# The Mayor of London's Nursery Air Quality Audit Programme

## Columbia Market Nursery, London Borough of Tower Hamlets



FEBRUARY 2020

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# THE MAYOR'S NURSERY AIR QUALITY AUDIT PROGRAMME

**Columbia Market Nursery – London Borough of Tower Hamlets**



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## DISCLAIMER

The contents of this report and its recommendations are principally based on the findings of the independent audit as of the date it was undertaken, and may not account for subsequent changes in local policy, conditions and/or circumstances in and/or around the nursery.

## Supplier



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# NON-TECHNICAL EXECUTIVE SUMMARY

Long-term exposure to poor air quality contributes to thousands of premature deaths in London. The Mayor wants London to have the best air quality of any major world city by 2050. Young children are amongst the most vulnerable to air pollution's effects. Toxic air can stunt their growth, causing significant health problems in later life.

In May 2018, the Mayor launched a programme of air quality audits to help clean up toxic air and protect the health of young children in 20 nurseries in some of London's most polluted areas.

The **Air Quality Audit** followed a structured approach, with desktop research and air quality modelling, followed by fieldwork and air quality monitoring. Recommendations were then developed based on the consultations with nursery staff and borough officers.

The audit has assessed both outdoor and indoor air pollution levels.

Outdoor pollutants are generated by industrial processes and traffic emissions, and can migrate indoors through windows, doors and other means of ventilation.

Indoor air pollution arises from a mixture of pollutants generated inside a building including building materials and furnishings, and through activities such as cooking, heating, smoking and use of paints, varnishes, cleaning products and air fresheners.

Indoor air pollution is still a relatively new area of study, and our understanding is still evolving as further evidence is collected on the complex interactions taking place, and the extent to which they affect our health.

## Audit Findings

**Nitrogen oxides (NO$_x$)** - Short-term exposure to concentrations of NO$_2$ can cause inflammation of the airways, increasing susceptibility to respiratory infections and to allergens.

The results of the three-month baseline monitoring showed that NO$_2$ concentrations were highest at the **roadside** (44µg/m³), with local road traffic emissions contributing significantly to roadside concentrations.

The three months of baseline NO$_2$ monitoring provides a snap-shot of concentrations in and around the nursery across the winter and spring months. In each month, the measured NO$_2$ concentrations exceeded the legal limits (annual mean NO$_2$ national Air Quality Objective of 40µg/m³).
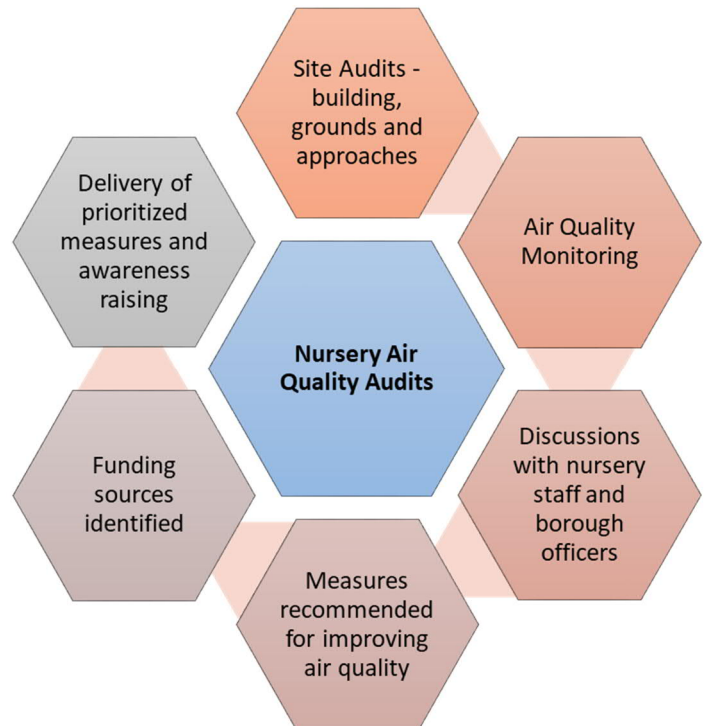
$NO_2$ concentrations fall to 31µg/m³ in the **playground**, which is partially screened from traffic by fencing and some trees and shrubs. Concentrations at the **nursery entrance** are higher (42µg/m³) than the playground. Inside the nursery concentrations fall to 29-33µg/m³.

**Volatile Organic Compounds (VOCs)** are emitted from vapours arising from petrol and solvents. In a nursery setting these are likely to originate from a wide variety of products, including furnishing, carpets, upholstery, cleaning products and air fresheners. In the UK, building regulations recommend total Volatile Organic Compounds (TVOCs[1]) concentrations should be below 300 µg/m³. In the nursery they were found to be 433 µg/m³. Within the December samples the majority of VOCs detected were hydrocarbons and likely to be from passing traffic. In the March sample VOC chemical species were identified as being likely to be indoor pollutants, and included fragrances, perfumes and alcohols, likely to be products derived from use of cleaning materials and solvents.

**Formaldehyde** are emitted from vapours arising from solvents and adhesives. In a nursery setting these are likely to originate from glues, adhesives and finishing's. Exposure can cause burning sensations of the eyes, nose, and throat, coughing, wheezing, nausea and skin irritation. The World Health Organisation (WHO) indoor air quality guideline[2]. The World Health Organisation (WHO) indoor air quality guideline for short and long-term exposures to formaldehyde is 100 µg/m³. In Columbia Market they were found to be 10.16 µg/m³.

The wider area around the nursery was assessed using the London Atmospheric Emissions Inventory (LAEI), which showed that pollution levels reducing with distance, away from the heavily trafficked Hackney Road. $NO_2$ **concentrations are predicted to be highest along the southern boundary of the nursery**, which is closest to the main road.

**Particulate Matter** ($PM_{10}$ and $PM_{2.5}$)[3] is derived from a wide range of sources, including industrial processes, road traffic, dust and brake and tyre wear. The fine component of $PM_{10}$, known as $PM_{2.5}$, is formed by combustion and is believed to be the main cause of the harmful effects of particulate matter.

**Nearly 50% of $NO_x$ emissions in London are from road transport**. Larger diesel vehicles in particular are major contributors to local air pollution. Approximately **8,300 vehicles per day travel** within 200m of the nursery. Buses make up only 4% of these vehicle movements, but contribute 30% of the transport related $NO_x$ emissions locally. Similarly, HGVs only account for 8% of the total traffic but contribute 35% of emissions. Cars account for 19% of emissions.

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[1] TVOC is a grouping of a wide range of organic chemical compounds to simplify reporting when these are present in ambient air or emissions.

[2] Chapter 5.8 Formaldehyde. WHO Air Quality Guidelines – Second Edition, 2001

[3] $PM_{10}$ is particulate matter with an aerodynamic diameter of less than 10 micrometres (10µm). $PM_{2.5}$ is particulate matter with an aerodynamic diameter of less than 2.5 micrometres (2.5µm).

### Key observations – summary of potential issues

- Nursery is located close to the busy Hackney Road, which is a heavily trafficked road and the principal source of emissions
- Development sites and associated construction traffic travelling on nearby Hackney Road will be contributing significantly to local emissions.
- Through traffic on Columbia Road. While the road is traffic calmed it is wide and straight with narrow footways which give the gives the impression of vehicle dominance.
- No school keep clear markings outside school and pedestrian guard railings not in correct position.
- The footways immediately surrounding the nursery are unsatisfactory in terms of drop kerbs and narrowness at pinch points. Side road crossings, especially Pelter Street is long and provision for vulnerable pedestrians is not adequate
- Wooden structure of older building and windows has poor thermal performance resulting in overheating in summer and cold spots in the winter. Reliance on natural ventilation through opening windows /doors, and so resulting in greater exposure to outdoor emissions.
- The heating system has been added to in piecemeal fashion and is not performing well with some rooms overheating and others being cold. The lack of efficiency is resulting in additional gas being burnt meaning an increase in emissions.
- The playground is exposed to emissions and particulates from the road

### Audit Recommendations

The Mayor is implementing a significant programme of London-wide measures to improve air quality, including the introduction of the Ultra-low Emission Zone, tougher emission standards for the London wide Low Emission Zone, and the introduction of low emission buses, which will contribute significantly to addressing some of the issues identified.

Based on the preceding desktop research, site audits and stakeholder feedback, a range of **recommended measures and initiatives** have been identified. See Table 4 for full list of measures. Some of the key measures were considered to be:

- **Green Infrastructure** - The nursery playground is separated from Pelter Street by a tall chain link fence. This could be replaced by a green wall that will provide a screen for emissions, provide visual amenity, improve ambiance and provide a teaching aid for children.
- **Heating and Cooling** - The uneven temperatures in the building at different times of the year especially in the wooden constructed part of the building, create additional burning of the gas boilers and opening of windows to ventilate exposing children to emissions. Review scope for improving building insulation, reducing heat gain in hot weather, and where not already in place, install thermostatic radiator valves to enable more efficient heating. Lessening incidences of winter overheating that result windows and doors being opened, and worsening exposure to pollution from the nearby roads. Reducing energy usage, and potentially boiler run-times and associated emissions.
- **Removal of redundant crossover/ improvements to footway on Columbia Road** - The nursery was keen to remove the redundant vehicular crossover at its pedestrian entrance as children were liable to run straight into the road as there is no kerb edge. This could be implemented with a package of measures on Columbia Road, including widening the footway

removing the parking bays, installing pocket parks with additional planting, pop up children characters.

- **School Street** - A School Street at drop off and collection times on Columbia Road at the nursery would be beneficial to and encourage the uptake of walking and other sustainable modes of travel to nursery.

## Next Steps

In working with the nursery and air quality and transport borough officers to complete the air quality audit, we found there to be a passionate group of individuals, who were enthusiastic about improving local air quality for the children, and the wider community as a whole.

The **borough and nursery should investigate the scope for rapidly delivering key measures** from the recommendations.

To take forward the recommendations, the nursery and borough will need to continue to work closely, building on the relationships already in place. A wide range of **potential funding** sources are identified within the report (See Appendix F), and boroughs and nurseries are encouraged to apply for these where appropriate to maximise the potential for delivering the recommendations.

Each nursery will be given a starter grant of £4,500 by the GLA to help kick-start the implementation of recommendations. The GLA will liaise with the nurseries and boroughs to agree which recommendations the grant will be used for.

## Summary of Nursery related recommendations

The full range of recommendations primarily applicable to the nursery, as opposed to highways measures to be delivered by the borough or TfL, are as follows. See Table 4 for further details on these measures.

**Nursery Grounds**

| Green Infrastructure |
| --- |

**Nursery Building**

| Improved heating and insulation |
| --- |
| Monitor London Air website / app |
| Air Filtration Systems |
| Add indoor plants |

**Behavioural Measures**

| Engagement Activities |
| --- |
| Behaviour change |
| Attain a Silver Award in Stars |
| Staff Engagement |
| Prepare 'Welcome Packs' for new pupils / parents |
| Promoting Park & Stride |
| Promoting car sharing |
| Anti-idling campaign |
| Walking Buses |

# 1.    INTRODUCTION

## 1.1.    BACKGROUND

1.1.1.    Long-term exposure to poor air quality contributes to thousands of premature deaths in London. There is strong scientific evidence of the acute health effects of short-term exposure to very high pollution levels experienced during air pollution episodes.

1.1.2.    Tackling air pollution is one of the Mayor of London's top priorities, and he recognises that co-ordinated action is required to reduce exposure, especially amongst the most vulnerable such as young children, whose lungs are still developing.

1.1.3.    The London Environment Strategy, published in May 2018, seeks to reduce the number of Londoners whose lives are blighted by poor air quality. The Mayor wants London to have the best air quality of any major world city by 2050, going beyond the legal requirements to protect human health and minimise inequalities. This include commitments to act to improve air quality in and around schools and nurseries and provide enhanced information to Londoners.

**Why Nurseries?**

1.1.4.    The Mayor is particularly concerned about the impacts of poor air quality on vulnerable groups such as children, the elderly and those with pre-existing health conditions such as asthma and cardio-vascular diseases. Young children are amongst the most vulnerable of the at-risk groups, as their lungs are still developing, and toxic air can stunt their growth, causing significant health problems in later life. The World Health Organization (WHO) also recognises younger children as being a vulnerable group to air pollution, making nurseries a key consideration in improving air quality.

1.1.5.    A study led by Kings College in East London found that primary school children had on average 5% lower lung capacity than those growing up in rural areas. A UNICEF report published in December 2017 highlights the impact of air pollution on the critical growth that occurs in the brain in the first 1,000 days of life, making children exposed to pollution more vulnerable to developmental problems. UNICEF estimate that 17 million children globally are breathing air so toxic it is affecting their brain development. Air pollution exacerbates asthma, which affects 1 in every 11 children in England.

**The Mayor's Nurseries Air Quality Audits**

1.1.6.    In May 2018, the Mayor launched a programme of air quality audits to help clean up toxic air and protect the health of young children in 20 nurseries in some of London's most polluted areas. The nurseries were selected based on assessments of predicted annual mean nitrogen dioxide ($NO_2$) and particulate matter ($PM_{10}$ and $PM_{2.5}$) levels near the nursery, and in agreement with the respective local authority.

1.1.7.    The aim is to establish a robust process and toolkit of measures, which the London boroughs and nursery schools can roll out, so that every nursery that is located in an area of high pollution can benefit from this approach.

1.1.8.    This programme builds on the approach founded in the Mayor's School Air Quality Audit Programme completed in March 2018, and the audit reports the Mayor recently commissioned on indoor air quality in London's primary schools, which included the Toolkit of Measures to Improve Air Quality at

Schools.[4] The programme is led and funded by the Greater London Authority (GLA) and the audits were conducted by global engineering consultancy WSP, who have visited each of the nurseries, assessing indoor and outdoor air pollution sources, and how children travel to the nurseries.

1.1.9. Road transport is a major contributor to emissions, and has a significant impact on air quality, accounting for around half of $NO_x$ emissions. Whilst private car use is decreasing, congestion is increasing[5]. Without significant intervention, as the Capital grows rapidly these trends are set to continue.



