

The Mayor of London's Nursery Air Quality Audit Programme

Dorothy Gardner Nursery School, Westminster City Council



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THE MAYOR'S NURSERY AIR QUALITY AUDIT PROGRAMME

Dorothy Gardner Nursery School – City of Westminster



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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.

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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.

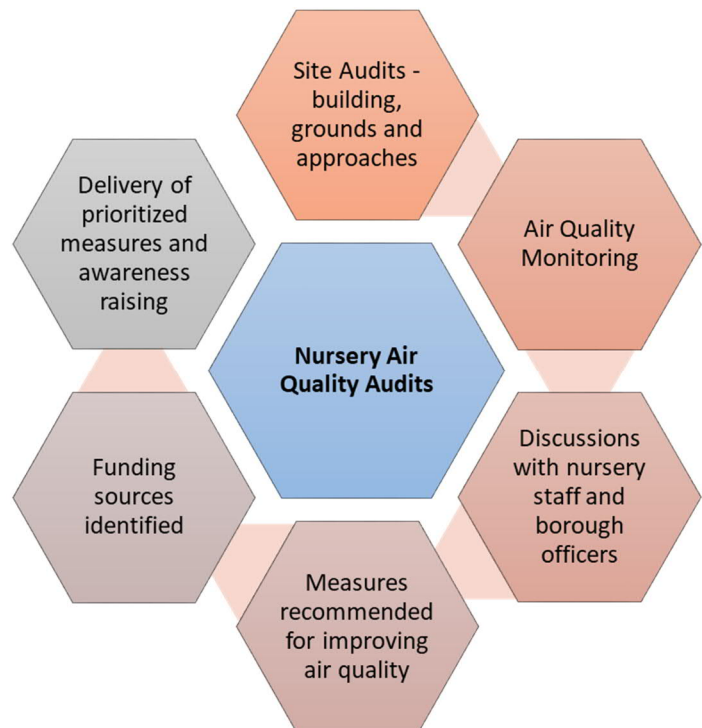
Indoor air pollution is still a relatively new area of study, and our understanding is still evolving as further evidence is collected on the complex interactions taking place, and the extent to which they affect our health.

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** (38µg/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 across the winter and spring months. However, in one of the three months, the measured NO₂ concentrations slightly exceeded the legal limits (annual mean NO₂ national Air Quality Objective of 40µg/m³).



NO₂ concentrations were found to be slightly lower (35 µg/m³) in the **playground**, which is partially screened from traffic by fencing and some trees and shrubs. Concentrations at the **nursery entrance** are of a lower level (33µg/m³) to the playground. 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**, the **indoor** concentrations fall to 21-24µg/m³.

Volatile Organic Compounds (VOCs) are emitted from vapours arising from petrol and solvents. In a nursery setting these are likely to originate from a wide variety of products, including furnishing, carpets, upholstery, cleaning products and air fresheners. In the UK, building regulations recommend total Volatile Organic Compounds (TVOCs¹) concentrations should be below 300 µg/m³. In the nursery they were found to be 89.8 µg/m³. 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. The World Health Organisation (WHO) indoor air quality guideline for short and long-term exposures to formaldehyde is 100 µg/m³. In Dorothy Gardner Nursery School they were found to be 6.04 µg/m³.

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 Fernhead Road. **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 **17,300 vehicles per day travel** within 200m of the nursery. Buses make up only 2% of these vehicle movements, but contribute

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

23% of the transport related NO_x emissions locally. Similarly, HGVs only account for 5% of the total traffic but contribute 30% of emissions. Cars account for 36% of emissions.

Key observations – summary of potential issues

- The nature of Shirland Road / Fernhead Road junction means vehicles have to stop and start and this increases sources of local emissions.
- The playground is located directly adjacent to the most polluted area locally.
- Low levels of scooter / buggy parking can potentially discourage more active modes of travel.
- Poor safety record at Shirland Road / Fernhead Road roundabout.
- The building is reliant on natural ventilation and doors / windows are frequently left open even during the winter, colder months. This results in a) increased exposure to emissions and b) increased run times by school boilers and therefore greater emissions.

Audit Recommendations

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

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

- **Green infrastructure** – around the nursery playground to help reduce exposure to roadside emissions.
- **Air Filtration Systems** - in classrooms where children spend the majority of their time, in rooms exposed to poor air quality and reliant on natural ventilation. These systems have demonstrated some encouraging initial scientific evidence of efficacy.
- **Junction improvements at the Shirland Road / Fernhead Road junction** – that seeks to reduce stop-start activity from drivers, reduce the number of collisions and enhance the pedestrian environment.
- **Encourage parents to approach the nursery along less polluted routes**, for example, taking parallel routes to Fernhead Road 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.

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 (e.g. Playground Greening)
Retiming Deliveries

Nursery Building

Air Quality Monitoring
Air Filtration Systems
Optimising Compensator Control System
Provision of Buggy / Scooter Parking
Improved heating and insulation
Indoor Fans

Butchers Curtains
Electricity Suppliers
Boilers
Building Improvements
Switch to lower VOC cleaning products
Review purchasing choices and switch to low-VOC content furnishings

Behavioural Measures

Leaflets / Poster
Future Purchases
Use of Windows
Clean Air Activities
Welcome Packs / Newsletter
Servicing & Deliveries
Click & Collect
Buying Goods
Engagement with Mary Paterson Nursery
Behaviour change
Monitor London Air website / app
Attain a Gold Award in Healthy Schools
Staff Engagement
Promoting car sharing
Anti-idling campaign
Walking Buses

1. INTRODUCTION

1.1. BACKGROUND

- 1.1.1. Long-term exposure to poor air quality contributes to thousands of premature deaths in London. There is strong scientific evidence of the acute health effects of short-term exposure to very high pollution levels experienced during air pollution episodes.
- 1.1.2. Tackling air pollution is one of the Mayor of London's top priorities, and he recognises that co-ordinated action is required to reduce exposure, especially amongst the most vulnerable such as young children, whose lungs are still developing.
- 1.1.3. The London Environment Strategy, published in May 2018, seeks to reduce the number of Londoners whose lives are blighted by poor air quality. The Mayor wants London to have the best air quality of any major world city by 2050, going beyond the legal requirements to protect human health and minimise inequalities. This include commitments to act to improve air quality in and around schools and nurseries and provide enhanced information to Londoners.

Why Nurseries?

- 1.1.4. The Mayor is particularly concerned about the impacts of poor air quality on vulnerable groups such as children, the elderly and those with pre-existing health conditions such as asthma and 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:

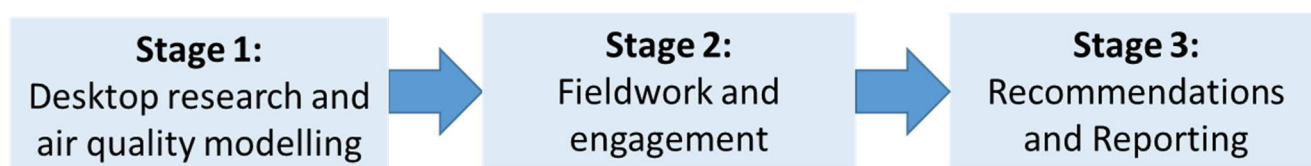
- Audit and identify the sources of poor outdoor air quality and exposure by children at 20 state-funded nurseries and their surrounding nursery catchment areas, including NO₂, PM₁₀ and PM_{2.5}.
- Audit and identify the sources of poor indoor air quality and potential exposure by children attending 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.
- 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 – DOROTHY GARDNER 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	17 th January 2019	
Nursery Representatives	Wendy Jenkins (Deputy Headteacher)	
Borough Representatives	Carla Leowe (Road Safety Officer)	
WSP Auditors	Mark Cottray, Alessandro Ciampechini	
Itinerary	Timings	Description
	1300 - 1330hrs	Initial observations and site familiarisation by WSP auditors
	1330 – 1345hrs	Internal audit of building and grounds
	1345 – 1500hrs	Brainstorming Workshop with key staff from the nursery and borough officer.
	1430 – 1530hrs	Site walk with nursery staff and borough officer.
	1530 - 1615hrs	Audit of building and grounds to appreciate the layout of the building/playgrounds etc. accompanied by the bursar/caretaker

3. CONTEXT AND INITIATIVES

3.1. NURSERY CONTEXT

Figure 2 - Nursery Context

Borough: Westminster

Address: 293 Shirland Road, W9 3JY

Pupil Numbers: 190

Age Range:
3-5 years



Gender:
Mixed

Type: Local authority nursery school



Deprivation Rank: 2

Children attending Full Time/ Part Time:

Full Time



Part Time



Children who speak English as an additional language:

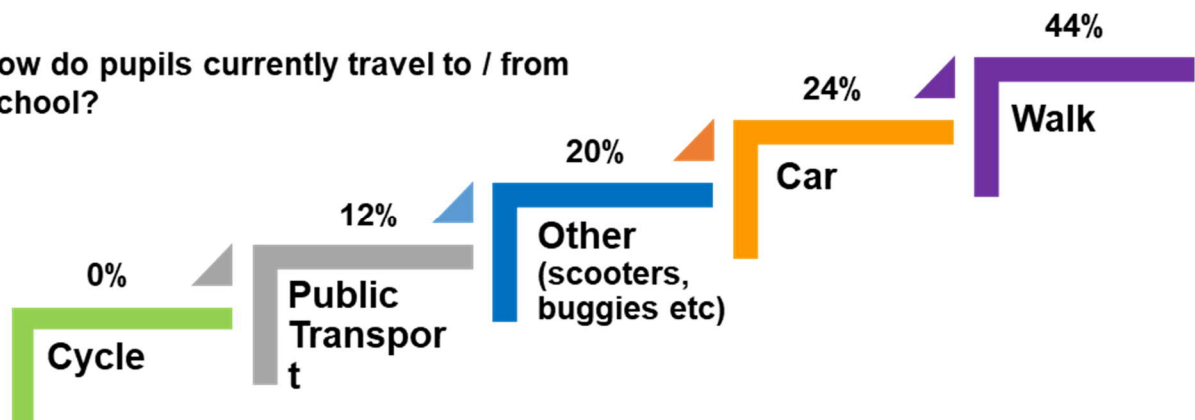
Higher than average



Children with disabilities or special educational needs:

Higher than average

How do pupils currently travel to / from School?



