Background Paper

Great West Corridor & Site Allocations

Noise and Air Quality

October 2020

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1. Introduction

The evidence within this document has been prepared in light of the identified draft policies below which relate to noise and air quality within the Regulation 19 Consultation Draft of the Great West Corridor Local Plan Review (dated July 2019) inclusive of Draft Policy GWC 4 due to the relationship between areas of tranquillity and noise. Proposed minor amendments to policy GWC3: Health and Wellbeing as part of the Draft Submission version of the GWC Local Plan Review are also set out here.

The document also looks at Site Allocations set out in the Draft Volume 2: Site Allocations Local Plan review document within the GWC plan area, providing detailed assessment of associated Noise and Air Quality impacts that may be present, and appropriate guidance on any suitable mitigation measures to address these (please see Appendix A and C)

It seeks to provide evidence and observation regarding the challenges faced in the Borough in terms of planning for Noise and Air Quality and as a basis to secure 15 year goals, policies and strategies to provide ongoing improvements and benefits and provide high quality developments.

Draft Regulation 19 Policy GWC3 Health and Wellbeing

The Council will create high – quality accessible places with local services and infrastructure that enable active and healthy lifestyles, improve mental and physical health and well-being and reduce health inequalities. We will achieve this by:

(a) Working with stakeholders to deliver measures to minimise air and noise pollution as set out in the Air Quality Action Plan and Noise SPD, and to become Air Quality Positive by implementing measures across the area that will actively reduce air pollution, in order to improve the environmental quality of the area.

[b-h not relevant to noise or air quality]

The Council will expect development proposals to:

(i) Ensure site and building design minimises exposure to elevated levels of air and noise pollution through:

> *I. provision of noise and vibration insulation;*
>
> *II. locating sensitive uses away from existing or planned sources of air and noise pollution, including through the siting of less sensitive non-residential uses adjacent to the A4 and M4 to act as a physical "buffer" between the roads and more sensitive uses to the rear;*
>
> *III. the provision of winter gardens and balconies; and*

IV. the use of greenery to act as a "buffer" along the A4/M4 corridor and other streets.

(j) Consider health and wellbeing during the design stages and use Best Available Techniques (BATs) to mitigate and minimise any adverse effects on health and quality of life (e.g. soil, noise, water, air or light pollution). Proposals for major development schemes should also be supported by Noise Assessment, Air Quality Assessment (AQA) and a Health Impact Assessment (HIA).

(k) Minimise air pollution making new developments 'air quality positive' in accordance with the Mayor SPG on Sustainable Design.

Proposed Policy Amendments – Draft Submission Policy GWC3: Health and Wellbeing

The Council will create high – quality accessible places with local services and infrastructure that enable active and healthy lifestyles, improve mental and physical health and well-being and reduce health inequalities.(a) Working with partners and stakeholders to implement measures across the area that will ensure that quality of life, health and wellbeing and the natural environment are not adversely affected by harmful pollutants, in accordance with the London Plan policy SI1 and the Mayor's SPG on Sustainable Design and Construction (or any relevant superseding guidance).

[b-h not relevant to noise or air quality]

The Council will expect development proposals to:

(i) Ensure the site and building design minimises and mitigates exposure to elevated levels of air and noise pollution by:

I. locating sensitive uses away from existing or planned sources of air and noise pollution, including through the siting of less sensitive n o n - r e s idential uses adjacent to the A4 and M4 to act as a physical "buffer" between the roads and more sensitive uses;

II. using technology and design solutions to prevent or minimise exposure to air, light, vibration and noise pollution

III. the provision of winter gardens; and

IV. the use of greenery to act as a "buffer" along the A4/M4 corridor and along rail and road transport and waste facilities.

(j) Demonstrate that health and wellbeing has been considered during the design stages using best available techniques (BATs) to mitigate and minimise any adverse effects on health and quality of life (e.g. soil, noise, water, air or light pollution and flood risk). Proposals for major development schemes should also be supported

by Noise Assessment, Air Quality Assessment (AQA) and a Health Impact Assessment (HIA).

(k) Contribute to and/or deliver measures to mitigate and minimise air pollution on large scale development subject to Environmental Impact Assessment demonstrating how they can become 'air quality neutral' or 'air quality positive' in accordance with London Plan policy SI1 and the Mayor's SPG on Sustainable Design and Construction

Draft Regulation 19 Policy GWC4: Open Spaces

The Council will protect and enhance existing open space and establish a well-connected and continuous green and blue network that strategically links green open spaces, public squares and rivers with neighbourhoods and workplaces to enhance opportunities for relaxation, recreation and a healthy lifestyle.

We will achieve this by:

(a) Protecting the quality, heritage and ecological value, tranquillity and amenity of the extent of Metropolitan Open land, registered parks and open spaces in around the area.

Draft Regulation 19 Policy GWC6: Connecting People and Places

The Council is committed to working with strategic partners, stakeholders and developers to expand and enhance the Great West Corridor transport infrastructure, improve road safety, minimise car parking and implement measures that will be provide attractive alternatives to the private car in order to reduce car dependency in-turn helping to mitigate the impacts of growth on the environment.

(b) Contributing to the London Plan's Healthy Streets approach to improve air quality, reduce congestion and deliver an attractive and safe public realm that promotes active travel to better connect the Great West Corridor with surrounding stations, town centres, neighbourhoods, Kew Pier River and other key destinations. This could potentially be achieved by improving traffic controlled pedestrian crossings and walking and cycling facilities throughout the area, specifically along the A315 (Cycle Superhighway 9), parallel to the A4 (Clean air routes) and north-south routes to adjoining town centres, public transport nodes and other destinations, and links to Cycle Superhighway 9 including contributing towards delivery of the Council's identified Cycle Priority Network (Local implementation Plan)

(c) Working with key stakeholders to reduce traffic congestion and improve air quality, noise pollution and pedestrian and cycle safety in traffic hotspots such as the Chiswick roundabout, the M4/A4 corridor and on orbital connector routes such as Ealing Road

[d to k not relevant to noise or air quality]

The Council expect development proposals to:

(j) Improve walking and cycling infrastructure provision and network in and to/from the Corridor by contributing to:

I. increased permeability, connectivity and legibility of redeveloped sites;

II. improvement of existing and creation of new walking routes and links from development to stations, surrounding neighbourhoods, open spaces, town centres and other key local destinations, ensuring it is adequately lit, creates step-free legible access and provides direct links to other pedestrian movement corridors;

III. creation of new, and the improvement of existing, segregated cycle lanes along the A4/Great West Road, new north-south links to and from local town centres, surrounding neighbourhoods, stations, open spaces, and other key local destinations contributing to delivery of the council's Priority Cycle Network;

IV. creation of walking and cycling clean air routes parallel to the A4 that are safe and legible within site design; and

V. provision of cycle parking in new developments and at key transport hubs, and stations that exceed the minimum design and space standards in accordance with the London Plan standards and the London Cycle Design Standards (LCDS)

Draft Regulation 19 Policy Great West Corridor West Policy: P1

Proposals should plan positively to deliver the place vision by GWC P1

[…]

"(i) Requiring residential or mixed-use developments to be designed and managed in a manner that ensure the efficient servicing of sites and safeguards the future operation of existing industrial uses in accordance with the Agent of Change principle

[…]

(m) Ensuring that any new residential development is designed to mitigate any noise and air quality issues and is sensitively located away from the Great West Road"

[…]

(o) Support the creation of 'clean air' pedestrian routes running parallel to the A4 / M4

Draft Regulation 19 Great West Corridor Central Policy: P2

Proposals should plan positively to deliver the place vision by:

[…]

"(d) Ensuring new residential development is of a high design standard and is compatible with existing and/or new employment uses to safeguard the future operation of these uses, in line with the Agent of Change principle.

[…]

(i) Implementing strategies to improve air quality along the A4/M4 corridor and to encourage healthier and more active living by smoothing traffic flow, encouraging the use of public transport through improved service, and improving pedestrian and cycle routes along the corridor.

(j) Supporting the creation of 'clean air' pedestrian routes running parallel to the A4 / M4.

(k) Promoting the greening of streets and public spaces to enhance the environmental quality of the public realm, especially along the A4.

[…]

(s) Ensuring that mixed-use developments locate less sensitive commercial uses to front the M4/A4 corridor to provide a protective buffer for residential uses located to the rear."

[…]

(u) Supporting the improvement of public bus services operating both east/west along the Corridor and running north/south of the Corridor in order to improve accessibility.

(v) Improving and implementing additional walking and cycling routes and infrastructure to increase safety and provide further sustainable transport options, particularly along and parallel to the A4 and routes that link stations to the area such as the link from Boston Manor station to the London Gateway area.

[…]

(w) Work strategically to reduce traffic along the A4 and promote access to businesses fronting the corridor.

Draft Regulation 19 Policy GWC P3 East

Proposals should plan positively to deliver the place vision by:

[…]

(f) Requiring new residential development to be designed to mitigate any noise and air quality issues and is sensitively located away from the A4/M4 and north circular roads

(g) Supporting greening proposals that deliver a green buffer zone between the main road corridors and the footway for semi mature tree planting and landscaping, including planters with low growing shrubs species to help mitigate air and noise pollution and enhance the environment

[…]

(k) Supporting the creation of 'clean air' pedestrian routes running parallel to the A4 / M4

[…]

(p) Requiring the design of new open space and public squares to be sheltered from road noise, have a sunny aspect, offer a range of public space amenities, be overlooked by development and animated by active ground floor uses.

1.1 Study Overview

Purpose of the Study

The aim of this background paper is to review the above Draft GWC policies. This will set out recommendations for mitigation and measures to ensure that the policies are appropriate, in line with latest best practice guidance and allow for appropriate development within the GWC study area.

Key Outputs

- Review of relevant international, national, regional and local policy context and legislation;
- Air quality mapping and identification of high concentrations of pollutants within the GWC study area;
- Summary of Air Quality and Noise constraints and opportunities at allocated sites;
- Noise modelling for the allocated sites within the GWC to consider the effects of different interpretations of the draft policy;
- Proposed Interpretation of Draft Policy to identify implications of the policy on development within the allocated sites and to feed into emerging supplementary planning guidance.

Report Structure

The report is divided into sections reviewing the above for Air Quality and Noise and each section is set out as below:

- An introduction to why noise and air quality are issues which are relevant for consideration within the context of this Local Plan.
- A review of extant policies, guidance and baseline within the study area.
- Discussion of the effectiveness of each of the proposed policies.

- Examination of the potential effects of air quality/noise at allocated sites within the GWC study area.
- Conclusions and further recommendations.

2. Air Quality

2.1 Introduction to Air Quality

This Section has been prepared in relation to the effects of air quality within the Great West Corridor (GWC) and the considerations outlined within Policies GWC 3 'Health and Wellbeing', GWC West Policy P1, GWC Central P2 and GWC East P3. Although a number of the measures outlined within these policies represent design principles that are expected to be considered in detail on a case-by-case basis, this document also includes additional analysis to quantify the extent of the areas within which the overarching design principles outlined below are considered to be applicable.

A review of the Local Plan in the Great West Corridor (GWC) requires the Local Authority (LA) to manage risks associated with mixed use developments that may be either in close proximity or front onto the A4/M4. Air quality management is important for improving the existing condition of the GWC study area and not exposing future occupiers of any development to poor air quality.

Considering the GWC largely serves the needs of mainly commercial businesses with some retail occupiers, it should be recognised that residential dwellings to front facades along A4/M4 are not generally suitable without being able to demonstrate robust and demonstrably effective mitigation measures being put in place to protect any future occupiers.

2.1.1 Effects of Air Quality on Health

This sub-section outlines why air quality is an important consideration given the effect of poor air quality within the borough on vulnerable groups of people and public health.

Air quality is a significant issue within the UK. A lobby group, Client Earth, through the High Court, have taken successful action against the British Government for not meeting air quality limits. Local authorities are therefore under significant pressure to reduce pollution. However, it is acknowledged that it is not a simple problem and will require a combination of policy, technology and social change.

Exposure to Nitrogen Dioxide (NO_2) (the key traffic derived pollutant) has been attributed to 23,500 premature deaths per year[1] in the UK. The limits of 40µg/m³ for long-term (annual exposure) and 200µg/m³ for short-term (hourly) exposure have been set as the level where there are observable health effects in the general population. Exposure to high levels of NO_2 have been linked to both respiratory problems and shown to affect brain function.

The limits for NO_2 are based on empirical studies and have been set based on the studies of the onset of health conditions. The following is from the World Health Organisation (WHO) *"Air quality guidelines for particulate*

[1] Air Pollution in the UK 2015, Defra, September 2016 https://uk-air.defra.gov.uk/assets/documents/annualreport/air_pollution_uk_2015_issue_1.pdf

matter, ozone, nitrogen dioxide and sulphur dioxide - Global update 2005"[2]:

> *"Epidemiological studies have shown that bronchitic symptoms of asthmatic children increase in association with annual NO_2 concentration, and that reduced lung function growth in children is linked to elevated NO_2 concentrations within communities already at current North American and European urban ambient air levels. These studies also found adverse effects on the health of children living in metropolitan areas characterized by higher levels of NO_2 even in cases where the overall city-wide NO_2 level was fairly low."*

Whilst the UK annual average limit for $PM_{2.5}$ is 25µg/m³, the WHO has a lower limit of 10µg/m³[3] as there is no identified 'safe' level of exposure to particulate matter.

The WHO guidance states that recent indoor studies have provided evidence of effects on respiratory symptoms among infants at NO_2 concentrations below 40 µg/m³.

A number of short-term experimental human toxicology studies have reported acute health effects following exposure to 1-hour NO_2 concentrations in excess of 500 µg/m³ . Although the lowest level of NO_2 exposure to show a direct effect on pulmonary function in asthmatics in more than one laboratory is 560 µg/m³, studies of bronchial responsiveness among asthmatics suggest an increase in responsiveness at levels upwards from 200µg/m³.

Evidence from a report commissioned by the British Heart Foundation suggests that both the short-term and long-term exposure to particulate matter (PM) may be associated with cardiovascular disease (CVD)[4].

"In 2014, the European Study of Cohorts for Air Pollution Effects (ESCAPE) found that long-term exposure to $PM_{2.5}$ is strongly linked to heart attacks and angina."

Researchers found that a 5µg/m³ increase in $PM_{2.5}$ was associated with a 13 per cent increase in relative risk of coronary events and a 10µg/m³ increase in PM_{10} was associated with a 12 per cent increased risk of coronary events. The study involved over 100,000 participants with no prior history of heart disease over a ten-year period (1997-2007). This study found that the risk of heart attack and angina increased at levels of $PM_{2.5}$ exposure below current EU limit thresholds[5].

This mirrors findings from a study conducted in Italy, which found that long-term exposure to both $PM_{2.5}$ and NO_2 had a negative association on mortality from coronary heart disease.

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[2] http://www.euro.who.int/ data/assets/pdf_file/0005/78638/E90038.pdf?ua=1

[3] https://apps.who.int/iris/bitstream/handle/10665/69477/WHO_SDE_PHE_OEH_06.02_eng.pdf;jsessionid=3B77161C23347F1CCA2FD6113CE48890?sequence=1

[4] Every breath we take: the lifelong impact of air pollution | RCP London, 2016

[5] Peters A et al (2014) „Long-term exposure to ambient air pollution and incidence of acute coronary events: perspective cohort study and meta-analysis in 11 European cohorts form the ESCAPE project." *British Medical Journal* http://www.bmj.com/content/348/bmj.f7412

Levels of NO_2 in the Great West Corridor study areas, is currently, and has been in breach of the EU directive 2008/50/EC and the national Air Quality Standards Regulations (amended) 2016 and subsequent amendments, in some locations, for over ten years.

As levels of NO_2 and particulate matter are both traffic derived and correlate with each other, within this context, it is considered that a nominal value of **38µg/m³** of Nitrogen Dioxide as an annual mean should be used within the London Borough of Hounslow as a trigger level for identifying 'poor' air quality, thus allowing for variation and error. Going forward, this level of **38µg/m³** (as a more stringent level compared to the National Limit of 40µg/m³) should be used in the emerging supplementary planning guidance, as the basis for a borough-wide target, trigger for and the maximum design target for mitigation, and the maximum headroom limit for all nitrogen dioxide emissions (notwithstanding the requirement for all new developments to be Air Quality Neutral and take an Air Quality Positive approach).

2.2 Plans, Policies and Programmes

This section covers the following:

- National planning policy/Clean Air Strategy;
- London specific guidance and policies;
- Existing baseline information to identify areas which are of known poor air quality;
- Specific measures which are to be implemented which will affect air quality within the Great West Corridor, e.g. the Ultra Low Emission Zone (ULEZ).

The above have all been reviewed within the context of the draft policies.

2.2.1 National Policy

Levels of Nitrogen Dioxide (NO_2) in the Great West Corridor is currently and has been in breach of the EU directive 2008/50/EC and the national Air Quality Standards Regulations (amended) 2016 and subsequent amendments, in some locations, for over ten years. The introduction of the National Planning Policy Framework (NPPF)[6] and the update to the supplementary Planning Policy Guidance (PPG), places certain obligations on LPAs where planning policies and decisions should contribute to and enhance the natural and local environment by "*preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability, Development should, wherever possible, help to improve local environmental conditions such as air quality and water quality, taking into account relevant information such as river basin management plans*"[7]. The PPG states '*Where air quality is a relevant consideration, the local planning authority may need to establish whether occupiers or users of the development could experience poor living conditions or health due to poor air quality*[8].

The key pollutant of concern is NO_2 for which the borough wide Air Quality Management Area has been declared as it is above the annual average legal limit of 40µg/m³. A major source of NO_2 is emissions from road traffic. Particulate Matter is also of concern as another traffic derived pollutant.

The overriding priority is to devise suitable policies that satisfy the above requirements for the GWC corridor.

2.2.2 London Policy

2.2.2.1 'Air Quality Neutral' and 'Air Quality Positive' in the London Plan

The adopted London Plan (2016) addresses the improvement of air quality. Policy 7.14 within the London Plan

[6] National Planning Policy Framework.pdf
[7] National Planning Policy Framework.pdf Paragraph 170 (e)
[8] https://www.gov.uk/guidance/air-quality--3 Paragraph 005 Reference ID: 32-005-20191101

(2016)[9] specifically relates to 'air quality neutral':

'Policy 7.14 Improving Air Quality

Strategic

A. The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimise public exposure to pollution.

Planning Decisions

B. be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs)

The GLA is currently in the process of updating the London Plan, with the Intend to Publish Draft London Plan published in December 2019. Since then, the Secretary of State has written to the Mayor setting out his consideration of the Plan (13th March 2020) and the Mayor has issued a response (24th April 2020), neither of which directly address any polices relating to air quality. The Draft New London Plan (2019) addresses the improvement of air quality in proposed policy SI1:

Policy SI 1 Improving air quality

A Development Plans, through relevant strategic, site-specific and area based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.

B To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:

1 Development proposals should not:

a) lead to further deterioration of existing poor air quality

b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits

c) create unacceptable risk of high levels of exposure to poor air quality.

2 In order to meet the requirements in Part 1, as a minimum:

a) development proposals must be at least Air Quality Neutral

*b) development proposals should use **design solutions** to prevent or minimise increased*

[9] https://www.london.gov.uk/sites/default/files/the_london_plan_2016_jan_2017_fix.pdf

exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures

c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1

d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.

C Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:

a) how proposals have considered ways to maximise benefits to local air quality, and

b) what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.

D In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.

E Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development.

In addition to the above details from the current and Draft London Plan, to support the policies in the London Plan, the 'Sustainable Design and Construction Supplementary Planning Guidance (SPG) provides guidance on air quality neutral assessments. The relevant section is copied below.

4.3.12 The NPPF states that planning policies should sustain compliance with and contribute towards meeting EU limits values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan.

4.3.14 The London Plan and the Mayor's Air quality Strategy set out that developments are to be at least 'air quality neutral'. To enable the implementation of this policy emission benchmarks have been produced for buildings' operation and transport across London based

on the latest technology (including its effectiveness and viability). Developments that do not exceed these benchmarks will be considered to avoid any increase in NOx and PM emissions across London as a whole and therefore be 'air quality neutral'. These are to be considered minimum benchmarks and will be kept under review and will be updated in line with technological and commercial advances.

4.3.15 This policy applies to all major developments91 in Greater London. Developers will have to calculate the NO_x and/or PM_{10} emissions from the buildings and transport elements of their developments and compare them to the benchmarks set out in Appendix 5 and 6. For smaller developments paragraphs 4.3.23 – 4.3.25 set out emissions standards for combustion plant. Where schemes do not meet the 'air quality neutral' benchmarks, after mitigation measures have been implemented onsite, the developer will be required to off-set emissions off-site. Further information on off-setting requirements is included below.

4.3.16 To complement this policy emission standards have been recommended for combustion plant that provide heat and power to developments. These are outlined in paragraphs 4.3.20 – 4.3.25.

Emissions from buildings

4.3.17 Two Building Emission Benchmarks (BEBs) have been defined; one for NOx and one for PM10, for a series of land-use classes. The benchmarks are provided in Appendix 5. Section 4 of The Air quality neutral report provides further details on how to apply these benchmarks.

Transport emissions

4.3.18 Developments should be designed to encourage and facilitate walking and cycling and the use of public transport. This will enable air pollutants deriving from a particular development to be minimised. To further support this policy, boroughs should also ensure developments do not exceed local car parking standards[10].

2.2.2.2 'Air Quality Neutral' Guidance

While the above London Plan extracts show that developments need to demonstrate their status as 'air quality neutral', no methodology on completing an appropriate assessment is prescribed within the guidance beyond the benchmarks given in Appendix 5 of the SPG.

Best practice guidance has been produced by Air Quality Consultants[11] for completing AQ Neutral assessments along with typical trip lengths and emissions factors to assist in calculating emissions from developments and

[10] Sustainable Design and Construction Supplementary Planning Guidance April 2014
[11] https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=226d8d5e-d7e9-40e1-bf0d-85c4554496da

comparing them against the benchmarks.

The current assessment methodology determines that the test of whether a development is 'neutral' is passed if a development's emissions are below the relevant benchmark commensurate to the scale of the development.

2.2.2.3 'Air Quality Positive'

Policy GWC3 reflects Policy SI 1 (c) within the Mayor of London's London Plan: Intend to Publish, wherein large scale development proposals subject to Environmental Impact Assessment (EIA) should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. The Mayor of London's Intend to Publish version of the Draft New London Plan[12] states the following with regards to an air quality positive approach:

> *9.1.11 An air quality positive approach is linked to other policies in the London Plan, such as Healthy Streets, energy masterplanning and green infrastructure. One of the keys to delivering this will be to draw existing good practice together in a holistic fashion, at an early stage in the process, to ensure that the development team can identify which options deliver the most improvement to air quality. Large schemes, subject to Environmental Impact Assessments, commonly have project and design teams representing a range of expertise, that can feed in to the development of a statement to set out how air quality can be improved across the proposed area of the development.*
>
> *9.1.12 Single-site schemes, including referable schemes, are often constrained by pre-existing urban form and structure, transport and heat networks. These constraints may limit their ability to consider how to actively improve local air quality. By contrast, large schemes, particularly masterplans, usually have more flexibility to consider how new buildings, amenity and public spaces, transport and heat networks are deployed across the area and will therefore have greater opportunities to improve air quality and reduce exposure through the careful choice of design and infrastructure solutions. Delivery of an air quality positive approach will be project specific and will rely on the opportunities on site or in the surrounding area to improve air quality.*
>
> *9.1.13 Statements for large-scale development proposals, prepared in response to Part C of this policy, should set out:*
>
> - *How air quality is intended to be analysed and opportunities for its improvement identified as part of the design process.*

[12] London Plan: Intend to Publish.pdf

- *How air quality improvements have informed the design choices made about layout and distribution of buildings, amenity spaces and infrastructure.*

- *What steps will be taken to promote the uptake and use of sustainable and zero-emission modes of transport beyond minimum requirements. This may include specific measures in transport plans or delivery against Healthy Streets indicators.*

- *How air pollutant emissions from the buildings or associated energy centres can be reduced beyond the minimum requirements set out in Part B of this policy. This may include specific measures in heating masterplans or working with existing heat network providers to reduce or eliminate energy centre emissions.*

- *How specific measures that are identified to deliver air quality improvements will be evaluated and secured, including whether more detailed design specifications will be required so that the final development meets the desired performance.*

9.1.14 The GLA will produce guidance in order to assist developers and boroughs in identifying measures and best practice to inform the preparation of statements for developments taking an air quality positive approach.

9.1.15 Where the Air Quality Assessment or the air quality positive approach assumes that specific measures are put in place to improve air quality, prevent or mitigate air quality impacts, these should be secured through the use of planning conditions or s106 agreements. For instance, if ultra low NOx boilers are assumed in the assessment, conditions should require the provision of details of the installed plant prior to the occupation of the building, or where larger plant is used for heating, post installation emissions tests should be required to ensure that the modelled emission parameters are achieved.

The London Environment Strategy[13] states the following with regards to providing guidance for developers.

Proposal 4.3.3.a The London Plan includes policies so that all new large-scale developments in London are 'Air Quality Positive', and maintain Air Quality Neutral requirements for all other developments London's growth and redevelopment should contribute to delivering improvements in air quality now and into the future. All major developments are already, and will continue to be, required to be Air Quality Neutral.

Emission benchmarks for Air Quality Neutral Developments are set out in planning guidance

[13] https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf, p113.

for building operations and transport emissions based on the latest technology (including its effectiveness and viability).

Developments that meet or improve on these benchmarks are considered to avoid any increase in NOx and PM emissions across London as a whole and are therefore 'Air Quality Neutral'. By ensuring all developments meet this minimum requirement London's growth can be accommodated without undoing other improvements in air quality. The Mayor will continue to keep these benchmarks under review to ensure that they remain fit for purpose. Implementation of the Air Quality Neutral policy will be monitored through the LLAQM process and in the London Plan monitoring report to ensure the requirements are met.

Larger developments have the potential to go further and boost local air quality by effective design and integration into the surrounding area. For instance, by the provision of low or zero emission heating and energy, green infrastructure, or improvements to public transport, walking and cycling infrastructure, Air Quality Positive developments will make sure that emissions and exposure to pollution are reduced.

The Mayor will provide guidance for developers on the most effective approach to take to ensure a development is Air Quality Positive and will review and update the guidance as required. This will ensure the best approaches to Air Quality Positive development are used in London.

Developments will need to go beyond demonstrating that they meet the benchmarks in the air quality neutral guidance but must go further and show that they will actively improve air quality through active measures on site.

2.2.3 London Borough of Hounslow - Air Quality Action Plan Objectives

All stakeholders, including developers and their agents, recognise the fact that many London Boroughs are failing to meet their air quality obligations. There are a number of reasons that have contributed to this outcome, which includes growth in uptake of diesel vehicles, lack of performance in emissions reduction from modern engine technology and impact of growth in developments that led to emissions increases from buildings and transport elements. These reasons have collectively led to the failure in meeting the air quality objectives. Therefore, in this context of emissions from developments (buildings & transport, including servicing/deliveries), any development proposals should be congruent to the objectives of the London Borough of Hounslow's Air Quality Action Plan (AQAP)[14], with a view to delivering measurable emissions reductions and improvements in local air quality.

[14] Hounslow Air Quality Action Plan - 2018.pdf

The latest version of the AQAP was published in September 2018 and contains measures to reduce pollutant concentrations and increase awareness of the issue of air quality throughout the borough. The AQAP was published prior to The London Plan: Intend to Publish, and therefore, does not contain reference to air quality positive measures. Of all the proposed actions, perhaps the most relevant action in the context of the Great West Corridor is Action 40:

The council will continue to work in partnership with Highways England (HE), seeking clear strategy and framework to: (i) reducing current (and future – Smart Motorway) exceedances of NO_2/PM AQO and mitigate adverse effects, including health impacts of harmful emissions associated with road/routes within their jurisdiction; (ii)) Seek contributions for implementing mitigation measures locally, aimed at reducing exposure to harmful emissions NO_2/PM (all sensitive receptors), resulting from their roads/routes; and improving air quality in nearby areas.

The proposed draft policies do not conflict with the AQAP actions.

2.2.4 Ultra-Low Emissions Zone

London's Low Emission Zone (LEZ) currently includes the Great West Corridor but the Ultra-Low Emissions Zone (ULEZ) is around 10km to the east of the GWC site. The proposed extension from 25th October 2021 brings the ULEZ much closer to the GWC area as shown in Figure 2.1 below.

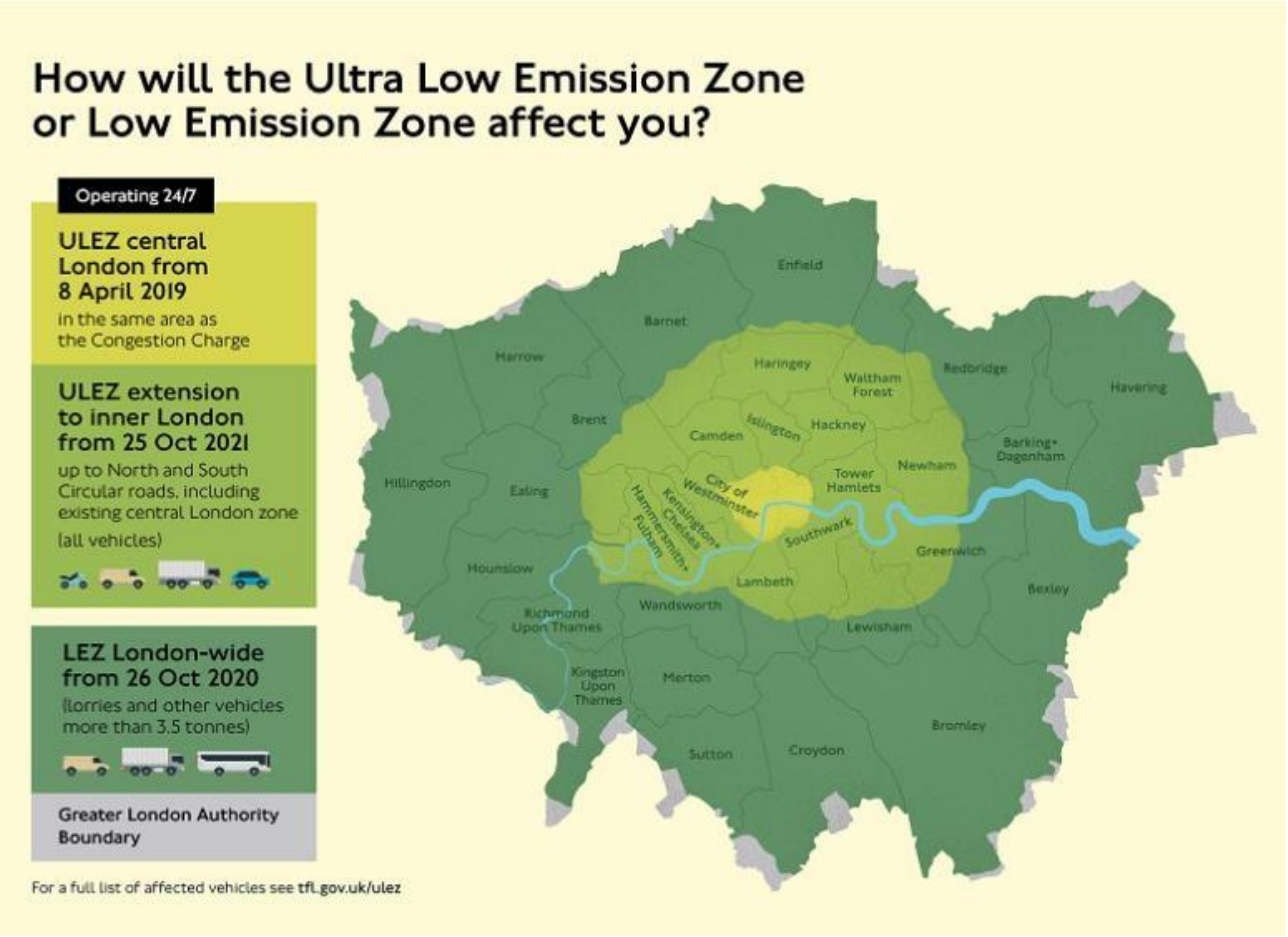


Figure 2.1 Map of Ultra Low Emission Zone (ULEZ) and Low Emission Zone (LEZ)

The ULEZ has proved to be an effective driver of behaviour change and there are typically 13,500 fewer of the worst polluting vehicles in Central London when comparing with the situation before the introduction of the ULEZ[15].

Original understandings of the ULEZ were that there was a potential impact on the border of Hounslow, the edge of the ULEZ. A recent Mayor of London study has demonstrated the initial impacts of the ULEZ and shows that there has been a reduction of NO_2 emissions on boundary roads since the introduction of the ULEZ, providing a strong indication of the positive impact the scheme has on air pollution in boundary areas[16]. Ongoing monitoring will continue to be assessed, however initial results indicate that the ULEZ is having a positive impact on air quality within Hounslow and will continue to have an overall positive impact on the Borough.

2.2.5 Nitrogen Dioxide (NO_2) Modelling and Monitoring

A review of the monitoring undertaken by the London Borough of Hounslow (LBH) within 2018 has been

[15] https://www.london.gov.uk/press-releases/mayoral/ulez-reduces-polluting-cars-by-13500-every-day
[16] Central London Ultra Low Emission Zone Six Month Report
https://www.london.gov.uk/sites/default/files/ulez_six_month_evaluation_report_final_oct.pdf

undertaken. Monitoring within LBH is undertaken through both continuous and non-continuous methods. Table 2.1 and 2.2 below indicate the continuous and non-continuous monitoring within the Great West Corridor.

Monitoring

Continuous Monitoring

LBH operates one automatic monitoring stations within the GWC. This offers continuous records of NO_2 and PM_{10} concentrations within the area. The most recently available monitored NO_2 and PM_{10} concentration data is from 2018 at the locations shown in the table below.

Table 2.1 Monitored Annual Mean NO_2 Concentrations at Automatic Monitoring Stations

Site ID	X	Y	Location	Site Type	NO_2 Annual Mean Concentration 2018 (µg/m^3)	PM_{10} Annual Mean Concentration 2018 (µg/m^3)
HS5	517425	178074	Brentford	Roadside	48.0	26.0

The HS5 automatic monitoring station showed levels which exceeded the Air Quality Objective (AQO) for NO_2 (40 µg/m^3 annual mean) in 2018, with monitored levels were met for the for PM_{10} Air Quality Objective (25 µg/m^3 annual mean).

Non - Continuous Monitoring

LBH operates a network of five diffusion tubes within the GWC. Diffusion tubes within the GWC study area are given below.

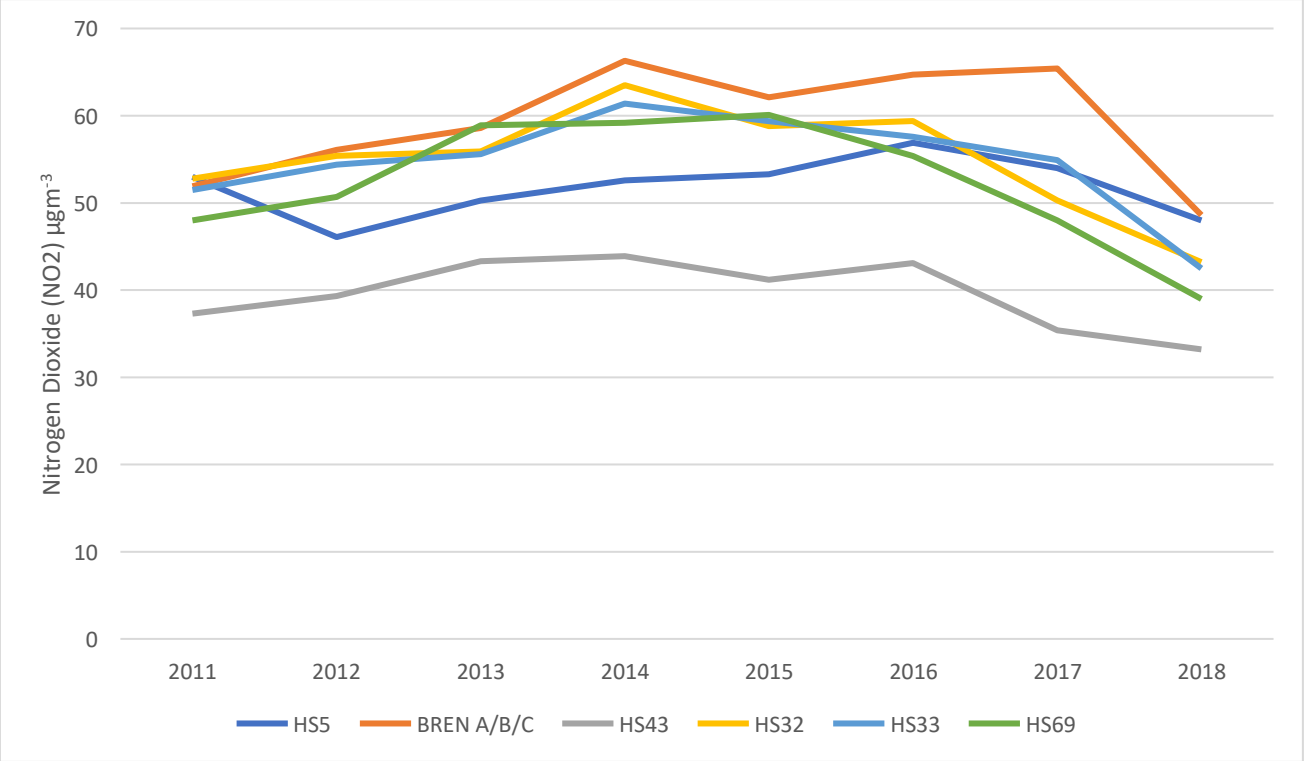
Table 2.2 Monitored Annual Mean NO_2 Concentrations at Diffusion Tubes

Site ID	X	Y	Location	Site Type	2014 Annual Mean NO_2 Concentration (µg/m^3)
BREN A/B/C	517425	178071	Brentford, Glenhurst Road	Roadside	48.6
HS43	517447	178059	Glenhurst Road	Roadside	33.2
HS32	517592	178210	24 Adelaide Terrace	Roadside	43.2
HS33	519452	178314	30 Surrey Crescent	Roadside	42.5
HS69	519005	178040	Kew Bridge	Roadside	39.0

Three diffusion tubes, BREN A/B/C, HS32 and HS33 exceed the AQO for NO_2(40 µg/m^3 annual mean). Monitoring trends have been reviewed within the Great West Corridor for the past 8 years of available data. This data shows that only in recent years is any kind of downward trend observable.

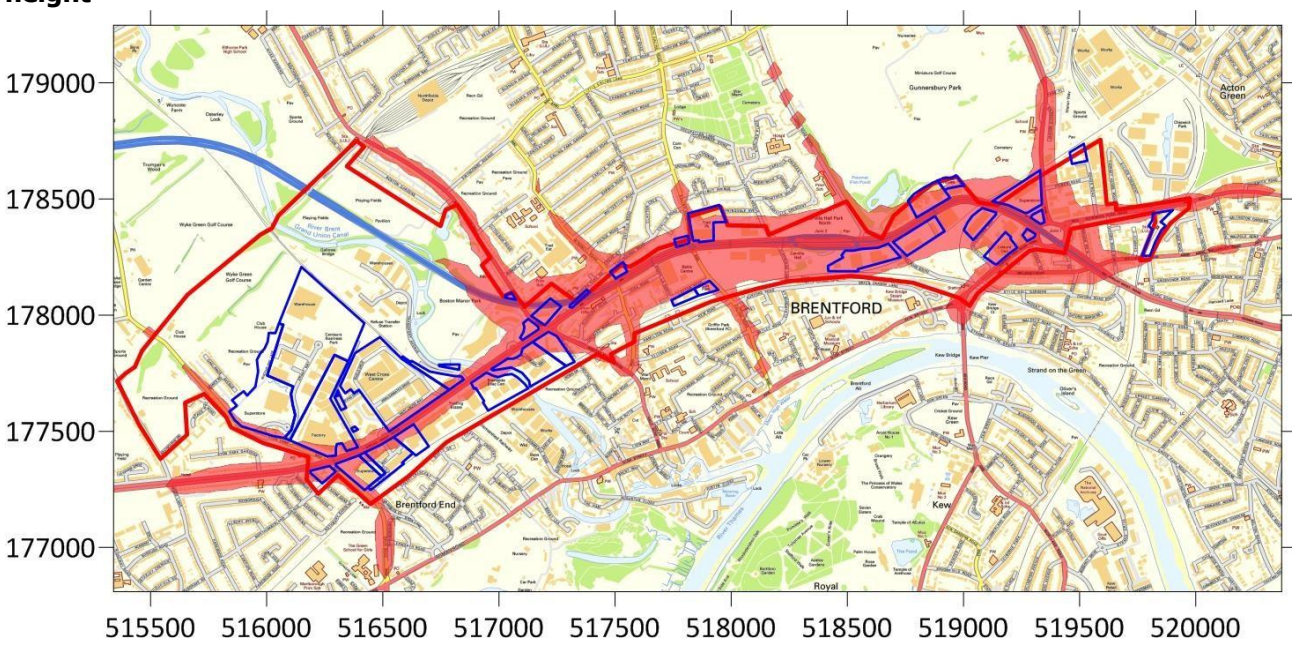
It should be noted that results of both continuous and non-continuous monitoring methods are considered to be influenced in part by canyon effect, which produces a negative effect on NO_2 concentrations at locations across the GWC area.

Figure 2.2 Trend of Continuous and Non-Continuous Monitored NO_2 Concentration Within the GWC area (2011-2018)



Air quality modelling of the baseline levels of NO_2 has been undertaken. The contour plot in Figure 2.3 below presents an illustration of 'hot spot' areas above 38 µg/m³ around the Great West Corridor. Full details of the modelling parameters are included in Appendix B.

Figure 2.3 Areas within GWC above 38µg/m³ for Long Term Annual Average 2018 NO_2 at 2m height



As displayed in Figure 2.2 there is an overall improvement in monitored Air Quality within the Great West Corridor (GWC). If this trend of improvement continues, a reduction in the extent of 'hotspot' areas shown in Figure 2.3 would be expected.

2.3 Design Mitigation

Mitigation measures that help to limit or reduce exposure to pollutants will need to be incorporated into the design of developments. Preference should be given to preventing or avoiding exposure to the pollutants by eliminating or isolating potential sources of emissions, or by replacing sources or activities with alternatives. To best achieve this, consideration should be given to the potential effect a development may have on air quality at the early design stage of a scheme. Mitigation measures which have been considered in relation to the GWC are described below.

2.3.1 Green Walls

A review has been undertaken to assess the use of greenery to act as a "buffer" along the A4/M4 corridor and other streets within the Great West Corridor.

Some studies have shown that, subject to other specific local conditions, vegetation has the potential to actas a barrier which provides mitigation against poor air quality.

A variety of factors which can affect air quality need to be taken into account if green walls or barriers are to be implemented within the Great West Corridor. It should be noted that it has been demonstrated that the use of high-level green infrastructure has the potential to have a negative impact on air quality as a result of high level greenery acting as a canyon, trapping the air within it and restricting air flow. However, low-level dense vegetation, such as hedges, can hinder air flow underneath and have positive impact on street canyon environments, such as those present within the Great West Corridor.[17]

Vegetation has the potential to act as a barrier which screens against poor air quality and disturbs air flow when at suitable density, as well as the ability to absorb pollutants to different extents dependent on the vegetation type. Studies undertaken on green walls have shown that the effectiveness of green infrastructure in improving air quality is a result of pollutants being more likely to be deposited onto vegetation than other smoother, impervious artificial surfaces[18]. Trees, bushes and other vegetation have been shown to reduce regional air pollution levels through the interception of airborne particles or through the uptake of gaseous air pollution throughout the plant surface.

In local air quality terms. The use of vegetation to improve air quality acts more as a barrier than the uptake of air pollution through the leaf stoma, by predominantly altering air flow. Vegetation type, height, and thickness

[17] Baldauf, 2017, Roadside Vegetation Design Characteristics that can improve local, near road air quality.

[18] (Neft et al 2016) Simulations of aerosol filtration by vegetation: validation of existing models with available lab data and application to near-roadway scenario.

can all influence the extent of mixing and pollutant deposition experienced at the site.

A report by Jeanjean found that trees are beneficial from a purely dynamic point of view. The study examined the benefits of trees in a neighbourhood in Leicester (UK) and the results showed decreased concentration of traffic emissions by 7% on average at pedestrian height. [19]

A study by Gromke et al has shown that a reduction of up to 60% at pedestrian level can be achieved in the presence of continuous hedgerows. These results show that the effects of trees and urban vegetation in general are strictly dependent on their interaction with geometry and meteorological conditions.[20]

Exposure to vegetation has also been shown to provide benefits to human health in terms of encouraging increased levels of physical activity leading to lower levels of obesity and improved mental health.[21] [22]

A study in Marylebone[20a] demonstrated that the meteorological conditions including wind speed and direction, have a greater influence on the local air quality when combined with the canyon effect produced by vegetative barriers, than the ability of the barrier to reduce air pollution.

[19] (Jeanjean, 2015) A CFD study on the effectiveness of trees to disperse road traffic emissions at a city scale.

[19a] (Jeanjean 2017) Air quality affected by trees in real street canyons: the case of Marylebone neighbourhood in central London.

[20] (Gromke et al, 2016) Influence of roadside hedgerows on air quality in urban street canyons

[21] (Jeanjean, 2015) A CFD study on the effectiveness of trees to disperse road traffic emissions at a city scale.

[21a] (Jeanjean 2017) Air quality affected by trees in real street canyons: the case of Marylebone neighbourhood in central London.