1.1.10. In response the Mayor is implementing a significant programme of measures, including bold proposals to reduce London's deadly air pollution and protect the health and wellbeing of all Londoners, including:

- **The Ultra Low Emission Zone** (ULEZ) launched in central London on 8 April 2019. It replaced the T-Charge (Toxicity Charge) and means that vehicles that do not meet the strict ULEZ emissions stands are charged to drive in the zone, 24 hours a day, every day of the year. It is expected that the ULEZ will reduce road transport emissions of nitrogen oxides ($NO_x$) by around 45 per cent in the central London zone.
- **Expanding the ULEZ and tightening the Low Emission Zone (LEZ).** The ULEZ will expand to inner London, up to the North and South Circulars, in October 2021, and emissions standards for heavy vehicles in the London-wide LEZ will be tightened (to Euro 6) in October 2020.
- **Cleaning up London's buses.** The Mayor is transforming London's bus fleet with a retrofit programme covering thousands of buses, and only procuring hybrid or zero emission double decks since 2018.
- **Cleaning up the taxi fleet**. From 2018, TfL has stopped new diesel taxis from being licensed in London and all new taxis need to be zero emission capable. TfL provide financial incentives to enable this switch to cleaner taxis and over 175 rapid charge points have been installed, with many dedicated to the trade.
- **Low emission neighbourhoods –** have been funded across London to pioneer measures to promote the use of low emission vehicles and improve local air quality, including low emission

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[4] https://www.london.gov.uk/sites/default/files/school_aq_audits_-_toolkit_of_measures_dr_v3.3.pdf

[5] London Assembly, London stalling: Reducing traffic congestion in London, January 2017, Transport for London, Travel in London - Report 9 data, 2017

vehicle only streets, measures to promote deliveries by cycle cargo bikes and low emission vehicles, and bold proposals to promote walking and cycling.

- **The London Environment Strategy** – is an ambitious strategy, with a particular focus on air quality published in 2018, and seeks to address the most urgent environmental challenges facing London, to safeguard its environment over the longer term. This strategy establishes aims for London, which include having the best air quality of any major city, and a zero-carbon city by 2050, with energy efficient buildings, clean transport and clean energy. The Mayor is providing funding through his Greener City Fund to create and improve green spaces and to plant trees.
- **The Draft London Plan -** published in November 2017, places a considerable emphasis on air quality. The aim of policies is to ensure that new developments are designed and built, as far as is possible, to improve local air quality and reduce the extent to which the public are exposed to poor air quality.
- **Healthy Streets Approach** - the Mayor is embedding the 'Healthy Streets' approach in transport strategy. This promotes a holistic approach to improve the health, liveability, social cohesion and economic prosperity of an area.
- **The Mayor's Transport Strategy 2018 -** The Mayor has set out ambitious plans to improve transport in London over the next 25 years. The Mayor's ambition for 80% of trips in London to be made on foot, by cycle or using public transport by 2041, and a commitment to make the entire transport system zero-emission by 2050.

1.1.11. These measures are already starting to have a measurable impact on pollution levels in London. However, the Mayor also wanted to take early action at 20 nurseries located in areas with some of the highest air pollution levels, so has provided £250k funding to commission this programme.

1.1.12. The Mayor's Nurseries Air Quality Audits Programme follows the approach developed as part of the Mayor's School Air Quality Audit Programme, identifying a combination of hard-hitting measures and quick win improvements, to minimise the impacts of toxic air on nursery children in some of the worse affected areas across London. This is both in terms of reducing the sources of harmful emissions, as well as reducing the exposure to these emissions.

## 1.2. OBJECTIVES

1.2.1. The key objectives of the Mayor's Nurseries Air Quality Audit Programme are to:

- Audit and identify the sources of poor outdoor air quality and exposure by children at 20 state-funded nurseries and their surrounding nursery catchment areas, including $NO_2$, $PM_{10}$ and $PM_{2.5}$.
- Audit and identify the sources of poor indoor air quality and potential exposure by children attending the nurseries, and establishing a baseline of indoor air quality.
- Assess the feasibility of installing air filtration systems at the selected nurseries.
- Trial and monitor the effectiveness of air filtration systems in at least 5 of the nurseries.
- To identify, evaluate and recommend measures within and around the nurseries' that will help a borough and nursery to reduce particulate matter, emissions and children's exposure to poor air quality, and award grant funding to deliver some of the recommended measures.
- To engage nursery communities and raise awareness about the impacts of air pollution, including an introduction to Transport for London's STARS programme and the GLA's Healthy Early Years London Programme.
- To engage eligible London boroughs and other relevant stakeholders to inform the context and feasibility of the proposed recommendations.

# 2. AUDIT APPROACH

## 2.1. OVERALL AUDIT APPROACH

2.1.1.  The Mayor's Nurseries Air Quality Audits follow the structured approach established through the preceding audit programme of Primary Schools, but this time included air quality monitoring of both indoor and outdoor air pollution. The structured approach the audit followed is summarised in Figure 1 below.

**Figure 1 – Overview of Approach**
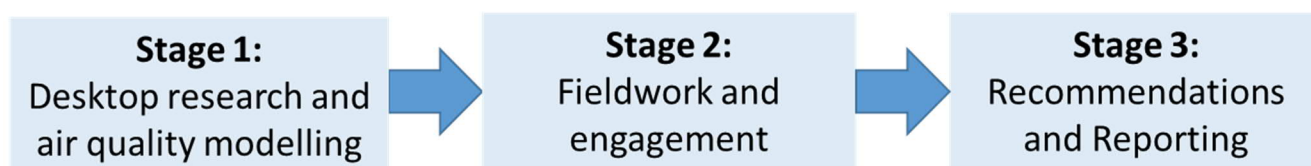


2.1.2.  Each audit consists of broadly three key stages:

**Stage 1: Desktop research and air quality modelling**

2.1.3.  Prior to the site visit **air quality modelling** was undertaken for the area around the nursery, with an assessment of the contribution to emissions made by each vehicle type on the roads around the nursery.

2.1.4.  A **desktop review** of the local areas around the nursery site, and the wider catchment was also undertaken, to highlight key features for the auditor to assess further on site. This includes sources of pollution, causes of exposure, and notable features in the local area which may have a bearing on the potential mitigation measures (i.e. bus routes, pedestrian crossing locations, nearby construction sites, physical barriers such as railways or rivers). The nurseries STARS[8] travel plan progress was also reviewed for reference ahead of the audits.

**Stage 2: Fieldwork and consultation**

2.1.5.  A site visit to the nursery was undertaken by the WSP auditor anthe borough officer who deals with air quality..

2.1.6.  Observations were undertaken with the borough officers and nursery staff during the peak arrival/ departure time, to capture as much information as possible on drop-off and waiting activity in and around the nursery, **identifying external sources of emissions** close to the nursery, and the areas where the children are exposed to poor air quality when approaching the nursery.

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[8] STARS is TfL's accreditation scheme for London schools and nurseries, promoting travel to school sustainably, actively, responsibly and safely by championing walking, scooting and cycling.

2.1.7. The external observations were then followed by an **audit of the building and grounds** which was undertaken with the assistance of the facilities manager, to enable the auditor to familiarise themselves with its layout, and the proximity of classrooms and playgrounds to areas of poor air quality. The audit included a review of the nurseries boilers, and considered features likely to lead to emissions of indoor air pollutants, such as building ventilation, evidence of fresh air intrusion, and identifying use and location of potential pollutant sources.



2.1.8. A key element of the audits was to capture the views of nursery staff, the wider nursery community, and relevant borough officers, to gain an understanding of operational considerations, behavioural traits and recent history of the nursery.

2.1.9. A **brainstorming session** was then undertaken, with staff from the nursery and the borough officer in attendance. This session served several functions. It enabled the auditor to capture additional information on other issues and concerns not observed directly, and additional information on issues such as whether there are any plans for extensions or additional pupil intake for example. Whilst from the borough officers, we could establish what planned or committed development is nearby, proposed or previously considered transport schemes etc. We then discussed a range of potential measures to address the issues discussed and collected feedback and suggestions from the borough and nursery representatives to inform the recommended measures.



2.1.10. Nursery staff were also consulted regarding what they felt would be the most suitable and effective form of **engagement activity**, which could be undertaken at the nursery to raise awareness of air pollution, its causes, the health impact, and a range of measures to reduce air pollution.

2.1.11. A 3-month baseline **air quality survey** was undertaken to monitor Nitrogen Dioxide ($NO_2$), Formaldehyde and Volatile Organic Compounds (VOCs) at sites both inside and outside the nursery building, in order to capture any attenuating influence the indoor environment may have on $NO_2$ concentrations.



### Stage 3: Recommendations and Reporting

2.1.12. The auditor reviewed the findings of the audit and preparatory assessments, with the specialist support of air quality, transport planning and buildings specialists, to develop advice and recommendations. The auditor was also able to draw on an updated version of the toolkit of best practice measures and case study examples, developed for the previous primary school audit programme.

## 2.2.  AUDIT SCHEDULE – COLUMBIA MARKET NURSERY

2.2.1.  Table 1 provides further detail of the audit schedule and key participants from the nursery and borough.

**Table 1 – Audit Details**

| Date of Audit | Wednesday 19th December 2018 | |
|---|---|---|
| Nursery Representatives | Lynn Cottle (Headteacher) | |
| Borough Representatives | Nicholas Marks – Air Quality Officer | |
| WSP Auditors | Martin Battle / Alessandro Ciampechini | |
| **Itinerary** | **Timings** | **Description** |
| | 0800 – 0900hrs | Initial observations and site familiarisation by WSP auditors |
| | 0915 – 1030hrs | Brainstorming Workshop with key staff from the nursery and borough officers. |
| | 1030 – 1045hrs | Site walk and observations with borough air quality officers/ school transport officer/ nursery staff |
| | 1045 – 1100hrs | Audit of building and grounds to appreciate the layout of the building/playgrounds etc. accompanied by the bursar/caretaker |
| | 1100 - 1115hrs | Further observations and completion of site audit template |

# 3. CONTEXT AND INITIATIVES

## 3.1. NURSERY CONTEXT

**Figure 2 - Nursery Context**

**Borough:** Tower Hamlets

**Address:** Columbia Road, E2 7PQ

**Pupil Numbers:** 80

**Age Range:**
3-5 years

**Gender:**
Mixed

**Type:** Local authority nursery school

**Deprivation Rank:** 1

**Children who speak English as an additional language:**

Higher than average

**Children with disabilities or special educational needs:**

Average

**How do pupils currently travel to / from School:**

9% Car

11% Cycle

14% Other (scooters, buggies etc)

16% Public Transport

50% Walk
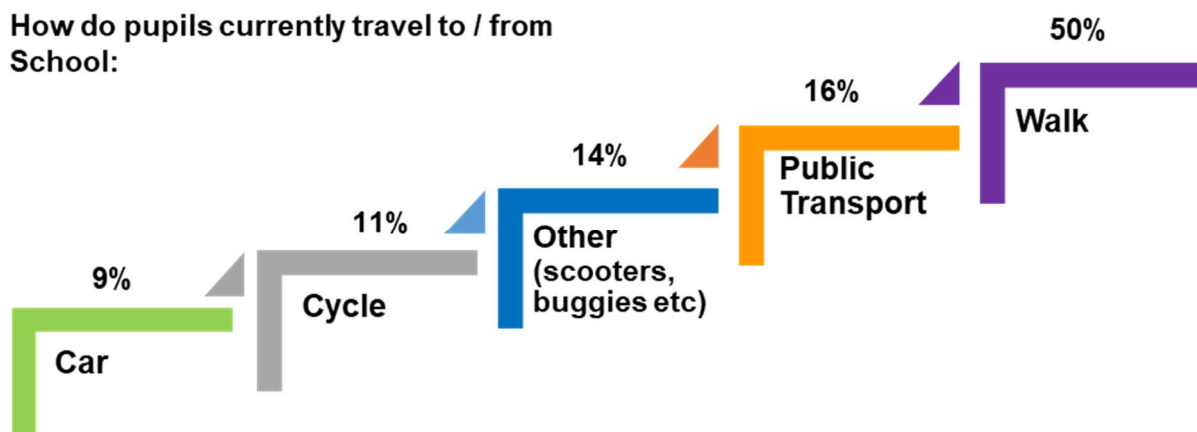
3.1.1.  **Columbia Marke**t nursery is located in inner London within he Borough of Tower Hamlets. The main entrance is situated on to Columbia Road, which is a through road but bound with residential properties.

3.1.2.  Approximately **8,300** vehicles per day travel on the core roads within a 200m radius of the nursery. This is within the 4th quartile in terms of traffic volumes amongst of the 20 nurseries assessed as part of this programme. For context, in the UK in 2017[9] the average traffic flow on urban minor roads was 2,100 vehicles, and 19,200 vehicles on an urban A-road.

3.1.3.  The nursery site is part of the former Columbia Market and the building and surrounding railings and gate piers are grade 2 listed.

3.1.4.  The nursery has approximately 80 pupils and 20 staff.

3.1.5.  The nursery has been a high proportion of children traveling to the site by sustainable means. Walking (50% and public transport (16%) exceed the relatively low numbers traveling to nursery by car (9%). This is a reflection of the inner London location of nursery be surrounded by residential housing and low ownership of cars.

3.1.6.  The subsequent two pages illustrate the context of the nurseries within the local area.

- The **outer context** plan highlights key roads and land uses in the area, including the frequencies of buses, as well as other notable sources of air pollution. The figure also illustrates the key walking routes taken by the children when approach the nursery.
- The **inner context** plan provides detail on the main accesses (both pedestrian and vehicular) to the nursery, and the location of the playgrounds where children are most exposed to air pollution.

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[9] DfT Road Traffic Estimates: Great Britain 2017 (2018)

**Figure 3 – Outer Context Plan**



1st Quartile 25% - 0.19km; walking time 3 minutes
2nd Quartile 50% - 0.31km; walking time 4 minutes
3rd Quartile 75% - 0.51km; walking time 7 minutes
Mean – 0.6km; walking time 8 minutes

Hoxton

26 (6/hr each way)
48 (5/hr each way)
55 (6/hr each way)
N26 (2/hr each way)
N55 (2/hr each way)

Ravenscroft St

A10 Kingsland Rd

Pelter St

Hackney Rd

Columbia Rd

Virginia Rd

47 (5/hr each way)
55 (6/hr each way)
243 (8/hr each way)
N55 (2/hr each way)

Old St

26 (6/hr each way)
48 (5/hr each way)
67 (7/hr each way)
149 (12/hr each way)
242 (7/hr each way)
N26 (2/hr each way)

Contains Ordnance Survey data © Crown copyright and database right 2017.

