



AIRBORNE DUST MONITORING AT, SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

CLIENT REFERENCE: -

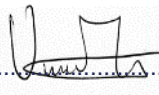
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CONDITIONS OF ISSUE OF REPORTS.

THIS REPORT IS ISSUED IN CONFIDENCE AND SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT WRITTEN APPROVAL FROM 4-RAIL SERVICES.

FURTHER INFORMATION.

REQUESTS FOR ADDITIONAL INFORMATION ON THE SUBJECT OF THIS REPORT OR OTHER QUERIES SHOULD BE ADDRESSED TO THE AUTHOR.

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1. INTRODUCTION

- 1.1. 4-RAIL Services limited were requested by the client, Claude Snowdon, Noise, Vibration and Air Quality Lead, London Underground, to undertake dust monitoring at London Underground train stations.
- 1.2. The scope of works in based on ES12102, The Specification - London Underground Network: Occupational exposure to dust monitoring and survey. In addition, the client requested monitoring at two DLR train stations.
- 1.3. The objectives listed in ES12102 for the station monitoring are the following:
 - To establish work shift exposures to respirable dust for station staff;
 - To measure the respirable dust levels at the platforms and gate lines of the sample group of stations;
 - To replicate each static monitoring measurement with PM2.5 and PM10 aerodynamic diameter fractions;
 - To analyse 24 samples in inhalable fraction from the sample group of stations for their metallic content.

2. SAMPLING STRATEGY

- 2.1. The following stations and sample locations were monitored based on the client request and previous monitoring:

STATION	No. SAMPLES	LOCATIONS
Aldgate East	4	Gate line/ticket hall Outside station supervisor's office Platform 1 (District line) Platform 2 (District line)
Baker Street	8	Gate line/ticket hall Top of escalators Platform 5 (Circle, Hammersmith & City, Metropolitan line) Platform 6 (Circle, Hammersmith & City, Metropolitan line) Platform 7 (Jubilee line) Platform 8 (Bakerloo line) Platform 9 (Bakerloo line) Platform 10 (Jubilee line)
Bank	8	Central line ticket hall Northern line ticket hall Platform 3 (Northern line) Platform 4 (Northern line) Platform 5 (Central line) Platform 6 (Central line) Platforms 9 (DLR) Platform 10 (DLR)
Canada Water	4	Gate line/ticket hall, Outside station supervisor's office Platform 1 (Jubilee line) Platform 2 (Jubilee line)
Colliers Wood	4	Gate line/ticket hall Outside station supervisor's office Platform 1 (Jubilee line) Platform 2 (Jubilee line)
Cutty Sark	4	Gate line/ticket hall Outside station supervisor's office Platform 1 (DLR) Platform 2 (DLR)
Elephant & Castle	7	Northern line ticket hall/gate line Bakerloo line ticket hall/gate line Outside station supervisor's office Platform 1 (Northern line) Platform 2 (Northern line) Platform 3 (Bakerloo line) Platform 4 (Bakerloo line)

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STATION	No. SAMPLES	LOCATIONS
Embankment	6	Gate line/ticket hall Outside station supervisor's office Platform 3 (Northern line) Platform 4 (Northern line) Platform 5 (Bakerloo line) Platform 6 (Bakerloo line)
Euston Square	5	Gate line (A) – north side Gate line (B) – south side Outside station supervisor's office Platform 1 (Circle, Hammersmith & City, Metropolitan line) Platform 2 (Circle, Hammersmith & City, Metropolitan line)
Hampstead	4	Gate line/ticket hall – High street entrance Outside station supervisor's office Platform 1 (Northern line) Platform 2 (Northern line)
Highbury & Islington	4	Gate line/ticket hall Outside station supervisor's office Platform 3 (Victoria line) Platform 5 (Victoria line)
Holborn	6	Gate line/ticket hall Outside station supervisor's office Platform 1 (Central line) Platform 2 (Central line) Platform 3 (Piccadilly line) Platform 4 (Piccadilly line)
Kennington	6	Gate line/ticket hall Outside station supervisor's office Platform 1 (Northern line, via Charing Cross) Platform 2 (Northern line) Platform 3 (Northern line, via Bank) Platform 4 (Northern line)
Kings Cross	11	Circle line gate line/ticket hall Main ticket hall Outside station supervisor's office Platform 1 (Circle, Hammersmith & City, Metropolitan line) Platform 2 (Circle, Hammersmith & City, Metropolitan line) Platform 3 (Victoria line) Platform 4 (Victoria line) Platform 5 (Piccadilly line) Platform 6 (Piccadilly line) Platform 7 (Northern line) Platform 8 (Northern line)
London Bridge	6	Gate line/ticket hall Outside station supervisor's office Platform 1 (Northern line) Platform 2 (Northern line) Platform 3 (Jubilee line) Platform 4 (Jubilee line)
Mile End	6	Gate line/ticket hall Outside station supervisor's office Platform 1 (Central line) Platform 2 (District and Hammersmith & City line) Platform 3 (District and Hammersmith & City line) Platform 4 (Central line)
Moorgate	6	Gate line/ticket hall Outside station supervisor's office Platform 1 (Circle, Hammersmith & City and Metropolitan line) Platform 2 (Circle, Hammersmith & City and Metropolitan line) Platform 7 (Northern line) Platform 8 (Northern line)

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STATION	No. SAMPLES	LOCATIONS
Oxford Circus	8	Ticket hall Outside station supervisor's office Platform 1 (Central line) Platform 2 (Central line) Platform 3 (Bakerloo line) Platform 4 (Bakerloo line) Platform 5 (Victoria line) Platform 6 (Victoria line)
Paddington	6	Bakerloo line gate line Circle and District line gate line Outside station supervisor's office Platform 2 (Circle and District line) Platform 3 (Bakerloo line) Platform 4 (Bakerloo line)
Piccadilly Circus	6	Piccadilly line gate line Outside station supervisor's office Platform 1 (Bakerloo line) Platform 2 (Bakerloo line)) Platform 3 (Piccadilly line) Platform 4 (Piccadilly line)
Tooting Bec	4	Gate line/ticket hall Outside station supervisor's office Platform 1 (Northern line) Platform 2 (Northern line)
Tottenham Court Road	6	Gate line/ticket hall Outside station supervisor's office Platform 1 (Central line) Platform 2 (Central line) Platform 3 (Northern line) Platform 4 (Northern line)
Vauxhall	4	Gate line/ticket hall Outside station supervisor's office Platform 1 (Victoria line) Platform 2 (Victoria line)
Waterloo	8	Gate line/ticket hall Outside station supervisor's office Platform 1 (Northern line) Platform 2 (Northern line) Platform 3 (Bakerloo line) Platform 4 (Bakerloo line) Platform 5 (Jubilee line) Platform 6 (Jubilee line)
Westminster	6	Gate line/ticket hall Outside station supervisor's office Platform 1 (Circle and District line) Platform 2 (Circle and District line) Platform 3 (Jubilee line) Platform 4 (Jubilee line)

2.2. The following analysis was undertaken for the above locations:

PARAMETER	SAMPLE MEDIA / TECHNIQUE	LOCATIONS	ANALYSIS
Respirable Dust	Active sampling pumps with PVC filters and Cyclone sampling heads. Monitoring undertaken in line with MDHS 14/4. Sampling flowrate 2.2L/min	Each location	In-house gravimetric analysis accredited to UKAS ISO17025.
Inhalable Dust	Active sampling pumps with of PVC filters and IOM inhalable sampling heads. Monitoring undertaken in line with MDHS 14/4. Sampling flowrate 2.0L/min	One selected platform	In-house gravimetric analysis accredited to UKAS ISO17025.

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PARAMETER	SAMPLE MEDIA / TECHNIQUE	LOCATIONS	ANALYSIS
PM2.5	Active sampling pumps with of PVC filters and SKC PEM PM2.5 impactor sampling heads. Sampling flowrate 2.0L/min	Each location	In-house gravimetric Analysis
PM10	Active sampling pumps with of PVC filters and SKC PEM PM10 impactor sampling heads. Sampling flowrate 2.0L/min	Each location	In-house gravimetric Analysis
Metals	ICP-MS analysis for aluminium*, arsenic, chromium, copper, iron oxide, nickel, manganese and zinc, Ultraviolet spectroscopy for chromium VI	Inhalable dust sample	Subcontracted analysis to Institute of Occupational Medicine (IOM), UKAS lab. No. 0307. *non-accredited

3. HAZARD INFORMATION, EXPOSURE LIMITS & GUIDELINE VALUES

3.1. Control of Substances Hazardous to Health

3.1.1. The Control of Substances Hazardous to Health (COSHH) regulations define substances as hazardous to health as follows:

- a) Substances with harmonised classification in Table 3.2 Part 3 of Annex VI of the CLP regulations which indicate the substance is very toxic, toxic, harmful, corrosive or an irritant;
- b) Substances with a Health and Safety Executive approved workplace exposure limit in EH40/2005;
- c) Which is a biological agent;
- d) Dust of any kind, except dust which is a substance within paragraph (a) or (b) which exceeds the limits given COSHH Regulation 2 for inhalable or respirable dust;
- e) Which, not being a substance falling within sub-paragraphs (a) to (d), because of its chemical or toxicological properties and the way it is used or is present at the workplace creates a risk health.