[22] (James et al, 2015) A review of the health benefits of greenness

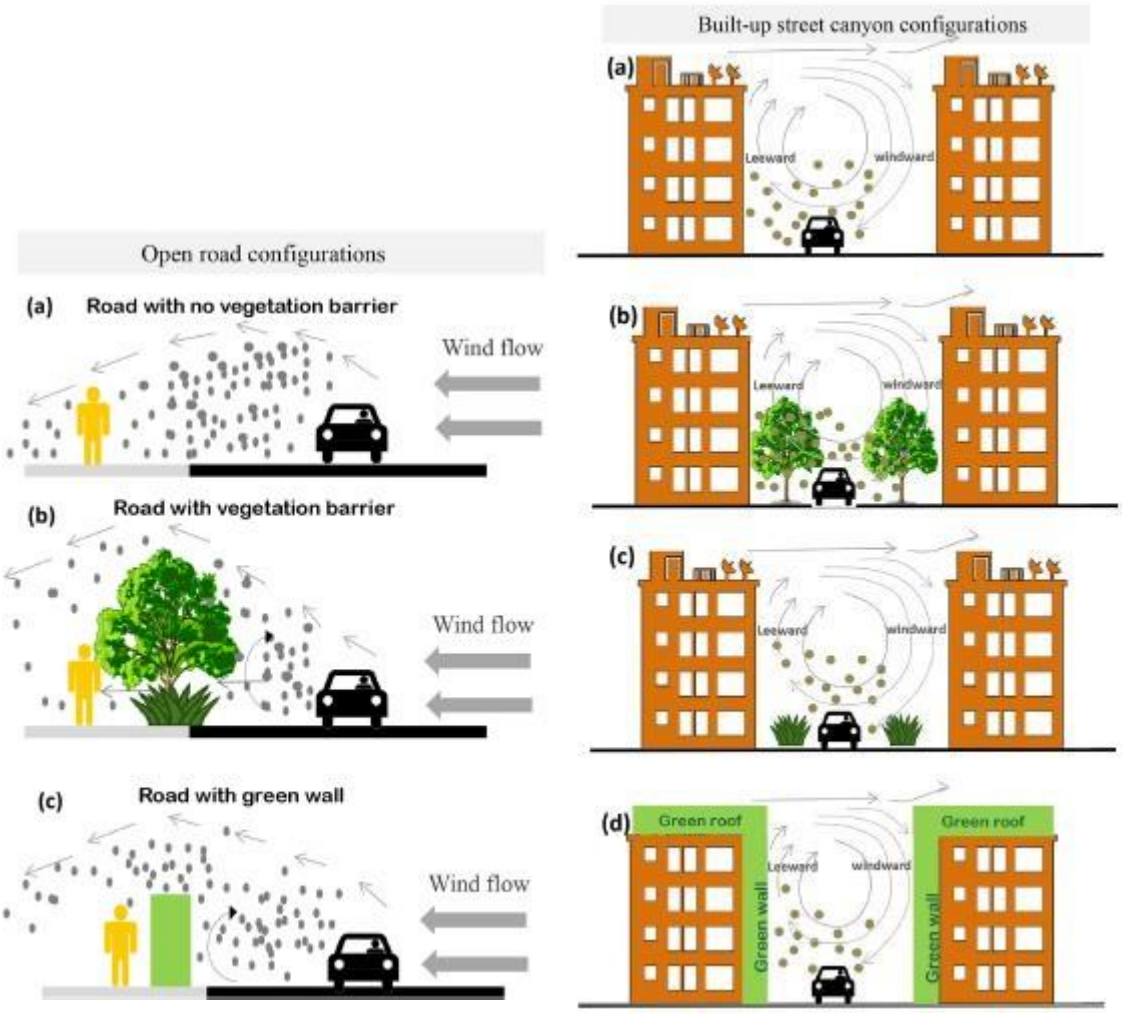


Figure 2.4 Examples of Effects of Micrositing from Vegetation

Overall, it can be demonstrated that green walls and vegetation are more likely to be effective in improving urban air quality when acting as a barrier, rather than through the chemical process of the leaf stoma. Many factors including type of vegetation, size, density and meteorological conditions have an impact on the ability of a green wall barrier to improve air quality. Any green wall to be installed within the Great West Corridor will require assessment and approval by the local planning authority.

2.3.2 External Amenity Areas

It has been recognised within national standards that the provision of external areas is an important feature of residential dwellings. If external amenity cannot be provided on-site, national standards (NPPF/NPPG) refer to external amenity off-site within a five-minutes' walk. Therefore, access to external amenity, such as at Boston Manor Park, or other alternative spaces will be a requirement.

Typically, amenity areas are only occupied for short periods and so it is appropriate to assess them against the

'short-term' air quality objectives. This is supported by Box 1.1 of Defra's TG16[23] which states: *24-hour mean and 8-hour mean [apply] at Gardens of residential properties.*

These limits are outlined below for reference for the key traffic derived pollutants of concern.

Table 2.3 Short-term Pollutant limits

Pollutant	Averaged over	Short-term limit
NO_2	1 hour	200µg/m³ not more than 18 times per year
PM_{10}	24 hours	50µg/m³ not more than 35 times per year

Paragraph 7.91 of TG(16) states: *Previous research carried out on behalf of Defra and the Devolved Administrations identified that exceedances of the NO_2 1-hour mean are unlikely to occur where the annual mean is below 60µg/m³.* This has been used to compare the modelling by both WYG and from the LAEI maps show for likely indications of where the short term NO_2 is exceeded.

Whilst this annual 60µg/m³ limit is stated in TG(16), it does not represent the actual hourly limit of 200µg/m³ of NO_2 and as such and in order to provide 'high-quality' design and minimise exposure, a value of 50µg/m³/as an annual limit is used as an additional trigger level to protect short-term exposure.

In these locations or locations close to this annual limit of 50µg/m³/it may not be appropriate to have balconies on air quality grounds and winter gardens could be a more appropriate design choice. There is evidence that winter gardens are capable of controlling pollutant concentrations[24] by regulation of air currents. Publicly accessible areas where the short-term value is above the trigger level are highlighted in pink in Figures 2.5-2.7 below. These areas include parks, public footpaths and other amenity areas.

[23] https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf

[24] Gaseous and thermal analysis of winter garden used for air regeneration throughout office buildings, https://www.researchgate.net/publication/327646588_Gaseous_and_thermal_analysis_of_winter_garden_used_for_air_regeneration_throughout_office_buildings/link/5b9b97f892851ca9ed07cdbe/download

Figure 2.5 Areas above Short-Term Trigger Level (Western Section)

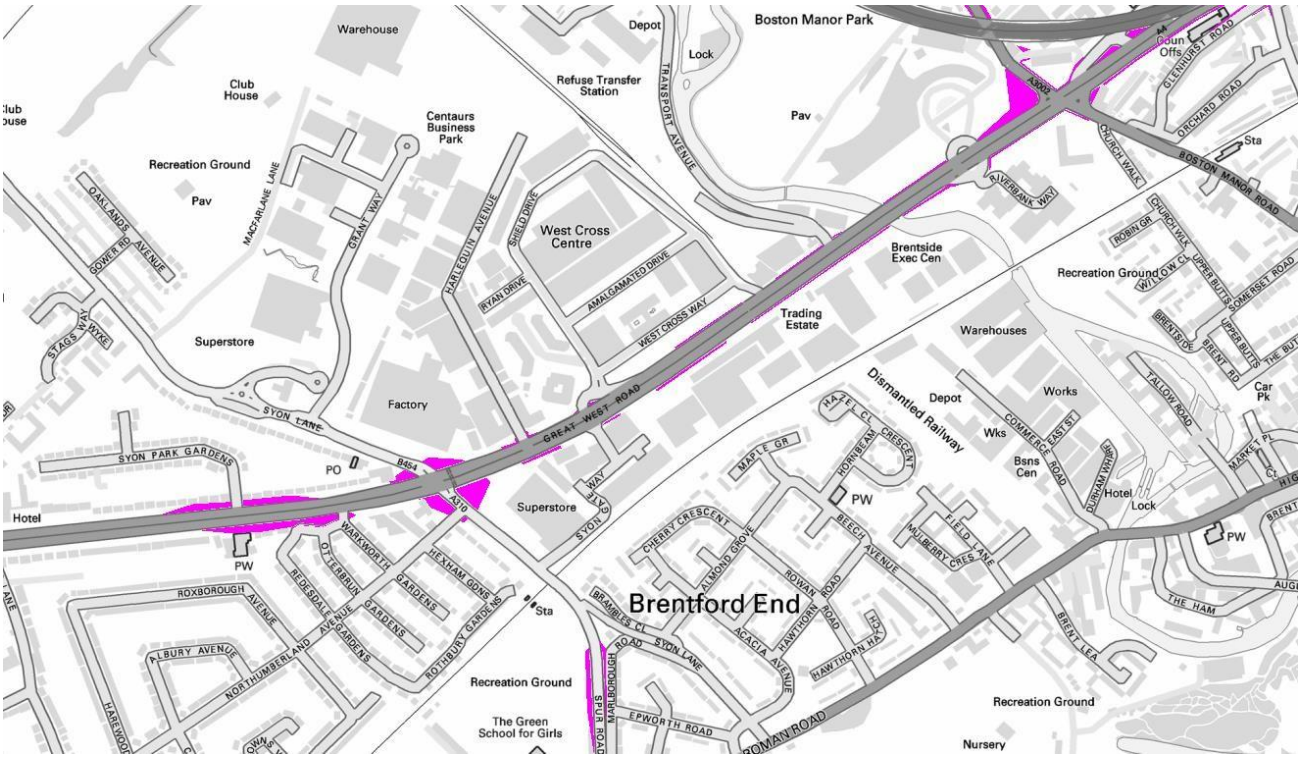


Figure 2.6 Areas above Short-Term Trigger Level (Central Section)

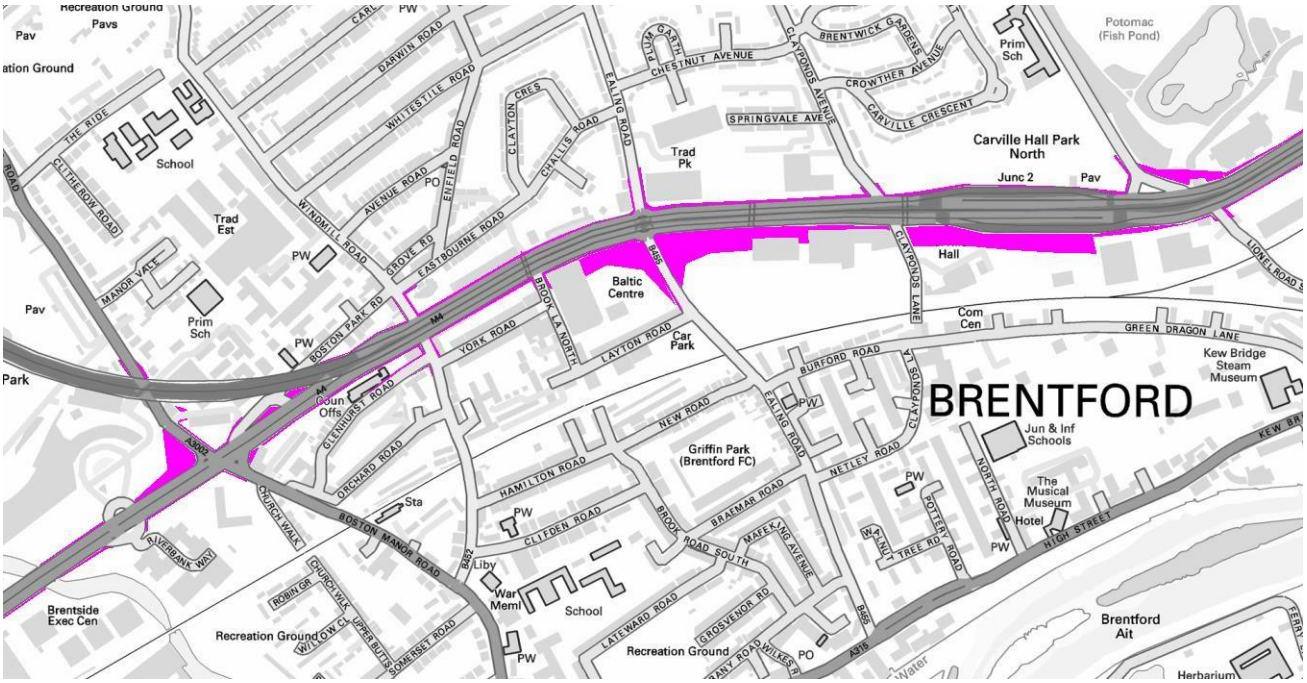
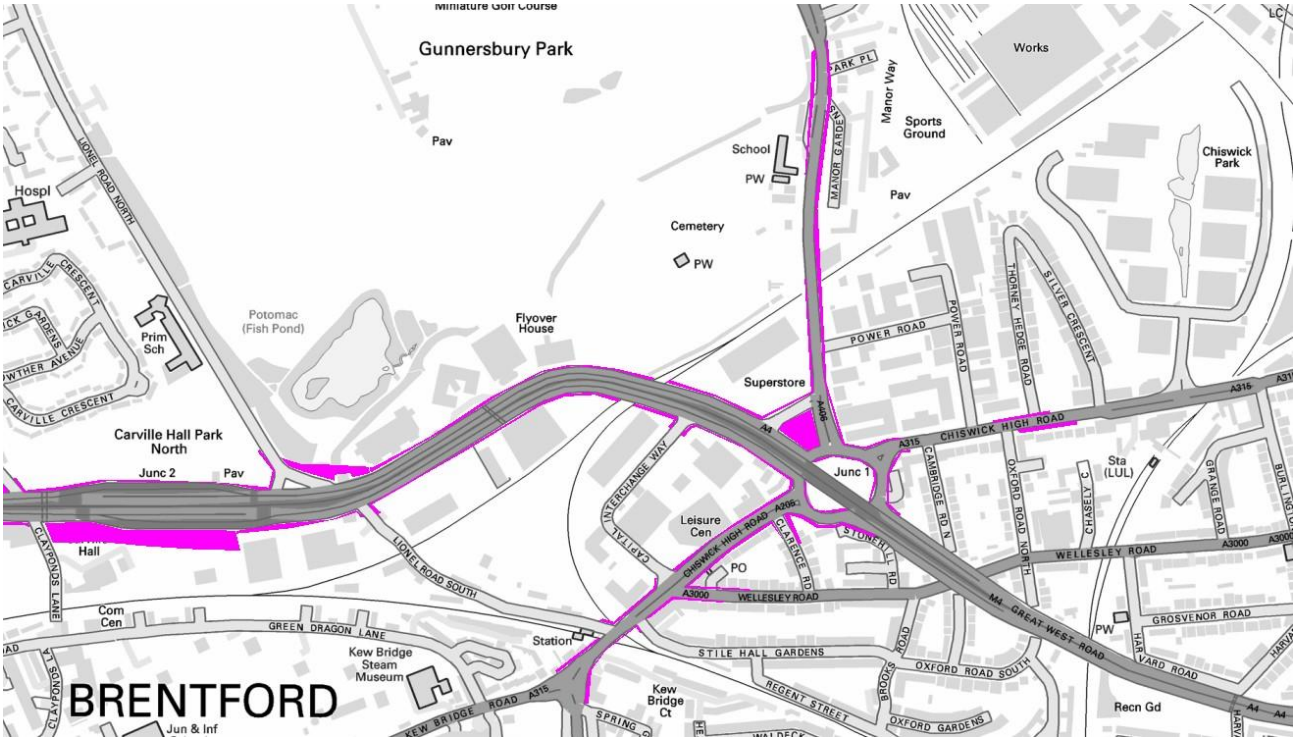


Figure 2.7 Areas above Short-Term Trigger Level (Eastern Section)



2.3.3 NO_2 Shielding

Massing, building forms and topography affect the dispersion of pollutants and concentrations will generally be lower on the side of a building away from the main source of pollution. Within the context of the GWC study areas this is the more heavily trafficked roads.

While this effect can be modelled, the following is taken from 7.462 of TG(16):

Most dispersion models include options to take into account the effects of nearby tall buildings and topography on the dispersion of stack plumes, which can be significant. However, model uncertainty using these options is generally considered greater and it is always recommended to carry out sensitivity tests (particularly when modelling buildings) as part of the assessment.

Based on the above, it is not considered that using models to determine the effect of dispersion of pollutants should be used to inform the policy and determine the effect of shielding.

Monitoring evidence shows that there is a typical reduction factor of around 0.4 µg/m^3 in the leeward side of a busy road from monitoring completed in Leicester City Centre where the building height and density and volumes of traffic are similar to those close to the busiest roads within the GWC study areas.

Similarly, LBH measured data suggests that the buffer offered by 4-story buildings which are offset by eight to ten metres, can offer a reduction of around 25% in NO_2 concentration level as evidenced by monitoring in

Brentford.

Table 2.4 Comparison between Kerbside Diffusion tubes at Brentford AQM vs Glenhurst Road (HS43)

Location	NO_2 Concentration (µg/m³)					Average Reduction
	2014	2015	2016	2017	2018	
Brentford	52.6	53.3	56.9	54	48	
HS43	43.9	41.2	43.1	35.4	33.2	
Difference	-17%	-23%	-24%	-34%	-31%	- 26%

Note that ground absorption conditions between different kerbside locations may have varying impact on pollutant concentration level.

2.3.4 NO_2 Regression with Height

In order to justify if residential developments are feasible on front facades of heavily polluted transport corridors and at height (6th floor upwards), we have researched several scholarly papers on the likely reductions of pollutants, both with and without the canyon effect. We have reviewed NO_2 regression with height for both measured and modelled NO_2 concentration levels, without the Canyon effect, which is more appropriate in outer London conurbations such as Hounslow. Assessing results from the 2015 Investigation of Air Pollution Standing Conference (IAPSC, 9th June 2015, by Ricard Gellatly[25]), it is reasonable to suggest that the rate of NO_2 regression with height is as follows:

> The rate of NO_2 regression was measured at height intervals of 3m, which broadly represents one storey. It can be seen that the rate of NO_2 regression at or above 4th storey becomes negligible, meaning that NO_2 concentration level tends towards background concentration level, aided by dispersion in the absence of any canyon.

This may appear to suggest that residential dwellings may be placed at 6th storey upwards with minimal impact to residents, however there remain other challenges. One of those challenges is how to deal with particulates and fine particulates, for which there is no safe threshold limit, since long-term exposure to even moderately high concentration levels of fine particulates can lead to cardiovascular disease and even dementia in vulnerable people and exacerbate such conditions[26]. Therefore, in the context of sustainability, development design proposals should aim to eliminate exposure to such harmful pollutants, to deliver the necessary safeguards and protection for public health and quality of life (QoL).

[25] http://www.iapsc.org.uk/assets/document/0615_R_Gellatly.pdf

[26] Association Between Cardiovascular Disease and Long-term Exposure to Air Pollution with the Risk of Dementia March 2020

Table 2.5 – Nitrogen Dioxide (NO_2) Regression with Height

Height (m)	3	6	9	12	15	18
Meas. NO_2 Conc. Level (µg/m)	5.0	3.2	1.5	0.3	0.0	0.6

City Air Quality at Heights

WSP and Parsons Brinkerhoff[27] have in 2017 completed air quality monitoring at different heights at several locations including within city canyons. The figure below shows the monitored trends and a summary of the conclusions are given below.

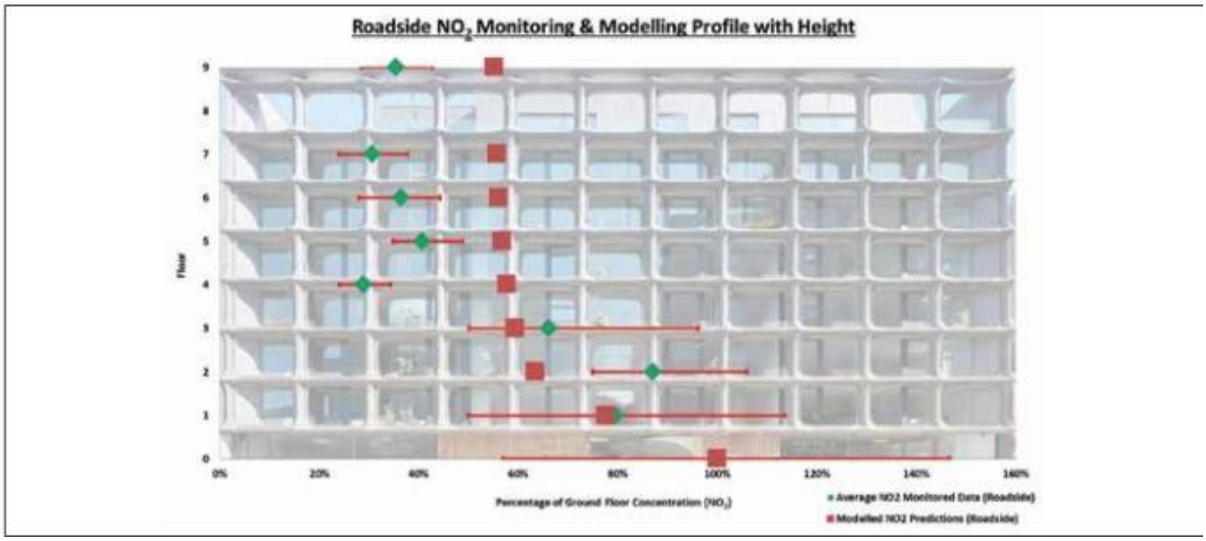


Figure 2.8 Roadside NO2 Monitoring and Modelling Profile with Height

Summary: Between the ground and third floor the modelled concentration profile slightly under-predicts NO_2 concentrations by approximately 5-15% compared to the monitoring data. From the fourth to ninth floor the modelled concentration profile over-predicts NO_2 concentrations by approximately 20-30% compared to the monitoring data. The graph highlights that air quality dispersion in urban environments is complex and variable. These complexities are evident from the differences between the modelled and monitored NO_2 concentration

27 https://www.camden.gov.uk/documents/20142/18667687/8-1+City+Air+Quality+at+Height.pdf/5cfb1877-c72c-869b-23e1-32f06a3cd642

profiles. The modelled profile is based on formulated simplistic parameters and therefore the reduction in NO_2 concentrations with height may not necessarily be realistic. Monitoring provides a more specific and accurate understanding of variations in concentrations with height at a particular location.

WYG Monitoring

WYG has completed several studies testing the trends in NO_2 and the regression with height through the UK including in London. The table and figure below show the result of NO_2 diffusion tube monitoring at a high-rise residential block adjacent to the A1 in Tottenham.

Figure 2.9 Monitored Regression with Height

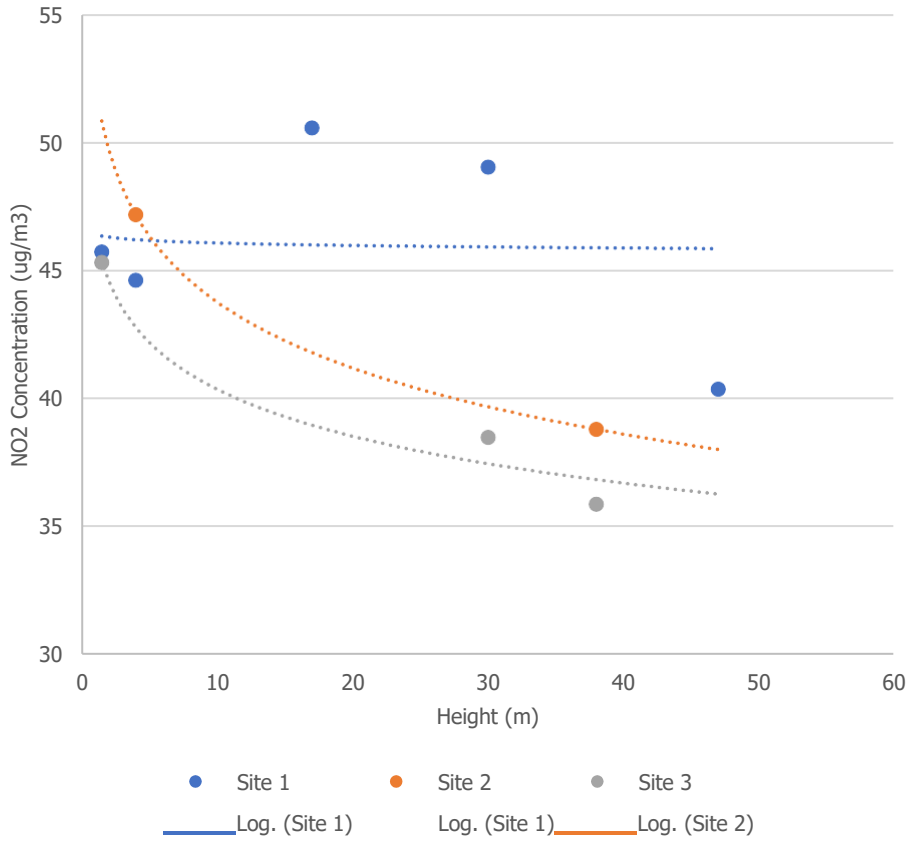


Table 2.6 Monitored Concentrations at Heights (µg/m³)

	Ground	First	4th	7th	9th	11th
Site 1	45.72	44.62	50.56	49.03	-	40.38
Site 2	-	47.18	-	-	38.81	-
Site 3	45.31	-	-	38.5	35.89	-

The above results support the assertion that NO_2 regresses with height and sites' 2 and 3 showed similar trends.

Site 1 shows that there can be variations as a result of micro-siting but still show an overall downward trend. For example, at Site 1 there was interference from CHP emissions.

2.3.5 Direct Control of Emissions at Future Residences (Filtered Mechanical Ventilation)

The Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) document[28] states that *"the presence of an AQMA should not halt all development, but where development is permitted, the planning system should ensure that any impacts are minimised as far as is practicable."* And (4.14)

> *"Air quality (and other) impacts can be controlled through the application of planning conditions or through planning obligations (often known as 'section 106 agreements') Conditions are specific to the development, while planning obligations can have a wider remit. For instance, a planning condition might be used to require the installation of a suitable ventilation system."*

There are suitable filtration products available for developers which are capable of reducing external to internal NO_2 concentrations by around 75% and should be promoted. However, this form of mitigation should only be considered as a last resort once all other design phase mitigation measures have been fully explored as it only protects residents from poor air quality, rather than reducing the overall exposure.

2.3.6 IGCB (Defra : Interdepartmental Group on Costs and Benefits) Damage Costs

Many local authorities outside London have included the use of 'Damage Costs' within their air quality planning guidance. This has been incorporated as part of assessing the effect of a development with regards to air quality.

Regarding the general structure of the planning guidance they follow the same trend of classifying a site, determining the extent of an air quality assessment, assessing and quantifying the potential impacts from a proposed development and establishing the level of mitigation that would be required. The planning guidance documents all provide details regarding the classification of a proposed development, with specific details on the land-use of the proposal and size of the development. The guidance then places a development in a category of 'minor', 'medium' or 'major'.

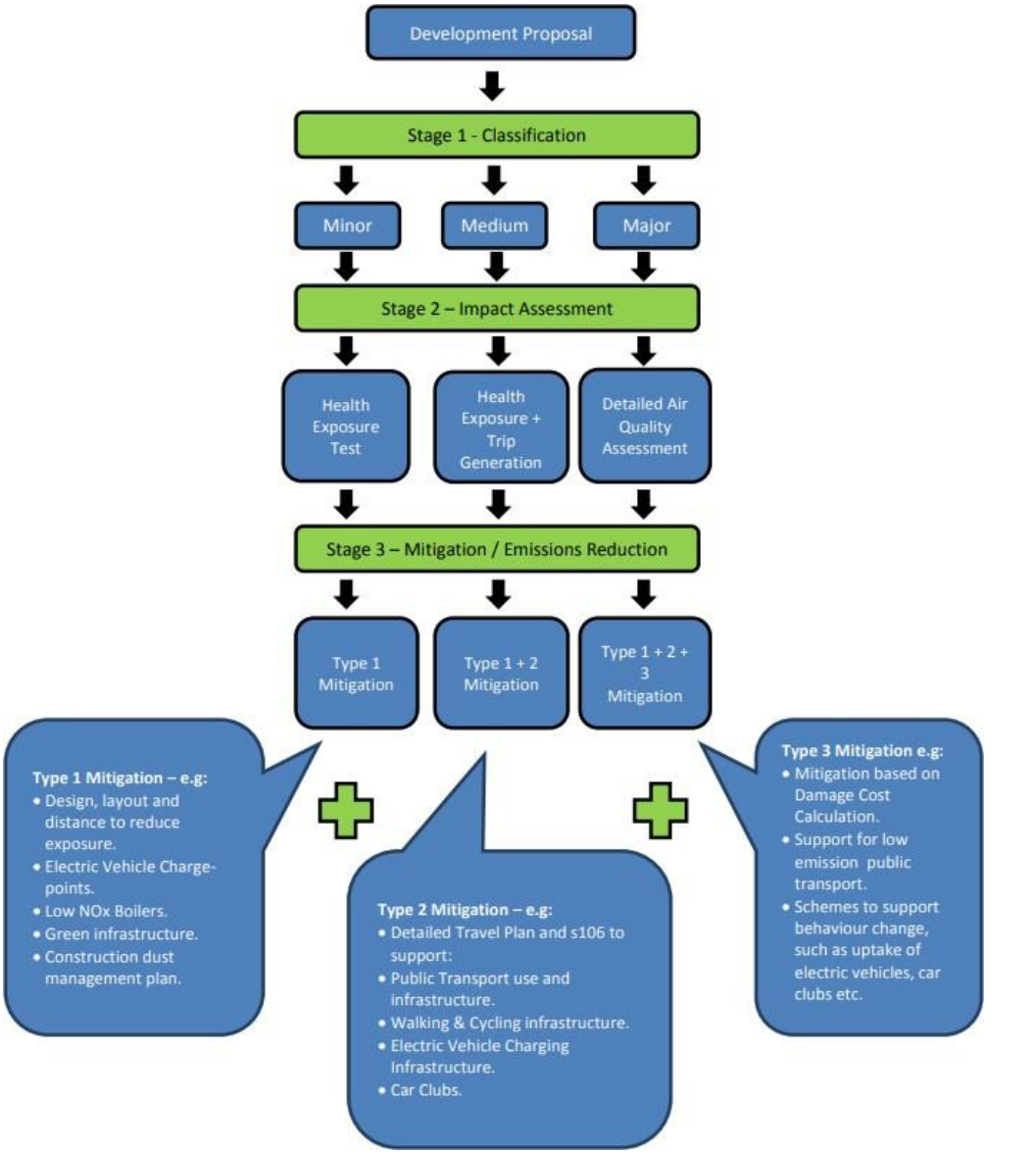
Damage costs assessments are included as a requirement for all developments that are not considered minor developments. Most damage costs assessments use the latest Defra guidance for completion. A damage costs assessment provides a monetary value based on the emissions associated with any additional traffic. This monetary value is then used to determine the extent of mitigation required.

Based on the category of a proposed development, appropriate mitigation is recommended. As many of the recommended mitigation measures pertain to the design phase of the development, mitigation is required to

[28] http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

be set out at the early phase of the planning of the development to determine the level of mitigation that would be required at a proposed development.

The example from the West Yorkshire Low Emissions Strategy is shown below in Figure 2.10.



[29]

Figure 2.10 West Yorkshire Low Emissions Strategy Guidance for Assessment

Damage costs have been a requirement for developments to ensure that mitigation for the proposed development is implemented, and in other cases, for example Cannock Chase District Council, any excess funds from the damage costs assessment that has not gone towards mitigation measures for the proposed development goes towards measures within the air quality action plan. This is shown in the above diagram.

[29] Figure 9: Air Quality & Planning Technical Guide – How it Works. West Yorkshire

Conclusion

Overall it can be determined that mitigation incorporated into design work can help limit or reduce exposure to pollutants and should be the preferred choice when developing within an area of poor air quality, with consideration to options being given at the design stage. Post design stage, additional consideration can be given to other mitigation options such as ventilation filtration to ensure people are not exposed to poor air quality above the air quality objectives.

2.4 Requirement for Health Impact Assessment

Policy GW3 (Section 1) states that any major development should be accompanied by a 'Health Impact Assessment' (HIA). Some legislative and guidance context is provided below including standard practices and typical content for HIAs.

Definition of Health

The World Health Organisation (WHO) defines health as not only the absence of disease or infirmity, but also as 'a state of complete physical, mental and social wellbeing.' It emphasises that all people have the right to the highest attainable standard of health and wellbeing, stating that health is 'one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.'

It is now accepted that an individual or community's health is determined not only by the availability and quality of healthcare services, but that a range of economic, social, psychological and environmental influences play an equally important role.

London Plan

The adopted London Plan (2016) Chapter Three: London's People has the following relevant policy.

Policy 3.2 Improving Health and addressing health inequalities

A. The Mayor will take account of the potential impact of development proposals on health and health inequalities within London. The Mayor will work in partnership with the NHS in London, boroughs and the voluntary and community sector as appropriate to reduce health inequalities and improve the health of all Londoners, supporting the spatial implications of the Mayor's Health Inequalities Strategy.

B. The Mayor will promote London as a healthy place for all – from homes to neighbourhoods and across the city as a whole – by:

> *a. coordinating investment in physical improvements in areas of London that are deprived, physically run-down, and not conducive to good health;*

b. coordinating planning and action on the environment, climate change and public health to maximise benefits and engage a wider range of partners in action; and,

c. promoting a strong and diverse economy providing opportunities for all.

C The impacts of major development proposals on the health and wellbeing of communities should be considered, for example through the use of Health Impact Assessments (HIA).

Planning decisions

D. New developments should be designed, constructed and managed in ways that improve health and promote healthy lifestyles to help to reduce health inequalities.

LDF Preparation

E. Boroughs should:

a work with key partners to identify and address significant health issues facing their area and monitor policies and interventions for their impact on reducing health inequalities;

b promote the effective management of places that are safe, accessible and encourage social cohesion;

c integrate planning, transport, housing, environmental and health policies to promote the health and wellbeing of communities; and,

d ensure that the health inequalities impact of development is taken into account in light of the Mayor's Best Practice Guidance on Health issues in Planning.

The 'Health Issues in Planning: Best Practice Guidance, Mayor of London, June 2007' has been reviewed and used to inform this assessment.

The Draft New London Plan: Intend to Publish version (December 2019)

The London Plan: Intend to Publish has the following relevant policy:

Policy GG3 Creating a healthy city

To improve Londoners' health and reduce health inequalities, those involved in planning and development must:

A ensure that the wider determinants of health are addressed in an integrated and co-ordinated way, taking a systematic approach to improving the mental and physical health of all Londoners and reducing

health inequalities;

B promote more active and healthy lives for all Londoners and enable them to make healthy choices;

C use the Healthy Streets Approach to prioritise health in all planning decisions;

D assess the potential impacts of development proposals and Development Plans on the mental and physical health and wellbeing of communities, in order to mitigate any potential negative impacts, maximise potential positive impacts, and help reduce health inequalities, for example through the use of Health Impact Assessments;

E plan for appropriate health and care infrastructure to address the needs of London's changing and growing population;

F seek to improve London's air quality, reduce public exposure to poor air quality and minimise inequalities in levels of exposure to air pollution;

G plan for improved access to and quality of green spaces, the provision of new green infrastructure, and spaces for play, recreation and sports;

H ensure that new buildings are well-insulated and sufficiently ventilated to avoid the health problems associated with damp, heat and cold; and

I seek to create a healthy food environment, increasing the availability of healthy food and restricting unhealthy options.

NHS Healthy Urban Planning Checklist

The NHS has created Toolkits to assist in the completion of HIAs. The text below is taken from their website:[30]

Healthy Urban Planning Checklist

Healthy Urban Development Unit (HUDU) also publishes a healthy urban planning checklist which is a desktop assessment aiming to 'mainstream' health into the planning process. The checklist poses a series of questions based on London Plan policy requirements and standards which if met can positively influence health and wellbeing.

It is intended that the checklist should be applied to larger (but not strategic scale) development proposals. It

[30] https://www.healthyurbandevelopment.nhs.uk/our-services/delivering-healthy-urban-development/health-impact-assessment/

can also be used to help with preparing a local or neighbourhood plan, or to screen possible health impacts for a rapid or full HIA. Local planning authorities in London are encouraged to use the checklist and customise it for local use.

The checklist identifies four main themes for which HIAs should frame their review of a developments effect on 'health', which are:

- 'Healthy Housing' – dealing with housing design, accessibility of homes and affordability
- 'Active Travel' – promoting safe walking and cycling and minimising car use
- 'Healthy Environment' – Looking at environmental effects including noise and air quality and relating them to health
- 'Vibrant Neighbourhoods' – Access to healthcare, education, social care local food, public spaces and employment opportunities.

Any HIA submitted for major developments would be expected to follow this framework for the assessment. The purpose of an HIA is to identify opportunities for minimising harms (including unequal impacts) and maximising potential health gains.

2.5 Case Law

There is an increasing trend for planning decisions, when determined by appeal, citing Air Quality matters being a reason for refusal. There have been several recent cases where the appeal was allowed (Wheatstone House, Case Ref: APP/F5540/A/14/2222128 [31] & 92-94 Windmill Road, Case Ref: APP/F5540/W/17/3186406[32]), where the pollutant levels were above the 40ug/m^3 criteria and mitigation was proposed. However, in other cases planning permission has been refused at appeal and the Inspector's decision upheld by the High Court (London Road, Kent [33]) despite proposed pollutant levels being proposed to be mitigated.

As such, there remain concerns in drawing any case law direction regarding the decision-making process that Inspectors follow for air quality. The main inconsistency appears to be regarding the appropriateness or justification of mitigation and the balance between both mitigating the effects of a scheme (which can be argued is a national or regional level problem) together with mitigating the effects of the existing environment on future occupiers. However, for context a summary of the High Court decision is provided below which is considered to be relevant to this local plan review and LBH believes provides a justification for the approach to aim to, where possible, off-set developments away from polluted road transport corridors and request full details of the effectiveness of off-set style mitigation measures proposed by applicants. Similarly, this provides justification for a 'damage cost' style quantification of mitigation effects approach which may be contributed to a successful planning permission if had been undertaken by the appellants in the case study below.

Case Study:Gladman Developments Ltd and Secretary of State for Communities and Local Government and Swale Borough Council and CPRE Kent (C1/2017/3476) [34].

In 2014, Gladman Developments Ltd submitted proposals for up to 330 homes and 60 extra-care facilities at Pond Farm, Newington, with the site located between air quality management areas (AQMAs) in Newington and Rainham. In 2017 the planning application was refused. The inspector then dismissed two appeals under Section 78, the first for 330 homes and 60 extra-care facilities, and the second for 140 dwellings and 60 extra- care facilities.

The application for the development was refused in 2015 by Swale Borough Council as the dwellings on the grounds that, due to the location and design, would be heavily reliant on car-based transport. This development was determined to negatively impact the air quality of the area.

The Planning Inspectorate upheld Swale Borough Council's decision and agreed that the development had the potential to worsen air quality in the area, in particular due to moderate to adverse effects in the two AQMA's adjacent to the site in Newington and Rainham.

The context for the pollutant levels within these two AQMA's is that concentrations of NO_2 at the time of the

[31] https://historicengland.org.uk/content/docs/legal/appeal-decision-wheatstone-house-650-chiswick-high-rd-pdf/
[32] https://acp.planninginspectorate.gov.uk/ViewCase.aspx?Caseid=3186406&CoID=0
[33] https://cprekent.org.uk/wp-content/uploads/2019/09/Pond-Farm-Court-of-Appeal.pdf
[34] https://cprekent.org.uk/wp-content/uploads/2019/09/Pond-Farm-Court-of-Appeal.pdf

appeal were predicted to fall between 2015 and 2020.

This is a similar situation to that within the Great West Corridor study areas, where pollutant levels are predicted to fall in the future.

The mitigation measures proposed by the appellant included electric vehicle charging points for each dwelling and incentives for sustainable travel methods, however no evidence was provided on the impacts that these measures would have on air quality.

The decision concluded that the proposals would conflict with the guidance within NPPF, policies within the local plan, and concluded that both human health and air quality would suffer if the development was to go ahead.

2.6 Hierarchical Summary

The table below shows a general hierarchical summary of effectiveness of policies and mitigation in the GWC study area.

Table 2.7 Hierarchical Summary of Policies, Planning Controls and Mitigation for the GWC Study Area

	Policies and Planning Controls	Development-led Mitigation
Most Effective	Ensuring all developments are Air Quality Positive [quantitative mitigation assessment (damage cost approach)]	Use of design and layout (shielding and set-back) to not introduce new sensitive uses (dwellings/hospitals/schools) into areas of poor air quality
	Promoting Car Free Development in accessible areas.	Specific Financial Contributions to Specific Off-site Action Plan Targets / Schemes
	Engagement with Communities and Stakeholders	On site provision for public transport, cycling walking
	Ongoing reduction of pollution levels to be achieved by development-led mitigation.	Car Free Development in accessible areas
Moderately Effective	Ensuring all developments are Air Quality Neutral [quantitative mitigation assessment (damage cost approach)]	Unspecified financial contributions to Air Quality Action Plan targets
		Provision of Electric Charging Points & Car Sharing Clubs
	London Low Emission Zone	Use of design and layout (utilising regression with height) to not introduce new sensitive uses (dwellings/hospitals/schools) into areas of poor air quality
	All developments to provide Electric Charging Points	Use of mechanical filters in new dwellings
	Air Quality Neutral – Boilers and Heating Emission Limits	Green walls, vegetative barriers
Less Effective in the GWC Area	Restriction on development in Air Quality Poor Areas	Supporting Community Action Groups
	Requesting Health Impact Assessments	Developer paid for monitoring
	Pollutant Monitoring	Retrofitting mechanical filters in existing dwellings
	Controls on Construction Emissions	Promoting access to green spaces

2.7 Designated Site Considerations

The designated sites associated with the GWC have been considered with respect to noise affecting residential development sites within the accompanying Appendix A.

2.8 Interpretation of Policy and Air Quality

'Consider health and wellbeing during the design stages and use Best Available Techniques (BATS) to mitigate and minimise any adverse effects on health and quality of life[35]*.*

In relation to the above, 'Best Available Techniques' typically refers to *"'the available techniques which are the best for preventing or minimising emissions and impacts on the environment. You need to use BAT if your operation is an installation (e.g. a facility that carries out an industrial process like a refinery, food factory or intensive farm).'*[36] This is usually in reference to controlling emissions at source rather than controlling them at the receptor.

Details have been given for measures which would help 'mitigate and minimise' the effects of pollution to future residential receptors (e.g. green infrastructure, installation of mechanical ventilation, design measures such as setbacks) but all of these measures require some form of maintenance or management and do not ultimately detract from the fact that, if receptors are introduced into high areas of pollution, there is an increased likelihood for health to be affected. This is evidenced by the research which shows that $PM_{2.5}$ levels have health effects even at low concentrations. Filtration could be used as a means of controlling emissions at receptors but should only be employed when other measures have been reviewed and exhausted.

The best methods of managing exposure to poor air quality are undertaken early at the design stage and would include calculating appropriate step backs from busy roads and designing buildings in such a way that as many receptors would be shielded by the massing of the building itself in line with subsection (i) II of draft policy GWC3.

Determination and identification of areas of 'poor air quality' (e.g. areas above 38µg/m³ of NO_2) would be completed ideally through long term monitoring completed by developers to provide robust assessment of concentrations. This also gives the opportunity for monitoring to be completed at different heights to determine regression with height trends.

The requirement for large-scale development proposals to be 'Air Quality Positive' as required by subsection (k) of draft policy GWC3 and Draft New London Plan policy SI1 will be managed through the completion of 'Damage Costs' assessments to determine the extent of mitigation required for any development to offset additional emissions. Additional details on damage costs assessments are given in Section 2.4.1 above. This cost should be used to implement measures such as EV charging points or contributions to cycle infrastructure (as examples) or other measures set out within the AQAP.

[35] https://www.gov.uk/guidance/best-available-techniques-environmental-permits
[36] https://www.gov.uk/guidance/best-available-techniques-environmental-permits

2.9 Air Quality Conclusions

Exposure to Nitrogen Dioxide (NO_2) (the key traffic derived pollutant) has been attributed to 23,500 premature deaths per year[37] in the UK. The limits of 40µg/m³ for long-term (annual exposure) and 200µg/m³ for short-term (hourly) exposure have been set as the level where there are observable health effects in the general population. Exposure to high levels of NO_2 have been linked to both respiratory problems and shown to affect brain function.

Levels of NO_2 in the Great West Corridor (GWC) study areas remains above the limits particularly along heavily trafficked routes including the A4, M4 and Great West Road.

It is acknowledged that improving air quality is not a simple problem and will continue to require a combination of policy, technology and behavioural change.

Key existing policies that continue to tackle air pollution are those that promote air quality positive development, including car free or zero emission communities.

Case studies and guidance such as the West Yorkshire Low Emission Strategy[38] show that more can be done to improve developer lead mitigation to achieve air quality positive development, both in terms of on-site design to not introduce new sensitive uses (dwellings /hospitals/schools) into areas of poor air quality (which is more effective than simply fitting mechanical filters) and off-site mitigation such as schemes to promote sustainable transport. However, emerging policies and guidance needs to ensure that this mitigation is quantitively assessed with clear requirements such as with a 'damage cost' type approach.

To ensure that emerging policies and guidance achieve a reduction in pollutant levels in this part of the Borough a nominal value of **38µg/m³** of NO_2 as an annual mean, should be used as a trigger level for identifying 'poor' air quality. Going forward, this level of **38µg/m³** (as a more stringent level compared to the National Limit of 40µg/m³) should be used as the basis for a borough-wide target, trigger for and the maximum design target for mitigation, and maximum headroom limit for all NO_2 emissions (notwithstanding the requirement for all new developments to be Air Quality Neutral and take an Air Quality Positive approach).

These measures are to be developed further within the LBH Air Quality and Noise Supplementary Planning Document in order to assist developers, decision makers, agents, residents and others to identify issues to be addressed in any application for development in which air quality will be an important consideration when assessing that application

Full details of the site-specific considerations for the GWC are shown in Appendix A.

[37] Air Pollution in the UK 2015, Defra, September 2016 https://uk-air.defra.gov.uk/assets/documents/annualreport/air_pollution_uk_2015_issue_1.pdf

[38] https://www.bradford.gov.uk/media/3590/west-yorkshire-low-emissions-strategy.pdf

3. Noise

3.1 Draft Local Plan Policies

This section has been prepared in relation to the effects of noise within the Great West Corridor (GWC) and the considerations outlined within Policies GWC 3 'Health and Wellbeing', GWC West Policy P1, GWC Central P2 and GWC East P3. Although a number of the measures outlined within these policies represent acoustic design principles that are expected to be considered in detail on a case-by-case basis this document also includes additional analysis to quantify the extent of the areas within which the overarching design principles outlined below are considered to be applicable.

The following broad principles for the reduction of noise effects (and vibration) are considered as the following:

- Avoid significant adverse effects of noise on people living and working in the Borough;
- Mitigate and reduce to a minimum the adverse effects of noise within the context of sustainable development and prevent development which is unacceptable in terms of noise;
- Encourage good acoustic design as far as is reasonably practical;
- Improve living and working conditions where the acoustic environment already has a significant adverse effect on people's quality of life; and
- Improve and enhance the acoustic environment and promote the protection and access to areas of relative tranquillity and quietness where such features are valued.

3.2 Noise Legislation

The adopted London Plan provides an overall strategic framework for integrated economic, environmental, transport and social development of London over the next 20–25 years. With respect to noise, requirements of Policy 7.15 are relevant to this evidence document, in particular:

> "***Strategic***
>
> - *The transport, spatial and design policies of this plan will be implemented in order to reduce and manage noise to improve health and quality of life and support the objectives of the Mayor's Ambient Noise Strategy*
>
> ***Planning decisions***
>
> - *Development proposals should seek to manage noise by:*
>
> *a. avoiding significant adverse noise impacts on health and quality of life as a result of new development;*

b. mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens on existing businesses;

c. improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity);

d. separating new noise sensitive development from major noise sources (such as road, rail, air transport and some types of industrial development) through the use of distance, screening or internal layout – in preference to sole reliance on sound insulation;

e. where it is not possible to achieve separation of noise sensitive development and noise sources, without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through the application of good acoustic design principles; …

…g. promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver…"

The London Plan (section 7.52) identifies that *"Noise management includes promoting good acoustic design of buildings whenever opportunities arise. See, for example, the guidance on planning and design in Section 5 of BS 8223:2014. It will include traditional and innovative noise reduction measures in otherwise unacceptable situations."*

Furthermore, as noted above, The London Plan also refers to the overarching strategic guidance presented within the Mayor's Ambient Noise Strategy, addressing the spatial implications of the Ambient Noise Strategy. Additionally, the London Plan includes references to *"The Government's Aviation Policy Framework, 2013, [which] states that: "Our overall objective on noise is to limit and where possible reduce the number of people in the UK significantly affected by aircraft noise"*

With respect to the emerging Draft London Plan policies D4, D12 and D13 are relevant to the consideration of noise.

