Transport for London

Old Oak Common

Strategic Transport Study

February 2015

MAYOR OF LONDON

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Old Oak Common
Strategic Transport Study
OAPF consultation

February 2015

Acknowledgements

Transport for London
London Boroughs of Hammersmith and Fulham, Brent and Ealing
Greater London Authority

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0 Executive Summary

Introduction

This report documents the findings of the Old Oak Common Strategic Transport Study, undertaken by Transport for London in conjunction with project partners the Greater London Authority and the London Boroughs of Hammersmith & Fulham, Ealing and Brent. It considers the transport impacts of an additional 24,000 homes and 55,000 jobs being provided at Old Oak Common.

A Vision for the future of Old Oak Common was the subject of public consultation over summer 2013. Following consultation, work began on developing this Strategic Transport Study and translating the Vision into an Opportunity Area Planning Framework (OAPF). The draft OAPF, which covers Old Oak Common and Park Royal, is now the subject of a six week public consultation. This Strategic Transport Study forms part of the evidence base for the draft OAPF. The OAPF will be adopted by the Old Oak and Park Royal Mayoral Development Corporation (OPDC) when it comes into operation in April 2015.

As well as providing an evidence base for the transport proposals within the OAPF, the Strategic Transport Study identifies the type and amount of infrastructure and supporting transport measures that will be necessary to support 24,000 homes and 55,000 jobs at Old Oak Common. The Study also responds to major transport infrastructure proposals including High Speed 2 (HS2) and Crossrail 1. A list of future year challenges has been developed from a number of work streams including highways and public transport modelling using TfL's transport demand models.

Current transport network opportunities and challenges (2012)

The Old Oak Common Opportunity Area (OOCOA) is located to the west of central London and extends over 55 hectares of land containing light industrial, transport, recycling and car retail users. The strategic road network links of the A40 and A406 North Circular are relatively close to the site. The network of local access roads to the OOCOA is limited and predominantly runs north-south. The road network within the OOCOA is sparse, of a poor standard, and only connects via single points to Scrubs Lane and Old Oak Common Lane.

Network Performance data was analysed to identify locations on the road network that experience congestion. This analysis confirms that a number of roads and junctions have volumes of traffic that are close to or exceeding their capacity. In particular, strategic routes such as the A40 and A406 are under stress. Junctions on the A40 such as Gypsy Corner, Savoy Circus and Hanger Lane are congested, particularly at peak periods.

Accessibility to public transport services from most areas within the OOCOA is relatively poor. Rail stations, such as Willesden Junction and North Acton, and bus stops are located on the periphery of the site and pedestrian access to them from within the OOCOA is extremely constrained by the severance caused by rail lines, the Grand Union canal and large plot sizes. There are very few pedestrian or cycle crossings to traverse these barriers and those that exist are of poor quality. The overall lack of accessibility is reflected in low PTAL scores of 1 and 2 for a large part of the OOCOA.

Crowding on rail services is not an issue for most routes which serve local stations. The exceptions to this are the Overground routes – the West London Line and the North London

Line. There are also localised problems of crowding within rail stations such as North Acton. Bus routes, providing links to such places as Brent Cross, Hammersmith, White City and Harlesden serve the edges of the OOCOA but do not penetrate the heart of the area leaving parts of it outside the recommended 400 metre walking catchment of a bus stop.

The connectivity and quality of the pedestrian network in certain parts of the OOCOA is of a relatively low standard and is unattractive and unwelcoming. The canal and rail corridors create significant severance for pedestrian movement, with only limited crossing opportunities provided. The OOCOA lacks a comprehensive and attractive footway network that provides both north / south and east / west connectivity.

The cycle network to and within the OOCOA is relatively poor in terms of quality and provision, with cyclists experiencing the same severance issues as pedestrians. With the exception of National Cycle Network Route 6, which runs along the canal towpath, there is an absence of infrastructure for cyclists.

Future transport network opportunities and challenges, 2031 Reference Case

The London Transport Studies (LTS) model has been used to produce transport demand forecasts for 2031 taking into account growth projections for London's population and employment, and the impact of committed transport projects. This forecast does not include new development at Old Oak Common but does include the impact of the Government's proposed new HS2, National Rail and Crossrail station, along with a range of other committed schemes. This scenario formed the Reference Case and provides a benchmark against which the impacts of development related growth at Old Oak Common can be measured.

TfL's West London Highway Assignment Model (WeLHAM) was used to estimate changes in traffic patterns. This showed that there was an overall 16 per cent increase in traffic to and from the Old Oak Common area in the morning peak between the model base year and 2031 (with no development at OOCOA). Areas currently experiencing congestion including junctions and links on the A40 and A406 remain congested in 2031. There is a general marginal increase in delay.

TfL's public transport model, Railplan, was used to estimate impacts on the public transport network. The proposed HS2, National Rail and Crossrail station will provide new interchange opportunities and significantly improved connectivity for the area. Over 42,000 passengers are projected to interchange at the new station in the morning peak period, with 84 per cent changing between rail services wholly within the station. However, the majority of HS2 passengers will interchange at Euston. Willesden Junction is forecast to experience a 26 per cent increase in passengers in the morning peak period.

Future opportunities and challenges, 2031 medium development scenario

Coupled with the significant general background growth and the increase in travel demand resulting from the new HS2, National Rail and Crossrail station, the additional homes and jobs at Old Oak Common will add to the existing travel demand, both at the strategic and local level. A medium development scenario for the year 2031 of 24,000 homes and 55,000 jobs was modelled in accordance with the draft Further Alterations to the London Plan and the draft OAPF. The medium development scenario did not include any further improvements to the highway or public transport networks, over and above those included in the Reference Case. The test of this scenario, when compared to the Reference Case, helped

to identify where additional network problems may possibly worsen or occur, and provided a steer on where mitigation measures should be targeted. The highway modelling showed that there were significant delays at locations around the site such as Old Oak Common Lane and Victoria Road due to inadequate access arrangements. Delays also occurred at locations such as Harlesden gyratory, Station Road, Du Cane Road, Savoy Circus, Gypsy Corner, Wood Lane and the A406 north of Hanger Lane.

The extent of additional delays and deterioration in conditions indicate that the network, without a package of mitigation measures, would be unable to cope with the additional development related traffic. Appropriate access arrangements will be required around the site and other mitigation measures proposed to deal with the impacts on the wider network.

The rudimentary and fragmented nature of the footpath network and the existence of the many barriers resulted in routes between the development and public transport interchanges being long and often convoluted. Whilst planned capacity improvements on rail and Underground routes help to mitigate impacts on many of the train services passing through the area, there may be increased pressure on London Overground services, particularly on the West London Line. Rail station usage compared to the 2031 reference case includes a 138% increase at North Acton and 40% more passengers at Willesden Junction.

Developing the transport strategy

A package of transport measures was developed to address and mitigate the issues identified with the medium development scenario. It also builds on the improved public transport connectivity resulting from the proposed new transport 'super-hub' at Old Oak Common. In addition, the package also seeks to improve local connections for existing communities.

An initial 'long-list' of proposals was informed from a review of previous studies, discussions with stakeholders and from TfL's own assessment. These proposals were assessed against the study's objectives and the Mayor's Transport Strategy objectives, and sifted. Transport proposals selected from the initial assessment and sifting were formed into packages of measures for testing in the suite of transport models. Sensitivity testing of variants of the package were undertaken to refine and select a preferred strategy.

Given the significant growth at Old Oak there is an opportunity to develop a transformational transport strategy that will enable the maximum development and regeneration potential to be fulfilled. The strategy has the following three main interrelated tenets:

- To **minimise highway congestion**. To avoid increased delays on an already congested highway network, the transport strategy requires additional car trips to be minimised and aims to maximise the number of trips by walking, cycling and public transport. The strategy is predicated on the basis that there is a need to limit the number of new highway trips in order to accommodate the preferred growth scenario. Encouraging more pedestrians and cyclists can help bring activity into an area, make it feel safer and, through increased footfall, also benefit local business. To address problems of localised congestion, improved access to development sites and better connections with the wider area are needed.
- **Address the significant severance**. The strategy seeks to address the significant severance caused by the presence of railway lines, the Grand Union Canal and other transport infrastructure, through the introduction of extensive new connections, in particular new north/ south and east/ west links.

- **Maximise the potential of the proposed new HS2 / Crossrail 1 interchange**. The new station provides excellent national and regional connectivity but needs to provide much better sub-regional and local connectivity. New London Overground stations at Old Oak Common would support this and help facilitate local regeneration, assist the dispersal of passengers from HS2 and also provide relief to crowding at Euston station.

The transport strategy is based on the assumption that new commercial development will essentially be car-free with only operational and blue-badge parking available. For the residential element, whilst there will be some car parking available, it will be at a very low level, and measures will be in place to encourage trips by more sustainable modes. Without a low level of additional car use, the preferred growth scenario would place unacceptable impacts on the surrounding road network. As such, it is anticipated that most trips to and from the new homes, shops, offices and other facilities in the area will take place on foot, bicycle or public transport. In order to limit the impact, freight and servicing for new developments will be planned and designed from the outset.

Transport strategy proposals

Specific recommended interventions are:

Highways

- Two new or improved access junctions from Scrubs Lane including a new railway bridge, improvement of Scrubs Lane together with new internal bridges and junctions;
- Two new or improved access junctions from Old Oak Lane / Old Oak Common Lane, including improvement of Old Oak Common Lane;
- The above to be linked with a new through link road running east-west through the site, but designed to discourage through-traffic;
- Improvements to junctions on Old Oak Common Lane;
- New link from Hythe Road to HS2/Crossrail station for buses, pedestrians and cyclists and station traffic only;
- Victoria Road widening;
- Signal timing optimisation at local junctions;

Managing travel demand

- Restrictive parking standards for all land uses;
- Requirement for travel plans to support new development;

Rail station capacity and access

- Willesden Junction station capacity and access improvements;
- North Acton station capacity and access improvements;
- London Overground capacity improvements (due to be implemented in 2015);
- New London Overground station(s) at Old Oak Common;
- Crossrail extended to West Coast Main Line;

Improving bus and other public transport facilities

- New bus routes and infrastructure serving the development (including bus stops, stands and drivers' facilities);
- Taxi ranks;

Future proofing for appropriate freight services

- Consolidation centres;
- Provision of Delivery and Servicing Plans;
- Re-timing deliveries to outside of peak periods;
- Concierge services;

Improving pedestrian connectivity, wayfinding and public realm

- Create a new high quality network of streets and public spaces with high levels of pedestrian permeability and connectivity across the site;
- New pedestrian and cycling bridges crossing the canal;
- A pedestrian and cycle 'land-bridge' connection to Willesden Junction;
- A pedestrian and cycle link from the HS2 station via the new proposed new Overground station to North Acton station;
- A link through the HS2 station to Wormwood Scrubs;
- Improve pedestrian wayfinding;

Improving cycle accessibility and facilities

- High quality routes for cyclists across the site and to the site linking to Harlesden, Ladbroke Grove, White City and the Park Royal area;
- Links to planned improvements including the proposed Cycle Superhighway;
- Provision of publicly accessible cycle parking across the site;

Testing of the transport strategy

The interventions proposed in the transport strategy to reduce highway demand and achieve a high public transport mode share were tested as a comprehensive package. Sensitivity tests showed that the infrastructure measures on their own were not sufficient to reduce highway traffic to a sufficient level to avoid additional widespread congestion. In order to achieve levels of congestion no worse than the Reference Case, travel demand mode share on the site must replicate that of sites such as Canary Wharf. A mode share target similar to that achieved at Canary Wharf and in central London was applied to the demand generated by the development. This assumed that around 6,000 highway trips would shift from highway to public transport in response to the interventions. The reduction in development related highway trips resulted in levels of congestion lower than in the medium development scenario but similar to the 2031 Reference Case. This is only likely to be achieved if the whole package of infrastructure and measures to manage highway trip demand, and in particular the restrictive parking standards, are implemented. If these demand management

elements of the transport strategy cannot be comprehensively delivered then the overall level of development will need to be re-assessed.

It should be noted that even under the reduced highway / high public transport share scenario the highway network will be under stress and further work is required to examine possible options for the A40 and A406, taking into account the whole corridor and the cumulative impact of a number of large-scale developments.

Further studies

A number of proposals require further, more detailed investigation. These include:

- A review of what major junction/ capacity improvements may be needed on the strategic road network, including the A40 Westway, Hanger Lane Gyratory and the A406 North Circular to mitigate the traffic impact. It is proposed that these be looked at in more detail as part of a separate piece of work;
- A review of the feasibility and impact of emerging proposals to improve access to the OOCOA and additional links to the wider highway network including work currently being developed by TfL in response to the Roads Task Force recommendations;
- A review of proposals developed by other stakeholders including the new highway link to the A40 proposed by Fosters and a new link road from A219 Scrubs Lane to Ladbroke Grove. It should be noted that these proposed schemes have not been included as part of the recommended Transport Strategy outlined in this report;
- Localised modelling of junctions and links within the Park Royal area and preparation of a transport strategy for Park Royal;
- Complete the detailed design for new LO stations and associated infrastructure, following public consultation and a recommendation to proceed with option C. In particular, the transport impact of a new station in the Old Oak North site should be explored;
- A more detailed examination of what improvements may be needed at both North Acton and Willesden Junction stations;
- A study into the feasibility of building the proposed bridge over the WCML tracks from Old Oak to Willesden Junction to a standard that could accommodate buses;
- A more detailed review of bus services and liaison with operators, to ensure the provision of an efficient bus network to serve OOCOA and provide connections to the wider area;
- A review of the modelling outputs on rail crowding taking into account the impact of the potential Crossrail 1 to WCML link;
- Further consideration as to what cycle facilities may be needed to achieve levels of cycling above MTS targets including the adoption of mini-Holland type schemes, connecting the site to the wider area e.g. White City, Harlesden, Ladbroke Grove and Park Royal and to future infrastructure such as the proposed Cycle Superhighway;
- Development of a Construction Logistics Strategy that aims to maximise the use of rail and water transport and minimises the impacts of road based transport;
- A review and update of the Transport Strategy to inform the Local Plan process;
- A monitoring strategy; and
- A phasing strategy.

Conclusions

The Strategic Transport Study used transport modelling tools to examine the strategic transport impact of the new HS2/Crossrail transport hub and the preferred growth scenario for Old Oak Common. A transport strategy has been developed to demonstrate how future demand can be accommodated. The transport strategy aims to improve local connections and facilitate regeneration of the area, whilst minimising any negative impact on the transport network and its users.

The transport strategy has been designed with a degree of flexibility to reflect the fact that regeneration of Old Oak Common is a long-term vision, and there are elements of uncertainty, such as what might happen to rail depots in the long-term. Further modelling and analysis will be required as the OAPF is developed in more detail and development proposals come forward for specific sites.

1 Introduction

This report documents the findings of the Old Oak Common Strategic Transport Study (the Study), undertaken by Transport for London (TfL) in conjunction with project partners, including the Greater London Authority (GLA) and the London Boroughs of Hammersmith and Fulham (LBHF), Brent (LBB) and Ealing (LBE). The Study has been carried out in consultation with key stakeholders including Network Rail and High Speed 2 (HS2) Ltd.

1.1 Purpose of study

The Study considers the potential impacts of an identified growth scenario on the transport network and identifies a package of improvement measures that will be needed to support it. It responds to major planned transport infrastructure proposals at Old Oak, including HS2 and Crossrail 1.

TfL has developed a draft Transport Strategy, to help deliver the OAPF and to provide an evidence base and appraisal of proposed transport measures to support growth and regeneration in the area.

1.2 Study methodology

The stages involved in developing the Transport Strategy are shown in Figure 1-1:. They include the identification of transport issues and opportunities, for both current day and future year, and interventions to address these.

Data used to undertake the Study has been drawn from a wide variety of sources. In addition, TfL has commissioned additional pieces of analysis, including highway and public transport modelling using the West London Highway Assignment Model (WeLHAM) and Railplan, respectively.

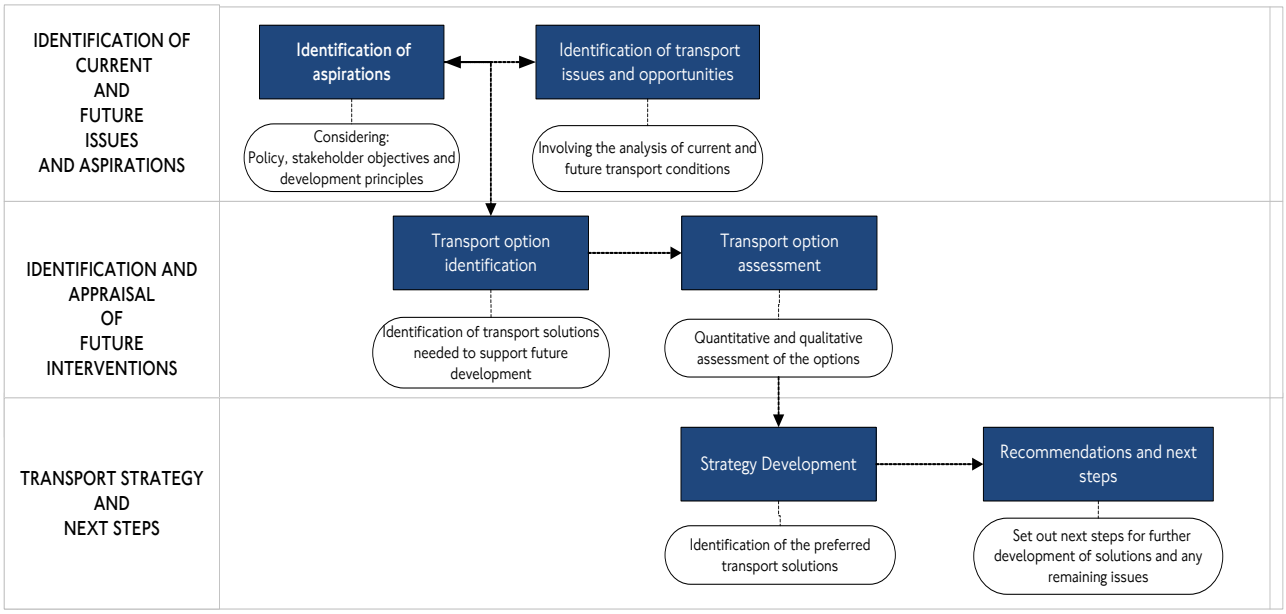


Figure 1-1: Strategic Transport Study methodology

1.3 Stakeholder consultation

Stakeholder consultation formed an essential part of the Study, with a Stakeholder Consultation Strategy prepared at the outset of the project. Regular updates on the Study were provided at weekly meetings, which comprised of planning and transport representatives from each of the three local authorities, the GLA and, when appropriate, Network Rail and HS2 Ltd. TfL modal representatives were also consulted throughout the Study, to ensure their views were known and addressed. Findings from previous public consultations in the area were also considered in the production of the document,

1.4 Structure of the report

Following this introductory section, the report is structured as follows:

- **Section 2** : introduces the Old Oak Common Opportunity Area (OOCOA), and the study objectives;
- **Section 3** : describes the regional and local transport policy context;
- **Section 4** : describes the current transport infrastructure serving the Old Oak study area and any existing issues identified;
- **Section 5** : presents the development projects proposed within the Old Oak study area and surrounds;
- **Section 6** : outlines the proposed transport network and forecast issues for a future year (2031) scenario, *without* development;
- **Section 7:** outlines the proposed transport network and forecast issues for a future year (2031) scenario, *with* development;
- **Section 8:** identifies and appraises potential transport mitigation measures and interventions, to support the additional demands put on the transport network by

development growth. The section also assesses how the potential transport interventions outlined relate to the study objectives and goals of the Mayor's Transport Strategy.

- **Section 9:** outlines the forecast impact of the proposed transport interventions and its implementation;
- **Section 10:** proposes an indicative timeframe for delivery of the Study interventions; and
- **Section 11:** presents conclusions and way forward.

2 Old Oak Common Opportunity Area

2.1 Background

In January 2011, an Opportunity Area Planning Framework (OAPF) covering the Park Royal industrial estate was published by the Mayor of London. It set out the growth ambitions for Park Royal over the next 20 years, based on the targets subsequently adopted in the replacement London Plan (July, 2011), of 14,000 new jobs and 3,500 new homes.

In January 2012, the Government announced the decision to proceed with Phase 1 of HS2, a new high speed rail link between London and Birmingham. The proposals would see a new station built at Old Oak Common, within Park Royal, providing interchange with the planned Crossrail route for access to Heathrow, the West End, the City and Canary Wharf. Subsequent proposals for Phase 2 of HS2 would provide improved access to the north of England, with new stations proposed along two rail spurs from Birmingham to Manchester and Leeds.

The HS2 station at Old Oak Common would also serve National Rail services on the Great Western Main Line (GWML), and provide connections to a future potential new London Overground (LO) station(s). Consequently, the new HS2 interchange will improve public transport connectivity on a national, regional and local level, enabling the opportunity for a major new residential/ commercial development in west London, with substantial numbers of new homes and jobs.

2.2 Study area

2.2.1 Old Oak Common Opportunity Area (OOCOA)

Old Oak is an area of industrial and railway land in between Old Oak Common Lane, Wormwood Scrubs, Scrubs Lane and Willesden Junction.

As part of the Draft Further Alterations to the London Plan (2014), Old Oak Common is designated as an Opportunity Area.

