HOARE LEA

Technical Note.

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Project:	34/22120 Stephenson Way
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Client:	GPF Lewis

Pre-Construction Dust Monitoring.

Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	19/07/23	First Draft	AJ / PS	LB	CR
01	20/07/23	First Issue	AJ	PS	CR
02	09/08/23	Second Issue	AJ	PS	CR
03	28/09/23	Third Issue	AJ	PS	CR

1. Introduction.

Hoare Lea have been commissioned by GPF Lewis Solutions Limited to provide pre-construction dust monitoring for the land fronting Stephenson Way, NW1 2HD (the 'Site') due to planning conditions received from the London Borough of Camden (LBoC). The Consented Development (planning reference: 2018/2316/P) will comprise the erection of a 7-storey building plus basement for student accommodation on the upper floors, including shared amenity space at ground and sixth floor level and terrace at the sixth floor level fronting Stephenson Way (Sui Generis). Comments were received from the Planning Officer at Camden on 1st August 2023 necessitating two dust monitors to be installed on the Site. Further comments were received on the 22nd of September 2023 requesting modifications to the monitors located at the Site and further clarifications.

1.1 Site Context.

The Site consists of a vacant car park that is currently not in use, located fronting Stephenson Way. The neighbouring properties are Euston Square Hotel to the west, the UCL Institute of Health Informatics to the south, and an office building to the east. The surrounding area consists of primarily office use with some residential properties. The location of the Site is illustrated in Figure 1.

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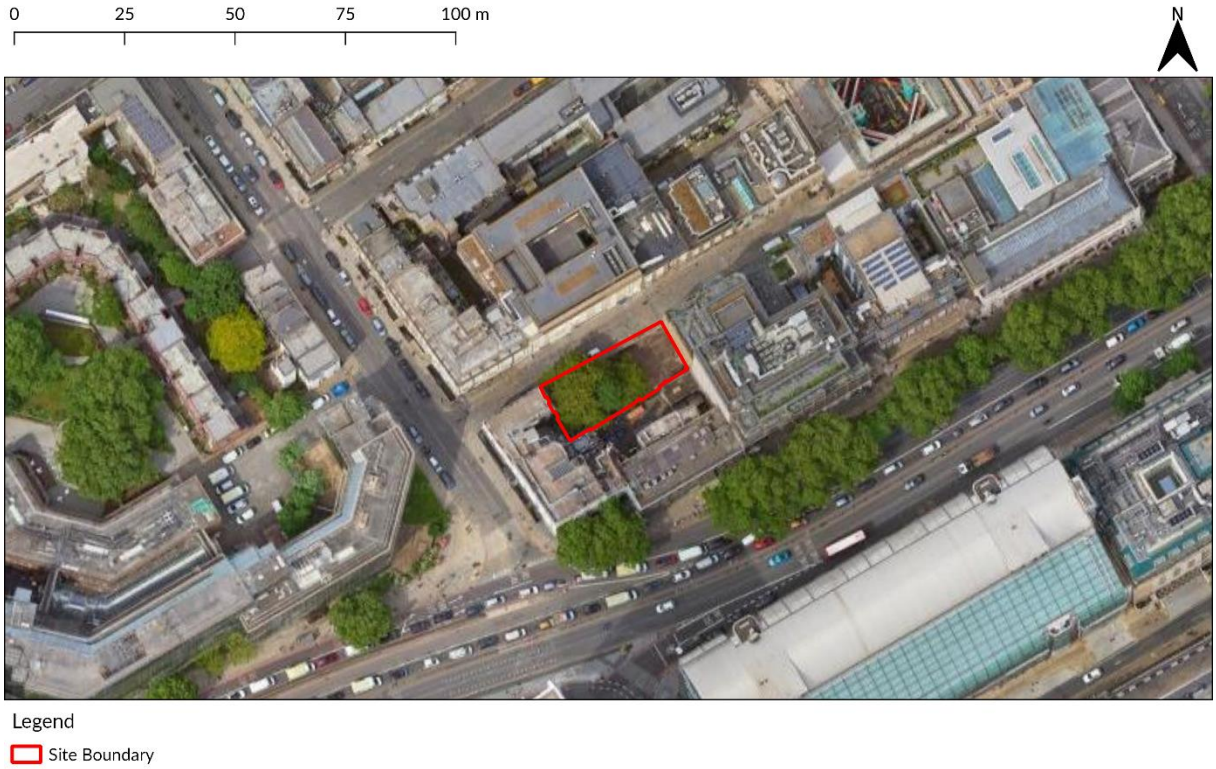


