Introductory review of three recent waste stream fires in London: potential impact on local ambient air quality

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Together with

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1. Preface

This initial review of three recent waste stream fires in the central London area was commissioned by Material Focus, a not-for-profit organisation delivering the UK "Recycle Your Electricals" campaign (May 2024).

2. Introduction

Waste streams refer to flows of waste of different types and classes from sources through to recovery and or disposal. These can be defined in terms of sector (e.g. domestic, medical or construction), materials (glass, metals) or products (e.g. electronic waste ,e-waste) which after processing join appropriate materials streams[i] . An increasingly significant element of e-waste is power storage componentry such as lithium (Li) based battery technologies. Activities which make up the e-waste stream include bulk product breakdown, mechanical or manual sorting, transport, waste treatment, accumulation in preparation for ingestion into materials specific waste streams, and storage at a range of scales. The proportion of waste streams of all types which are being directed towards recovery and recycling of materials is increasing following both regulatory guidance and ambitions e.g. the circular economy. Waste stream processing facilities are often located in or around urban areas because of logistics efficiencies in regional waste management. Greater London contains a significant number of waste management facilities which employ a large number of technical staff, and which are in proximity to residential areas and areas used by the wider public.

The three selected waste stream fires for discussion in this initial exploratory study are:

- Brentford Station. 6th September 2023. Waste Transfer Station, Brentford, Transport Avenue, Brentford, TW8 9HF. (Lat: 51.4890638, Lon: -0.3246975).
- Shakespeare Road. 8th September 2023. Waste transfer station, Herne Hill, 191 Shakespeare Road, SE24 0PY. (Lat: 51.4598907, Lon: -0.104571).
- Silver Town Scrapyard. 17th February 2024. Unit 6, Standard Industrial Estate, Factory Road, London, E16 2EJ. (Lat: 51.500416, Lon: 0.0562067).

3. Air Quality Measurements

Regulatory bodies in the UK have a statutory requirement to provide data on selected key atmospheric pollutants for compliance and regulatory purposes. These are linked to national level time integrated compliance monitoring and reporting responsibilities driven by health, environmental damage or climate concerns. Measurement methods and procedures are specified by relevant regulatory bodies. In the EU requirements are detailed in Ambient Air Quality Directives[ii] which are currently part of UK air quality legislation[iii] with routine automated air quality monitoring in the UK primarily based on hourly data from national networks. Local authorities also have a statutory requirement to monitor, assess and take action to improve local air quality as part of UK Local Air Quality Management (LAQM). In some areas with large numbers of local authority measurement sites, these have been co ordinated into larger networks e.g. iv and v.

The distribution of such large-scale automated monitoring sites is limited with expansion cost prohibitive as well as logistically difficult. Even where additional monitoring is being undertaken, such as in London, reference sites may not fully represent variation at the local scale, potentially missing very localised variations in pollution concentrations. Currently there is no statutory requirement to make hyperlocal or personal scale measurements other than for baseline information reporting or if there are significant concerns in a particular area.

An emerging tool for expanding observational capability is based on the use of advanced miniaturised sensing technologies (widely referred to as “low-cost sensors”, “lower capital cost sensors” or “small sensors”) to increase coverage and provide data at appropriate quality levels to address specific local needs. Low-cost refers to the lower initial costs relative to reference grade instruments. These have a high degree of flexibility associated with ease of installation, low power needs and integrated telemetry. Breathe London is an example of a high-density network of such sensors and uses a unique continuous network scaling approach based on the relationship between sensor and reference measurements to reduce measurement uncertainty. The network has been in operation since 2021 and covers all London Boroughs. The network consists of over 400 active measurement locations (as of April 2024)[vi].

4. Data and Approach Used

No specific local meteorological data was available for use in this analysis and so no direct source apportionment was possible . Instead a distance-based approach was used where all available data in London was assessed and sites local to the fires selected from the available observational data based on variations in pollutant signals (as represented by PM2.5 levels). Using this approach it was found that a radius of 3 km from each fire was an appropriate distance to consider when looking for signals from the plumes from these fires. Two wider radii were assessed (5 km and 8 km) but these were found not to contain any clearly identifiable potential fire event signals.

Further analysis has the potential to integrate London background winds and also consider measurements from outside 3 km from each event, but this is outside the scope of this preliminary overview study. The fires themselves were selected based on fire service reports indicating the fires as being due to, or related to, disposal of batteries containing lithium. The London Background values (LBG in analysis) are calculated routinely by the Imperial College London Environmental Research Group (ICL ERG) as part of wider reporting on pollution levels in London and is based on cumulative data from a large number of representative reference stations. A daily assessment of general atmospheric conditions across London is also produced by the ERG as part of routine wider reporting and was used in contextualising the date selected and reported here.·

5. Brief Descriptions of Selected Fires

Details of the fire event as reported here are taken from the London Fire Service Incident reporting website[vii] .

5.1. Brentford Facility

The Brentford waste facility fire is located on Transport Avenue in Brentford. The fire required eight engines and 60 firefighters to deal with the incident. The first call to the emergency services was at 12:52 on the 6th September 2023. The fire was reported to be under control at 17:48 on the same day though it is unclear as to whether the fire was completely extinguished at this point. It is estimated that twenty tonnes of domestic waste was alight. Whilst the London Fire Brigade do not specify the cause of the fire it was later reported by the site operator that the fire was caused by a lithium battery in an inappropriate waste stream (household waste).

5.2. Shakespeare Road

The waste transfer station at Herne Hill is located on Shakespeare Road in Lambeth. From the London Fire Brigade Incident reporting website[viii] it is reported that fifteen engines and one hundred firefighters attended the incident. The first call to the emergency services was at 02:09 on the 8th September 2023. The fire is stated as being under control in the morning of the 8th September but still burning in some form on the 10th September[ix] and as being fully extinguished by the 12th September following controlled demolition of the building. The London Fire Brigade lists the failure of a lithium battery as the probable cause of the fire.

