

The Mayor of London's Nursery Air Quality Audit Programme

Nell Gwynn Nursery School, London Borough of Southwark



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THE MAYOR OF LONDON'S SCHOOL AIR QUALITY AUDIT PROGRAMME

Nell Gwynn Nursery School – London Borough of Southwark



ACKNOWLEDGEMENTS & CONTRIBUTIONS

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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.

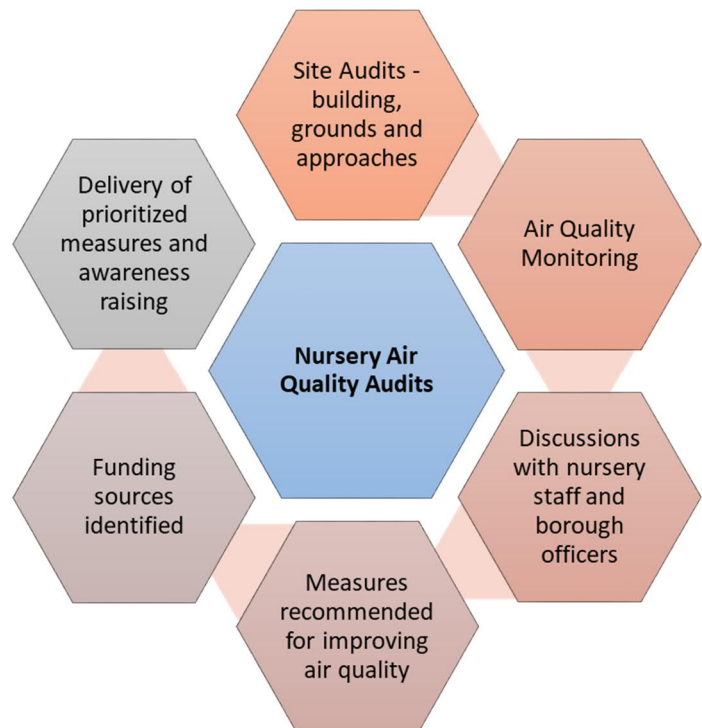
Audit Findings

Nitrogen oxides (NO_x) - Short-term exposure to concentrations of NO₂ can cause inflammation of the airways, increasing susceptibility to respiratory infections and to allergens.

The results of the three-month baseline monitoring showed that NO₂ concentrations were highest at the **roadside** (47.20µg/m³), with local road traffic emissions contributing significantly to roadside concentrations.

The three months of baseline NO₂ monitoring provides a snap-shot of concentrations in and around the nursery. However, in each month, the measured NO₂ concentrations exceeded the legal limits (annual mean NO₂ national Air Quality Objective of 40µg/m³).

NO₂ concentrations fall to 32.62µg/m³ in the **playground**, which is partially screened from traffic by fencing and some trees and shrubs. Concentrations at the **nursery entrance**, which is not screened



from the road, are slightly higher than in the playground ($35.05\mu\text{g}/\text{m}^3$). Whilst concentrations were found to be below national legal limits, known as Air Quality Objectives, there is no 'safe' level and children would still benefit from further reductions. Children will also be adversely affected by their journeys to and from nursery.

Inside the nursery, concentrations fall to $24.40\mu\text{g}/\text{m}^3$ at the nursery entrance and $26.52\mu\text{g}/\text{m}^3$ in the classroom.

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. Exposure can cause irritation to the eyes and upper airways. In the UK, building regulations recommend total Volatile Organic Compounds (TVOCs¹) concentrations should be below $300\mu\text{g}/\text{m}^3$. In Nell Gwynn as an average they were found to be $190.23\mu\text{g}/\text{m}^3$. The majority of VOCs identified were likely to be from the fragrances, perfumes and alcohols in, 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 guideline² for short- and long-term exposure to formaldehyde is $100\mu\text{g}/\text{m}^3$. In Nell Gwynn they were found to be $13.64\mu\text{g}/\text{m}^3$.

Overall the monitoring found that indoor air quality at the nursery met legal standards, however there are no entirely safe levels of exposure to harmful pollutants, and the children would still benefit from further reductions.

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 Peckham High Street. **NO₂ concentrations are predicted to be highest along the southern boundary of the nursery**, which is closest to the main road.

Particulate Matter (PM₁₀ 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 PM₁₀, 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 **8,400 vehicles per day travel**

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 PM₁₀ is particulate matter with an aerodynamic diameter of less than 10 micrometres (10 μm). PM_{2.5} is particulate matter with an aerodynamic diameter of less than 2.5 micrometres (2.5 μm).

within 200m of the nursery. Buses make up only 7% of these vehicle movements, but contribute 54% of the transport related NO_x emissions locally. Similarly, HGVs only account for 5% of the total traffic but contribute 17% of emissions. Cars account for 17% of emissions.

Key observations – summary of potential issues

- **Large construction site immediately opposite the nursery**, with associated construction activity and heavy goods vehicle movements.
- **Heavily trafficked roads** nearby with large numbers of buses.
- **Rat running on road outside the nursery**, particularly by vans. Some speeding vehicles
- Parking on zebra crossing zig-zags, red route and yellow lines, obstructing pedestrians crossing the road, and leading to minor **incidences of congestion** and queuing vehicles.
- The building is reliant on **natural ventilation**, with **poor insulation** potentially worsening the need for ventilation in hot weather, and requiring longer run times of nursery boilers, a further source of local emissions.
- The front **playground is partially exposed to emissions and particulates** from the road and construction site, and kitchen ducts, though is not currently in use.
- The **nurseries plant room boilers** vent into the 2-year olds playground, and one the two kitchen ducts exits onto the front playground.

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 additional **recommended measures and initiatives** have been identified. See Table 4 for full list of measures. Some of the key measures were considered to be:

- **Divert boiler exhaust flues away from playground** - to the rooftop and away from the playground, to raise their discharge height further away from children playing.
- **Air Filtration Systems** - in classrooms and the hall where children spend the majority of their time, in rooms exposed to poor air quality and reliant on natural ventilation. The findings of the Air Filtration System trials will be available to inform this decision upon completion in November 2019.
- **Playground Greening** - with additional planting in the rear playground. In addition to which, consideration could be given to installing sections of green screening/climbers on the security fencing on the front playground where there are gaps in the existing foliage.
- **Discourage rat running with traffic calming** - Introduce traffic calming and greater enforcement of existing speed limits to discourage rat-running, and encourage more travel by sustainable modes. A further consideration could be to review options for introducing a weight restriction to prevent larger freight vehicles routing past the nursery.
- **Encourage parents to approach the nursery along less polluted routes**, for example taking parallel routes to Peckham High Street where possible. This can have a real impact on short-term exposure and is something that parents can be proactive with. The nursery could promote apps / websites and promote the suitable walking routes to avoid air pollution hotspots.

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

Divert boiler flues away from playground
Improved heating and insulation
Air Filtration Systems
Extend kitchen extractor exhaust
Additional ventilation
Add indoor plants

Review purchasing choices and switch to low-VOC content furnishings

Switch to lower VOC cleaning products

Behavioural Measures

Achieve Gold accreditation in STARS

Engagement Activities

Attain a Gold Award in Healthy Early Years London scheme

Staff Engagement

Prepare 'Welcome Packs' for new pupils / parents

Anti-idling campaign

Promote cleaner routes to the nursery

Monitor London Air website / app

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 cardiovascular 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 (NO₂) and particulate matter (PM₁₀ 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 increasing⁵. 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 standards 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

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:

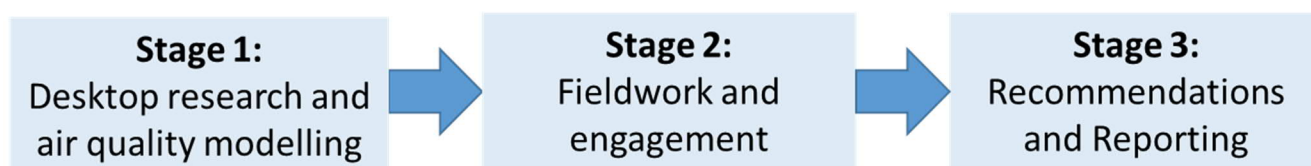
- Audit and identify the sources of poor outdoor air quality and exposure by children at 20 state-funded nurseries and their surrounding nursery catchment areas, including NO₂, PM₁₀ and PM_{2.5}.
- Audit and identify the sources of poor indoor air quality and potential exposure by children attending the nurseries, and establishing a baseline of indoor air quality.
- Assess the feasibility of installing air filtration systems at the selected nurseries' sites.
- Trial and monitor the effectiveness of air filtration systems in at least 5 of the nurseries sites.
- 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 STARS⁶ 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 and officers at the borough who deal with air quality, transport planning and school/ nursery travel.
- 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.

⁶ 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 officers 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 (NO₂), 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 NO₂ 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 – NELL GWYNN NURSERY SCHOOL

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	Thursday 17 ^h January 2019	
Nursery Representatives	Lynne Cooper (Executive Headteacher), Pippa Baker (Head of School and SENCo), Nursery School Caretaker	
Borough Representatives	Bill Legassick (Air Quality Officer), Gary Douglas (School Transport Officer).	
WSP Auditors	Matt Croucher	
Itinerary	Timings	Description
	0845 - 0915hrs	Initial observations and site familiarisation by WSP auditors
	0915 – 0930hrs	Site walk and observations with borough air quality officers/ school transport officer/ nursery staff
	0930 – 1015hrs	Audit of building and grounds to appreciate the layout of the building/playgrounds etc. accompanied by the bursar/caretaker
	1015 – 1115hrs	Brainstorming Workshop with key staff from the nursery and borough officers.
	1115 - 1200hrs	Further observations and completion of site audit template

3. CONTEXT AND INITIATIVES

3.1. NURSERY CONTEXT

Borough: Southwark

Address: Meeting House Lane, SE15 2TT

Pupil Numbers: 164

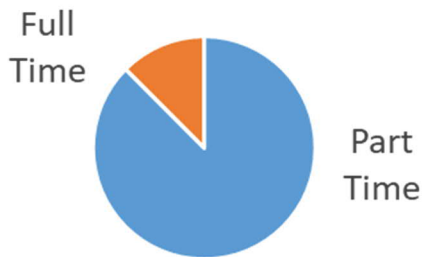
Age Range:
2-5 years

Gender:
Mixed



Type: Maintained Nursery School (MNS)

Children attending Full Time/ Part Time:



Children who speak English as an additional language:

Higher than average

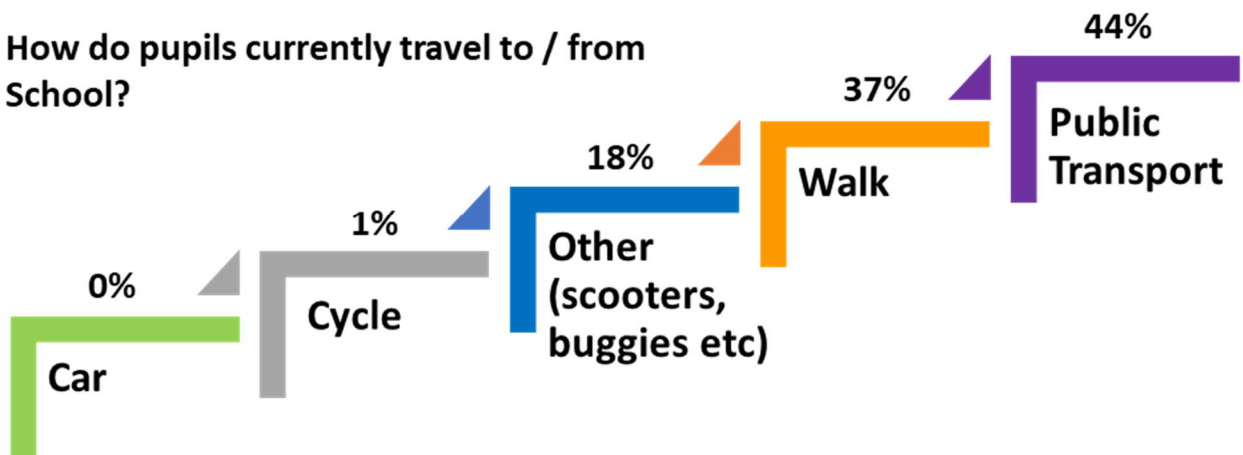


Children with disabilities or special educational needs:

Higher than average

Deprivation Rank:
2

How do pupils currently travel to / from School?



