School Streets – Air Quality Details

Introduction

Air pollution is associated with several adverse health impacts; it is recognised as a contributing factor in the onset of heart disease and cancer. Additional air pollution particularly affects the most vulnerable in society: children and older people, and those with underlying heart and lung conditions.

'Air Quality' refers to the air around us and how many pollutants (harmful chemicals, particles or substances) it contains.

The two main pollutants of concern that the council monitor are:

- Particulate Matter (PM10 or 2.5) – Tiny bits of solid material suspended in the air. It can be made of a range of substances. Sizes range from <10µm to <2.5µm respectively.
- Nitrogen Dioxide (NO_2) – one of a group of gases referred to as Nitrogen Oxides (NOx)

To monitor these pollutant of concern two types of monitors are in use:

- Automatic monitors – These are most accurate and can provide hourly data. These can measure PM10, PM2.5, and / or NOx.
- Passive diffusion tubes – Provide monthly readings of NO_X

While diffusion tubes are not as accurate as automatic monitors they can be more widely deployed and can provide trends over a larger area and time period. Diffusion tubes are well known and a nationally approved monitoring technique.

Methodology to assess the impact of School Streets Implementation

Six trial School Streets have been introduced to the borough in order to create safer, cleaner and quieter neighbourhood as part of our Haringey Streets for People programme. The scheme aims to reduce through traffic and improve air quality. The Six School Streets are as follows:

- Trinity Primary SS25, Trinity Road.
- St Martin of Porres SS24, Blake Road.
- West Green Primary SS19, Woodlands Park Road.
- 7 Sisters Primary SS28, South Grove.
- Bruce Grove Primary SS02, Sperling Road.
- Belmont Junior SS20, Rusper Road.

Table 1 below gives the individual site details and locations of the diffusion tubes. There were five diffusion tube monitoring locations, and they are indicative of the relevant exposure at each School Street.

There is no AQ monitoring equipment located at Trinity Primary Academy or along the section of Trinity Road that is affected by the scheme, therefore this School Street has been excluded from our analysis.

Table 1: Details of Diffusion tube monitoring sites

Site Ref	Project	LTN	Full Monitoring Location Address
LTN/20	SS24	Bounds Green	St Martin of Porres Pr. School, Blake Road, Bounds Green, N11 2AF
LTN/3	SS19	St Ann's	West Green Primary School, Woodlands Park Rd, London N15 3RH
LTN/10	SS28	St Ann's	Seven Sisters Primary School, Edgecot Grove, London, N15 5HD
LTN/30	SS02	Bruce Grove	Bruce Grove Primary School, Sperling Road, London, N17 6UL
HR50	SS20	Bruce Grove	Belmont Junior School, Rusper Road, N22 6RA

Air quality varies over time due to a range of factors including climate fluctuations. Therefore, it is important to monitor over longer periods of time to identify and ensure the changes in air quality are due to the implementation of the School Street schemes, rather than due to the influence of weather conditions. Best practise advises that a year's worth of data should be used as a baseline.

Our diffusion tubes are collected and sent to an accredited laboratory for analysis on a monthly basis meaning our results are not immediate. Therefore, we only have seven months of data to compare for St. Martin of Porres Primary School, West Green Primary School, Seven Sisters Primary School and Bruce Green Primary School.

For Belmont Junior School we have 9 months of data.

More data analysis will be undertaken when there is more 'after School Street implementation' data available. However due to the interest and importance of air quality in the School Street scheme, we are including interim analysis to provide an initial view of Air quality and the impact the School Streets have had.

<u>Results: Air Quality diffusion tubes</u>

Tables 2 – 5 below use NOx data from diffusion tubes only.

Values highlighted in bold indicate an exceedance of the NO_2 national limit of 40 µg m-3

Values highlighted in green indicate an improvement.

Values highlighted in amber indicates a worsening of air quality whilst remaining within the national limits.

Values highlighted in red indicate an exceedance of national limits.

Please note the values reported in tables 2 – 5 are raw diffusion tube data to allow for a monthly comparison. Values are rounded to the nearest whole number.

Table 2: Raw monthly diffusion tube NOx data before and after School Street implementation (June-December)

	NOx - Raw Monthly Data (µg/m3)													
	2021							2022						
Monitoring Location Address	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
St Martin of Porres Primary School	16	16	12	24	24	25	29	-	15	21	18	27	32	27
West Green Primary School	18	17	14	27	25	29	28	14	19	20	29	31	28	30
Seven Sisters Primary School	16	17	12	26	26	25	28	33	29	26	33	**44**	20	38
Bruce Grove Primary School	35	36	24	42	35	43	31	31	33	26	**41**	39	**40**	**40**

Table 3: Difference in Raw monthly diffusion tube NOx concentrations, and percentage difference. After School Steet Implementation (June-December)

	NOx - Raw Monthly Data													
	Improvement / Worse (µg/m3)							Improvement / Worse (%)						
Monitoring Location Address	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jun	Jul	Aug	Sep	Oct	Nov	Dec
St Martin of Porres Primary School	-	-1	9	-6	3	7	-2	-	-6%	75%	-25%	13%	28%	-7%
West Green Primary School	-4	2	6	2	6	-1	2	-22%	12%	43%	7%	24%	-3%	7%
Seven Sisters Primary School	17	12	14	7	18	-5	10	106%	71%	117%	27%	69%	-20%	36%
Bruce Grove Primary School	-4	-3	2	-1	4	-3	9	-11%	-8%	8%	-2%	11%	-7%	29%