5.3. Silver Town

The fire at the scrap metal recycling facility on Thames Road, Silverton required ten engines and approximately 70 firefighters to deal with a burning scrap metal stack[x] . The first emergency service call was at 04:33 on the 17th February 2024 with the fire reported as being under control by 09:10 on the same morning though it is unclear as to whether this means the fire was completely extinguished at this point. The cause of the fire as reported by the London Fire Brigade is the failure of a lithium battery.

6. Initial Analysis of Selected Fires

6.1. Brentford Facility

Two reference sites and five Breathe London sites were identified in a 3 km radius of the Brentford facility fire and selected for analysis (see figure 1 and table 1). There were additional reference stations in this area, but these showed no potential fire signals in the recorded $PM_{2.5}$ data over the selected analysis period (05/09/2023 00:00:00 to 10/09/2023 00:00:00).

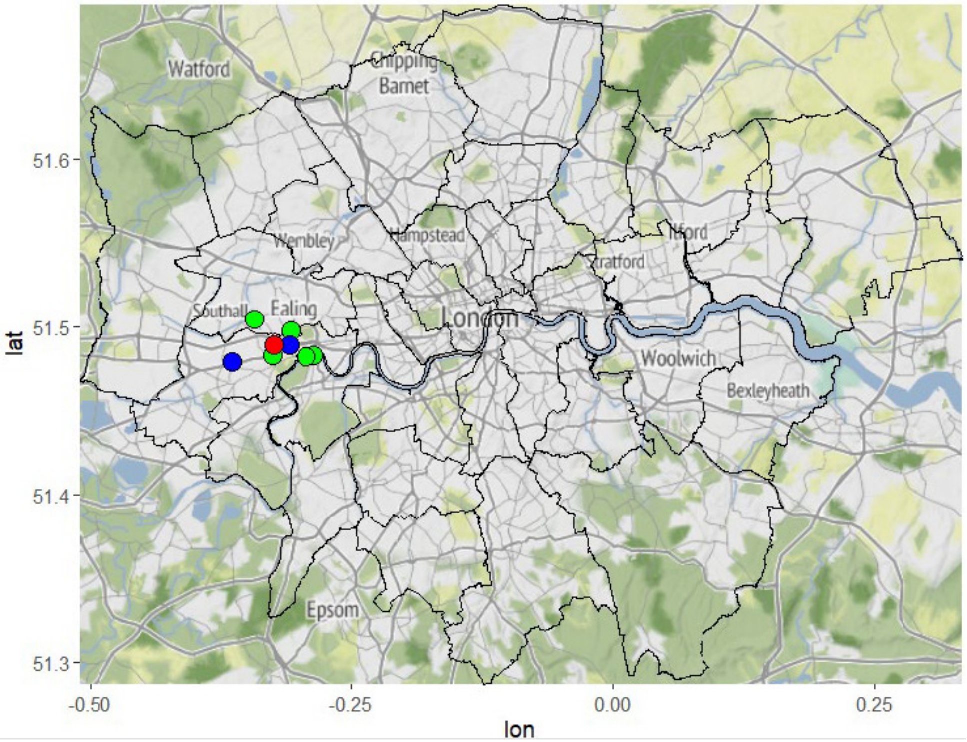

Figure 1: Map showing selected measurement sites used in this study. Where the red marker shows the fire location, the blue markers are reference sites and green markers are Breathe London sites[xi, xii].

Site Code	Site Name	Distance (km)	Bearing (Deg)
CLDP0102	Gillette Corner - Hounslow	0.66	186
HS5 (AQE)	Hounslow Brentford	1.01	87
CLDP0476	Weymouth Avenue - Little Ealing Lane	1.49	36
CLDP0166	Billets Hart Allotments	2.18	334
CLDP0362	Kew Gardens	2.25	123
CLDP0206	Kew Rd, before j/w South Circ/ Kew Green	2.71	115
HS6 (AQE)	Hounslow Heston	2.99	236

Table 1: Table of selected sites (codes and descriptive names) as well as their distances and compass bearings from the fire.

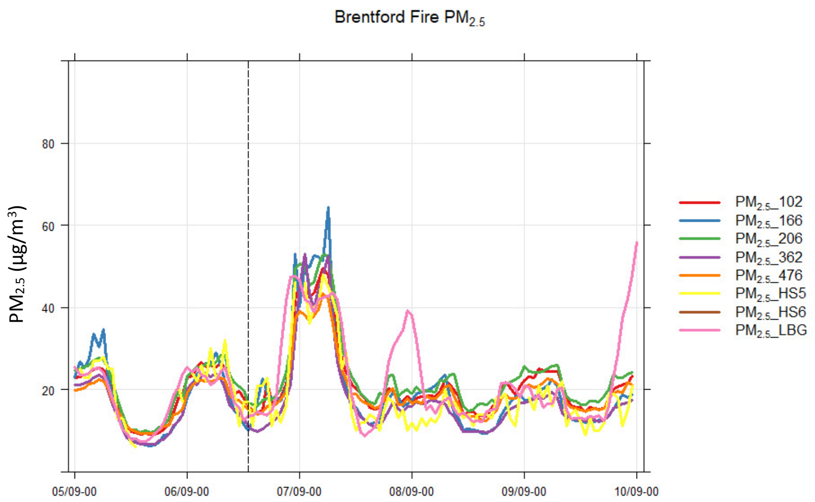

Figure 2: Figure showing data from the selected measurement sites used in this study. The dashed line shows the approximate reported start time of the fire.

