Draft London Plan Strategic Transport Modelling Supporting Evidence

Interim
July 2026

MAYOR OF LONDON

TRANSPORT FOR LONDON
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Executive summary

This interim evidence base outlines the possible transport impacts of the draft London Plan in 2036. It has been informed by Transport for London's (TfL) strategic transport modelling suite, MoTiON[1] and includes consideration of alignment with the Mayor's Transport Strategy (MTS)[2].

Key context and trends

Over the past decade the average number of trips undertaken per Londoner per day has declined, resulting in travel demand not increasing in line with population and employment.

The modelling uses 2023 as a recent year to compare the 2036 London Plan analysis to. The 2023 model estimates 24.9 million daily trips in London on a typical Monday to Friday weekday (during term time), of which 8.5 million are walk and cycle trips, 8.2 million public transport trips and 8.3 million highway trips. The proportion of highway trips need to fall to 20 per cent of the total to meet the MTS target of 80 per cent sustainable mode share by 2041.

Since 2019, rail crowding has improved and air quality has benefitted from policies such as the Ultra Low Emission Zone (ULEZ). However, congestion remains an ongoing challenge impacting bus reliability and speed. More information on this can be found in Travel in London 2025[3] report. Reliability challenges have also emerged on rail-based public transport, particularly impacting certain Underground lines. These baseline conditions form the foundation for assessing future impacts.

Growth scenarios and assumptions

To inform the draft London Plan, three 2036 scenarios were modelled. In these scenarios, homes, population and jobs are varied to represent a range of potential impacts on the transport network.

The homes in the Reference Case represents our current trajectory with the current London Plan. The Central Case and High Case both represent potential housing delivery of around 675,000 homes over 10 years to 2036. This is higher than the final housing target of 558,000 in the draft London Plan, though it should be noted that number of homes does not have a linear effect on population projections, which is the main driver of transport impacts. This is discussed further in section 1.3.

The input assumptions for population and jobs are outlined below. The population range between the Reference Case and High Case serves as a broader proxy to represent uncertainty in both, potential housing delivery or population growth.

[1] Strategic Land Use Models, Reports and Publications Strategic transport models - Transport for London
[2] The Mayor's Transport Strategy The Mayor's Transport Strategy - Transport for London
[3] Travel in London, TfL Publications and Reports Travel in London reports - Transport for London

All three scenarios include transport schemes that are currently committed, but at this stage contain no additional transport mitigation to accommodate draft London Plan growth:

(1) **Reference Case** – A lower growth baseline where London has a population of 9.6 million (+530,000 from 2023) and 5.9 million jobs (+260,000 from 2023). This scenario only includes housing and employment developments that are currently committed and historic 'windfall' housing.

(2) **Central Case** – Based on a population of 9.9 million (+940,000 from 2023) and 6.2 million jobs (+490,000 from 2023). This scenario includes new sources of housing supply from the draft London Plan and is the 'most likely' view of resulting transport impacts in 2036.

(3) **High Case** – A stress test of the transport network with higher levels of population growth. A London population of 10.4 million (+1.4 million from 2023) and 6.2 million jobs (same as Central Case). This scenario includes the same housing supply growth as the Central Case, but a larger population increase as it assumes there is no population displacement from existing housing stock.

In all three scenarios, the distribution of population growth is greatest in outer north and east London for housing, whilst employment growth is focused in central London and locations bordering the Central Activities Zone (CAZ). Car ownership is projected to decline, especially in inner boroughs with significant housing growth.

London-wide impacts and mode share

Under the Central Case, daily travel demand in London is forecast to rise by over 11 per cent from 2023 to 27.6 million daily trips in 2036. Public transport trips increase the most (17 per cent) followed by highway trips (10 per cent) and active travel (6 per cent). The distribution of travel demand growth is uneven, with greatest change in locations where land-use change is predicted.

Modelling of the Central Case without any uncommitted transport interventions indicate a modest increase in sustainable mode share. When the above modelled data is converted to be comparable to MTS reporting in TiL, the sustainable mode share in the 2036 Central Case reaches 65 per cent compared to the MTS target of 80 per cent by 2041. The draft London Plan presents opportunities to promote sustainable travel choices. Further modelling will assess potential measures to mitigate the impacts of growth that could also support further shift to sustainable modes (see Chapter 4 below).

Road network impacts

The road network sees significant challenges in all three scenarios, even in the Reference Case, compared to 2023. Even though car parking standards reduce car ownership rates per household in new developments, the continued population growth means more trips will be made on London's roads by 2036. The challenges are experienced as:

- A significant reduction in traffic speeds across London at 5 per cent in the Reference Case, 7 per cent in the Central Case and 9 per cent in the High Case. Outer London is most affected.

- More junctions operating at or above capacity, particularly near growth areas.

These impact buses, freight as well as general traffic, and risk worsening journey time reliability. The findings highlight the need for interventions to shift travel behaviour and manage demand.

Public transport impacts

Public transport demand is expected to see the strongest demand growth of all modes, placing additional pressure on the network. There are challenges in the Reference Case compared to 2023, which the Central and High Cases further magnify. These challenges include:

- Demand increases on key corridors that already experience crowding in peak hours, particularly from north and east London.

- More passengers experiencing crowding above 3 standing per square metre during peak hours, indicating discomfort and at the upper limits, potential operational concerns.

- Increased congestion pressure at stations. In the Central Case AM peak, around 20 additional stations are expected to experience new or extended periods of severe crowding compared to 2023. Severe crowding in the models indicates the possible regular need for intervention during periods of peak demand, such as closing stations to entering passengers or non-stopping trains. This demonstrates the need for continued investment in station upgrades.

Conclusions and next steps

This analysis has identified transport challenges that come with growth in London. These include increased congestion on roads, higher public transport demand and increased crowding at key stations. These challenges are widespread but unevenly distributed, with outer London and central London particularly affected.

The draft London Plan has some influence on these outcomes. In seeking to direct growth to the most well-connected locations, supporting mode shift and minimising car parking it plays a key role in ensuring that this growth and development is sustainable and that impacts are minimised as far as possible.

The policies in the draft London Plan steer growth towards locations with better sustainable transport options. These are captured in the Central and High Cases, and are reflected in the fact these scenarios achieve higher sustainable mode shares than the Reference Case. While transport challenges have been identified to accommodate this level of growth, alternative land use policies accomodating

the same level of growth but without a similar focus on locating around sustainable transport options, would lead to worse highway outcomes. Similarly policies reflecting restraints on car parking provision are included in all three scenarios and in the absence of these, congestion outcomes would be worse.

The draft London Plan plays an important role in mitigating the transport impacts of growth but it cannot do this alone. The role of the MTS and broader transport planning, policies and investment is key – with the development of London's transport network needing to support the city's growth and broader evolution over time.

Following this interim assessment, further work will:

- Refine growth assumptions and modelling inputs and assess a wider range of scenarios

- Identify and evaluate other mitigation measures, such as infrastructure investment, service improvements and demand management.

This analysis will focus on assessing packages of interventions to ensure London's transport system can support London's continuing growth and delivery of the MTS.

1 Introduction and background

1.1 Background to the draft London Plan

The London Plan is the Spatial Development Strategy for London, setting out an integrated economic, environmental, transport and social framework for the development of London between 2026 and 2046. This includes the target to deliver 558,000 homes in the first ten-year period to 2036. The draft London Plan sits alongside the National Policy Planning Framework (NPPF), which provides the overarching framework for housing and other development across England.

Transport plays a key role in the draft London Plan; the homes are not just units but homes that will be filled by people who will travel around the city for work and leisure. These trips need to be accommodated on the transport network and consider what policies and mitigations could be appropriate.

Alongside the draft London Plan, the MTS sets out the strategic aims for transport in London. The MTS is structured around the three pillars of healthy streets and healthy people, a good public transport experience and new homes and jobs.

The MTS was published in 2018 and has a timeframe to 2041. The draft London Plan will cover the period 2026 to 2046 and so there is an overlap between the two strategies.

1.2 Purpose of this evidence base

The purpose of this interim evidence base is to help to understand and assess the transport challenges for the draft London Plan. This evidence base considers modelled forecasts for London's transport network in 2036, providing an assessment of transport impacts following the delivery of the first ten years of growth set out in the draft London Plan.

Through this, an understanding of the challenges on the transport network posed by London's growth can be developed, such as crowding and congestion. Understanding the possible challenges informs the identification of mitigation measures that could be required and deliverable.

This evidence base is interim. The draft London Plan will likely evolve through consultation and examination. Therefore, the transport modelling will also need to evolve, and further modelling will be carried out in the coming months (see Chapter 4 below).

1.3 Current travel trends in London

To understand the travel impacts of the draft London Plan growth in 2036, it is important to understand London now: the current population, how people travel and how the network operates. TfL publish TiL[4] reports annually and contains this information in detail. These reports can be found on the publications and reports

[4] Travel in London, TfL Publications and Reports Travel in London reports - Transport for London

section of the TfL website, and some key trends from the latest report are summarised below.

London is growing and the population is the highest it has ever been. In 2000 London's population was 7.2 million and by 2023 it had increased to 9 million.

As well as the total population living in London, it is important to understand how many trips individuals make on an average day. This is called the trip rate. The trip rate for Londoners has been decreasing. In 2005 Londoners made an average of 2.59 trips per day and in 2024 this had reduced to 2 trips per day.

This means that while the number of people living in London has been increasing, the average number of trips each person makes has been decreasing. Londoners are travelling less at an individual level despite there being more people in the city overall.

In 2023, the total number of trips made in London was 24.9 million on a typical Monday to Friday during term time (modelled data), as shown in Figure 1. These trips are those that are from, to and within London, and are undertaken by both Londoners and non-Londoners.

Most of these 24.9 million trips were made by active modes (8.5 million trips made by walking or cycling) or by public transport (8.2 million trips by bus or rail). 8.3 million trips were made by vehicles on the highway (e.g. by car or taxi).

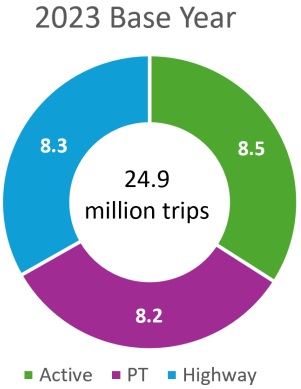


Figure 1 Number of trips made on an average day in London in 2023, based on modelled data.

The MTS was published in 2018 and sets out TfL's strategic aims up to 2041. Detail on progress towards these aims is reported in the MTS Strategy Tracker which is available on the TfL website.[5]

The MTS sets an overarching objective for 80 per cent of trips in London to be made by sustainable modes which includes walking, cycling or public transport by 2041. TfL monitor this using data from across the network, and in 2024, 63.4 per cent of trips were made by these modes, according to TiL.

Supporting these sustainable modes are a broader set of aims. For roads, this includes reducing car trips and roadside nitrogen dioxide and improving average

[5] Mayors Transport Strategy tracker, TfL Publications and Reports Travel in London reports - Transport for London

bus speeds. For rail, there is the aim is to reduce the proportion of TfL rail journeys with crowding of two people per square metre or higher.

London's transport system is continually evolving. The Elizabeth line opening in 2022 had a transformative impact on east-west rail capacity across the city. Other routes have had upgrades, whereas some have experienced challenges with service reliability. The bus network has experienced a mixed picture in recent years with the introduction of Superloop improving orbital connectivity, especially in outer London, but increasing road congestion leading to slower journeys and reliability challenges.

1.4 Strategic transport modelling

TfL's strategic models[6] have been used widely for forecasting the impacts of transport and land use decisions in London. This has included assessment of previous London Plans. The following strategic models have been used to understand the potential travel demand for London in 2036 with the draft London Plan growth:

- London Population Synthesiser (LoPopS) estimates the demographic segments (such as age, gender, etc) of a projected population.

- Model of Travel in London (MoTiON) takes a wide variety of data inputs, including population and employment, to forecast how many trips people will make, where these trips will happen and which mode of transport they will take.

