG2_13	521048.8	182803.7
	PG2_14	521049.9	182797.9
	PG2_15	521039.51	182855.94
	PG2_16	521040.18	182851.32
	PG2_17	521043.86	182828.65
	PG2_18	521044.53	182824.03
	PG2_19	521055.97	182958.11
	PG2_20	521056.65	182954.93
	PG2_21	521054.02	182957.74
	PG2_22	521019.94	182947.67
	PG2_23	521024.20	182948.45
	PG2_24	521029.34	182949.44
	PG2_25	521033.60	182950.32

APPENDIX B CONTOUR PLOTS

Site Boundary

PEC for PM_{10}

24h 90.4 Percentile - Screening All Site ($\mu g/m^3$)

- 38.4
- 38.5
- 38.6
- 38.7

0 100 200 300 400 500

Metres

N

B.1

PEC for PM_{10}, 24h 90.4 Percentile - Screening All Site ($\mu g/m^3$)

2, Powergate Business Park, Volt Ave

London NW10 6PW

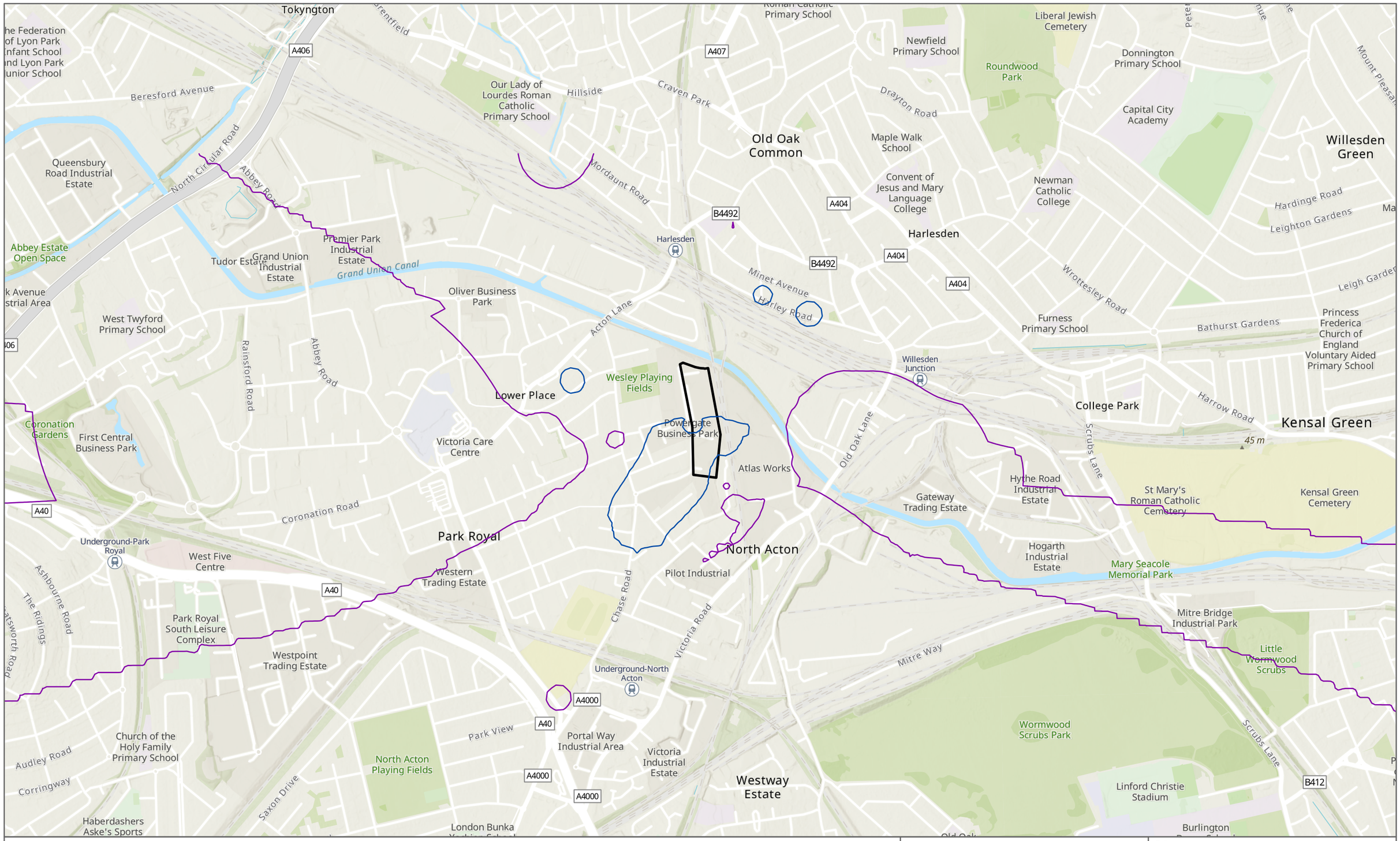
SCALE: 1:12000	VERSION: A02
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