The OOCOA covers an area of 55 hectares and includes three wards; namely College Park and Old Oak in Hammersmith & Fulham, East Acton in Ealing, and Harlesden in Brent. The OOCOA which forms the core study area, along with the wider study area which extends to include Park Royal is shown in Figure 2-1. The proposed HS2/ Crossrail station is central to the OOCOA and is the primary focus of this Study. However, links and connections to the wider area have also been considered as part of this Study, as the transport network will need to be integrated into the wider area and existing communities. The Old Oak area is in close proximity and has good links to other Opportunity Areas such as White City, Earl's Court, Southall, Wembley and Heathrow.

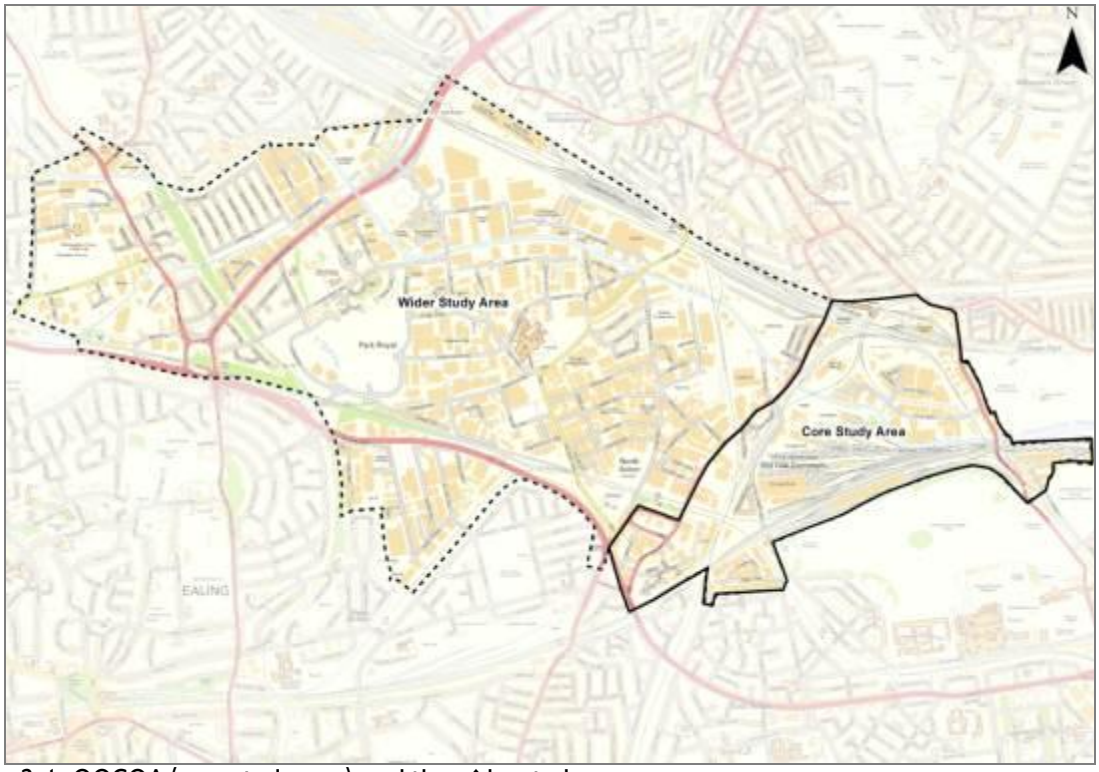


Figure 2-1: OOCOA (core study area), and the wider study area

2.3 Existing land use

The proposed OOCOA is broadly comprised of 3 sub-areas - Old Oak North, Old Oak South and North Acton, as shown in Figure 2-2. A summary of current land use within these sub-areas follows.

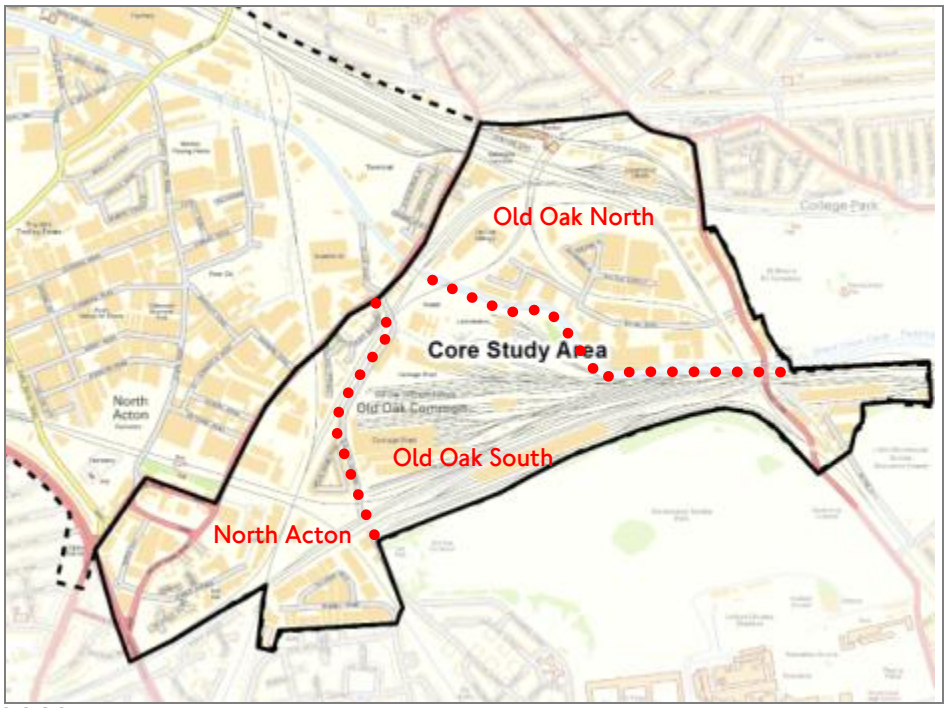


Figure 2-2: OOCOA sub-areas

2.3.1 Old Oak North

Three main businesses currently operate within Old Oak North; namely Powerday, European Metal Recycling (EMR) and Car Giant.

Powerday is a recycling and waste management company. Its waste facility at Old Oak, located in the vicinity of Willesden Junction station, has its own railway sidings and wharf on the Grand Union Canal to enable transportation of waste. EMR is a recycling company, adjacent to A219 Scrubs Lane. Its primary function is the recycling of scrap metal from various sources such as vehicles, industry, construction and demolition. Car Giant operates a car supermarket and is a major employer on the site. It is also a major land owner in the OOCOA.

2.3.2 Old Oak South

Old Oak South is dominated by rail uses, most notably the GWML but also accommodates a number of other rail-related facilities, including depots and stabling sidings.

To the far north of the site is the Crossrail 1 depot and maintenance facility. This is currently being constructed and will be fully open from 2018. It will be the main site for the maintenance of the rolling stock as well as providing a substantial proportion of the stabling for the Crossrail fleet. A study is underway to consider the full or partial relocation of these facilities in the 2020's which could release the site for redevelopment.

To the south of the Crossrail depot and immediately north of the GWML is the First Great Western (FGW) and Heathrow Express (HEx) depots. These are two separate facilities that support the operation of National Rail services on the GWML. There are proposals for both these depots to be relocated as part of plans for HS2. Work is ongoing to identify suitable alternatives.

As part of the planned electrification of the GWML and rollout of the Intercity Express Programme (IEP), a new depot facility will be provided at North Pole depot, to the south of the GWML. This was formerly the site of the Eurostar fleet until it relocated to Temple Mills near Stratford International station in East London and will accommodate a substantial part of the replacement for the existing FGW fleet.

2.3.3 North Acton

This area predominantly consists of light industrial and commercial land uses. The main spatial characteristic of this sub-area is its division by railway lines. The site is severed from both of the Old Oak sub areas by the North London Line (NLL) and the Dudding Hill Line which broadly run in a north to south alignment, and is divided in two by the east-west course of the London Underground Limited (LUL) Central line.

2.4 Objectives

2.4.1 Role of the Transport Study

To support the OAPF, this Study is aimed at assessing the potential impact of development growth upon the transport network and outline what, if any, improvements to the transport

network may be required to help unlock the site in order to achieve the optimum development scenario. The specific objectives of this Study are set out below. These have taken into consideration London Plan policy, the Mayor's Transport Strategy (MTS) goals, local authority policies and the aspirations of key stakeholders.

Old Oak Common Strategic Transport Study objectives

- **Minimise congestion on the surrounding highway network by:**
  - investigating options to limit road congestion, especially on key strategic links; and
  - investigating options to encourage low levels of private car use throughout the OA.
- **Improve connectivity throughout the OA and the surrounding area by**:
  - identifying potential new local road connections through the site to improve connectivity for all road users (including vehicle occupants, bus users, cyclists and pedestrians);
  - identifying improved bus connections through the site, and identifying locations where any supporting infrastructure (e.g. bus stops and stands) may be required;
  - maximising opportunities for walking and cycling throughout the OA and the surrounding area by improving local connectivity and reducing severance;
  - identifying options to improve access to, and along the Canal, and provide local access to the area north of the Canal;
  - identifying opportunities for new walking, cycling and public transport links; and
  - providing improved access to Wormwood Scrubs from the north
- **Improve connectivity throughout the OA and the surrounding area by**;
  - Maximising the benefits and opportunities arising from the HS2 proposals.
- **Ensure the future freight / servicing demands within the OA can be accommodated by:**
  - Proposing a package of measures which will help mitigate the impact of freight traffic on the local highway network.

3 Policy context

The planning context for OAs is set out in the London Plan (2011) and Draft Further Alterations to the London Plan (2014). Relevant planning policy is also set out in the MTS (2010), the West Sub-regional Transport Plan (2010 and 2014), and the plans of each local authority. This section summarises the policy framework that supports the development of the OOCOA.

3.1 Regional Policy Context

3.1.1 London Plan (2011) and Draft Further Alterations to the London Plan (2014)

The Mayor's London Plan identifies a number of potential OAs, of which PROA is one. These are defined as locations with significant capacity to accommodate new housing, commercial and other development, linked to existing or potential improvements to public transport connectivity.

The Government's decision to proceed with a new HS2 interchange has presented an opportunity to review the remit for the existing PROA, as the arrival of a transport 'super hub' provides the potential to deliver a more comprehensive mixed use development than is currently proposed. To help take this forward Old Oak Common has been designated as an Opportunity Area as part of the Draft Further Alterations to the London Plan, with the potential to deliver up to 24,000 homes and 55,000 jobs.

3.1.2 Old Oak - a Vision for the Future (2013)

A 30 year vision for Old Oak Common was issued for public consultation in June 2013. This set out one possible way forward for the regeneration of this area. It sought to capitalise on the dramatic improvements to the connectivity of the area that the HS2 and Crossrail proposals would bring. The Vision proposed to relocate the Powerday and European Metal Recycling waste recycling sites, as well as making changes to the regional transport network. This Vision document has been used to inform the development of the draft OAPF alongside local authorities' development plans and the London Plan.

3.1.3 Mayoral Development Corporation (2014)

To help coordinate the delivery of regeneration of Old Oak and Park Royal a Mayoral Development Corporation (MDC) will be established from April 2015. The Old Oak and Park Royal Development Corporation (OPDC) will assume planning powers within its borders from 1 April 2015. Public consultation took place in summer 2014 on the proposed structure and powers that the OPDC could have, as well as the proposed OPDC boundary. Further amendments to the boundary were consulted on in November 2014.

3.1.4 Mayor's Transport Strategy (2010)

The MTS [1]is a statutory document developed alongside the London Plan, as part of a strategic policy framework to support and shape the economic and social development of London over the next 20 years. This Study is consistent with the MTS. The funded and committed schemes identified by the MTS were assumed to be completed in the time period of this Study and have been considered as part of the assessment. Where the funded and committed schemes have changed since the publication of the MTS, this has been highlighted in this report and the possible impact considered.

3.1.5 West Sub-regional Transport Plan (2010 with 2014 update)

The West Sub-Regional Transport Plan (SRTP) identifies some specific priorities and projects for west London, such as an HS2 station and sub regional interchange at Old Oak Common (Crossrail). Future versions of the West London Sub-regional Transport Plan will consider the conclusions of this Study.

The SRTP notes that Old Oak Common would be a major new strategic interchange for the benefit of the West London sub-region as well as for the north and south sub regions.

The following benefits of this new hub are identified as:

- supporting growth and regeneration around the Willesden Junction and Park Royal Opportunity Area;
- providing the west region with greatly enhanced connectivity - providing possible connections between High Speed rail, Crossrail, Great Western, local rail, Overground and Underground services; and
- leading to a reduction in car trips with associated CO_2, air quality and reduced congestion benefits.

3.1.6 Roads Task Force (2013)

The Roads Task Force (RTF) [2] report sets out a new vision for the future of London's roads and streets, to ensure the capital can cope with major population growth, support jobs and new homes, while remaining one of the most attractive, vibrant, accessible and competitive world cities. The RTF's vision focuses on three core aims:

- to enable people and vehicles to move more efficiently on London's streets and roads;
- to transform the environment for cycling, walking and public transport; and
- to improve the public realm and provide better and safer places for all the activities that take place on the city's streets, and provide an enhanced quality of life.

[1] Further information is available on line at: http://www.london.gov.uk/priorities/transport/publications/mayors-transport-strategy
[2] Further information is available online at: http://www.london.gov.uk/priorities/transport/investing-transport/roads-task-force

3.1.7 The Mayor's Vision for Cycling in London (2013)

The Mayor's Cycling Vision [3] sets out an aspiration to develop a 'Tube network for the bike', 'safer streets for the bike', to 'get more people travelling by bike' and 'better places for everyone'. As part of this, a new east/ west Cycle Superhighway ('Crossrail for bikes') is proposed between Tower Hill and Acton, that would run along the A40 Westway, located to the south of the proposed OOCOA.

3.2 Local Policy Context

The OOCOA is located on land within the jurisdiction of LBHF, LBB and LBE. The following sets out the current borough policies in relation to Park Royal/ Old Oak Common for each of these local authorities.

3.2.1 London Borough of Hammersmith and Fulham

Core Strategy

LBHF's Core Strategy was adopted in October 2011 and conforms to the London Plan. This is the Council's overarching policy document, and highlights the strategic objectives for the borough.

It includes specific references to the Park Royal Opportunity Area, and advises that the long term vision for the area is to '*transform it with substantial mixed use regeneration made possible principally by the projected HS2 line and Crossrail. This could provide thousands of homes, jobs and supporting facilities in a high quality environment focused on the Grand Union Canal and securing future growth for London in a very sustainable way*'.

This document also includes a number of transport policies, with the strategic objectives identified to:

- ensure there is a high quality transport infrastructure, including a Crossrail Station and a High Speed rail hub to support development in the north of the borough and improve transport connectivity and reduce traffic congestion and the need to travel;
- reduce and mitigate the local causes of climate change, mitigate flood risk and other impacts and support the move to a low carbon future; and
- encourage and promote healthier lifestyles and reduce health inequalities.

Borough wide strategic Policy T1 focuses on transport, and states the aim is to '*work with strategic partners to improve transport connectivity in the borough, especially on north-south routes and by seeking better connections to national and regional rail'*. Policies specific to this area include:

- continuing to promote major improvements with new stations and enhanced local and sub-regional passenger services on the West London Line;
- supporting the implementation of Crossrail and the national High Speed 2 (HS2) Heathrow rail link proposal and seeking a Crossrail station and West London hub

[3] Further information is available online at:
http://www.london.gov.uk/sites/default/files/Cycling%20Vision%20GLA%20template%20FINAL.pdf

station for HS2 with an interchange with the West London Line (WLL) in the Old Oak Common and Hythe Road regeneration area;

- increasing opportunities for walking and cycling;
- seeking localised improvements to the highway network to reduce congestion on north-south routes in the borough; and
- ensuring appropriate parking is provided to meet the essential needs of the development without impacting on the quality of the urban environment.

Development Management Local Plan

The Council's development management policies were adopted in July 2013. These, together with the Core Strategy and the London Plan, are used to guide development and to determine individual planning applications. Of relevance to this Study, Strategic objective 18 is to '*ensure there is a high quality transport infrastructure, including a Crossrail station and a High Speed 2 rail hub to support development in the north of the borough and improve transport connectivity and reduce traffic congestion and the need to travel'.*

Draft Local Plan

Public consultation on the draft Local Plan outlining the Council's vision and preferred options for development in the borough in the next 20 years started in January 2015. The Draft Local Plan includes identification of five key regeneration areas including Old Oak Common and strategic sites for development.

3.2.2 London Borough of Ealing

Core Strategy

EBC's Core Strategy was adopted in April 2012. The following policies focus on promoting development in Park Royal.

Policy 3.3- Promote Business and Industry in Park Royal

a) To retain business and industry throughout the Park Royal industrial estate;
b) To promote Park Royal as a centre for green industry in the borough;
c) To improve cycle access to employment, including one-way exemptions, off road routes and better towpath access; and
d) To promote the use of the Grand Union Canal for freight transport.

Policy 3.4- Southern Gateway, Park Royal

a) To create an improved southern gateway to Park Royal with efficient movement to and from the strategic industrial location and a clear, safe relationship and routes between the tube, buses, heavy goods vehicles and the surrounding area and an important focal point for business in its own right with up to 2,000 potential office jobs. This could lead to 1,500 residential units in a place where residents choose to live, because it is convenient and has good facilities and a decent environment;

b) To redevelop North Acton station and environs with a mix of commercial development and in a setting at Victoria Road with shops, restaurants, cafes and leisure to support the gateway and the wider Park Royal area, and improved bus, cycle and pedestrian facilities and access routes;
c) To create a network of green space, with safe, attractive footpaths and featuring at least two new public open spaces; and
d) To further explore opportunities for creating a district energy network.

In addition, Policy 1.1 sets out the spatial vision for Ealing for 2026. Two of the identified aims of this are to '*support sustainable, safe and convenient transport networks to and through Ealing that, in particular, improve north-south transport links between Uxbridge Road/ Crossrail and A40/ Park Royal corridors and to promote healthy travel behaviour and seek to reduce the need to travel',* and to '*protect and enhance suburban communities, improve public transport, cycle and pedestrian links to the development corridors and neighbourhoods'.*

The Strategy also states that the objective of the 'Vision for Ealing 2026', is to '*support opportunities from Crossrail and High Speed 2 (HS2) working closely with Crossrail and HS2 planners to ensure the benefits to the borough are maximised. These benefits include improved accessibility, greater public transport capacity on the key east/ west radial corridor in the borough and a major potential contribution to the regeneration and economic development in town centres and other sites along routes.'*

3.2.3 London Borough of Brent

Core Strategy

LBB's Core Strategy was adopted in July 2010. It includes a strategic objective related to transport. This aims to reduce the need to travel and improve transport choices by:

- completing first class retail and other retail facilities in Wembley that reduce the need to travel to other centres. Improving key transport interchanges at Wembley, Alperton, First Central and Queen's Park;
- promoting access by public transport, bicycle or on foot and reducing car parking standards for growth areas because of their relative connectivity; and
- completing at least 5 car free schemes per annum in the plan period.

The Strategy also includes specific policy related to Park Royal. However, as it was adopted in 2010, it does not take into consideration the proposed HS2/ Crossrail interchange and the benefits this could bring to the area. The policy focuses on supporting the existing industrial area and the current SIL designation. The Strategy recognises the need to provide new infrastructure to support the level of growth being proposed.

4 Existing transport infrastructure and issues

This section summarises the current transport infrastructure and issues identified within the core Opportunity Area, alongside the wider study area. Various existing data sources have been used to present an overview of the existing transport network, travel patterns and conditions.

The OOCOA is served by Willesden Junction, East Acton and North Acton rail stations, although these are located on the periphery of the Opportunity Area and access to them is relatively poor. The wider study area is served by a mix of transport infrastructure, including strategic (TfL) and local roads and accesses; LUL and LO rail services; local bus services and walking and cycling routes.

The section begins by looking into the travel characteristics of those living in the three boroughs within which the Opportunity Area is located, before examining the various modes of transport that exist and highlighting any observed issues.

4.1 Travel characteristics

To understand the local propensity to travel, data taken from the London Travel Demand Survey (LTDS) has been explored, which is a rolling five year survey of Londoners travel habits. It has not been possible to complete the LTDS analysis specifically for the OOCOA by itself, due to the sample size limitations. Therefore, the analysis below considers the three boroughs within which the OOCOA is located. All figures quoted in section 4.1 relate to trends across the whole day rather than just peak periods.

Table 4-1 gives an overview of the travel patterns in each of the boroughs, with a comparison with the west London sub-region in which they lie and Greater London as a whole. It looks at the number of trips made by residents, trip lengths, the number of trips per day and the distance this equates to.

Borough of residence	Number of persons (000s)	Number of trips (000s)	Total trip length (000s km)	Ave. trips per person per day	Ave. trip distance per person per day (km)
Hammersmith and Fulham	182	459	2,992	2.7	17.6
Ealing	339	777	4,832	2.5	15.4
Brent	312	725	4,037	2.5	14.0
West London sub-region	1,604	3,688	23,218	2.5	15.8
Greater London	8,204	19,509	113,896	2.6	14.8

Table 4-1: Travel patterns of residents in boroughs making up the OOCOA

LBHF residents have marginally higher trip rates and travel greater distances per person, per day, on average when compared to west sub-region and Greater London. The number of trips, per person per day, for LBE and LBB residents is lower than LBHF, but is at the level of the west London sub-region. The average trip distance per day is also slightly lower.

4.1.2 Mode Share

Figure 4-1 shows the mode share of daily trips made by residents of the three OOCOA boroughs. A significant proportion of residents (between 25% and 40%) across the boroughs walk, which is consistent with inner London trends. The use of car is also prevalent, but more so in LBE and LBB (35%-40%) than LBHF (approximately 20%). Again, these proportions are in line with London averages.