$PM_{2.5}$	102	166	206	362	476	HS5	HS6	LBG
Mean	20.9	19.37	22.63	17.16	19.11	19.04	NA	21.71
3rd Qu.	23.47	22.15	25.02	18.99	21.17	23	NA	25.23
Max.	49.65	64.39	52.82	53.15	43.36	48	NA	55.92
NA's	1	1	1	1	1	13	121	

Table 2: Table of summarised data for selected sites (with truncated site codes) showing the mean, 3rd quartile and maximum values from the analysis period as well as the number of missing (NA) values for each site. Where NA values are reported this is due to insufficient data being available in the analysis period.

The $PM_{2.5}$ data from the sites selected for analysis are presented in figure 2 and summarised in table 2, both with additional data from the calculated London Background (LBG) added. An initial review of the data suggests an increase in $PM_{2.5}$ signals at all selected sites after the fire is reported. However when compared with regional background pollutant levels as represented by the calculated London Background it can be seen that the majority of this increase in $PM_{2.5}$ can be attributed to more regional air pollution as opposed to $PM_{2.5}$ from local sources such as the Brentford waste facility fire. The plot on the left of Figure 3 shows the London Background signal highlighted against the signals from the other measurement sites. From this it can be seen that there is still potentially additional $PM_{2.5}$ measured for a short period after the fire above this background value which could be reasonably attributed to the selected fire event. The plot on the right of Figure 3 shows calculated rolling 24hour averages for the same data again with the LBG signal highlighted. The WHO air quality guideline (AQG) level for $PM_{2.5}$ over a 24-hour window is shown in this right-hand figure for reference (15 µg/m^3 .)[xiii]

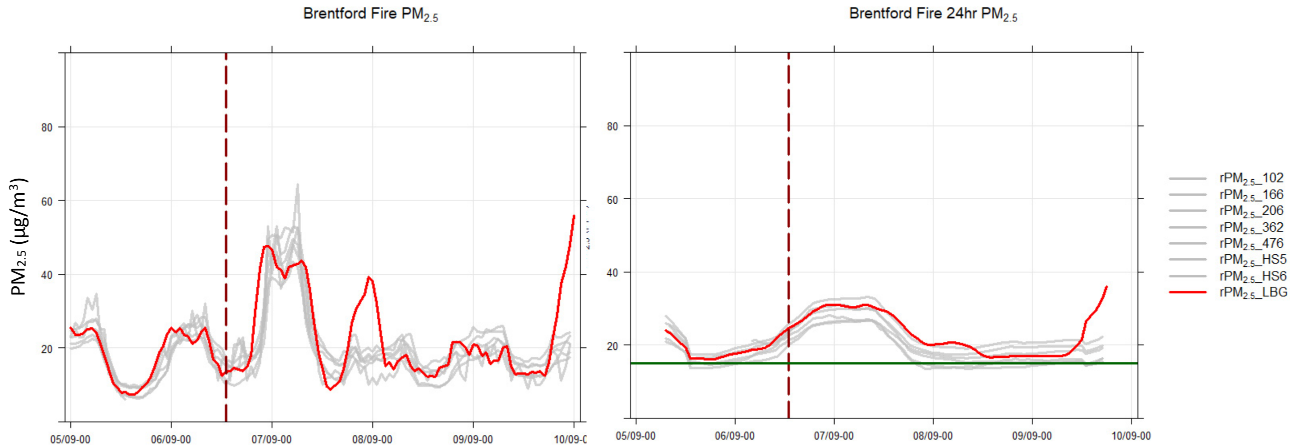

Figure 3: (Left) Plot showing data from the selected measurement sites used in this study. (Right) Plot showing calculated 24-hour rolling means of data from the selected measurement sites used in this study. (Both) London Background signal highlighted in red against signals from the other measurement sites in grey. Dashed lines show the approximate reported start time of the fire. The solid green line the WHO AQG level for $PM_{2.5}$ over a 24-hour window.

When considered as rolling 24 hour averages the data can reasonably be compared against the WHO AQG guideline levels. In this case the broader London background was in exceedance of these guidelines for this period and whilst an increase in $PM_{2.5}$ was reported the majority of this can be attributed to wider London background pollution levels with a relatively small increase in local $PM_{2.5}$ over a short window (hours) which could be associated with local events such as the Brentford waste facility fire. These short-term increases have not significantly affected compliance with WHO AQG levels for $PM_{2.5}$ which are calculated over 24-hour windows.

Site	102	166	206	362	476	HS	HS	LB
Mean	6.4	4.9	8.2	2.6	4.5	4.3	NA	7.2
3rd Qu.	8.9	9.5	10.	5.8	6.3	8.9	NA	12.
Max.	15.0	15.9	18.1	11.6	12.0	13.1	NA	20.9

Table 3: Summary statistics for calculated 24 hour rolling averages of $PM_{2.5}$ after subtracting the WHO AQG.

Site	102	166	206	362	476	HS5	HS6
Mean	-0.8	-2.3	1.0	-4.6	-2.7	-2.9	NA
3rd Qu.	-3.3	-2.7	-1.4	-6.4	-6.0	-3.4	NA
Max.	-5.9	-5.0	-2.8	-9.3	-8.9	-7.8	NA

Table 4: Summary statistics for calculated 24 hour rolling averages of $PM_{2.5}$ after subtracting the WHO AQG and LBG 24 hour rolling average.

Summary statistics for calculated 24 hour rolling averages of $PM_{2.5}$ after subtracting the WHO AQG value are shown in table 3. With the differential values in green if lower than the WHO AQG and red if higher. All sites with sufficient reported data were above this threshold, including the LBG. Table 4 shows these same summary statistics after the LBG value is also removed again with the differential values in green if lower than the WHO AQG after LBG removed and red if higher. Only one site showed a potential positive mean increment (of 1 µg/m^3) in this scenario.

