

London-wide ULEZ and MTS Revision Baseline Report for ULEZ Scheme IIA and MTS IIA

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1. Relevant Policy and Legislation

1.1 Environment

1.1.1 Air Quality

Document Title	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
Environment Act 1995 ¹	The Environment Act 1995 requires the Government to produce a national Air Quality Strategy (AQS) for the UK setting out air quality standards, objectives, and measures for improving ambient air quality. The last comprehensive review of the Strategy was published in 2007, with a review yielding some minor changes published in 2011.
The Air Quality Standards (England) Regulations 2010 ² and The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 ³	Transposed into English law the requirements of Directives 2008/50/EC ⁴ and 2004/107/EC ⁵ on ambient air quality, which set Limit Values for concentrations of pollutants in ambient (outdoor) air. Limit Values are defined for a variety of pollutants, including NO ₂ , PM ₁₀ and PM _{2.5} . Some pollutants have Air Quality Objectives (AQOs) expressed as annual mean concentrations due to the chronic way in which they affect human health or the natural environment (i.e. impacts occur after a prolonged period of exposure to elevated concentrations). Others have AQOs expressed as 24 hour or 1 hour mean concentrations due to the acute way in which they affect human health or the natural environment (i.e. after a relatively short period of exposure).
Environment Act 2021, Part IV ⁶	This act sets up the Local Air Quality Management (LAQM) in the UK. This requires local authorities to review and assess air quality within their boundaries regularly and systematically against Air Quality Objectives (AQOs) and to declare an Air Quality Management Area (AQMA) and make Air Quality Action Plans (AQAPs) to meet the AQOs, where these are exceeded.

¹ <https://www.legislation.gov.uk/ukpga/1995/25/contents>

² <http://www.legislation.gov.uk/uksi/2010/1001/contents/made>

³ <https://www.legislation.gov.uk/uksi/2020/1313/contents/made>

⁴ <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32008L0050>

⁵ <https://eur-lex.europa.eu/eli/dir/2004/107/oj>

⁶ <https://www.legislation.gov.uk/ukpga/2021/30/contents>

	<p>Responsibility for tackling local air pollution will be shared with designated relevant public authorities, all tiers of local government and neighbouring authorities.</p> <p>Where needed, the Mayor of London can (following consultation) use powers of direction to require boroughs to take steps to meet AQOs.</p> <p>This act requires the Secretary of state to regularly review the AQS at least every 5 years, and to publish an annual statement to Parliament on progress towards achieving air quality standards and objectives. It includes a commitment for an initial review within 12 months of the measures coming into force. The first review will be published in 2023. The Act also sets out that the Government must set a new PM2.5 annual mean target, with consultation on the new target having commenced in April 2022.</p>
<p>Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007) volume 1⁷, volume 2⁸ and volume 3⁹</p>	<p>This strategy provides a clear, long-term vision for improving air quality in the UK and offers options for further consideration to reduce risk to health and the environment from air pollution. It recognises that action at national, regional, and local level may be needed, depending on the scale and nature of the air quality problem.</p>
<p>Air Quality (England) Regulations 2000¹⁰ and Air Quality (England) Amendment Regulations 2002¹¹</p>	<p>Set national AQOs for local authorities in England. AQOs exist for a variety of pollutants, including NO₂, PM₁₀ and PM_{2.5}, for the protection of human health.</p>
<p>National Planning Policy Framework (2021)¹²</p>	<p>Paragraph 186 identifies that: “Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should</p>

⁷ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf

⁸ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69337/pb12670-air-quality-strategy-vol2-070712.pdf

⁹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/221088/pb12637-icgb.pdf

¹⁰ <http://www.legislation.gov.uk/uksi/2000/928/contents/made>

¹¹ <http://www.legislation.gov.uk/uksi/2002/3043/contents/made>

¹² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

	<p>ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan". (Ministry of Housing, Communities and Local Government, 2021, p. 53)</p>
<p>Clean Air Strategy (2019)¹³</p>	<p>The Clean Air Strategy shows how we will tackle all sources of air pollution, making our air healthier to breathe, protecting nature and boosting the economy. The strategy proposes tough new goals to cut public exposure to particulate matter pollution, as recommended by the World Health Organization. This strategy sets out the comprehensive action that is required from across all parts of government and society to meet these goals.</p>
<p>Decarbonising Transport; a better, greener Britain (2021)¹⁴</p>	<p>This plan sets out the government's commitments and the actions needed to decarbonise the entire transport system in the UK. It includes:</p> <ul style="list-style-type: none"> our pathway to net zero transport in the UK the wider benefits net zero transport can deliver the principles that underpin our approach to delivering net zero transport <p>The plan follows on from Decarbonising transport: setting the challenge, published in March 2020, which laid out the scale of additional reductions needed to deliver transport's contribution to legally binding carbon budgets and delivering net zero by 2050.</p>
<p>Net Zero Strategy: Build Back Greener (2021)¹⁵</p>	<p>This strategy sets out policies and proposals for decarbonising all sectors of the UK economy to meet our net zero target by 2050. The strategy identifies four key principles:</p> <ol style="list-style-type: none"> 1. We will work with the grain of consumer choice: no one will be required to rip out their existing boiler or scrap their current car 2. We will ensure the biggest polluters pay the most for the transition through fair carbon pricing

¹³<https://www.gov.uk/government/publications/clean-air-strategy-2019>

¹⁴ <https://www.gov.uk/government/publications/transport-decarbonisation-plan>

¹⁵ <https://www.gov.uk/government/publications/net-zero-strategy>

	<p>3. We will ensure that the most vulnerable are protected through Government support in the form of energy bill discounts, energy efficiency upgrades, and more</p> <p>4. We will work with businesses to continue delivering deep cost reductions in low carbon tech through support for the latest state of the art kit to bring down costs for consumers and deliver benefits for businesses.</p> <p>This strategy is a long-term plan for a transition that will take place over the next three decades</p>
<p>Mayor’s Transport Strategy (MTS) (2018)¹⁶</p>	<p>The Greater London Authority Act 1999 requires the Mayor to publish a transport strategy which sets out the Mayor’s policies and proposals for the promotion and encouragement of safe, integrated, efficient and economic transport facilities and services to, from and within Greater London together with proposals for the provision of transport which is accessible to persons with mobility problems and any other appropriate proposals.</p> <p>Under ‘Improving air quality and the environment’, Policy 6 of the MTS 2018 states that: <i>“The Mayor, through TfL and the boroughs, and working with stakeholders, will take action to reduce emissions – in particular diesel emissions – from vehicles on London’s streets, to improve air quality and support London reaching compliance with UK and EU legal limits as soon as possible. Measures may include retrofitting vehicles with equipment to reduce emissions, promoting electrification, road charging, the imposition of parking charges/levies, responsible procurement, the making of traffic restrictions/regulations and local actions”.</i></p> <p>Additionally, under ‘Improving air quality and the environment’, Proposal 24 of the MTS 2018 states that: <i>“The Mayor, through TfL, will seek to introduce the central London Ultra Low Emission Zone (ULEZ) standards and charges in 2019, tighter emissions standards London-wide for heavy vehicles in 2020, and an expanded ULEZ covering inner London in 2021.”</i></p>
<p>London Environment Strategy (2018)¹⁷</p>	<p>The London Environment Strategy sets out aims to make the Mayor’s vision of transforming the city’s environment a reality. One of these key Mayoral aims listed in the strategy is for “London to have the best air quality of any major world city by 2050, going beyond the legal requirements to protect human health and minimize inequalities”.</p>

¹⁶ <https://www.london.gov.uk/sites/default/files/mayors-transport-strategy-2018.pdf>

¹⁷ https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

	Objective 4.2 of the Mayor's London Environment Strategy (LES) is to "achieve legal compliance with UK and EU limits as soon as possible, including by mobilising action from London boroughs, government and other partners", whilst Objective 4.3 is to "establish and achieve new, tighter air quality targets for a cleaner London by transitioning to a zero emission London by 2050, meeting world health organization [WHO] health based guidelines for air quality" and Objective 6.3 is "a zero emission transport network by 2050".
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1.1.2 Natural Environment

Document Title	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
Conservation of Habitats and Species Regulations 2017 (as amended)	<p>Sets out the obligations of a competent authority for the protection of sites or species. Changes were made by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. The main changes to the 2017 Regulations are:</p> <ul style="list-style-type: none"> • the creation of a national site network within the UK territory comprising the protected sites already designated under the Nature Directives, and any further sites designated under these Regulations • the establishment of management objectives for the national site network (the 'network objectives') • a duty for appropriate authorities to manage and where necessary adapt the national site network as a whole to achieve the network objectives • an amended process for the designation of Special Areas of Conservation (SACs) • arrangements for reporting on the implementation of the Regulations, given that the UK no longer provides reports to the European Commission • arrangements replacing the European Commission's functions with regard to the imperative reasons of overriding public interest (IROPI) test where a plan or project affects a priority habitat or species • arrangements for amending the schedules to the Regulations and the annexes to the Nature Directives that apply to the UK
Wildlife & Countryside Act 1981 (as amended)	The principal piece of UK legislation relating to the protection of wildlife. It consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC

	<p>on the Conservation of Wild Birds (Birds Directive) in Great Britain. The Countryside and Rights of Way Act 2000 was passed to provide additional levels of protection for wildlife whilst also strengthening the protection afforded to sites of specific interest</p>
<p>Natural Environment and Rural Communities Act 2006</p>	<p>Designed to help achieve a rich and diverse natural environment and thriving rural communities. Section 40 of NERC Act carries a duty to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity. Section 41 requires the Secretary of State to publish a list of the living organisms and types of habitat which it deems of principal importance for the purpose of conserving biodiversity</p>
<p>Environment Act 2021, Part 6 ¹⁸</p>	<p>According to Part 6, Nature and Biodiversity, of the Environment Act 2021, the Secretary of State may by regulations make provision for and in relation to a register of biodiversity gain sites (“the biodiversity gain register”). The information contained within the register must be made “accessible to members of the public”. According to the Act, the Secretary of State must keep under review the supply of land for registration in the biodiversity gain site register.</p> <p>Part 6 also states that “the general biodiversity objective” is the conservation and enhancement of biodiversity in England through the exercise of functions in relation to England. A public authority which has any functions exercisable in relation to England must from time to time consider what action the authority can properly take, consistently with the proper exercise of its functions to further the general biodiversity objective. After that consideration the authority must (unless it concludes there is no new action it can properly take):</p> <ul style="list-style-type: none"> • Determine such policies and specific objectives as it considers appropriate for taking action to further the general biodiversity objective, and • Take such action as it considers appropriate, in the light of those policies and objectives, to further that objective.
<p>Natural England’s climate change risk assessment and adaptation plan (2021)¹⁹</p>	<p>The Adaptation Reporting Power (ARP) of the Climate Change Act 2008 requires organisations to outline how they are preparing and adapting to the current and predicted risks posed by climate change. The report comprises an overarching risk assessment of climate change to</p>

¹⁸ <https://www.legislation.gov.uk/ukpga/2021/30/contents>

¹⁹ <http://publications.naturalengland.org.uk/publication/4891702237331456>

	<p>Natural England’s aims and objectives. Depending on future emission pathways [Natural England] expect to see moderate to major impacts on [their] aims and objectives in the medium to long term (Natural England, 2022).</p> <p>This report outlines how key work areas of the organisation are adapting to climate change. The report sets out an outline of the adaptation plans over the next five years, for work areas across the six corporate programmes: Resilient Landscapes and Seas, Sustainable Development, Greener Farming and Fisheries, Connecting People with Nature, Managing the Organisation, and Science and Evidence.</p>
<p>UK post-2010 Biodiversity Framework (2012)²⁰</p>	<p>The purpose of this UK Biodiversity Framework is to set a broad enabling structure for action across the UK between 2011 and 2020. It seeks a more joined up strategic approach in relation to planning for biodiversity (i.e. Biodiversity Action Plans). It identifies a set of strategic goals and key actions to achieve these. The framework takes account of international drivers such as the ‘Strategic Plan for Biodiversity 2011–2020’ (including the 20 Aichi targets), agreed at Nagoya, Japan in October 2010, and the EU Biodiversity Strategy (EUBS) May 2011.</p>
<p>Biodiversity 2020: A Strategy for England’s wildlife and ecosystem services (2011)²¹</p>	<p>Sets out the strategic direction for biodiversity policy for the next decade on land (including rivers and lakes) and at sea. Identifies a vision, mission, outcomes and actions to show what achieving the overarching objective by 2020 will mean in practice. Vision for England - By 2050 our land and seas will be rich in wildlife, our biodiversity will be valued, conserved, restored, managed sustainably and be more resilient and able to adapt to change, providing essential services and delivering benefits for everyone.</p>
<p>Green Capital. Green Infrastructure for a future city (2016)²²</p>	<p>Green infrastructure is the network of green spaces(as well as features such as street trees and green roofs) that is planned, designed and managed to deliver a range of benefits, including:</p> <ul style="list-style-type: none"> • healthy living; • mitigating flooding; • improving air and water quality;

²⁰ <https://data.jncc.gov.uk/data/587024ff-864f-4d1d-a669-f38cb448abdc/UK-Post2010-Biodiversity-Framework-2012.pdf>

²¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf

²² https://www.london.gov.uk/sites/default/files/green_capital.pdf

	<ul style="list-style-type: none"> • cooling the urban environment; • encouraging walking and cycling; and • enhancing biodiversity and ecological resilience.
<p>London Environment Strategy (2018)²³</p>	<p>The London Environment Strategy recognises that, green space has been lost and what remains has in some cases reduced in quality the range of plants and animals that live in London. Without careful attention, the number and diversity of bird, wildflower and bee species will continue to decline.</p> <p>Chapter 2: Transforming London’s environment indicates that “the Mayor wants London to be the world’s greenest city’, which in part involves support to local authorities and community groups in managing and valuing London’s parks and biodiversity better.</p> <p>According to Policy 5.2.1 of the Strategy: “Protect a core network of nature conservation sites and ensure a net gain in biodiversity”. To support this, the following proposals are presented:</p> <p>5.2.1.a: The London Plan includes policies on the protection of Sites of Importance for Nature Conservation (SINCs) and Regionally Important Geological Sites (RIGS) – <i>The land use planning system provides the primary mechanism for protecting land of ecological value in London.</i></p> <p>5.2.1.b: The Mayor will develop a biodiversity net gain approach for London, and promote wildlife-friendly landscaping in new developments and regeneration projects – <i>The Mayor will work with boroughs, statutory agencies and wildlife organisations to explore opportunities to establish a biodiversity net gain framework, including a biodiversity offsetting metric for London.</i></p>

1.1.3 Climate Change

Document Title	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
<p>United Nations Framework Convention on Climate Change</p>	<p>Aimed to mitigate the negative impacts of climate change and stabilise GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system</p>
<p>Kyoto Climate Change Protocol & UK Climate Change Programme</p>	<p>Enhancement of energy efficiency in relevant sectors of the national economy.</p>

²³ https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

	<p>Limitation or reduction of methane emissions through recovery and use in waste management, as well as in the production, transport and distribution of energy.</p> <p>Established to limit emissions of greenhouse gases. 6 gases addressed: Carbon dioxide, Methane, Nitrous oxide, Hydrofluorocarbons, Perfluorocarbons, Sulphur hexafluoride.</p>
<p>Climate Change Act 2008²⁴, The Climate Change Act 2008 (2050 Target Amendment) Order 2019²⁵ and The Climate Change Act 2008 (Credit Limit) Order 2021²⁶</p>	<p>Through the Climate Change Act 2008, as amended by the 2050 Target Amendment in June 2019²⁷, the UK Government has committed to:</p> <ul style="list-style-type: none"> • reduce GHG emissions by at least 100 per v of 1990 levels (net zero) by 2050; and • contribute to global emission reductions, to limit global temperature rise to as little as possible above 2°C. <p>To meet these targets, the UK Government has set five-yearly carbon budgets, which currently run until 2032. They restrict the amount of GHG the UK can legally emit in a five-year period (expressed as tonnes of carbon dioxide equivalent (CO₂e)). In December 2020, the Committee on Climate Change published its recommendation for the 6th UK carbon budget, which is the first budget to be published on a trajectory towards 'net zero'. At the time of writing, however, this budget was yet to be formally adopted into UK law.</p>
<p>Climate Change Risk Assessment (2022)²⁸</p>	<p>As required by the Climate Change Act 2008, the UK government has undertaken the third five-year assessment of the risks of climate change on the UK, working closely with the Climate Change Committee (CCC). This has presented strong evidence that the UK will be subject to a range of significant and costly impacts unless significant further action is taken now. The risk assessment considers sixty-one UK-wide climate risks and opportunities cutting across multiple sectors of the economy and prioritises eight risk areas for action in the next two years including:</p> <ul style="list-style-type: none"> • Risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards • Risks to soil health from increased flooding and drought • Risks to natural carbon stores and sequestration from multiple hazards • Risks to crops, livestock and commercial trees from multiple climate hazards

²⁴ <https://www.legislation.gov.uk/ukpga/2008/27/contents>

²⁵ <https://www.legislation.gov.uk/uksi/2019/1056/contents/made>

²⁶ <https://www.legislation.gov.uk/uksi/2021/749/contents/made>

²⁷ https://www.legislation.gov.uk/uksi/2019/9780111187654/pdfs/ukdsiem_9780111187654_en.pdf

²⁸ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1047003/climate-change-risk-assessment-2022.pdf

	<ul style="list-style-type: none"> • Risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks • Risks to people and the economy from climate-related failure of the power system • Risks to human health, wellbeing and productivity from increased exposure to heat in homes and other buildings • Multiple risks to the UK from climate change impacts overseas
<p>National Adaptation Programme (NAP) (2018)</p>	<p>Sets out what government, businesses, and society are doing to become more climate ready. Developed in response to the UK Climate Change Risk Assessment. Forms one of the key components to the Government's response to the Climate Change Act 2008.</p> <p>Of particular relevance to minerals and waste planning is Objective 21: To promote and gain widespread uptake in other sectors of adaptation measures that benefit, or do not adversely affect, the natural environment. Objectives 2, 3, 4, 6, 7, 9 10, 19, 20, 24, 26 are also of relevance. These target a number of areas and issues that in general aim to: Provide a clear planning framework, Help business and industries, Assist investors and developers, Investigate the long term implications of climate change, Ensure infrastructure is resilient to climate change, Understand the vulnerabilities of infrastructure, To develop, understand and promote expertise in managing services in relation to climate change, To build the resilience of wildlife, habitats and ecosystems, and To increase the extent of which businesses are considering climate change and for a better understanding and management of risks.</p>
<p>Analysis of a Net Zero 2030 Target for Greater London, Final Report for the Greater London Authority (2022)²⁹</p>	<p>At the time of publication of the 1.5°C plan, the UK ambition was to achieve 80 per cent reduction in emissions by 2050. In June 2019, parliament passed legislation requiring the UK Government to achieve 'Net Zero' greenhouse gas emissions by 2050 at the latest.</p> <p>This technical report, produced by Element Energy, analyses possible pathways to achieving net zero. The objective of this study is to update the analysis underpinning the 1.5°C plan on achieving net zero in London through:</p> <ul style="list-style-type: none"> • Developing a set of scenarios that meet net zero by 2030 • Identifying the key challenges, risks and implications

²⁹ https://www.london.gov.uk/sites/default/files/nz2030_element_energy_final.pdf

	<ul style="list-style-type: none"> Describing the policies required at national and London level to stimulate activity and deliver the target <p>Element Energy analysed four possible pathways to net zero, looking at the different ways London can reduce emissions. The report shows that under all pathways, it is possible to accelerate action and 'radically' reduce carbon emissions with the right ambition, leadership, powers and funding. As well as helping avoid catastrophic climate change, there are many other benefits in achieving net zero, including supporting tens of thousands of jobs; improving health through better air quality and more active lifestyles; reducing inequalities and improving quality of life for all (Greater London Authority, 2022).</p>
<p>London Environment Strategy (2018)³⁰</p>	<p>Chapter 6 of London's Environment Strategy sets out the ambition that London will be a zero carbon city by 2050, with energy efficient buildings clean transport and clean energy.</p> <p>Objective 6.3 A zero emission transport network by 2050 is relevant to the ULEZ ,stating that the Mayor's ambition is to have a zero emission transport network by 2050. This will be achieved through an integrated approach, reducing carbon emissions and air pollutants from transport side by side in both this strategy and the Mayor's Transport Strategy. Policies and proposals to reduce London's carbon emissions from transport have been combined with policies and proposals under the air quality chapter of the strategy (<i>discussed under the air quality section of this review</i>)</p>
<p>The Carbon Plan³¹ (2011)</p>	<p>The Climate Change Act established a legally binding target to reduce the UK's greenhouse gas emissions by at least 80% below base year levels by 2050. The plan sets out how the UK will achieve decarbonisation within the energy policy framework: to make the transition to a low carbon economy while maintaining energy security, and minimising costs to consumers, particularly those in poorer households. Sets out proposals and policies for meeting the first four carbon budgets. Includes sectoral plans that set targets to contribute towards overall carbon budget and reiterates the commitment of working towards a zero waste economy. Targets of relevance are contained in the Low carbon industry sectoral plan (By 2027, emissions from industry should be between 20% and 24% lower than 2009 levels. By 2050, the Government expects industry to have delivered its fair share of emissions cuts, achieving</p>

³⁰ https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

³¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47613/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf

	reductions of up to 70% from 2009 levels) and the Agriculture, land use, forestry and waste sectoral plan (overall reduction in methane emissions from landfill.
Mayor's Transport Strategy (MTS) (2018)³²	<p>The Greater London Authority Act 1999 requires the Mayor to publish a transport strategy which sets out the Mayor's policies and proposals for the promotion and encouragement of safe, integrated, efficient and economic transport facilities and services to, from and within Greater London together with proposals for the provision of transport which is accessible to persons with mobility problems and any other appropriate proposals.</p> <p>Under 'Achieving a zero-carbon city and good air quality', Policy 7 of the MTS states: <i>"The Mayor, through TfL and the boroughs, and working with stakeholders, will seek to make London's transport network zero emission by 2050, contributing towards the creation of a zero carbon city, and also to deliver further improvements in air quality to help meet tighter air quality standards, including achieving a health-based target of 10µg/m³ for PM_{2.5} by 2030. London's streets and transport infrastructure will be transformed to enable zero emission operation, and the switch to ultra low and zero emission technologies will be supported and accelerated".</i></p>

1.1.4 Energy Use and Generation

Legislation, Plan or Policy	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
Scenarios to 2050: London Energy Plan	The London Energy Plan explores how much energy London would need in the future, where it might be needed and the different ways of supplying that energy. It is a set of interconnected data models for building demand, power, heat, decentralised energy and transport, which have been developed using the best available data and with input from a range of stakeholders.
UK Renewable Energy Strategy (2009)³³	Establishes the methods and reasons for increasing the use of renewable electricity, heat and transport. Models scenarios to show how targets might be met.

³² <https://www.london.gov.uk/sites/default/files/mayors-transport-strategy-2018.pdf>

³³ <https://www.gov.uk/government/publications/the-uk-renewable-energy-strategy>

<p>British Energy Security Strategy (2022)³⁴</p>	<p>This plan, released in given the rise in cost of global energy prices, is central to the 'weaning' of Britain off of expensive fossil fuels. The plan will also be central to boosting diverse sources of homegrown energy, for greater long-term energy security. This plan builds on the Prime Minister's 'Ten Point Plan for a green industrial revolution' and the 'Net zero strategy'.</p>
<p>Energy white paper: Powering our net zero future (2020)³⁵</p>	<p>This white paper recognises the need to address the climate change challenge and that, if unchecked, represents an existential threat to the planet. This paper also recognises that there is a 'huge' opportunity for both growth and job creation in global markets such as low-carbon technologies, electric vehicles and clean energy. The paper states that "zero emission vehicles could support 40,000 jobs by 2030" and now is the time to seize these opportunities.</p> <p>This white paper addresses the transformation of our energy system, promoting high-skilled jobs and clean, resilient economic growth to promote delivery of net-zero emission by 2050. This white paper puts net zero and governmental efforts to fight climate change at its core, following the Prime Minister's Ten Point Plan for a Green Industrial Revolution. The Prime Minister's Ten Point Plan has set out the measures that will help ensure the UK is at the forefront of the Green Industrial Revolution. The Energy White Paper provides further clarity on the Prime Minister's measures and puts in place a strategy for a wider system that transforms energy, supports a green recover, and creates a fair deal for consumers.</p>
<p>Analysis of a Net Zero 2030 Target for Greater London, GLA (2022)</p>	<p>The primary aim of this study is to help identify the possible pathways and the implications of the accelerated target relative to 2050 through: modelling a set of scenarios, identifying key challenges, implications and opportunities and describing the likely policies to support delivery. This study considers four scenarios, representing different levels of decarbonisation ambition to explore the range of potential decarbonisation pathways for London:</p> <ul style="list-style-type: none"> • High Electrification Scenario • High Hydrogen Scenario • No Constraints Scenario • Accelerated Green Scenario (intermediate) <p>These scenarios represent a higher level of ambition than those of the UK government as well as those in the existing 1.5°C plan and are differentiated by the level of technology mix in relation to energy supply. This study does not prescribe the approach to achieving net zero of</p>

³⁴ <https://www.gov.uk/government/publications/british-energy-security-strategy>

³⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf

	<p>the policies required or roles of key stakeholders. This study identifies that two scenarios, high electrification and high hydrogen, are closest to current UK-wide targets (68% reduction in emissions by 2030 relative to 1990 levels), but still exceed this UK level commitment due to a more ambitious retrofit programme.</p> <p>This study sets out actions to reduce demand, including maximization of energy efficiency retrofit in buildings. In addition, all scenarios within this study assume high degrees of both behaviour change and energy efficiency to support technology deployment in reducing emissions. This study also outlines emissions for all scenarios, with all four scenarios achieving greater levels of decarbonisation by 2030 than the scenarios in the 1.5°C plan, but all have more than 10% residual emissions (relative to 1990 levels by 2030).</p> <p>This study recognises that waiting to make a decision on which pathway to follow risks either under-delivery by 2030 or more challenging action and investment in the mid-to-late 2020s to compensate. This study suggests that it will be necessary to take action in the next 5 years and that “high ambition in this period is essential to ensure the greatest chance of success”.</p>
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1.1.5 Flood Risk

Legislation, Plan or Policy	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 ³⁶	The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 replace and revoke the previous 2003 Regulations, and continue to transpose for England and Wales Directive 2000/60/EC. The Regulations also include the protection of groundwater against pollution and deterioration (transposed from aspects of Directive 2006/118/EC) as well as environmental quality standards in the field of water policy (in accordance with Directive 2008/105/EC).

³⁶ <https://www.legislation.gov.uk/uksi/2017/407/contents/made>

Flood & Water Management Act 2010	Assigned new responsibilities to local authorities to work in partnership with the Environment Agency, water companies and others to manage various aspects of flood risk. It requires Lead Local Authorities to produce a local strategy setting out significant flood risks affecting their area, and how they intended to address them.
UK Water Strategy (2008)	Builds on the principles of the existing Government Strategy for Flood and Coastal Erosion Risk Management - 'Making Space for Water' (2005) to ensure a fully integrated approach to flood risk and water management up to 2030.
London's Regional Flood Risk Appraisal (2014)³⁷	<p>Combined with the policies in the London Plan and a range of actions being undertaken by various organisations, aims to ensure that overall flood risk (probability x consequences) does not increase, and that by addressing existing problems, overall risk is reduced.</p> <p>The Regional Flood Risk Appraisal (RFRA) provides an overview of all sources of flooding in London and addresses its probability and consequences. This first review of the RFRA builds on and updates the original version that was published in October 2009. It is the impact of surface water flood risk which represents the key change in this RFRA compared with the 2009 version. This RFRA demonstrates that with the continued spatial focus on urban concentration, spatial flood risk probability in London is not expected to increase significantly as a consequence of the anticipated levels of growth. This RFRA presents a revised set of monitoring recommendations.</p> <p>This RFRA also recognises the need to apply relevant London Plan policies to sustainably manage flood risk through new development. New development represents one of the key opportunities to reduce overall flood risk.</p>
Thames Catchment Flood Management Plan (2009)	Provides an overview of the potential extent of flooding now and in the future, and enables policies to be set for managing flood risk within Thames Catchment. The plan, which contains a range of data and policies, is used to inform planning and decision making by key stakeholders
London Environment Strategy 2018³⁸	The Strategy states that action will be taken now to plan for new flood defences and new water resources for London. This strategy establishes some key aims for London including "for London and Londoners to be resilient to severe weather and longer-term climate change impacts including flooding, heat risk and drought. This strategy also recognises the role of trees

³⁷ https://www.london.gov.uk/sites/default/files/gla_migrate_files_destination/Regional%20Flood%20Risk%20Assessment%20-%20First%20Review%20-%20August%202014.pdf

³⁸ https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

	<p>in localised flood prevention, with one of the targets set by the strategy being to achieve more than 50% green cover. The Strategy outlines several policies, objectives and proposals specific to flooding prevention, management, resilience and awareness.</p> <p>This Strategy also notes several actions to be required in order for London to adapt to climate change and be resilient to severe weather events, including “the risk of flooding must be reduced through appropriate flood defences and increased awareness. This Strategy also recognises “Flooding and coastal change risks to communities, business and infrastructure” as “High Risk” with “More Action Needed”.</p> <p>This Strategy recognises the role of the Thames Barrier, tidal walls and embankments in providing London with a high level of protection against tidal flooding and that almost 20% of London is in the Thames floodplain. The Strategy outlines that whilst most of this area is very well defended by traditional hard-engineered flood defenses, the upstream part of the Thames and many of the tributaries to the Thames have lower standards of protection. The Strategy highlights the volume of London residents living and working in areas of tidal and fluvial flood risk and, if left unmitigated, the tidal flood risk to London will continue to increase with increasing sea levels. To stay protective from tidal flood risk, the defences must be upgraded and effectively maintained.</p>
<p>Thames Estuary 2100 (TE2100 Plan): Managing flood risk through London and the Thames estuary (2012)³⁹ and Thames Estuary 2100: 10-Year Review monitoring key findings⁴⁰</p>	<p>Sets out the recommendations and actions needed to manage flood risk through this century. In developing the plan the Environment Agency investigated and understood flood risk in the Estuary today, how it might change in the future and the many ways London can manage and adapt to those changes. It aims to direct future work on flood warning, flood plain management and expenditure needed to maintain and replace 330 km of walls, embankments, flood barrier and gates.</p> <p>Every 10 years, a full review and update is carried out in relation to the recommendations in the Plan. The three phases in the 10-year review include the monitoring review, the economic review and the update of the Thames Estuary 2100 Plan. The updated plan is due to be published in 2022. The key findings report is a summary of key findings from the monitoring review and suggests some early implications and next steps for this work within the 10-year review. Key findings have been set out as 10 high-level ‘indicators of change’ with headline findings and an explanation of the monitoring results for each.</p>

³⁹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/322061/LIT7540_43858f.pdf

⁴⁰ <https://www.gov.uk/government/publications/thames-estuary-2100-te2100/thames-estuary-2100-key-findings-from-the-monitoring-review>

	<p>The key findings report outlines some headline findings, which are set out in detail as part of the review. Some of these headline findings include but are not limited to: sea level in the Thames Estuary has risen over the last century; sea level rise has been accelerating over the last few decades; river flows are increasing; 97.5% of the tidal flood defences in the estuary are classified as meeting or exceeding their target condition; the number of people and properties in the Plan area has increased since 2009. The findings will be used, with data from other studies, to update the recommendations for managing flood risk in the Thames Estuary 2100 Plan.</p>
<p>London Resilience Partnership Strategic Flood Response Framework (2015)</p>	<p>Considers flooding, of any kind, causing or with the potential to cause London-wide impacts. This includes flooding from rivers, the sea (tidal), surface water, groundwater, reservoirs, sewers, canals and artificial waterways. This may be severe flooding in one or more locations requiring a London-wide response, or a greater number of less severe flooding in multiple locations within London</p>

1.1.6 Geology and Soils

<p>Legislation, Plan or Policy</p>	<p>Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA</p>
<p>Safeguarding our Soils – A Strategy for England (2011)</p>	<p>Sets out a vision to improve the sustainable management of soil and tackle degradation within 20 years. Aims to ensure that England's soils are better protected and managed. Four main themes:</p> <ul style="list-style-type: none"> • Sustainable use of agricultural soils • Role of soils in mitigating and adapting to climate change • Protecting soil functions during construction and development • Preventing pollution and dealing with historic contamination. <p>Details 16 key objectives for meeting these themes.</p>
<p>A Green Future: Our 25 Year Plan to Improve the Environment (2018)</p>	<p>The strategy sets out 5 key goals, one of which specifically states 'Improving our approach to soil management: by 2030 we want all of England's soils to be managed sustainably, and we will use natural capital thinking to develop appropriate soil metrics and management approaches'</p>

1.1.7 Historic Environment

Legislation, Plan or Policy	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
Planning (Listed Buildings and Conservation Areas) Act 1990	Builds on the framework set out in the European conventions and includes for the protection of Scheduled Monuments, Conservation Areas, Registered Parks and Gardens and Listed Buildings
Ancient Monuments and Archaeological Areas Act 1979⁴¹	The Ancient Monuments and Archaeological Areas Act consolidates and amends the law relating to ancient monuments; to make provision for the investigation, preservation and recording of matters of archaeological or historical interest and for the regulation of operations or activities affecting matters. The Act defines 'scheduled monuments' and makes damage to protected monuments a criminal offence.
Hedgerow Regulations 1997 (as amended 2003)	Set the legislative context for the protection of countryside boundary features
National Planning Policy Framework (2021)⁴²	Paragraph 7 of the National Planning Policy Framework highlights the purpose of a planning system as being able to "contribute to the achievement of sustainable development" and summarises the high-level objective of sustainable development as "meeting the needs of the present without compromising the ability of future generations to meet their own needs".
The London Plan (2021)⁴³	Chapter 7 of the London Plan provides policy guidance on Heritage and Culture within London.
Translating Good Growth for London's Historic Environment (2017)⁴⁴	This study demonstrated that heritage is a fundamental component of achieving good growth, and that heritage is "at the heart of London-ness, and Londoners' identity". This study explores and articulates the contribution that London's historic environment is making to the delivery of good growth. This paper sets out the benefits of embedding an understanding an appreciation of the historic environment in the delivery of positive change and is supported by a selection of case studies. The conclusions and recommendations identified by the study provide thoughts and actions to carry forward into the review of the London Plan and other Mayoral Strategies.

⁴¹ <https://www.legislation.gov.uk/ukpga/1979/46>

⁴² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

⁴³ https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

⁴⁴ <https://historicengland.org.uk/content/docs/get-involved/translating-good-growth-london-historic-environment-120717-pdf/>

Culture for all Londoners, Mayor of London's Culture Strategy (2018)⁴⁵

The Culture Strategy outlines an “ambitious programme to sustain a city that works hard, and plays hard for everyone; a city that is built on the principle of culture for all Londoners”. The Strategy is based around four key principles:

- Love London
- Culture and Good Growth
- Creative Londoners
- World City

According to the Strategy, the Mayor recognises that “if London is to continue as a cultural powerhouse, its inequalities must be addressed”. To do this, London must attract and grow the best talent which required an ambitious programme of support and investment in infrastructure, skills promotion and planning.

“This Strategy takes a broad view of culture, from arts institutions, creative industries, the historic environment and museums to community festivals, pubs and nightclubs, busking pitches, skateparks and street art.”

London Environment Strategy (2018)⁴⁶

Objective 5.2 of the Strategy: “Make more than half of London’s area green by 2050”. The Strategy recognises London’s historic parks, nature reserves and natural habitats as providing opportunities to enjoy the natural heritage and designed landscapes with “their rich cultural and natural history” being an important reason for their protection and management “as they are a valuable part of the city’s cultural offer”.

Objective 5.1.2a of the Strategy: “The Mayor will ensure that opportunities for a complementary relationship between cultural heritage and green infrastructure are fully explored in the interests of good place-making”. The Strategy recognises that as the city continues to grow, opportunities to create new green infrastructure that is appropriate to its historic context will need to be taken. According to the Strategy, the Mayor will “ensure that policies are in place that recognises and embeds the role of heritage landscapes in place-making and promotes innovative and creative solutions that contribute to maintaining and enhancing the character of London’s neighbourhoods”.

⁴⁵ https://www.london.gov.uk/sites/default/files/2018_culture_strategy_final_2021_0.pdf

⁴⁶ https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

1.1.8 Materials and Waste

Legislation, Plan or Policy	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
<p>Waste Framework Directive (2008) as amended (2018)</p>	<p>The aims of this Directive are:</p> <ul style="list-style-type: none"> • To provide a comprehensive and consolidated approach to the definition and management of waste. • To shift from thinking of waste as an unwanted burden to a valued resource and make Europe a recycling society. • To ensure waste prevention is the first priority of waste management.
<p>Waste (England and Wales) (Amendment) Regulations 2014</p>	<p>Transposes the requirements of the EU Waste Framework Directive into English and Welsh legislation.</p>
<p>National Planning Policy for Waste (October 2014)</p>	<p>Sets out detailed waste planning policies and places responsibility on waste planning authorities to ensure that waste management is considered alongside other spatial planning concerns such as housing and transport; recognising the positive contribution waste management can make to developing sustainable communities. This includes preparing Local Plans which identify opportunities to meet the needs of their area for the management of waste streams</p>
<p>Resources and Waste Strategy for England (2018)⁴⁷</p>	<p>This Strategy sets out the plan to double resource productivity and eliminate avoidable waste of all kinds by 2050. The Strategy combines current actions with firm commitments for coming years, and gives a clear longer-term policy direction in line with the 25 year Environment Plan⁴⁸. The Strategy recognises that a move towards a circular economy is required and will “see us keeping resources in use for as long as possible”. The Strategy sets out how the government will:</p> <ul style="list-style-type: none"> • Preserve stock of material resources by minimizing waste, promote resource efficiency and move towards a circular economy • Minimise the damage caused to the natural environment by reducing and managing waste safely and carefully • Deal with waste crime

⁴⁷ <https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england>

⁴⁸ <https://www.gov.uk/government/publications/25-year-environment-plan>

<p>London Environment Strategy (2018)⁴⁹</p>	<p>Chapter 7 of the London Environment Strategy sets out policies and proposals for reducing the amount of municipal waste produced, increasing the amount of waste reused, recycled or composed, and generating low carbon energy from waste remaining. The Mayor’s objectives are:</p> <ul style="list-style-type: none"> • Drive resource efficiency • Maximise recycling rates • Reduce the environmental impact of waste activities • Maximise local waste sites and ensure London has the infrastructure to manage all the waste it produces. <p>According to one of the aims, as set out in chapter 7 of the Strategy, “London will be a zero waste city. By 2026 no biodegradable or recyclable waste will be sent to landfill, and by 2030 65 per cent of London’s municipal waste will be recycled”.</p> <p>(Greater London Authority, 2022)</p>
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1.1.9 Noise and Vibration

Legislation, Plan or Policy	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
<p>London Environment Strategy (2018)⁵⁰</p>	<p>The Mayor has a legal duty to set out policies and proposals in this Strategy to tackle ambient noise, the main long-term, predictable sources of noise across London. The Strategy recognises that the Mayor’s power to monitor and control noise are limited and, whilst the mayor may be able to seek mitigations to some ambient noise impacts through TfL and GLA actions, the Mayor has no direct control over policing other noise impacts such as through construction works, vehicles in street or loudspeakers in the street.</p> <p>The Strategy recognises that noise is an inherent part of a vibrant city, but that excessive noise can damage people’s health. The Strategy highlights that “almost 2.4 million people in London are already exposed to noise levels that exceed international guidelines”. As part of the Strategy, the Mayor has set out aims to make the vision of transforming the city’s environment a reality. One of these aims is specific in relation to noise:</p>

⁴⁹ https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

⁵⁰ https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

	<ul style="list-style-type: none"> • “Londoners’ quality of life to be improved by reducing the number of people adversely affected by noise and promoting more quiet and tranquil spaces”. • The Strategy outlines that ‘noise; forms one of the “Ten Healthy Streets Indicators” and that “reducing the noise impacts of motor traffic will directly benefit health, improve the ambience of street environments and encourage active travel and human interaction”. <p>According to the Strategy, London requires the following actions to tackle the adverse impacts of ambient noise:</p> <ul style="list-style-type: none"> • Reduce adverse impacts of noise from transport and non-transport sources • Promote good acoustic design and quiet and tranquil spaces
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1.1.10 Water Resources and Quality

Legislation, Plan or Policy	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
Water Act 2003	<p>National legislation which transposes the Water Framework Directive – 2000/60/EC into UK law. Act aims to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which:</p> <p>Prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems;</p> <p>Promotes sustainable water use based on a long-term protection of available water resources;</p> <p>Ensures the progressive reduction of pollution of groundwater and prevents its further pollution, and Contributes to mitigating the effects of floods and droughts</p>
Thames river basin district flood risk management plan (2016)⁵¹	<p>Flood risk management plans (FRMPs) explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. FRMPs describe actions to manage flood risk across England. Each FRMP covers a specific river basin district (RBD). Each FRMP must be reviewed by the Environment Agency and Local Lead Flood Authorities every 6 years, as per the Flood Risk Regulations 2009.</p> <p>The Thames river basin district flood risk management plan covers a period of 2015 – 2021 and presents a summary of the aims and actions needed to manage the risk. Thames River basin district covers 16,190km² with London at the heart of the district. The river basin district</p>

⁵¹ <https://www.gov.uk/government/publications/thames-river-basin-district-flood-risk-management-plan>

	<p>comprises 17 catchments and 2 flood risk areas. Risk management authorities have agreed social, economic and environmental objectives for 2015 to 2021 following discussion and consultation with other organisations and communities. Actions in the FRMP are known as 'measures' which are specific projects or investigations to work towards achieving the objectives.</p> <p>Measures in the FRMP are grouped into four categories:</p> <ul style="list-style-type: none"> • Preventing risk • Preparing for risk • Protecting from risk • Recovery and review.
<p>Water for People and the Environment – Water Resources Strategy Regional Action Plan for Southern Region (2009)</p>	<p>Establishes how water resources should be managed to 2050 and beyond to ensure that there will be enough water for people and the environment.</p>
<p>Meeting our future water needs: a national framework for water resources (2020)⁵²</p>	<p>The national framework explores England's long-term water needs. The framework contributes to 2 of the pledges in the government's 25-year environment plan:</p> <p>Leave the environment in a better state than we found it</p> <p>Improve resilience to drought and minimise interruptions to water supplies</p> <p>The framework report marks a move to strategic regional planning and sets out the principles, expectations and challenges for 5 regional groups. The framework recognises that water resource management plans are unlikely to deliver the right strategic solutions for the nation as a whole and, hence, regional planning is needed. "By putting aside company boundaries and considering the needs of the whole region, we can deliver the step-change in resilience and environmental protection required".</p>
<p>Mayor's Water Strategy (2011)</p>	<p>The first water strategy for London and provides a complete picture of London's water needs. The strategy calls for organisations involved in the city's water management to:</p> <ul style="list-style-type: none"> • invest in a water management and sewerage infrastructure system that's fit for a world class city and will create jobs; • support and encourage Londoners to take practical actions to save water, save energy and save money off their utility bills; and

⁵² <https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources>

<p>London Environment Strategy (2018)⁵³</p>	<ul style="list-style-type: none">• realise the potential of London’s sewerage as an energy resource to help reduce greenhouse gas emissions. <p>According to chapter 2 of the Strategy, the Mayor wants London to be the world’s greatest global city and, in part, this will mean making it cleaner: “The Mayor will clean up London’s air, water and energy in a way that is fair, protects the health of Londoners, and contributed to the fight against climate change”. Chapter 2 also recognises that water, energy and raw materials will be less readily available in the future due to climate change and that the Mayor will make sure the city does not waste valuable resources, is prepared for the future and that the future is safeguarded for future generations. In addition, the Strategy states that “action will be taken now” to plan for new water resources for London.</p> <p>The Strategy also highlights that, as part of making London the world’s first National Park City, London will be “a city where everyone can enjoy high-quality green spaces, clean air and clean waterways, and where more people choose to walk and cycle”.</p> <p>The Strategy recognises that years of pollution and poorly managed river maintenance and modification work have left London’s rivers in a poor state with only one of London’s 47 river water bodies classified as ‘good’ under an EU framework. The Strategy also recognises the role that a greener city plays in improved water quality. The Strategy also sets out how the Mayor is working with key stakeholders to address water quality problems by:</p> <ul style="list-style-type: none">• Integrated Water Management Systems• Infrastructure expansion• Addressing misconnections• Green infrastructure (nature-based solution)• Sustainable Drainage Systems (SuDS) (nature-based solution)• River Restoration (nature-based solution) <p>Chapter 8 of the Strategy states that, even with gains in water efficiency, London is forecast to have a water resource gap of over 400m litres per day by 2040. The Strategy highlights water resource options pursued by water companies, and notes that it is essential that the Greater London Authority maintains an oversight of strategic water resource planning and demand management measures.</p>
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⁵³ https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

	Policy 8.3.2: Support the planning for new strategic water resources appropriate for London. The Strategy recognises the water resource solution(s) must be acceptable to London in terms of scale, flexibility and compatibility with wider London priorities.
London Abstraction Licensing Strategy (2013)	Sets out how water resources are managed in the London area. It provides information on where water is available for further abstraction and an indication of how reliable a new abstraction license may be.