- 3.1.1. The **Dorothy Gardner Nursery** is located in the north west of the City of Westminster and can accommodate up to 87 children. At the time of the audit the nursery could accommodate up to 87 children. The main entrance is on **Shirland Road**.
- 3.1.2. Approximately **17,300 vehicles per day travel** on the core roads within a 200m radius of the nursery⁷. This is within the 1st 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.
- 3.1.3. The desktop review and subsequent discussions with the nursery confirmed that around **44% of children arrive at the nursery by walk**, 24% by car, 20% travel by other modes (scooter or buggy), 12% via public transport. Fewer children were observed arriving by car on the day of the audit. The audit took place on a dry / sunny day and this may have been an influencing factor.
- 3.1.4. The majority of staff live locally and therefore travel to nursery via sustainable means, whether it be walking, cycling or use of public transport. The nursery has no off-street parking available for staff to use.
- 3.1.5. 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 3 – Outer Context Plan

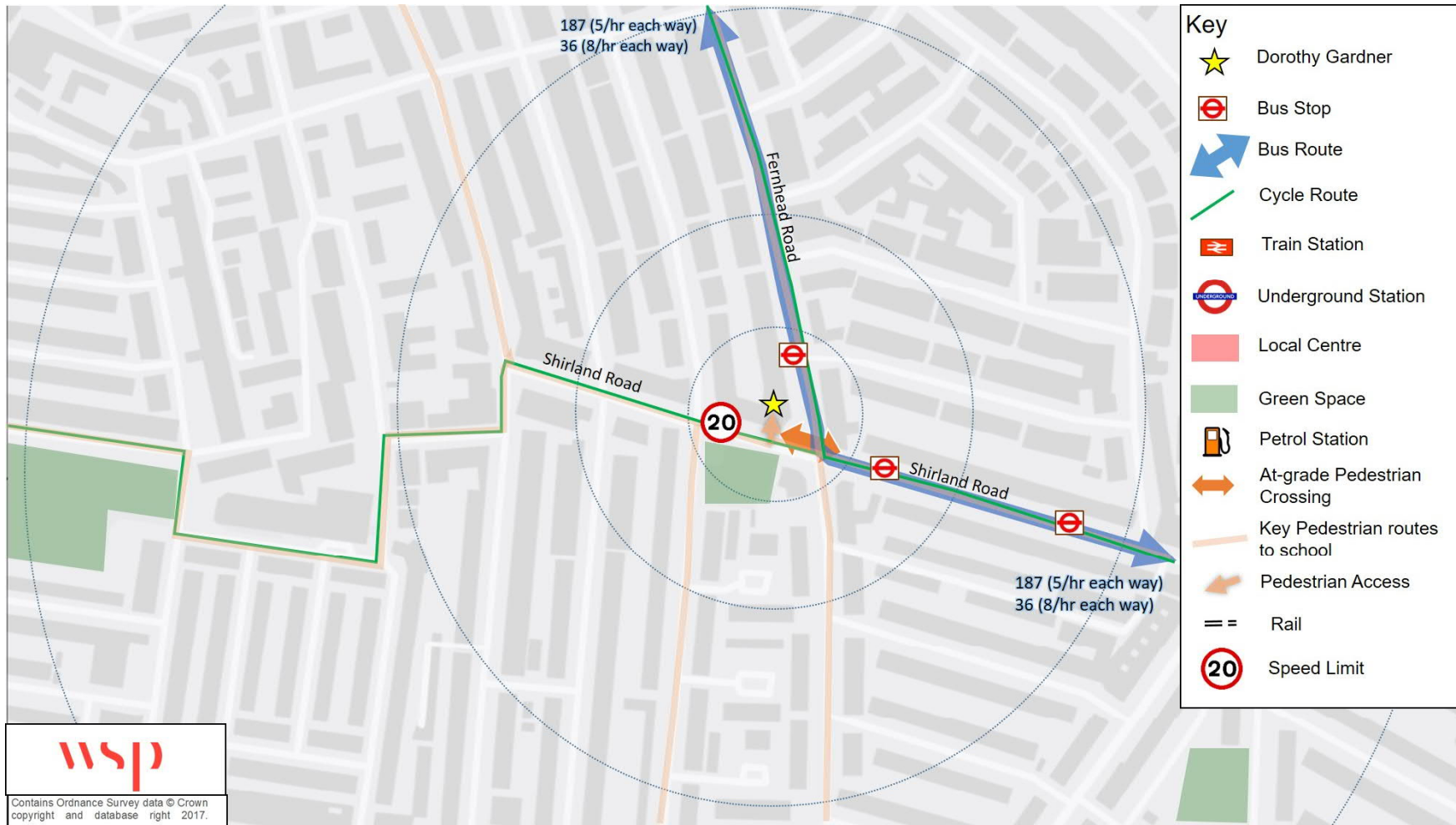
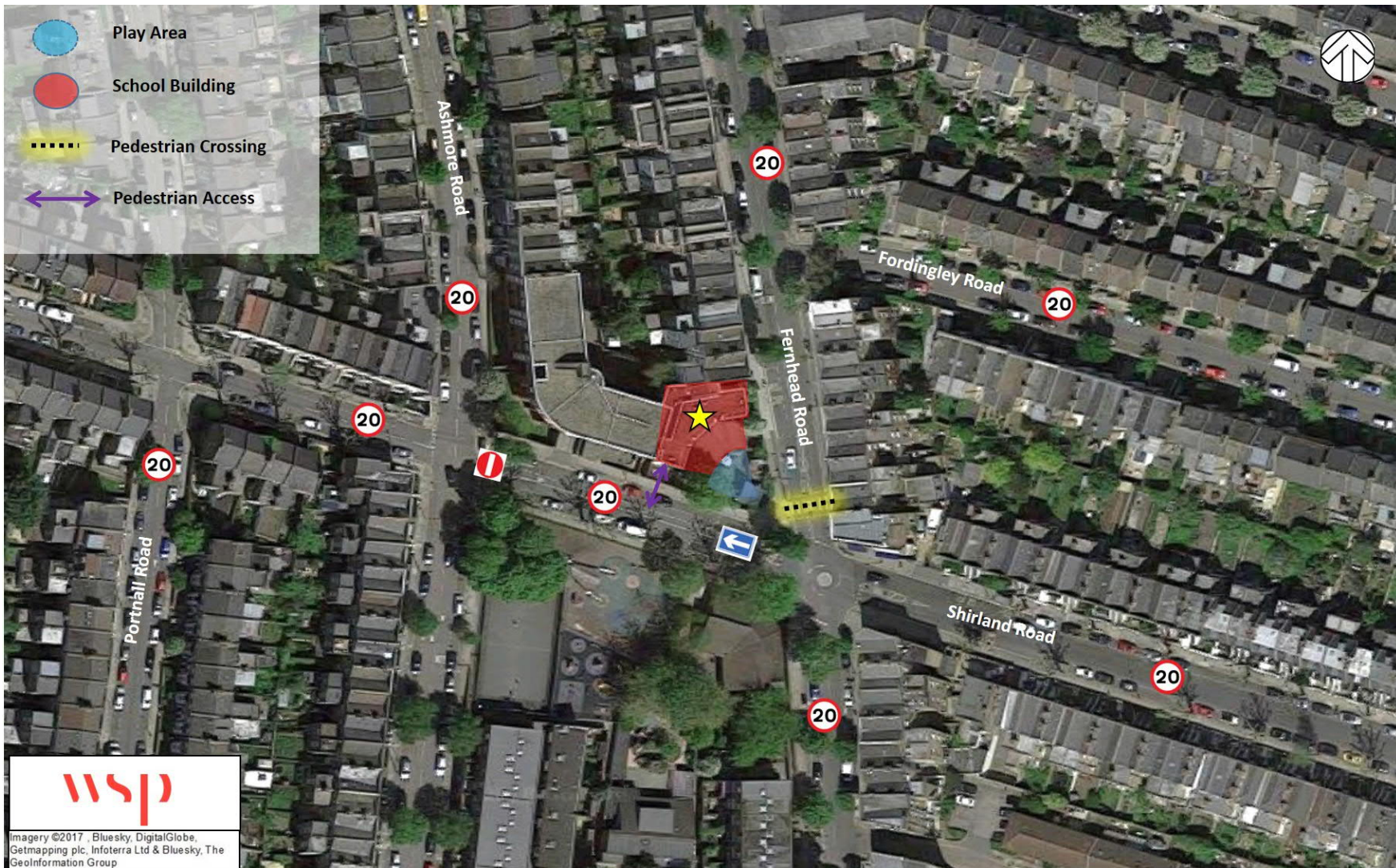


Figure 4 – Inner Context Plans



3.2. PLANNED SCHEMES & RECENT INITIATIVES

- 3.2.1. There are no major developments planned or under construction within the immediate locality of the nursery. However, a number of notable schemes and initiatives were highlighted, that will have a bearing on the air quality around the nursery, these include:

LOCAL SCHEMES

- 3.2.2. Whilst there are no major developments planned within the immediate locality of the nursery, a number of notable transport schemes were highlighted that will have a significant bearing on the air quality around the nursery, these include:

#DONTBEIDLE

- 3.2.3. In 2013 a pilot of the Clean Air Champions project was completed in the London Boroughs of Hackney, Havering and Redbridge. The project aimed to recruit, train and support 21 cleaner air champions across the three boroughs to raise awareness about air quality and promote anti-idling. This was supported by the GLA and Mayor of London and was deemed to be a successful way of raising awareness about air quality as well as promoting measures to reduce pollution. Following the scheme, the City of Westminster also introduced the use of Air Quality Champions to help with their #DontBeldle campaign. This involves trained volunteers chatting with drivers and asking them to switch off their vehicles when parked to reduce unnecessary air pollution caused by engine idling. Additionally, the air quality champions help to organise anti-idling event days in order to engage with local communities and promote anti-idling. The #DontBeldle campaign is still ongoing and upcoming event days can be found on the council's campaign webpage.



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CLEANER AIR MANIFESTO

- 3.2.4. Westminster published their Air Quality Manifesto in 2018 which set out a number of priorities that was considered key to cleaning air, such as:

- Reducing or cleaning dirty journeys and creating better infrastructure for electric and low emission vehicles
- Placing emissions and pollution in the forefront of decision making on public spaces and buildings and encouraging all those who shape spaces and buildings to do likewise
- Making cleaner and environmentally-friendly options easier for our residents and changing behaviour
- Moving the air quality agenda forward through thought leadership and innovation. The City of Westminster is at the heart of British business, creativity and the UK academic community.