3.1.2. Where substances which are hazardous to health are present, the COSHH Regulation require employers to prevent or control the exposure to the hazardous substance.

3.1.3. Control is defined as adequate based on the following criteria:

- a) The principles of good practice are applied;
- b) Any WEL is not exceeded;
- c) Exposure to asthmagens, carcinogen and mutagens are reduced to as low as is reasonably practicable.

3.1.4. WELs are British Occupational exposure limits that are designed to protect the health of workers.

3.1.5. WELs are concentrations of a hazardous substance in air, averaged over a period of time. The two time periods generally used in WELs are:

- a) Long term 8-hour Time Weighted Average (8-hr TWA)
- b) 15-minute Short-Term Exposure Limits (15-minute STEL)

3.1.6. HSE document EH40/2005 (Fourth Edition 2020) is a list of workplace exposure limits for use with the Control of Substances Hazardous to Health Regulations 2002.

3.1.7. Note, WELs are applicable to personal samples only. Static samples are for information purposes only.

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3.2. Inhalable Dust

- 3.2.1. Inhalable dust approximates to the fraction of airborne material that enters the nose and mouth during breathing, and is therefore available for deposition anywhere in the respiratory tract. Inhalable dust nominally comprises of dust particles with an aerodynamic diameter of <100µm (EN 481:1993 and ISO 7708:1995).
- 3.2.2. Inhalable dust has a WEL in COSHH 2002 L5 6th Edition, Regulation 2, of 10mg/m³ 8-hour TWA LTEL. Any substance above this limit would be considered a substance hazardous to health.

3.3. Respirable Dust

- 3.3.1. Respirable dust is the fraction of dust that can penetrate down to the deep lung, where gas exchange takes place. Respirable dust will have a nominal aerodynamic diameter of 4µm (EN 481:1993 and ISO 7708:1995). Respirable dust, dependent upon the specific nature, can be linked to fibrosis, scarring of the lung as well as cancer and other health complaints.
- 3.3.2. Respirable dust has a WEL in COSHH 2002 L5 6th Edition, Regulation 2, of 4mg/m³ 8-hour TWA LTEL. Any substance above this limit would be considered a substance hazardous to health.

3.4. Inhalable Metals

- 3.4.1. The table below details the exposure limits for the selected metals, based on the client scope, as detailed within the HSE EH40/2005 WELs:

SUBSTANCE	LONG-TERM EXPOSURE LIMIT (8-HOUR TIME WEIGHTED AVERAGE)
	MG/M ³
Aluminium metal / Aluminium oxides	10
Arsenic and arsenic compounds except arsine (as As)	0.1
Chromium	0.5
Chromium VI compounds (as Cr)	0.01
Copper and compounds: dust and mists (as Cu)	1
Iron Oxide, fume (as Fe)	5.0
Manganese and its inorganic compounds (as Mn)	0.2
Nickel and its inorganic compounds (except nickel tetracarbonyl):nickel and water-insoluble nickel compounds (as Ni)	0.5

- 3.4.2. Zinc does not currently have a limit in HSE EH40/2005.

3.5. Particulate Matter 2.5 and 10

- 3.5.1. Particulate Matter (PM) is a mixture of micrometre sized solid and liquid particulates of various sizes and chemical composition. It is recognised as pollutant with an impact on human health.
- 3.5.2. There are two fractions of particular health interest due to their sizes. These dust fractions are defined by their diameters, with aerosol particulates having a diameter of less than 10µm, known as PM10 and aerosol particulates with a diameter of less than 2.5µm, known as PM2.5. Due to their size differences, PM10 is known as the coarse fraction and PM2.5 is known as the fine fraction.

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- 3.5.3. Exposure to particulate matter and dust can result in a wide range of health effects, predominantly to the respiratory and cardiovascular systems. Susceptibility to health effects can also be influenced by any pre-existing health conditions or age.
- 3.5.4. While particulate matter is known to cause adverse effects to human health, they are not assessed using Workplace Exposure Limits.
- 3.5.5. Sources of PM vary based on location, with the source of PM in urban environments mainly from road traffic. Within the railway environment the particulate matter mainly originates from the train wheel and rail interface, braking activity, but may also be from cementitious sources. Studies to determine concentrations and compositions of the PM_{2.5} within the underground environment have noted that iron oxide is the most predominant at 47% of the overall composition (J.D. Smith et al., 2020).

4. RESULTS

- 4.1. See Tables 1 to 25 for the summary of airborne dust monitoring results.
 - See Table 1 for a summary of the results for Aldgate East;
 - See Table 2 for a summary of the results for Baker Street;
 - See Table 3 for a summary of the results for Bank;
 - See Table 4 for a summary of the results for Canada Water;
 - See Table 5 for a summary of the results for Colliers Wood;
 - See Table 6 for a summary of the results for Cutty Sark;
 - See Table 7 for a summary of the results for Elephant & Castle;
 - See Table 8 for a summary of the results for Embankment;
 - See Table 9 for a summary of the results for Euston Square;
 - See Table 10 for a summary of the results for Hampstead;
 - See Table 11 for a summary of the results for Highbury & Islington;
 - See Table 12 for a summary of the results for Holborn;
 - See Table 13 for a summary of the results for Kennington;
 - See Table 14 for a summary of the results for King's Cross;
 - See Table 15 for a summary of the results for London Bridge;
 - See Table 16 for a summary of the results for Mile End;
 - See Table 17 for a summary of the results for Moorgate;
 - See Table 18 for a summary of the results for Oxford Circus;
 - See Table 19 for a summary of the results for Paddington;
 - See Table 20 for a summary of the results for Piccadilly Circus;
 - See Table 21 for a summary of the results for Tooting Bec;
 - See Table 22 for a summary of the results for Tottenham Court Road;
 - See Table 23 for a summary of the results for Vauxhall;
 - See Table 24 for a summary of the results for Waterloo;
 - See Table 25 for a summary of the results for Westminster.
- 4.2. See Table 26 for a summary of the inhalable metal results.
- 4.3. See Table 27 for a comparison of 2020 and 2023 data.

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5. DISCUSSION

5.1. Site Visit and Sampling

5.1.1. Site attendances were carried out on the following dates:

- Aldgate East station – 24th April 2023
- Canada Water station – 25th April 2023
- Colliers Wood station – 26th April 2023
- Hampstead station – 26th April 2023
- Highbury & Islington station – 28th April 2023
- Tooting Bec station – 2nd May 2023
- Vauxhall station – 3rd May 2023
- Embankment station – 4th May 2023
- Holborn station – 5th May 2023
- Kennington station – 9th May 2023
- London Bridge station – 10th May 2023
- Mile End station – 11th May 2023
- Moorgate station – 12th May 2023
- Paddington station – 15th May 2023
- Piccadilly Circus station – 16th May 2023
- Tottenham Court Road station – 17th May 2023
- Westminster station – 18th May 2023
- King's Cross station – 19th May 2023
- Baker Street station – 22nd May 2023
- Oxford Circus station – 23rd May 2023
- Waterloo station – 24th May 2023
- Elephant & Castle station – 25th May 2023
- Euston Square – 26th May 2023
- Bank station (DLR) – 30th May 2023 (separate attendance needed due to DLR requirements)
- Cutty Sark station – 31st May 2023
- Bank station – 1st June 2023

5.1.2. Personal respirable samples were requested from a suitable station staff member during each attendance, however staff only volunteered at the following locations:

- Aldgate East station – 24th April 2023, personal on Shift No. EN23, Employee No. 9847173
- Hampstead station – 27th April 2023, personal on Duty No. B722
- Vauxhall station – 3rd May 2023, personal on Duty No. DN23
- Mile End station – 11th May 2023, personal on Duty No. 22

5.1.3. Where a personal sample could not be taken, a static sample was taken outside the station supervisor office.

5.1.4. During the site attendance at Banks station on 1st June 2023, the station supervisor requested monitoring was stopped before 4 hours of data was obtained.

5.1.5. Due to equipment failure or significant amounts of anomalous data, reattendances were carried out at the following locations:

- Colliers Wood station, all locations – 5th June 2023
- Westminster station, ticket hall/gate line and Jubilee line platforms only – 6th June 2023
- Kennington station, Northern line platforms only – 7th June 2023

5.2. Aldgate East

5.2.1. The respirable dust concentrations recorded at Aldgate East station were between 0.21mg/m³ and 0.41mg/m³, with the highest concentration recorded on Platform 1, Westbound District/H&C Line.

5.2.2. The PM_{2.5} dust concentrations recorded at Aldgate East station were between 0.05mg/m³ and 0.34mg/m³, with the highest concentration recorded on Platform 1, Westbound District/H&C Line.