1.2 People

Legislation, Plan or Policy	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
Levelling Up the United Kingdom⁵⁴	A moral, social and economic programme for the whole of government. The Levelling Up White Paper sets out the progress made by the UK Government towards spreading opportunity around the country since 2019 and sets out the next stages in this programme to level up the UK. According to The Levelling Up White Paper, "a mix of factors is needed to transform places and boost local growth: strong innovation and a climate conducive to private sector investment, better skills, improved transport systems, greater access to culture, stronger pride in place, deeper trust, greater safety and more resilient institutions."
The GLA Act 1999⁵⁵ (section 33)	Requires the Mayor and Greater London Authority (GLA) to put in place procedures to have 'due regard' and promote equality of opportunity in relation to the formulation and implementation of mayoral strategies. EQIA is an important tool in achieving this.
Equality Act (2010)⁵⁶	The Equality Act 2010 legally protects people from discrimination in the workplace and in wider society, places duty on public authorities to pay 'due regard' to actively tackling all forms of discrimination, harassment and victimisation, promote equality of opportunity and good relations.

⁵⁴ <https://www.gov.uk/government/publications/levelling-up-the-united-kingdom>

⁵⁵ <https://www.legislation.gov.uk/ukpga/1999/29/contents/2000-07-03>

⁵⁶ <https://www.legislation.gov.uk/ukpga/2010/15/contents>

<p>Mayor's Transport Strategy (MTS) (2018)¹⁶</p>	<p>The MTS sets out the Mayor's policies and proposals to achieve the vision to '<i>create a future London that is not only home to more people, but is a better place for all of those people to live in</i>' (p.19). The Strategy sets three key themes using the Healthy Streets Approach to achieve this vision:</p> <ul style="list-style-type: none"> • Healthy streets and healthy people; • A good public transport experience; and • New homes and jobs <p>The health and economic benefits of active travel, including reducing the burden on the NHS, are a strong focus of the MTS. The Strategy also seeks to create <i>a good public transport experience</i> with ambitions to improve the safety, affordability, accessibility and inclusivity of public transport in London.</p>
<p>London Environment Strategy (2018)⁵⁷</p>	<p>The strategy recognises that air and noise pollution, the threat to green spaces and the adverse effects of climate change all pose major risks to the health and wellbeing of Londoners, particularly those living in the most deprived areas. The strategy sets out proposals for strategies and investment to deliver sustainable growth, improve health and reduce inequalities. Part of the strategy is a commitment to improving pollution and air quality in London through encouraging cleaner vehicles and encouraging uptake of active travel (Greater London Authority, 2018).</p>
<p>The Marmot Review: Fair Society, Healthy Lives (Marmot et al, 2010)⁵⁸ Health Equity in England: The Marmot Review 10 Years On (The Health Foundation, 2020)⁵⁹</p>	<p>The Marmot Review (2010) sets out a life course framework for tackling health inequalities in England. The review '<i>sets out a framework for action under two policy goals: to create an enabling society that maximizes individual and community potential; and to ensure social justice, health and sustainability are at the heart of all policies and aims to support healthy communities</i>' (Local Government Association, 2021).</p> <p>The Marmot Review '10 years on' report shows that, in England, health is getting worse for people living in more deprived districts and regions, health inequalities are increasing and, for the population as a whole, health is declining.</p>

⁵⁷ https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

⁵⁸ <https://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review>

⁵⁹ <https://www.health.org.uk/publications/reports/the-marmot-review-10-years-on>

<p>Healthy Streets for London Framework (2017)⁶⁰</p>	<p>The MTS uses the Healthy Streets Approach ⁶⁰ which makes health and personal experience the priority in transport plans for the city. There are 10 healthy streets indicators, and those considered relevant to the Health and Equalities Impact Assessment are as follows:</p> <ul style="list-style-type: none"> • Pedestrians from all walks of life; • Easy to cross; • Places to stop and rest; • Not too noisy; • People choose to walk, cycle and use public transport; • People feel safe; • People feel relaxed; • Clean air.
<p>The London Health Inequalities Strategy (2018)⁶¹</p>	<p>The London Health Inequalities Strategy sets out a vision for making London a healthier, fairer society, with all Londoners having the best opportunities to live a long life in good health. The Strategy highlights the 'stark' health inequalities which can be seen by the differences in life expectancy in certain parts of the city compared to others.</p> <p>A key ambition of the strategy is for London to have the best air quality of any global city, with progress fastest in the most polluted areas, benefitting people most vulnerable to the effects of air pollution. Nitrogen dioxide and particulate matter are highlighted as significant concerns for health.</p>
<p>Health Inequalities Strategy Implementation Plan 2021-24, (2021)⁶²</p>	<p>As highlighted by the London Health Inequalities Strategy⁶¹, 'stark' London exhibits 'stark' health inequalities which can be seen by the differences in life expectancy in certain points of the city compared to others.</p> <p>The Health Inequalities Strategy implementation plan 2021-24 details what actions the Mayor and partners will take to tackle these inequalities over the next few years with the five aims of the Health Inequalities Strategy remaining the core framework for action.</p>

⁶⁰ <https://content.tfl.gov.uk/healthy-streets-for-london.pdf>

⁶¹ https://www.london.gov.uk/sites/default/files/health_strategy_2018_low_res_fa1.pdf

⁶² <https://www.london.gov.uk/publications/health-inequalities-strategy-implementation-plan-2021-24>

	<p>The implementation plan closely aligns with London’s recovery plans and the London Health and Care Partnership’s Vision to be the healthiest global city. As part of this plan, the Major has identified six key commitments with clear and measurable goals:</p> <ul style="list-style-type: none"> • Healthy Children: Up to 50 School Superzones supported by 2025 • Health Minds: by 2025, London will have a quarter of a million wellbeing ambassadors • Healthy Places (1): London will have the cleanest air of any major world city, meeting legal and health requirements by 2050 • Healthy Places (2): The Major will lead the campaign to make London a Living Wage City • Health Communities • Healthy Living: By 2041, all Londoners will do at least 20 minutes of active travel each day.
<p>Inclusive London: The Mayor’s Equality, Diversity and Inclusion Strategy (2018)⁶³</p>	<p>Inclusive London is the Mayor’s Equality, Diversity and Inclusion Strategy, which seeks to achieve greater fairness and equality for people in London. The Strategy outlines long-term strategic objectives relating to equality, diversity and inclusion of groups protected by the Equality Act 2010 but also wider issues such as low-income Londoners, young people in care, care leavers, single parents, migrants and refugees. Of relevance to the ULEZ, a series of objectives are orientated around improving accessibility, inclusivity, safety and affordability of transport in London.</p>
<p>The London Plan (2021)⁶⁴</p>	<p>The London Plan is the Mayor’s Greater London Authority Spatial Development Plan (SDS) which outlines an integrated economic, environmental, transport and social framework for the development of London over a 20-25 year period (2019-2041). The Plans vision seeks to promote <i>Good Growth</i> which balances the following objectives which should be taken into account by all planning and development in London:</p> <ul style="list-style-type: none"> • GG1 Building strong and inclusive communities; • GG2 Making the best use of land; • GG3 Creating a healthy city; • GG4 Delivering the homes Londoners needs; • GG5 Growing a good economy; and

⁶³ <https://www.london.gov.uk/sites/default/files/mayors-equality-diversity-inclusion-strategy.pdf>

⁶⁴ https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

	<ul style="list-style-type: none"> • GG6 Increasing efficiency and resilience.
<p>Action on Equality – TfL’s commitments to 2020 (2016)⁶⁵</p>	<p>Action on Equality sets out TfL’s commitments to promoting equality for customers, staff and stakeholders, in compliance with the Equality Act 2010. The vision for Equality and Inclusion outlined is that <i>‘every person matters in keeping London moving, working and growing’</i> (p.15), with actions proposed based on this vision, objectives and policies. Action on Equality outlines a series of TfL equality objectives which demonstrate the improvement TfL seek to make to the equality of transport.</p>

1.3 Economy

Legislation, Plan or Policy	Key objectives, targets, and indicators relevant to the MTS IIA and London-wide ULEZ IIA
<p>The London Plan (2021)⁶⁴</p>	<p>The Mayor wants London to continue to provide the best environment in the world in which to do business, so that businesses of all different sizes and sectors can reach their growth potential. This includes supporting business and employment across all sectors of the economy and capitalising on new growth opportunities in emerging sectors. This Plan provides the planning framework to complement the Mayor’s Economic Development Strategy (EDS) to ensure that the varied innovation and workspace requirements of London’s businesses are met. Specifically policy E8 of the London Plan stipulates the following:</p> <ul style="list-style-type: none"> • Employment opportunities for Londoners across a diverse range of sectors should be promoted and supported along with support for the development of business growth and sector-specific opportunities. • London’s global leadership in tech across all sectors should be maximised. • The evolution of London’s diverse sectors should be supported, ensuring the availability of suitable workspaces including: <ul style="list-style-type: none"> ○ start-up, incubation and accelerator space for micro, small and medium sized enterprises ○ flexible workspace such as co-working space and serviced offices

⁶⁵ <https://content.tfl.gov.uk/action-on-equality-tfls-commitments-to-2020.pdf>

- conventional space for expanding businesses to grow or move on
- laboratory space and theatre, television and film studio capacity
- affordable workspace in defined circumstances (see Policy E3 Affordable workspace).
- Innovation, including London's role as a location for research and development should be supported, and collaboration between businesses, higher education providers and other relevant research and innovation organisations should be encouraged.
- London's higher and further education providers and their development across all parts of London should be promoted. Their integration into regeneration and development opportunities to support social mobility and the growth of emerging sectors should be encouraged.
- Clusters such as Tech City and MedCity should be promoted and the development of new clusters should be supported where opportunities exist, such as CleanTech innovation clusters, Creative Enterprise Zones, film, fashion and design clusters, and green enterprise districts such as in the Thames Gateway.

In collaboration with the Mayor, boroughs are encouraged to identify and promote the development of Strategic Outer London Development Centres (SOLDC) that have one or more specialist economic functions of greater than sub-regional importance. SOLDCs should be supported by: 1) encouraging local innovation to identify and enhance distinct economic strengths 2) co-ordinating infrastructure investment 3) creating a distinct and attractive business offer and public realm 4) ensuring that development complements the growth of town centres and other business locations, and supports the environmental and transport objectives of this Plan 5) bringing forward development capacity 6) improving Londoners' access to employment opportunities.

Boroughs are encouraged to identify and support the growth of sustainably located employment clusters in inner and outer London

Specific reference is also made to Strategic Outer London Development Centre in the policy part G and H and in para 6.8.5 which stipulates that the Strategic Outer London Development Centre (SOLDC) concept seeks to support the growth of business and employment opportunities beyond central London. This involves realising the potential of such locations to develop their specialist economic growth in ways which will help achieve the Mayor's wider objectives. Town centres offer particular advantages for some specialist activities but the SOLDC concept can apply to a range of business locations including industrial areas. The approach is designed to encourage local innovation whilst ensuring that it supports and

	<p>complements the economic prospects of neighbouring town centres including those in adjacent boroughs.</p>
<p>London Recovery Programme (2020)⁶⁶</p>	<p>The London Recovery Programme has identified a “grand challenge to restore confidence in the city, minimise the impact on communities and build back better the city’s economy and society”. It is addressing these challenges through nine recovery missions, which are bringing together the public, private and voluntary sectors. Of the nine recovery missions, those considered relevant to the IIA are listed below:</p> <ul style="list-style-type: none">• A green new deal: tackle the climate and ecological emergencies and improve air quality by doubling the size of London’s green economy by 2030 to accelerate job creation for all• A robust safety net: By 2025, every Londoner is able to access the support they need to prevent financial hardship• High streets for all: Deliver enhanced public spaces and exciting new uses for underused high street buildings in every Borough by 2025. Examples listed within the Recovery Programme include capitalising on TfL / Borough Street Space programmes to promote walking, cycling and wider accessibility.• A New deal for young people: By 2024 all young people in need are entitled to a personal mentor and all young Londoners have access to quality local youth activities.• Good work for all: Support Londoners into good jobs with a focus on sectors key to London’s recovery• Mental health and wellbeing: By 2025 London will have a quarter of a million wellbeing ambassadors, supporting Londoners where they live, work and play• Digital access for all: Every Londoner to have access to good connectivity, basic digital skills and the device or support they need to be online by 2025.• Healthy food, healthy weight: By 2025 every Londoner lives in a healthy food neighbourhood.• Building strong communities: By 2025, all Londoners will have access to a community hub ensuring they can volunteer, get support and build strong community networks

⁶⁶ https://www.london.gov.uk/sites/default/files/recovery_programme_overview.pdf

<p>Economic Recovery Framework for London⁶⁷</p>	<p>The Economic Recovery Framework for London sets out a framework for action for dealing with the structural changes to London's economy and fostering economic recovery. There are five pillars to the framework – Jobs, Business, Thriving Neighbourhoods, Connected City and Global London, with Building the green economy and narrowing social, economic and health inequalities being cross-cutting themes. Within each pillar are four key issues to focus collective efforts on.</p> <p>The framework builds on the recovery missions developed by the London Recovery Board and sets out:</p> <ul style="list-style-type: none"> • London's priority actions for economic recovery • The role of London boroughs in delivering these and where they might work together collaboratively via sub-regions for each pillar • Opportunities for collaboration and work with central government, business and major institutions to support London's economic recovery <p>(London Councils, 2021)</p>
<p>The Mayor's Economic Development Strategy (EDS) (2018)⁶⁸</p>	<p>Sets out approach to facilitating ongoing sustainable economic growth in London, including the need to apply the healthy streets approach, reduce car dependency and transition to a low carbon economy. There is a focus on improving public realm and making walking and cycling to economic centres more appealing, and on reducing traffic levels and improving air quality to reduce the economic strain that ill health has on productivity within the city. Economic growth linked with development, and associated land use or policy change, needs to fit within the framework set out in the London Plan.</p>
<p>The Mayor's Transport Strategy (MTS) (2018)¹⁶</p>	<p>The MTS defines the link between the approach to future transport provision with London and the conditions which will allow London's economy to flourish. It recognises the need to connect business to each other, and to their customers and workers, while facilitating 'good growth' – i.e., growth which is sustainable and healthy for Londoners. Relevant policies, which</p>

⁶⁷ https://www.london.gov.uk/sites/default/files/mayor_of_london_economic_recovery_framework.pdf

⁶⁸ https://www.london.gov.uk/sites/default/files/economic-development-strategy-2018_1.pdf

may be impacted by the proposed ULEZ and also impact on the economy and businesses, include:

Policy 1: The Mayor, through TfL and the boroughs, and working with stakeholders, will reduce Londoners' dependency on cars in favour of active, efficient and sustainable modes of travel, with the central aim for 80 % of all trips in London to be made on foot, by cycle or using public transport by 2041.

Policy 2: The Mayor, through TfL and the boroughs, and working with stakeholders, will seek to make London a city where people choose to walk and cycle more often by improving street environments, making it easier for everyone to get around on foot and by cycle, and promoting the benefits of active travel.

Policy 5: The Mayor, through TfL and the boroughs, and working with stakeholders, will prioritise space efficient modes of transport to tackle congestion and improve the efficiency of streets for the movement of people and goods, with the aim of reducing overall traffic levels by 10-15 % by 2041.

Policy 10: The Mayor, through TfL and the boroughs, and working with stakeholders, will use the Healthy Streets Approach to deliver coordinated improvements to public transport and streets to provide an attractive whole journey experience that will facilitate mode shift away from the car.

Policy 17: The Mayor, through TfL and the boroughs, and working with stakeholders, will seek the use of the full potential of the Thames to carry passengers, to integrate river services with the public transport system, walking and cycling networks, and to enable the transfer of freight from road to river in the interests of reducing traffic levels and the creation of Healthy Streets.

Policy 19: The Mayor, through TfL and the boroughs, and working with stakeholders, will seek the development of London's public transport services to support the growth of the night-time economy

The Mayor's Transport Strategy also sets out several proposals which, alongside the policies, are used to deliver the Healthy Streets Approach throughout London. Specifically, proposal

London-wide Ultra Low Emissions Zone

24 of the MTS under 'Improving air quality and the environment', states that *"The Mayor, through TfL, will seek to introduce the central London Ultra Low Emission Zone (ULEZ) standards and charges in 2019, tighter emissions standards London-wide for heavy vehicles in 2020, and an expanded ULEZ covering inner London in 2021"*.

2. Environment Baseline

2.1 Introduction

Baseline data have been provided for each of the topics included within the environmental assessment. These are:

- Air quality and carbon;
- Noise; (Scoped Out)
- Biodiversity and nature conservation;
- Cultural heritage;
- Materials and waste; and
- Landscape, townscape and the urban realm.

The assessment of these topics requires the establishment of anticipated baseline conditions in 2023 to provide a basis for predicted changes resulting from the implementation of the Mayor's wider ULEZ.

For air quality and carbon, forecast data (i.e. a future baseline at 2023) are not currently available and therefore data for 2019 (the latest year for which emissions and concentration data are available from the London Atmospheric Emissions Inventory (LAEI)) have been used as the basis of the baseline information presented below.

For all other topics, a high level overview of current environmental conditions has been provided for 2022, and it is assumed that these conditions would remain largely unchanged in 2023

The baseline for each topic has been established across Greater London (the 32 London boroughs and the City of London). In some cases, areas beyond Greater London may be considered, for instance where a sensitive receptor is either intersected by the Greater London boundary or located immediately outside it.

2.2 Air Quality and Carbon

2.2.1 Air Quality Thresholds

The assessment of the potential impacts of the Proposed Scheme on air quality has focussed on changes in emissions and annual mean concentrations of key road traffic derived air pollutants, specifically:

- Oxides of nitrogen (NO_x).
- Nitrogen dioxide (NO₂).
- Particulate matter less than 10µm in diameter (PM₁₀).
- Particulate matter less than 2.5µm in diameter (PM_{2.5}).

This assessment refers to Air Quality Objectives (AQOs) and Limit Values (which are defined in UK legislation) as well as World Health Organization (WHO) recommended guidelines⁶⁹. Whilst WHO guidelines are not legally binding, they are quantitative health-based recommendations for air quality which can be used to inform legislation and policy.

In 2021, the WHO updated its recommended guidelines for air pollutants. For PM_{2.5} it tightened the recommended annual average guideline to 5 µg/m³, while retaining 10 µg/m³ as its lowest Interim Target, which the Mayor of London has committed to meet by 2030 (the legal annual average limit is 20 µg/m³). For NO₂ the WHO tightened the recommended annual average guideline to 10 µg/m³ (the previous WHO guideline was 40 µg/m³ which is also the legal annual average limit). These changes to WHO guidelines underscore that, despite the significant progress made to-date in improving air quality within London, accelerated additional action is needed to protect human health.

Following passage of the Environment Act 2021, the UK Government is currently consulting on a new legally binding Annual Mean Concentration Target for PM_{2.5} of 10 µg/m³, which is to be met across England by 2040⁷⁰.

⁶⁹ An Air Quality Objective is the target date on which exceedances of a Standard must not exceed a specified number. Limit Values are legally binding parameters that must not be exceeded.

⁷⁰ <https://consult.defra.gov.uk/natural-environment-policy/consultation-on-environmental-targets/>

The annual mean air quality thresholds referenced in this report are set out in

Table 2-1.

Table 2-1. Relevant annual mean air quality thresholds

Pollutant	Annual mean air quality threshold						
	Air Quality Objective	Limit Value	WHO Interim Target ^a				WHO Guideline
			1	2	3	4	
NO ₂	40	40	40	30	20	-	10
PM ₁₀	40	40	70	50	30	20	15
PM _{2.5}	25	20	35	25	15	10	5

^a Interim targets are defined as an air pollutant concentration associated with a specific decrease of health risk. Interim targets serve as incremental steps in the progressive reduction of air pollution towards the air quality guideline levels and are intended for use in areas where air pollution is high. In other words, they are air pollutant levels that are higher than the air quality guideline levels, but which authorities in highly polluted areas can use to develop pollution reduction policies that are achievable within realistic time frames. The interim targets should be regarded as steps towards ultimately achieving air quality guideline levels, rather than as end targets.

2.2.2 Data Sources

Existing baseline air quality and carbon conditions within the study area have been established using outputs from the LAEI 2019 ⁷¹, specifically:

- Estimated road transport emissions of NO_x, PM₁₀ and PM_{2.5} and carbon dioxide (CO₂) for 2019 within central, inner, outer and Greater London, respectively, as well as within each London borough and within the extents of non-GLA local authorities covered by the LAEI.
- Modelled 2019 annual mean concentrations of nitrogen dioxide (NO₂), PM₁₀ and PM_{2.5} across Greater London.
- Estimated annual average population weighted concentrations of NO₂, PM₁₀ and PM_{2.5} within central, inner, outer and Greater London, respectively, as well as within each London borough and within the extents of non-GLA local authorities covered by the LAEI.
- Estimated populations (and proportions of populations) exposed to an annual average NO₂ concentration above the AQO of 40 µg/m³ and lowest WHO PM_{2.5} Interim Target of 10 µg/m³, respectively, within central, inner, outer and Greater London as well as within each London borough and within the extents of non-GLA local authorities covered by the LAEI, based on modelled 2019 ground level concentrations.
- The proportion of major road ⁷² lengths exceeding the legal limit for annual mean NO₂ of 40 µg/m³ within central, inner, outer and Greater London, respectively.

It should be noted that whilst the LAEI 2019 includes the impacts associated with the operation of the Central London Ultra Low Emission Zone (ULEZ), it does not include the introduction of tougher standards for the London-wide Low Emission Zone (LEZ) or the ULEZ extension as these were not yet operational ⁷³. However, any vehicle upgrades made by vehicle owners in advance of these schemes would be reflected in the vehicle fleet composition data used in the LAEI 2019 (e.g. upgrades to TfL buses in preparation for the tougher LEZ standards), and therefore will have been accounted for.

2.2.3 Study Area

The geographical scope of the assessment is limited to the area covered by the LAEI, which includes Greater London (the 32 London boroughs and the City of London), as well as areas outside Greater London up to the M25 motorway (Figure 2-1).

⁷¹ <https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2019>

⁷² Major roads are road links in the LAEI which are assigned traffic flows based on TfL strategic transport models and exclude minor roads and most smaller residential roads across London where there is much lower risk of exceeding the legal limits for NO₂ concentrations.

⁷³ The tougher standards for the Londonwide LEZ were enforced from 1 March 2021 and the ULEZ was expanded on 25 October 2021.

Changes in road transport emissions and exposure to pollution will be assessed at the Greater London level, as well as across central, inner and outer London and within each London borough, respectively, and within non-GLA areas covered by the LAEI.

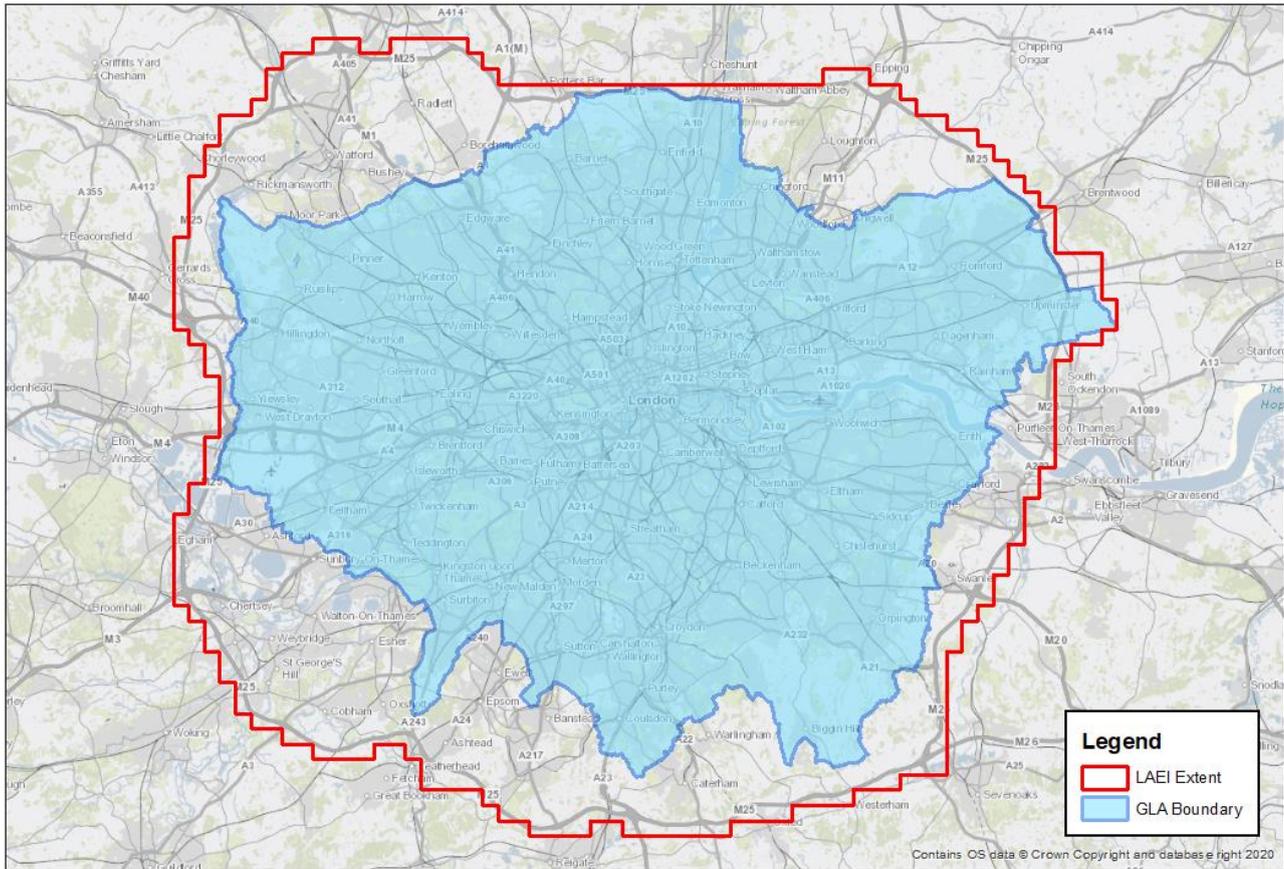


Figure 2-1: Approximate Extent of Air Quality Study Area

2.2.4 Baseline Conditions

2.2.4.1 Road Transport Emissions

Estimated road transport emissions of NO_x, PM₁₀, PM_{2.5} and CO₂ for 2019 within central, inner, outer and Greater London and within the extents of non-GLA local authorities covered by the LAEI, respectively, are summarised in Table 2-2.

Table 2-2. Estimated 2019 Road Transport Emissions within Central, Inner, Outer and Greater London and Relevant Non-GLA Local Authorities

Area	Estimated 2019 Road Transport Emissions (tonnes/annum)			
	NO _x	PM ₁₀	PM _{2.5}	CO ₂
Central London	495	50	25	187,320
Inner London	5,085	665	335	2,106,285
Outer London	9,910	1,290	665	4,145,575
Greater London	15,490	2,005	1,030	6,439,185
Non-GLA ^a	6,800	620	345	3,231,330

Note: Values presented in tonnes/annum in table above are rounded to the nearest 5 tonnes. As each value in the table above has been calculated separately and then rounded, it should be noted that there may be some minor discrepancies between the value presented for Greater London and the total of the values presented for central, inner and outer London, respectively.

^a Based on spatial extents of relevant local authority areas covered by the LAEI, which is in some cases limited.

The results in Table 2-2 indicate that approximately 64 per cent, 33 per cent and 3 per cent of road traffic emissions in Greater London in 2019 are estimated to have occurred in outer London, inner London and central London, respectively.

It should be noted that whilst NO_x emissions originate from vehicle exhausts, and therefore are expected to reduce over time, as older vehicles are gradually replaced with newer vehicles (which meet more stringent exhaust emission standards), a large proportion of road traffic PM_{2.5} emissions originate from brake and tyre wear and road abrasion (i.e. non-exhaust sources), which are not expected to reduce in such a way.

Estimated road transport emissions of NO_x, PM₁₀, PM_{2.5} and CO₂ for 2019 within London boroughs and the extents of non-GLA local authorities covered by the LAEI, respectively, are summarised in Table 2-3.

Table 2-3. Estimated 2019 Road Transport Emissions within London Boroughs and Relevant Non-GLA Local Authorities

London Borough / Non-GLA Local Authority	Estimated 2019 Road Transport Emissions (tonnes/annum)			
	NO _x	PM ₁₀	PM _{2.5}	CO ₂
London Boroughs				
Barking and Dagenham	330	45	20	136,730
Barnet	945	115	60	383,465
Bexley	520	70	35	212,120
Brent	475	65	35	196,260
Bromley	655	95	50	263,690
Camden	335	35	20	135,405
City	105	10	5	37,705
City of Westminster	575	60	30	219,245
Croydon	590	85	45	238,805
Ealing	670	90	45	273,200
Enfield	890	105	55	404,960
Greenwich	575	75	40	234,260
Hackney	270	35	15	114,895
Hammersmith and Fulham	270	35	20	111,145
Haringey	305	40	20	128,330

London Borough / Non-GLA Local Authority	Estimated 2019 Road Transport Emissions (tonnes/annum)			
	NO _x	PM ₁₀	PM _{2.5}	CO ₂
Harrow	350	50	25	142,420
Havering	885	95	50	406,780
Hillingdon	955	120	60	404,875
Hounslow	710	90	45	293,825
Islington	225	25	15	90,225
Kensington and Chelsea	285	35	15	115,220
Kingston	350	50	25	142,180
Lambeth	365	50	25	156,160
Lewisham	345	45	25	143,420
Merton	340	45	25	137,435
Newham	440	60	30	185,215
Redbridge	580	80	40	242,690
Richmond	350	50	25	139,570
Southwark	345	45	25	144,820
Sutton	270	40	20	109,670
Tower Hamlets	390	50	25	160,295
Waltham Forest	400	55	30	167,685
Wandsworth	400	55	25	165,460
Non-GLA Local Authorities ^a				
Brentwood	120	10	5	65,275
Broxbourne	10	<5	<5	4,660
Chiltern	30	<5	<5	15,165
Dacorum	15	<5	<5	8,570
Dartford	385	40	20	183,145
Elmbridge	525	55	30	224,325
Epping Forest	675	55	30	324,830
Epsom and Ewell	125	20	10	51,240
Guildford	75	5	5	36,740
Hertsmere	590	55	30	282,035
Mole Valley	270	20	10	125,735
Reigate and Banstead	410	35	20	187,065
Runnymede	425	40	20	202,960
Sevenoaks	545	35	20	272,060
Slough	25	5	<5	11,720
South Bucks	465	45	25	226,195
Spelthorne	350	40	20	156,480
St. Albans	255	20	10	135,225
Tandridge	390	30	20	184,190
Three Rivers	570	50	30	280,665
Thurrock	275	25	15	139,730
Watford	170	20	10	69,770

London Borough / Non-GLA Local Authority	Estimated 2019 Road Transport Emissions (tonnes/annum)			
	NO _x	PM ₁₀	PM _{2.5}	CO ₂
Welwyn Hatfield	<5	<5	<5	1,015
Windsor and Maidenhead	20	<5	<5	10,810
Woking	65	5	5	31,725

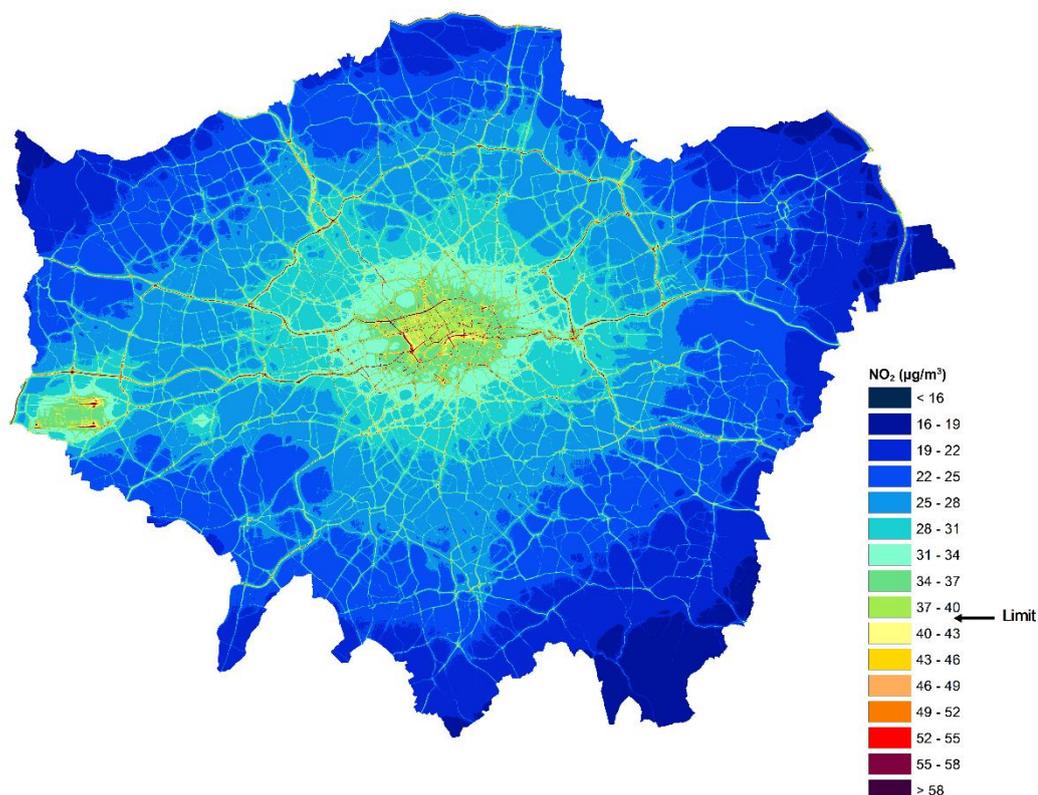
Note: Values presented in tonnes/annum in table above are rounded to the nearest 5 tonnes.
 a Based on spatial extents of relevant local authority areas covered by the LAEI, which is in some cases limited.

2.2.4.2 Modelled Pollutant Concentrations

Modelled 2019 annual mean NO₂, PM₁₀ and PM_{2.5} concentrations across Greater London are shown in Figure 2-2, Figure 2-3, Figure 2-4, respectively, which indicate that:

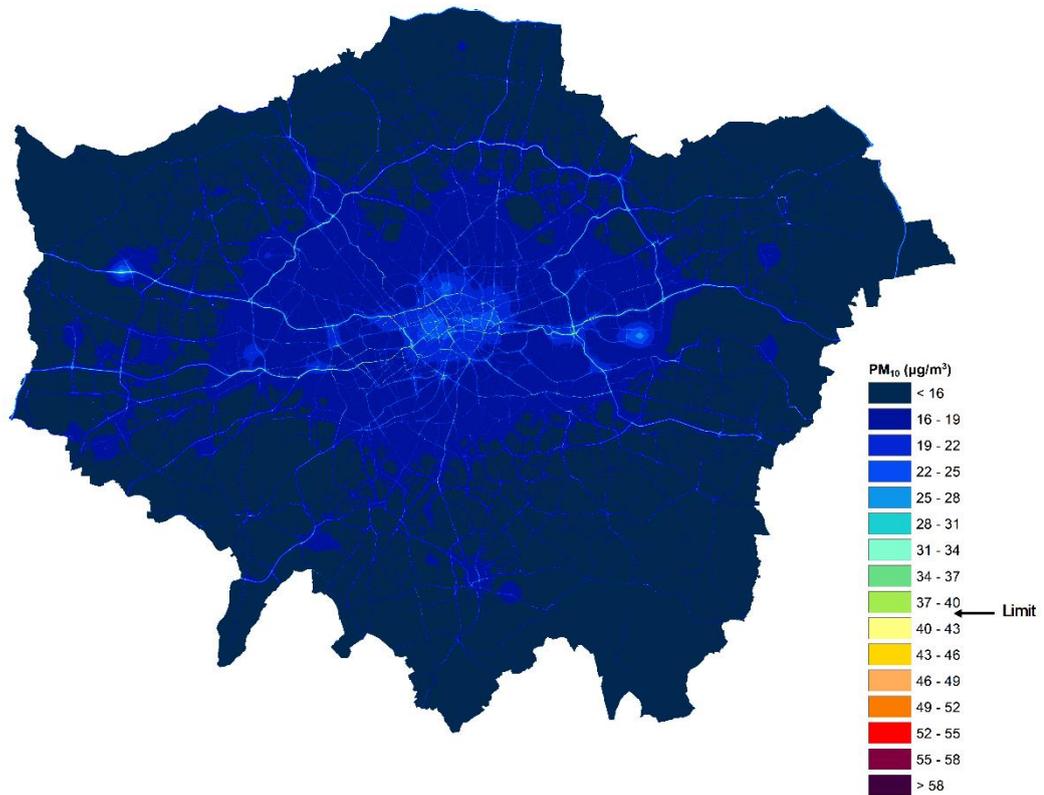
- Annual mean NO₂ concentrations in 2019 exceeded the level of the annual mean AQO (40 µg/m³) within central London and adjacent to major roads in both inner and outer London.
- Annual mean PM₁₀ concentrations in 2019 were well within the AQO (40 µg/m³) across Greater London.
- Annual mean PM_{2.5} concentrations in 2019 exceeded the lowest WHO Interim Target of 10 µg/m³ across central and inner London and the majority of outer London, whilst the WHO Guideline Value of 5 µg/m³ was exceeded across the whole of Greater London.

Figure 2-2: Modelled 2019 Annual Mean NO₂ Concentrations Across Greater London



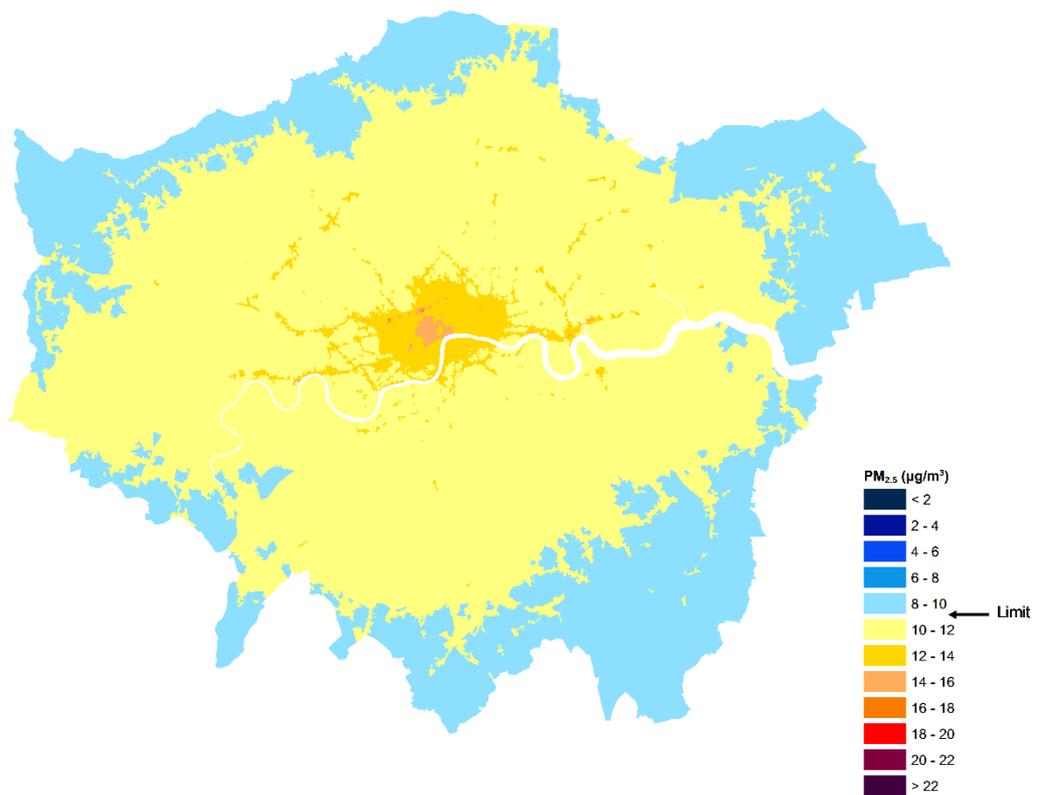
SOURCE: London Atmospheric Emissions Inventory 2019

Figure 2-3. Modelled 2019 Annual Mean PM₁₀ Concentrations Across Greater London



SOURCE: London Atmospheric Emissions Inventory 2019

Figure 2-4. Modelled 2019 Annual Mean PM_{2.5} Concentrations Across Greater London



SOURCE: London Atmospheric Emissions Inventory 2019

2.2.4.3 Exposure to Pollution

Estimated 2019 annual average population weighted pollutant concentrations within central, inner, outer and Greater London and within the extents of non-GLA local authorities covered by the LAEI, respectively, are shown in Table 2-4. These values provide an estimate of the average air pollutant concentration to which the population within each area is exposed. This data indicates that, on average, the population of central London is exposed to the highest air pollutant concentrations, followed by inner London and outer London, respectively. The annual average population weighted NO₂ concentration for central London, which is approaching the level of the annual mean AQO (40 µg/m³), is substantially higher than that for inner and outer London (by 23 per cent and 50 per cent, respectively). This spatial differentiation in pollutant concentrations is less pronounced for PM₁₀ and PM_{2.5}, reflecting the more 'regional' nature of these pollutants.

Table 2-4. Estimated 2019 Annual Average Population Weighted Pollutant Concentrations within Central, Inner, Outer and Greater London and Relevant Non-GLA Local Authorities

Area	Annual Average Population Weighted Concentration (µg/m ³)		
	NO ₂	PM ₁₀	PM _{2.5}
Central London	38.8	21.3	12.8
Inner London	31.5	18.0	11.3
Outer London	25.8	15.7	10.3
Greater London	28.5	16.7	10.8
Non-GLA ^a	23.2	14.8	10.2

^a Based on output areas within spatial extents of relevant local authority areas covered by the LAEI, which is in some cases limited.

Estimated 2019 annual average population weighted pollutant concentrations within London boroughs and the extents of non-GLA local authorities covered by the LAEI, respectively, are summarised in Table 2-5.

Table 2-5. Estimated 2019 Annual Average Population Weighted Pollutant Concentrations within London Boroughs and Relevant Non-GLA Local Authorities

London Borough	Annual Average Population Weighted Concentration (µg/m ³)		
	NO ₂	PM ₁₀	PM _{2.5}
London Boroughs			
Barking and Dagenham	25.4	16.0	10.4
Barnet	27.7	16.1	10.5
Bexley	24.3	15.3	10.2
Brent	29.2	17.0	10.9
Bromley	23.0	14.6	10.0
Camden	35.1	19.0	11.9
City	39.9	22.8	13.2
City of Westminster	37.1	19.8	12.3
Croydon	24.8	15.5	10.3
Ealing	28.5	16.9	10.7
Enfield	26.3	15.6	10.4
Greenwich	27.4	16.6	10.7
Hackney	32.1	18.1	11.4
Hammersmith and Fulham	31.9	18.4	11.4

London Borough	Annual Average Population Weighted Concentration ($\mu\text{g}/\text{m}^3$)		
	NO ₂	PM ₁₀	PM _{2.5}
Haringey	29.1	16.7	10.9
Harrow	24.9	15.5	10.2
Havering	22.0	14.4	9.8
Hillingdon	25.6	15.3	10.1
Hounslow	28.7	16.7	10.5
Islington	33.9	19.0	11.8
Kensington and Chelsea	35.0	19.2	11.9
Kingston	25.3	15.4	10.3
Lambeth	30.9	17.6	11.2
Lewisham	27.8	16.4	10.7
Merton	26.7	16.0	10.6
Newham	29.3	17.9	11.1
Redbridge	26.5	16.0	10.5
Richmond	26.4	15.7	10.4
Southwark	32.2	18.1	11.4
Sutton	23.9	15.0	10.2
Tower Hamlets	33.9	19.4	11.7
Waltham Forest	27.8	16.4	10.7
Wandsworth	29.6	17.0	11.0
Non-GLA Local Authorities ^a			
Dartford	22.4	14.3	9.8
Elmbridge	21.0	13.7	9.6
Epping Forest	21.9	14.0	9.7
Epsom and Ewell	21.7	14.1	9.8
Hertsmere	22.0	13.9	9.6
Mole Valley	20.9	13.6	9.4
Reigate and Banstead	20.0	13.5	9.4
Runnymede	21.3	13.7	9.5
Sevenoaks	20.5	13.5	9.4
South Bucks	21.4	13.8	9.4
Spelthorne	23.1	14.1	9.7
St Albans	21.6	13.9	9.3
Tandridge	19.2	13.3	9.3
Three Rivers	20.1	13.4	9.3
Thurrock	21.7	14.1	9.6
Watford	21.4	13.7	9.6
Woking	21.2	13.8	9.4
^a Based on output areas within spatial extents of relevant local authority areas covered by the LAEI, which is in some cases limited.			

Estimated populations (and proportions of populations) exceeding relevant air quality thresholds in 2019 within central, inner, outer and Greater London and within the extents of non-GLA local authorities covered by the LAEI, respectively, are shown in Table 2-6. This data indicates that approximately 28 per cent of the population in central London were exposed to annual mean NO₂ concentrations in excess of the AQO in 2019, compared to only 3 per cent and less than 1 per cent of the population in inner London and outer London, respectively. Whilst no exceedances of the annual mean PM₁₀ AQO are estimated to have occurred in 2019, the entire population of both central London and inner London are estimated to have been exposed to PM_{2.5} concentrations in excess of the lowest WHO Interim Target (10 µg/m³), along with the majority (78 per cent) of the population of outer London.