- 3.1.1. **Nell Gwynn Nursery** is located in South London and sits within the London Borough of Southwark.
- 3.1.2. At the time of the audit the nursery had **169 children**, of which 21 are full time (30 hrs per week), and the remainder (158) are part time (15hrs per week).
- 3.1.3. The nursery has **capacity for up to 200 children**. The main entrance is on **Meeting House Lane**, a 20-mph street. Approximately **8,400 vehicles per day travel** on the core roads within a 200m radius of the nursery⁷. This is within the 3rd quartile in terms of traffic volumes amongst of the 20 nurseries assessed as part of this programme. For context, in the UK in 2017⁸ the average traffic flow on urban minor roads was 2,100 vehicles, and 19,200 vehicles on an urban A-road.
- 3.1.4. The desktop review and subsequent discussions with the nursery confirmed that around **44% of children arrive at the nursery via public transport, 37% walk**, 18% travel by other modes (scooter or buggy), and 1% cycle. It was noted however that whilst 0% of children were recorded as travelling by car in the most recent survey, at the time of the audit 3-4 parents dropped off their children by car.
- 3.1.5. Staff explained that the **nurseries catchment area has expanded** over recent years, and attributed this to a significant proportion of parents being housed in temporary accommodation, which is increasingly provided further afield from the nursery. It was also suggested that the extent of regeneration and gentrification taking place in the local area had resulted in a growing number of families being unable to afford to live in the area, with some children travelling to the nursery from as far as Croydon and New Eltham. Consequently, a relatively **large proportion of children travel to the nursery by public transport**, mainly via bus. The nursery explained that whilst these parents may have the option of a more local nursery, it is often the case that a sibling attends a nearby primary school.
- 3.1.6. The nursery staff also explained the **funding challenges** they face, meaning they are increasingly limited to only providing core provision, and cannot afford supplementary activities such as taking children off-site to Forest School or alike, due to the additional costs.
- 3.1.7. The nursery building also serves a **wider community function**, and is used by the local community, including residents from the former Acorn Estate, to host meetings and events.
- 3.1.8. 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.

⁷ The traffic flows and vehicles splits presented are based on the average number of vehicles on each LAEI modelled road link within 200m radius of the nursery in the LAEI 2013 base.

⁸ DfT Road Traffic Estimates: Great Britain 2017 (2018)

Figure 2 – Outer Context Plan

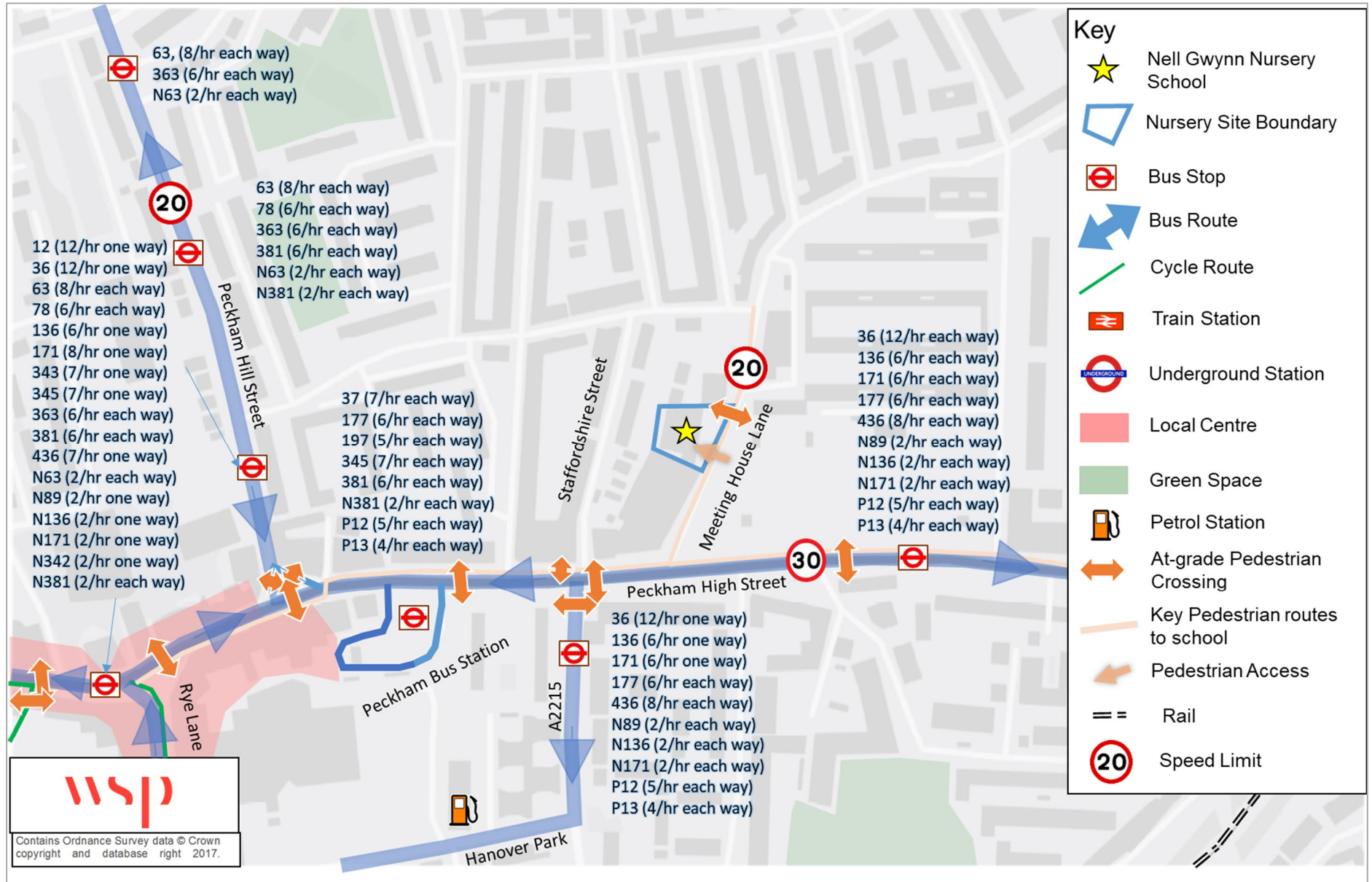
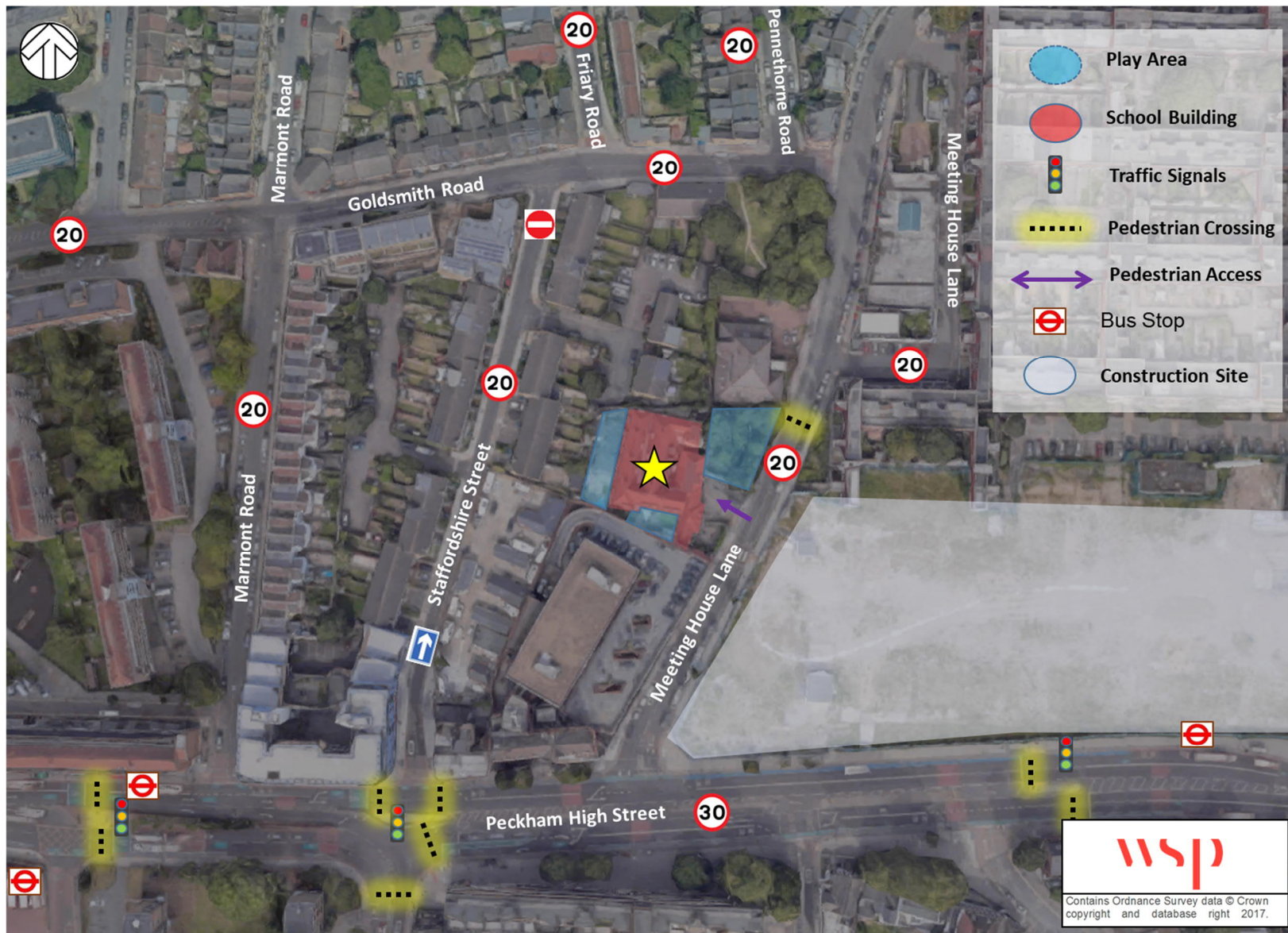


Figure 3 – Inner Context Plans



3.2. PLANNED SCHEMES & RECENT INITIATIVES

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

PECKHAM PLACE (FORMERLY THE WOODDENE ESTATE)

3.2.2. Peckham Place is a major mixed-use development under construction immediately adjacent to the nursery, on the opposite side of Meeting House Lane. The site was formerly known as Wooddene Estate. The development comprises 54 social rental properties, 78 private sale and 201 shared ownership units. The site also includes one commercial unit.