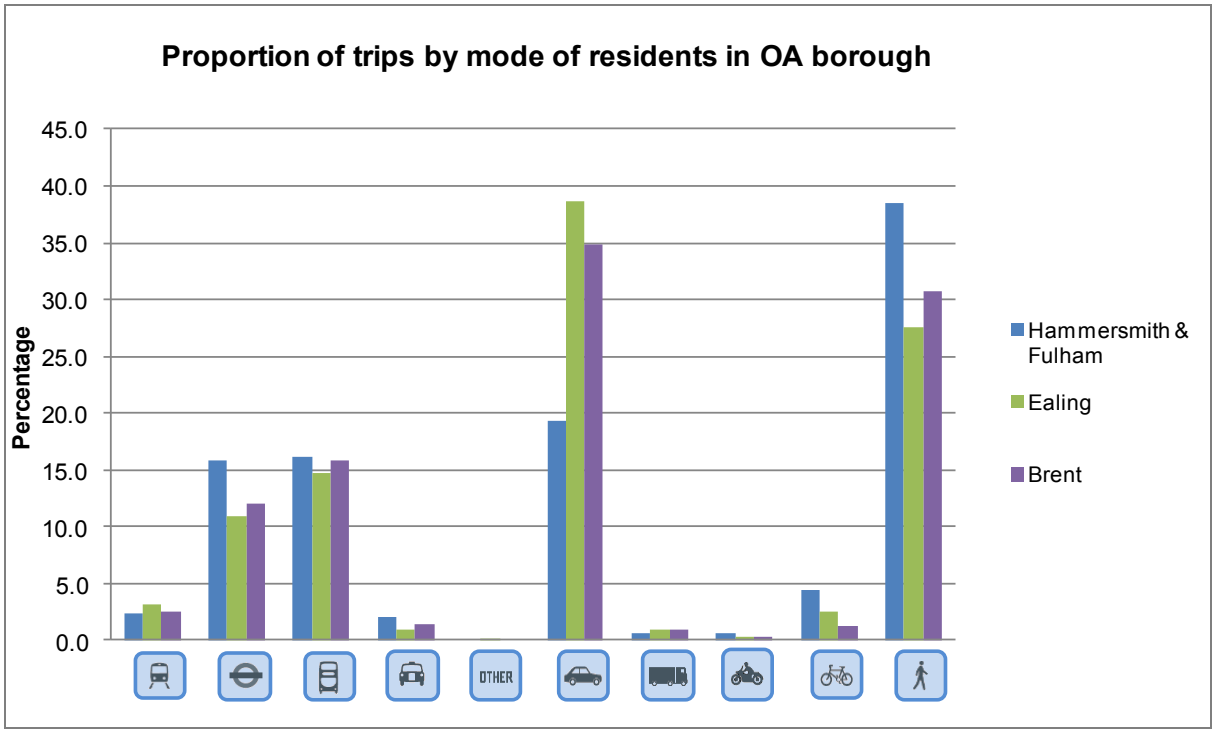


Figure 4-1: Mode share of residents in boroughs making up the OOCOA

4.1.3 Journey purpose

Figure 4-2 shows the journey purpose of residents living within the boroughs making up the OOCOA. It is evident that leisure and shopping are the biggest drivers of trips in these boroughs, which is typical of trends across London as a whole. There is little variation between journey purpose type proportions, between the three boroughs.

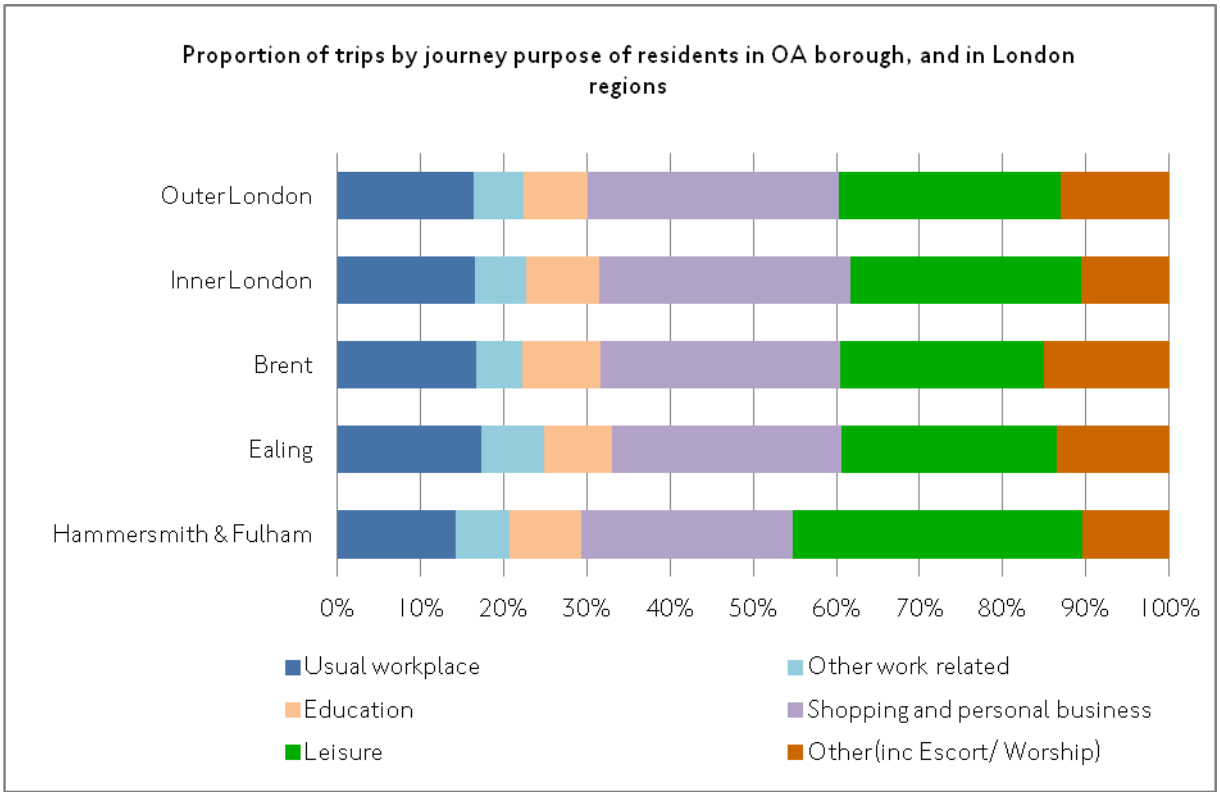


Figure 4-2: Journey purpose of residents in boroughs making up the OOCOA

4.2 Highway network

4.2.1 Existing highway network

A number of strategic highway routes pass around the OOCOA. The A40, also known as the Westway, runs in an east to west direction, to the south of the site. This key strategic road providing a link to the M25 carries traffic between central London and west London. Further west, it becomes the M40 and passes through Buckinghamshire and Oxfordshire to Birmingham. The A406 North Circular, which forms an orbital route through North London, is located to the west of the OOCOA. Both the A40 and A406 North Circular form part of the Transport for London Road Network (TLRN), whilst the A404 Harrow Road, which runs to the north of the site, forms part of the Strategic Road Network (SRN). Figure 4-3 shows the layout of the strategic road network in and around the OOCOA

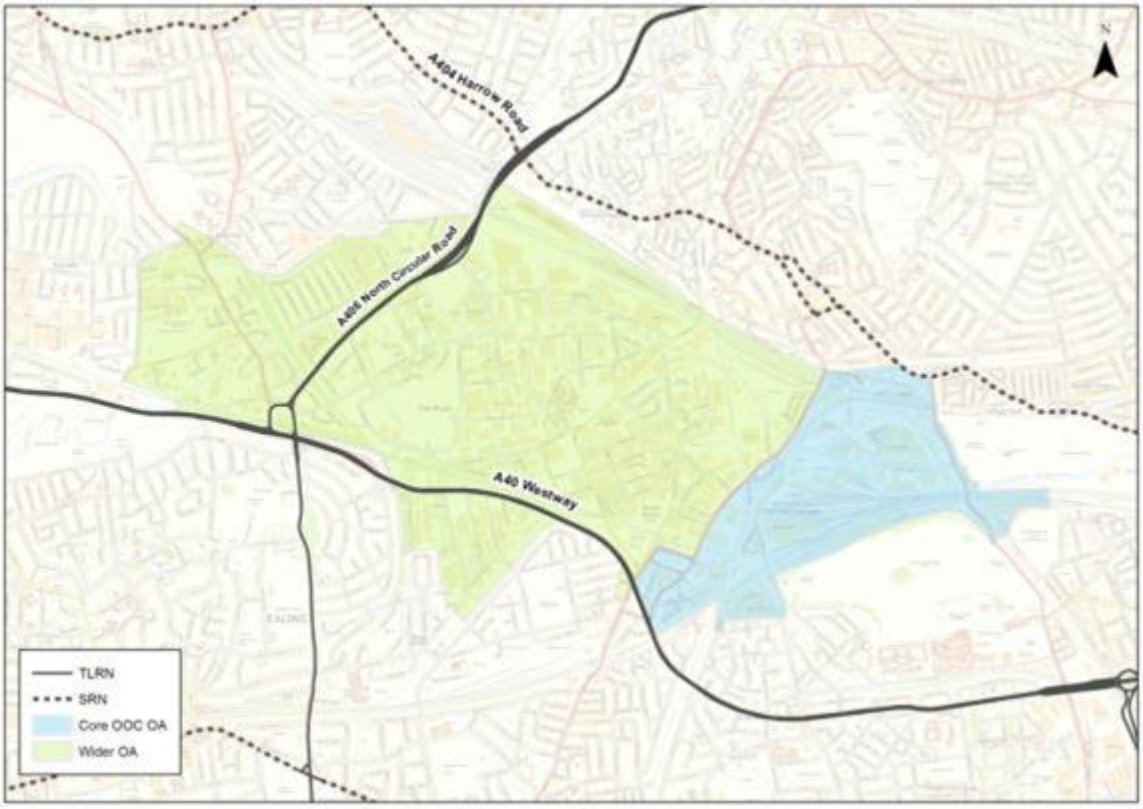


Figure 4-3: Strategic highway network

The A40 is a key strategic corridor, crucial to bringing traffic into and out of London from the west. It has high traffic flows and suffers from congestion. A number of key junctions on the A40, namely the Hanger Lane gyratory, Gypsy Corner (junction with Victoria Road) and Savoy Circus (junction with Old Oak Common Lane), are located in close proximity to the south of the OOCOA. These, due to traffic intersecting and moving east/west to north/south, get congested during peak periods with significant queues forming. The A40 also causes severance, as it is a busy route with very few at-grade pedestrian or cycle crossings and therefore acts as a barrier to those travelling on foot or by bicycle.

The A406 North Circular is also an important strategic link, providing the main orbital link for north London. This road also causes a severance effect for those communities living either side of it, and again provides poor facilities for pedestrians and cyclists, with relatively few formal crossing points available.

The roads in, and around, Old Oak Common itself are generally used for local traffic and can sometimes be used as rat runs by people wanting to avoid the congestion on the A40. The added pressure brought about by this rat running increases the stress on the network. Due to the canal and railway lines, there are limited opportunities to traverse north-south, which adds to the severance of the site.

4.2.2 Highway network performance

Traffic volume and road capacity (V/C)

Volume over capacity (V/C) represents traffic volume as a percentage of a road's capacity and can be used to highlight areas of the highway network that are approaching or are over

theoretical capacity. For this Study, V/C has been defined by three thresholds, as defined in Table 4-2.

Volume over capacity (V/C)	
<80%	Operating within capacity
80-90%	Approaching critical capacity
>90%	Operating under operational stress or over capacity

Table 4-2: Volume over capacity (v/c) theoretical thresholds

TfL maintains a suite of strategic traffic models that predict future traffic patterns on the network in response to future growth in jobs and population as well as assumptions about the transport network. To give confidence in the forecast scenarios, the models are first validated to ensure they replicate *current observed* traffic conditions. These current year scenarios then can also be used to validate anecdotal evidence on existing network stress. The analysis undertaken, shown in Figure 4-4 and Figure 4-5, identified that there are a considerable number of roads and junctions that currently have a V/C ratio between 70 and 80 per cent. Although they are not yet at a critical capacity, they are approaching this point, suggesting that spare capacity across the network is limited.

The analysis indicated that, on the A40, a number of junctions are approaching the critical capacity threshold, during both peak periods (as shown in yellow). During the AM peak, shown in Figure 4-4, one of the junctions of the Gypsy Corner gyratory is already over theoretical capacity (as shown in red). During the PM peak, shown in Figure 4-5, approaches to the Hanger Lane Gyratory and sections of the A406 North Circular Road and A4000 Horn Lane are approaching critical capacity or are over capacity.

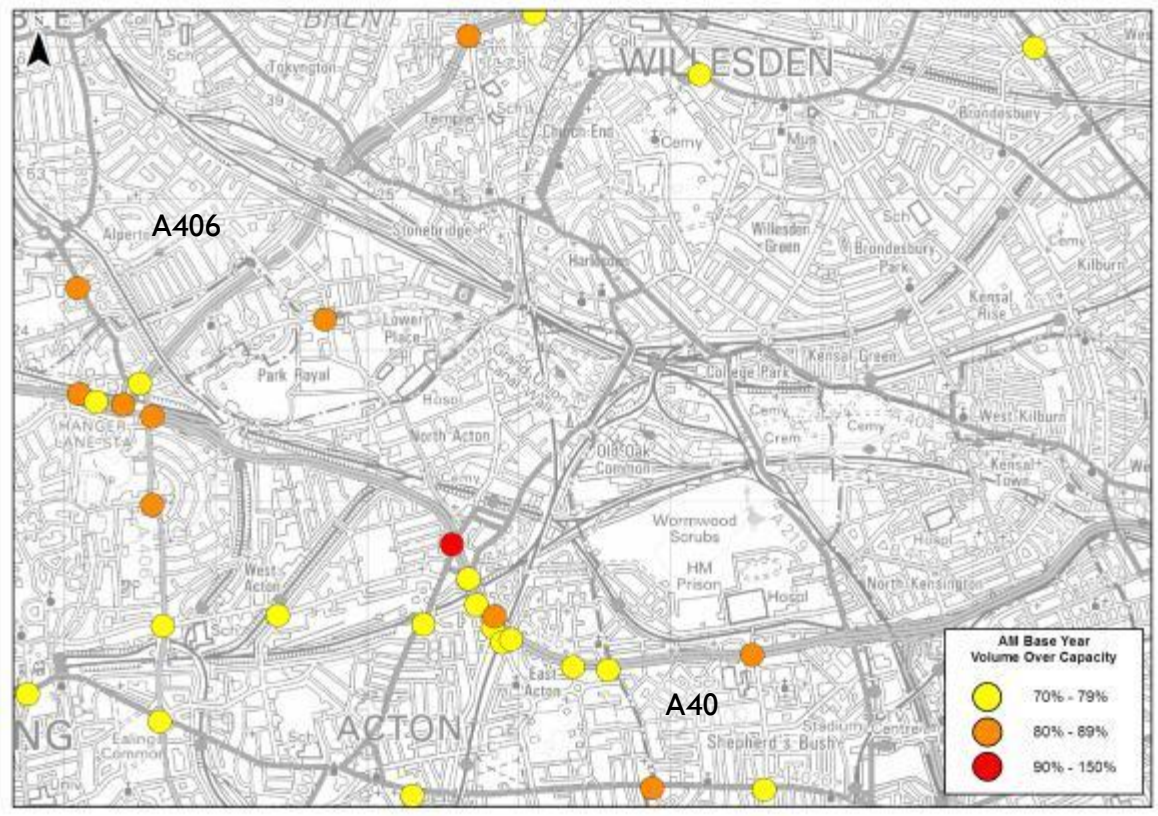


Figure 4-4: Highway network V/C – current year AM pk

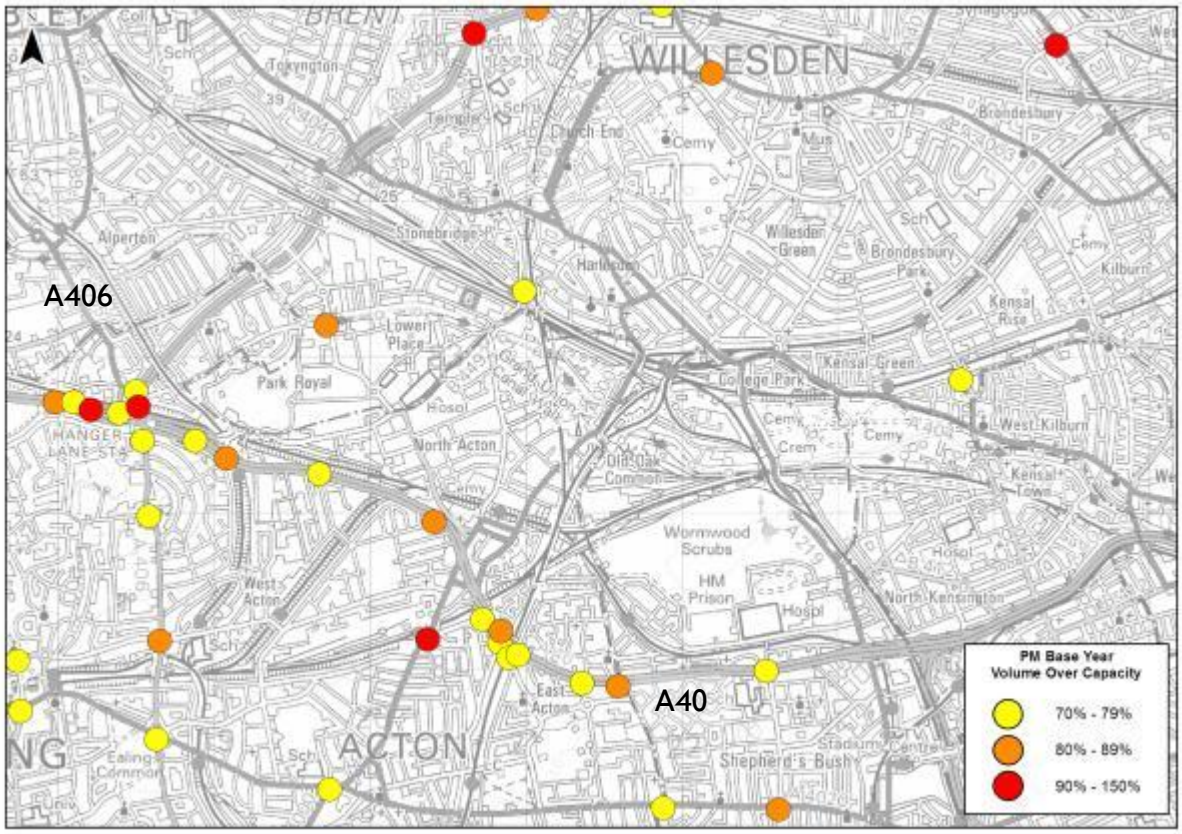


Figure 4-5: Highway network V/C – current year PM pk

Traffic delays

A different way of representing the operational performance of the road network is by using Trafficmaster data to examine average delays measured in time spent in traffic queues. Trafficmaster data is based on Global Positioning Systems (GPS) data from vehicles. Figure 4-6 shows the current observed delays on the road network in and around the OOCOA during the AM peak and figure 4-7 shows the equivalent for the PM peak.