Figure 1: Location of the Site. Contains Google Maps Data (2023) [Retrieved 18/07/2023]

1.2 Requirements.

An Air Quality Assessment (AQA) was produced by Hoare Lea in 2018[1] and the Site was identified as low risk in the construction dust risk assessment with regards to construction dust emissions. For low-risk sites, in line with the Greater London Authority (GLA) guidance[2], monitoring would typically not be necessary. However, due to conditions specified by the London Borough of Camden (LBoC) in the Decision Notice[3] published, and subsequent communications from LBoC for the Consented Development, pre-construction dust monitoring is required on Site. Condition 11 outlines the requirement for air quality monitoring:

> *"No development shall take place until full details of the air quality monitors have been submitted to and approved by the local planning authority in writing. Such details shall include the location, number and specification of the monitors, including evidence of the fact that they have been installed in line with guidance outlined in the GLA's Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance and have been in place for 3 months prior to the proposed implementation date. The monitors shall be retained and maintained on site for the duration of the development in accordance with the details thus approved.*

[1] Hoare Lea (2018) Stephenson Way Air Quality Assessment –[online], (Last Accessed: 18/07/2023), Available at: http://camdocs.camden.gov.uk/HPRMWebDrawer/Record/7163776/file/document?inline

[2] Greater London Authority (2014), The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance – [online] (Last Accessed: 18/07/2023), Available at: www.london.gov.uk/sites/default/files/gla_migrate_files_destination/Dust%20and%20Emissions%20SPG%208%20July%202014.pdf

[3] London Borough of Camden (2020) Decision Notice for Land fronting Stephenson Way –[online], (Last Accessed: 18/07/2023), Available at: http://camdocs.camden.gov.uk/HPRMWebDrawer/Record/8478772/file/document?inline

Reason: To safeguard the amenities of the adjoining premises and the area generally in accordance with the requirements of policies G1, A1, D1 and CC4 of the London Borough of Camden Local Plan 2017."

Further comments from the Planning Officer at Camden on the 22nd of September 2023 expand on these requirements:

"1. The 3 month baseline is required to inform the trigger levels for the site and so that ambient air quality can be established. Without a baseline any exceedance would be reasonably interpreted to be the result of activity on the site and the onus would be on the developer to prove that this was not the case. The works (installation of pole and removal of trees) to ensure the monitors are acceptable should be undertaken as soon as possible to enable compliant monitoring to commence as soon as possible.

2. Agreement to Camden's air quality trigger & action levels with an alert and reporting strategy established, with monthly air quality reports to be submitted to AirQuality@Camden.gov.uk each month.

3. During the initial works monitoring should be in place and you should establish the trigger alert levels and send a message automatically to email if exceeded.

4. You should record all activity on site and report it in the relevant monthly report."

1.3 Scope.

To partially address Condition 11 and the comments from the Planning Officer at Camden, Hoare Lea have deployed two air quality monitors at the Site and produced this note to confirm the methodology of the monitoring methodology and programme with LBoC.

The proposed methodology for monitoring was provided to and discussed with LBoC's Air Quality Officers to determine an acceptable methodology for the baseline survey. Details of the equipment and location chosen for the air quality monitor have been provided to LBoC for comment. Permission to affix a monitor to street furniture (Lamppost ID: 6) has been provided by the LBoC.

2. Method Statement.

2.1 Guidance.

Appropriate guidance has been referred to in determining the suitable equipment and location for construction dust monitoring at the Site.

2.1.1 Greater London Authority Guidance

Supplementary Planning Guidance (SPG) on the control of dust and emissions during construction and demolition has been published by the GLA[2]. The guidance provides protocols for on-site monitoring to manage the generation of particulate matter (PM_{10} and $PM_{2.5}$) and nitrogen oxides (NO_x) during construction activities. The monitoring approach has been undertaken in line with the GLA SPG.

2.1.2 Institute of Air Quality Management Guidance

The Institute of Air Quality Management (IAQM) has published Guidance on Monitoring in the Vicinity of Demolition and Construction Sites (2018)[4]. This document advises on monitoring dust and particulate matter and the quality assurance procedures that should be applied. The monitoring approach has been undertaken with consideration of the IAQM guidance.