The project will feature an on-site energy centre that will serve 333 new homes, along with the Acorn Estate. Work began in 2017, with properties due to begin being completed later this year. Construction is due to finish in 2020.

Potential impact of development:

- Air pollution associated with construction activity.
- Potential for additional traffic once completed.

ACORN NEIGHBOURHOOD OFFICE, 95A MEETING HOUSE LANE

3.2.3. The former neighbourhood office site on Meeting House Lane, a short distance north of the nursery, is due to be redeveloped to provide 29 residential units and a community hall, with amenity space, landscaping and ancillary works.

Potential impact of development:

- Air pollution associated with construction activity.
- Potential for additional traffic once completed.

MEETING HOUSE LANE PUBLIC REALM IMPROVEMENTS

3.2.4. In late 2017 Southwark Council's Regeneration South Team hosted a consultation event to ask local people what improvements they would like made to the public spaces on Meeting House Lane. Following the consultation proposals were developed, including:

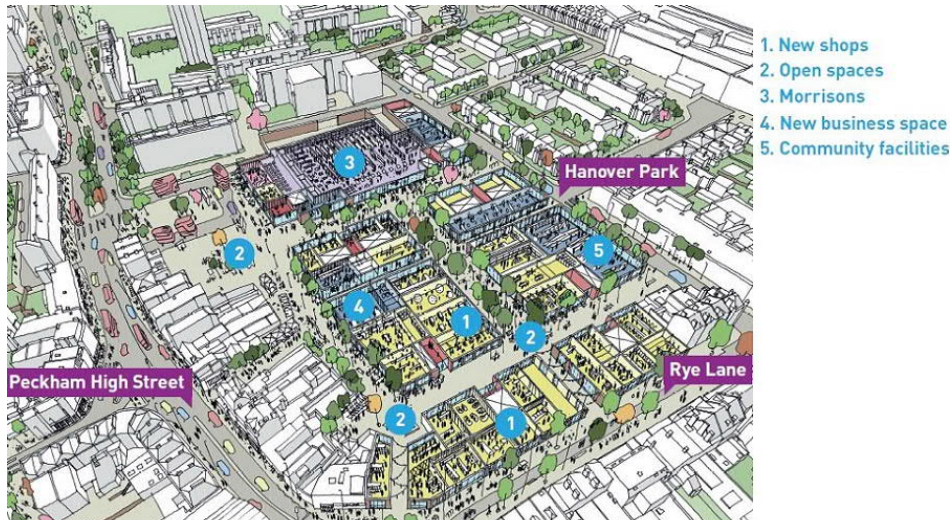
- A new pedestrian entrance set back from the road providing safe entry
- More generous buggy parking, cycle storage and 'waiting area' for parents
- Improve playground screening
- Wider pavement to allow for safer access

Impact of scheme:

- Improved access to the nursery by sustainable travel (walking, scooting and cycling).

AYLESHAM CENTRE AND PECKHAM BUS STATION

- 3.2.5. A major development site west of the nursery, featuring commercial land uses, a car park, petrol station, bus station and a Morrison's store. The plans also include 400 homes, and open space, but no increase in car parking.



Impact of development and scheme:

- Air pollution associated with construction activity.
- Improved access to the nursery by sustainable travel (public transport).
- Potential for additional traffic once completed.

- 3.2.6. A number of notable schemes and initiatives were also highlighted, that will have a significant bearing on the air quality around the nursery, these include:

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 21 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.

LOW EMISSION BUSES

3.2.9. 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. This will mean that next year the entire city will become a Low Emission Bus Zone.



3.2.10. 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. Of relevance locally are the zones from Camberwell to New Cross and Lewisham to Catford, which cover the nursery's road (Peckham Road).

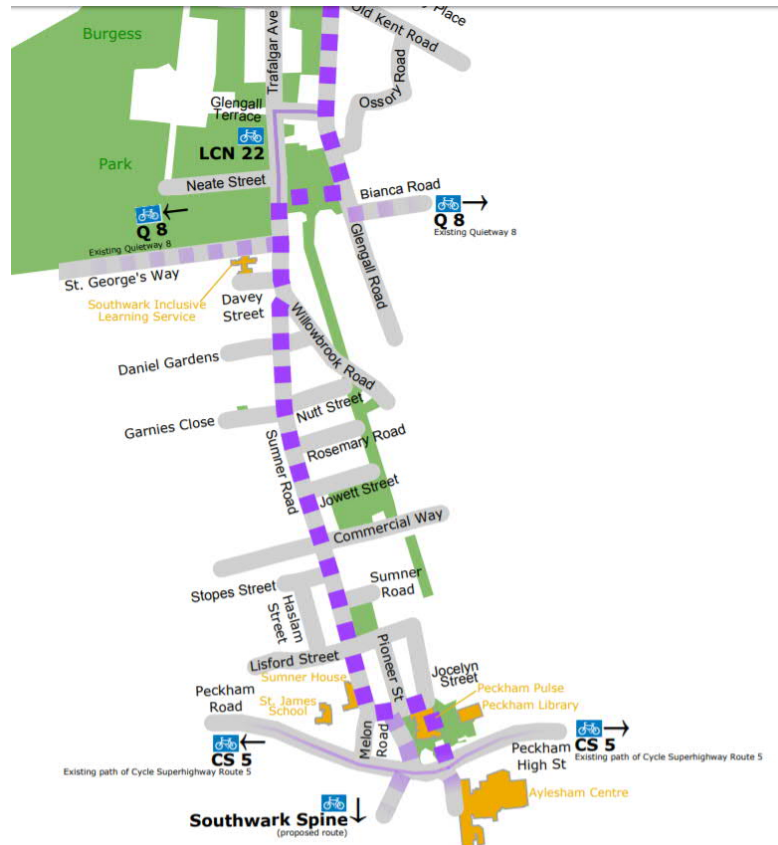
Impact of scheme:

- Reduced air pollution as buses are replaced with low emission buses.

LOCAL SCHEMES

CYCLE SUPER HIGHWAY 5 (CSH5)

3.2.11. The extended cycle super highway route connects Peckham with the Oval and Pimlico, providing more space for cyclists, with new cycle lanes, junction improvements, new Advanced Stop Lines, cycle feeder lanes, and speed reduction measures.



QUIETWAY 8 CYCLE ROUTE – BERMONDSEY TO PECKHAM

3.2.12. Quietways are part of a London-wide programme to implement a network of continuous and convenient cycle routes on less-busy streets across London. The Bermondsey to Peckham Quietway is planned to run from Bermondsey down to Peckham Road running along Glengall Road, Trafalgar Avenue and Sumner Road, and aims to provide a safe alternative cycle route to the Surrey Canal Path which can sometimes become crowded with pedestrians and cyclists.

Impact of scheme:

- Improved travel options locally via sustainable travel (walking and cycling).

ANTI IDLING ENFORCEMENT

- 3.2.13. In January 2018, LB Southwark introduced an initiative to enable Council parking enforcement officers to issue an £80 penalty charge notice to motorists who refuse to switch off their engines when asked.
- 3.2.14. The Council has also led and encouraged a number of voluntary anti-idling patrols at known idling hot-spots to raise driver awareness of the health risks associated with engine idling.

Potential impacts of the initiative:

- Powers in place and a programme of support from volunteers to mitigate issues with idling if required

NURSERY STARS ACTIVITIES

- 3.2.15. 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.
- 3.2.16. 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.
- 3.2.17. Nell Gwynn Nursery School holds Silver 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:



- Creation of community garden and improved buggy, scooter and cycle parking
- Hands-up surveys and travel plan development
- Produced Road Safety booklets to encourage parents and children to encourage Sustainable Travel
- Carnival workshops encouraging walking and raising fitness levels
- Visit to Forest School
- Public transport to Tate Modern
- Other smarter driving activity - encouraging parents not to drive to school standing outside the school every morning. Park and stride also encouraged.
- Tesco Bags of Help funds Forest School
- Sustainability Fair with nearby Primary School, here they took part in healthy sport activities and learnt about raising funds from sustainable resources.
- Other walking activity - The children and staff have worked with Notting Hill Genesis to provide a photographic exhibition of the local environment around the school. Staff took children on learning walks around Peckham where they took photos to be processed for the exhibition.
- Removal of staff parking on-site as a way of discouraging potential congestion.
- Meeting House Lane Safety Group on Facebook to promote the safety of nursery users and the wider community in their use of the surrounding roads and specifically the area in front of the nursery school



HEALTHY SCHOOLS LONDON

- 3.2.18. Healthy Schools London is a programme that supports London's schools and nurseries in providing an environment and culture that helps their pupils grow to be healthy happy and learn. This programme supports schools as they work towards an award scheme (sponsored by the Mayor of London), with a network of local coordinators, and a range of resources, tools and advice provided through this website and regular workshops for schools.
- 3.2.19. Nell Gwynn Nursery School is currently silver accredited with the Healthy Schools programme.

Impact of schemes:

- Awareness raising and promotion of sustainable travel options, lessening sources of emissions and incidences of exposure.

