

**TLW**

**105 Judd Street, London, WC1H 9RN**

# **Air Quality Dust Monitoring - Proposed Monitoring & Reporting Methodology**

**25<sup>th</sup> April 2023**  
**784-B030322**

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**PRESENTED TO**

**TLW**

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## DOCUMENT CONTROL

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1	11 <sup>th</sup> April 2023	First Issue
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3	25 <sup>th</sup> April 2023	Third Issue

## 1.0 OVERVIEW

This document has been prepared to discharge Condition 7a of planning permission ref. 2022/1817/P.

### **Description of development (ref. 2022/1817/P)**

Erection of roof extensions at third, fourth and fifth floor level with rooftop plant in connection with the continued commercial use of the building (Class E) with associated external alterations to all elevations, public realm improvements; roof terraces at levels three, four and five, provision of cycle parking, waste/recycling storage and other services.

### **Condition 7 (Air Quality Monitoring)**

Air quality monitoring shall be implemented on site. No development shall take place until:

- a. prior to installing monitors, 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;
- b. prior to commencement, evidence has been submitted demonstrating that the monitors have been in place for at least 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.

### **Overview of Monitoring**

Tetra Tech propose to install two unattended small sensor particulate monitors on the boundary of the site near to the closest sensitive receptors to the site.

Particulate matter monitoring will be undertaken during a 3-month baseline period prior to demolition and construction works commencing, to comply with pre-commencement condition 7b relating to planning permission ref: 2022/1817/P and London Borough of Camden: '*Requirements for real-time dust monitoring on demolition and construction sites April 2021*'.

Monitoring will then be undertaken during the demolition and construction periods to comply with Greater London Authority '*Control of Dust and Emissions: During Construction and Demolition: Supplementary Planning Guidance*', as the site has been assessed as 'medium risk' impact of dust emissions during the demolition phase.

The Air Quality Assessment (ref: 784-B030322, dated: 4<sup>th</sup> March 2022) submitted as part of the application pack (ref: 2022/1817/P) determined that the application site is 'medium' risk during the demolition phase of the development, and 'low' risk for the construction phase.

## 2.0 MONITORING EQUIPMENT SPECIFICATION/ SET-UP

Two EarthSense Zephyr monitors will be installed on-site using 110-volt power or solar panels. EarthSense Zephyrs are compliant with the 'Performance Standards for Indicative Ambient Particulate Monitors'.

Monitors will be set-up as free-field as possible and will be serviced regularly by a Tetra Tech technician on-site. Monitors will have clearly identifiable Tetra Tech contact labels attached.

The monitors will measure PM<sub>10</sub> and PM<sub>2.5</sub> in real-time continuously throughout the duration of the monitoring period.

**Figure 2.1 Typical Zephyr set-up photo**



Data will be measured in 15-minute intervals and will be downloaded on a weekly basis (or at greater frequency if needed due to triggers levels being exceeded).

### 3.0 MONITORING LOCATIONS

The monitors will be installed adjacent to the nearest sensitive receptors to the site. It is proposed that one monitor is installed at the southeast corner of the site bordering sensitive residential receptors at 103 Judd Street (to also be representative of businesses and other residential receptors on Judd Street). Another monitor is proposed to be installed at the northwest corner of the site opposite sensitive residential receptors at Sinclair House (to also be representative of other residential flats and businesses on Thanet Street and Hastings Street). A proposed monitoring location plan is presented below.

**Figure 3.1 Proposed Particulate Matter Monitoring Location Plan**



During the 3-month baseline monitoring period prior to demolition and construction works commencing the monitors will be set-up on bracketry on the façade of existing site building by the proposed monitoring location marker. During the demolition phase the monitors will be relocated onto the nearest available hoarding/boundary fence by the proposed monitoring location marker. The locations are considered worst-case positions for dust emissions at the site relative to the activities undertaken on site and the sensitive receptors around the site. The equipment will be positioned so that it does not interfere with any pedestrian or vehicular access.

Photo locations of the proposed monitoring locations are presented in the figures below.