5.2.3. The PM₁₀ dust concentrations recorded at Aldgate East station were between 0.74mg/m³ and 4.48mg/m³, however the highest concentration is anomalous based on the other results. If this anomalous result is omitted, then the next highest concentration monitored would be on Platform 1, Westbound District/H&C Line with a concentration of 0.75mg/m³.

5.2.4. The inhalable dust concentration recorded at Aldgate East station Platform 1, Westbound District/H&C Line was 0.72mg/m³.

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5.3. Baker Street

- 5.3.1. The respirable dust concentrations recorded at Baker Street station were between 0.25mg/m³ and 0.88mg/m³, with the highest concentration recorded on Platform 9, Northbound Bakerloo Line.
- 5.3.2. The PM2.5 dust concentrations recorded at Baker Street station were between 0.10mg/m³ and 0.31mg/m³, with the highest concentration recorded on Platform 9, Northbound Bakerloo Line, and Platform 6, Westbound Circle/H&C Line.
- 5.3.3. The PM10 dust concentrations recorded at Baker Street station were between 0.39mg/m³ and 1.06mg/m³, with the highest concentration recorded on Platform 9, Northbound Bakerloo Line.
- 5.3.4. The inhalable dust concentration recorded at Baker Street station Platform 7, Eastbound Jubilee Line was 0.71mg/m³.

5.4. Bank

- 5.4.1. The respirable dust concentrations recorded at Bank station were between 0.28mg/m³ and 1.03mg/m³, with the highest concentration recorded on Platform 4, Northbound Northern Line.
- 5.4.2. The PM2.5 dust concentrations recorded at Bank station were between 0.21mg/m³ and 0.50mg/m³, with the highest concentration recorded on Platform 6, Westbound Central Line.
- 5.4.3. The PM10 dust concentrations recorded at Bank station were between 0.43mg/m³ and 1.42mg/m³, with the highest concentration recorded on Ticket Hall/Gate Line Central Line.
- 5.4.4. The inhalable dust concentration recorded at Bank station Platform 4, Northbound Northern Line was 0.96mg/m³.

5.5. Canada Water

- 5.5.1. The respirable dust concentrations recorded at Canada Water station were between 0.22mg/m³ and 0.55mg/m³, with the highest concentration recorded on Platform 2, Eastbound Jubilee Line.
- 5.5.2. The PM2.5 dust concentrations recorded at Canada Water station were between <0.02mg/m³ and 0.34mg/m³, with the highest concentration recorded on Platform 2, Eastbound Jubilee Line.
- 5.5.3. The PM10 dust concentrations recorded at Canada Water station were between 0.20mg/m³ and 0.73mg/m³, with the highest concentration recorded on Platform 2, Eastbound Jubilee Line.
- 5.5.4. The inhalable dust concentration recorded at Canada Water station Platform 2, Eastbound Jubilee Line was 0.74mg/m³.

5.6. Colliers Wood

- 5.6.1. The respirable dust concentrations recorded at Colliers Wood station were between 0.34mg/m³ and 0.67mg/m³, with the highest concentration recorded on Platform 1, Northbound Northern Line.
- 5.6.2. The PM2.5 dust concentrations recorded at Colliers Wood station were between 0.12mg/m³ and 0.30mg/m³, with the highest concentration recorded on Platform 2, Southbound Northern Line.
- 5.6.3. The PM10 dust concentrations recorded at Colliers Wood station were between 0.33mg/m³ and 0.80mg/m³, with the highest concentration recorded on Platform 2, Southbound Northern Line.
- 5.6.4. The inhalable dust concentration recorded at Colliers Wood station Platform 2, Southbound Northern Line was 0.86mg/m³.

5.7. Cutty Sark

- 5.7.1. The respirable dust concentrations recorded at Cutty Sark station were between 0.10mg/m³ and 0.26mg/m³, with the highest concentration recorded on Platform 2, DLR.
- 5.7.2. The PM2.5 dust concentrations recorded at Cutty Sark station were between 0.02mg/m³ and 0.15mg/m³, with the highest concentration recorded on Platform 2, DLR.
- 5.7.3. The PM10 dust concentrations recorded at Cutty Sark station were between 0.12mg/m³ and 0.55mg/m³, with the highest concentration recorded on Platform 2, DLR.
- 5.7.4. The inhalable dust concentration recorded at Cutty Sark station Platform 1, DLR was 0.49mg/m³.

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5.8. Elephant & Castle

- 5.8.1. The respirable dust concentrations recorded at Elephant & Castle station were between 0.04mg/m³ and 0.64mg/m³, with the highest concentration recorded on Platform 1, Northbound Northern Line.
- 5.8.2. The PM2.5 dust concentrations recorded at Elephant & Castle station were between <0.02mg/m³ and 0.36mg/m³, with the highest concentration recorded on Platform 1, Northbound Northern Line.
- 5.8.3. The PM10 dust concentrations recorded at Elephant & Castle station were between <0.02mg/m³ and 0.83mg/m³, with the highest concentration recorded on Platform 1, Northbound Northern Line.
- 5.8.4. The inhalable dust concentration recorded at Elephant & Castle station Platform 2, Northbound Bakerloo Line was 0.39mg/m³. This result is likely anomalous based on the other results.

5.9. Embankment

- 5.9.1. The respirable dust concentrations recorded at Embankment station were between 0.04mg/m³ and 0.75mg/m³, with the highest concentration recorded on Platform 3, Northbound Northern Line.
- 5.9.2. The PM2.5 dust concentrations recorded at Embankment station were between <0.02mg/m³ and 0.37mg/m³, with the highest concentration recorded on Platform 5, Northbound Bakerloo Line.
- 5.9.3. The PM10 dust concentrations recorded at Embankment station were between <0.02mg/m³ and 0.84mg/m³, with the highest concentration recorded on Platform 5, Northbound Bakerloo Line.
- 5.9.4. The inhalable dust concentration recorded at Embankment station Platform 6, Southbound Bakerloo Line was 1.03mg/m³.

5.10. Euston Square

- 5.10.1. The respirable dust concentrations recorded at Euston Square station were between 0.15mg/m³ and 0.55mg/m³, with the highest concentration recorded on Platform 1, Westbound Circle/H&C/Metropolitan Line.
- 5.10.2. The PM2.5 dust concentrations recorded at Euston Square station were between 0.09mg/m³ and 0.19mg/m³, with the highest concentrations recorded on Platform 2, Eastbound Circle/H&C/Metropolitan Line and Ticket Hall/Gate Line – South Side.
- 5.10.3. The PM10 dust concentrations recorded at Euston Square station were between 0.10mg/m³ and 0.40mg/m³, with the highest concentrations recorded on Platform 1, Westbound, and Platform 2, Eastbound, Circle/H&C/Metropolitan Line.
- 5.10.4. The inhalable dust concentration recorded at Euston Square station Platform 2, Eastbound Circle/H&C/Metropolitan Line was 0.50mg/m³.

5.11. Hampstead

- 5.11.1. The respirable dust concentrations recorded at Hampstead station were between 0.11mg/m³ and 1.07mg/m³, with the highest concentration recorded on Platform 1, Northbound Northern Line.
- 5.11.2. The PM2.5 dust concentrations recorded at Hampstead station were between 0.11mg/m³ and 0.59mg/m³, with the highest concentration recorded on Platform 1, Northbound Northern Line.
- 5.11.3. The PM10 dust concentrations recorded at Hampstead station were between 0.24mg/m³ and 1.63mg/m³, with the highest concentration recorded on Platform 1, Northbound Northern Line.
- 5.11.4. The inhalable dust concentration recorded at Hampstead station Platform 1, Northbound Northern Line was 1.58mg/m³.

5.12. Highbury & Islington

- 5.12.1. The respirable dust concentrations recorded at Highbury & Islington station were between 0.05mg/m³ and 1.06mg/m³, with the highest concentration recorded on Platform 3, Northbound Victoria Line.
- 5.12.2. The PM2.5 dust concentrations recorded at Highbury & Islington station were between <0.02mg/m³ and 0.57mg/m³, with the highest concentration recorded on Platform 3, Northbound Victoria Line.
- 5.12.3. The PM10 dust concentrations recorded at Highbury & Islington station were between <0.02mg/m³ and 1.63mg/m³, with the highest concentration recorded on Platform 5, Southbound Victoria Line.
- 5.12.4. The inhalable dust concentration recorded at Highbury & Islington station Platform 2, Southbound Northern Line was 0.86mg/m³.

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5.13. Holborn

- 5.13.1. The respirable dust concentrations recorded at Holborn station were between 0.03mg/m³ and 0.93mg/m³, with the highest concentration recorded on Platform 4, Eastbound Piccadilly Line.
- 5.13.2. The PM2.5 dust concentrations recorded at Holborn station were between <0.02mg/m³ and 0.39mg/m³, with the highest concentration recorded on Platform 1, Westbound Central Line.
- 5.13.3. The PM10 dust concentrations recorded at Holborn station were between 0.03mg/m³ and 1.18mg/m³, with the highest concentration recorded on Platform 4, Eastbound Piccadilly Line.
- 5.13.4. The inhalable dust concentration recorded at Holborn station Platform 3, Westbound Piccadilly Line was 1.17mg/m³.