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 (NO₂), formaldehyde (CH₂O) 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. NO₂ is a 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 NO₂. 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 Nell Gwynn Nursey School, five NO₂ diffusion tubes, one formaldehyde diffusion tube and one VOC diffusion tube were deployed in the following locations:

Nitrogen Dioxide (NO₂)

- 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 4 - Comparison of the average NO₂ concentrations at Nell Gwynn Nursery School (µg/m³)

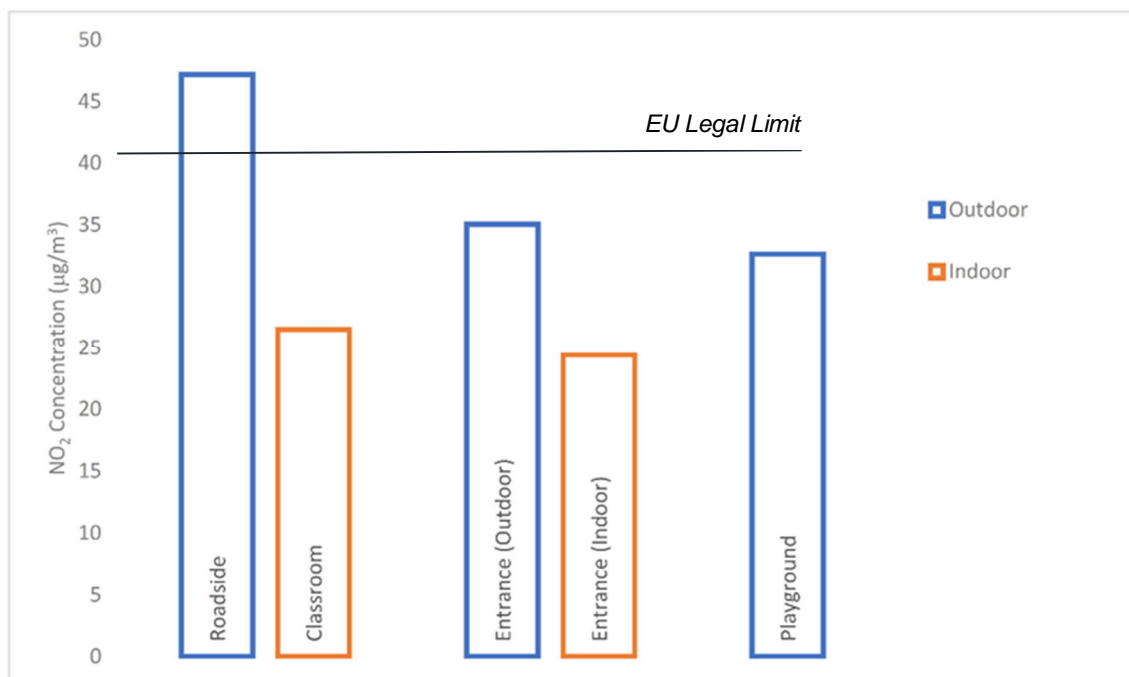


Table 2 – Nell Gwynn Nursery School: Three Month Baseline NO₂ Monitoring Results (µg/m³)

Diffusion Tube Location	Indoor / Outdoor Location	Baseline NO ₂ Monitoring Results - NO ₂ (µg/m ³)			
		January	February	March	Average
Roadside	Outdoor	50.87	49.36	41.37	47.20
Playground	Outdoor	34.96	33.44	29.47	32.62
Nursery entrance	Outdoor	36.16	38.79	30.19	35.05
Nursery entrance	Indoor	26.11	26.05	21.04	24.40
Classroom	Indoor	29.03	28.11	22.41	26.52
Ratio of indoor to outdoor (I/O) concentrations		0.72	0.67	0.70	0.70

- 4.1.8. NO₂ concentrations were found to be highest at the **roadside** (47.20µg/m³), with local road traffic emissions contributing significantly to roadside concentrations.
- 4.1.9. The three months of baseline NO₂ 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 NO₂ concentrations exceeded the annual mean NO₂ national Air Quality Objective (AQO) of 40µg/m³.

- 4.1.10. NO₂ concentrations fall to 32.62µg/m³ in the **playground**, which is partially screened from traffic by fencing and some trees and shrubs. Concentrations at the **nursery entrance**, which is not screened from the road, are slightly higher than in the playground (35.05µg/m³).
- 4.1.11. **Inside the nursery**, concentrations fall to 24.40µg/m³ at the nursery entrance and 26.52µg/m³ in the classroom. It should be noted that indoor NO₂ is not regulated against EU limits, it is regulated against HSE exposure limits.
- 4.1.12. Previous research undertaken for the GLA found that outdoor NO₂ 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.
- 4.1.13. The NO₂ I/O ratio was 0.70 at Nell Gwynn Nursery School, indicating that uncontrolled infiltration rates are at the higher end of the spectrum, and so offer less protection to its occupants than a more airtight building.
- 4.1.14. The results of the three-month baseline VOC and Formaldehyde monitoring are shown in Table 3.

Table 3 – Nell Gwynn Nursery School: Three Month Baseline Formaldehyde and VOC Monitoring Results (µg/m³)

Pollutant	Baseline Formaldehyde and VOC Monitoring (µg/m ³)			
	January	February	March	Average
Formaldehyde	10.16	17.12	<0.14	13.64
VOCs	73.5	310.7	360.9	190.23

- 4.1.15. **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 (TVOCs⁹) concentrations should be below 300 µg/m³. In Nell Gwynn as an average they were found to be 190.23 µg/m³. The majority of VOC chemical species identified were recognised 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.
- 4.1.16. **Formaldehyde** are emitted from vapours arising from solvents and adhesives. In a nursery setting these are likely to originate from glues, adhesives and finishings. Exposure can cause burning sensations of the eyes, nose, and throat, coughing, wheezing, nausea and skin irritation. The World

⁹ TVOC is a grouping of a wide range of organic chemical compounds to simplify reporting when these are present in ambient air or emissions.

Health Organisation (WHO) indoor air quality guideline¹⁰ for short- and long-term exposures to formaldehyde is 100 µg/m³. In Nell Gwynn they were found to be 13.64 µg/m³.

- 4.1.17. In addition to the monitoring undertaken at the site, 2013 baseline annual mean NO₂, PM₁₀ and PM_{2.5} concentrations have been estimated for each nursery from the **London Atmospheric Emissions Inventory** (LAEI) maps.
- 4.1.18. Briefly, the LAEI model provides mapped annual mean NO_x, NO₂, PM₁₀ 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.
- 4.1.19. 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.
- 4.1.20. Figure 5 shows the 2013 LAEI baseline annual mean NO₂ concentrations within the vicinity of Nell Gwynn Nursery School.
- 4.1.21. The contours (changes in colours) show the change in the change in pollution gradients, with distance, away from the heavily trafficked Peckham High Street. NO₂ concentrations are predicted to be highest along the southern boundary of the nursery, which is closest to the main road.

¹⁰ Chapter 5.8 Formaldehyde. WHO Air Quality Guidelines – Second Edition, 2001

Figure 5 - LAEI Baseline Annual Mean NO₂ Concentrations within the Immediate Area of Nell Gwynn Nursery School



4.1.22. Nearly 50% of NO_x 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 NO₂ in the vicinity of the nursery.

4.1.23. The pie chart below shows that while buses make up only 7% of vehicle movements, they contribute 54% of the transport related NO_x emissions locally. Similarly, HGVs only account for 5% of the total traffic but contribute 17% 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 6 – Average Road Transport – by Vehicle Type (within 200m of nursery)

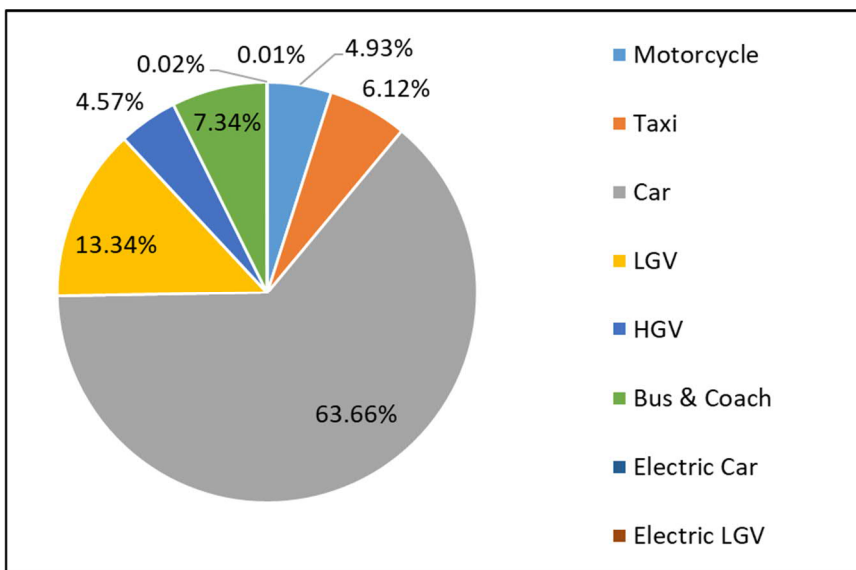
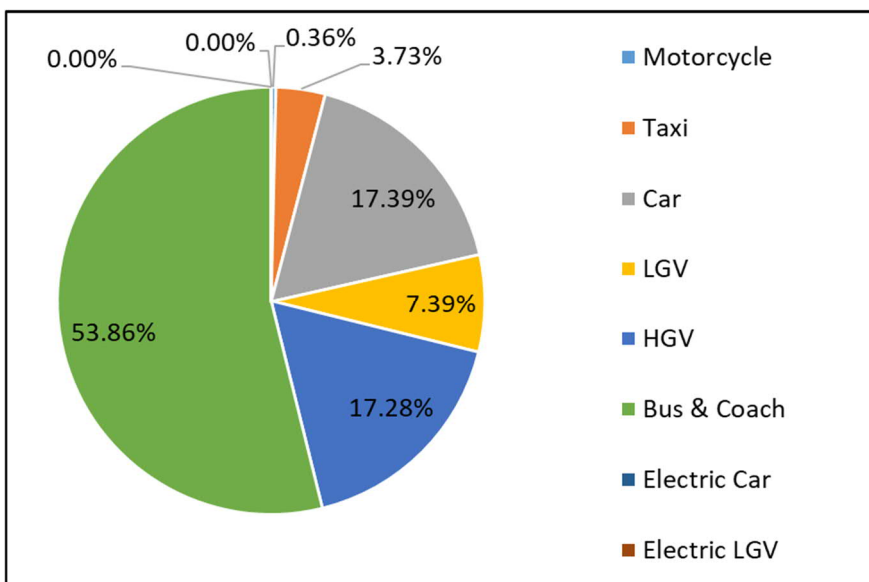


Figure 7 – Average Road Transport NO_x Emissions by Vehicle Type (within 200m of nursery)



4.1.24. The pie charts below illustrate that PM₁₀ and PM_{2.5}, like NO_x, are emitted in higher levels by large vehicles such as buses, HGVs and LGVs, though not to the same extent. Buses make 7% of vehicle movements, and contribute 37% of the transport related PM₁₀ emissions locally, and 27% of PM_{2.5}.