Key

| | |
|---|---|
| ⭐ | Columbia Market Nursery School |
| | Bus Stop |
| | Bus Route |
| | Cycle Route |
| | Train Station |
| == = | Rail |
| | Local Centre |
| | Green Space |
| | Petrol Station |
| | At-grade Pedestrian Crossing |
| | Key Pedestrian routes to school |
| | Pedestrian Access |
| 20 | Speed Limit |

Contains OS data © Crown Copyright and database right 2018

**Figure 4 – Inner Context Plans**

## 3.2.    PLANNED SCHEMES & RECENT INITIATIVES

3.2.1.    Whilst there are no major developments planned within the immediate locality it is very close to the City of London and developments occurring on Bishopsgate and Shoreditch area.

3.2.2.    The borough has implemented their first 'school street' on Salmon Street adjacent to the Sir William Burrough Primary School to address poor air quality and road safety. Through the boroughs' 'School Streets' scheme Columbia Market nursery has been identified for action.

3.2.3.    There is an on-going consultation in the Bethnal Green for the 'Liveable Streets initiative which aims to promote sustainable travel based on the TfL toolkit.

3.2.4.    Tower Hamlets held an anti-idling event on Columbia Road in January 2019.

3.2.5.    The new transport strategy for the borough is currently out for consultation.

3.2.6.    There are number of major developments planned or under construction within the immediate locality of the nursery, including:

### WIDER SCHEMES

### ULTRA LOW EMISSION ZONE (ULEZ) AND LOW EMISSION ZONE (LEZ)

3.2.7.    The recently launched ULEZ will operate 24 hours a day, 7 days a week within the same area as the current Congestion Charging Zone (CCZ). All cars, motorcycles, vans, minibuses, buses, coaches and heavy goods vehicles (HGVs) will need to meet exhaust emission standards, or pay a daily charge. In the case of petrol cars and vans this means Euro 4, and Euro 6 for diesels. HGVs and coaches are also Euro 6. Further details on emissions standards and classification of vehicles can be found through TfL.

3.2.8.    The London-wide Low Emission Zone (LEZ) is being tightened to a Euro VI emissions standard for heavy duty vehicles (buses, coaches, Heavy Goods Vehicles (HGVs) from October 2020. The ULEZ will be expanded for light duty vehicles (such as cars, vans and motorcycles) so that all vehicles are subject to emissions standards, within an area roughly bounded by the North and South Circular Roads, from October 2021. It is forecast that an expanded ULEZ and tighter LEZ standards will result in 13 per cent less harmful nitrogen oxide (NOx) from road transport in the borough from 2021.

Impact of scheme:
▪ Reduced air pollution as more polluting vehicles are discouraged from travelling in the ULEZ.

### LOCAL SCHEMES

### NURSERY STARS ACTIVITIES

3.2.9. STARS (Sustainable Travel: Active, Responsible, Safe), is TfL's accreditation scheme for London schools and nurseries, to inspire young Londoners to travel to school sustainably, actively, responsibly and safely by championing walking, scooting and cycling.

3.2.10. As part of the STARS scheme nurseries receive bespoke guidance from the borough, on-line resources, access to a London-wide community of schools and nurseries, priority access to funding, accreditation and recognition.

3.2.11. Columbia Market nursery holds Gold status of the STARS programme as of September 2017, and has been active in undertaking range of STARS activities, with the following recorded from 2017-2018:

- The Children's Traffic Club being a TfL road safety resource with road safety book and online education.
- Cycle skills for adults.
- Bike training for children for them to build up skills.
- Brighten your bag was a discussion and workshop to explain how clothes and high visibility jackets are used.
- Personal safety promotion
- School travel noticeboard and web page with newsletters and information on website plus texts for parents
- Health benefits of active travel
- Outdoor class room day
- Walking trips to local planes to learn pedestrian skills
- Public transport for school trips by taking advantage of TfLs free travel scheme for parents and children
- Nursery zig zag enforcements

### LOCAL SCHEMES

# 4. AIR QUALITY AUDIT FINDINGS

4.1.1.  The air quality audit findings are summarised in this chapter as follows:

- Baseline air quality; and
- Observed issues, emission sources and potential exposure

## 4.1. BASELINE AIR QUALITY

4.1.1.  The air quality audit used a combination of modelled and measured data to establish the local, baseline pollution levels in and around each nursery.

4.1.2.  Three pollutants were monitored in and around the nursery, these were **nitrogen dioxide (NO$_2$)**, **formaldehyde (CH$_2$O)** and **Volatile Organic Compounds (VOCs)**. All three pollutants can cause respiratory inflammation which can exacerbate to respiratory problems such as asthma and bronchitis at high levels.

4.1.3.  NO$_2$ is both a primary and secondary pollutant, derived from emissions of nitrogen oxides (NO$_x$) from combustion sources. In London key sources include road vehicles and domestic boilers. Vehicle emissions contribute significantly to local increases in concentrations especially near busy roads.

4.1.4.  VOCs are made up of a range of organic compounds, including formaldehyde. They have a significant photochemical oxidant forming potential and contribute to the formation of secondary pollutants, such as NO$_2$. They arise from a wide variety of products commonly used in homes and workplaces, including furnishing, carpets, upholstery, cleaning products and air fresheners.

4.1.5.  Formaldehyde is a notable VOC, and can be released from furniture, finishes and building materials, and is formed in chemical reactions from combustion processes, such as smoking, heating, cooking or candle burning.

4.1.6.  Baseline air pollutant monitoring was undertaken for three months. At Columbia Market Nursey School, five NO$_2$ diffusion tubes, one formaldehyde diffusion tube and one VOC diffusion tube were deployed in the following locations:

**Nitrogen Dioxide (NO$_2$)**
- roadside outside the nursery
- immediately outside the nursery entrance
- playground
- immediately inside the nursery entrance
- inside a nursery classroom.

**Formaldehyde and VOCs**
- Inside a nursery classroom.

4.1.7.  See Appendix C for further details on the location of the diffusion tubes.

**Figure 5 - Comparison of the average NO$_2$ concentrations at Columbia Market Nursery School (µg/m3)**



4.1.8. The results of the three-month baseline NO$_2$ monitoring at Columbia Market Nursery School, shown in Table 2.

**Table 2 – Columbia Market Nursery School: Three Month Baseline NO2 Monitoring Results (µg/m$^3$)**

| Diffusion Tube Location | Indoor / Outdoor Location | Baseline NO$_2$ Monitoring Results - NO$_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | December | January | February* | Average |
| Roadside | Outdoor | 43.47 | 44.81 | <0.63 | 44.14 |
| Playground | Outdoor | 35.23 | 25.81 | 1.11 | 30.52 |
| Nursery entrance | Outdoor | 40.32 | 43.10 | <0.63 | 41.71 |
| Nursery entrance | Indoor | 32.14 | 33.04 | 1.23 | 32.59 |
| Classroom | Indoor | 23.34 | 34.57 | 0.63 | 29.00 |
| Ratio of indoor to outdoor (I/O) concentrations | | 0.80 | 0.77 | - | 0.79 |

* February samples invalid – excluded from averages

4.1.9.  $NO_2$ concentrations were found to be highest at the **roadside** (44.1µg/m³), with local road traffic emissions contributing significantly to roadside concentrations.

4.1.10. The three months of baseline $NO_2$ monitoring provides a snap-shot of concentrations in and around the nursery across the winter and spring months, when concentrations are likely to be at their highest due to elevated $NO_x$ emissions driven by the cold weather. However, in each month, the measured $NO_2$ concentrations exceeded the annual mean $NO_2$ national Air Quality Objective (AQO) of 40µg/m³.

4.1.11. $NO_2$ concentrations fall to 30.52µg/m³ in the **playground**, which is partially screened from traffic by fencing and some trees and shrubs. Concentrations at the **nursery entrance** are higher (43µg/m³) than the playground.

4.1.12. **Inside the nursery**, concentrations both sit above and below external concentrations. During the second month, indoor levels rose above playground concentrations by between 7-9 µg/m³. It should be noted that indoor $NO_2$ is not regulated against EU limits, it is regulated against HSE exposure limits.

4.1.13. Previous research undertaken for the GLA found that outdoor $NO_2$ concentrations and the airtightness of the building envelope explained 84% of the variation between classrooms, indicating the influence of strong outdoor pollution sources and the importance of the building envelope. Overall, **indoor to outdoor (I/O) ratios** in both seasons ranged from 0.3-0.5 in an airtight, contemporary school compared with 0.7-0.9 in Victorian schools that have original wooden window frames.

4.1.14. The $NO_2$ I/O ratio was 0.79 at Columbia Market Nursery School, indicating that uncontrolled infiltration rates are at the higher range of the spectrum, and that the building offers only a limited level of protection to its occupants than a more airtight building.

4.1.15. The results of the three-month baseline VOC and Formaldehyde monitoring are shown in Table 3.

**Table 3 – Columbia Market School: Three Month Baseline Formaldehyde and VOC Monitoring Results (µg/m³)**

| Pollutant | Baseline Formaldehyde and VOC Monitoring (µg/m³) | | | |
|---|---|---|---|---|
| | **December** | **January** | **February** | **Average** |
| VOCs | 722.2 | 9.90 | 567.0 | 433.0 |
| Formaldehyde | 5.23 | 4.64 | 1.2 | 3.69 |

4.1.16. **Volatile Organic Compounds (VOCs)** are emitted from vapours arising from petrol and solvents. In a nursery setting are likely to originate from a wide variety of products, including furnishing, carpets, upholstery, cleaning products and air fresheners. Exposure can cause irritation to the eyes and upper airways. In the UK, building regulations recommend total Volatile Organic Compounds

(TVOCs[10]) concentrations should be below 300 µg/m$^3$. In Columbia Market they were found to be 433.0 µg/m$^3$,which was a very high concentration. Within the December samples the majority of VOCs detected were hydrocarbons and likely to be street-sourced pollutants derived from products of partial combustion. In the March sample VOC chemical species were identified as being likely to be indoor pollutants, and included fragrances, perfumes and alcohols, likely to be products derived from use of cleaning materials and solvents.

4.1.17. **Formaldehyde** are emitted from vapours arising from solvents and adhesives. In a nursery setting these are likely to originate from glues, adhesives and finishing's. Exposure can cause burning sensations of the eyes, nose, and throat, coughing, wheezing, nausea and skin irritation. The World Health Organisation (WHO) indoor air quality guideline[11] for short- and long-term exposures to formaldehyde is 100 µg/m$^3$. In Columbia Market they were found to be 3.69 µg/m$^3$.

4.1.18. In addition to the monitoring undertaken at the site, 2013 baseline annual mean $NO_2$, $PM_{10}$ and $PM_{2.5}$ concentrations have been estimated for each nursery from the **London Atmospheric Emissions Inventory** (LAEI) maps.

4.1.19. Briefly, the LAEI model provides mapped annual mean $NO_x$, $NO_2$, $PM_{10}$ and $PM_{2.5}$ concentrations on a 20m x 20m basis for the whole of London from a base-year of 2013 for 2020, 2025 and 2030.

4.1.20. The LAEI uses air pollution emission estimates from a wide range of sources including transport, industrial, domestic and commercial combustion, agriculture and long-range transport using the most up-to-date activity data, emission factors and projection factors.

4.1.21. Figure 5 shows the 2013 LAEI baseline annual mean $NO_2$ concentrations within the vicinity of Columbia Market Nursery School.

4.1.22. The contours (changes in colours) show the change in the change in pollution gradients, with distance, away from the heavily trafficked Hackney Road. $NO_2$ concentrations are predicted to be highest along the southern boundary of the nursery, which is closest to the main road.

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[10] TVOC is a grouping of a wide range of organic chemical compounds to simplify reporting when these are present in ambient air or emissions.

[11] Chapter 5.8 Formaldehyde. WHO Air Quality Guidelines – Second Edition, 2001

**Figure 6 - LAEI Baseline Annual Mean NO$_2$ Concentrations within the Immediate Area of Columbia Market Nursery**

4.1.23. Nearly 50% of NOx emissions in London are from road transport. Vehicle emissions data for the LAEI modelled road links within 200m of the nursery, split by source, have been analysed to identify the key sources contributing to $NO_2$ in the vicinity of the nursery.

4.1.24. The pie chart below shows that while buses make up only 4% of vehicle movements, they contribute 30% of the transport related $NO_x$ emissions locally. Similarly, HGVs only account for 8% of the total traffic but contribute 35% of emissions. However, it should be noted that with TfL's commitment to upgrading the whole bus fleet to the cleanest Euro VI vehicles as a minimum, by October 2020, that the emissions contributed by buses will be expected to fall significantly.