- London Highway Assignment Model (LoHAM) assigns the highway trips from MoTiON to the network providing information about how many vehicle kilometres will be driven, what route they take and any subsequent congestion and delay at junctions. Further analysis of LoHAM outputs can provide insights into London-wide air quality impacts.

- RailPlan takes public transport trips from MoTiON and assigns them to London's transport network. RailPlan provides information about which routes people will use including rerouting and crowding impacts.

Forecasting is not a prediction. The future is inherently uncertain, and uncertainty increases the further into the future you look. The purpose of this strategic modelling is not to try and predict the future but to identify the highest risks to inform potential mitigations and investment.

[6] Strategic transport models - Transport for London
https://tfl.gov.uk/corporate/publications-and-reports/strategic-transport-and-land-use-models

2 Inputs and assumptions: London's modelled growth

2.1 What is modelled for the draft London Plan

To model the draft London Plan three scenarios were run using each of the above strategic transport models. The scenarios are summarised in Table I.

Table I Summary of the three draft London Plan scenarios

Description	Reference Case	Central Case	High Case
Purpose	To provide a lower growth baseline to compare the draft London Plan against	The 'most likely' impacts of the draft London Plan based on TfL's current understanding	To stress test the network against even higher levels of growth
Description	Lower growth projections with housing delivery aligned to sites with current planning permissions, before new national policy and draft London Plan.	Higher growth projections to reflect the draft London Plan and changes in NPPF. Assumes some occupants of new homes relocate within London, and some are new to London.	Even higher growth projections by assuming housing growth directly translates into population growth i.e. new homes are all occupied by people who wouldn't otherwise live in London. Could also reflect the highest levels of housing delivery.
Population	9.6m (+530,000 vs 2023)	9.9m (+940,000 vs 2023)	10.4m (+1.4m vs 2023)
Jobs	5.9m (+260,000 from 2023)	6.2m (+490,000 from 2023)	6.2m (+490,000 from 2023)
Distribution of new housing	Currently consented housing development and historic windfall	Also includes new sources from draft London Plan	Also includes new sources from draft London Plan

Description	Reference Case	Central Case	High Case
Transport mitigation measures, beyond current commitments	None	None	None

The assessment of housing capacity for the draft London Plan is an iterative process, including multiple stages of viability testing, while transport modelling has long lead-in times. As a result, both Central and High Cases model around 675,000 additional homes over 10 years to 2036, rather than the housing target of 558,000 in the draft London Plan. It is possible this might slightly overstate some impacts on the transport network, but transport is primarily influenced by population and employment, rather than housing units per se. New housing mainly affects the distribution of the additional population across different parts of London. Both Central and High Cases include new sources of housing, such as in the Green Belt and on industrial land, ensuring these impacts are tested. In contrast, these are not included in the Reference Case (which is limited to 250,000 new homes within existing spatial patterns of development).

The difference between the Central and High Cases was created by changing the population assumptions as a broader proxy to represent the higher and lower levels of both housing delivery and population growth. The population in the London Plan High Case is less plausible than the Central Case but allows the transport network to be stress tested.

The precise housing inputs will be revisited as part of future modelling work (see section 4) but the overall conclusions are sufficiently consistent with the draft London Plan published for consultation for initial assessment.

Section 2.3 summarises these three inputs (housing, population and jobs) for the three London Plan scenarios that were modelled.

2.2 Caveats and limitations

The caveats and limitations with these interim transport modelling results are outlined below:

- The MoTiON modelling considers travel demand across a whole day but the LoHAM and RailPlan assignment modelling focus on the AM peak because this is the busiest time for travel.

- MoTiON modelling has many strengths including the representation of public transport and highway trips on the network. There is greater uncertainty regarding the representation of walk and cycle trips; however, the inclusion of a cycling model in the modelling suite still is a level of detail beyond typical modelling suites in the UK.

- Indicative conclusions on the impact of the draft London Plan on freight trips are included. More detailed freight modelling will be included in the next stage of modelling work.

- As a strategic modelling exercise, this is suitable for looking at travel impacts across strategic areas but not in local area detail such as impacts on specific road junctions or stations. The analysis contained in this report is all based on modelled data for 2023 and 2036. It is not directly comparable with publications such as Travel in London which is based on observed data. An exception to this is the section on the MTS where the modelled data has been converted into the same metrics used in TiL.

2.3 Key inputs and assumptions

The most influential drivers of travel demand are where people live and where they work. Understanding the impact of this is a key part of the assessment of the draft London Plan.

Housing and population figures for the draft London Plan Reference Case and Central Case were produced by the Greater London Authority (GLA). Housing delivery in the wider South East and London assumes the equivalent proportion of standard methodology housing need under the National Planning Policy Framework. Population inputs for the High Case were developed by TfL. The purpose of the Reference and High Cases are to illustrate a potential range of uncertainty in transport impacts.

For total jobs, inputs were based on the latest borough employment projections produced by the GLA and the distribution of jobs within boroughs was based on the London Employment Sites Database (LESD) data.

2.3.1 Households

2036 Central Case has 20 per cent more households across London when compared to 2023 Base Year, but this growth is not evenly distributed across London. As shown in Figure 2, the darker purples denote the greatest percentage increase in households which is in outer and east London.

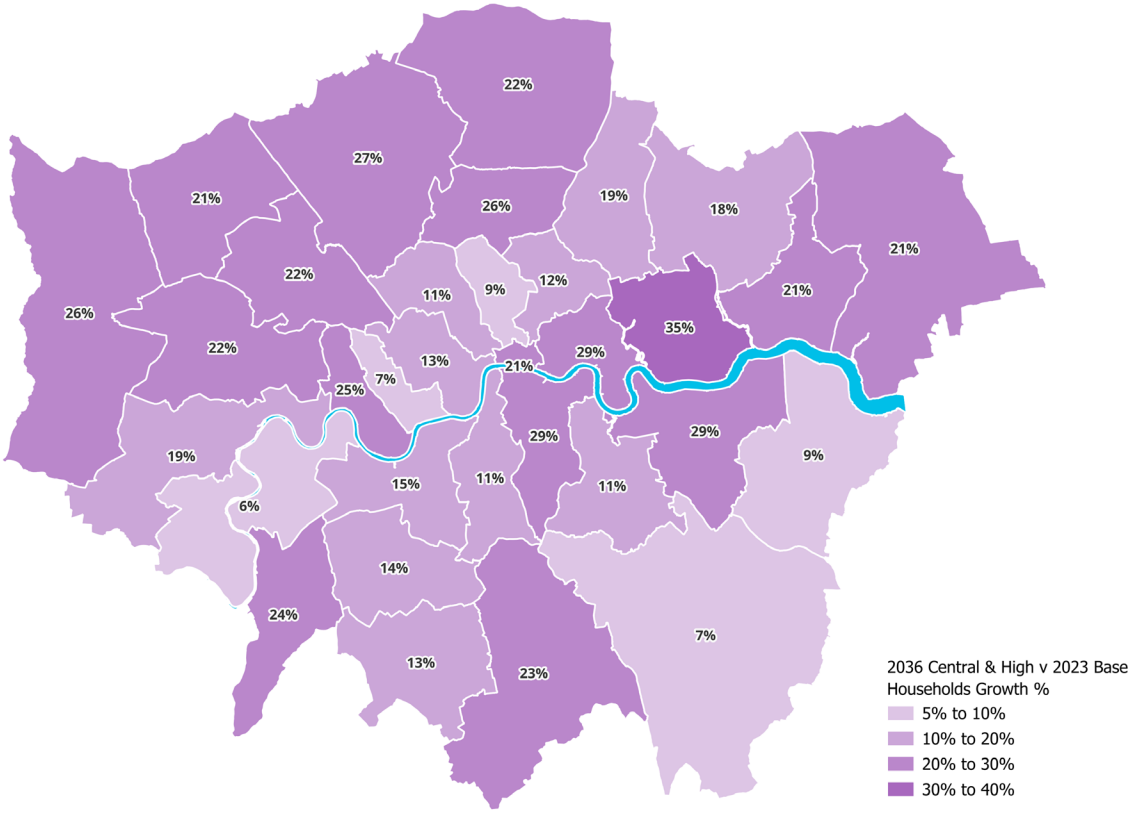


Figure 2 Borough map of percentage household growth, 2036 Central Case compared to 2023 Base Year.

As well as new housing being delivered in London by 2036, the NPPF assumes housing delivery across the rest of England including in the wider South East region. For the purposes of this modelling, the 675,000 homes assumed for London equates to around 75 per cent of the NPPF housing target. The same 75 per cent is therefore assumed for the delivery for the wider South East to ensure consistency. The rationale is to avoid representing potential transport impacts due to population redistribution effects between London and the wider South East, if there were to be differing rates of housing delivery assumed in the modelling.

2.3.2 Population

Population increases 10 per cent between 2023 Base Year and 2036 Central Case. The location of this population growth reflects where housing has been delivered, with higher growth in outer and east London. Figure 3 shows the percentage change by borough where the darker pinks denote the greatest increase in population.

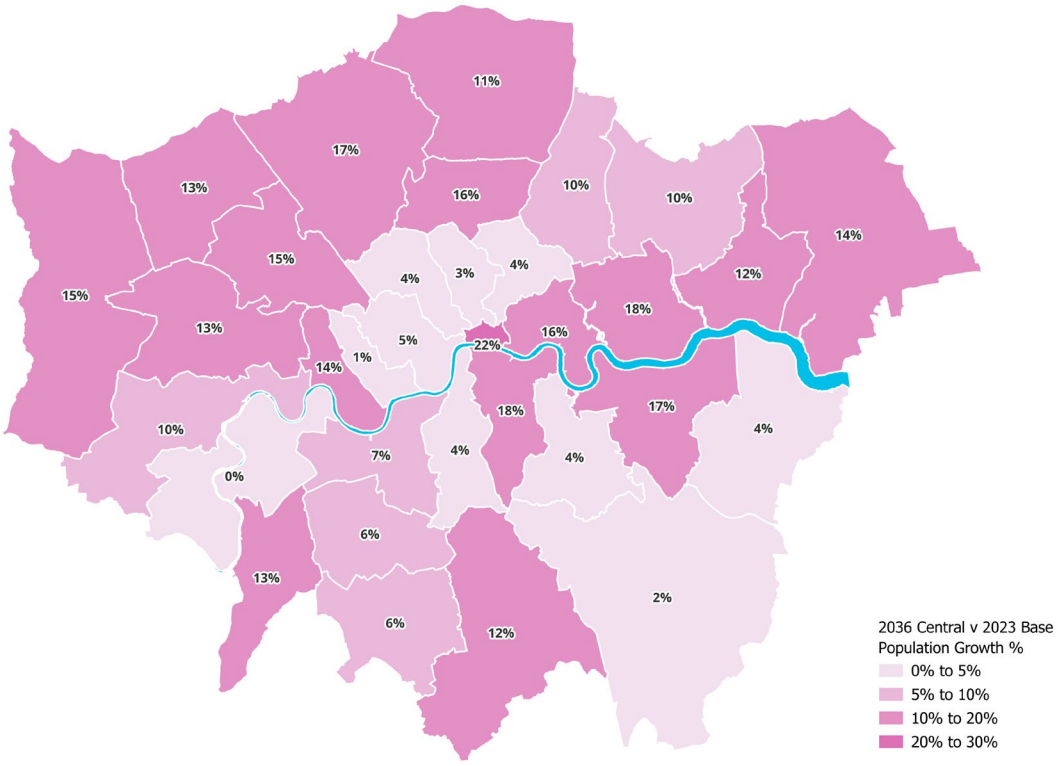


Figure 3 Borough map of percentage population growth, 2036 Central Case compared to 2023 Base Year.

A large proportion of housing and population growth is anticipated to concentrate on larger sites identified in the Strategic Housing Land Availability Assessment (SHLAA). This is represented in the strategic modelling, as indicated in Figure 2 and Figure 3. Figure 4 shows percentage population growth per MoTiON model zone. The pattern of growth for individual sites can lead to localised transport challenges that will be assessed and options for mitigation considered through planning processes for the particular site in question.