- 3.2.5. Of particular relevance, is the objective of creating 'low emission zones' around their schools. As part of this, Westminster have worked with a number of schools on various projects to reduce local pollution, introduced 20mph limits around schools, and encouraged schools to have Travel Plans to help parents and pupils switch to healthy and low pollution ways of travelling.

- 3.2.6. They have also progressed a number of measures identified as part of the GLA School Air Quality Programme in 2017-18, such as the introduction of School Streets and green infrastructure around school boundaries to help reduce exposure to pollution.

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 10 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.



Impact of scheme:

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

LOCAL SCHEMES

NURSERY STARS ACTIVITIES

- 3.2.11. 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.



- 3.2.12. 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.
- 3.2.13. Dorothy Gardner Centre is engaged with the STARS programme, albeit is not currently accredited. It is however noted from the audit that they have been undertaking a wide range of activities that can contribute towards getting accredited. This includes:
- Walking Once a Week;
 - Park & Stride events
 - Encouraging scooting to school.

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 both a primary and secondary pollutant, derived from emissions of nitrogen oxides (NO_x) from combustion sources. In London key sources include road vehicles and domestic boilers. Vehicle emissions contribute significantly to local increases in concentrations especially near busy roads.
- 4.1.4. VOCs are made up of a range of organic compounds, including formaldehyde. They have a significant photochemical oxidant forming potential and contribute to the formation of secondary pollutants, such as 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 Dorothy Gardner Nursey School, five NO₂ diffusion tubes, one formaldehyde diffusion tube and one VOC diffusion tube were deployed in the following locations:

Nitrogen Dioxide (NO₂)

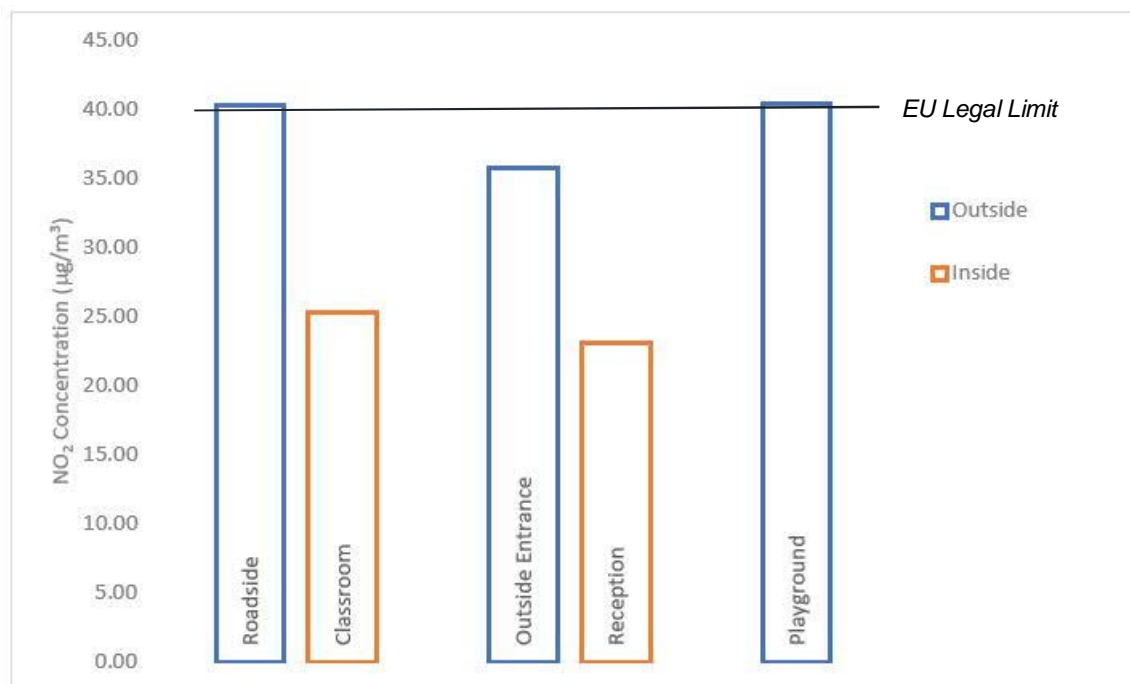
- roadside outside the nursery
- immediately outside the nursery entrance
- playground
- immediately inside the nursery entrance
- inside a nursery classroom.

Formaldehyde and VOCs

- Inside a nursery classroom.

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

Figure 5 - Comparison of the average NO₂ concentrations at Dorothy Gardner Nursery School (µg/m³)



4.1.8. The results of the three-month baseline NO₂ monitoring at Dorothy Gardner Nursery School, shown in Table 2.

Table 2 – Dorothy Gardner 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	40.27	39.89	32.41	37.52
Playground	Outdoor	40.44	33.51	30.54	34.83
Nursery entrance	Outdoor	35.80	34.39	29.44	33.21
Nursery entrance	Indoor	23.08	22.48	17.4	20.99
Classroom	Indoor	25.34	25.63	22.47	24.48
Ratio of indoor to outdoor (I/O) concentrations		0.64	0.65	0.59	0.64

4.1.9. NO₂ concentrations were found to be highest at the **roadside** (37.52µg/m³), with local road traffic emissions contributing significantly to roadside concentrations.

4.1.10. 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 one of the three months, the measured NO₂ concentrations slightly exceeded the annual mean NO₂ national Air Quality Objective (AQO) of 40µg/m³.

- 4.1.11. NO₂ concentrations were found to be slightly lower (34.83 µg/m³) in the **playground**, which is partially screened from traffic by fencing and some trees and shrubs. Concentrations at the **nursery entrance** are of a lower level (32.21 µg/m³) to the playground.
- 4.1.12. **Inside the nursery**, concentrations fall by 9-17µg/m³ compared to external concentrations. It should be noted that indoor NO₂ is not regulated against EU limits, it is regulated against HSE exposure limits.
- 4.1.13. Previous research undertaken for the GLA found that outdoor 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.
- 4.1.14. The NO₂ I/O ratio was 0.64 at Dorothy Gardner Nursery School, indicating that uncontrolled infiltration rates are at the intermediate end of the spectrum, with the building offering a moderate level of protection to its occupants.
- 4.1.15. The results of the three-month baseline VOC and Formaldehyde monitoring are shown in Table 3.

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

Pollutant	Baseline Formaldehyde and VOC Monitoring (µg/m ³)			
	December	January	February	Average
VOCs	142.8	42.5	84.2	89.8
Formaldehyde	6.89	6.07	5.16	6.04

- 4.1.16. **Volatile Organic Compounds (VOCs)** are emitted from vapours arising from petrol and solvents. In a nursery setting are likely to originate from a wide variety of products, including furnishing, carpets, upholstery, cleaning products and air fresheners. Exposure can cause irritation to the eyes and upper airways. In the UK, building regulations recommend total Volatile Organic Compounds (TVOCs⁹) concentrations should be below 300 µg/m³. In Dorothy Gardner they were found to be 73.5 µg/m³. The majority of VOC chemical species were identified as being likely to be indoor

⁹ TVOCs denote a wide ranging group of organic chemical compounds. For simplicity they are commonly reported together.

pollutants, and included fragrances, perfumes and alcohols, likely to be products derived from use of cleaning materials and solvents.

- 4.1.17. **Formaldehyde** are emitted from vapours arising from solvents and adhesives. In a nursery setting these are likely to originate from glues, adhesives and finishing's. Exposure can cause burning sensations of the eyes, nose, and throat, coughing, wheezing, nausea and skin irritation. The World Health Organisation (WHO) indoor air quality guideline¹⁰ for short- and long-term exposures to formaldehyde is 100 µg/m³. In Dorothy Gardner they were found to be 10.16 µg/m³.
- 4.1.18. 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.
- 4.1.19. 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.
- 4.1.20. The LAEI uses air pollution emission estimates from a wide range of sources including transport, industrial, domestic and commercial combustion, agriculture and long-range transport using the most up-to-date activity data, emission factors and projection factors.
- 4.1.21. Figure 6 shows the 2013 LAEI baseline annual mean NO₂ concentrations within the vicinity of Dorothy Gardner Nursery School.
- 4.1.22. The changes in colours show the change in the change in pollution gradients, with distance, away from the heavily trafficked Fernhead Road. 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 6 - LAEI Baseline Annual Mean NO₂ Concentrations within the Immediate Area of Dorothy Gardner Nursery School



- 4.1.23. 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.
- 4.1.24. The pie chart below shows that while buses make up only 2% of vehicle movements, they contribute 23% of the transport related NO_x emissions locally. Similarly, HGVs only account for 5% of the total traffic but contribute 30% of emissions. However, it should be noted that with TfL's commitment to upgrading the whole bus fleet to the cleanest Euro VI vehicles as a minimum, by October 2020, that the emissions contributed by buses will be expected to fall significantly.