ERM

EQUINIX

PROJECTION: British National Grid

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx/0630690_AQAContoursB.1_A02



Site Boundary

PEC for NO_2

1h Maximum - Start-up maximum of any engine

No UPS (µg/m^3)

- 68
- 70
- 80
- 90
- 100
- 150
- 200

PROJECTION: British National Grid

0 100 200 300 400 500

Metres

N

SCALE: 1:12000	VERSION: A01
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

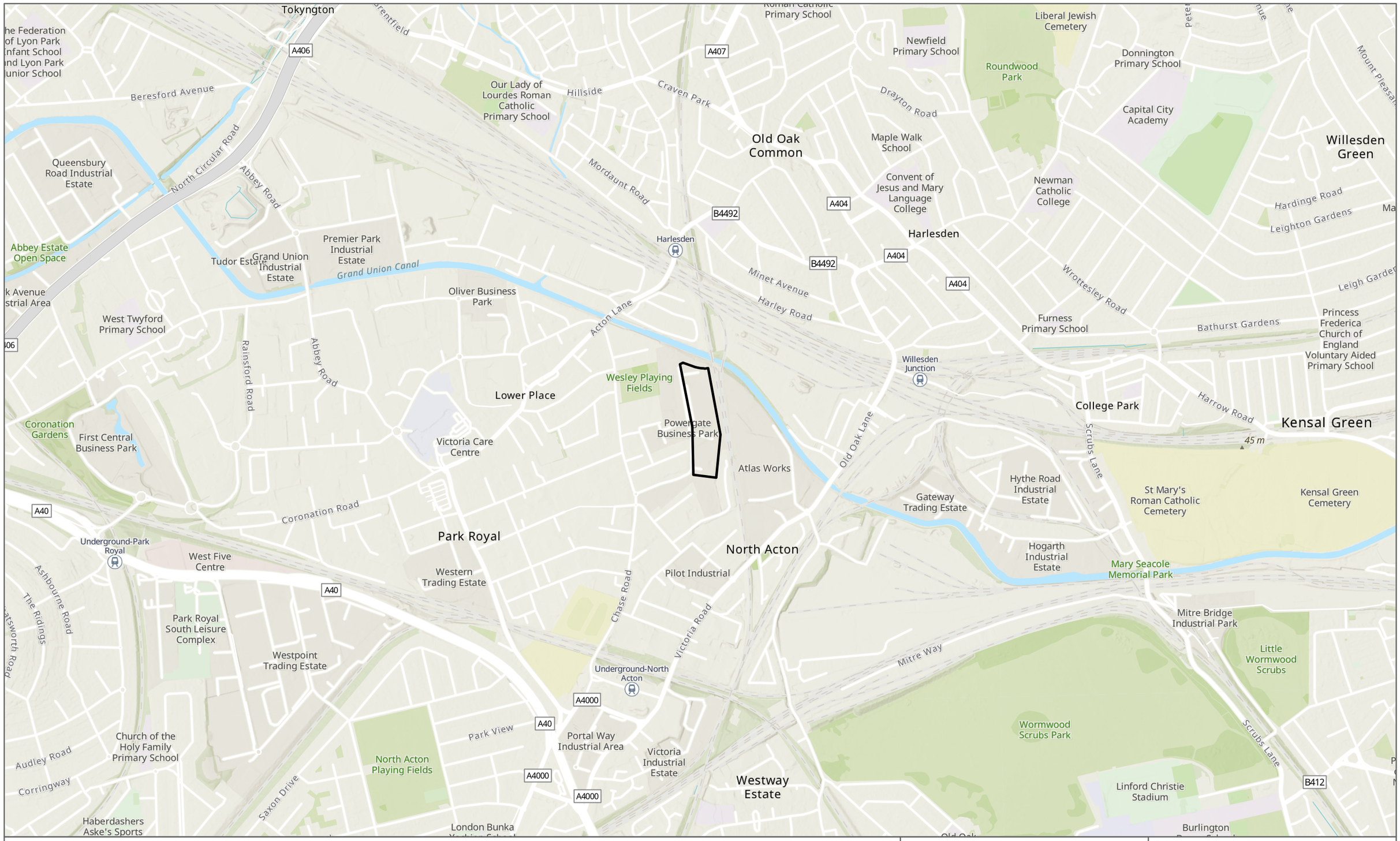
B.2
PEC for NO_2, 1h Maximum - Start-up maximum of any engine
No UPS (µg/m^3)
2, Powergate Business Park, Volt Ave
London NW10 6PW

ERM

EQUINIX

World Topographic Map: Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
World Hillshade: Esri, Intermap, NASA, NGA, USGS

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx/0630690_AQAContoursB.2_A01



Site Boundary

1h Maximum - Black Building Test, Group 8 ($\mu g/m^3$)