**Figure 7 – Average Road Transport – by Vehicle Type (within 200m of nursery)**
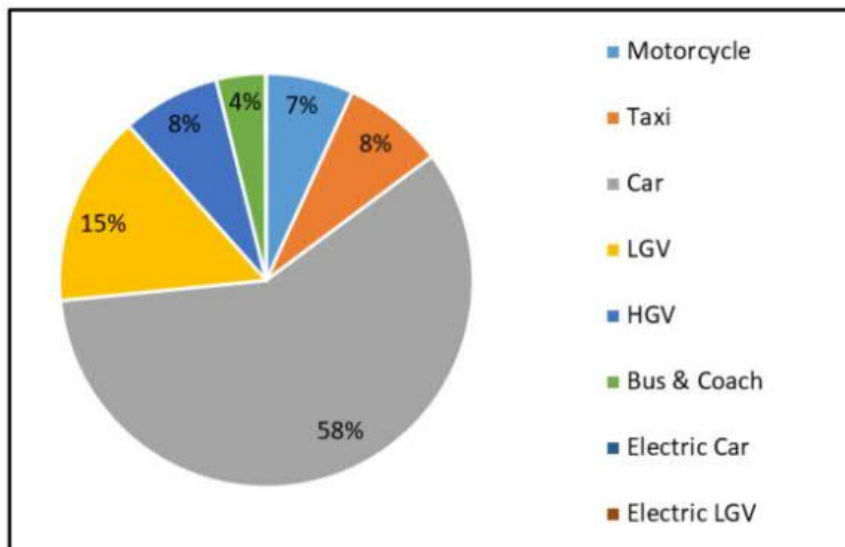


**Figure 8 – Average Road Transport NO$_x$ Emissions by Vehicle Type (within 200m of nursery)**
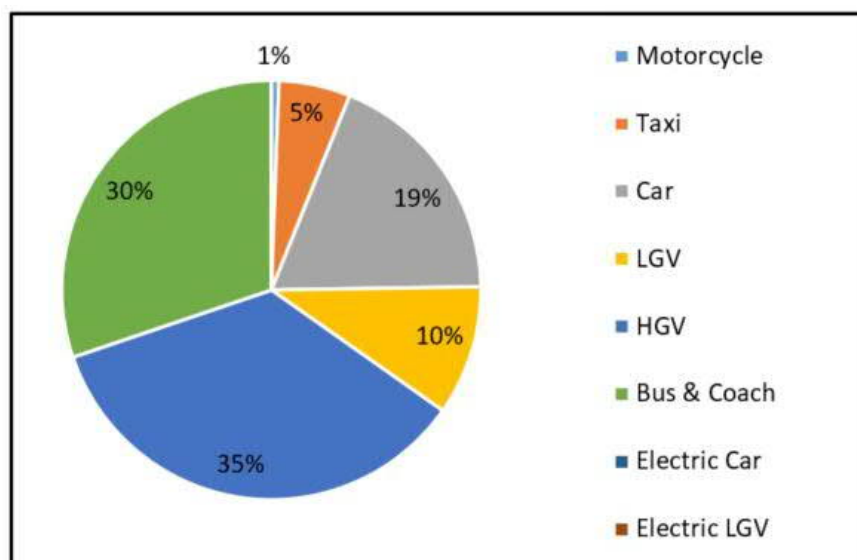


4.1.25. The pie charts below illustrate that $PM_{10}$ and $PM_{2.5}$, like NOx, are emitted in higher levels by large vehicles such as buses, HGVs and LGVs, though not to the same extent. Buses make 4% of vehicle movements, and contribute 16% of the transport related $PM_{10}$ emissions locally, and 11% of $PM_{2.5}$.

**Figure 9 – Average Road Transport PM$_{10}$ Emissions by Vehicle Type (within 200m of nursery)**
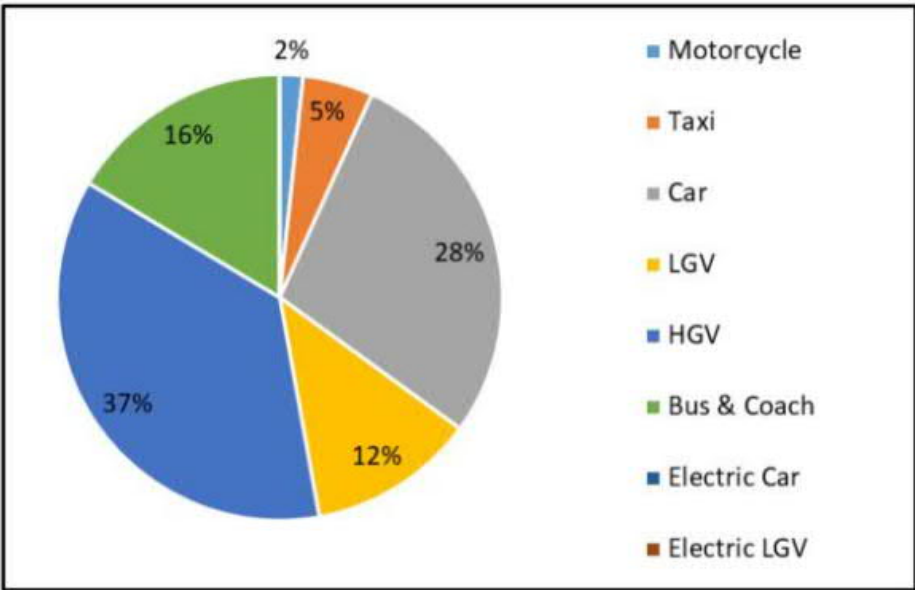


**Figure 10 – Average Road Transport PM$_{2.5}$ Emissions by Vehicle Type (within 200m of nursery)**
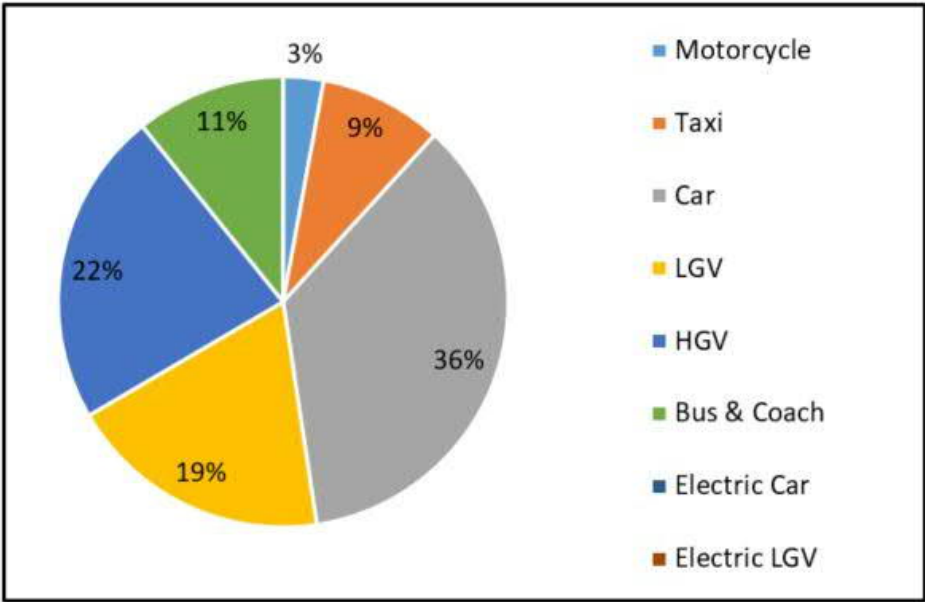


4.1.26.  Figures 11-13 show the 2013 LAEI baseline annual mean NO$_x$, PM$_{10}$ and PM$_{2.5}$ concentrations in within 2km of Columbia Market Nursery School. The contours (changes in colours) show how the pollution gradient changes, with distance, away from the heavily trafficked roads and other key sources.

4.1.27.  PM$_{10}$ and PM$_{2.5}$ sources are much more universal and dispersed than NO$_2$ sources. A proportion of PM$_{2.5}$ and PM$_{10}$ is imported via weather events from regions outside of London, with other contributions coming from combustion processes, cleaning street sweeping/ dust re-entrainment, construction dust, etc. Therefore, concentration profiles of PM$_{10}$ (Figure 12) and PM$_{2.5}$ (Figure 13) appear less defined than for NO$_2$.

**Figure 11 – 2013 LAEI Baseline Annual Mean NO$_2$ Concentrations within 2km of Columbia Market Nursery**
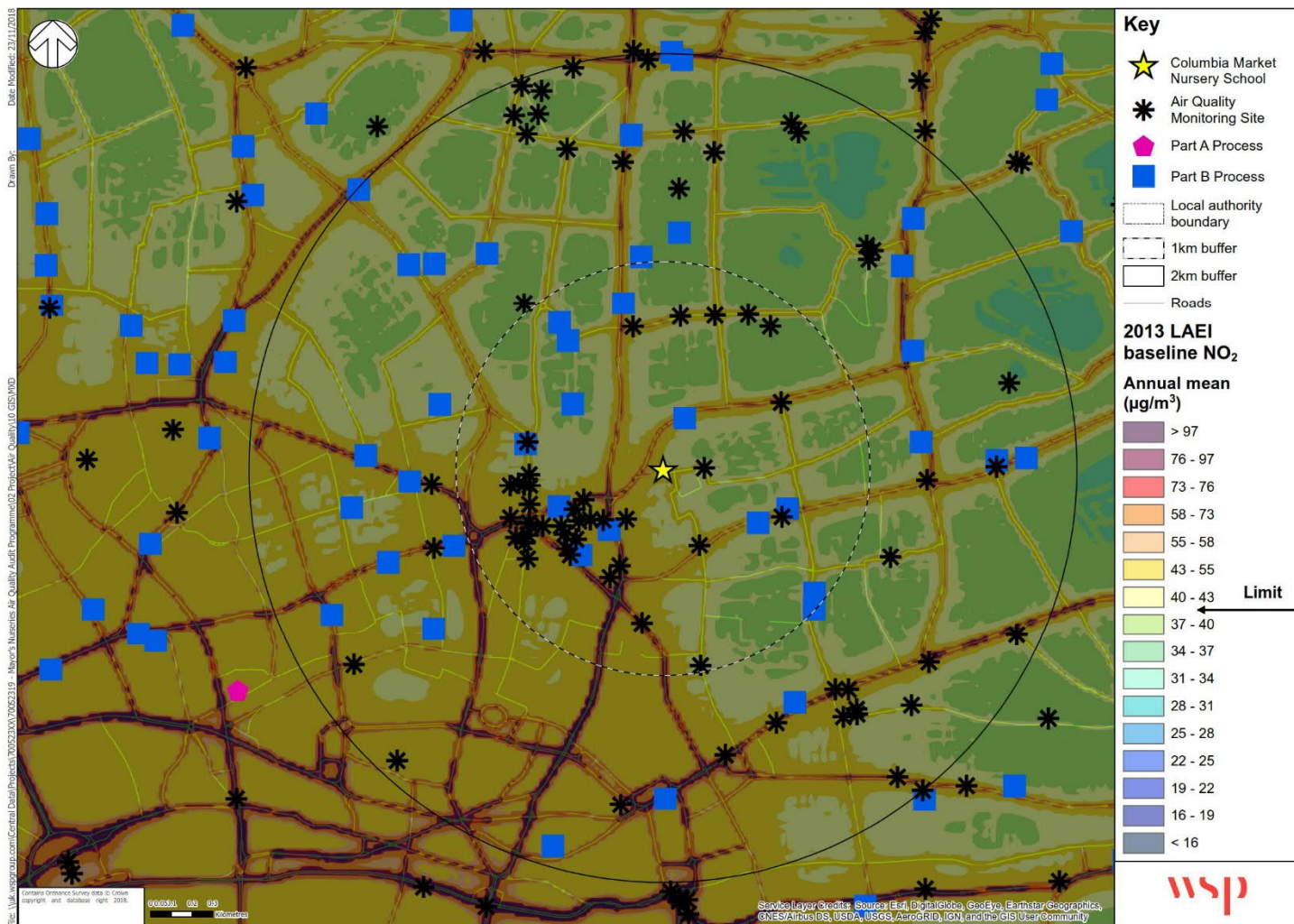


Note: Part A and B Processes include regulated industrial installations that have the potential to cause pollution and are required to have an Environmental Permit to operate, including facilities which carry out industrial processes, waste activities, mobile plant and solvent emission activities