2.1.3 LBoC Requirements for Real-Time Dust Monitoring on Demolition and Construction Sites

LBoC have provided guidance on the requirements for dust monitoring on demolition and construction sites within the borough (2021)[5]. This document details the methodology required in order for LBoC to approve a dust monitoring regime implemented to fulfil a planning condition. The monitoring approach has been undertaken with consideration of the LBoC requirements and guidance. Namely, the guidance outlines the key information required as follows:

i) Number of air quality/dust (PM_{10}) monitors being installed;
ii) Details of the proposed locations;
iii) Brief rationale for installing monitors at these locations;
iv) Manufacturer and model of the monitoring equipment; and
v) The dust (PM_{10}) trigger levels that will be used.

2.2 Monitoring Equipment.

Two EarthSense Zephyrs have been deployed to record PM_{10} and $PM_{2.5}$ concentrations, one of which is located on Site, the other just outside of the Site boundary within the public domain. The equipment will be supplied with power from connected solar panels to provide active sampling throughout the monitoring period. Following advice received from the LBoC, two monitors are required to assess the impacts of dust generated on Site.

The EarthSense Zephyr is an MCERTS Certified Indicative Ambient Particulate Monitor[6] and is used for the purposes of construction dust monitoring across the UK. The specification sheet for the Zephyr has been provided in Appendix 1, and this equipment has been deemed acceptable for use by LBoC. The monitor is capable of recording particulate matter within 5 $\mu g/m^3$ of accuracy on 10 second intervals. The monitor will send data to an online dashboard which provides real-time data and has the capability to send alerts if required by LBoC.

[4] Institute of Air Quality Management (2018) Guidance on Monitoring in the Vicinity of Demolition and Construction Sites –[online], (Last Accessed: 18/07/2023), Available at: https://iaqm.co.uk/text/guidance/guidance_monitoring_dust_2018.pdf

[5] London Borough of Camden (2021) Requirements for real-time dust monitoring on demolition and construction sites (updated April 2021)

[6] CSA Group (2023) MCERTS Certified Products: Indicative Ambient Particulate Monitors – [online] (Last accessed: 18/07/2023), Available at: MCERTS Certified Products: Indicative Ambient Particulate Monitors Archives - CSA Group

2.3 Monitoring Locations.

Two monitoring locations have been determined to provide a transect across the Site. Based on publicly available data at Heathrow Airport, the prevailing wind direction is south-westerly. As such, the monitors have been positioned within the north east and south west corners of the Site in the prevailing wind direction, to determine the dust that will be leaving the Site. This is in line with the GLA guidance[2].

The locations of the monitors are illustrated in Figure 2. Photographs of the monitor setup at the Site are shown in Appendix 2.

2.3.1 Monitor 1

Monitor 1 is located towards the north-east corner of the Site, on a lamppost on the adjacent footpath and has been recording data at this location since 31st July 2023, with good data capture (100% based on hourly concentrations recorded between 31st July 2023 and 27th September 2023)

This location is deemed safe and out of the way of pedestrian and vehicle traffic. The monitor on the lamppost has been located at 1.9 m height, this is the highest point at which the monitor can be affixed safely without interfering with signage associated with the lamppost, ensuring a free flow of air around the inlet. In line with manufacturers guidance, the solar panel has been positioned above the monitor to prevent interference with the air flow around the inlet (positioned at the bottom of the monitor). The lamppost location allows for a consistent monitoring location throughout the development construction phases, as it is unlikely to require relocation during works commencing on Site.

2.3.2 Monitor 2

Monitor 2 is located on the fence at the south of the Site at a height of 3.2 m to be above the current fencing and away from the adjacent building to allow free flow of air around the inlet.

This monitor had inconsistent data readings during the first month of its installation on Site caused by lack of solar power due to overshadowing from trees and the surrounding buildings. The trees were removed on the 26th of September 2023 which is expected to improve the supply of solar power to the monitor. However it is worth noting that due to the small footprint of the Site and nature of the surrounding buildings, the overshadowing from nearby buildings at this location may continue to impact the data capture at this location, which will be continually monitored. If the data capture does not improve at this location, it is proposed to remove this monitor, subject to agreement with the council.