5.14. Kennington

- 5.14.1. The respirable dust concentrations recorded at Kennington station were between 0.15mg/m³ and 0.91mg/m³, with the highest concentration recorded on Platform 4, Southbound Northern Line.
- 5.14.2. The PM2.5 dust concentrations recorded at Kennington station were between 0.08mg/m³ and 0.33mg/m³, with the highest concentration recorded on Platform 1, Northbound Northern Line.
- 5.14.3. The PM10 dust concentrations recorded at Kennington station were between 0.34mg/m³ and 1.28mg/m³, with the highest concentration recorded on Platform 4, Southbound Northern Line.
- 5.14.4. The inhalable dust concentration recorded at Kennington station Platform 4, Southbound Northern Line was 1.40mg/m³.

5.15. King's Cross

- 5.15.1. The respirable dust concentrations recorded at King's Cross station were between 0.04mg/m³ and 0.90mg/m³, with the highest concentration recorded on Platform 8, Southbound Northern Line.
- 5.15.2. The PM2.5 dust concentrations recorded at King's Cross station were between <0.02mg/m³ and 0.39mg/m³, with the highest concentration recorded on Platform 6, Eastbound Piccadilly Line.
- 5.15.3. The PM10 dust concentrations recorded at King's Cross station were between 0.40mg/m³ and 1.03mg/m³, with the highest concentration recorded on Platform 6, Eastbound Piccadilly Line.
- 5.15.4. The inhalable dust concentration recorded at King's Cross station Platform 7, Northbound Northern Line was 0.76mg/m³.

5.16. London Bridge

- 5.16.1. The respirable dust concentrations recorded at London Bridge station were between 0.52mg/m³ and 0.70mg/m³, with the highest concentration recorded on Platform 4, Eastbound Jubilee Line.
- 5.16.2. The PM2.5 dust concentrations recorded at London Bridge station were between 0.25mg/m³ and 0.37mg/m³, with the highest concentration recorded on Platform 4, Eastbound Jubilee Line.
- 5.16.3. The PM10 dust concentrations recorded at London Bridge station were between 0.75mg/m³ and 0.95mg/m³, with the highest concentration recorded on Platform 4, Eastbound Jubilee Line.
- 5.16.4. The inhalable dust concentration recorded at London Bridge station Platform 4, Eastbound Jubilee Line was 0.88mg/m³.

5.17. Mile End

- 5.17.1. The respirable dust concentrations recorded at Mile End station were between 0.24mg/m³ and 0.61mg/m³, with the highest concentration recorded on Platform 3, Eastbound District/H&C Line.
- 5.17.2. The PM2.5 dust concentrations recorded at Mile End station were between 0.16mg/m³ and 0.31mg/m³, with the highest concentration recorded on Platform 3, Eastbound District/H&C Line.
- 5.17.3. The PM10 dust concentrations recorded at Mile End station were between 0.29mg/m³ and 0.77mg/m³, with the highest concentration recorded on Platform 4, Eastbound Central Line.
- 5.17.4. The inhalable dust concentration recorded at Mile End station Platform 4, Eastbound Central Line was 0.77mg/m³.

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5.18. Moorgate

- 5.18.1. The respirable dust concentrations recorded at Moorgate station were between 0.06mg/m³ and 0.48mg/m³, with the highest concentration recorded on Platform 8, Southbound Northern Line.
- 5.18.2. The PM2.5 dust concentrations recorded at Moorgate station were between 0.09mg/m³ and 0.22mg/m³, with the highest concentration recorded on Platform 3, Eastbound District/H&C Line.
- 5.18.3. The PM10 dust concentrations recorded at Moorgate station were between 0.29mg/m³ and 0.77mg/m³, with the highest concentration recorded on Platform 4, Eastbound Central Line.
- 5.18.4. The inhalable dust concentration recorded at Moorgate station Platform 4, Eastbound Central Line was 0.77mg/m³.

5.19. Oxford Circus

- 5.19.1. The respirable dust concentrations recorded at Oxford Circus station were between 0.07mg/m³ and 0.99mg/m³, with the highest concentration recorded on Platform 5, Southbound Victoria Line.
- 5.19.2. The PM2.5 dust concentrations recorded at Oxford Circus station were between 0.08mg/m³ and 0.53mg/m³, with the highest concentration recorded on Platform 2, Eastbound Central Line.
- 5.19.3. The PM10 dust concentrations recorded at Oxford Circus station were between 0.28mg/m³ and 1.18mg/m³, with the highest concentrations recorded on Platform 3, Southbound, Bakerloo Line and Platform 5, Southbound, Victoria Line.
- 5.19.4. The inhalable dust concentration recorded at Oxford Circus station Platform 1, Westbound Central Line was 1.13mg/m³.

5.20. Paddington

- 5.20.1. The respirable dust concentrations recorded at Paddington station were between 0.08mg/m³ and 0.86mg/m³, with the highest concentration recorded on Platform 4, Southbound Bakerloo Line.
- 5.20.2. The PM2.5 dust concentrations recorded at Paddington station were between 0.07mg/m³ and 0.23mg/m³, with the highest concentration recorded on Platform 4, Southbound Bakerloo Line.
- 5.20.3. The PM10 dust concentrations recorded at Paddington station were between 0.19mg/m³ and 1.08mg/m³, with the highest concentration recorded on Platform 3, Northbound Bakerloo Line.
- 5.20.4. The inhalable dust concentration recorded at Paddington station Platform 3, Northbound Bakerloo Line was 0.83mg/m³.

5.21. Piccadilly Circus

- 5.21.1. The respirable dust concentrations recorded at Piccadilly Circus station were between 0.03mg/m³ and 0.83mg/m³, with the highest concentration recorded on Platform 3, Eastbound Piccadilly Line.
- 5.21.2. The PM2.5 dust concentrations recorded at Piccadilly Circus station were between 0.11mg/m³ and 0.33mg/m³, with the highest concentration recorded on Platform 3, Eastbound Piccadilly Line.
- 5.21.3. The PM10 dust concentrations recorded at Piccadilly Circus station were between 0.10mg/m³ and 1.23mg/m³, with the highest concentration recorded on Platform 1, Northbound Bakerloo Line.
- 5.21.4. The inhalable dust concentration recorded at Piccadilly Circus station Platform 3, Eastbound Piccadilly Line was 1.21mg/m³.

5.22. Tooting Bec

- 5.22.1. The respirable dust concentrations recorded at Tooting Bec station were between 0.34mg/m³ and 0.95mg/m³, with the highest concentration recorded on Platform 2, Southbound Northern Line.
- 5.22.2. The PM2.5 dust concentrations recorded at Tooting Bec station were between 0.07mg/m³ and 0.41mg/m³, with the highest concentration recorded on Platform 2, Southbound Northern Line.
- 5.22.3. The PM10 dust concentrations recorded at Tooting Bec station were between 0.49mg/m³ and 1.15mg/m³, with the highest concentration recorded on Platform 2, Southbound Northern Line.
- 5.22.4. The inhalable dust concentration recorded at Tooting Bec station Platform 2, Southbound Northern Line was 0.39mg/m³. This result is likely anomalous based on the other results.

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5.23. Tottenham Court Road

- 5.23.1. The respirable dust concentrations recorded at Tottenham Court Road station were between 0.20mg/m³ and 1.01mg/m³, with the highest concentration recorded on Platform 2, Eastbound Central Line.
- 5.23.2. The PM_{2.5} dust concentrations recorded at Tottenham Court Road station were between 0.14mg/m³ and 0.56mg/m³, with the highest concentration recorded on Platform 3, Northbound Northern Line.
- 5.23.3. The PM₁₀ dust concentrations recorded at Tottenham Court Road station were between 0.31mg/m³ and 1.44mg/m³, with the highest concentration recorded on Platform 3, Northbound Northern Line.
- 5.23.4. The inhalable dust concentration recorded at Tottenham Court Road station Platform 3, Northbound Northern Line was 0.82mg/m³.

5.24. Vauxhall

- 5.24.1. The respirable dust concentrations recorded at Vauxhall station were between 0.30mg/m³ and 1.23mg/m³, with the highest concentration recorded on Platform 1, Northbound Victoria Line.
- 5.24.2. The PM_{2.5} dust concentrations recorded at Vauxhall station were between 0.20mg/m³ and 0.62mg/m³, with the highest concentration recorded on Platform 2, Southbound Victoria Line.
- 5.24.3. The PM₁₀ dust concentrations recorded at Vauxhall station were between 0.45mg/m³ and 1.66mg/m³, with the highest concentration recorded on Platform 1, Northbound Victoria Line.
- 5.24.4. The inhalable dust concentration recorded at Vauxhall station Platform 1, Northbound Victoria Line was 1.54mg/m³.