6.2. Shakespeare Road

Three reference sites and eight Breathe London sites were identified in a 3 km radius of the Shakespeare Road fire and selected for analysis (see figure 4 and table 5). There were additional reference stations in this area, but these showed no potential fire signals in the recorded $PM_{2.5}$ data over the selected analysis period (07/09/2023 00:00:00 to 12/09/2023 00:00:00). When the analysis radius was increased to 5 km there was potentially another period where a signal for local pollutants such as the fire were identified but would need further analysis to separate from general or background pollution levels to enable the investigation of any potential causal links.

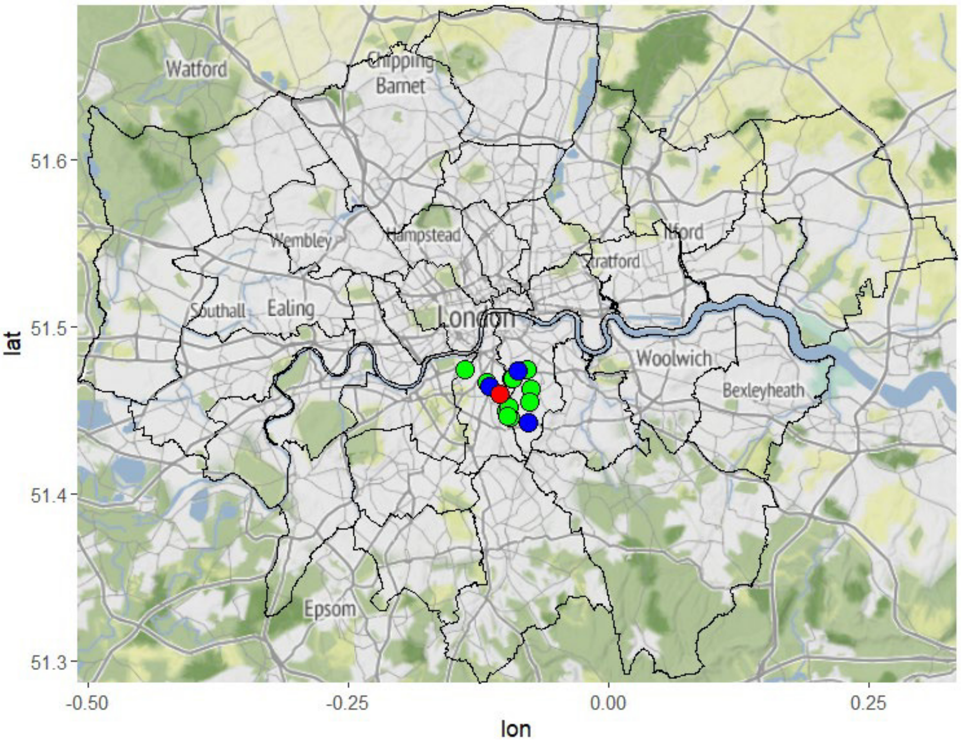

Figure 4: Map showing selected measurement sites used in this study. Where the red marker shows the fire location, the blue markers are reference sites and green markers are Breathe London sites.

Site Code	Site Name	Distance (km)	Bearing (Deg)
LB4 (LAQN)	Lambeth - Brixton Road	0.84	314
CLDP0323	Elm Lodge Surgery	1.04	156
CLDP0052	Stockwell Primary	1.17	321
CLDP0108	SWK-BL1: Croxted Road / Guernsey Grove	1.24	168
CLDP0315	Denmark Hill Hospital	1.26	27
CLDP0357	Maudsley Hospital	1.34	30
CLDP0456	Rosendale Primary School, Norwood	1.58	168
CLDP0107	SWK-BL2: Croxted Road/Dalkeith Road	1.7	165
SKB (LAQN)	Southwark - Vicarage Grove	1.92	28
CLDP0448	Harris Primary Academy, East Dulwich	2.01	112
CLDP0175	London Wildlife Trust Centre	2.05	78
CLDP0078	Oliver Goldsmith Primary School	2.43	38
SKC (LAQN)	Southwark - South Circular Road	2.68	147
CLDP0103	Griffin School - Wandsworth	2.85	313

Table 5: Table of selected sites (codes and descriptive names) as well as their distances and compass bearings from the fire.

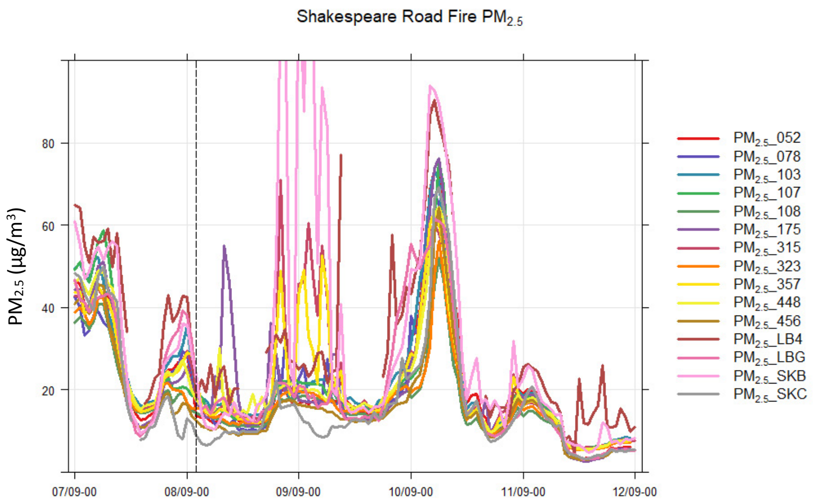

Figure 5: Figure showing data from the selected measurement sites used in this study. The dashed line shows the approximate reported start time of the fire.