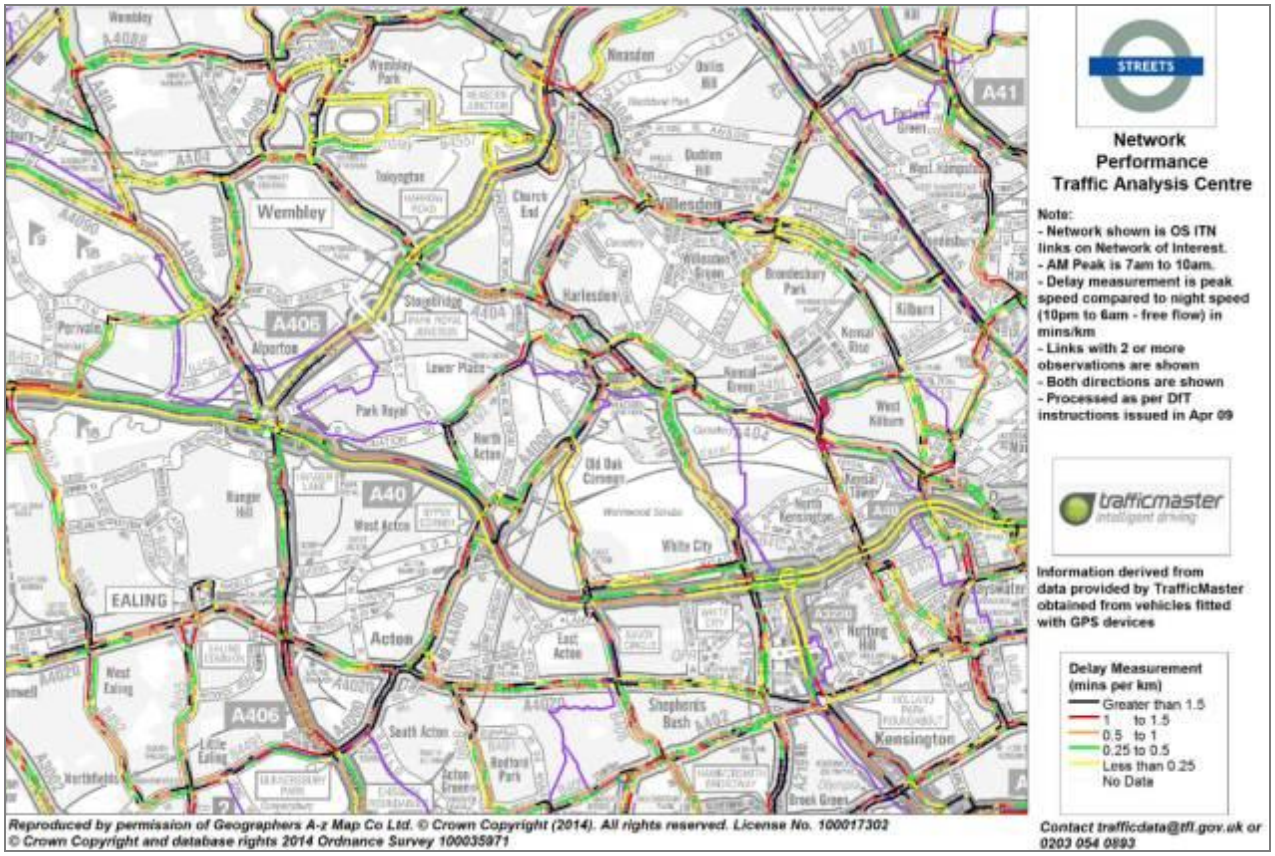


Figure 4-6: Traffic delays – current year AM pk

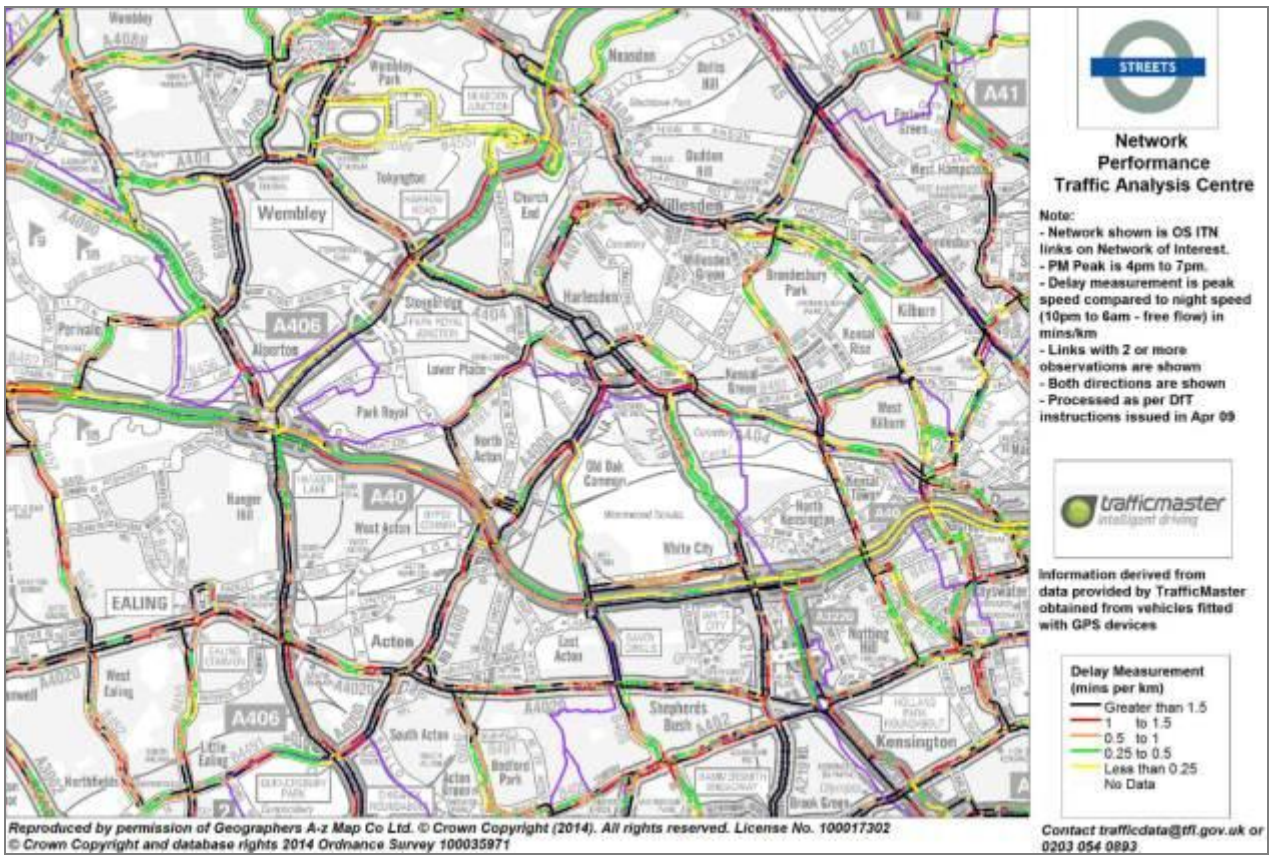


Figure 4-7: Traffic delays – current year PM pk

Journey time reliability

Journey time reliability, in this instance, is defined as the percentage of journeys completed within an allowable excess of five minutes, for a standard 30 minute journey during the morning peak. This is calculated from recorded journey times between Automatic Number Plate Recognition (ANPR) camera pairings across the TLRN (taken from TfL's quarterly *London Streets Performance Report*).Both the A40 and A406 are part of the TLRN and as a result have had JTR performance statistics calculated.

Table 4-3 shows the A40 inbound has an average journey time reliability of 81% (over the three most recent periods at time of writing), which indicates that approximately 8 out of 10 journeys are "on time". A low average speed of 33kph (20 mph) is also noted. The A406 is seen to perform slightly better, with closer to 9 out of 10 journeys 'on time'.

Route Type	Corridor	Direction	Period - JTR			Average speed (kph)
			9	10	11	
Radial	A40	Inbound – east bound	85%	79%	78%	33
Orbital	A406	Clockwise	92%	89%	87%	45
Orbital	A406	Anti-clockwise	88%	84%	83%	32

Legend – Journey time reliability	
More than 9 out of 10 journeys are "on time"	>90%
8-9 out of 10 journey are "on time"	80%-90%
Less than 8 out of 10 journeys are "on time"	<80%

Table 4-3: TLRN journey time reliability – current year (AM pk)

(Data from September 2013)

4.2.3 Collisions

Reported collisions have been analysed for 36 months from January 2009 to December 2011 within the OOCOA and the wider PROA study area. During this period, there were a total of 340 reported collisions, 32 of which were classified as serious in severity and 308 as slight.

Figure 4-8 shows that the recorded collisions are clustered around key junctions and roads, such as Hanger Lane, the North Circular and Gypsy Corner. Network performance and traffic flow data have shown these are some of the busiest roads in the study area which may relate to the number of collisions recorded. The collision descriptions highlight the most common causal factors of collisions in the area are changing lanes and sudden braking.

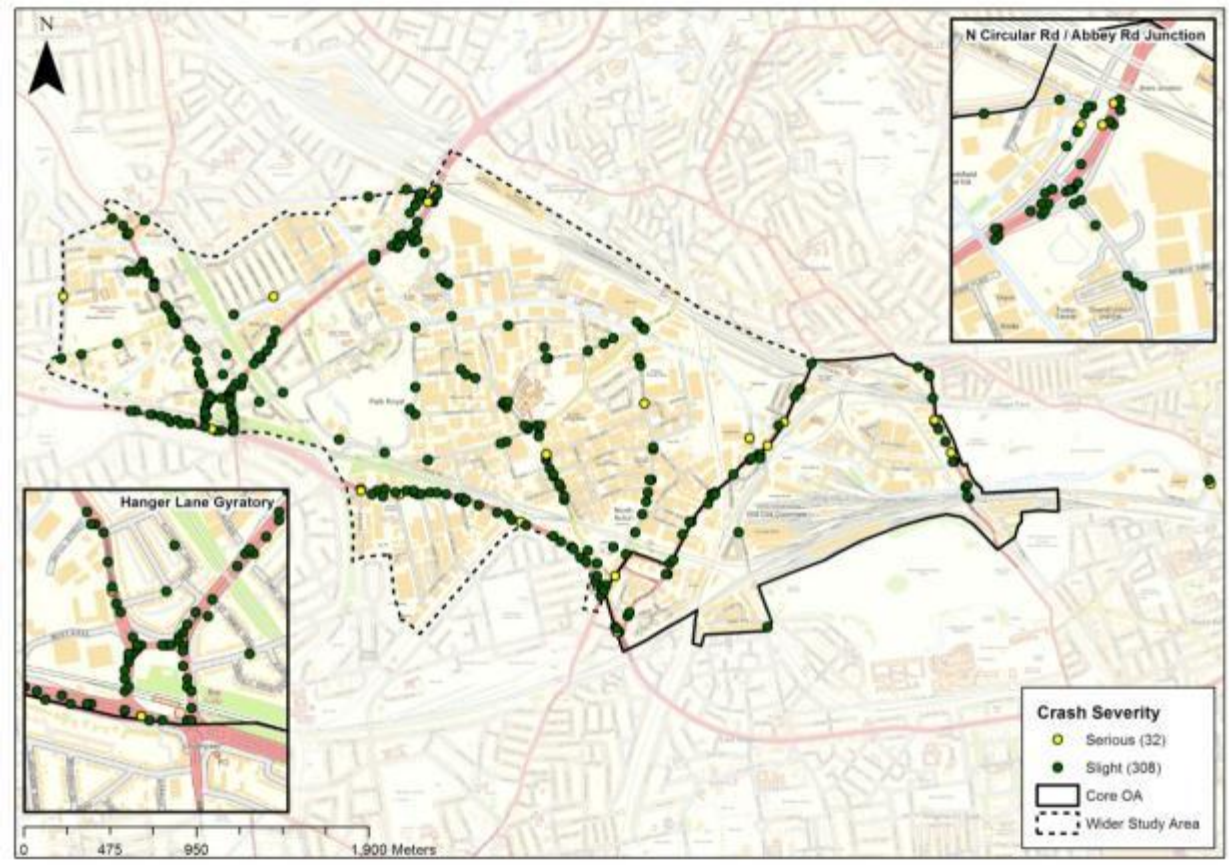


Figure 4-8: Collision location plan (Jan 2009 – Dec 2011)

Table 4-4 summaries the 410 casualties, with regard to mode and severity, recorded as a result of the 340 collisions which have taken place. The data highlights that cars and powered-two-wheeler vehicles were the main modes involved in collisions which resulted in casualties. A number of pedestrians and pedal cyclists were involved in collisions, but the numbers are deemed lower than average for an urban area. This may relate to the current low level of demand and the lack of provision for pedestrians and cyclists in the OOCOA - thus resulting in low levels of usage. This is something that would be expected to change in the future with the anticipated increase in population and activity. Over 90% of casualties were recorded as being slight in severity.

Mode	Casualty Severity			Total
	Fatal	Serious	Slight	
Pedestrian	*0*	*6*	*32*	*38*
Pedal Cycle	*0*	*2*	*20*	*22*
Powered 2 Wheeler	*0*	*12*	*86*	*98*
Car	*0*	*11*	*197*	*208*
Taxi	*0*	*3*	*9*	*12*
Bus or Coach	*0*	*1*	*12*	*13*
Goods Vehicle	*0*	*0*	*19*	*19*
Total	*0*	*35*	*375*	*410*

Table 4-4: Casualty mode and severity (Jan 2009 – Dec 2011)

4.2.4 Car parking

Parking across the three boroughs is predominantly managed using controlled parking zones (CPZ) and residential permits. These are used to protect residents who live near stations and town centres and discourages short distance intra-borough journeys by car. LBHF has a small CPZ located close to A219 Scrubs Lane, and there is also a CPZ within LBE, close to Hanger Lane. LBB operates an extensive CPZ close to the OOCOA, which is in operation Monday to Friday only, for the area to the east of Willesden Sports Centre/ All Souls Avenue, and for everything to the west of All Souls Avenue (i.e. Harlesden town centre) operating Monday to Saturday.

4.3 Public transport

4.3.1 Access to the public transport network

Public Transport Accessibility Levels (PTALs) give an indication of a geographical location's access to public transport, by measuring the distance to public transport services from a given point and the frequency of services. The results are expressed on a scale of 0 to 6. This includes sub-divisions 1a, 1b, 6a and 6b, where 1a indicates extremely poor accessibility to the location by public transport and 6b indicates excellent access. It should be noted that PTALs do not measure service capacity or physical accessibility for those with disabilities.

The public transport provision in the study area is a mixture of LUL, LO and bus. Figure 4-9 indicates that much of the study area has a low PTAL rating and there are some areas where the PTAL score is 0 (which means there are no public transport services located within an acceptable walking distance). However, some locations around the fringe of the study area have PTAL ratings of 5 and 6, due to the close proximity of LUL stations. As aforementioned, the pedestrian network is highly constrained which makes accessing the surrounding stations and bus stops difficult for some, resulting in the lower PTAL values.

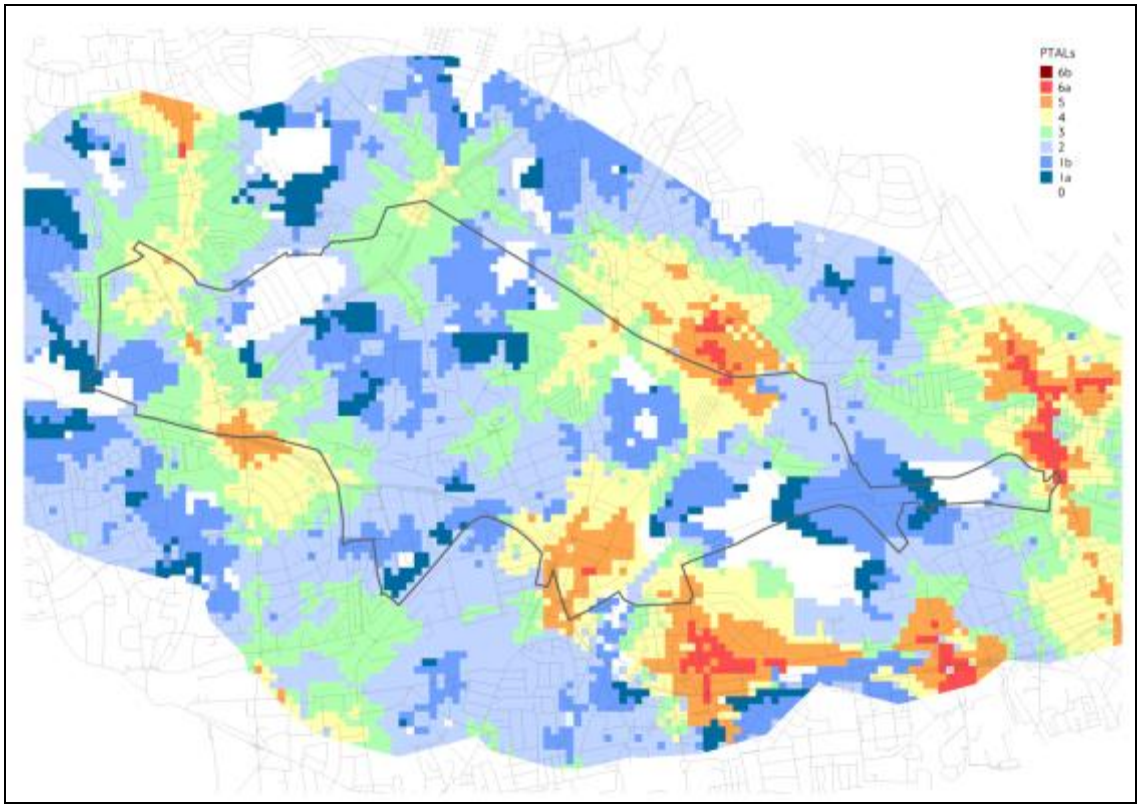


Figure 4-9: PTAL values – current year

4.3.2 Rail network

The OOCOA is served by Willesden Junction and North Acton stations, providing LO, Bakerloo Line and Central line services. These stations are on the periphery of the study area and access to them by foot or by cycle from some areas of the OA is currently limited due to the lack of safe and appropriate routes. Kensal Green (LO and Bakerloo Line) and East Acton (Central Line) stations are located nearby, but fall outside the OA.

The wider study area is also served by Harlesden and Stonebridge Park (Bakerloo Line and LO), North Ealing, Park Royal and Alperton (Piccadilly Line) and Hanger Lane (Central Line) stations. Rail services in and around the study area is shown in Figure 4-10.

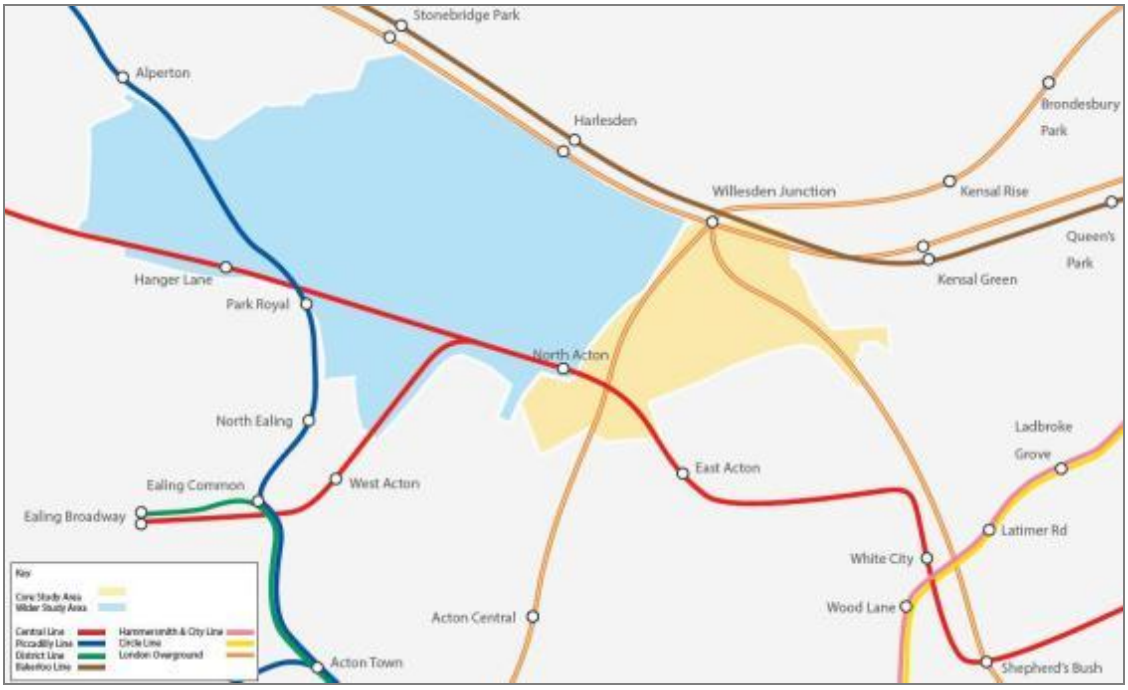


Figure 4-10: Rail network in and around OOCOA

Figure 4-11 shows the walking catchments from rail stations in and around the OOCOA. The darker colours highlight a 640m (approximately 8 minute) catchment from a station and the lighter colours a 960m (approximately 12 minute) catchment. There is a large parcel of land in the middle of the OA which falls outside a 960m walk to a station. This is seen as being poor in regard to access to public transport and is reflected by the low PTAL score previously discussed.

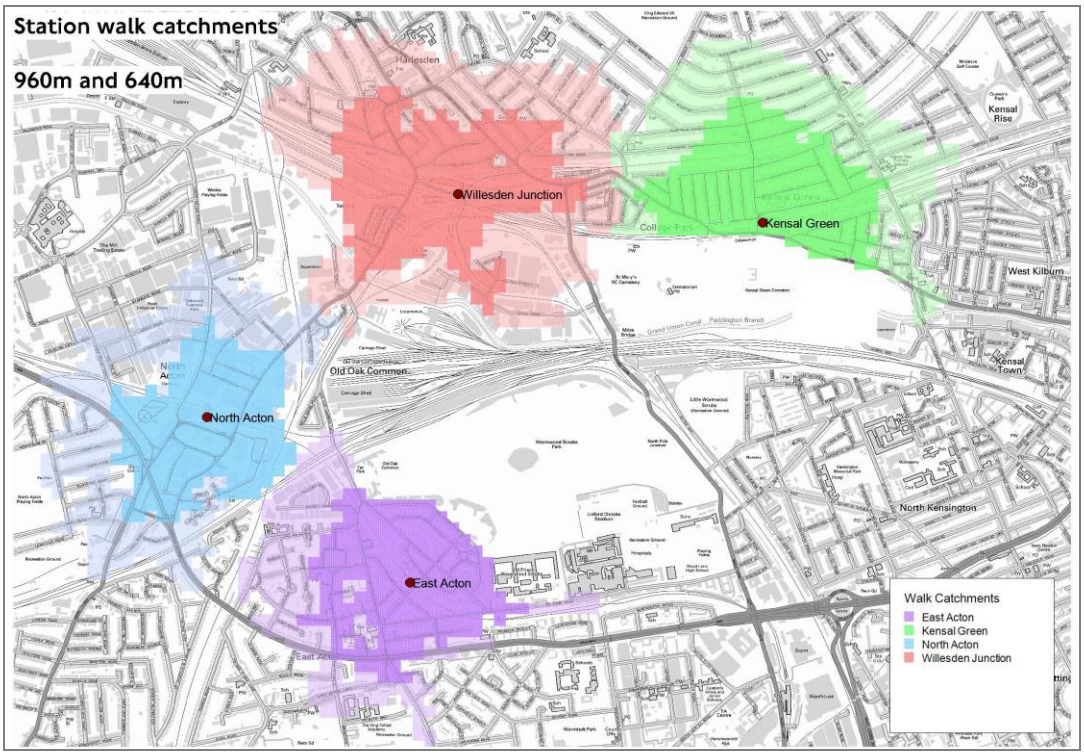


Figure 4-11: Rail station walk catchment areas

Rail station accessibility

The current layout of Willesden Junction station, the primary station serving the OOCOA, results in a poor level of accessibility via the local pedestrian and cycle network. The station, shown in Figure 4-12, can currently be accessed by bus, road or foot from the west, via the station forecourt. However, direct pedestrian access to the station from the north, south and east is poor and limited to unattractive alleyways with no active frontages, changes in levels, a large number of steps, constrained sight lines and poor natural surveillance. The routes are difficult to access for passengers with reduced mobility.