**Figure 3.2 Proposed southeast monitoring location**



**Figure 3.3 Proposed northwest monitoring location**



## 4.0 TRIGGER LEVELS

The IAQM ‘Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites’ (2018) guidance outlines the onsite action levels for PM<sub>10</sub>. The action levels for this site are set at a PM<sub>10</sub> concentration of over 250 µg/m<sup>3</sup> for a 15-minute period, a PM<sub>10</sub> concentration of over 190 µg/m<sup>3</sup> for a 1-hour period, and a PM<sub>2.5</sub> concentration of over 48 µg/m<sup>3</sup> for a 15-minute period.

A traffic light approach based on sections 4.41 of the IAQM document ‘Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites’ (2018) is considered appropriate and is proposed in Table 4.1 below. Given the proximity of nearby receptors and the possibility for exposure to PM<sub>10</sub> the following criteria is proposed.

### 15 Minute Monitoring Criteria

**Table 4.1 PM<sub>10</sub> Level Criteria – Levels at Boundary**

Alert level	Time Period	Maximum Permissible 15-minute average (µg/m <sup>3</sup> )
<b>Red</b> (at this level all works to cease immediately, investigate cause of exceedance and use alternative methods where appropriate)	15-minute average	>250 µg/m <sup>3</sup>
<b>Amber</b> (continual monitoring and investigation of alternative methods where appropriate)	Two consecutive 15-minute averages	>150 µg/m <sup>3</sup>
<b>Green</b> (early warning/no action required)	15-minute average	>150 µg/m <sup>3</sup>

The below criteria is proposed for PM<sub>2.5</sub> levels at the boundary of the site.

**Table 4.2 PM<sub>2.5</sub> Level Criteria – Levels at Boundary**

Monitoring Levels	Time Period	PM <sub>2.5</sub> exceedance limits at monitoring locations
<b>Red</b> (at this level all works to cease immediately, investigate cause of exceedance and use alternative methods)	15-minute average	>48 µg/m <sup>3</sup>
<b>Amber</b> (continual monitoring and investigation of alternative methods where appropriate)	Two consecutive 15-minute averages	>38 µg/m <sup>3</sup>
<b>Green</b> (no action required)	15-minute average	>38 µg/m <sup>3</sup>

### 1hr Monitoring Criteria

In addition to the above detailed 15-minute traffic light criteria, TetraTech have undertaken works to devise a 1-hour average of particulate matter on site, as recommended by the document published by the London Borough of Camden, ‘Requirements for real-time dust monitoring on demolition and construction sites’ (updated April 2021). A traffic light system will be used to classify 1-hourly-averages, as per the table below.

**Table 4.3 One-Hour PM<sub>10</sub> Level Criteria – Levels at Boundary**

Alert level	Time Period	Maximum Permissible 15-minute average (µg/m <sup>3</sup> )
<b>Red</b> ( <i>at this level all works to cease immediately, investigate cause of exceedance and use alternative methods where appropriate</i> )	1-hour average	>190 µg/m <sup>3</sup>
<b>Amber</b> ( <i>continual monitoring and investigation of alternative methods where appropriate</i> )	Two consecutive 1-hour averages	>80 µg/m <sup>3</sup>
<b>Green</b> ( <i>early warning/no action required</i> )	1-hour average	>80 µg/m <sup>3</sup>

### 24hr Monitoring Criteria

Tetra Tech have devised an additional 24-hour criterion to determine whether particulate matter onsite is being distributed in the same pattern as particulate matter monitored at the nearest urban background site. This criterion is non-statutory and has been devised to be utilised as a general guide to inform overall dust management at the site by identifying peak episodes with regards to particulate matter.