Figure 8 – Average Road Transport PM₁₀ Emissions by Vehicle Type (within 200m of nursery)

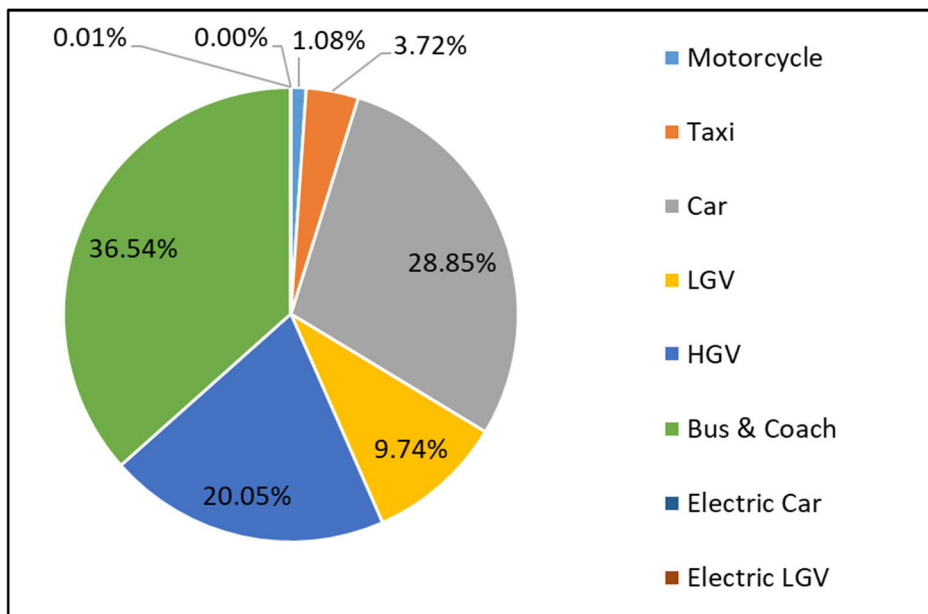
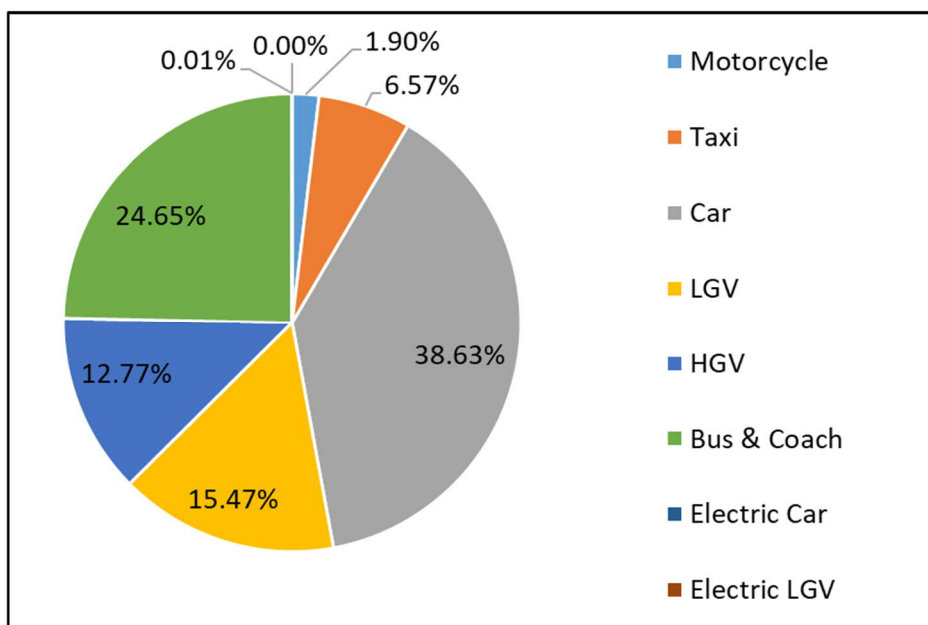


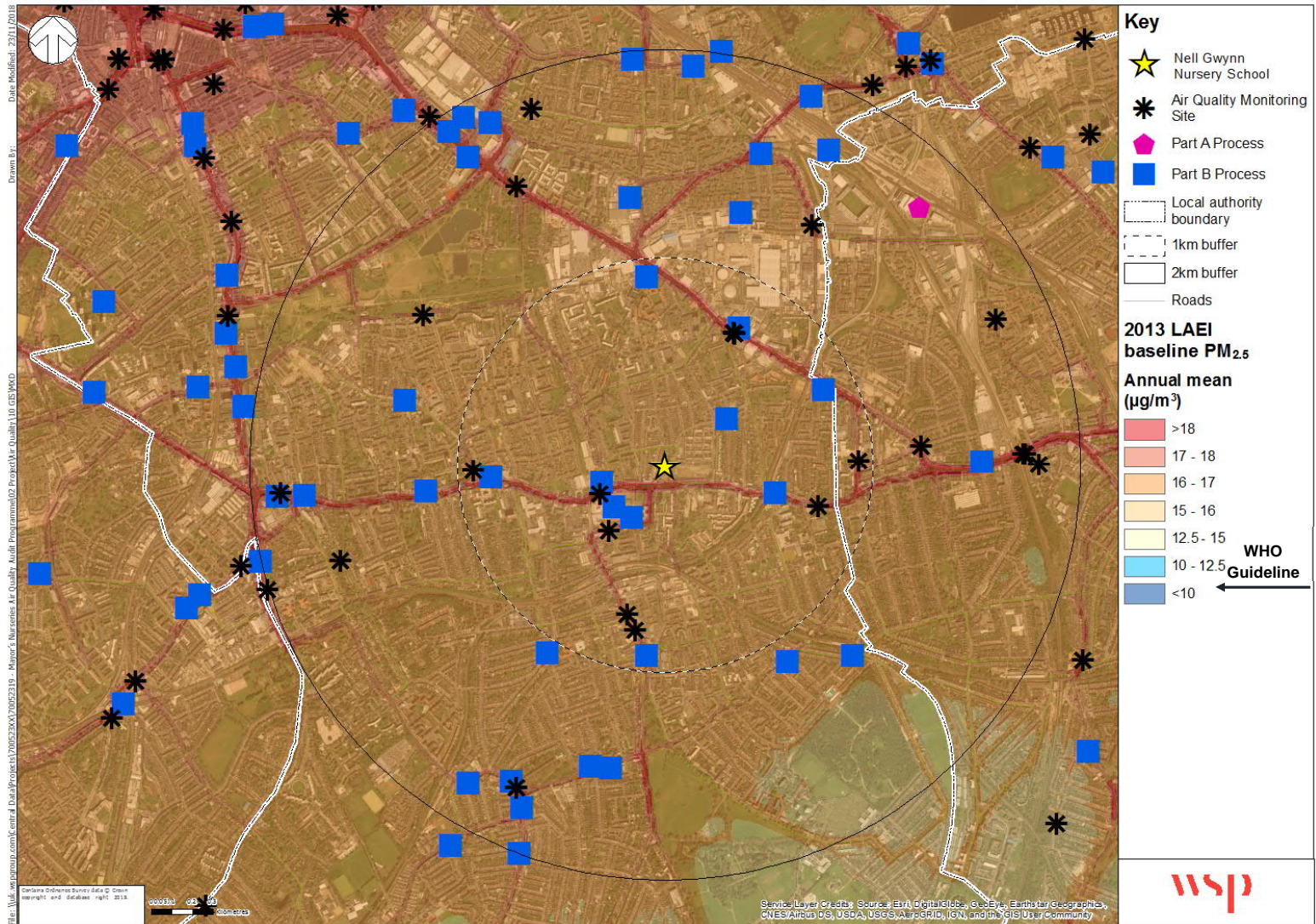
Figure 9 – Average Road Transport PM_{2.5} Emissions by Vehicle Type (within 200m of nursery)



4.1.25. Figures 10-12 show the 2013 LAEI baseline annual mean NO_x, PM₁₀ and PM_{2.5} concentrations in within 2km of Nell Gwynn 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.

4.1.26. PM₁₀ and PM_{2.5} sources are much more universal and dispersed than NO₂ sources. A proportion of PM_{2.5} and PM₁₀ 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 PM₁₀ (Figure 11) and PM_{2.5} (Figure 12) appear less defined than for NO₂.

Figure 12 - 2013 LAEI Baseline Annual Mean PM_{2.5} Concentrations within 2km of Nell Gwynn Nursery School



4.2. HIGHWAYS – KEY OBSERVATIONS

- 4.2.1. The nursery is located on Meeting House Lane, and set back a short distance (70m) from the **heavily trafficked** Peckham High Street (A2215), a wide four lane road carrying large volumes of cars, buses, vans and heavy goods vehicles. The road is a **key bus corridor** with up to 53 buses per hour at peak times, which contributes significantly towards local air pollution, though this will be reduced as the buses are upgraded to the cleanest Euro VI vehicles as a minimum by 2020, as part of TfL's existing commitments.
- 4.2.2. Children approach the nursery from the north and south along Meeting House Lane, but primarily from the south via Peckham High Street, which poses a **barrier to those walking to the nursery**, and exposes children to high levels of emissions as they cross the road using the signalised two-stage pedestrian crossing facilities.
- 4.2.3. Meeting House Lane is a minor road principally serving the surrounding residential area, though we understand it is frequently used as a **rat run for north-south traffic** travelling between Peckham High Street/ Queens Road and Old Kent Road. This appeared to be borne out through our observations, with a **relatively high number of vans** using the road, worsening local air pollution around the nursery.
- 4.2.4. A number of vehicles were **exceeding the 20mph speed limit**, despite the traffic calming present on the road, in the form of the raised zebra crossing north of the nursery, and the raised entry and the junction with Peckham High Street. A school crossing patrol was also in place assisting pedestrians at the zebra crossing, following a number of incidents where traffic has failed to stop, which we observed whilst undertaking the audit. This can contribute towards making the street feel like an unsafe environment, potentially discouraging more children from walking or scooting.
- 4.2.5. Most children cross Meeting House Lane using these facilities, though a number were observed crossing along a more direct pedestrian desire line. A number of vehicles (typically vans or police vehicles) were observed parking on both the yellow lines, and the section of red route at the southern end of the road opposite the Police station, which on occasion caused **minor congestion** as vehicles queued to pass them. This also resulted in a small number of incidences where parents and children crossed with a limited view around the parked vehicles.
- 4.2.6. Overall however, as **very few of the parents drop off their children by car**, the activity we observed at the peak arrival time was largely calm and unproblematic. As such it is recognised that this activity is only a small contributor to overall poor air quality around the nursery, and that the majority of air pollution in this location will be associated with wider background emissions.
- 4.2.7. The **construction activity** at the site of the Peckham Place development, immediately opposite the nursery, is a very evident when approaching the nursery, resulting in frequent heavy goods vehicle movements. 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.
- 4.2.8. Diesel engine exhaust emissions from construction vehicles, machinery and heavy equipment, known as **'Non-Road Mobile Machinery (NRMM)'** is another source of PM₁₀ and PM_{2.5} on construction sites. NRMM are a source of NO_x emissions, as well as other air pollutants.

- 4.2.9. 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. NRMM use is regulated in London.
- 4.2.10. The **HGVs exit the construction site from the access immediately opposite the nursery**, and sometimes enter via this access too, though we understand it is formally designated for exiting vehicles only. The narrow dimensions of Meeting House Lane and limited turning space mean on occasion HGVs mount the pavement outside nursery and perform three point turns to exit the site. The vehicles are marshalled by a steward when this takes place, but nonetheless poses clear conflicts with passing pedestrians, and minor congestion and delays on the road, worsening local emissions outside the nursery. The nursery staff also expressed concerns about the traffic movements from the car park exiting via this access once the development is occupied.
- 4.2.11. To the south of the nursery is the former **Peckham Police station** building, which is still in use as an office and depot, but no longer as a public facing Police office. We observed relatively frequent vehicle movements entering and exiting the facility, posing some minor conflicts with parents and children walking across the entrance to the nursery. Approximately 40 parking spaces are visible on the roof, and potentially a similar number on the ground floor. As such this is a source of local emissions, though we did observe that a number of the police vehicles were low emission vehicles.
- 4.2.12. A small number of vehicles were parked in the car park of the **Doctors Surgery** immediately to the north of the nursery, one of which was observed idling their engine for an extended period.
- 4.2.13. At the time of the audit **major roadworks** were ongoing on nearby Rye Lane as part of replacement gas mains, resulting in significant traffic impacts and bus diversions locally.
- 4.2.14. It was evident there was **demand for additional cycle parking** locally, with a number of bikes secured to railings.