It is noticeable that some locations are forecast to experience a modest fall in population. This is due to a limited supply of new homes in these locations, as well as, on average, the number of residents per household reducing slightly due to the increased housing supply in other areas.

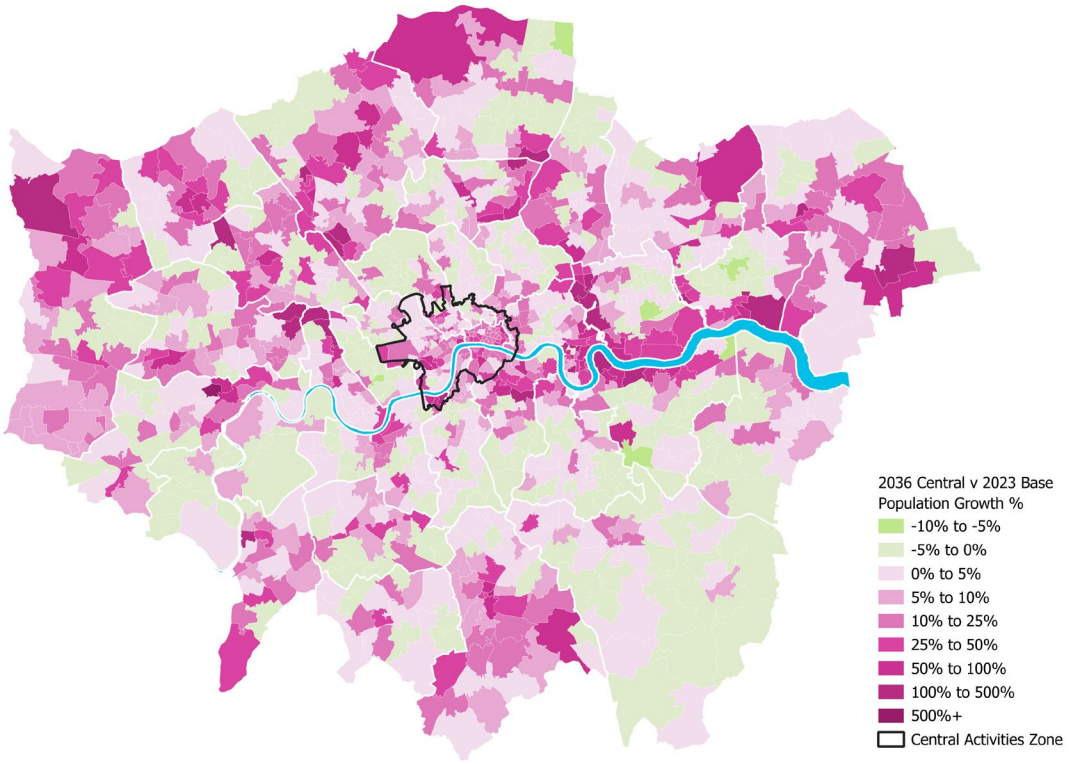


Figure 4 Map of percentage population growth at the MoTiON strategic model zone, 2036 Central Case compared to 2023 Base Year.

2.3.3 Employment

Employment projections for boroughs were calculated by the GLA using a trend-based model which uses an assumption about future output growth and the historical relationship between output and jobs (labour productivity). The main data sources were London gross value added (GVA)[7] and the London job series, borough-by-sector jobs[8] from 1971 to 2022 and the London Employment Sites Database 2024[9] (LESD 2024).

The Central and High Cases share the same employment projection of 9 per cent growth in jobs in London, concentrated in the Central Activities Zone (CAZ), as shown in Figure 5. The modelled growth in absolute employment numbers is shown in Figure 6, which clearly shows substantial growth in jobs to 2036 occurring in or around the CAZ. Figure 7 shows the same data but at the MoTiON zone level.

[7] Gross Value Added - Gross Value Added (GVA) - Office for National Statistics
[8] Borough by sector employee jobs | London Datastore
[9] London Employment Sites Database 2024 | london.gov.uk

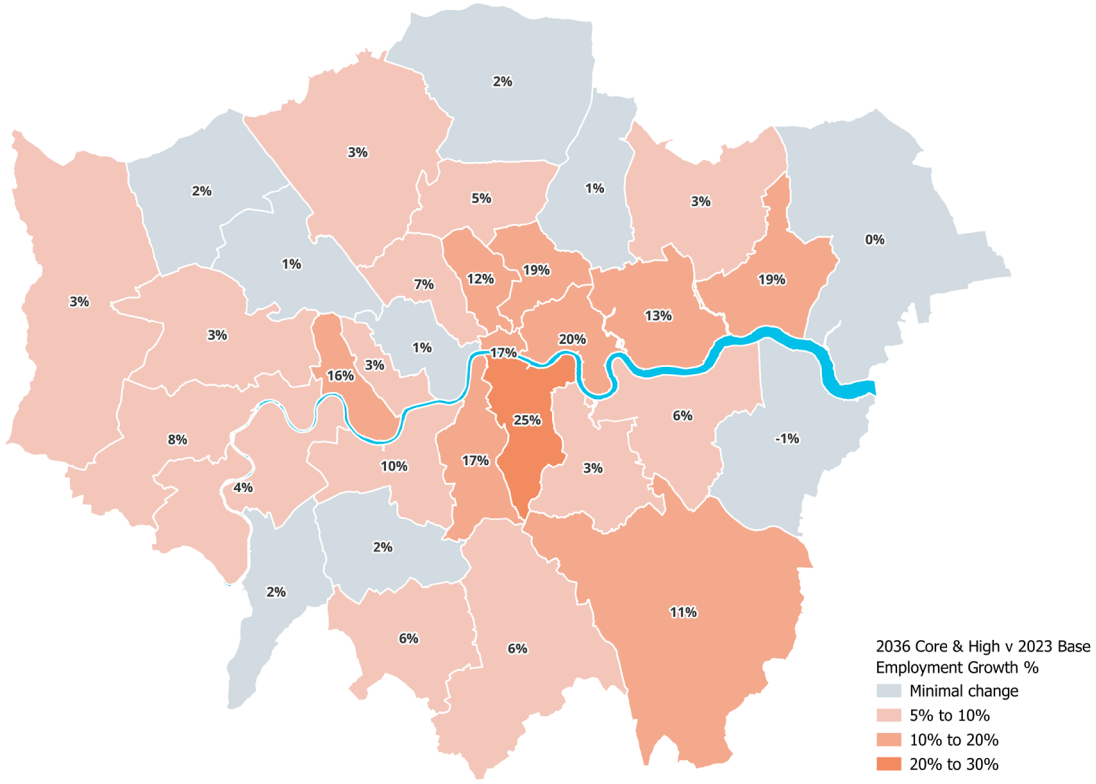


Figure 5 Borough map of percentage employment growth, 2036 Central and High Case compared to 2023 Base Year

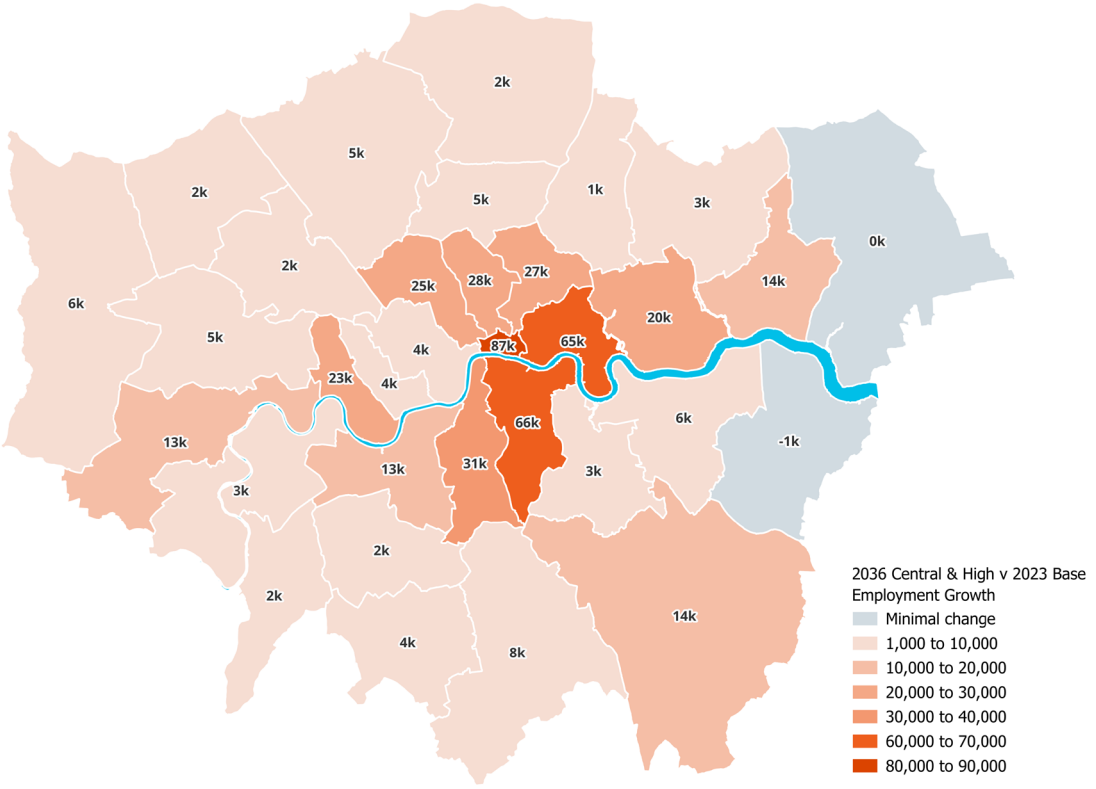


Figure 6 Borough map of absolute employment growth, 2036 Central and High Case compared to 2023 Base Year

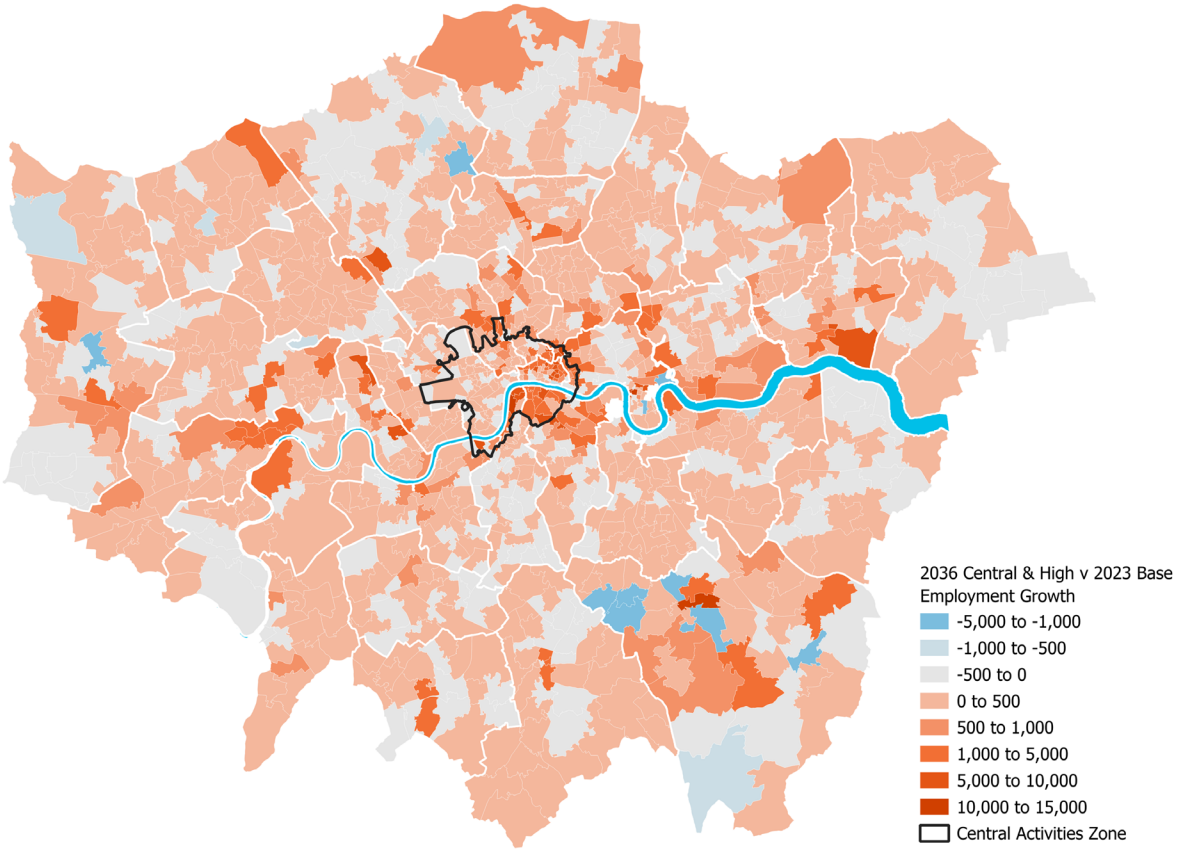


Figure 7 Map of absolute employment growth at the MoTiON zone level, 2036 Central and High Case compared to 2023 Base Year

2.3.4 Public transport network

This evidence base is designed to identify the transport challenges for the draft London Plan. It does not contain an assessment of new transport schemes or policies that respond to identified draft London Plan impacts.