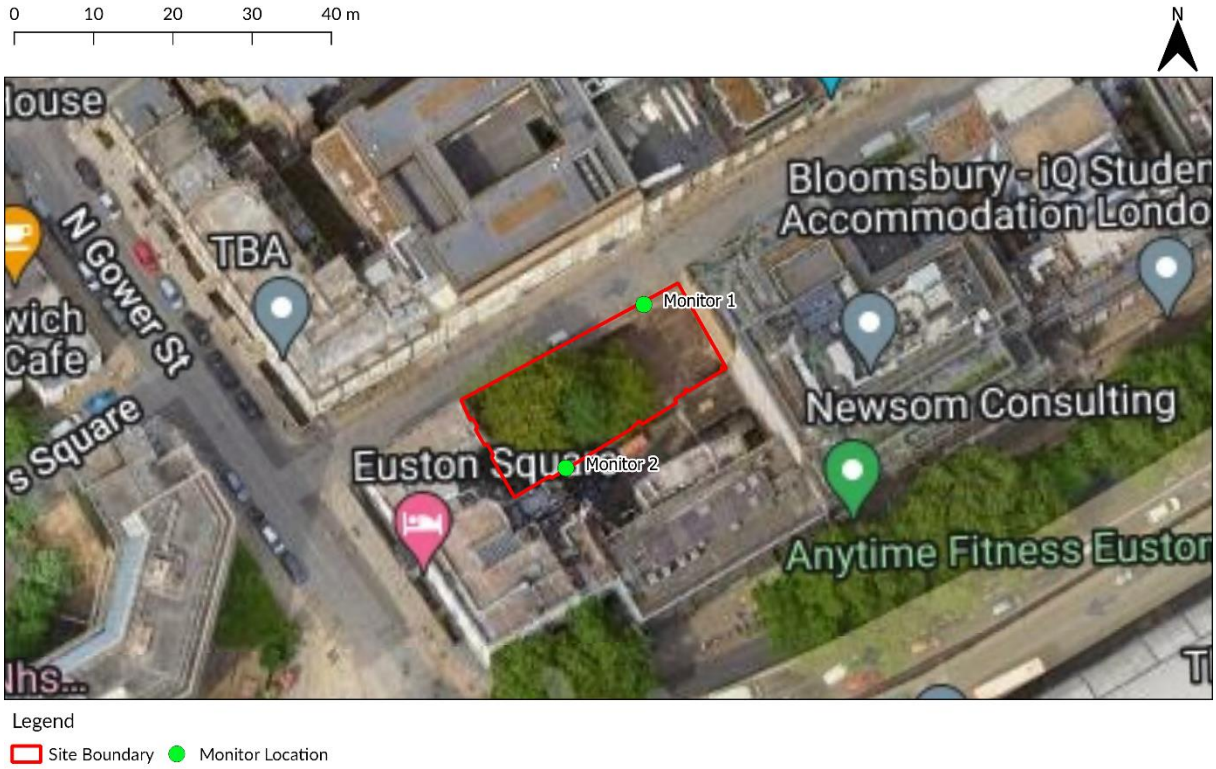


Figure 2: Locations of the EarthSense Zephyrs on the Site. Contains Google Maps Data (2023) [Retrieved 27/09/2023].

2.4 Monitoring Schedule.

The first dust monitor was set up by air quality professionals from Hoare Lea on the 18th of July 2023. This was later moved following permission to affix to the street furniture to its current position on the lamppost on the 31st of July 2023. The second monitor was requested by LBoC and setup on the 9th of August 2023. These monitors will be in place for three months prior to construction works starting on Site. The professional experience of the individuals involved has been detailed in Appendix 1. There should be no need for further visits to the Site during the monitoring period. The EarthSense online portal will be periodically checked to ensure the data is being captured consistently. Monthly reports will be issued to LBoC outlining the monitoring results and any on-site activity for the duration of the preceding monitoring period.

During the construction period, monitoring will need to be continued on Site using the same equipment type and in a similar locations to the baseline survey, provided safe access can be maintained. If a dust monitoring location cannot be retained throughout the development, approval from Camden Council for the proposed relocation will be sought.

2.5 Trigger Levels.

In line with the relevant IAQM guidance[1] and the requirements of the planning condition, trigger levels have been set for monitored PM_{10} concentrations on-site, above which steps must be taken to reduce and minimise the risk of dust-related impacts. Notification of exceedances for these levels will be automatically received by email and the on-site team will be informed. The trigger level is set out in Table 1 and is based on the Site Action Level provided within the most recent IAQM guidance[1]. Following analysis of the baseline data period, amber warning levels may also be determined to assist with providing an early warning system to on-site personnel,

Table 1: Trigger Level for PM_{10}.