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

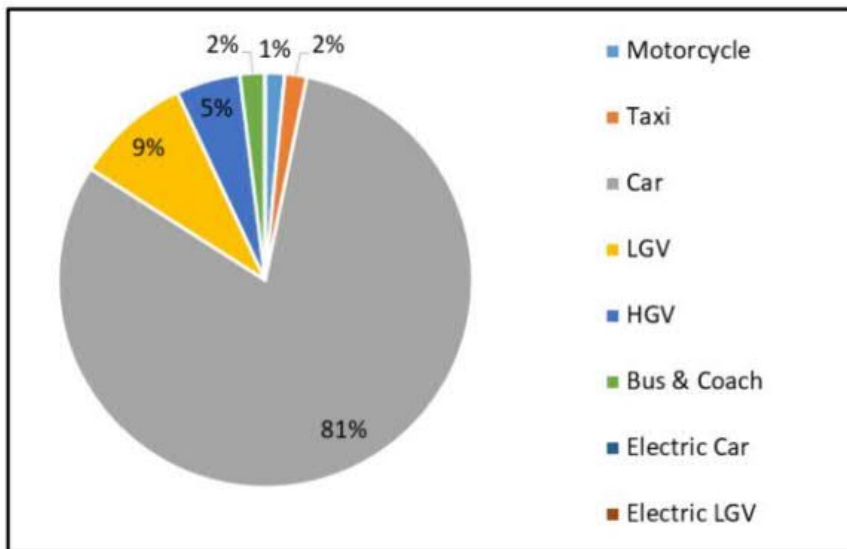
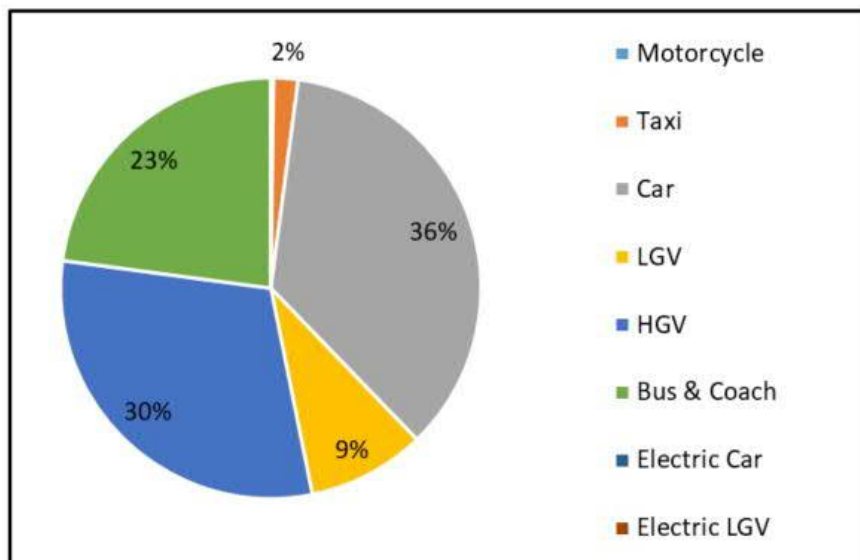


Figure 8 – Average Road Transport NO_x Emissions by Vehicle Type (within 200m of nursery)



- 4.1.25. The pie charts below illustrate that 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 2% of vehicle movements, and contribute 12% of the transport related PM₁₀ emissions locally, and 7% of PM_{2.5}.

Figure 9 – Average Road Transport PM₁₀ Emissions by Vehicle Type (within 200m of nursery)

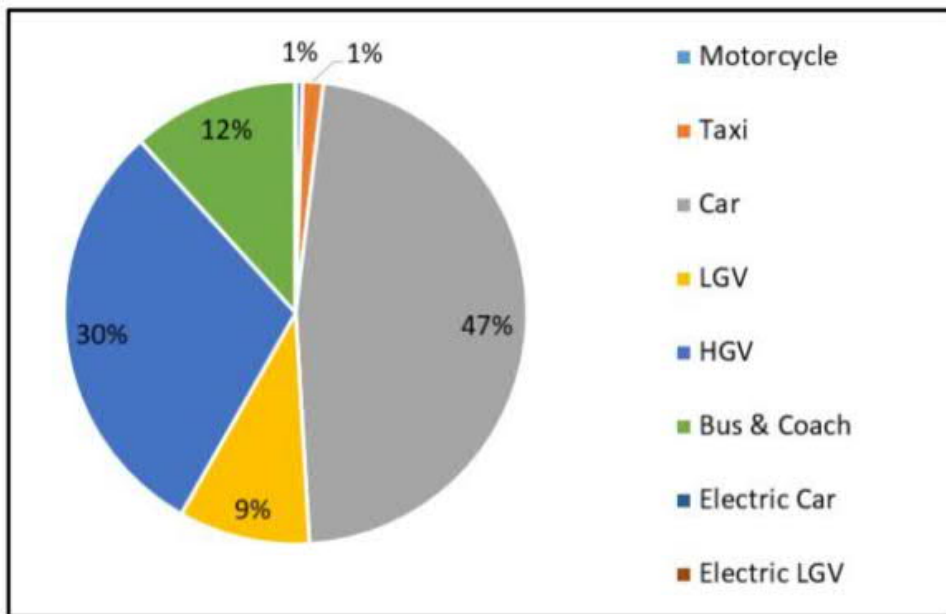
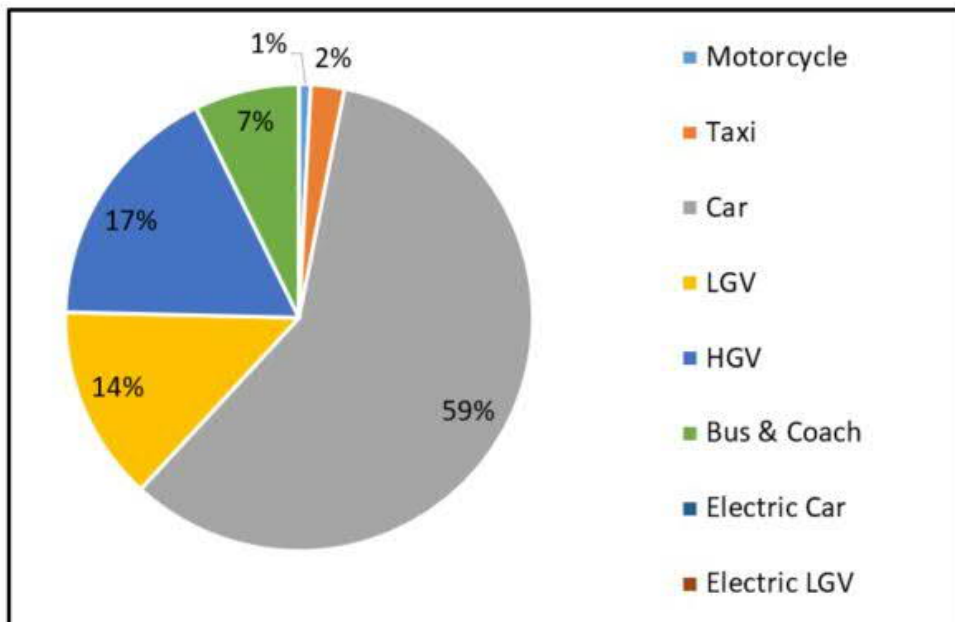


Figure 10 – Average Road Transport PM_{2.5} Emissions by Vehicle Type (within 200m of nursery)



- 4.1.26. Figures 10-12 show the 2013 LAEI baseline annual mean NO_x, PM₁₀ and PM_{2.5} concentrations in within 2km of Dorothy Gardner Centre. The contours (changes in colours) show how the pollution gradient changes, with distance, away from the heavily trafficked roads and other key sources.
- 4.1.27. 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 11 – 2013 LAEI Baseline Annual Mean NO₂ Concentrations within 2km of Dorothy Gardner Nursery School



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

Figure 12 - 2013 LAEI Baseline Annual Mean PM₁₀ Concentrations within 2km of Dorothy Gardner Nursery School