That said, there are improvements to the network that are committed to be delivered by 2036; these are in parallel to the draft London Plan, though can play a role in mitigating its impacts. By 2036, the services outlined in Table 2 are expected to be open and they are represented in the modelling accordingly.

Table 2 Changes to modelled rail-based public transport network in 2036 compared to 2023

Transport mode	Changes to transport network
Underground and Overground	• Central and Piccadilly line increased frequency due to either new or refurbished rolling stock. • Four Lines Modernisation: New trains and signalling system on Circle, District, Hammersmith & City and Metropolitan lines. • Marginal increase in Windrush line frequency.

Transport mode	Changes to transport network
DLR	• Extension to Thamesmead. • Increased frequency between Canary Wharf and Lewisham, Canning Town and Woolwich, as well as to Stratford International.
Elizabeth Line	• Increased frequency west of Old Oak Common, between Old Oak Common and Paddington, and along trunk sections
National Rail	• High Speed 2 running between Birmingham and Old Oak Common.

It should be noted that London Underground reliability challenges are assumed on some services in 2036, consistent with conditions in 2023.

These schemes have been included in all three of the London Plan scenarios that have been modelled. This means that in the modelled future year, the transport network has new capacity and frequencies in some areas. In others the transport network stays largely the same as today.

2.3.5 Car ownership

Car ownership per household is one of the factors that impact mode choice outcomes. Car ownership assumptions are calculated for all scenarios based on the provision of parking spaces per household, particularly at new developments, together with evidence that car ownership reduces in well-connected areas. It is intrinsically linked to the number of households in the scenario, and therefore Central and High Case have the same car ownership rates. All scenarios assume car parking restraint in new development broadly akin to the draft London Plan policies.

In the London Plan Central and High Case, car ownership decreases by 10 per cent compared to 2023, measured as cars owned per 100 households. Figure 8 shows the pattern of reduction in car ownership per 100 households; it correlates with increase in households but is particularly pronounced in inner London boroughs with high levels of new homes, where car-free development is more common.

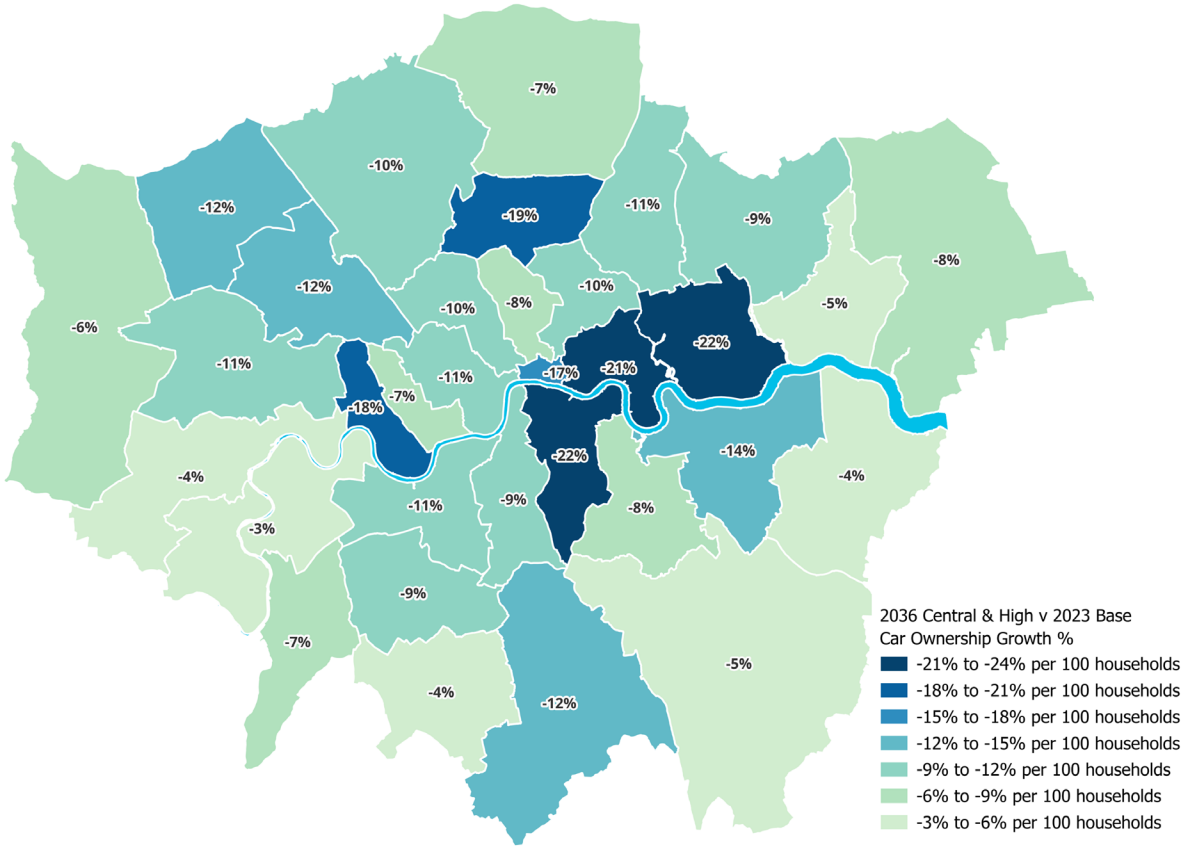


Figure 8 Borough map of percentage change in car ownership (per 100 households), 2036 Central Case compared to 2023 Base Year.

3 Interim output: Where London's transport challenges lie

3.1 Introduction

Chapter 3 of this report presents the interim modelling results exploring the transport impacts of the growth assumed in the draft London Plan. Modelling is shown compared to 2023 Base Year to highlight the scale of change expected in 2036 with no specific mitigations to improve the walk, cycle, public transport or road networks, or to reduce car dependency. Future modelling will develop mitigations, and this is outlined in Chapter 4.

There are three sub-sections; the first covers London wide impacts, the second covers impacts on London's roads and the third covers impacts on London's rail network.

It must be noted that the modelled data presented in this Chapter is not directly comparable to TiL[10] data because they are based on different 'average day' definitions. TiL represents a seven-day average for trips which includes weekend travel and school holiday periods; this is to describe observed travel behaviour of London residents. The strategic transport models, however, represent a typical weekday in a school term-time period to assess the peak levels of demand on London's highway and public transport networks. The following sub-sections present modelled data only.

3.2 London wide impacts

With the delivery of the growth in the draft London Plan, there could be around 27.6 million trips in London during a typical working-week day in the Central Case. This is 11 per cent higher for both origins and destination trips compared to 2023.

Figure 9 shows the total trips to, from and within London on an average weekday (from modelled data). In the Central Case, with no mitigations to increase the attractiveness of public transport, the highest growth is in trips by public transport which grows from around 8.2 million trips on an average day in 2023 to around 9.5 million in 2036, an increase of 17 per cent.

[10] Travel in London reports - Transport for London

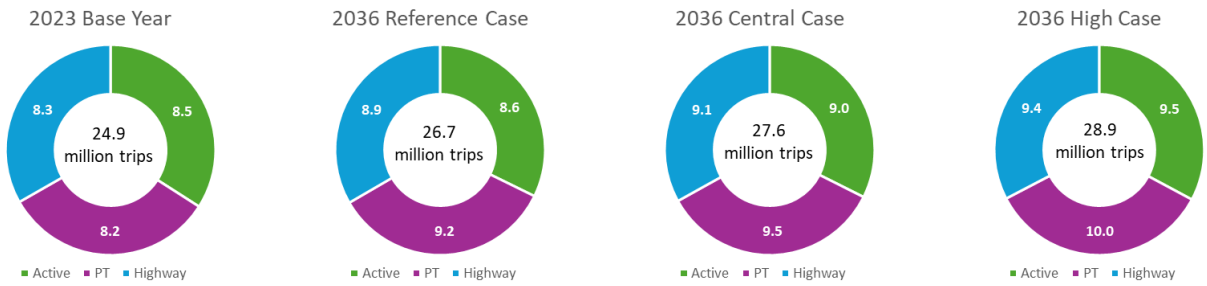


Figure 9 Total trips in London on an average day (modelled) disaggregated by main mode, for 2023 Base Year and the 2036 London Plan scenarios.

Highway trips increase from around 8.3 million in 2023 to around 9.1 million in the Central Case, an increase of 10 per cent. Active trips (those made by walking and cycling) increase from around 8.5 million in 2023 to around 9 million in the Central Case, an increase of 6 per cent. When comparing the Central Case to the Reference there is an increase of 300,000 PT trips (3 per cent), 400,000 active trips (4.6 per cent) and 200,000 highway trips (2 per cent). The majority of the additional trips are by PT or active modes, but an additional 200,000 daily highway trips will still have network implications as discussed later in the report.

The High Cases provides a stress test compared to the Central Case; this helps to understand the sensitivity of outcomes to different levels of travel demand. As shown in Figure 10, the High Case forecasts around 28.9 million trips, an increase of 16 per cent.

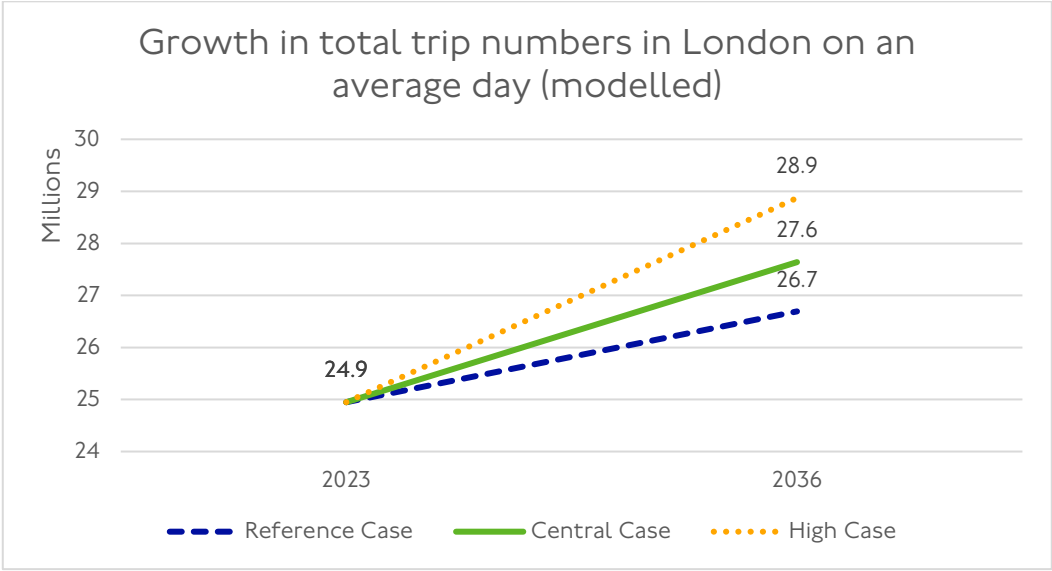


Figure 10 Growth in total London trip numbers on an average day (modelled) for 2023 Base Year, and the 2036 London Plan scenarios.