"Policy D4 Housing quality and standards

3.4.5 ***Single Aspect Dwellings*** *are more difficult to ventilate naturally and are more likely to overheat and should normally be avoided. Single aspect dwellings that are north facing, contain three or more bedrooms or are exposed to noise levels above which significant adverse effects on health and quality of life occur should not be permitted."*

"Policy D12 Agent of Change

A The Agent of Change principle places the responsibility for mitigating impacts from existing noise and other nuisance-generating activities or uses on the proposed new noise-sensitive development

B Boroughs should ensure that Development Plans and planning decisions reflect the Agent of Change principle and take account of existing noise and other nuisance generating uses in a sensitive manner when new development is proposed nearby…

D Development should be designed to ensure that established noise and other nuisance-generating uses remain viable and can continue or grow without unreasonable restrictions being placed on them.

E New noise and other nuisance-generating development proposed close to residential and other noise-sensitive uses should put in place measures to mitigate and manage any noise impacts for neighbouring residents and businesses.

EA Development proposals should manage noise and other potential nuisances by:

1) ensuring good design mitigates and minimises existing and potential nuisances generated by existing uses and activities located in the area

2) exploring mitigation measures early in the design stage, with necessary and appropriate provisions including ongoing and future management of mitigation measures secured through planning obligations

3) separating new noise-sensitive development where possible from existing noise generating businesses and uses through distance, screening, internal layout, sound-proofing, insulation and other acoustic design measures.

F Boroughs should refuse development proposals that have not clearly demonstrated how noise and other nuisances will be mitigated and managed."

The Mayor of London's document 'Culture and the night-time economy' Supplementary Planning Guidance (SPG) further outlines the agent of change principle, specifically that *"acoustic and other design measures should be used to mitigate noise and other impacts. There should be no prospect of unreasonable neighbour complaints, licensing restrictions or threat of closure."*

This principle is expanded further at Sections 5.8, 5.9 and 5.12 of the SPG which state:

"5.8 Sustaining and protecting noise generating cultural venues such as theatres, concert halls, pubs and live music venues thus requires a sensitive approach to managing change in the surrounding area. Adjacent development and land uses should be designed in ways which ensure that established cultural venues remain viable and can be continued in their

present form.

5.9 Housing proposed near to an existing cultural venue should include necessary acoustic design measures. This will ensure residential units have effective sound insulation to mitigate and minimise potential noise impacts or neighbour amenity issues. Mitigation measures should be explored at an early design stage, with necessary and appropriate provisions secured through planning obligations. The 2016 Housing SPG also requires the impact of noise to be considered in the layout and placement of dwellings, rooms and private open spaces within new development.

5.12 Noise impact assessments should be carefully tailored to local circumstances. That way the noise characteristics of existing uses can be properly captured and assessed. Cultural venues can have peaks of noise at different times of the day and night and on different days of the week and can have an impact on surrounding streets. It will therefore be important for acoustic surveys to be carried out and their results assessed accordingly. Boroughs should consider any assumptions made and methods used in noise impact assessments. That way they can ensure a full, accurate assessment has been submitted by the developer"

"Policy D13 Noise

A In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:

1. avoiding significant adverse noise impacts on health and quality of life

2. reflecting the Agent of Change principle to ensure measures do not add unduly to the costs and administrative burdens on existing noise-generating uses

3. mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on development

4. improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity)

5. separating new noise-sensitive development from major noise sources (such as road, rail, air transport and some types of industrial use) through the use of distance, screening or internal layout – in preference to sole reliance on sound insulation

6. where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good

acoustic design principles

7. promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.

B. Boroughs, and others with relevant responsibilities, should identify and nominate new Quiet Areas and protect existing Quiet Areas in line with the procedure in Defra's Noise Action Plan for Agglomerations.

National Planning Policy

The Noise Policy Statement for England (NPSE) (2010) provides guidance on how to 'secure a healthy environment' with emphasis on 'promoting good health and a good quality of life through the effective management of noise'. There are some key aims that apply to the draft local plan as set out below:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.*

National Planning Policy Framework

The NPSE uses the term of SOAEL, the Significant Observed Adverse Effect Level which is the level above which significant adverse effects on health and quality of life occur. It is this 'significant adverse impact' which is reflected within the current national policy guidance with respect to noise presented within the NPPF, published on 19th February 2019. With regard to noise and planning, the current version of the NPPF contains the following statement at Paragraph 170:

"*170. Planning policies and decisions should contribute to and enhance the natural and local environment by:*

a) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans

A further 2 short statements are presented at Paragraph 180, which state:

"*180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

A) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life

B) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

Furthermore, paragraphs 182 and 183 state:

> *"182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.*

Planning Practice Guidance

Planning Practice Guidance (PPG): Noise [22 July 2019][39] provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England, is to identify *"whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."*[40] Furthermore, the PPG introduces the term 'unacceptable observed affect level' where noise would be noticeable and very disruptive.

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the PPG and repeated as follows:

Table 3.1 NPPG Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No Specific Measures Required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No Specific Measures Required
Lowest Observed Adverse Effect Level			

[1] Paragraph: 003 Reference ID: 30-003-20190722 : Revision date: 22 07 2019
[40] Paragraph: 003 Reference ID: 30-003-20190722 : Revision date: 22 07 2019

Perception	Examples of Outcomes	Increasing Effect Level	Action
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The PPG: Noise also identifies at Paragraph: 011 Reference ID: 30-011-20190722 the requirement for developments proposals to incorporate measures to mitigate the impact of noise on residential developments. In particular:

"Noise impacts may be partially offset if residents have access to one or more of:

- *a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;*
- *a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;*
- *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- *a relatively quiet, protected, external publically (sic) accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance)."*

Ultimately, the NPSE (para 2.22) states that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations and neither the NPPF, NPSE and NPPG present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, it is necessary to consider additional local planning policy guidance and appropriate standards and guideline which are considered in-turn below.

Relevant British Standards and Guidance Documents

As noted above, the National, Regional and Local planning policy frameworks do not prescribe absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations.

As such, the following standards represent the most appropriate, contemporary and widely used standards for the assessment of noise affecting new residential development.

Absolute Noise Levels (BS 8233)

The most appropriate criteria to assess internal noise levels is BS8233:2014 *'Guidance on sound insulation and noise reduction for buildings'*. The guideline values for bedrooms and living rooms are presented in Table 3.2.

Table 3.2 Guideline noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,\ 16\ hour}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,\ 16\ hour}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,\ 16\ hour}$	30 dB $L_{Aeq,\ 8\ hour}$ 45 dB L_{Amax}
Resting	Gardens/Balconies	55 dB $L_{Aeq,\ 16hour}$	-

The levels outlined in Table 3.2 above are also outlined within the World Health Organisation (WHO): Guidelines on Community Noise (1999) which also identifies that internal noise levels of 45 dB L_{Amax} represent the onset of effects such as sleep disturbance with respect to impulsive, short-term noise sources. Similarly, the WHO Night Noise Guidelines identify that the threshold in relation to night-time L_{Amax} noise events may be lower for a number of effects, though guidance documents such as the 2017 Professional Practice Guidance on Planning and Noise[41] (ProPG) consider methods for determining the probability of awakenings and a SOAEL for specific developments under consideration.

The WHO Environmental Noise Guidelines for the European Region (WHO 2018) also provides recommendations with respect to levels of external noise exposure to protect human health in relation to road, rail and air traffic though the values in the document are not LOAELs but the "*the aim of the current guidelines is to define an exposure level at which effects certainly begin"*.

Professional Practice Guidance on Planning and Noise for new residential development (ProPG)

Professional Practice Guidance on Planning and Noise for new residential development (ProPG) was launched on 22nd June 2017 by the Chartered Institute of Environmental Health (CIEH), the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA). The guidance has been published to provide practitioners with guidance on the management of noise within the planning system in England.

The guidance is specifically for 'new residential development that would be exposed predominantly to noise

[41] https://www.ioa.org.uk/sites/default/files/14720%20ProPG%20Main%20Document.pdf

from existing transport sources' and reflects the Government's overarching NPSE, the NPPF, and PPG-Noise, as well as other authoritative sources of guidance.

The guidance provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, aims to:

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- Encourage the process of good acoustic design in and around new residential developments;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Promote appropriate noise exposure standards; and
- Assist the delivery of sustainable development.

There are two stages of the overall approach outlined in the ProPG:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of 4 key elements which is underpinned by an Acoustic Design Statement.

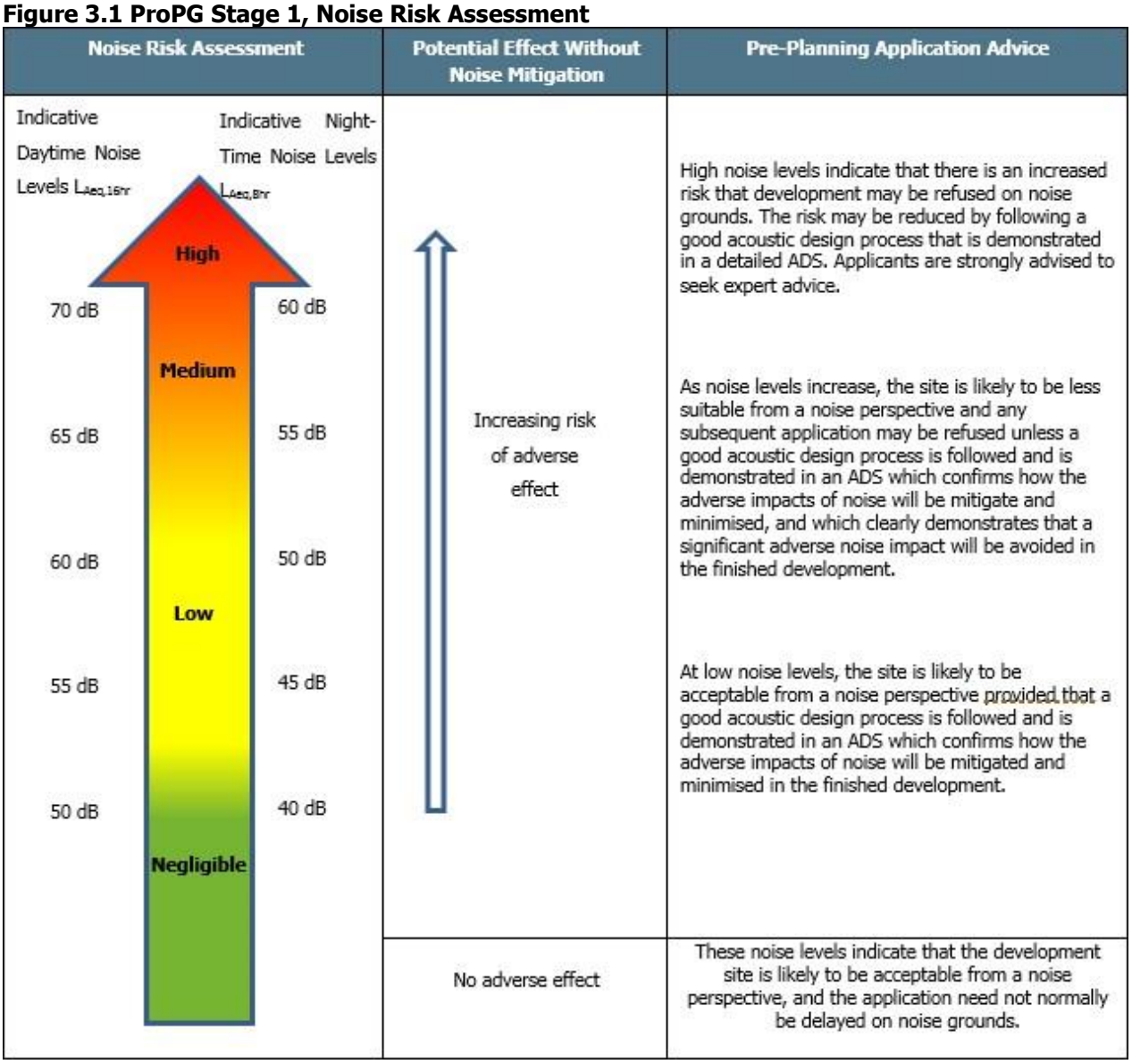
With regards to Stage 1, ProPG provides guidance to produce an initial site risk assessment, pre-mitigation, with regards to noise based on the prevailing daytime and night time noise levels across the site, from which the site (or areas thereof) can be allocated a Noise Risk as shown in Figure 2.1 below, together with their corresponding sound levels as referred to in the ProPG.

Stage 2 of the ProPG approach contains four key elements to be undertaken and considered systematically. The key elements are as follows:

- Element 1 – Good Acoustic Design Process
- Element 2 – Internal Noise Level Guidelines
- Element 3 – External Amenity Area Noise Assessment
- Element 4 – Assessment of Other Relevant Issues

An Acoustic Design Statement is then produced which addresses issues found in Stages 1 & 2 of the ProPG approach including recommendations for mitigation.

Figure 3.1 ProPG Stage 1, Noise Risk Assessment



Both ProPG and BS 8233:2014 identify numerous situation-specific scenarios that are required to be considered within the noise assessment process, however as the policies associated with the Great West Corridor are directly related to major transportation noise sources associated with the A4/M4 and Heathrow Airport, the following provisions are of particular relevance.

ProPG incorporates the target internal noise level criteria that are detailed within BS 8233:2014 and the World Health Organisation L_{Amax} criterion of 45 dB L_{Amax}, noting at Figure 2 (note 4) that *"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events."*

Furthermore, ProPG (Figure 2, note 5) notes that *"designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded..."*

BS 8233 and ProPG recognise that the target noise level guideline values may not be achievable in all circumstances and ProPG expands on this point (Figure 2, note 7), stating that "*where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form"*

It should be noted that the guidance presented within the January 2020 Acoustics Ventilation and Overheating Residential Design Guide[42] by the Association of Noise Consultants and Institute of Acoustics has been produced to supplement the guidance and approach for noise assessments to consider the integrated and sustainable design of buildings to improve the health and wellbeing for occupants. Although the direct effects of overheating and ventilation provisions are not considered within this document, the London Plan identifies measures within the 'Cooling Hierarch' to be included within building designs.

As such, in accordance with the aims and requirements of the NPSE, NPPF, PPG: Noise to identify appropriate noise level criteria in terms of the Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL), the following table presents the equivalent noise levels and their application in the context of the Local Plan Policies to achieve high quality design and to minimise exposure to elevated noise levels. It should be noted that the principles of the adopted and emerging London Plans, BS 8233 and ProPG all require a good acoustic design process to be followed as part of the development process, including site layout options and as such it will be necessary for development proposals to demonstrate that the noise level guidelines outlined in Table 3.3 below can be achieved.

[42] https://www.association-of-noise-consultants.co.uk/wp-content/uploads/2020/07/ANC-AVO-Residential-Design-Guide-January-2020-v1.1.pdf

Table 3.3 Noise Level Criteria and Actions

Effect Level	Noise Level Criteria	Justification
No Observed Effect Level (NOEL)	Noise levels are below: Bedrooms: 30 dB $L_{Aeq,8hours}$/45 dB $L_{Amax,\ 8hours}$ Living Rooms: 35 dB $L_{Aeq,16hours}$ Gardens/Balconies: 50 dB $L_{Aeq,16hours}$	Within BS8233 / WHO guideline criteria
Lowest Observed Adverse Effect Level (LOAEL)	Noise levels are at: Bedrooms: 30 dB $L_{Aeq,8hours}$/45 dB $L_{Amax,\ 8hours}$ Living Rooms: 35 dB $L_{Aeq,16hours}$ Gardens/Balconies: 55 dB $L_{Aeq,16hours}$	The guideline BS8233 / WHO noise level criteria represent the level above which physiological effects relating to sleeping/resting conditions or subjective reactions such as annoyance may be observed for most people.
Significant Observed Adverse Effect Level (SOAEL)	Noise levels are at: Bedrooms: 35 dB $L_{Aeq,8hours}$/45 dB L_{Amax} more than 10-15 times per night Living Rooms: 40 dB $L_{Aeq,16hours}$ Gardens/Balconies: 60 dB $L_{Aeq,16hours}$	BS8233 and ProPG recognise that the target noise level criteria may not be achievable in all circumstances and that noise levels of up to 5 dB above the target noise level criteria may be considered reasonable. However, any development where the BS 8233/WHO noise level criteria are exceeded would be required to robustly demonstrate how noise levels across the development site have been reduced as far as practicable, including the layout of the development. If average L_{Aeq} noise levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where noise levels in external amenity areas are expected to be within the SOAEL, provision of winter gardens or other mitigation measures to reduce noise levels within external amenity areas would be required.
Unacceptable Observed Adverse Effect Level (UOAEL)	Average noise levels are up to 10 dB above target criteria: Bedrooms: 40 dB $L_{Aeq,8hours}$/45 dB L_{Amax} more than 15 times per night Living Rooms: 45 dB $L_{Aeq,16hours}$ Gardens/Balconies: 65 dB $L_{Aeq,16hours}$	Internal L_{Aeq} levels that exceed the target levels by more than 10 dB are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally.

With respect to noise, it is expected that proposals for noise-sensitive development will seek to secure a Good Acoustic Design, taking into account other socio-economic considerations of the development site.

Table 3.4 Hierarchical Summary of Noise Policies, Planning Controls and Mitigation for the GWC Study Area

	Policies and Planning Controls	Development-led Mitigation
Most Effective	Ensuring that sensitive uses are located away from excessive noise sources	Use of design and layout (shielding and set-back) to not introduce new sensitive uses (dwellings/hospitals/schools) into areas exposed to elevated noise levels
	Promoting Good Acoustic Design Principles	Undertaking site-specific risk assessments to identify noise constraints to inform the development proposals and site master-plans
Moderately Effective	Management of noise generating sources	Assessment of new commercial sources of noise affecting noise-sensitive properties and provision of noise control measures such as barriers/screening
		Restriction of operating hours and/or determination of noise emission limits
	Separation of noise sources and sensitive properties	Incorporation of noise buffers into site layouts
Less Effective in the GWC Area	Insulation of noise sensitive properties with enhanced building envelope designs	Provision of enhanced glazing products and provision of a suitable ventilation for internal spaces and screening provided to reduce noise levels within external amenity spaces.
	Reliance of nearby open spaces for access to external amenity areas and areas of relative tranquillity.	Provision of fully or partially enclosed external amenity spaces

3.3 Application of GWC Planning Policy Within Designated Sites

The overarching national and regional planning policy considerations and guidance documents outlined above represent a framework of design principles that set out measures for minimising exposure to elevated noise levels through good acoustic design. The guidance documents and policies set out that good acoustic design does not simply represent achieving the identified guideline values though the use of the building fabric and that the layout and design of developments should demonstrate that a good acoustic design process has been following and that measures to mitigate and reduce the effects of noise to a minimum have been incorporated.

This is reflected within Policy GWC3 which requires development proposals to ensure that site and building design minimises exposure to elevated levels of pollution by designing-out the adverse effects of noise through a range of measures.

This is considered to be particularly important when considered against the expected changes in home and working practices across the nation as home-working becomes more prevalent which could result in increases in exposure to elevated levels of noise during daytime working hours when road traffic and aircraft noise may be higher than evening or weekend periods.

In particular, many allocated sites within the Great West Corridor are directly exposed to road traffic noise which can dominate external amenity spaces in particular. As such, and in accordance with the requirements of the national PPG, developments will be expected to demonstrate that they provide access to external areas which are relatively quiet and protected from noise levels that are likely to result in significant adverse effects (i.e. ambient $L_{Aeq,\ 16\ hour}$ noise levels at or in excess of 63 dB). To achieve this, development proposals should consider the orientation and layout of buildings and sensitive external spaces at an early stage to remove or reduce the adverse effects of noise as far as practicable in order to demonstrate that a good acoustic design process has been followed; the use of additional physical mitigation measures (such as balcony balustrades, winter gardens or other innovative solutions such as acoustic shelters or horizontal screening).

The PPG: noise makes an allowance for access to tranquil spaces (such as parks) within 5 minutes' walk of a development site, therefore through the provision of winter gardens, where the 5 minutes criterion is also met, it can be demonstrated that there is adequate provision for access to an appropriate tranquil space.

To provide context regarding the draft allocated sites within the Great West Corridor that are exposed to elevated noise levels from the surrounding road network and to quantify the extent to which specific sites are likely to be affected by noise, three-dimensional noise modelling has been carried out for the existing road network based upon published Department for Transport (DfT) average traffic counts and contributions from Heathrow Airport using published aircraft noise contours. Modelling has been undertaken to demonstrate the sound pressure levels, expected to affect development sites both horizontally and vertically as a result of road traffic and aircraft noise.

Computer Aided Noise Abatement (CADNA) noise modelling software has been used. This model is based on the Department of Transport (DfT) Calculation of Road Traffic Noise (CRTN) and ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data, assumptions and model settings as given in the table below have been used.

Table 3.5 Modelling Parameters Sources and Assumptions

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	Ordnance Survey
Ground levels – other areas	Site Observations and Ordnance Survey	OS 1:25,000 contours and OS 1:10,000 spot heights.
Receptor positions	WYG	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties with 3m per additional storey.
Reflections	WYG	First order reflections have been applied based on mirror image sources
Absorbent Ground	CADNA	Frequency dependant ground absorption has been applied based on values specified in VDI 2714/16 clause 6.3.

Parameter	Source	Details
Façade Correction	CADNA	Façade corrections have been incorporated into the modelling

It is acknowledged that a number of these assumptions will affect the overall noise levels presented in this report. However, it should be noted that certain assumptions made, as identified above, are worst-case.

Road Traffic Data

All roads expected to make a significant contribution have been included within this assessment; traffic flows and heavy goods vehicle (HGV) percentages have been based on DfT traffic counts which are summarised in the following table.

Table 3.6 Road Traffic Data for Noise Model Inputs

Road/Site number	18 Hour AAWT*	Percentage HGV
A205/28108	33380.1	3
A205/6758	30255.3	4
A205/6898	25025.4	3
A205/73838	33381	4
A3000/26918	30256	1
A3002/27613	25026	3
A310/75073	30256	3
A315/36948	6443	2
A315/36948	7828	2
A315/46927	18330	2
A315/56697	12739	3
A4/16111	12739	3
A4/26116	13961	3
A4/36120	11872	2
A4/38561	35737	4
A4/6122	89487	3
A4/75072	35837	3
A406/37112	10049	4
B4491/942598	40656	5
B454/900003	50245	4
B454/930066	34205	1
B454/942595	7857	1
B455/942448	18431	3
B455/951712	8839	1
Cawdor Cres/942616	12330	10
Clayponds Ave/942475	12266	0
Durham Rd/942615	8061	0
Green Dragon Ln/900008	213	1
Kew Green/942868	2747	2
Kew Green/942871	1166	1

Road/Site number	18 Hour AAWT*	Percentage HGV
Larch Dr/990563	5643	6
Lionel Rd/942455	583	0
M4/26012	350	1
M4/47892	6893	3
Rose Gardens/942606	3027	0
Rothbury Gardens/942469	91886	0

*Annual Average Weekday Traffic

The road traffic data summarised in the table above represent daily 18 hour traffic flows, therefore, in order to present noise levels in terms of $L_{Aeq,\ 16\ hour}$, the following correction (derived from PPG24) has been used:

$$L_{Aeq,16hour} = L_{A10,18hour} - 2\ dB$$

Limitations of Assessment

It should be noted that numerous site-specific factors will affect overall noise levels within specific development sites (for example commercial, industrial or entertainment noise sources) and noise effects can occur at different times of the day and night and as such the figures reflected within this document do not represent the absolute acceptability (or not) of a development site with respect to noise. However, the noise constraints identified within this document represent the areas where significant adverse effects relating to noise may occur and the mitigation measures that would be expected to be incorporated as part of the development process.

3.4 Designated Site Considerations

The designated sites associated with the Great West Corridor have been considered with respect to noise affecting residential development sites within the accompanying Appendices C and D

3.5 Noise Conclusions

With respect to noise, proposals for noise-sensitive development will need to secure a Good Acoustic Design, taking into account other socio-economic considerations of the development site. In particular the following good acoustic design principles will be adopted in emerging guidance as part of a hierarchical approach to avoiding and reducing significant adverse effects in relation to noise:

1. Avoid/Reduce the sound sources and the sound transmission path through site selection or other measures such as barriers/buildings.
2. Explore measures to manage the level of sound sources (including time/type of activity).
3. Separate the noise source and sensitive receiver with increased distance from the sources.
4. Explore innovative design measures including the layout, orientation of buildings and provision of acoustic screening, taking into account the character of the noise sources.
5. Insulate sensitive properties with enhanced building envelope designs.

Consideration will need to be given to designs that will achieve good acoustic design principles as far as

practicable within internal and external amenity spaces of a development to provide an integrated approach that is aligned with, or does not otherwise conflict with, other design aspects that will affect living conditions and the quality of life of the inhabitants or other sustainable design objectives and requirements.

These measures are to be developed further within the LBH Air Quality and Noise Supplementary Planning Document in order to assist developers, decision makers, agents, residents and others to identify issues to be addressed in any application for development in which noise and/or vibration will be an important consideration when assessing that application.

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Appendix A - Air Quality GWC Designated Site Considerations

The following designated sites have been considered with respect to air quality affecting residential, commercial and industrial development sites within the Great West Corridor.

Design phase mitigation is the preferred choice to mitigate air quality impacts, this includes the use of; setbacks of height and distance, use of non-sensitive us to screen or buffer sensitive uses and the use of greenery to act as a buffer through green walls or landscaping. Where design phase measures are not a viable option, mechanical ventilation should be utilised as a last resort as this is not considered to constitute high quality design mitigation.

All setbacks from roads will be given in metres and measurements have been taken from the kerbside of the associated roads. Setbacks of height have all been given from ground floor, the assessment takes into account the elevated M4 at 10m high. Sites adjacent to railways have been considered within the backgrounds of the modelled assessment.

1 - Sky Campus Brentford (Business (B1), Industrial (B2/B8) with ancillary Office (B1a), Retail and Hotel development)

Proposals - The Sky Campus will continue to develop as a hub for broadcasting, production and media activities, integrating with the wider Western Hub.

The highest concentration at the proposed site boundary is 38.6µg/m^3 at ground floor. There are no proposed residential units associated with this site and there is no expected exceedance of the short term objective of 50ug/m^3. No setbacks from Syon Lane or setbacks at height are necessary. It is expected that the proposed site is suitable for the proposed use and no additional design mitigation will be required.

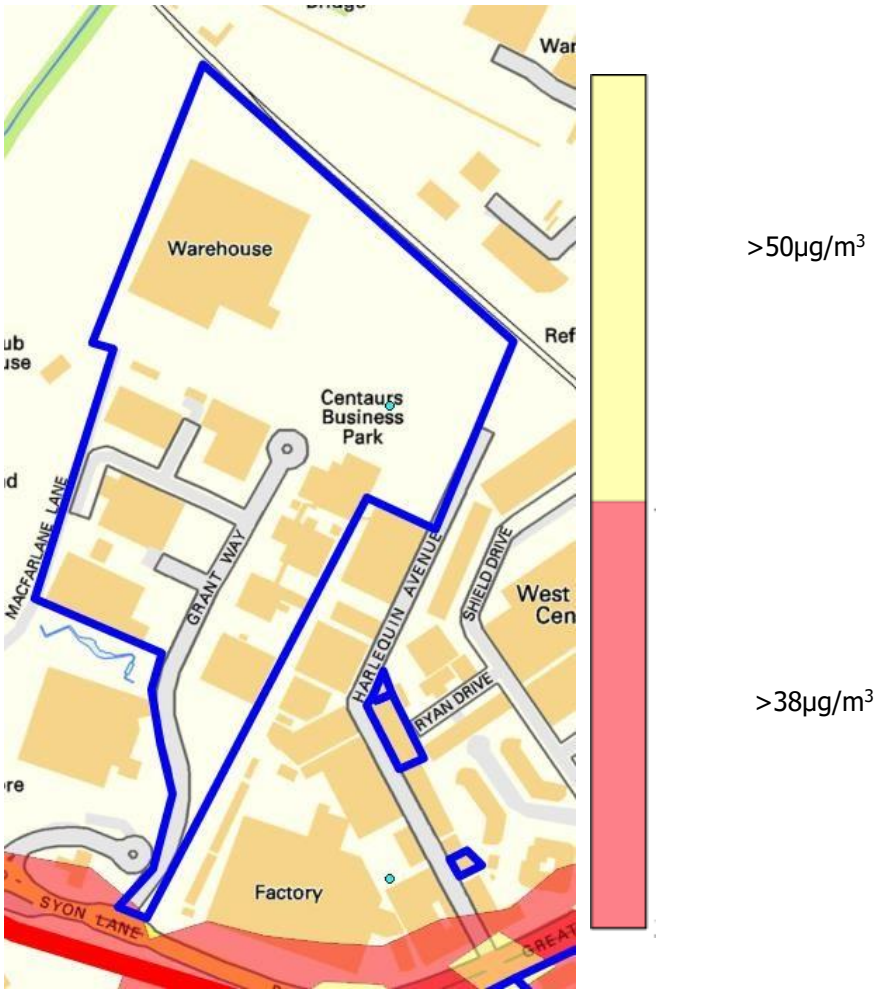


Figure 2.1 Total Modelled NO_2 (µg/m^3) at Sky Campus Brentford Site

2 - Tesco Osterley Large Format Retail (A1) and Residential (C3)

Proposal - Tesco Osterley will be redeveloped into a mixed-use site incorporating new housing and an enhanced public realm.

The highest concentration of NO_2 at the proposed site is expected to be**,** 44.1 µg/m3. There are 350 residential units proposed with this scheme. To ensure any proposed residents are not exposed to poor air quality above the air quality objective (38ug/m^3), residential units should be set back either 20m from Syon Lane or if within 20m of Syon Lane, residential units must begin from 6m high. Any residential units within 20m of Syon Lane and below 6m will implement additional design mitigation above to ensure residents are not exposed to poor air quality.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

There is no expected exceedance of the 50 µg/m^3 as a result there is not expected to be an exceedance of the short-term air quality objective. It is likely that the proposed site allocation is likely to comply with the proposed policy if the above parameters are applied.

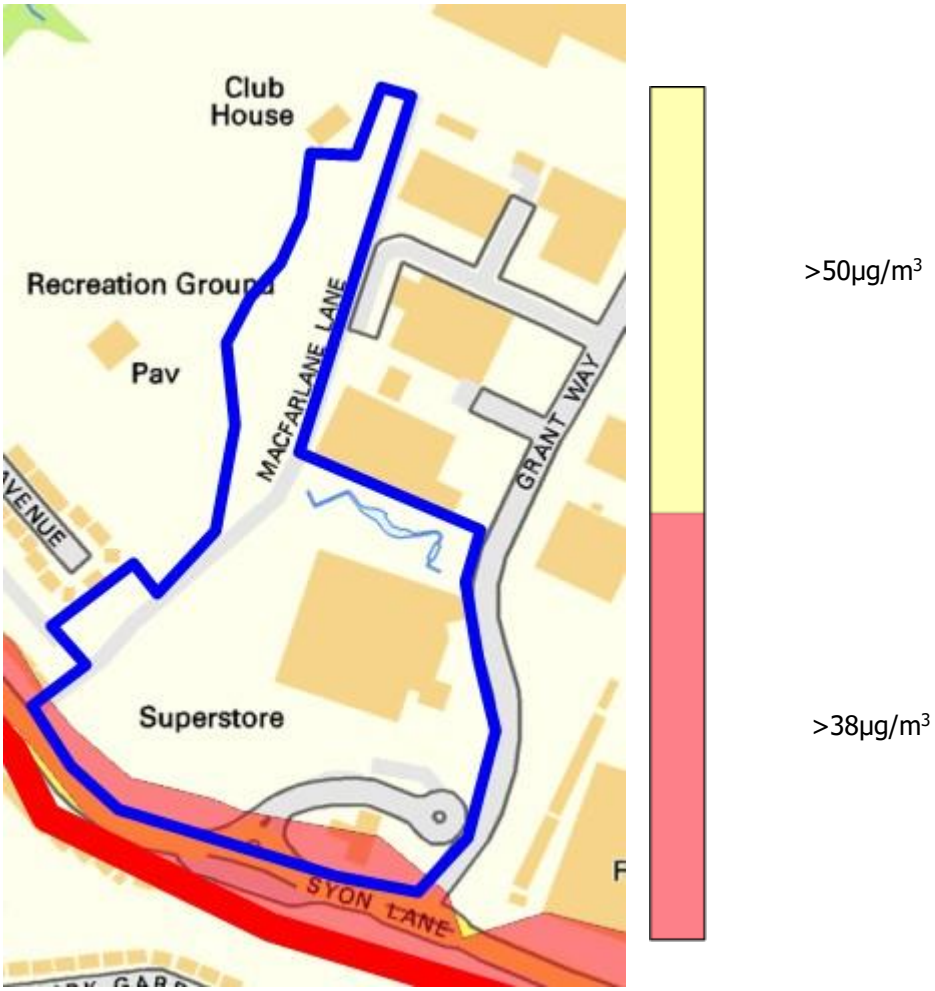


Figure 2.2 Total Modelled NO_2 (µg/m$^{3)}$ at Tesco Osterley Site

3 - Gillette Factory Business (B1) principally light industrial (B1c) with limited residential (C3) and retail.

Proposal- Gillette Corner will become a major new creative hub drawing on its unique heritage to deliver flexible light industrial space with ancillary Office and their supporting uses related to media and production, making the most of the building's large floorplates and attractive features.

The highest NO_2 concentration at the proposed site is 56.6 g/m3 on the corner of Syon lane and the Great West Road. There are expected to be approximately 200 residential units associated with the scheme. To ensure proposed residents are not exposed to poor air quality above the AQO (38ug/m^3) and comply with the proposed policies, residential units should be set back approximately 45m from Syon lane and Great West Road, or residential units should start from 10m high if adjacent to Great West Road or Syon Lane. For any residential units within 45m of Syon Lane and Great West Road and below 10m height from the ground, additional design mitigation will be implemented to ensure residents are not exposed to poor air quality, such as shielding with non-sensitive use. There is potential for the exceedance of 50 µg/m^3 and therefore the short term AQO along the corner of Syon Lane and the Great West Road, a setback of 10m would limit the possibility of an exceedance of the short term AQO at this corner.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

It is likely that the proposed site allocation will comply with the proposed policy if the above parameters are applied.

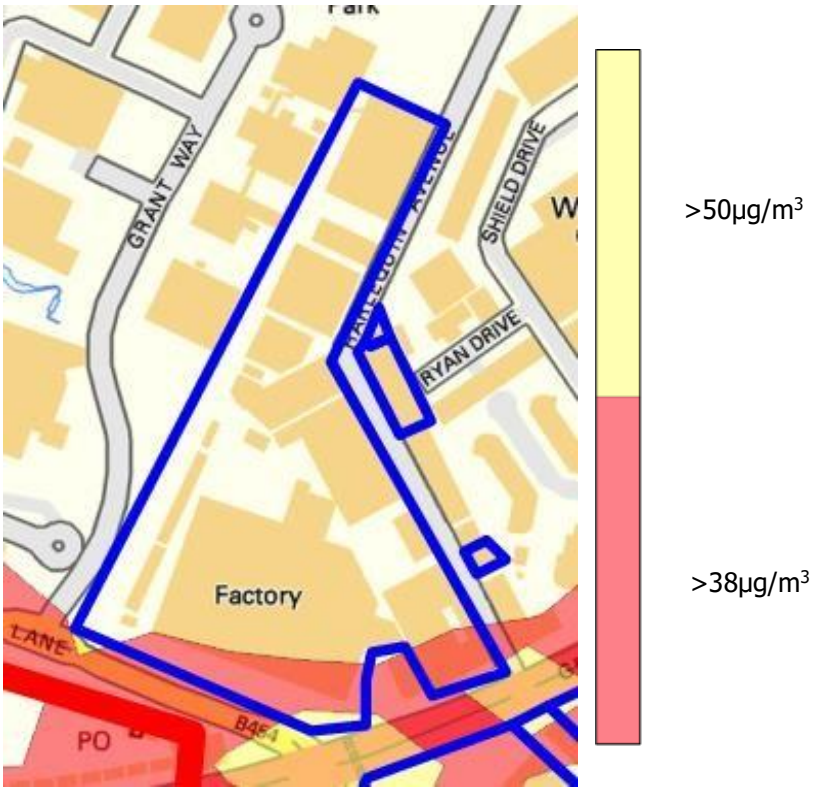


Figure 2.3 Total Modelled NO_2 (µg/$m^{3)}$ at Gillette Factory Site

4 - 125 Harlequin Avenue Light Industrial (B1c)

Proposal- 125 Harlequin avenue will be redeveloped to provide modern and flexible business floorspace which integrates with the surrounding business uses.

The expected NO_2 concentration at the proposed site is 33.3 µg/m3. There are no residential units associated with the scheme. There is not predicted to be a risk of exposure to the short-term air quality objective as the NO_2 concentrations are below 50µg/m^3.

It is considered that the proposed site is suitable for the proposed use and no further design mitigation will be required.

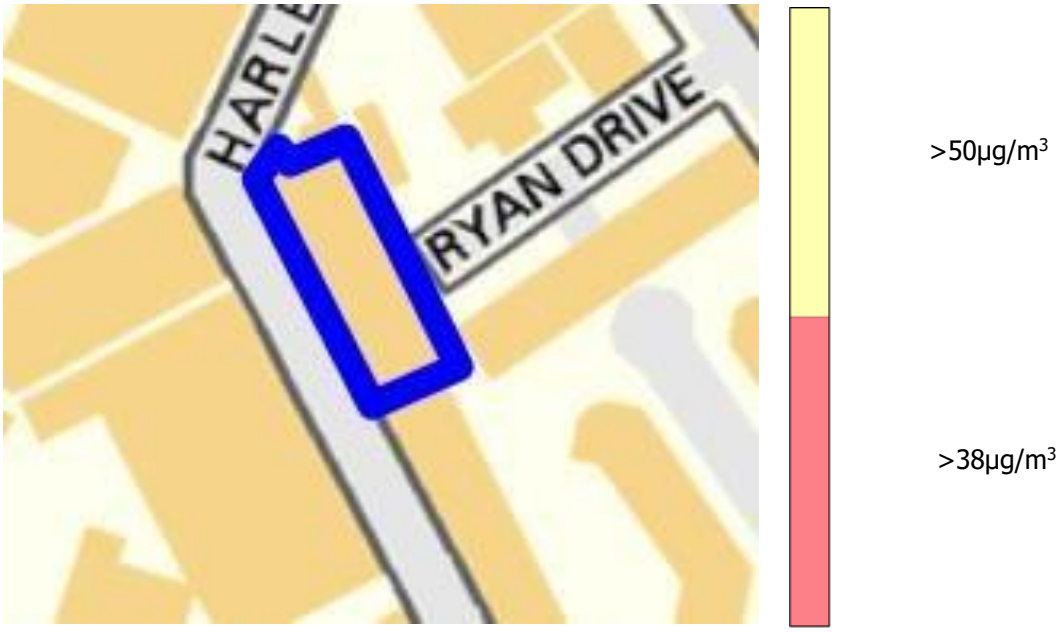


Figure 2.1 Total Modelled NO_2 (µg/$m^{3)}$ at 125 Harlequin Avenue Site

5 - West Cross Campus Industrial (B2/B8), Light Industrial (B1c); Business (B1a/b) uses, Residential (C3) and Retail (A1-A4).

Proposal- The West Cross Campus will become a high-quality mixed-use industrial quarter of light industrial, office and other employment uses, in a range of unit sizes, co-located with housing and shared amenities creating a sense of an 'industrial life'. It is a major opportunity for transformation and intensification to take forward the Mayor of London's Policy for industrial intensification and Co-location with residential uses.

The expected NO_2 concentration at the proposed site is 51.7µg/m^3 along the Great West Road. There are expected to be approximately 1820 residential units associated with the scheme. To ensure proposed residents are not exposed to poor air quality above the AQO (38ug/m^3), residential units should be set back approximately 45m from the Great West Road or residential units should start from 10m high if within 45m to Great West Road. Any residential units within 45m of Great West Road and below 10m height, will include additional design mitigation to ensure residents are not exposed to poor air quality, such as shielding with non-sensitive use.

There is potential for the exceedance of the 50 µg/m^3 as a result there is potential for an exceedance of the short-term air quality objective. To ensure the short term AQO is not exceeded at the proposed site, a setback of 5m from Great West Road should be implemented.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

It is likely that the proposed site allocation will comply with the proposed policy if the above parameters are applied.

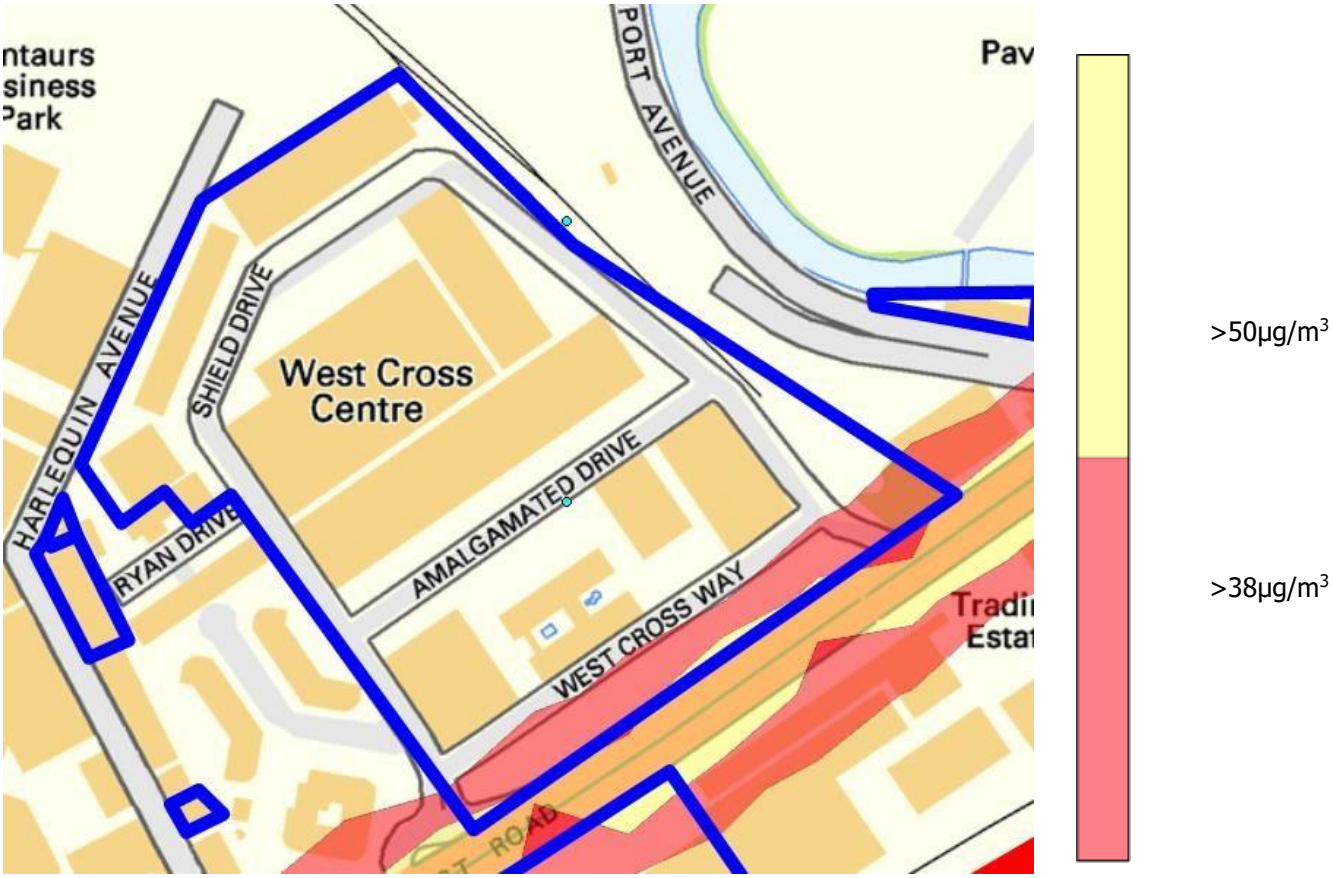


Figure 2.5 Total Modelled NO_2 (µg/$m^{3)}$ at West Cross Campus Site

6 - BSS Brentford Light Industrial (B1c); Office (B1a/b), Residential (C3) and Retail (A1-A4).

Proposal- The BSS Brentford Site will be redeveloped and intensified to support a broader range of uses.

The expected NO_2 concentration at the proposed site is 51.1µg/m^3 along the Great West Road. There are expected to be approximately 120 residential units associated with the scheme. To ensure proposed residents are not exposed to poor air quality above the AQO (38ug/m^3), residential units should be set back approximately 40m from the Great West Road or residential units should start 10m high if within 40m to Great West Road. Any residential units within 40m of Great West Road and below 10m will implement additional design mitigation above to ensure residents are not exposed to poor air quality, such as shielding with non-sensitive use.

There is potential for the exceedance of 50 µg/m^3 as a result there is possibility of an exceedance of the short term air quality objective. To ensure the short term AQO is not exceeded at the proposed site, a setback of 5m from Great West Road should be implemented.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

It is likely that the proposed site allocation will comply with the proposed policy if the above parameters

are applied.

Figure 2.6 Total Modelled NO_2 (µg/$m^{3)}$ at BSS Brentford Site

7 - Profile West Brentford Car Park Business (B1a/b) and Residential (C3)

Proposal- The Profile West Car Park will form a key link between Boston Manor Park and the Golden Mile Station and an attractive entrance to Transport Avenue.

The expected NO_2 concentration at the proposed site is 36.6µg/m^3 the nearest road being Great West Road, the site is located around 55m from the Great West Road. There is expected to be approximately 30 residential units associated with the scheme. The site is below the AQO (38ug/m^3) and there is not expected to be any risk to residents in terms of air quality at this site. It is expected that the proposed site is suitable for the proposed use and no further design mitigation will be required.

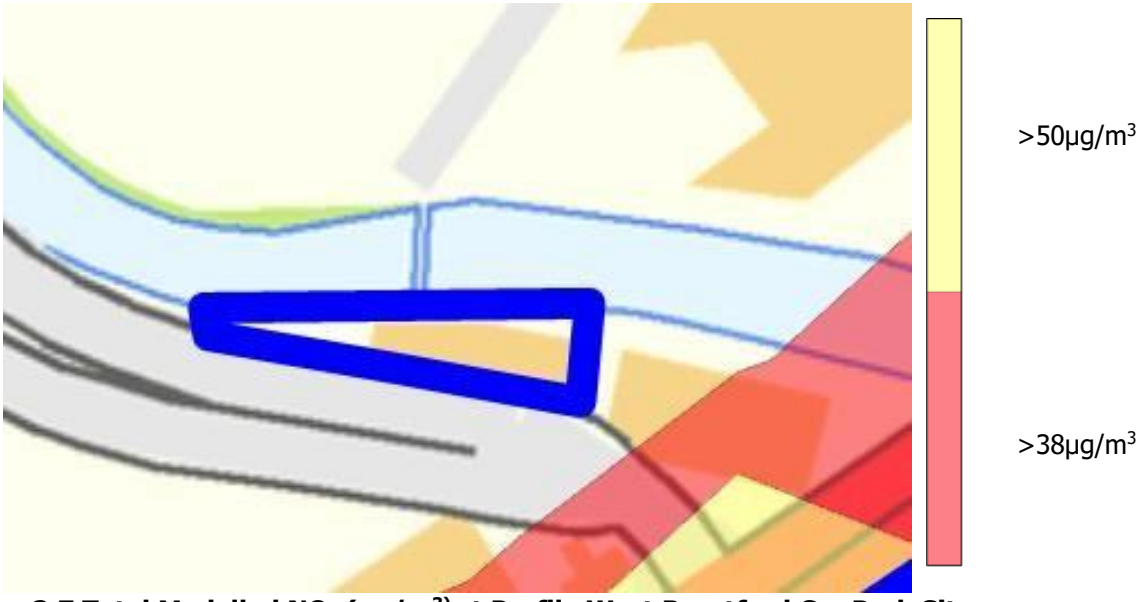


Figure 2.7 Total Modelled NO_2 (µg/$m^{3)}$ at Profile West Brentford Car Park Site

8 - 971 Great West Road Light Industrial (B1c)

Proposal- The Carpet Right Site will be redeveloped to significantly increase industrial floorspace.