Site	52	78	103	107	108	175	315	323	357	448	456	LB4	SKB	SKC	LBG
Mean	20.6	19.3	22	20.7	17	21.1	22.7	17.7	21.9	21.3	16.7	32.1	31.89	17.3	21.3
3rd Qu.	23	23.8	24.5	21.7	18.4	23.5	29.3	19.6	28.3	23.4	17.1	42.9	46.94	17.7	28.7
Max.	73.1	67.2	73.1	75.6	52	76.3	71.1	56.2	63	64.4	64.1	90.3	155.4	69.2	61.7
NA's	1	1	1	1	1	1		1	1	1	1	22		1	

Table 6: Table of summarised data for selected sites (with truncated site codes) showing the mean, 3rd quartile and maximum values from the analysis period as well as the number of missing (NA) values for each site.

The $PM_{2.5}$ data from the sites selected for analysis are presented in figure 6 and summarised in table 6, both with additional data from the calculated London Background (LBG) added. An initial review of the data suggests a small increase in $PM_{2.5}$ signals at most of the selected sites directly after the fire is reported. There is also a period of increases at most sites and a later period with an increase in all signals.

This last period of elevated $PM_{2.5}$ data can be ruled out in terms of direct influence of the local fire event as it is seen in all signals including the LBG. From a wider analysis it was found that there was an episode of transboundary pollutant import from the European Continent overnight associated with this widespread increase across London. Further comparison with the calculated LBG (See figure 6) highlights this difference between the main periods of elevated $PM_{2.5}$. Focusing on the period of elevated PM2.5 levels on the 9th of September and looking at the plot on the left of Figure 6 shows the London Background signal highlighted against the signals from the other measurement sites. This shows that the majority of this increase in $PM_{2.5}$ can reasonably be attributed to more local sources such as fire at the waste transfer station on Shakespeare Road as opposed to $PM_{2.5}$ of a more regional origin. This is true to a lesser extent (as it affects a smaller number of the selected monitoring sites) for the smaller elevated levels of $PM_{2.5}$ observed directly after the nominal fire start time. The plot on the right of Figure 6 shows calculated rolling 24hour averages for the same data again with the LBG signal highlighted. The 24 hour WHO AQG level for $PM_{2.5}$ is shown in this right-hand figure for reference (15 µg/m^3).

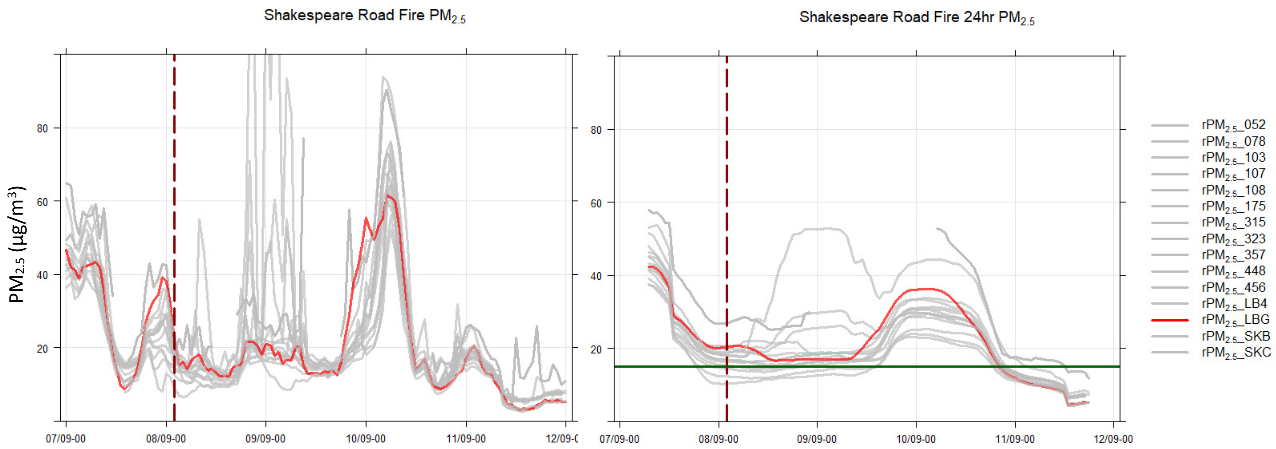

Figure 6: (Left) Plot showing data from the selected measurement sites used in this study. (Right) Plot showing calculated 24-hour rolling means of data from the selected measurement sites used in this study. (Both) London Background signal highlighted in red against signals from the other measurement sites in grey. Dashed lines show the approximate reported start time of the fire. The solid green line the WHO AQG level for $PM_{2.5}$ over a 24-hour window.

When the measured data is converted to a rolling 24-hour averages and compared against the WHO AQG guideline levels it can be seen that the LBG background was slightly above this level for most of the analysis period. For the period just after the fire up to the identified transboundary pollution transport event it is slightly above this threshold and during this regional episode increased by approximately 40 µg/m^3 over the threshold at one site.

Site	**52**	**78**	**103**	**107**	**108**	**175**	**315**	**323**	**357**	**448**	**456**	**LB4**	**SKB**	**SKC**	**LBG**
Mean	5.8	4.7	7.1	5.6	1.9	6.5	8.1	2.7	7.2	6.4	1.8	15.0	18.0	2.2	6.6
3rd Qu.	13.3	10.9	14.1	11.1	5.5	12.0	13.9	6.5	11.7	12.2	7.5	23.1	29.3	9.4	13.4
Max.	28.2	22.3	33.0	36.6	22.5	29.9	26.7	24.0	27.3	31.3	26.3	42.9	38.7	30.1	27.4

Table 7: Summary statistics for calculated 24 hour rolling averages of $PM_{2.5}$ after subtracting the WHO AQG.