Trigger Level	Concentration
Action Level (as a 1-hour average)	190 µg/m^3

3. Monthly Reporting.

In line with the requirements set out by LBoC for dust monitoring on demolition and construction sites[3], monthly reports must be issued to the council and made publicly available throughout the duration of works on-site. These must be accessible online, with details of where to find them advertised to the local community through details presented on the site boundary in public view. These monitoring reports will include:

i) Details of the monitoring equipment;
ii) Site plan of the monitoring location and recent photographs;
iii) PM_{10} trigger levels used;
iv) Summary table of exceedances of the trigger levels;
v) Monthly average PM_{10} concentration;
vi) Time series graphs of PM_{10} concentration;
vii) Valid data capture percentages for the monitors;
viii) Details of works being undertaken on-site; and
ix) Dust mitigation measures implemented on-site.

These monthly reports will be produced each month throughout the monitoring period, including the baseline period.

4. Summary.

This note details the methodology for the pre-construction dust monitoring for the land fronting Stephenson Way, NW1 2HD.

Monitoring will take place for three months prior to construction activities taking place on the Site. This monitoring will be conducted using two EarthSense Zephyrs set up in appropriate locations by air quality professionals, in line with guidance from the GLA and the IAQM. Monthly reports of the monitoring data and on-site activity will be submitted to LBoC for the duration of the monitoring period.

This will partially satisfy the Condition 11 as described in the Decision Notice published by LBoC. Monitoring must continue for the duration of construction activities on Site for Condition 11 to be fully discharged.

Appendix 1 – Professional Experience.

Chris Rush (Hoare Lea), BSc (Hons), MSc, PG Dip Acoustics, CEnv, MIOA, MIEMA, MIEnvSc, MIAQM

Chris is an Associate Director Air Quality Consultant with Hoare Lea. He is a Chartered Environmentalist, a Member of the Institute of Acoustics, a Full Member of the Institute of Environmental Management and Assessment, a Member of the Institution of Environmental Sciences and a Full Member of the Institute of Air Quality Management (IAQM).

He has a diverse portfolio of experience and has worked on a range of projects from initial site feasibility, through planning and development to construction and operation. Chris's expertise covers planning, noise and air quality, specifically in relation to residential developments, industrial fixed installations such as waste management centres and transportation environmental impact on developments including air traffic. Chris is involved in the testing and assessment of the impact of indoor air quality and how building design contributes to this. He also is a member of Chartered Institute of Building Services Engineers (CIBSE) Air Quality Working Group and a committee member of the IAQM.

Lauren Buchanan (Hoare Lea), MSc, BSc (Hons), AMIEnvSc, MIAQM

Lauren is a Principal Air Quality Consultant at Hoare Lea. She is an Associate Member of the Institution of Environmental Sciences and a Member of the Institute of Air Quality Management. She has worked on a range of projects gaining experience in many different aspects of air quality assessment, including monitoring and detailed dispersion modelling of dust, odour, roads and industrial emissions for a variety of sectors and to fulfil Local Air Quality Management (LAQM) duties on behalf of Local Authorities. Lauren has undertaken air quality assessments for permit requirements and planning applications, including stand-alone reports, Environmental Impact Assessments, Habitats Regulations Assessments and Development Consent Orders.

Phoebe Stockton (Hoare Lea), MSc, BSc (Hons), AMIAQM

Phoebe is an Air Quality Consultant at Hoare Lea, with 4 years' experience in air quality consultancy. She holds an MSc in Environmental Engineering from Newcastle University. Phoebe has worked on a range of projects across the public and private sector, including experience in undertaking borough-wide air quality dispersion modelling exercises to inform Local Plans on behalf of Local Authorities. She has provided air quality consultancy support for a variety of different project types both to inform the design and to accompany planning applications through production of Air Quality Assessments. She also has extensive experience with siting and deploying air quality monitoring equipment. Phoebe's interests lie in the effects that pollution has on human health and wellbeing.