Summary – Key Issues

- Large construction site immediately opposite the nursery, with associated construction activity and heavy goods vehicle movements.
- Heavily trafficked roads nearby with large numbers of buses.
- Rat running on road outside the nursery, particularly by vans.
- Some speeding vehicles
- Parking on zebra crossing zig-zags, red route and yellow lines, obstructing the view of pedestrians crossing the road, and leading to minor incidences of congestion and queuing vehicles.



High traffic volumes on Peckham High Street (A2215), including large numbers of buses and vans.



Pedestrians crossing 4 lanes of traffic to reach the nursery.



Peckham Place development under construction immediately opposite the nursery.



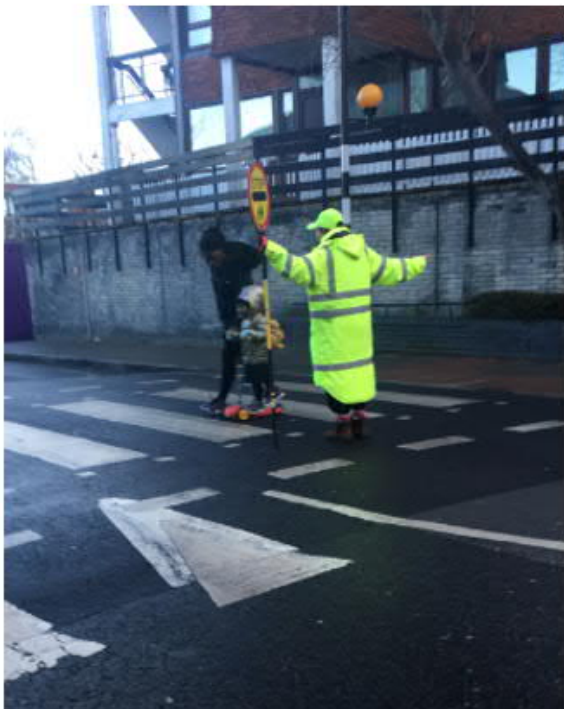
Parking on the zebra crossing zig zags outside the nursery. Van traffic routing via Meeting House Lane.



Police station car park adjacent to the nursery generates frequent vehicle movements.



Vehicles stop on the red route and yellow lines on Meeting House Lane.



Crossing patrol on zebra crossing near the nursery following incidents of drivers failing stop.



Goldsmith's Nature Garden is in a poor condition, spoilt by litter, graffiti and with evidence of drug use and anti-social behaviour

4.3. NURSERY GROUNDS / BUILDING - KEY OBSERVATIONS

- 4.3.1. The nursery gates open at 0830. The morning session for the Two-Year Olds is 0900 until 1200. The afternoon session is 1300-1600. The Three and Four-Year Olds morning session runs from 0915- 1145. The afternoon session is 13.00-1530. The full-time session runs from 0915 until 1530.
- 4.3.2. The nursery is housed in a **brick built building constructed in 1911**, and was formerly a school, and prior to that the site was a brewery. The majority of the building is single storey with high pitched roofs, though there are mezzanine floors in a corner of each classroom, and within the main hall.
- 4.3.3. The two **2-year olds classrooms** are located at the rear of the building, on the southern side of the building, screened from Meeting House Lane. The classrooms open out onto the 2-year old's playground, and the children typically free-flow between the classroom and the playground throughout the day, with exception of lunch break and an initial settling in period. The external doors are left open, with a butcher's curtain fitted to retain the heat.
- 4.3.4. The **2-year-old playground** is a small and relatively enclosed area, with the high brick wall of the police station car park forming the southern boundary.
- 4.3.5. The four **3-4-year-old classrooms** are located at the rear of the nursery, away from Meeting House Lane and the construction site. The classrooms each have large windows and double height ceilings, with external doors leading to the **rear playground**. The children typically free-flow between the classroom and the playground throughout the day. The playground backs onto residential properties, and to the police station on the southern boundary, with is some limited vegetation.
- 4.3.6. The classrooms are each accessed off a large **central hall**, which is used extensively by the children in addition to their classrooms. At the front of the nursery is the reception area, flanked by the visitor's entrance on one side, and a separate entrance for the children. A sensory room is located at the front of the building in the southeast corner of the site. The remainder of the frontage is occupied by the kitchens.
- 4.3.7. In addition to the playgrounds at the rear of the building there is a larger **playground** in the northeast corner of the site, fronting onto Meeting House Lane. A new security fence was recently installed along the front of the playground, with wooden slats that partially screen the playground, and some shrubs and mature trees providing partial screening from the road. At the time of the audit this playground was not in use, and had not been for a number of months whilst there were fewer children attending, owing to financial constraints a requirement for additional staff to supervise it. The playground would though be brought back into use should numbers increase.
- 4.3.8. The former staff car park was removed from the front the nursery in 2012, and converted into a **community garden**, with a section of green screening, and an area for **parking buggies/ scooters/ bikes**. This was significantly upgraded in 2018 as part of the package of improvements delivered at the front of the nursery, including realigning and relocating the buggy store, widening the footway space and replacing the gates and fencing. The buggy store features a meadow roof, and appeared well used and nearly full on the day of the audit.
- 4.3.9. The nurseries **plant room** is located on the southern side of the site, and contain two small domestic type boilers. The boilers were considered to be in reasonable working order, however both vent their exhausts from the wall directly into the adjacent playground used by the 2-year olds, which can be problematic, though the density of the exhausts mean they will generally rise.

- 4.3.10. The nursery is **reliant on natural ventilation** through opening doors and windows, with a number of the rooms reported to get excessively hot, particularly the administrative staff and management teams offices on the first floor. The classrooms feature high ceilings and large windows, and given the age of the building are likely to be **poorly insulated**, which would 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. The nurseries radiators were replaced in 2014 after one exploded.
- 4.3.11. The **nurseries kitchen** stoves had large modern hoods, and extract systems vent out onto through large ducts, one which exits into the playground at the front of site. It was not clear if this duct or the second, directed away from the playground, though still not at roof level, was in use. There was no evidence of strong cooking odours in the nursery building away from the kitchen, indicating the extract were working effectively.
- 4.3.12. The nursery receives only 1 or 2 **deliveries** a week typically, with vehicles accessing via the front of the building.
- 4.3.13. As would be expected in a nursery, **paints and glue sticks** were used widely by the children throughout the classrooms, and consequently the odour was noticeable around these areas. When not in use they are stored in the Long Store, which is not accessible to the children.
- 4.3.14. There was not a strong odour of **cleaning products** in the building, and when not in use they are stored away from the classrooms behind closed doors in the laundry room, which is not accessible to the children.
- 4.3.15. The **classroom floors** comprised lino or vinyl, with areas of carpet tiles. There is wood flooring in the main hall. The rooms are **furnished** with items made from a variety of materials including wood (some of which are likely to be MDF), plastic, metal, wicker, as well as some soft furnishings. The nursery building contained only a limited number of **green plants**.

Summary – Key Issues

- The building is reliant on natural ventilation, with poor insulation potentially worsening the need for ventilation in hot weather, and requiring longer run times of nurseries boilers, a further source of local emissions.
- The nurseries classrooms, the main hall and the playgrounds in use by the children are set back from the nearby roads and Peckham Place construction site, they do back onto the adjacent police station car park, though the vehicles on the ground floor are screened by a wall.
- The front playground is partially exposed to emissions and particulates from the road and construction site, and kitchen ducts, though is not currently in use.
- The nurseries plant room boilers vent into the 2-year olds playground, and one the two kitchen ducts exists onto the front playground.



3-4 year old classrooms and playground



Building reliant on natural ventilation



Boilers vent from the wall into the 2-year olds playground.



Plant room



3-4-year olds classroom



Doors opened throughout the day for free flow between classroom and playground. Butchers curtains are fitted to each doorway



Section of green screening in place where the community garden fronts onto Meeting House Lane.



New buggy storage with meadow roofing well used by parents.



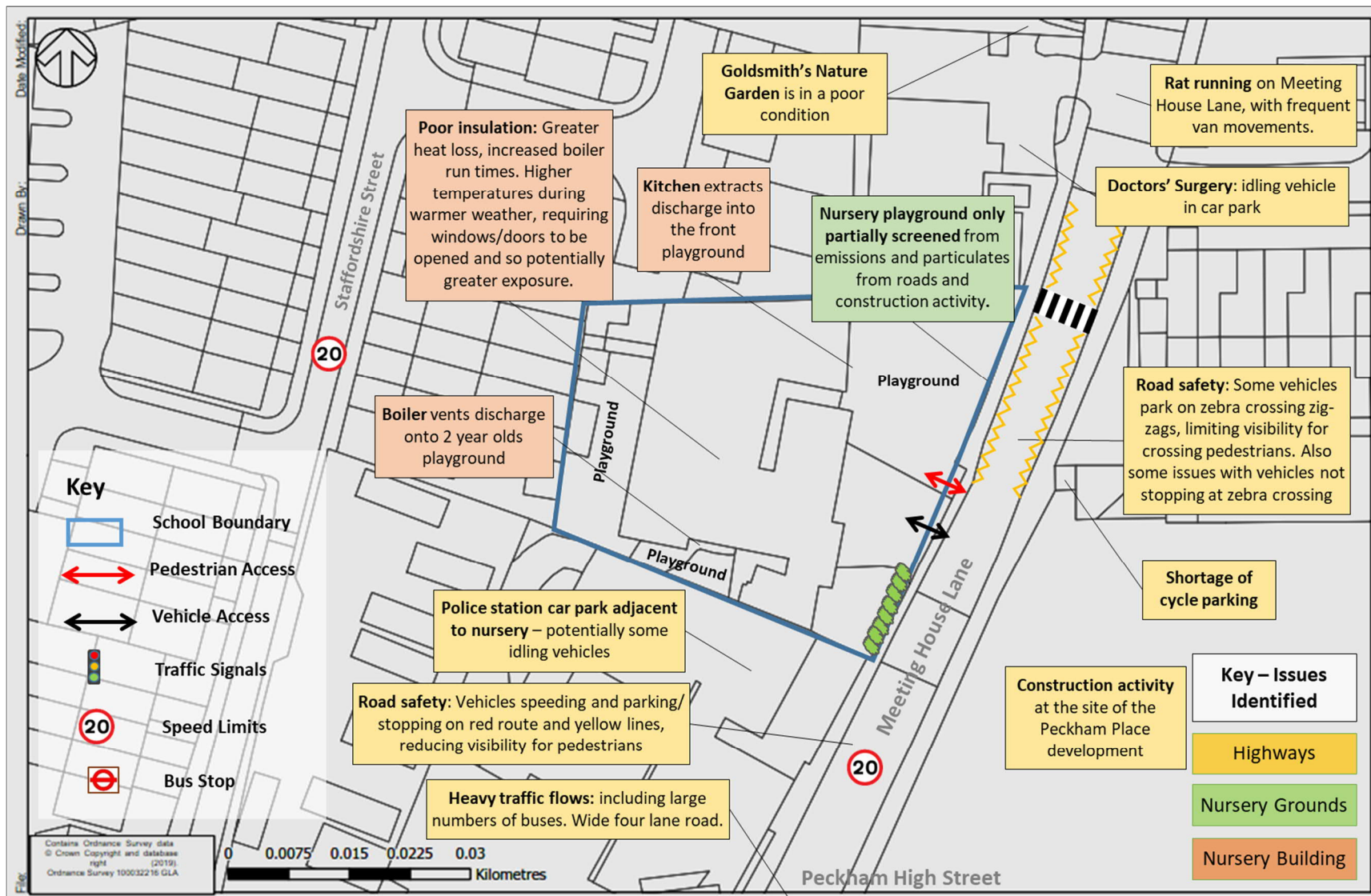
Front playground – partial screening from new fencing, with shrubs and mature trees.