Site	**52**	**78**	**103**	**107**	**108**	**175**	**315**	**323**	**357**	**448**	**456**	**LB4**	**SKB**	**SKC**
Mean	-0.8	-1.9	0.5	-1.0	-4.7	-0.2	1.5	-4.0	0.6	-0.3	-4.9	8.4	11.4	-4.4
3rd Qu.	0.0	-2.4	0.8	-2.3	-7.8	-1.4	0.6	-6.8	-1.7	-1.2	-5.9	9.7	15.9	-4.0
Max.	0.8	-5.1	5.5	9.1	-4.9	2.5	-0.8	-3.4	-0.1	3.9	-1.2	15.5	11.2	2.7

Table 8: Summary statistics for calculated 24 hour rolling averages of $PM_{2.5}$ after subtracting the WHO AQG and LBG 24 hour rolling average.

Summary statistics for calculated 24 hour rolling averages of $PM_{2.5}$ after subtracting the WHO AQG value are shown in table 7. With the differential values in green if lower than the WHO AQG and red if higher. All sites with sufficient reported data were above this threshold, including the LBG. Table 8 shows these same summary statistics after the LBG value is also removed again with the differential values in green if lower than the WHO AQG after LBG removed and red if higher. Of the fourteen sites selected as potentially reporting a signal which might be associated with the Shakespeare Road waste transfer station fire, eight had a positive increment over both the WHO AQG and LBG combined (note these values are for the whole analysis period). The peak 24 hour rolling average value during the elevated period associated with the Shakespeare Road fire was approximately 50 µg/m^3 , over three times the WHO AQG level.

6.3. Silver Town

Two reference sites and six Breathe London sites were identified in a 3 km radius of the Silver Town scrap metal recycling facility and selected for analysis (see figure 7 and table 9). There were additional reference stations just outside the 3 km radius area, but these showed no potential fire signals in the recorded $PM_{2.5}$ data over the selected analysis period(16/02/2024 00:00:00 to 21/02/2024 00:00:00).

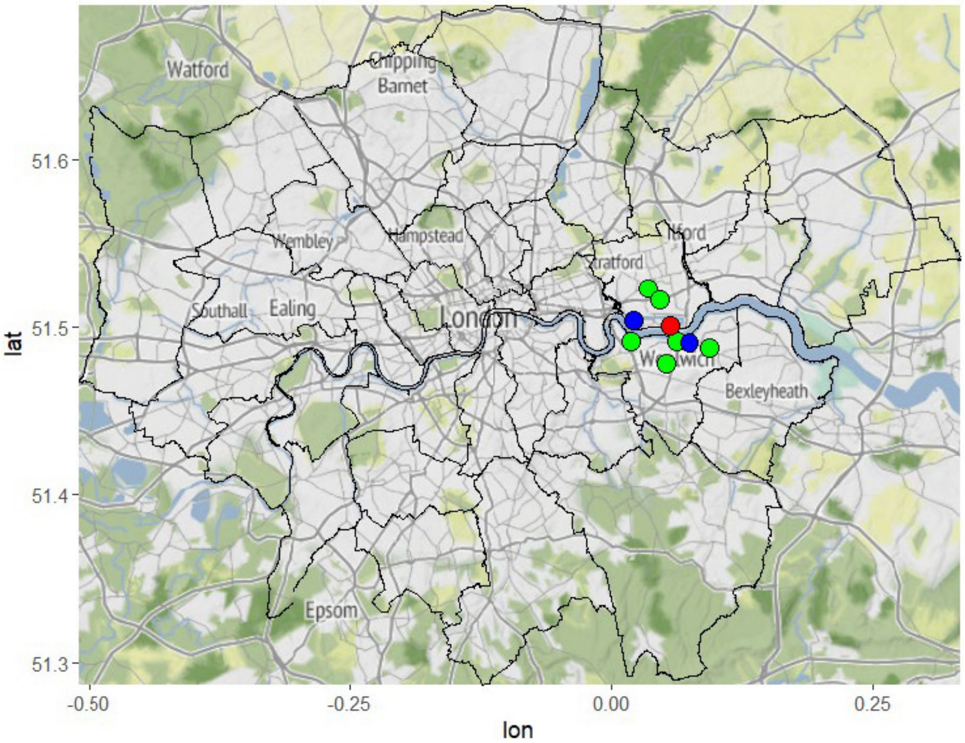

Figure 7: Map showing selected measurement sites used in this study. Where the red marker shows the fire location, the blue markers are reference sites and green markers are Breathe London sites.

Site Code	Site Name	Distance (km)	Bearing (Deg)
CLDP0024	Burrage Grove	1.65	147
GN0 (LAQN)	Greenwich - A206 Burrage Grove	1.65	147
CLDP0394	Ellen Wilkinson Primary School	1.93	346
CLDP0326	Queen Elizabeth Hospital	2.45	184
TL6 (LAQN)	Newham - Britannia Gate	2.5	283
CLDP0152	Horn Link Way j/w Peartree Way	2.8	236
CLDP0003	Newham University Hospital	2.97	340
CLDP0153	Ceres Road, j/w Bannockburn Road	2.99	133

Table 9: Table of selected sites (codes and descriptive names) as well as their distances and compass bearings from the fire.