The expected NO_2 concentration at the proposed site is 56.2µg/m^3 along the Great West Road. There are no proposed residential units associated with this scheme. The short-term objective has potential to be exceeded at the site as concentrations at the proposed development are above 50µg/m^3. To ensure the short term AQO is not exceeded on the proposed site, a setback of 10m from Great West Road should be implemented. Where a setback is not a viable option other design mitigation should be considered such as use of greenery to act as a buffer.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

It is likely that the proposed site allocation will comply with the proposed policy if the above parameters are applied.

Figure 2.8 Total Modelled NO_2 (µg/$m^{3)}$ at 971 Great West Road Site

9 - Syon Lane Industrial Estate Light Industrial (B1c)

Proposal- The Syon Lane Industrial Estate will be redeveloped to increase industrial uses on the site while protecting the. The Grade II listed Syon Clinic building.

The expected NO_2 concentration at the proposed site is 58.1µg/m^3 along the Great West Road. There are no proposed residential units associated with this scheme. The short-term objective is unlikely to be exceeded at the site if a setback of 10m from Great West Road is undertaken to ensure concentrations at the proposed development are below 50µg/m^3. If a setback is not a viable option, other design measures such as the use of greenery to act as a buffer should be considered.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

It is likely that the proposed site allocation will comply with the proposed policy if the setback is undertaken.

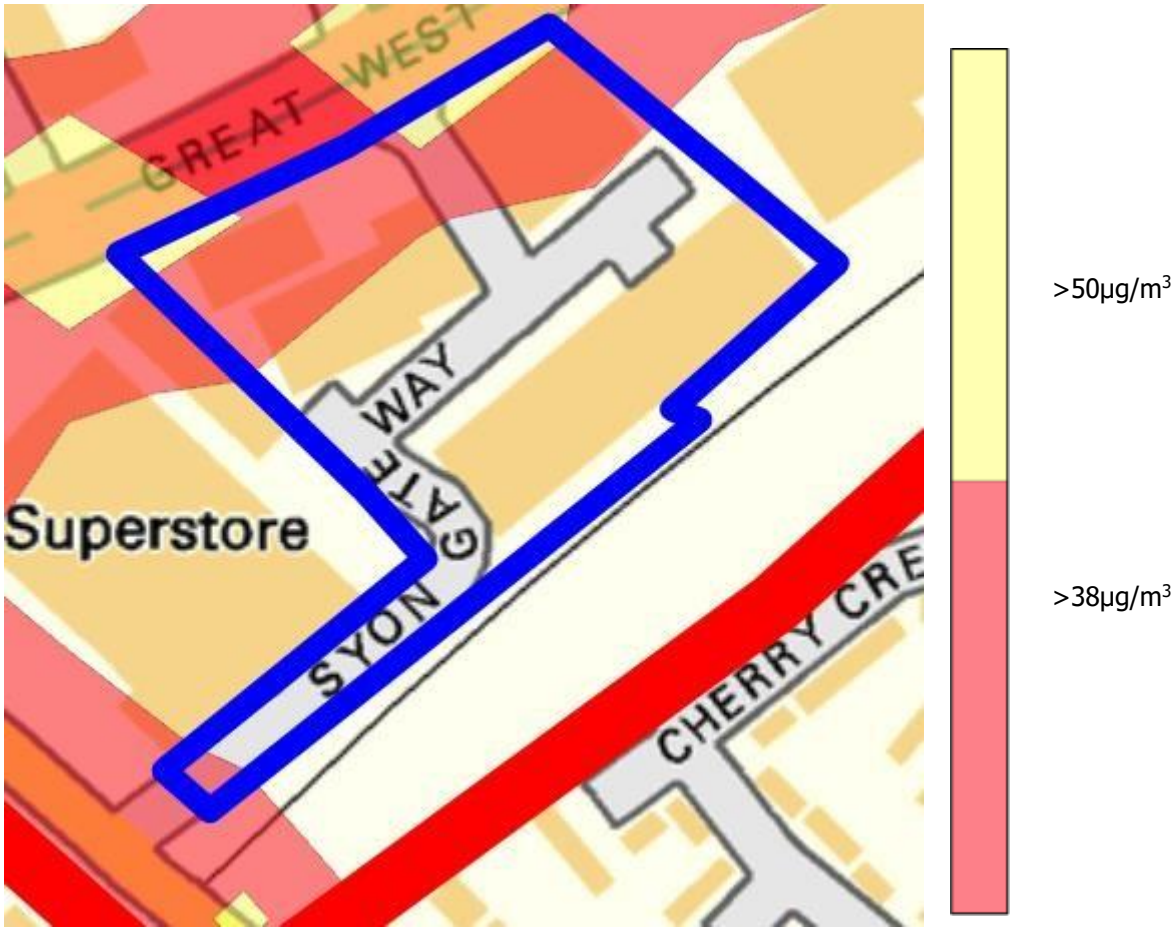


Figure 2.9 Total Modelled NO_2 (µg/$m^{3)}$ at Syon Lane Industrial Estate Site

10 - 931 Great West Road Light Industrial (B1c), Business (B1a/b) and Retail (A1-A4).

Proposal- The Skoda Car Dealership will be redeveloped to intensify industrial uses and facilitate integration with the adjacent Homebase and Syon Land industrial estate.

The expected NO_2 concentration at the proposed site is 58.3µg/m^3 along the Great West Road. There are no proposed residential units associated with this scheme. The short-term objective is unlikely to be exceeded at the site if a setback of 10m from Great West Road is undertaken to ensure concentrations at the proposed development are below 50µg/m^3. If a setback is not a viable option, additional design mitigation should be considered, such as the use of greenery to act as a buffer.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

It is likely that the proposed site allocation will comply with the proposed policy if the setback is undertaken.

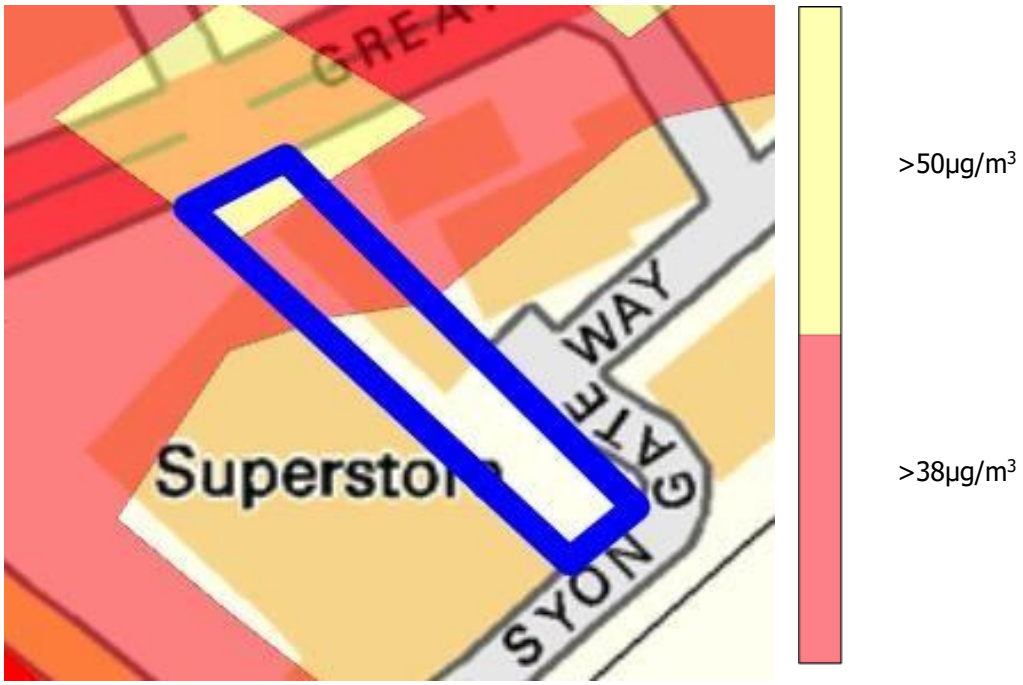


Figure 2.10 Total Modelled NO_2 (µg/$m^{3)}$ at - 931 Great West Road Site

11 - Homebase Syon Lane Business (B1a/b), Residential (C3) and Retail (A1-A4) or Large format Retail (A1) and Residential (C3)

Proposal- Homebase Syon Lane will be redeveloped to provide a mixed-use development which links Gillette Corner with Syon Lane station.

The expected worst case NO_2 concentration at the proposed site is 68.4 $\mu g/m^3$ at the corner of the Great West Road and Syon Lane. There are expected to be approximately 340 residential units associated with the scheme. To ensure proposed residents are not exposed to poor air quality above the AQO (38 $\mu g/m^3$) the recommended heights of residential units for different setback distances are as follows:

- With no set back from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 12m high.
- For a setback 10m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 12m high.
- For a setback 20m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 12m high.
- For a setback 30m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 12m high.
- For a setback 40m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 10m and 12m high respectively.
- For a setback 50m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 10m and 12m high respectively.
- For a setback 60m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 10m and 10m high respectively.
- For a setback 70m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 8m and 10m high respectively.
- For a setback 80m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 6m and 10m high respectively.
- For a setback 90m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 4m and 10m high respectively.
- For a setback 100m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from GF and 8m high respectively.

Any residential units above 12m would not require any setbacks.

Any residential units within the setbacks and below the recommended heights outlined above will implement additional design mitigation above to ensure residents are not exposed to poor air quality. This should include the positioning of non-sensitive buildings to provide screening to residential units.

As the proposed development has the potential to exceed the short term 50µg/m^3 concentration, any non-sensitive units should be set back 40m from the corner of Syon Lane and the Great West Road. Any commercial units within 40m will implement additional design mitigation to ensure there is no exposure to poor air quality.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

Where setbacks cannot be included, further modelling or monitoring should be undertaken to demonstrate that the AQO for both the short term 50µg/m^3 and long term 38 µg/m^3 are not exceeded, including the effects of any additional design phase mitigation.

It is likely that the proposed site allocation will comply with the proposed policy if the above parameters are applied.

Figure 2.11 Total Modelled NO_2 (µg/m$^{3)}$ at Homebase Syon Lane Site

12 - Former Syon Gate Service Station Gillette Corner

Light Industrial (B1c) and Residential (C3).

Proposal- The Former Syon Gate site will be redeveloped into an attractive employment location whose high-quality design reflects surrounding listed buildings at the western entrance to the corridor.

The expected NO_2 concentration at the proposed site is 64.4 μg/m^3 at the corner of the Great West Road and Syon lane. There are expected to be approximately 20 residential units associated with the scheme. To ensure proposed residents are not exposed to poor air quality above the AQO (38μg/m^3), residential units should begin from 12m. Any residential units within the parameters above will implement additional design mitigation above to ensure residents are not exposed to poor air quality such as positioning non-sensitive use buildings to act as a screen or shield sensitive use behind or greenery as a buffer.

Where it is not possible to implement design mitigation, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration.

As the proposed development has the potential to exceed the short term 50μg/m^3 objective a setback of 20m should be applied to any non-sensitive unit. Any non-sensitive units within the parameters above will implement design mitigation above to ensure the short term AQO is not exceeded such as use of greenery as a buffer.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

It is likely that the proposed site allocation will comply with the proposed policy if the above parameters are applied.

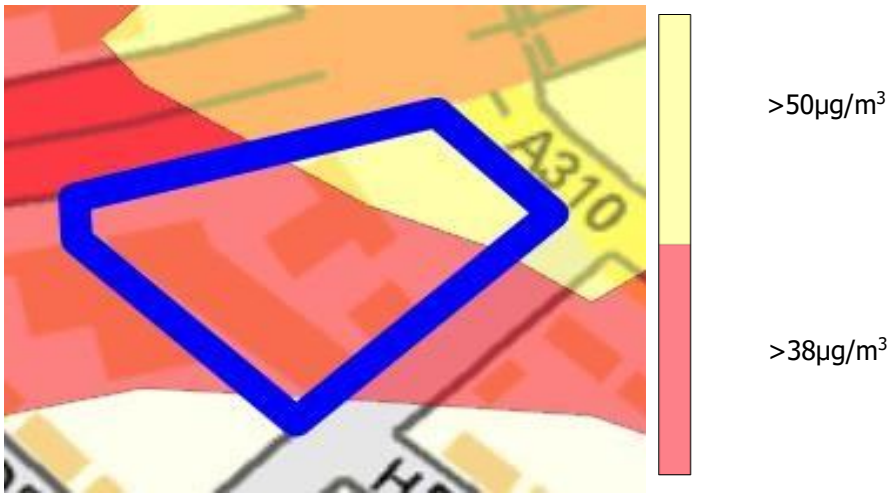


Figure 2.12 Total Modelled NO_2 (µg/$m^{3)}$ at Former Syon Gate Service Station Gillette Corner Site

13 - Harlequin Avenue Substation Business (B1a/b) and Residential (C3).

Proposal- Harlequin Avenue sub-station will be redeveloped to provide a number of residential units with modern and flexible business floorspace which integrates with the surrounding business uses.

The expected NO_2 concentration at the proposed site is 32.8 µg/m^3 along Harlequin Avenue. There is expected to be approximately 10 residential units associated with the scheme. It is expected that any proposed residential receptors will not be exposed to poor air quality above the AQO 38 µg/m^3 at the proposed site.

It is expected that the proposed site is suitable for the proposed use and no further design mitigation will be required.

Figure 2.13 Total Modelled NO_2 (µg/$m^{3)}$ at Harlequin Avenue Substation Site

14 - 2 Harlequin Avenue Light Industrial (B1c)

Proposal- 2 Harlequin avenue will be redeveloped to provide modern and flexible business floorspace which integrates with the surrounding business uses.

The expected NO_2 concentration at the proposed site is 35.2µg/m^3 along the Harlequin Avenue, 72m north of Great West Road. There are no proposed residential units associated with this scheme. The short-term objective is unlikely to be exceeded at the site as concentrations at the proposed development are below 50µg/m^3. It is expected that this site allocation will comply with the proposed policies. It is expected that the proposed site is suitable for the proposed use and no further design mitigation will be required.

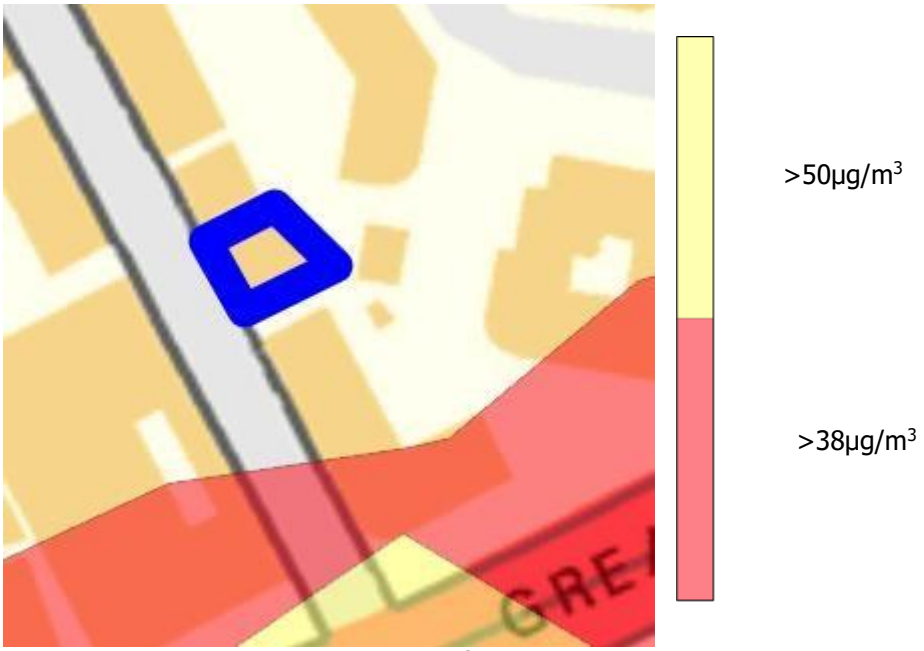


Figure 2.14 Total Modelled NO_2 (µg/$m^{3)}$ at 2 Harlequin Avenue Site

15 - Land at Glaxosmithkline Business (B1a/b)

Proposal- The GSK Building will be extended to provide high quality, modern, Office (B1a) space.

The expected NO_2 concentration at the proposed site is 70.4 µg/m^3 at the corner of Great West Road and Boston Manor Road junction. Although there are no proposed residential units associated with the scheme, the short-term objective has potential to be exceeded at the site as concentrations at the proposed site are above 50µg/m^3 at the corner of Great West Road and Boston Manor Road junction. Any units should either be set 35m back from the corner of Great West Road and Boston Manor road junction or implement additional design mitigation above to ensure people are not exposed to poor air quality such as including greenery to act as a buffer.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

With these parameters in place it is likely that the proposed site allocation will comply with the proposed policies.

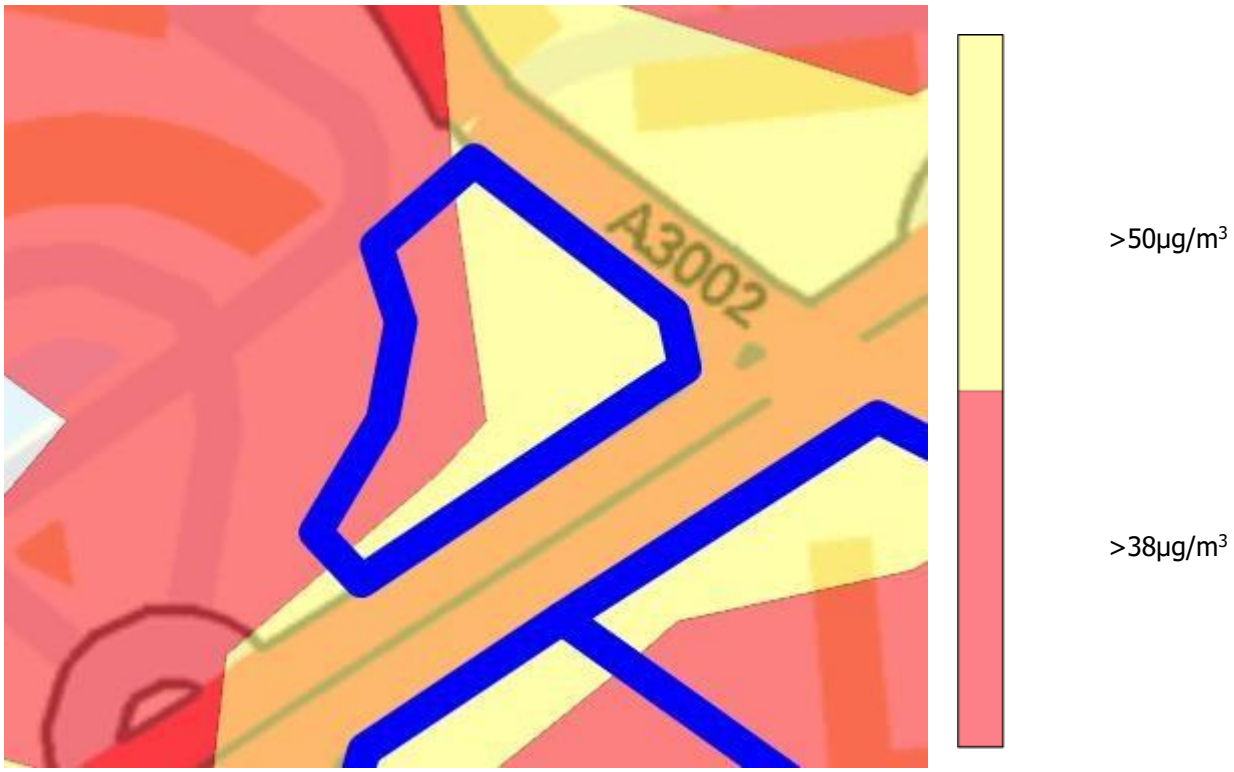


Figure 2.15 Total Modelled NO_2 (µg/$m^{3)}$ at Land at Glaxosmithkline Site

16 - Brentside Park Business (B1a/b), Residential (C3) and Retail (A1-A4)

Proposal- Brentside Park will be an attractive mixed-use development focused around an enhanced Brent river front.

The expected NO_2 concentration at the proposed site is 52.1 µg/m^3 along Great West Road. There is expected to be approximately 380 residential units associated with the scheme. To ensure proposed residents are not exposed to poor air quality above the AQO 38µg/m^3:

- With no setback from Great West Road residential units should begin from 12m high.
- With a 10m setback from Great West Road, residential units should begin from 12m high.
- With a 20m setback from Great West Road, residential units should begin from 10m high.
- With a 30m setback from Great West Road, residential units should begin from 10m high.
- With a 40m setback from Great West Road, residential units can begin from ground floor.

Any residential units within the setbacks and below the recommended heights outlined above will implement additional design mitigation to ensure residents are not exposed to poor air quality, such as positioning of non-sensitive buildings to provide screening to residential units or using greenery as a buffer.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

The proposed site has the potential to exceed the short term 50µg/m^3 concentration objective, a setback of 10m from The Great West Road will reduce the impacts of exposure to poor short-term air quality. Any non-residential units within the 10m setback will implement additional design mitigation as outlined above to ensure people are not exposed to poor air quality, including implementing greenery to act as a buffer.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

With these parameters in place it is likely that the proposed site allocation will comply with the proposed

policies.

Figure 2.66 Total Modelled NO_2 (µg/$m^{3)}$ at Brentside Park Site

17 - Great West Plaza Business (B1a/b), Residential (C3) and Retail (A1-A4)

Proposal- Great West Plaza will be an attractive mixed-use development focused around an enhanced Brent river front and having a close relationship with Brentside Park via a new pedestrian bridge.

The expected NO_2 concentration at the proposed site is 62.4 µg/m^3 along Great West Road, the north east corner of the site. There is expected to be approximately 380 residential units associated with the scheme. To ensure proposed residents are not exposed to poor air quality above the AQO 38µg/m^3, residential units should be set back approximately 60m from Great West Road. Or residential units should start from 10m high along Great West Road, except the north east corner of the site along great west road where residential should begin from 14m high. Any residential units within the parameters above will implement additional design mitigation above to ensure residents are not exposed to poor air quality, such as positioning non-sensitive buildings to screen residential units or use of greenery along the A4.

As the proposed development site has the potential to exceed the short term 50µg/m^3 concentration objective a setback of 15m should be applied on both the north west and north east corners of the site along Great West Road.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

If design mitigation is be implemented, then additional information will be provided to demonstrate that levels at the proposed site are suitable for the intended use. With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

Figure 2.17 Total Modelled NO_2 (µg/m^3) at Great West Plaza Site

18 - Great West House Business (B1a/b), Residential (C3) and Retail (A1-A4)

Proposal- Great West House will be integrated with new development surrounding the existing building to better integrate it into the London Gateway and intensify the use of the site.

The expected NO_2 concentration at the proposed site is 64.5 µg/m^3 along the corner of the Great West Road and Boston Manor road junction at the north east corner of the site. There is expected to be approximately 70 residential units associated with the scheme. To ensure proposed residents are not exposed to poor air quality above the AQO 38µg/m^3, additional design mitigation should be considered as setbacks at height and distance would not be a viable option and would heavily restrict development. Non-sensitive use should screen the residential units or the use of greenery along Great West Road A4 should be implemented. Any residential units within the parameters above will implement this design mitigation to ensure residents are not exposed to poor air quality.

The proposed development has the potential to exceed the short-term objective as the long term NO_2 concentrations are greater than 50µg/m^3. Any non-residential units should be set back approximately 35m from the Great West Road A4. Any units within the parameters above will implement design mitigation above to ensure residents are not exposed to poor air quality such as the use of greenery to act as a buffer.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

If design mitigation measures are be implemented, then additional information will be provided to demonstrate that levels at the proposed site are suitable for the intended use and below the respective AQO.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

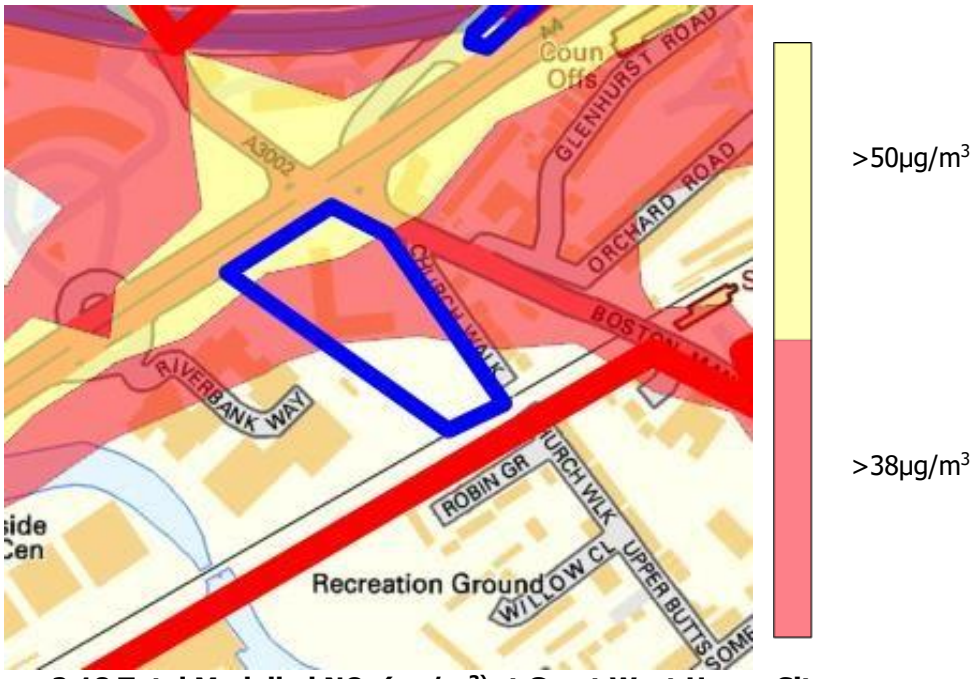


Figure 2.18 Total Modelled NO_2 (µg/$m^{3)}$ at Great West House Site

19 - Mille Building Business (B1a/b) and Retail (A1-A4)

Proposal- The Mille building will be redeveloped into a modern, grade A office floorspace with amenities serving occupiers as part of the London Gateway.

The expected NO_2 concentration at the proposed site is 67.3 µg/m^3 along the corner of the Great West Road and Boston Manor road junction at the south east corner of the site. There are no proposed residential units associated with this scheme.

The proposed development has the potential to exceed the short-term objective as the long term NO_2 concentrations are above 50µg/m^3. Setbacks at from the A4/M4 are not a viable option and would restrict development. Any units below 14m from ground level will implement design mitigation above to limit exposure to poor air quality.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

If design mitigation measures are be implemented, then additional information will be provided to demonstrate that levels at the proposed site are suitable for the intended use and below the respective AQO.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

Figure 2.19 Total Modelled NO_2 (µg/$m^{3)}$ at Mille Building Site

20 - Boston Manor Road Sub Station Business (B1a/b)

Proposal- Boston Manor Road Substation will be redeveloped to provide a new business location as part of the Great West Corridor Central development.

The expected NO_2 concentration at the proposed site is 54.7 µg/m^3 at ground floor level along Boston Manor Road. There are no proposed residential units associated with this scheme. The long-term air quality NO_2 concentrations indicates that there is potential for the short-term 50µg/m^3 objective will be exceeded. Units should be set back 25m from Boston Manor Road, if within 25m additional design mitigation above will be implemented to limit exposure to poor air quality such as the use of greenery to act as a buffer.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

If design mitigation measures are be implemented, then additional information will be provided to demonstrate that levels at the proposed site are suitable for the intended use and below the respective AQO.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

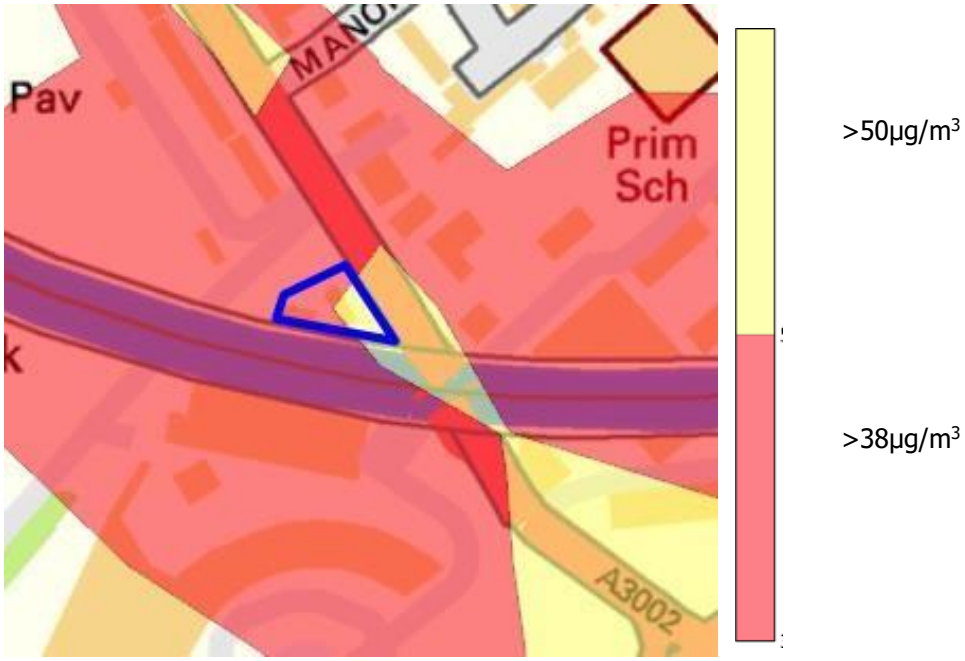


Figure 2.20 Total Modelled NO_2 (µg/m$^{3)}$ at Boston Manor Road Sub Station Site

21 - Enterprise, Boston Park Road Light Industrial (B1c)

Proposal- Enterprise Rent a Car will be redeveloped to provide a new business location as part of the Great West Corridor Central development.

The expected NO_2 concentration at the proposed site is 70.1 µg/m^3 at 10m high along the M4. There are no proposed residential units associated with this scheme and the long-term air quality NO_2 concentrations indicates that potentially the short-term objective of 50µg/m^3 will be exceeded. All units below 14m high will implement design mitigation where possible such as use of greenery to act as a buffer.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

If design mitigation measures are be implemented, then additional information will be provided to demonstrate that levels at the proposed site are suitable for the intended use and below the respective AQO.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

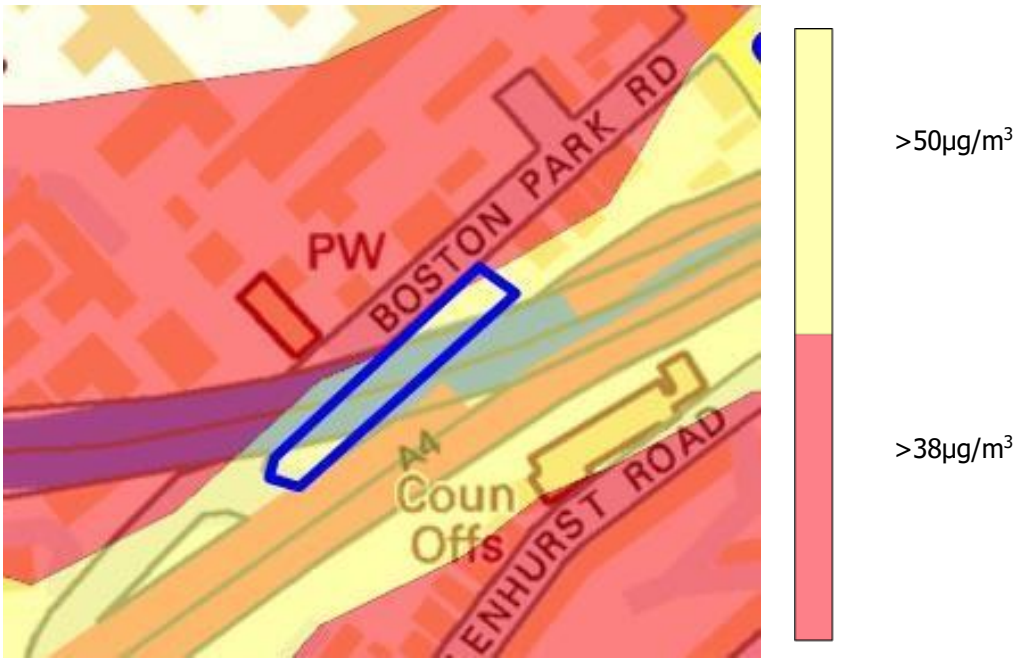


Figure 2.21 Total Modelled NO_2 (µg/m$^{3)}$ at Enterprise, Boston Park Road Site

22 - 1020 Great West Road Light Industrial (B1c)

Proposal- 1020 Great West Road will be redeveloped to intensify industrial uses on the site.

The expected NO_2 concentration at the proposed site is 68.6µg/m^3 along the A4, Windmill Road Junction. There are no proposed residential units associated with this scheme however, the long-term air quality NO_2 concentrations indicates that it is potential that the short-term objective of 50µg/m^3 will be exceeded. Any units below 12m from ground floor along the M4/A4 should be set back 15m from the A4/M4. Those units below 6m will implement further design measures where possible such as the use of greenery to act as a buffer.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

If design mitigation measures are be implemented, then additional information will be provided to demonstrate that levels at the proposed site are suitable for the intended use and below the respective AQO.

Units above 12m are not expected to be at risk to exceeding the short term air quality objective and as a result no design measures are required.

Although this limits the area of development, these parameters will likely ensure the proposed site allocation will comply with the proposed policies.

Figure 2.22 Total Modelled NO_2 (µg/$m^{3)}$ at 1020 Great West Road Site

23 - Texaco Filling Station, Great West Road, Brentford Light Industrial (B1c)

Proposal- Texaco Filling Station will be redeveloped to intensify business uses on the sites.

The expected NO_2 concentration at the proposed site is 83.4 μg/m^3 along the A4/Ealing Road roundabout. There are no proposed residential units associated with this scheme, however, the long-term air quality NO_2 concentrations indicates that it is potential for the short term objective of 50μg/m^3 will be exceeded. Any units below 14m will be require to implement additional design mitigation as setbacks up to 8m high are not feasible and would restrict areas of development. Units above 8m will require a setback of 15m from the A4/M4.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

If design mitigation measures are be implemented, then additional information will be provided to demonstrate that levels at the proposed site are suitable for the intended use and below the respective AQO.

Although this limits the area of development, these parameters will likely ensure the proposed site allocation will comply with the proposed policies.

Figure 2.23 Total Modelled NO_2 (µg/$m^{3)}$ at Texaco Filling Station, Great West Road, Brentford Site

24 - Layton Road Warehouses Residential (C3).

Proposal- The Layton Road Warehouse will be redeveloped to provide new residential units.

The expected NO_2 concentration at the proposed site is 38.6 µg/m^3 along the north east corner of the site situated toward Ealing road approximately 80m away. There are expected to be 30 residential units associated with the scheme. To ensure proposed residents are not exposed to poor air quality above the 38 µg/m^3 objective, residential units should be set back 15m from the north east corner of the site along Layton Road.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

Figure 2.24 Total Modelled NO_2 (µg/$m^{3)}$ at Layton Road Warehouses Site

25 - Layton Road Car Park Education (D1)

Proposal- Layton Road Car Park will be redeveloped into a new school to support growth in the Great West Corridor

The expected NO_2 concentration at the proposed site is 51.1µg/m^3 along Ealing road. There are no proposed residential units associated with this scheme, however the site allocation is for a new school, as a result it will be considered highly sensitive. Design mitigation would be required to be implemented below 14m. Greenery to act as a buffer should be installed along Ealing Road and Layton road. Additional design measures such as setbacks are not a viable option for this development. Any outdoor playing areas should be located towards the south west of the proposed site location to reduce exposure to children.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

If design mitigation measures are be implemented, then additional information will be provided to demonstrate that levels at the proposed site are suitable for the intended use and below the respective AQO.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

Figure 2.25 Total Modelled NO_2 (µg/$m^{3)}$ at Layton Road Car Park Site

26 - Phoenix Business Park Light Industrial (B1c), Industrial (B2/8), Business (B1a/b), Residential (C3) and Retail (A1-A4)

Proposal- Phoenix Trading Estate will be redeveloped to intensify employment uses on the site and introduce a mix of uses which are integrated with the surrounding area.

The expected NO_2 concentration at the proposed site is 82.7 µg/m^3 along the south west corner of the site situated toward Ealing road A4 roundabout. There is expected to be approximately 260 residential units associated with the scheme. Residential units are to be screened by less sensitive non-residential units along the A4, any non-residential unit below 8m has the potential to exceed the short term 50 µg/m^3 objective, as such a setback of 35m from the A4 and Ealing Road should be implemented.

It is considered that the use of non-residential units to shield residential units behind should ensure that the exposure is below the 38 µg/m^3 objective, however detailed modelling or post completion monitoring of the site taking into account the shielding effects should be undertaken.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

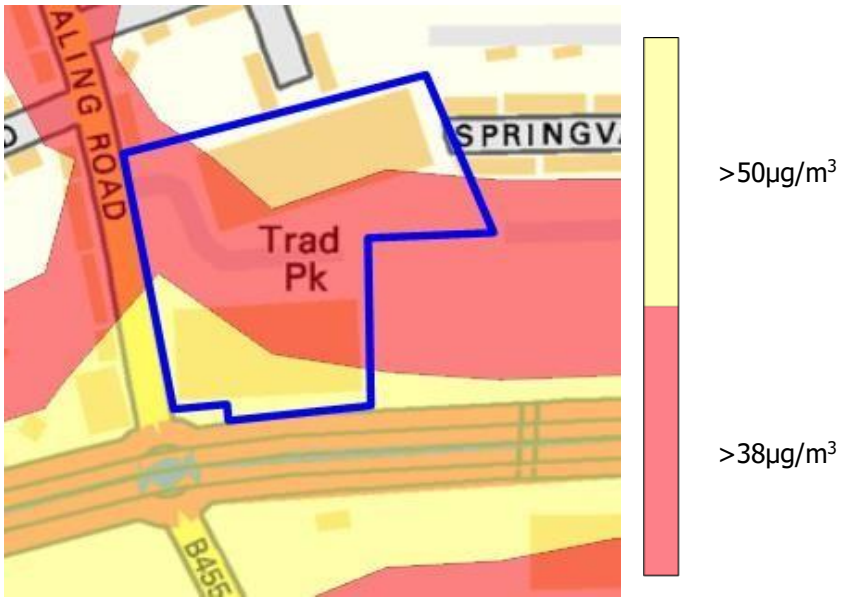


Figure 2.26 Total Modelled NO_2 (µg/$m^{3)}$ at Phoenix Business Park Site

27 - Kew Bridge Distribution Centre Light Industrial (B1c), Industrial (B2/8), Business (B1a/b), Residential (C3) and Retail (A1-A4)

Proposal- Kew Bridge Distribution Centre will be redeveloped to create a new mixed-use development with residential development and stacked industrial uses arranged along a new street connecting Lionel Road Station to Carville Hall Park.

The expected NO_2 concentration at the proposed site is 60.2 µg/m^3 along the north west corner of the site situated toward Ealing road A4 M4 slip road Junction 2. There is expected to be approximately 440 residential units associated with the scheme. Any non-residential unit below 6m has the potential to exceed the short term 50 µg/m^3 objective, as such a setback of 25m from the M4/A4 should be implemented.

It is considered that the use of non-residential units will shield residential units behind and should ensure that the exposure is below the 38 µg/m^3 objective, however detailed modelling or post completion monitoring of the site taking into account the shielding effects should be undertaken.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

Figure 2.27 Total Modelled NO_2 (µg/$m^{3)}$ at Kew Bridge Distribution Centre Site

28 - 27 Great West Road Business (B1a/b), Residential (C3) and Retail (A1-A4)

Proposal- 27 Great West Road will be redeveloped to create a new employment led local centre around Lionel Road Station.

The expected NO_2 concentration at the proposed site is 61.8 $\mu g/m^3$ along the north of the site at approximately 10m high along the M4. There is expected to be approximately 440 residential units associated with the scheme. Any non-residential unit below 6m has the potential to exceed the short term 50 $\mu g/m^3$ objective, as such a setback of 25m from A4/M4 should be implemented.

It is considered that the positioning of non-residential buildings will provide shielding to residential units and will keep exposure below the 38 $\mu g/m^3$ objective. Residential units should not require shielding or setbacks of any distance at 25m high. Detailed modelling or post completion monitoring of the site taking into account the shielding effects should be undertaken.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

Figure 2.28 Total Modelled NO_2 (µg/$m^{3)}$ at 27 Great West Road Site

29 - EMC Tower Business (B1a/b) and Residential (C3).

Proposal- Dell/EMC will be redeveloped to intensify employment uses and introduce a mix of uses on the site, creating a new pedestrian and cycling route against Gunnersbury Park between Lionel Road North and Gunnersbury Cemetery

The expected NO_2 concentration at the proposed site is 57.5 µg/m^3 along the south of the site at approximately 10m along the M4. There is expected to be approximately 420 residential units associated with the scheme. Any non-residential unit below 6m has the potential to exceed the short term 50 µg/m^3 objective, as such a setback of 20m from A4/M4 should be implemented. Where a setback is not a viable option, the use of greenery should be used as a buffer, however, however detailed modelling or post completion monitoring of the site taking into account the effects of greenery should be undertaken.

It is considered that the use of non-residential units to shield residential units behind should ensure that the exposure is below the 38 µg/m^3 objective, however detailed modelling or post completion monitoring of the site taking into account the shielding effects should be undertaken.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

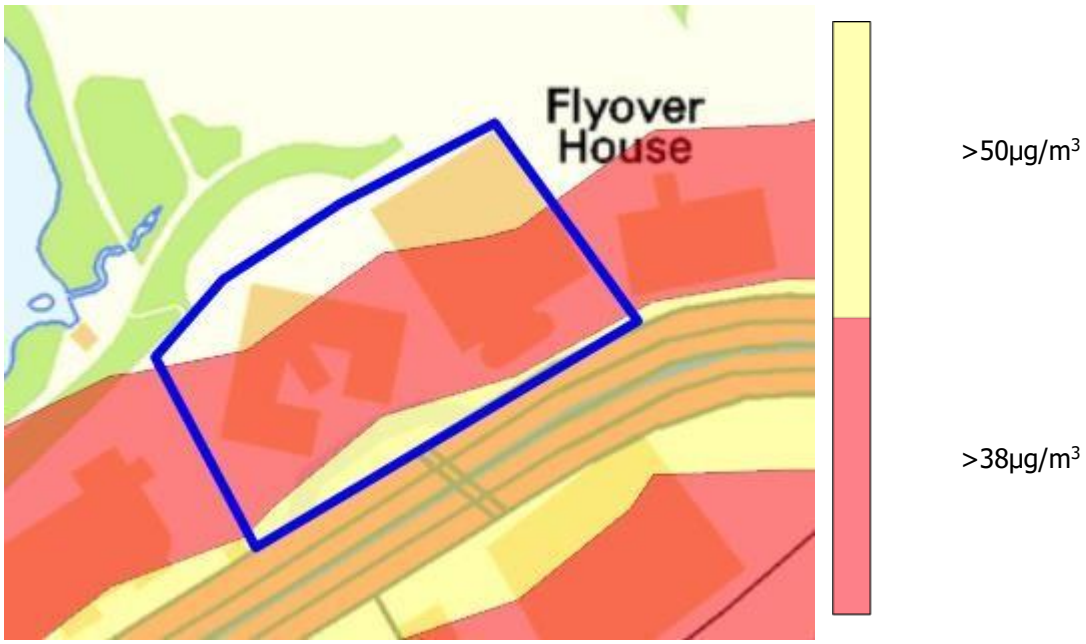


Figure 2.29 Total Modelled NO_2 (µg/$m^{3)}$ at EMC Tower Site

30 - Vantage West Residential (C3).

Proposal- Vantage West will be redeveloped to intensify employment uses and introduce a mix of uses on the site, creating a new pedestrian and cycling route against Gunnersbury Park between Lionel Road North and Gunnersbury Cemetery

The expected NO_2 concentration at the proposed site is 40.7 µg/m^3 along the south of the site approximately 45m from the A4. There is expected to be approximately 140 residential units associated with the scheme. The proposed site is currently largely screened by the existing Vantage West building.

It is considered that the existing Vantage West building will shield residential units behind and should ensure that the exposure is below the 38 µg/m^3 objective, however detailed modelling or post completion monitoring of the site taking into account the shielding effects should be undertaken and units are below the AQO.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated. This would only be required from residential units up to 10m.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

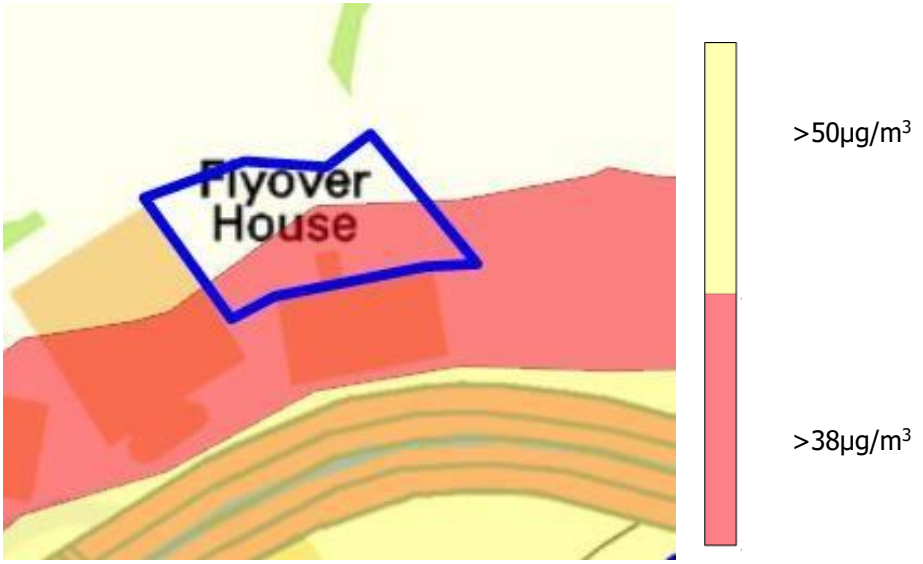


Figure 2.30 Total Modelled NO_2 (µg/$m^{3)}$ at Vantage West Site

31 - 1-4 Capital Interchange Way Business (B1a/b), Residential (C3) and Retail (A1-A4).