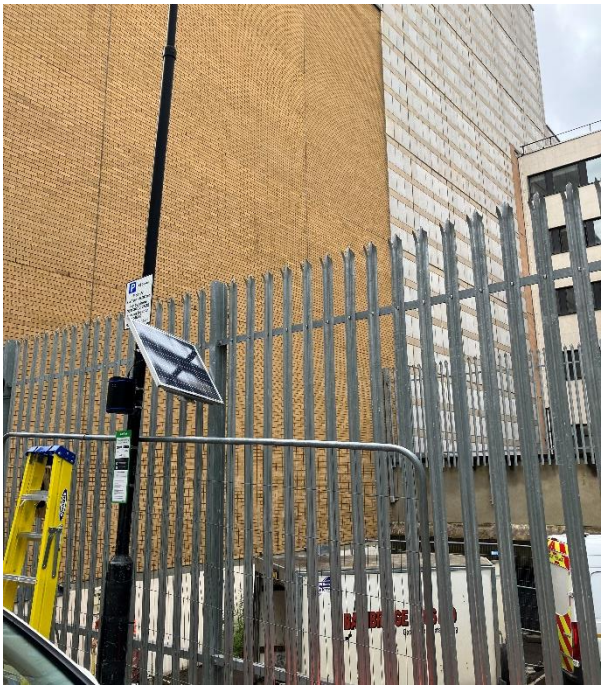
Alex Johnson (Hoare Lea), MSc, BSc (Hons), AMIAQM

Alex is a Graduate Air Quality Consultant with Hoare Lea. He graduated from the University of Southampton with a master's degree in Environmental Pollution Control. Alex's research project focused on how air quality had changed in urban environments throughout the COVID-19 pandemic in order to further our understanding of how different activities influence pollution levels.

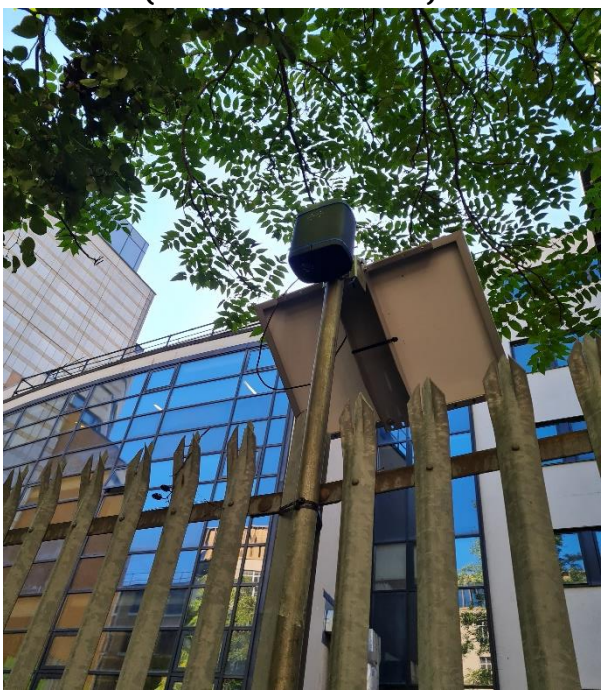
He has completed several air quality assessments, indoor air quality plans and technical reports for clients across various sectors already at Hoare Lea. Previously, he has also worked on several projects for Natural England, Defra and the Environment Agency to provide geospatial data analysis and research assistance.

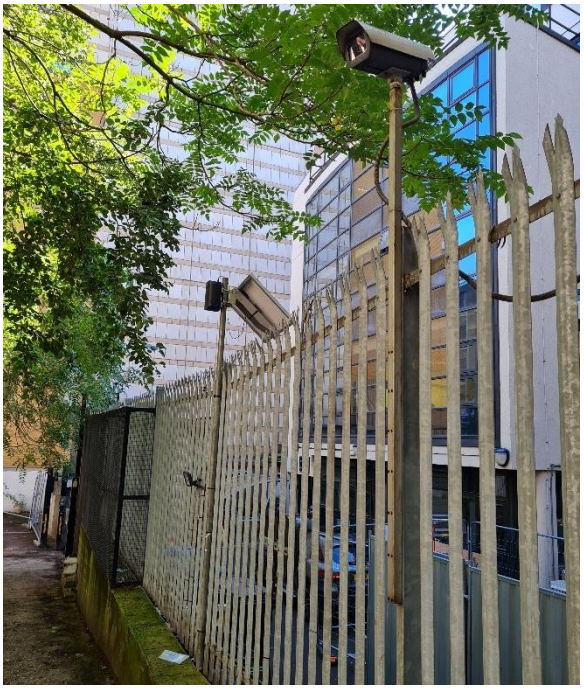
Appendix 2 – Photographs of the Installed Monitors

