Pollution Suppressant Application Routes and PM_{10} Monitoring Data from the London Air Quality Network

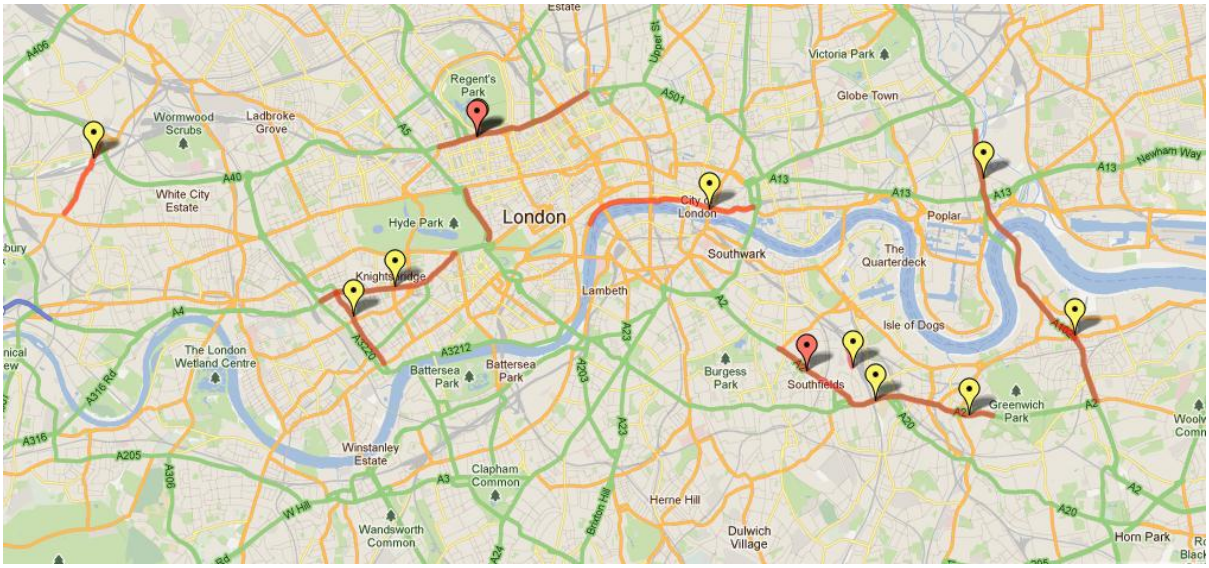
Introduction

This paper examines the application of calcium magnesium acetate dust suppressants ('pollution suppressants') by Transport for London and potential impacts on PM_{10} concentrations measured at air quality monitoring stations located close to the application routes. Clean Air in London has obtained documents from Transport for London detailing the initial 10 routes where pollution suppressants are now being applied.

What roads are being sprayed with pollution suppressants?

The map below shows 9 of the ten routes (in red) where pollution suppressants are currently being applied. The 10th, Manor Road, is some distance to the east of this map.

The markers represent air quality monitoring stations located on the routes. Monitoring stations represented by yellow markers are of the London Air Quality Network (LAQN) whilst those represented by red markers are also of the UK wide Automatic Urban and Rural Network (AURN).



The full map can be seen at http://g.co/maps/jgzhq

When (dates and times) are the pollution suppressants being applied?

The table overleaf summarises information provided by Transport for London on the intended application dates for the pollution suppressants. Note that the timings given are based upon pollution suppressant applications earlier in 2012 and may vary from the current timings.

Applications usually take place every day Monday to Friday, including Bank Holidays. They take place in distinct periodic sessions with set start and finish days. In between these sessions there may be cleaning of the road surface (power washing) or there may be no activity. Applications are normally suspended if TfL starts winter services, i.e. in freezing or snowy conditions. In the trial applications during early 2011 they also suspended when it rained, however the current guidelines do not mention this.