Proposal- Capital Interchange way will be developed into an office-led mixed-use site which contributes to the creation of the Brentford Stadium Quarter.

The expected NO_2 concentration at the proposed site is 54.6 µg/m^3 along the north west of the proposed site boundary at 10m along the M4. There is expected to be approximately 390 residential units associated with the scheme.

Any non-residential unit below 6m has the potential to exceed the short term 50 µg/m^3 objective, as such a setback of 15m from A4/M4 should be implemented. Where a setback is not a viable option, the use of greenery should be used as a buffer, however, however detailed modelling or post completion monitoring of the site taking into account the effects of greenery should be undertaken.

It is considered that the use of non-residential units to shield residential units behind should ensure that exposure is below the 38 µg/m^3 objective, however detailed modelling or post completion monitoring of the site taking into account the shielding effects should be undertaken.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

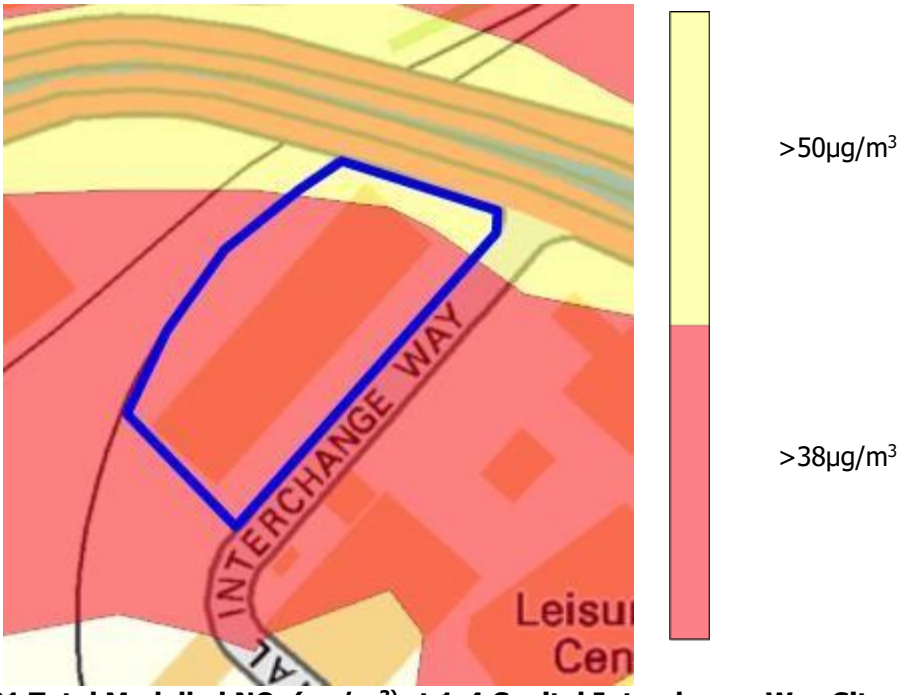


Figure 2.31 Total Modelled NO_2 (µg/$m^{3)}$ at 1-4 Capital Interchange Way Site

32 - Brentford Fountains Leisure Centre Leisure (D2), Residential (C3) and Retail (A1-A4).

Proposal- Brentford Fountains Leisure centre will be redeveloped to provide a new, modern leisure centre with residential development to maximise use of the site.

The expected NO_2 concentration at the proposed site is 61.9 µg/m^3 along the east corner of the proposed site boundary along Chiswick High road. The proposal involves the use of non-sensitive use up to 8m with residential units above. There is expected to be approximately 300 residential units associated with the scheme.

To ensure proposed residents are not exposed to poor air quality above the 38 µg/m^3 objective residential units should begin from 20m. Additional design mitigation would be required to be implemented below 20m which would not prove a viable option and limit development. Unless it can be demonstrated residential units will be below the AQO, it is considered other mitigation measures not considered high-level design should be implemented such ventilation and filtration.

Non-sensitive use up to 4m may exceed the short term AQO as the long term of 50 µg/m^3 has the potential to exceed. A set back of 15m from Chiswick High Road should be considered for all non-sensitive use.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

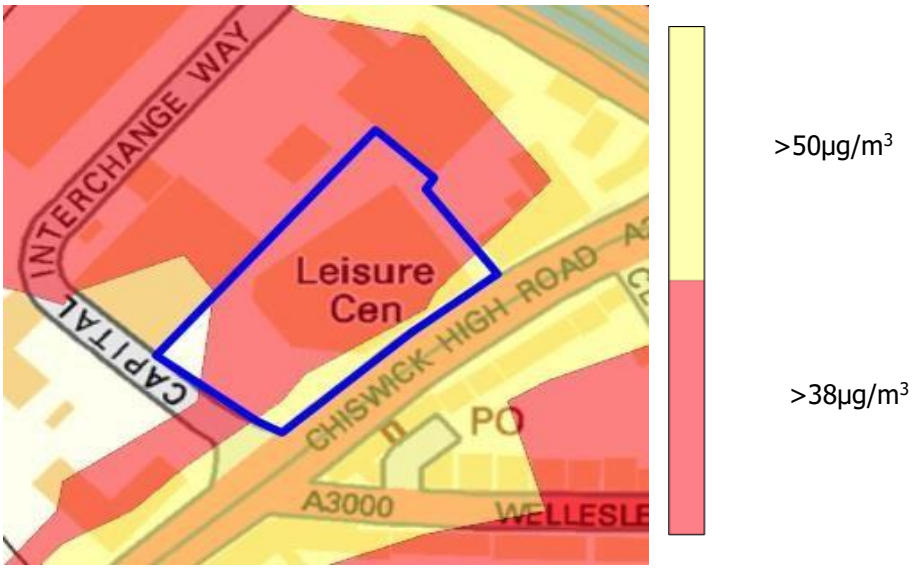


Figure 2.32 Total Modelled NO_2 (µg/$m^{3)}$ at Brentford Fountains Leisure Centre Site

33 - Esso Filling Station Chiswick Roundabout Business (B1a/b) and Residential (C3).

Proposal- Esso Filling Station will be redeveloped to deliver a new mixed-use site business location.

The expected NO_2 concentration at the proposed site is 78.6 µg/m^3 along the east corner of the proposed site boundary along the A4/Chiswick High Road roundabout junction. There are expected to be approximately 30 residential units associated with the scheme. The proposal involves the use of non-sensitive use up to 12-18m high with residential units above.

To ensure proposed residents are not exposed to poor air quality above the AQO 38 µg/m^3, residential units should begin from 20m upwards. Additional design mitigation would be required to be implemented below 20m, such as setbacks with distance and the installation of green walls. However, given the constraints of the site, setbacks would not be feasible as this would severely limit the area of the site available for development. Unless it can be demonstrated residential units will be below the AQO, it is considered that other mitigation measures not considered to represent high-level design, such as ventilation and filtration, should be implemented for units below 20m.

Non-sensitive uses located up to 12m in height may exceed the short term AQO and the long term AQO of 50µg/m^3 has the potential to be exceeded. As outlined above, a setback may not prove a viable option for this site and therefore, other additional design mitigation should be implemented. However, it must be demonstrated that these measures will result in the short-term limit not being exceeded. Where this is not possible, other mitigation measures not considered to be high-level design should be implemented, such as ventilation and filtration.

A detailed dispersion model or monitoring should be undertaken to ensure that both the short-term objective for the non-sensitive use and the long-term objective for the residential units are not exceeded.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

Figure 2.33 Total Modelled NO_2 (µg/$m^{3)}$ at Esso Filling Station Chiswick Roundabout Site

34 - Former Natwest Bank Site, Chiswick Business (B1a/b), Residential (C3) and Retail (A1-A4).

Proposal - The Natwest Bank site will be redeveloped into a mixed-use development combining office, retail and residential units along with appropriate mitigation for noise and pollution.

The expected NO_2 concentration at the proposed site is 97.7 µg/m^3 along the east corner of the proposed site boundary along Chiswick High road. There is expected to be approximately 120 residential units associated with the scheme. The proposal involves the use of non-sensitive use up to 12-18m high with residential use above.

To ensure future residents are not exposed to poor air quality above the AQO 38 µg/m^3, residential units should begin from 25m from ground floor level. Additional design mitigation would be required to be implemented for any residential units located below 25m, however due to site constraints this may not represent a viable option in this location. Unless it can be demonstrated that residential units will be below the AQO, it is considered that other mitigation measures not considered high-level design should be implemented, such as ventilation and filtration, to units located below 25m.

Non-sensitive use up to 14m may exceed the short term AQO as the long term of 50 µg/m^3 has the potential to be exceeded. A setback would not prove a viable option given site constraints, and other additional design mitigation should be implemented, as detailed above. Where this is not possible, other mitigation measures not considered to represent high-level design, should be implemented, such as ventilation and filtration.

A detailed dispersion model or monitoring should be undertaken to ensure that both the short-term objective for the non-sensitive use and the long-term objective for the residential units are not exceeded.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

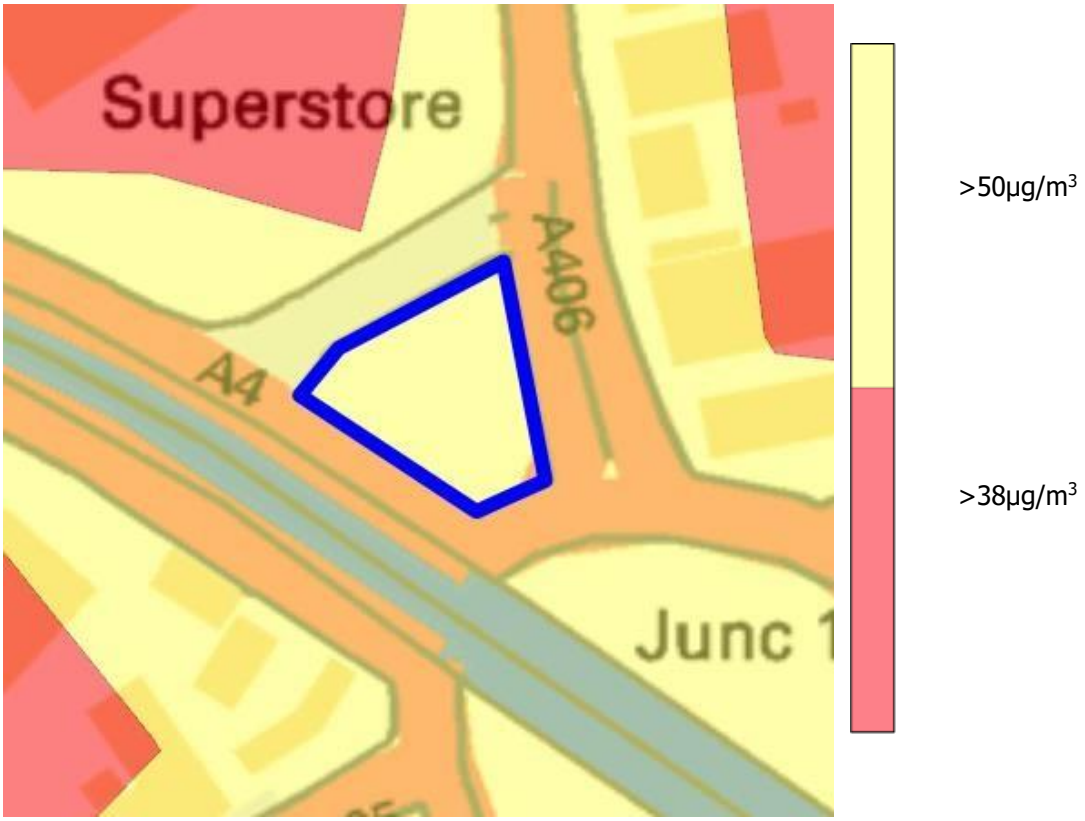


Figure 2.34 Total Modelled NO_2 (µg/$m^{3)}$ at Former Natwest Bank Site, Chiswick Site

35 - B&Q Chiswick Leisure (D2), Hotel (C1), Business (B1a/b) Residential (C3) and Retail (A1-A4).

Proposal - The B&Q Site will be redeveloped into a mixed-use quarter with a range of uses which support the Brentford Stadium Quarter.

The expected NO_2 concentration at the proposed site is 71.6 µg/m^3 at the east corner of the proposed site boundary along the A406. There is expected to be approximately 270 residential units associated with the scheme.

To ensure proposed residents are not exposed to poor air quality above the AQO of 38 µg/m^3:

- The whole site is above the AQO up to 12m high, residential units should not be below 12m high.
- Within 20m of the north east corner of the site adjacent to the A406, residential units should begin from 14m high.
- Within 70m of the north east corner of the site adjacent to the A406, residential units should begin from 16m high.
- Within 100m of the north east corner of the site adjacent to the A406, residential units should begin from 18m high.
- Within 125m of the north east corner of the site adjacent to the A406, residential units should begin from 20m high.
- From 25m high residential units would not require additional mitigation for the site area.

Any proposed residential units outside of the parameters above would require additional design mitigation such as the use of non-sensitive buildings to provide shielding to residential units beyond.

Unless it can be demonstrated residential units will be below the AQO, it is considered other mitigation measures not considered high-level design should be implemented, such as ventilation and filtration.

Non-sensitive uses also have the potential to exceed the short term AQO of 50 µg/m^3 along the A4/M4 and the A406.

- Non-sensitive uses should be set back 20m from the A4/M4 and A406 at heights up to 6m.
- Non-sensitive uses should be set back 10m from the A4/M4 at heights between 6m-10m.

Any proposed non-sensitive use outside of the parameters above would require additional design mitigation such as the use of green buffers.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered to be high-level design should be implemented, such as ventilation and filtration, but only once all other design phase mitigation measures have been considered and fully investigated.

A detailed dispersion model or monitoring should be undertaken to ensure that both the short-term objective for the non-sensitive use and the long-term objective for the residential units are not exceeded, including the impacts of any design measures to be implemented.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

Figure 2.35 Total Modelled NO_2 (µg/$m^{3)}$ at B&Q Chiswick Site

36 - 110 Power Road Light Industrial (B1c)

Proposal- Power Road will be enhanced as a key locally significant industrial site with focus on supporting small creative industries related to media and broadcasting, as a site within the TV Triangle.

The expected NO_2 concentration at the proposed site is 36.4 µg/m^3 along south west corner of the proposed site boundary, approximately 120m east of the A406. There are no proposed residential units associated with this scheme and it is considered that there is no potential for the short term AQO of 50 µg/m^3 is to be exceedance.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

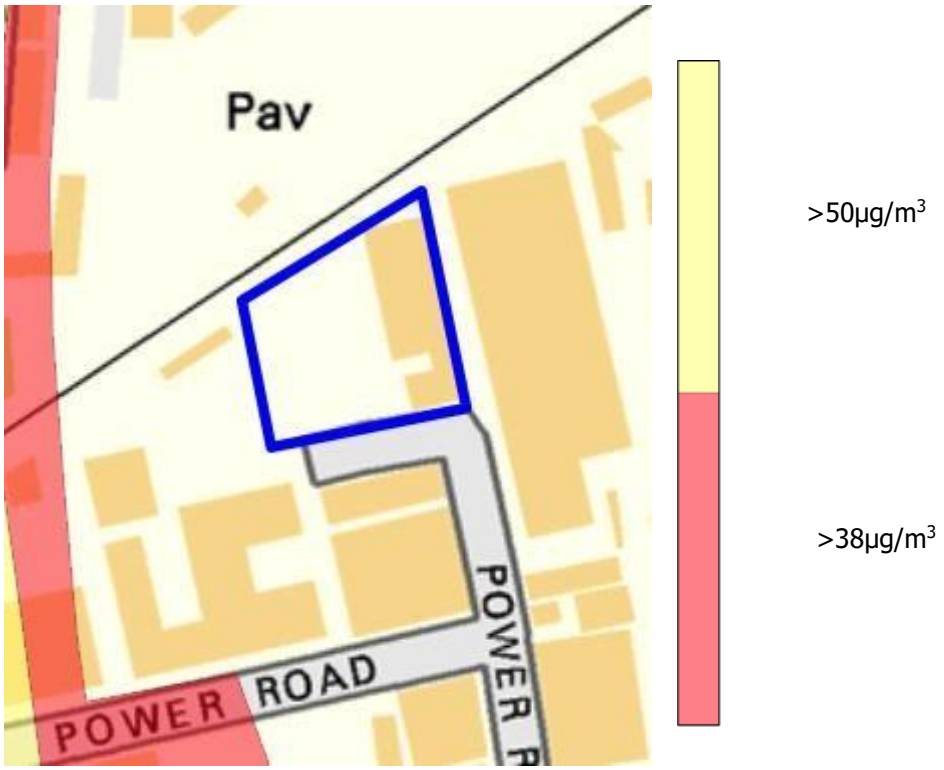


Figure 2.36 Total Modelled NO_2 (µg/$m^{3)}$ at 110 Power Road Site

37 - Gunnersbury Station Car Park Business (B1a/b), Residential (C3), and Retail (A1-A4).

Proposal - Gunnersbury Station will be improved with better access and greater capacity through enabling development, to improve public transport accessibility to the eastern end of the Great West Corridor.

The expected NO_2 concentration at the proposed site is 38.6 µg/m^3 at the northern boundary of the proposed site boundary along Chiswick High Road. There is expected to be approximately 120 residential units associated with the scheme. To ensure proposed residents are not exposed to poor air quality above the AQO of 38 µg/m^3, residential units should be set back 10m from the northern boundary along Chiswick High Road. Any residential units within 10m of northern boundary along Chiswick High Road should be a minimum of 6m in height.

Where it is not possible to implement design phase mitigation measures, other mitigation measures which are not considered high-level design should be implemented, such as ventilation and filtration, but only as a last resort once all other design phase mitigation measures have been fully investigated.

With the above parameters, it is likely that the proposed site allocation will comply with the proposed policies.

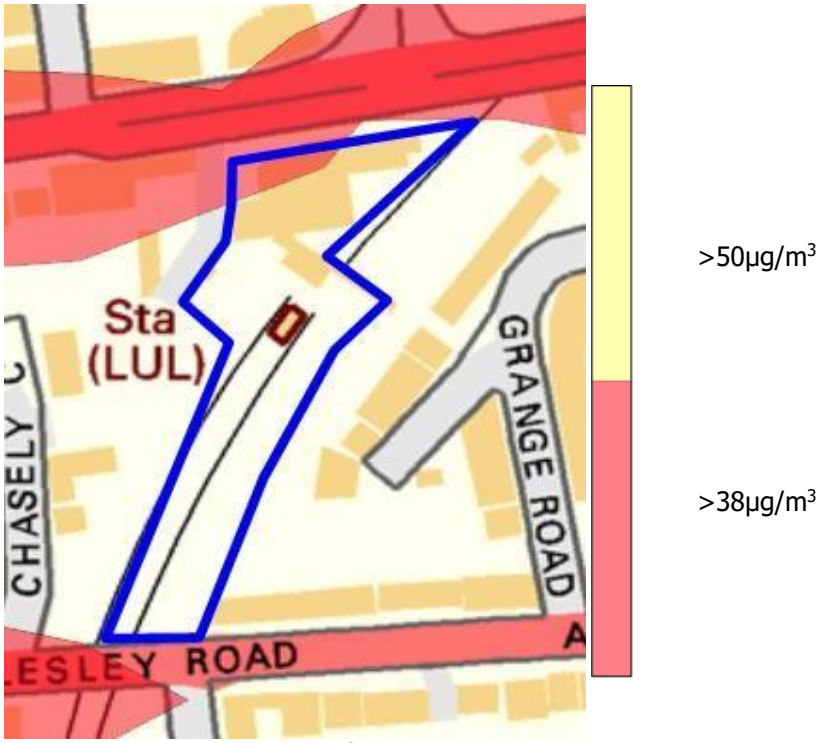


Figure 2.37 Total Modelled NO_2 (µg/$m^{3)}$ at Gunnersbury Station Car Park Site

Appendix B – Air Quality Technical Modelling

This section provides a review of the existing air quality in the vicinity of the GWC in order to provide baseline conditions and completion of modelling to analyse the distribution of pollutants throughout the study area. Baseline air quality in the vicinity of the GWC been defined from several sources, as described in the following sections.

Local Air Quality Management (LAQM)

A review of the monitoring within LBH and has been undertaken. As required under section 82 of the Environment Act 1995, LBH has undertaken an ongoing exercise to review and assess air quality within its area of jurisdiction. The assessments have indicated that concentrations of NO_2 are above the relevant AQOs at locations of relevant public exposure within the authority area. LBH has one designated Air Quality Management Area (AQMA) for NO_2 that covers the entirety of the borough:

- Hounslow AQMA: An area encompassing the entire borough of Hounslow

Monitoring

Continuous Monitoring

LBH operates one automatic monitoring stations within the GWC. This offer continuous records of NO2 and PM_{10} concentrations within the study area. The most recently available monitored NO_2 concentration data is from 2018 at the locations shown in Table B1 below.

Table B1 Monitored Annual Mean NO_2 Concentrations at Automatic Monitoring Stations

Site ID	X	Y	Location	Site Type	NO_2 Annual Mean Concentration 2018 (µg/m^3)	PM_{10} Annual Mean Concentration 2018 (µg/m^3)
HS5	517425	178074	Brentford	Roadside	48.0	26.0

As indicated in Table B1, the automatic monitoring station exceed the AQO for NO_2(40 µg/m^3 annual mean).

Non - Continuous Monitoring

LBH operates a network of five diffusion tubes within the GWC. Diffusion tubes within the GWC study area are given below in Table B2.

Table B2 Monitored Annual Mean NO_2 Concentrations at Diffusion Tubes

Site ID	X	Y	Location	Site Type	2018 Annual Mean NO_2 Concentration (µg/m^3)
BREN A/B/C	517425	178071	Brentford, Glenhurst Road	Roadside	48.6
HS43	517447	178059	Glenhurst Road	Roadside	33.2

Site ID	X	Y	Location	Site Type	2018 Annual Mean NO_2 Concentration ($\mu g/m^3$)
HS32	517592	178210	24 Adelaide Terrace	Roadside	43.2
HS33	519452	178314	30 Surrey Crescent	Roadside	42.5
HS69	519005	178040	Kew Bridge	Roadside	39.0

As indicated in Table B2, three diffusion tubes, BREN A/B/C, HS32 and HS33 exceed the AQO for NO_2(40 $\mu g/m^3$ annual mean).

The monitoring undertaken by LBH within the GWC has been included within the model verification below.

Meteorology

Meteorological conditions have significant influence over air pollutant concentrations and dispersion. Pollutant levels can vary significantly from hour to hour as well as day to day, thus any air quality predictions need to be based on detailed meteorological data. The ADMS (Atmospheric Dispersion Modelling System) model calculates the dispersion of pollutants on an hourly basis using a year of local meteorological data. The 2018 meteorological data used in the assessment is derived from Heathrow Airport Meteorological Station. This is the nearest meteorological station, which is considered representative of the GWC, with all the complete parameters necessary for the ADMS model. Reference should be made to Figure B1 for an illustration of the prevalent wind conditions at the Heathrow Airport Meteorological Station site.

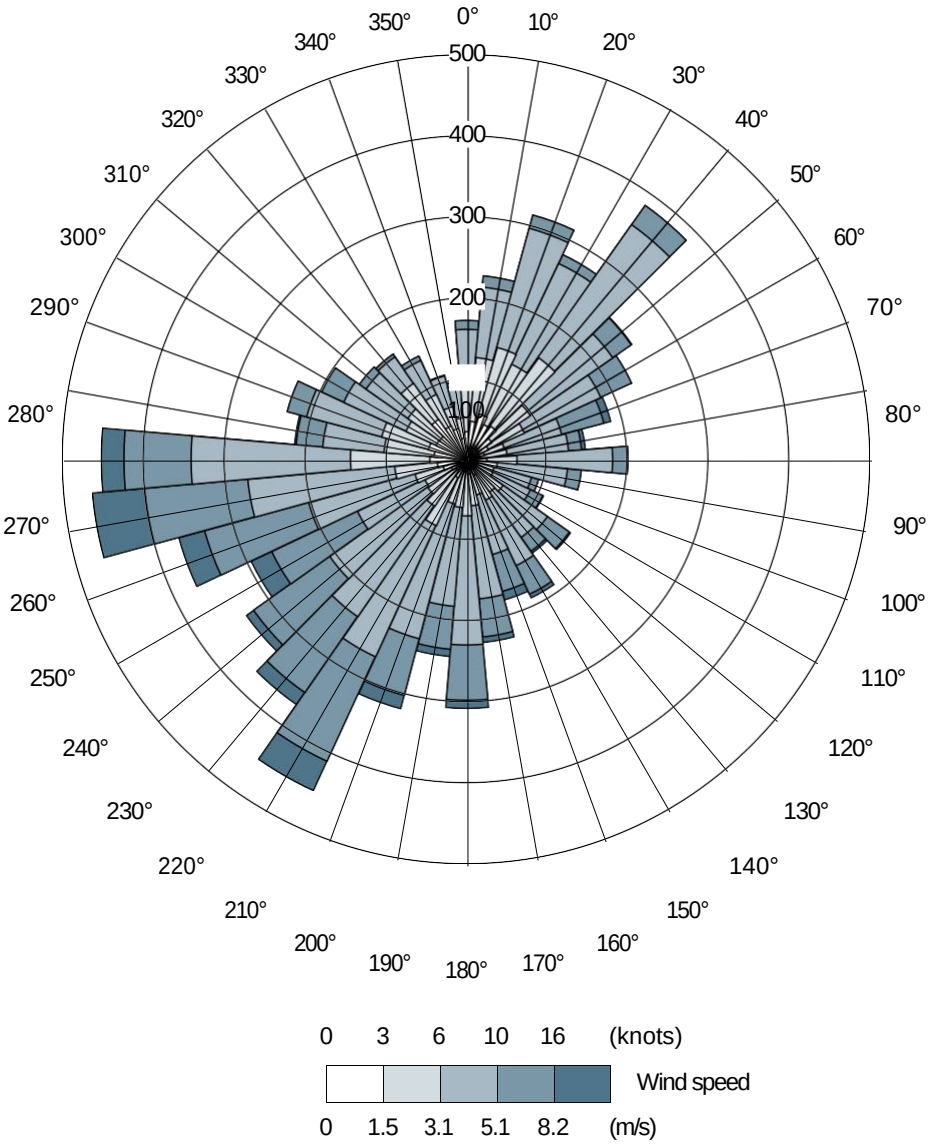


Figure B1 Heathrow 2018 Wind Rose

Emission Sources

A desktop assessment has identified that traffic movements are likely to be the most significant local source of pollutants affecting the site and its surroundings. The principal traffic derived pollutants likely to impact local receptors are NO_2, PM_{10} and $PM_{2.5}$.

It should be noted that the pollutant contribution of minor roads and rail sources that are not included within the dispersion model is considered to be accounted for via the use of background air quality levels.

Sensitive Receptors

Receptors that are considered as part of the air quality assessment are primarily those existing receptors as part of the Site Allocations Local Plan Review (July 2019) for the GWC have been included, all thirty-seven sites within this document have been included within the assessment.

The thirty-seven site allocation are shown in Table B3.

Table B3 Long-Term Modelled Existing Sensitive Receptor Locations

Discrete Sensitive Receptor	
R1	Sky Campus Brentford
R2	Tesco Osterley
R3	Gillette Factory
R4	125 Harlequin Avenue
R5	West Cross Campus
R6	BSS Brentford
R7	Profile West Brentford Car Park
R8	971 Great West Road
R9	Syon Lane Industrial Estate
R10	931 Great West Road
R11	Homebase Syon Lane
R12	Former Syon Gate Service Station Gillette Corner
R13	Harlequin Avenue Sub station
R14	2 Harlequin Avenue
R15	Land at Glaxosmithkline
R16	Brentside Park
R17	Great West Plaza
R18	Great West House
R19	Mille Building
R20	Boston Manor Road Sub Station
R21	Enterprise, Boston Park Road
R22	1020 Great West Road
R23	Texaco Filling Station, Great West Road, Brentford
R24	Layton Road Warehouses
R25	Layton Road Car Park
R26	Phoenix Business Park
R27	Kew Bridge Distribution Centre
R28	27 Great West Road
R29	EMC Tower
R30	Anfield Vantage West
R31	1-4 Capital Interchange Way
R32	Brentford Fountains Leisure Centre
R33	Esso Filling Station Chiswick Roundabout
R34	Former Natwest Bank Site, Chiswick
R35	B&Q Chiswick
R36	110 Power Road
R37	Gunnersbury Station Car Park

Assessment of Detailed Dispersion Modelling

In the context of the GWC, road traffic is identified as the dominant emission source that is likely to cause potential risk of exposure of air pollutants across the GWC

The traffic assessment consists of the quantified predictions of NO_2, across the GWC and the predicted concentrations at the thirty-seven site allocations. Modelling has been completed using ADMS Roads.

Existing and Predicted Traffic Flows

Traffic data has been obtained to identify 2018 baseline conditions in the form of Annual Average Daily Traffic Figures (AADT) for the major roads within the GWC.

The traffic data has been sourced through the London Air Emissions Inventory (LAEI) for 2016, the identified links are shown below which correlate with the LAEI data. The TG16 technical guidance requires the local authority monitoring data, meteorological data and traffic data to all derive from the same year for baseline modelling. To determine 2018 traffic flows a TEMPRO factor as 1.0268 to the 2016 LAEI traffic flows.

The traffic data utilised within the assessment is shown in Table B4

Table B4 Traffic Data used within Assessment

Link (Sourced from LAEI)	Speed (km/h)	2018	
		AADT	HGV%
57294	80	44526	4.4
71521	80	44526	4.4
12329	80	44637	4.6
65343	80	44637	4.6
70816	80	41647	4.5
72014	80	41647	4.5
70496	80	41647	4.5
71523	80	41647	4.5
12905	64	23316	3.6
71750	64	23316	3.6
28465	64	23366	3.8
17353	64	23316	3.6
25784	64	20984	5.7
21686	64	20984	5.7
21686	20	20984	5.7
25784	20	20984	5.7
54738	20	20984	5.7
15083	20	20984	5.7
57430	64	20984	5.7
15083	64	20984	5.7
57438	20	20984	5.7
15083	20	20984	5.7
26371	20	21144	6.4

Link (Sourced from LAEI)	Speed (km/h)	2018	
		AADT	HGV%
68167	20	20984	5.7
68229	20	20984	5.7
68167	64	20984	5.7
68229	64	20984	5.7
67907	64	20984	5.7
14138	64	20984	5.7
67907	64	10492	5.7
14138	64	10492	5.7
67905	64	10492	5.7
67905	64	10492	5.7
67906	64	10492	5.7
67906	64	10492	5.7
14560	64	10492	5.7
14560	64	10492	5.7
14044	64	21389	4.9
14044	64	21389	4.9
66888	20	21389	4.9
48087	20	21389	4.9
26693	20	18145	7.0
15143	80	36777	4.2
15142	80	36777	4.2
14096	20	5347	4.9
14096	64	5347	4.9
14096	64	5347	4.9
15145	20	5347	4.9
15145	64	5347	4.9
15145	64	5347	4.9
21560	20	8195	9.7
21561	20	8195	9.7
17812	48	16324	9.3
54968	48	8276	10.6
17552	59	8276	10.6
54969	48	16552	10.6
72790	20	23151	5.2
17811	20	23571	6.9
72790	48	23151	5.2
17811	48	23571	6.9
72176	48	46174	5.0
56378	20	18034	6.4
22147	20	18145	7.0
56378	48	18034	6.4
22147	48	18145	7.0
32321	48	30897	7.7
72174	20	30897	7.7
72205	20	15449	7.7
72175	20	15448	7.6
26685	20	15197	6.1
22612	20	3799	6.1

Link (Sourced from LAEI)	Speed (km/h)	2018	
		AADT	HGV%
22609	20	3799	6.1
22682	20	3799	6.1
22686	20	3799	6.1
22615	20	8895	1.9
22615	48	8895	1.9
59652	20	6485	4.2
59875	20	6485	4.2
14045	32	12972	4.2
52601	20	11048	7.0
14832	32	11048	7.0
26374	20	14748	6.1
21314	48	14748	6.1
26374	20	2791	13.0
48651	20	9235	6.8
21314	32	2791	13.0
47912	20	2791	13.0
47912	48	9235	6.8
58508	20	18927	5.6
58508	48	18927	5.6
25220	20	9106	9.0
25220	48	9106	9.0
77384	20	22413	4.3
77384	48	22413	4.3
77384	20	14807	1.7
66575	48	14807	1.7
66575	20	14807	1.7

Background Concentrations

The use of background concentrations within the modelling process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants include industrial, domestic and rail emissions within the vicinity of the study site. Several sources have been used to obtain representative background levels as discussed below.

The background concentrations used within the assessment have been determined with reference to the IAQM Guidance and TG (16).

The IAQM Guidance states:

> "*A matter of judgement should take into account the background and future background air quality and whether it is likely to approach or exceed the value of the AQO.*"

Additionally, TG (16) states:

> "*Typically only the process contributions from local sources are represented within an output*

by the dispersion model. In these circumstances, it is necessary to add an appropriate background concentration(s) to the modelled source contributions to derive the total pollutant concentrations."

Defra Published Background Concentrations for 2018

The background concentrations shown in Table B5 were referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the application site. In May 2019, Defra issued revised 2017 based background maps for nitrogen oxide (NO_X), NO_2, PM_{10} and $PM_{2.5}$.

Table B5 Published Background Air Quality Levels (µg/m³)

Receptor Location	2018			
	NO_2	NO_x	PM_{10}	$PM_{2.5}$
Local Authority Monitoring				
N7	30.21	49.67	18.53	12.79
N15	30.21	49.67	18.53	12.79
N16	30.33	50.29	18.35	12.47
N8	30.33	50.29	18.35	12.47

All the Defra background concentrations detailed in Table B5 for 2018, show that the background levels are predicted to be below the relevant AQO within the study area.

Worst case Defra backgrounds have been utilised to represent a worst-case assessment when assessing the GWC.

1.1 Model Verification

Model verification involves the comparison of modelled data to monitored data in order to gain the best possible representation of current pollutant concentrations for the assessment years. The verification process is in general accordance with that contained in Section 7 of the TG16 guidance note and uses the most recently available diffusion tube monitoring data to best represent this.

The verification process consists of using the monitoring data and the published background air quality data in the UK National Air Quality Information Archive to calculate the road traffic contribution of NO_X at the monitoring locations. Outputs from the ADMS Roads model are provided as predicted road traffic contribution NO_X emissions. These are converted into predicted roadside contribution NO_2 exposure at the relevant receptor locations based on the updated approach to deriving NO_2 from NO_X for road traffic sources published in Local Air Quality Management TG16. The calculation was derived using the NO_X to NO_2 worksheet in the online LAQM tools website hosted by Defra. Table B6 summarises the final model/monitored data correlation following the application of the model correction factor.

Table B6 Comparison of Roadside Modelling & Monitoring Results for NO_2

Tube Location	NO_2 µg/m^3		
	Monitored NO_2	Modelled NO_2	Difference (%)
Local Authority Monitoring			
HS5	48.00	46.78	-2.55
HS32	43.20	44.24	2.40
HS33	42.50	41.84	-1.54
HS69	36.50	38.19	4.63

The final model produced data at the monitoring locations to within 10% of the monitoring results as recommended by TG16.

Summary of Model Inputs

Table B7 Summary of ADMS Roads Model Inputs

Parameter	Description	Input Value
Chemistry	A facility within ADMS-Roads to calculate the chemical reactions in the atmosphere between Nitric Oxide (NO), NO_2, Ozone (O_3) and Volatile organic compounds (VOCs).	No atmospheric chemistry parameters included
Meteorology	Representative meteorological data from a local source	**Heathrow 2018 Meteorological Station**, hourly sequential data
Surface Roughness	A setting to define the surface roughness of the model area based upon its location.	**1.5m** representing a typical surface roughness for **Large Urban Area** was used for the Site. With **0.5m** representing a typical surface roughness for **Parkland, Open Suburbia** was used for the met. Measurement site.
Latitude	Allows the location of the model area to be set	United Kingdom = **51.49**
Monin-Obukhov Length	This allows a measure of the stability of the atmosphere within the model area to be specified depending upon its character.	Large Conurbations= **100m** was used for the Site. With Cities & Large Towns= **30m** was used for the met. Measurement site.
Elevation of Road	Allows the height of the road link above ground level to be specified.	All road links were set at ground level = **0m**. The Elevated M4 above the A4 was set at **10m**
Road Width	Allows the width of the road link to be specified.	Road width used depended on data obtained from OS map data for the specific road link
Topography	This enables complex terrain data to be included within the model in order to account for turbulence and plume spread effects of topography	No topographical information used
Time Varied Emissions	This enables daily, weekly or monthly variations in emissions to be applied to road sources	No time varied emissions used
Road Type	Allows the effect of different types of roads to be assessed.	**Urban (London - Outer)** settings were used for the relevant links
Road Speeds	Enables individual road speeds to be added for each road link	Based on national speed limits
Road Source Emissions	Road source emission rates are calculated from traffic flow data using the in-built EFT database of traffic emission factors.	The **EFT** Version **9.0 (2019)** dataset was used.
Year	Predicted EFT emissions rates depend on the year of emission.	**2018** data for baseline Assessment.

1.2 ADMS Modelling Results

The ADMS Model has predicted concentrations of NO_2, at relevant receptor locations adjacent to roads likely to be affected by the site allocations, as summarised in the following tables.

Site Allocations Assessment Results

Table B8 illustrates the highest concentration identified through the modelling at each site allocation within the GWC and the height or setback required to ensure residents are below the air quality objective for NO_2.

Table B8 Predicted Annual Average Concentrations of NO_2 at Receptor Locations

Receptor		Land Use Class	Worst Case NO_2 Concentration within Site Boundary ($\mu g/m^3$)	Potential Measures to Meet 50$\mu g/m^3$ Target AQO for Amenity Areas	Potential Measures to Meet 38$\mu g/m^3$ Level Long Term AQO for Residential/School Receptors
R1	Sky Campus Brentford	(Business (B1), Industrial (B2/B8) with ancillary Office (B1a), Retail and Hotel development)	38.6	N/A	N/A
R2	Tesco Osterley	Large Format Retail (A1) and Residential (C3)	44.1	N/A	Set Back 20m from Syon lane. Residential units from 6m high if within 20m
R3	Gillette Factory	Factory Business (B1) principally light industrial (B1c) with limited residential (C3) and retail.	56.6	Setback of 10m from corner of Syon Lane and the Great West Road	Set back approximately 45m from the corner of Syon lane and the Great West Road or residential units should start from 10m high if within 45m.
R4	125 Harlequin Avenue	Light Industrial (B1c)	33.3	N/A	N/A
R5	West Cross Campus	Industrial (B2/B8), Light Industrial (B1c); Business (B1a/b) uses, Residential (C3) and Retail (A1-A4).	51.7	Setback of 5m from Great West Road	Set back approximately 45m from the Great West Road or residential units should start from 10m high if within 45m to Great West road.
R6	BSS Brentford	Light Industrial (B1c) ;Office (B1a/b), Residential (C3) and Retail (A1-A4).	51.1	Setback of 5m from Great West Road	Set back approximately 40m from the Great West Road or residential units should start from 10m high if within 40m to Great West road.
R7	Profile West Brentford Car Park	Business (B1a/b) and Residential (C3)	36.6	N/A	N/A
R8	971 Great West Road	Light Industrial (B1c)	56.2	Setback of 10m from Great West Road	N/A
R9	Syon Lane Industrial Estate	Light Industrial (B1c)	58.1	Setback of 10m from Great West Road	N/A
R10	931 Great West Road	Light Industrial (B1c), Business (B1a/b) and Retail (A1-A4).	58.3	Setback of 10m from Great West Road	N/A
R11	Homebase Syon Lane	Business (B1a/b), Residential (C3) and Retail (A1-A4) or Large format Retail (A1) and Residential (C3)	68.4	Set back 40m from the corner of Syon Lane and the great west road.	• With no set back from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 12m high. • For a setback 10m from Great West Road

Receptor		Land Use Class	Worst Case NO_2 Concentration within Site Boundary ($\mu g/m^3$)	Potential Measures to Meet 50$\mu g/m^3$ Target AQO for Amenity Areas	Potential Measures to Meet 38$\mu g/m^3$ Level Long Term AQO for Residential/School Receptors
					and the corner of the Great West Road and Syon Lane, residential units should begin from 12m high. • For a setback 20m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 12m high. • For a setback 30m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 12m high. • For a setback 40m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 10m and 12m high respectively. • For a setback 50m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 10m and 12m high respectively. • For a setback 60m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 10m and 10m high respectively. • For a setback 70m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 8m and 10m high respectively. • For a setback 80m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 6m and 10m high respectively. • For a setback 90m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from 4m and 10m high respectively. • For a setback 100m from Great West Road and the corner of the Great West Road and Syon Lane, residential units should begin from GF and 8m high respectively. Any residential units above 12m would not require any setbacks.
R12	Former Syon Gate Service Station Gillette Corner	Light Industrial (B1c) and Residential (C3).	64.4	Setback of 20m from Great West Road	Residential Units should begin from 12m high. Setback from distance is not a viable option for this site.

Receptor		Land Use Class	Worst Case NO_2 Concentration within Site Boundary ($\mu g/m^3$)	Potential Measures to Meet 50$\mu g/m^3$ Target AQO for Amenity Areas	Potential Measures to Meet 38$\mu g/m^3$ Level Long Term AQO for Residential/School Receptors
R13	Harlequin Avenue Sub station	Business (B1a/b) and Residential (C3).	32.8	N/A	N/A
R14	2 Harlequin Avenue	Light Industrial (B1c)	35.2	N/A	N/A
R15	Land at Glaxosmith kline	Business (B1a/b)	70.4	Set 35m back from the corner of great west road and Boston manor road junction.	N/A
R16	Brentside Park	Business (B1a/b), Residential (C3) and Retail (A1-A4)	52.1	Setback 10m from Great West Road	• With no setback from Great West Road residential units should begin from 12m high. • With a 10m setback from Great West Road, residential units should begin from 12m high. • With a 20m setback from Great West Road, residential units should begin from 10m high. • With a 30m setback from Great West Road, residential units should begin from 10m high. • With a 40m setback from Great West Road, residential units can begin from ground floor.
R17	Great West Plaza	Business (B1a/b), Residential (C3) and Retail (A1-A4)	62.4	Setback 15m from Great West Road	Residential units should be set back approximately 60m from Great West Road. Or residential units should start from 10m high along Great West Road, except the north east corner of the site along great west road where residential should begin from 14m high.
R18	Great West House	Business (B1a/b), Residential (C3) and Retail (A1-A4)	64.5	Setback 35m from Great West Road	Additional design mitigation should be considered as setbacks at height and distance would not be a viable option and would heavily restrict development. Non-sensitive use should screen the residential units or the use of greenery along Great West Road A4 should be implemented
R19	Mille Building	Business (B1a/b) and Retail (A1-A4)	67.3	Set at 6m high below the M4 and from 14m high above the M4.	N/A
R20	Boston Manor Road Sub Station	Business (B1a/b)	54.7	Set back 25m from Boston Manor Road	N/A
R21	Enterprise, Boston Park Road	Light Industrial (B1c)	70.1	Any units will be either below the M4 and those units above the M4 will be where 14m high would be located to ensure the short-term air quality objective is not exceeded.	N/A
R22	1020 Great West Road	Light Industrial (B1c)	68.6	Any units below the M4 along the A4 will be either set back 15, from the A4 or begin from 6m high. Those	N/A

Receptor		Land Use Class	Worst Case NO_2 Concentration within Site Boundary ($\mu g/m^3$)	Potential Measures to Meet 50µg/m³ Target AQO for Amenity Areas	Potential Measures to Meet 38µg/m³ Level Long Term AQO for Residential/School Receptors
				units above the M4 are not expected to be at risk to exceeding the short term air quality objective	
R23	Texaco Filling Station, Great West Road, Brentford	Light Industrial (B1c)	83.4	Any units below the M4 along the A4 will be either set back 25m from the south east corner of the site adjacent to the A4 Ealing road roundabout or begin from 6m high. Those units above the M4 should begin 14m high along the M4	N/A
R24	Layton Road Warehouses	Residential (C3).	38.6	N/A	Residential units will ideally be located away from the north east corner of the site and begin from 4m high.
R25	Layton Road Car Park	Education (D1)	51.1	N/A	Any outdoor plan areas should be located towards the south west of the proposed site location to limit any risk to exceedances of the air quality objective.
R26	Phoenix Business Park	Light Industrial (B1c), Industrial (B2/8), Business (B1a/b), Residential (C3) and Retail (A1-A4)	82.7	non-residential unit below 8m has the potential to exceed the short term 50 µg/m3 objective, as such a setback of 35m from the A4 and Ealing Road should be implemented.	Residential units are to be screened by less sensitive non-residential units along the A4,
R27	Kew Bridge Distribution Centre	Light Industrial (B1c), Industrial (B2/8), Business (B1a/b), Residential (C3) and Retail (A1-A4)	60.2	Non-residential units should be set 25m back from the north west corner of the site and from the A4/M4 Junction	Residential units should begin from 20m high upwards. se of non-residential units will shield residential units behind and should ensure that the exposure is below the 38 µg/m3 objective
R28	27 Great West Road	Business (B1a/b), Residential (C3) and Retail (A1-A4)	61.8	Any non-residential unit below 6m has the potential to exceed the short term 50 µg/m3 objective, as such a setback of 25m from A4/M4 should be implemented.	Residential units should not require shielding or setbacks of any distance at 25m high.
R29	EMC Tower	Business (B1a/b) and Residential (C3).	57.5	Non-residential units below the M4 are expected to not be at risk to exposure to exceedances of the short term NO2 air quality objective. Any non-residential units should be set 10m back along the M4/A4 from 10m high and no set back is required from the 12m high. No set back is required below the M4 for non-residential units.	Residential units should begin from 6m high if set back 60m from the A4/M4, residential should be set back from 10m high, from 14m high 30m set back and no set back is required 18m high upwards.
R30	Anfield Vantage West	Residential (C3).	40.7	N/A	It is considered that the existing Vantage West building will shield residential units behind and should ensure that the exposure is below the 38 µg/m3 objective
R31	1-4 Capital Interchange Way	Business (B1a/b), Residential (C3) and Retail (A1-A4).	54.6	setback of 15m from A4/M4 should be implemented. Where a setback is not a viable option, the use of greenery should be used as a buffer	It is considered that the use of non-residential units to shield residential units behind should ensure that exposure is below the 38 µg/m3 objective,
R32	Brentford	Leisure (D2), Residential (C3)	56.7	N/A	Residential units should begin from 12m high if set

Receptor		Land Use Class	Worst Case NO_2 Concentration within Site Boundary ($\mu g/m^3$)	Potential Measures to Meet 50$\mu g/m^3$ Target AQO for Amenity Areas	Potential Measures to Meet 38$\mu g/m^3$ Level Long Term AQO for Residential/School Receptors
	Fountains Leisure Centre	and Retail (A1-A4).			back 75m from the A4/Chiswick High Road roundabout, 35m 14m high and no set back from 16m high.
R33	Esso Filling Station Chiswick Roundabout	Business (B1a/b) and Residential (C3).	69.9	Non-sensitive uses located up to 12m in height may exceed the short term AQO and the long term AQO of 50µg/m3 has the potential to be exceeded. As outlined above, a setback may not prove a viable option for this site and therefore, other additional design mitigation should be implemented.	Residential units should begin from 20m high upwards
R34	Former Natwest Bank Site, Chiswick	Business (B1a/b), Residential (C3) and Retail (A1-A4).	80.3	sensitive use up to 14m may exceed the short term AQO as the long term of 50 µg/m3 has the potential to be exceeded. A setback would not prove a viable option given site constraints, and other additional design mitigation should be implemented	Residential units should begin from 20m high.
R35	B&Q Chiswick	Leisure (D2), Hotel (C1), Business (B1a/b) Residential (C3) and Retail (A1-A4).	71.6	• Non-sensitive uses should be set back 20m from the A4/M4 and A406 at heights up to 6m. • Non-sensitive uses should be set back 10m from the A4/M4 at heights between 6m-10m.	• The whole site is above the AQO up to 12m high, residential units should not be below 12m high. • Within 20m of the north east corner of the site adjacent to the A406, residential units should begin from 14m high. • Within 70m of the north east corner of the site adjacent to the A406, residential units should begin from 16m high. • Within 100m of the north east corner of the site adjacent to the A406, residential units should begin from 18m high. • Within 125m of the north east corner of the site adjacent to the A406, residential units should begin from 20m high. • From 25m high residential units would not require additional mitigation for the site area.
R36	110 Power Road	Light Industrial (B1c)	36.4	N/A	N/A
R37	Gunnersbury Station Car Park	Business (B1a/b), Residential (C3), and Retail (A1-A4).	38.6	N/A	residential units should be set back 10m from the northern boundary along Chiswick High Road. Any residential units within 10m of northern boundary along Chiswick High Road should be a minimum of 6m in height.