Figure 4-13 shows the constrained nature of existing pedestrian access from the south. To the east, access from A404 Harrow Road is also constrained by a set of steep steeps. The lack of visibility and natural surveillance is likely to act as a deterrent to some people who may want to use this route.

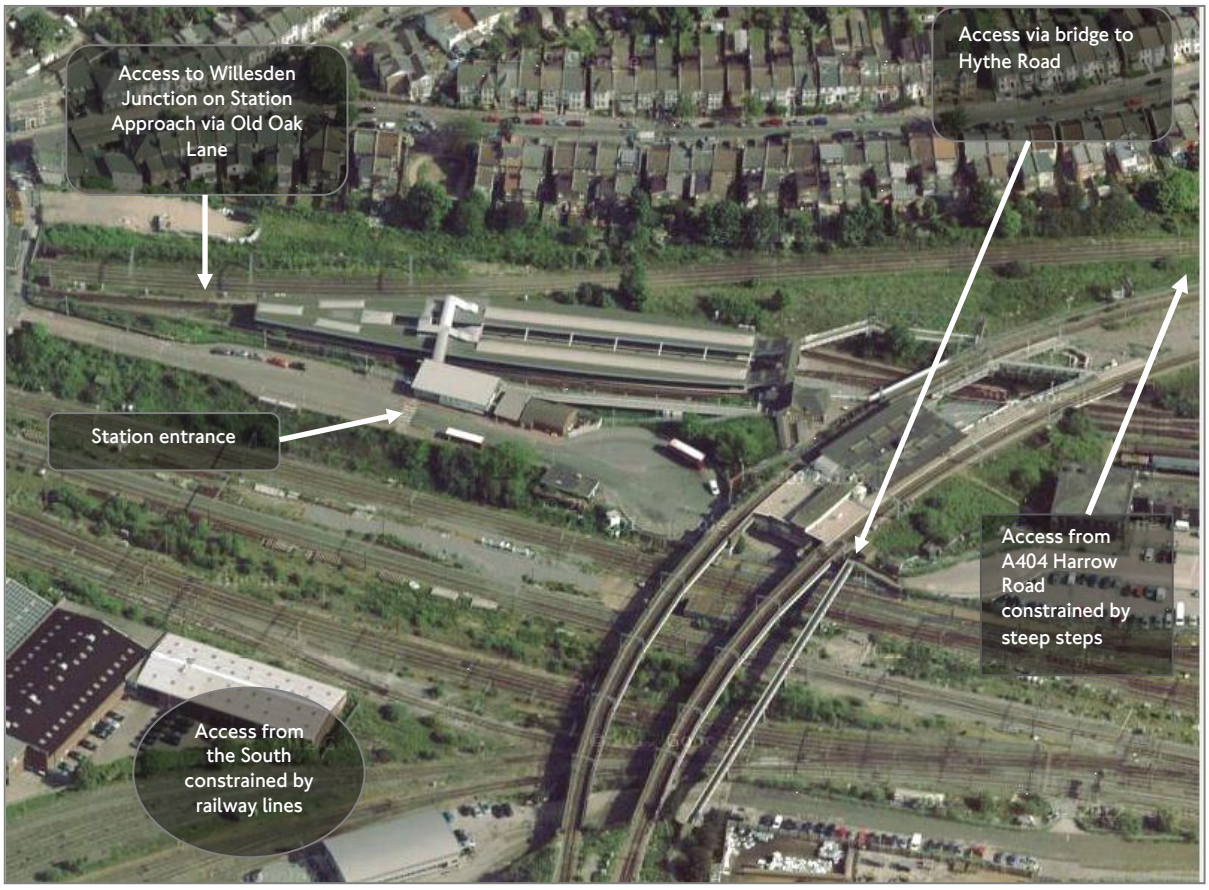


Figure 4-12: Willesden Junction station accessibility



Figure 4-13: Current pedestrian access to Willesden Junction station, from the south

Station demand and crowding

The passenger station demand in the current year, with regard to AM peak (0700 – 1000) entry and exit as well as overall station movement (including interchange between services), is shown in Table 4-5.

It is evident that Willesden Junction has the heaviest patronage of stations in and around the OOCOA, whilst it also has a significant number of passengers interchanging between services. Kensal Green has a similar number of passengers entering and exiting, whilst North Acton is the least busy station in terms of passenger footfall. Taking into account available station capacity, North Acton is currently classified as a station that is busy with some crowding while Willesden Junction is classified as a station with little crowding. However, taking account of planned growth the level of crowding is anticipated to rise in the future.

Station	Entry (no. passengers)	Exit (no. passengers)	Total station movement (no. passengers)
Willesden Junction	2,600	2,000	7,700*
Kensal Green	2,000	2,000	3,900**
North Acton	1,500	1,100	2,600

Table 4-5: Station entry, exit and interchange (07:00 to 10:00) – 2012

**Includes interchange.* ***Does not match entry and exit due to model rounding.*

Crowding on rail services

Figure 4-14 and Figure 4-15 show the current extent of crowding on the LUL, LO and National Rail networks during the AM peak (data taken for year 2011). The black lines indicate that crowding is exceeding four people standing per square metre (PPSM), which means that the route is severely crowded. It is evident that the most crowded sections of the LUL are predominantly confined to central London. At present, none of the LUL lines passing through Old Oak Common suffer from severe crowding; however, as the Central Line approaches central London, crowding increases.

The WLL refers to the section of the LO network operating between Clapham Junction to the south and Willesden Junction in the north,[4] whilst the NLL refers to the section of the LO network operating between Richmond and Stratford. Figure 4-15 indicates that the WLL is severely crowded on the section between Kensington and Shepherds Bush (northbound) during the morning peak, but that crowding subsides before services reach Willesden Junction. In the southbound direction, it can be seen that services between Willesden Junction and Shepherd's Bush also suffer from crowding. The NLL is crowded on nearly all of the sections between Willesden Junction and Stratford in both directions.

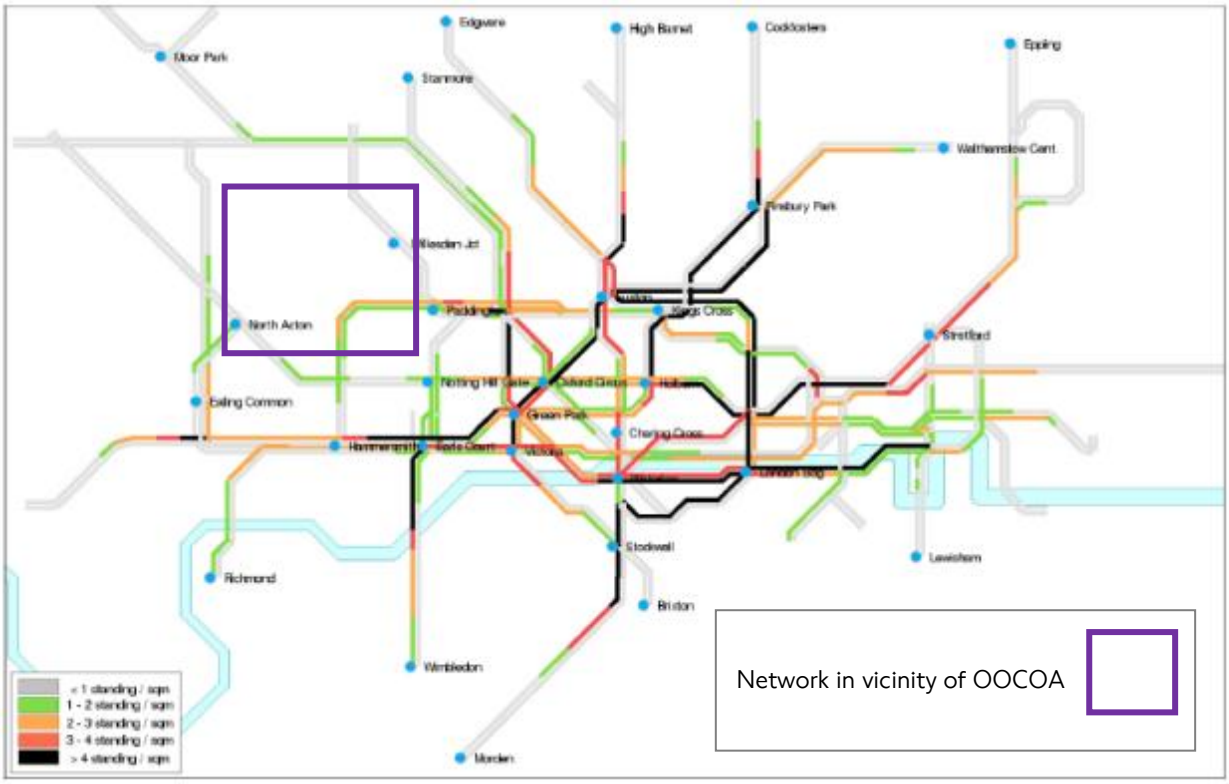


Figure 4-14: Crowding on LUL – current year AM pk

[4] Southern services between Clapham Junction and Shepherds Bush and between East Croydon and Watford Junction/Milton Keynes also use the WLL although they are not included in the analysis.

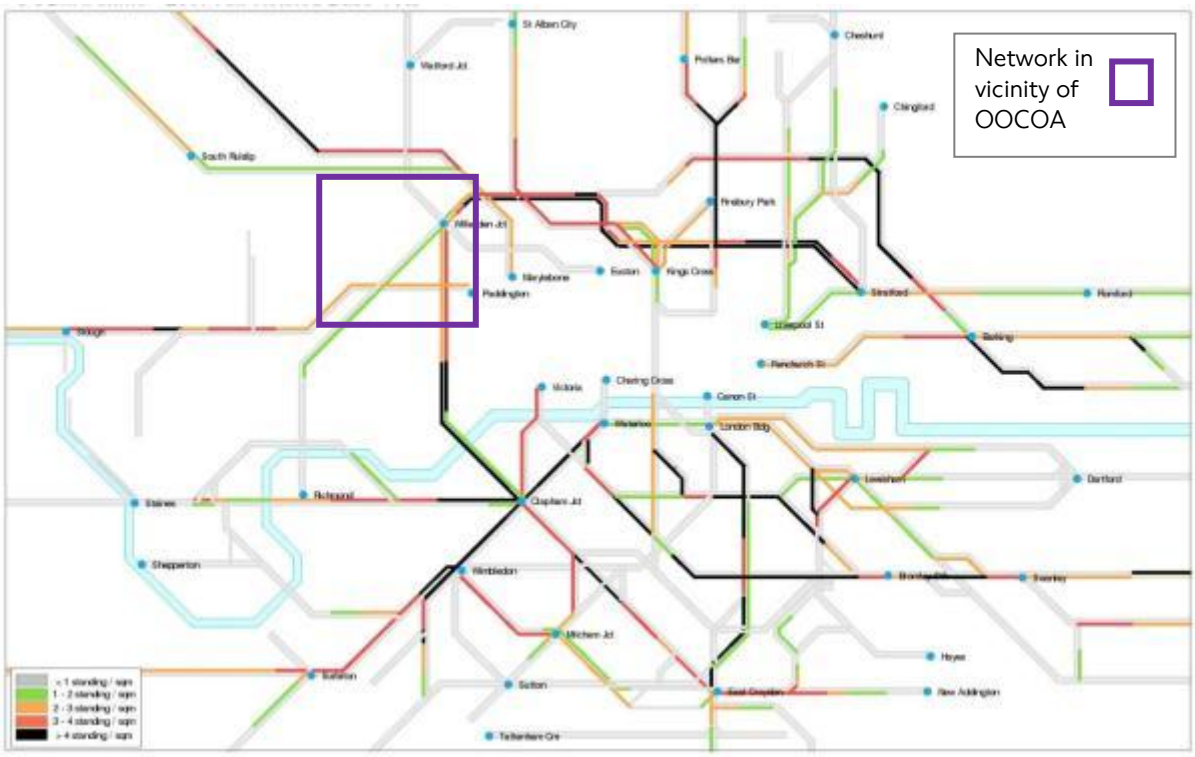


Figure 4-15: Crowding on National Rail and LO – current year AM pk

4.3.3 Bus network

The OOCOA (shown by the dotted line) is currently served by five bus routes, shown in Figure 4-16. Routes run along A219 Scrubs Lane (No.220 Willesden Junction to Wandsworth), Old Oak Common Lane (No.228 Park Royal to Kilburn), Old Oak Lane (No.266 Brent Cross to Hammersmith) and the A400 (No.260 White City to Golders Green and No. 440 to Gunnersbury to Stonebridge Park). Across the wider study area, there are services to locations such as Acton, Harlesden, Hammersmith, Shepherds Bush and local LUL / National Rail stations. The frequency of services is regular, with intervals of approximately 6 to15 minutes.

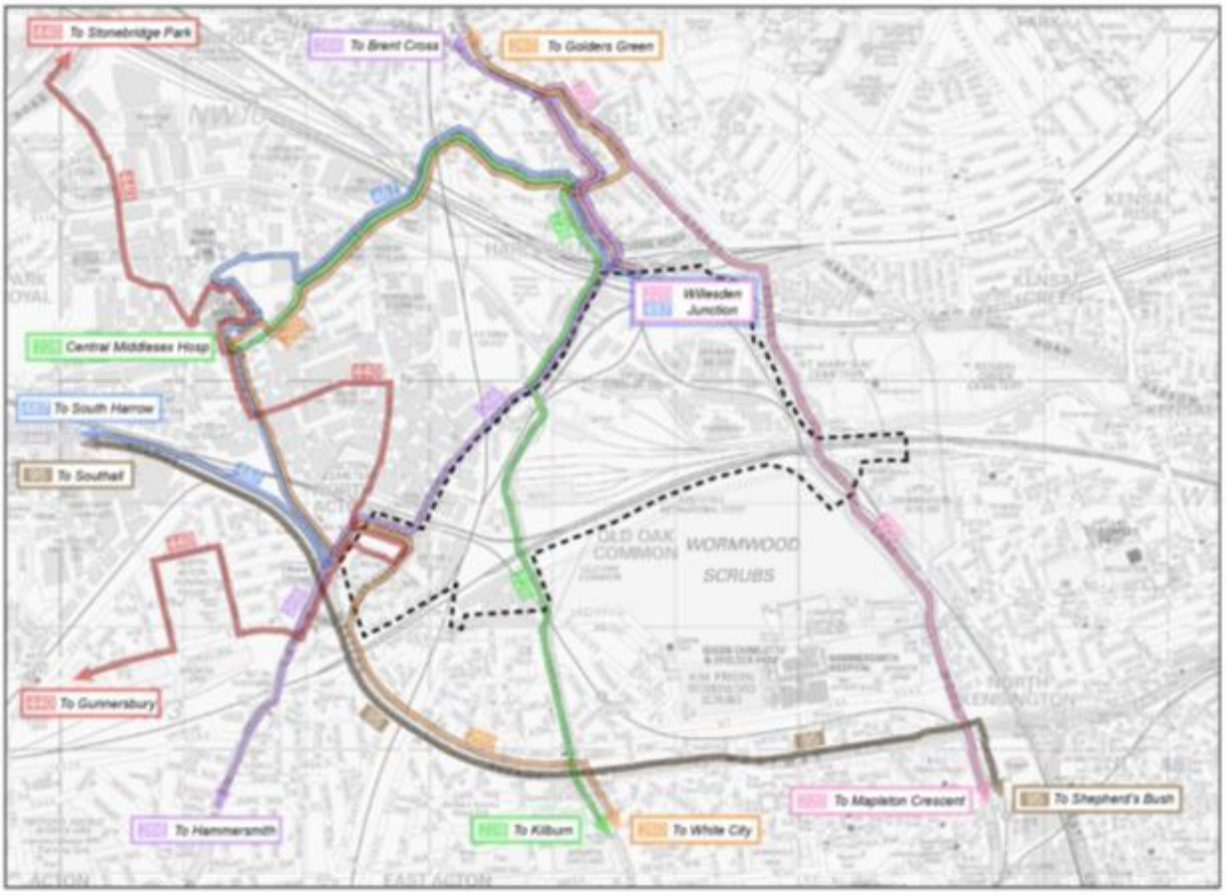


Figure 4-16: Bus network in and around OOCOA

Figure 4-17 shows that the majority of the wider study area has access to a bus service and is within an acceptable 400 metre walking catchment of a bus stop. However, there are locations within the OOCOA which are outside the recommended catchment for bus service accessibility.

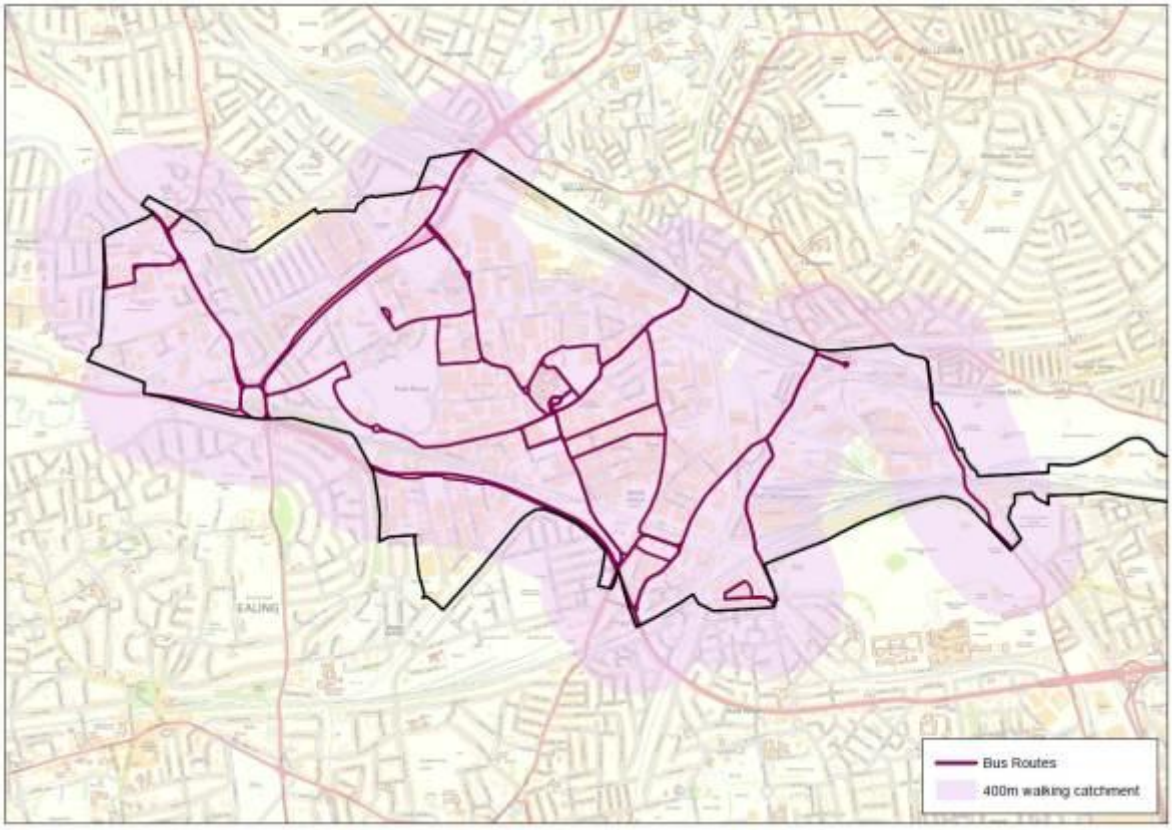


Figure 4-17: Bus services walking catchment area

All of the main roads in and around the wider study are served by buses, as is Central Middlesex Hospital, local housing estates and the majority of the industrial estate. There are some gaps where the walking distance to access bus services is further than desirable. These areas are located in the heart of Old Oak Common where the railway depots are currently situated and also the edge of the industrial estate near Stonebridge.

Bus patronage

Bus Origin and Destination Data (BODS) survey data is available for two of the routes serving the OOCOA. Data was collected in 2013 for bus routes 266 and 220, to ascertain the average number of boarders and alighters at the stops, over the entire day, on each route within the study area.

Route 266 serves Brent Cross and Hammersmith and is routed along A4000 Victoria Road. Figure 4-18 and Figure 4-19 show the average number of boarders and alighters per bus in both directions along this road and within the vicinity of the OOCOA. Southbound, the data indicates that the most popular stops for both boarders and alighters is Willesden Junction and North Acton station, with relatively little boarding and alighting between these stops within the study area. Northbound, Victoria Road/ Park Royal and Victoria Road/ Chase Road stops on the western side of the study area have the greatest number of boarders and alighters. There is less activity evident at the rail stations bordering the study area in the northbound direction.