Monitor 1

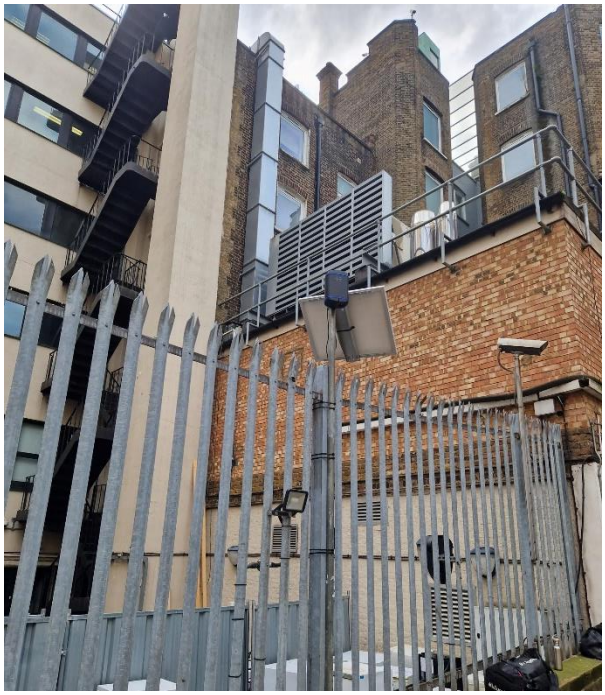


Monitor 2 (Before tree removal)





Monitor 2 (After tree removal)



Appendix 3 – Zephyr Air Quality Monitor – Specification Sheet

Zephyr® Air Quality Monitor
Specification Sheet

MADE IN BRITAIN

EARTHSENSE

Key

[a] - accuracy may be diminished where Zephyrs are exposed to direct sunlight

[b] - lowest tested concentrations are background

[c] - estimates of range are based on the theoretical limits of the electronics

Mechanical		
Size	235mm (h) x 160mm (w) x 114mm (d)	
Weight	1750g - 2000g (dependent on cartridge)	
Operating Parameters	Operating Range: -20°C to +45°C ambient. Relative Humidity range: 15 - 85% continuous* *prolonged exposure outside of this range may irreparably damage the gas sensors.	
Construction	Extruded aluminium body, hard anodised with ASA-PC end mouldings. Stainless steel mounting brackets for 80-140mm diameter poles.	
Electrical		
Power Inputs	12-32V DC (~13.8V for cars and LCV, ~27.6V for HGV) or solar powered applications (~18-20V)	
IP Rated Zephyr® Monitor	IP64	
IP Rated Power Supply Unit (Optional)	IP67	
IP Rated Power Supply Unit (Indoor use only)	IP2X	
Solar Panel (Optional)	50WP output Bracket, mount and straps included Dimensions: 530mm (h) x 670mm (w) x 25mm (d) Weight: 5.5kg	
Power Draw	Max: 19W at 19V Nominal: ~ 0.2W at 19V Elexon charge code: 8300003002100* *Standard cartridge confirguration only	
Internal Battery	Li-Ion ~55 Whr. Charged by MPPT battery charging controller to maximise solar panel output. Increase battery capacity option available	
Battery Run Time	Normal mode: 3 days, 17 hours* *with 1 standard cartridge	Low Power/Winter Mode: 7 days, 18 hours* *with a standard cartridge

Cartridge Options - *all Zephyrs come with a cartridge based system that uses active sampling*					
Measure	Standard Cartridge	Standard + Cartridge	Enhanced Cartridge	Enhanced + Cartridge	Enhanced ++ Cartridge
Nitrogen dioxide (NO_2)	•		•	•	•
Nitric oxide (NO)	•		•	•	•
Ozone (O_3)	•		•	•	•
Particulate Matter (PM_1)	•		•	•	•
Particulate Matter ($PM_{2.5}$)	•		•	•	•
Particulate Matter (PM_{10})	•		•	•	•
Carbon monoxide (CO)			•	•	•
Sulphur dioxide (SO_2)			•	•	•
Hydrogen sulphide (H_2S)			•	•	•
Carbon dioxide (CO_2) (optional)		•		•	•
Total Organic Volatile Compounds (TVOCs) (optional)		•			•
Pressure	•		•	•	•
Temperature	•		•	•	•
Relative Humidity	•		•	•	•