**Figure 12 - 2013 LAEI Baseline Annual Mean PM$_{10}$ Concentrations within 2km of Columbia Market Nursery**
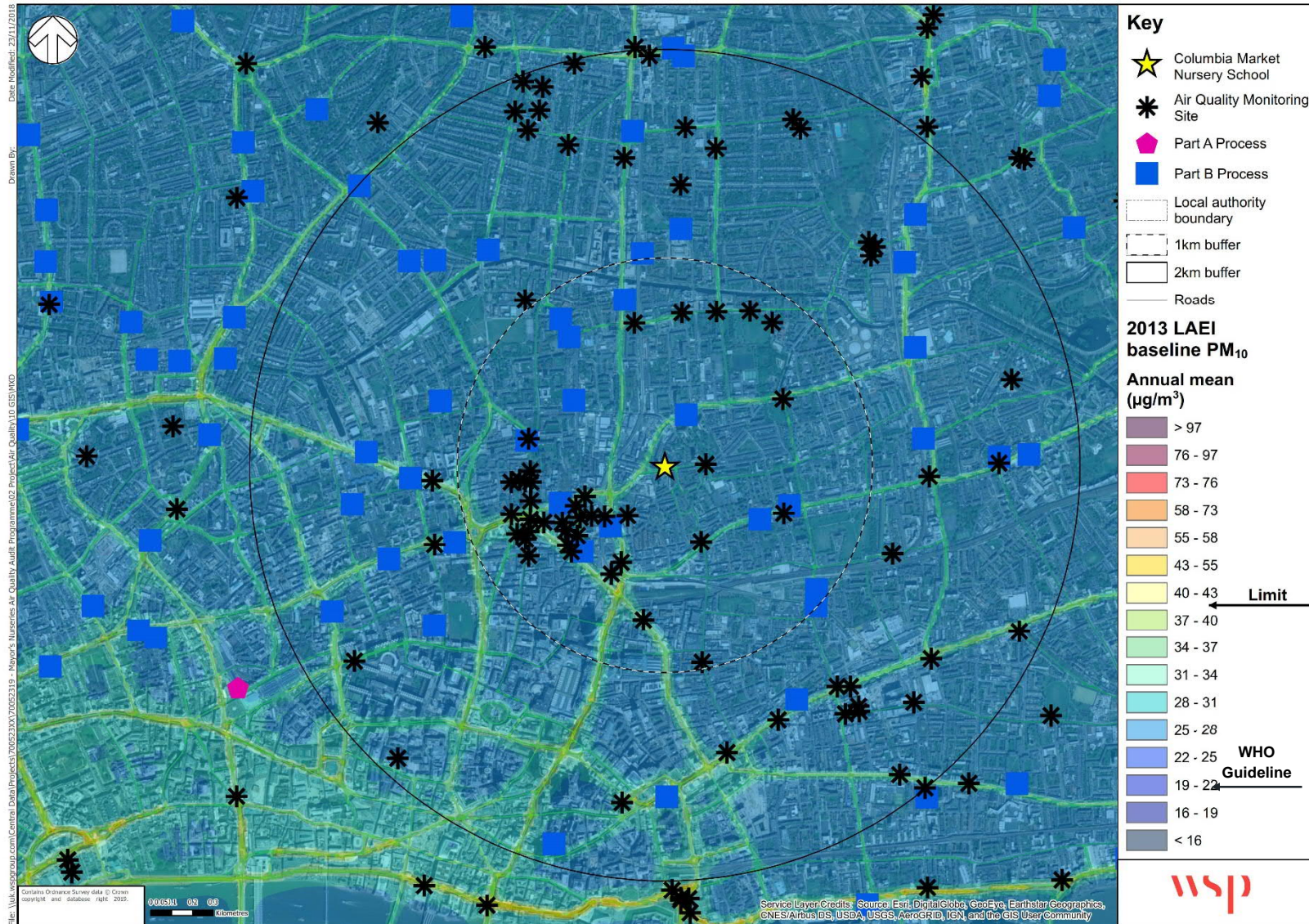
**Figure 13 - 2013 LAEI Baseline Annual Mean PM$_{2.5}$ Concentrations within 2km of Columbia Nursery**
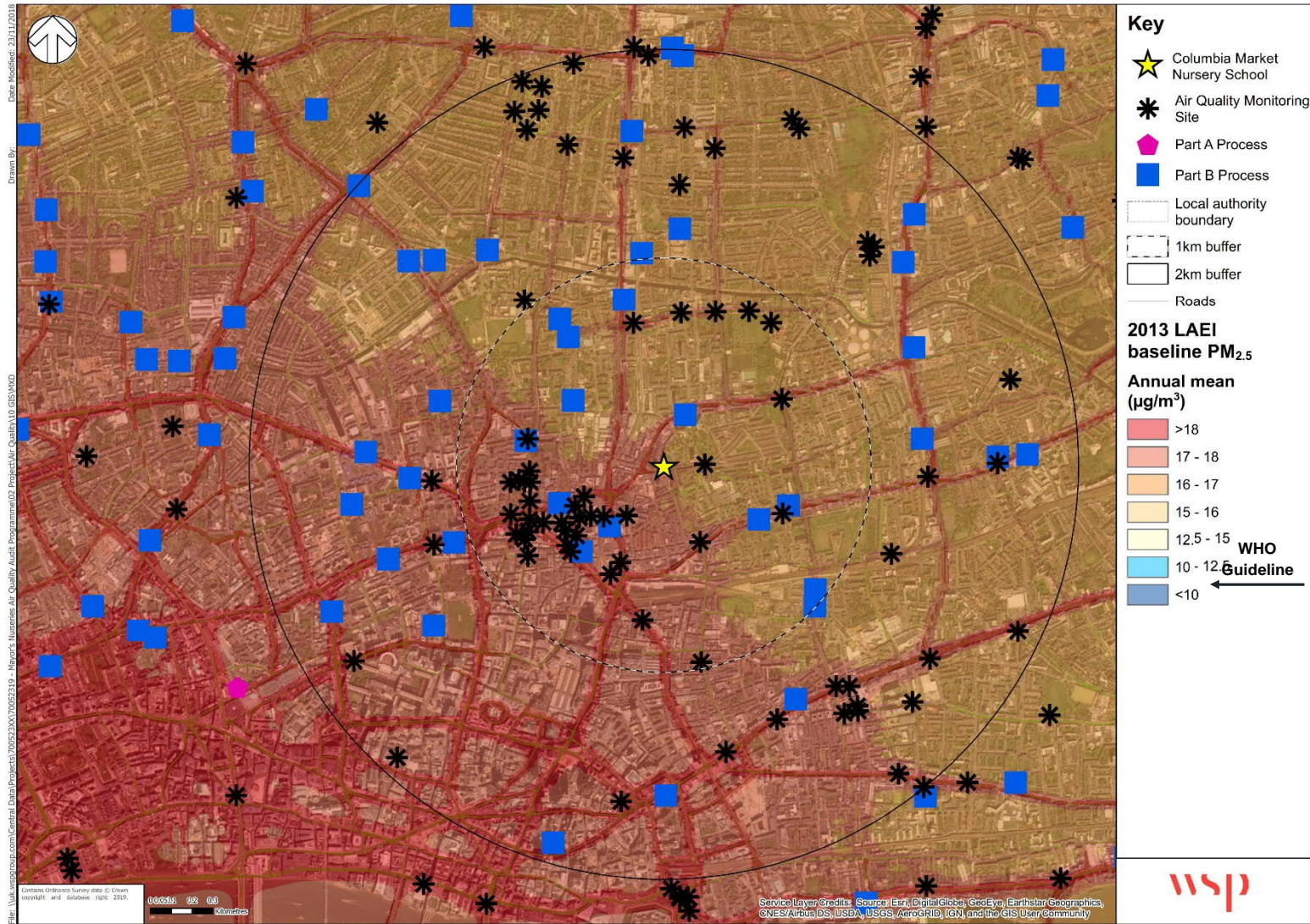
## 4.2. HIGHWAYS – KEY OBSERVATIONS

4.2.1.   The nursery is located 130 metres east of the A1208 Hackney Road, which is a **heavily trafficked** road and the principal source of emissions. The pedestrian entrance is located onto Columbia Road at the eastern end of the nursery. There is no vehicular entrance to the site and therefore no off-street parking or servicing. Columbia Road is made up of a mixture of high and low-rise flats, and terraced housing.

4.2.2.   There is a significant amount of development taking place in the local area, and the associated **construction vehicles** were evident in large numbers on Hackney Road. With large development sites at Cremer Street, Long Street and Scawfell Street.

4.2.3.   If unmitigated, construction sites also have the potential to generate high levels of dust from site clearance activities, e.g., demolition, and construction. Dust and particulate matter is generated by mechanical wear, attrition and the handling of common building materials such as concrete, cement, wood, stone and sand.

4.2.4.   Diesel engine exhaust emissions from construction vehicles, machinery and heavy equipment, known as 'Non-Road Mobile Machinery (NRMM)' is another source of $PM_{10}$ and PM on construction sites. NRMM are a source of NOx emissions, as well as other air pollutants.

4.2.5.   Noxious vapours from oils, glues, thinners, paints, treated woods, plastics, cleaners and other hazardous chemicals that are widely used on construction sites, may also contribute to air pollution.

4.2.6.   Columbia Road has a posted speed limit of 20mph. It has vertical traffic calming in the form of raised tables and road humps to address issues with speeding. There is a humped zebra crossing located just to the east of the nursery between the junctions of Gascoigne Place and Virginia Road. There are **no school keep clear markings kerb side** at the nursery. The zebra crossing zig zags extend past the pedestrian entrance to the nursery, and join a short section of double yellow lines and a car club parking bay and a general use parking bay. The nursery extends up to the junction with Pelter Street. The nursery staff are concerned the **nursery is not sufficiently visible from the roadside**, and would welcome measures to raise awareness of presence of the nursery, and promote more considerate driving.

4.2.7.   The nursery is within 500 metres of the ring road that forms the boundary of current London congestion zone, and now forms the **boundary of the Ultra Low Emission Zone** (ULEZ), which came into forced in April 2019, and will expand again to encompass the nursery in 2021.

4.2.8.   Pelter Street has a very wide bellmouth (junction space) and poorly positioned drop kerbs. The width of the junction result in long crossing distances, and makes the road **intimidating to cross as a pedestrian**, especially with small children or buggies. The radii of the bellmouth of Pelter Street also creates a narrow pinch point in the footpath adjacent to the boundary wall of the nursery, which is less than a metre in width and further constrained by traffic sign poles. This pinch point would prevent the passage of parents with children in buggies or prams. This environment potentially discourages greater travel by sustainable modes. The auditor was informed that the traffic levels on Pelter Street were much higher in the past but a traffic management scheme implemented has **reduced through traffic and rat-running**.

4.2.9.   A ramp was constructed to provide step free access from Columbia Road to the nursery entrance. This resulted in a pedestrian gate to the nursery grounds being blocked off. The gate benefited from pedestrian guard railing at the kerb edge to stop children running straight out into the road. Now the

pedestrian entrance uses a former vehicular entrance that still features a crossover in the footway with no kerb. There is concern that there is no kerb edge or guard railing to warn and prevent children entering the carriageway of Columbia Road. Also, the gradient changes in the footway to meet the levels of the crossover create an **unsatisfactory walking environment**.

4.2.10. The **number of children driven to school by parents is relatively low**. A member of the nursery team is always stationed on the footpath for the arrival and departure period and will move on any parents stopping or parking inappropriately.

4.2.11. Gascoigne Place opposite has also been closed to through vehicular traffic expect cycles which has a beneficial impact to the nursery. The drop kerbs and pedestrian crossing environment at Columbia Road is unsatisfactory being uneven.

4.2.12. The Borough informed that the Columbia Market Nursery was high in the priority list for a **school street** closure.

### Summary – Key Issues

- Nursery is located close to the busy Hackney Road, which is a heavily trafficked road and the principal source of emissions
- Development sites and associated construction traffic travelling on nearby Hackney Road will be contributing significantly to local emissions.
- Through traffic on Columbia Road. While the road is traffic calmed it is wide and straight with narrow footways which give the gives the impression of vehicle dominance.
- No school keep clear markings outside school and pedestrian guard railings not in correct position.
- The footways immediately surrounding the nursery are unsatisfactory in terms of drop kerbs and narrowness at pinch points. Side road crossings, especially Pelter Street is long and provision or vulnerable pedestrians is not adequate.

Wide bell mouth Pelter Street and inadequate drop crossing provision





Pinch point in footway at Pelter Street and nursery grounds

Former and unused vehicular crossover and guard railing



Cluttered footway and parking bays adjacent to nursery

## 4.3. NURSERY GROUNDS / BUILDING - KEY OBSERVATIONS

4.3.1.  The nursery plot sits at the corner of Columbia Road and Pelter Street. Directly behind the nursery is a privately-run nursery. The grounds abut but they are not shared. The nursery building is sited close to the boundary with Columbia Road. It is single storey and forms a square ring around a central courtyard.

4.3.2.  Three sides of the building dates from the time of the original Columbia Market building and are of **wooden construction, with large single glazed wooden windows** on all sides that can be opened. The fourth side of the building was constructed in the last decade, and is of modern building standards and insulation levels. The original building facade is timber shiplap. The auditor was informed that upon removing the internal wall covering, it was discovered there was **no insultation**.

4.3.3.  The **playground** is located in the northwest corner of the site, and has a 4 metre tall metal chain link fence.  There are a number of large trees and bushes planted along this boundary, but it is otherwise largely exposed to vehicle emission from Pelter Street. There is also little visual screening from the street.

4.3.4.  There are three large class rooms for children that surround the courtyard area, and open on to the large playground. The classrooms have high vaulted ceilings and **single glazed windows**. It was informed that the **rooms get very hot in the summer months, and very cold in the winter**, depending on the outside ambient temperature. The children typically free-flow between the classroom and the playground throughout the day. The doors to the grounds do not have free-flow 'butchers' curtains to retain heat.

4.3.5.  The nursery is **reliant on natural ventilation** through opening doors and windows, and the limited insulation, high ceilings and large windows will result in greater heat loss, and so potentially increased run times by the nurseries boilers, and therefore greater emissions. It also results in higher temperatures during warmer weather, requiring windows/doors to be opened and so greater exposure.

4.3.6.  There is concern that the **listed building status** of the structure could make installation or changes to the building difficult to implement.

4.3.7.  The nursery offices and kitchens are on the front of the building facing Columbia Road.

4.3.8.  The nursery informs that they **have sufficient scooter and cycle parking** for their needs. The grounds have a cycle track where children are able to practise cycling and road skills in a safe environment.

4.3.9.  The nursery **provides welcome packs and home visits to new starters** with information on how to travel to nursery in a sustainable manner. The nursery organises frequent outings for the children and parents, the parents have really benefitted as many have not used public transport before.

4.3.10.  The schools heating and hot water is provided by **two gas boilers. One is under 10 years old and the second is around twenty years old**. Both are regularly serviced. The flues exhaust above roof height in the far corner of the plot at the junction of Columbia Road and Pelter Street. The **heating has been added to in a piecemeal fashion over the year, and is not performing effectively**. Heat is not traveling to the newest section of the building. The nursery has installed blinds to lessen solar gain in the summer, and some rooms on the Columbia Road elevation have heat exchanges for cooling purposes.

4.3.11. The school **kitchen** does not have gas appliances. The cleaning chemicals are kept in a room off the kitchen where there is no access for children. Most floor coverings are laminate and furniture is of engineered wood.

4.3.12. The nursery receives only 1 or 2 **deliveries** a week typically, with vehicles accessing via the front of the building.

### Summary – Key Issues

- Wooden structure of older building and windows has poor thermal performance resulting in overheating in summer and cold spots in the winter.
- Reliance on natural ventilation through opening windows /doors, and so resulting in greater exposure to outdoor emissions.
- The heating system has been added to in piecemeal fashion and is not performing well with some rooms overheating and others being cold. The lack of efficiency is resulting in additional gas being burnt meaning an increase in emissions.
- The playground is exposed to emissions and particulates from the road

Chain link fence at boundary to Pelter Street





Boiler flues, wooden construction of building and opening of windows in December

## 4.4.    KEY OBSERVATIONS – SUMMARY OF ISSUES

### Figure 14 - Summary of Potential Issues Map



**Legend:**
- Nursery Boundary
- 20 Speed Limit
- Pedestrian Crossing
- Pedestrian Access
- School Clearway

**Chain link fence:** the nursery playground fronts Pelter Street and there is only a chain link fence between the two and no barrier to vehicular emissions or noise

**Cluttered footway:** The footway adjacent to the nursery is cluttered which is also exacerbated by the parking bays leaving limited space for parents with multiple children to pass safely.

**Building construction:** the timber construction of the majority of the building with single glazing windows does not provide sufficient insulation to the outside leading to hot and cold spots throughout the building at all times of the year

**Pinch point:** The footway between Pelter Street and the nursery boundary is very narrow and it would not be possible for a parent with a large pram or buggy to pass safely.

**Pelter Street:** Very wide belmouth junction which results in a long crossing for parents with small children. Also, drop kerbs are inadequate and steep for parents with push chairs.

**Heating system:** Poor control and heat distribution. Heat is not traveling to the all parts of the building while some rooms are overheating requiring windows to be opened and the use of fans and heat exchangers to cool rooms.

**ULEZ boundary:** Nursery is 500 metres from inner road being the congestion charge boundary and ULEZ boundary from April 2019 which may affect traffic flows at nursery.

**Parking bays:** A general use parking bay and car club bay situated outside main entrance allowing vehicles to manoeuvre close to children.