Table 2-6. Estimated Population and Proportion of Population Exceeding Air Quality Thresholds in 2019 within Central, Inner, Outer and Greater London and Relevant Non-GLA Local Authorities

Area	Population Exceeding Annual Mean Air Quality Threshold in 2019 (µg/m ³) (with proportion of population shown in parentheses)		
	NO ₂ (AQO: 40 µg/m ³)	PM ₁₀ (AQO: 40 µg/m ³)	PM _{2.5} (Lowest WHO Interim Target: 10 µg/m ³)
Central London	59,200 (28.3%)	-	208,900 (100.0%)
Inner London	109,800 (2.9%)	-	3,780,100 (100.0%)
Outer London	4,600 (0.1%)	-	3,973,800 (78.0%)
Greater London	173,700 (1.9%)	-	7,962,700 (87.7%)
Non-GLA ^a	-	-	50,838 (5.6%)

^a Based on spatial extents of relevant local authority areas covered by the LAEI, which is in some cases limited.

Estimated populations (and proportions of populations) exceeding relevant air quality thresholds in 2019 within London boroughs and the extents of non-GLA local authorities covered by the LAEI, respectively, are summarised in Table 2-7.

Table 2-7. Estimated Population and Proportion of Population Exceeding Air Quality Thresholds in 2019 within London Boroughs

London Borough	Population Exceeding Air Quality Threshold in 2019 (µg/m ³) (with proportion of population shown in parentheses)		
	NO ₂ (AQO: 40 µg/m ³)	PM ₁₀ (AQO: 40 µg/m ³)	PM _{2.5} (Lowest WHO Interim Target: 10 µg/m ³)
London Boroughs			
Barking and Dagenham	-	-	197,500 (91.9%)
Barnet	1,800 (0.5%)	-	347,600 (86.7%)
Bexley	-	-	186,200 (73.9%)
Brent	2,000 (0.6%)	-	338,700 (100.0%)
Bromley	-	-	151,400 (45.2%)
Camden	28,100 (11.1%)	-	253,900 (100.0%)
City	2,700 (34.5%)	-	7,800 (100.0%)
City of Westminster	54,100 (21.1%)	-	256,000 (100.0%)
Croydon	-	-	272,200 (69.1%)
Ealing	1,400 (0.4%)	-	357,100 (99.6%)
Enfield	500 (0.1%)	-	268,100 (78.8%)

London Borough	Population Exceeding Air Quality Threshold in 2019 ($\mu\text{g}/\text{m}^3$) (with proportion of population shown in parentheses)		
	NO_2 (AQO: $40 \mu\text{g}/\text{m}^3$)	PM_{10} (AQO: $40 \mu\text{g}/\text{m}^3$)	$\text{PM}_{2.5}$ (Lowest WHO Interim Target: $10 \mu\text{g}/\text{m}^3$)
Greenwich	500 (0.2%)	-	286,400 (99.4%)
Hackney	3,500 (1.2%)	-	284,100 (100.0%)
Hammersmith and Fulham	5,600 (3.0%)	-	189,100 (100.0%)
Haringey	400 (0.1%)	-	286,400 (100.0%)
Harrow	-	-	207,700 (80.7%)
Havering	-	-	42,000 (16.1%)
Hillingdon	-	-	164,300 (52.6%)
Hounslow	3,300 (1.2%)	-	258,100 (92.0%)
Islington	7,400 (3.1%)	-	239,800 (100.0%)
Kensington and Chelsea	15,300 (9.6%)	-	159,700 (100.0%)
Kingston	-	-	146,900 (81.1%)
Lambeth	7,900 (2.4%)	-	336,300 (100.0%)
Lewisham	-	-	311,800 (99.7%)
Merton	-	-	211,000 (100.0%)
Newham	4,700 (1.3%)	-	355,800 (100.0%)
Redbridge	1,800 (0.6%)	-	282,300 (91.4%)
Richmond	-	-	159,300 (79.6%)
Southwark	7,800 (2.4%)	-	324,700 (100.0%)
Sutton	-	-	152,800 (73.1%)
Tower Hamlets	23,900 (7.5%)	-	319,400 (100.0%)
Waltham Forest	400 (0.1%)	-	280,500 (98.1%)
Wandsworth	700 (0.2%)	-	327,800 (100.0%)
Non-GLA Local Authorities ^a			
Dartford	-	-	7,137 (11.8%)
Elmbridge	-	-	4,602 (3.4%)
Epping Forest	-	-	5,935 (8.6%)
Epsom and Ewell	-	-	14,123 (17.5%)
Hertsmere	-	-	2,568 (3.2%)
Mole Valley	-	-	-
Reigate and Banstead	-	-	296 (0.6%)
Runnymede	-	-	1,466 (3.7%)
Sevenoaks	-	-	332 (1.2%)
South Bucks	-	-	-
Spelthorne	-	-	7,625 (7.7%)
St Albans	-	-	-
Tandridge	-	-	-
Three Rivers	-	-	-
Thurrock	-	-	1,664 (9.5%)

London Borough	Population Exceeding Air Quality Threshold in 2019 ($\mu\text{g}/\text{m}^3$) (with proportion of population shown in parentheses)		
	NO_2 (AQO: $40 \mu\text{g}/\text{m}^3$)	PM_{10} (AQO: $40 \mu\text{g}/\text{m}^3$)	$\text{PM}_{2.5}$ (Lowest WHO Interim Target: $10 \mu\text{g}/\text{m}^3$)
Watford	-	-	4,745 (4.9%)
Woking	-	-	345 (4.8%)

^a Based on output areas within spatial extents of relevant local authority areas covered by the LAEI, which is in some cases limited.

The young, older people and those with existing poor health are typically more susceptible to health effects associated with poor air quality. The number of schools, hospitals and care homes exceeding relevant air quality thresholds in 2019 within Greater London and within the extents of non-GLA local authorities covered by the LAEI, respectively, are therefore shown in Table 2-8. These results indicate that whilst the annual mean threshold for NO_2 is estimated to be met at the majority of schools and hospitals in Greater London (and all care homes), the annual mean $\text{PM}_{2.5}$ lowest Interim Target ($10 \mu\text{g}/\text{m}^3$) is estimated to be exceeded at the majority of such buildings.

Table 2-8. Estimated Number of Schools, Care Homes and Hospitals Exceeding Air Quality Thresholds in 2019 within Greater London and Relevant Non-GLA Local Authorities

Area	Schools, Hospitals and Care Homes Exceeding Annual Mean Air Quality Threshold in 2019 ($\mu\text{g}/\text{m}^3$) (with proportion shown in parentheses)								
	NO_2 (AQO: $40 \mu\text{g}/\text{m}^3$)			PM_{10} (AQO: $40 \mu\text{g}/\text{m}^3$)			$\text{PM}_{2.5}$ (Lowest WHO Interim Target: $10 \mu\text{g}/\text{m}^3$)		
	Schools	Hospitals	Care Homes	Schools	Hospitals	Care Homes	Schools	Hospitals	Care Homes
Greater London	52 (1.6%)	26 (8.9%)	-	-	-	-	2,883 (88.4%)	265 (91.1%)	281 (87.3%)
Non-GLA ^a	-	-	-	-	-	-	3 (0.8%)	2 (14%)	5 (8.5%)

^a Based on spatial extents of relevant local authority areas covered by the LAEI, which is in some cases limited.

2.2.4.4 Compliance with Legal Limits

The proportions of major road lengths ⁷² which are estimated (by TfL) to have exceeded the annual mean NO_2 Limit Value of $40 \mu\text{g}/\text{m}^3$ in 2019 within central, inner, outer and Greater London, respectively, are shown in Table 2-9. These estimates are considered to provide a reasonably conservative estimate of compliance in London ⁷⁴, however, it should be noted it is Defra who undertake the formal assessment of compliance with Limit Values within London using outputs from the national scale Pollution Climate Mapping (PCM) model.

The data in Table 2-9 indicate that in 2019, the annual mean NO_2 Limit Value was exceeded adjacent to approximately 74 per cent, 27 per cent and 8 per cent of major road lengths in central, inner and outer London, respectively.

⁷⁴ A weighted average along the distance of each road link is used as the concentration varies alongside roads depending on traffic flows and geography, including road width and dispersive characteristics such as tall street canyons and road type.

Table 2-9. Estimated Roadside NO₂ Concentrations within Central, Inner, Outer and Greater London

Annual Average Roadside NO ₂	Estimated Annual Average Roadside NO ₂ Concentrations and Proportion of Road Lengths Exceeding Annual Mean NO ₂ Limit Value in 2019			
	Central London	Inner London	Outer London	Greater London
< 20	-	-	1.4%	1.0%
20-30	-	9.0%	49.5%	35.6%
30-40	26.5%	64.5%	40.9%	47.5%
40-50	54.4%	20.8%	7.2%	12.9%
50-60	16.1%	4.2%	0.9%	2.4%
60-80	2.9%	1.3%	0.1%	0.5%
>80	0.1%	0.2%	-	0.05%
>40	73.5%	26.5%	8.1%	15.9%
<40	26.5%	73.5%	91.9%	84.1%

2.3 Biodiversity and Nature Conservation

The geographical scope of the assessment will be limited to the area covered by the LAEI, which includes Greater London (the 32 London boroughs and the City of London), as well as areas outside Greater London up to the M25 motorway the approximate extent of which is illustrated in Figure 2-1).

NO_x can affect plants directly or indirectly, for example, it may directly enter a plant via the stomata or it can also deposit onto soil and, following transformation to nitrate, enrich the soil, leading to eutrophication. As such, an AQO for annual mean NO_x of 30 µg/m³ has been adopted for the protection of vegetation against the direct effects of air pollution. Compliance with this AQO is strictly only required at locations more than 20 km from towns with more than 250,000 inhabitants or more than 5 km from other built-up areas, industrial installations or motorways (i.e. not within London). In practice, however, assessment against this AQO is frequently undertaken to inform planning and permitting processes across the country, regardless of this definition. For the purposes of this assessment, the impact of the Proposed Scheme on exceedances of the annual mean NO_x AQO within designated ecological sites has been used to assess the potential impact of the proposed scheme on biodiversity and nature conservation.

Given the geographical scope of the assessment is limited to the area covered by the LAEI, no assessment of potential changes in NO_x concentrations as a result of the Proposed Scheme will be undertaken outside of this area. While changes in NO_x concentrations are likely to occur outside of the study area which will be considered, it is assumed that any such changes will primarily be either negligible or positive in nature (e.g., as a result of reductions in traffic flows or improvements to the vehicle fleet).

There are numerous statutorily designated nature conservation sites and priority habitats within the Greater London boundary. Statutory designated nature conservation sites include:

- Special Areas of Conservation / Special Protection Areas;
- Sites of Special Scientific Interest;
- Ramsar;
- National Nature Reserves;
- Local Nature Reserves; and
- Ancient woodland.

Individual species have not been considered due to the strategic nature of this assessment.

Statutory designated receptors in (or adjacent to the boundary of) Greater London are shown in Figure 2-5 and are summarised in Table 2-10. Where sites cross more than one local authority boundary, these have been assigned to the London borough/local authority in which the majority of the site area falls.

Table 2-10. Statutory designated biodiversity receptors within or immediately adjacent to the Greater London boundary

Designation	No. within air quality study area	Further receptor details
Special Areas of Conservation	3	Richmond Park (Richmond Upon Thames), Wimbledon Common (Merton) and Epping Forest (Waltham Forest).
Special Protection Areas	3	Southwest London Waterbodies (Hounslow), Lee Valley (Waltham Forest) and Thames Basin Heaths (located 30 miles southwest of London along the M3/A3 corridor, across Surrey, Hampshire and Berkshire).
Sites of Special Scientific Interest	65	Extents of six of which are in Bromley, five in Hillingdon, four in each of Epping Forest, South Bucks and Tandridge, three in each of Reigate and Banstead, Spelthorne, Three Rivers District, Thurrock and Waltham Forest, two in each of Croydon, Elmbridge, Greenwich, Harrow, Havering, Hounslow, Kingston upon Thames, Richmond upon Thames, Runnymede, Sevenoaks, and St. Albans and one in each of Barnet, Bexley, Brent,

Designation	No. within air quality study area	Further receptor details
		Brentwood, Camden, Dartford, Enfield, Epsom and Ewell, Guildford, Mole Valley, Redbridge and Slough.
Ramsar sites	2	Southwest London Waterbodies (Hounslow) and Lee Valley (Waltham Forest).
National Nature Reserves	4	Ashted Common (Kingston-upon-Thames), Richmond Park (Richmond-upon-Thames), South London Downs (Croydon), and Ruislip Woods (Hillingdon).
Local Nature Reserves	185	Extents of 21 of which are in Three Rivers, 20 in Epsom and Ewell, 15 in Merton, 13 in each of Havering, Barking and Dagenham and Kingston upon Thames, 12 in both of Hounslow and Richmond upon Thames, 11 in each of Sutton, Barnet and Bexley, nine in both of Lewisham and Ealing, 8 in both of Bromley and Southwark, six in both of Tower Hamlets and Hammersmith and Fulham, five in each of Camden, Croydon, Epping Forest, Hillingdon, South Bucks and Greenwich, four in each of Tandridge, Brent, Hertsmere, Haringey and Watford, three in each of Wandsworth, Islington and Harrow, two in each of Hackney, Mole Valley, Guildford, Reigate and Banstead and Spelthorne and one in each of Waltham Forest, Runnymede, Enfield, Sevenoaks, Redbridge and the City of Westminster.

Changes in air quality can affect ecological receptors. For example, increased nitrogen deposition, resulting from increased emissions of NO_x is known to reduce plant diversity in natural and semi-natural ecosystems⁷⁵. Impacts are seen through visible symptoms of tree decline, discolouring and susceptibility to diseases.

Table 2-11 summarises the area and percentage area within each type of designated ecological site, within the air quality study area, which is forecast to achieve and exceed the annual average NO_x AQO (30 µg/m³), respectively, in 2019. It should be noted, however, that not all of these sites will contain features which are sensitive to nitrogen.

As highlighted in Table 2-11, of the designation types it is the Ramsar and Special Protection areas that have the joint greatest proportion of their total area above the 30 µg/m³ NO_x AQO limit, at 77.6 per cent. This is followed by Special Areas of Conservation which, in total, has over half (58.5 percent) of its area falling above the 30 µg/m³ AQO NO_x limit. Of all the ecological sites, Ancient Woodland has the lowest proportion of its total area above the NO_x AQO limit, at less than a quarter of its total area.

⁷⁵ Dise et al. (2011). In: The European Nitrogen Assessment, ed. Mark A. Sutton, Clare M. Howard, Jan Willem Erisman, Gilles Billen, Albert Bleeker, Peringe Grennfelt, Hans van Grinsven and Bruna Grizzetti. Cambridge University Press.

Table 2-11: Total area (and percentage of area) of ecological designated site types forecast to exceed annual mean NO_x AQO (30 µg/m³)

Designation Type	Total area above 30 µg/m ³ in 2019 (ha) (Percentage of total)
Ancient Woodland	1,550 (23.5%)
Local Nature Reserves	1,994 (46.6%)
National Nature Reserves	865 (49.3%)
Ramsar	526 (77.6%)
Sites of Special Scientific Interest	3,762 (46.4%)
Special Areas of Conservation	1,654 (58.5%)
Special Protection Areas	526 (77.6%)

2.4 Cultural heritage

The geographical scope of the assessment will be limited to the area covered by the LAEI which includes Greater London (the 32 London boroughs and the City of London), as well as areas outside Greater London up to the M25 motorway.

Sensitive receptors to changes in air quality generally include archaeological remains, historic buildings and historic landscapes.

Based on the nature of the Proposed Scheme (i.e. absence of any requirement for major development or construction work), it is not anticipated that archaeological remains would be disturbed. Therefore, the cultural heritage assessment focuses on historic buildings and historic landscapes as these can be impacted by changes in traffic values, flows and vehicle fleet composition.

Historic buildings have a significant historical value. These may include structures that have no aesthetic appeal or structures not usually thought of as 'buildings', such as milestones or bridges.

Historic landscapes are landscapes that are the result of the action and interaction of natural and/or human factors and include evidence of past human activities. They may derive both from archaeological remains and from historic buildings within them.

Changes in air quality have been linked to building degradation, particularly for historic buildings. Particulate matter (i.e. PM₁₀) is potentially harmful to cultural heritage as it can cause visual damage (known as 'soiling') and direct chemical degradation. Nitrogen emissions from vehicles, when dissolved in rainwater, also have the potential to cause damage associated with acid deposition, to buildings and other structures.

Many historic buildings and structures are built with limestone and calcareous stones which are particularly vulnerable to corrosion and degradation.

As shown in Figure 2-6 and summarised in Table 2-12, there are a number of cultural heritage sites with statutory designations within the Greater London Authority Area.

Table 2-12: Cultural heritage receptors within or immediately adjacent to the Greater London boundary

Designation	No. within or adjacent to the GLA boundary	Receptors
World Heritage Site	4	Royal Botanic Gardens Kew (Richmond upon Thames), Maritime Greenwich (Greenwich), the Tower of London (Tower Hamlets), and the Palace of City and Westminster/Westminster Abbey/St Margaret's Church (Westminster).
Scheduled Monument	201	In all London boroughs.
Registered Parks and Garden	155	Within or directly adjacent to the GLA boundary.
Registered Battlefield	1	Battle of Barnet 1471.
Listed Building Grade I	602	In all London boroughs.
Listed Building Grade II*	1466	In all London boroughs.
Listed Building Grade II	17,401	In all London boroughs.

2.5 Waste and Materials

The scope for materials and waste includes Greater London (the 32 London boroughs and the City of London), as well as the locations of waste management facilities outside Greater London at which scrapped vehicles are processed.

Vehicles that are currently in operation have strict requirements on them to manage their disposal due to large and varied material inputs.

Disposal of the vehicles' components would need to be managed effectively following the end of their life. Scrap vehicles comprise a variety of hazardous and non-hazardous waste products and these must be dismantled and recycled in accordance with Directive 2000/53/EC - the "End of Life Vehicles Directive." This directive sets clear quantified targets for reuse, recycling, and recovery of End of Life Vehicles (ELVs) and their components, using the principles of the waste hierarchy.

To reduce the impact that scrap cars have on the environment, there are laws in place. Businesses handling scrap cars should have an Authorised Treatment Facility (ATF) permit, all scrap cars must be depolluted to remove all toxic materials, and the car needs to be recycled to the highest degree possible in order to meet the Government's scrap car recycling target of 95 per cent, introduced as part of the End of Life Vehicle regulations⁷⁶.

According to CarTakeBack, the largest scrap car recycling network in the UK, the process of petrol or diesel vehicle recycling involves the safe removal of fluid (such as fuel, brake fluid) as well as airbag detonation. Any parts that are in a good condition are then salvaged for reuse. Following this, the car is crushed or cubed to allow efficient transport to a shredder plant where the cubed or crushed car is processed into smaller pieces. Its constituent materials are separated and recycled for use. Following this, 5 per cent of the vehicle is leftover non-recyclable material that then becomes top cover for landfill⁷⁶.

⁷⁶ Cartakeback.com. n.d. Scrap Car Recycling | Recycle Your Car Today. [online] Available at: <<https://www.cartakeback.com/responsible-car-recycling>> [Accessed 5 April 2022].

According to the Environment Agency “End-of-life vehicles (ELV) Authorised Treatment Facilities Register - England”⁷⁷, as of April 2022 there were 55 facilities permitted to deal with correct disposal of ELVs within the M25 area.

2018 data from the Department of Transport⁷⁸ and the European Commission⁷⁹ indicates that the baseline annual scrappage rate for the UK is 4.1 percent (i.e., of the 39.4 million vehicles in the UK in 2018, the number of ELVs was approximately 1.6 million). Data is not available below the national level.

ELV facilities fall under 2 main types of EA permit that allow the dismantling of vehicles with a maximum quantity of waste accepted per year at either 25,000 or 75,000 tonnes per year, per site. If a median value of 50,000 tonnes per year capacity is taken and multiplied by the 55 facilities from above, there is an assumed capacity within the M25 of 2,750,000 tonnes for ELVs. However, many sites that treat ELVs also accept scrap metal so some of this capacity would be occupied by scrap and therefore the actual capacity figure would be lower.

According to the DfT, as of 2020 there are 2.6m cars and 209,000 Light Goods vehicles (LGVs) licensed in London⁷⁸ and applying the 4.1 percent scrappage rate from above generates a scrappage number for ELVs number of around 115,200 per annum. Based on a weighted average car and LGV weight (1080kg)⁸⁰ and applying this to the 115,200 number above, this gives a total scrappage weight of 124,400 tonnes. This shows that there is currently sufficient spare capacity for scrappage in the baseline scenario. These 2.81 million combined cars and LGV number would be higher for the M25 area for comparison but even with an uplift this figure appears comfortably within the tolerances for current ELV facility capacity.

2.6 Landscape, townscape, and urban realm

The geographical scope of the assessment will be limited to the area covered by the LAEI which includes Greater London (the 32 London boroughs and the City of London), as well as areas outside Greater London up to the M25 motorway.

The Proposed Scheme may have impacts on London’s landscape in relation to additional highways furniture.

On the Transport for London Road Network, TfL has statutory powers permitting the removal or implementation of traffic signs. These include the implementation of signage on existing poles and signage on new poles. New cameras, new camera poles and an upgrade to the existing cameras will also be included within the streetscape elements of the proposed scheme.

Inner London makes up the National Character Area (NCA) 112. It is predominantly an urban area which sits centrally within the Thames Basin. Transport networks are a dominant aspect of the zones' built environment helping structure other townscape elements including residential and commercial areas. An expanse of green infrastructure networks run through both zones, some are Local Nature Reserves and other, parks. All are valued highly and enhance nature into a predominantly urban environment.

The landscape baseline is depicted in Figure 2-7. The Proposed Scheme would extend over numerous NCA’s, including the Northern Thames Basin (NCA 111), Thames Basin Lowlands (NCA 114), Thames Valley (NCA 115)

⁷⁷ Environment Agency (2022). Environmental Permitting Regulations – End of Life Vehicles. [online] Available at: <<https://environment.data.gov.uk/public-register/view/search-elv>> [Accessed 7 April 2022].

⁷⁸ Department for Transport (2020). Licensed Vehicles – Type, Borough – London Datastore. [online] Available at: <<https://data.london.gov.uk/dataset/licensed-vehicles-type-0>> [Accessed 6 April 2022].

⁷⁹ European Commission (2020a). European statistics. Available at: <https://ec.europa.eu/eurostat/web/products-datasets/-/env_waselvt> [Accessed 6 April 2022]

⁸⁰ European Commission, (2006). A Study to Examine the Costs and Benefits of the ELV Directive – Final Report - ANNEX 2: Arisings and Treatment of End of Life Vehicles. GHK in association with Bio Intelligence Service, p.9. Available at: <<https://ec.europa.eu/environment/pdf/waste/study/annex2.pdf>> [Accessed 6 April 2022]

and North Downs (NCA 119). All collectively contain a variety of landscape characters that should be protected and enhanced where possible. It is a largely built-up environment with transport networks transcending throughout. Street signage and other highways furniture are a recognised element that attributes to the context of all counties within the zones.

Open pasture and parkland area located throughout all zones and any streetscape additions should maintain the openness of these spaces.

Green Belt land is also located within and around the outer zone the openness of which should be respected.

To the southeast of the outer boundary and beyond lies Kent Downs AONB Land which would need to be treated as a highly sensitive area. NPPF policy on AONBs '115 states that "Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty".

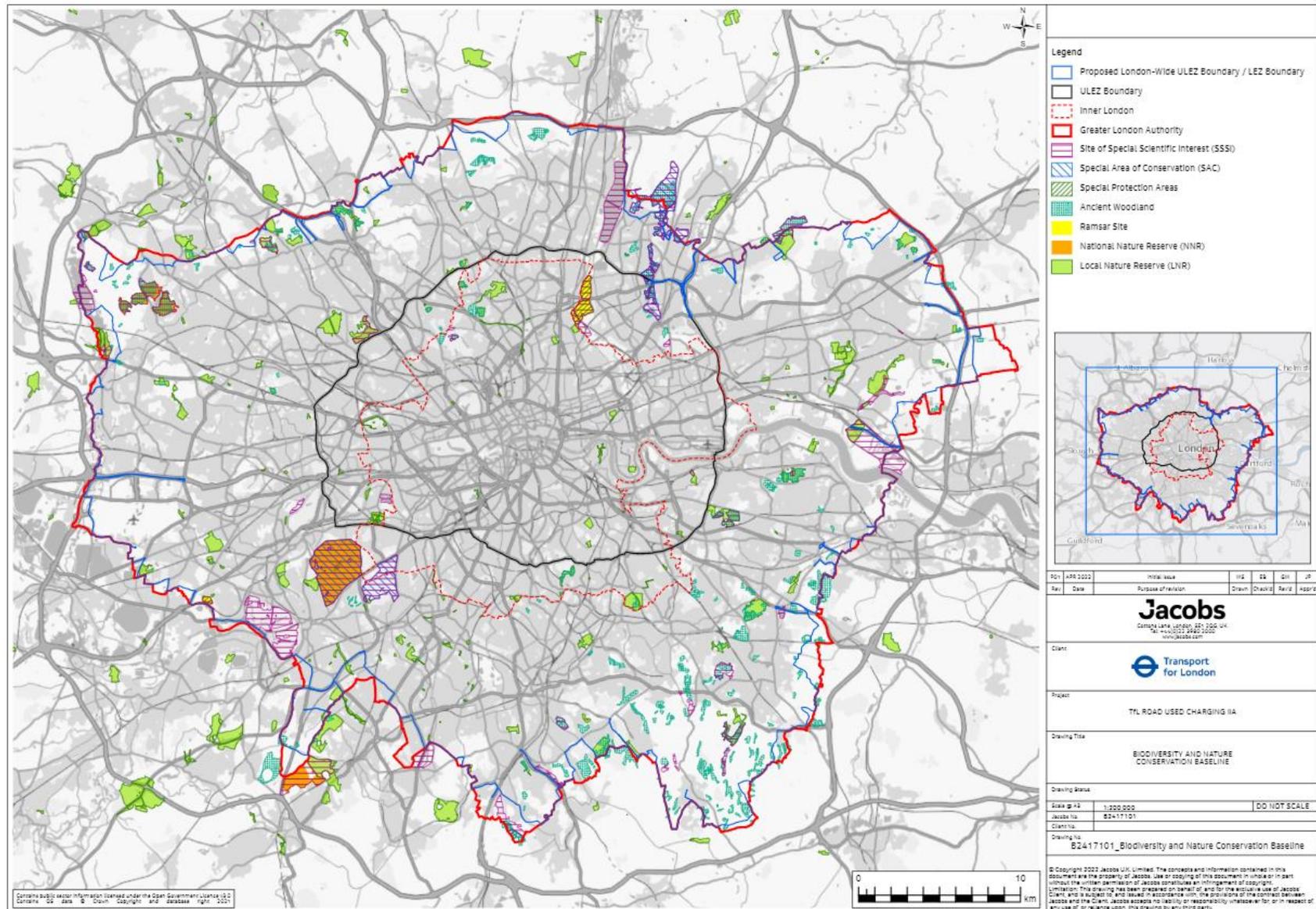


Figure 2-5: Biodiversity and nature conservation baseline

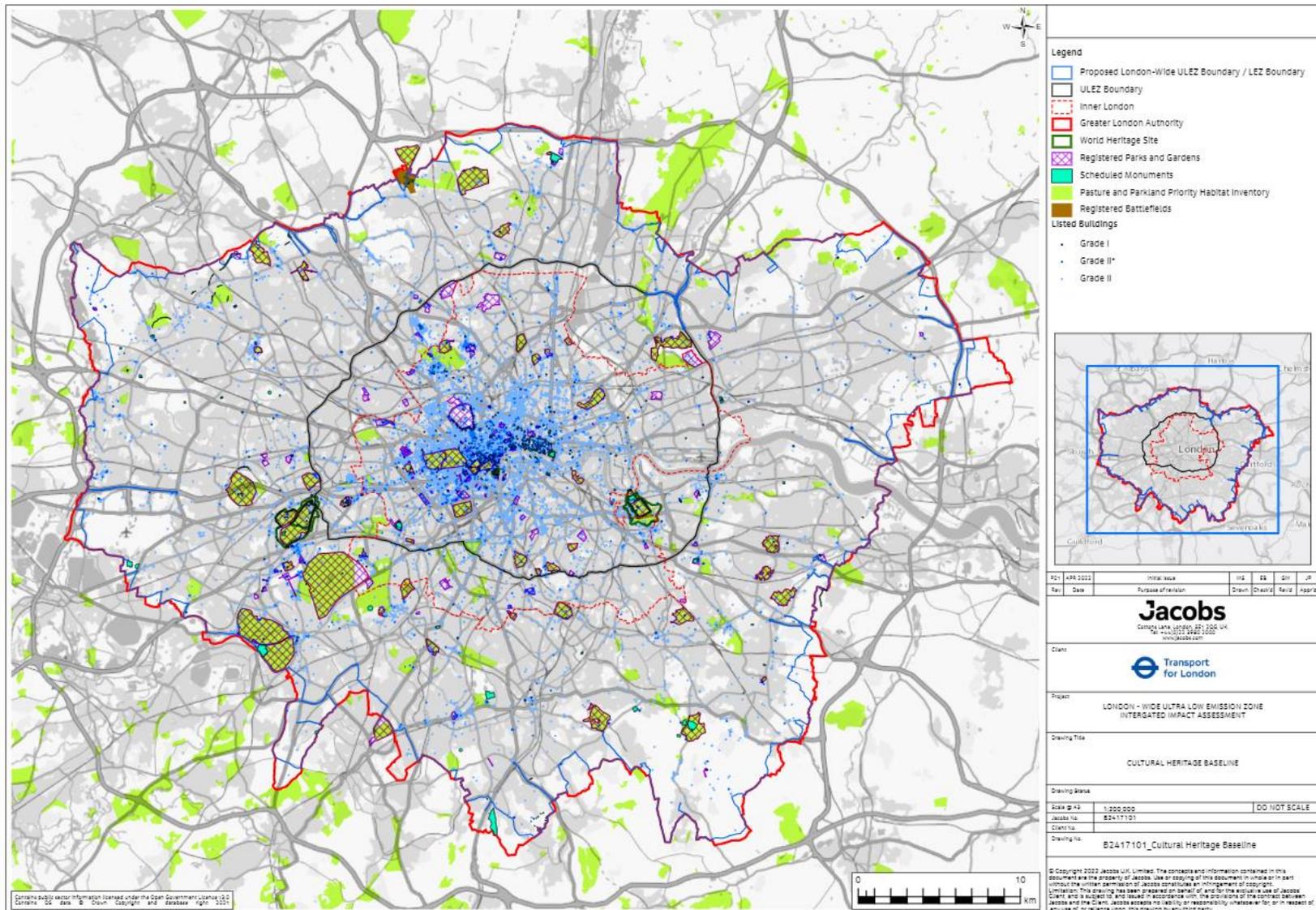


Figure 2-6: Cultural heritage baseline

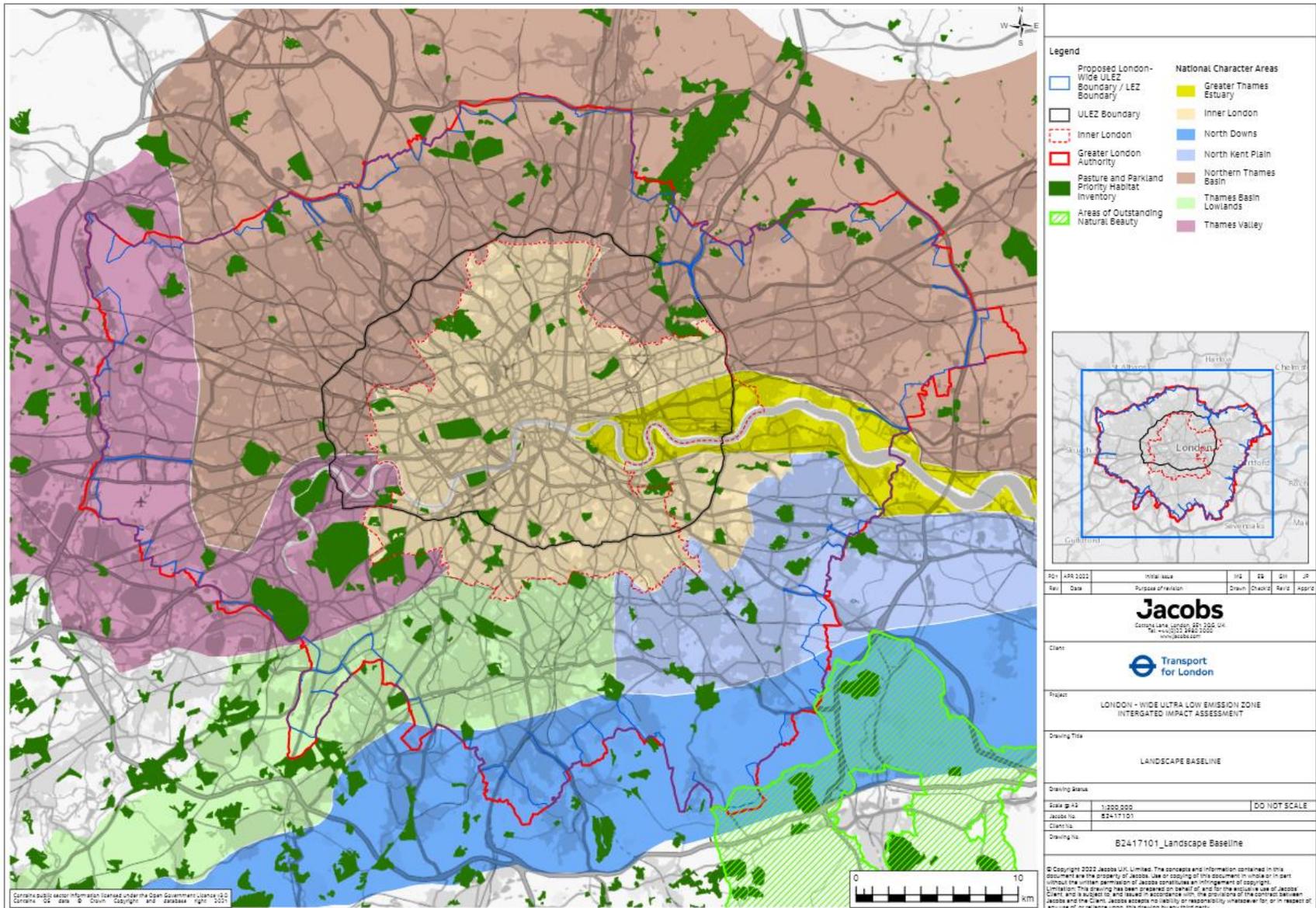


Figure 2-7: Landscape baseline

3. People Baseline

3.1 Introduction

This appendix sets out the baseline information gathered in relation to three key aspects for the Health and Equalities Impact Assessment:

- Baseline data in relation to protected characteristic groups (PCGs) and vulnerable groups.
- Health profiles of inner and outer London boroughs.
- An evidence base for the health pathways and determinants (Health and Equalities IIA Topics) considered in the assessment.

3.2 Protected Characteristic Groups and Vulnerable Groups

This section outlines the baseline conditions for each PCG and other 'vulnerable' groups considered in the assessment. The protected characteristics and vulnerable groups scoped in as part of the scoping exercise are shown in Table 3-1.

Table 3-1: Protected Characteristics and Vulnerable Groups considered in the People Assessment

Protected Characteristic Group	Definition and Rationale for Scoping In
Age	<p>This refers to persons defined by either a particular age or a range of ages. This assessment considers effects for school age (0-17), young people (18-25), older people (65+) and the elderly (75+).</p> <p>A key issue for young people and older people will be the impact of the proposals on their ability to access services and recreational activities within outer London, which require the use of private car, PHV or minibus.</p>
Disability	<p>A disabled person is defined as someone who has a physical or mental impairment that has a substantial and long-term adverse effect on his or her ability to carry out normal day-to-day activities. This definition includes individuals who are neurodivergent and those with long term mental and physical health conditions. There is a close link between living in poverty and living with a disability, due to socio-economic disadvantages such as higher costs of living and barriers to employment.</p> <p>People with disabilities are more likely to require access to health care facilities and special needs services that may be situated within the expanded ULEZ area.</p> <p>Blue Badge holders need to pay the existing ULEZ charge unless their vehicle meets the ULEZ emission standards or is registered with the DVLA as having a 'disabled' or 'disabled passenger vehicle' tax class.</p>
Sex	<p>This refers to a man or to a woman or a group of people of the same sex, while gender refers to the wider social roles and relationships that structure men's and women's, boys', and girls' lives.</p> <p>The assessment will consider the disproportionate or differential impacts that men and women may experience based on their travel needs, methods of travel and requirements to travel within Outer London.</p>
Race	<p>The Equality Act defines race as encompassing colour, nationality (including citizenship) and ethnic or national origins. The assessment will consider effects for</p>

Protected Characteristic Group	Definition and Rationale for Scoping In
	<p>relevant groups, following the ONS terminology used in the 2011 Census⁸¹. Reference will be made to Black, Asian, and Minority Ethnic people (BAME) more generally, where the effects may relate to a number of groups in relation to this protected characteristic. The Traveller Community will also be considered as a distinct ethnic group.</p> <p>The assessment will consider the impacts of the Proposed Scheme upon the different races, considering methods of travel used, representation in employment sectors that may be affected, and the likelihood of intersectional impacts (e.g., in relation to poor health from air pollution).</p>
Pregnancy and maternity	<p>The EQIA will consider impacts for pregnant women and mothers of new babies. The relevant impacts on this group are likely to be related to their requirements for access to medical services at healthcare facilities in outer London and in relation to potential health benefits from reduced air pollution.</p>
Sexual Orientation	<p>The EQIA will consider impacts based on sexual orientation of heterosexual or lesbian, gay, bisexual, transgender, intersex, asexual and queer people, and persons with other sexual orientations and gender identities.</p> <p>There may be potential impact on LGBT+ people to the extent that they may not feel safe travelling on public transport, particularly at night-time.</p>
Gender reassignment (trans) ⁸²	<p>The EQIA will consider impacts on people who are proposing to undergo, are undergoing, or have undergone a process for the purpose of reassigning their gender identity. The Act 2010 outlines that people must not be discriminated against because they are transsexual, if their gender identity is different from the sex assigned when they were born. To be protected from gender reassignment discrimination, a person does not need to have undergone any specific treatment or surgery to change from their birth sex to their preferred gender. This is because changing physiological or other gender attributes is a personal process rather than a medical one⁸³.</p> <p>There may be potential impact on trans individuals to the extent that they may not feel safe travelling on public transport, particularly at night-time.</p>
Religion or belief	<p>Religion means any religion a person follows. Belief means any religious or philosophical belief and includes those people who have no formal religion or belief. The assessment will consider effects for relevant groups, following ONS terminology for religious affiliation⁸⁴ as well as for relevant sub-groups of main religious groups.</p> <p>Religious groups may wish to access places of worship within outer London by private vehicle and as such may be impacted by the proposed measures.</p>
Socio-economically deprived people	<p>Socio-economic deprivation relates to a person's social and economic position in relation to others, based on income, education, and occupation. It is not a protected characteristic as defined by the Equality Act 2010 but will be considered in the IIA as it</p>

⁸¹ Census 2011 categories are White or White British people (English, Welsh, Scottish, Irish, Northern Irish, Gypsy, or Irish Traveller, Other White); Asian or Asian British people (Indian, Pakistani, Bangladeshi, Chinese, Other Asian); Black or Black British (African, Caribbean); Mixed Race (White and Black Caribbean, White and Black African, White, and Asian, White Other); and Other Ethnic Groups (Arab or Other groups). The ethnic groups in the Census 2021 differ slightly from those in the 2011 Census, however these census results will not be available in time for use in the IIA.

⁸² In 2016 a Women and Equalities Committee report made over 30 recommendations calling for government action to ensure full equality for trans people. One of the report's recommendations was that the use of the terms 'gender reassignment' and 'transsexual' in the Equality Act 2010 are outdated and misleading; the preferred umbrella term is trans (Equality and Human Rights Commission, 2021).

⁸³ Equality and Human Rights Commission (2021). Gender reassignment discrimination. Available at: <https://www.equalityhumanrights.com/en/advice-and-guidance/gender-reassignment-discrimination#:~:text=To%20be%20protected%20from%20gender,rather%20than%20a%20medical%20one>.

⁸⁴ Census 2011 religious affiliation main categories are Christian, Buddhist, Hindu, Jewish, Muslim, and Sikh.

Protected Characteristic Group	Definition and Rationale for Scoping In
	<p>is a key determinant of health and wellbeing. There is greater car dependency in Outer London and areas outside of London, and as a result, lower income groups may be more likely to own a car and be disproportionately impacted by the Proposed Scheme. The impacts on deprived or disadvantaged communities will be related to their ability to access employment and essential services and well as potential impacts on health, e.g., from air quality and climate change effects. Poor health and disability are linked to high levels of unemployment and lack of access to education, therefore contributing to socio-economic deprivation.</p>
<p>Vulnerable Groups</p>	
<p>Gypsy and Traveller Communities</p>	<p>The term Gypsy, Roma and Traveller has been used by policy-makers and researchers to describe a range of ethnic groups or those with nomadic ways of life who are not from a specific ethnicity. Gypsies and some Traveller ethnicities have been recognised in law as being ethnic groups protected against discrimination by the Act. A report published by the UK Parliament Women and Equalities Committee highlighted the inequalities faces by Gypsy and Traveller communities. The inquiry found that Gypsies and Travellers are among the most disadvantaged people in the country and have poor outcomes in areas such as health and education⁸⁵. The impacts on Gypsies and Traveller communities will be in relation to their economic activity within outer London, due to reliance on vehicles to undertake manual work, a high proportion of which may not be compliant. The financial impact of the Proposed Scheme may further exacerbate poor socio-economic outcomes and health inequalities in these communities.</p>
<p>Refugees and Asylum Seekers</p>	<p>'Asylum seeker' means a person who has applied for asylum under the 1951 Refugee Convention on the Status of Refugees on the grounds that they have a well-founded fear of persecution should they return to their home country. 'Refugee' means an asylum seeker whose claim has been successful⁸⁶. Studies suggest that in almost all indices of physical, mental, and social wellbeing, asylum seekers and refugees suffer a disproportionate burden of morbidity and are largely disempowered and restricted in access to services such as healthcare⁸⁷. The potential impacts on refugees and asylum seekers from the Proposed Scheme will be considered in relation to impacts on charitable organisations that may provide this group with support and assistance, through delivering goods and in accessing services by vehicle.</p>
<p>Single parents</p>	<p>Poverty is twice as high for lone parents and for children in lone-parent families as for those in couple families, with almost half being in poverty⁸⁸. The impacts on single parents considered in the assessment will be in relation to potential financial impact and on accessibility to facilities. Single parent families spend 13% of their income on transport⁸⁸ and may experience a greater financial burden with the Proposed Scheme in place, resulting in poor socio-economic outcomes. Single parent families may rely</p>

⁸⁵ Equality and Human Rights Commission (2019). Inequalities experienced by Gypsy and Traveller Communities. Available at: <https://www.equalityhumanrights.com/sites/default/files/research_report_12inequalities_experienced_by_gypsy_and_traveller_communities_a_review.pdf> Accessed May 2020

⁸⁶ London Councils (n.d.). Asylum Seekers. Available at: <<https://www.londoncouncils.gov.uk/our-key-themes/asylum-migration-and-refugees/refugees-and-asylum-seekers>> Accessed May 2022

⁸⁷ Taylor K. (2009). Asylum seekers, refugees, and the politics of access to health care: a UK perspective. The British journal of general practice: the journal of the Royal College of General Practitioners, 59(567), 765–772. <<https://doi.org/10.3399/bjgp09X472539>>

⁸⁸ Department for Transport (2019). Transport and inequality. Available at: <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/953951/Transport_and_inequality_report_document.pdf> Accessed May 2022.

Protected Characteristic Group	Definition and Rationale for Scoping In
	more on private vehicle to take children to different schools and activities and travelling by public transport to undertake these trips may be more challenging and time consuming.

'Marriage and civil partnership' is also considered a protected characteristic under the Equality Act 2010. This has not been assessed in the IIA as it relates solely to employment discrimination and is therefore not relevant to the Proposed Scheme.

3.2.1 Age

The age breakdown of inner and outer London residents as well as the overall data for Greater London is shown in Table 3-2. Older people (defined as aged 65 and over, those of state pension age) and younger people (aged 0 – 15, those who are legally considered children) are considered specifically in the assessment due to their greater sensitivity to potential impacts.

This data indicates that there is an older population residing in outer London compared to inner London, with outer London having a significantly higher proportion of the population over aged 65. The number of people aged over 65 in London overall is projected to increase by 8 per cent to 970,400 in the next 30 years, at a far quicker rate than the younger age groups. By 2024, 180,000 people living in the city will be over age 85⁸⁹.

Table 3-2: Age breakdown of Inner and Outer London residents⁸⁹

Measure	Inner London Boroughs	Outer London Boroughs	Greater London
Proportion of population ages 0-15	19%	22%	21%
Proportion of population of working age	71%	64%	67%
Proportion of population aged 65 and over	10%	14%	12%

Table 3-3 provides a breakdown of the different methods of travel used by Londoners at least once a week specific to younger and older people. It is evident that the most common method for both demographic groups is walking which is consistent across all London's population. The use of bus is highest amongst the 11-15 and 16-24 age groups, with 65+ recording slightly lower although greater than the London average. Travelling by car (as a driver) for 65-79 age groups is greater than the London average but then reduces to below the average for those 80+.