Estimated Accuracy, Range and Limits of Detection						
Measure	Estimated Accuracy		Range		Limits of Detection	
	µg/m³ | mg/m³	ppb | ppm	µg/m³ | mg/m³	ppb | ppm	µg/m³ | mg/m³	ppb | ppm
Nitrogen dioxide (NO_2)	10 µg/m³	5.2 ppbV	0 - 20,000 µg/m³ [c]	0 - 10,000 ppbV [c]	1.5 µg/m³	0.78 ppbV
Nitric oxide (NO)	10 µg/m³	8 ppbV	0 - 6,000 µg/m³ [c]	0 - 5,000 ppbV [c]	1.5 µg/m³	1.20 ppbV
Ozone (O_3)	15 µg/m³	7.5 ppbV	0 - 15,000 µg/m³ [c]	0 - 7,500 ppbV [c]	1.5 µg/m³	0.75 ppbV
Particulate Matter (PM_1)	5 µg/m³		0 - 20,000 µg/m³ [c]		0.2 µg/m³	
Particulate Matter ($PM_{2.5}$)	5 µg/m³		0 - 20,000 µg/m³ [c]		1.3 µg/m³	
Particulate Matter (PM_{10})	5 µg/m³		0 - 20,000 µg/m³ [c]		1.4 µg/m³	
Carbon monoxide (CO)	0.3 mg/m³	0.3 ppmV	0 - 40 mg/m³ [c]	0 - 35 ppmV [c]	0.03 mg/m³	0.02 ppmV
Sulphur dioxide (SO_2)	20 µg/m³	7.6 ppbV	0 - 6,500 µg/m³ [c]	0 - 2,500 ppbV [c]	1.5 µg/m³	0.57 ppbV
Hydrogen sulphide (H_2S)	5 µg/m³	3.6 ppbV	0 - 1,500 µg/m³ [c]	0 - 1,000 ppbV [c]	1.5 µg/m³	1.08 ppbV
Carbon dioxide (CO_2) (optional)	30 ppmV		0 - 5,000 ppm		-	
Total Organic Volatile Compounds (TVOCs) (optional)	-		0 - 15,000 ppbV [c]		1 ppbV	
Pressure	1.2 hPa		300 - 1,100 hPa		-	
Temperature	5°C [a]		-20°C - 45°C ambient		-	
Relative Humidity	5% [a]		15 - 85% continuous* *prolonged exposure outside of this range may irreparably damage the gas sensors.		-	

Location Sensing	
High Sensitivity GNSS	GPS, GLONASS, Galileo and Beidou module with internal active antenna.
Internal Storage	
16GB SD Card	Sufficient for 32 million measurement sets.
Data Handling	
Web Services Infrastructure	Data infrastructure is hosted in the cloud to give high service availability, resilience. and regional selection
Communication Technologies	Wi-Fi (802.11 b/g/n 2.4GHz) Bluetooth (2.4GHz v4.2 BR/EDR + BLE compliant) GSM 2G 4G (NB-IoT and LTE Cat-M1)* RS232*, RS485* *Optional

Data Access	
MyAir® Web App	View and download data via a URL link to the MyAir web app. MyAir functionality includes: - Mapped Zephyr® locations - Data charting and download via KML or CSV - Additonal data overlays including global MappAir and 3rd party data - Satellite, AURN and Air Quality Management Area map overlays - Source apportionment - Historic and forecast data Our server via the customer username & password will hold collected Zephyr® data until the of the subscription.
Zephyr® API	Data can be integrated into existing systems such as traffic management, environmental reports and GIS.

MyAir® web app showing mapped Zephyr® locations with MappAir® modelling.

Default Sensing Programme		
	Normal Mode	Low Power/Winter Mode
Sample Rate:*	10 seconds	1 minute
Upload Rate:*	15 minutes	60 minutes
*for standard cartridge. Custom modes can be configured		

Data Integrations	
Stratos Traffic Management System	Compatible with Yunex Traffic (formerly Siemens Mobility) traffic management system
MindSphere	Integrated with Siemens MindSphere Industrial IoT Solution
Third Party Device Integrations	
RS232 / RS485	Zephyr® input power can be passed through to the connector (9-30V) to supply the auxilliary hardware with up to 1A. We are able to configure data connections for a wide range of additional hardware, please contact us if your proposed device is not listed below.
Other Sensor Providers that Work with the Zephyr®	Gill MaxiMet range - GMX100, 101, 200, 240, 300, 301, 400, 500, 501, 531, 541, 550, 551 and 600. Any other integrations are available upon application.
Warranty	
Warranty	Full warranty on manufacturer faults