5.25. Waterloo

- 5.25.1. The respirable dust concentrations recorded at Waterloo station were between 0.50mg/m³ and 0.95mg/m³, with the highest concentration recorded on Platform 1, Northbound Northern Line.
- 5.25.2. The PM_{2.5} dust concentrations recorded at Waterloo station were between 0.11mg/m³ and 0.41mg/m³, with the highest concentration recorded on Platform 1, Northbound Northern Line.
- 5.25.3. The PM₁₀ dust concentrations recorded at Waterloo station were between 0.55mg/m³ and 1.27mg/m³, with the highest concentration recorded on Platform 2, Southbound Northern Line.
- 5.25.4. The inhalable dust concentration recorded at Waterloo station Platform 6, Eastbound Jubilee Line was 0.96mg/m³.

5.26. Westminster

- 5.26.1. The respirable dust concentrations recorded at Westminster station were between 0.20mg/m³ and 0.76mg/m³, with the highest concentration recorded on Platform 3, Eastbound Jubilee Line.
- 5.26.2. The PM_{2.5} dust concentrations recorded at Westminster station were between 0.19mg/m³ and 0.34mg/m³, with the highest concentration recorded on Platform 3, Eastbound Jubilee Line.
- 5.26.3. The PM₁₀ dust concentrations recorded at Westminster station were between 0.47mg/m³ and 0.78mg/m³, with the highest concentration recorded on Platform 3, Eastbound Jubilee Line.
- 5.26.4. The inhalable dust concentration recorded at Westminster station Platform 3, Eastbound Jubilee Line was 1.00mg/m³.

5.27. Inhalable Metal Results

- 5.27.1. The inhalable aluminium concentrations recorded were between <0.001mg/m³ and 0.020mg/m³, with the highest concentration recorded at Vauxhall station Platform 1, Northbound Victoria Line. The next highest aluminium concentration was recorded at Holborn station Platform 3, Westbound Piccadilly Line, with a concentration of 0.014mg/m³.
- 5.27.2. The inhalable arsenic concentrations recorded were all below the limit of detection for the techniques used.
- 5.27.3. The inhalable copper concentrations recorded were between <0.001mg/m³ and 0.003mg/m³, with the highest concentrations recorded at Mile End station Platform 4, Eastbound Central Line and Oxford Circus Platform 1, Westbound Central Line. The next highest copper concentration was recorded at Cutty Sark Platform 1, DLR, with a concentration of 0.014mg/m³. Note, the remaining copper concentrations recorded were all below the limit of detection for the techniques used.

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- 5.27.4. The inhalable chromium, total, concentrations recorded were between $<0.001\text{mg}/\text{m}^3$ and $0.005\text{mg}/\text{m}^3$, with the highest concentration recorded at Vauxhall station Platform 1, Northbound Victoria Line. The next highest chromium concentration were recorded at Canada Water station Platform 2, Eastbound Jubilee Line and Highbury & Islington station Platform 5, Southbound Victoria Line, with a concentration of $0.003\text{mg}/\text{m}^3$.
- 5.27.5. The inhalable hexavalent chromium concentrations recorded were all below the limit of detection for the techniques used.
- 5.27.6. The inhalable iron, as iron oxide, concentrations recorded were between $0.162\text{mg}/\text{m}^3$ and $1.373\text{mg}/\text{m}^3$, with the highest concentration recorded at King's Cross station Platform 7, Northbound Northern Line. The next highest iron concentration was recorded at Hampstead station Platform 1, Northbound Northern Line, with a concentration of $1.133\text{mg}/\text{m}^3$.
- 5.27.7. The inhalable nickel concentrations recorded were all below the limit of detection for the techniques used.
- 5.27.8. The inhalable manganese concentration recorded were between $<0.001\text{mg}/\text{m}^3$ and $0.008\text{mg}/\text{m}^3$, with the highest concentration recorded at King's Cross station Platform 7, Northbound Northern Line. The next highest manganese concentrations were recorded at Hampstead station Platform 1, Northbound Northern Line and Vauxhall station Platform 1, Northbound Victoria Line, with a concentration of $0.007\text{mg}/\text{m}^3$.
- 5.27.9. The inhalable zinc concentrations recorded were all below the limit of detection for the techniques used.

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6. CONCLUSIONS

- 6.1. There were no exceedances to the COSHH limit for respirable and inhalable dust during the monitoring. The concentrations recorded were all below half the limit for dust of any composition to be considered hazardous to health.
- 6.2. The personal respirable dust exposure monitored on station staff were all significantly below the applicable COSHH limit, with the concentrations below a tenth of the limit for dust of any composition to be considered hazardous to health.
- 6.3. There were no exceedances to the HSE EH40 Workplace Exposure Limits for the selected inhalable metals during the monitoring. The parameters monitored were all below half of the relevant workplace exposure limits, with the majority below a tenth of the relevant workplace exposure limits.
- 6.4. For the inhalable metals selected, iron was the main metal present in the inhalable dust. The iron is most likely from steel from the rail environment. The steel would also account for the presence of manganese in the inhalable dust. Note, the EH40 WEL for iron is applicable to iron fume.
- 6.5. The non-platform areas monitored, such as the ticket hall or gate lines, typically had lower airborne dust concentrations compared to the platform areas.
- 6.6. The respirable dust concentrations recorded are compared to the data obtained in 2020, see Table 27. See report 4RS-APO-202073-R685426 for previously obtained data. Some observations on the comparison are as follows:
 - The data showed that the ten highest respirable dust concentrations were lower in 2023 compared to the results obtained in 2020;
 - The data showed that the locations of the ten highest respirable dust concentrations were all different in 2023 compared to the results obtained in 2020;
 - The data shows that the mean of all the respirable dust concentrations in 2023 were slightly lower compared to the results obtained in 2020, but the data is within the standard deviation of each other so the decrease would not be considered significant;
 - The data shows that the mean of the platform and non-platform areas respirable dust concentrations in 2023 were slightly lower compared to the results obtained in 2020, but again the data is within the standard deviation of each other so the decrease would not be considered significant;
 - The comparison is undertaken for information purposes only; it is possible that the respirable dust concentrations could vary daily.

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7. REFERENCES

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HSE L5 Sixth Edition, Control of Substances Hazardous to Health Regulations, 2002 (as amended) – Approved Code of Practice and guidance. 2013.

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AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 1. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – ALDGATE EAST STATION

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Employee no. 9847173 Shift no. EN23	Personal	24/04/2023 09:23 to 14:09	0.21	-	-	-
Platform 1 - Westbound, District/H&C Line	Static	24/04/2023 09:18 to 14:02	0.41	0.34	0.75	0.72
Platform 2 - Eastbound, District/H&C Line	Static	24/04/2023 09:27 to 14:07	0.39	0.05	0.74	-
Ticket Hall/Gate Line	Static	24/04/2023 09:22 to 14:04	0.26	0.05	4.48*	-

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TABLE 2. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – BAKER STREET

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Ticket Hall/Gate Line - Bakerloo/Jubilee Line (in lieu of personal sample)	Static	22/05/2023 09:43 to 13:51	0.25	-	-	-
Platform 5 - Eastbound, Circle/H&C Line	Static	22/05/2023 09:12 to 13:45	0.40	0.16	0.40	-
Platform 6 - Westbound, Circle/H&C Line	Static	22/05/2023 09:17 to 13:46	0.40	0.31	0.67	-
Platform 7 - Eastbound, Jubilee Line	Static	22/05/2023 09:36 to 13:59	0.68	0.25	0.64	0.71
Platform 8 - Southbound, Bakerloo Line	Static	22/05/2023 09:33 to 13:56	0.51	0.27	0.71	-
Platform 9 - Northbound, Bakerloo Line	Static	22/05/2023 09:28 to 13:54	0.88	0.31	1.06	-
Platform 10 - Westbound, Jubilee Line	Static	22/05/2023 09:42 to 13:52	0.34	0.21	0.49	-
Ticket Hall/Gate Line - Circle/H&C/Metropolitan Line	Static	22/05/2023 09:22 to 13:50	0.30	0.10	0.39	-

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TABLE 3. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – BANK

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office (in lieu of personal sample)	Static	01/06/2023 09:30 to 12:24	0.28	-	-	-
Platform 3 - Southbound, Northern Line	Static	01/06/2023 09:45 to 12:10	0.62	0.33	Negative	-
Platform 4 - Northbound, Northern Line	Static	01/06/2023 09:38 to 12:10	1.03	0.48	0.87	0.96
Platform 5 - Westbound, Central Line	Static	01/06/2023 09:52 to 12:17	0.69	Negative	Negative	-
Platform 6 - Eastbound, Central Line	Static	01/06/2023 09:57 to 12:17	0.70	0.50	0.94	-
Platform 9 - DLR	Static	30/05/2023 10:59 to 14:59	0.61	0.24	0.93	-
Platform 10 - DLR	Static	30/05/2023 10:59 to 14:59	0.59	0.21	1.04	-
Ticket Hall/Gate Line - Central Line	Static	01/06/2023 10:03 to 12:35	0.51	0.40	1.42	-
Ticket Hall/Gate Line - Northern Line	Static	01/06/2023 10:07 to 12:30	0.30	0.33	0.43	-