Kitchen ducts vent onto front playground.

4.4. KEY OBSERVATIONS – SUMMARY OF ISSUES

Figure 13 - Summary of Potential Issues Map



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. 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	Discourage rat running and speed with traffic calming	Introduce traffic calming and greater enforcement of existing speed limits on Meeting House Lane, to discourage rat-running and change the character the road to a more residential/ local road, fostering a safer environment for pedestrians, and encourage more travel by sustainable modes. This could take the form of build outs to create single lane priority narrowing's. A further consideration could be to review options for introducing a weight restriction to prevent larger freight vehicles routing past the nursery, though the majority of vehicles observed were smaller vans.	Reduce sources and exposure	X			<ul style="list-style-type: none"> Road safety Promotion of sustainable transport 		X		X				X
2	Improve pedestrian crossing	Linked to the above measure, consideration could be given to introducing tighter kerb radii at the junction of Meeting House Lane and Peckham High Street, to the south of the nursery. This would slow vehicles speed when entering the road, reduce crossing distances for pedestrians, and reinforce the above measures to reduce the profile of the road as a rat-run for passing traffic.	Promoting walking, scooting and cycling by providing improved local conditions	X			<ul style="list-style-type: none"> Road safety 		X			X			X
3	Tree planting	Tree planting in the wider area of footway at the junction of Meeting House Lane and Peckham High Street, linked to the above measure, to intercept some particulates and foster a 'green gateway' to the nursery.	Reduce exposure	X			<ul style="list-style-type: none"> Visual amenity 	X			X				X
4	Parking enforcement	Increase patrolling and enforcement to address unsafe parking on the red route, double yellow lines and zebra crossing zigzags by the nursery, to discourage parking that obstructs pedestrians when crossing, and results in minor congestion, worsening local emissions.	Reduce sources and exposure	X			<ul style="list-style-type: none"> Road safety 	X			X			X	
5	Anti-Idling	Whilst engine idling was not a major issue at the site, it may be beneficial to introduce anti-idling signage/ banners at the front of the nursery, with parallel awareness raising to launch and enforcement, to drive a more general improvement amongst local drivers. In addition to engagement with the adjacent doctor's surgery, regarding idling vehicles in their car park, which backs onto the nursery playground.	Reduce sources and exposure	X			<ul style="list-style-type: none"> Supports STARS and HSL objectives 	X			X				X
6	Reducing construction	Investigate opportunities to formalise or reinforce current informal agreements to restrict the number of construction vehicles during key times when children are most exposed to emissions. Future freight / construction vehicles associated with	Reduce sources and exposure	X			<ul style="list-style-type: none"> Road safety 	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
	related emissions	new developments can be required to use only Euro 6 compliant vehicles and ULEVs as they become available, with consolidation of trips and re-timing of deliveries to off-peak periods as part planning permissions. Construction Logistics Plan (CLPs) guidance could ensure construction vehicles avoid nursery start / finishing times.													
7	Monitor impact of new development traffic	As part of Travel Plan monitoring, review the impact of additional traffic movements from the access to Peckham Place once occupied, immediately opposite the nursery, to ensure it does not result in additional congestion or conflict with those accessing the nursery, and if so consider revising site access arrangements.	Reduce exposure	X			<ul style="list-style-type: none"> Road safety 	X				X		X	
8	Engage with local organisations with car parks	Engage with the Police in the adjacent building to seek measures to reduce emissions associated with the use of their car park, including the promotion of low emission vehicles, and additional screening from the nursery.	Reduce sources and exposure	X			<ul style="list-style-type: none"> Promotion of sustainable transport 		X			X		X	
9	Engage with local businesses to reduce freight/delivery emissions	Engage with local businesses (including the Kent Park Industrial Estate and Six Bridges Trading Estate to the north) to promote the use of low emission deliveries and explore the potential for consolidation, re-timing, collectivisation and pick-up drop off facilities.	Reduce sources and exposure		X		<ul style="list-style-type: none"> Biodiversity 	X				X		X	
10	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	<ul style="list-style-type: none"> Promotion of sustainable travel 			X			X		X
11	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%. The revenue raised can be used to contribute towards measures to improve air quality.	Reduce sources and exposure			X			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		
12	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 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.	Reduce sources of emissions	X			<ul style="list-style-type: none"> Reduced noise 	X			X					X	
13	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.	Reduce sources of emissions	X				X			X					X	
14	Restore nearby Nature Garden	Consider restoring the nearby Goldsmiths Nature Garden, as an additional green space for use by the nursery on occasion, but also the wider community.	Awareness raising	X			<ul style="list-style-type: none"> Biodiversity 	X			X			X			
15	Additional cycle parking	Consider introducing additional cycle parking or hangers to cater for demand in local area (for use by local residents/ visitors), where bikes are currently locked to fencing.	Promoting walking, scooting and cycling by providing improved local conditions	X			<ul style="list-style-type: none"> Promotion of sustainable travel 	X			X					X	
16	Promote sustainable transport, travel demand management and low emission vehicles	Promote a shift towards the use of sustainable modes of transport, including walking, cycling, public transport, car clubs and low emission vehicles, as well as travel demand management, with supportive measures such as improved cycle infrastructure, electric vehicle charge points and car club bays.	Reduce sources of emissions	X			<ul style="list-style-type: none"> Promotion of sustainable travel 	X			X					X	

Highway (Key Stakeholder: TfL)

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
17	<p>Low Emission Buses</p> <p>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.</p> <p>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. Of relevance locally are the zones from Camberwell to New Cross and Lewisham to Catford, which cover the nursery's road (Peckham Road).</p>	Reduce sources and exposure			X				X		X			X	
Nursery Grounds (Key Stakeholder: Nursery/ Borough)															
18	<p>Green Infrastructure</p> <p>Consider installing sections of green screening/climbers on the security fencing on the front playground fronting onto Meeting House Lane, where there are gaps in the existing foliage. The playground was not in use at the time of the audit, so may not be a priority, and it is partially screened already. 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.</p> <p>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 NO₂ and 38% for PM₁₀. Green screens also provide aesthetic benefits as well as increased privacy, biodiversity and noise reduction.</p> <p>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</p>	Reduce exposure to emissions	X			<ul style="list-style-type: none"> Visual amenity Security, privacy 		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
	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.														
Nursery Building (Key Stakeholder: Nursery/ Borough)															
19	Divert boiler flues away from playground	Divert boiler flues to the rooftop and away from the playground, to raise their exhaustion height further away from children playing. Flues and extraction equipment should ideally be exhausting above roof ridge height to aid quick dispersal. In some cases there can be complications with raising their exhaustion height further due to pressure drops, so specialist advice should be sought.	Reduce exposure to emissions	X				X			X			X	
20	Improved heating and insulation	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.	Reduce sources and exposure	X			<ul style="list-style-type: none"> Reduced energy consumption and reduced operating costs Improved learning environments 			X		X		X	
21	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. The findings of the Air Filtration System trials will be available to inform this decision in early 2020. The potential air quality improvement from Air Filtration System is identified as being low, however this is subject to the findings of the trial.	Reduce exposure to emissions	X			<ul style="list-style-type: none"> Improved learning environments Child health and welfare 		X			X		X	
22	Extend kitchen extractor exhaust	Review kitchen extractor fan exhaust, and if the extract into the front playground is in use, extend so that it emits away from the playground, and at a higher level to aid dispersal.	Reduce exposure to emissions	X				X			X			X	
23	Additional ventilation	Additional ventilation should be considered in arts/crafts preparation areas, as well as storage rooms where cleaning products are kept, and areas with photocopiers, where off-	Reduce exposure to emissions	X				X			X			X	