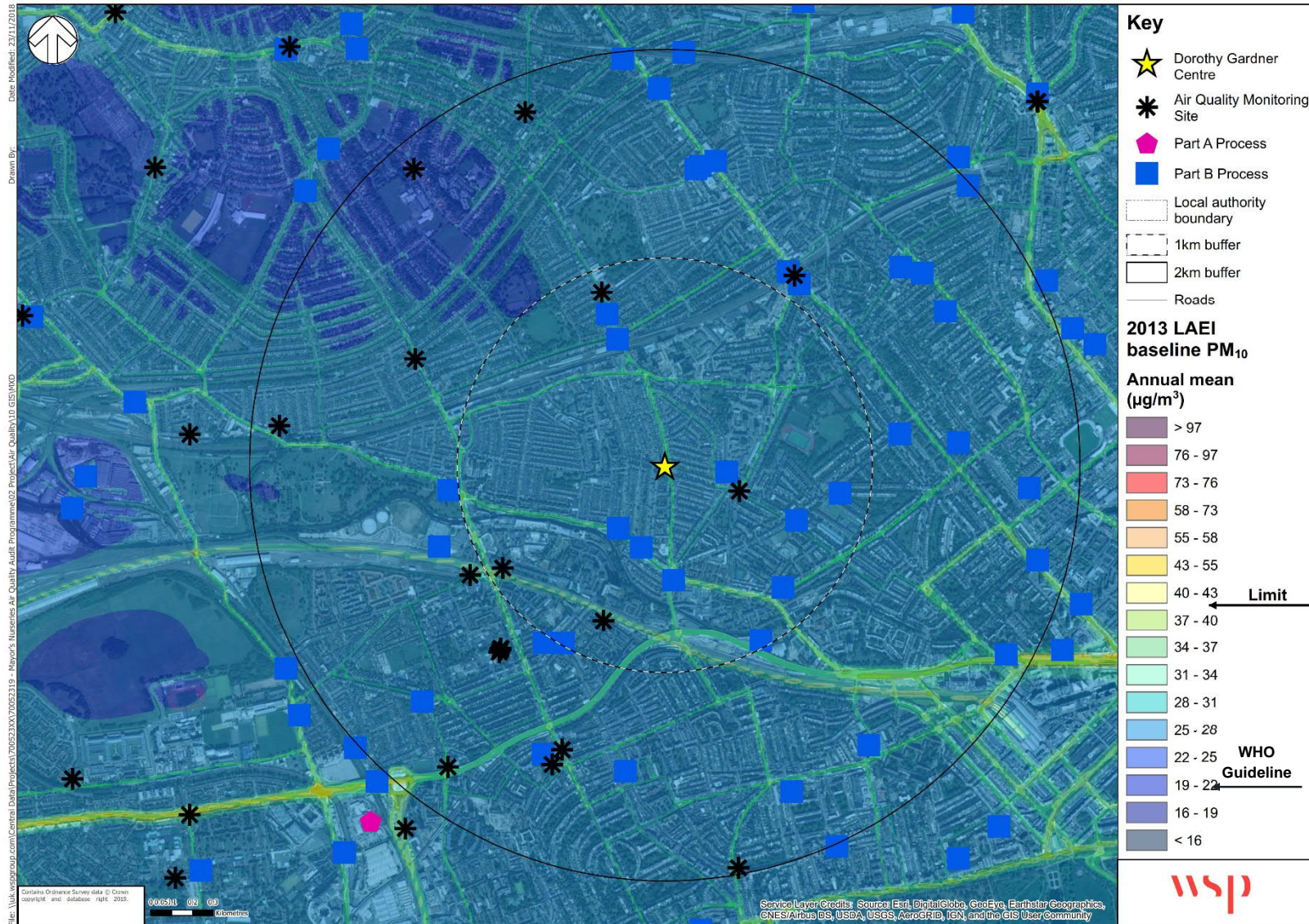
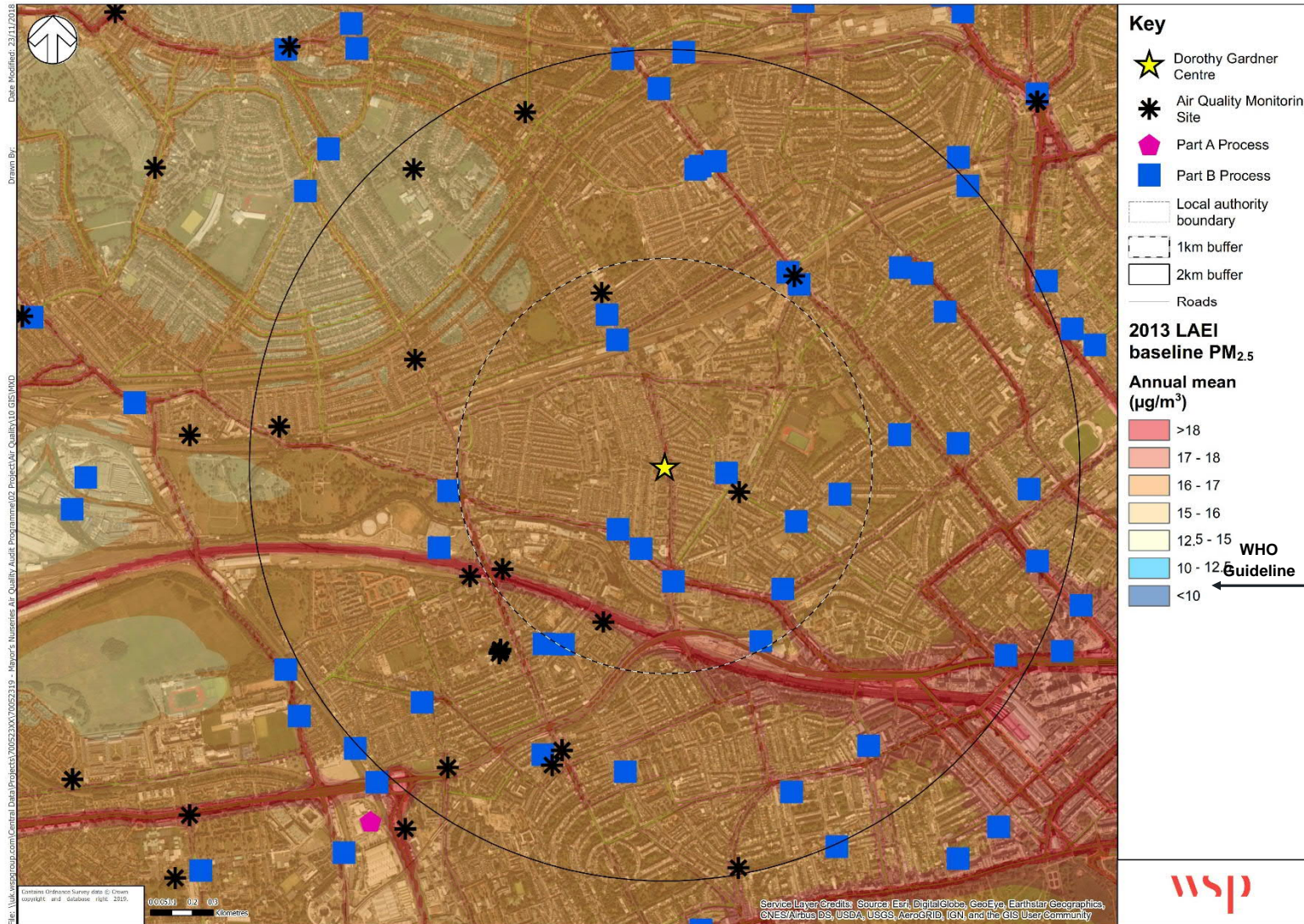


Figure 13 - 2013 LAEI Baseline Annual Mean PM_{2.5} Concentrations within 2km of Dorothy Gardner Nursery School

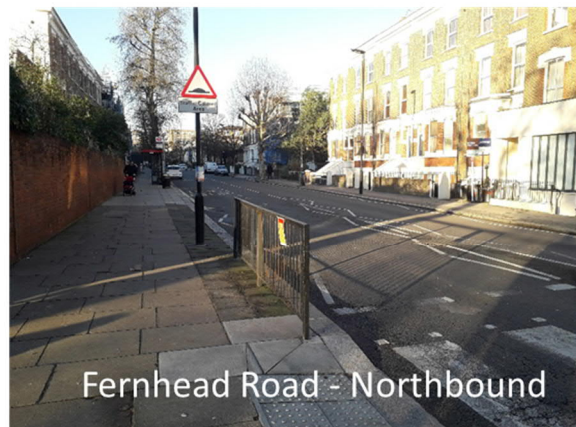


4.2. HIGHWAYS – KEY OBSERVATIONS

- 4.2.1. The nursery is situated just a 9 minute (0.4km) walk from Queens Park Station, on the north-western periphery of the City of Westminster. The **roads around the nursery are predominantly residential** with relatively **low levels of traffic flow**.
- 4.2.2. **Fernhead Road is the most heavily trafficked.** This road appeared to be relatively well used by those travelling between the A404 Harrow Road (south of the nursery) and the B413 Carlton Road (north of the nursery).
- 4.2.3. The northern part of Fernhead Road is a secondary **bus corridor** used by services 187 and 36, with up to 13 buses per hour at peak times, contributing towards local air pollution around the nursery.
- 4.2.4. Fernhead Road / Shirland Road is connected via a roundabout meaning that drivers are stopping and starting when travelling through the junction. This contributes towards the poor levels of air quality directly adjacent to the nursery as vehicles having to brake and the accelerate to pull away is when they produce the greatest amount of pollution, though it will also be serving to slow traffic when passing the nursery.
- 4.2.5. The peak drop-off time in the morning is between 0830-0900hrs and they depart at 1500-1520hrs in the afternoon. On the day of the audit, children appeared to be departing evenly between all four directions; north and south via Fernhead Road, and east and west via Shirland Road. Shirland Road directly opposite the nursery entrance is a one-way street with a dedicated cycle lane which was observed to be well used by cyclists. Of the two roads, Fernhead Road (north) is considered to be the worst from an air quality perspective.
- 4.2.6. Whilst the majority of children walk or scoot to the nursery, there were some parents observed dropping off their children by car and parking on Shirland Road directly opposite the nursery. At the time of the audit, parking occupancy levels were relatively low, meaning parents were able to park within close proximity of the entrance / exit. Shirland Road is within a Controlled Parking Zone (CPZ) that operates Monday to Friday (0830 to 1830hrs), but it is noted that parents are able to park close to a school / nursery for up to 10 minutes before being subject to a Penalty Charge Notice (PCN).
- 4.2.7. There was **no observed idling activity** during the pick-up hours, which is thought to be linked to the fact the children are too young to walk into the nursery independently and need to be accompanied by an adult.
- 4.2.8. The nursery highlighted that guard rails on Shirland Road directly opposite the entrance / exit help minimise the risks associated with children running onto the carriageway where there is a perception of high speeds, by both vehicles and cyclists. An initial review of accidents in the nearby area show that no collisions have been recorded on Shirland Road, but seven **collisions** have been recorded at the Shirland Road / Fernhead Road roundabout directly adjacent to the nursery. Two of these accidents have involved pedestrians.
- 4.2.9. Opposite Dorothy Gardner Centre, is Mary Paterson Nursery. Whilst there is an access to the site via Shirland Road, the main entrance is via Riverton Close. The differing entrance / exit points means there was no observed congestion on the footways, or concentration of vehicles dropping off and picking up their children.

Summary – Key Issues

- Heavily trafficked roads around the nursery
- The roundabout at the junction of Shirland Road / Fernhead Road junction means vehicles have to brake and then accelerate to pull away, which may contribute to worsening local emissions.
- Poor safety record at main roundabout.



4.3. NURSERY GROUNDS / BUILDING - KEY OBSERVATIONS

- 4.3.1. The main entrance to the nursery is via Shirland Road. The nursery has one **playground**, that is located directly adjacent to the roundabout with Shirland Road and Fernhead Road. There is **limited screening** from the surrounding roads, in the form of a fence and some greenery. Staff highlighted that the children will spend a large proportion of their day outdoors, albeit the level will depend on the season and weather. Taking into account the location of the playground (directly adjacent to the main roads) and the time spent by children, it is this area of the nursery that is of greatest concern from an air quality perspective.
- 4.3.2. The building itself is thought to be of 1970s construction and is split over two storeys. It is considered to be **relatively well insulated** but is reliant on **natural ventilation** meaning windows and doors are opened when it is too warm.
- 4.3.3. The main classroom used by children is located closest to the Fernhead Road and Shirland Road roundabout, which has large windows and high ceilings, with external doors leading to the playground. Children are able to free-flow between the classroom and the playground throughout the day. The room is reliant on natural ventilation and it was noted from staff that the nursery often have the doors to the playground left open for access to the playground, even in the colder months, which results in greater heat loss and so potentially results in increased run times by nursery boilers and therefore emissions. This also makes achieving a consistent comfortable temperature across the nursery difficult.
- 4.3.4. The **boiler** is located in a single plant room and was considered by the nursery caretaker to be in 'good' condition. It is 14 years and the flues exit onto the roof, away from areas used by children.
- 4.3.5. There was not a strong odour of **cleaning products** in the building, and when not in use they are stored in the store room, away from the classrooms behind closed doors, which is not accessible to the children.
- 4.3.6. 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 at times noticeable around these areas. When not in use they are stored in the store room, which is not accessible to the children.
- 4.3.7. There is a relatively **small number of scooter / cycle parking spaces** with limited scope to increase provision internally due to the fact that space is at a premium. It was noted that there was insufficient space for scooter / buggy parking, that could act as a deterrent for parents to travel via active modes.
- 4.3.8. The nursery receives only 1 or 2 **deliveries** a week typically, with vehicles accessing via the front of the building (on Shirland Road).