This growth in travel demand is not evenly distributed across London, and some areas see more growth than others; this is shown in Figure 11.

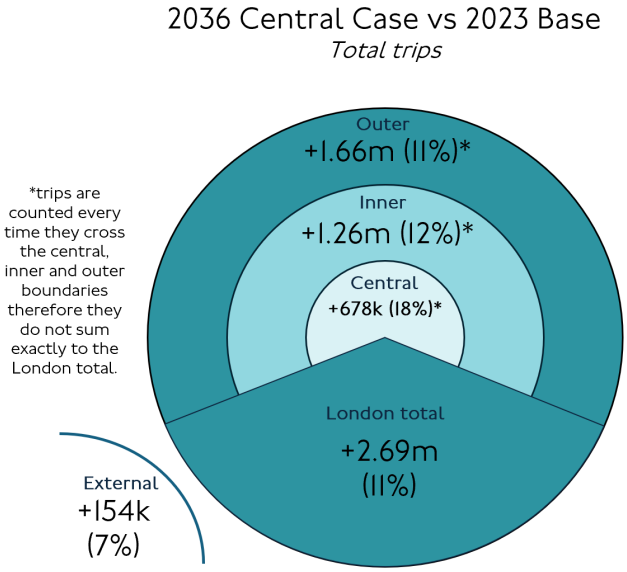


Figure 11 Growth in total London trip origins on an average day (modelled), 2036 Central Case compared to 2023 Base Year.

Central Case growth in the absolute number of trips on an typical weekday is greatest in outer London with 1.66 million, followed by inner (1.26 million) and central (678,000). The growth in trips at the London level is 2.69 million trips, which corresponds with Figure 9 and Figure 10. In percentage terms, central notes the highest growth, followed by inner, then outer.

3.3 London's roads

The 2023 base year in TfL's MoTiON demand model contains around 8.3 million daily trips by car and private hire vehicle (PHV) to, from and within London on a representative modelled weekday. This demand is then assigned within the London Highway Assignment Model (LoHAM), which represents peak-hour highway conditions and includes cars, taxis, PHVs, light goods vehicles (LGVs) and heavy goods vehicles (HGVs). LoHAM assigns vehicle trips to the road network to understand routing patterns and network performance, including average traffic speeds and congestion.

In the Central Case scenario, highway trips in London increase to 9.1 million. The increased population means that there are more car trips taking place on a typical day, despite car ownership per household falling. Given constrained capacity of London's road network, it is likely that increased traffic will pose challenges. Mitigating measures to increase the attractiveness of sustainable modes, compared to private motorised road vehicles, will need to be considered in the next stages of analysis (see Chapter 4).

Around 18 per cent of road traffic in London is freight vehicles. The demand for freight traffic in London is heavily influenced by patterns of land-use, for example the distribution of population and, in particular, industrial floor space. The growth in the draft London Plan is projected to result in changes to freight demand with associated impacts on traffic levels. For example, Light Goods Vehicle (LGV) mileage is expected to increase between 2023 and 2036 by around 4 per cent, in both the Central Case and the Reference Case. The different population

distribution between the scenarios does not lead to large changes in patterns of freight demand.

The redistribution of some industrial land in the draft London Plan is forecast to lead to spatial differences in the distribution of freight traffic. While LGV mileage is forecast to be largely unchanged in Inner London between 2023 and 2036 in the Central Case, LGV mileage in Outer London is expected to increase by 8 per cent. This has implications not just for the movement of freight itself, but also for other road users sharing the road space. It should be noted, in the outcomes detailed below, that Outer London sees comparatively worse outcomes on road traffic metrics than other parts of London. One contributory factor could be higher volumes of industrial land located in Outer London leading to higher LGV demand. Heavy Goods Vehicles (HGVs) are projected to continue the long-term trend of declining demand in London in the Central Case, leading to lower HGV traffic in 2036 than in 2023.

In 2023, the average modelled traffic speed in London during the AM peak hour was 21 kilometres per hour. Within this, speeds varied across London, with 13 kilometres per hour in Central London, 19 kilometres per hour in Inner London and 23 kilometres per hour in Outer London, as shown in Figure 12.

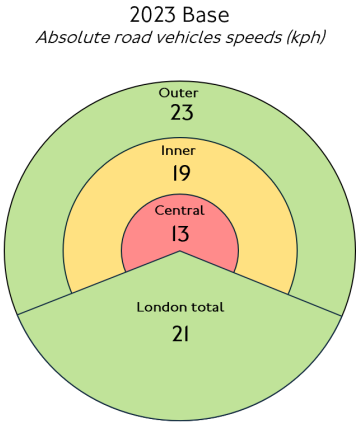


Figure 12 Average speeds (kilometres per hour) in Central, Inner, Outer and London-total for 2023 (modelled data)

2036 forecast modelled average speeds reduce across London in the Reference Case, the Central Case and High Case when compared to 2023, as shown in Figure 13.

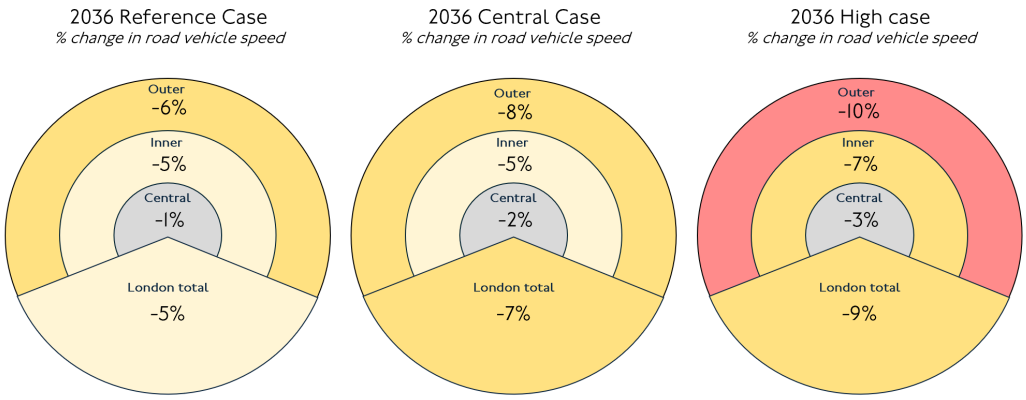


Figure 13 Percentage change in average speeds in central, inner and outer London for Reference Case, Central Case and High Case (modelled data) compared to 2023 Base Year, AM peak hour.

Across the three scenarios, the largest percentage speed reductions occur in outer London, forecast to be around 8 per cent in the Central Case, two percentage points greater than the Reference Case. In the 2023 AM peak, around 65 per cent of vehicle kilometres on London's roads are in outer London, hence changes in outer London have a disproportionate impact on total travel times. The 8 per cent reduction in AM peak hour outer London speeds in the Central Case results in the average delay rate rising from 2.6 minutes per vehicle-kilometre to 2.9 minutes per vehicle-kilometre. In the Central Case and across London, the increased congestion equates to 23,000 additional hours lost to congestion in the AM peak hour compared to a scenario of no change in road traffic speeds. These hours lost will have an economic impact.

Whilst (modelled) average speeds provide a useful indicator of highway network performance, they do not reflect the (day-to-day) variability of journey times experienced by road users. Increases in congestion are typically associated with reduced reliability, meaning that journey times can become less predictable. This can lead to a disproportionate impact compared to average speed reductions alone, as travellers may need to build in additional contingency time to account for the journey time uncertainty if they must arrive at a fixed time.

The scale of speed reduction forecast in these scenarios is substantial. For context, AM peak hour average traffic speed in London fell by 8 per cent in the 10 year period 2009 to 2019, a similar proportion to the Central Case forecast between 2023 and 2036. Since 2019 traffic speeds have been particularly volatile due to pandemic related demand impacts making comparisons less helpful. Furthermore, traffic speeds in London are slow when compared to other major cities internationally so a significant reduction could potentially impact on London's competitiveness if not mitigated.

Analysis at a more granular level indicates that reductions in speed are not evenly distributed within London. Figure 14 presents the average change in speed under the Central Case scenario by London borough, showing that speeds decrease across many areas (highlighted in yellow and red) compared to 2023. The largest reductions are predominantly concentrated in outer London boroughs, especially in areas to the north and east of the city.

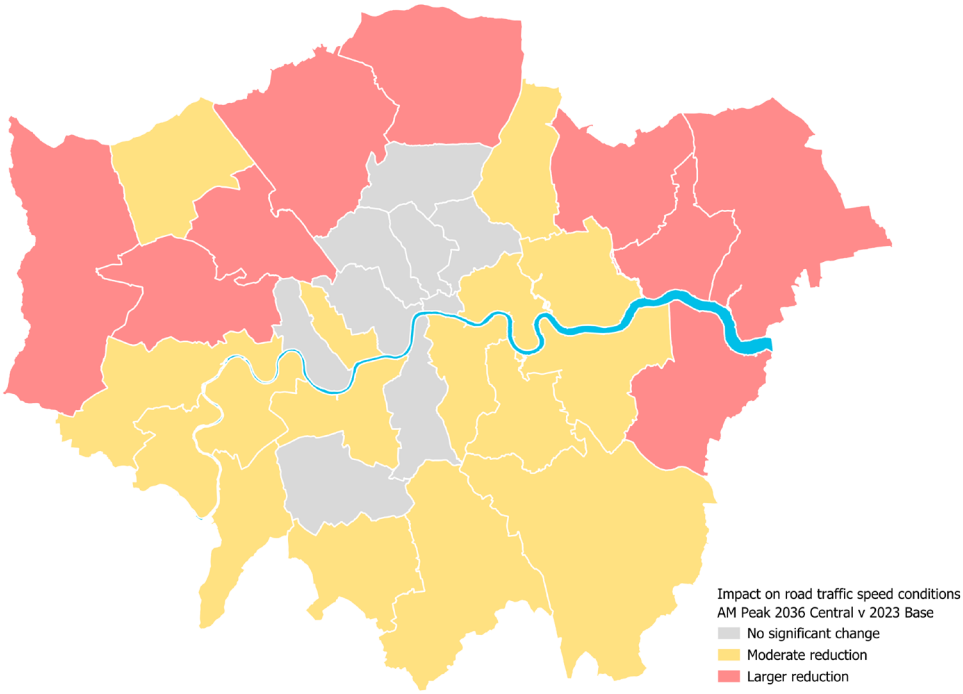


Figure 14 Average speeds by Local Authority for London Plan Central Case, modelled data. Percentage change compared to 2023, AM peak hour.

As well as impacts on speed, the modelling indicates that, due to the concentrated and localised nature of development growth, some junctions experience increased pressure. In all the London Plan scenarios, there is a noticeable increase in the number of junctions operating at or above capacity compared to the 2023 baseline: these are aggregated by London borough and shown in Figure 15.