- 68
- 70
- 80
- 90
- 100
- 150
- 200

PROJECTION: British National Grid

0 100 200 300 400 500 Metres

N

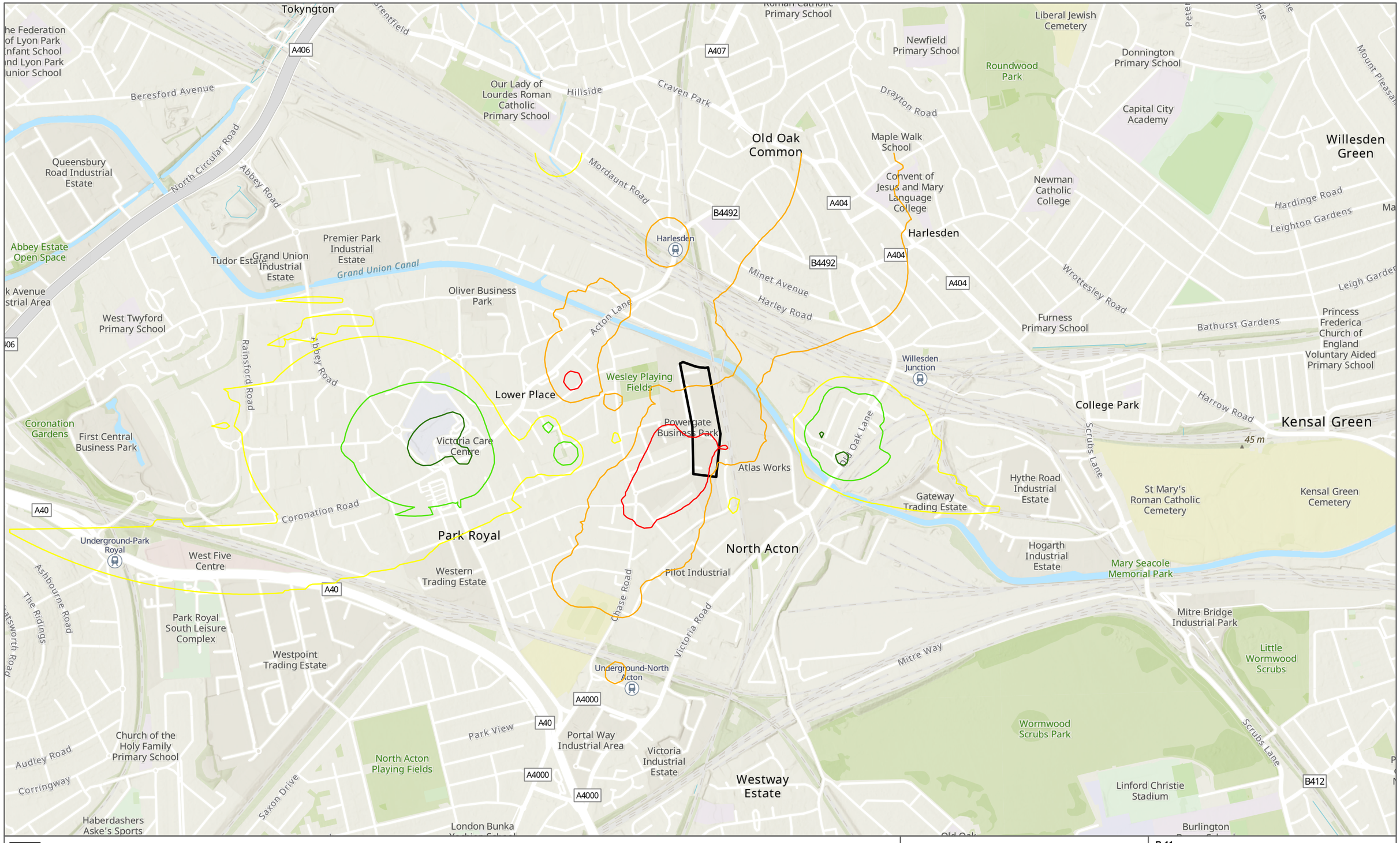
B.6
PEC for NO_2
1h Maximum - Black Building Test, Group 8 ($\mu g/m^3$)
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:12000	VERSION: A02
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

ERM

EQUINIX

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx/0630690_AQAContoursB.6_A02



Site Boundary

PEC for NO_2

1h Maximum - Load Bank Test, PG1_08 ($\mu g/m^3$)