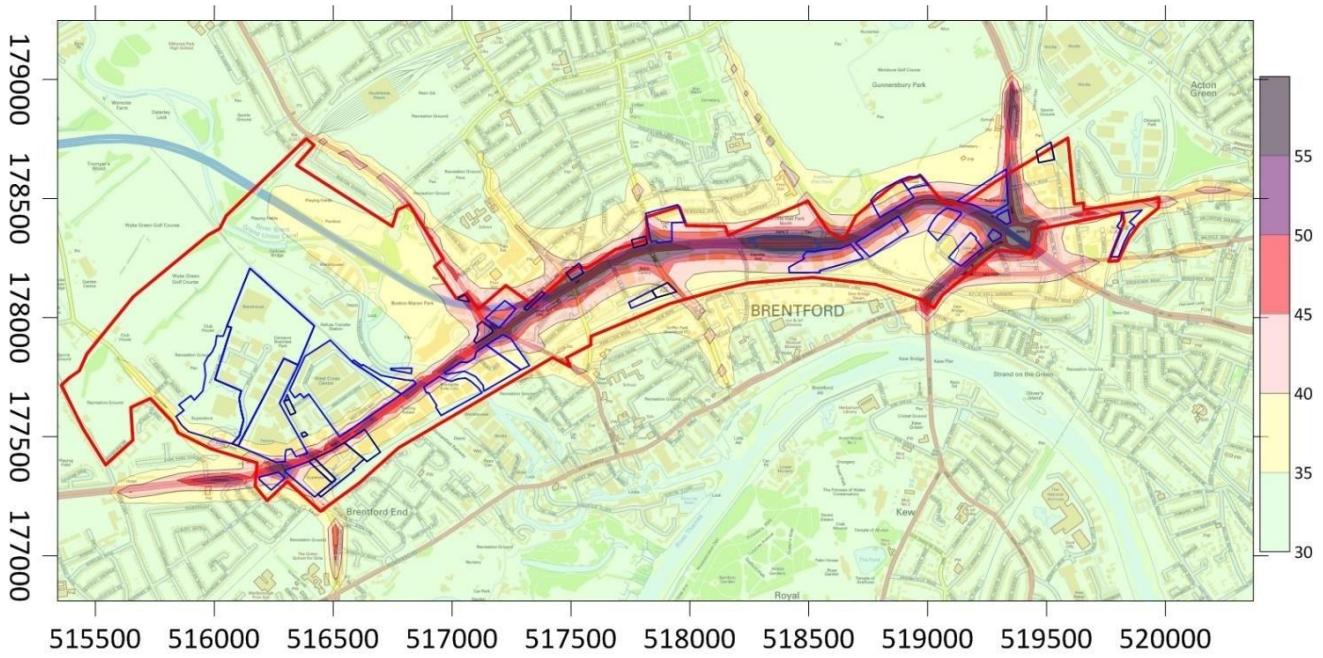


Figure B2 NO_2 Concentrations at 2nd Storey Height (µg/m³)

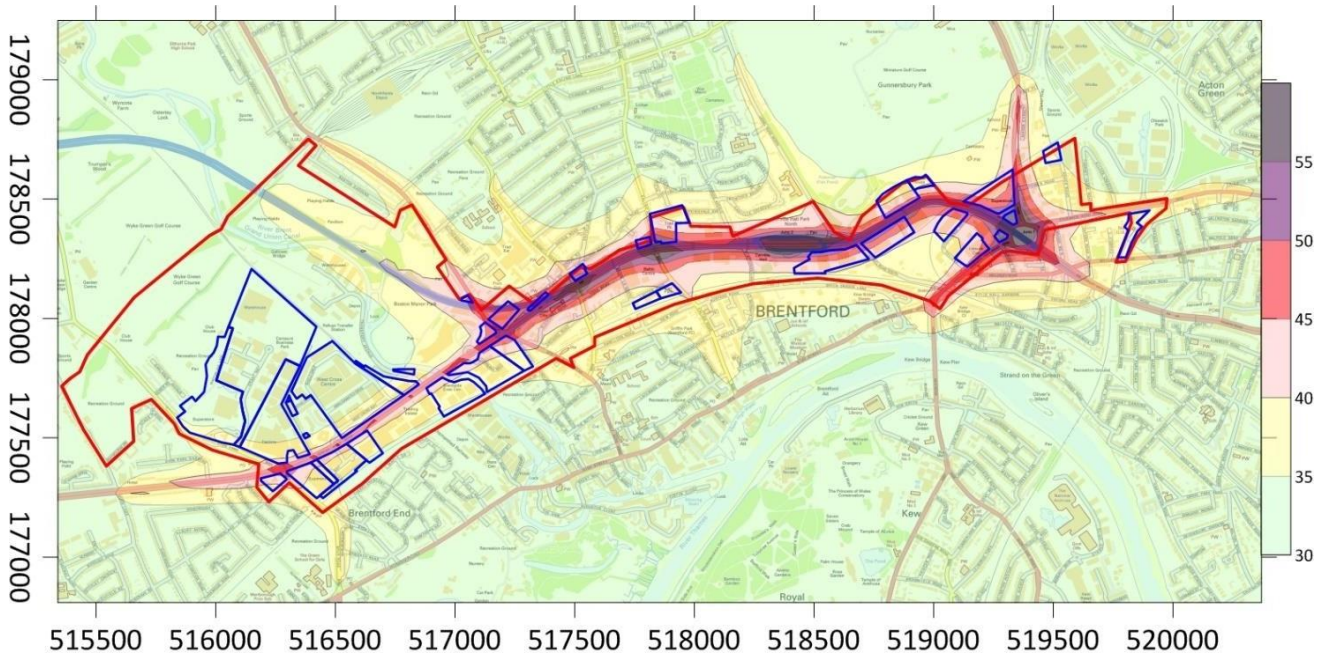


Figure B3 NO_2 Concentrations at 3rd Storey Height (µg/m³)

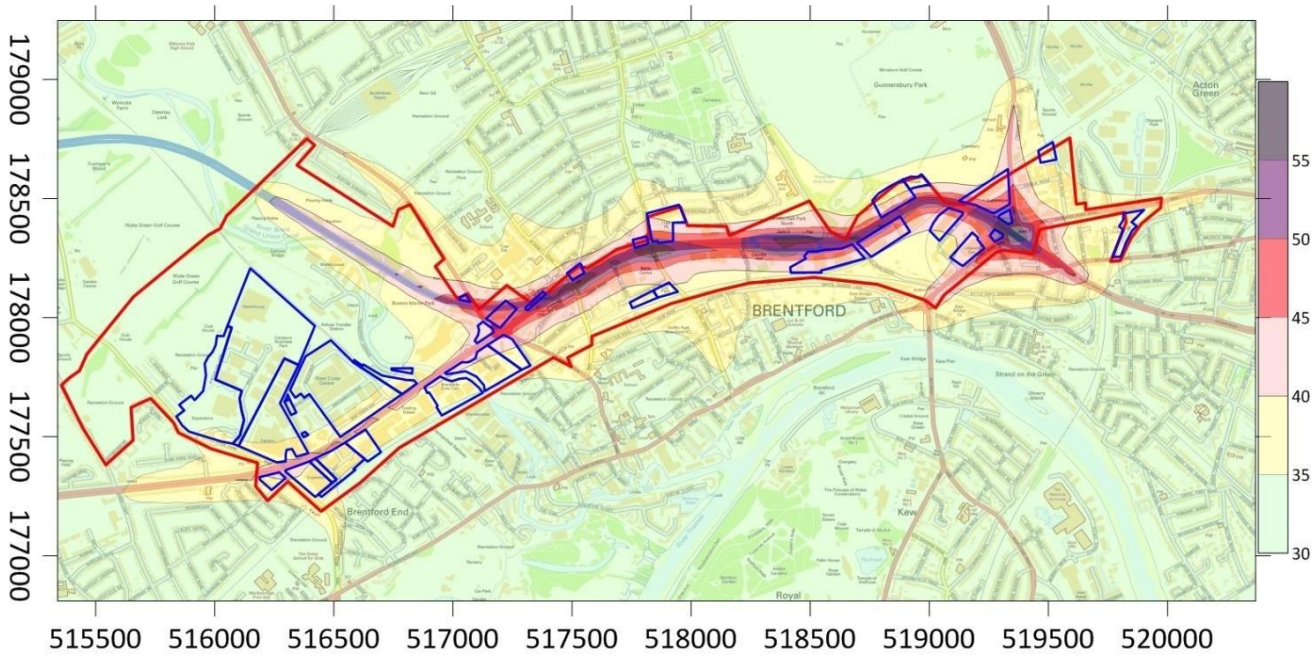


Figure B4 NO_2 Concentrations at 4th Storey Height (µg/m³)

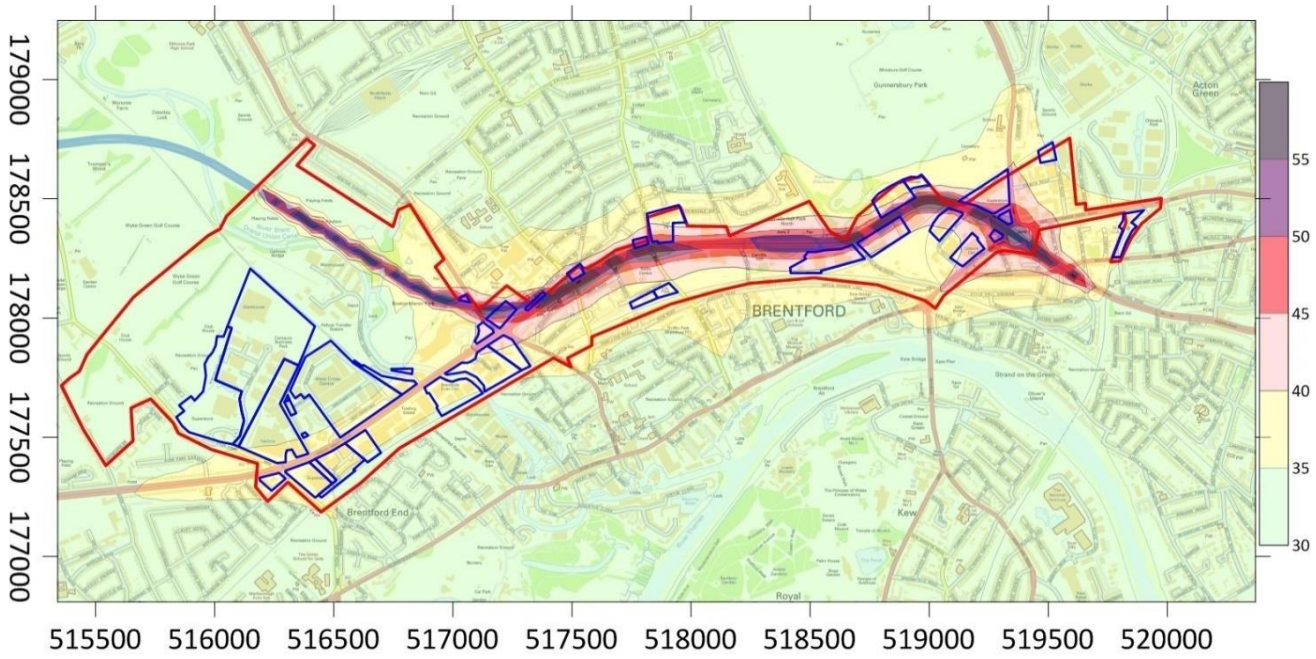


Figure B5 NO_2 Concentrations at 5th Storey Height (µg/m³)

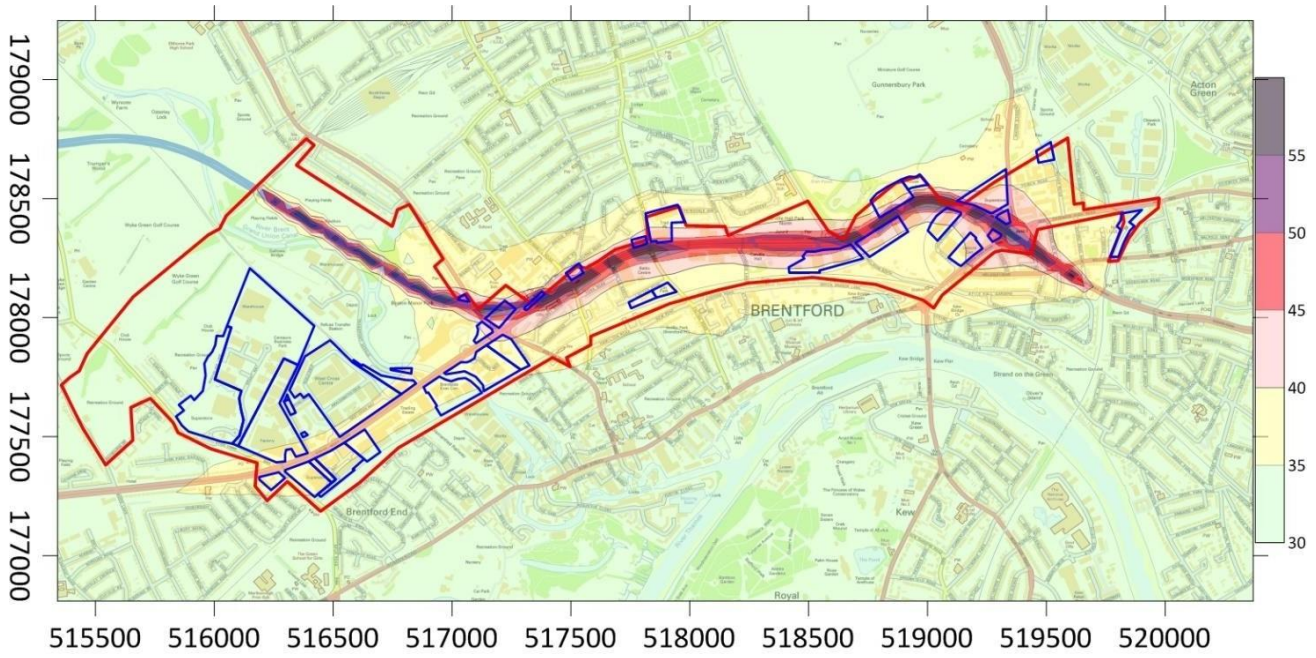


Figure B6 NO_2 Concentrations at 6th Storey Height (µg/m³)

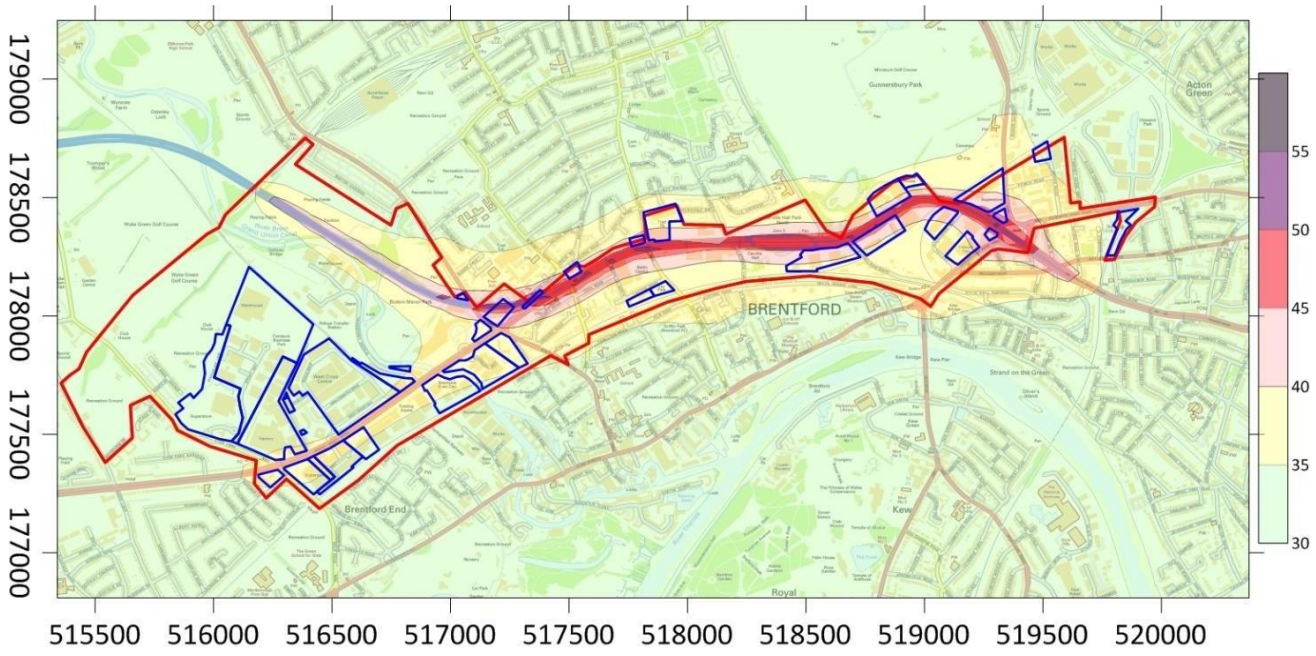


Figure B7 NO2 Concentrations at 7th Storey Height (µg/m³)

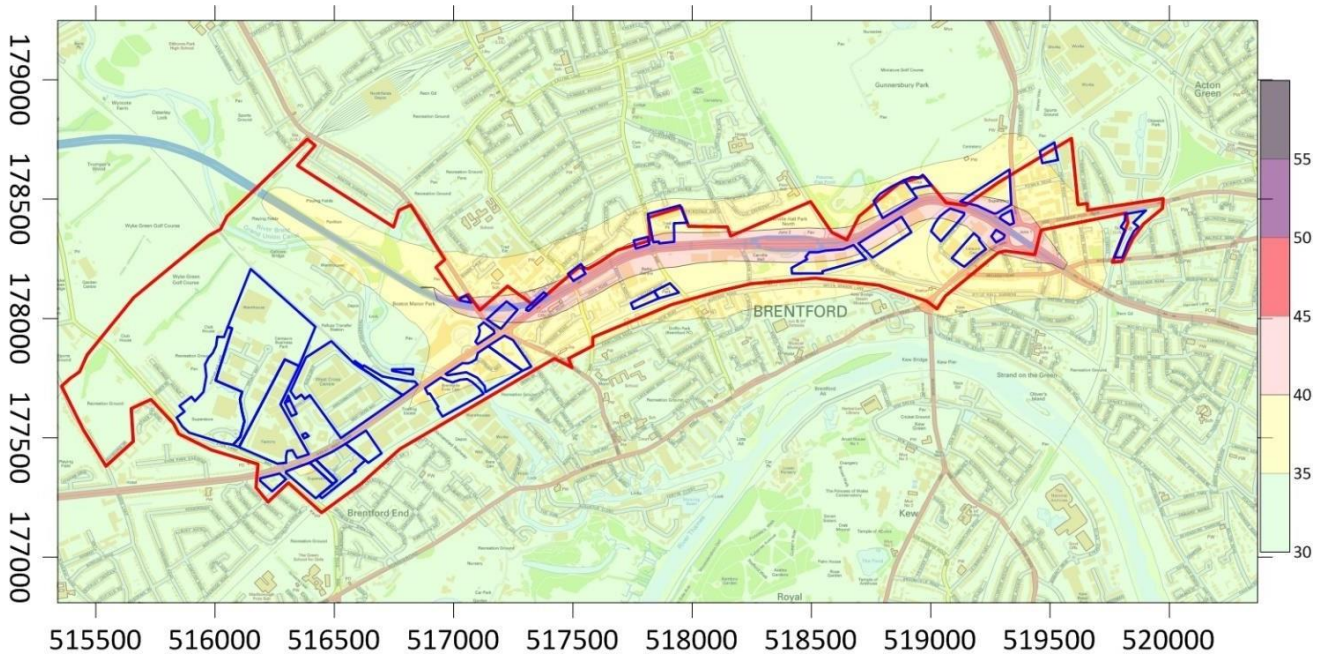


Figure B8 NO_2 Concentrations at 8th Storey Height (µg/m³)

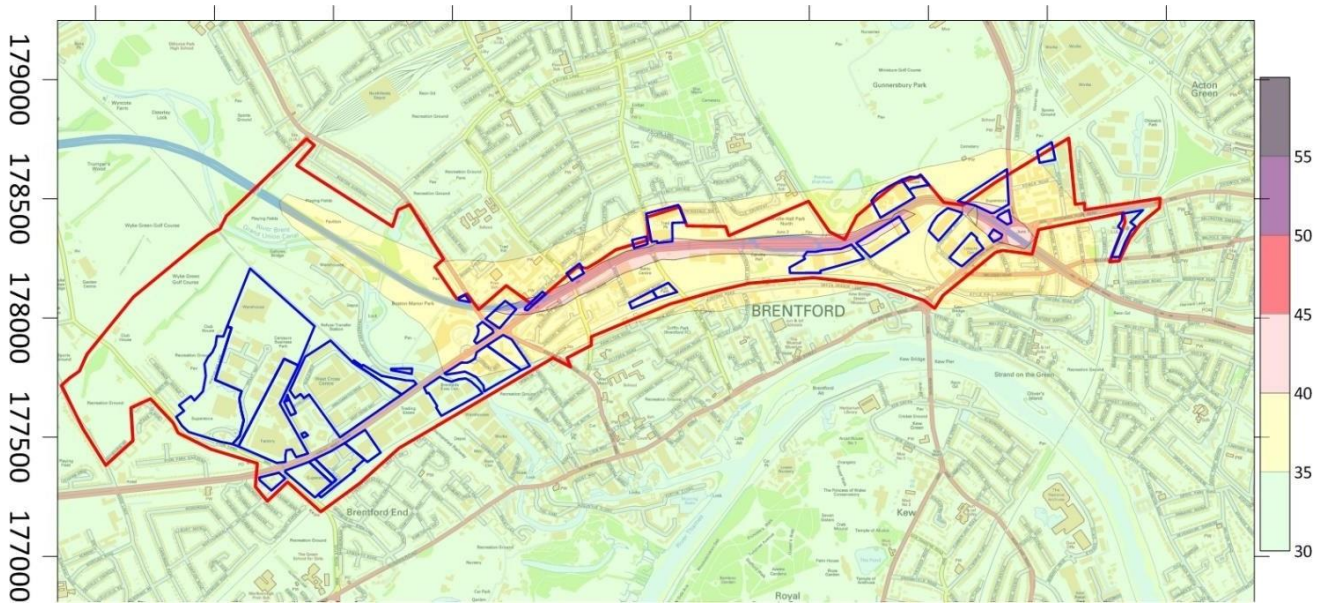


Figure B9 NO_2 Concentrations at 9th Storey Height (µg/m³)

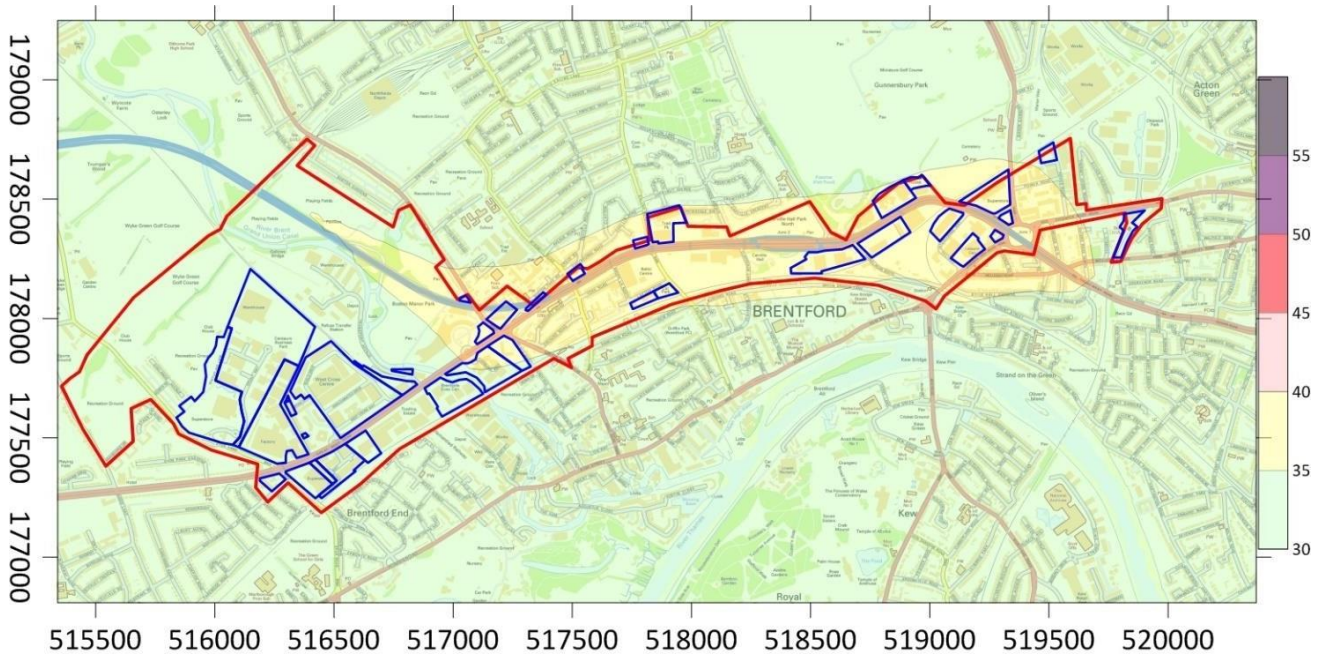


Figure B10 NO_2 Concentrations at 10th Storey Height (µg/m³)

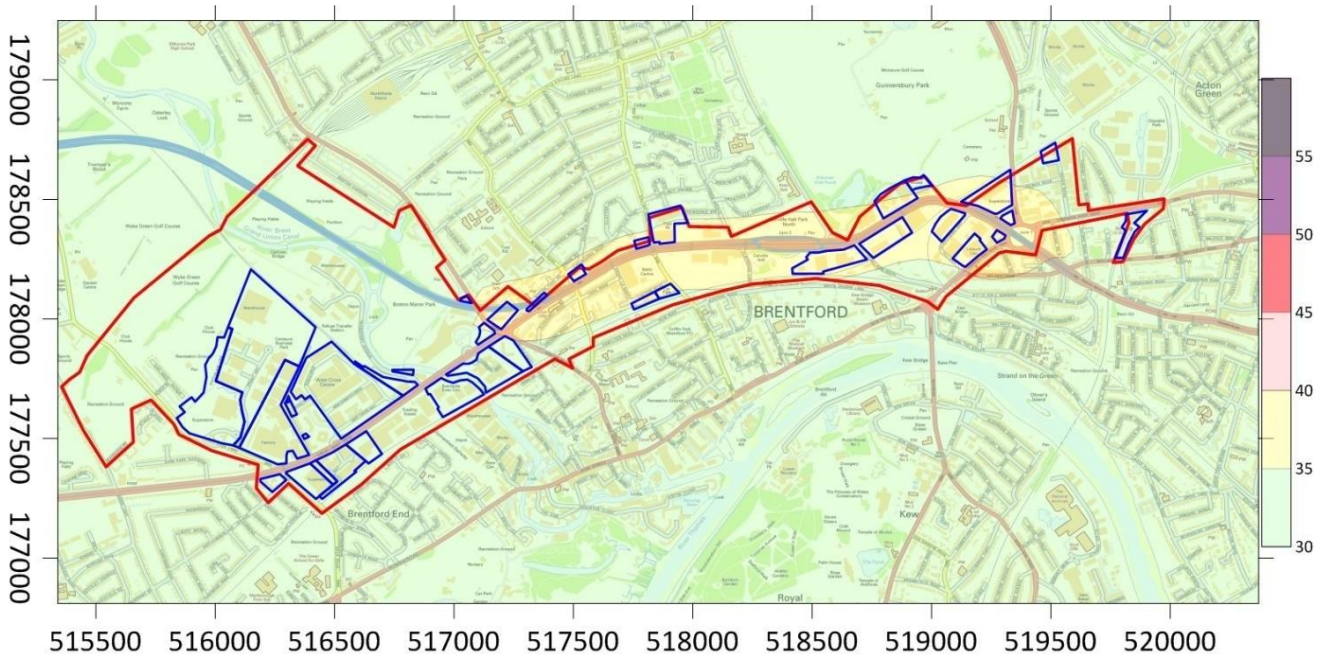


Figure B11 NO_2 Concentrations at 25m Height (µg/m³)

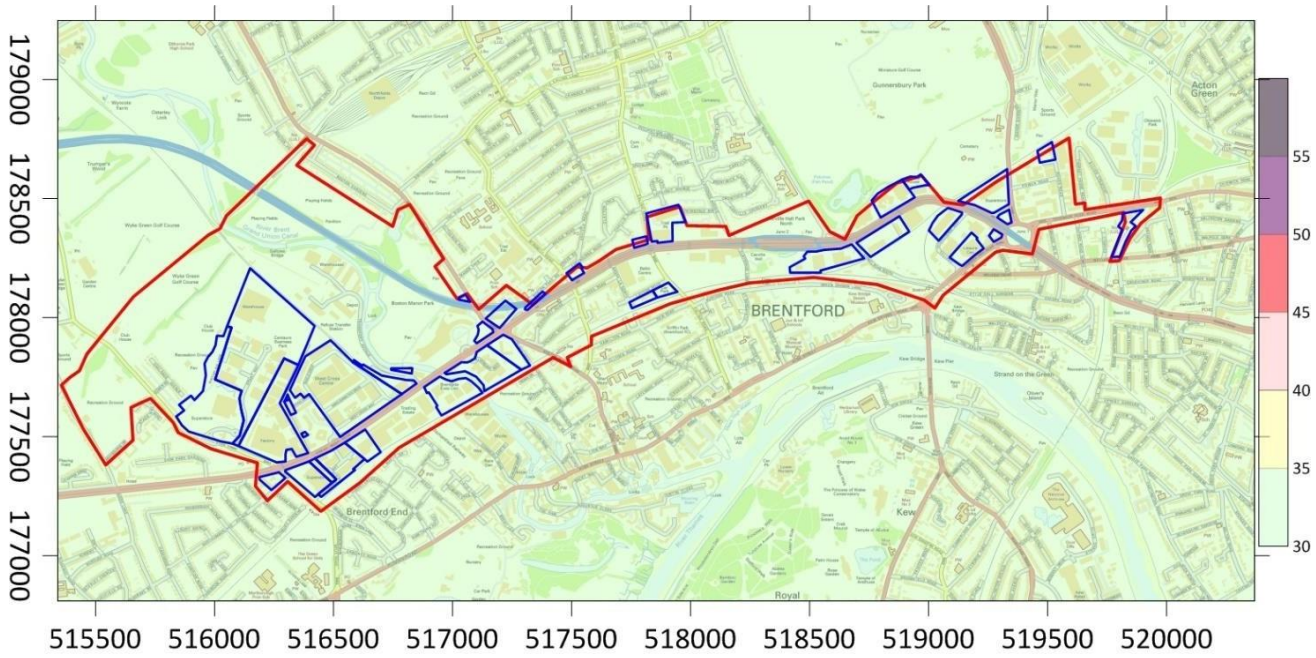


Figure B12 NO_2 Concentrations at 30m Height (µg/m³)

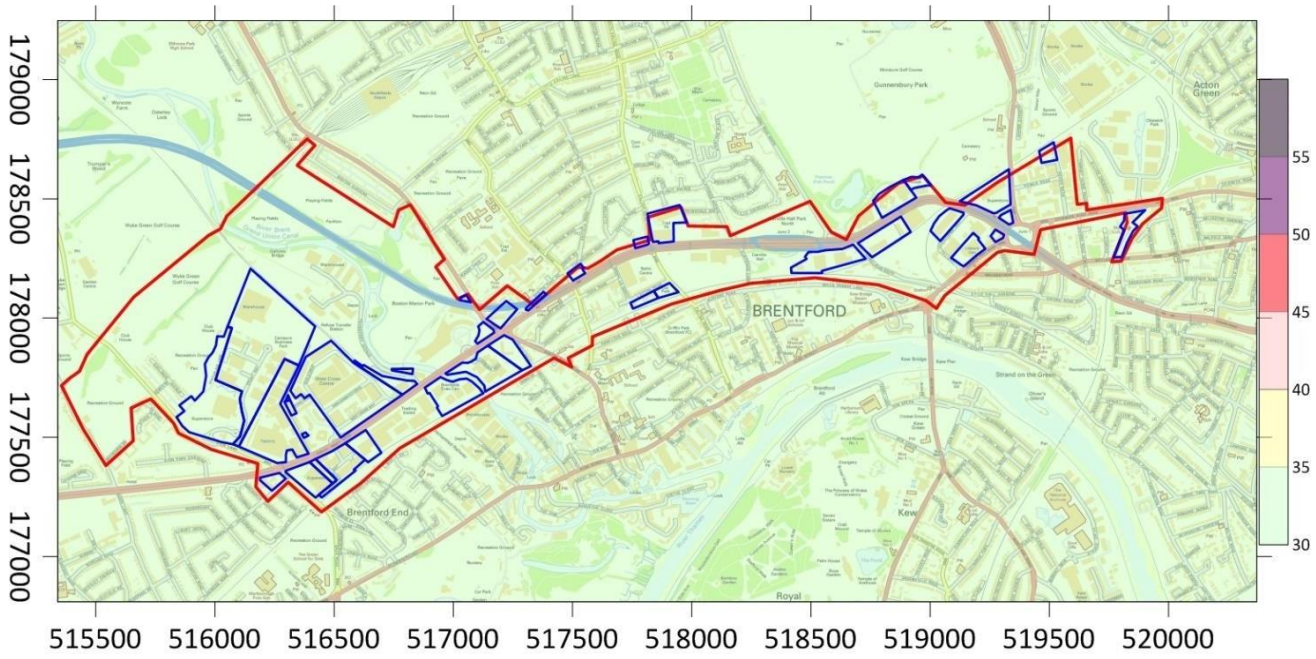


Figure B13 NO_2 Concentrations at 40m Height (µg/m³)

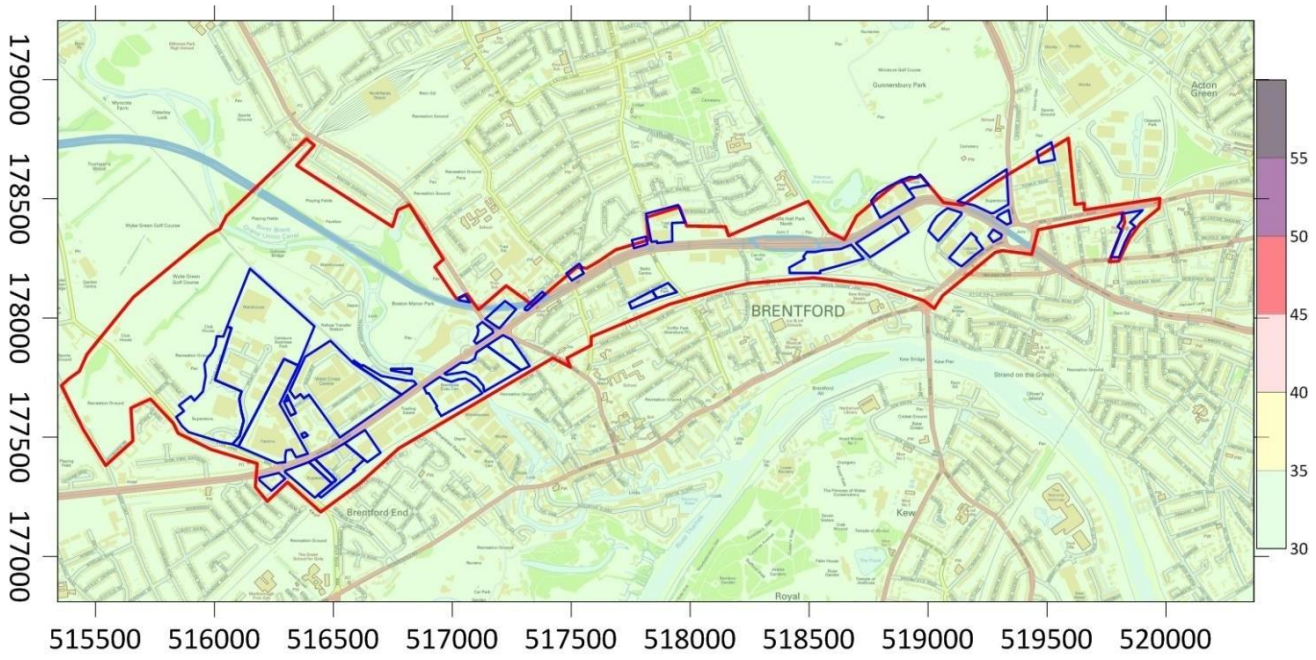
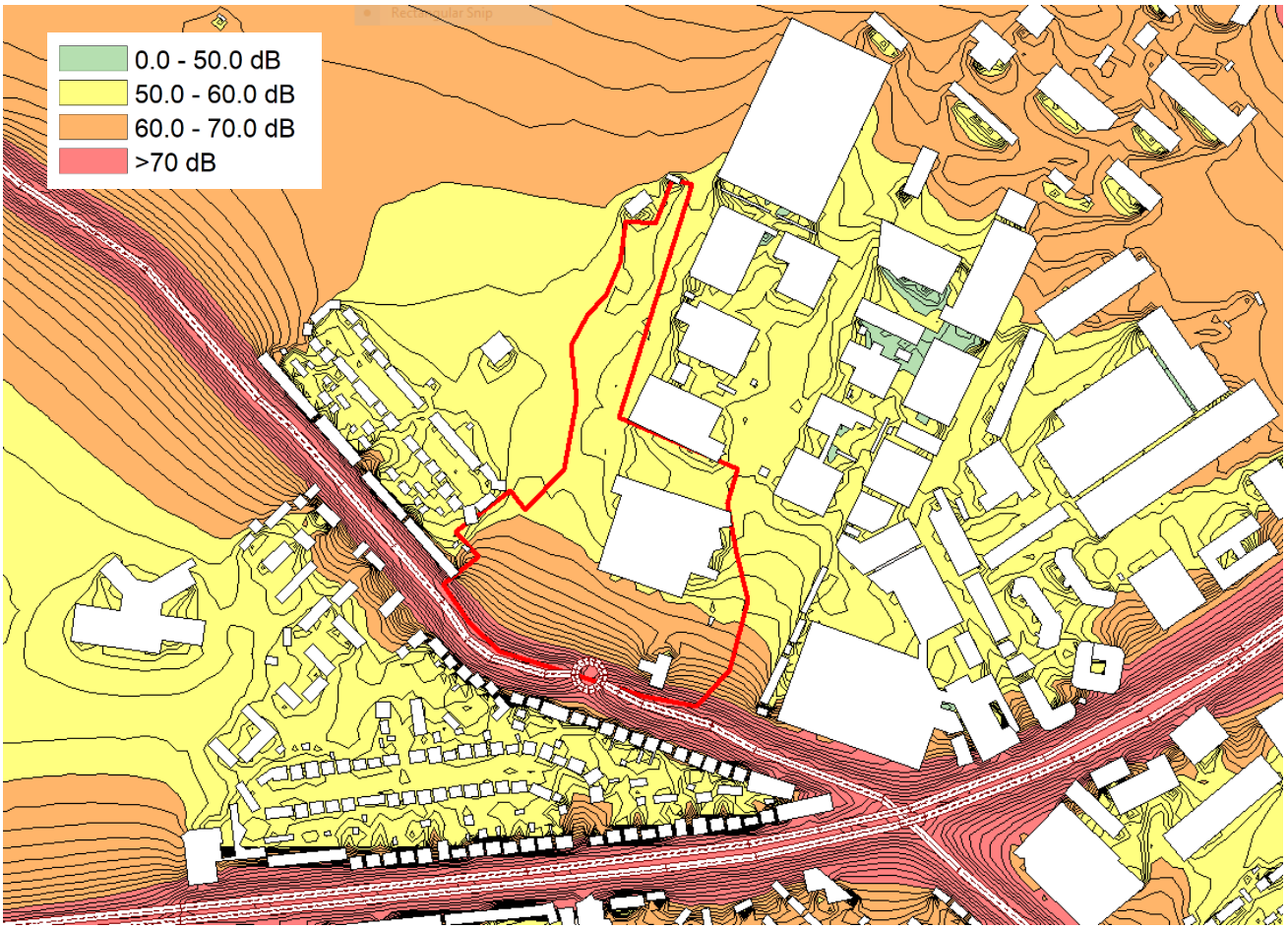


Figure B14 NO_2 Concentrations at 50m Height (µg/m³)

Appendix C – Noise Great West Corridor Designated Site Considerations

2 - Tesco Osterley Large Format Retail (A1) and Residential (C3)

Proposal - Tesco Osterley will be redeveloped into a mixed-use site incorporating new housing and an enhanced public realm.

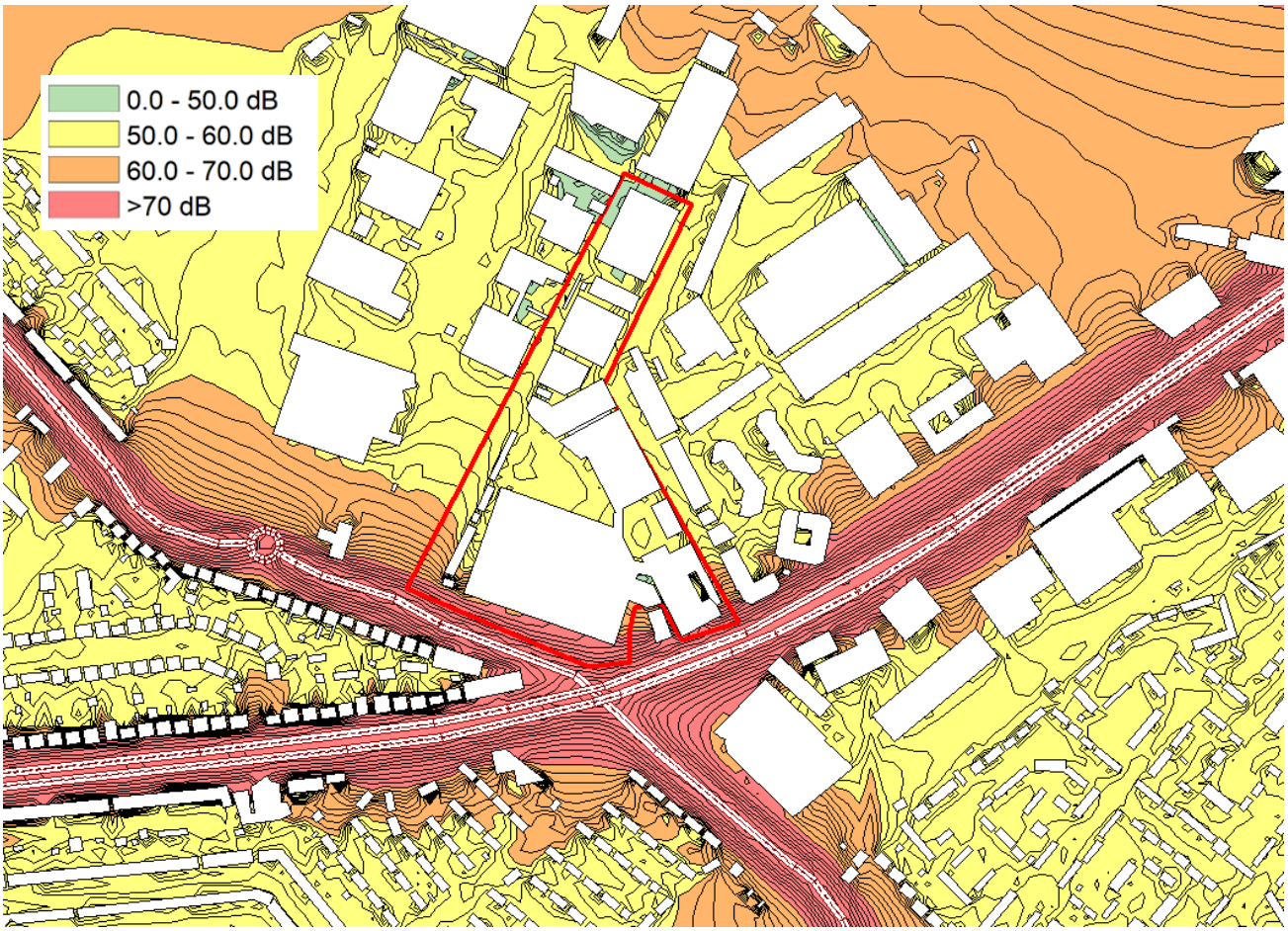


The development site is located approximately 140m from the A4 and outside of the Heathrow 57 dB L_{Aeq} noise contour. Road traffic noise within the site during the daytime ranges between 58 and 70 dB L_{Aeq} within the development site. As such external amenity spaces such as balconies or gardens within the development site are expected to require detailed consideration to demonstrate that noise levels can be reduced through site layout and barriers where appropriate.

Detailed consideration will also need to be given to the surrounding industrial and commercial uses which surround the development site and constraints on development that may arise, in-line with the agent of change principle.

3 - Gillette Factory Business (B1) principally light industrial (B1c) with limited residential (C3) and retail

Proposal - Gillette Corner will become a major new creative hub drawing on its unique heritage to deliver flexible light industrial space with ancillary Office and their supporting uses related to media and production, making the most of the building's large floorplates and attractive features.