**Table 4.4 24-hour Traffic Light Criteria**

Alert level	Time Period	Percentage Difference from Monitored Background Concentration (%)
<b>Red</b>	24-hours	>+100
<b>Amber</b>	24-hours	+50 to +100
<b>Green</b>	24-hours	< +50



## 5.0 RESPONSE PROTOCOL

Automatic alerts will be sent through to Tera Tech staff in real-time when designated boundary particulate matter trigger levels are breached or near to exceedance. Tetra Tech staff will immediately remotely analyse air quality data and inform the site manager of the situation to gather more details. Mitigation will be advised in real-time to reduce dust emissions and bring the air quality level to an acceptable level. Alerts can be set-up to be sent to site representatives if required.

## 6.0 REPORTING

Results will be reported with reference to site boundary limits and red, amber, green traffic light criteria.

Reports will be issued on a monthly basis. Elements to be reported include the following:

- Monitoring equipment specifications and serial numbers.
- Monitoring location plan.
- Site photographs.
- Exceedance details and response taken.
- Month average PM<sub>10</sub> and PM<sub>2.5</sub> concentrations.
- Daily average PM<sub>10</sub> and PM<sub>2.5</sub> concentrations.
- Time History Graphs of PM<sub>10</sub>.
- Data Capture details.
- Descriptions of works being undertaken on site.
- Dust Mitigation measured used.