- 68
- 70
- 80
- 90
- 100
- 150
- 200

0 100 200 300 400 500

Metres

N

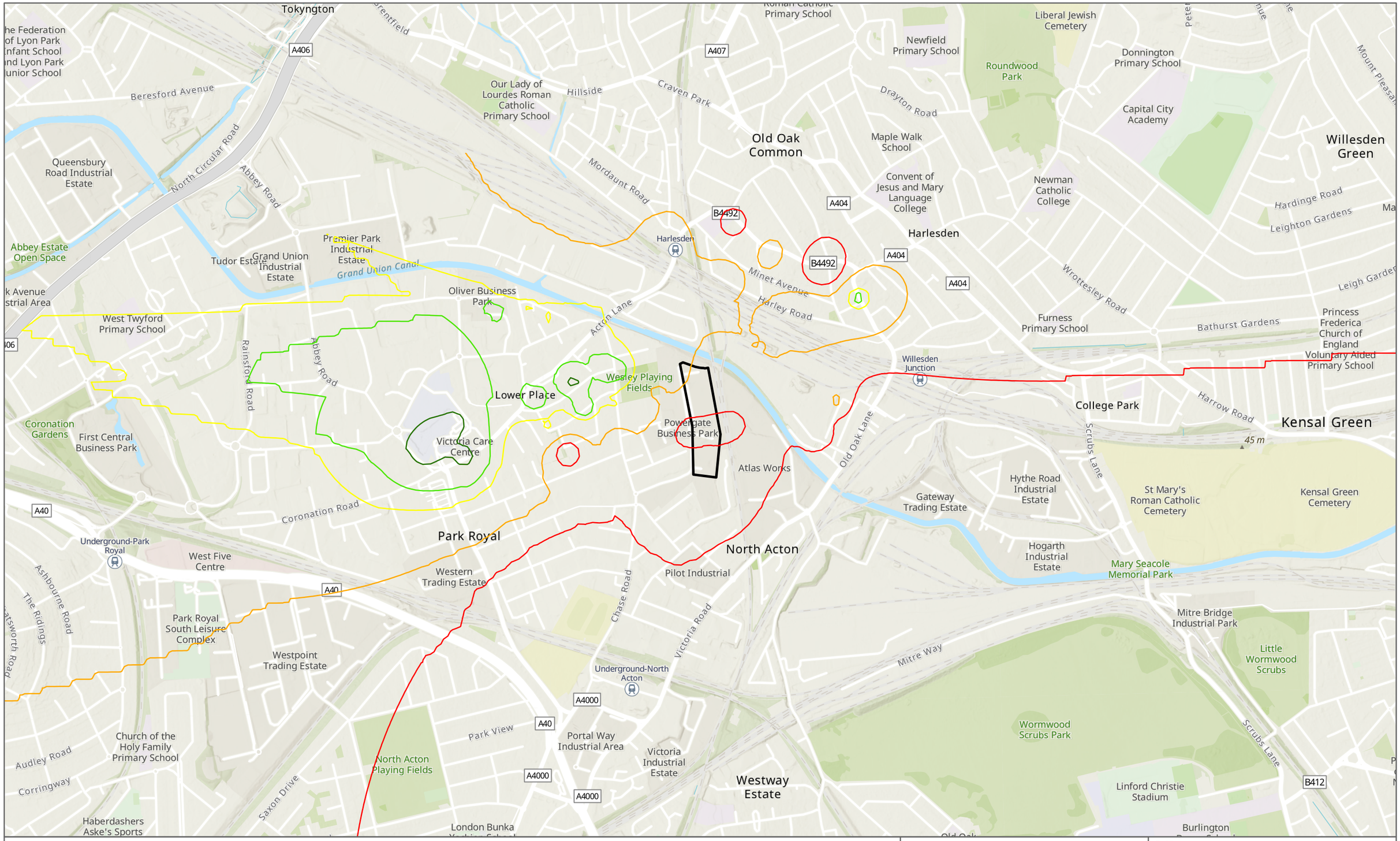
B.11
PEC for NO_2, 1h Maximum - Load Bank Test, PG1_08 ($\mu g/m^3$)
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:12000	VERSION: A01
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

PROJECTION: British National Grid

World Topographic Map: Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
World Hillshade: Esri, Intermap, NASA, NGA, USGS

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx/0630690_AQAContoursB.11_A01



Site Boundary

PEC for NO_2

1h Maximum - Load Bank Test, PG1_20 ($\mu g/m^3$)