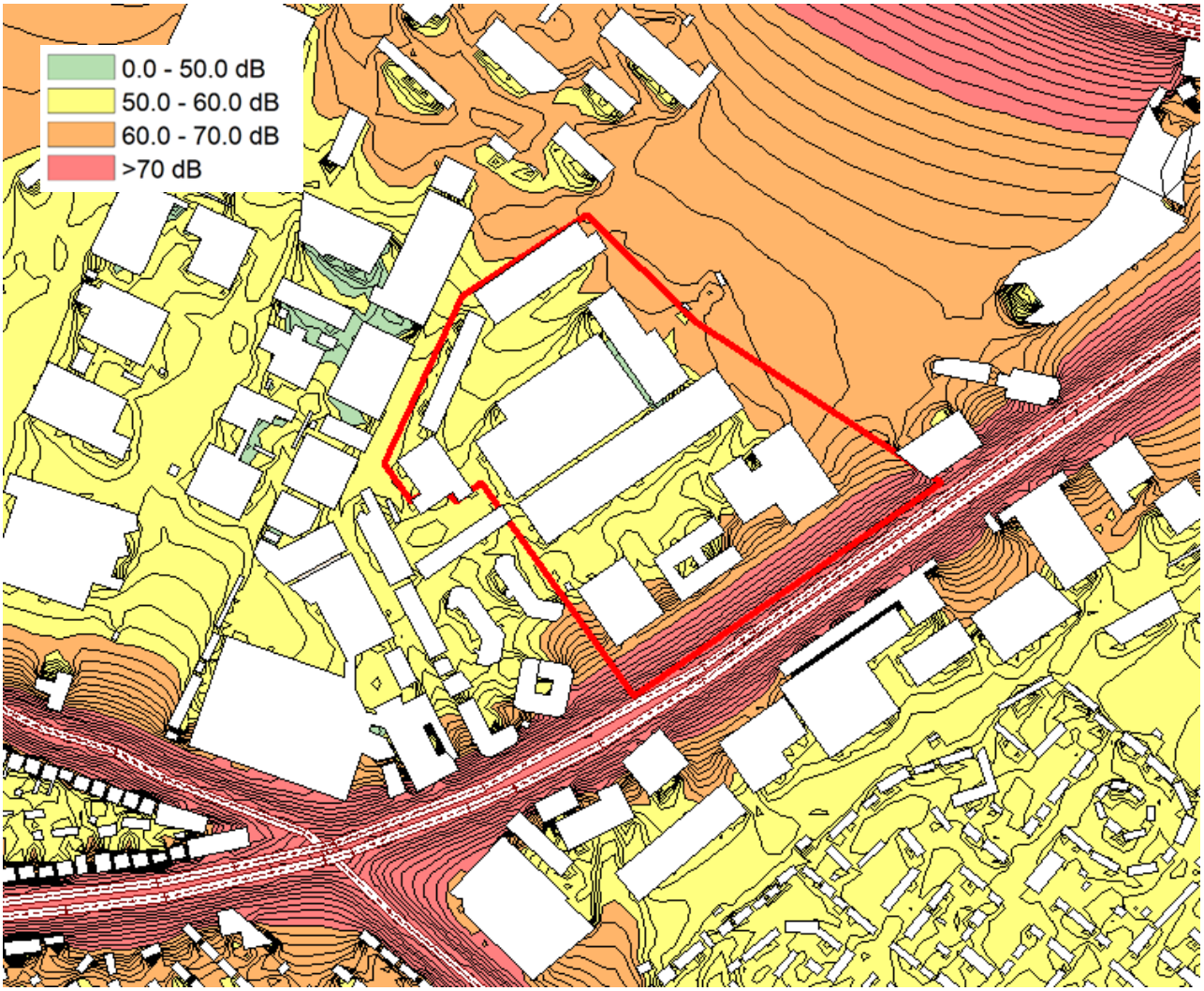


The development site borders the A4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour. Road traffic noise within the site during the daytime ranges between 60 and 75 dB L_{Aeq} within the development site. As such external amenity spaces such as balconies or gardens within the development site are expected to exceed the SOAEL and would require detailed consideration to demonstrate that noise levels can be reduced through site layout and barriers where appropriate. Potential balcony areas facing the A4 at up to 60 metres (vertically and horizontally) from the road are expected to exceed the SOAEL (assuming no screening is provided by intervening structures) and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the A4 may be appropriate.

Detailed consideration will also need to be given to the surrounding industrial and commercial uses which surround the development site and constraints on development that may arise, in-line with the agent of change principle.

5 - West Cross Campus Industrial (B2/B8), Light Industrial (B1c); Business (B1a/b) uses, Residential (C3) and Retail (A1-A4)

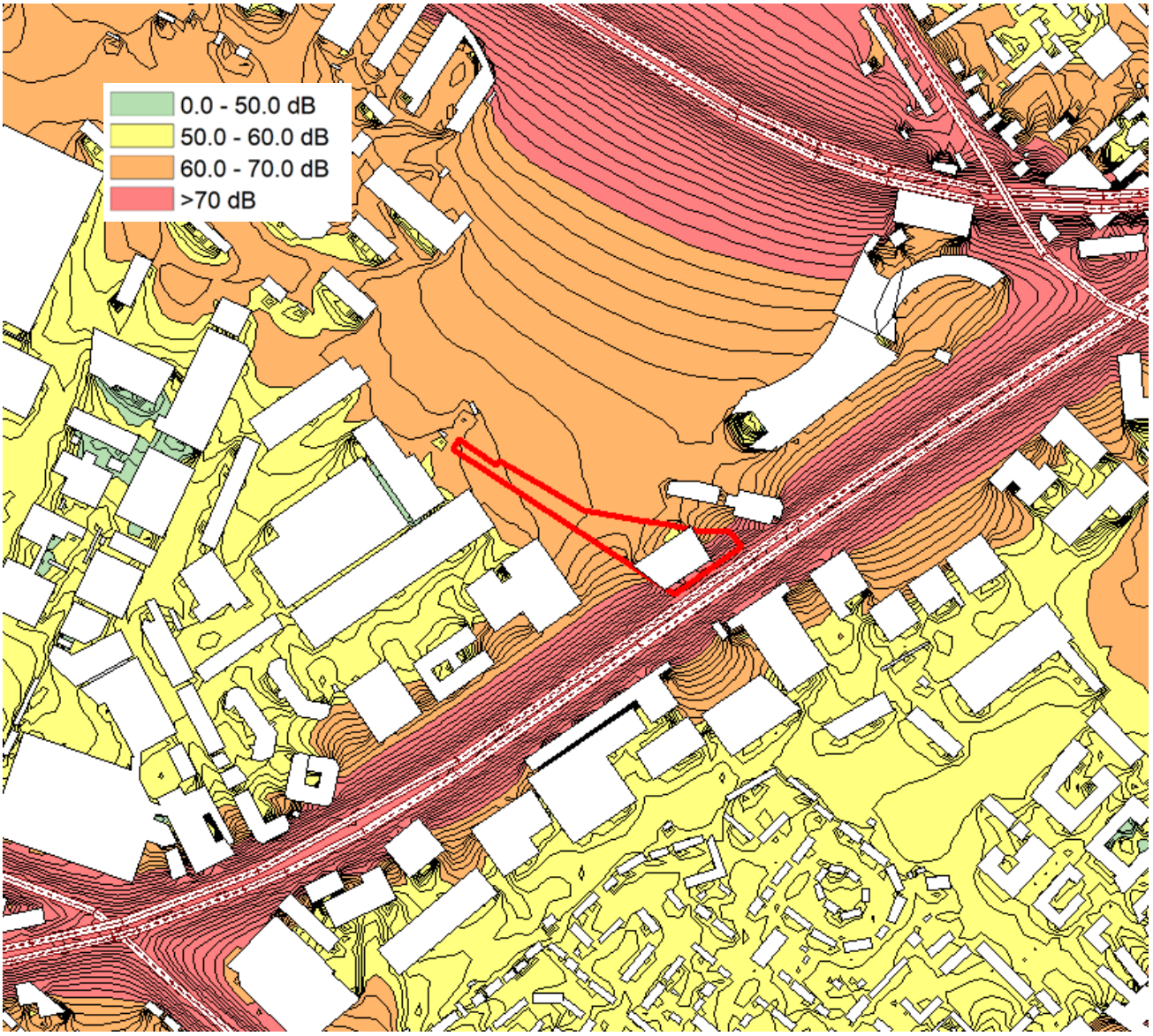
Proposal - The West Cross Campus will become a high-quality mixed-use industrial quarter of light industrial, office and other employment uses, in a range of unit sizes, co-located with housing and shared amenities creating a sense of an 'industrial life'. It is a major opportunity for transformation and intensification to take forward the Mayor of London's Policy for industrial intensification and co-location with residential uses.



The development site borders the A4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour. Road traffic noise within the site during the daytime ranges between 55 and 75 dB L_{Aeq} within the development site. As such external amenity spaces such as balconies or gardens within the development site are expected to exceed the SOAEL and would require detailed consideration to demonstrate that noise levels can be reduced through site layout and barriers where appropriate. Potential balcony areas facing the A4 at up to 60 metres from the road are expected to exceed the SOAEL (assuming no screening is provided by intervening structures) and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the A4 may be appropriate.

6 - BSS Brentford Light Industrial (B1c); Office (B1a/b), Residential (C3) and Retail (A1-A4)

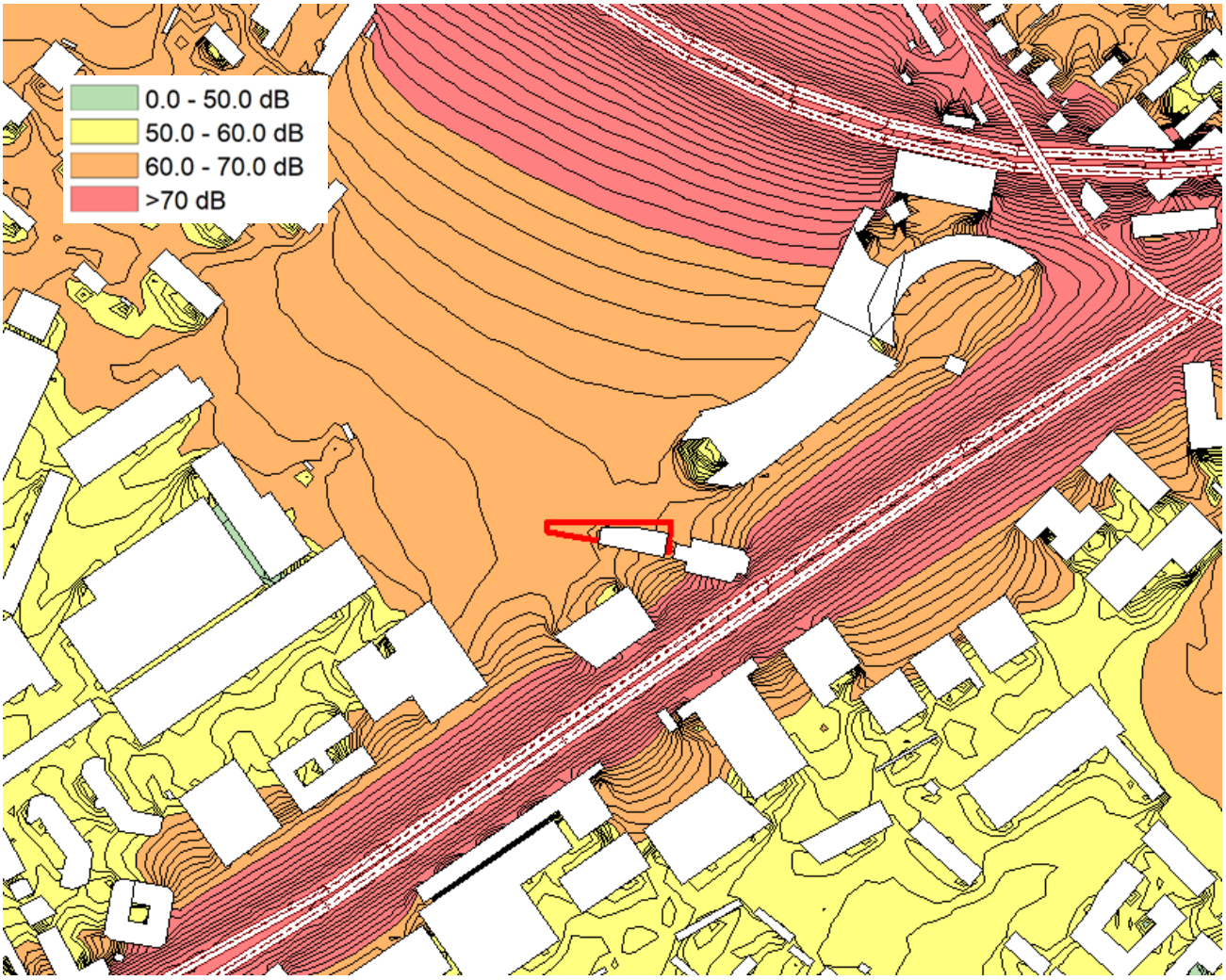
Proposal - The BSS Brentford Site will be redeveloped and intensified to support a broader range of uses.



The development site borders the A4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour. Road traffic noise within the site during the daytime ranges between 59 and 71 dB L_{Aeq} within the development site. As such external amenity spaces such as balconies or gardens within the development site are expected to exceed the SOAEL and would require detailed consideration to demonstrate that noise levels can be reduced through site layout and barriers where appropriate. Potential balcony areas facing the A4 at up to 60 metres from the road are expected to exceed the

7 - Profile West Brentford Car Park Business (B1a/b) and Residential (C3)

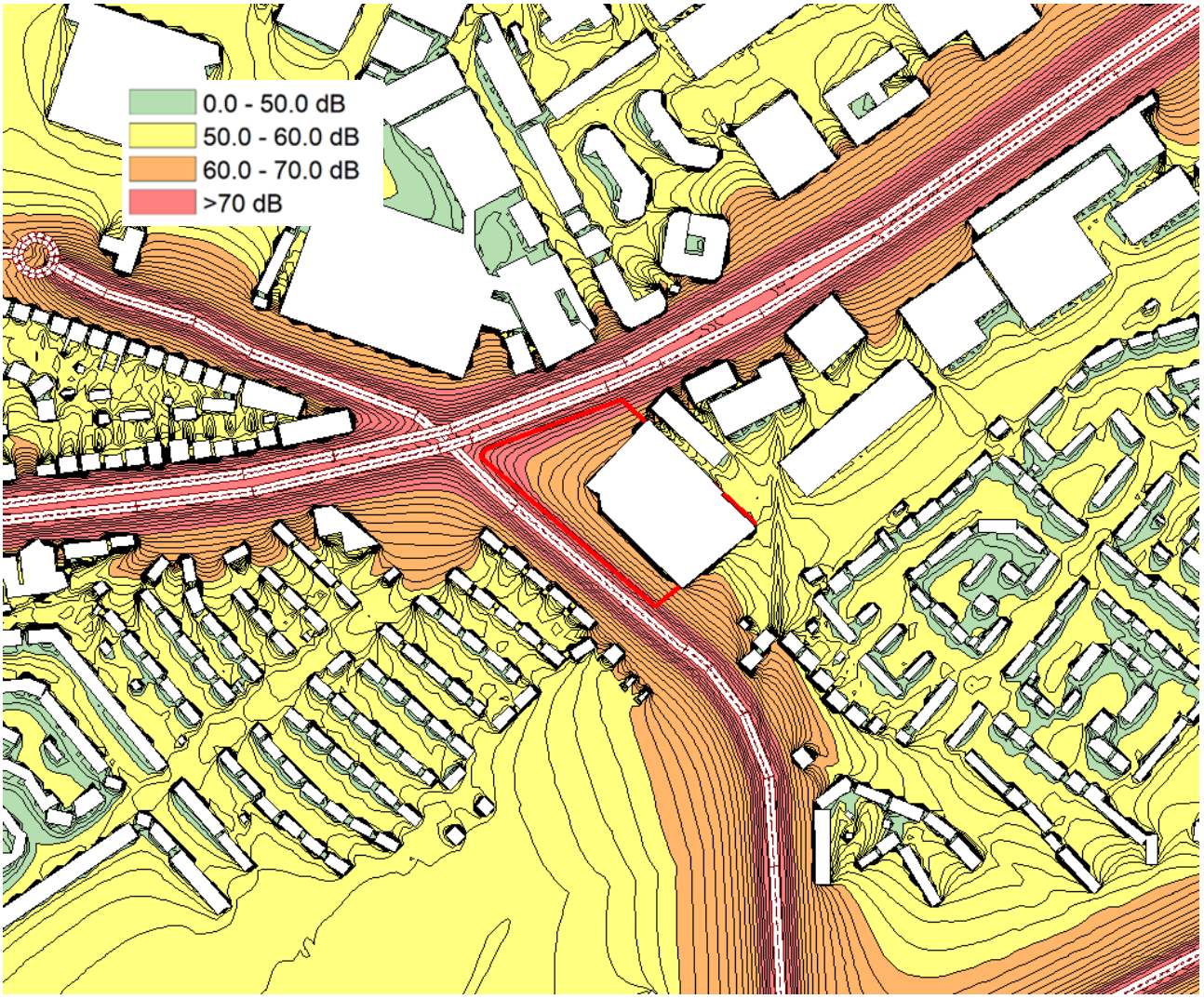
Proposal - The Profile West Car Park will form a key link between Boston Manor Park and the Golden Mile Station and an attractive entrance to Transport Avenue.



The development site is approximately 67m from the A4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour. Road traffic noise within the site during the daytime ranges between 60 and 63 dB L_{Aeq} within the development site. As such external amenity spaces such as balconies or gardens within the development site are expected to exceed the SOAEL and would require detailed consideration to demonstrate that noise levels can be reduced through site layout and barriers where appropriate. Potential balcony areas facing the across the site are expected to exceed the SOAEL and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens may be appropriate.

11 - Homebase Syon Lane Business (B1a/b), Residential (C3) and Retail (A1-A4) or Large format Retail (A1) and Residential (C3)

Proposal - Homebase Syon Lane will be redeveloped to provide a mixed-use development which links Gillette Corner with Syon Lane station.



The development site borders the A4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from rail traffic to the south of the site. Road traffic noise within the site during the daytime ranges between 60 and 75 dB L_{Aeq} within the development site. As such external amenity spaces such as balconies or gardens within the development site are expected to exceed the SOAEL and would require detailed consideration to demonstrate that noise levels can be reduced through site layout and barriers where appropriate. Potential balcony areas facing the A4 at up to 70 metres from the road are expected to exceed the SOAEL (assuming no screening is provided by intervening structures) and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the A4 may be appropriate.

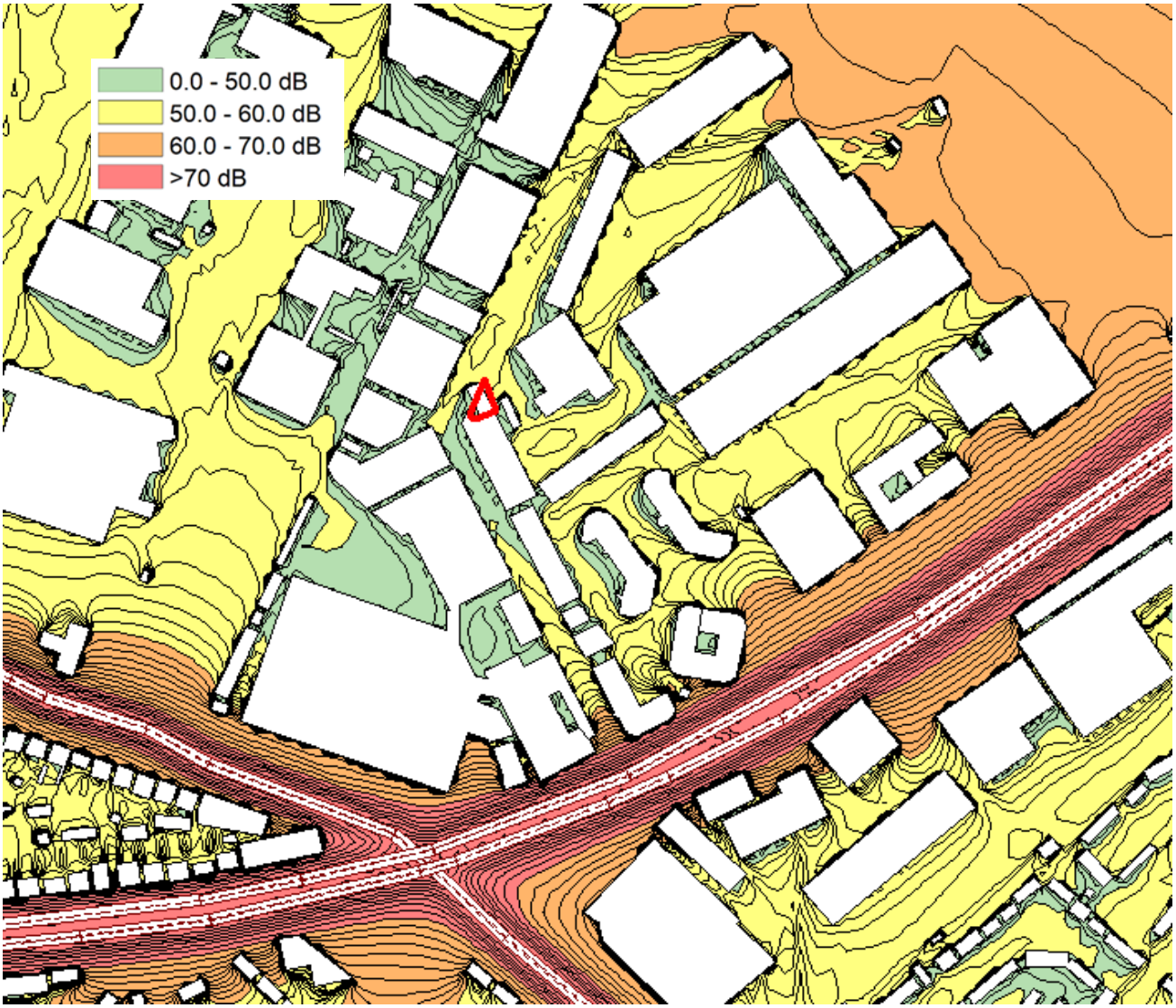
12 - Former Syon Gate Service Station Gillette Corner Light Industrial (B1c) and Residential (C3)

Proposal - The Former Syon Gate site will be redeveloped into an attractive employment location whose high-quality design reflects surrounding listed buildings at the western entrance to the corridor.

The development site borders the A4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour. Road traffic noise within the site during the daytime ranges between 63 and 75 dB L_{Aeq} within the development site. As such external amenity spaces such as balconies or gardens within the development site are expected to exceed the SOAEL and would require detailed consideration to demonstrate that noise levels can be reduced through site layout and barriers where appropriate. Potential balcony areas facing the A4 across the development site are expected to exceed the SOAEL (assuming no screening is provided by intervening structures) and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the A4 may be appropriate.

13 - Harlequin Avenue Substation Business (B1a/b) and Residential (C3)

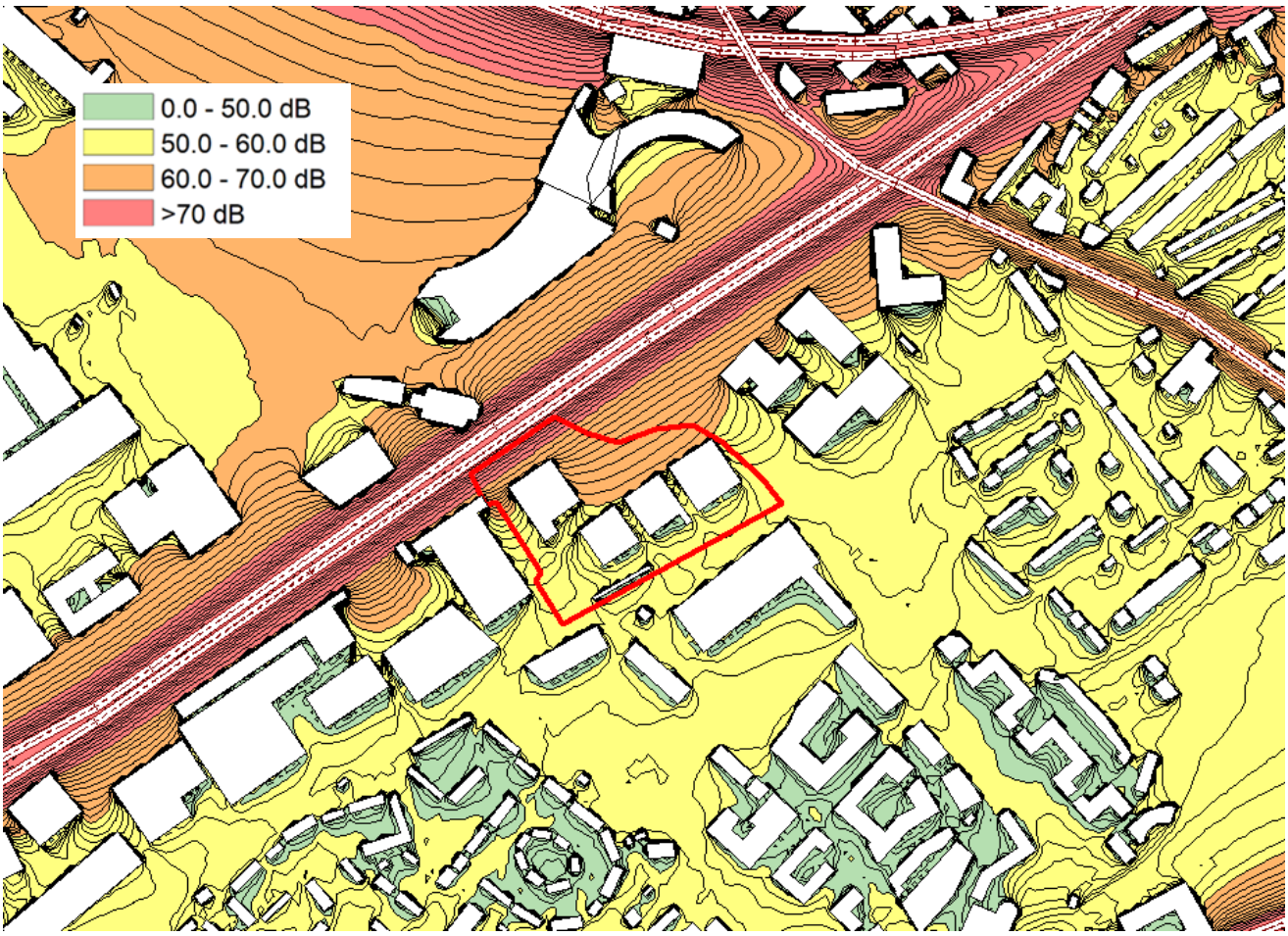
Proposal - Harlequin Avenue sub-station will be redeveloped to provide a number of residential units with modern and flexible business floorspace which integrates with the surrounding business uses.



The development site is located at least 200m from the A4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour. Road traffic noise within the site during the daytime are expected to be below 60 dB L_{Aeq} within the development site. However, considering the numerous commercial and industrial areas surrounding the potential development site, the site is likely to be significantly constrained by existing commercial noise sources and detailed assessment is likely to be required to demonstrate that the site layout can accommodate residential uses.

16 - Brentside Park Business (B1a/b), Residential (C3) and Retail (A1-A4)

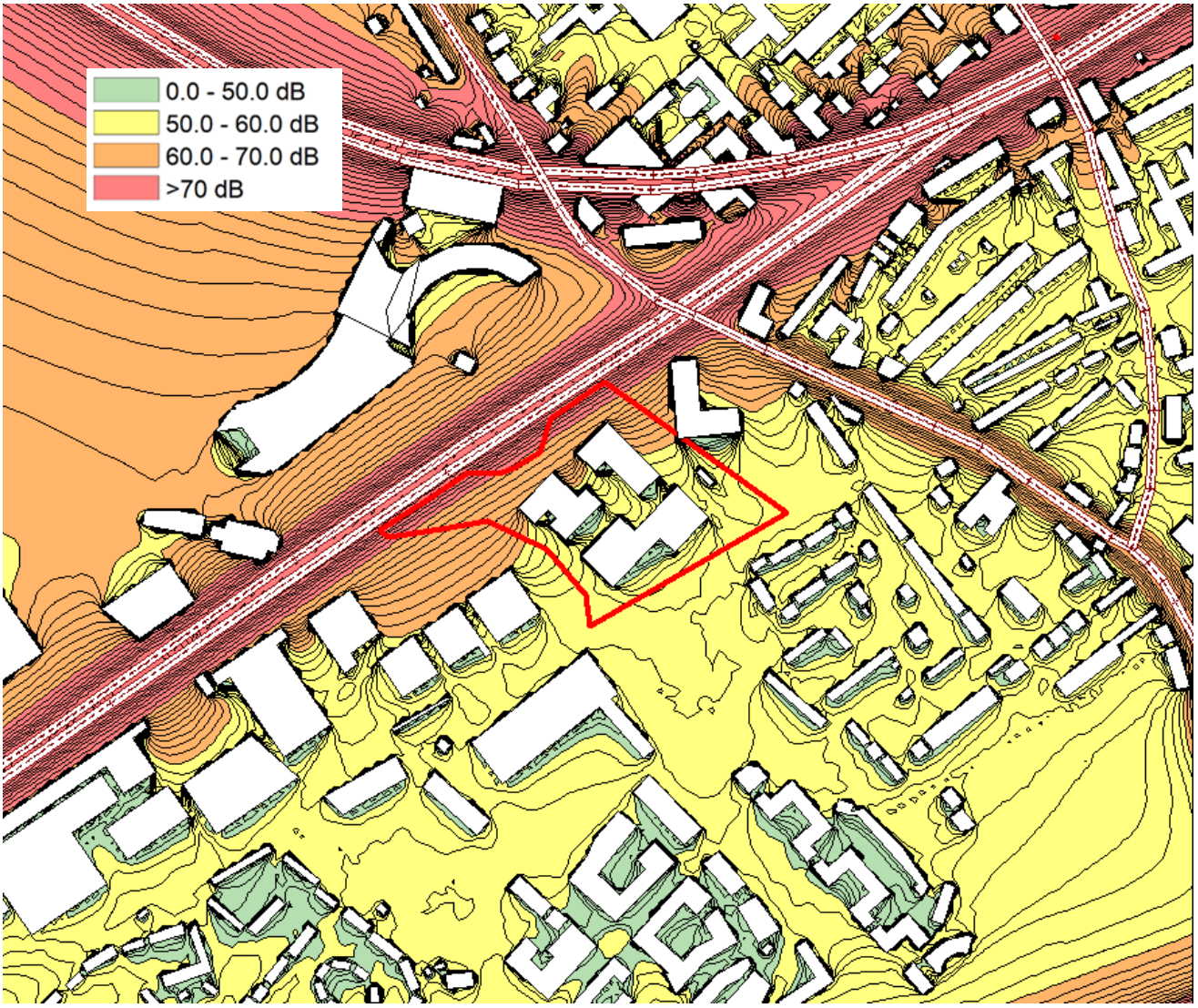
Proposal - Brentside Park will be an attractive mixed-use development focused around an enhanced Brent river front.



The development site borders the A4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from rail traffic to the south of the site. Road traffic noise within the site during the daytime ranges between 50 and 75 dB L_{Aeq} within the development site. As such external amenity spaces such as balconies or gardens within the development site are expected to exceed the SOAEL and would require detailed consideration to demonstrate that noise levels can be reduced through site layout and barriers where appropriate. Potential balcony areas facing the A4 at up to 50 metres from the road are expected to exceed the SOAEL (assuming no screening is provided by intervening structures) and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the A4 may be appropriate.

17 - Great West Plaza Business (B1a/b), Residential (C3) and Retail (A1-A4)

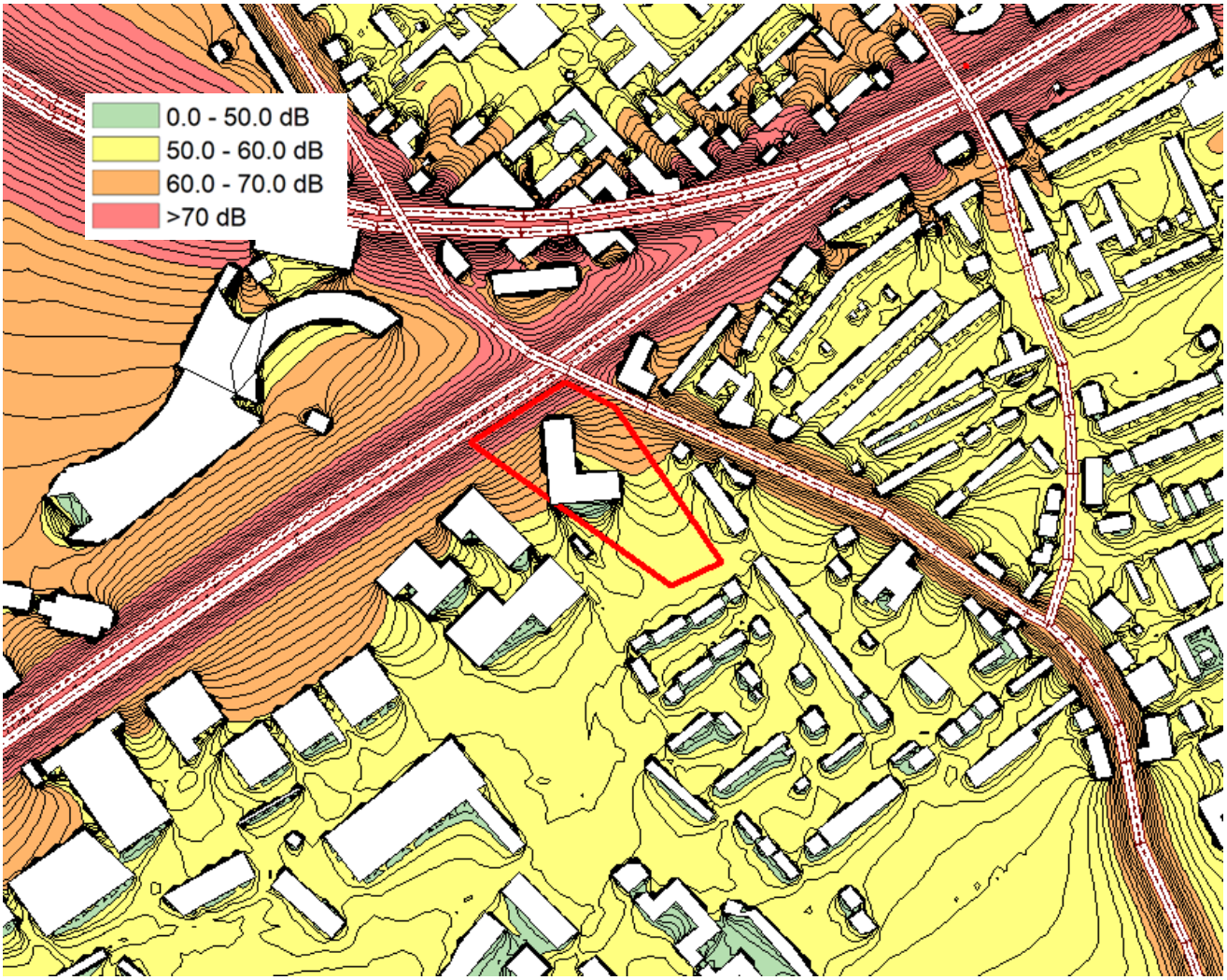
Proposal - Great West Plaza will be an attractive mixed-use development focused around an enhanced Brent river front and having a close relationship with Brentside Park via a new pedestrian bridge.



The development site borders the A4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from rail traffic to the south of the site. Road traffic noise within the site during the daytime ranges between 50 and 75 dB L_{Aeq} within the development site. As such external amenity spaces such as balconies or gardens within the development site are expected to exceed the SOAEL and would require detailed consideration to demonstrate that noise levels can be reduced through site layout and barriers where appropriate. Potential balcony areas facing the A4 at up to 50 metres from the road are expected to exceed the SOAEL (assuming no screening is provided by intervening structures) and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the A4 may be appropriate.

18 - Great West House Business (B1a/b), Residential (C3) and Retail (A1-A4)

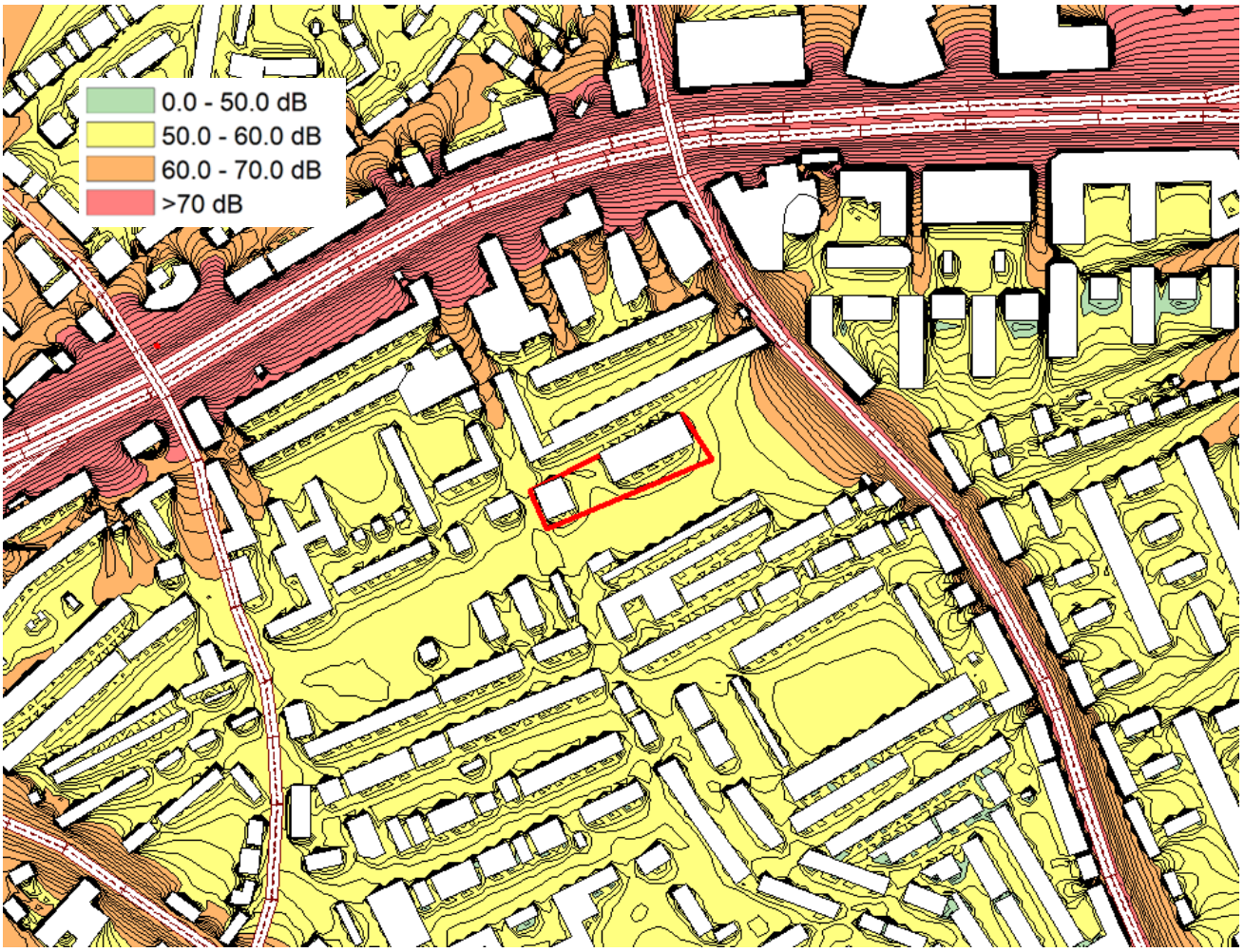
Proposal- Great West House will be integrated with new development surrounding the existing building to better integrate it into the London Gateway and intensify the use of the site.



The development site borders the A4 and the A3002 Boston Manor Road and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from rail traffic to the south of the site. Road traffic noise within the site during the daytime ranges between 50 and 75 dB L_{Aeq} within the development site. As such external amenity spaces such as balconies or gardens within the development site are expected to exceed the SOAEL and would require detailed consideration to demonstrate that noise levels can be reduced through site layout and barriers where appropriate. Potential balcony areas facing the A4 at up to 50 metres from the road are expected to exceed the SOAEL (assuming no screening is provided by intervening structures) and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the A4 may be appropriate.

24 - Layton Road Warehouses Residential (C3)

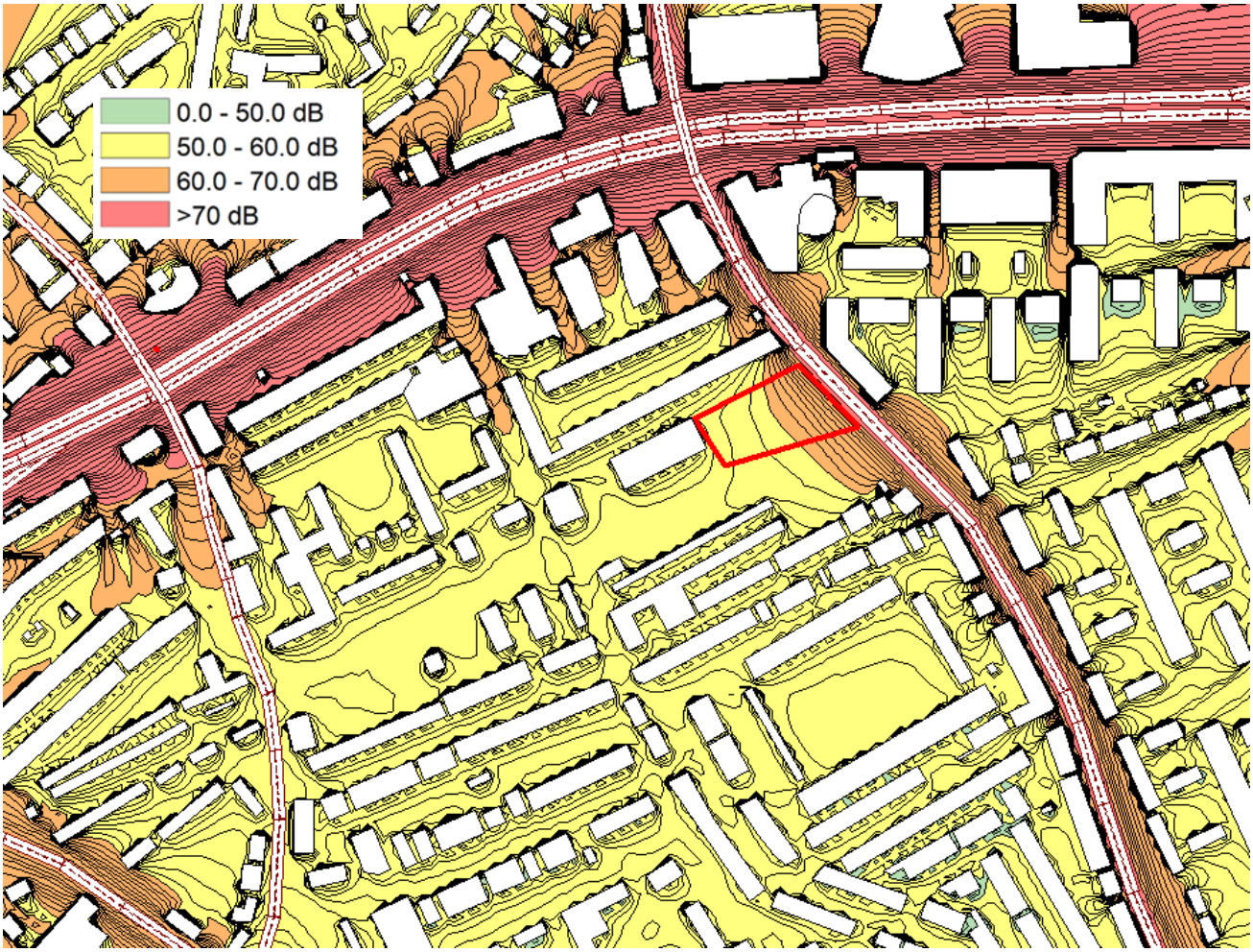
Proposal - The Layton Road Warehouse will be redeveloped to provide new residential units.



The development site is located at least 150m from the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from rail traffic to the south of the site. Road traffic noise within the site during the daytime are expected to be below 60 dB L_{Aeq} within the development site. However, considering the rail line and commercial and industrial areas surrounding to the south of the potential development site, the site is likely to be constrained by these noise sources and detailed assessment is likely to be required to demonstrate that the site layout can accommodate residential uses.

25 - Layton Road Car Park Education (D1)

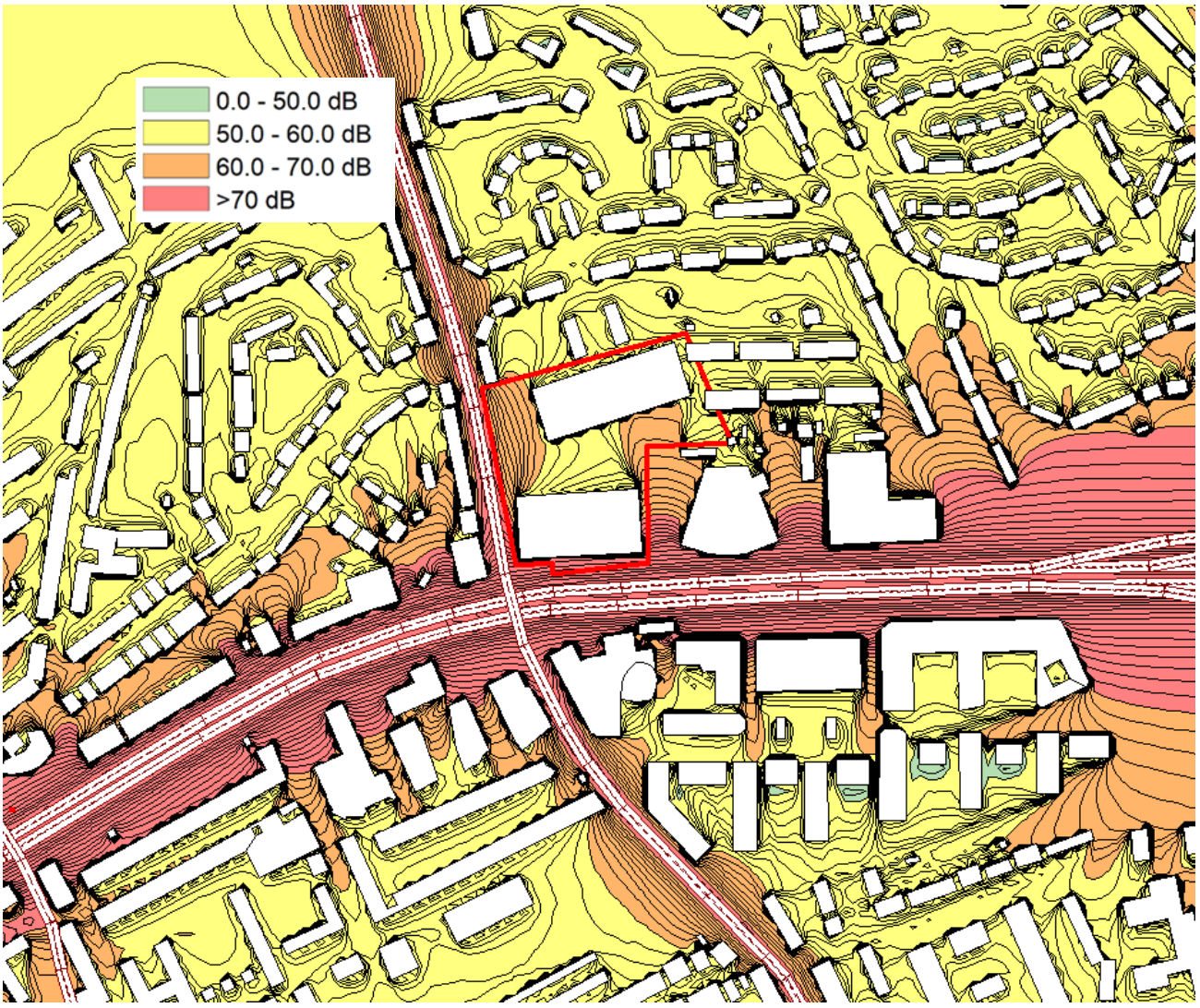
Proposal - Layton Road Car Park will be redeveloped into a new school to support growth in the Great West Corridor



The development site is located at least 150m from the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from rail traffic to the south of the site and Ealing Road to the East. Road traffic noise within the site during the daytime are expected to be between 55 and 65 dB L_{Aeq} within the development site. However, considering the rail line and commercial and industrial areas to the south of the potential development site, the site is likely to be constrained by these noise sources and detailed assessment is likely to be required to demonstrate that the site layout can accommodate educational uses in accordance with the guidance set out in Building Bulletins 93 and 101 (BB93: acoustic design of schools - performance standards and BB 101: Ventilation, thermal comfort and indoor air quality).