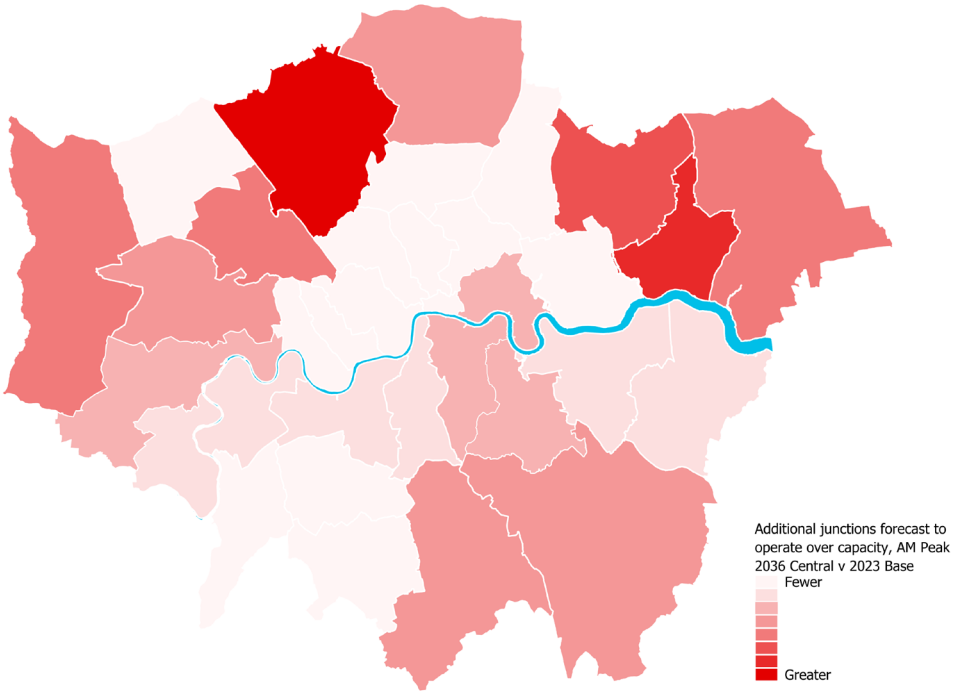


Figure 15 Indicative change in the number of junctions operating at or above capacity by London Borough (Central Case, AM peak, unmitigated), compared to 2023 baseline.

These impacts are not evenly distributed, with clusters of affected junctions typically occurring in areas of higher planned growth. However, the relationship between growth and congestion is not entirely consistent, suggesting that local factors such as network characteristics, availability of alternative travel options, and the scale and location of development also influence outcomes. This highlights the importance of more detailed local assessments to understand and mitigate the impacts of growth at both the borough-level and for individual development proposals.

The road network in London is a hierarchy of function and responsibilities. TfL manages the Transport for London Road Network (TLRN), a network of major roads widely known as the red routes making up 5 per cent of London's roads but carrying up to 30 per cent of the city's traffic. A map showing the TLRN links in London is shown in Figure 16.

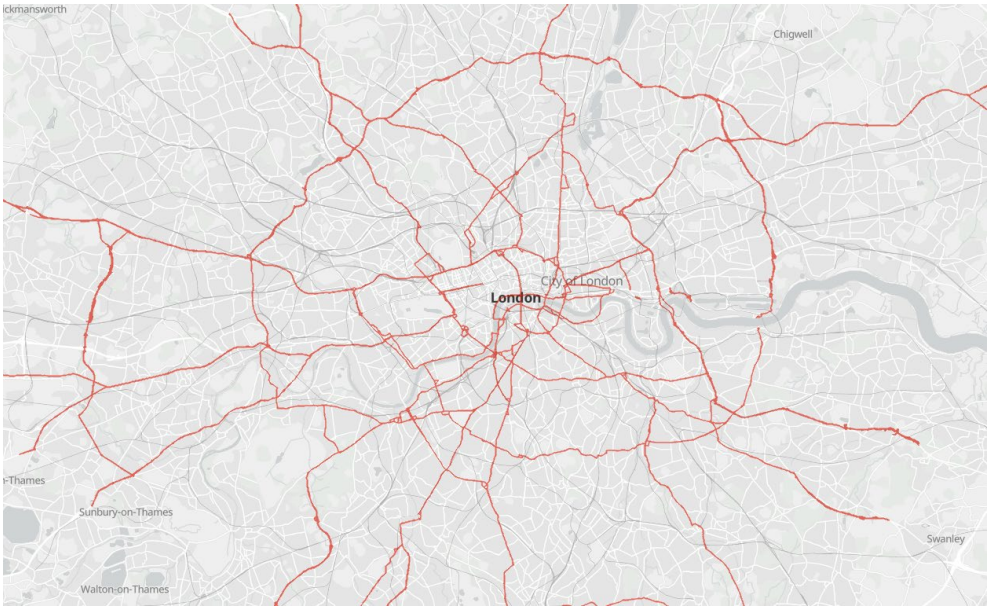


Figure 16 Map of the TLRN (red routes), source TfL Map ArcGIS Online

The Strategic Road Network (SRN), which is predominantly made up of A-roads and motorways, and Local Roads together make up the remainder of the network and accommodate the majority of trips. While these classifications are described in relation to London's road hierarchy, the modelled results presented here are derived from the wider LoHAM simulation network extending beyond the Greater London boundary.

The TLRN and other strategic routes play an important role in accommodating longer-distance and freight movements, while local roads more commonly provide access to homes, businesses and local centres.

Compared to 2023, all types of roads experience a reduction in average traffic speeds, as shown in Table 3.

Table 3 Percentage change in AM peak hour average traffic speeds by road type for the 2036 Reference Case, Central Case and High Case compared to 2023.

Road Type	2036 Reference Case	2036 Central Case	2036 High Case
TLRN (red routes)	-8%	-10%	-11%
SRN	-7%	-9%	-11%
Local Roads	-7%	-9%	-10%

In the London Plan Central Case scenario, the TLRN experiences an average speed reduction of 10 per cent when compared to 2023. For the SRN and local roads, there is a 9 per cent reduction.

The small differences in impact by road type is suggesting that the impacts of growth are expected to be felt across the network. The data suggests a slightly greater deterioration of speeds on TLRN and SRN routes which in turn may have slightly larger impacts for longer distance trips, freight and buses.

The impact of increased road congestion on buses is of concern and requires further investigation. In some locations buses may be protected from congestion by bus priority infrastructure. However, bus journey times and bus reliability are longstanding challenges and must be considered carefully in further work.

Whilst there are highway challenges in the Central Case and High Case, a large proportion of this is also evident in the Reference Case (i.e. in the absence of a new London Plan). The draft London Plan contains policies to mitigate impacts on the road network, including parking policies and policies that promote the location of new homes around sustainable transport options. The absence of such policies would likely lead to greater demand on the highway network and therefore further reductions in average speeds and increased congestion on the network. These outcomes also reflect reductions without any further transport interventions to support and mitigate growth. Further analysis is required to consider potential mitigating interventions in future modelling assessment.

3.4 London's public transport network

3.4.1 Demand

Public transport is forecast to accommodate around half of the increase in total travel demand from 2023 to 2036, equating to an increase in public transport trips of around 17 per cent in the Central Case. The growth in public transport demand is focused in areas of significant land-use change, for example, population or employment growth. Current forecasts could be an underestimate because mitigating interventions to make sustainable modes more attractive compared to car have not yet been Figure 17 shows the range of growth in public transport demand between the forecast scenarios and by time of day.

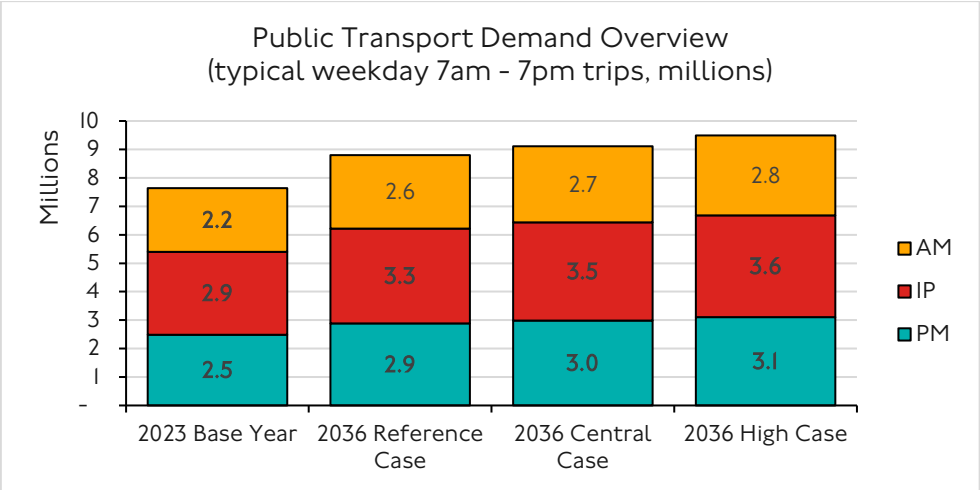


Figure 17 Average working weekday public transport demand by time period (AM 3-hour period, interpeak 6-hour period, PM 3-hour period).

3.4.2 Passenger kilometres

The change in passenger kilometres in the AM peak period by public transport service is shown in Figure 18. The DLR consistently displays the strongest growth. Contributory factors include population and employment growth in the DLR catchment and increased capacity due to new trains. Buses, London Overground and Trams also note significant growth, which is likely due to growth in outer London, as shown in Chapter 2.3.

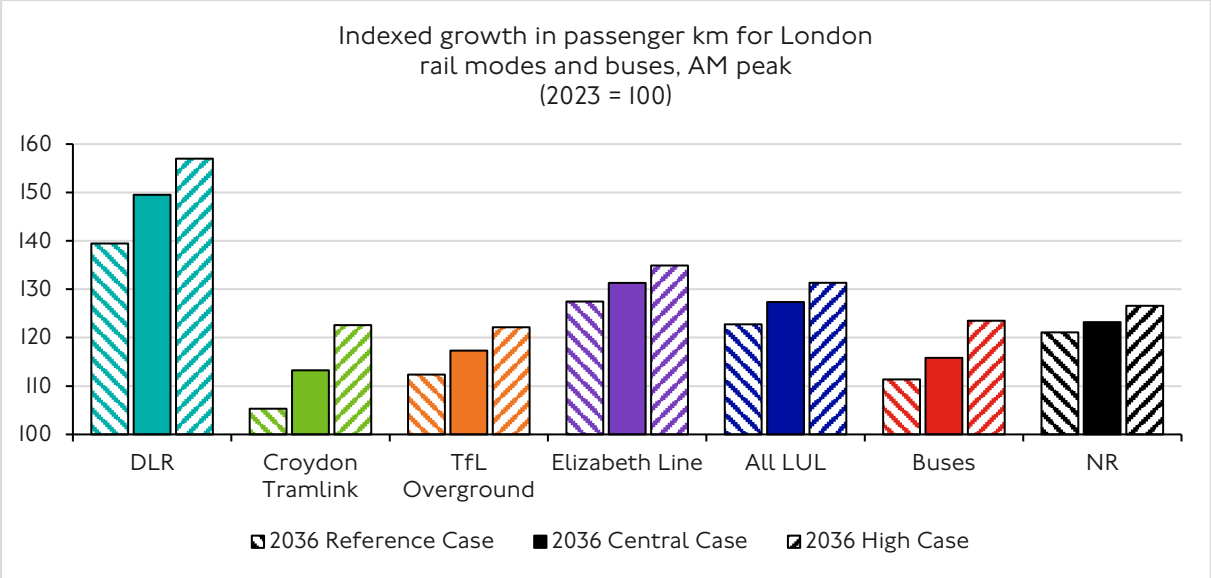


Figure 18 Change in public transport passenger kilometres in London by service group.

Figure 19 shows AM peak passenger kilometres increase forecast across London Underground lines. There is significant variability between individual lines, due to the location of the new housing and jobs, as well as the capacity of the line to accommodate increased demand.