- 68
- 70
- 80
- 90
- 100
- 150
- 200

PROJECTION: British National Grid

0 100 200 300 400 500

Metres

N

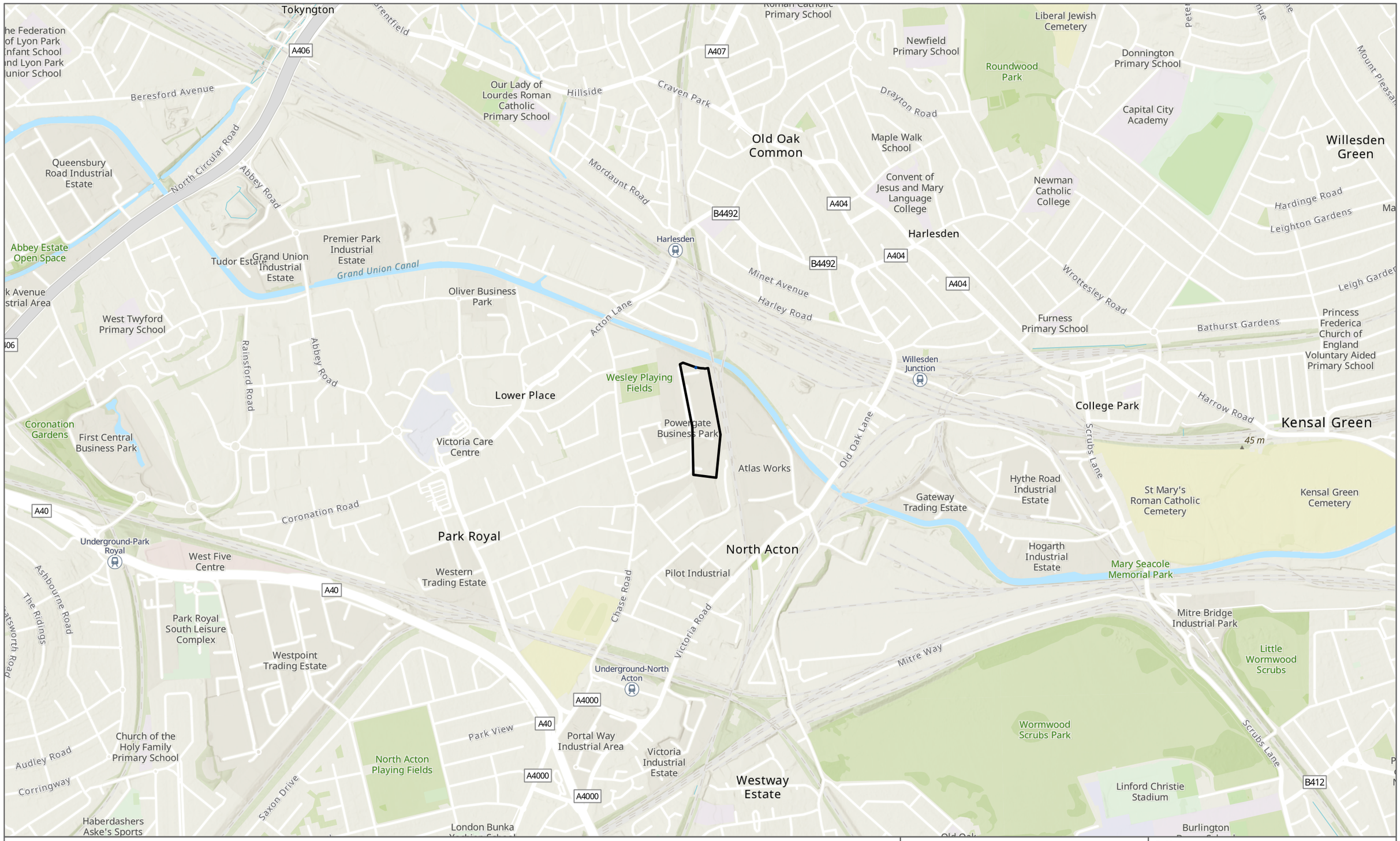
B.12
PEC for NO_2, 1h Maximum - Load Bank Test, PG1_20 ($\mu g/m^3$)
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:12000	VERSION: A01
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

ERM

EQUINIX

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx/0630690_AQAContoursB.12_A01



Site Boundary

PEC for NO_2

1h Maximum - Load Bank Test, PG2_25 ($\mu g/m^3$)