26 - Phoenix Business Park Light Industrial (B1c), Industrial (B2/8), Business (B1a/b), Residential (C3) and Retail (A1-A4)

Proposal - Phoenix Trading Estate will be redeveloped to intensify employment uses on the site and introduce a mix of uses which are integrated with the surrounding area.



The development site is adjacent to the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from existing commercial premises within the site and from adjacent plots. Road traffic noise within the site during the daytime are expected to be between 50 and 78 dB L_{Aeq} within the development site.

Therefore, significant mitigation measures to reduce noise levels within dwellings would be expected to be required and given the high specification of glazing which will be required, it is unlikely that passive ventilation will be suitable to provide the required sound reduction and a mechanical means of

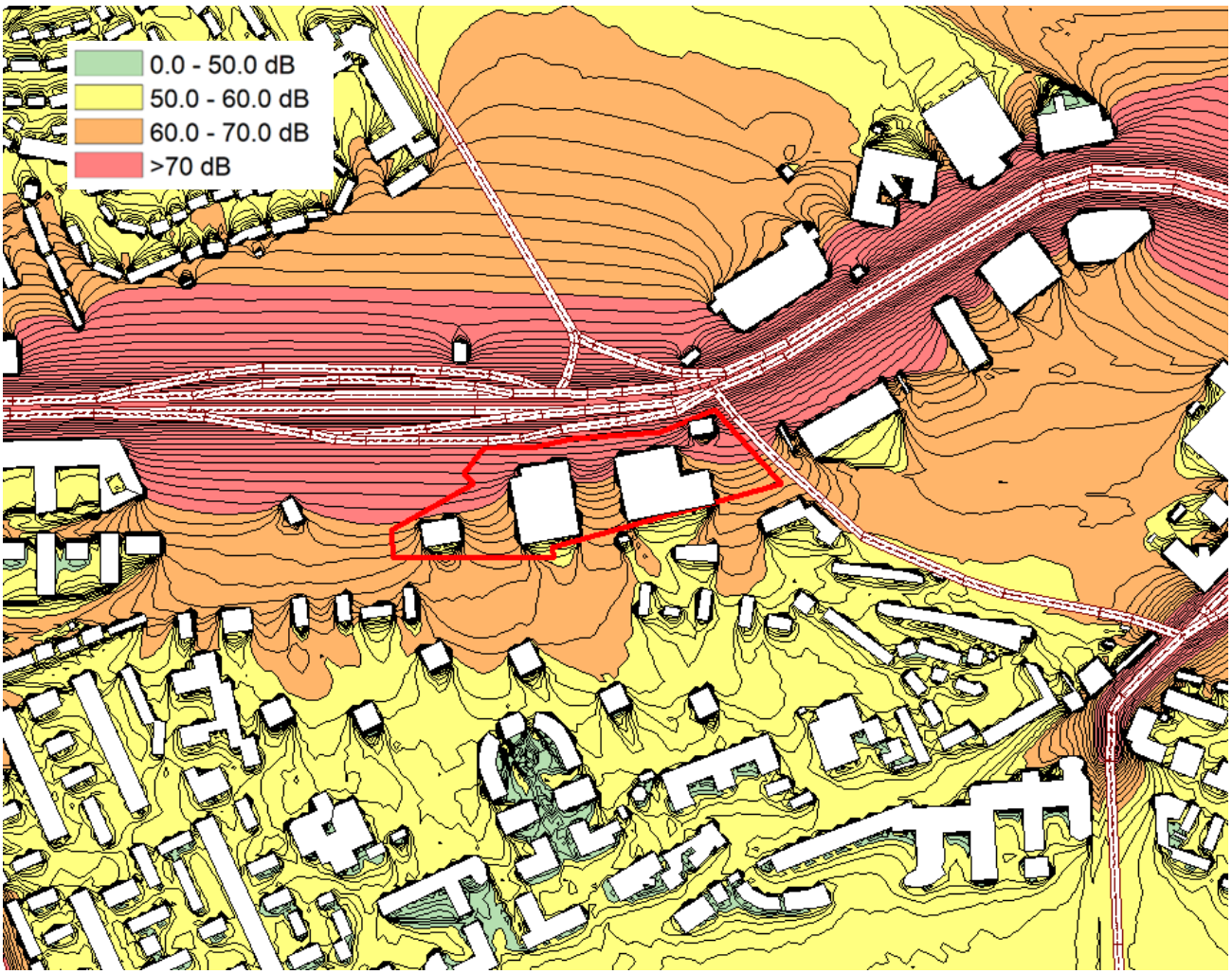
ventilation would be required to ensure that internal ventilation and acoustic conditions are in accordance with the relevant criteria.

Furthermore, potential external amenity spaces such as balconies or gardens would exceed the SOAEL (60 dB L_{Aeq}) and areas on all facades facing the M4 on all floors are expected to exceed the SOAEL and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the road network within distances of 70m may be appropriate.

Development proposals that include a residential element would be expected to demonstrate how the orientation and layout of the site could be designed to provide screening to potential residential dwellings (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).

27 - Kew Bridge Distribution Centre Light Industrial (B1c), Industrial (B2/8), Business (B1a/b), Residential (C3) and Retail (A1-A4)

Proposal- Kew Bridge Distribution Centre will be redeveloped to create a new mixed-use development with residential development and stacked industrial uses arranged along a new street connecting Lionel Road Station to Carville Hall Park.



The development site is adjacent to the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from existing commercial premises within the site and from the adjacent railway line. Road traffic noise within the site during the daytime are expected to be between 65 and 79 dB L_{Aeq} within the development site.

Therefore, significant mitigation measures to reduce noise levels within dwellings would be expected to be required and given the high specification of glazing which will be required, it is unlikely that passive ventilation will be suitable to provide the required sound reduction and a mechanical means of ventilation would be required to ensure that internal ventilation and acoustic conditions are in accordance with the relevant criteria.

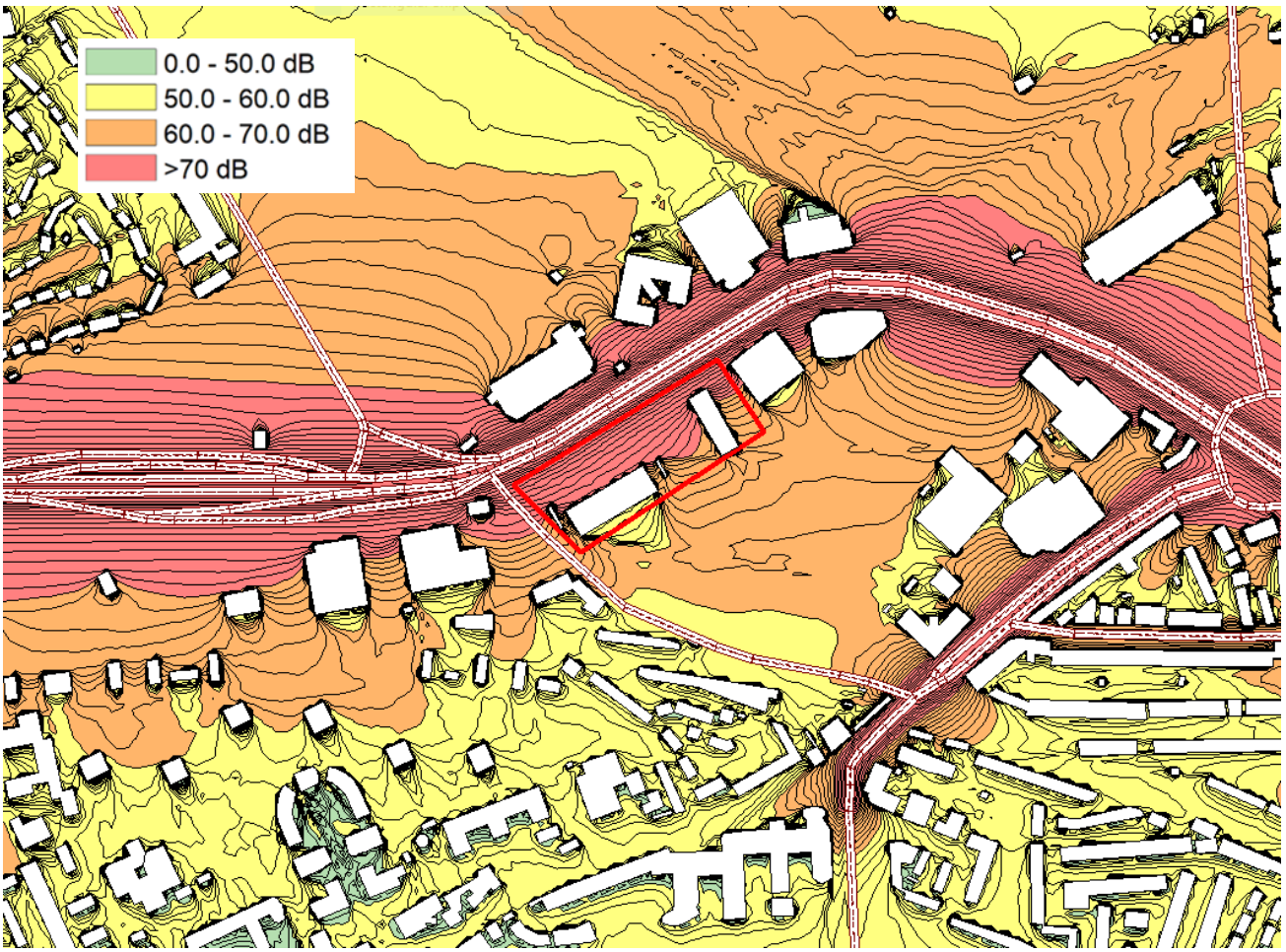
Furthermore, potential external amenity spaces such as balconies or gardens would exceed the SOAEL (60 dB L_{Aeq}) and areas on all facades facing the M4 on all floors are expected to exceed the SOAEL and

it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the road network may be appropriate.

Development proposals that include a residential element would be expected to demonstrate how the orientation and layout of the site could be designed to provide screening to potential residential dwellings from road traffic and rail noise (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).

28 - 27 Great West Road Business (B1a/b), Residential (C3) and Retail (A1-A4)

Proposal - 27 Great West Road will be redeveloped to create a new employment led local centre around Lionel Road Station.



The development site is adjacent to the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from existing commercial premises within the site and from the adjacent railway line and Lionel Road Stadium development to the south of the potential development site. Road traffic noise within the site during the daytime are expected to be between 60 and 80 dB L_{Aeq} within the development site.

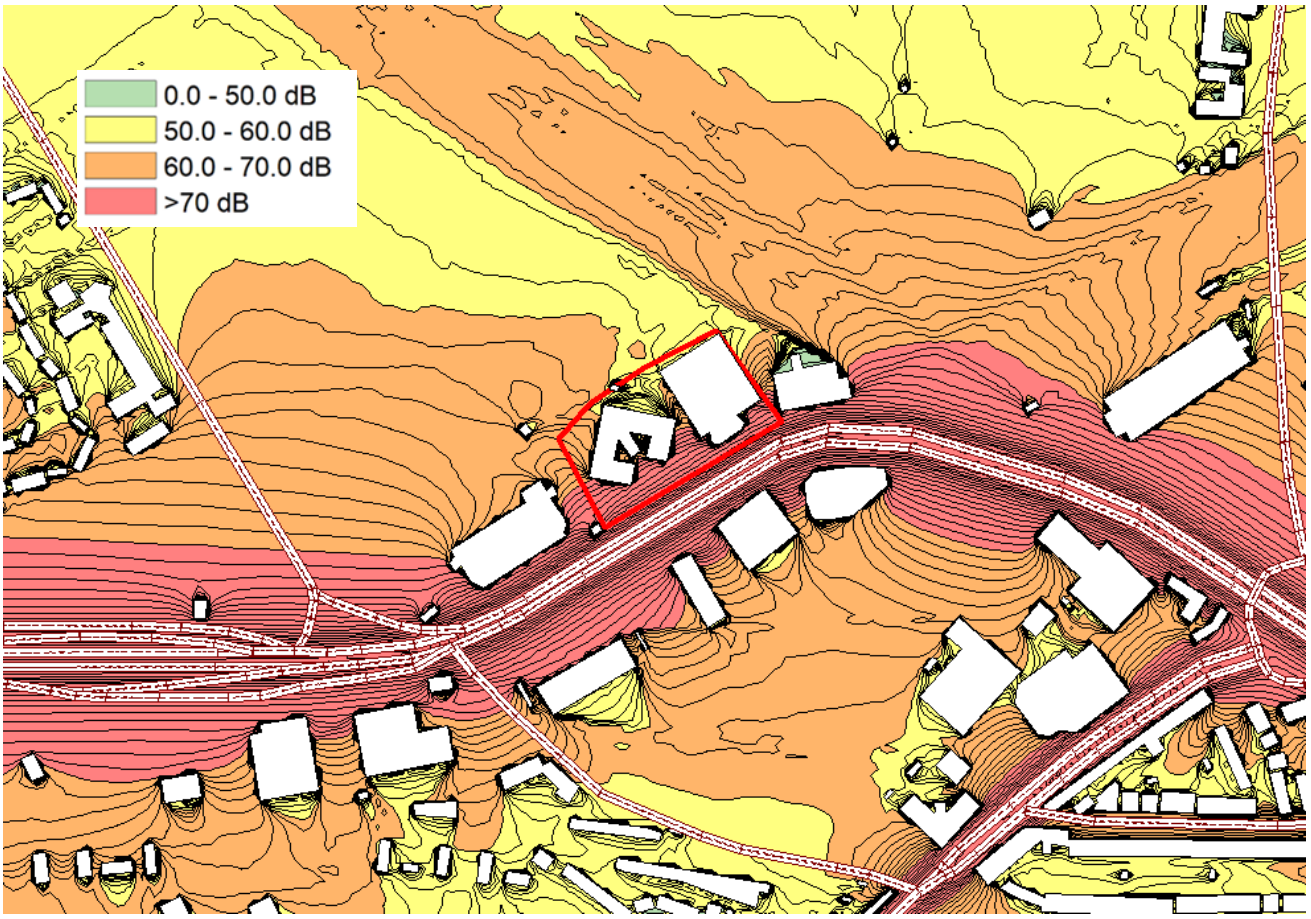
Therefore, significant mitigation measures to reduce noise levels within dwellings would be expected to be required and given the high specification of glazing which will be required, it is unlikely that passive ventilation will be suitable to provide the required sound reduction and a mechanical means of ventilation would be required to ensure that internal ventilation and acoustic conditions are in accordance with the relevant criteria.

Furthermore, potential external amenity spaces such as balconies or gardens would exceed the SOAEL (60 dB L_{Aeq}) and areas on all facades facing the M4 on all floors are expected to exceed the SOAEL and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the road network may be appropriate.

Development proposals that include a residential element would be expected to demonstrate how the orientation and layout of the site could be designed to provide screening to potential residential dwellings from road traffic and rail noise (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).

29 - EMC Tower Business (B1a/b) and Residential (C3).

Proposal- Dell/EMC will be redeveloped to intensify employment uses and introduce a mix of uses on the site, creating a new pedestrian and cycling route against Gunnersbury Park between Lionel Road North and Gunnersbury Cemetery.



The development site is adjacent to the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from existing commercial premises within the site. Road traffic noise within the site during the daytime are expected to be between 55 and 80 dB L_{Aeq} within the development site.

Therefore, significant mitigation measures to reduce noise levels within dwellings would be expected to be required and given the high specification of glazing which will be required, it is unlikely that passive ventilation will be suitable to provide the required sound reduction and a mechanical means of ventilation would be required to ensure that internal ventilation and acoustic conditions are in accordance with the relevant criteria.

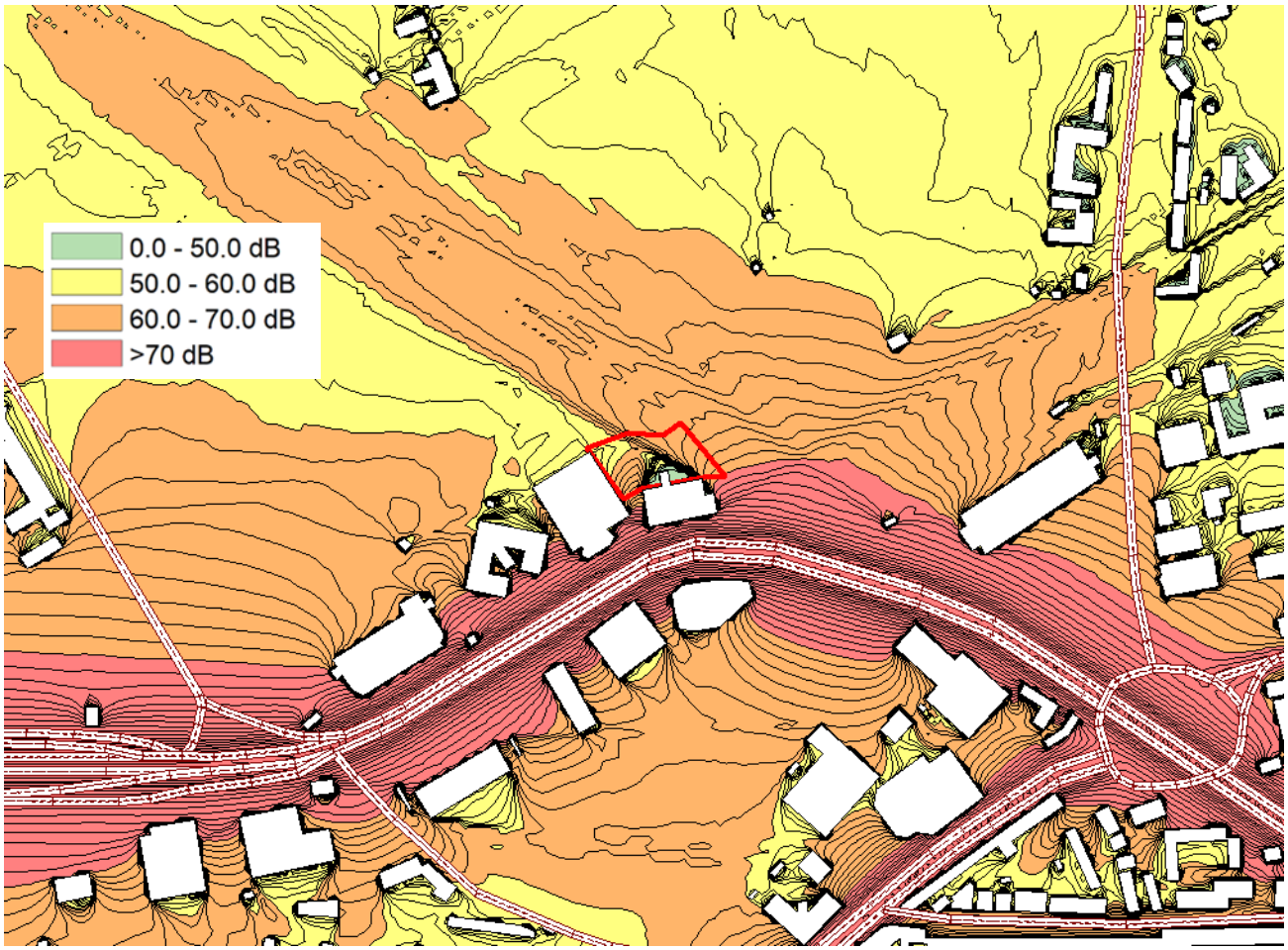
Furthermore, potential external amenity spaces such as balconies or gardens would exceed the SOAEL (60 dB L_{Aeq}) and areas on all facades facing the M4 on all floors are expected to exceed the SOAEL and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the road network may be appropriate.

Development proposals that include a residential element would be expected to demonstrate how the

orientation and layout of the site could be designed to provide screening to potential residential dwellings from road traffic (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).

30 - Vantage West Residential (C3).

Proposal - Vantage West will be redeveloped to intensify employment uses and introduce a mix of uses on the site, creating a new pedestrian and cycling route against Gunnersbury Park between Lionel Road North and Gunnersbury Cemetery.



The development site is adjacent to the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from existing commercial premises within the site. Road traffic noise within the site during the daytime are expected to be between 55 and 65 dB L_{Aeq} within the development site.

Therefore, mitigation measures to reduce noise levels within dwellings would be expected to be required and given the high specification of glazing which will be required, it is unlikely that passive ventilation will be suitable to provide the required sound reduction and a mechanical means of ventilation would be required to ensure that internal ventilation and acoustic conditions are in accordance with the relevant criteria.

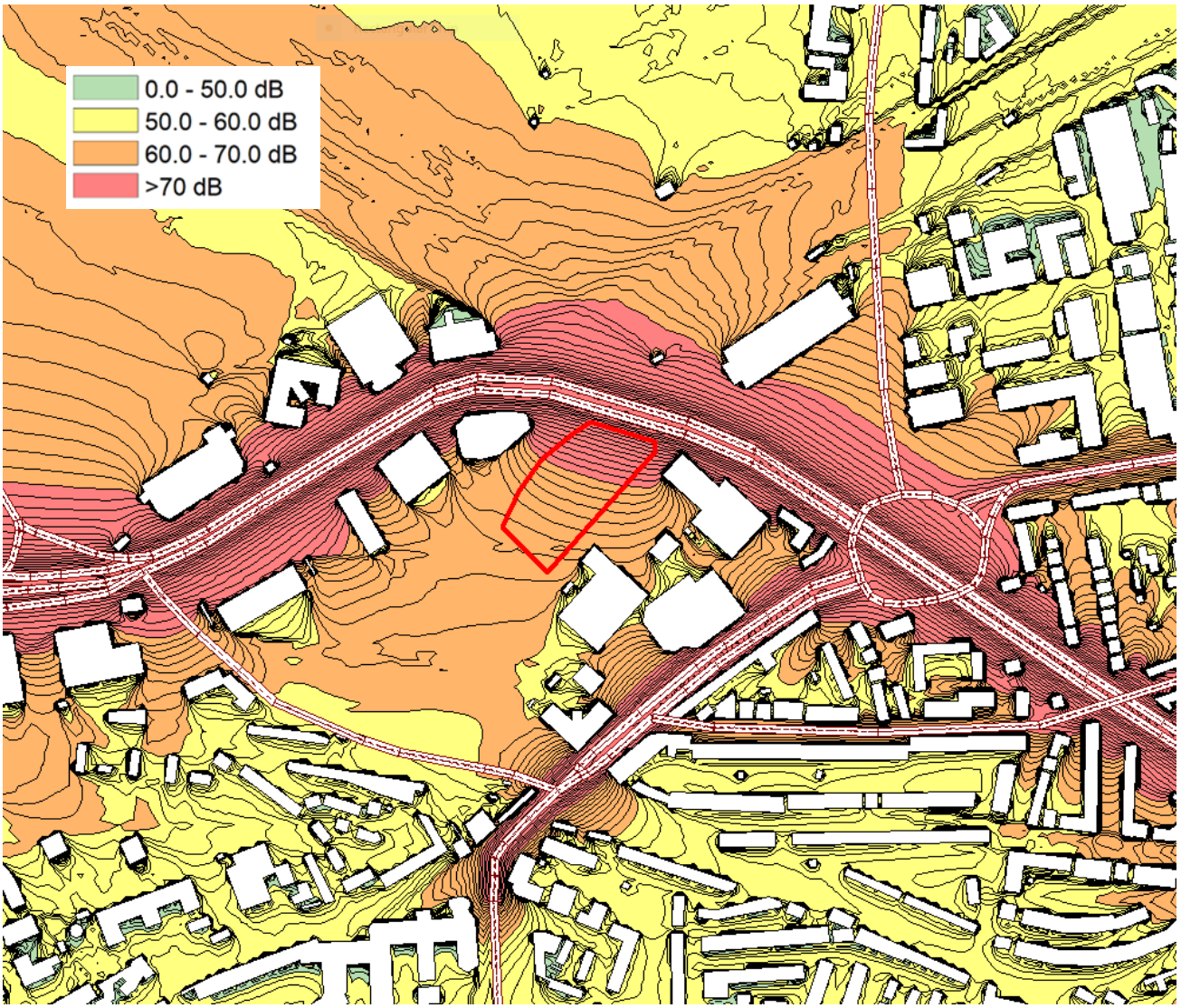
Furthermore, potential external amenity spaces such as balconies or gardens could exceed the SOAEL (60 dB L_{Aeq}) on facades facing the M4 on all floors and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the road network may be appropriate.

Development proposals that include a residential element would be expected to demonstrate how the orientation and layout of the site could be designed to provide screening to potential residential

dwellings from road traffic (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).

31 - 1-4 Capital Interchange Way Business (B1a/b), Residential (C3) and Retail (A1-A4).

Proposal - Capital Interchange way will be developed into an office-led mixed-use site which contributes to the creation of the Brentford Stadium Quarter.



The development site is adjacent to the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from existing commercial premises within the site and from the adjacent railway line and Lionel Road Stadium development to the south-west of the potential development site. Road traffic noise within the site during the daytime are expected to be between 63 and 80 dB L_{Aeq} within the development site.

Therefore, significant mitigation measures to reduce noise levels within dwellings would be expected to be required and given the high specification of glazing which will be required, it is unlikely that passive ventilation will be suitable to provide the required sound reduction and a mechanical means of

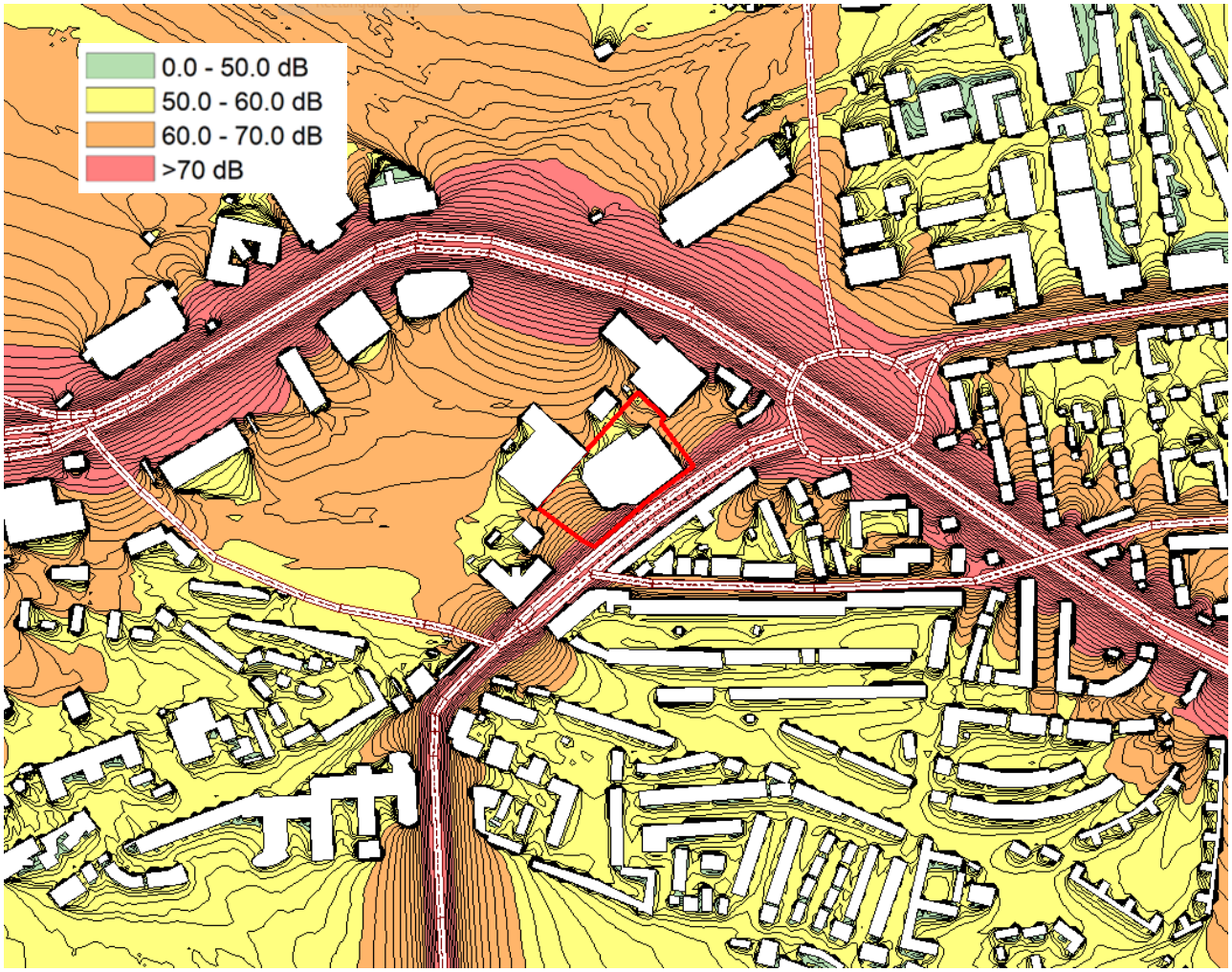
ventilation would be required to ensure that internal ventilation and acoustic conditions are in accordance with the relevant criteria.

Furthermore, potential external amenity spaces such as balconies or gardens would exceed the SOAEL (60 dB L_{Aeq}) and areas on all facades facing the M4 on all floors are expected to exceed the SOAEL and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the road network may be appropriate.

Development proposals that include a residential element would be expected to demonstrate how the orientation and layout of the site could be designed to provide screening to potential residential dwellings from road traffic and rail noise (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).

32 - Brentford Fountains Leisure Centre Leisure (D2), Residential (C3) and Retail (A1-A4).

Proposal- Brentford Fountains Leisure centre will be redeveloped to provide a new, modern leisure centre with residential development to maximise use of the site.



The development site is within approximately 100m of the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from the adjacent A2015 and existing commercial premises within the site and from the nearby railway line and Lionel Road Stadium development to the west of the potential development site. Road traffic noise within the site during the daytime are expected to be between 55 and 75 dB L_{Aeq} within the development site.

Therefore, mitigation measures to reduce noise levels within dwellings would be expected to be required and given the high specification of glazing which will be required, it is unlikely that passive ventilation will be suitable to provide the required sound reduction and a mechanical means of ventilation would be required to ensure that internal ventilation and acoustic conditions are in accordance with the relevant criteria.

Furthermore, potential external amenity spaces such as balconies or gardens would exceed the SOAEL (60 dB L_{Aeq}) and areas on all facades facing the M4 on all floors are expected to exceed the SOAEL and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces

and as such the provision of winter gardens facing the road network may be appropriate.

Development proposals that include a residential element would be expected to demonstrate how the orientation and layout of the site could be designed to provide screening to potential residential dwellings from road traffic and rail noise (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).

33 - Esso Filling Station Chiswick Roundabout Business (B1a/b) and Residential (C3).

Proposal- Esso Filling Station will be redeveloped to deliver a new mixed-use site business location.

The development site is adjacent to the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from the adjacent A205 and existing commercial premises within the site. Road traffic noise within the site during the daytime are expected to be between 65 and 75 dB L_{Aeq} within the development site.

Therefore, significant mitigation measures to reduce noise levels within dwellings would be expected to be required and given the high specification of glazing which will be required, it is unlikely that passive ventilation will be suitable to provide the required sound reduction and a mechanical means of ventilation would be required to ensure that internal ventilation and acoustic conditions are in accordance with the relevant criteria.

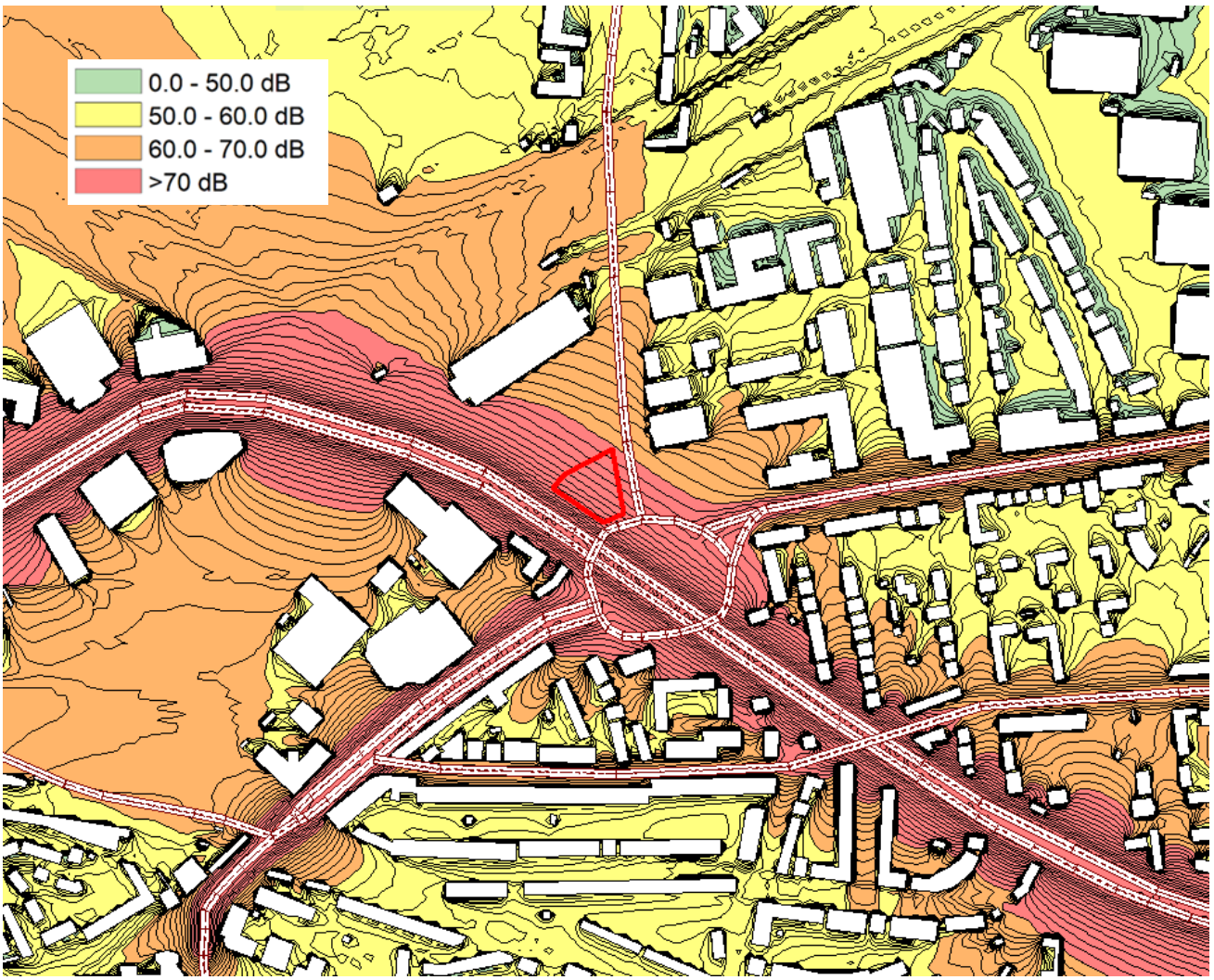
Furthermore, potential external amenity spaces such as balconies or gardens would exceed the SOAEL

(60 dB L_{Aeq}) and areas on all facades facing the M4 on all floors are expected to exceed the SOAEL and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the road network may be appropriate.

Development proposals that include a residential element would be expected to demonstrate how the orientation and layout of the site could be designed to provide screening to potential residential dwellings from road traffic and rail noise (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).

34 - Former Natwest Bank Site, Chiswick Business (B1a/b), Residential (C3) and Retail (A1-A4).

Proposal - The Natwest Bank site will be redeveloped into a mixed-use development combining office, retail and residential units along with appropriate mitigation for noise and pollution.



The development site is adjacent to the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from the adjacent A406 and existing commercial premises around the site. Road traffic noise within the site during the daytime are expected to be between 70 and 80 dB L_{Aeq} within the development site.

Therefore, significant mitigation measures to reduce noise levels within dwellings would be expected to be required and given the high specification of glazing which will be required, it is unlikely that passive ventilation will be suitable to provide the required sound reduction and a mechanical means of ventilation would be required to ensure that internal ventilation and acoustic conditions are in accordance with the relevant criteria.

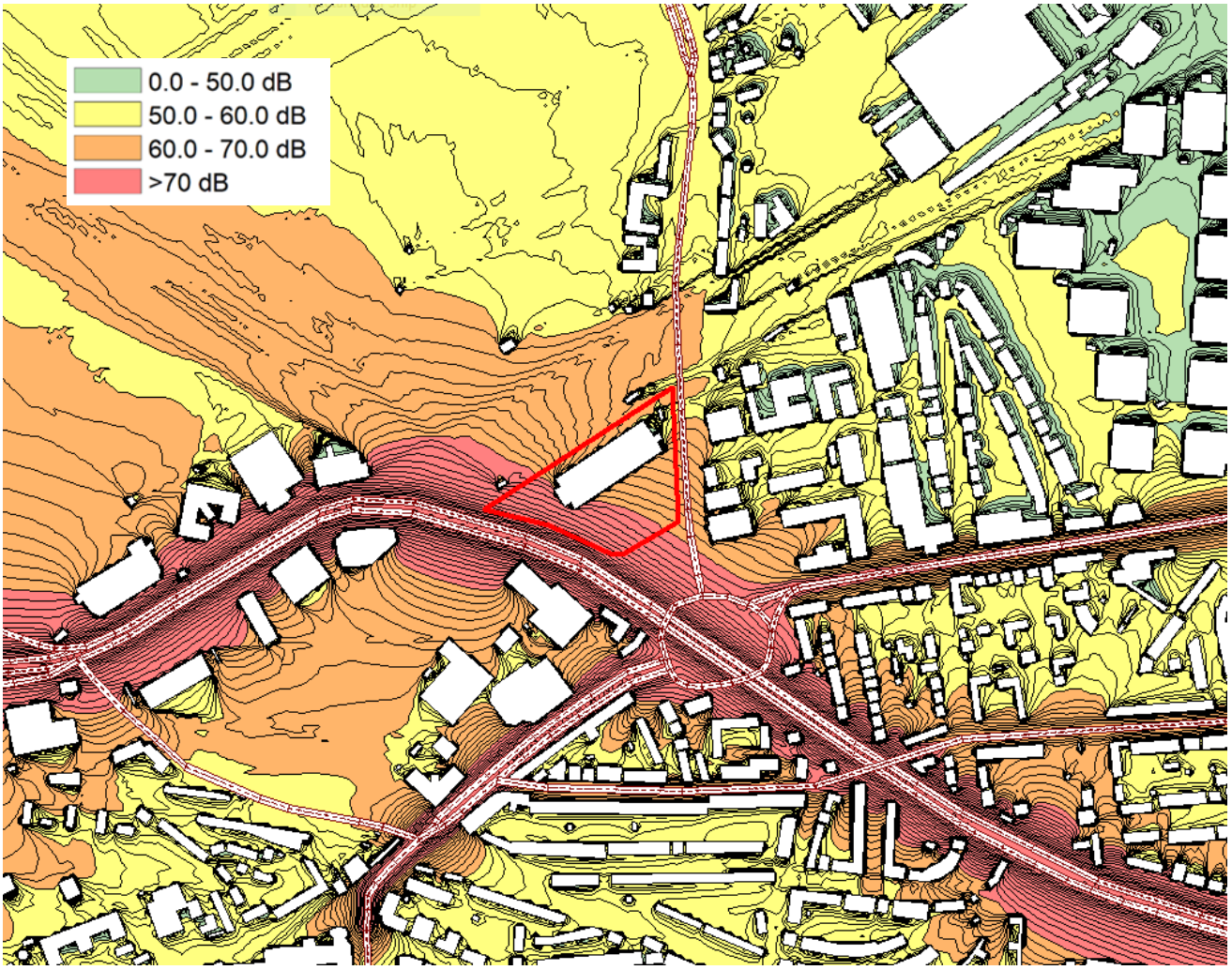
Furthermore, potential external amenity spaces such as balconies or gardens would exceed the SOAEL (60 dB L_{Aeq}) and areas on all facades facing the M4 on all floors are expected to exceed the SOAEL and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces

and as such the provision of winter gardens facing the road network may be appropriate.

Development proposals that include a residential element would be expected to demonstrate how the orientation and layout of the site could be designed to provide screening to potential residential dwellings from road traffic and rail noise (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).

35 - B&Q Chiswick Leisure (D2), Hotel (C1), Business (B1a/b) Residential (C3) and Retail (A1-A4).

Proposal - The B&Q Site will be redeveloped into a mixed-use quarter with a range of uses which support the Brentford Stadium Quarter.



The development site is adjacent to the M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from the adjacent A406 and existing commercial premises around the site. Road traffic noise within the site during the daytime are expected to be between 57 and 80 dB L_{Aeq} within the development site.

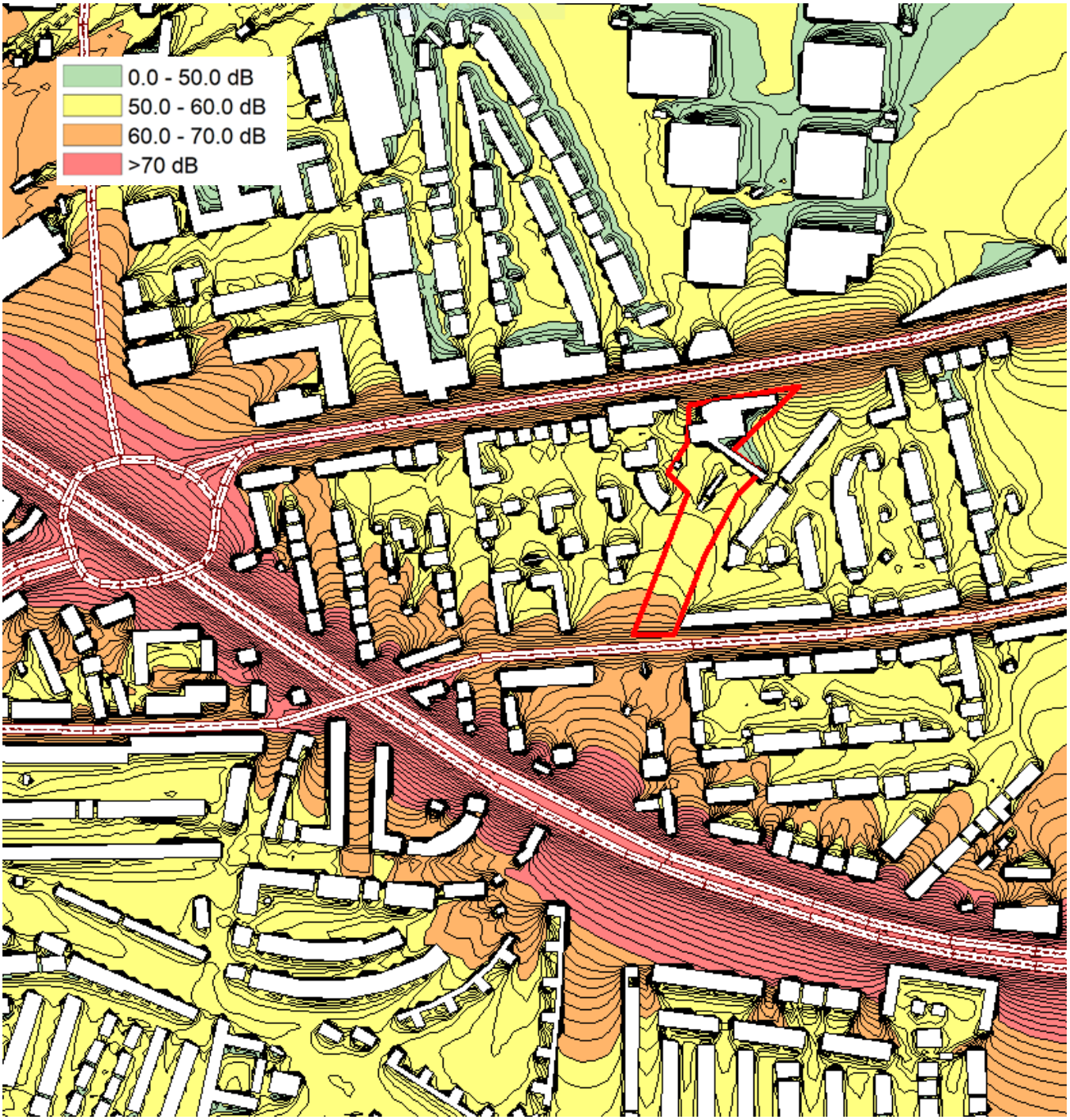
Therefore, significant mitigation measures to reduce noise levels within dwellings would be expected to be required and given the high specification of glazing which will be required, it is unlikely that passive ventilation will be suitable to provide the required sound reduction and a mechanical means of ventilation would be required to ensure that internal ventilation and acoustic conditions are in accordance with the relevant criteria.

Furthermore, potential external amenity spaces such as balconies or gardens would exceed the SOAEL (60 dB L_{Aeq}) and areas on all facades facing the M4 on all floors are expected to exceed the SOAEL and it is unlikely that solid barriers or balustrades alone will be sufficient to control noise within these spaces and as such the provision of winter gardens facing the road network may be appropriate.

Development proposals that include a residential element would be expected to demonstrate how the orientation and layout of the site could be designed to provide screening to potential residential dwellings from road traffic and rail noise (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).

37 - Gunnersbury Station Car Park Business (B1a/b), Residential (C3), and Retail (A1-A4)

Proposal - Gunnersbury Station will be improved with better access and greater capacity through enabling development, to improve public transport accessibility to the eastern end of the Great West Corridor.



The development site is located approximately Great West Road/M4 and is outside of the Heathrow 57 dB L_{Aeq} noise contour with contributions from A306 and London Underground/Overground railway line that runs through the site. Road traffic noise within the site during the daytime are expected to be

between 40 and 65 dB L_{Aeq} within the development site.

Development proposals that include a residential element would be expected to demonstrate how the orientation and layout of the site could be designed to provide screening to potential residential dwellings from road traffic and rail noise (for example through the use of non-sensitive commercial employment spaces to provide screening to more sensitive areas of the development site).