⁸⁹ Office for National Statistics (2020a) ONS mid-year population estimates, 2020. Available at: <<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalescotlandandnorthernireland>> Accessed May 2022

Table 3-3: Proportion of Londoners using types of transport at least once a week - by age⁹⁰.

Method of Travel	Age						
	All Population (%)	5-10 (%)	11-15 (%)	16-24 (%)	65-69 (%)	70-79 (%)	80+ (%)
Walking	95	97	98	96	94	90	73
Bus	59	44	75	76	67	68	56
Car (as passenger)	44	75	72	48	39	41	43
Tube	41	14	16	52	36	28	15
Car (as a driver)	38	-	-	15	54	45	25
National Rail	17	3	7	19	16	12	5
Overground	12	4	6	15	9	6	3
Other taxi/minicab	10	4	3	14	5	5	7
DLR	5	2	3	7	2	2	2
London taxi/minicab	3	0	1	2	2	2	3
Trams	2	2	4	3	3	2	1
Motorbike	1	-	-	1	1	-	-

3.2.2 Disability

According to the Family Resources Survey in 2019 to 2020, 1.3 million people in London had a disability⁹¹. It is noted that due to a combination of the trend towards an ageing population in London and as a result of various long-term symptoms that many people have developed following Covid-19 illness that the number of disabled people in the city is likely to increase substantially in the coming years.

As shown in Table 3-4, there is a slightly higher percentage of working age people with a disability living in outer London than in inner London.

⁹⁰ TfL (2019a). Travel in London: Understanding our Diverse Communities 2019. Available at: <<https://content.tfl.gov.uk/travel-in-london-understanding-our-diverse-communities-2019.pdf>> (Accessed 07/05/21).

⁹¹ Department for Work and Pensions (2020). Family Resources Survey: financial year 2019-2020. Available at: <<https://www.gov.uk/government/statistics/family-resources-survey-financial-year-2019-to-2020/family-resources-survey-financial-year-2019-to-2020>> Accessed April 2022.

Table 3-4: Percentage of working age people with a disability in Inner and Outer London⁹²

	Inner London Boroughs	Outer London Boroughs	Greater London
Percentage of working age people with a disability	16.4	17.0	16.8

Table 3-5 shows the breakdown of transport methods used at least once a week by disabled people compared to non-disabled people. The most common method for disabled people was walking (81 per cent), although this is lower than for those without a disability (96 per cent). Bus travel for disabled people was similar to levels for non-disabled people, however beyond 65 years of age, use of bus travel decreases for disabled people and increases for non-disabled people. Use of a car as a passenger was similar, however those without disabilities recorded higher levels of using a car once a week compared to disabled people. These trends show that for all modes of transport, disabled people travel less frequently than non-disabled people, though it should be noted that the data presented in Table 3-5 does not capture trips undertaken by wheelchair. TfL survey data reported that a high proportion of disabled people have difficulties using public transport, with 45 per cent of disabled Londoners in 2018 finding planning and making trips on public transport stressful⁹³.

Table 3-5: Proportion of Londoners using types of transport at least once a week (2016/17)⁹⁴

Method of Travel	Disabled All Ages (%)	Disabled 16-64 (%)	Disabled 65+ (%)	Non-disabled All Ages (%)	Non-disabled 65+ (%)
Walking	81	88	70	96	95
Bus	58	64	48	60	72
Car (as a passenger)	42	40	41	45	41
Car (as a driver)	24	26	25	39	52
Tube	21	30	13	43	35
National Rail	9	12	5	17	15
Overground	7	10	3	12	8
Other taxi/minicab (PHV)	10	12	8	10	4
London taxi/black cab	3	3	3	2	2
DLR	3	5	2	5	1
Tram	2	3	1	2	2
Motorbike	-	1	-	1	1
Net: Any public transport (bus, Tube, National Rail, DLR, London Overground, tram).	61	69	52	74	78

⁹² Office for National Statistics (2020b), ONS Working Age and Disability – London Datastore. [online] Available at: [Employment Rates by Disability - London Datastore](https://www.ons.gov.uk/employment-and-labour-markets/employment-rates-by-disability-london-datastore)

⁹³ TfL (2019b). Travel in London Report 12. Available at: <<https://content.tfl.gov.uk/travel-in-london-report-12.pdf>> (Accessed 07/05/21).

⁹⁴ TfL (2019a). Travel in London: Understanding our Diverse Communities 2019. Available at: <<https://content.tfl.gov.uk/travel-in-london-understanding-our-diverse-communities-2019.pdf>> (Accessed 07/05/21).

In relation to blue badge holders, as of the year ending March 2021, there were 247,000 blue badge holders in London, a decrease of 5.9 per cent since the year ending March 2020⁹⁵. Those eligible for a blue badge in England qualify through the higher rate of the mobility component of the Disability Living Allowance (DLA) or meet the moving around criteria (8 points or more) or the journey planning criteria of the Personal Independence Payment (PIP). In 2021, 94 per cent of the badges issued without further assessment were issued to those who met the relevant criteria under DLA or PIP. Remaining badges were issued to those registered blind (5 per cent) and those on War Pensioner's Mobility Supplement or Armed Forces and Reserved Forces Compensation Scheme (1 per cent). In 2019 eligibility for blue badges in England was extended to people with hidden disabilities (including anxiety disorders or a brain injury). Although there is no strict differentiation between a hidden or visible disability, a hidden disability is defined as '*a disability that may not be immediately obvious*'.⁹⁶

Disabled people in London are more likely to live in households with less than £20,000 annual income: 61 per cent of disabled Londoners live in such households compared to 25 per cent of non-disabled Londoners. This is even more pronounced for those aged 25-64 with a disability with 58 per cent in this age category living in a low income household compared to 19 per cent of those without a disability within this age category⁹⁷. London's Poverty Profile (LPP) finds that 1 in 3 families with a disabled adult are living in poverty, compared to 1 in 4 families without a disabled adult⁹⁸.

A study undertaken by the King's Fund on key trends within the care sector found that in 2019/20, there was a decrease in the number of people in England receiving long-term care, from 842,000 to 839,000. However, the number of people asking for social care support from their councils increased in 2019/20 from 1.91 million to 1.93 million⁹⁹. Additionally, analysis undertaken as part of the 'State of Adult Social Care in London' report found that London can expect the demand on adult social care to increase in the coming decades as a result of growth among vulnerable population groups¹⁰⁰.

Unpaid carers make up a large proportion of the care force. The King's Fund study found that '*unpaid carers - usually, but not always, family members - contribute the equivalent of four million paid care workers to the social care system. Without them, the system would collapse. The charity Carers UK estimates that carers in England have contributed more than £400 million of care each day since the start of the Covid-19 pandemic*'⁹⁹. The 2011 census indicated that over 687,000 Londoners spend at least an hour a week caring for someone¹⁰¹, and this is likely to have increased greatly since as a result of the coronavirus pandemic and the general trend towards an ageing population.

3.2.3 Sex

The specific travel patterns, needs and behaviour of men and women are discussed in Section 3.4: Health and Equality IIA Topics Evidence Base.

⁹⁵ Department for Transport (2022) Blue Badge Statistics, England 2021. Available at: <<https://www.gov.uk/government/statistics/blue-badge-scheme-statistics-2021/blue-badge-scheme-statistics-england-2021>> Accessed May 2022

⁹⁶ Hidden Disabilities (2021); Online). What is a hidden disability? Available at: <https://hiddendisabilitiesstore.com/what-is-a-hidden-disability> [Accessed 15/06/2021].

⁹⁷ TfL (2019a). Travel in London: Understanding our Diverse Communities 2019. Available at: <<https://content.tfl.gov.uk/travel-in-london-understanding-our-diverse-communities-2019.pdf>> (Accessed 07/05/21).

⁹⁸ Trust for London. (2020). London's Poverty Profile. Available at: <https://trustforlondon.fra1.cdn.digitaloceanspaces.com/media/documents/Londons_Poverty_Profile_2020.pdf> Accessed April 2022.

⁹⁹ Kings Fund (2021). Social Care 360.

¹⁰⁰ London Councils (2019). State of Adult Social Care in London

¹⁰¹ Mayor of London (2022). Who Cares? Helping London's Unpaid Carers. Available at: <<https://www.london.gov.uk/node/52970#:~:text=Nonetheless%2C%20London%20has%20the%20third,100%2C000%20children%2C%20provide%20unpaid%20care>>. Accessed May 2022

3.2.4 Race/Ethnicity

London is more ethnically diverse than any other UK city; over 40 per cent of Londoners are from Black, Asian and minority ethnic groups and 37 per cent were born outside of the UK. These proportions are much higher in comparison to the population in the rest of England, where only 11 per cent of the population are Black, Asian and minority ethnic and 11 per cent are born outside of the UK¹⁰².

Table 3-6 illustrates the spatial distribution of different ethnic groups across the city, showing that there is a slightly higher percentage of Black, Asian and minority ethnic people living in outer London boroughs than in inner London boroughs.

Table 3-6: Percentage of population from Black, Asian and minority ethnic groups in Inner and Outer London, forecasted for 2022

	Inner London Boroughs	Outer London Boroughs	Greater London
Percentage of population from Black, Asian and minority ethnic groups	42.8%	44.6%	43.9%

Table 3-7 provides a breakdown of Londoners using different types of transport at least once a week by ethnicity. Walking is the most common form of transport across all ethnicity groups. The use of cars amongst Black, Asian and minority ethnic groups is less than that of white Londoners; 32 per cent of Black, Asian and minority ethnic Londoners drive a car at least once a week compared with 41 per cent of white Londoners. The use of cars (as a driver) amongst Asian Londoners is greater than other Black, Asian and minority ethnic groups.

Table 3-7: Proportion of Londoners using types of transport at least once a week – by ethnicity (2016/2017)¹⁰³

Method of travel	Ethnicity						
	All (%)	White (%)	Black, Asian and minority ethnic (%)	Black (%)	Asian (%)	Mixed (%)	Other (%)
Walking	95	95	96	96	96	94	93
Bus	59	56	65	73	59	64	66
Car (as passenger)	44	43	46	41	50	51	40
Car (as a driver)	38	41	32	24	36	27	29
Tube	41	43	37	36	36	38	41
National Rail	17	19	13	16	11	16	8
Overground	12	12	12	15	9	14	11
Other taxi/minicab (PHV)	10	11	8	10	6	11	8

¹⁰² Trust for London. (2020). London's Poverty Profile. Available at: <https://trustforlondon.fra1.cdn.digitaloceanspaces.com/media/documents/Londons_Poverty_Profile_2020.pdf> Accessed April 2022.

¹⁰³ TfL (2019a). Travel in London: Understanding our Diverse Communities 2019. Available at: <<https://content.tfl.gov.uk/travel-in-london-understanding-our-diverse-communities-2019.pdf>> (Accessed 07/05/21).

Method of travel	Ethnicity						
	All (%)	White (%)	Black, Asian and minority ethnic (%)	Black (%)	Asian (%)	Mixed (%)	Other (%)
London taxi/black cab	3	3	1	1	1	1	5
DLR	5	5	7	7	6	9	2
Tram	2	2	2	4	2	3	0
Motorbike	1	1	0	0	0	1	1

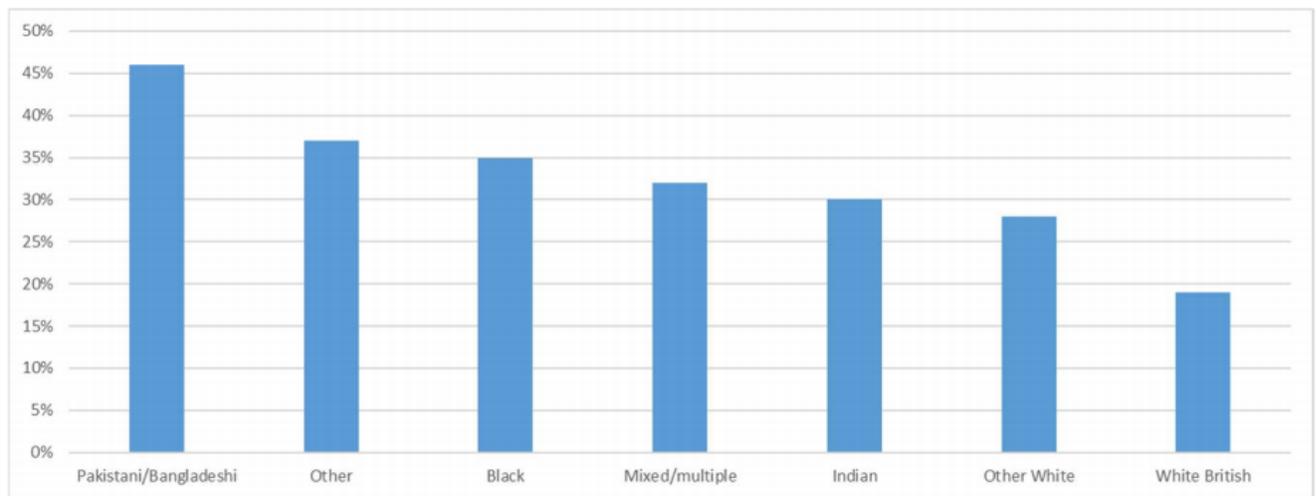
According to TfL's 'Understanding our diverse communities' Report¹⁰³, Black, Asian and minority ethnic Londoners are 'more likely to be classified as 'worried' while using public transport and to have experienced a specific worrying incident in the past three months when travelling'. In addition, this report highlights that Black, Asian and minority ethnic Londoners have slightly overall lower satisfaction ratings in comparison to white Londoners, across most transportation modes. This is likely to be related to the younger age profile, with lower satisfaction ratings traditionally given by younger customers compared with older customers. The report also highlights that barriers in accessing public transport are similar between Black, Asian and minority ethnic and white Londoners, however specific barriers that are more likely to be mentioned by Black, Asian and minority ethnic Londoners include the cost of travel, service disruptions, and slow journey times.

Low pay disproportionately impacts Black, Asian and minority ethnic people, who are more likely to be in low paid and insecure work than white workers. Research conducted by the Living Wage Foundation and New Economics Foundation found that 18 per cent of Black, Asian and minority ethnic workers are in low paid and insecure work – for example, jobs with too few hours, zero hours contracts or short notice of shift patterns – compared to 15 per cent of white workers¹⁰⁴. Low pay can have confounding effects on health as a result of physical and mental stress.

Figure 3-1 shows the proportion of employees who are paid below the London Living Wage¹⁰⁵ by ethnicity between 2014-16. The greatest number of employees paid below the London Living Wage identified as Pakistani/Bangladeshi with a proportion of over 45 per cent (more than twice the proportion of White British).

¹⁰⁴ Living Wage (2020). Over 5 Million Workers in Insecure, Low Paid Work. Available at: <<https://www.livingwage.org.uk/news/news-over-5-million-workers-insecure-low-paid-work>> Accessed April 2022.

¹⁰⁵ The London Living Wage is an hourly rate of pay, currently set at £11.05. It is calculated independently to reflect the high cost of living in the capital, giving a worker in London and their family enough to afford the essentials and to save. [https://www.london.gov.uk/what-we-do/business-and-economy/london-living-wage#:~:text=The per cent20London per cent20Living per cent20Wage per cent20is,the per cent20essentials per cent20and per cent20to per cent20save.](https://www.london.gov.uk/what-we-do/business-and-economy/london-living-wage#:~:text=The%20per%20cent%20London%20per%20cent%20Living%20per%20cent%20Wage%20per%20cent%20is,the%20per%20cent%20essentials%20per%20and%20per%20to%20per%20cent%20save.)

Figure 3-1: Proportion of employees paid below the London living wage, by ethnicity, London 2014-2016¹⁰⁶

A study by The Health Foundation¹⁰⁷ during the Covid-19 pandemic found that Black, Asian and minority ethnic people make up a disproportionately large share of key worker sectors, at 48 per cent of the health and social care sector in London compared to 13 per cent in the rest of the UK. Data published by Skills for Care illustrates that Black, Asian and minority ethnic people make up 67 per cent of the adult social care sector and workforce in London for both independent agencies and local authorities combined.¹⁰⁸

3.2.5 Pregnancy and maternity

Pregnant women and new mothers/parents need to access hospital facilities more frequently than the general population, particularly specialist care facilities which may not be located close to their homes. The locations of maternity and paediatric centres within Greater London are shown on **Map 1**. These centres are evenly distributed around London. There are 28 maternity and paediatric centres within outer London and four adjacent to The Greater London boundary.

3.2.6 Religion or belief

The proportions of people with different religious beliefs across London is shown in Figure 3-2.

¹⁰⁶ Greater London Authority (2019). Equality, diversity and inclusion evidence base for London. Available at: <https://data.london.gov.uk/dataset/equality--diversity-and-inclusion-evidence-base> Accessed April 2022.

¹⁰⁷ Health Foundation (2020). Black and minority ethnic workers make up a disproportionately large share of key worker sectors in London. Available at: <https://www.health.org.uk/black-and-minority-ethnic-workers-make-up-a-disproportionately-large-share-of-key-worker-sectors-in> Accessed May 2022

¹⁰⁸ Skills for Care (2020). The adult social care sector and workforce. Available at: <https://www.skillsforcare.org.uk/adult-social-care-workforce-data/Workforce-intelligence/documents/Regional-reports/London.pdf> (Accessed 23/05/21).

Figure 3-2: Religious beliefs across London¹⁰⁹

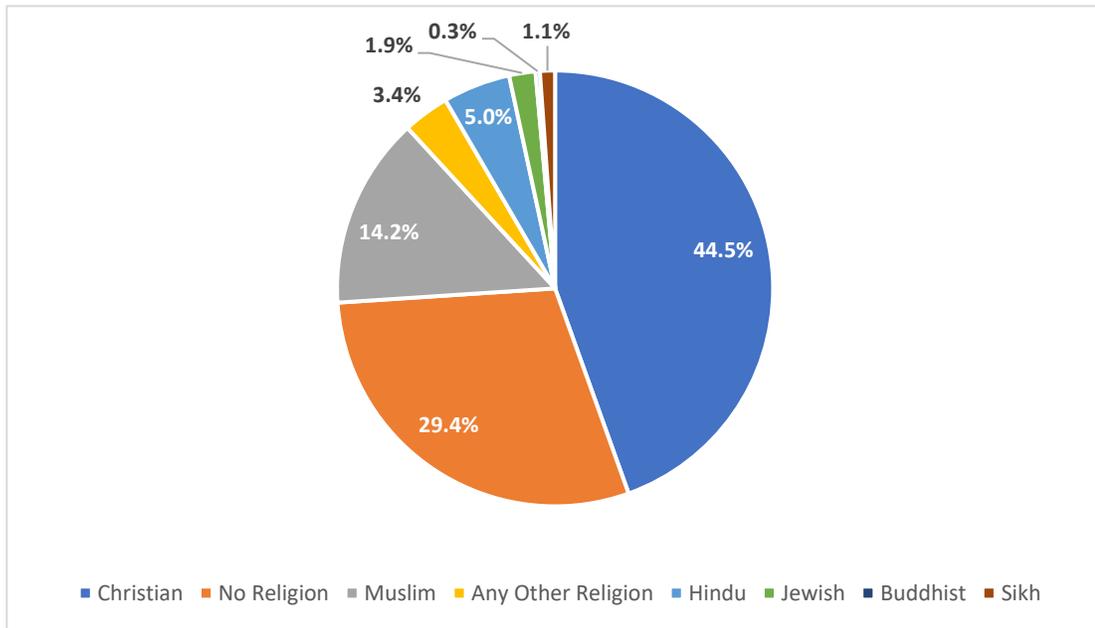
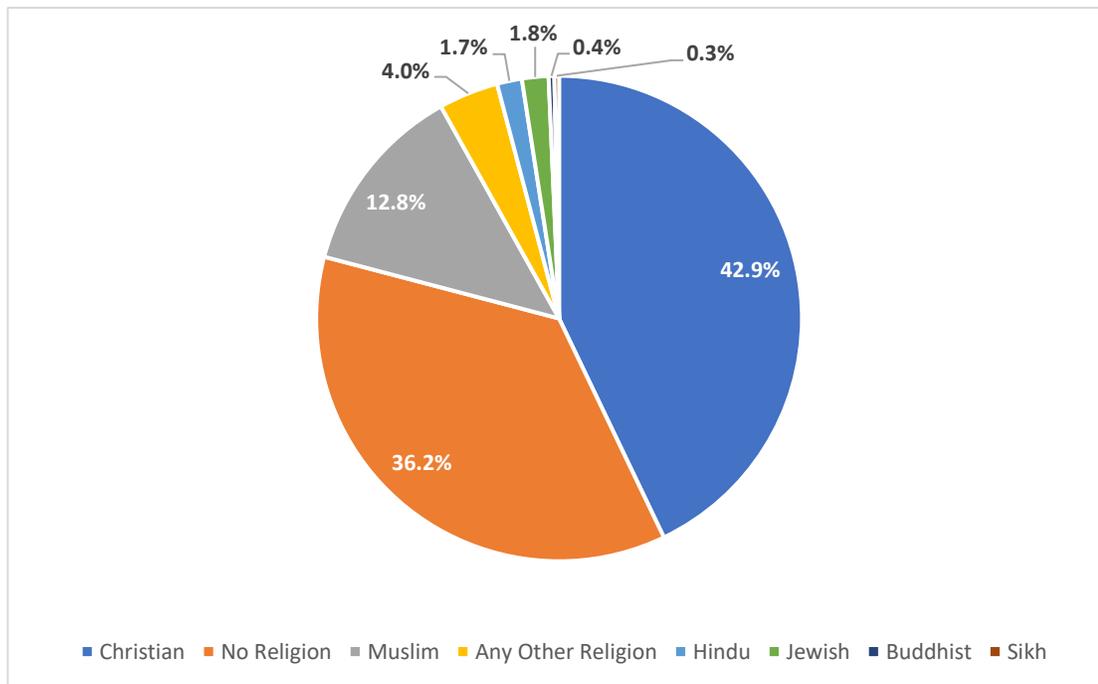


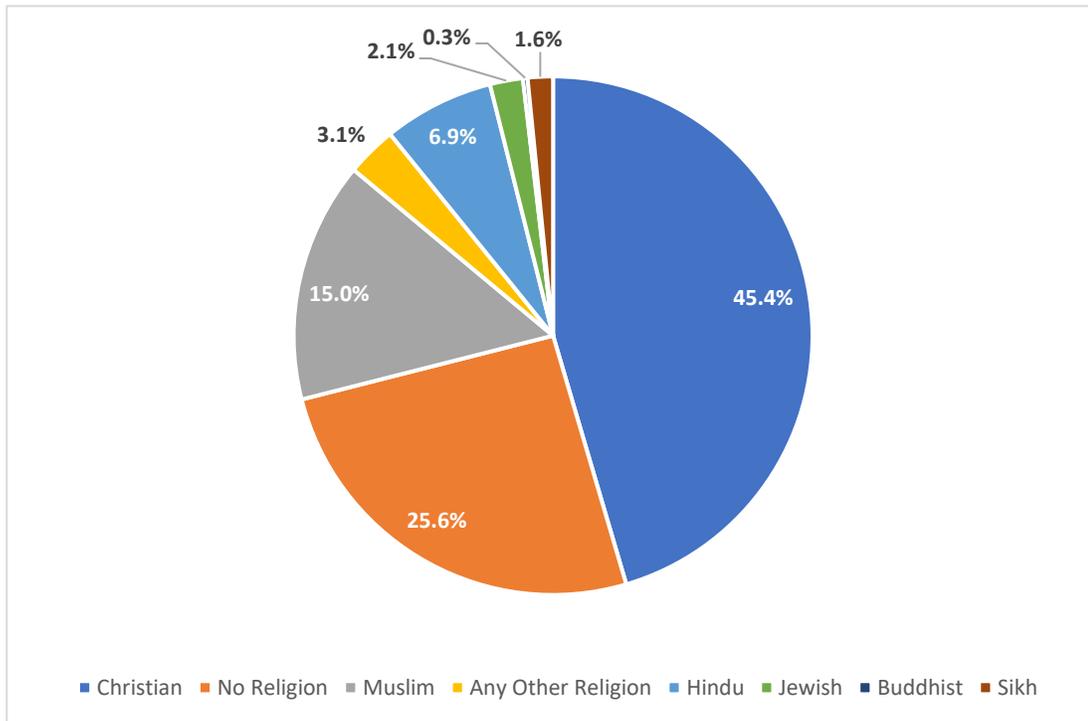
Figure 3-3 and Figure 3-4 illustrate the proportions of religious belief within both inner and outer London boroughs.

Figure 3-3: Religious beliefs across Inner London Boroughs¹⁰⁹



¹⁰⁹ Greater London Authority (2017) 2016-based Ethnic Group projections. Available at: <<https://data.london.gov.uk/dataset/ethnic-group-population-projections>>

Figure 3-4: Religious beliefs across Outer London Boroughs¹⁰⁹



For both inner and outer London boroughs, Christianity is the prevailing religion, followed by Islam. The prevalence of Christian and Islamic beliefs is marginally greater in outer London than in inner London, whereas the proportion of those with 'No Religion' is greater in the inner London boroughs. Hinduism is more prevalent in the outer London boroughs (6.9 per cent) compared to the inner London boroughs (1.7 per cent), as well as Sikhism (1.6 per cent in Outer London compared to 0.3 per cent in inner London).

3.2.7 Sexual orientation

Data on sexual orientation is not readily available within the national census. However, according to the Office for National Statistics in 2016, London recorded the largest proportion of population in UK regions who identified as lesbian, gay or bisexual (LGB), with 2.7 per cent of the population¹¹⁰. This may be attributed to the younger demographics of the population living in London compared to the rest of the country.

The research undertaken for TfL's report 'Understanding our diverse communities: 2019' identified very little difference between the barriers to using public transport identified by LGB people and all Londoners. However, a significantly greater proportion of LGB Londoners said that they felt worried owing to unwanted sexual behaviour (13 per cent of LGB Londoners mentioned this compared with 8 per cent of heterosexual Londoners) and owing to passengers drinking alcohol (cited by 27 per cent of LGB Londoners and 20 per cent of heterosexual Londoners). Generally, LGB people report higher levels verbal or physical violence, or threats of such violence with of 41 per cent of LGBT+ Londoners having experienced this in the past year – compared to the 36 per cent in the rest of the UK¹¹¹.

¹¹⁰ ONS (2017). Sexual Identity, UK: 2016. Available at: <<https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/sexuality/bulletins/sexualidentityuk/2016>> (Accessed 07/05/21).

¹¹¹ Centre for London (2020). How do LGBT+ people experience life in the capital? Available at: <<https://www.centreforlondon.org/blog/lgbt-londoners/>> Accessed May 2022.

3.2.8 Gender reassignment (trans)

There is very little statistical data available on the trans community and there were no questions about trans identity in the census until 2020, and the results of the census have not yet been published. Stonewall estimate that *'around 1 per cent of the population might identify as trans, including people who identify as non-binary. That would mean about 600,000 trans and non-binary people in Britain, out of a population of over 60 million'*¹¹².

There is also limited data on the travel behaviours of trans people, however anecdotal evidence from stakeholder consultation suggests that like LGBT+ people, trans people may be more wary of using public transport than the general population due to the fear of verbal or physical abuse. Among transgender Londoners, 69 per cent have experienced violence or threats of violence in the past year – which is higher in London than in the rest of the country (56 per cent)¹¹¹.

3.2.9 Deprivation and low income Londoners

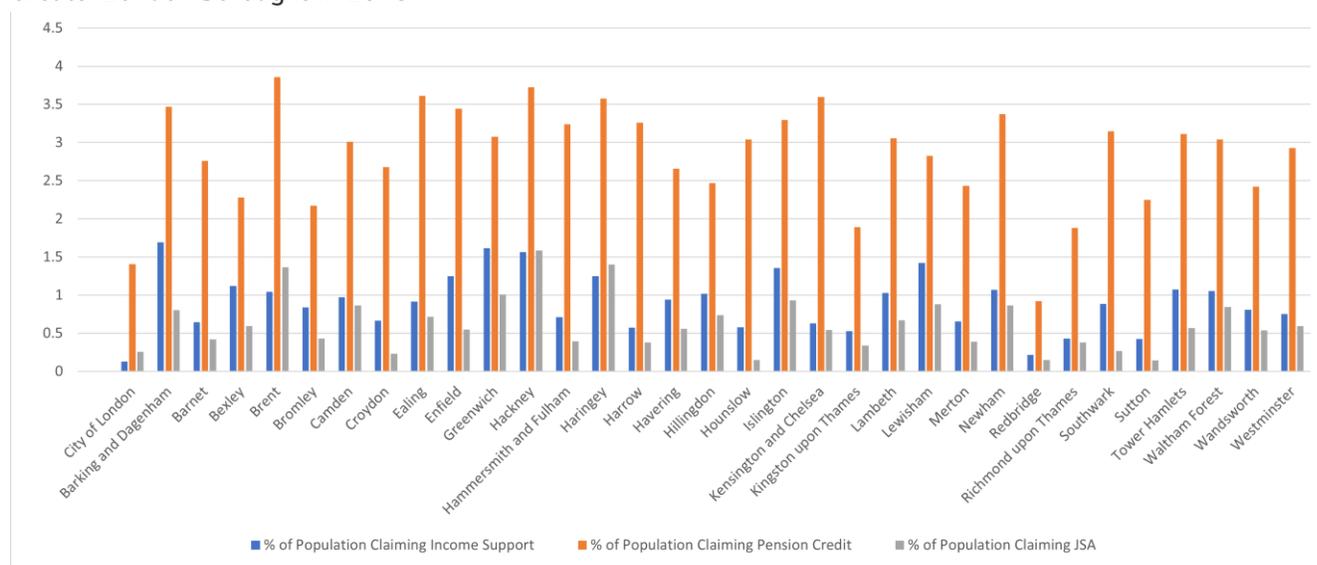
The data presented in Table 3-8 of Section 3.3 indicates that, on average, families in outer London are comparably better off financially than those in inner London. On average, the 'proportion of children in low income families' within outer London boroughs is 34 per cent less than that of inner London boroughs, with Islington and Richmond upon Thames showcasing the largest (30.8 per cent) and smallest (8.5 per cent) 'proportion of children in low income families', respectively. The overall average 'proportion of children in low income families' within the outer London boroughs is also less than both the England and Greater London averages, whereas the inner London boroughs have a higher proportion of children in low income families than both the English and London region averages, with the exception of Wandsworth which has a proportion comparable to both the English and London region averages.

The data presented in Table 3-9 of Section 3.3 shows that inequalities in life expectancy at birth for both males and females is, on average, greater in the inner London boroughs. The inequality in life expectancy indicator relates to the 'social gradient' of health; generally, life expectancy increases as the level of deprivation decreases. The slope index of inequality (SII) is a summary measure of this social gradient, which indicates how much life expectancy varies with deprivation (Public Health England, 2018). Between the most and least deprived areas of England, the level of inequality, or gap, in life expectancy is 9.3 years for males and 7.3 years for females (as measured by the SII) (Public Health England, 2018). For males in inner London, the average inequality in life expectancy at birth for males is circa 8.9 years, compared to an average of circa 6.6 for males within outer London boroughs – a 27 per cent decrease. For females, this trend is the same, but the disparity is less with a 14 per cent decrease in inequalities in life expectancy at birth between outer and inner London boroughs. More generally, inequality in life expectancy, as measured by the SII, increased in London in 2020 by 1.5 years to 8.4 years for males, and by 1.3 years to 6.2 years for females. As a result of these increases, inequality in life expectancy in London was greater in 2020 than in any year in the last decade (Office for Health Improvement & Disparities, 2021).

Figure 3-5 illustrates the proportion of population claiming Income Support, Pension Credit and Jobseeker's Allowance across the boroughs. Brent and Haringey (located in outer London) and Hackney (located in inner London) have the highest proportion of claimants across the three benefits combined of all the boroughs. In Kensington and Chelsea there is a much higher proportion of people claiming Pension Credit than other benefits, suggesting an older population. There is no discernible pattern between the inner and outer boroughs in relation to benefit claims. It should also be noted that JSA and income support were superseded by Universal Credit in 2018, and that the number of people claiming benefits will have been impacted by this and by the cost of living crisis.

¹¹² Stonewall (n.d). The Truth About Trans. Available at: <<https://www.stonewall.org.uk/truth-about-trans>> Accessed May 2022

Figure 3-5: Proportion of population claiming Income Support, Pension Credit and Jobseeker’s Allowance across Greater London Boroughs in 2018



The cost of living has been increasing across the UK since early 2021 and in February 2022, inflation reached its highest recorded level since 1992, affecting the affordability of goods and services for households. Consumer prices, as measured by the Consumer Prices Index (CPI), were 6.2 per cent higher in February 2022 than the previous year as a result of demand, supply chain bottlenecks and energy prices (UK Parliament, 2022). In its latest forecasts, published 23 March 2022, the Office for Budget Responsibility (OBR) forecast CPI inflation to peak at 8.7 per cent in Q4 2022 and be above 7 per cent in each quarter from Q2 2022 to Q1 2023; this is much higher than the peak of 4.4 per cent that was forecast in October 2021 (UK Parliament, 2022). The cost-of-living crisis, compounded by the 54 per cent increase in the domestic energy price cap taking effect from 1st April 2022, was noted as a point of concern by several stakeholders during workshops, as it will impact on low income households disproportionately and push more people into poverty.

Relative deprivation levels within Greater London are shown on Map 2. As per the data listed in Table 3-9 in Section 3.3, the least deprived boroughs are predominantly situated in outer London (for instance, Richmond upon Thames, Sutton, Merton, Kingston upon Thames, Bromley and Barnet). On the contrary, the most deprived boroughs are located in the centre and east of the city: these include Hackney, Tower Hamlets, Barking and Dagenham, Newham and Islington. This geographical distribution is also reflected in the ‘children in low income families’ indicator.

In relation to the Index of Multiple Deprivation (IMD) scores, all inner boroughs perform worse than the England average (as highlighted in Table 3-9 in Section 3.3) except for Wandsworth, which outperforms the national average. Most perform substantially worse than the 21.8 average for England – namely Hackney (32.5) Islington (27.5) and Tower Hamlets (27.9). On average, the IMD score for inner London boroughs is 22 per cent greater than that of outer London Boroughs, illustrating that outer London is generally less deprived. The most deprived boroughs in Greater London are Hackney and Barking and Dagenham. A 2018 report by The Smith Institute found that poverty and social exclusion in outer London is worsening, especially relative to the performance of inner London. The research found that 1.4 million people are living in poverty in outer London, and that whilst the proportion of people in poverty remains higher in inner London, the gap is converging, with rates narrowing from a 12-percentage point difference 15 years ago to seven percentage points in the latest dataset (The Smith Institute, 2018). With the development of cost of living crisis, this is likely to have gotten worse over the past year.

Table 3-8 shows the proportion of Londoners on low incomes (<£20,000/year) using different modes of transport at least once a week in 2016/17. Other than walking, bus travel records the greatest proportion (69 per

cent) for those earning less than £20,000. Only 23 per cent of those earning less than £20,000 use a car (as a driver) once a week, compared with 38 per cent of all Londoners.

Table 3-8: Proportion of Londoners (by annual income) using all types of transport at least once a Week (TfL 2019a)

Method of Travel	Annual household income						
	All Londoners (%)	All less than £20,000 (%)	Less than £5000 (%)	£5000-£9,999 (%)	£10,000 - £14,999 (%)	£15,000 - £19,999 (%)	£20,000 - £24,999 (%)
Walking	95	93	91	92	93	95	95
Bus	59	69	70	71	69	68	63
Car (as a passenger)	44	38	35	37	37	41	44
Car (as a driver)	38	23	16	20	26	27	32
Tube	41	32	36	30	29	36	36
National Rail	17	11	11	11	9	11	15
Overground	12	11	10	13	8	11	11
Other taxi/minicab (PHV)	10	9	9	10	7	10	8
DLR	5	5	5	5	6	6	7
Tram	2	2	2	1	3	4	3
Motorbike	1	1	1	-	1	1	1

Poverty is twice as high for lone parents and for children in lone-parent families as for those in couple families, with almost half being in poverty (Department for Transport, 2019). Both single parent families and couples with children spend 13 per cent of their income on transport (Department for Transport, 2019), and particularly in Outer London may rely more on private vehicles to take children to different schools and activities.

3.2.10 Refugees / Asylum Seekers

By the end of 2020, there were 132,349 refugees, 77,245 pending asylum cases and 4,662 stateless people in the UK¹¹³. Studies suggest that in almost all indices of physical, mental and social wellbeing, asylum seekers and refugees suffer a disproportionate burden of morbidity and are largely disempowered and restricted in access to services such as healthcare (Taylor, 2009)¹¹⁴. According to the Refugee Council, refugees often face barriers to accessing basic health services, such as often being wrongly refused access to primary care and routinely refused interpreting services by GPs, dentists or hospitals. In addition, the Refugee Council highlights that many refugees are digitally excluded, and inability to access the internet is a key barrier in accessing health services and information, particularly demonstrated during coronavirus lockdowns (Refugee Council, 2021)¹¹⁵.

It should be noted that the number of refugees in London has been rising quickly in recent months due to the war in Ukraine. More than 4 million Ukrainians have fled their country since Russia invaded in February, the vast majority settling in Poland, according to the UN refugee agency, UNHCR (The Guardian, 2022). About 6.5 million

¹¹³ Asylum Seekers, London Councils (n.d.), [Link](#)

¹¹⁴ Asylum seekers, refugees, and the politics of access to health care: a UK perspective, Taylor et al., (2009), [Link](#)

¹¹⁵ Healthcare for refugees: where are the gaps and how do we help?, Refugee Council (2021), [Link](#)

people have been displaced within Ukraine. The UK has granted 25,500 visas to Ukrainian refugees since the beginning of March, 22,800 of which have been issued to people hoping to join relatives in the UK under the Ukraine Family scheme (The Guardian, 2022).

3.2.11 Gypsy and Traveller Community

The 2011 census data showed that there were 8,196 people identifying as Gypsies and Travellers in London, well below the 13,500 seen as a conservative estimate in the 2008 Gypsy and Traveller Accommodation Needs Assessment (London Housing Committee, n.d).

Due to historical reasons and the availability of land, Gypsy and Traveller sites are mainly situated in the outer London boroughs, with a concentration of Gypsy and Traveller sites based in the west, east and southeast sub-regions (London Housing Committee, n.d). This is supported by 2011 Census data which highlights that Bexley has the highest concentration of Gypsies and Travellers followed by Bromley and Hackney (London Housing Committee, n.d). The location of known Gypsy and Traveller sites in London are shown on **Map 3**.

A report published by the UK Parliament Woman and Equalities Committee in 2019 highlighted the inequalities faced by Gypsy and Traveller communities. The inquiry found that Gypsies and Travellers are amongst the most disadvantaged people in the country and have poor outcomes in areas including health, with the report stating that Gypsy, Roma and Traveller communities have 'the worst health outcomes of any ethnic group'. The report highlights that poor conditions and sanitation on Traveller sites are 'contributing to the poor health of Gypsy and Traveller families, including many children' (Women and Equalities Committee, 2019)¹¹⁶.

3.2.12 Intersectionality

Intersectionality refers to *'the complex, cumulative way in which the effects of multiple forms of discrimination (such as racism, sexism, and classism) combine, overlap, or intersect especially in the experiences of marginalized individuals or groups.'*¹¹⁷.

Having an intersectional identity can mean that a person does not feel they completely belong in one group or another, which can lead to isolation, depression and other mental health issues (Equality Network, n.d.). Some people may fall within two or more of the PCG groups and/or vulnerable groups described in this section and may therefore be subject to cumulative impacts from the proposed scheme. For example, a disabled LGBT+ person could experience multiple impacts as part of a journey due to poor accessibility of public transport, as well as fear for their personal safety due to the potential for hate crime.

Recent research published on intersectionality and transport policy concluded that *'intersectionality states that an understanding of individual experiences based on a single aspect of identity (such as class, gender, ability, age, etc.) is unrepresentative of individual needs. Adopting an intersectional lens for analysing policies allows for a deeper understanding of the impact of multi-level interacting social locations and structures of domination that shape human experience.'*¹¹⁸

3.3 Health Profiles

The 2011 Census asked people to self-assess their general state of health as 'very good', 'good', 'fair', 'bad' or 'very bad'. Around half of London residents said their health was very good and around a third said it was good. Of the remaining 1.3 million some 305,000 residents, 3.7 per cent of the total in London, reported that they had bad

¹¹⁶ Tackling inequalities faced by Gypsy, Roma and Traveller communities, Women and Equalities Committee (2019) [Link](#)

¹¹⁷ Meriam Webster (2022) What is Intersectionality?

¹¹⁸ Kakar, Inayat Singh & Peden, Margaret & Jagnoor, Jagnoor, (2021). "Intersectionality based policy analysis: Equity in mobility in India," Transport Policy, Elsevier, vol. 101(C), pages 14-22.

health and 100,000 (1.2 per cent) reported very bad health when compared to 4.3 per cent and 1.3 per cent in England and Wales respectively.

The Office for Health Improvement and Disparities (OHID) publishes Health Profiles that report a range of health indicators collected at ward level in London to rank the overall health of boroughs within Greater London against the average levels in England.

Table 3-9 presents results for the health profile indicators that may be affected by the proposed scheme for Greater London as a whole and all London boroughs. Each indicator is benchmarked against the English average using the following colour codes:

- Green = better
- Orange = similar
- Red = worse.

Light grey shading on the top row indicates the inner London boroughs and darker grey indicates the outer London boroughs.

Most of the selected indicators for Greater London are similar or better than the average levels in England as a whole, however there is significant variation between boroughs, as shown in Table 3-9.

Life expectancy

Life expectancy for both men and women is varied across the city and is generally similar or better than the average for England, as illustrated in Table 3-9. For males, the boroughs of Barking and Dagenham, Lambeth and Lewisham have the lowest life expectancy across London and lower than the average for that of both England and the London region. For females, it is only the borough of Barking and Dagenham that has a life expectancy less than the average for both England and the London region. For the 'under 75 mortality rates from all cardiovascular diseases' indicator for Greater London as a whole performs in line with the England average, however the London boroughs of Barking and Dagenham, Hackney, Haringey, Hounslow, Lambeth, Lewisham, Newham, Tower Hamlets, and Waltham Forest perform significantly worse with rates over 79 per 100,000 under 75 mortality compared to the 70.4 England average. On average, under 75 mortality rates from all cardiovascular diseases is only marginally (5 per cent) greater for inner London boroughs compared with outer London boroughs.

Physical activity

The 'percentage of physically active adults' fluctuates across the city. Overall, Greater London performs marginally worse than the England average, with 65.2 per cent of physically active adults in London compared 66.4 per cent for England.

Overall, physical activity is greater in the inner London boroughs than the outer London boroughs with, on average, 70.1 per cent and 62.5 per cent of adults identified as physically active, respectively. Additionally, levels of physical activity in adults within the outer London boroughs is on average less than both the English and London region averages, whereas levels of physical activity in adults within the inner London boroughs is on average greater than both the English and London region averages. Over half of the inner London boroughs exhibit over 70 per cent of adults being categorised as physically active including: Hackney, Hammersmith and Fulham, Islington, Kensington and Chelsea, Lambeth, Southwark, and Wandsworth.

Obesity

Overall, Greater London performs better than the England average in relation to levels of obesity, as shown by the 'Adults (18+) classified as overweight or obese' indicator which is significantly better in London (55.6 per cent) in comparison with the England average (66.4 per cent).

Childhood obesity rates are generally high in London. However, in contrast to adults, the rates are higher when compared to the national average. The highest rates of obesity in adults and children occur in the areas of greatest

deprivation across the city. Outer London has higher rates of adult obesity than inner. However, outer London also has slightly lower rates of childhood obesity than inner.

Road traffic accidents

As illustrated in Table 3-9, on average, the rate of people killed and seriously injured on roads is 64.1 per cent greater within the inner London boroughs when compared with the outer London boroughs. In general, the rate of people killed and seriously injured on roads in the outer London boroughs is generally lower than both the Greater London and English averages with the exception of Haringay and Hounslow, which have a higher rate of road traffic injuries. The highest rate is observed in Westminster in inner London, with 97.4 per 100,000 people killed and seriously injured on roads. The lowest rate of people killed and seriously injured on roads is observed in Harrow in outer London, with 24.6 per 100,000 people.