Route	Start and finish points	Start date	Finish date	Time range (historic)	Contractor	Notes
1. Victoria Embankment / Upper Thames St	Bayward Street to Northumberland Avenue	Wed 22/02/12	Fri 27/04/12	Start 23:30 to 2:00. Finish 0:00 to 2:30	Ringway Jacobs	n/a
2. Marylebone / Euston road	Kings Cross to Lisson Grove	Mon 19/03/12	Fri 27/04/12	Start 21:00 to 3:00. Finish 22:00 to 4:00	Ringway Jacobs	Do not treat Euston Road Underpass (of Tottenham Court Road)
3. Park Lane	Hyde Park Corner to Marble Arch	Mon 19/03/12	Fri 27/04/12	Start 22:10 or 1:10. Finish 22:20 or 1:20	Ringway Jacobs	Do not treat gyratories at either end. Treat only 2 nearside lanes (one pass)
4. Earls Court	Kings Road to Knightsbridge	Mon 19/03/12	Fri 27/04/12	Start 1:30 to 2:15. Finish 2:15 to 3:00	Ringway Jacobs	Only treat 2 nearside lanes where roads expand to 3 lanes
5. A2 corridor	Hyde Vale to Rotherhithe New Road	Mon 20/02/12	Fri 27/04/12	First run 23:00 to 23:30. Second run 1:15 to 1:45	Enterprise Mouchel	Treat once at start of shift and once at end of run
6. Blackwall tunnel	Blackwall Tunnel Approach to Devas Street	Mon 27/02/12	Fri 27/04/12	Start 23:40 to 23:50. Finish 00:10 to 00:20	Enterprise Mouchel	Do not treat underpass and roundabouts. Only treat nearside lanes
7. Mercury Way, Lewisham	Mercury Way to Mercury Way	Mon 19/03/12	Fri 27/04/12	Start 23:35. Finish 23:45	Enterprise Mouchel	
8. Horn Lane A4000, Ealing	Western Avenue to Horn Lane	Mon 20/02/12	Fri 23/03/12	Start 22.45 – 23:00. Finish 23:10	Ringway Jacobs	Treat 3 times per week: Sunday, Tuesday and Thursday Treat in both directions and only treat outside lanes on approach to Uxbridge Rd.
9. Manor Road, Bexley	Manor Road to Salde Green Road	Mon 20/02/12	Fri 27/04/12	Start 1:00. Finish 1:15	Enterprise Mouchel	
10. Woolwich rd, A 206, Blackwall tunnel underpass	Assume application take place alongside route 6	Mon 20/02/12	Fri 30/03/12 (TBC)	Assume application takes place alongside route 6	Enterprise Mouchel	Treat on roads underneath Blackwall Tunnel approach on A206

Are pollution suppressants applied in front of air quality monitors that exceed European limit values for PM_{10}?

Under European law the concentration of PM_{10} in ambient air must not exceed an average of 50 micrograms per m^3 on more than 35 days per year. In 2011 exceedances of this limit value were recorded at 12 monitoring stations in the London Air Quality Network.

Pollution suppressants are now being applied on roads that pass 8 of the monitoring stations that exceeded in 2011. An additional 6 monitoring stations that did not exceed the daily limit values in 2011 are also located on routes where pollution suppressants are applied, making a total of 14 monitoring stations located on the 10 routes.

Monitors *on* PS routes *that exceeded* in 2011	**PS applied 2011 (trials)?**	**PS applied 2011/12?**	**Notes**
Horn Lane	No	Yes	
Earls Court Road	No	Yes	
Marylebone Road	Yes	Yes	
Marylebone Road FDMS	Yes	Yes	
Upper Thames Street	Yes	Yes	
Blackheath	No	Yes	
Manor Road (West)	No	Yes	
Woolwich Flyover	No	Yes	
Monitors *not on* PS routes *that exceeded* in 2011	**PS applied 2011 (trials)?**	**PS applied 2011/12**	**Notes**
Brent Ikea	No	No	
Neasden Lane	No	No	Possibly starting application in 2012 (noted in Mayor's questions[1])
Bondway Interchange	No	No	Site affected by emissions from a Tube ventilation shaft (i.e. now unreliable)
Brixton Road	No	No	Site closing in 2012
Monitors *on* PS routes that *did not exceed* in 2011	**PS applied 2011 (trials)?**	**PS applied 2011/12**	**Notes**
Blackwall	No	Yes	Same route as Woolwich flyover
Cromwell Road	No	Yes	Same route at Earls Court Road
A2 Old Kent Road	No	Yes	Same route as Blackheath
New Cross	No	Yes	Same route as Blackheath
Mercury Way	No	Yes	
Manor Road (East)	No	Yes	Exceeded in 2010; exceedances now at the closely located Manor Road (West)