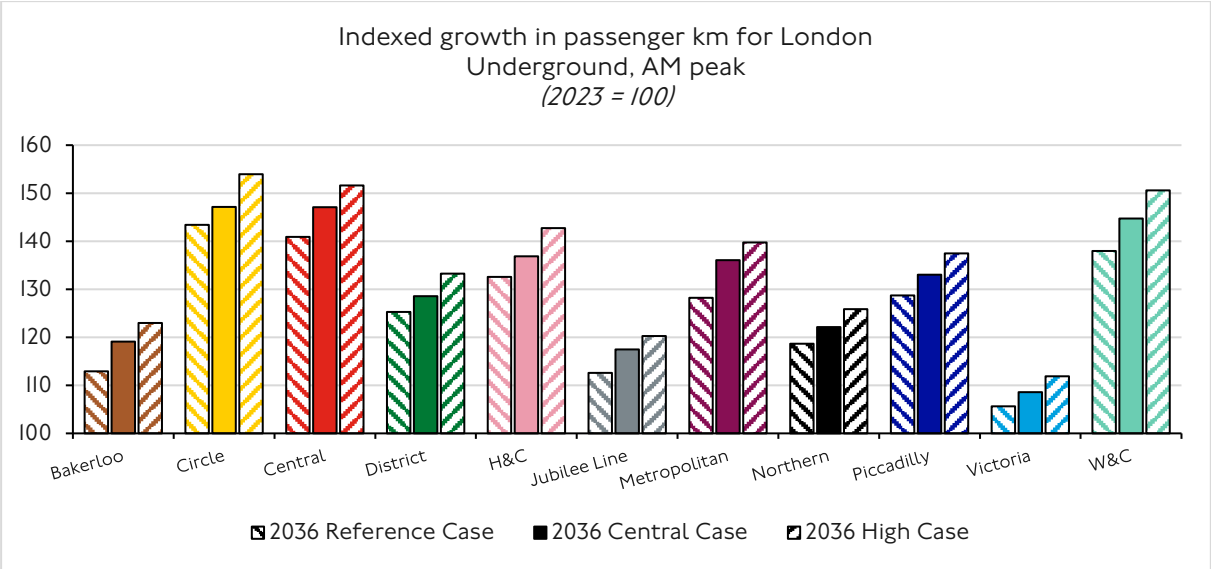


Figure 19 Change in AM peak (7am to 10am) passenger kilometres in London from 2023 by Underground line

London's extensive bus network will play a key role in providing sustainable travel options for occupants of new homes, for example, local trips to town centres and a feeder to the wider public transport network. The bus network is regularly reviewed to respond to changing patterns of demand and the planning of bus service changes to serve large growth locations will occur through the planning process. Figure 20 shows that bus demand is forecast to increase across London and the growth in volume of bus demand is particularly large in outer London.

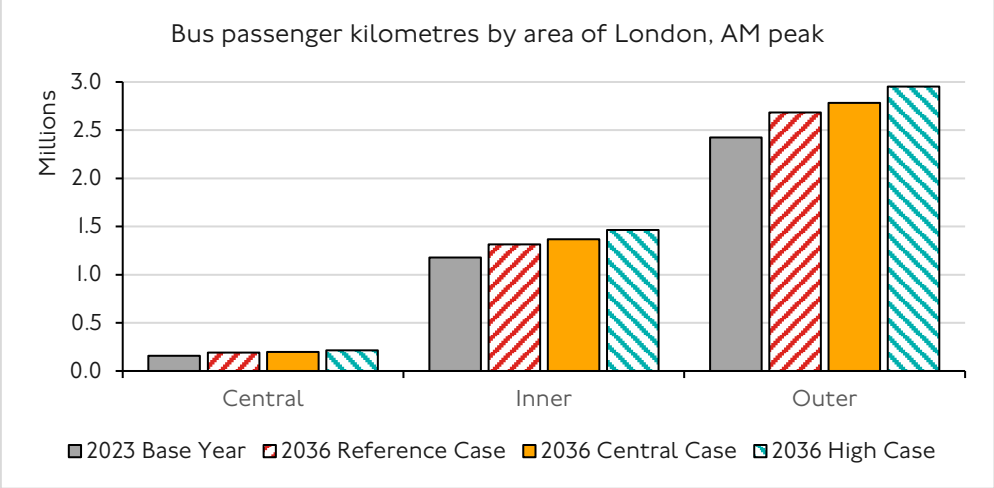


Figure 20 Change in bus passenger kilometres in central, inner and outer London

Figure 21 displays levels of crowding across the Tube network in the AM peak hour. All forecasts show an increase in the number of AM peak period passenger kilometres in crowded categories when compared to 2023. The number of passenger kilometres spent with 2-3 and 3-4 passengers per square metres notes the largest growth; from 2023, both categories increase by 400,000 in the Central Case.

This indicates more services operating at levels where intervention may start to be required to maintain passenger safety. In situations where services are operating at

or near capacity limits, good reliability is essential to avoid service gaps that can quickly lead to the need for operational interventions (such as closing gatelines or non-stopping trains) and disruption for passengers.

While the occurrence of the need for operational interventions is lower now than it was before the pandemic it would be expected to rise again with increased crowding.

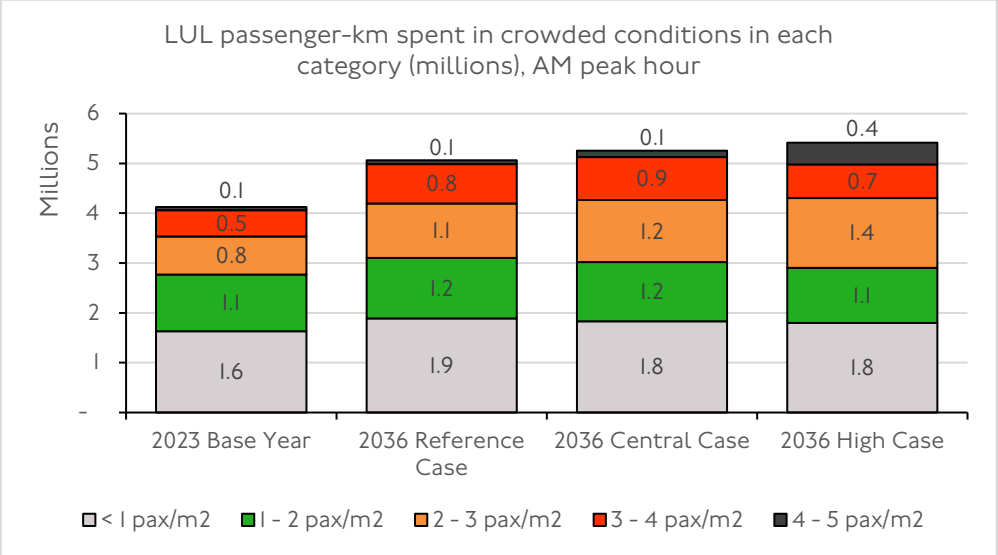


Figure 21 AM peak hour London Underground passenger kilometres by crowding category

3.4.3 Crowding

Figure 22 details the levels of crowding forecast on London's rail-based public transport network in the AM peak hour in the 2036 Central Case. Of those lines most affected by crowding there are a mix of potential mitigations, but in some cases it would be challenging to have mitigations in place by 2036.

A potential area of mitigation to be assessed is London Underground service reliability. Challenges have arisen in recent years and forecasts include degradation compared to 2019 reliability. Indicative testing suggests improved reliability could have a material crowding relief impact, as well as making those services more attractive.

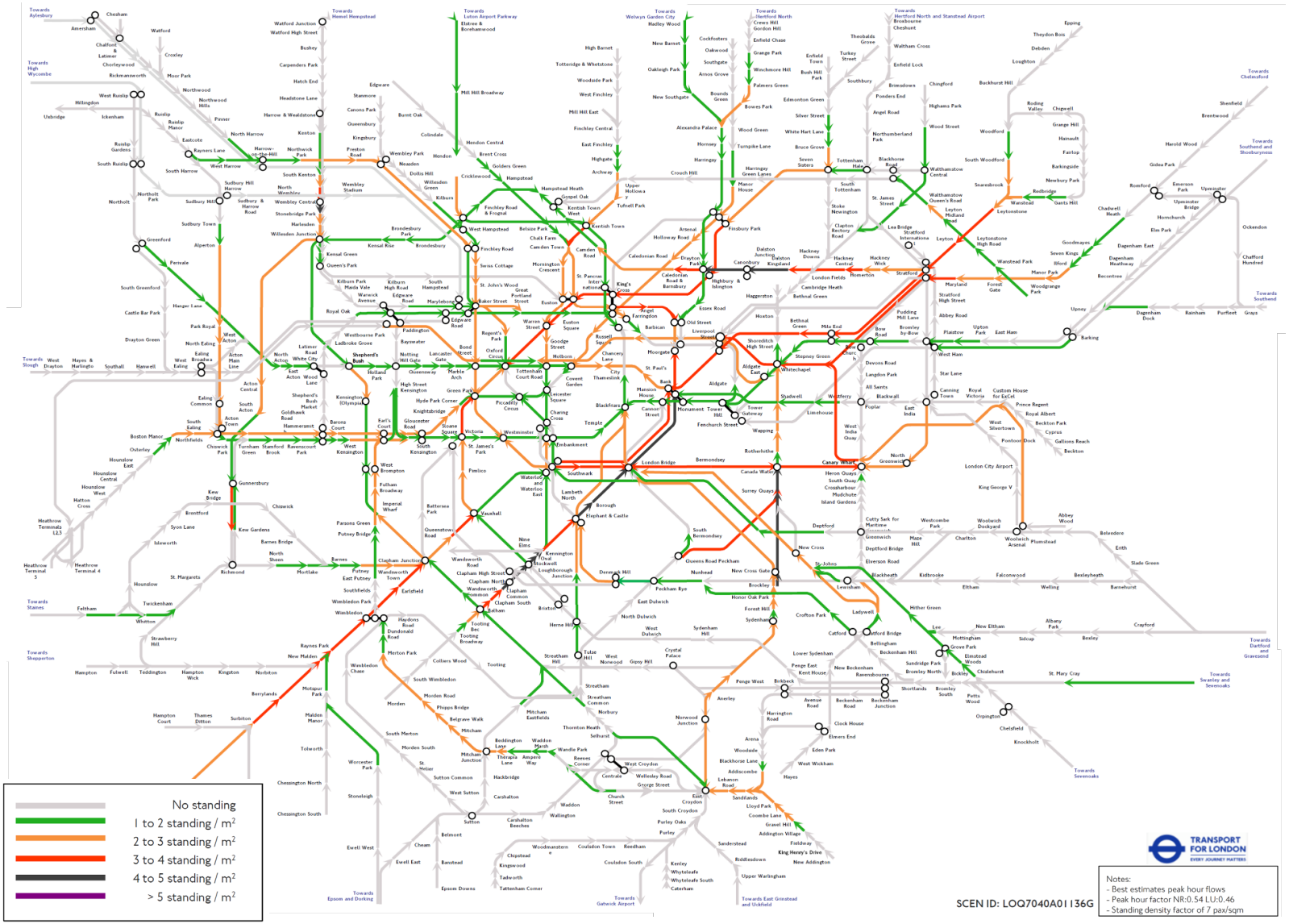


Figure 22 Crowding plot for AM peak Central Case 2036

3.4.4 Stations

Stations can be bottlenecks on London's public transport network. For example, station crowding regularly necessitates intervention, such as closing gatelines or trains skipping the stop, to maintain safety.

The high-level station assessment undertaken thus far only considers London Underground and DLR stations at this stage. Station impacts across all rail modes are routinely assessed through Transport Assessments and broader Opportunity Area studies. The purpose of this analysis is to provide an impression of the potential scale and distribution of impacts. Figure 23 shows the stations where congestion worsens, congestion spreads to other times of the day, and where stations become congested, in the Central Case, compared to 2023. Affected stations are distributed across multiple boroughs, with particular concentrations in central andeast London.

Stations expected to experience either new severe congestion or extended periods of congestion are located in areas of significant housing growth, large employment growth and with large interchange demand.

Further analysis is required to better understand the implications at the stations with the most severe crowding. as well as to identify and evaluate potential mitigation measures to improve station operations.

The High Case model outputs suggest relatively few additional stations becoming severely congested compared to the Central Case.