## APPENDIX 1- EARTHSENSE ZEPHYR SPECIFICATION

# Zephyr® Air Quality Monitor

## Specification Sheet



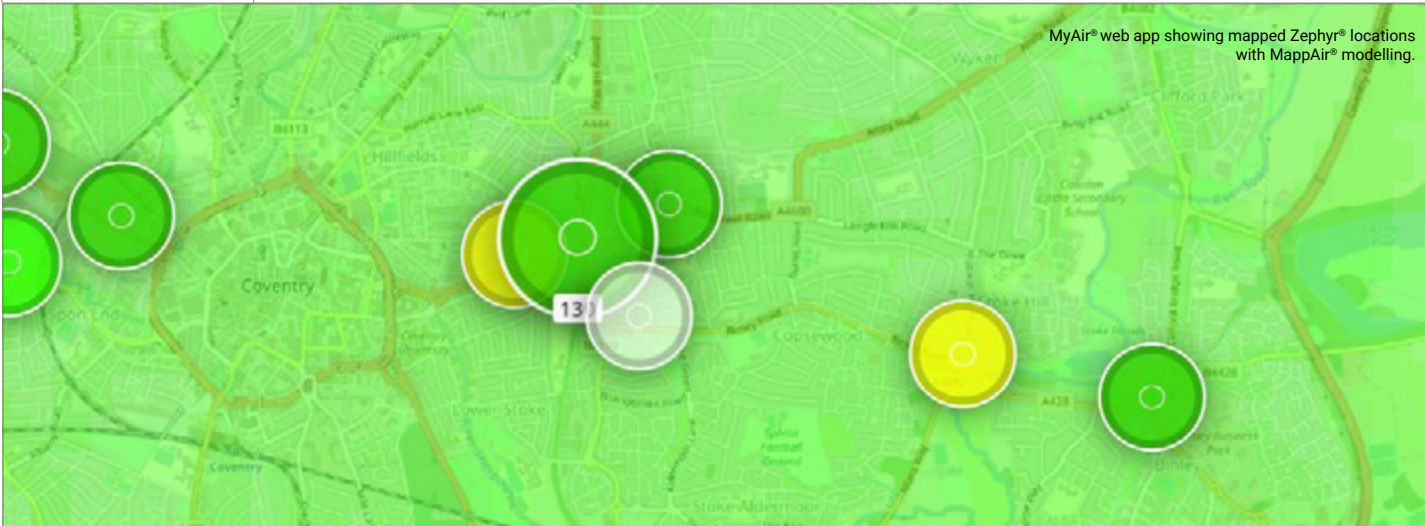
### Key

- <sup>a</sup> - accuracy may be diminished where Zephyrs are exposed to direct sunlight
- <sup>b</sup> - lowest tested concentrations are background
- <sup>c</sup> - 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 Elxon charge code: 8300003002100* *Standard cartridge configuration 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 <sub>2</sub> )	•		•	•	•	
Nitric oxide (NO)	•		•	•	•	
Ozone (O <sub>3</sub> )	•		•	•	•	
Particulate Matter (PM <sub>1</sub> )	•		•	•	•	
Particulate Matter (PM <sub>2.5</sub> )	•		•	•	•	
Particulate Matter (PM <sub>10</sub> )	•		•	•	•	
Carbon monoxide (CO)			•	•	•	
Sulphur dioxide (SO <sub>2</sub> )			•	•	•	
Hydrogen sulphide (H <sub>2</sub> S)			•	•	•	
Carbon dioxide (CO <sub>2</sub> ) (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 <sub>2</sub> )	10 µg/m³	5.2 ppbV	0 - 20,000 µg/m³ <sup>c</sup>	0 - 10,000 ppbV <sup>c</sup>	1.5 µg/m³	0.78 ppbV
Nitric oxide (NO)	10 µg/m³	8 ppbV	0 - 6,000 µg/m³ <sup>c</sup>	0 - 5,000 ppbV <sup>c</sup>	1.5 µg/m³	1.20 ppbV
Ozone (O <sub>3</sub> )	15 µg/m³	7.5 ppbV	0 - 15,000 µg/m³ <sup>c</sup>	0 - 7,500 ppbV <sup>c</sup>	1.5 µg/m³	0.75 ppbV
Particulate Matter (PM <sub>1</sub> )	5 µg/m³		0 - 20,000 µg/m³ <sup>c</sup>		0.2 µg/m³	
Particulate Matter (PM <sub>2.5</sub> )	5 µg/m³		0 - 20,000 µg/m³ <sup>c</sup>		1.3 µg/m³	
Particulate Matter (PM <sub>10</sub> )	5 µg/m³		0 - 20,000 µg/m³ <sup>c</sup>		1.4 µg/m³	
Carbon monoxide (CO)	0.3 mg/m³	0.3 ppmV	0 - 40 mg/m³ <sup>c</sup>	0 - 35 ppmV <sup>c</sup>	0.03 mg/m³	0.02 ppmV
Sulphur dioxide (SO <sub>2</sub> )	20 µg/m³	7.6 ppbV	0 - 6,500 µg/m³ <sup>c</sup>	0 - 2,500 ppbV <sup>c</sup>	1.5 µg/m³	0.57 ppbV
Hydrogen sulphide (H <sub>2</sub> S)	5 µg/m³	3.6 ppbV	0 - 1,500 µg/m³ <sup>c</sup>	0 - 1,000 ppbV <sup>c</sup>	1.5 µg/m³	1.08 ppbV
Carbon dioxide (CO <sub>2</sub> ) (optional)	30 ppmV		0 - 5,000 ppm		-	
Total Organic Volatile Compounds (TVOCs) (optional)	-		0 - 15,000 ppbV <sup>c</sup>		1 ppbV	
Pressure	1.2 hPa		300 - 1,100 hPa		-	
Temperature	5°C <sup>a</sup>		-20°C - 45°C ambient		-	
Relative Humidity	5% <sup>a</sup>		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	<p>View and download data via a URL link to the MyAir web app.</p> <p>MyAir functionality includes:</p> <ul style="list-style-type: none"><li>- Mapped Zephyr® locations</li><li>- Data charting and download via KML or CSV</li><li>- Additional data overlays including global MappAir and 3<sup>rd</sup> party data</li><li>- Satellite, AURN and Air Quality Management Area map overlays</li><li>- Source apportionment</li><li>- Historic and forecast data</li></ul> <p>Our server via the customer username &amp; password will hold collected Zephyr® data until the of the subscription.</p>	
Zephyr® API	Data can be integrated into existing systems such as traffic management, environmental reports and GIS.	
<div></div> <p>MyAir® web app showing mapped Zephyr® locations with MappAir® modelling.</p>		
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 <a href="#">Yunex Traffic</a> (formerly Siemens Mobility) traffic management system	
MindSphere	Integrated with <a href="#">Siemens MindSphere</a> 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	