[1] See http://mqt.london.gov.uk/mqt/public/question.do?id=39912

With the exception of Brent Ikea and Neasden Lane all of the 'active' sites exceeding the daily limit value are located on routes where pollution suppressants are now applied. The Mayor has indicated that application may start at Neasden Lane at a later date.

Of the 6 monitoring stations located on pollution suppressant routes that did not exceed the daily limit value in 2011, all but one are on routes that also pass stations that reported exceedances (the exception is Mercury Way, an industrial site).

Is pollution suppressant application reducing exceedances of the PM_{10} daily limit value?

Transport for London's report on the 2011 trials of pollution suppressant application suggested that intensive application of calcium magnesium acetate (pollution suppressant) could reduce kerbside PM_{10} concentrations by 14%[2].

The table below lists 6 monitoring stations on pollution suppressant routes that have reported exceedances of the daily limit value during January to March 2012. It shows how many more exceedances of the PM_{10} daily limit value may have occurred if pollution suppressant was not applied under two scenarios:

- The theoretical maximum reduction (14%)
- A more modest reduction (10%)

It also shows on how many more days PM_{10} concentrations could have been high enough to trigger a high (or above) smog alert on the UK air quality index. Note that other air pollutants also affect smog alerts using the UK air quality index.

	Marylebone Road (FDMS)	**Marylebone Road**	**Horn Lane**	**Upper Thames Street**	**Earls Court**	**Blackheath**
2012 DLV exceedances	12	25	22	28	15	20
2012 PM_{10} high (and above) smog index days	0	1	2	2	5	2
Days above 43 ug (50 ug minus 14%)	20	40	34	38	27	30
Days above 45ug (50 ug minus 10%)	18	36	29	34	24	27
Days above 64.5 ug (75 ug minus 14%)	2	13	9	10	13	9
Days above 67.5 (75 ug minus 10%)	2	9	8	7	12	5
Potential reduction in DLV exceedance days (10% - 14%)	***6 – 8 (33-40%)***	***11 – 15 (31-38%)***	**7 – 12 (24-35%)**	**6 – 10 (18-26%)**	**9 – 12 (38-44%)**	**7 – 10 (26-33%)**
Potential reduction in high or above smog alert days (10% - 14%)	***2 – 2 (100%)***	***8 – 12 (89-92%)***	**6 – 7 (75-78%)**	**5 – 8 (71-80%)**	**7 – 8 (58-62%)**	**3 – 7 (60-78%)**

[2] See http://www.tfl.gov.uk/assets/downloads/corporate/dust-suppressant-results.pdf

The outlier (highest and lowest) figures are highlighted in italic font. Once the outliers are removed this analysis suggests that pollution suppressant application may have:

- Reduced exceedances of the daily limit value by between **6 and 12 days** depending on the monitoring station and assumed reduction
- Reduced the number of occasions that PM_{10} levels could have triggered a high or above smog alert by between **3 and 8 days** depending on the monitoring station and assumed reduction

Please note the following limitations of this analysis:

- The 14% reduction figure is a theoretical maximum if CMA was applied every day. This has not been the case to date and we know, for example, that CMA is only applied during week days and not at all in periods of bad weather.
- The monitoring data used is provisional data (it is too recent to be ratified)
- The air quality index is calculated using a rolling 24 hour average, whilst the figures used to produce the table are daily averages. The figures may therefore differ from those produced for the air quality index.

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