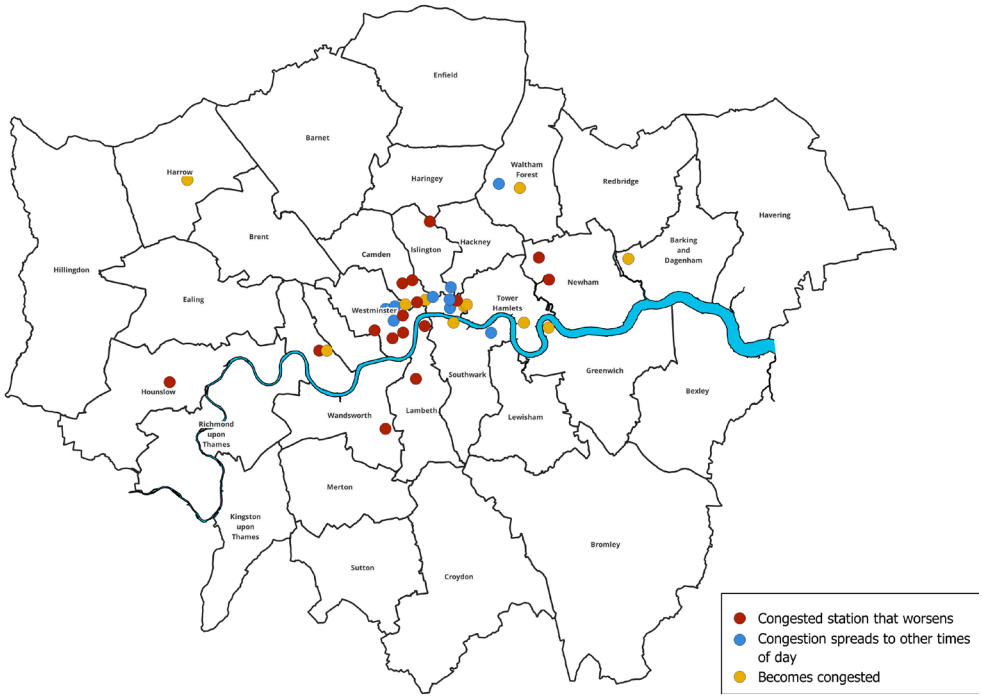


Figure 23 Stations forecast to experience high levels of congestion in the 2036 Central Case

4 Next steps: Further assessment and transport interventions

As explained in section 1.2, the purpose of this interim evidence base is to help understand and assess the transport challenges in light of the growth in the draft London Plan. Following the public consultation, further evidence will be published to:

- Refine and update as necessary modelling inputs to further test impacts on the transport network
- Test the potential to mitigate those impacts through packages of transport policies and interventions.

It is anticipated that further work will be undertaken ahead of the Examination in Public process and will serve as an update to this document.

This work will also further consider the relationship between the London Plan and the MTS and its overarching aim of 80 per cent of trips in London to be made by public transport, walking and cycling by 2041. The London Plan plays an important supporting role across many transport interventions, as well as an impacting mode share through the location and design of new development. This includes development being located where sustainable travel options are stronger than the London average, improved public realm around the development and restraints on the provision of new car parking alongside development.

However, the impact of planning measures alone can only go so far, and achieving the goals of the MTS requires a broad set of transport interventions, which can include measures such as:

- Rail line and station upgrades to add capacity
- Rail reliability improvements to add capacity within existing infrastructure limits
- Changes to bus services and additional bus priority to improve speeds
- Changes to walking and cycling infrastructure to make these modes safer and more attractive
- Measures to manage and reduce traffic and tackle congestion

While mode share outcomes of London Plan modelling presented in previous sections of this report are not directly comparable with the MTS mode share, in this section, necessary adjustments have been applied to ensure comparability.

In 2023 the sustainable mode share was 63 per cent. Even in the absence of any transport interventions beyond those already committed to, this grows in all three cases tested through this modelling, with higher increases in higher growth scenarios. Mode share reaches 64.6 per cent in the Reference Case, 65 per cent in London Plan Central Case and 65.3 per cent in the High Case, as shown in Figure 24.

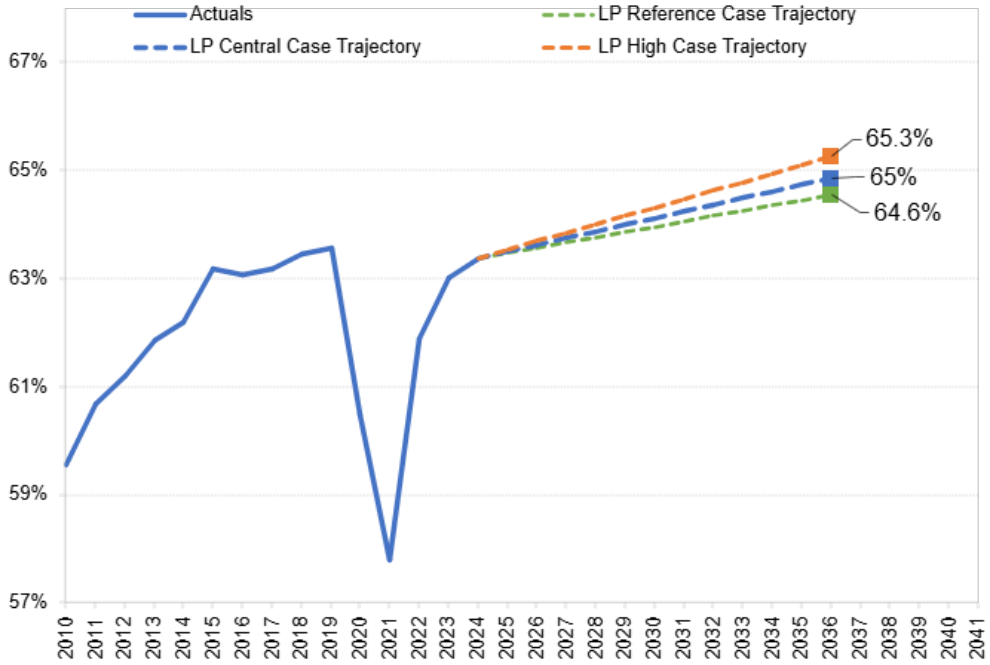


Figure 24 Sustainable mode share, actual data from 2010 to 2024 plus the projected 2036 London Plan growth for the Reference Case, Central Case and High Case.

These mode share outcomes are forecast without interventions beyond those currently committed. There is an opportunity for further mode shift when transport mitigations are developed to support the draft London Plan growth.

As well as mode share, the MTS also contains a broader set of aims for London's transport network in 2041, which could be explored further in future modelling work. The London Plan is likely to have at least some influence on nearly all of these aims, including those relating to:

- Increasing levels of daily physical activity Londoners achieve through walking and cycling
- Increasing the proportion of Londoners living in well-connected places
- Reducing rail crowding and increasing average bus speeds
- Eliminating deaths and serious injuries on London's roads
- Reducing car trips and emissions from traffic

5 Conclusion

This interim analysis of draft London Plan growth has sought to identify areas of potential challenge on the transport network. The transport modelling has found that, without transport interventions, 2036 Reference Case levels of growth result in increased travel demand across all modes. This would generate transport challenges compared to 2023, even if a new London Plan was not developed. In the 2036 Central Case, while the growth in sustainable travel supports our MTS aims, there would also be increased congestion on the roads and worsening crowding at key rail stations without additional mitigation, and these impacts are greater in the 2036 High Case. These impacts are more strongly experienced in outer and central London.

The policies of the draft London Plan have some influence on these outcomes. In seeking to direct growth to the most well-connected locations, supporting mode shift and minimising car parking it plays a key role in ensuring that this growth and development is sustainable and that impacts are minimised as far as possible. The draft London Plan contains policies to steer growth towards locations with better sustainable transport options, as reflected in the Central and High Cases. Additionally, policies reflecting restraints on car parking provision are included in all three scenarios.

It is essential to note that if development in London were to occur without the influence of the draft London Plan policies, it would likely lead to greater transport challenges than the forecasts reported in this document, when assessed against the aims of the MTS.

The draft London Plan plays an important role in mitigating the transport impacts of growth but it cannot do this alone. The role of the MTS and broader transport planning, policies and investment is key - with the development of London's transport network needing to support the city's growth and broader evolution over time.

The findings of the interim analysis will form the basis for the next phase of work (outlined in section 4) which will identify transport interventions to mitigate the challenges associated with growth and support the delivery of the draft London Plan.

Appendix – Glossary

Car ownership per household – The number of cars owned per household.

Gateline – Gatelines control access to stations across the Tube, London Overground, Elizabeth line, and National Rail services.

Junction delay – how long a vehicle is delayed at a junction.

Loadings – the number of people boarding a rail service.

London Employment Sites Database (LESD) - GLA dataset for employment capacity.

London Plan – the Spatial Development Strategy for London based on an economic, environmental, transport and social framework. The draft London Plan will cover the period from 2026 to 2046 (housing delivery is from 2026 to 2036).

Mayor's Transport Strategy (MTS) - transport strategy for London which includes aims up to the year 2041.

Modelled data - data solely from TfL's strategic transport models. This can be different from observed data which is based on counts.

National Policy Planning Framework (NPPF) - national planning framework setting out the government's planning policies for England and how these are expected to be applied.

Passenger kilometres – a metric widely used in transport modelling. It represents the movement of one passenger over a distance of one kilometre.

Reliability – Refers to how often a public transport service runs as timetabled.

Road types:

- **Transport for London road network (red routes)** - a network of major roads widely known as the red routes. These are managed by TfL. Red routes make up 5 per cent of London's roads, but carry up to 30 per cent of the city's traffic.
- **Strategic Road Network (SRN)** - mostly made of A roads, and accounts for almost 3 per cent of roads within the GLA boundary. These are mostly controlled by local authorities.
- **Local roads** – the vast majority of the road network in London and managed by local authorities.

Wider South East region – refers to the counties in southeastern England. Berkshire, Buckinghamshire, East Sussex, Hampshire, Isle of Wight, Kent, Oxfordshire, Surrey, West Sussex.

Strategic Housing Land Availability Assessment (SHLAA) - a technical, evidence-gathering study used by local planning authorities to identify potential land for future housing development.

Strategic transport models:

- **London Population Synthesis (LoPopS)** – estimates the demographic segments (such as age, gender etc) of a projected population.
- **Model of Travel in London (MoTiON)** – takes a wide variety of data inputs, including population and employment, to forecast how many trips people will make, where these trips will happen and which mode of transport they will take. It is widely used to forecast travel in London in different futures. This is all at MoTiON zone level.
- **London Highway Assignment Model (LoHAM)** – takes the highway trips from MoTiON and assign trips to the network to show how many vehicle kms will be driven, what route will be taken and any subsequent congestion and delay at junctions. Further analysis of LoHam outputs can provide insights into Londonwide air quality impacts.
- **RailPlan** – takes public transport trips from MoTiON and assigns them to London's transport network. RailPlan tells which routes people will use including rerouting and crowding impacts.

Sustainable mode share – The proportion of trips made by walking, cycling and public transport. In other documents, such as TiL and the MTS tracker, this is sometimes referred to as the Active, Efficient and Sustainable mode share.

Termini – refers to National Rail terminus stations. In London this is London Blackfriars, London Cannon Street, London Charing Cross, City Thameslink, London Euston, London Fenchurch Street, London King's Cross, London Liverpool Street, London Bridge, London Marylebone, Moorgate, Old Street, London Paddington, St Pancras International, Vauxhall, London Victoria, London Waterloo and London Waterloo East.

Transport modes:

- **Active modes** – walking and cycling.
- **Public transport modes** – bus, London Underground, TfL Rail, Trams and Docklands Light Railway (DLR).
- **Private modes** – car driver, car passenger, taxi, private hire vehicle (PHV).
- **Freight** – refers to trips made to transport goods, often involving Heavy Goods Vehicles (HGVs) or Light Goods Vehicles (LGVs).

Travel in London (TiL) – TfL's annual report of travel in London, including current trends for all modes and reporting on MTS aims. All reports are published at Travel in London reports.

Trip rate – the number of trips an average person makes on an average day.