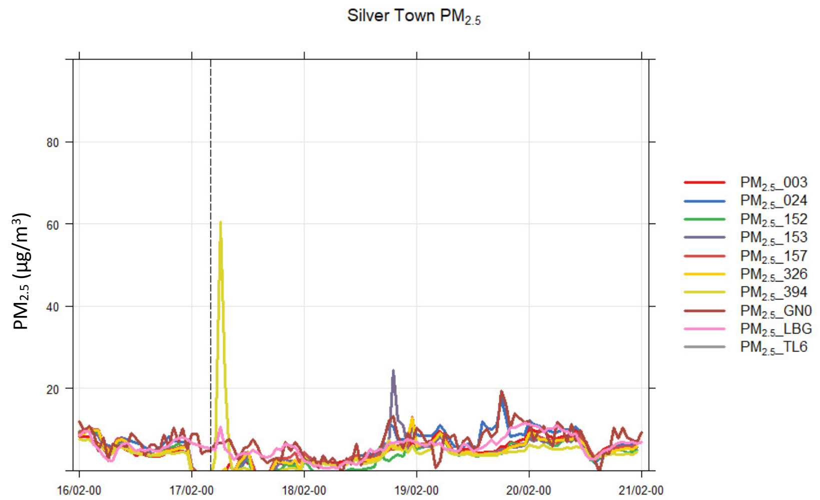

Figure 8: Figure showing data from the selected measurement sites used in this study. The dashed line shows the approximate reported start time of the fire.

Site	3	24	152	153	326	394	GN0	TL6	LBG
Mean	4.42	5.64	3.57	4.45	4.29	4	6.77	NA	5.8
3rd Qu.	6.1	8.82	6.1	6.01	6.24	5.14	9.04	NA	6.97
Max.	10.4	17.7	12.4	24.5	12.9	60.5	19.4	NA	11.6
NA's	1	1	1	1	1	1		121	

Table 10: Table of summarised data for selected sites (with truncated site codes) showing the mean, 3rd quartile and maximum values from the analysis period as well as the number of missing (NA) values for each site.

The $PM_{2.5}$ data from the sites selected for analysis are presented in figure 8 and summarised in table 10, both with additional data from the calculated London Background (LBG) added. An initial review of the data suggests no increase in $PM_{2.5}$ signals at all selected sites bar one after the fire is reported. When compared with regional background pollutant levels as represented by the calculated London Background it can be seen that the majority of $PM_{2.5}$ can be attributed to more regional air pollution as opposed to $PM_{2.5}$ from local sources such as the Silver Town fire. The plot on the left of Figure 9 shows the London Background signal highlighted against the signals from the other measurement sites. From this it can be seen that there is still potentially additional $PM_{2.5}$ measured for a short period at one site after the fire above this background value which could be potentially attributed to the selected fire event. The plot on the right of Figure 9 shows calculated rolling 24hour averages for the same data again with the LBG signal highlighted. The 15 µg/m3 WHO AQG level for $PM_{2.5}$ over a 24-hour window is also shown for reference.

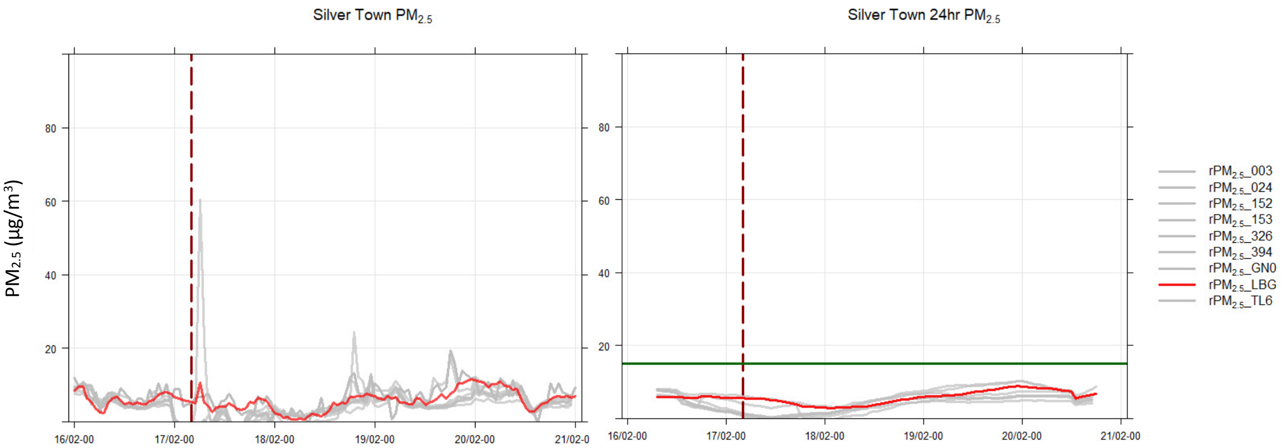

Figure 9: (Left) Plot showing data from the selected measurement sites used in this study. (Right) Plot showing calculated 24-hour rolling means of data from the selected measurement sites used in this study. (Both) London Background signal highlighted in red against signals from the other measurement sites in grey. Dashed lines show the approximate reported start time of the fire. The solid green line the WHO AQG level for $PM_{2.5}$ over a 24-hour window.

When considered as rolling 24 hour averages and compared against the WHO AQG guideline levels all sites were seen to be below these guidelines for this period and whilst a notable increase in $PM_{2.5}$ was reported at one site it was for a very short period of time though it could be associated with local events such as the Silver Town fire. This very short term increases did not significantly affected compliance with WHO AQG levels for $PM_{2.5}$ which are calculated over 24-hour windows.

Site	3	24	152	153	326	394	GN0	TL6	LBG
Mean	-10.8	-9.5	-11.7	-10.7	-10.9	-11.1	-8.3	NA	-9.3
3rd Qu.	-8.7	-6.7	-9.5	-8.9	-9.2	-10.2	-6.9	NA	-8.3
Max.	-7.6	-4.8	-7.3	-7.3	-7.0	-8.9	-4.8	NA	-6.2

Table 11: Summary statistics for calculated 24 hour rolling averages of $PM_{2.5}$ after subtracting the WHO AQG.