Table 3-9: Health profile indicators for London Boroughs, benchmarked against England¹¹⁹

Indicator	Period	Units	England	Greater London	Barking and Dagenham	Barnet	Bexley	Brent	Bromley	Camden	Croydon	Ealing	Enfield	Greenwich	Hackney	Hammersmith and Fulham	Haringey	Harrow
Deprivation score (IMD 2019) ¹²⁰	2019		21.8	-	32.7	16.1	16.3	25.5	14.2	20.1	22.5	22.7	25.8	24.5	32.5	22.2	27.9	15
Children in low-income families (under 16s)	2016	Proportion per cent	17	18.8	22.5	14	16.3	18	13.2	27.3	16.1	16.9	22.2	21.8	24.7	20.6	21.3	12.9
Year 6: Prevalence of obesity (including severe obesity)	2019 – 20	Proportion per cent	21	23.7	29	20.6	22.8	25.2	15.6	21.9	25.1	23.5	27	27.6	27.4	19.7	22.3	21
Percentage of physically active adults	2019 - 20	Proportion per cent	66.4	65.2	53.9	63.7	59.2	59.7	73.9	65.8	62.2	59.8	61	67.5	74.2	74.3	70.6	57.2
Adults (18+) classified as overweight or obese	2019 – 20	Proportion per cent	62.8	55.7	65.5	57.7	69	60.3	57.4	48.2	56.6	60.7	58.2	57	52.6	41.6	49.8	58.5
Life expectancy at birth (Male)	2018 – 20	years	79.4	80.3	77	82	79.9	80.4	81.3	83.1	79.7	79.9	80.0	79.2	79.3	79.0	79.6	82.2
Life expectancy at birth (Female)	2018 – 20	years	83.1	84.3	81.7	85.5	83.8	85.0	84.8	87.7	83.7	84.1	84.2	82.8	83.7	83.9	84.4	85.7
Under 75 mortality rates from all cardiovascular diseases	2017 – 19	Value per 100,00	70.4	69.1	91.2	51.1	60.2	76.2	55.5	58.5	65.5	76.5	71.9	74.1	87.2	76.2	81.4	56.6
Inequality in life expectancy at birth (Male)	2017 – 19	Years	9.4	7.2	2.9	6.8	7.3	6.3	8.1	12.9	8.4	6.2	8.1	5.8	6.3	7.3	7.4	7.7
Inequality in life expectancy at birth (female)	2017 - 19	Years	7.6	5.1	3.2	6.3	6.5	6.5	6.7	10.0	6.2	3.7	6.5	4.7	3.9	4.7	3.5	6.1
Percentage of people in employment	2020 - 21	Proportion per cent	75.1	74.5	63.2	73.0	76.0	69.2	78.0	69.5	75.0	77.1	65.5	75.6	74.3	77.5	73.6	68.5
Killed and seriously injured on roads	2016 – 18	Value per 100,000	42.6	39.5	37	30.8	25.6	29	31.5	50.9	27.2	38.6	32.8	29.8	49.2	52.3	40.8	24.6

¹¹⁹ Office for Health Improvement and Disparities (2022). Public health profiles. <https://fingertips.phe.org.uk> © Crown copyright 2022

¹²⁰ English indices of deprivation 2019 File 10 (2019) [Link](#)

Indicator	Period	Units	Havering	Hillingdon	Hounslow	Islington	Kensington and Chelsea	Kingston upon Thames	Lambeth	Lewisham	Merton	Newham	Redbridge	Richmond upon Thames	Southwark	Sutton	Tower Hamlets	Waltham Forest	Wandsworth	Westminster
Deprivation score (IMD 2019)	2019		16.9	18.2	21.5	27.5	21.5	11.4	25.4	26.7	14.6	29.6	17.2	9.4	25.8	14	27.9	25.2	16.6	20.3
Children in low-income families (under 16s)	2016	Proportion per cent	16.5	16	13.8	30.8	20.5	11.7	23.4	22.6	13.1	20.1	14.7	8.5	23.2	9.8	30.3	19.4	17.2	27.3
Year 6: Prevalence of obesity (including severe obesity)	2019 – 20	Proportion per cent	23.8	21.3	23.9	25	23.1	18.6	23.7	24.2	20.1	27.9	25	11.1	27.2	18.4	25.9	23.7	19	25.2
Percentage of physically active adults	2019 – 20	Proportion per cent	58.2	61.0	58.9	73.7	72.1	72	74.9	69.6	65.6	53.4	53.7	73.9	71.7	67.2	63.3	64.1	72.3	61.7
Adults (18+) classified as overweight or obese	2019 – 20	Proportion per cent	63.7	65.3	61.1	49.2	44.1	50.4	49.6	53.6	53.2	68.2	60.6	51.9	50.4	61.5	53.7	58.2	50.3	44.0
Life expectancy at birth (Male)	2018 – 20	Years	79.7	79.7	79.4	79.5	84.2	81.7	78.6	78.8	80.3	79.0	80.5	82.2	79.6	80.3	79.9	79.8	80.0	84.7
Life expectancy at birth (Female)	2018 – 20	Years	83.5	83.7	83.7	83.2	87.9	85.2	83.9	83.2	84.1	83.1	84.6	86.4	84.1	84.0	83.3	84.5	84.3	87.1
Under 75 mortality rates from all cardiovascular diseases	2017 – 19	Value per 100,000	71.4	75.8	81.8	73.9	45.6	58.5	84.9	81.3	62.3	94	63.4	53	69.6	51.7	86.9	79.2	76.6	51.6
Inequality in life expectancy at birth (Male)	2017 – 19	Years	7.1	6.6	4.8	9.8	14.8	6.2	5.0	7.4	7.3	7.2	5.7	6.3	6.3	5.1	11.9	5.7	5.5	14.2
Inequality in life expectancy at birth (female)	2017 - 19	Years	5.6	4.8	5.4	5.1	11.9	6.1	4.0	5.8	4.9	5.7	4.5	1.5	4.3	3.4	4.8	4.5	5.2	6.6
Percentage of people in employment	2020 - 21	Proportion per cent	79.8	76.9	72.8	71.1	70.5	77.8	80.4	78.2	78.7	76.9	71.4	75.6	76.7	77.9	74.8	70.1	81.0	72.0
Killed and seriously injured on roads	2016 – 18	value per 100,000	30.5	32.5	38.9	49.2	66.3	27.3	54.5	32.5	29.4	32.7	28.3	35.6	44.7	26.4	51.2	30.9	42.8	97.4

3.4 Health and Equality IIA Topics Evidence Base

The Mayor's London Health Inequality Strategy (HIS) has highlighted the stark health inequalities that exist in the city. A boy born today in one part of London could be expected to die up to six years earlier than a boy born elsewhere in the city, whilst girls born in some boroughs could be expected to live up to a third of their life in poor health¹²¹. The HIS recognises that addressing the wider determinants of health is crucial for improving the situation for Londoners to achieve a long term change in health outcomes.

With cognisance of the wider determinants of health and consideration of equality outcomes, a literature review of various sources - including scientific research, policy documents and emerging evidence - has been undertaken to form an evidence base for the Health and Equality Impact Assessment. Additionally, online sources and stakeholders have been consulted to form an understanding of the barriers that some PCGs and vulnerable groups experience using different modes of transport - with a particular emphasis on those issues experienced in Outer London/adjacent to Greater London.

3.4.1 Air Quality

The links between air quality emissions and health effects are well established, with poor air quality linked to human health conditions such as asthma, respiratory problems and cardiovascular disease¹²². It is now widely accepted that long-term exposure to air pollution (exposure to pollution over the entire life span of an individual) increases mortality risk and thus decreases life expectancy. Estimates suggest that exposure to outdoor air pollution contributes to 40,000 deaths per year in the UK. The main pollutants from vehicle emissions are particulate matter (PM) and nitrogen oxides (NO_x).

Traffic contributes to a range of gaseous air pollutants and to suspended PM of different sizes and composition. Motorised road traffic contributes 60 per cent of PM₁₀, 47 per cent of NO_x and 17 per cent of CO₂ emissions in London¹²³. A systematic review of evidence undertaken by the World Health Organization (WHO) to underpin their new Air Quality Guidelines¹²⁴ concluded suggestive causality between long-term exposure to PM_{2.5} and PM₁₀ in relation to all-cause and cause-specific mortality. This study also found evidence of a positive association between short term exposure to PM₁₀, PM_{2.5}, NO₂, and ozone and all-cause mortality, and between PM₁₀ and PM_{2.5} and cardiovascular, respiratory and cerebrovascular mortality. There have been steady reductions in total PM_{2.5} emissions in the UK since 1990¹²⁵. However, further reductions in road transport emissions are now being restricted by increases in non-exhaust sources of PM from vehicle tyre and brake wear and road abrasions as a share of transport emissions; to the extent that these sources now exceed PM emissions from vehicle exhausts.

A report by the Committee on the Medical Effects of Air Pollutants (COMEAP) noted positive associations between long-term exposure to NO₂ and all-cause, respiratory and cardiovascular mortality, children's respiratory symptoms and lung function, though uncertainties remained about causality between NO₂ specifically and health effects due to strong correlations with other pollutants¹²⁶. The findings were updated in a 2018 report, however again it was concluded that the extent to which the association between NO₂ and mortality reflect an effect that is

¹²¹ Greater London Authority (2018). The London Health Inequalities Strategy.

¹²² Royal College of Physicians. (2016). Every breath we take: the lifelong impact of air pollution. <https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution>

¹²³ TfL (n.d). Road Task Force – Technical Note 21. Available at: <https://content.tfl.gov.uk/technical-note-21-what-is-air-quality-on-the-road-network.pdf> Accessed May 2022

¹²⁴ WHO global air quality guidelines. Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Geneva: World Health Organization; 2021. Licence: CC BY NC SA 3.0 IGO.

¹²⁵ National Atmospheric Emissions Inventory (2022). About PM_{2.5}. Available at: https://naei.beis.gov.uk/overview/pollutants?pollutant_id=122 Accessed May 2022

¹²⁶ Committee on the Medical Effects of Air Pollutants (COMEAP) (2015) Statement on the Evidence for the Effects of Nitrogen Dioxide on Health

additional to the mortality effect found to be associated with fine particulate matter (PM_{2.5}) is not clear¹²⁷. Between 2017 and 2025, the total cost of PM_{2.5} and NO₂ combined is estimated to be £1.6 billion in models used in Public Health England's cost of air pollution project. Additionally, a report by CBI Economics found that UK economy could benefit to the tune of £1.6 billion each year if it were to achieve the guidelines set by the World Health Organisation for air quality¹²⁸. These economic benefits would be realised as a result of fewer deaths, fewer work absences and fewer days a person attends work ill.

Levels of vulnerability to poor air quality can change due to biological (e.g. age, sex, disease, diet) or environmental (e.g. place of residence, housing, access to healthcare, mode of travel) factors. Groups particularly vulnerable to air pollution include children, pregnant women, older people and those from more deprived backgrounds. Children (aged up to 14 years) are deemed more susceptible to the impacts of air pollution as their lungs are still growing; in children, pollution can cause the onset of asthma and have a negative effect on neural development and cognitive capacities, which in turn can affect performance at school and later in life. Older people are also more vulnerable as they are more likely to already have medical issues such as cardiovascular diseases, chronic obstructive pulmonary disease (COPD) and other breathing problems which are exacerbated by poor air quality. Pregnant women are also a vulnerable population due to potential harmful impacts on the unborn foetus and evidence regarding adverse birth outcomes¹²⁹. Pregnant women are at greater risk from air pollution, with maternal exposure to ambient air pollution associated with adverse impacts on fertility, pregnancy, newborns, and children. People from more deprived communities are also more sensitive to air pollution because they are more likely to have existing medical conditions and tend to live in areas where air pollution is worse (Royal College of Physicians, 2016); this is discussed in greater detail in Section 2.

A recent report by Imperial College London¹³⁰ predicts that London specific air quality policies, combined with wider improvements in air quality, will improve the average life expectancy of a child born in London in 2013 by six months, compared with 2013 air pollution concentrations remaining unchanged. The report found that in 2019 around 4,000 deaths in London could be attributable to air pollution. The highest mortality rates were identified in outer London boroughs. This is due to the higher percentage of older people living in these areas who are more susceptible to the impacts of air pollution. Future improvements to life expectancy improvements were forecast to be greater in inner London as a result of a greater concentration of air pollution reductions in these areas following policy implementation.

Studies on the impacts of air pollution on people living in London were undertaken by Aether on behalf of the GLA in 2013, 2017 and 2019. The 2013 and 2017 studies found that populations living in the most deprived areas were on average more exposed to poor air quality than those in less deprived areas and sought to understand inequalities in access to clean air in London¹³¹. The aim of Air Pollution Exposure in London: Impact of the London Environment Strategy (2019) study was to investigate the impact of future policy on inequalities in exposure. The key outcome of the analysis indicated that the London Environment Strategy was projected to make significant progress in removing inequality associated with poor air quality¹³².

The Air Pollution and Inequalities in London: 2019 Update report, compiled by Logika Noise Air Quality consultants in 2021 on behalf of the GLA, builds upon the Aether study and set out the following key findings in relation to the relationship between air quality and deprivation¹³³:

¹²⁷ Committee on the Medical Effects of Air Pollutants (COMEAP) (2020) The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom

¹²⁸ CBI Economics (2020). Breathing life into the UK Economy. Available at: <https://www.cleanairfund.org/publication/breathing-life-into-the-uk-economy-cbi-economics-2020/> Accessed May 2022.

¹²⁹ Shang, L., Huang, L., Yang, L. et al. Impact of air pollution exposure during various periods of pregnancy on term birth weight: a large-sample, retrospective population-based cohort study. *Environ Sci Pollut Res* 28, 3296–3306 (2021). <https://doi.org/10.1007/s11356-020-10705-3>

¹³⁰ Imperial College London (2021). London Health Burden of Current Air Pollution and Future Health Benefits of Mayoral air quality policies. Available at: http://erg.ic.ac.uk/research/home/resources/ERG_ImperialCollegeLondon_HIA_AQ_LDN_11012021.pdf

¹³¹ Aether (2017) Updated Analysis of Air Pollution Exposure in London

¹³² Aether (2019) Air Pollution Exposure in London: Impact of the London Environment Strategy

¹³³ Air Pollution and Inequalities in London: 2019 Update, Logika Noise Air Quality Consultants (2019). https://www.london.gov.uk/sites/default/files/air_pollution_and_inequalities_in_london_2019_update_0.pdf

- In 2019, communities which have higher levels of deprivation, or a higher proportion of people from non-white ethnic background were more likely to be exposed to higher levels of air pollution.
- In 2019, in areas where the most deprived Londoners were likely to live, the annual average NO₂ levels were 13 per cent higher than the least deprived areas.
- Recent policies to improve air pollution have also reduced the inequality in exposure between different socioeconomic groups.

The report set out the following key findings in relation to air quality and ethnic group:

- White ethnic groups are still more likely to be exposed to lower levels of air pollution and are the only group whose average exposure is lower than the London average.
- In 2019, annual average concentrations of nitrogen dioxide were on average between 16 and 27 per cent higher in areas where non-white people were most likely to live compared to areas where white people were most likely to live.
- Between 31 and 35 per cent of areas with the highest proportion of black and mixed/multiple ethnicities are in areas with higher levels of air pollution, reduction to 15-18 per cent for Asian ethnic groups and 4-5 per cent for white ethnic groups.
- Recent policies to improve air pollution have also reduced the inequality in exposure between different ethnic groups.
- The highest concentrations of nitrogen dioxide experienced in each group have substantially reduced since 2013. The largest reductions have been for non-white groups and so the differences between non-white and white groups are now much smaller.
- The range in the highest nitrogen dioxide concentrations across ethnic groups has reduced by 74 per cent between 2013 and 2019.

The Updated Analysis of Air Pollution Exposure in London found that in 2010, there were 1777 primary schools in London of which 433 were in locations where average concentrations exceed the NO₂ UK limit value. However, recent data published by the London Atmospheric Emissions Inventory (LAEI) in 2019 shows that there are now only 20 schools still located in areas exceeding the legal limits for NO₂¹³⁴.

Further baseline information in relation to air quality is detailed in Section 2 Environment Baseline.

3.4.2 Climate

Climate change and air pollution are closely linked because the sources of air pollutants are also often the sources of climate change agents. In addition to greenhouse gases such as CO₂, the other major atmospheric pollutant that can affect the climate is PM, which can either heat or cool the climate depending on the size and composition of the PM¹³⁵. Petrol and diesel vehicles release air pollutants via both exhaust emissions associated with the burning of hydrocarbons, and non-exhaust emissions associated with resuspension of dust from the road surface, and tyre and brake wear¹³⁶. Due to the close relationship between air quality and climate change, and policy measures to improve air quality can also help to improve climate change, and vice versa.

Climate change presents a substantial risk to London, through increased temperatures and changing rainfall patterns. These factors will increase the risk of floods, droughts and heat waves. London is experiencing hotter and drier summers that are further impacted on by the Urban Heat Island effect (UHI). The UHI can cause London

¹³⁴ London Atmospheric Emissions Inventory (2019). Schools exceeding NO₂ legal limit of 40µg/m³ and the WHO interim PM_{2.5} guideline of 10µg/m³. Available at: <https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2019> Accessed May 2022.

¹³⁵ Akasha, Ghaffarpassand and Pope (2021). Climate Change and Air Pollution. Available at: https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/16600/962_Climate_Change_and_Air_Pollution.pdf?sequence=3&isAllowed=y Accessed May 2022.

¹³⁶ Ibid.

to be up to 10°C warmer than neighbouring rural areas as a result of the sun's rays being absorbed by hard surfaces rather than by vegetation such as trees, plants and grass.¹³⁷

Extreme heat can trigger dehydration, fatal heat exhaustion or heat stroke, which occur when a person's body cannot cool itself enough. Heat stress can also kill by exacerbating underlying conditions, such as cardiovascular and cerebrovascular disease, diabetes, chronic obstructive pulmonary disease, pneumonia and asthma, and increased mortality¹³⁸. An increase in the occurrence of heatwaves exacerbated by the UHI affects the most vulnerable people in society the most, particularly older people, young children, disabled people and people with pre-existing health conditions. New research from University College London (UCL) indicates that the risk of death during hot weather is most likely in the outskirts of London, where many homes are at risk of overheating, rather than in the city centre, where outdoor temperatures are generally higher. The study found that Heat-related mortality may be highest in outer London due to the greater older population and certain housing types can double the risk of occupants' heat mortality relative to the average domestic building, e.g. poorly insulated bungalows, or top-floor flats¹³⁹. During hot weather it is estimated that the London UHI causes around eight deaths per day¹⁴⁰.

Climate change is also an equality issue, including for Black, Asian and minority ethnic groups and people on low incomes and living in deprived areas. A recent study on the effects of the UHI on different socio-economic groups found that in most (72 per cent) cases, poorer neighbourhoods experience elevated heat exposure, an incidental consequence of the intra-city distribution of income in cities¹⁴¹. Poorer neighbourhoods are less likely to have shaded areas and green space than more affluent ones, meaning that deprived communities are more exposed to the effects of the UHI. People living in deprived areas are also more likely to have underlying health conditions making them more vulnerable to the effects of the UHI.

3.4.3 Active Travel

Active travel is a key mode of transport in London and is the main source of physical activity for Londoners. Walking, cycling and public transport allow people to be more physically active compared to car use, with the average amount of time spent physically active per journey being less than 1 minute for car trips; 8 minutes for bus trips and 15 minutes for rail trips; 17 minutes for walking trips; and 22 minutes for cycling trips (Mayor of London, n.d).

There is strong evidence to suggest that physical activity can help prevent some diseases particularly cardiovascular and cerebrovascular disease, certain cancers – which are the leading causes of premature death in the UK – as well as Type-2 diabetes and obesity. The UK is currently experiencing an epidemic of obesity and physical activity, in England nearly a quarter of adults are classified as obese, and two-thirds are obese or overweight. According to the Office for Health Improvement and Disparities (OHID) the percentage of active adults is lower in London (65.2 per cent) compared to the England average of 66.4 per cent. Levels of physical activity in London had been increasing incrementally from 2016 to 2019¹⁴² however this has decreased again since 2020¹⁴³ likely to be as a result of the Covid-19 pandemic. However, the percentage of adults classified as overweight or obese in the London region (55.7 per cent) is still lower than the national average of 62.8 per cent. Research by Sport England found that in England, physical activity levels among both the most and least affluent socio-economic groups have seen a clear drop since the start of the pandemic; however this drop is greater among the

¹³⁷ Greater London Authority (n.d). Heat. Available at: <https://www.london.gov.uk/what-we-do/environment/climate-change/climate-adaptation/heat#:~:text=The%20UHI%20can%20cause%20London,into%20the%20air%20as%20heat>. Accessed May 2022

¹³⁸ Hsu, A., Sheriff, G., Chakraborty, T. et al. Disproportionate exposure to urban heat island intensity across major US cities. *Nat Commun* 12, 2721 (2021). <https://doi.org/10.1038/s41467-021-22799-5>

¹³⁹ ARCC (2016). Can we predict the location of overheating -related deaths? Available at: <https://www.arcc-network.org.uk/can-we-predict-the-location-of-overheating-related-deaths/> Accessed May 2022.

¹⁴⁰ Ibid.

¹⁴¹ Hsu, A., Sheriff, G., Chakraborty, T. et al. Disproportionate exposure to urban heat island intensity across major US cities. *Nat Commun* 12, 2721 (2021). <https://doi.org/10.1038/s41467-021-22799-5>

¹⁴² In relation to the per cent of adults active at least 150 minutes per week.

¹⁴³ Sport England (2022). Active Lives Adult Survey November 2020 – 21 Report.

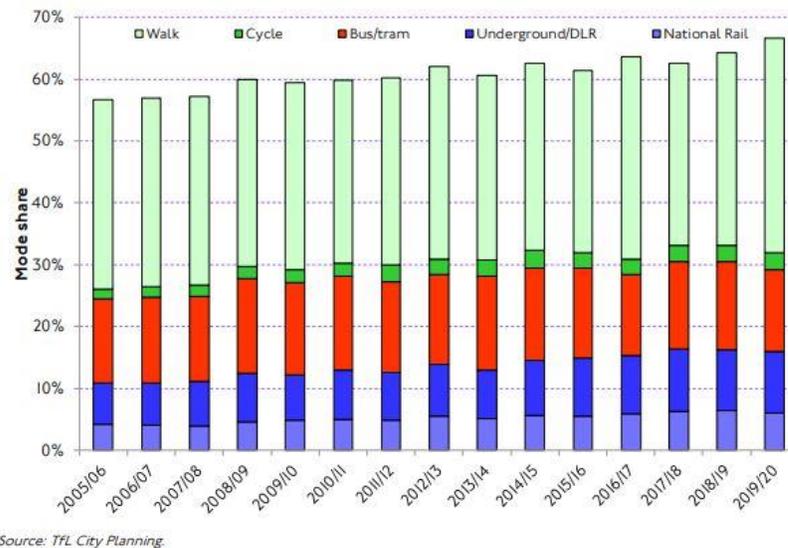
least affluent, down 1.7 per cent compared to the years 2018 – 2019¹⁴⁴. In general, the population is thought to be 20 per cent less active than in the 1960s ¹⁴⁵.

The Mayor’s Transport Strategy sets the aim for all Londoners to travel actively for at least 20 minutes every day by 2041. UK Chief Medical Officers recommend that adults should do at least 150 minutes per week of moderate to vigorous physical activity, which aligns with the current aim for all Londoners to achieve 20 minutes of active travel per day. However, new evidence shows that health benefits are gained from even very short periods of physical activity, and therefore the guidance no longer states that activity needs to be done in minimum periods of ten minutes.

In addition to the health benefits gained from use of sustainable and active travel modes, use of these modes can have other implications for people’s physical and mental health. Community severance¹⁴⁶ resulting from traffic congestion can lead to increased distances to workplaces and community facilities such as schools, parks, religious centres, and health services. For older people, the road network can contribute considerably to feelings of isolation and low levels of independent mobility. Removing severance by providing more attractive walking routes can therefore result in improved social cohesion and increased uptake of physical activity.

Trips in London made by walking and cycling have increased in recent years. Figure 3-6 from Transport for London’s Travel in London Report 13 (2020) illustrates the percentage mode share for active, efficient and sustainable modes of travel from 2000 to 2019. The active, efficient and sustainable mode share for 2019 was estimated to be 63.2 per cent, a 0.2 percentage point increase over 2018, and 3.6 percentage points higher than 2010¹⁴⁷. In 2019/20, 42 per cent of Londoners achieved 20 minutes of active travel per day, an increase of 3 percentage points on 2018/19.

Figure 3-6: Trip-based active, efficient, and sustainable mode share (London Travel Demand Survey) (Transport for London, 2020)



The Travel in London 14 Report¹⁴⁸ describes how the pandemic changed travel patterns within London, with demand during 2020 highly variable as a result of the onset of various lockdowns, which severely restricted

¹⁴⁴ Ibid.

¹⁴⁵ Public Health England (2016). Health matters: getting every adult active every day.

¹⁴⁶ The term ‘community severance’ describes the effects of transport infrastructure or motorised traffic as a physical or psychological barrier separating one built-up area from another built-up area or open space.

¹⁴⁷ TfL (2019). Travel in London Report 12. <https://tfl.gov.uk/corporate/publications-and-reports/travel-in-london-reports>

¹⁴⁸ TfL (2021). Travel in London Report 14. <https://tfl.gov.uk/corporate/publications-and-reports/travel-in-london-reports>

activity and travel. In 2020, the active, efficient and sustainable mode share decreased by 4.9 percentage points to 58.3 per cent, due to the effects of the coronavirus pandemic, primarily the large decrease in public transport trips, and in the context of substantially lower travel activity overall.

As illustrated in the Table 3-9 analysis, on average, people in inner London are more active than people in outer London. TfL's London Travel Demand Survey data shows that a smaller proportion of residents achieve at least 20 minutes active travel in outer London than in inner London. This aligns with data from the Active Lives Survey which shows that in general a smaller proportion of the population are achieving minimum physical activity guidelines (150 minutes per week) in outer London.

3.4.4 Public Transport

The EBIA baseline provides summary data for travel mode share and journey purpose into outer London. The data illustrates how the importance of road based travel increases in outer London and the adjacent areas, which can be seen as a reflection of the level of access to the public transport network along with other factors such as connectivity of different transport modes and the prevalence of lower-density developments.

Public Transport Accessibility Levels (PTALs) are a detailed measure of the accessibility of any point in Greater London to the public transport network, taking into account walk access time and service availability. Each lower super output area (LSOA) is graded between 1a and 6b with 1a being very poor access and 6b excellent access to public transport. There is a strong correlation between PTALs and the time taken to reach key services – i.e. high PTAL areas generally have good access to services and low PTAL areas have poor access to services.

Map 4 shows PTAL scores by LSOA in Greater London. As seen in Table 3-10, inner London has higher levels of accessibility than Outer London. The lower the PTAL score the more difficult it may be to switch modes from private car to public transport.

Table 3-10: London Areas and the respective number and percentage of LSOAs with low PTAL scores

Area	Number of LSOAs with low PTAL scores (1-2)	Percentage of total LSOAs (4,835)
Inner London boroughs	258	5.3 per cent
Outer London boroughs	2085	43.2 per cent

There are several key transportation hubs around outer London used by people to access inner London for employment and other purposes. These locations provide connectivity between different modes of active travel and public transport and are key interchanges between central, outer and inner London. Some examples and the types of public transport available at these hubs include:

- Stratford (east London) - train / tube / bus;
- East Croydon (south London) train, tram, bus;
- Surbiton (south west London) express train service into central London;
- Heathrow (south west London) tube and train;
- Richmond upon Thames (south west London) tube, fast train, buses;
- Wimbledon (south London) tube, train, tram; and
- Tottenham Hale (north London) tube, train, bus.

Many people commute into London by rail for employment purposes. According to the rail passenger numbers and crowding statistics report¹⁴⁹, of the daily arrivals into London, 55 per cent occurred during the morning peak, indicating that a large proportion of rail journeys into London are for commuting to work.

Crowded train services can dissuade people from adopting rail as the preferred mode for their daily commute, due to poor journey amenity and the potential for stress and anxiety. This inward and outward flux of commuting passengers into London lends itself towards twice daily peaks in travel – pre and post working hours. Nearly 18.8 per cent of passengers were reported as standing on trains during peak hours. Notably, of the '10 busiest peak trains during the autumn period' listed within the rail passenger numbers and crowding statistics report¹⁵⁰, 8 of them involve travel either to or from London locations. Despite this, morning peak crowding in London 2019 (pre-pandemic) was at its lowest level since 2014, with approximately 3.5 per cent of passengers in excess of capacity on trains across both peaks in London. Despite growing demand, the report attributes extra capacity provided by new services and improved rolling stock as driving this overall fall in crowding. Notably, in 2019, London had more seat capacity on trains than that required by demand, during the 3-hour morning peak.

Currently 51 per cent of the TfL rail network – spanning London Underground, Docklands Light Railway System, London Overground, London Trams and TfL Rail services – is now step-free (refer to Map 6). Therefore half of stations are not fully accessible for people travelling with restricted mobility (PRM), including disabled people and people travelling with children aged under five or with a pram/buggy. 48 per cent of women travelling with children planned their journey with access to a lift in mind, significantly higher than the PRM sample overall (29 per cent). When TfL asked people to rank the London Underground for accessibility on a scale of 0–10, 28 per cent of women travelling as a PRM ranked it good to excellent (8–10), consistent with the overall result (29 per cent).

According to the Travel in London: Understanding our diverse communities report (2019), 84 per cent of disabled Londoners report their disability as limiting their ability to travel, 'reflecting that disabled Londoners travel less often than non-disabled Londoners (1.9 compared with 2.4 trips on an average weekday). This report also highlights that disabled Londoners are less likely to agree that 'TfL cares about its customers' in comparison with non-disabled customers. The most common modes of transport for disabled Londoners include walking (81 per cent), the bus (81 per cent) and in the car as a passenger (42 per cent)¹⁵¹.

Buses are an important mode of travel within outer London. The MTS sets out that buses play a key role in delivering the Healthy Streets approach, and are one of the most efficient uses of road space, as they can move 70 people in the same amount of space taken up by about three cars¹⁵². The removal of cars from the roads frees up street space and makes streets more attractive for active travel. Buses are also an affordable, reliable mode of transport that is accessible to all, including older and disabled people and those travelling with young children. There are accessible buses in operation across 700 London bus routes, all fitted with low-level floors, wheelchair ramps and audiovisual announcers. Disabled people that hold Freedom Passes can travel free of charge on all Transport for London buses, and registered assistance dogs are also welcome on-board. Buses are used frequently by older people and teenagers, with 65 per cent and 75 per cent respectively stating they use the bus at least once a week, compared to 59 per cent of all Londoners¹⁵³.

TfL has published several travel stories in relation to the accessibility of public transport for people with disabilities, available through the TfL website. Specifically in relation to crowding, one disabled passenger surveyed stated that 'Crowded areas can be a challenge. If there are too many people I just stop. It's like running out of petrol. The

¹⁴⁹ Department for Transport (2019). Rail passenger numbers and crowding on weekdays in major cities in England and Wales: 2019. Available at: <https://www.gov.uk/government/statistics/rail-passenger-numbers-and-crowding-on-weekdays-in-major-cities-in-england-and-wales-2019>

¹⁵⁰ Ibid.

¹⁵¹ Travel in London: Understanding our diverse communities, TfL (2019). Available at: <https://content.tfl.gov.uk/travel-in-london-understanding-our-diverse-communities-2019.pdf>

¹⁵² Mayor of London (2018). Mayor's Transport Strategy. <https://tfl.gov.uk/corporate/about-tfl/the-mayors-transport-strategy>

¹⁵³ TfL (2019a). Travel in London: Understanding our Diverse Communities 2019. Available at: <https://content.tfl.gov.uk/travel-in-london-understanding-our-diverse-communities-2019.pdf>

concourses during the rush hour are particularly daunting when people are moving in different directions.’ Another disabled passenger surveyed highlighted the importance of the Freedom Pass¹⁵⁴, stating that it ‘has made a big difference’¹⁵⁵. The Travel in London: Understanding our Diverse Communities Report (2019) highlights that ‘Freedom Passes are the most common ticket type used on TfL services by disabled Londoners (66 per cent)¹⁵¹.’

3.4.5 Community Transport

The community transport sector provides services across all London boroughs including day trips, school runs, access to medical appointments, and running a limited number of regular bus services. They ensure that those often excluded from the mainstream transport network are able to get to where they need to be and enable many London residents to live, work, learn and socialise in the way they would otherwise not be able to.

There are 27 Community Transport companies (CTCs) currently operating in Greater London¹⁵⁶. All of these are social enterprises or have a charitable status. The predominant form of vehicle used by these CTCs is the minibus (up to 16 seats, many of which are adapted for wheelchair use). Some of the CTCs are contracted by local authorities and NHS Clinical Commissioning Groups to provide transportation services for clients.

A Community Transport Survey was conducted to feed into the 2017 ULEZ Integrated Impact Assessment Report. This survey was delivered via email to all CTCs based in Greater London, of which there were 23 at the time, and a total of 15 responses were received. Notably, the majority of the responses stemmed from operators who owned or leased non-ULEZ compliant minibuses.

The survey results indicated that most petrol cars were compliant whilst diesel cars were generally Euro 5 or older and therefore non-compliant. Also, most of the older vehicles are owned (new or second hand) by the operators. This meant that the cost of vehicle replacement will be carried by the organisation. Small community transport operators did not have the additional funds to bring forward their fleet replacement plans in order to comply with the expanded ULEZ scheme implemented in 2021, as highlighted by several operators as part of the survey. 8 out of the 15 respondents could not reorganise their fleet deployment to minimise disruptions to their current operational fleet replacement cycle.

Alternative transport options that are currently available for disabled people include Dial-a-Ride and Taxicard. London Dial-a-Ride is a free door-to-door public transport service for passengers with mobility impairments who find it hard to use public transport. Dial-a-Ride provides a service that disabled people can use for leisure, visiting relatives and friends or going shopping. Dial-a-Ride cannot be used for daily trips to work, day centres and schools, and cannot accommodate trips to hospital and clinic appointments.

During stakeholder engagement undertaken in 2017 to inform the IIA for the expanded ULEZ it was highlighted that Dial-a-Ride cannot always accommodate all journey requests, especially for same day bookings, due to high levels of passenger demand.

Taxicard offers subsidised travel in licensed taxis and private hire vehicles (mini cabs) to London residents with serious mobility impairments or who are severely sight impaired. However, like Dial-a-Ride, the scheme provides trips for social purposes only, for example going shopping, visiting friends and family, and going out to events, meaning disabled people cannot use it daily to go to work or attend hospital appointments. In addition to this, stakeholders noted that Taxicard is best suited to short journeys in and around people’s local areas and can be expensive if people need to travel long distances.

Disabled Tax Registered Vehicles

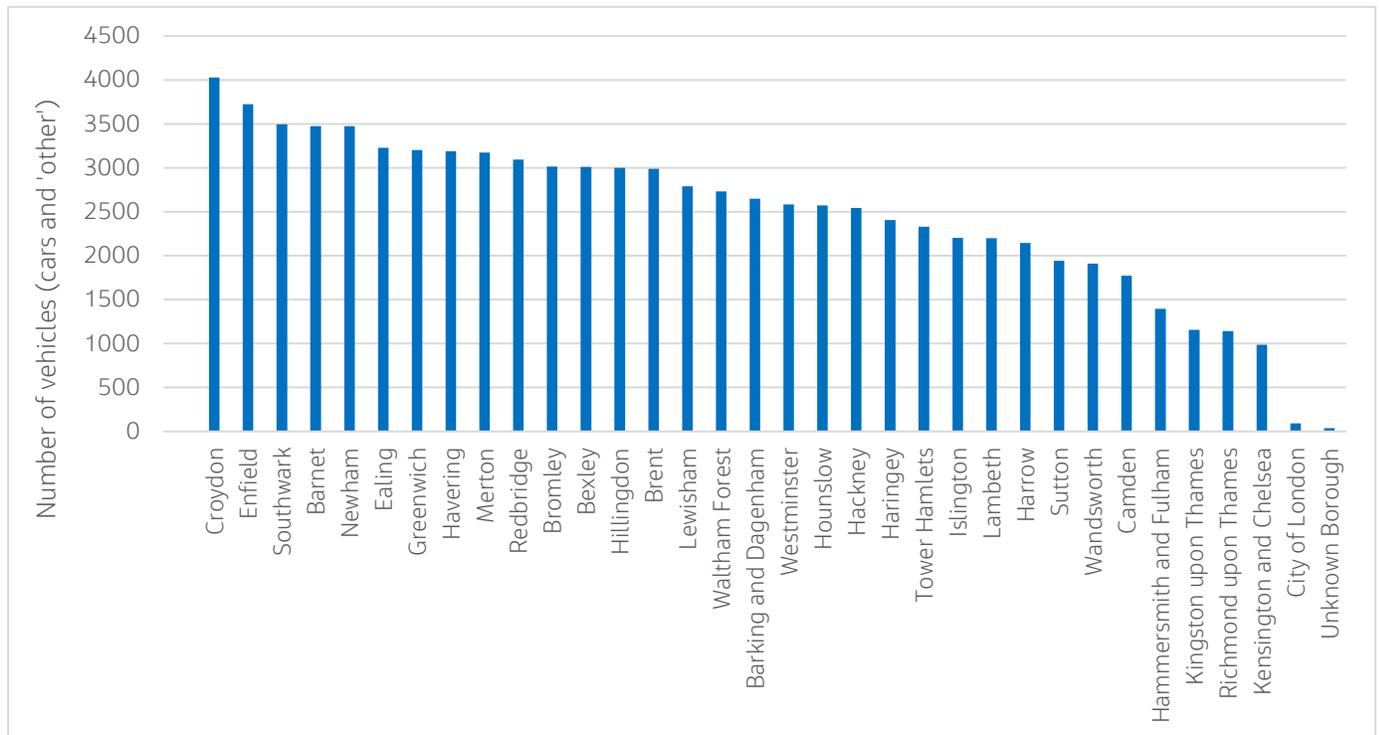
¹⁵⁴ The Freedom Pass allows free or discounted travel on a range of transport services across London. There are two variations of the Freedom Pass including the disabled person’s freedom pass and the Older Person’s Freedom Pass.

¹⁵⁵ Accessible Travel Stories, TfL (n.d.). Available at: <https://tfl.gov.uk/transport-accessibility/accessible-travel-stories>

¹⁵⁶ TfL (2022). Community Transport. Available at: <https://tfl.gov.uk/transport-accessibility/community-transport>

'Exempt: Disabled' vehicles are those that are exempt from tax, so long as they are used by disabled people claiming the higher rate of the mobility component of Disability Living Allowance, War Pensioners Mobility Supplement or have an invalid carriage¹⁵⁷. The numbers of Exempt: Disabled vehicles for each of the London boroughs (including the City of London and 'unknown boroughs') are displayed in Figure 3-7. There are 83,675 'Exempt: Disabled' vehicles registered in Greater London, including cars and other vehicles.

Figure 3-7: Number of Exempt: Disabled Vehicles in London (DfT, 2020)



Overall, a greater proportion all of Exempt: Disabled vehicles within London are registered to outer London (67 per cent) than inner London (33 per cent). The borough having the largest number of Exempt: Disabled vehicles is Croydon with circa 4000 vehicles, closely followed by Enfield which has circa 3700 Exempt: Disabled registered vehicles

It is recognised that some Blue Badge holders may not qualify for vehicle tax exemptions. When people are assessed for Personal Independence Payment (PIP), people with mobility issues can either get the mobility component of PIP at a standard or at an enhanced rate. People with mobility issues who score between 8 and 11 points in total, qualify for the standard rate of the PIP mobility component and therefore qualify for a Blue Badge but not a vehicle tax exemption. People need to score 12 points to qualify for the enhanced rate and quality for a vehicle tax exemption.

During stakeholder engagement workshops participants highlighted that there are many people with severe physical impairments who score 10 or 11 but do not reach the 12 points required for the enhanced rate. People only score 10 when they:

- cannot follow the route of an unfamiliar journey without another person, assistance dog or orientation aid;

¹⁵⁷ Licensed Vehicles – Numbers, Borough, DfT (2020). Available at: <https://data.london.gov.uk/dataset/licensed-vehicles-numbers-borough>

- cannot undertake any journey because it would cause them overwhelming psychological distress;
- can stand and then move using an aid or appliance more than 20 metres but no more than 50 metres.

Motability Scheme

If a disabled person receives one of four qualifying benefits at a higher level they can use it to lease a new car, scooter or powered wheelchair on the Motability Scheme. Motability currently has over 640,000 UK customers on the Car Scheme, of which more than 50,000 are in Greater London. The Car Scheme includes standard production cars which may or may not include post manufacture adaptations. Cars are typically leased on a three-year basis. At the end of the lease most customers choose to enter into a new lease on a new vehicle. It is possible for customers to purchase their ex-Scheme vehicle, but this is very uncommon.

Over the past decade many features required by disabled drivers, which would previously have been post production adaptations, are now part of manufacturer's vehicle specifications. 10 per cent of disabled drivers require further vehicle specific adaptations post manufacture to enable the customer to drive safely and in comfort.

This includes Wheelchair Accessible Vehicles (WAVs) where customers access and travel in the vehicle while seated in their wheelchair. These vehicles fall into two categories: Passenger WAVs, where the customer travels as a passenger, generally in the rear of the vehicle; and Drive From Wheelchair WAVs where the customer drives the vehicle while seated in their wheelchair. These latter vehicles generally require significant conversion to allow wheelchair access to the driving position and frequently require further adaptations including driving controls. It follows that these vehicles are very expensive. Within Greater London approximately 2,000 cars on the scheme are WAVs. Scheme leases are usually three years for standard production cars and five years for WAVs.

Customers pay for their vehicle by assigning the appropriate disability benefit to the Motability Scheme. If a customer requires a larger / more expensive / adapted vehicle that is covered by an Advance Payment payable in a lump sum at the start of a lease to top up the monthly payments. As a charity, Motability provides means tested support to eligible customers to allow them access to a vehicle that meets their specific disability related needs which includes assistance with any Advance Payment. As WAVs are expensive, many of them are supported by a Grant provided by Motability. A Drive from Wheelchair WAV has an average mean advance payment of £21,000 in addition to the five years disability allowance. The majority of Drive from Wheelchair WAVs have Grant support from Motability. WAVs are almost entirely based on van bodies. These range from small vans such as the Citroen Berlingo or Fiat Doblo up to Mercedes Sprinter or Renault Master.

3.4.6 Car ownership and compliance

In 2020 there were 713,500 cars registered to owners in inner London and 1,933,500 cars registered in outer London, and 2,648,100 cars registered to owners in Greater London overall¹⁵⁸. The data presented in Table 3-11 illustrates the greater reliance on private vehicle in the outer London area when compared to inner London and Greater London.

Table 3-11: Car Ownership in Inner, Outer and Greater London Per Capita of Population

Area	Cars Registered	Total Population ¹⁵⁹	Car Ownership Per Capita of Population
Inner London boroughs	713,500	3,665,500	0.19

¹⁵⁸ DfT (2020). Data on all licensed and registered vehicles, produced by Department for Transport. Available at: <https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01> (Accessed 07/05/21).

¹⁵⁹ GLA Population Projections: Custom Age Tables (2020) <https://data.london.gov.uk/dataset/gla-population-projections-custom-age-tables>

Area	Cars Registered	Total Population ¹⁵⁹	Car Ownership Per Capita of Population
Outer London boroughs	1,933,500	5,360,800	0.36
Greater London	2,648,100	9,026,300	0.29

Map 7 and Map 8 illustrates the existing levels of compliance within the GLA relative to income deprivation, for cars and for all vehicles respectively. As shown the levels of compliance of registered vehicles within the existing ULEZ boundary are generally high, at over 72 per cent, with areas of lower compliance in the north and east of inner London which correspond with areas of high deprivation (e.g. Hackney, Newham). Outer London has large areas with lower levels of compliance (62 – 72 per cent), which also correspond with areas of high deprivation in the north and east (including Hounslow, Ealing, Brent, Barking and Dagenham, north Croydon, southern Kingston upon Thames, south Havering and north Bexley). The lowest levels of compliance (58-67 per cent) are shown in Hounslow.

3.4.7 Access to health and social care services and other social infrastructure

Barriers to transportation can prevent people from accessing healthcare and other social infrastructure. Studies suggest transport is often cited as a barrier to healthcare access, with consequences including rescheduled or missed appointments, delayed care, and missed or delayed medication use. Such consequences of transport barriers correspond to poorer health outcomes¹⁶⁰. According to the Department for Transport, 'over the course of a year around 1.4 million people miss, reject, or choose not to seek healthcare due to transport problems'¹⁶¹. In particular for people without access to a car, the lack of available and affordable public transport limits healthcare accessibility. This risks impacts on the health of patients resulting from missed appointments, late diagnoses and treatment not being sought.

People with disabilities reported worse access to healthcare than the general population, with financial cost, long waiting lists, and transport as the major barriers¹⁶². These findings are concerning as they demonstrate that a section of the population, who may have higher healthcare requirements, face increased barriers in accessing services. The NHS reimbursement scheme introduced as part of the existing ULEZ scheme was introduced as a means of offsetting the cost for patients who rely most of on the healthcare system, thereby aiming to remove the financial barrier and/or accessibility barrier for those not easily able to use other modes.

People with poor access to public transport living in less connected areas are likely to be vulnerable to impacts on accessibility of local and social facilities, as they may not be able to easily access public transport or be able to use active travel means. This is more common among people on low incomes, disabled people and older people. Having easy access to local shops and services, and green spaces to walk or play in, are determinants of health, and are important in helping people to live healthier and happier lives¹⁶³. Research demonstrates that leisure activities can have a positive impact on individuals' physical and mental health because it serves as way of coping with daily stressors and difficult life events¹⁶⁴.

¹⁶⁰ Traveling Towards Disease: Transportation Barriers to Health Care Access, Syed et al., (2013), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4265215/>

¹⁶¹ Social Exclusion Unit. (2003) Making the Connections: Final Report on Transport and Social Exclusion

¹⁶² Sakellariou, Dikaios and Rotarou, Elena. (2017). Access to healthcare for men and women with disabilities in the UK: secondary analysis of cross-sectional data. *BMJ Open*, 7(8), p.e016614.