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TABLE 4. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – CANADA WATER

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office (in lieu of personal sample)	Static	25/04/2023 09:42 to 14:42	0.33	-	-	-
Platform 1 - Westbound, Jubilee Line	Static	25/04/2023 09:39 to 14:39	0.46	0.29	0.65	-
Platform 2 - Eastbound, Jubilee Line	Static	25/04/2023 09:35 to 14:35	0.55	0.34	0.73	0.74
Ticket Hall/Gate Line	Static	25/04/2023 09:41 to 14:41	0.22	<0.02	0.20	-

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TABLE 5. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – COLLIERS WOOD

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	05/06/2023 09:10 to 13:26	0.34	-	-	-
Platform 1 - Northbound, Northern Line	Static	05/06/2023 09:24 to 13:30	0.67	0.28	0.69	-
Platform 2 - Southbound, Northern Line	Static	05/06/2023 09:20 to 13:29	0.64	0.30	0.80	0.86
Ticket Hall/Gate Line	Static	05/06/2023 09:15 to 13:27	0.36	0.12	0.33	-

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TABLE 6. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – CUTTY SARK

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	31/05/2023 10:22 to 14:22	0.12	-	-	-
Platform 1 - DLR	Static	31/05/2023 10:10 to 14:15	0.49	0.14	0.14	0.49
Platform 2 - DLR	Static	31/05/2023 10:15 to 14:17	0.26	0.15	0.15	-
Ticket Hall/Gate Line	Static	31/05/2023 10:20 to 14:20	0.10	0.02	0.12	-

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TABLE 7. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – ELEPHANT & CASTLE

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	25/05/2023 09:14 to 14:02	0.04	-	-	-
Platform 1 - Northbound, Northern Line	Static	25/05/2023 09:25 to 14:08	0.64	0.36	0.83	-
Platform 2 - Southbound, Northern Line	Static	25/05/2023 09:31 to 14:10	0.42	0.18	0.45	-
Platform 3 - Northbound, Bakerloo Line	Static	25/05/2023 09:19 to 14:04	0.45	0.11	0.44	0.39*
Platform 4 - Southbound, Bakerloo Line	Static	25/05/2023 09:23 to 14:06	0.40	0.25	0.53	-
Ticket Hall/Gate Line - Bakerloo Line	Static	25/05/2023 09:13 to 14:00	0.08	0.03	<0.02	-
Ticket Hall/Gate Line - Northern Line	Static	25/05/2023 09:36 to 14:13	0.17	<0.02	0.22	-

*anomalous result

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 8. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – EMBANKMENT

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	04/05/2023 08:25 to 14:02	0.04	-	-	-
Platform 3 - Northbound, Northern Line	Static	04/05/2023 09:27 to 14:06	0.75	0.22	0.79	-
Platform 4 - Southbound, Northern Line	Static	04/05/2023 09:30 to 14:10	0.59	0.24	0.72	-
Platform 5 - Northbound, Bakerloo Line	Static	04/05/2023 09:16 to 14:20	0.65	0.37	0.84	-
Platform 6 - Southbound, Bakerloo Line	Static	04/05/2023 09:06 to 14:14	0.70	0.03	0.53	1.03
Ticket Hall/Gate Line	Static	04/05/2023 08:48 to 14:00	0.05	<0.02	<0.02	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 9. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – EUSTON SQUARE

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	26/05/2023 09:12 to 13:26	0.15	-	-	-
Platform 1 - Westbound, Circle/H&C/Metropolitan Line	Static	26/05/2023 09:05 to 13:30	0.55	0.14	0.40	-
Platform 2 - Eastbound, Circle/H&C/Metropolitan Line	Static	26/05/2023 09:02 to 13:25	0.50	0.19	0.40	0.50
Ticket Hall/Gate Line - North Side	Static	26/05/2023 09:08 to 13:28	0.35	0.09	0.23	-
Ticket Hall/Gate Line - South Side	Static	26/05/2023 09:09 to 13:29	0.17	0.19	0.10	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 10. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – HAMPSTEAD

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Personal - Duty No. B722	Personal	27/04/2023 09:38 to 14:38	0.13	-	-	-
Platform 1 - Northbound, Northern Line	Static	27/04/2023 09:17 to 14:20	1.07	0.59	1.63	1.58
Platform 2 - Southbound, Northern Line	Static	27/04/2023 09:24 to 14:24	0.87	0.55	1.42	-
Ticket Hall/Gate Line	Static	27/04/2023 09:34 to 14:36	0.11	0.11	0.24	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 11. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – HIGHBURY & ISLINGTON

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	28/04/2023 09:30 to 14:30	0.11	-	-	-
Platform 3 - Northbound, Victoria Line	Static	28/04/2023 09:19 to 14:25	1.06	0.57	1.06	-
Platform 5 - Southbound, Victoria Line	Static	28/04/2023 09:05 to 14:20	0.82	0.47	1.63	1.16
Ticket Hall/Gate Line	Static	28/04/2023 09:27 to 14:27	0.05	<.0.02	<.0.02	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 12. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – HOLBORN

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	05/05/2023 09:40 to 14:00	0.03	-	-	-
Platform 1 - Westbound, Central Line	Static	05/05/2023 09:19 to 14:13	0.66	0.39	0.87	-
Platform 2 - Eastbound, Central Line	Static	05/05/2023 09:26 to 14:15	0.62	0.25	0.67	-
Platform 3 - Westbound, Piccadilly Line	Static	05/05/2023 09:02 to 14:05	0.71	0.17	1.04	1.17
Platform 4 - Eastbound, Piccadilly Line	Static	05/05/2023 09:11 to 14:08	0.93	0.28	1.18	-
Ticket Hall/Gate Line	Static	05/05/2023 09:36 to 14:03	0.03	<0.02	0.03	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 13. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – KENNINGTON

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	09/05/2023 09:17 to 14:37	0.15	-	-	-
Platform 1 - Northbound, Northern Line	Static	09/05/2023 09:25 to 14:32	0.52	0.33	0.52	-
Platform 2 - Southbound, Northern Line	Static	07/06/2023 09:25 to 13:30	0.75	0.32	1.09	-
Platform 3 - Northbound, Northern Line	Static	09/05/2023 09:28 to 14:33	0.56	0.19	0.67	-
Platform 4 - Southbound, Northern Line	Static	07/06/2023 09:24 to 13:30	0.91	0.27	1.28	1.40
Ticket Hall/Gate Line	Static	09/05/2023 09:32 to 14:36	0.21	0.08	0.34	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 14. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – KING’S CROSS

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	19/05/2023 10:08 to 14:21	0.04	-	-	-
Platform 1 - Westbound, Circle/H&C/Metropolitan Line	Static	19/05/2023 09:57 to 14:14	0.20	<0.02	0.12	-
Platform 2 - Eastbound, Circle/H&C/Metropolitan Line	Static	19/05/2023 09:50 to 14:11	0.20	0.04	0.29	-
Platform 3 - Northbound, Victoria Line	Static	19/05/2023 09:43 to 14:04	0.55	0.32	Filter Damaged	-
Platform 4 - Southbound, Victoria Line	Static	19/05/2023 09:46 to 14:08	0.31	0.17	0.40	-
Platform 5 - Westbound, Piccadilly Line	Static	19/05/2023 09:29 to 13:57	0.61	0.30	0.96	-
Platform 6 - Eastbound, Piccadilly Line	Static	19/05/2023 09:34 to 14:00	0.58	0.39	1.03	-
Platform 7 - Northbound, Northern Line	Static	19/05/2023 09:19 to 13:52	0.46	0.23	0.59	0.76
Platform 8 - Southbound, Northern Line	Static	19/05/2023 09:25 to 13:54	0.90	0.33	0.91	-
Ticket Hall/Gate Line - Circle/H&C/Metropolitan Line	Static	19/05/2023 10:03 to 14:17	0.11	<0.02	<0.02	-
Ticket Hall/Gate Line - Main	Static	19/05/2023 10:10 to 14:22	0.06	<.02	0.17	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 15. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – LONDON BRIDGE

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	10/05/2023 09:24: to 14:28	0.52	-	-	-
Platform 1 - Northbound, Northern Line	Static	10/05/2023 09:55: to 14:36	0.57	0.27	0.80	-
Platform 2 - Southbound, Northern Line	Static	10/05/2023 09:57: to 14:38	0.55	0.30	0.86	-
Platform 3 - Westbound, Jubilee Line	Static	10/05/2023 09:45: to 14:42	0.61	0.28	0.89	-
Platform 4 - Eastbound, Jubilee Line	Static	10/05/2023 09:38: to 14:40	0.70	0.37	0.95	0.88
Ticket Hall/Gate Line	Static	10/05/2023 09:26: to 14:26	0.55	0.25	0.75	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 16. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – MILE END