**Redundant crossover:** Pedestrian entrance is via redundant vehicular crossover with drop kerbs. The crossover is level with the carriageway, has no kerb or guard railing allowing children to walk in the road.

**School keep clear markings:** School keep clear markings to enforce no stopping outside nursery..

**Gascoigne Place:** Inadequate drop kerb layout and steep for parents with prams.

Playground

Pelter St

Columbia Rd

Gascoigne Pl

Contains Ordnance Survey data © Crown Copyright and database right (2019). Ordnance Survey 100032216 GLA

0    0.0075   0.015   0.0225
Kilometres

# 5. RECOMMENDATIONS

## 5.1. DEVELOPING THE RECOMMENDATIONS

5.1.1. Based on the preceding desktop research, site audits and stakeholder feedback, a range of recommended measures and initiatives have been identified to deliver air quality improvements and reduced exposure to air pollution. The recommendations will not in themselves solve the air quality problem, but will each contribute directly or indirectly to helping improve the situation in and around the nurseries.

5.1.2. These recommendations are drawn from a comprehensive Air Quality Audit **Toolkit of Measures**, researched and developed as part of the Mayor's Primary School Air Quality Audit Programme, and updated as part of this programme (see Appendix E for further details).

5.1.3. The toolkit has been compiled from a review of best practice approaches and new technologies, including both well established and simple measures, and more innovative or harder hitting measures. The measures include both physical measures and softer behavioural measures.

5.1.4. The characteristics of the local area, nursery site and building have then been accounted for in identifying and tailoring a suitable package of measures to address the issues identified in causing sources of pollution or exposure to air pollution. These recommendations have also sought to be cognisant of any relevant existing plans for the local and wider area around the nursery (see Section 3.2).

5.1.5. A key facet of this approach, and the palette of measures from which measures were identified, is that they represent a holistic approach, as promoted by the Healthy Streets approach, in seeking to address a broad range of factors which each influence how streets are used, how people travel and consequently how clean the air is in and around the nursery. As such whilst a number of measures are less directly related to air quality, they were felt to offer the potential for contribute indirectly, for example through creating a better and safer environment for travelling by sustainable modes.

5.1.6. Table 4 on the following page sets out the list of recommendations. For the purposes of this assessment they have been categorised as proposals associated with:

- **Highways** – where recommendations would predominantly be delivered by either the borough council or TfL, who manage the highways.
- **Nursery grounds** – where the nursery, often supported by the borough council, would typically deliver the types of measures recommended.
- **Nursery building** – as with the nursery grounds, the building measures would primarily be delivered by the nursery and borough council.
- **Behavioural** – many of the behavioural measures can be delivered at minimal cost by the nursery, sometimes with the support of the borough council or TfL.
- **Wider measures** – these are larger schemes or policy changes, which would need to be delivered by TfL, the borough council or the UK Government.

5.1.7.    In order to enable comparison of each measure, and to assist the nursery, borough and other stakeholders, in determining which measures to prioritise, each has been assessed against a series of key criteria:

- **Potential Air Quality Improvement**

  - Low – nominal measureable change but a tangible reduction in sources or exposure
  - Medium – a small measurable change in air quality
  - High – a large measureable improvement in air quality

- **Wider Benefits**

  - Such as improved safety, visual amenity, child health and welfare, improve learning environments, costs savings, promotion of sustainable transport, contributes to STARS or Healthy Early Years London.

- **Cost** *(Note these reflect the overall costs, but these may vary amongst difference stakeholders)*.

  - Low - <£10k
  - Medium - £10k-100k
  - High - >100k

- **Deliverability**

  - Quick Win – readily deliverable within 12 months
  - Medium term – deliverable within 1-3 years
  - Longer term – only deliverable in the longer term (i.e. over 3 years)

- **Stakeholder Support**

  - Low – likely to be significant objections which could delay/prevent the scheme
  - Medium – may be some objections and will require consultation but not significant delays
  - High – likely to have strong support from key stakeholders

5.1.8.    These are high level comparative analyses intended to offer a means of considering the recommendations against one another in relative terms.

5.1.9.    Further, more detailed research and options development would be required to quantify these recommendations in greater detail, such as would be undertaken in a subsequent feasibility study.

5.1.10.  The implementation of the measures will be dependent on securing funding to enable delivery over time (see section 5.8), as well as undertaking feasibility assessments and scheme prioritisation.

**Table 4 – Recommended measures for consideration**

| Measure | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| **Highway** (Key Stakeholder: Borough) | | | | | | | | | | | | | | | |
| 1 School Street | Expedite the boroughs 'School Street' initiative and review the potential to close Columbia Road adjacent to nursery at drop off and collection times. | Reduce sources and exposure | X | | | ▪ Road safety ▪ Promotion of sustainable transport | X | | | | X | | | | X |
| 2 Road space reallocation | Reallocate the road space outside the nursery on Columbia Road by removing parking bays and widening footway and/or creating pocket parks with greening and replacement visitor cycle parking. | Reduce sources and exposure | X | | | ▪ Road safety ▪ Promotion of sustainable transport | | X | | | X | | | X | |
| 3 School keep clear markings | Replace double yellow lines on Columbia Road adjacent to nursery to enforce no stopping and waiting by drivers or parents dropping or collecting | Reduce sources and exposure | X | | | ▪ Road safety ▪ Promotion of sustainable transport | X | | | X | | | | X | |
| 4 Anti-Idling | Provide signage at the front of the nursery to encourage drivers to switch off engines with parallel awareness raising to launch and enforcement. | Reduce sources and exposure | X | | | ▪ Road safety ▪ Promotion of sustainable transport ▪ Supports STARS and HSL objectives | X | | | X | | | | | X |
| 5 Vehicular crossover | Remove redundant vehicular crossover to nursery which is now pedestrian entrance. provide kerb edge and a barrier in the form of pocket park, wider footway and guard railing to provide some security for children running out into road | Promoting walking, scooting and cycling by providing improved local conditions | X | | | ▪ Road safety ▪ Promotion of sustainable transport | X | | | X | | | X | | |
| 6 Pop up children characters | Provide pop up children characters at kerb side adjacent to nursery to reinforce the presence of the nursery to passing drivers and dissuade parents from stopping to drop or collect children | Promoting walking, scooting and cycling by providing improved local conditions | X | | | ▪ Road safety ▪ Promotion of sustainable transport | X | | | X | | | | | X |
| 7 Pelter Street junction | Tighten junction to shorten pedestrian crossing distance. Provide raised table or adequate drop kerb facilities to improve walking environment | Promoting walking, scooting and cycling by providing | X | | | ▪ Road safety ▪ Promotion of sustainable transport | | X | | X | | | | X | |

| Measure | | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| | | | improved local conditions | (green) | | | | | (orange) | | (green) | | | | | (orange) | |
| 8 | Pelter Street footway | Widen footway to remove pinch point at Pelter Street at corner with Columbia Road to allow sufficient space for parents with prams and buggies to pass | Promoting walking, scooting and cycling by providing improved local conditions | X | | | • Road safety<br>• Promotion of sustainable transport | X | | | X | | | | | X |
| 9 | Gascoigne Place | Enhance pedestrian drop kerbs to improve walking environment | Promoting walking, scooting and cycling by providing improved local conditions | X | | | • Road safety<br>• Promotion of sustainable transport | X | | | X | | | | | X |
| 10 | Promote cleaner routes to school | Encourage children approach the school along less polluted routes, such as avoiding Columbia Road and Hackney Road to approach nursery using back streets as much as possible | Reduce exposure | X | | | • Road safety | X | | | X | | | | | X |
| 11 | Healthy Streets approach, sustainable transport and roadspace reallocation from vehicular traffic | Promote the Mayor of London's Healthy Streets approach which aims to improve air quality, reduce congestion and help make London's diverse neighbourhoods greener, healthier and more attractive places to live, work, play and do business. Take a proactive role in endorsing the approach and supporting these initiatives. | Reduce sources and exposure | | | X | • Promotion of sustainable travel | | | | | X | (red) | (red) | X | |
| 12 | Additional parking charges for more polluting vehicles | Consider introducing surcharges on top of existing parking charges for more polluting vehicles. A trial in Westminster found that the number of dirtier diesel vehicles using the parking bays dropped by 12%. Westminster's, and Islington also looking to introduce a similar scheme. | Reduce sources and exposure | | | X | | | X | | | X | | X | | |
| 13 | Non-Road Mobile Machinery Audit | The Council could consider a requirement for a Non-Road Mobile Machinery (NRMM) Audit to be undertaken at construction sites. This requirement is being trialled within some Low Emission Neighbourhoods to help ensure | Reduce sources of emissions | X | | | • Reduce noise | X | | | X | | | | X | |

| Measure | | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| | | compliance of vehicles used for developments. Currently, NRMM is the third largest contributor of NOx emissions and the fifth largest contributor of PM emissions in London, and any comprehensive plan to reduce London's emissions should attempt to address emissions from construction machinery. | | | | | | | | | | | | | | |
| 14 | Control of Dust and Emissions during Construction and Demolition SPG | Introduce a requirement in planning conditions to manage dust and emissions associated with construction based on the Control of Dust and Emissions during Construction and Demolition SPG prepared by the GLA, which includes requirements for construction sites to monitor air quality and share the results with the borough council – https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/control-dust-and | Reduce sources of emissions | X | | | | X | | | X | | | | X | |
| **Highway** *(Key Stakeholder: TfL)* | | | | | | | | | | | | | | | | |
| 15 | Low Emission Buses | Since 2018, all new double deck buses are hybrid or zero emission. The Mayor has also launched an £85m programme to upgrade around 5,000 buses so that the entire fleet meets the Euro VI emissions standard in 2020. Around 75 per cent of all TfL buses – including all buses operating in the ULEZ – now meet or exceed the strict ULEZ emission standards. By October 2020 every TfL bus in London – over 9,000 buses - will meet or exceed the ULEZ standards.<br><br>Twelve new low Emission Bus Zones are being introduced in areas where Londoners are exposed to some of the highest levels of nitrogen dioxide pollution. The Mayor has completed ten of these zones, reducing NOx emissions from buses by an average of 90 per cent along some of the capital's most polluted roads. The Mayor will complete delivery of all 12 routes ahead of schedule in 2019 rather than 2020. | Reduce sources and exposure | | | X | | | | X | X | | | | X | |
| **School Grounds** *(Key Stakeholder: School/ Borough)* | | | | | | | | | | | | | | | | |

| | Measure | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| 16 | Green Infrastructure | Install green screening/climbers along the boundary with Pelter Street.<br><br>A dense vegetation layer with a high leaf density can as much as halve the levels of pollution just behind the barrier, though the benefit tails off with increasing distance. The benefit is mainly attributable to their effect on dispersion, though the deposition of some pollutants onto the leaf surfaces from air that passes through the vegetation will also have a small but beneficial effect.<br><br>A study by Kings College London assessed the efficacy of green screens in preventing vehicle emissions from nearby roads reaching school grounds, through the installation of an ivy screen. In this instance the screen was found to be an effective pollution barrier, once the ivy had started growing and a significant impact could be seen once the screen had matured. It led to a decrease in the pollution concentrations on the playground side by 23% for $NO_2$ and 38% for $PM_{10}$. Green screens also provide aesthetic benefits as well as increased privacy, biodiversity and noise reduction.<br><br>The screens can be planted directly into the ground or into planters and are maintained with the option of a drip line irrigation system. It should be noted however that the same level of reduction would not necessarily be achieved in each instance, as the local conditions and designs are specific to each site. It should be noted that green screens need ongoing maintenance. | Reduce exposure to emissions | X | | | ▪ Visual amenity<br>▪ Security, privacy | | X | | | X | | | | X | |
| **School Building** (Key Stakeholder: School/ Borough) | | | | | | | | | | | | | | | | |
| 17 | Improved heating and insulation | Review heating and local control system for more efficient heating of building, and lessening incidences of winter overheating that result windows and door being opened and worsening exposure to pollution from the nearby roads. Also upgrade insulation and windows where possible to further reduce heat loss, lessen energy usage, and potentially boiler run-times. Potentially less heat gain in hot weather. | Reduce sources and exposure | X | | | ▪ Reduced energy consumption and reduced operating costs<br>▪ Improved learning environments | | | X | | X | | | X | |