- 68
- 70
- 80
- 90
- 100
- 150
- 200

PROJECTION: British National Grid

0 100 200 300 400 500 Metres

N

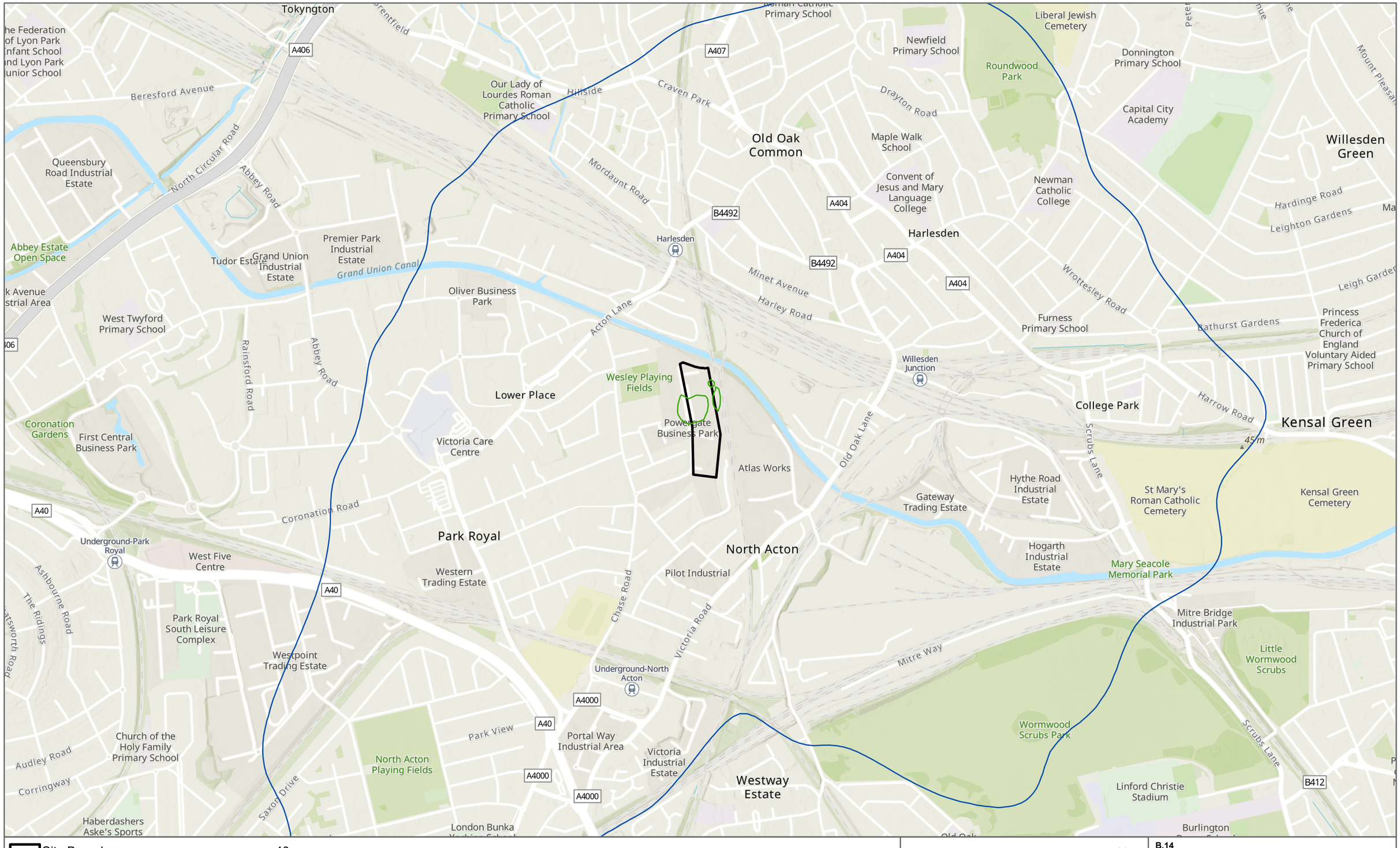
B.13
PEC for NO_2
1h Maximum - Load Bank Test, PG2_25 ($\mu g/m^3$)
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:12000	VERSION: A02
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

ERM

EQUINIX

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx/0630690_AQAContoursB.13_A02



Site Boundary

PEC for NO_2

Annual Mean - Maintenance of All Site ($\mu g/m^3$)