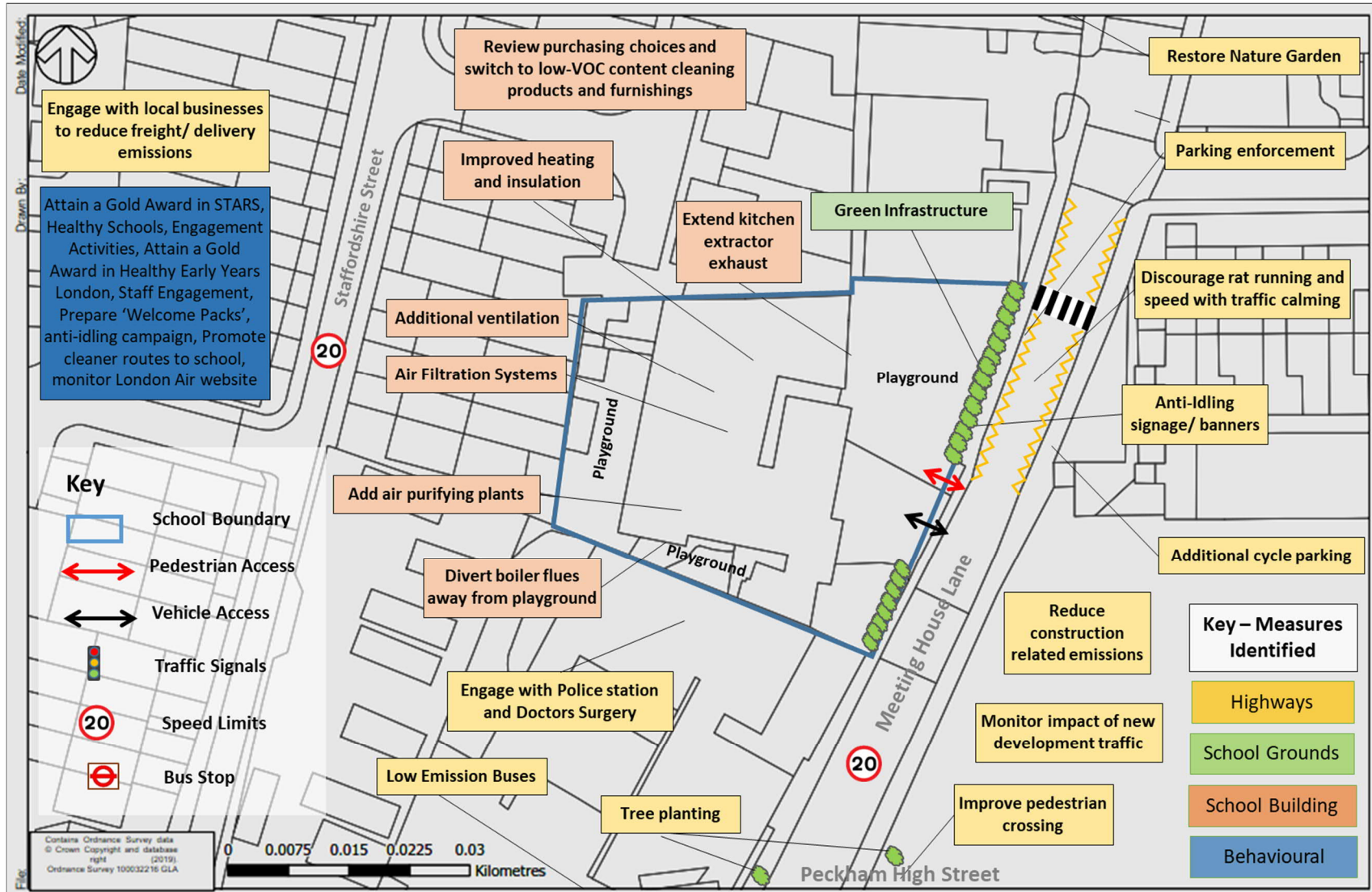
Measure	Description	Purpose	Potential Air Quality Improvement			Wider Benefits	Cost			Deliverability			Stakeholder Support				
			Low	Medium	High		Low	Medium	High	Quick Win	Medium Term	Long Term	Low	Medium	High		
		gassing may occur, and be operated whilst odours, such as paints or glue are present.															
24	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	Reduce exposure to emissions	X			<ul style="list-style-type: none"> Improved learning environments Visual amenity 	X			X					X	
25	Review purchasing choices and switch to low-VOC content furnishings	Ensuring that when introducing new furniture, the use of hazardous compounds and residues is limited. Review purchasing choices and switch to low-VOC content furnishings, including pre-owned furniture, and following schemes such as the EU Ecolabel, or a UK specific version if introduced as referenced in DEFRA's Clean Air Strategy 2019.	Reduce sources and exposure	X				X				X				X	
26	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	
27	Considering replacing the boiler with a Heat Pump	In the longer term the gas boiler could potentially be replaced with a heat-pump system. Such a system would run on electricity only, and would therefore not have any combustion on site. Heat pumps deliver a net gain relative to boilers from an energy and environmental perspective, however the typical payback period can be 7/8 years for buildings such as nurseries.	Reducing sources and exposure	X			<ul style="list-style-type: none"> Reduced energy consumption and reduced operating costs 			X			X			X	
Behavioural Measures (Key Stakeholder: Nursery/ Borough)																	
28	Achieve Gold accreditation in STARS	Strive for gold status, which would entail achieving a range of measures promoting active travel and reduced emissions, also signposting additional initiatives and avenues of support. The framework also helps document and track progress, and implement recommendations.	Behavioural measures / reducing exposure to emissions	X			<ul style="list-style-type: none"> Awareness raising 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	
29	Engagement Activities	Deliver air quality related activities to raise 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			<ul style="list-style-type: none"> Awareness raising Secure community buy-in for measures 	X			X					X
30	Attain a Gold Award in Healthy Early Years London scheme	By achieving a gold award as part of the Healthy Early Years London scheme, the nursery will have supported a wide range of measures to promote active travel, receiving air quality alerts, and sustainability related activities amongst parents and carers, many of which contribute towards improved air quality.	Behavioural measures / reducing exposure to emissions.	X			<ul style="list-style-type: none"> Awareness raising Supports STARS and HSL objectives 	X			X					X
31	Staff Engagement	Awareness raising session amongst staff about air pollution, ventilating and heating the classrooms, lessening the children's exposure.	Awareness raising and behavioural measures	X			<ul style="list-style-type: none"> Awareness raising 	X			X					X
32	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 the nursery and b) promote the suitable walking routes to avoid air pollution hotspots.	Reducing sources and exposure	X			<ul style="list-style-type: none"> Awareness raising Supports STARS and HSL objectives 	X			X					X
33	Anti-idling campaign	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			<ul style="list-style-type: none"> Awareness raising Supports STARS and HSL objectives 	X			X				X	
34	Promote cleaner routes to the nursery	Encourage parents to approach the nursery along less polluted routes, for example taking parallel routes to Peckham High Street where possible. This can have a real impact on short-term exposure and is something that parents can be proactive with. The nursery could promote apps / websites such as 'www.walkit.com' to a) promote walking, and b) promote the suitable walking routes to avoid air pollution hotspots	Reduce exposure	X			<ul style="list-style-type: none"> Awareness raising 	X			X				X	X
35	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	Reducing exposure to emissions	X			<ul style="list-style-type: none"> Awareness raising Child health and welfare 	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
		alerts when very high air pollution is forecast, and information on how to reduce pupils' personal exposure.													
36	Managing art and craft materials	Art and craft materials could be separated from wider classroom activities, undertaken in separate rooms or well-ventilated areas, reducing exposure by the children.	Reduce exposure	X				X			X				X
37	Cleaning practices to reduce VOC	Training of cleaners to reduce detergent use, avoid use of cleaning solvents within classrooms, encourage ventilation of classrooms post cleaning to purge residual VOCs.	Reduce exposure	X				X			X				X
Wider Measures (Key Stakeholder: Borough/ TfL/ GLA/ Central Government)															
38	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 14 – Summary Recommendations Map



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:

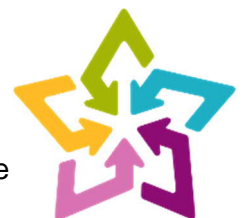
'Based on the toolkit of measures and the findings of the observations and initial analysis, what are the measures you would prioritise for the nursery?'

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

- **Divert boilers flues away from playground** - to the rooftop and away from the playground, to raise their exhaustion height further away from children playing. Flues and extraction equipment should ideally be exhausting above roof ridge height to aid quick dispersal.
- **Air Filtration systems** - in classrooms and the hall where children spend the majority of their time, in rooms 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 in removing particulates, and using titanium dioxide as a reducer for NOx and NO2. They can also assist with virus elimination/reduction. Trials will be undertaken from March to September in a number of nurseries, to test their effectiveness and suitability in a nursery environment.
- **Discourage rat running with traffic calming** - Introduce traffic calming and greater enforcement existing speed limits on Meeting House Lane, to discourage rat-running and change the character the road to a more residential/ local road, fostering a safer environment for pedestrians, and encourage more travel by sustainable modes. This could take the form of build outs to create single lane priority narrowing's. A further consideration could be to review options for introducing a weight restriction to prevent larger freight vehicles routing past the nursery, though the majority of vehicles observed were smaller vans. In combination with increased parking enforcement, an improved pedestrian crossing with a tighter kerb radii at the junction of Meeting House Lane and Peckham High Street, to slow vehicles speed when entering the road, and reducing crossing distances for pedestrians. Tree planting at the junction would intercept some particulates and foster a 'green gateway' to the nursery.
- **Encourage parents to approach the nursery along less polluted routes**, for example taking parallel routes to Peckham High Street where possible. This can have a real impact on short-term exposure and is something that parents can be proactive with. The nursery could promote apps / websites such as 'www.walkit.com' to a) promote walking, and b) promote the suitable walking routes to avoid air pollution hotspots.

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. Nell Gwynn Nursery School has achieved Silver accreditation. Our recommended measures for the nursery include a number of initiatives that would also count towards the achieving 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 of 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.

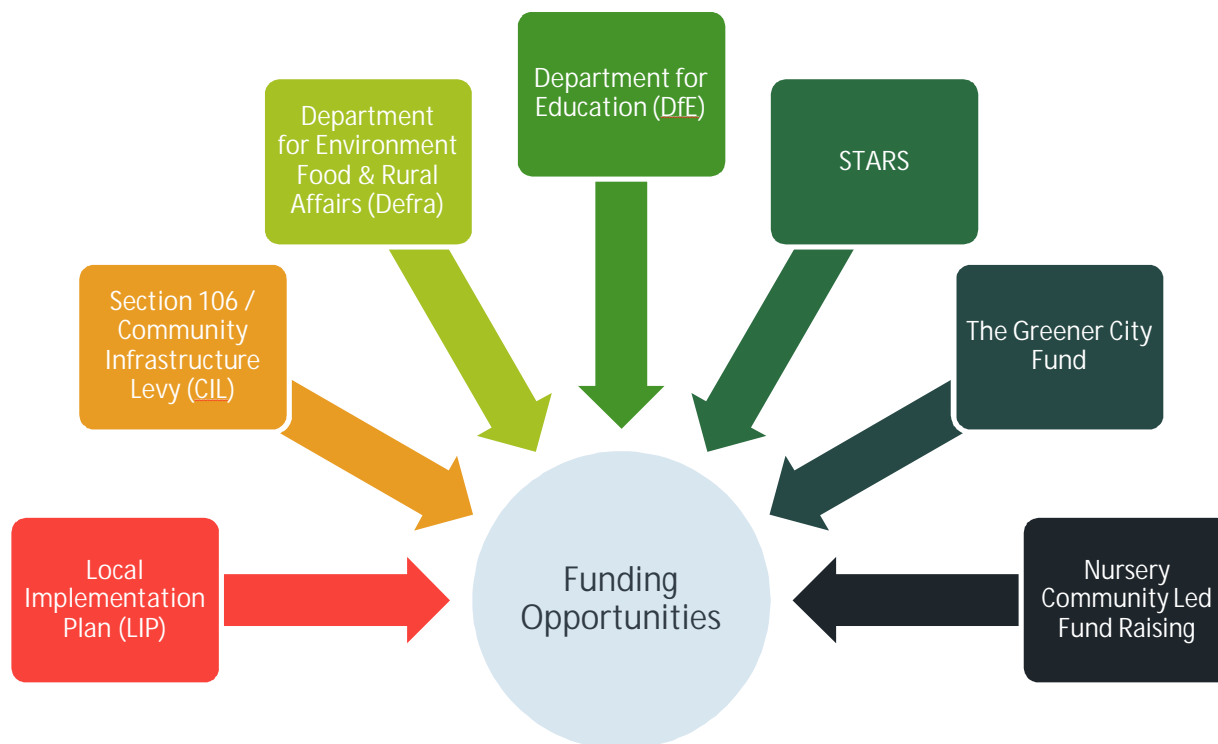
HEALTHY EARLY YEARS LONDON (HEYL)

- 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 15 – 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
- **Learning Through Landscapes Nature Grants Scheme**
- **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.¹¹ Groundwork London's Our Space award¹² offers grants between £500 and £5,000.

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

¹¹ <https://www.groundwork.org.uk/Sites/london/pages/school-air-quality-greening>

¹² <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.
- 5.9.4. Where possible such monitoring should cover:
- Key pollutants (NO_x, PM₁₀, 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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