Site	3	24	152	153	326	394	GN0	TL6
Mean	-1.5	-0.3	-2.4	-1.5	-1.7	-1.8	1.0	NA
3rd Qu.	-0.4	1.6	-1.2	-0.6	-0.9	-1.9	1.4	NA
Max.	-1.4	1.3	-1.1	-1.1	-0.9	-2.7	1.4	NA

Table 12: Summary statistics for calculated 24 hour rolling averages of $PM_{2.5}$ after subtracting the WHO AQG and LBG 24 hour rolling average.

Summary statistics for calculated 24 hour rolling averages of $PM_{2.5}$ after subtracting the WHO AQG value are shown in table 11. With the differential values in green if lower than the WHO AQG and red if higher. All sites with sufficient reported data were above this threshold, including the LBG. Table 12 shows these same summary statistics after the LBG value is also removed again with the differential values in green if lower than the WHO AQG after LBG removed and red if higher. One site showed a positive increment of 1.3 µg/m^3 in this scenario as a result of the background $PM_{2.5}$ value being so low.

7. Conclusions

This initial review of three recent waste stream fires in the central London identified a number of measurement sites around each fire event which had the potential to provide information on increases in levels of pollutants from these fires as represented by $PM_{2.5}$. $PM_{2.5}$ is used here as a proxy for pollutants in general and the pollutants found in fire plumes in particular. These measurement sites included both reference sites and lower cost sensor sites to provide an insight into pollutants at the local to street scales. A distance-based approach (i.e. a 3 km radius around each fire) was selected for use after reviewing all available data across London for these periods. This was coupled with representative background pollutant levels for London and wider reporting on pollutant transport across London produced routinely by the ICL ERG measurement team. Further analysis has the potential to integrate London background and local winds and also consider measurements from outside the initially identified 3 km zone around each fire. The fires were selected based on fire service reports as being due to, or related to, disposal of lithium containing batteries and is not an exhaustive list of relatively recent and possibly suitable fires in London.

For the Brentford waste facility fire, an initial review of the data shows an increase in $PM_{2.5}$ signals at all selected sites after the fire is reported. However the majority of this increase in $PM_{2.5}$ can be attributed to regional air pollution. There is still potentially additional $PM_{2.5}$ measured for a short period after the fire above background values which could be reasonably attributed to the fire. The broader London background was in exceedance of WHO guidelines for this period though the short-term increases did not significantly affected compliance with WHO AQG guideline levels.

For the Shakespeare Road waste transfer station fire three distinct periods of interest were identified. A small increase in $PM_{2.5}$ signals at most of the selected sites directly after the fire is reported, a period of higher increases at most sites then an increase at all sites for a period, all separated by reductions in levels of $PM_{2.5}$. The third period of elevated $PM_{2.5}$ data can be ruled out in terms of direct local influences as it is also seen in the LBG signal (and wider analysis linked it to an episode of transboundary pollutant import from continent overnight). The period around the 9th of September midnight clearly shows a disparity between the background signal and $PM_{2.5}$ levels at the selected measurement sites. This is true for a subset of selected monitoring sites for the smaller elevated levels of $PM_{2.5}$ observed directly after the reported fire start time. The rolling 24-hour average LBG background was slightly above WHO AQG guideline levels for the period just after the fire up to the identified transboundary pollution transport event. During this regional episode the 24-hour average LBG background was approximately 20 $\mu g/m^3$ over the WHO AQG threshold. Eight of the fourteen measurement sites selected had a positive increment over both the WHO AQG and LBG combined. The peak 24-hour rolling average value of approximately 50 $\mu g/m^3$ at one site is over three times the WHO AQG level.

For the Silver Town scrap metal recycling facility fire, an initial review of the data suggests no increase in $PM_{2.5}$ signals (bar one site) after the fire is reported. With the majority of $PM_{2.5}$ attributable to more regional air pollution. There is still potentially additional $PM_{2.5}$ measured for a short period at one site after the fire above this background value which could be potentially attributed to the selected fire event. All sites were seen to be below the WHO AQG guidelines for this period with no significant impact on meeting WHO AQG levels for $PM_{2.5}$.

[i] Understanding waste streams: treatment of specific waste (europa.eu)

[ii] See Ambient Air Quality Directive (2008/50/EC) and the amending Directive (EU) 2015/1480.

[iii] See UK Air Quality Standards Regulations 2010

[iv] London Air Quality Network

[v] Air quality in England (airqualityengland.co.uk)

[vi] Breathe London

[vii] Waste facility fire - Brentford | London Fire Brigade (london-fire.gov.uk)

[viii] Fire at waste transfer station - Herne Hill | London Fire Brigade (london-fire.gov.uk)

[ix] https://love.lambeth.gov.uk/lambeth-herne-hill-fire-update/

[x] Scrapyard fire - Silvertown | London Fire Brigade (london-fire.gov.uk)

[xi] Cheng J, Schloerke B, Karambelkar B, Xie Y (2023). _leaflet: Create Interactive Web Maps with the JavaScript 'Leaflet' Library_. R package version 2.2.0, <https://CRAN.R-project.org/package=leaflet>

[xii] Carslaw, D. C. and K. Ropkins, (2012) openair --- an R package for air quality data analysis. Environmental Modelling & Software. Volume 27-28, 52-61.

[xiii] 9789240034433-eng.pdf (who.int)

About us

Material Focus is a new not-for-profit organisation – our vision is of a world where materials are never wasted.

Three I's inform and guide everything we do: inspiration, investment and insight.

Inspiration
We inspire people to change their behaviour. We do this through our Recycle Your Electricals campaign by revealing the hidden value of the materials in our electricals and by making it feel both easy (and normal) to reuse and recycle them.

Investment
We work with partners to expand the number, and type of collection points, making it easier for everyone to reuse and recycle their old electricals.

Insight
We fund technical research to overcome the barriers to reusing and recycling old electricals. Insight from this research galvanises new and innovative approaches to reuse and recycling, and supports enhancements to the UK waste electrical and electronic (WEEE) system.

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