- 33.5005
- 33.505
- 33.75
- 35
- 40

0 100 200 300 400 500

Metres

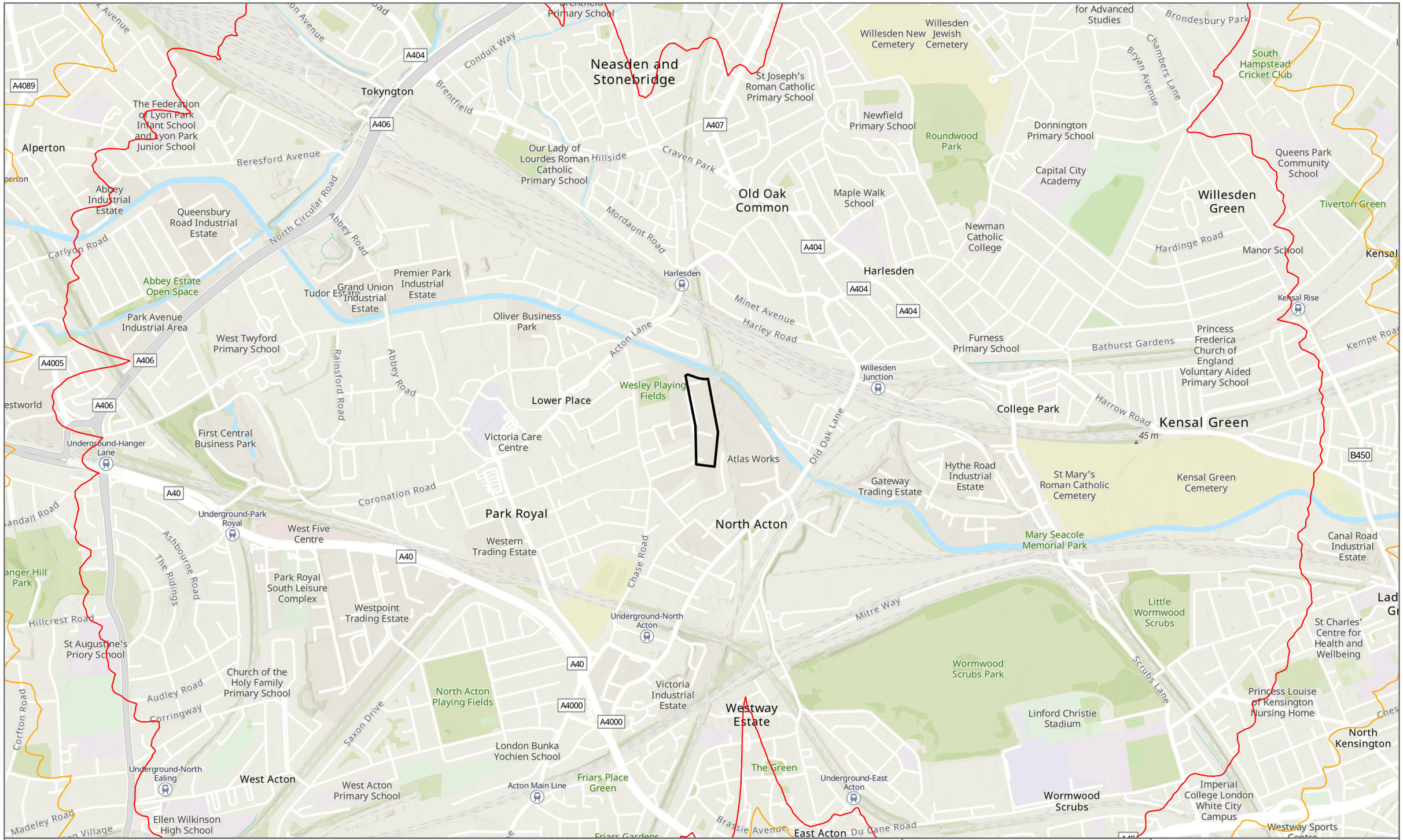
N

B.14
PEC for NO_2
Annual Mean - Maintenance of All Site ($\mu g/m^3$)
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:12000	VERSION: A02
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

PROJECTION: British National Grid

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx\0630690_AQAContoursB.14_A02



Site Boundary

PEC for NO_2

1h Maximum - Emergency Power for All Site ($\mu g/m^3$)

- 68
- 70
- 80
- 90
- 100
- 150
- 200

0 100 200 300 400 500

Metres

N

PROJECTION: British National Grid

B.15
PEC for NO_2
1h Maximum - Emergency Power for All Site ($\mu g/m^3$)
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:15000	VERSION: A02
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

ERM

EQUINIX

World Topographic Map: Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
World Hillshade: Esri, Intermap, NASA, NGA, USGS

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx/0630690_AQAContoursB.15_A02

Site Boundary

PEC for NO_2

Annual Mean - Emergency Power for All Site ($\mu g/m^3$)

- 33.5005
- 33.505
- 33.75
- 35
- 40

PROJECTION: British National Grid

0 100 200 300 400 500 Metres

N

SCALE: 1:12000	VERSION: A02
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

B.16
PEC for NO_2
Annual Mean - Emergency Power for All Site ($\mu g/m^3$)
2, Powergate Business Park, Volt Ave
London NW10 6PW

ERM

EQUINIX

World Topographic Map: Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
World Hillshade: Esri, Intermap, NASA, NGA, USGS

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx/0630690_AQAContoursB.16_A02

Site Boundary

PC for NO_x

24h Maximum - Load Bank Test, Group 2 ($\mu g/m^3$)

- 7.5
- 15
- 30
- 37.5
- 60
- 70
- 75

0 100 200 300 400 500

Metres

N

B.18
PC for NO_x
24h Maximum - Load Bank Test, Group 2 ($\mu g/m^3$)
2, Powergate Business Park, Volt Ave
London NW10 6PW