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Personal - Duty No. 22	Personal	11/05/2023 08:56 to 14:00	0.24	-	-	-
Platform 1 - Westbound, Central Line	Static	11/05/2023 09:56 to 14:09	0.37	0.27	0.65	-
Platform 2 - Westbound, District/H&C Line	Static	11/05/2023 09:33 to 14:08	0.50	0.26	0.63	-
Platform 3 - Eastbound, District/H&C Line	Static	11/05/2023 09:11 to 14:03	0.61	0.31	0.47	-
Platform 4 - Eastbound, Central Line	Static	11/05/2023 09:17 to 14:05	0.52	0.27	0.77	0.77
Ticket Hall/Gate Line	Static	11/05/2023 09:38 to 14:02	0.27	0.16	0.29	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 17. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – MOORGATE

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	12/05/2023 10:00 to 15:14	0.06	-	-	-
Platform 1 - Eastbound, Circle/H&C/Metropolitan Line	Static	12/05/2023 09:47 to 15:02	0.13	0.09	0.22	-
Platform 2 - Westbound, Circle/H&C/Metropolitan Line	Static	12/05/2023 09:52 to 15:08	0.19	0.09	0.24	-
Platform 7 - Northbound, Northern Line	Static	12/05/2023 09:30 to 14:55	0.38	0.22	0.63	-
Platform 8 - Southbound, Northern Line	Static	12/05/2023 09:40 to 14:58	0.48	0.18	0.18	0.54
Ticket Hall/Gate Line	Static	12/05/2023 09:56 to 15:11	0.28	0.09	0.23	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 18. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – OXFORD CIRCUS

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	23/05/2023 09:50 to 14:20	0.07	-	-	-
Platform 1 - Westbound, Central Line	Static	23/05/2023 09:43 to 14:15	0.79	0.44	0.96	1.13
Platform 2 - Eastbound, Central Line	Static	23/05/2023 09:49 to 14:17	0.80	0.53	1.03	-
Platform 3 - Southbound, Bakerloo Line	Static	23/05/2023 09:33 to 14:11	0.96	0.43	1.18	-
Platform 4 - Northbound, Bakerloo Line	Static	23/05/2023 09:30 to 14:07	0.77	0.39	1.01	-
Platform 5 - Southbound, Victoria Line	Static	23/05/2023 09:37 to 14:10	0.99	0.43	1.18	-
Platform 6 - Northbound, Victoria Line	Static	23/05/2023 09:24 to 14:08	0.91	0.49	0.77	-
Ticket Hall/Gate Line - Main	Static	23/05/2023 09:16 to 14:02	0.12	0.08	0.28	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 19. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – PADDINGTON

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	15/05/2023 09:19 to 14:26	0.08	-	-	-
Platform 3 - Northbound, Bakerloo Line	Static	15/05/2023 09:33 to 14:35	0.71	0.08	1.08	0.83
Platform 4 - Southbound, Bakerloo Line	Static	15/05/2023 09:30 to 14:32	0.86	0.23	1.01	-
Ticket Hall/Gate Line - Bakerloo Line	Static	15/05/2023 09:37 to 14:37	0.45	0.13	0.61	-
Ticket Hall/Gate Line - District/Circle line	Static	15/05/2023 09:20 to 14:24	0.14	0.07	0.19	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 20. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – PICCADILLY CIRCUS

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	16/05/2023 09:24 to 14:23	0.03	-	-	-
Platform 1 - Northbound, Bakerloo Line	Static	16/05/2023 09:05 to 14:11	0.61	0.32	1.23	-
Platform 2 - Southbound, Bakerloo Line	Static	16/05/2023 09:10 to 14:14	0.49	0.31	0.86	-
Platform 3 - Eastbound, Piccadilly Line	Static	16/05/2023 09:16 to 14:17	0.83	0.33	0.72	1.21
Platform 4 - Westbound, Piccadilly Line	Static	16/05/2023 09:19 to 14:18	0.69	0.23	1.09	-
Ticket Hall/Gate Line	Static	16/05/2023 09:29 to 14:25	0.07	0.11	0.10	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 21. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – TOOTING BEC

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	02/05/2023 09:31 to 14:31	0.34	-	-	-
Platform 1 - Northbound, Northern Line	Static	02/05/2023 09:20 to 14:20	0.60	0.29	0.84	-
Platform 2 - Southbound, Northern Line	Static	02/05/2023 09:11 to 14:15	0.95	0.41	1.15	0.39*
Ticket Hall/Gate Line	Static	02/05/2023 09:30 to 14:30	0.34	0.07	0.49	-

*anomalous result

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 22. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – TOTTENHAM COURT ROAD

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	17/05/2023 09:48 to 14:50	0.20	-	-	-
Platform 1 - Westbound, Central Line	Static	17/05/2023 09:36 to 14:44	0.99	0.42	1.21	-
Platform 2 - Eastbound, Central Line	Static	17/05/2023 09:42 to 14:48	1.01	0.54	1.15	-
Platform 3 - Northbound, Northern Line	Static	17/05/2023 09:28 to 14:39	0.85	0.56	1.44	0.82
Platform 4 - Southbound, Northern Line	Static	17/05/2023 09:22 to 14:33	0.90	0.53	1.30	-
Ticket Hall/Gate Line	Static	17/05/2023 09:46 to 14:52	0.25	0.14	0.31	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 23. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – VAUXHALL

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Personal - Duty No. DN23	Personal	03/05/2023 09:25 to 14:09	0.33	-	-	-
Platform 1 - Northbound, Victoria Line	Static	03/05/2023 09:29 to 14:03	1.23	0.36	1.66	1.54
Platform 2 - Southbound, Victoria Line	Static	03/05/2023 09:38 to 14:05	1.09	0.62	1.60	-
Ticket Hall/Gate Line	Static	03/05/2023 09:40 to 14:10	0.30	0.20	0.45	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 24. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – WATERLOO

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	24/05/2023 09:03 to 14:02	0.50	-	-	-
Platform 1 - Northbound, Northern Line	Static	24/05/2023 09:18 to 14:10	0.95	0.41	1.01	-
Platform 2 - Southbound, Northern Line	Static	24/05/2023 09:16 to 14:09	0.86	0.36	1.27	-
Platform 3 - Northbound, Bakerloo Line	Static	24/05/2023 09:11 to 14:07	0.60	0.23	0.63	-
Platform 4 - Southbound, Bakerloo Line	Static	24/05/2023 09:06 to 14:05	0.86	0.16	0.55	-
Platform 5 - Westbound, Jubilee Line	Static	24/05/2023 09:31 to 14:21	0.53	0.27	0.64	-
Platform 6 - Eastbound, Jubilee Line	Static	24/05/2023 09:29 to 14:20	0.62	0.11	0.77	0.96
Ticket Hall/Gate Line - Main	Static	24/05/2023 09:00 to 14:00	0.50	0.20	0.57	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 25. SUMMARY OF STATION AIRBORNE DUST MONITORING RESULTS – WESTMINSTER

LOCATION	PERSONAL/ STATIC	DATE/TIME	RESPIRABLE CONCENTRATION / MG.M ⁻³	PM2.5 CONCENTRATION / MG.M ⁻³	PM10 DUST CONCENTRATION / MG.M ⁻³	INHALABLE DUST CONCENTRATION / MG.M ⁻³
Outside Station Supervisor Office	Static	18/05/2023 10:00 to 15:11	0.57	-	-	-
Outside Station Supervisor Office	Static	06/06/2023 09:38 to 13:57	0.20	-	-	-
Platform 1 - Westbound, District/Circle Line	Static	18/05/2023 09:28 to 15:08	0.55	0.29	0.69	-
Platform 2 - Eastbound, District/Circle Line	Static	18/05/2023 09:52 to 14:53	0.49	0.19	0.74	-
Platform 3 - Eastbound, Jubilee Line	Static	06/06/2023 09:45 to 13:53	0.76	0.34	0.78	1.00
Platform 4 - Westbound, Jubilee Line	Static	06/06/2023 09:47 to 13:50	0.50	0.30	0.52	-
Ticket Hall/Gate Line	Static	06/06/2023 09:40 to 13:56	0.38	0.19	0.47	-