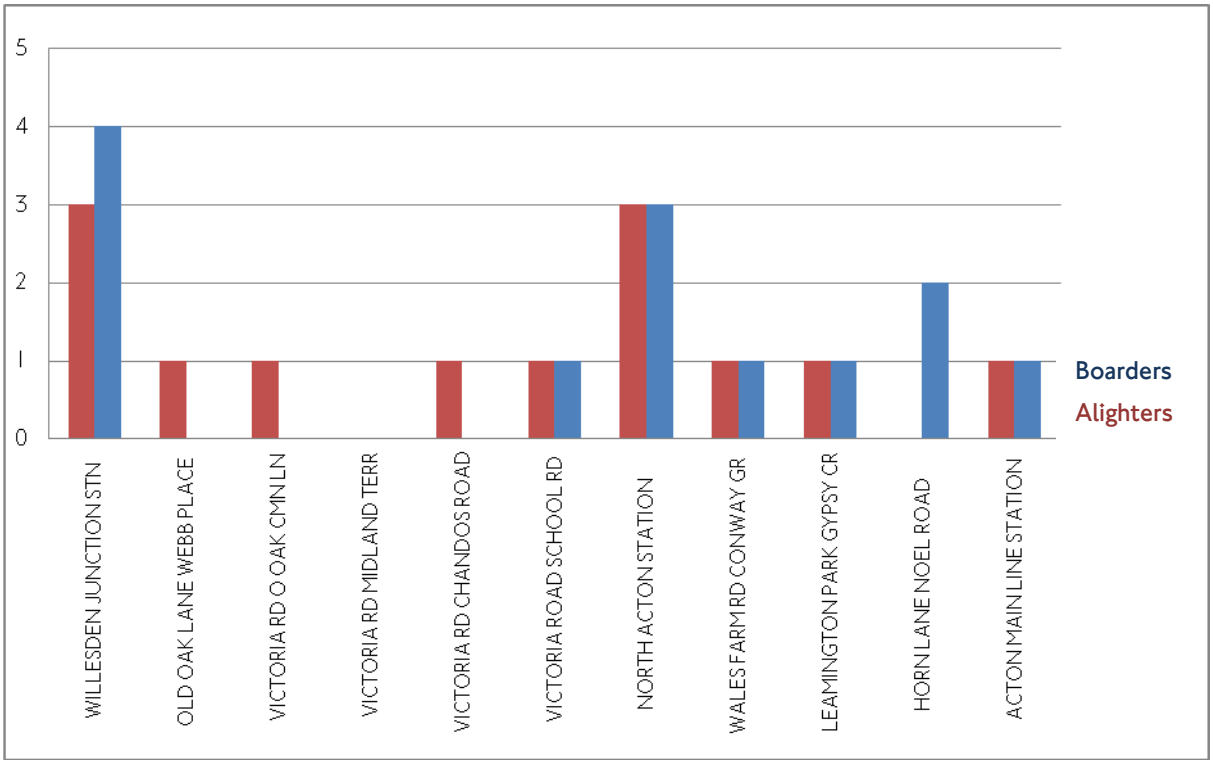


Figure 4-18: Bus route266 southbound - average number of boarders & alighters per bus

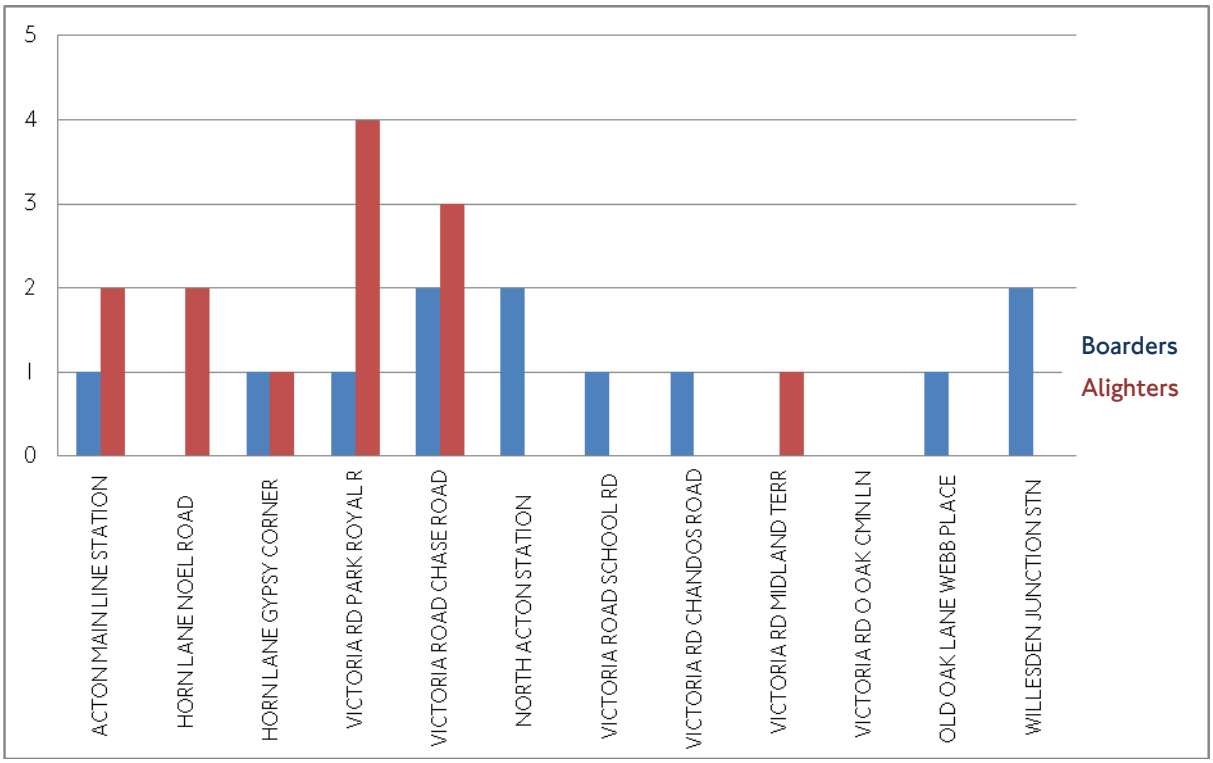


Figure 4-19: Bus route266 northbound - average number of boarders & alighters per bus

Route 220 serves Willesden Junction and Wandsworth and is routed along A219 Scrubs Lane, although the majority of the route is just outside the OOCOA, to the east. Figure 4-20 and Figure 4-21 illustrate the average number of boarders and alighters in both directions along this road, within the vicinity of the area. In general, the number of average boarders and alighters per bus in the vicinity of the OOCOA is relatively low. Southbound, the A219

Scrubs Lane/ Harrow Road and Wood Lane/ Du Cane Road stops have the greatest number of boarders, whilst White City station has the largest number of alighters. Northbound, the highest number of boarders is at White City, and greatest number of alighters at the Wood Lane/ Du Cane Road and Wood Lane/ North Pole Rd stops. As Route 220 terminates at Willesden Junction in the study area there are generally not many boarders at these latter stops.

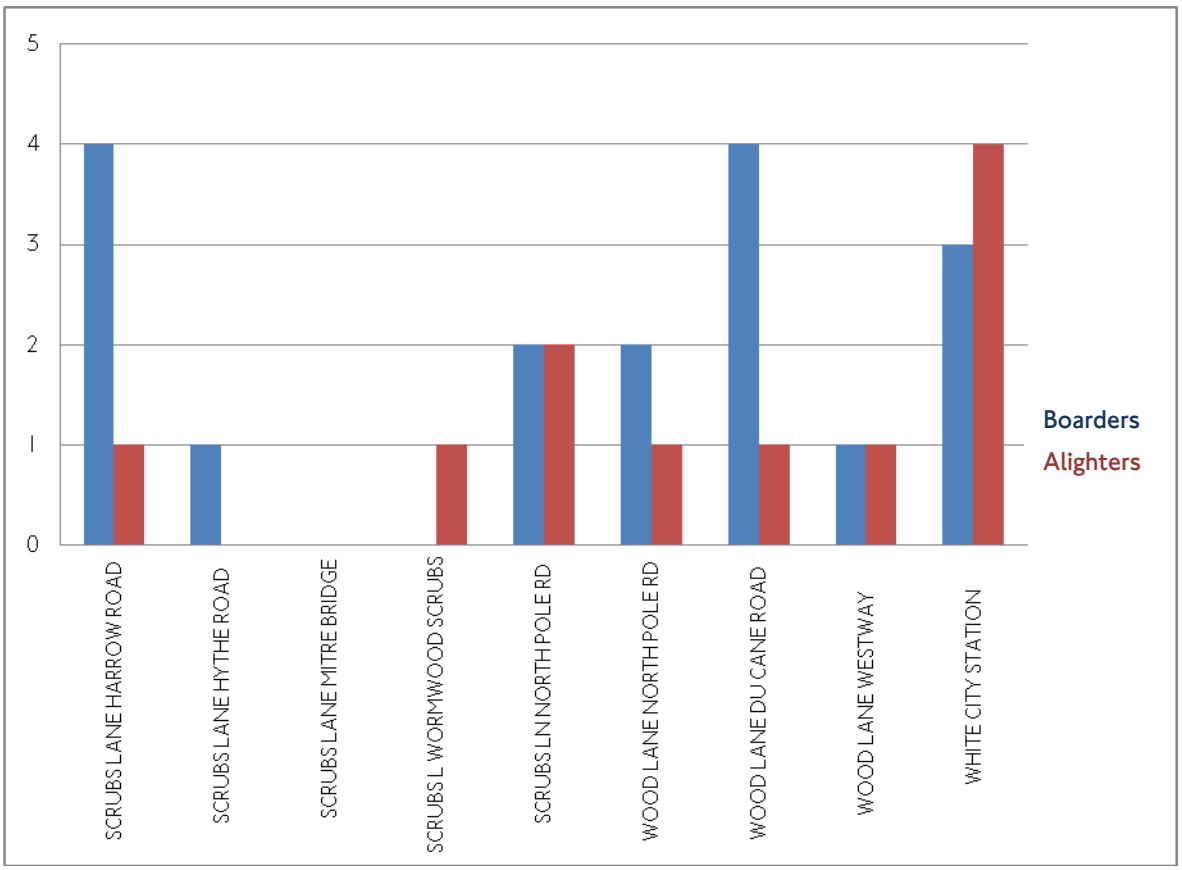


Figure 4-20: Bus route220 southbound - average number of boarders & alighters per bus

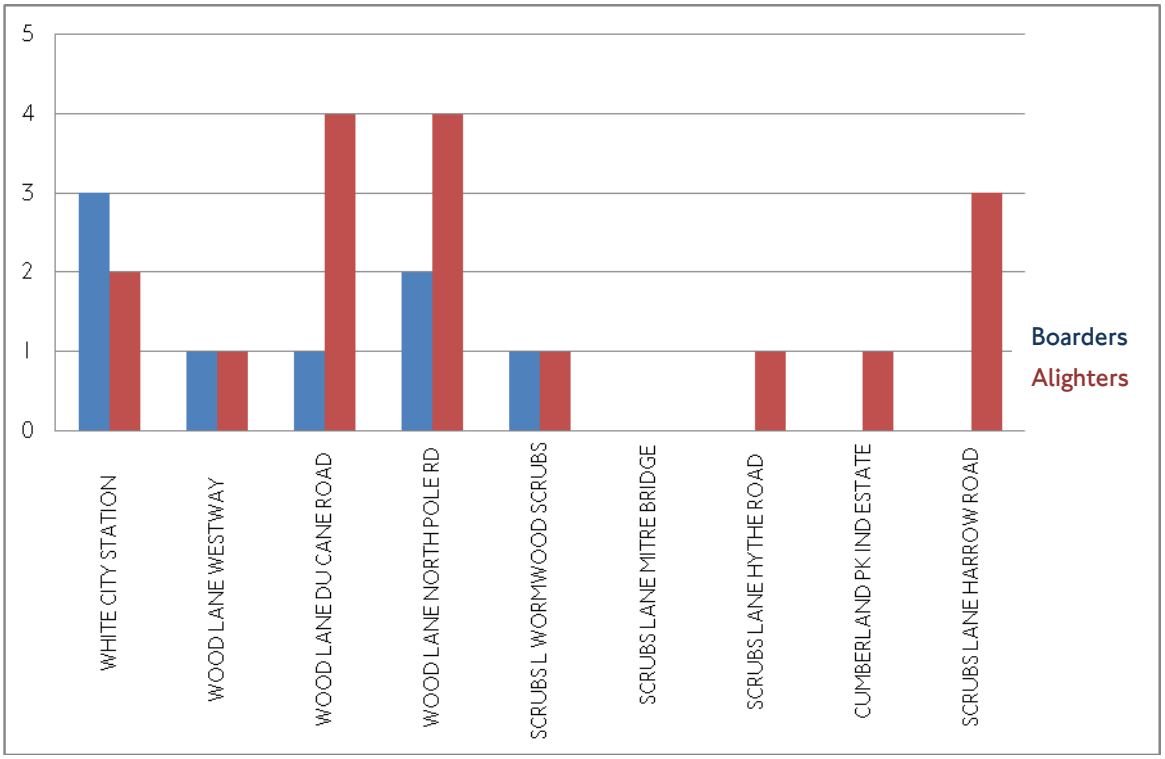


Figure 4-21: Bus route220 northbound - average number of boarders & alighters per bus

Bus demand

Bus demand, as a proportion of bus capacity (buses per hour multiplied by vehicle passenger capacity), has been calculated for the current year, as shown in Figure 4-22. A value of one indicates that capacity just matches demand. It indicates that there is currently spare capacity on bus routes in and around the OOCOA, except on parts of A219 Scrubs Lane, where capacity only just matches demand.

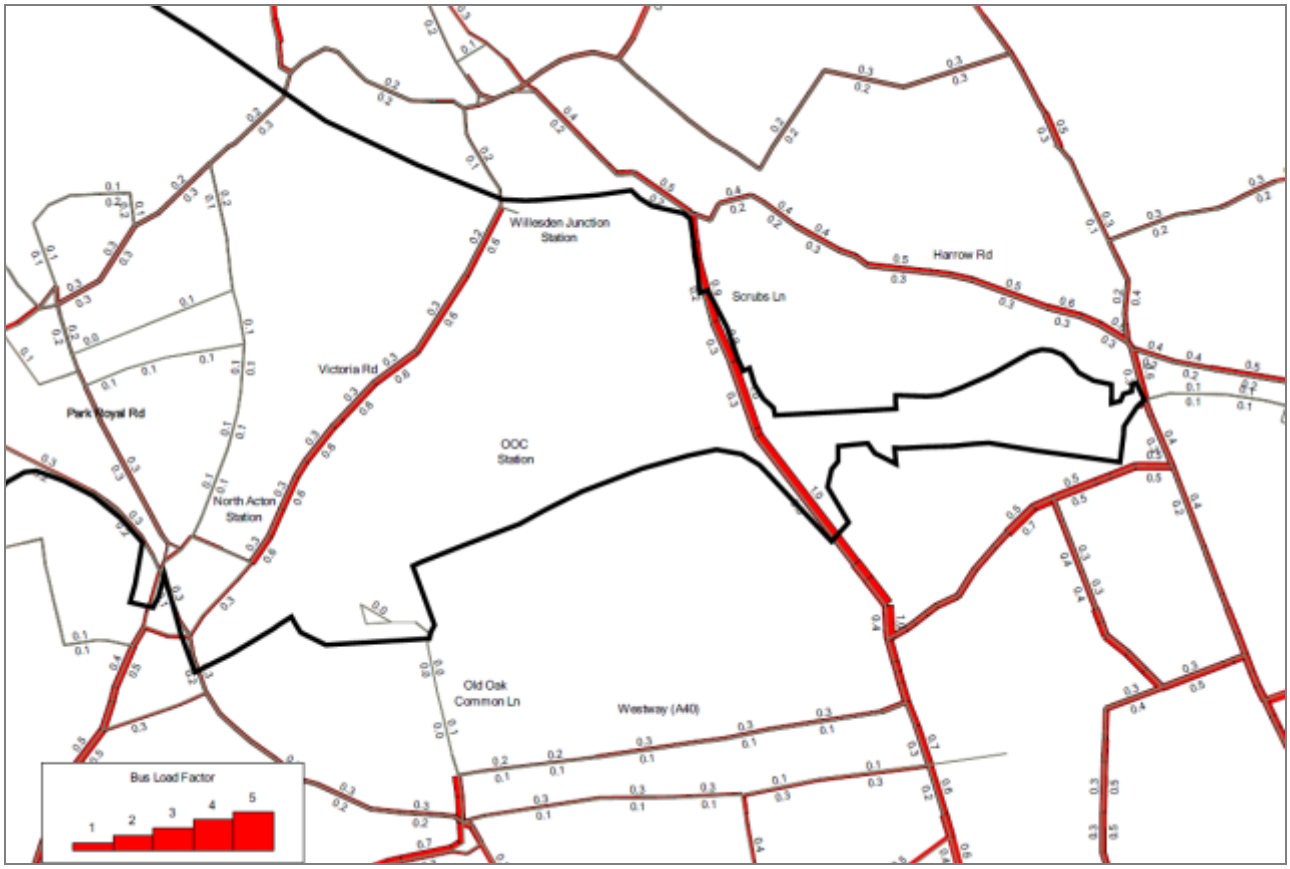


Figure 4-22: Bus volume demand to capacity ratio – 2007 bus network

(Route 228 was introduced in 2009 so data is unavailable)

4.3.4 Pedestrian network

The OOCOA suffers from poor permeability for pedestrians with transport corridors, large plot sizes and features acting as significant barriers to movement. These include the Grand Union canal, the West Coast Mainline, the Great Western Mainline, the North London Line, the WLL and the Central Line. Wormwood Scrubs to the south and cemeteries to the east act also as barriers to movement. Although Wormwood Scrubs and the Grand Union canal path are used as walking routes they have little or no lighting and, in some cases, no actual pathway.

For the most part the roads within the OOCOA have footways and lighting and, as such, can be considered reasonably adequate walking routes. There are, however, areas which do not create a pleasant experience for pedestrians; for example, the northern end of Old Oak Common Lane has no lighting and is bordered by open scrubland on one side and an industrial estate with no active frontage on the other (see Figure 4-23). Pedestrian routes can therefore, at times, feel deserted and create a perception of poor personal security and a fear of crime, especially after dark.

Derelict and vandalised buildings can also have a negative impact on the streetscape and act as barriers to pedestrian movement. Figure 4-24 shows one such example on Old Oak Lane. The current nature of the local built environment may also hinder pedestrian wayfinding and legibility.



Figure 4-23: Old Oak Common Lane (looking northwards).

To the east open scrubland and to the west industrial units



Figure 4-24: Derelict building located on Old Oak Lane.

4.3.5 Cycle network

Cycle routes in and around OOCOA are shown in Figure 4-25. As with pedestrian routes, the rail lines, depots, large industrial sites and a lack of through routes create physical barriers to cycling. National Cycle Network Route 6 passes through the area, along the Grand Union Canal, although the towpath is not ideal for regular use and there is a lack of local connections. Other routes signed or marked for cyclists are A4000 Victoria Road/ Old Oak Lane, A219 Scrubs Lane, Old Oak Common Lane and Hythe Road, although cycle lane provision on these routes is limited and often of poor quality where they exist.

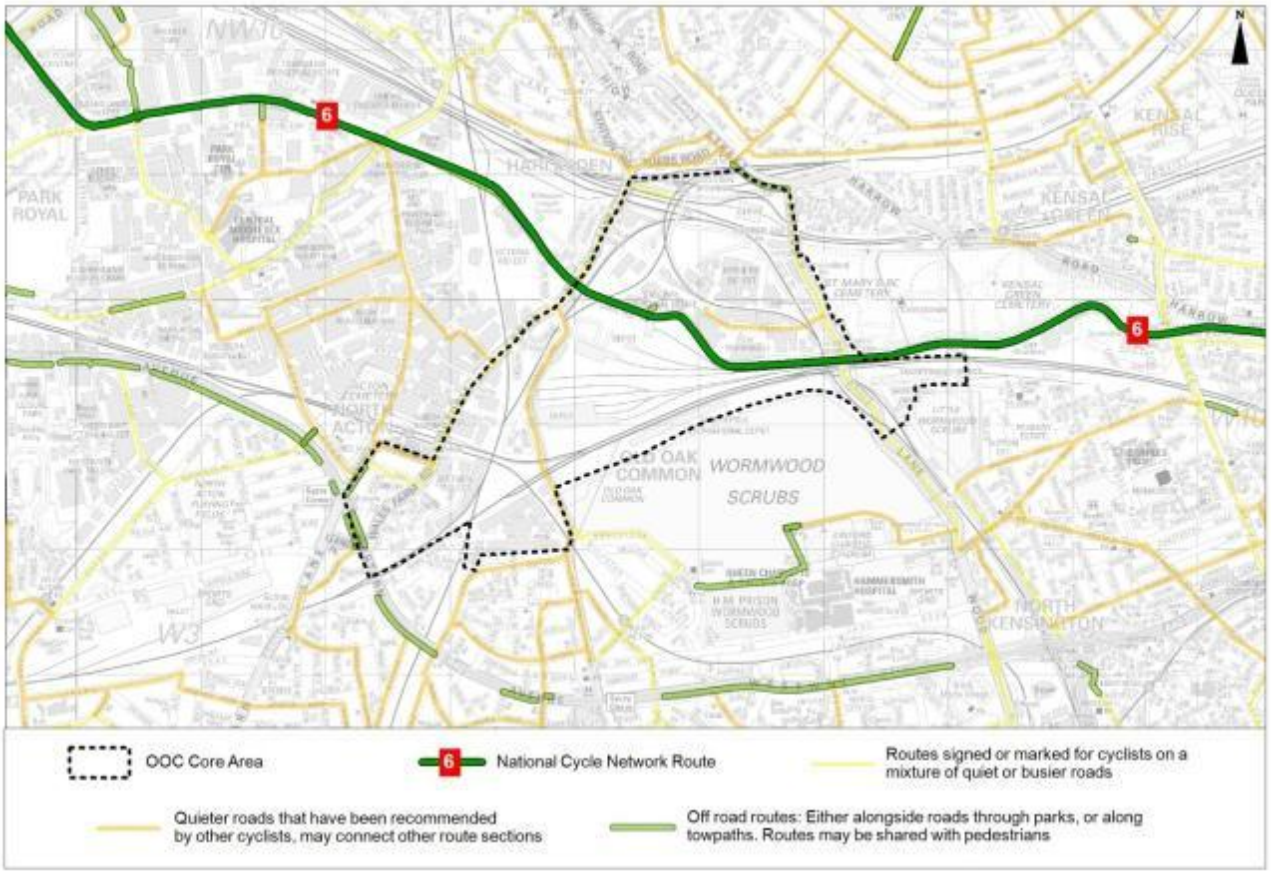


Figure 4-25: Cycle network in and around OOCOA

4.4 Air quality

There are significant air quality challenges in west London and improving air quality is one of the key objectives of the West London sub region (West London Sub Region Plan, 2014). Within the OOCOA, the majority of air pollution is generated from transport sources, due to its proximity to major roads such as the A406 North Circular and A40 Westway, Heathrow Airport and the Great West Mainline rail corridor. This highlights the need for the future transport strategy for the area to be sensitive to the existing situation. Figure 4-26 shows existing concentrations of NO_x in and around the study area, whilst Figure 4-27 shows concentrations of PM_{10}.