¹⁶³ Randall, C., Measuring National Well-being, where we Live. (2012). Office for National Statistics Department for Communities and Local Government, 2008, Place survey

¹⁶⁴ Caldwell, L.L., 2005, Leisure and health: Why is leisure therapeutic?

The domiciliary care sector provides an important function as part of the health care system, and many carers rely on private vehicles to travel to and between the homes of their service users. This is particularly true in outer London, where public transport is less frequent and accessible than in inner and central London.

In the years 2020/2021, the adult social care sector and workforce in London comprised 219,900 people¹⁶⁵. Staff vacancy rates decreased during the Covid-19 pandemic in 2021, and since March 2021 the vacancy rate has returned to pre-pandemic levels, suggesting that the fall in jobs is related to recruitment and retention difficulties rather than a decrease in demand.

According to a report published by London Councils¹⁶⁶, the ageing population and increase in prevalence of chronic diseases, adult social care services have been facing increasing challenges and pressures, even before the coronavirus pandemic. In addition, the report highlights that the Care Quality Commission (CQC) report (2020) recorded admissions to care homes falling by more than 25 per cent amongst publicly funded clients, and by two thirds amongst self-funders. This made it difficult for providers to continue operating. Should this trend continue, financial pressures will increase on the care market which may result in closure of some residential and nursing homes.

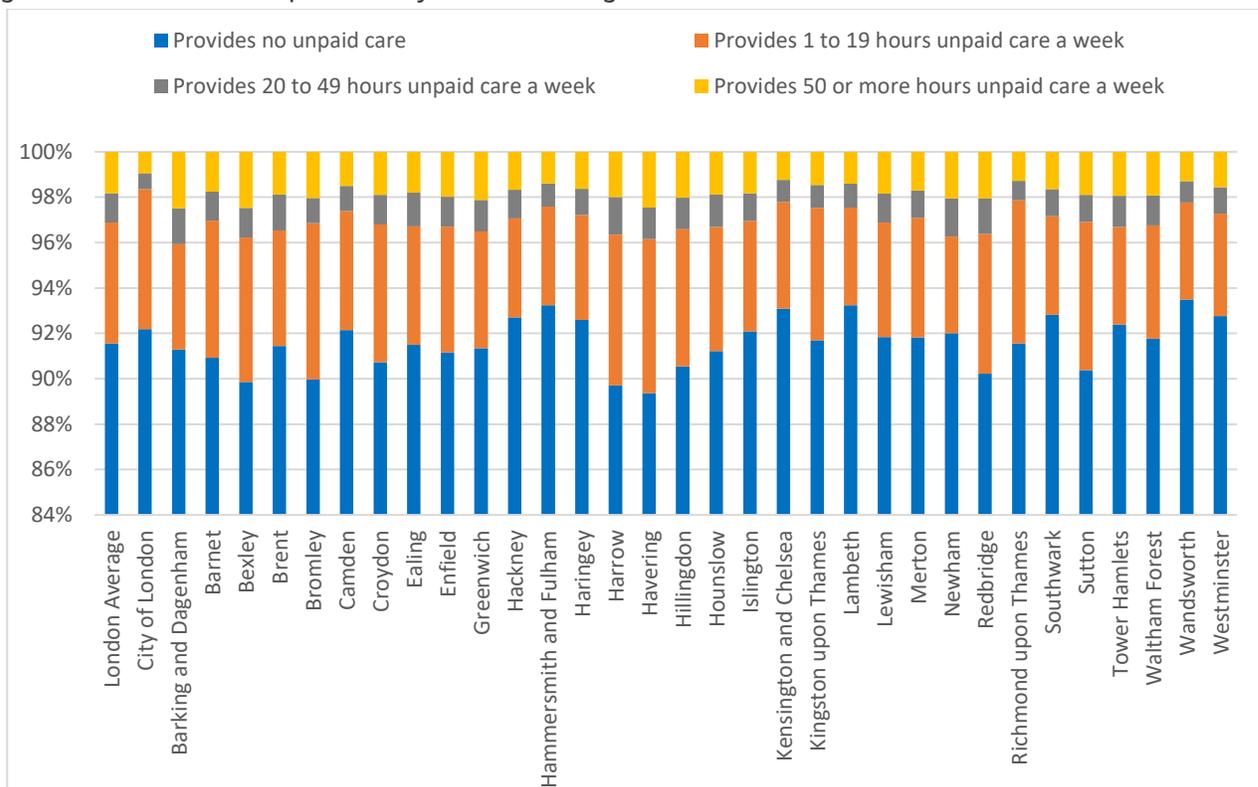
London also relies heavily on unpaid carers, with the 2011 census indicating that over 687,000 Londoners spend at least an hour a week caring for someone¹⁶⁷. The proportion of provision of unpaid care for the boroughs within outer London is shown in Figure 3-8. Of those people who do provide care, across the boroughs, 62 per cent of those surveyed provided 1 to 19 hours, 16 per cent provided 20 to 49 hours and 22 per cent provided 50+ hours of unpaid care a week.

¹⁶⁵ Skills for Care (2020). The adult social care sector and workforce. Available at: <https://www.skillsforcare.org.uk/adult-social-care-workforce-data/Workforce-intelligence/documents/Regional-reports/London.pdf> (Accessed 23/05/21).

¹⁶⁶ London Councils (2019). State of Adult Social Care in London

¹⁶⁷ Mayor of London (2022). Who Cares? Helping London's Unpaid Carers. Available at: <https://www.london.gov.uk/node/52970#:~:text=Nonetheless%2C%20London%20has%20the%20third,100%2C000%20children%2C%20provide%20unpaid%20care.>

Figure 3-8: Provision of unpaid care by London Borough



Through stakeholder engagement with Homecare Association the following information was gathered regarding provision of care within London, the travel patterns of carers and the impact of the existing ULEZ scheme:

- 70 per cent of care delivered in London is commissioned by Councils or the NHS.
- In 2021, Homecare Association undertook a Freedom of Information request and found that the average fee rate paid for an hours' homecare delivery in London by Councils was £17.99. Despite the high cost of living in the capital, this is lower than the average for England which was, in 2021, £18.54.
- Homecare Association calculated that in order to pay minimum wage to care workers, and to cover sick pay, training, travel time and expenses and management costs, office costs, telecoms, and other necessary operational overheads providers would have needed £21.43 per hour; only three Councils in London paid this. It is noted that fuel prices and other costs have risen significantly since this research was undertaken.
- Anecdotally, following the latest ULEZ expansion (in October 2021), Homecare Association have heard from members that they have not received any increase in rates from commissioners in London to reflect any costs related to this or to support care workers/care providers with transitioning to compliant modes of transport.
- While providers in central and inner London may be able to provide care using a combination of active transport and public transport; transport links on the outer edges of Greater London are simply not as good and distances to travel are longer. Using public transport has also not been ideal for care workers when Covid-19 rates are very high from an infection control perspective.
- Typically, (though there are exceptions) care workers drive their own vehicles and are reimbursed mileage etc. by their employer. With recent petrol price increases, this is already a hot topic.
- There remain barriers to electric vehicle usage including initial costs (when care workers are often on low pay) and many people will live in flats or accommodation with on-street parking that does not have easy access to vehicle charging at home. There are also costs involved in transitioning to ULEZ compliant cars.

3.4.8 Access to employment

Being in employment is related with social and psychological wellbeing, with work being one of the core aspects of individual identity and social status¹⁶⁸. Unemployment is an important risk factor for poor physical and mental health and is a major contributor to health inequalities within society. Cumulative material wealth provides increased opportunities for participation in society and can improve access to healthier lifestyle choices, which are directly linked with improved physical and mental health.

According to the Marmot Review: 10 Years On¹⁶⁹, unemployment rates have generally decreased from the preceding decade but increases in employment have often been in low-paid, unskilled, self-employed, short-term, or zero-hours contract jobs. The latest available data for London's Poverty Profile demonstrates high levels of in-work poverty¹⁷⁰ in London, with 9 per cent of families where all adults work full time living in poverty, in comparison with 6 per cent ten years ago¹⁷¹. For individuals living in families where one or more adults work part-time it is 49 per cent, compared with 41 per cent a decade ago.

Zero hours contracts are contracts that do not guarantee a minimum number of paid hours. They are an insecure form of income which is often detrimental to health, particularly for those where the salary is also low. Research has found that at age 25, people on zero hours contracts and those who were unemployed were less likely to report feeling healthy in comparison to people in more secure employment, and also more likely to report psychological distress¹⁷². In London more than three quarters of those working on zero hours contracts earned less than the London living wage¹⁷³. Furthermore, there are higher numbers of individuals on these types of contracts in lower skilled and lower paid jobs compared to higher skilled and better paid occupations. The negative health impacts of zero hours contracts will be higher in manual occupations, contributing to increased health inequalities. Anxiety, stress and depression can be common for workers on zero-hours contracts because of the financial and social insecurity, and the nature of the work can also result in a lack of sufficient sleep, poor eating habits and relationship problems¹⁷⁴. There are also age differences, with a larger number of 16–24-year-olds and over-65s on zero hours contracts in comparison to other age groups.

In Greater London in the years 2020–21, 74.5 per cent of people are in employment, similar to the 75.1 per cent English average, as indicated in Table 3–9. Both outer and inner London have similar proportions of people in employment, with inner London having a marginally higher percentage (75.1 per cent - equal to the English average) compared with outer London (73.9 per cent - lower than the English average). The London borough with the smallest percentage of people in employment is Barking and Dagenham, at 63.2 per cent. Out of all London boroughs there are only four which exhibit levels of employment less than 70 per cent (and circa 5 per cent less than the English average): Barking and Dagenham (63.2 per cent), Brent (69.2 per cent), Enfield (65.5 per cent), and Harrow (68.5 per cent). All of these four London boroughs are situated in outer London.

Inequalities in the labour market exist between white people and Black, Asian and minority ethnic people. White people in London are more likely to be in employment (79.5 per cent) than any other ethnic group, closely followed by Indian people (78.2 per cent). People of a Pakistani/ Bangladeshi ethnicity are least likely to be employed (59.4 per cent) and 68 per cent of Black, Asian and minority ethnic people as a group overall are employed in London, indicating significant disparities in economic outcomes across ethnic groups. There are a number of reasons for

¹⁶⁸ Waddell, G., Burton, A. K. (2007). Is work good for your health and well-being?, The Stationery Office

¹⁶⁹ Marmot et al (2020). The Marmot Review: 10 Years On. Available at: <https://www.health.org.uk/publications/reports/the-marmot-review-10-years-on>

¹⁷⁰ In-work poverty occurs when a working household's total income does not meet their needs.

¹⁷¹ Trust for London (2020). London's Geography and Population. Available at: <https://www.trustforlondon.org.uk/data/geography-population/>

¹⁷² University College London (2017). Being on a zero hours contract is bad for your health. Available at: <https://www.ucl.ac.uk/ioe/news/2017/jul/being-zero-hours-contract-bad-your-health-new-study-reveals#:~:text=They%20found%20that%20at%20age,reporting%20symptoms%20of%20psychological%20distress.>

¹⁷³ Durcan, D (2015). Local action on health inequalities: Promoting good quality jobs to reduce health inequalities. Public Health England/ Institute of Health Equity.

¹⁷⁴ The Conversation (2019). Zero-hour contracts take huge mental and physical toll. Available at: <https://theconversation.com/zero-hour-contracts-take-a-huge-mental-and-physical-toll-poor-eating-habits-lack-of-sleep-and-relationship-problems-119703#:~:text=But%20research%20has%20demonstrated%20how%20detrimental%20zero-hour%20contracts,contracts%20because%20of%20the%20financial%20and%20social%20insecurity.>

different levels of employment among the Black, Asian and minority ethnic community, such as less access to education and economic opportunities, discrimination and racism during the job application process, and cultural factors such as women taking on a care-giving role at home and therefore not entering the labour market¹⁷⁵.

Women are more likely to be employed in low-paid jobs or to work part time or zero-hours contracts than men. According to a briefing from the UK Women's Budget Group¹⁷⁶, they account for 70 per cent of low earners, and make up the majority of part time workers (73 per cent) or zero-hours contracts (53.6 per cent). Women make up 81 per cent of the adult social care sector and workforce in London¹⁷⁷ and 76.7 per cent of the total NHS workforce in England¹⁷⁸. Women are also more likely to be employed in lower paid roles within the NHS, with the latest figures showing that the average monthly basic pay for all NHS staff was £3,406 for men and £2,644 for women¹⁷⁹. Women from each ethnic group were paid less than their male counterparts among medical staff; this was also true for non-medical staff, apart from for the Black and Other groups, where women were paid more than their male counterparts¹⁸⁰. People with disabilities are more likely to be unemployed than people without disabilities, reporting a number of barriers to work, such as difficulties with transport, the attitudes of employers or colleagues, anxiety or lack of confidence, and issues relating to access and support¹⁸¹. A report funded by Trust for London, found that the employment rate for Disabled people in London is 46.5 per cent. Around 400,000 Disabled Londoners are unemployed, and in some boroughs, only a quarter of Disabled people are working. People with mental health problems, who make up almost a third of all Disabled people in London, are most likely to be unemployed¹⁸².

Within the taxi and PHV sector of employment, statistics show there is a disproportionate representation of Black, Asian and minority ethnic people, particularly of Asian ethnicity. The two main ethnic groups of drivers were White and Asian or Asian British in 2020/21, making up 43 per cent and 44 per cent of drivers respectively. This compares to 63 per cent and 29 per cent respectively in 2009/10. Additionally, men make up 93 per cent of the taxi/PHV workforce. Drivers are also more likely to be within older age groups: in 2020/21 the average age of a driver was 48 years old, with 22 per cent of drivers being aged under 40. Those aged 60 or over made up 20 per cent of drivers.

A vast cohort of London's population is employed within the transportation sector, and many are reliant on vehicles to undertake their work. As of 17 April 2022, TfL reported that there were 14,761 taxi vehicle and 81,282 private hire vehicle licences active within the GLA¹⁸³. London taxis are exempt from the existing ULEZ charge and London PHVs are currently 97 per cent compliant with ULEZ.

While there is a lack of systemic data on Gypsy and Traveller employment, anecdotal evidence suggested that unemployment levels are comparatively high among this demographic group due a range of factors. Educational exclusion is more likely to affect the Gypsy and Traveller community than the general population, generally due to leaving school at a young age, resulting in high levels of illiteracy and lack of basic numerical skills¹⁸⁴. Additionally, Gypsy and Traveller communities can often be financially excluded – from, for example, not having a

¹⁷⁵ Race Equality Foundation (2021). Employment Briefing Paper. Link

¹⁷⁶ Women's Budget Group (2018). Women, Employment and Earnings. Available at: <https://wbg.org.uk/wp-content/uploads/2018/10/Employment-November-2018-w-cover.pdf>

¹⁷⁷ Skills for Care (2020). The adult social care sector and workforce. Available at: <https://www.skillsforcare.org.uk/adult-social-care-workforce-data/Workforce-intelligence/documents/Regional-reports/London.pdf>

¹⁷⁸ NHS (2021). NHS celebrates the vital role hundreds of thousands of women have played in the pandemic. Available at: <https://www.england.nhs.uk/2021/03/nhs-celebrates-the-vital-role-hundreds-of-thousands-of-women-have-played-in-the-pandemic/> Accessed May 2022

¹⁷⁹ UK Government (2021) NHS Basic Pay. Available at: <https://www.ethnicity-facts-figures.service.gov.uk/workforce-and-business/public-sector-pay/nhs-basic-pay/latest> Accessed May 2022

¹⁸⁰ Ibid.

¹⁸¹ Equality and Human Right Commission (2013). Barriers to employment and unfair treatment at work. Available at: <https://www.equalityhumanrights.com/sites/default/files/research-report-88-barriers-to-employment-and-unfair-treatment-at-work-disabled-peoples-experiences.pdf> Accessed May 2022

¹⁸² Trust for London. (2020). London's Poverty Profile. Available at: https://trustforlondon.fra1.cdn.digitaloceanspaces.com/media/documents/Londons_Poverty_Profile_2020.pdf Accessed April 2022.

¹⁸³ Transport for London (2022) Licensing Information. Available at: <https://tfl.gov.uk/info-for/taxis-and-private-hire/licensing/licensing-information> Accessed May 2022

¹⁸⁴ Equality and Human Rights Commission (2009). Inequalities experienced by Gypsy and Traveller Communities: A review Available at: https://www.equalityhumanrights.com/sites/default/files/research_report_12inequalities_experienced_by_gypsy_and_traveller_communities_a_review.pdf [Accessed May 2022]

bank account due to a lack of permanent residence - resulting in economic exclusion and lack of support in job seeking¹⁸⁵.

3.4.9 Access to education

As set out in The Marmot Review, inequalities in educational outcomes affect physical and mental health, income, and quality of life. Affordable transport for young people and parents with school children, particularly from deprived backgrounds, is crucial in facilitating access to education and training opportunities. London enrolls a much higher proportion of pupils from disadvantaged backgrounds than the English average. Around one fifth of pupils in London are eligible for free school meals (FSM), which is used as a proxy for poverty¹⁸⁶. Research shows that children who do not receive FSM have higher attainment levels than those eligible for FSM¹⁸⁷.

Many young people and parents with children living in areas adjacent to Greater London travel to educational establishments in outer London. The origins and destinations of education trips made by non-London residents to Greater London, as well as the locations of educational establishments, are shown on Figure 3-9. The darker orange areas show the locations where the highest proportions of these trips originate, and the darker green areas show destinations in London where the highest proportions of trips are going to. The locations which non London residents are travelling to in London tend to be very close to the boundary, whereas the catchments outside of the boundary, particularly towards the northwest and southwest tend to be larger.

Even in areas with high levels of public transport accessibility or where families live close to school many parents still choose to take their children to school by car. A study looking at parents' reasons for choosing the car to take their children to school found that distance did not affect the decision to take the car, suggesting parents choose to drive regardless of their proximity to the school¹⁸⁸. The main factor was convenience and efficiency, and also concerns regarding safety and security for younger children. Spending time together with the children in the car was also important, as for some parents this would be one of the few times a day they would get to make plans with their children and hear about their day¹⁸⁹.

¹⁸⁵ Ibid.

¹⁸⁶ Mayor of London (2020). Mind the Gap: Rising educational inequality for young Londoners. Available at: <https://www.london.gov.uk/about-us/london-assembly/london-assembly-publications/mind-gap-rising-educational-inequality-young-londoners> Accessed May 2022

¹⁸⁷ Ibid.

¹⁸⁸ Westman, J., Friman, M., & Olsson, L. E. (2017). What Drives Them to Drive?-Parents' Reasons for Choosing the Car to Take Their Children to School. *Frontiers in psychology*, 8, 1970. <https://doi.org/10.3389/fpsyg.2017.01970>

¹⁸⁹ Ibid.

- Fourteen per cent of women report experiencing some form of unwanted sexual behaviour while travelling in London in the previous year (the equivalent figure for men is 6 per cent).

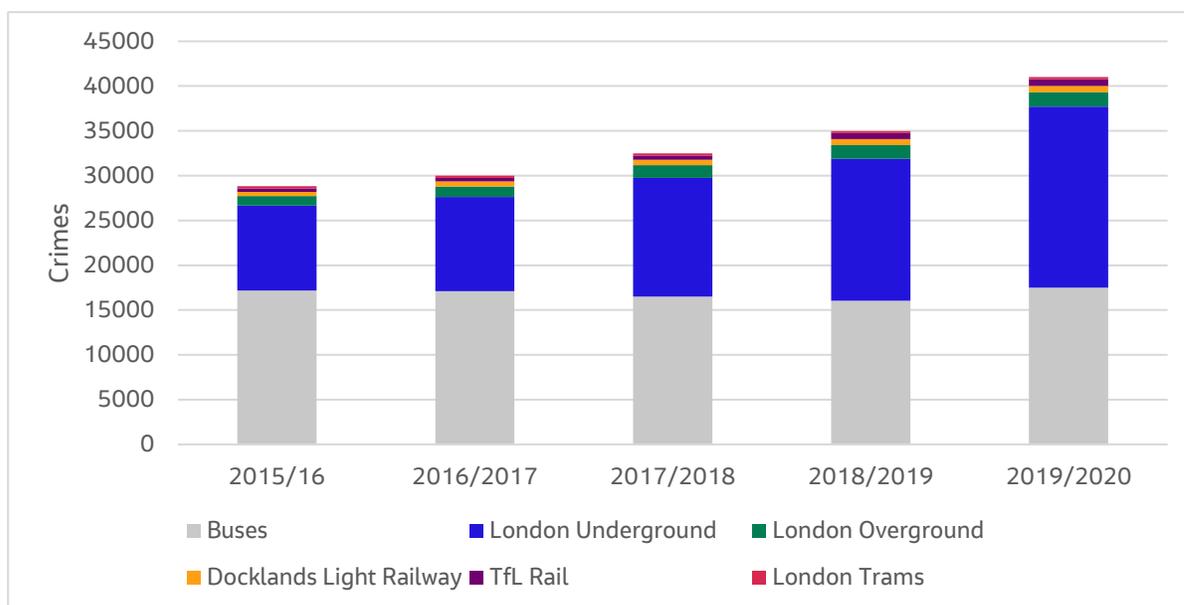
Women surveyed cited crime and personal safety as a barrier to using public transport more often, as well as concerns about anti-social behaviour; fear of crime on the bus/train and getting to the bus/train; fear of terrorist attacks; and risk of accidents.

According to the FS13 Future of Transport – Equalities and access to opportunity report¹⁹², sexual orientation may be a factor in people’s decisions regarding the use of specific transport modes or routes. The 2018 National LGBT survey highlights that LGBTQ+ respondents avoid being open about their sexual orientation on transport, and that public transport is considered an ‘unsafe space’ that may be altogether avoided by the LGBT+ community. The report also highlights that, along with younger women and disabled passengers, LGBT+ users of the London public transport network are more likely to experience unwanted sexual behaviours when using public transport resulting in anxiety and worry regarding the safety of public transport amongst this group. Increased likelihood of harassment or acts of discrimination amongst the LGBTQ+ community (in addition to disabled people, women, people from a Black, Asian and minority ethnic background, and religious groups) means that these groups are therefore more likely to be impacted by both perceived and actual threats to personal safety whilst utilising transport.

According to Travel in London: Understanding the needs of our diverse communities’ LGBT+ Londoners were more than four times likely than heterosexual Londoners to cite sexual orientation’ as the perceived motivation for incidents of hate crime experienced or witnessed on public transport (41 per cent compared with 9 per cent)¹⁵¹.

Figure 3-10 highlights a yearly breakdown in crimes associated with the various means of public transport within London between 2015/16 and 2019/20. These data indicate that the majority of crimes occur on either the London Underground or the bus networks, and that the occurrence of crime has increased each year for the past 5 years.

Figure 3-10: Crime on public transport 2015/16 - 2019/20



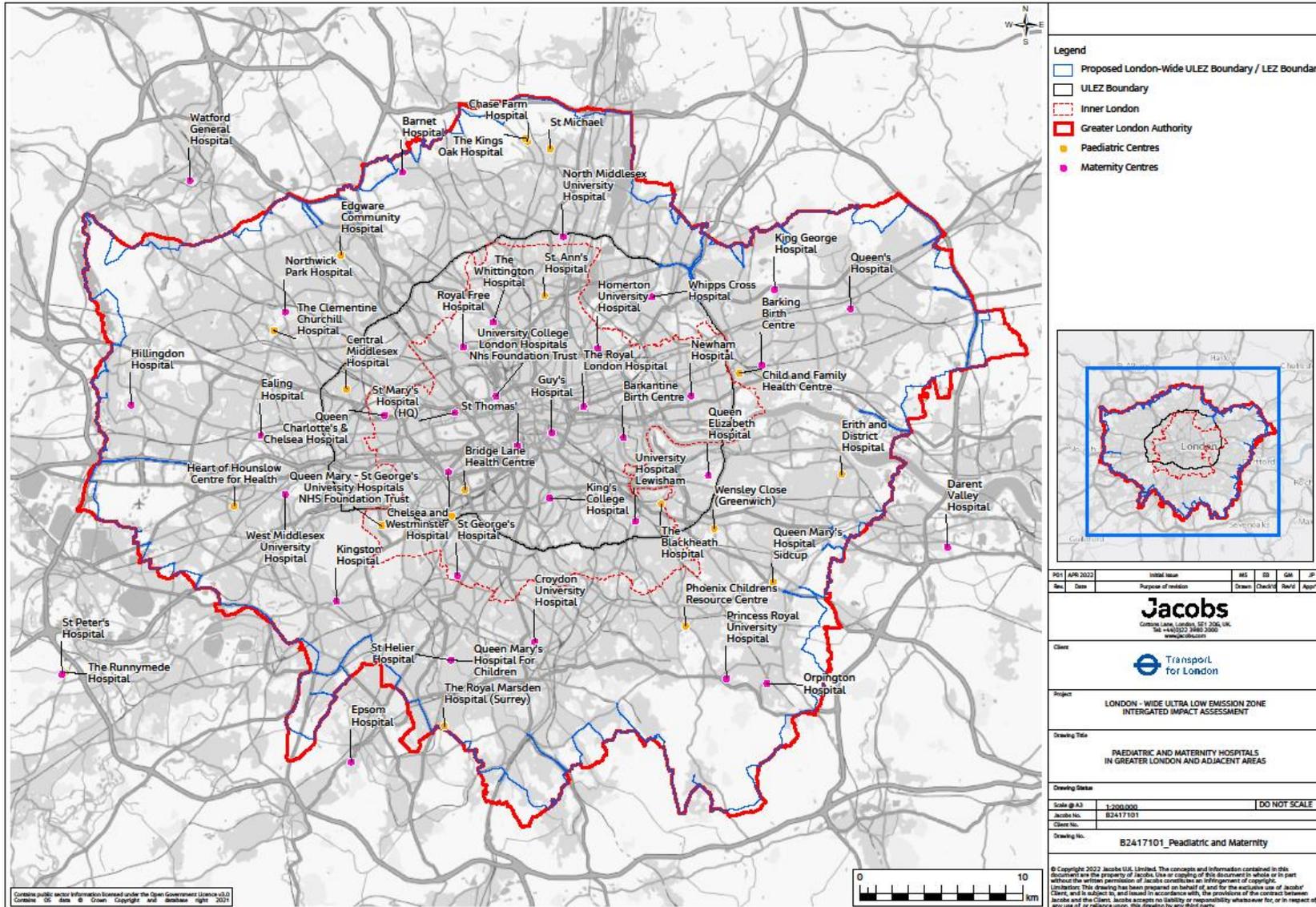
¹⁹² Mott Macdonald (2020). FS13 Future of Transport – Equalities and access to opportunity Rapid evidence review. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/937223/F13-Future-of-Transport-Equalities-access-to-opportunity-rapid-evidence-review-accessible.pdf

Research from the Department for Transport's National Travel Attitudes Study shows that respondents are most concerned for their health when using transport modes that involve contact with other passengers, particularly modes which require them to sit or stand with other passengers. In addition, overcrowding on transport services is one of the most cited reasons for not using public transport for both men and women¹⁹³. These factors would have been of additional significance during the height of the Covid-19 pandemic, and some people may still be concerned about virus transmission on public transport despite the relaxing of restrictions. People who would usually use public transport to travel into and around London may have switched to, and continue to choose, private transport or active travel as a means to increase their social distancing.

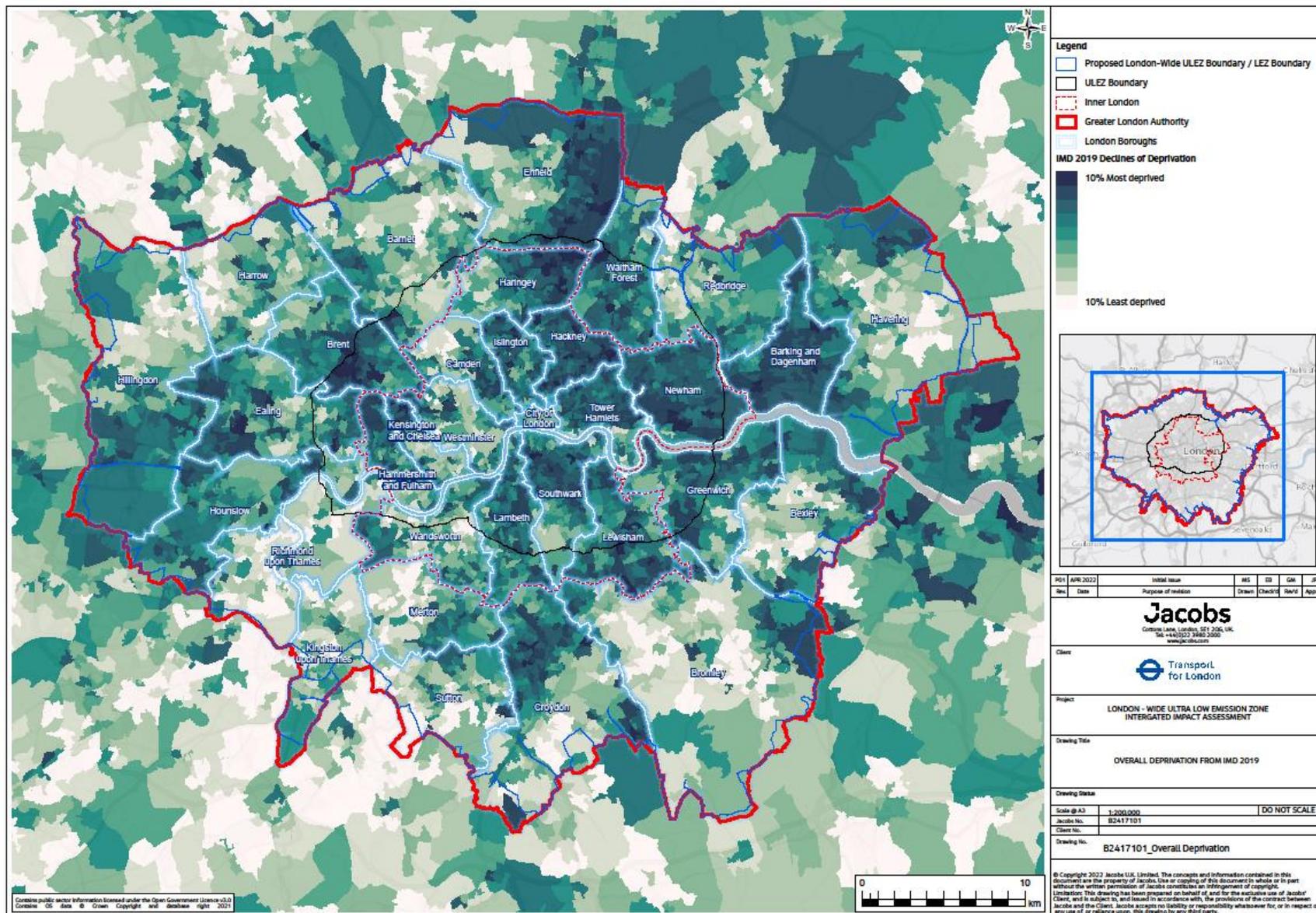
¹⁹³ TfL (2012) Understanding the travel needs of London's diverse communities: Women. Available at: <https://content.tfl.gov.uk/women.pdf>

3.5 Maps

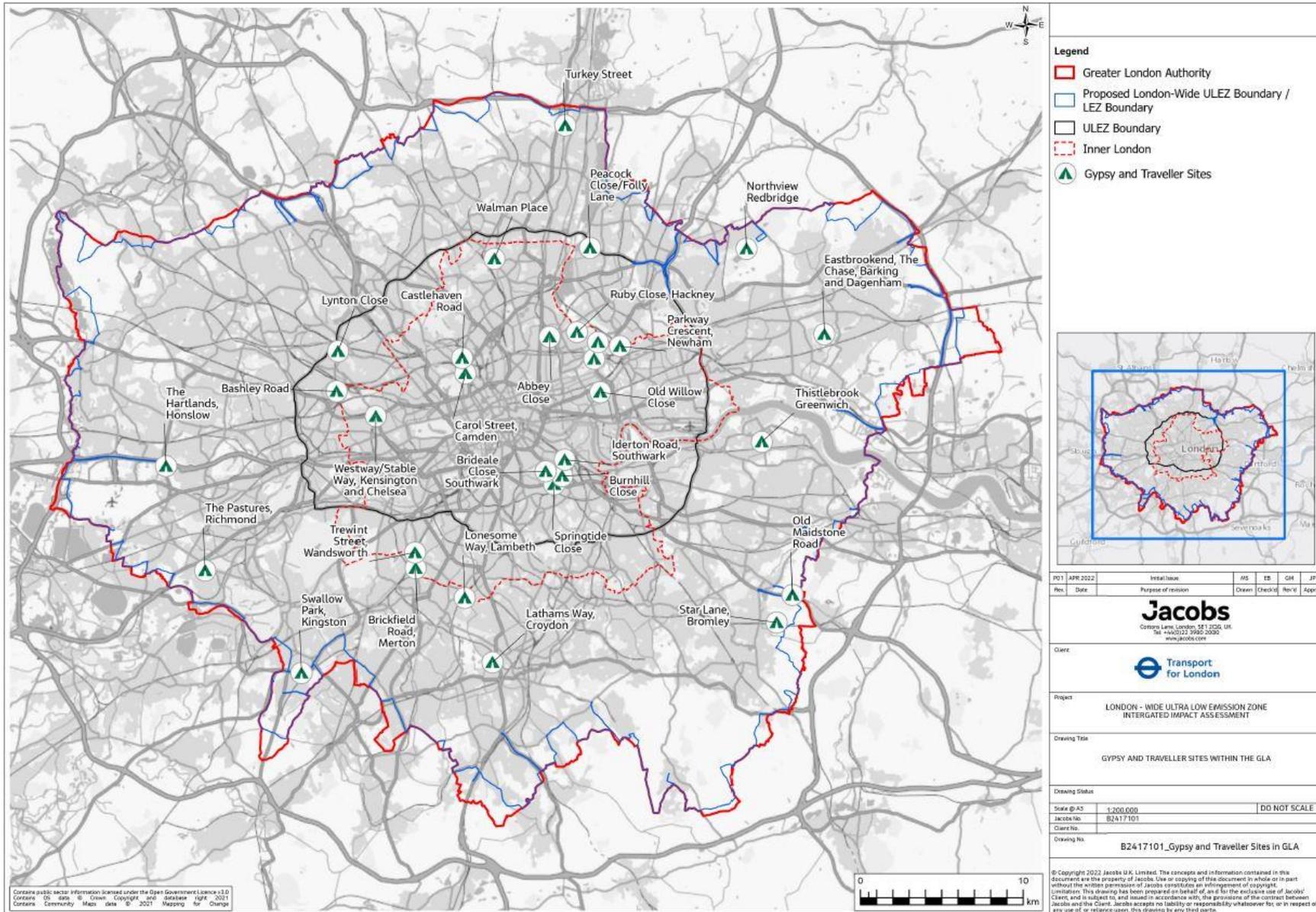
Map 1: Paediatric and Maternity Centres in Greater London



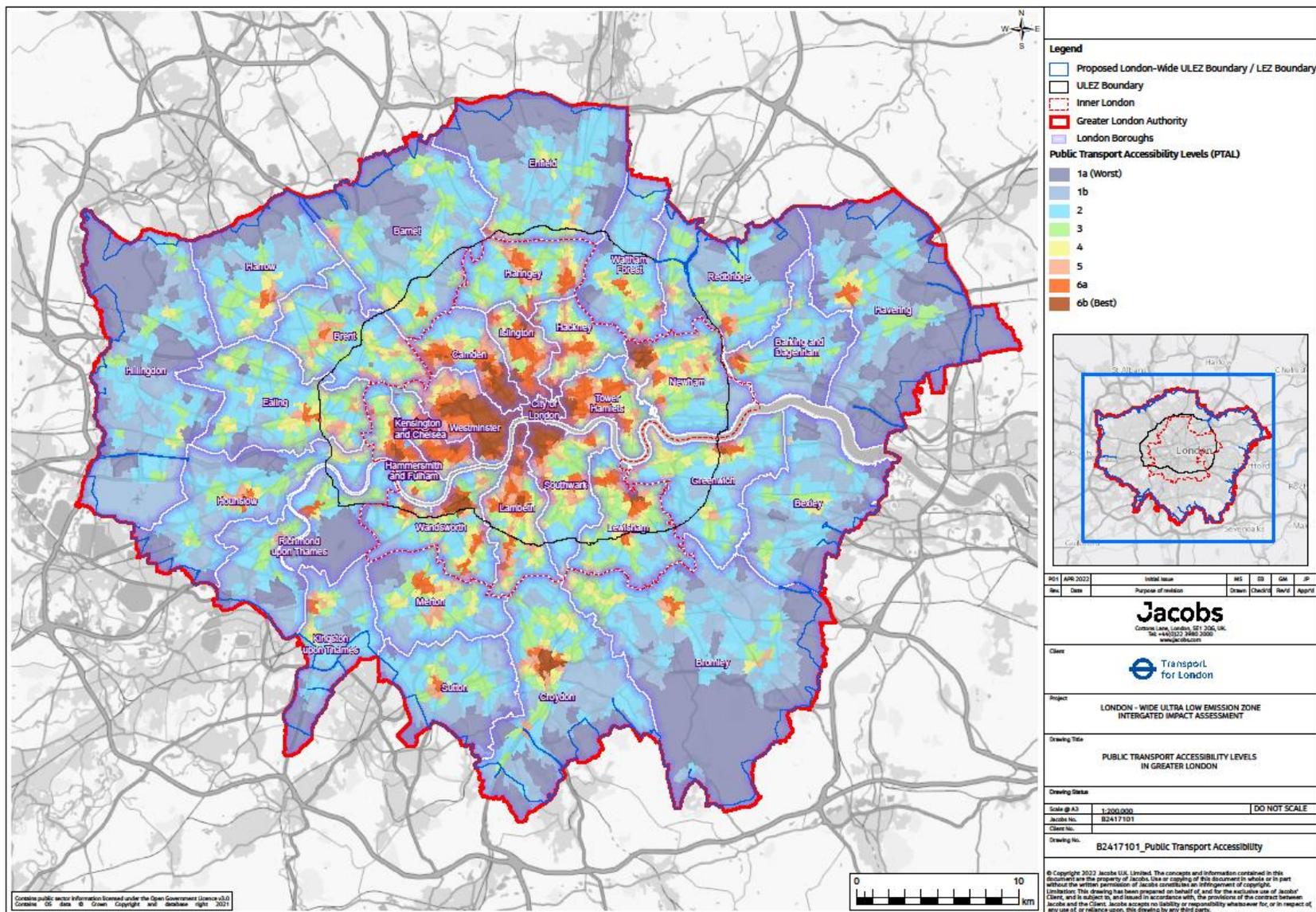
Map 2: Overall Deprivation from IMD 2019



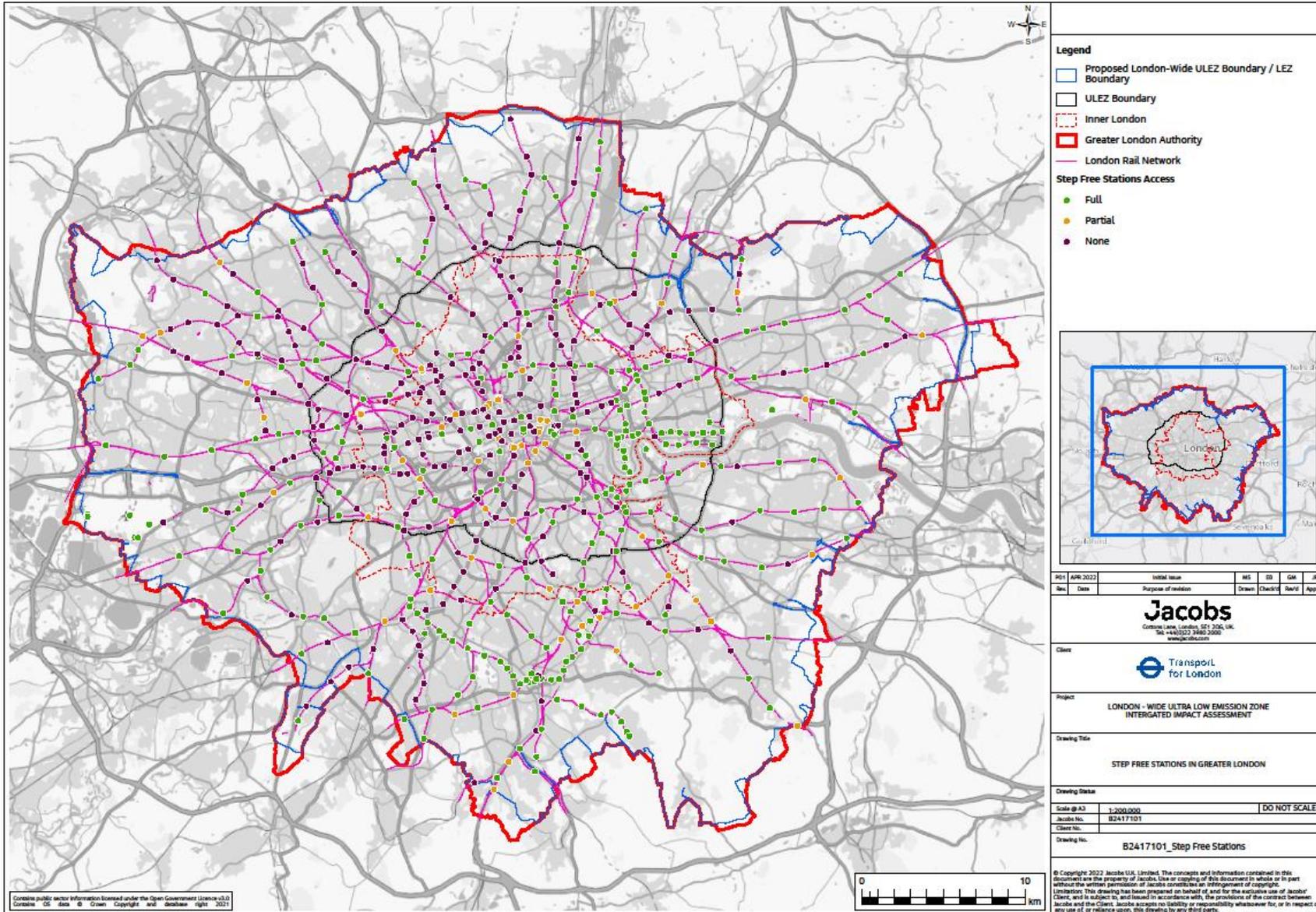
Map 3: Gypsy and Traveller Sites in the GLA



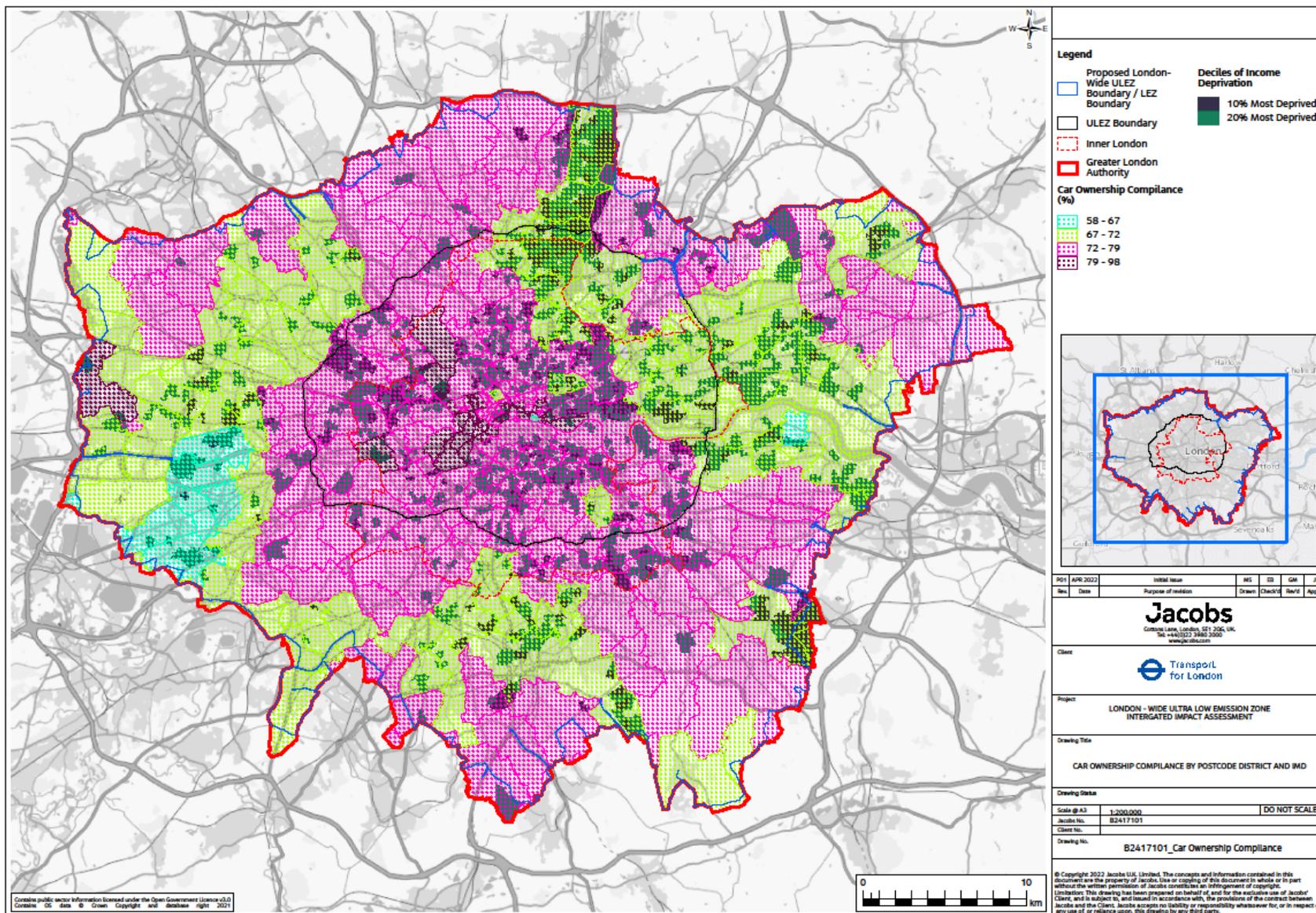
Map 5: Public Transport Accessibility Levels in Greater