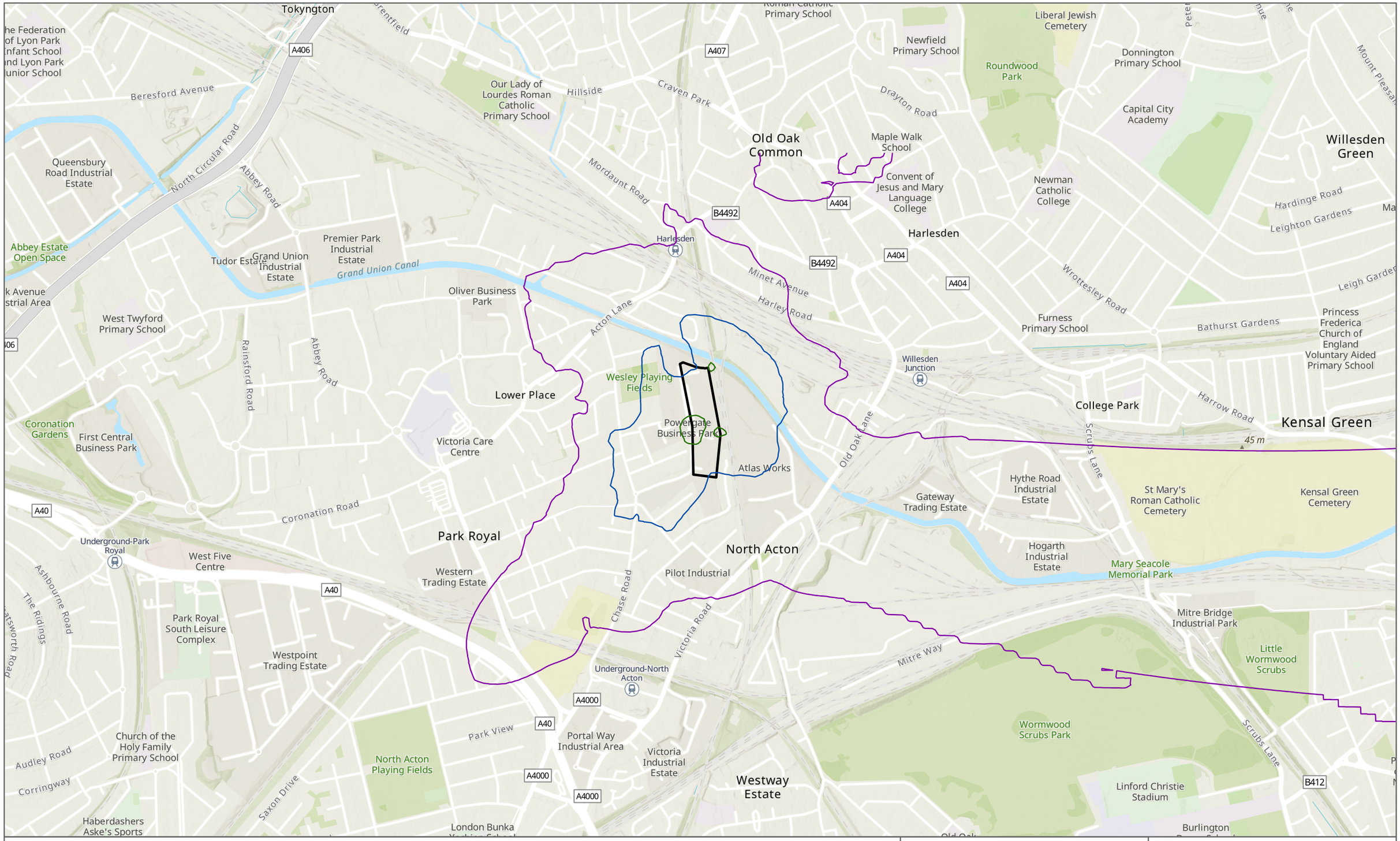
SCALE: 1:12000	VERSION: A02
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

ERM

EQUINIX

PROJECTION: British National Grid

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx/0630690_AQAContoursB.18_A02



Site Boundary

PC for NO_x

24h Maximum - Load Bank Test, Group 8 ($\mu g/m^3$)

- 7.5
- 15
- 30
- 37.5
- 60
- 70
- 75

PROJECTION: British National Grid

0 100 200 300 400 500 Metres

N

B.19
PC for NO_x
24h Maximum - Load Bank Test, Group 8 ($\mu g/m^3$)
2, Powergate Business Park, Volt Ave
London NW10 6PW

SCALE: 1:12000	VERSION: A02
SIZE: A3	DRAWN: JG
PROJECT: 0630390	CHECKED: RP
DATE: 29/04/2022	APPROVED: DP

ERM

EQUINIX

World Topographic Map: Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
World Hillshade: Esri, Intermap, NASA, NGA, USGS

Path: \\UKSSMBNAF-a383.ops.erm55.com\UKSGISData01\London\0630390 - Equinix\MAPS\LD9 Maps\0630390 - Equinix LD9 Air Quality.aprx/0630690_AQAContoursB.19_A02

ERM has over 160 offices across the following countries and territories worldwide

Argentina
Australia
Belgium
Brazil
Canada
China
Colombia
France
Germany
Ghana
Guyana
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
The Netherlands
New Zealand
Peru
Poland
Portugal
Puerto Rico
Romania
Russia
Senegal
Singapore
South Africa
South Korea
Spain
Switzerland
Taiwan
Tanzania
Thailand
UAE
UK
US
Vietnam

ERM's London Office
Exchequer Court
33 St Mary Axe
EC3A 8AA, London

T: +44 20 3206 5200
F: +44 20 3206 5440

www.erm.com

The business of sustainability

ERM