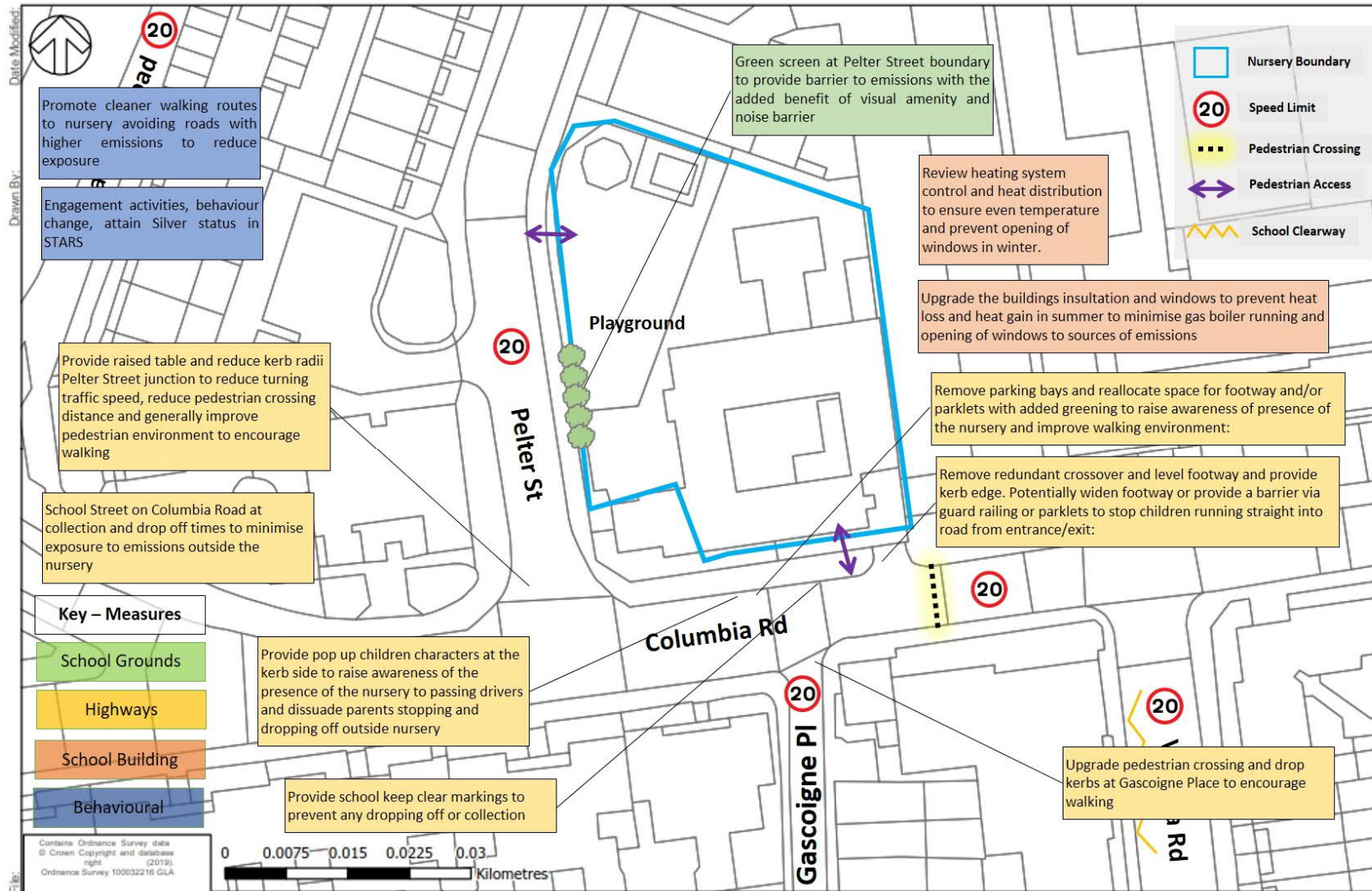| | Measure | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| 18 | Monitor London Air website / app | Daily monitoring of London Air website / app to understand air quality on the day and whether e.g. opening of windows, will increase exposure of air pollution. Sign up to receive air quality alerts when very high air pollution is forecast, and information on how to reduce pupils' personal exposure. | Reducing exposure to emissions | X | | | ▪ Awareness raising | X | | | X | | | | | X |
| 19 | Air Filtration Systems | Consider investing in air filtration systems in classrooms most exposed to poor air quality and reliant on natural ventilation. These systems are relatively high cost, only cover a single room per unit, and do require ongoing maintenance and power consumption, but have demonstrated some encouraging initial scientific evidence of efficacy. They can also assist with virus elimination/ reduction.<br><br>The findings of the Air Filtration System trials will be available to inform this decision in early 2020.<br><br>The potential air quality improvement from Air Filtration System is identified as being low, however this is subject to the findings of the trial. | Reducing exposure to emissions | X | | | ▪ Improved learning environment | X | | | X | | | | X | |
| 20 | Add indoor plants | Consider deploying additional air purifying plants. Whilst the research to date is inconclusive, and further testing is required, some studies have found certain house plants can remove $CO_2$, and that the growing substrate, and the microorganisms within, are involved in the removal of pollutants. A limitation is that tests often include a greater number of potted plants than would be feasible indoors to achieve measurable concentration reductions, so the density provided by green walls may be more suitable, and studies are now beginning to investigate green walls and, additionally, how the substrate may influence removal – as measured with VOCs. (University of Birmingham and the Royal Horticultural Society). Plants also have a number of wider health benefits, including promoting reductions in stress. https://www.cibsejournal.com/technical/plants-as-a-building-service/ provide | Reducing exposure to emissions | X | | | ▪ Improved learning environments<br>▪ Visual amenity | X | | | X | | | | X | |

| | Measure | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| 21 | Switch to lower VOC cleaning products | Switch to lower VOC alternative cleaning products, such as unperfumed cleaning products. | Reduce sources and exposure | X | | | | X | | | X | | | | X | |
| **Behavioural Measures** *(Key Stakeholder: School/ Borough)* | | | | | | | | | | | | | | | | |
| 22 | Engagement Activities | Deliver lesson plans with bespoke materials, poster and London school curriculum (see Appendix C), raising awareness of the issues and the type of measures that can have a positive impact on reducing poor air quality | Awareness raising and behavioural measures | X | | | ▪ Awareness raising<br>▪ Secure community buy-in for measures | X | | | X | | | | | X |
| 23 | Behaviour change | Prepare 'Welcome Packs' for new pupils / parents that includes the promotion of apps / sites such as 'www.walkit.com' to a) promote walking to / from school and b) promote the suitable walking routes to avoid air pollution hotspots. | Behavioural measures / reducing exposure to emissions. | X | | | ▪ Awareness raising<br>▪ Secure community buy-in for measures | X | | | X | | | | X | |
| 24 | Staff Engagement | Awareness raising session amongst staff about the impacts / costs of heating classrooms and share best practice. The Mayors London Curriculum Programme offers a wide range of high-quality teaching resources supporting most subjects on the national curriculum, CPD for teachers and events for children. A programme of targeted activity for air quality is being assembled to be delivered through the London Curriculum, with a focus on supporting teacher subject knowledge and confidence to tackle air quality as a science subject recognising that this requires a wide knowledge and skill base of science, statistics and mapping. | Awareness raising and behavioural measures | X | | | ▪ Awareness raising<br>▪ Supports STARS and HSL objectives | X | | | X | | | | | X |
| 25 | Prepare 'Welcome Packs' for new pupils / parents | Prepare 'Welcome Packs' for new pupils / parents that includes the promotion of apps / sites such as 'www.walkit.com' to a) promote walking to / from school and b) promote the suitable walking routes to avoid air pollution hotspots. | Reducing sources and exposure | X | | | ▪ Awareness raising<br>▪ Supports STARS and HSL objectives | X | | | X | | | | | X |
| 26 | Promoting Park & Stride | Promote park & stride amongst the parents and children. A waking bus from the site would entail some additional staff costs. | Reducing sources and exposure | X | | | ▪ Awareness raising<br>▪ Supports STARS and HSL objectives | X | | | X | | | | X | |

| | Measure | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| 27 | Promoting car sharing | Make use of websites such as Liftshare.com to help find prospective car sharing partners, or the school could act as a forum to manage car sharing amongst the school community. | Reducing sources and exposure | X | | | • Awareness raising • Supports STARS and HSL objectives | X | | | X | | | | X | |
| 28 | Anti-idling campaign | Frequent awareness raising campaign to reinforce and refresh the effectiveness of existing signage, including a banner, combined with enforcement. Develop an awareness raising banner and leaflets incorporating designs by the children. Also request that bus and coaches turn their engines off when waiting for extended periods, i.e. laying over or waiting to collect children. | Reducing sources and exposure | X | | | • Awareness raising • Supports STARS and HSL objectives | X | | | X | | | | X | |
| 29 | Walking Buses | A walking school bus is a group of children walking to school with one or more adults, and can be as informal as two families taking turns walking their children to school to as structured as a route with meeting points, a timetable and a regularly rotated schedule of trained volunteers. A bicycle train is a further variant on this, with adults supervising children riding their bikes to school. These can be planned in conjunction with cleaner walking routes to school initiatives to avoid the most polluted streets where possible. This would count as a STARS 'Other Walking Activity' and could contribute to progress. | Reducing sources and exposure | X | | | • Awareness raising • Supports STARS and HSL objectives | X | | | X | | | | X | |
| **Wider Measures** (Key Stakeholder: Borough/ TfL/ GLA/ Central Government) | | | | | | | | | | | | | | | | |
| 30 | Targeted scrappage scheme for polluting vehicles being driven in London | Ensure parents and staff are aware of the low income scrappage scheme being introduced by the Mayor and TfL, so that those that are eligible apply to the scheme. Encourage central Government to at a minimum match-fund the Mayor's scrappage commitments, to help enable even more Londoners to switch from polluting vehicles to ultra-low emission vehicles and more sustainable forms of transport. | Reduce sources and exposure | | | X | | | | X | | | X | X | | |

## 5.2. KEY RECOMMENDATIONS

### Figure 15 – Summary Recommendations Map



Promote cleaner walking routes to nursery avoiding roads with higher emissions to reduce exposure

Engagement activities, behaviour change, attain Silver status in STARS

Green screen at Pelter Street boundary to provide barrier to emissions with the added benefit of visual amenity and noise barrier

Review heating system control and heat distribution to ensure even temperature and prevent opening of windows in winter.

Upgrade the buildings insulation and windows to prevent heat loss and heat gain in summer to minimise gas boiler running and opening of windows to sources of emissions

Provide raised table and reduce kerb radii Pelter Street junction to reduce turning traffic speed, reduce pedestrian crossing distance and generally improve pedestrian environment to encourage walking

Remove parking bays and reallocate space for footway and/or parklets with added greening to raise awareness of presence of the nursery and improve walking environment:

Remove redundant crossover and level footway and provide kerb edge. Potentially widen footway or provide a barrier via guard railing or parklets to stop children running straight into road from entrance/exit:

School Street on Columbia Road at collection and drop off times to minimise exposure to emissions outside the nursery

Playground

Pelter St

Columbia Rd

Gascoigne Pl

**Key – Measures**

School Grounds

Highways

School Building

Behavioural

Provide pop up children characters at the kerb side to raise awareness of the presence of the nursery to passing drivers and dissuade parents stopping and dropping off outside nursery

Provide school keep clear markings to prevent any dropping off or collection

Upgrade pedestrian crossing and drop kerbs at Gascoigne Place to encourage walking

**Legend:**
- Nursery Boundary
- 20 Speed Limit
- Pedestrian Crossing
- Pedestrian Access
- School Clearway

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0   0.0075  0.015  0.0225  0.03
Kilometres

WSP
December 2019
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THE MAYOR OF LONDON'S NURSERY AIR QUALITY AUDIT
Project No.: 70035456 | Our Ref No.: 001
Greater London **Authority**

## 5.3. PRIORITISED MEASURES FOR THE NURSERY

5.3.1.   To help prioritise what measures should be progressed for the nursery, borough officers and representatives of the nursery were asked:

*'Based on the toolkit of measures and the findings of the observations and initial analysis, what are the measures you would prioritise for the nursery?'*

5.3.2.   Some of the more key measures were considered to be (in no particular order):

**Green Infrastructure**

- The nursery playground is separated from Pelter Street by a tall chain link fence. This could be replaced by a green wall that will provide a screen for emissions, provide visual amenity, improve ambiance and provide a teaching aid for children. The nursery was keen to implement as much greening as possible on all boundaries. A dense vegetation layer with a high leaf density can as much as halve the levels of pollution just behind the barrier, though the benefit tails off with increasing distance. The benefit is mainly attributable to their effect on dispersion, though the deposition of some pollutants onto the leaf surfaces from air that passes through the vegetation will also have a small but beneficial effect. A study by Kings College London assessed the efficacy of green screens in preventing vehicle emissions from nearby roads reaching school grounds, through the installation of an ivy screen. In this instance the screen was found to be an effective pollution barrier, once the ivy had started growing and a significant impact could be seen once the screen had matured. It led to a decrease in the pollution concentrations on the playground side by 23% for $NO_2$ and 38% for $PM_{10}$. Green screens also provide aesthetic benefits as well as increased privacy, biodiversity and noise reduction. The screens can be planted directly into the ground or into planters and are maintained with the option of a drip line irrigation system. It should be noted however that the same level of reduction would not necessarily be achieved in each instance, as the local conditions and designs are specific to each site. It should be noted that green screens need ongoing maintenance.

**Heating and Cooling**

- The uneven temperatures in the building create additional burning of the gas boilers and opening of windows to ventilate exposing children to emissions. This was due to lack of local control and levels of insultation in the two parts of the building, which were constructed at different times. Review scope for improving building insulation, reducing heat gain in hot weather, and where not already in place, install thermostatic radiator valves to enable more efficient heating. Lessening incidences of winter overheating that result windows and doors being opened, and worsening exposure to pollution from the nearby roads. Reducing energy usage, and potentially boiler run-times and associated emissions.

**Removal of redundant crossover/ improvements to footway on Columbia Road**

- The nursery was keen to remove the redundant vehicular crossover at its pedestrian entrance as children were liable to run straight into the road as there is no kerb edge. This could be implemented with a package of measures on Columbia Road, including widening the footway removing the parking bays, installing pocket parks with additional planting, pop up children characters. All to raise awareness of the nursery and increase the distance between vehicular traffic and children. With the added benefit of improving the walking environment to encourage sustainable travel modes

**School Street**

- A school Street at drop off and collection times on Columbia Road at the nursery would be beneficial to and encourage the uptake of walking and other sustainable modes of travel to nursery. Closing the road for the short periods may have a significant impact to traffic as Columbia Road is a through road to other areas so the impact would have to be assessed to ensure conditions are not made worse elsewhere.

## 5.4. STARS ACCREDITATION SCHEME FOR NURSERIES

5.4.1. STARS is TfL's world leading school and nursery travel accreditation scheme, inspiring young Londoners to travel smarter and more sustainably, and should form the framework within which the behaviour change related components of the above recommendations are recorded.

5.4.2. Many of the recommendations would also serve to contribute towards the required 'travel activities' and 'support activities' required to attain Gold status – which should ultimately be the aim for the nursery.

5.4.3. Equally by embracing the STARS process, delivering sustainable travel activities, achieving modal shift targets and demonstrating effective community engagement, the nursery will have successfully delivered air quality improvements through reduced travel by cars. The framework of STARS enables the nursery and borough to document, track and share their continued progress, and embed and implement the recommendations throughout the nursery community.

5.4.4. Nurseries are encouraged to note any air quality related activity undertaken on their TfL STARS profile stars.tfl.gov.uk, and to help inspire other nurseries, they are required to tell their story for each activity they have delivered.

5.4.5. The nursery has achieved Gold accreditation. Our recommended measures for the nursery include a number or initiatives that would also count towards maintaining their Gold STARS scheme accreditation, including: 'anti-idling awareness raising measures' and 'park and stride'. STARS activity cards are available for these measures, as well as wide range of other topics https://stars.tfl.gov.uk/Explore/Idea.