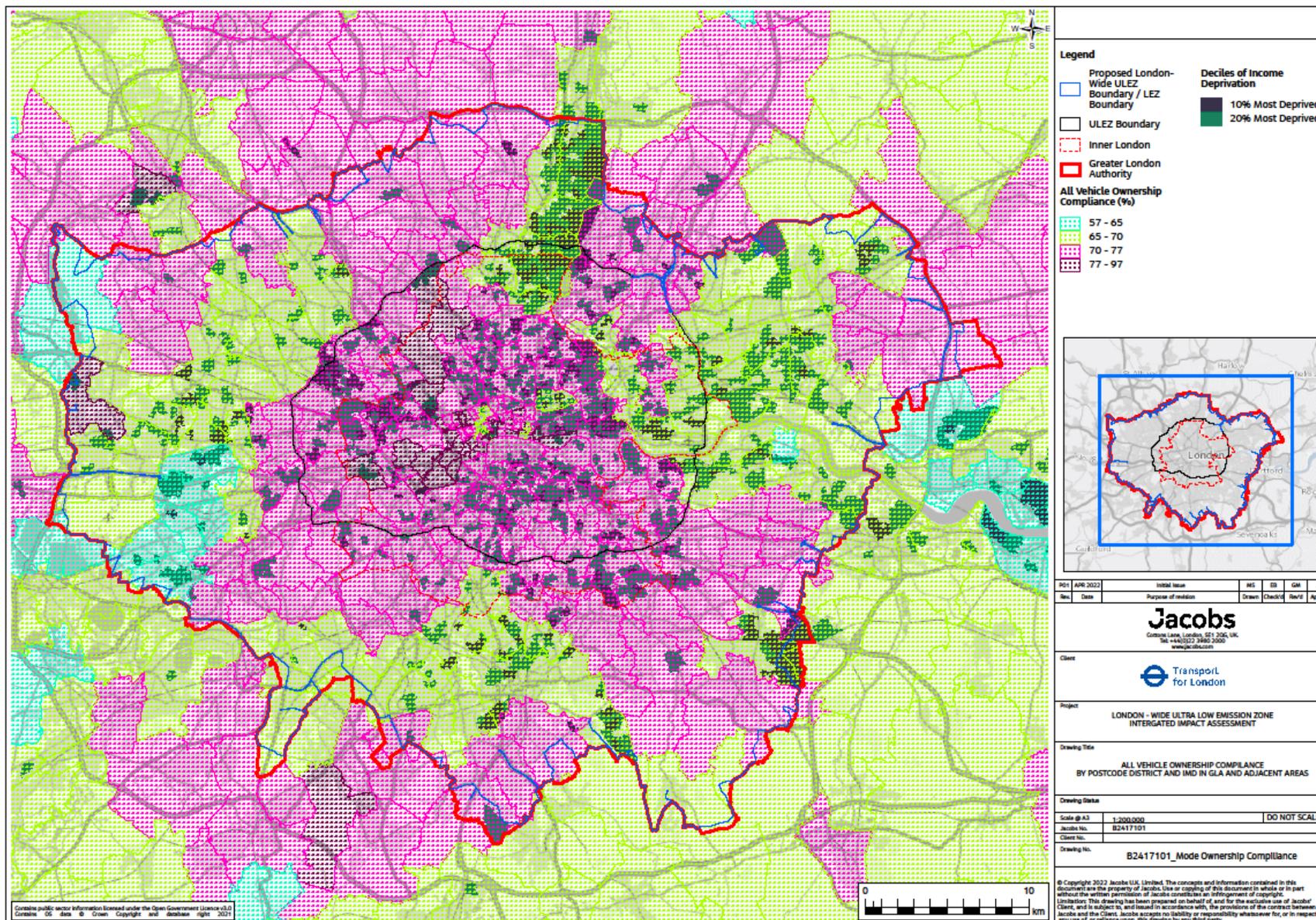
Map 6: Step Free Access Stations in the GLA



Map 7: Car Ownership Compliance by Postcode District and IMD



Map 8: All Vehicle Ownership Compliance by Postcode District and IMD



4. Economy and Business Baseline

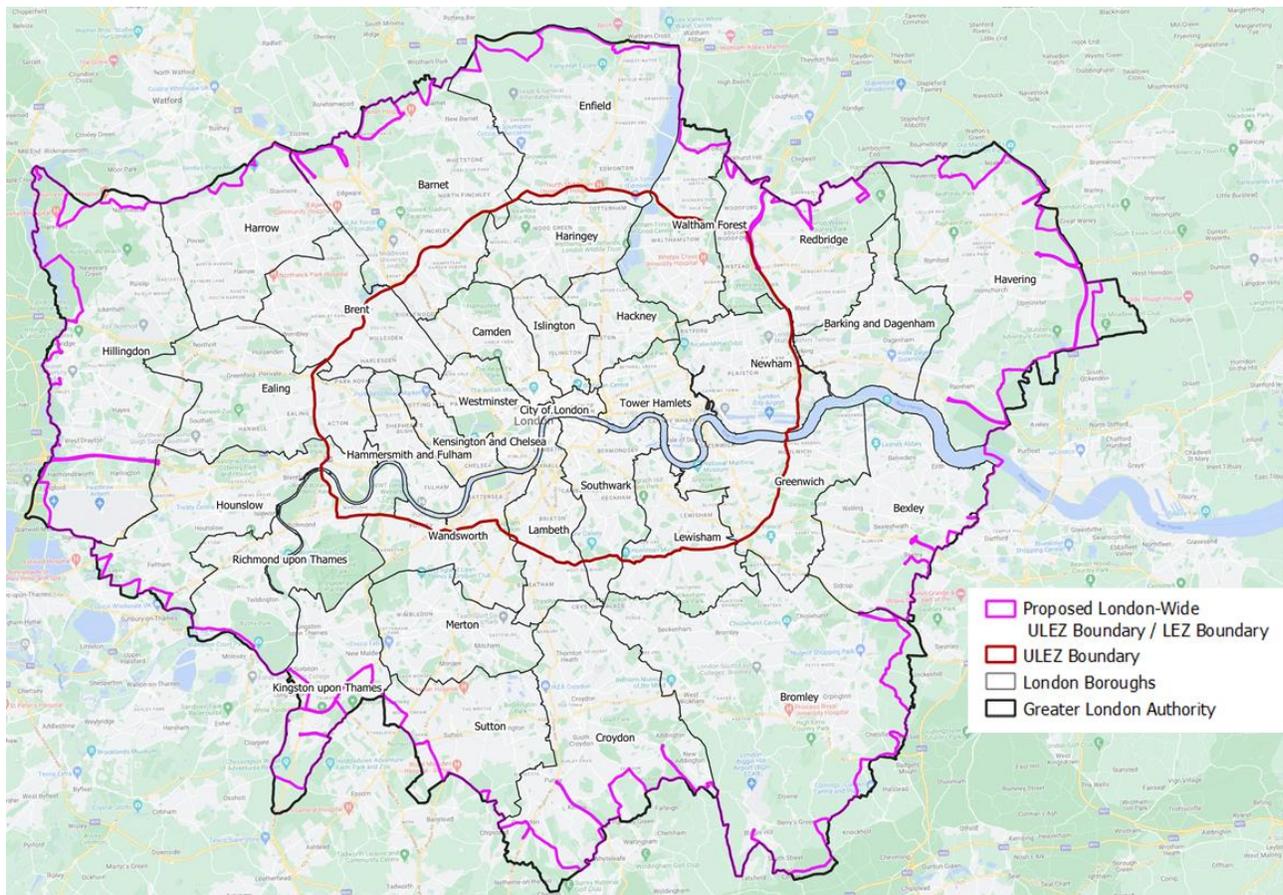
4.1 Introduction

This section provides the economic baseline against which the economic assessment is undertaken. The economic assessment is against two objectives namely:

- To support the growth and creation of businesses in outer London, including small to medium sized enterprises (SMEs)
- To promote the vitality and viability of London’s varied town centres.

Hence this baseline section provides an overview of the economic structure of outer London and its town centres. As people and businesses will already have adapted their behaviours in relation to the existing ULEZ this baseline and consequential assessment is based on understanding movement wholly within the area of outer London which will be covered by the Proposed Scheme, between this area of outer London and inner London and trips from outside Greater London to destinations within outer London.

Figure 4-1 Current ULEZ and LEZ boundaries

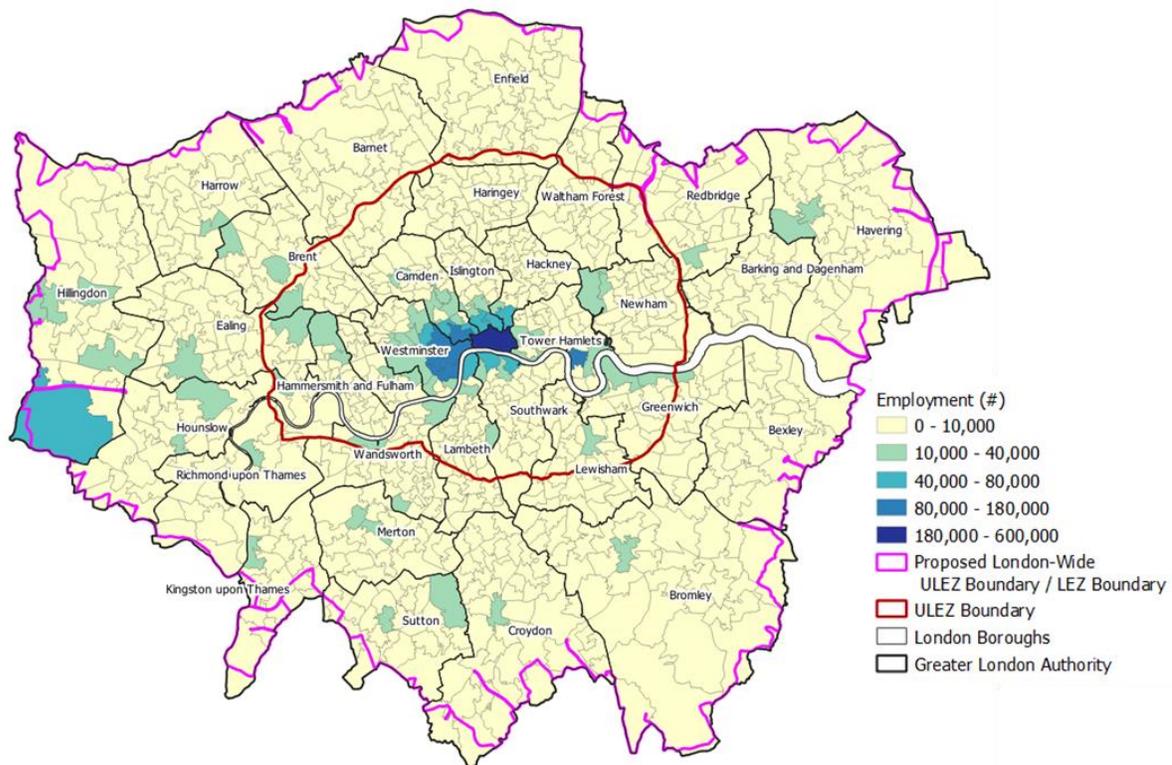


4.2 Employment & Travel Patterns

Employment in Greater London was 5.26m in 2020 (BRES, 2020), with the highest concentration of jobs within central London. Figure 4-2 illustrates the location of jobs at the MSOA (Middle-Super-Output Areas) level. The most significant employment clusters are within the existing ULEZ and people and businesses in this area have already adapted their travel behaviour as a result of the original ULEZ and its expansion in October 2021. Outside the existing ULEZ boundary, Heathrow, situated in Hillingdon, is by far the largest single employment centre. Employment in outer London is far more dispersed with no other centre having a similar concentration to either central London or Heathrow.

Of total London employment, 30 per cent (1.6m) is located within the area between the current ULEZ boundary and the Low Emissions Zone (LEZ) boundary. Table 4-1 sets out the largest economic sectors within outer London relative to total London employment. These are; retail, education, health, catering and public administration which account for 40 per cent of employment and are principally catering for local residents' needs. Highlighted in the table are those sectors that are most reliant on LGVs (such as the wholesale trade, services to building and landscape activities, specialised construction activities, warehousing and support activities for transportation and construction of buildings). These support a larger proportion of employment in outer London compared to total London employment. For example, specialised construction activities, which includes plumbers, electricians, scaffolders etc., contributes 3.3 per cent of all outer London employment, but only 1.6 per cent of total London employment. Furthermore, outer London is the location of 62 per cent of total specialised construction activities industry employment.

Figure 4-2: Level of Employment within Greater London by MSOA, 2020



Source: Jacobs' analysis of BRES 2020

Table 4-1 Industries making up over 1 per cent of outer London employment compared to contribution to total London employment, 2020 (sectors highlighted are those with a high use of LGVs)

Industry	Outer London Employment	Proportion outer London Employment (%)	London Employment	Proportion of London Employment (%)
47 : Retail trade, except of motor vehicles and motorcycles	163,385	10.2%	442,565	8.4%
85 : Education	162,925	10.2%	392,565	7.5%
86 : Human health activities	147,075	9.2%	389,810	7.4%
56 : Food and beverage service activities	98,770	6.2%	326,895	6.2%
84 : Public administration and defence; compulsory social security	65,450	4.1%	238,740	4.5%
46 : Wholesale trade, except of motor vehicles and motorcycles	63,900	4.0%	166,295	3.2%
49 : Land transport and transport via pipelines	58,050	3.6%	126,600	2.4%
81 : Services to buildings and landscape activities	52,805	3.3%	131,155	2.5%
43 : Specialised construction activities	52,220	3.3%	83,565	1.6%
88 : Social work activities without accommodation	50,220	3.1%	134,195	2.6%
78 : Employment activities	46,905	2.9%	170,600	3.2%
87 : Residential care activities	39,235	2.5%	64,900	1.2%
52 : Warehousing and support activities for transportation	38,940	2.4%	65,755	1.3%
62 : Computer programming, consultancy and related activities	37,925	2.4%	193,910	3.7%
70 : Activities of head offices; management consultancy activities	36,470	2.3%	234,115	4.5%
69 : Legal and accounting activities	36,045	2.3%	243,305	4.6%
51 : Air transport	33,935	2.1%	35,755	0.7%
68 : Real estate activities	29,795	1.9%	133,910	2.5%
93 : Sports activities and amusement and recreation activities	26,710	1.7%	58,210	1.1%
82 : Office administrative, office support and other business support activities	25,575	1.6%	114,795	2.2%
41 : Construction of buildings	24,145	1.5%	72,980	1.4%
45 : Wholesale and retail trade and repair of motor vehicles and motorcycles	22,145	1.4%	33,680	0.6%
71 : Architectural and engineering activities; technical testing and analysis	21,445	1.3%	106,120	2.0%
96 : Other personal service activities	18,580	1.2%	46,535	0.9%
80 : Security and investigation activities	17,325	1.1%	51,575	1.0%
53 : Postal and courier activities	15,975	1.0%	30,435	0.6%

Source: BRES, 2020

Within the existing ULEZ, only 17 per cent of all journeys that originate in the zone are made by car, whilst almost half (49 per cent) are made using public transport. However, journeys that originate in outer London are heavily reliant on private transport, with 44 per cent of trips made by car compared to 30 per cent using either bus or rail to make their journeys (Table 4-2).

Table 4-2: Proportion of journeys made by different modes of transport, baseline 2023

	Car	Public Transport	PHV	Walk and Cycle
ULEZ	17%	49%	2%	32%
Outer London	44%	30%	1%	25%

Source: MoTioN transport model

Table 4-3 highlights the proportion of journeys originating in outer London boroughs by mode used. More than half of all trips undertaken in a number of London boroughs such as Hillingdon, Havering, Bromley and Bexley are by car. These boroughs also have a significantly lower proportion of journeys made by public transport than the outer London average of 30 per cent.

Table 4-3: Proportion of total journeys made by mode of transport by outer London boroughs, 2023 baseline

Location	Mode of Travel				
	Car	Public Transport	PHV	Walk	Cycle
Hillingdon	55%	24%	1%	18%	1%
Havering	53%	26%	1%	18%	2%
Bromley	51%	26%	1%	20%	1%
Bexley	51%	26%	1%	20%	1%
Sutton	49%	23%	1%	25%	2%
Harrow	46%	28%	2%	23%	1%
Enfield	46%	27%	1%	24%	2%
Redbridge	44%	31%	1%	22%	2%
Croydon	44%	32%	1%	22%	1%
Kingston upon Thames	42%	28%	1%	25%	4%
Barnet	42%	33%	1%	22%	1%
Barking and Dagenham	41%	30%	1%	26%	2%
Hounslow	40%	30%	1%	24%	4%
Richmond upon Thames	39%	29%	1%	25%	6%
Merton	37%	35%	1%	24%	3%
Greenwich	34%	39%	2%	24%	2%
Brent	33%	39%	1%	24%	3%

Source: MoTioN transport model

Table 4-4 sets out the number of trips made from outer London boroughs and areas outside Greater London to destinations in outer London, and the proportion of these made by car, public transport or other forms of transport (mainly walking and cycling but also motorbikes and vans). Of note are the very large number of trips originating in Surrey and to a lesser extent Hertfordshire. Other areas outside Greater London generate far fewer trips into outer London. A significant number of journeys made to outer London boroughs are by car, particularly those that are coming from outside Greater London. For example, only 5 per cent of trips from Surrey into outer London are by public transport.

These tables highlight the far greater car dependency in outer London and especially for those travelling from outside Greater London into outer London. Businesses in outer London are therefore also more dependent on road transport than in the existing ULEZ in terms of access to labour and customers

Table 4-4: Proportion of total trips to outer London and by mode, baseline 2023

Origin Grouping	Origin	Total Trips to outer London	Proportion of trips made to outer London using:		
			Car	Rail/Bus	Other
Outer London	Barnet	871,200	44%	24%	32%
Outer London	Croydon	870,900	47%	23%	30%
Out of GL	Surrey	839,200	59%	5%	36%
Outer London	Bromley	765,900	55%	17%	28%
Outer London	Brent	723,600	35%	29%	36%
Outer London	Enfield	718,700	46%	18%	36%
Outer London	Hillingdon	717,400	54%	19%	27%
Outer London	Hounslow	600,100	38%	24%	38%
Outer London	Havering	589,800	55%	19%	26%
Outer London	Harrow	585,900	47%	20%	32%
Outer London	Greenwich	574,200	38%	26%	36%
Out of GL	Hertfordshire	550,700	58%	7%	35%
Outer London	Redbridge	549,700	47%	19%	34%
Outer London	Bexley	515,000	53%	19%	28%
Outer London	Sutton	498,200	50%	17%	33%
Outer London	Richmond upon Thames	480,100	40%	21%	39%
Outer London	Merton	460,900	40%	23%	36%
Outer London	Barking and Dagenham	448,300	42%	22%	36%
Outer London	Kingston upon Thames	422,200	41%	21%	37%
Out of GL	Kent	200,800	55%	7%	38%
Out of GL	Essex	143,400	56%	8%	37%
Out of GL	Buckinghamshire	44,000	81%	10%	9%
Out of GL	West Berkshire	25,800	90%	9%	1%

Out of GL	Bedford	10,500	87%	12%	1%
Out of GL	West Sussex	10,200	93%	6%	1%
Out of GL	Northamptonshire	10,100	91%	8%	1%
Out of GL	East Sussex	3,500	90%	9%	0%
Out of GL	East Anglia	3,300	85%	15%	0%
Out of GL	Oxfordshire	3,100	91%	9%	1%

Source: MoTiON transport model

4.3 Commuting Patterns

Within the existing ULEZ, over two thirds (64 per cent) of all originating commuting journeys are made using public transport. In contrast only 40 per cent of all commutes originating in outer London are made using public transport with 46 per cent being made by car, compared to only 15 per cent in the ULEZ (Table 4-5).

Table 4-5: Proportion of originating commuting journeys made by different modes of transport

	Car	Public Transport	PHV	Walk	Cycle
ULEZ	15%	64%	2%	11%	8%
Outer London	46%	40%	0%	9%	4%

Source: MoTiON transport model

Table 4-6 highlights the number of total commuting trips within outer London from other parts of outer London and trips from outside Greater London. Commuters originating outside Greater London are predominantly using their cars, over 80 per cent for those travelling in from Kent and Surrey. For those living in outer London over 50 per cent of commuting trips are by car, reaching two thirds in Bexley and Hillingdon.

Table 4-6: Proportion of total commuting trips to outer London and by mode, baseline 2023

Origin Grouping	Origin	Total Commuting Trips to outer London	Proportion of commuting trips made to outer London using:		
			Car	Rail/Bus	Other
Out of GL	Kent	33,600	83%	15%	2%
Out of GL	Surrey	80,800	81%	14%	5%
Out of GL	Hertfordshire	51,100	80%	19%	1%
Out of GL	Buckinghamshire	13,500	80%	20%	0%
Out of GL	Essex	35,900	78%	21%	1%
Out of GL	West Berkshire	15,600	77%	23%	0%
Out of GL	Oxfordshire	1,800	77%	23%	0%
Out of GL	Northamptonshire	4,000	76%	24%	0%

Out of GL	Bedford	3,500	74%	26%	0%
Outer London	Bexley	63,500	67%	17%	16%
Outer London	Hillingdon	104,900	66%	25%	9%
Outer London	Bromley	80,000	64%	20%	16%
Outer London	Havering	73,400	64%	19%	17%
Outer London	Enfield	82,400	63%	20%	17%
Out of GL	West Sussex	5,100	62%	38%	0%
Outer London	Croydon	111,100	57%	28%	15%
Outer London	Sutton	61,800	56%	22%	21%
Outer London	Redbridge	54,500	56%	24%	21%
Outer London	Barnet	92,700	55%	31%	14%
Outer London	Harrow	75,400	55%	27%	18%
Outer London	Greenwich	65,500	55%	27%	19%
Outer London	Barking and Dagenham	57,400	54%	21%	25%
Out of GL	East Anglia	1,400	54%	46%	0%
Outer London	Merton	47,800	50%	31%	18%
Out of GL	East Sussex	1,800	50%	50%	0%
Outer London	Hounslow	85,100	48%	29%	22%
Outer London	Richmond upon Thames	55,300	47%	26%	26%
Outer London	Kingston upon Thames	51,900	47%	23%	30%
Outer London	Brent	98,100	42%	33%	25%

Source: MoTiON transport model

Table 4-7 highlights the main commuter flows in outer London and the extent to which they are undertaken by car or public transport. As previously highlighted, it is flows from outside Greater London into outer London that are most car dependent, especially trips to Hillingdon which will be predominantly to Heathrow Airport. The table also suggests public transport is less competitive or attractive for journeys even between neighbouring boroughs such as Croydon to Bromley leading to car travel dominating the outer London commuter market.

Table 4-7: Top flows of from outer London or outside Greater London to outer London and by mode type

Origin	Origin Grouping	Destination	Total Commuting Trips	Car	Public Transport
Barking and Dagenham	Outer London	Havering	12,100	68%	24%
Barking and Dagenham	Outer London	Redbridge	10,500	55%	27%
Barnet	Outer London	Brent	11,200	51%	33%
Barnet	Outer London	Enfield	9,300	69%	25%
Barnet	Outer London	Harrow	7,100	62%	31%
West Berkshire	Out of GL	Hillingdon	8,200	82%	17%
Bexley	Outer London	Bromley	5,500	77%	20%
Bexley	Outer London	Greenwich	15,400	77%	17%

Brent	Outer London	Barnet	11,100	52%	32%
Brent	Outer London	Harrow	13,800	54%	34%
Bromley	Outer London	Bexley	5,600	75%	21%
Bromley	Outer London	Croydon	11,100	69%	26%
Buckinghamshire	Out of GL	Hillingdon	7,000	97%	2%
Croydon	Outer London	Bromley	10,700	68%	27%
Croydon	Outer London	Merton	5,300	58%	35%
Croydon	Outer London	Sutton	10,600	67%	28%
Enfield	Outer London	Barnet	9,300	68%	25%
Essex	Out of GL	Barking and Dagenham	6,000	78%	22%
Essex	Out of GL	Havering	14,900	83%	17%
Essex	Out of GL	Redbridge	8,100	80%	18%
Greenwich	Outer London	Bexley	14,900	79%	15%
Harrow	Outer London	Barnet	6,900	64%	29%
Harrow	Outer London	Brent	13,800	53%	34%
Harrow	Outer London	Hillingdon	8,900	62%	29%
Havering	Outer London	Barking and Dagenham	12,300	66%	26%
Havering	Outer London	Redbridge	6,300	60%	30%
Hertfordshire	Out of GL	Barnet	13,900	84%	15%
Hertfordshire	Out of GL	Enfield	11,000	80%	20%
Hertfordshire	Out of GL	Harrow	11,500	80%	18%
Hertfordshire	Out of GL	Hillingdon	6,500	88%	10%
Hillingdon	Outer London	Harrow	9,100	62%	29%
Hillingdon	Outer London	Hounslow	13,300	70%	25%
Hounslow	Outer London	Hillingdon	13,300	72%	23%
Hounslow	Outer London	Richmond upon Thames	12,600	49%	33%
Kent	Out of GL	Bexley	13,900	86%	10%
Kent	Out of GL	Bromley	9,800	84%	15%
Kent	Out of GL	Greenwich	5,700	84%	15%
Kingston upon Thames	Outer London	Merton	5,900	55%	28%

Kingston upon Thames	Outer London	Richmond upon Thames	6,800	57%	29%
Merton	Outer London	Croydon	5,200	57%	36%
Merton	Outer London	Kingston upon Thames	5,900	55%	28%
Merton	Outer London	Sutton	8,900	63%	28%
Redbridge	Outer London	Barking and Dagenham	10,400	57%	25%
Redbridge	Outer London	Havering	6,100	63%	27%
Richmond upon Thames	Outer London	Hounslow	12,700	48%	33%
Richmond upon Thames	Outer London	Kingston upon Thames	6,500	59%	26%
Surrey	Out of GL	Croydon	12,100	79%	19%
Surrey	Out of GL	Hillingdon	8,600	93%	6%
Surrey	Out of GL	Hounslow	13,900	82%	12%
Surrey	Out of GL	Kingston upon Thames	14,700	79%	11%
Surrey	Out of GL	Merton	5,800	74%	22%
Surrey	Out of GL	Richmond upon Thames	9,600	79%	13%
Surrey	Out of GL	Sutton	11,900	83%	13%
Sutton	Outer London	Croydon	10,400	67%	28%
Sutton	Outer London	Merton	8,700	63%	28%

Source: MoTiON transport model

4.4 Business trip patterns

Within the existing ULEZ, over two thirds (65 per cent) of all originating business trips are made using public transport. In contrast only 43 per cent of all business journeys originating in outer London are made using public transport with 47 per cent being made by car, compared to only 18 per cent in the ULEZ (Table 4-8).

Table 4-8: Proportion of originating business journeys made by different modes of transport

	Car	Public Transport	PHV	Walk	Cycle
ULEZ	18%	65%	2%	8%	6%
Outer London	47%	43%	1%	6%	2%

Source: MoTiON transport model

Table 4-9 highlights the number of total business trips within outer London from other parts of outer London and trips from outside Greater London. Business trips originating outside Greater London are predominantly using their cars, over 70 per cent for those travelling in from Buckinghamshire and Surrey. For those living in outer London, over 50 per cent of business trips are by car, reaching two thirds in Bexley and Bromley.

Table 4-9: Proportion of total business trips to outer London and by mode, baseline 2023

Origin Grouping	Origin	Total Business Trips to outer London	Proportion of Business trips made to outer London using:		
			Car	Rail/Bus	Other
Out of GL	Buckinghamshire	6,900	73%	24%	3%
Out of GL	Surrey	27,500	71%	26%	2%
Out of GL	Hertfordshire	17,600	70%	26%	4%
Out of GL	Kent	15,400	69%	28%	2%
Outer London	Bexley	30,300	68%	22%	10%
Outer London	Bromley	38,600	68%	19%	13%
Out of GL	Bedford	2,900	67%	29%	4%
Outer London	Havering	22,800	66%	23%	11%
Out of GL	Essex	16,300	64%	32%	4%
Out of GL	West Sussex	3,900	63%	34%	2%
Outer London	Sutton	25,600	63%	20%	17%
Outer London	Harrow	31,000	63%	23%	15%
Outer London	Enfield	31,800	62%	26%	12%
Out of GL	Oxfordshire	2,000	62%	34%	4%
Out of GL	West Berkshire	6,000	62%	31%	7%
Outer London	Hillingdon	34,100	61%	22%	17%
Out of GL	Northamptonshire	3,300	60%	36%	4%
Outer London	Barnet	48,200	58%	27%	15%
Outer London	Redbridge	22,500	57%	34%	10%
Outer London	Richmond upon Thames	29,100	55%	24%	21%
Outer London	Greenwich	27,500	51%	41%	8%
Out of GL	East Sussex	2,100	50%	48%	2%
Outer London	Kingston upon Thames	23,100	50%	31%	19%
Outer London	Hounslow	33,900	45%	32%	22%
Outer London	Barking and Dagenham	17,100	45%	45%	10%
Outer London	Brent	35,000	43%	40%	17%
Out of GL	East Anglia	2,700	43%	56%	1%
Outer London	Croydon	46,500	43%	41%	16%
Out of GL	Isle of White	100	42%	57%	2%
Outer London	Merton	30,600	39%	45%	16%

Source: MoTiON transport model

Table 4-10 highlights the main business flows in outer London and the extent to which they are undertaken by car or public transport. As previously highlighted, it is flows from outside Greater London into outer London that are most car dependent. The table also suggests public transport is less competitive or attractive for journeys even between neighbouring boroughs such as Greenwich to Bexley leading to car travel dominating the outer London business travel market.

Table 4-10: Top flows of from outer London or outside Greater London to outer London and by mode type

Origin	Origin Grouping	Destination	Total Business Trips	Car	Public Transport
Bexley	Outer London	Greenwich	9,100	84%	14%
Greenwich	Outer London	Bexley	7,800	83%	13%
Barnet	Outer London	Brent	6,300	47%	46%
Essex	Out of GL	Havering	5,900	71%	24%
Harrow	Outer London	Brent	5,700	64%	29%
Brent	Outer London	Barnet	5,300	41%	51%
Barnet	Outer London	Enfield	4,900	67%	29%
Bromley	Outer London	Croydon	4,900	62%	31%
Croydon	Outer London	Bromley	4,800	62%	31%
Hillingdon	Outer London	Hounslow	4,800	76%	18%
Hounslow	Outer London	Richmond upon Thames	4,700	56%	33%
Barnet	Outer London	Harrow	4,600	70%	26%
Enfield	Outer London	Barnet	4,600	65%	30%
Richmond upon Thames	Outer London	Hounslow	4,600	55%	34%
Harrow	Outer London	Barnet	4,500	73%	23%
Hertfordshire	Out of GL	Barnet	4,400	75%	21%
Kent	Out of GL	Bexley	4,400	74%	23%
Surrey	Out of GL	Croydon	4,400	69%	29%
Croydon	Outer London	Sutton	4,300	64%	30%
Brent	Outer London	Harrow	4,100	52%	37%
Surrey	Out of GL	Hounslow	4,100	77%	20%

Source: MoTiON transport model

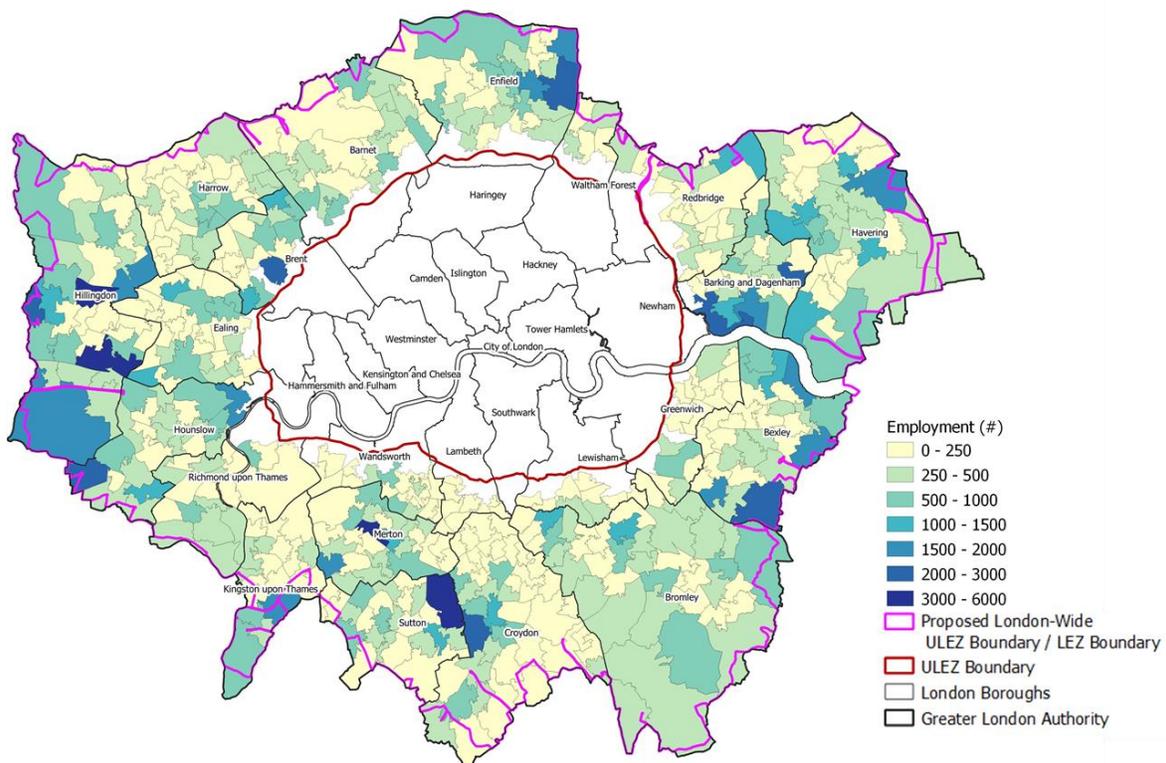
4.5 LGV Reliant Industries

This sub-section focuses on the location of the industries that are most reliant on LGVs and travel patterns to these areas, to understand the likely impacts proposed scheme may have on these businesses. In doing so, as highlighted above, the following sectors have been looked at:

- SIC 41: Construction of buildings.
- SIC 43: Specialised construction activities.
- SIC 46: Wholesale trade, except of motor vehicles and motorcycles.
- SIC 53: Warehousing and support activities for transportation.
- SIC 81: Services to buildings and landscape activities.

Together, these five industries in outer London provide 215,000 jobs, equivalent to 13 per cent of total outer London employment. Figure 4-3 highlights employment locations of these five LGV reliant sectors in aggregate. The largest pockets of employment are in MSOAs within Sutton, Merton, Hillingdon, Bexley and, Barking and Dagenham. (A detailed breakdown by each of the five sectors is set out in Appendix A.)

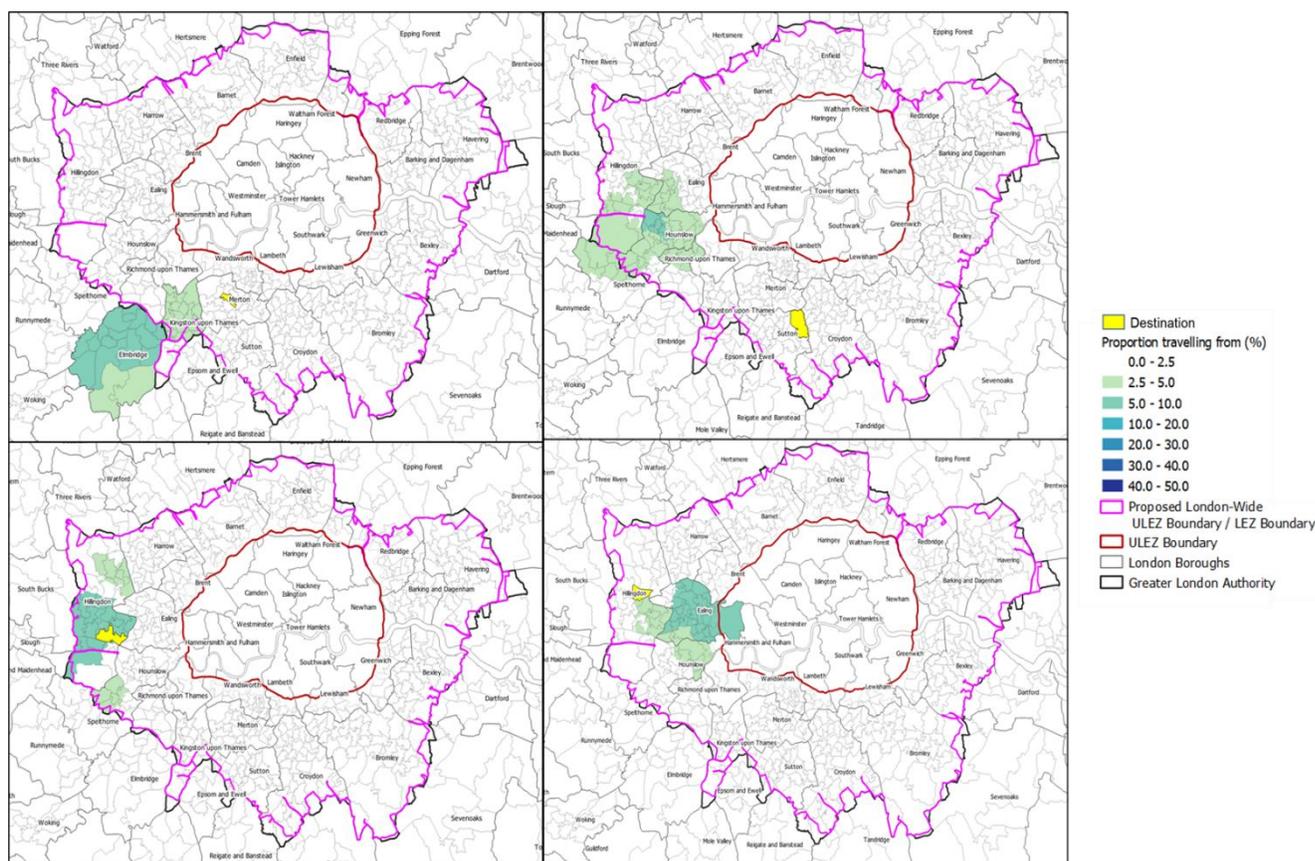
Figure 4-3 Employment location of LGV reliant industries in outer London, 2020



Source: Jacobs' analysis of BRES 2020

Figure 4-4 sets out the proportion of LGV trips to areas with the highest concentration of LGV reliant employment. The largest proportion of LGV flows to Merton are from just outside Greater London, specifically Elmbridge. Whilst the remaining areas of highest LGV reliant employment (Sutton and two areas in Hillingdon) see LGV trips coming predominantly from within outer London areas. The figures highlight the very dispersed nature of LGV trips with few core flows from a single origin to a single destination.

Figure 4-4 Proportion of LGV trips originating from areas and travelling to clusters where LGV reliant sectors are heavily concentrated



Source: TfL strategic analysis

Table 4-11 sets out the top LGV flows from outer London and outside Greater London to outer London Boroughs. The largest are from Essex to Havering (29,000 trips), Greenwich to Bexley (24,200 trips) and Kent to Bexley (23,800 trips). However, LGV usage is widespread across London and has been increasing due to several reasons, including businesses switching from HGVs to smaller vehicles and growth in the servicing sector. Their use is also likely to have risen with the significant increase in home deliveries during the pandemic, however it is not yet clear what the true impact is given the reduction in other sectors.

Table 4-11: Top LGV flows from outer London or outside Greater London to outer London

Origin	Origin Grouping	Destination	LGV Trips
Greenwich	Outer London	Bexley	24,200
Greenwich	Outer London	Bromley	6,700
Redbridge	Outer London	Havering	7,900
Redbridge	Outer London	Barking and Dagenham	7,500

Origin	Origin Grouping	Destination	LGV Trips
Havering	Outer London	Redbridge	7,500
Havering	Outer London	Barking and Dagenham	14,300
Barking and Dagenham	Outer London	Redbridge	8,900
Barking and Dagenham	Outer London	Havering	12,100
Bexley	Outer London	Greenwich	21,000
Bexley	Outer London	Bromley	8,600
Bromley	Outer London	Greenwich	6,800
Bromley	Outer London	Bexley	9,600
Bromley	Outer London	Croydon	16,400
Croydon	Outer London	Bromley	16,400
Croydon	Outer London	Sutton	13,400
Croydon	Outer London	Merton	6,600
Sutton	Outer London	Croydon	13,900
Sutton	Outer London	Merton	9,900
Merton	Outer London	Croydon	6,000
Merton	Outer London	Sutton	11,200
Merton	Outer London	Kingston upon Thames	5,900
Kingston upon Thames	Outer London	Richmond upon Thames	5,600
Richmond upon Thames	Outer London	Kingston upon Thames	5,800
Richmond upon Thames	Outer London	Hounslow	8,900
Hounslow	Outer London	Richmond upon Thames	10,500
Hounslow	Outer London	Hillingdon	12,400
Hillingdon	Outer London	Hounslow	10,600
Hillingdon	Outer London	Brent	5,100

Origin	Origin Grouping	Destination	LGV Trips
Hillingdon	Outer London	Harrow	8,800
Brent	Outer London	Harrow	11,800
Brent	Outer London	Barnet	13,100
Harrow	Outer London	Hillingdon	8,600
Harrow	Outer London	Brent	12,800
Harrow	Outer London	Barnet	6,800
Barnet	Outer London	Brent	12,900
Barnet	Outer London	Harrow	6,600
Barnet	Outer London	Enfield	14,000
Enfield	Outer London	Barnet	11,900
Kent	Out of GL	Greenwich	9,700
Kent	Out of GL	Bexley	23,800
Kent	Out of GL	Bromley	16,500
Surrey	Out of GL	Croydon	17,400
Surrey	Out of GL	Sutton	13,400
Surrey	Out of GL	Merton	7,000
Surrey	Out of GL	Kingston upon Thames	15,800
Surrey	Out of GL	Richmond upon Thames	9,900
Surrey	Out of GL	Hounslow	13,800
Surrey	Out of GL	Hillingdon	7,900
Hertfordshire	Out of GL	Hillingdon	6,700
Hertfordshire	Out of GL	Brent	5,500
Hertfordshire	Out of GL	Harrow	12,200
Hertfordshire	Out of GL	Barnet	17,600

Origin	Origin Grouping	Destination	LGV Trips
Hertfordshire	Out of GL	Enfield	13,700
Essex	Out of GL	Redbridge	10,200
Essex	Out of GL	Havering	29,000
Essex	Out of GL	Barking and Dagenham	7,800
Buckinghamshire	Out of GL	Hillingdon	9,400
West Berkshire	Out of GL	Hillingdon	7,400

Source: MoTiON transport model

4.6 SMEs

Small-medium sized enterprises (SMEs) make up a significant proportion of all businesses across London, with 98 per cent (c.523,000 out of c.533,000) of businesses classified as either micro (0-9 employees) or small businesses (10-49 employees) in 2021 (Inter-Department Business Register IDBR, NOMIS).

As set out in the previous section, it has been identified that LGV reliant industries are likely to be impacted the most by the Proposed Scheme. These industries include construction of buildings (SIC 41), specialised construction activities (SIC 43), wholesale trade, except of motor vehicles and motorcycles (SIC 46), warehousing and support activities for transportation (SIC 53) and services to buildings and landscape activities (SIC 81).

Outer London boroughs support 51,300 businesses across all LGV reliant industries. Out of these 50,700 businesses are small businesses (0-9 employees), equivalent to 98.7 per cent of all firms. Table 4-12 sets out the proportion of micro-businesses (0-9 employees) within outer London boroughs by the LGV reliant sectors. Barnet has the highest concentration across all five industries (11 per cent of all micro-businesses in outer London), 13 per cent of all micro-businesses operating in construction of buildings, 13 per cent of wholesale trade excluding motor vehicles and motorcycles, and 9 per cent of service of buildings and landscape activities. Whilst the highest concentration of businesses operating in the warehousing and support activities for transportation industry are in Hillingdon and Hounslow (13 per cent each). Havering supports the largest concentration of firms in the specialised construction activities in outer London.