PM_{10} levels around the area are compliant with EU limits. The recorded NO_x levels do not meet the annual mean limit value. Rail corridors within the study area are one of the air quality hot spots where NO_x exceeds the EU limit. Emissions from rail diesel engines are a large contributor to the air quality problems in the area. In future, however, more trains operating along this route are planned to be electric powered, and so the NO_x concentrations caused by diesel trains are expected to fall. Electrification of the GWML is taking place in stages. From 2019 the majority of services using the GWML corridor should be electric powered. NO_x levels are also exceeded along roads such as A219 Scrubs Lane and A4000 Old Oak Lane, due to the high volume of traffic using the roads.

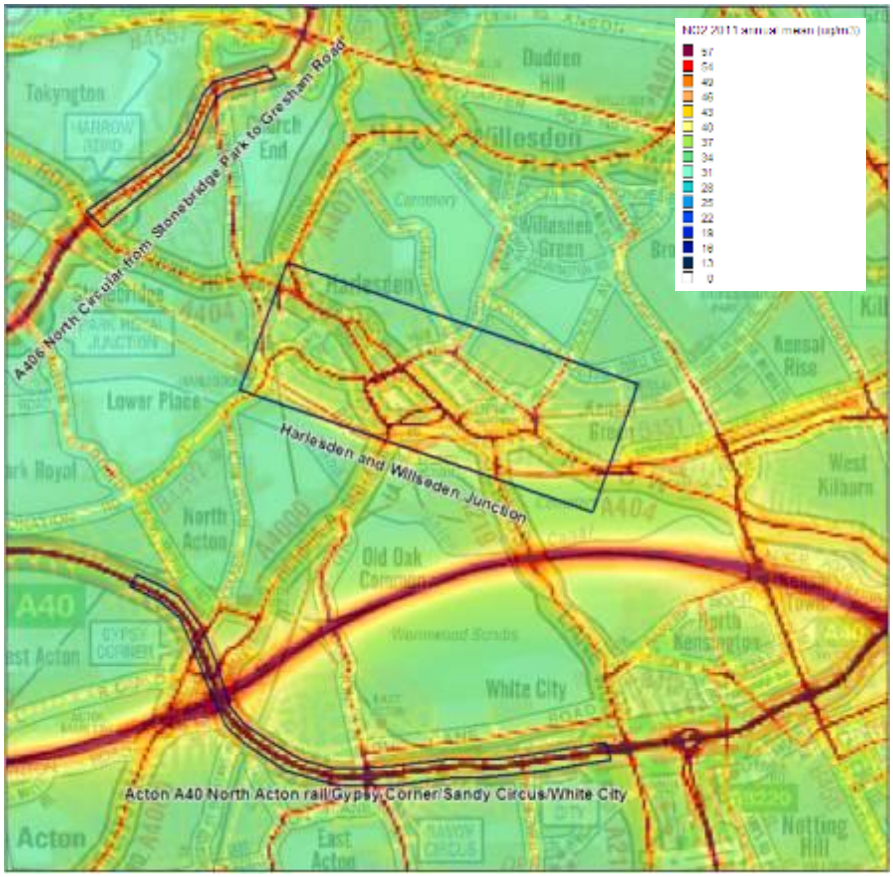


Figure 4-26: Current NO_x Levels in and around OOCOA



Figure 4-27: Current PM_{10} Levels in and around the OOCOA

4.5 Freight, servicing and delivery

Due to its location in close proximity to Heathrow Airport and key strategic routes such as the North Circular Road, the A40 and the M25, freight activity is a significant feature of the OOCOA. There is also rail freight activity within the wider Park Royal area utilising the GWML and WCML routes (including at various sites around Willesden such as the Euro Freight Terminal) which handle inbound flows of aggregates and cement and outbound flows of waste, mail and, until recently, scrap metal. There is also unrealised potential for water borne freight on the Grand Union Canal with a wharf facility located on the Powerday site.

A study by the University of Westminster, commissioned by TfL, undertook a review of current freight operations and future demand, and set out opportunities to promote sustainable freight in the future. Analysis of local freight patterns found there is currently a relatively high volume of HGV (Heavy Goods Vehicle) and LGV (Light Goods Vehicle) activity serving industrial and waste-related businesses. The impact of HGV activity in the area was seen to cause delay to other traffic, particularly on A219 Scrubs Lane, when the level-crossing on the access road to the Powerday and EMR sites was down.

4.6 Summary of existing transport infrastructure findings

The current transport issues identified which are associated with the OOCOA are summarised below.

Highway network:

The OOCOA is located in proximity to the A40 and A406 North Circular, which are key strategic roads. The network of local access roads to the OOCOA is limited and, with narrow lanes and poor sight lines, does not meet current highway design standards. The road network within the OOCOA is very limited and of a poor standard. The portion of the OOCOA north of the canal is served by a single narrow access, via Hythe Road, onto Scrubs Lane and the portion south of the canal is served by a single access onto Old Oak Lane. The reliance on these single access points, although adequate for the current land-uses and level of activity, leaves the site potentially vulnerable if there is an incident at one of them.

Parts of the surrounding highway network are already operating under stress during peak periods, in particular the A40 and A406 North Circular Road in the vicinity of the OOCOA. Analysis has also highlighted there are a number of roads and junctions that have a V/C approaching 80 per cent, resulting in congestion and indicating that spare capacity across the study area network is limited.

Public transport accessibility:

Accessibility to public transport services from most areas within the OOCOA is poor. Rail stations, such as Willesden Junction and North Acton, and bus stops are located on the periphery of the site and pedestrian access to them from within the OOCOA is extremely constrained by the severance caused by rail lines, the Grand Union canal and large plot sizes. There are very few pedestrian or cycle crossings to traverse these barriers and those that exist are of poor quality. The overall lack of accessibility is reflected in low PTAL scores of 1 and 2 for a large part of the OOCOA.

Rail network:

Whilst access to rail services is, in many instances, quite poor, none of the LUL lines serving the OOCOA suffer from unacceptable levels of crowding. Services on the West London Line are severely crowded between Kensington (Olympia) and Shepherd's Bush, but crowding subsides before services reach Willesden Junction. The North London Line also suffers from crowding in the core study area.

Pedestrian access to Willesden Junction station is considered to be poor from certain locations due to stairs, narrow footways and an unattractive public realm.

There are localised issues of station crowding at North Acton which may increase in future.

Bus network:

The edges of the OOCOA have adequate access to buses, based on frequency and accessibility. However, some parcels of land are outside of the recommended 400m walk distance to bus stops. The penetration of bus services within the OOCOA will need to be improved if these parcels of land are to be developed in the future. The operation of bus services is, and will be in future years, affected by the demand and capacity of the surrounding highway network.

Pedestrian network:

The Grand Union canal and rail lines running through the OOCOA create severance for pedestrian movement, with only limited crossing opportunities provided. The OOCOA lacks a comprehensive and attractive footway network, that provides both north/ south and east/ west connectivity, through the site and which traverses existing barriers.

The general pedestrian environment in certain parts of the OOCOA is poor, with lack of lighting and active frontages resulting in an unattractive and unwelcoming streetscape.

Cycle network:

The current cycle network within the OOCOA is relatively poor in terms of quality and provision, with cyclists experiencing the same severance issues as pedestrians. This will need to be addressed, as part of any redevelopment and future transport strategy for the area, as a means of encouraging sustainable travel and limiting the impact of development generated trips upon the highway network.

Air quality:

NO_x generated traffic is an issue and concentrations are not currently compliant with EU standards. It is crucial to encourage the use of active modes and public transport where possible, especially for local trips. This will help start to address some of the local issues of congestion discussed above, and contribute to a reduction in the levels of NO_x and an improvement in air quality.

Freight, servicing and delivery:

The OOCOA is currently largely comprised of industrial uses. Re-locating existing freight uses will need to be carefully managed to ensure that suitable alternatives can be found, and that any problems on the transport network are not simply transferred elsewhere.

5 Planned and committed developments

There are a number of developments planned or underway within the OOCOA, that are likely to enhance the place value and permeability of the area, create new neighbourhoods and increase capacity and demand on transport infrastructure, such as the highway network and public transport services. The key planned and committed development projects are detailed below.

5.1 Development proposals

Recent development activity in the area has been relatively limited, largely due to the existing land use designations (as strategic industrial land), and the constraints of the site. What little development there has been has tended to be concentrated around North Acton station, which benefits from better access to public transport and is less constrained. Table 5-1 summarises the status of known developments in the OOCOA.

Development Site	Borough	Status	Proposals
BBC Costume Store (Victoria Road)	LBE	Planning permission granted	Student accommodation led scheme with ancillary uses
Nash House, Old Oak Lane	LBE	Planning permission granted 2010	Student accommodation led scheme with ancillary uses
NEC site (Victoria Road)	LBE	Planning permission granted 2012- currently discharging conditions	Student accommodation led scheme with ancillary uses
Land at junction of Chase Road / Victoria Road	LBE	Planning permission granted 2012	151 residential units
University Arts student accommodation	LBE	Completed September 2013	
Perfume factory	LBE	Pre-application	Residential led mixed use development
Kensal Gasworks	RBKC	Issues and options planning brief issued in June 2012	Residential led mixed use development
Holbrook House, Victoria Road, North Acton	LBE	Pre-application	22 storey student housing accommodation, with approx. 500 bed spaces
QPR	LBHF/ LBB/ LBE	Pre-application	Mixed use development of a new 40,000 seat stadium, up to 10,000 residential units and c. 5,000 jobs
Car Giant site	LBHF	Pre-application	Residential led mixed use development
Genesis site	LBHF	Pre-application	Residential led mixed use development
One Portal Way (Carphone Warehouse)	LBE	Application submitted	Residential led mixed use development c. 750 units

Table 5-1: Development proposals within the OOCOA

In context of the wider area, the OOCOA falls within the west London 'Arc of Opportunity', which includes Vauxhall Nine Elms Battersea, Earl's Court and White City, alongside Wembley to the north. These will all be contributing towards growth in the west London sub-region in the future.

Vauxhall Nine Elms Battersea (VNEB)

The VNEB OAPF was adopted by the Mayor in March 2012. The framework sets an ambition for a minimum of 20,000 new homes and up to 25,000 jobs, and contains a proposal for an extension to the Northern Line from Kennington to Battersea via Nine Elms. A Public Inquiry was held at the end of 2013, and a decision to go ahead was made in late 2014.

The area is already undergoing significant change with a mix of developments being either out on site, granted planning permission, or going through the planning process.

Earl's Court

A draft OAPF for Earl's Court was adopted as a supplementary planning document (SPD) by LBHF in March 2012. Alongside this a planning application for the redevelopment of the Earl's Court exhibition centre was endorsed by the Mayor in July 2013. This proposes the development of approximately 5,800 residential units, 85,000sqm office floorspace, 23,000sqm of retail, 26,000sqm of education, health, community, culture and leisure floorspace plus other ancillary uses. A package of transport mitigation measures has been secured.

White City

A second draft of the White City OAPF was consulted on in 2013 before being adopted as supplementary planning guidance to the London Plan in December 2013. The current land use strategy suggests there is indicative capacity for 10,000 new jobs in the opportunity area and 5,000 new homes, plus associated uses. A number of development proposals have recently been granted planning permission, including the expansion of the Westfield shopping centre.

Wembley

The Wembley Area Action Plan sets out the strategy for growth and regeneration in Wembley over the next 15 years and has now been adopted. It is designated as a Growth Area and is expected to deliver around 11,500 new homes, 10,000 new jobs and 30,000 sqm of new retail floorspace.

6 Future year (2031) without development

6.1 Context

Over time, travel patterns respond to changes in the economy and changes/ intensification of local land uses, as well as the introduction of new transport infrastructure. The two potentially most significant drivers of change for the Old Oak Common regeneration area will be the arrival of Crossrail and HS2 (2026). In addition to these specific schemes, a general increase in the demand for travel across London is expected, reflective of population and employment growth across the Capital.

The current London Plan estimated that London's population would reach 7.8 million by 2011, however, recent projections arising from the 2011 Census indicate that London's population is actually growing faster than previously predicted. London's population is now reported to have exceeded its 1939 peak of 8.6 million.

Sub-regionally, whilst population growth in east London remains strong, there is now predicted to be stronger population growth in south and west London. The latest figures suggest an additional 205,000 people are now expected in the west sub-region between 2011 and 2031, representing 14% of the overall growth anticipated in London.

Future employment growth to 2031 is set to be more equally balanced between the sub-regions than previously predicted, with the west sub-region projected to account for 17% of the growth in employment, up from the 15% previously assumed.

This section outlines the development of a future year scenario in 2031, against which the impacts of the OAPF development can be measured.

6.2 Background demand growth

TfL's strategic transport demand forecasting framework, the London Transport Studies (LTS) model, is used to produce forecast demand patterns across the Capital in response to changing socio-economic conditions, as well as demand responses to changes in the transport network. The model has been employed to produce transport demand estimates for a 2031 future year, but *without* any development related growth in the Old Oak Common area. This forecast scenario is hereafter referred to as the '2031 Reference Case'. This then provides a benchmark of background growth in demand on the transport network, against which the impacts of the OAPF development related trips can be measured and mitigation of those impacts through the transport strategy is based.

It should be noted that all the modelling undertaken for this Study has been based on the figures and assumptions contained in the existing London Plan (2011), not those in the Further Alterations to the London Plan.

The 2031 Reference Case predicts general growth across London in the demand for transport between now and 2031. The majority of growth is expected on the public transport network, with a 27% increase in AM peak period demand across the network. Traffic growth is predicted to be much lower, at just a 3% increase in trips across the highway network in the AM peak period. PM peak growth is a little higher at 6% in car use and 29% in public transport use to 2031.

It is not considered that the OOCOA related development will be expected to mitigate the impact of this background growth on the transport network. Being able to facilitate growth over time is, however, an issue that needs to be considered more generally in order to ensure that development can continue to take place in the future. As such, TfL is looking to see how this growth can be accommodated on the network through other work streams, such as the TfL Business Plan and Strategic Area Studies, which are intended as a way to develop a transport improvement strategy at the sub-regional level.

6.3 Committed and proposed transport schemes

Looking forward, the 2031 Reference Case contains funded and committed schemes as outlined in TfL's Business Plan. This includes a range of capacity and service enhancements on the transport network, alongside HS2 and Crossrail services. London Overground station proposals have also been included here although they are not yet a committed project. The schemes below are all included in the 2031 Reference Case with the exception of the new London Overground station proposals.

6.3.1 HS2, National Rail and Crossrail station (proposed)

For the purpose of this Study, HS2 has been included as a committed scheme in the 2031 Reference Case, even though the Hybrid Bill is still going through Parliament. This is because in addition to the background increase in transport demand, the single biggest potential generator of demand in the area, should the development at Old Oak not be implemented, would be the arrival of HS2 (and with it Crossrail) services at a new station and interchange facility at Old Oak Common.

HS2 is a new high-speed railway link proposed between London and northern England via Birmingham. A brand new station is proposed at Old Oak Common. The current HS2 station design, shown in Figure 6-1, would provide a major new transport interchange with a number of other mainline and commuter rail services including Crossrail and National Rail services

from Paddington. The proposed station is located approximately 0.5 km from Willesden Junction, and has a proposed opening date of 2026. This development has been assumed as being committed within this Study.

The Old Oak Vision put forward seven design objectives for the development of the station. These were to:

- support the creation of a new destination of exceptional quality;
- be of an outstanding architectural quality;
- have the station accesses located to facilitate regeneration;
- build in the potential for development over the station;
- link to the strategic road network;
- provide a state of the art intermodal interchange; and
- provide additional rail connectivity.

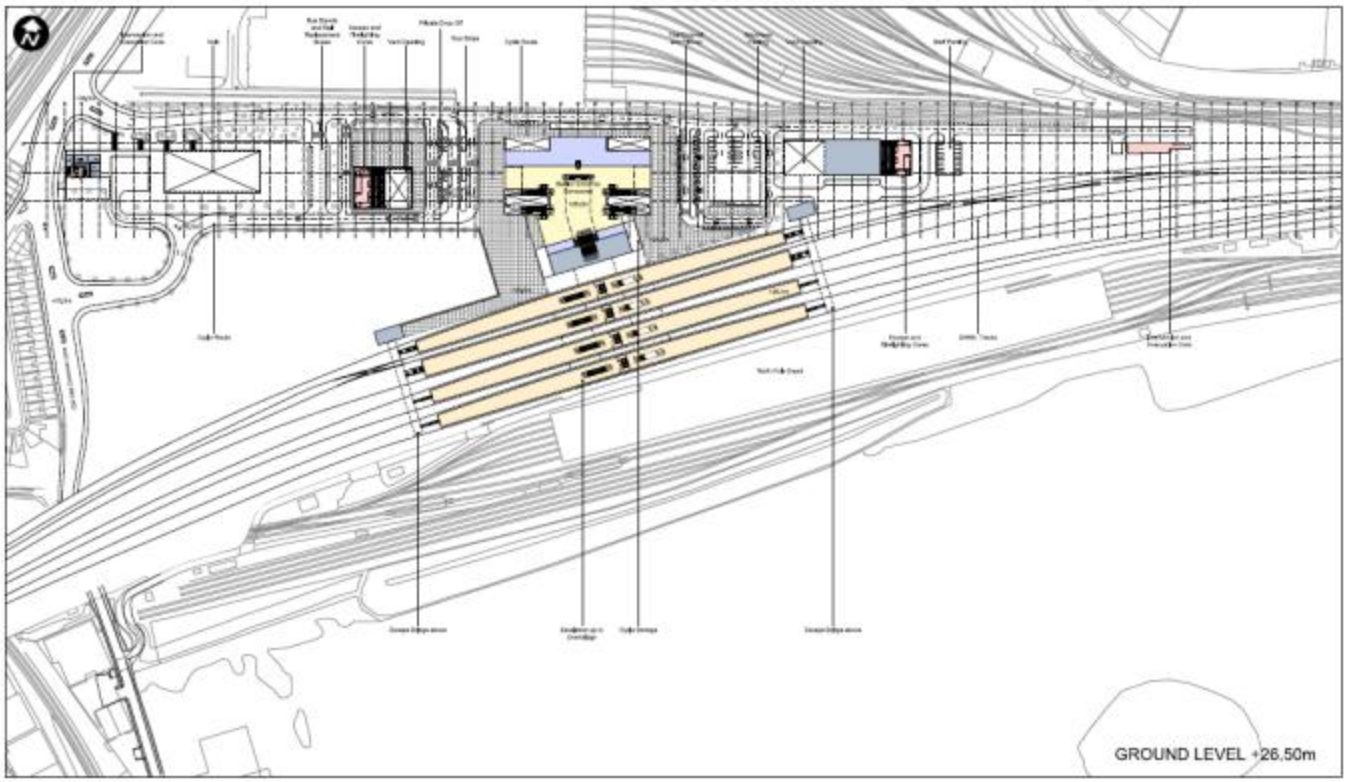


Figure 6-1: HS2 station plan

(Source: HS2 Ltd)

Estimates of HS2 passengers using Old Oak Common predict around 17,000 arrivals in the AM peak, of which some 15,000 interchange onto other rail services to continue their journey. The predicted final destinations of HS2 passengers who alight at Old Oak Common in the AM peak, based on existing forecast concentrations of destinations, is shown in Figure 6-2, with a prevalence of end trips to the West End, the City and Docklands.