Table 4: Raw monthly diffusion tube NOx data before and after School Street implementation (April-December)

	NOx - Raw Monthly Data (µg/m3)																	
	2021									2022								
Monitoring Location Address	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Belmont Junior School	19	19	16	16	15	21	22	25	25	27	14	12	20	20	20	28	30	-

Table 5: Difference in Raw monthly diffusion tube NOx concentrations, and percentage difference. After School Steet Implementation (June-December)

	NOx - Raw Monthly Data (µg/m3)																	
	Improvement / Worse (µg/m3)									Improvement / Worse (%)								
Monitoring Location Address	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Belmont Junior School	8	-5	-4	4	5	-1	6	5	-	42%	-26%	-25%	25%	33%	-5%	27%	20%	-

While the above allows for a monthly comparison this data is raw with no bias adjustments applied, therefore there are limitations to this dataset. To better understand the impact of the School Streets, the bias adjusted annual means from both 2021 (prior to School Street implementation) and 2022 (after School Street implementation) have been compared.

Table 6 below shows the 2021 and 2022 annual mean comparisons for each School Street.

Table 6: Bias adjusted annual mean NOx comparisons for School Streets – 2021 and 2022

NOx (µg/m3)				
Full Monitoring Location Address	**2021 Bias Adjusted Mean (Before)**	**2022 Bias Adjusted Mean (After)**	**Improvement /Worse**	**%**
St Martin of Porres Primary. School, Blake Road, Bounds Green, N11 2AF	20.8	22.0	1.2	5.9%
West Green Primary School, Woodlands Park Rd, London N15 3RH	22.5	21.7	-0.8	-3.6%
Seven Sisters Primary School, Edgecot Grove, London, N15 5HD	31.1	29.3	-1.8	-5.9%
Bruce Grove Primary School, Sperling Road, London, N17 6UL	35.1	33.6	-1.5	-4.4%
Belmont Junior School, Rusper Road, N22 6RA	19.2	20.8	1.6	8.3%

In summary the table above shows:

- In the post implementation period, average NOx concentrations at all of the monitoring locations are well within the annual national objective of 40 µg/m3.

- Out of the five School Streets from which AQ data could be obtained 3 show an improvement and 2 show no improvement. Therefore 60% of the School Streets show an improvement.

- Improvements range from 0.8 – 1.8 µg/m3.

To put these results into a wider context, they have been compared to three long standing borough wide automatic monitoring stations (see table 7 below).

Table 7: Bias adjusted annual mean NO_2 comparisons for Borough Wide sites – 2021 and 2022

NO_2 (µg/m3)					
Site Ref	**Full Monitoring Location Address**	**2021 Bias Adjusted Mean**	**2022 Bias Adjusted Mean**	**Improvement /Worse**	**%**
UKA00260	Haringey Roadside 639, High Road	32	31	-1	-3%
UKA00568U	Haringey South Priory Park	18	31	13	72%
HG005	Haringey Wood Green, 14 High Rd Hornsey, London N22 6HH	44	44	0	0%
-	**Borough Wide Air Quality (Mean)**	31.3	35.3	4	13%

Table 7 shows that on average Haringey as a borough has seen an increase of air pollutants in 2022 compared to 2021, with a 13% increase in NO_2 concentrations. This can be explained by an increase in traffic and cars on the roads post COVID 19.

Tables 6 and 7 show that the increase in NO_x measured for St Martin of Porres Primary. School and Belmont Junior School are lower than Haringey's borough wide increase in NO_2 (5.9% and 8.3% respectively compared to a borough wide increase of 13%.). Therefore, whilst it is true that the concentration of NO_x has increased along these School Streets, this increase is lower than the borough wide average.

It is likely that, without the implementation of these Schools Streets, the increase in NOx concentrations would be comparable to that seen in the wider borough.

In conclusion, the tables presented above show:

- On average, Haringey as a borough has seen an increase of air pollutants in 2022 compared to 2021, with a 13% increase in NO_2 concentrations.

- In the post implementation period, average NOx concentrations at all the School Street monitoring locations are well within the annual national objective of 40 μg/m3.

- Out of the five School Streets from which AQ data could be obtained, 3 show an improvement and 2 show no improvement. Therefore 60% of the School Streets show an improvement post-implementation.

- Improvements range from 0.8 – 1.8 μg/m3.

- Whilst two School Streets do not show an improvement in AQ post-implementation, when this data is put into a wider borough context, the two school streets show an improvement in comparison to borough wide trends.

- From the analysis of the overall results, the continuation of the scheme is recommended.

- Air quality varies over time due to a range of factors including climate fluctuations. Therefore, it is important to monitor over longer periods of time to identify and ensure the changes in air quality are due to the implementation of the School Street schemes, rather than due to the influence of weather conditions. Best Practise advises that a year's worth of data should be used as a baseline, calculated means should be "annualised" if valid data capture for the calendar year is less than 75% and greater than 25% and that calculated annual means should be appropriately bias adjusted. This ensures that robust datasets can be produced, allowing for accurate analysis to be undertaken.

- These conclusions are based on only seven months' worth of data. By continuing with the current schemes, more "after School Street" data will be available. This will allow for further analysis to be undertaken, which can then provide insight in how best to alter and modify the School Streets schemes.