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 26. SUMMARY OF STATION INHALABLE METALS RESULTS

LOCATION	DATE	AIR VOLUME / L	AL CONC. / MG.M ⁻³	AS CONC. / MG.M ⁻³	CR CONC. / MG.M ⁻³	CRVI CONC. / MG.M ⁻³	CU CONC. / MG.M ⁻³	FE ₂ O ₃ CONC. / MG.M ⁻³	MN CONC. / MG.M ⁻³	NI CONC. / MG.M ⁻³	ZN CONC. / MG.M ⁻³
Aldgate East - Platform 1 - Westbound, District/H&C Line	24/04/2023 09:18 to 14:02	568	<0.0004	0.001	0.004	0.575	<0.001	<0.001	<0.001	<0.001	0.004
Baker Street - Platform 7 - Eastbound, Jubilee Line	22/05/2023 09:36 to 13:59	526	<0.0005	<0.001	0.003	0.411	<0.001	<0.001	<0.001	<0.001	0.004
Bank - Platform 4 - Northbound, Northern Line	01/06/2023 09:38 to 12:10	304	<0.0008	<0.002	0.004	0.606	<0.002	<0.002	<0.002	<0.002	<0.002
Canada Water - Platform 2 - Eastbound, Jubilee Line	25/04/2023 09:35 to 14:35	600	<0.0004	0.003	0.004	0.606	<0.001	<0.001	<0.001	<0.001	0.007
Colliers Wood - Platform 2 - Southbound, Northern Line	05/06/2023 09:20 to 13:29	498	<0.0005	<0.001	<0.001	0.181	<0.001	<0.001	<0.001	<0.001	<0.001
Cutty Sark - Platform 1 - DLR	31/05/2023 10:10 to 14:15	490	<0.0005	<0.001	<0.001	0.234	<0.001	0.002	0.001	<0.001	<0.001
Elephant & Castle - Platform 3 - Northbound, Bakerloo Line	25/05/2023 09:19 to 14:04	570	<0.0004	<0.001	0.004	0.704	<0.001	<0.001	<0.001	<0.001	<0.004
Embankment - Platform 6 - Southbound, Bakerloo Line	04/05/2023 09:06 to 14:14	616	<0.0004	0.002	0.005	0.721	<0.001	<0.001	<0.001	<0.001	0.011
Euston Square - Platform 2 - Eastbound, Circle/H&C/Metropolitan Line	26/05/2023 09:02 to 13:25	522.81	<0.0005	<0.001	0.002	0.335	<0.001	<0.001	<0.001	<0.001	<0.001
Hampstead - Platform 1 - Northbound, Northern Line	27/04/2023 09:17 to 14:20	606	<0.0004	0.002	0.007	1.133	<0.001	<0.001	<0.001	<0.001	0.008
Highbury & Islington - Platform 5 - Southbound, Victoria Line	28/04/2023 09:05 to 14:20	630	<0.0004	0.003	0.005	0.768	<0.001	<0.001	<0.001	<0.001	0.009
Holborn - Platform 3 - Westbound, Piccadilly Line	05/05/2023 09:02 to 14:05	606	<0.0004	0.002	0.005	0.817	<0.001	<0.001	<0.001	<0.001	0.014

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

LOCATION	DATE	AIR VOLUME / L	AL CONC. / MG.M ⁻³	AS CONC. / MG.M ⁻³	CR CONC. / MG.M ⁻³	CRVI CONC. / MG.M ⁻³	CU CONC. / MG.M ⁻³	FE ₂ O ₃ CONC. / MG.M ⁻³	MN CONC. / MG.M ⁻³	NI CONC. / MG.M ⁻³	ZN CONC. / MG.M ⁻³
Kennington - Platform 4 - Southbound, Northern Line	07/06/2023 09:24 to 13:30	492	<0.0005	<0.001	0.002	0.254	<0.001	<0.001	<0.001	<0.001	0.002
King's Cross - Platform 7 - Northbound, Northern Line	19/05/2023 09:19 to 13:52	546	<0.0005	<0.001	0.008	1.373	<0.001	<0.001	<0.001	<0.001	0.004
London Bridge - Platform 4 - Eastbound, Jubilee Line	10/05/2023 09:38: to 14:40	604	<0.0004	0.002	0.004	0.630	<0.001	<0.001	<0.001	<0.001	0.005
Mile End - Platform 4 - Eastbound, Central Line	11/05/2023 09:17 to 14:05	576	<0.0004	<0.001	0.004	0.676	<0.001	0.003	<0.001	<0.001	0.005
Moorgate - Platform 8 - Southbound, Northern Line	12/05/2023 09:40 to 14:58	636	<0.0004	0.001	0.003	0.412	<0.001	<0.001	<0.001	<0.001	0.003
Oxford Circus - Platform 1 - Westbound, Central Line	23/05/2023 09:43 to 14:15	544	<0.0005	<0.001	0.004	0.685	<0.001	0.003	<0.001	<0.001	0.008
Paddington - Platform 3 - Northbound, Bakerloo Line	15/05/2023 09:33 to 14:35	604	<0.0004	<0.001	0.004	0.560	<0.001	<0.001	<0.001	<0.001	0.007
Piccadilly Circus - Platform 3 - Eastbound, Piccadilly Line	16/05/2023 09:16 to 14:17	602	<0.0004	<0.001	0.004	0.738	<0.001	<0.001	<0.001	<0.001	0.013
Tooting Bec - Platform 2 - Southbound, Northern Line	02/05/2023 09:11 to 14:15	608	<0.0004	<0.001	0.002	0.268	<0.001	<0.001	<0.001	<0.001	<0.003
Tottenham Court - Road Platform 3 - Northbound, Northern Line	17/05/2023 09:28 to 14:39	622	<0.0004	<0.001	0.003	0.508	<0.001	<0.001	<0.001	<0.001	0.003
Vauxhall - Platform 1 - Northbound, Victoria Line	03/05/2023 09:29 to 14:03	548	<0.0005	0.005	0.007	1.106	<0.001	<0.001	<0.001	<0.001	0.020
Waterloo - Platform 6 - Eastbound, Jubilee Line	24/05/2023 09:29 to 14:20	582	<0.0004	<0.001	0.004	0.672	<0.001	<0.001	<0.001	<0.001	0.006
Westminster - Platform 3 - Eastbound, Jubilee Line	06/06/2023 09:45 to 13:53	496	<0.0005	<0.001	<0.001	0.162	<0.001	<0.001	<0.001	<0.001	<0.001

AIRBORNE DUST MONITORING AT SELECTED LONDON UNDERGROUND TRAIN STATIONS 2023

TABLE 27. COMPARISON OF 2020 AND 2023 DATA – HIGHEST RESPIRABLE DUST CONCENTRATIONS

2020			2023		
LOCATION	DATE	RESPIRABLE DUST CONCENTRATION / MG.M ⁻³	LOCATION	DATE	RESPIRABLE DUST CONCENTRATION / MG.M ⁻³
Holborn station – Platform 1, Westbound Central Line	16/11/2020 08:39 to 12:49	2.27	Vauxhall station – Platform 1, Northbound Victoria Line	03/05/2023 09:29 to 14:03	1.23
Piccadilly Circus station – Platform 3, Eastbound Piccadilly Line	06/11/2020 09:02 to 13:06	1.69	Vauxhall station – Platform 2, Southbound Victoria Line	03/05/2023 09:38 to 14:05	1.09
Moorgate station – Platform 8, Southbound Northern Line	24/11/2020 09:02 to 13:13	1.36	Hampstead station – Platform 1, Northbound Northern Line	27/04/2023 09:17 to 14:20	1.07
London Bridge station – Platform 2, Southbound Northern Line	20/11/2020 09:25 to 13:25	1.23	Highbury & Islington station – Platform 3, Northbound Victoria Line	28/04/2023 09:19 to 14:25	1.06
Elephant & Castle station – Platform 2, Southbound Northern Line	29/10/2020 09:27 to 13:44	1.21	Bank station – Platform 4, Northbound Northern Line	01/06/2023 09:38 to 12:10	1.03
Holborn station – Platform 3, Westbound Piccadilly Line	16/11/2020 08:50 to 13:00	1.19	Tottenham Court Road station – Platform 2, Eastbound Central Line	17/05/2023 09:42 to 14:48	1.01
Baker Street station – Platform 9, Northbound Bakerloo Line	28/10/2020 09:08 to 13:57	1.18	Oxford Circus station – Platform 5, Southbound Victoria Line	23/05/2023 09:37 to 14:10	0.99
Canada Water station – Platform 2, Eastbound Jubilee Line	26/11/2020 09:38 to 13:38	1.15	Tottenham Court Road station – Platform 1, Westbound Central Line	17/05/2023 09:36 to 14:44	0.99
Baker Street station – Platform 8, Southbound Bakerloo Line	28/10/2020 09:31 to 13:53	1.15	Oxford Circus station – Platform 3, Southbound Bakerloo Line	23/05/2023 09:33 to 14:11	0.96
Oxford Circus station – Platform 1, Westbound Central Line	04/11/2020 09:02 to 13:15	1.14	Tooting Bec station – Platform 2, Southbound Northern Line	02/05/2023 09:11 to 14:15	0.95
Mean – 2020 (all respirable results)		0.60 (SD = 0.39)	Mean – 2023 (all respirable results)		0.49 (SD = 0.29)
Mean – 2020 (all platform results)		0.79 (SD = 0.35)	Mean – 2023 (all platform results)		0.65 (SD = 0.23)
Mean – 2020 (all non-platform results)		0.28 (SD = 0.22)	Mean – 2023 (all non-platform results)		0.22 (SD = 0.15)