## 5.5. HEALTHY SCHOOLS LONDON

5.5.1. The Healthy Schools London programme should also as framework for promoting sustainable transport measure that will contribute towards improved local air quality. To achieve the Healthy Schools London Bronze award, one of the criteria is that "*the nursery promotes active travel to and from nursery*", and provides a number of examples, including:

- By implementing a nursery travel plan and running active travel initiatives such as:
- walk/cycle to nursery days
- walkers/cyclers breakfast clubs
- cycling at break times
- pedestrian skills and cycle training
- active travel competitions
- accreditation programmes

5.5.2. The nurseries must complete the following statements:

- Active Travel is promoted by:
- Nursery travel plan: Date awarded/reviewed
- Active travel initiatives including:

5.5.3.   Our recommended measures for the nursery include a number or initiatives that would also count towards these criteria, including a variety of proposals to promote improved environments for walking, scooting and cycling, and initiatives to promote behaviour change and raise awareness of benefits of active travel.

## 5.6.   AIR QUALITY ALERTS

5.6.1.   When high and very high air pollution is forecast, air quality alerts are displayed at many public locations across London including 2,500 bus stop countdown signs and all Tube stations. Alerts and guidance are also available via social media, an app and a text alert service providing information and guidance on the alert level.

5.6.2.   The Mayor has recently (January 2018) expanded his existing air quality alerts systems and appointed King's College London to continuously monitor air pollution using the existing air quality monitoring network and cutting-edge modelling tools, delivering alerts as required. They will also directly notify a wider group of stakeholders so that the alerts are disseminated more widely and targeted at Londoners who are most vulnerable to the impacts of poor air, including nurseries.

5.6.3.   Each nursery has been provided with further information via email on what the alert means, and how to reduce pupils' personal exposure, and they can contact AirQualityLondon@london.gov.uk for more information.

## 5.7.   ENGAGEMENT

5.7.1.   Engagement activities to raise awareness of the issue of air quality amongst children and the nursery community are fundamental to achieving change.

5.7.2.   Following consultation with the nurseries and borough council as part of the audit process, bespoke awareness raising posters and web material were provided for each nursery – see Appendix D.

### HEALTHY EARLY YEARS LONDON (HEYL)

5.7.3.   Building on the success of Healthy Schools London, Healthy Early Years London is an awards scheme funded by the Mayor of London that supports and recognises early years setting achievements in child health, wellbeing and school readiness. Healthy Early Years London focuses on the whole child and gives settings a framework for their activity with children, parents, carers and staff and the wider community. HEYL will help to reduce health inequalities by creating environments which support a healthy start to life and promote a whole setting and targeted approach across a number of themes including Sustainability-active travel and air quality.

5.7.4.   HEYL complements and enhances the statutory Early Years Foundation Stage (EYFS) framework, providing further focus on children, families and staff health and wellbeing. There are 4 levels of Awards: HEYL First Steps, Bronze, Silver and Gold. HEYL can be used as an improvement tool to support practice in all Early Years settings including active travel:

- Active travel is supported and encouraged, both for journeys to and from the setting and for trips (e.g. walking, scooting)
- The setting is signed up to receive air quality alerts from www.airtext.info/alerts

- There are activities and information available for parents and carers to support sustainability including: active travel, recycling or energy saving
- Practitioners are able to discuss and advise parents and carers on active travel

## 5.8. FUNDING OPPORTUNITIES

5.8.1. A wide range of potential funding sources are available and should be considered to progress some of the measures outlined above, as set out in the figure below.

**Figure 16 – Summary of Funding Opportunities**
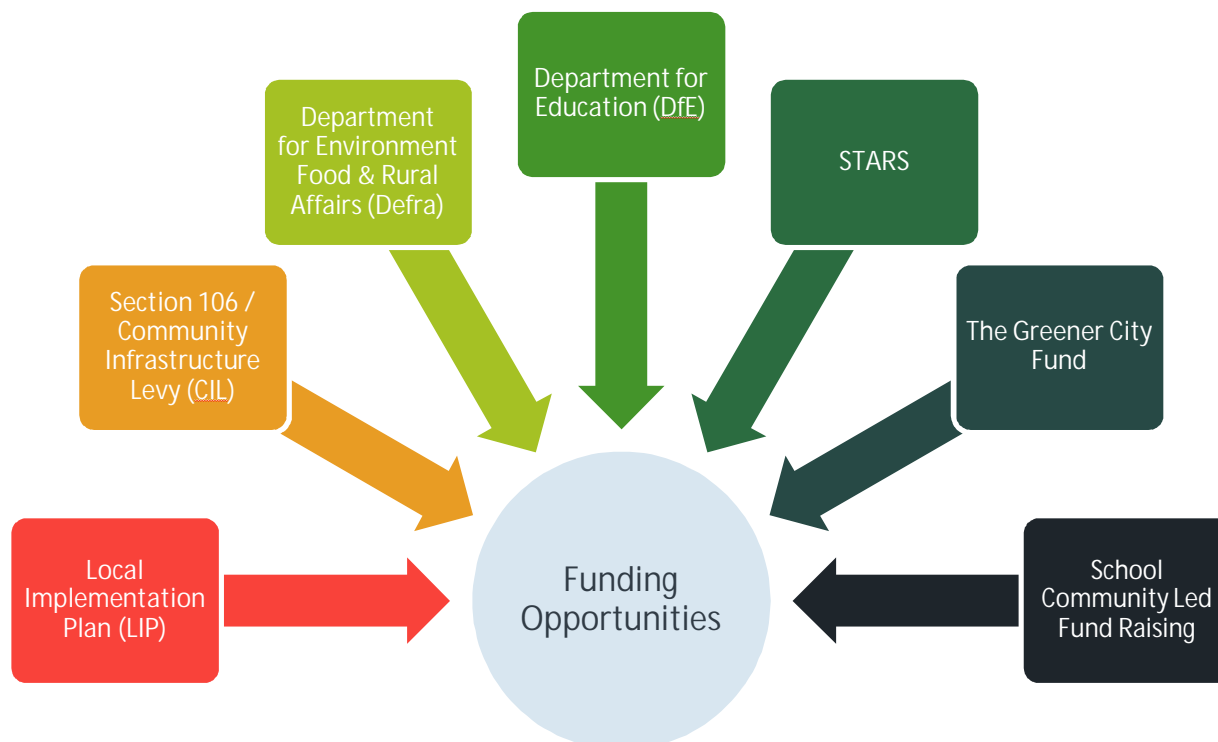


**Local Implementation Plan (LIP)**

5.8.2. A primary source of funding is linked to the Local Implementation Plan (LIP) 3 that will provide spending from April 2019 until April 2020. The guidance on bidding specifically referenced the need to improve air quality at schools and nurseries.

**Section 106 / Community Infrastructure Levy (CIL)**

5.8.3. Section 106 (S106) agreements and Community Infrastructure Levy (CIL) are potential sources of funding towards measures to address local air pollution. A Community Infrastructure Levy (CIL) is a planning charge introduced by the government via the Planning Act 2008.

**TfL Liveable Neighbourhoods**

5.8.4. A Liveable Neighbourhood scheme will deliver attractive, healthy and safe neighbourhoods for people and involves changes to improve conditions for walking and cycling and reducing traffic dominance – all of which can play a part in reducing air pollution. The programme has a budget totalling £85.9m over the five financial years (2017/18 – 2021/22), excluding the funding for the remaining Major Schemes that will be completed during this period.

**Department for Environment Food & Rural Affairs (Defra) Air Quality Grant Scheme**

5.8.5.    Defra's air quality grant scheme provides funding to eligible local authorities to help improve air quality. The scheme helps local authorities to make air quality improvements and to meet their statutory duties under the Environment Act 1995.

**Department for Education (DfE)**

5.8.6.    There may be scope for delivering some of the measures identified through DfE funding for nursery buildings and land, including capital funding for nurseries and academies, such as the Condition Improvement Fund, Priority School Building Programme, Early Years Capital Fund.

5.8.7.    Additionally, the Salix Energy Efficiency Loan Scheme provides funding for nurseries through DfE, to reduce energy costs through the installation of energy efficiency technologies.

**Greener City Fund**

5.8.8.    The Mayor's Greener City Fund (www.london.gov.uk/greenercity) includes a range of programmes to create and improve green spaces and encourage tree planting in London. This is part of the Mayor's commitment to making a London a National Park City. The Community Tree Planting Grant and Community Green Space grant schemes are open to applications from nurseries.

**RE:FIT**

5.8.9.    RE:FIT London is jointly funded by the GLA and the European Union European Regional Development Fund. The programme helps public sector organisations save carbon, energy and money by retrofitting buildings to make them more energy efficient. The RE:FIT London Programme Delivery Unit is an expert team which provides free end to end support to deliver projects.

**TfL STARS Reward Scheme**

5.8.10.    Whilst there is no specific funding attached to STARS, as gaining STARS accreditation helps boroughs reduce car travel, and increase cycling and walking, they often choose to link it to incentives – such as local grant funding through their LIP programmes.

5.8.11.    It is increasingly important that boroughs seek to create a portfolio of funding opportunities, and with that in mind other potential funding sources include:

- **Local Clinical Commissioning Groups (CCG)**
- **Health and Wellbeing Boards:**
- **Charitable Trusts**
- **Local business funding**
- **Consortium approach** – pooling funding with other boroughs and achieve economies of scale

**Nursery Community Led Fund Raising Initiatives**

5.8.12.    As well as the specific funding opportunities outlined above, there is an important role for the nursery, Ward Councillors, the Parent's Teachers Association (PTA) and Nursery Governors, both in a lobbying and leadership capacity, and as vehicles for fundraising to support and promote particular measures and initiatives.

**Other Funding Sources**

5.8.13.    There are several grant funding bodies who may be interested in funding recommendations particularly if a borough links up with a community organisation.

5.8.14. Boroughs could also seek to influence the Joint Strategic Needs Assessment process undertaken by Health and Well Being Boards and Directors of Public Health. This is the process which looks at local clinical, health and well -being population needs, and on which Clinical Commissioning Groups (CCGs) base their funding priorities.

**Other sources of funding for green infrastructure**

5.8.15. Potential sources of funding for green infrastructure in nurseries include:

- The Tree Council's **Trees for Schools** programme
- The **Woodland Trust** offers free trees for schools and nurseries.
- The **Gregg's Foundation Environmental Grants** offer up to £2,000 for projects that improve the physical environment
- **Tesco Bags of Help** offer up to £4,000 to projects including school and nursery grounds
- **The Big Lottery Fund's Awards for All programme** offers up to £10,000 for projects that "improve the places and spaces that matter to communities", including nurseries
- **Trees for Cities** –match-fund the creation of Edible Playground teaching garden space, School Greening projects and Trees for Schools
- **Groundwork London** –support nurseries in designing and implementing green interventions.[12] Groundwork London's Our Space award[13] offers grants between £500 and £5,000.

5.8.16. See Appendix F for further information on potential funding sources.

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[12] https://www.groundwork.org.uk/Sites/london/pages/school-air-quality-greening

[13] https://www.groundwork.org.uk/Sites/london/pages/our-space-award

## 5.9. MONITORING

5.9.1.   An important outcome of the nursery air quality audits will be in assessing the effectiveness of different schemes and initiatives implemented, so that the findings can be used to continually update and refine the toolkit of measures for use in future audits.

5.9.2.   Whilst it will likely prove difficult to disaggregate the impact of a range of measures when implemented simultaneously, by recording this information across all participating nurseries in London, and pooling the findings, it will provide some useful overall insights into what types of solutions work best in practice amongst a given set of conditions.

5.9.3.   In order to undertake these assessments and build on the baseline dataset generated as part of this audit, it will be essential to plan a programme of monitoring post implementation of any measures. This monitoring may include a wide range of metrics including surveys, traffic information, and air quality monitoring. The scope for monitoring should be proportionate to the extent of the problem and the scale of the investment.

Where possible such monitoring should cover:

- Key pollutants ($NO_x$, $PM_{10}$, $PM_{2.5}$), and/or
- a range of other suitable metrics (i.e. travel to nursery mode shares, STARS and Healthy Schools accreditations, traffic counts (as a proxy for road transport emissions), nursery buildings and boiler conditions, surveys and behavioural responses of parents/staff).

# 6. NEXT STEPS

6.1.1. In working with the nursery and borough officers to complete the air quality audit, we found there to be a passionate group of individuals, who were eager to make a difference, and enthusiastic about delivering a range of solutions to improve local air quality for the children, and the wider community.

6.1.2. The borough and nursery should investigate the scope for rapidly delivering key measures from the recommendations, to achieve a combination of quick win improvements for the nursery, whilst also thinking more holistically about how some of the medium to longer term recommendations can be progressed, to deliver more transformational change. By participating in this audit, the following steps have been completed:

- **Identified the sources of poor outdoor air quality** and exposure at nursery and within the surrounding catchment areas.
- **Identified the sources of poor indoor air quality** and potential exposure by children attending the nurseries, and established a baseline of indoor air quality.
- **Engaged the borough and other relevant stakeholders** to inform the context and feasibility of the proposed recommendations.
- **Identified, evaluated and developed recommended measures** within and around the nurseries' that will help a borough and nursery to reduce particulate matter, emissions and children's exposure to poor air quality.
- **Raised awareness within the nursery community** about the impacts of air pollution.

6.1.3. In order to take forwards the recommendations identified within this report, the nursery and borough council will need to continue to work closely, building on the relationships already in place. A wide range of potential funding sources are identified within the report, and borough councils and nurseries are encouraged to apply for these where appropriate to maximise the potential for delivering the recommendations. The nursery has an important leadership role in ensuring that measures to reduce exposure and emissions are included in the nurseries strategic plans.

6.1.4. STARS is an ongoing process, and the nursery should continue working towards the targets they have set, and continue adding to their air quality related activities, and uploading evidence to contribute towards achieving and sustaining higher levels of accreditation. An important outcome from this project will be to build on our knowledge of how effective different measures prove to be over time, so that the findings can be used to continually update and refine the toolkit of measures for use in future audits. The findings of the Air Filtration System trials currently underway will be made available as an update to the toolkit of measures.

6.1.5. We also hope that the borough and nursery will come together as part of a wider School and Nursery Air Quality forum, to share their experiences with other nurseries and boroughs facing similar challenges. A wide range of guidance and useful literature is available to support further studies, schemes or initiatives for improving local air quality – see Appendix A.

**Other formats and languages**

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