Table 4-12: Proportion of small businesses (0-49 employees) by LGV reliant sectors by outer London boroughs, 2021

Outer London Borough	41 : Construction of buildings	43 : Specialised construction activities	46 : Wholesale trade, except of motor vehicles and motorcycles	52 : Warehousing and support activities for transportation	81 : Services to buildings and landscape activities
	Percentages and Number of businesses (#)				
Barking and Dagenham	5%	5%	4%	7%	4%
Barnet	13%	8%	13%	7%	9%
Bexley	4%	7%	3%	4%	5%
Brent	8%	6%	9%	7%	6%
Bromley	5%	8%	5%	4%	8%
Croydon	6%	7%	6%	5%	7%
Enfield	7%	7%	8%	7%	8%
Greenwich	4%	4%	3%	4%	7%
Harrow	8%	6%	8%	5%	4%
Havering	5%	9%	4%	7%	5%
Hillingdon	7%	7%	7%	13%	5%
Hounslow	5%	4%	7%	13%	6%
Kingston upon Thames	3%	3%	4%	3%	4%
Merton	5%	4%	4%	4%	7%
Redbridge	8%	7%	6%	5%	5%
Richmond upon Thames	3%	2%	4%	3%	3%
Sutton	4%	6%	3%	2%	6%
Micro-Businesses (0-9)	14,060	19,325	8,830	1,565	3,935
Small Businesses (10-49)	325	590	1250	285	490
Medium (50-249)	35	90	220	105	110
Large (250+)	0	0	10	25	35
Total (all sizes)	14,420	20,005	10,310	1,980	4,570

Source: Inter-Department Business Register IDBR, NOMIS, 2021

4.7 Impact of the existing ULEZ

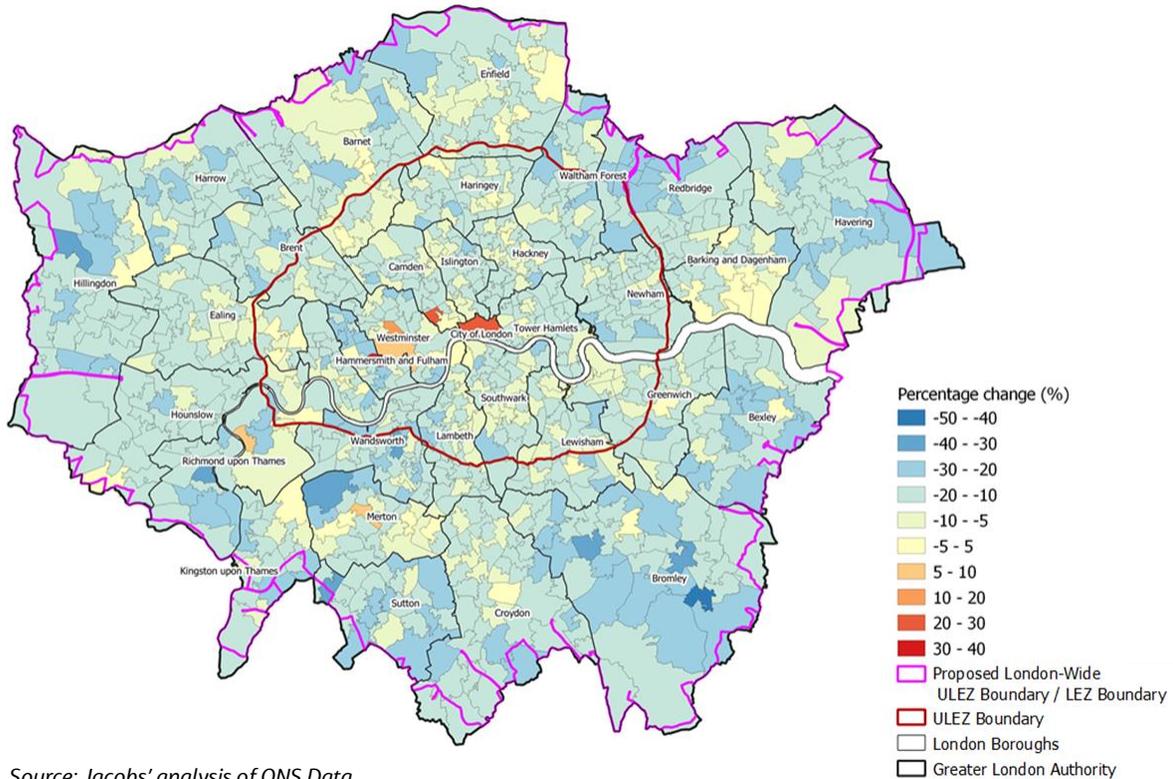
The economic impact of the extension of the existing ULEZ in October 2021 is difficult to determine given the more significant impacts of the pandemic and the present cost of living situation. Two proxy measures which are published on a regular basis have therefore been considered. The first relates to changes in unemployment levels and the second uses Google's mobility data. In both cases comparisons have been made between the area covered by the existing ULEZ and the area that will be covered by the London-wide scheme.

Unemployment

Figure 4-5 illustrates the change in claimant count (that is, number of people claiming unemployment-related benefits) since the extension of the ULEZ in October 2021. As the map illustrates, the changes in employment

within and outside the ULEZ are broadly similar. In total unemployment in the area covered by the ULEZ extension has fallen by 25,000 between October 2021 and March 2022, a decline of 12.6 per cent compared to a fall of 23,000 in outer London which is a reduction of 13.8 per cent.

Figure 4-5: Percentage change in claimant count between October 2021 and March 2022



Source: Jacobs' analysis of ONS Data

4.8 Google Mobility Data

Since the start of the pandemic Google has made available anonymised data on mobility, similar to that used in Google maps, at a local level. The reports chart movement trends over time by geography, across different categories of places such as retail and recreation, groceries and pharmacies, parks, transit stations, workplaces, and residential. The data is reported on the London Datastore website.

Table 4-13 shows the change in mobility recorded by Google for various activities in the existing ULEZ and outer London. The current ULEZ boundary was implemented on the 25th of October 2021 and the table shows the difference in 6-month average change before and after implementation in boroughs within the ULEZ and outer London.

The table shows that, apart from 'Grocery and Pharmacy' trips, boroughs within the existing ULEZ have seen greater increases in mobility than those in outer London. This would suggest that the introduction of the existing ULEZ has in aggregate not had a negative impact on economic activity and potentially its impact has been positive. (The major reduction in mobility related to parks reflects the different times of year being compared, that is, summer to winter).

Table 4-13: Difference in 6 months average before and after the implementation of the ULEZ, Google Mobility Data

	Difference in 6 months average change before and after ULEZ Introduction				
	Retail & Recreation	Grocery & Pharmacy	Parks	Transit Stations	Workplaces
ULEZ	3.9	-5.4	-36.3	1.6	3.0
Outer London	-0.2	-3.9	-40.0	0.8	0.7
ULEZ performance relative to outer London	4.1	-1.5	3.7	0.8	2.3

Source: Google Community Mobility Reports via London Datastore

4.9 Outer London Town centres

London retail

Retail expenditure is typically split into convenience and comparison spend. The former covers items bought on a regular basis such as food and toiletries which tend to be purchased close to where people live. The latter covers more ad hoc purchases such as clothing, furniture and electrical items and where people tend to travel to specialist stores or major centres that offer a wide range of choice. Both convenience and comparison goods are increasingly brought online. According to the Office for National Statistics retail sales data, online purchases reached around 20 per cent of all retail spend before the pandemic and is now around 30 per cent although that share has declined slightly as Covid related restrictions were withdrawn.

Outer London's major retail centres, defined as those offering more than 35,000 sqm of comparison retail space, that will be covered by the proposed scheme are set out in Table 4-14 along with an indication of total retail spend and the estimated proportion of that retail spend that comes from outside London. While the data is from 2017, the relativities of importance and the proportion of spend from outside London are unlikely to have changed materially. Harrow, Hounslow, Kingston, Romford and Uxbridge have the highest proportion of sales arising from outside Greater London. These centres are also competing with major retail centres outside London including Watford, Guildford, and Lakeside.

Table 4-14 Major retail centres in outer London with percentage of sales estimated to arise from outside Greater London

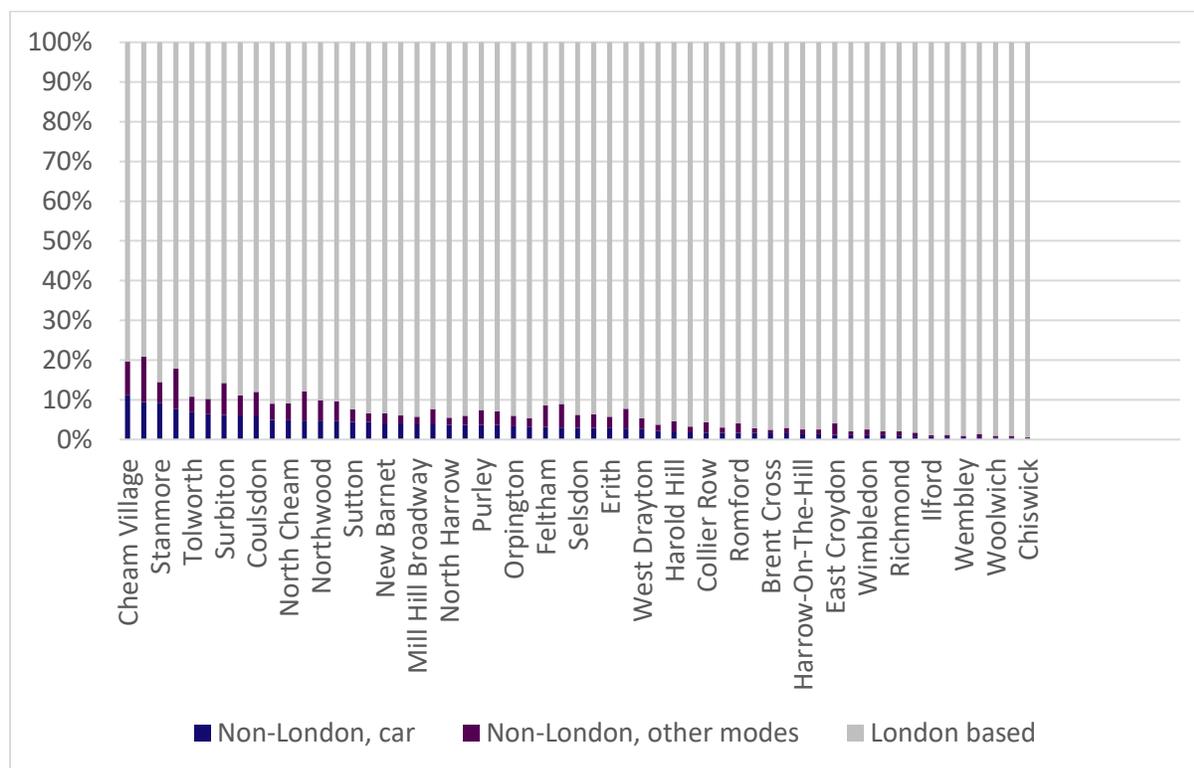
Centre	Annual retail spend £m	% of sales arising from outside Greater London	Comparison shopping floorspace '000sqm
Bexleyheath	250	2-6%	35
Brent Cross	580	0%	89
Bromley	580	2-6%	99
Croydon	650	2-6%	157
Ealing	400	1%	57
Enfield	250	2%	38
Harrow	320	6-13%	60
Hounslow	470	6-13%	51
Ilford	310	2%	67
Kingston	800	6-13%	134
Purley Way	200	2-6%	?

Centre	Annual retail spend £m	% of sales arising from outside Greater London	Comparison shopping floorspace '000sqm
Richmond	280	2%	32
Romford	440	6-13%	117
Sutton	320	2-6%	71
Uxbridge	370	6-13%	63
Wimbledon	310	2%	38

Source: Based on Consumer Expenditure and Comparison Goods Floorspace Need in London Experian for GLA 2017, and London Plan Town Centre Health Check 2017

At a more local level as shown in Figure 4-6, only Cheam Village and Stanmore had more than 10 per cent of their retail trips derived from car users travelling from outside Greater London.

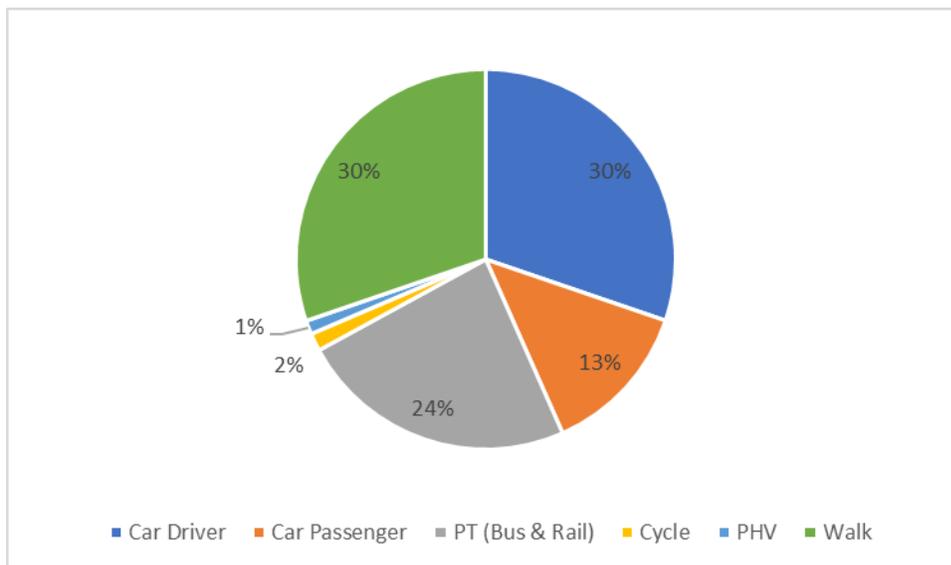
Figure 4-6 Shopping trips by mode to outer London town centres



Source: TfL

At an aggregate level people travelling within outer London to destinations in outer London for shopping are split mainly between car (driver and passenger) (43 per cent), walking (30 per cent) or bus (23 per cent) as shown in Figure 4-7.

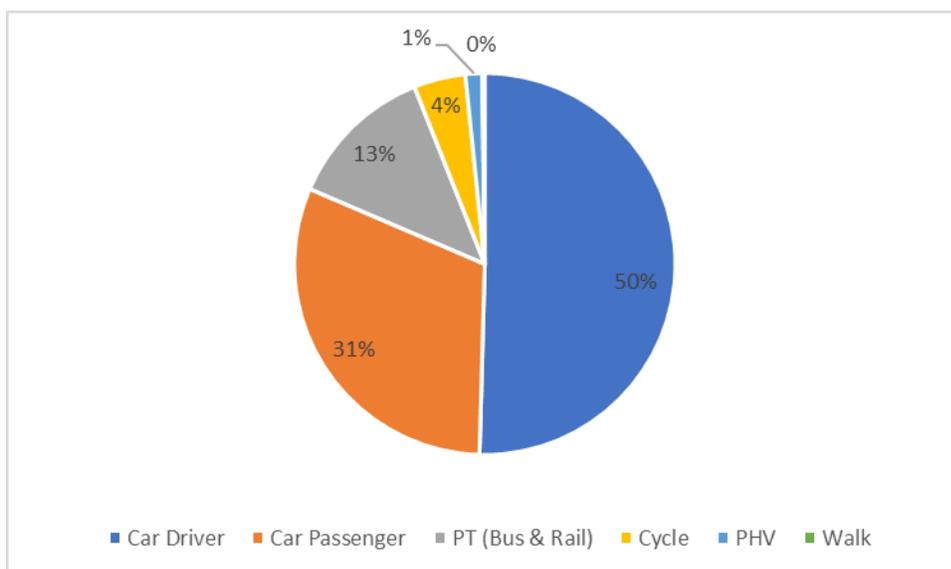
Figure 4-7 Mode used for shopping where origin and destination is in outer London



Source: MoTiON transport model

However, for those travelling into outer London from outside Greater London for shopping the aggregate picture is very different with car use accounting for 81 per cent of trips and bus just 12 per cent as shown in Figure 4-8. However, the number of trips arising from outside Greater London are just 5 per cent of those travelling within outer London.

Figure 4-8 Mode used for shopping where origin is outside Greater London and destination is in outer London



Source: MoTiON transport model

The main shopping flows with over 1,000 car trips and where car use accounts for more than 50 per cent of trips, highlighting those flows that might be more difficult to replicate using public transport are between:

- Enfield to Waltham Forest
- Bexley to Greenwich
- Hertfordshire to Barnet, Harrow and Hillingdon
- Kent to Bexley and Bromley

- Surrey to Kingston and Sutton
- Bromley to Bexley and Croydon

Town centres

Besides retail, town centres also contain a wide range of other activities that can attract users from a wider area. Table 4-15 shows the number of trips by car to major town centres for all journey purposes and the percentage of all trips made by non London car drivers or passengers. As shown in Table 4-15, Uxbridge is the centre with the highest proportion of trips made by car by non London drivers and passengers at 12 per cent. For other centres this ranges from 4-9 per cent.

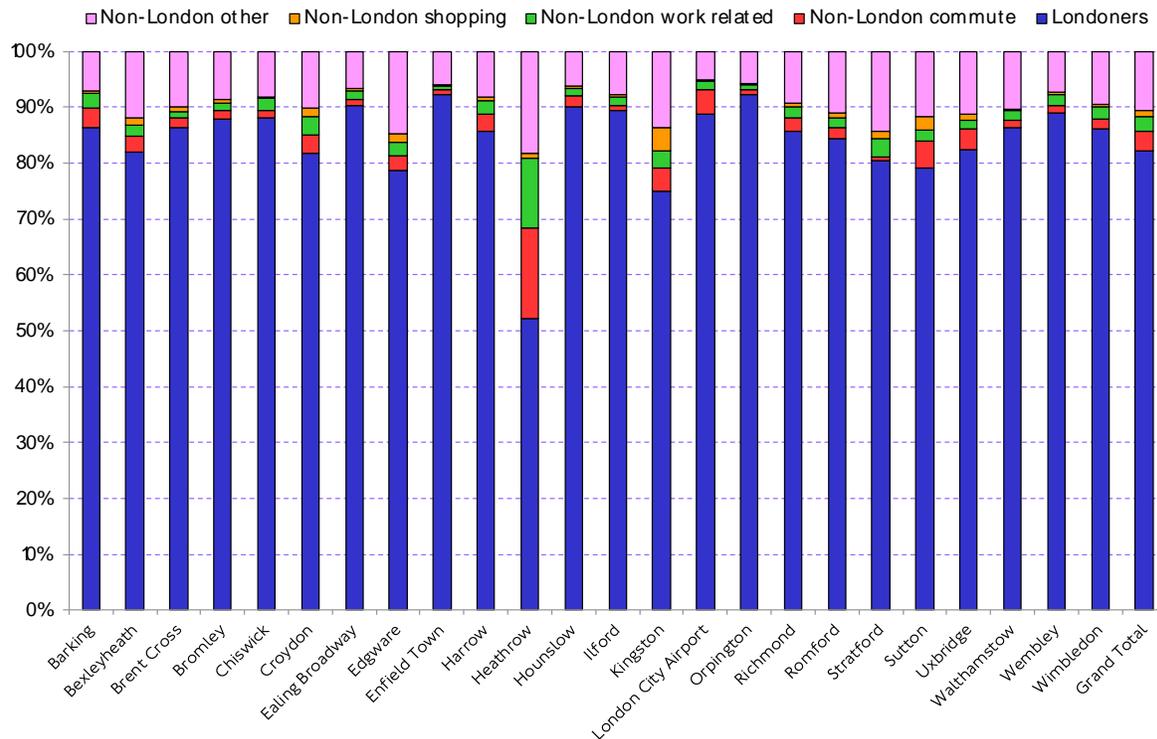
Table 4-15 Car mode share and proportion of car trips originating outside of London to key town centres

Town centre	Car mode share (all trips)	% of car trips by non-Londoners	% of all trips made by non-London car drivers or passengers
Bromley	49%	12%	6%
Croydon	40%	19%	8%
Hounslow	33%	13%	4%
Kingston	39%	24%	9%
Richmond	37%	14%	5%
Romford	48%	16%	8%
Uxbridge	55%	22%	12%
Wimbledon	41%	14%	5%

Source: EDMOND (2016)

Figure 4-9 shows that the vast majority of trips to London town centres are made by Londoners. Of the car trips made by residents outside of London to these town centres, about 46 per cent are for commuting, work related, or shopping purposes, with the remaining trips being undertaken for other purposes.

Figure 4-9 Journey purpose of car trips to London town centres



Source: EDMOND (2016)

The town centre night time economy mainly revolves around restaurants, pubs, takeaways, bars, hotels, cinemas, theatres, and night clubs. The main night time economy locations in outer London are shown in Table 4- 16 along with total floorspace allocated to these activities. Restaurants and pubs account for 50 per cent of night time economy floorspace in these locations. These centres mainly match the main retail centres with the addition of Wembley.

Table 4- 16 Floorspace allocated to night time economy uses in outer London town centres.

Town centre	Night time economy floorspace sqm
Bexleyheath	16,880
Bromley	20,510
Croydon	27,120
Ealing	25,260
Harrow	17,440
Ilford	16,910
Kingston	36,590
Richmond	16,410
Romford	31,490
Streatham	16,750
Sutton	21,540
Uxbridge	17,660
Wembley (with Wembley Park)	16,300

Town centre	Night time economy floorspace sqm
Wimbledon	16,450

Source: London Plan Town Centre Health Check 2017

There are many more local town centres in outer London but these will primarily be serving a very local need. As in the retail sector there are major changes in the restaurant trade driven by delivery apps. According to a 2020 YouGov poll¹⁹⁴ Londoners on average had a meal delivered to their home once a fortnight

Heathrow Airport

Heathrow Airport is the biggest employer in outer London. Some 70,000 people travel to work at the airport each day of whom some 90 per cent work shift patterns. Figure 4-10 is taken from Heathrow Airport's 2019 Travel Report shows the arrival and departure patterns of workers at the airport. It highlights the large number of employees who arrive between 04.00-06.00 when public transport availability is generally reduced.

Figure 4-10 Distribution of arrivals and departures of workers at Heathrow Airport

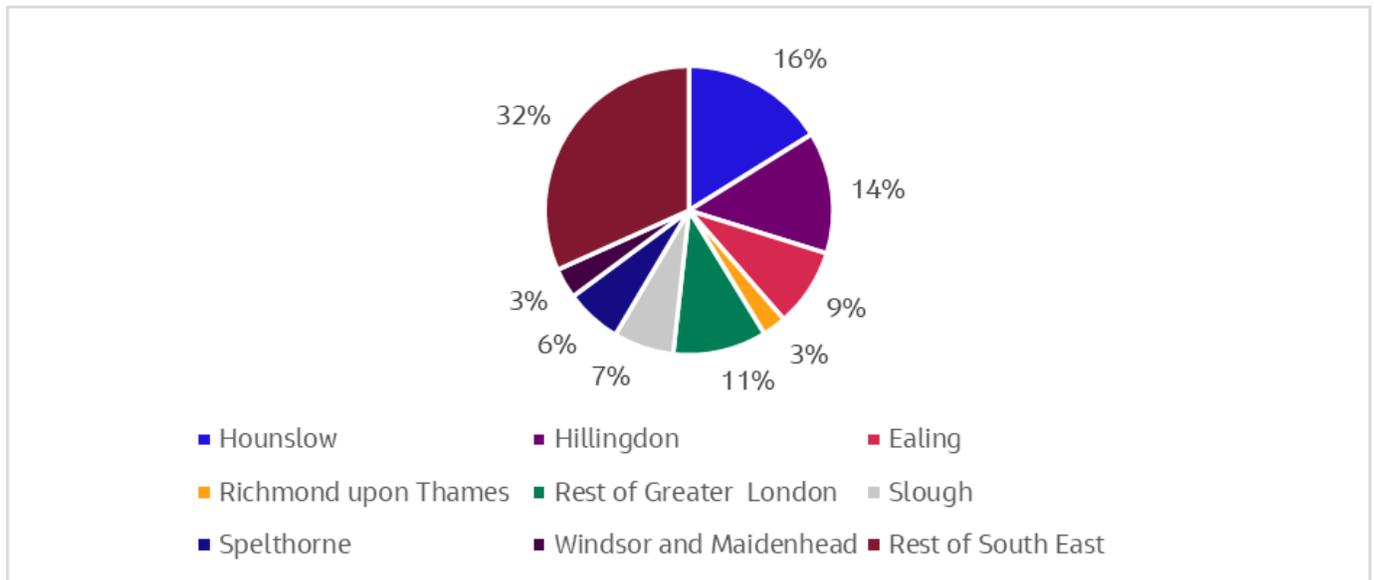


Source: Heathrow Airport 2019 Travel Report

The airport states that 64.8 per cent of workers commute by car, 1.3 per cent by motorbike and 0.8 per cent by taxi/PHV. Virtually all of the employees at the airport are travelling from areas outside the existing ULEZ and nearly half are travelling from outside Greater London as shown in Figure 4-11.

¹⁹⁴ <https://docs.cdn.yougov.com/xeif44cie1/YouGov%20-%20Takeaway%20consumption%20and%20COVID.pdf> accessed April 2022

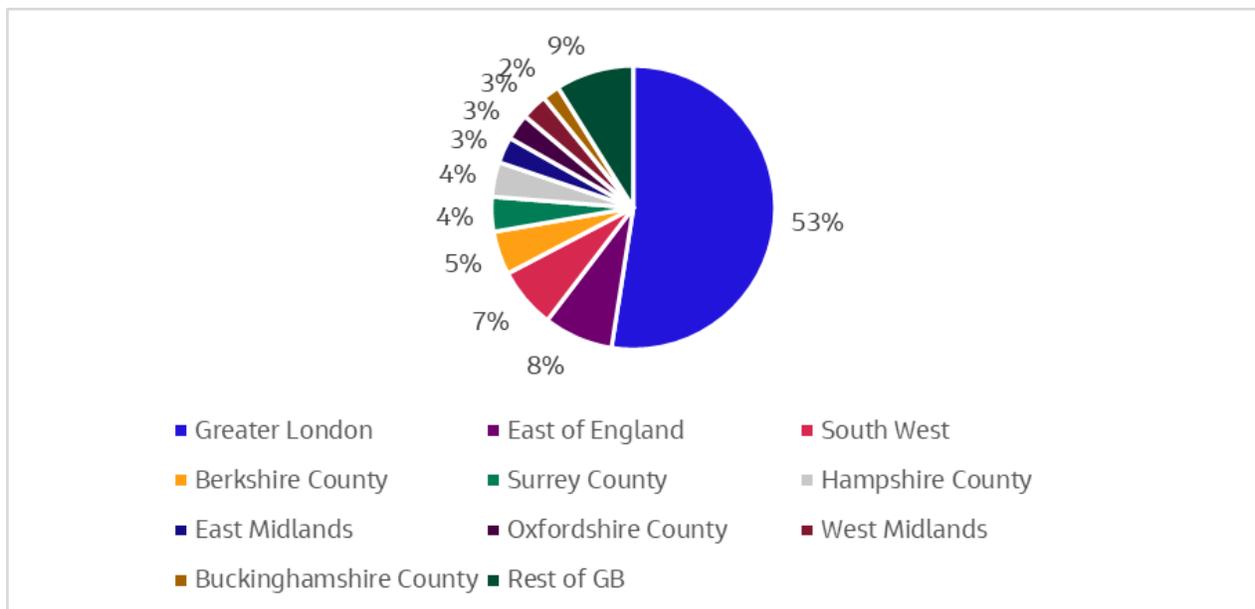
Figure 4-11 Origin of people working at Heathrow Airport



Heathrow Employment Survey 2016-17

In terms of passengers, around a third use taxis/PHVs and a quarter use cars with some 40 per cent using public transport according to Heathrow Airport’s 2019 Travel Report. The majority of passengers using Heathrow Airport have their UK origin or destination within Greater London as shown in Figure 4-12.

Figure 4-12 Origin/destination of Heathrow Airport passengers



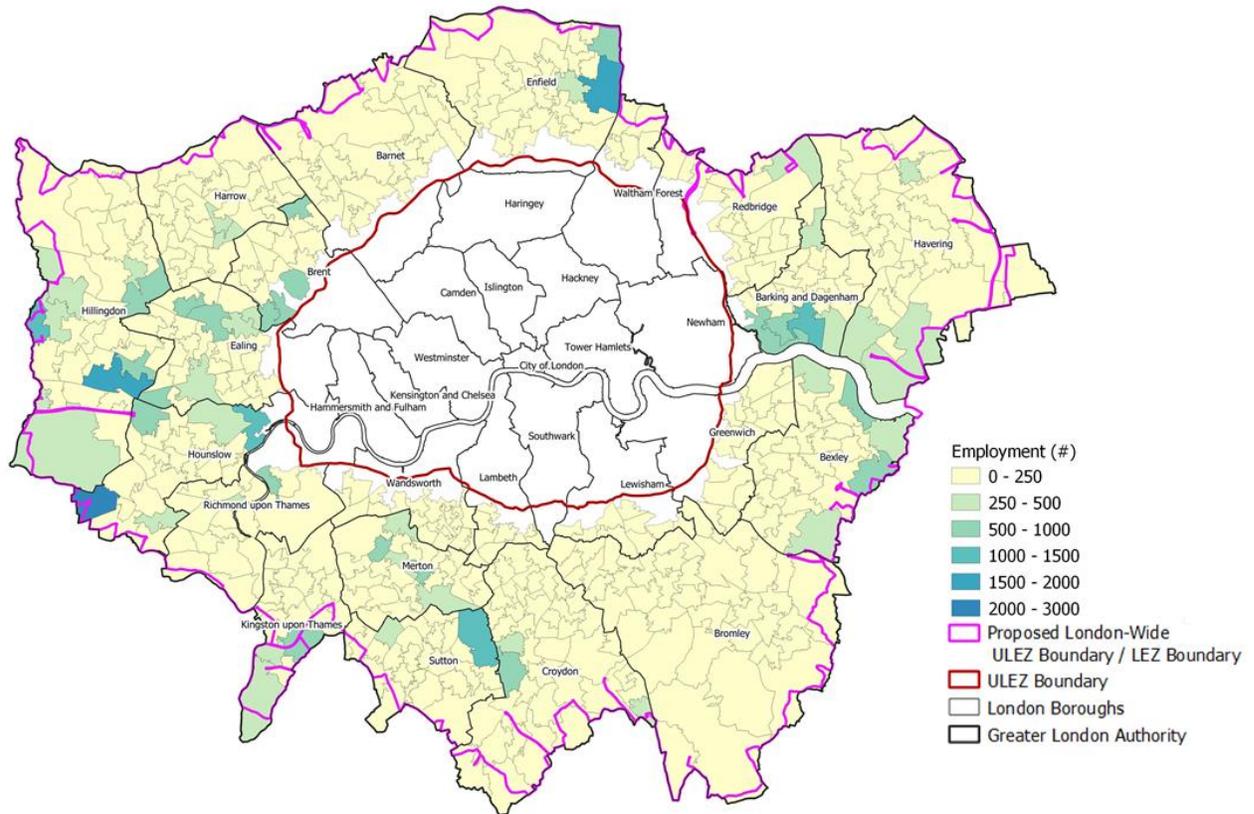
Source: Civil Aviation Authority

Air freight and servicing activities at the airport also generate considerable LGV traffic. The Heathrow Airport 2019 Travel Report estimates there are 8,500 LGV trips a day associated with the airport’s operations.

Appendix A.

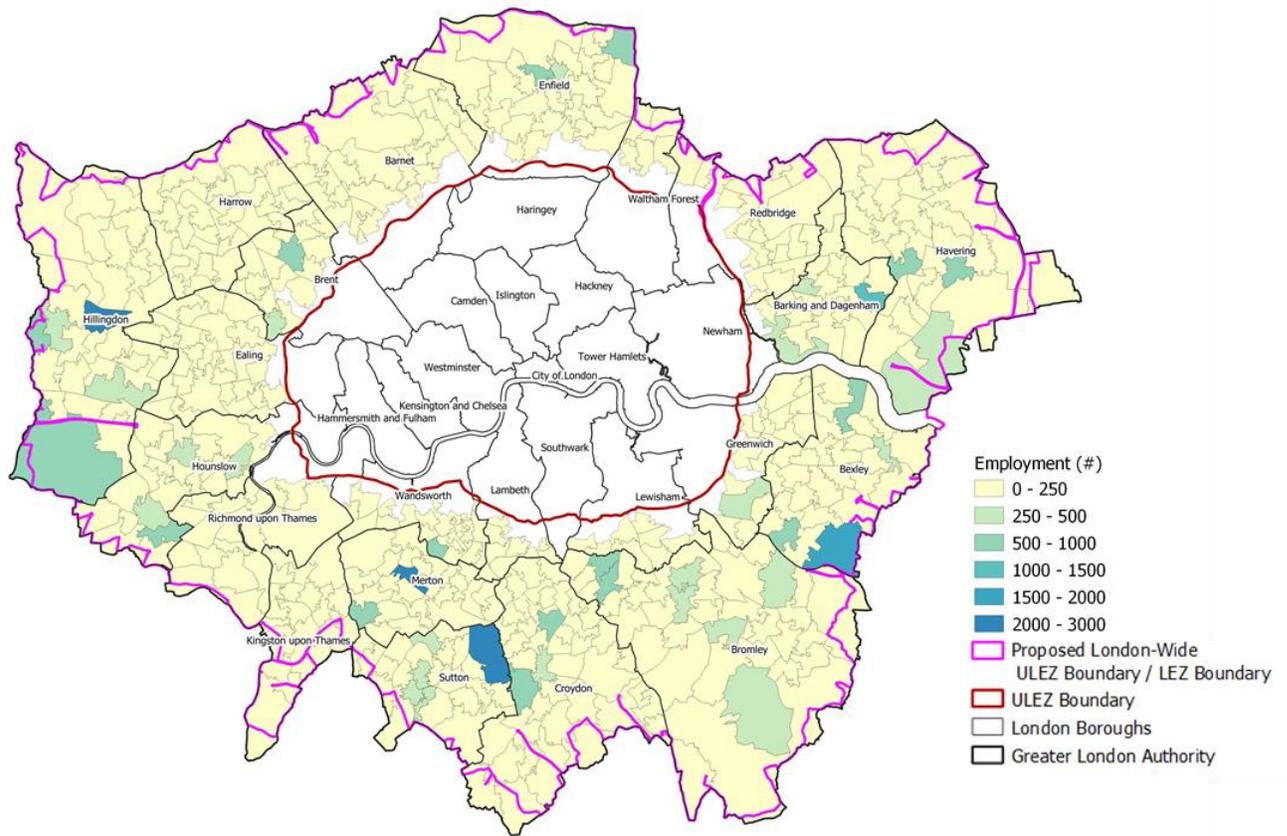
This section has a series of maps highlighting showing each of the concentrations of the top 5 LGV reliant sectors and their employment locations.

Figure 4-13 Wholesale trade, excluding trade of motor vehicles and motorcycles employment in outer London, 2020



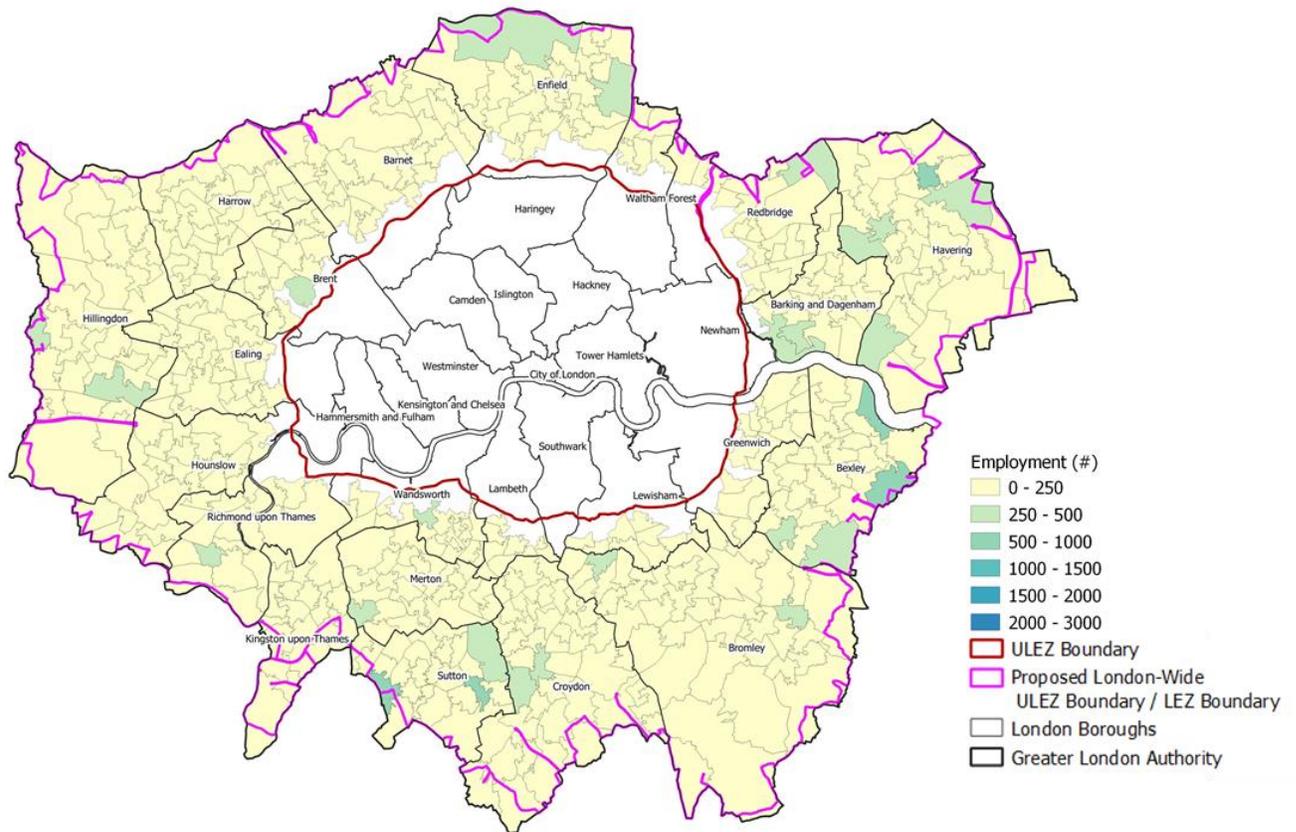
Source: Jacobs' analysis of BRES 2020

Figure 4-14 Services to buildings and landscape activities employment in outer London, 2020



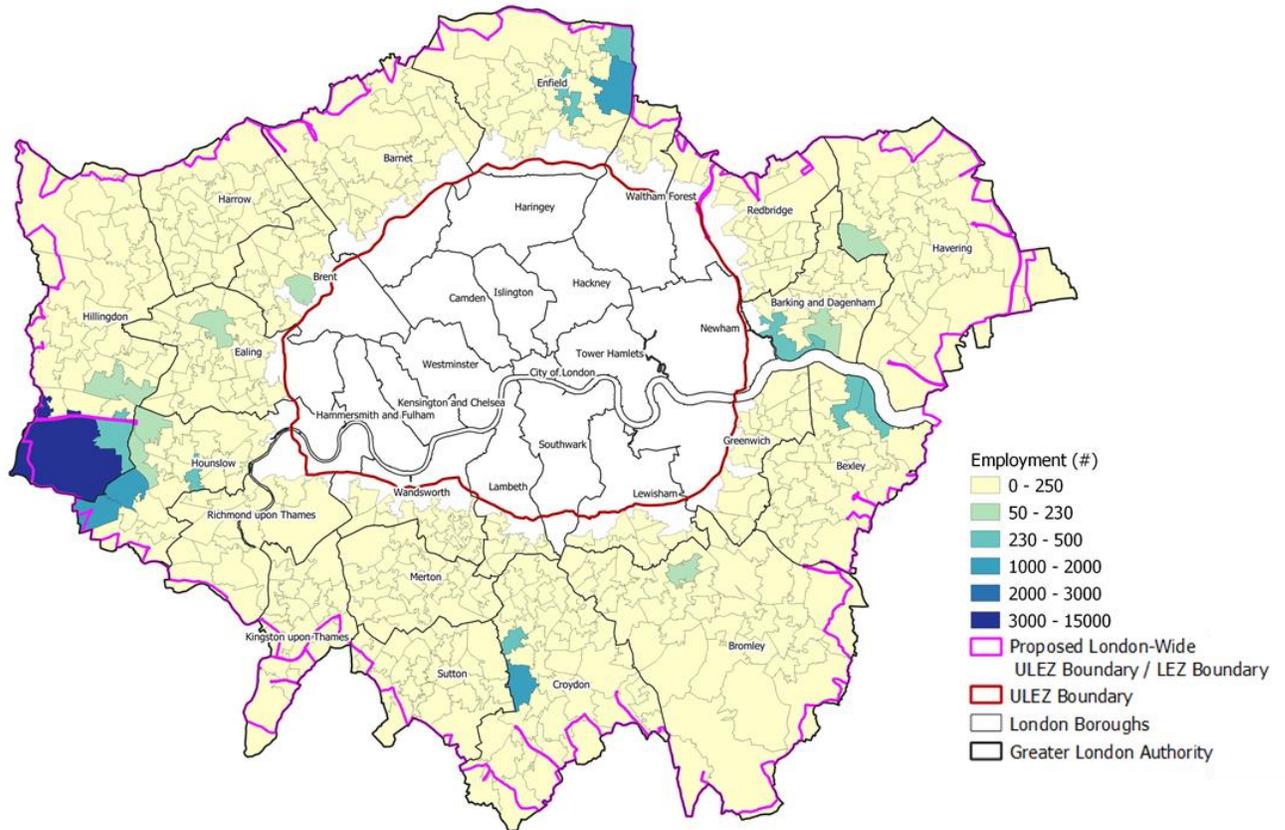
Source: Jacobs' analysis of BRES 2020

Figure 4-15 Specialised construction activities employment in outer London, 2020



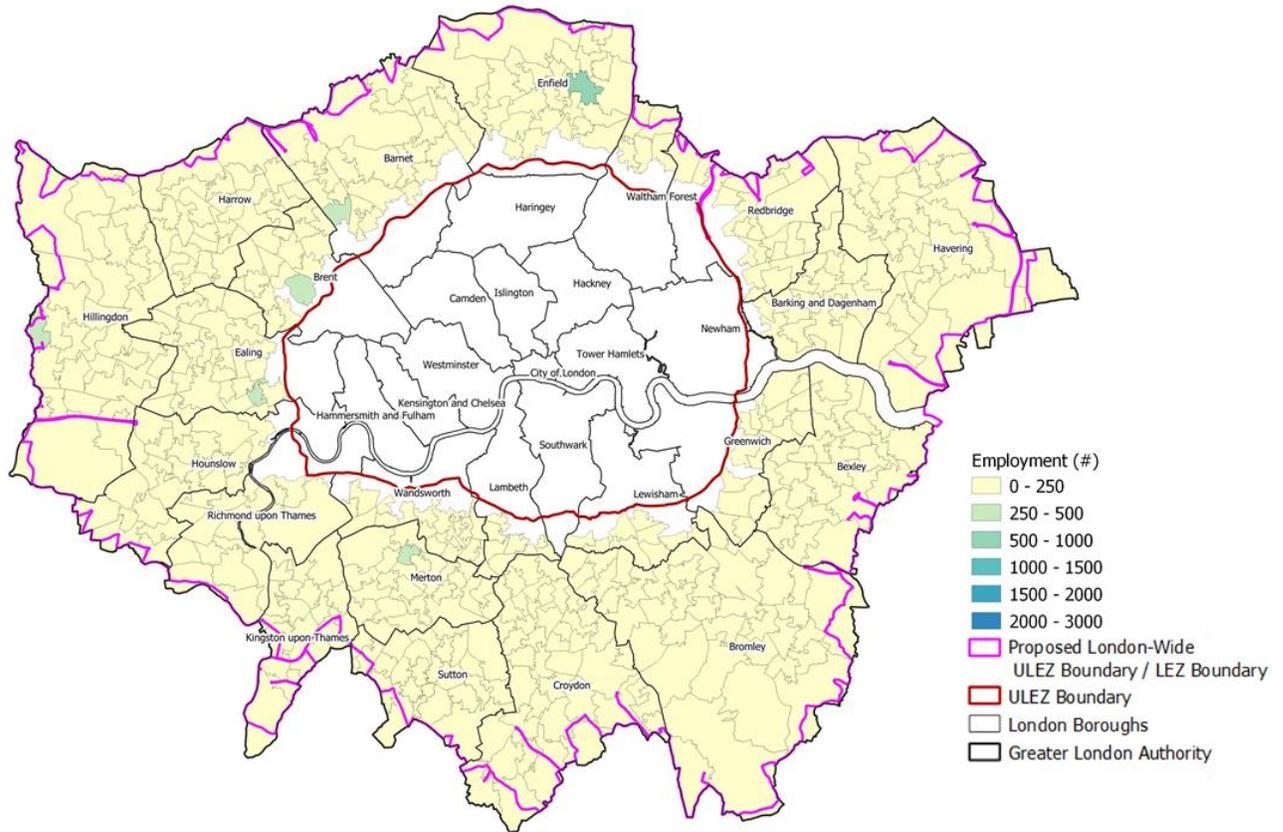
Source: Jacobs' analysis of BRES 2020

Figure 4-16 Warehousing and support activities for transportation employment in outer London, 2020



Source: Jacobs' analysis of BRES 2020

Figure 4-17 Construction of buildings employment in outer London, 2020



Source: Jacobs' analysis of BRES 2020

The figure below sets out the proportion of all trips and all journey purposes to areas with the highest concentration of LGV reliant employment.

Figure 4-18 Proportion of all trips originating from areas and travelling to clusters where LGV reliant sectors are heavily concentrated