Summary – Key Issues

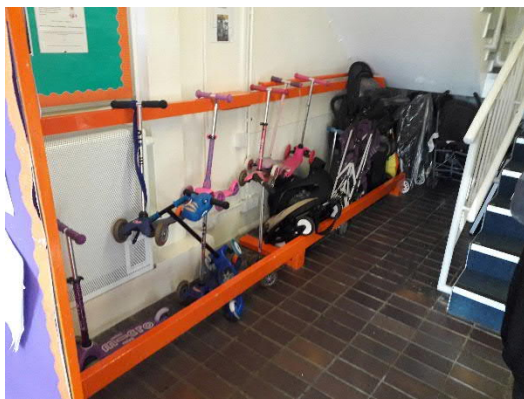
- The playground is located directly adjacent to a relatively well used road (Fernhead Road) and at a roundabout that means vehicles are constantly stopping-starting.
- The building is reliant on natural ventilation and doors / windows are frequently left open even during the winter, colder months. This results in a) increased exposure to emissions and b) increased run times by nursery boilers and therefore greater emissions.
- Low levels of scooter / buggy parking can potentially discourage more active modes of travel



Classroom – Upstairs



Radiators valves that assist in controlling temperature



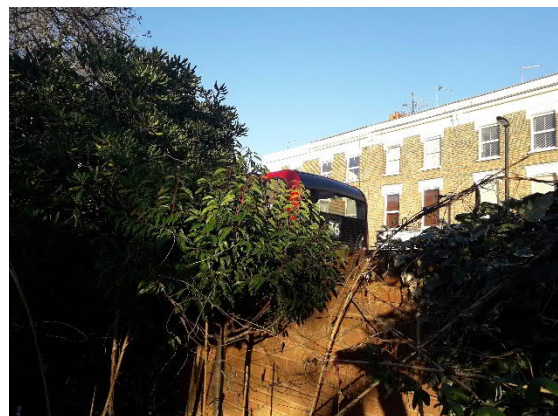
Limited scooter parking provision



Window ceilings on top floor



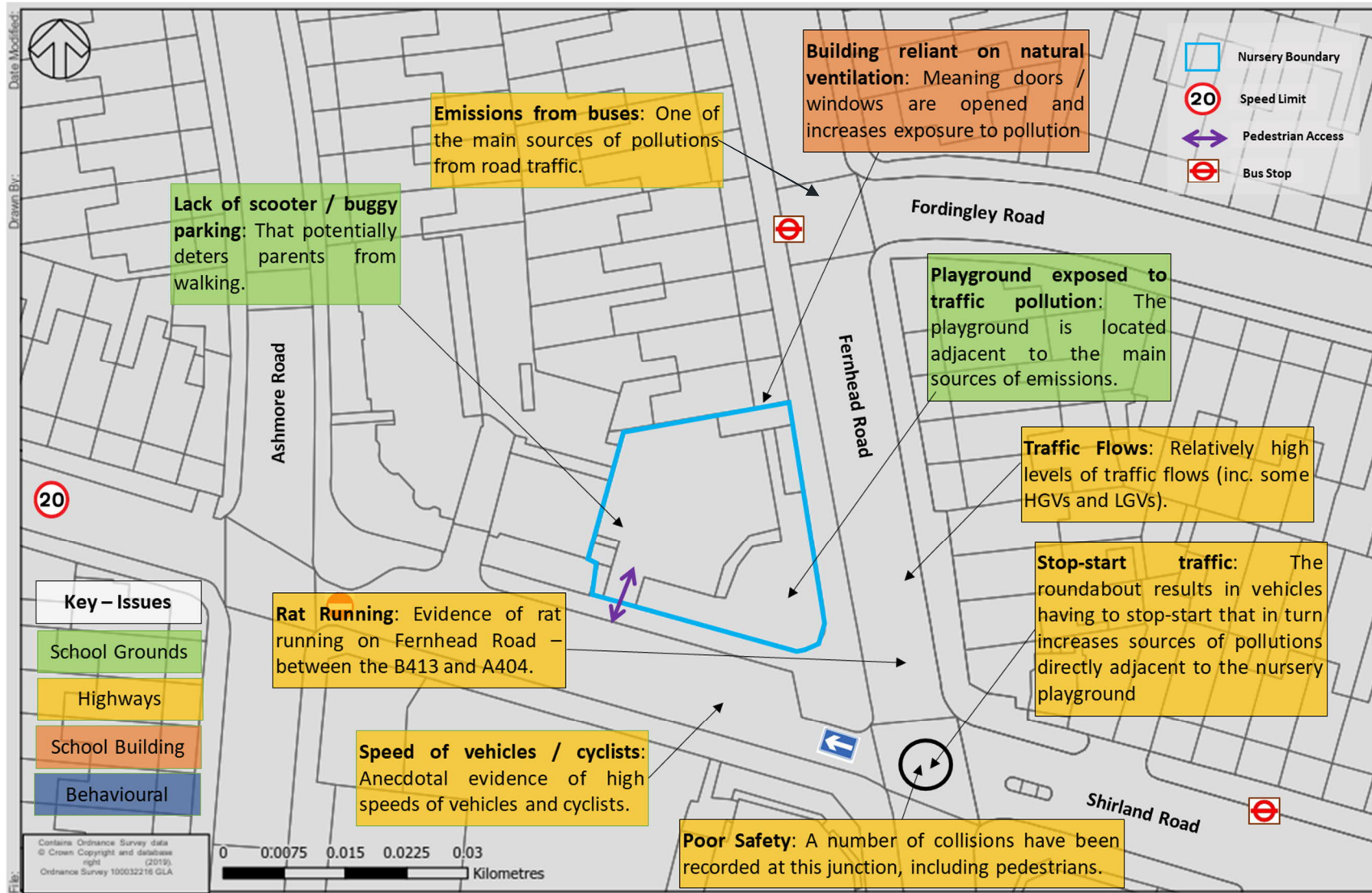
Nursery playground (facing towards roundabout)



Nursery playground (facing towards Fernhead Road)

4.4. KEY OBSERVATIONS – SUMMARY OF ISSUES

Figure 14 - 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.

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

Table 4 – Recommended measures for consideration

Measure	Description	Purpose	Potential Air Quality Improvement			Wider Benefits	Cost			Deliverability			Stakeholder Support		
			Low	Medium	High		Low	Medium	High	Quick Win	Medium Term	Long Term	Low	Medium	High
Highway (Key Stakeholder: Borough)															
1	Junction Improvements	Investigate junction improvement options to address the causes of collisions occurring at the roundabout, and if possible seek to smooth the flow of traffic (and minimise stop-starting) at the junction with Shirland Road and Fernhead Rd. A balance will need to be struck between smoothing traffic flows and managing speed, as the roundabout will currently be serving to reduce traffic speeds around the nursery. Any improvements should also seek to enhance the pedestrian environment.	Reduce sources and exposure	X			▪ Road Safety		X			X			X
2	Roadspace Reallocation on Shirland Road	Investigate opportunities to introduce a build out on Shirland Road opposite the main entrance to the nursery. The benefits would be threefold: a) Reduced width of carriageway – acting as traffic calming. b) Increased pedestrian footway width – providing opportunities to provide guardrails that can also provide secure scooter parking. c) Presents an opportunity to enhance the cycling environment. Any scheme progressed would need to consider existing on-street car parking provision, which were not observed to be well used during the audit.	Reduce sources and exposure	X			▪ Road Safety		X			X			X
3	Converting guard rails to scooter parking	Engage with a supplier of innovative cycle parking solutions about the possibility for guard rails to also provide secure scooter parking. Alternatively, the Council could explore opportunities to provide a parklet (as part of Recommendation 2) to help change the character the road to a more residential/ local road, fostering a safer environment for pedestrians, and also provide place for scooter / buggy parking.		X			▪ Active Travel		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	
4	Improve Visibility of the nursery	Increase prominence of nursery to encourage more responsible driving and parking amongst passing traffic – i.e. a banner, mural or display, themed bollards outside the school.	Reduce sources and exposure, Promotion of sustainable transport	X			▪ 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.	Reduce sources and exposure	X			▪ Support STARS and HSL objectives	X			X					X
6	Contractors Construction Forum	Emissions from HGVs is a significant factor in creating an environment with poor air quality around the nursery (as detailed in Chapter 5). Explore 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 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.	Reduce sources and exposure	X			▪ Road Safety	X				X			X	
7	Healthy Streets approach, sustainable transport and roadscape reallocation from vehicular traffic	Promote the Mayor of London's Healthy Streets approach which aims to improve air quality, reduce congestion and help make London's diverse neighbourhoods greener, healthier and more attractive places to live, work, play and do business. Take a proactive role in endorsing the approach and supporting these initiatives.	Reduce sources and exposure			X	▪ Promotion of sustainable travel			X			X		X	
8	Additional parking charges for more polluting vehicles	Continue using revenue generated on surcharges on top of existing parking charges for more polluting vehicles to help reduce sources and exposure to emissions where residents / visitors are most exposed.	Reduce sources and exposure			X			X			X		X		
9	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	Reduce sources of emissions	X			▪ Reduce noise	X			X				X	

Measure	Description	Purpose	Potential Air Quality Improvement			Wider Benefits	Cost			Deliverability			Stakeholder Support		
			Low	Medium	High		Low	Medium	High	Quick Win	Medium Term	Long Term	Low	Medium	High
		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.													
10	Control of Dust and Emissions during Construction and Demolition SPG	Introduce a requirement in planning conditions to manage dust and emissions associated with construction based on the Control of Dust and Emissions during Construction and Demolition SPG prepared by the GLA, which includes requirements for construction sites to monitor air quality and share the results with the borough council – https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/control-dust-and	Reduce sources of emissions	X				X			X				X
Highway (Key Stakeholder: TfL)															
11	Low Emission Buses	<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. These improvements will have significant benefits for Dorothy Gardner, with buses currently acting as a major source of emissions.</p>	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				
Nursery Grounds (Key Stakeholder: Nursery/ Borough)																			
12	Green Infrastructure	<p>Install green screening/climbers around the exposed outdoor spaces on the south-eastern perimeter of the nursery boundary, adjacent to Fernhead Road / Shirland Road junction. 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 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.</p>	Reduce exposure to emissions	X			<ul style="list-style-type: none"> Visual amenity Security, privacy 		X			X				X			
13	Retiming Deliveries	Investigate options for sustainable freight (e.g. for food deliveries) in partnership with other nearby nurseries, such as Mary Paterson Nursery.	Reduce exposure to emissions	X				X			X						X		
Nursery Building (Key Stakeholder: Nursery/ Borough)																			

Measure	Description	Purpose	Potential Air Quality Improvement			Wider Benefits	Cost			Deliverability			Stakeholder Support			
			Low	Medium	High		Low	Medium	High	Quick Win	Medium Term	Long Term	Low	Medium	High	
14	Air Quality Monitoring	LB Islington has TV screens linked to air quality monitors which are installed temporarily in schools to provide real-time information on air quality and to provide information on ways to lower exposure. Investigate opportunities for a similar initiative so that parents can see this information at drop-off and pick-up time and it also raises awareness of pollution within the nursery. The TVs can be linked to AirTEXT to provide wider London air pollution forecasts	Awareness raising and behavioural measures	X				X			X					X
15	Optimising Compensator Control System	Installation of an Optimising Compensator Control System to reduce time the boiler is used based on e.g. weather, occupancy of nursery etc. This should reduce the site gas usage due to more efficient control of the heating system, reducing local emissions from gas combustion.	Reducing sources and exposure	X			<ul style="list-style-type: none"> Reduced energy consumption and reduced operating costs 	X			X					X
16	Provision of Buggy / Scooter Parking	Monitor use of scooter parking spaces to ensure sufficient provision to meet demand. The introduction of a parklet (Recommendation 4) may provide an opportunity to provide a secure place for parents to park their buggy.	Behavioural measures	X				X			X					X
17	Improved heating and insulation	Review heating and local control system for more efficient heating of building, and lessening incidences of winter overheating that result in windows and doors being opened and worsening exposure to pollution from the nearby roads. Also upgrade windows where possible to further reduce heat loss, lessen energy usage, and potentially boiler run-times. Potentially less heat gain in hot weather.	Reduce sources and exposure	X			<ul style="list-style-type: none"> Reduced energy consumption and reduced operating costs Improved learning environments 		X	X	X					X
18	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.	Reduce exposure to emissions	X			<ul style="list-style-type: none"> Improved learning environments 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
		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.													
19	Indoor Fans	Any future indoor fans (used in summer months) are sourced to be the most efficient, such as using low friction magno drives.	X				X			X					X
21	Butchers Curtains	Install 'butchers curtains' for doors that open onto the playground. This will help retain heat and reduce exposure from outdoor pollution for children indoors.	X				X			X					X
22	Electricity Suppliers	Consider using electricity suppliers that have a high renewable content in their fuel mix, but ideally by those that have a 100% green tariff.	X				X			X					X
23	Boilers	Set a control strategy on the boilers to achieve the highest possible efficiency of the boiler system.	X				X			X					X
24	Building Improvements	Any future building design considers the viability of meeting the requirements of BREEAM and achieving all credits that relate to air quality.	X				X	X	X		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.	X				X				X			X	
26	Switch to lower VOC cleaning products	Switch to lower VOC alternative cleaning products, such as unperfumed cleaning products.	X				X			X				X	
Behavioural Measures (Key Stakeholder: Nursery/ Borough)															

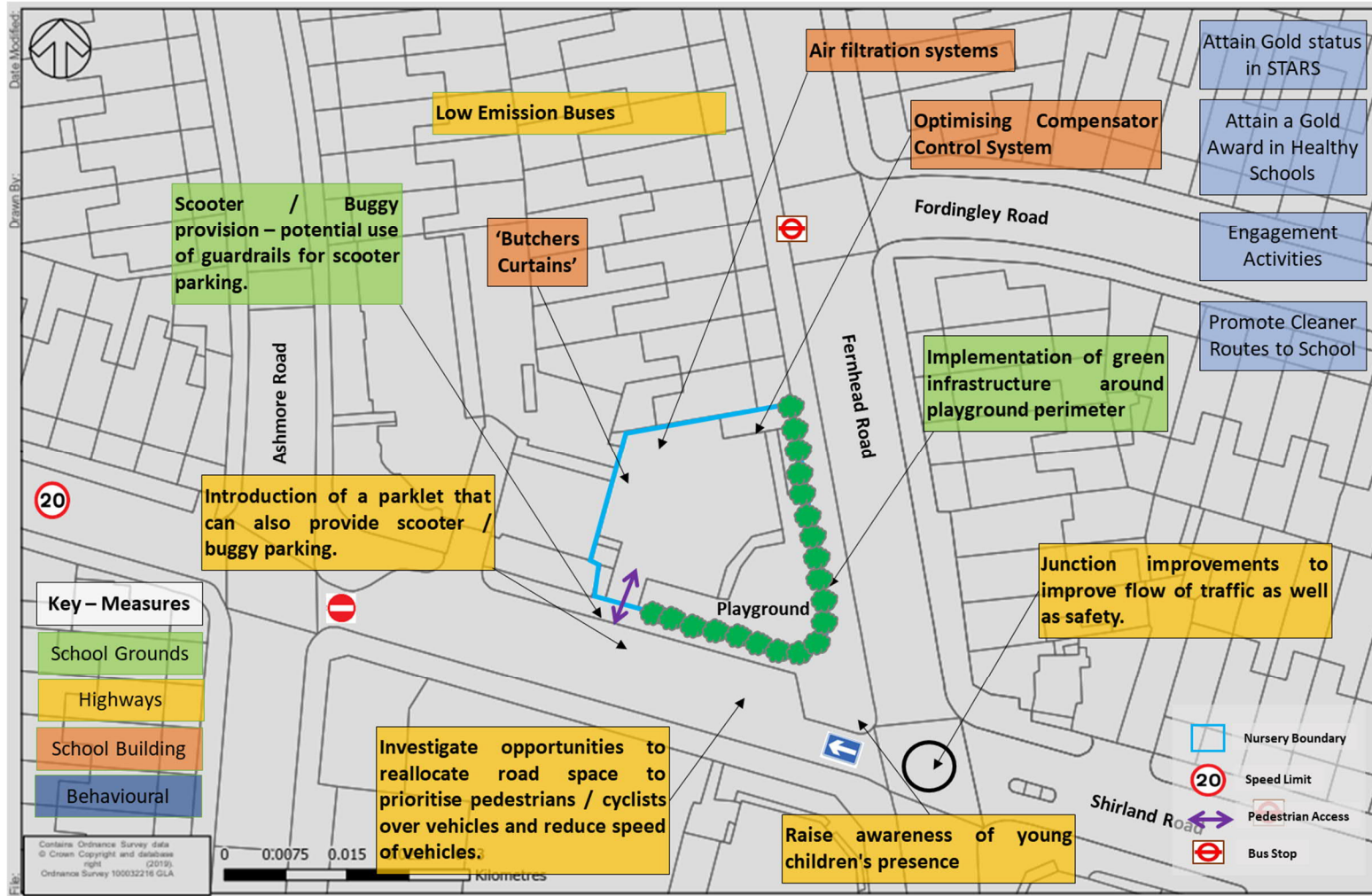
Measure	Description	Purpose	Potential Air Quality Improvement			Wider Benefits	Cost			Deliverability			Stakeholder Support		
			Low	Medium	High		Low	Medium	High	Quick Win	Medium Term	Long Term	Low	Medium	High
27	Promote cleaner routes to nursery	Encourage parents to travel to / from the nursery along less polluted routes, avoiding the more heavily trafficked route (such as Fernhead Road). In conjunction with awareness raising.	X			<ul style="list-style-type: none"> Active Travel 	X			X					X
28	Leaflets / Poster	Publicise clean air maps of the area so staff, parents and visitors know the low pollution areas / routes nearby.	X			<ul style="list-style-type: none"> Awareness raising 	X			X					X
28	Future Purchases	Any new materials / equipment are chosen with long-life and future recyclability in mind.	X			<ul style="list-style-type: none"> 	X			X					X
29	Use of Windows	Try to minimise opening of windows that face onto the main road and use of indoor ventilation is used to ensure air flow.	X			<ul style="list-style-type: none"> 	X			X					X
30	Clean Air Activities	Seek for opportunities for children and staff to get involved in clean air activities e.g. Children can ask their parents to walk / scoot to nursery on Car-Free day.	X			<ul style="list-style-type: none"> Awareness raising 	X			X					X
31	Welcome Packs / Newsletter	Provide information on air quality and its health impacts within any induction material.	X			<ul style="list-style-type: none"> Awareness raising 	X			X					X
32	Servicing & Deliveries	For deliveries and servicing, always consider couriers who use ultra-low / zero emission vehicles (this can include cargo bikes).	X			<ul style="list-style-type: none"> Awareness raising 	X			X					X
33	Click & Collect	Encourage staff to use click and collect locations for personal deliveries as opposed to deliveries to the nursery.	X			<ul style="list-style-type: none"> Awareness raising 	X			X					X
34	Buying Goods	Seek to buy goods and services from suppliers that are actively working towards reducing air pollution. Any new contracts could require at least one appropriate air pollution KPI, such as specifying combined deliveries, or zero emission vehicles etc.	X			<ul style="list-style-type: none"> Awareness raising 	X			X					X
35	Engagement with Mary Paterson Nursery	Explore opportunities to collaborate with Mary Paterson Nursery to encourage sustainable and active travel.	X			<ul style="list-style-type: none"> Awareness raising 	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	
36	Behaviour change	Prepare 'Welcome Packs' for new pupils / parents that includes the promotion of apps / sites such as 'www.walkit.com' to a) promote walking to / from school and b) promote the suitable walking routes to avoid air pollution hotspots.	Behavioural measures / reducing exposure to emissions.	X			<ul style="list-style-type: none"> Awareness raising Secure community buy-in for measures 	X			X					X
37	Monitor London Air website / app	Daily monitoring of London Air website / app to understand air quality on the day and whether e.g. opening of windows, will increase exposure of air pollution. Sign up to receive air quality alerts when very high air pollution is forecast, and information on how to reduce pupils' personal exposure.	Reducing exposure to emissions	X			<ul style="list-style-type: none"> Awareness raising Child health and welfare 	X			X					X
38	Attain a Gold Award in Healthy Schools	This will entail reviewing its practice in promoting health & wellbeing and evidence achieving the planned outcomes.	Behavioural measures / reducing exposure to emissions.	X			<ul style="list-style-type: none"> Awareness raising Supports STARS and HSL objectives 	X			X					X
39	Staff Engagement	Awareness raising session amongst staff about the impacts / costs of heating classrooms and share best practice. The Mayors London Curriculum Programme offers a wide range of high-quality teaching resources supporting most subjects on the national curriculum, CPD for teachers and events for children. A programme of targeted activity for air quality is being assembled to be delivered through the London Curriculum, with a focus on supporting teacher subject knowledge and confidence to tackle air quality as a science subject recognising that this requires a wide knowledge and skill base of science, statistics and mapping.	Awareness raising and behavioural measures	X			<ul style="list-style-type: none"> Awareness raising Supports STARS and HSL objectives 	X			X					X
40	Promoting car sharing	Make use of websites such as Liftshare.com to help find prospective car sharing partners, or the nursery could act as a forum to manage car sharing amongst the school community.	Reducing sources and exposure	X			<ul style="list-style-type: none"> Awareness raising Supports STARS and HSL objectives 	X			X				X	
41	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	Reducing sources and exposure	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	
		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.														
42	Walking Buses	A walking school bus is a group of children walking to school with one or more adults, and can be as informal as two families taking turns walking their children to school to as structured as a route with meeting points, a timetable and a regularly rotated schedule of trained volunteers. This would count as a STARS 'Other Walking Activity' and could contribute to progress.	Reducing sources and exposure	X			<ul style="list-style-type: none"> Awareness raising Supports STARS and HSL objectives 	X			X				X	
43	Travel Plan	Production of a Travel Plan to encourage active travel to / from the nursery and commitment to monitor travel behaviour.	Reduce sources and exposure	X			<ul style="list-style-type: none"> Supports STARS objectives 	X			X				X	
Wider Measures (Key Stakeholder: Borough/ TfL/ GLA/ Central Government)																
44	Targeted scrappage scheme for polluting vehicles being driven in London	Ensure parents and staff are aware of the low income scrappage scheme being introduced by the Mayor and TfL, so that those that are eligible apply to the scheme. Encourage central Government to at a minimum match-fund the Mayor's scrappage commitments, to help enable even more Londoners to switch from polluting vehicles to ultra-low emission vehicles and more sustainable forms of transport.	Reduce sources and exposure			X				X				X	X	

5.2. KEY RECOMMENDATIONS

Figure 15 – Summary Recommendations Map



5.3. PRIORITISED MEASURES FOR THE NURSERY

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

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

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

- **Green infrastructure** - a key measure identified on the day of the audit was the introduction of some green infrastructure along the perimeter of the nursery ground adjacent to the highway network. A dense vegetation layer with a high leaf density can as much as halve the levels of pollution just behind the barrier, though the benefit tails off with increasing distance. The benefit is mainly attributable to their effect on dispersion, though the deposition of some pollutants onto the leaf surfaces from air that passes through the vegetation will also have a small but beneficial effect. A study by Kings College London assessed the efficacy of green screens in preventing vehicle emissions from nearby roads reaching school grounds, through the installation of an ivy screen.



In this instance the screen was found to be an effective pollution barrier, once the ivy had started growing and a significant impact could be seen once the screen had matured. It led to a decrease in the pollution concentrations on the playground side by 23% for NO₂ and 38% for PM₁₀. Green screens also provide aesthetic benefits as well as increased privacy, biodiversity and noise reduction. The screens can be planted directly into the ground or into planters and are maintained with the option of a drip line irrigation system. It should be noted however that the same level of reduction would not necessarily be achieved in each instance, as the local conditions and designs are specific to each site. It is also important to note that green screens need ongoing maintenance.

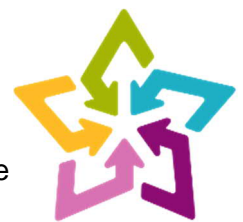
- **Junction Improvements** - The playground is located directly adjacent to the busy Shirland Road / Fernhead Road roundabout, whereby drivers have to brake and then accelerate to pull away, which creates more pollution than if there is a smooth flow of traffic. It is also noted that the junction has a poor safety record, with a number of collisions recorded over recent years that has included pedestrians. It is recommended that the Council undertake an initial feasibility study to explore the option of how the junction could be redesigned. The objective of the redesign should be on improving the operation of the junction, reducing conflicts with pedestrians crossing, and where possible smoothing traffic flows through the junction, whilst being careful to manage traffic speeds.

One option could be to remove the roundabout and the give-way lines for those travelling northbound on Fernhead Road, or to make the Shirland Road/ Fernhead Road northern arm the priority movement, reinforcing the existing bus route. Footway widening and additional pedestrian crossing points could also be provided. A review of the wider highway network would need to be

undertaken to inform any proposals for the junction. There are a number of opportunities to enhance the pedestrian and cycling environment by replacing some of the existing on-street parking bays. This includes the introduction of a parklet that could also provide additional scooter / buggy parking spaces, improved cycle lane and reduced speeds of vehicles.

Air Filtration Systems - The introduction in air filtration systems in the main classroom that fronts onto the playground. These systems 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..

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. 3.2.18. Dorothy Gardner Centre is engaged with the STARS programme, albeit is not currently accredited. Our recommended measures for the nursery include a number of initiatives that would also count towards the achieving 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

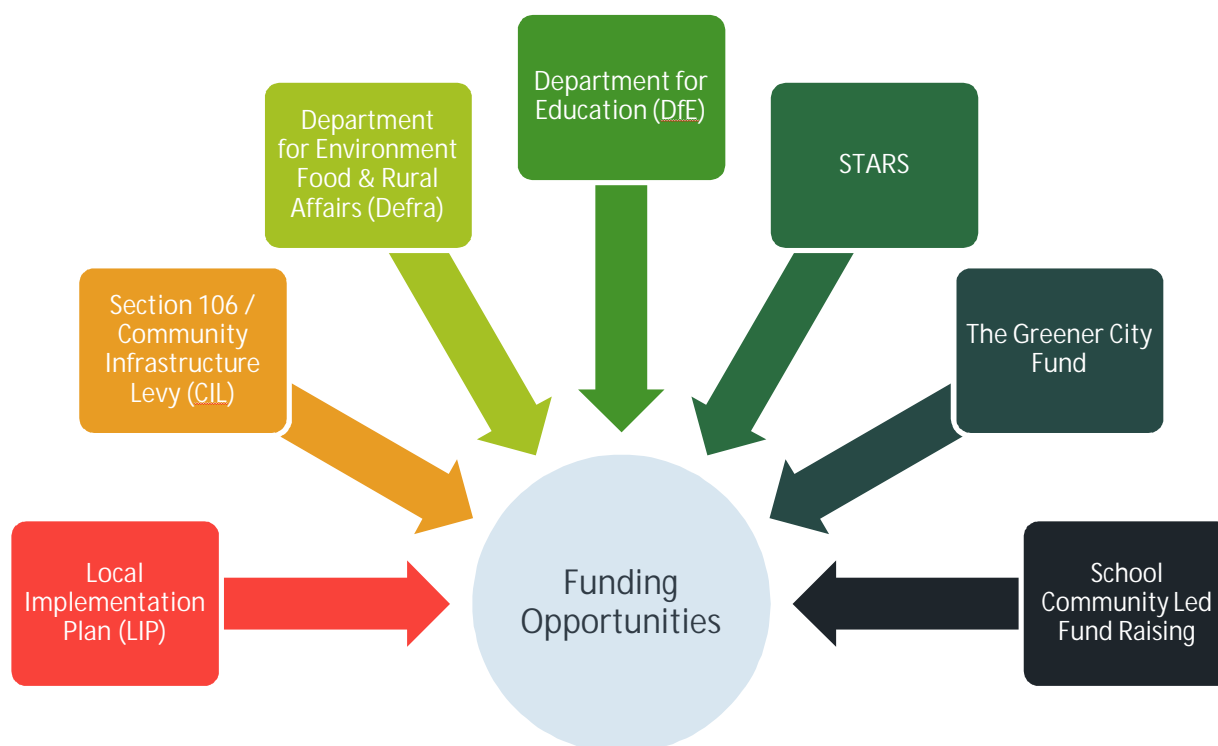
Awards: HEYL First Steps, Bronze, Silver and Gold. HEYL can be used as an improvement tool to support practice in all Early Years settings including active travel:

- 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 16 – Summary of Funding Opportunities



Local Implementation Plan (LIP)

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

Section 106 / Community Infrastructure Levy (CIL)

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

TfL Liveable Neighbourhoods

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

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

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

Department for Education (DfE)

- 5.8.6. There may be scope for delivering some of the measures identified through DfE funding for nursery buildings and land, including capital funding for nurseries and academies, such as the Condition Improvement Fund, Priority School Building Programme, Early Years Capital Fund.
- 5.8.7. Additionally, the Salix Energy Efficiency Loan Scheme provides funding for nurseries through DfE, to reduce energy costs through the installation of energy efficiency technologies.

Greener City Fund

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

RE:FIT

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

TfL STARS Reward Scheme

- 5.8.10. Whilst there is no specific funding attached to STARS, as gaining STARS accreditation helps boroughs reduce car travel, and increase cycling and walking, they often choose to link it to incentives – such as local grant funding through their LIP programmes.
- 5.8.11. It is increasingly important that boroughs seek to create a portfolio of funding opportunities, and with that in mind other potential funding sources include:
- **Local Clinical Commissioning Groups (CCG)**
 - **Health and Wellbeing Boards:**
 - **Charitable Trusts**
 - **Local business funding**
 - **Consortium approach** – pooling funding with other boroughs and achieve economies of scale

Nursery Community Led Fund Raising Initiatives

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

Other Funding Sources

- 5.8.13. There are several grant funding bodies who may be interested in funding recommendations particularly if a borough links up with a community organisation.
- 5.8.14. Boroughs could also seek to influence the Joint Strategic Needs Assessment process undertaken by Health and Well Being Boards and Directors of Public Health. This is the process which looks at local clinical, health and well-being population needs, and on which Clinical Commissioning Groups (CCGs) base their funding priorities.

Other sources of funding for green infrastructure

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

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