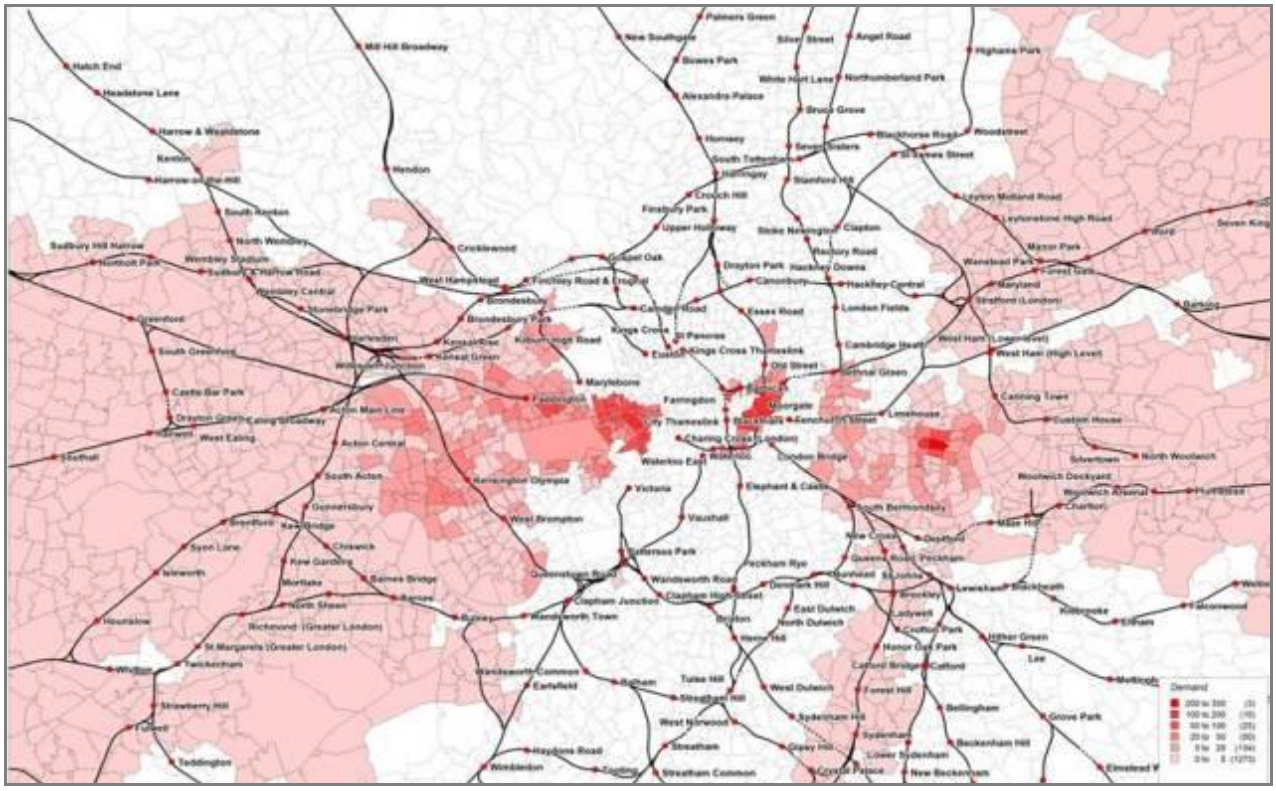


Figure 6-2: Projected end destination of arrivals at OOC HS2 station AM pk 07:00-10:00

The new station will have six high speed and eight conventional platforms, with the potential capacity to accommodate up to 250,000 passengers per day. By way of comparison, Waterloo station currently accommodates approximately 267,000 passengers per day.

While the predominant mode for access and egress at the station is likely to be public transport, based on the results presented in the HS2 Environmental Statement, some access by road for taxis and private car trips will be necessary. HS2 Ltd are predicting taxi and 'kiss and ride' to generate a total of around 300 highway trips in the AM peak hour in 2026, and well over 400 in 2041. To accommodate this, the HS2 proposals also include improvements to the highway network, in particular to Old Oak Common Lane and Victoria Road.

The HS2 plans also include a dedicated taxi, bus and cycle interchange, to be situated above the HS2 platforms.

6.3.2 Harlesden town centre regeneration and gyratory (Committed)

Funding was secured from TfL to implement a regeneration and highway scheme to help improve Harlesden Town Centre, which currently suffers from a poor urban realm, traffic congestion and pollution. The aim of the scheme was to support the development of an economically, socially and environmentally sustainable town centre which contributes to the wider objectives of reducing the need to travel (by motorised means) and where travel is necessary, to maximise the attractiveness of public transport by improving its reliability and speed. Works have already commenced, with highway changes introduced in October 2014, and with all urban realm works due to be completed in early 2015.

6.3.3 East-West Cycle Superhighway (Proposed)

Following the publication of the Mayor's Vision for Cycling in March 2013, work has been underway to investigate options for improving cycling in the Capital. TfL is proposing a continuous, largely segregated cycle route between Tower Hill and Acton. The East-West Cycle Superhighway would provide a clear and convenient route for cyclists, physically separated from other vehicles. Space would be created for the new cycle route by reallocating road space from other traffic and changing the operation of some junctions.

In the vicinity of the OOCOA, the Superhighway is proposed along the A40 Western Avenue as far as Horn Lane, Acton, as shown in Figure 6-3. Extensive connecting routes are proposed to link the new route to nearby town centres including Acton, Ealing and Westfield Shepherd's Bush.

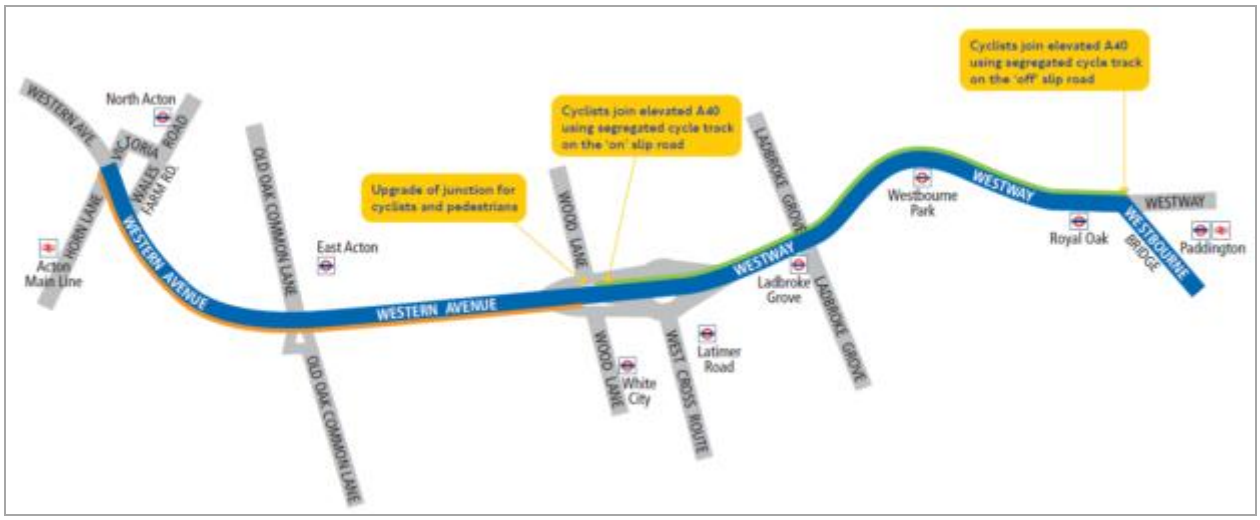


Figure 6-3: Proposed East-West Cycle Superhighway, in the vicinity of OOCOA

6.3.4 London Overground train lengthening to 5 cars (Committed)

There are committed plans to extend the length of trains on the WLL and NLL from 4 to 5 cars. However, it is very likely that further train lengthening will be required to keep up with demand, and the rolling stock is due to be replaced before 2030.

6.3.5 New London Overground stations (Proposed)

The current plans for a HS2 station at Old Oak Common would see HS2 and Crossrail 1 services call at the new station. However, despite running through the site, London Overground services would not currently be able to call at the new hub. TfL considers that new LO stations would help facilitate regeneration at Old Oak Common by i) making Crossrail and HS2 directly accessible for communities along the NLL and WLL, ii) helping to make the development case of the site more compelling for investors by adding local rail connections to the site; and iii) helping to open up the area by providing local rail links to neighbouring regions and facilitating sub-regional and cross capital movements.

Three possible locations for new stations were considered in more detail as part of a GRIP3 study. A nine week period of public consultation took place from September to November 2014. In February 2015 it was announced that option C would be taken forward to the next stage of development. This would provide two new stations, one on the NLL at Old Oak Common Lane and another on the WLL at Hythe Road. Option C is shown in Figure 6-4. The new London Overground station proposals have not been included in the 2031 Reference Case.

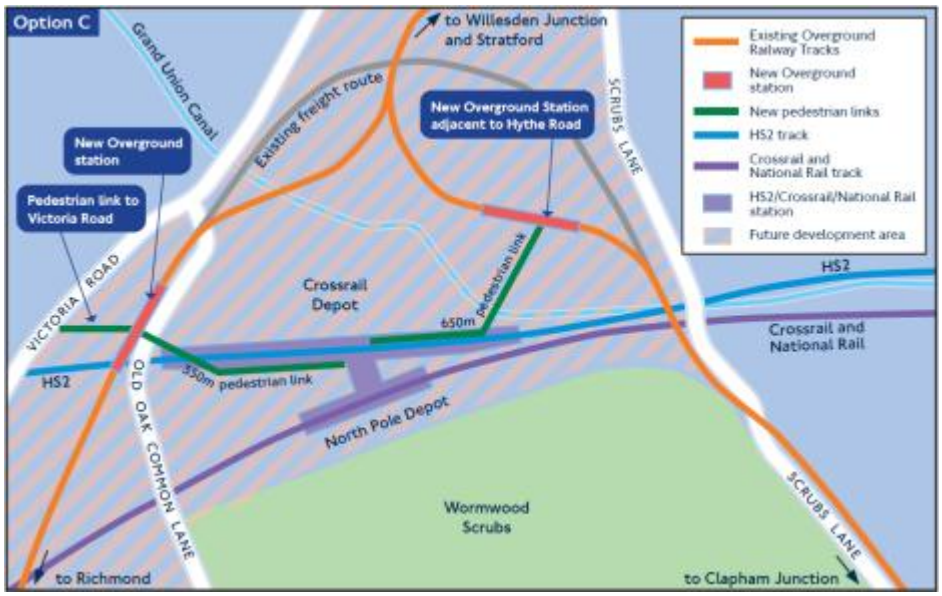


Figure 6-4: Proposed Old Oak LO station option C

6.4 Highway network

This section outlines the projected performance of the highway network in 2031 through analysis of outputs from the WeLHAM, which estimates the flow and routing of traffic on the strategic road network. The analysis compares the current situation (as of 2012) with the 2031 Reference Case, without any OAPF related development, but including background growth in traffic.

6.4.1 Highway network supply and demand

In the 2031 Reference Case, the main committed highway scheme in the vicinity of the study area is the Harlesden gyratory. The changes being proposed to the road network by HS2 Ltd have also been included. These include a new western access into the HS2 station from Old Oak Common Lane and the reconfiguration of the Victoria Road/ Old Oak Common Lane junction.

It can be seen there are increases in traffic volume across certain parts of the network. The increase in traffic is mainly concentrated on the same sections of the network which are currently busy and congested, thus further increasing pressure on the network.

Traffic levels in terms of vehicle trips to and from the Old Oak Common area are forecast to rise by approximately 16% in the AM peak hour. This scenario is based on the continuation and intensification of existing land uses.

6.4.2 Highway network performance

Traffic flows

Figure 6-5 and Figure 6-6 show the 2031 Reference Case forecast traffic flows, for AM and PM peaks, respectively. The A40 and A406 North Circular Road are both forecast to have high flows of over 2,000 PCUs (Passenger Car Units).

Compared to the current situation, traffic increases on average by 1% on the A40 between Hanger Lane and Wood Lane eastbound, and by 9% westbound in the AM peak. In the PM peak, the eastbound increase is 5% and westbound 4%.

On the A406 North Circular Road, between the Hanger Lane gyratory and the A404 Harrow Road, there is a 5% increase in northbound flows in the AM peak and 2% in the PM peak.



Figure 6-5: Traffic flows – 2031 Reference Case (AM peak)



Figure 6-6: Traffic flows – 2031 Reference Case (PM peak)

Junction delays

Figure 6-7 and Figure 6-8 show traffic delays at key junctions in the 2031 Reference Case, for the AM and PM peaks respectively. It is apparent that delays are forecast to generally worsen in the PM peak more than the AM peak. In the AM peak, the greatest delay is approximately four minutes per vehicle at the junction of the A406 North Circular Road/ A404 Harrow Road. There are also significant delays of over two minutes at the Hanger Lane gyratory and at Gypsy Corner on the A40. In the PM peak, the greatest delay is approximately 6 minutes per vehicle at the junction of the A406 North Circular Road and Abbey Road. There are also significant delays at other points on the A406 North Circular Road, the A40, Harlesden town centre and at Hanger Lane gyratory.

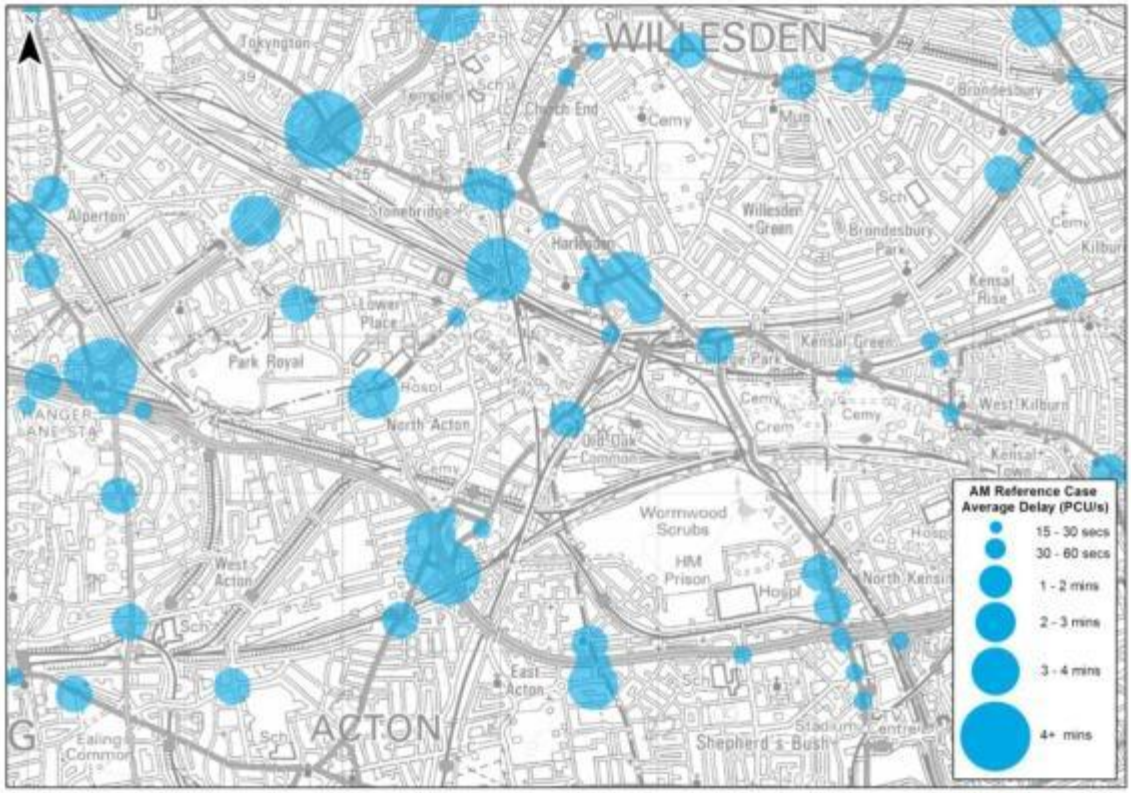


Figure 6-7: Junction delay – 2031 Reference Case (AM peak)

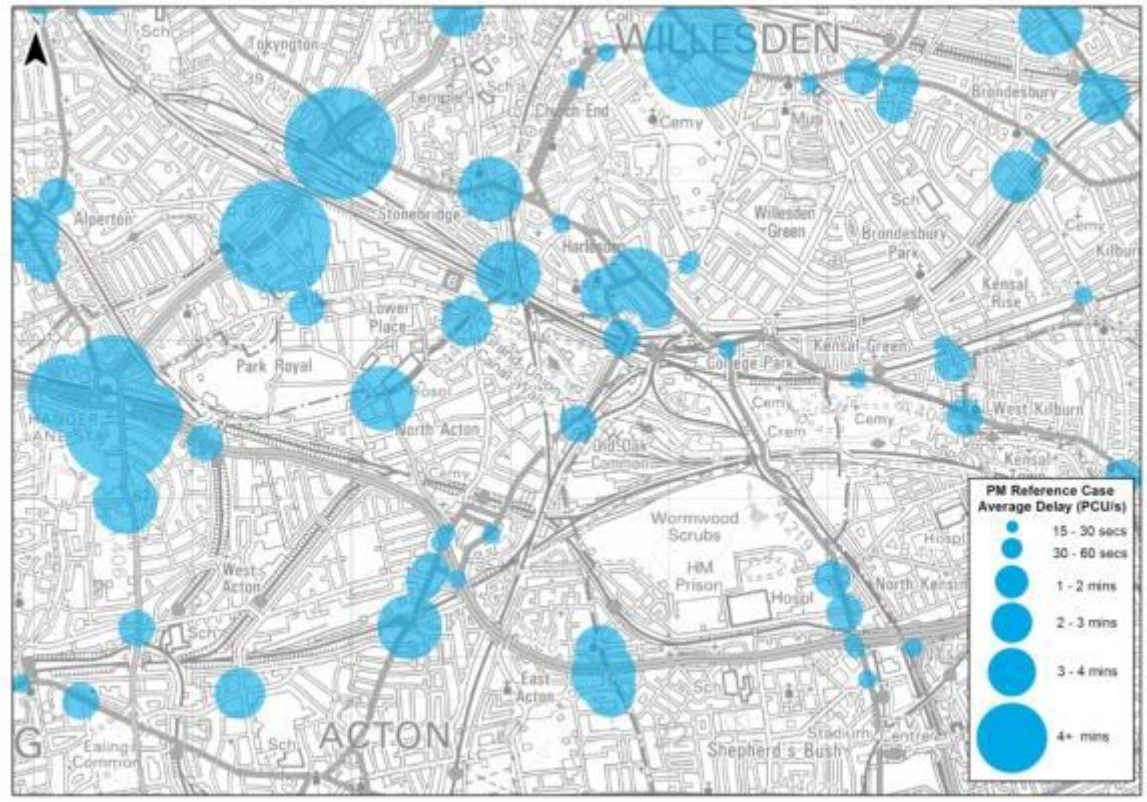


Figure 6-8: Junction delay – 2031 Reference Case (PM peak)

As a comparison, Figure 6-9 and

Figure 6-10 below show the change in delay in the 2031 Reference Case compared to current delays on the network (the 'Base'), for the AM and PM peaks respectively. The green nodes represent an increase in delay, whilst the blue nodes represent a decrease in delay. It is evident that an increase in delay occurs at the majority of junctions within and around the OOCOA, reflective of an increase in traffic by 2031. Due to the dynamics of the traffic assignment, increases in delay at one junction or arm of junction may release delay at another part, as traffic is held up-stream or reassigns to avoid the congestion. Changes in delay are in general in the order of up to 30 seconds.

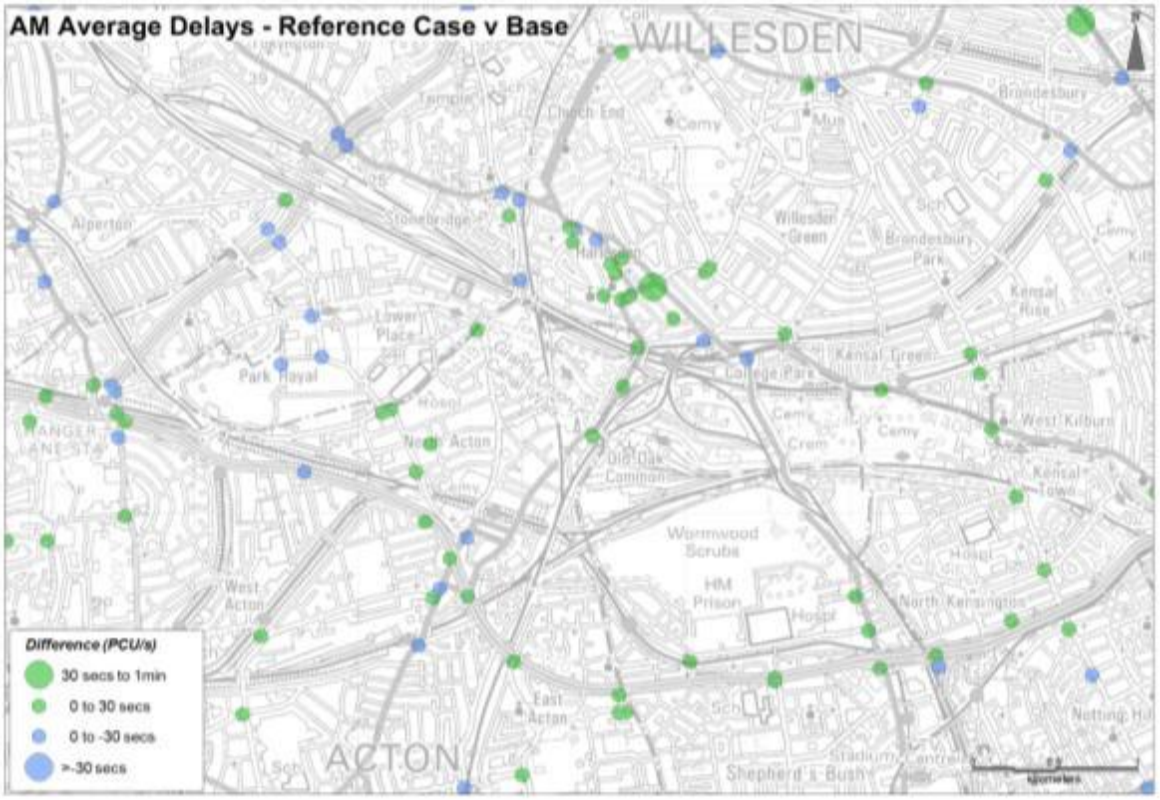


Figure 6-9: Change in junction delay between current year & 2031 Reference Case AM pk

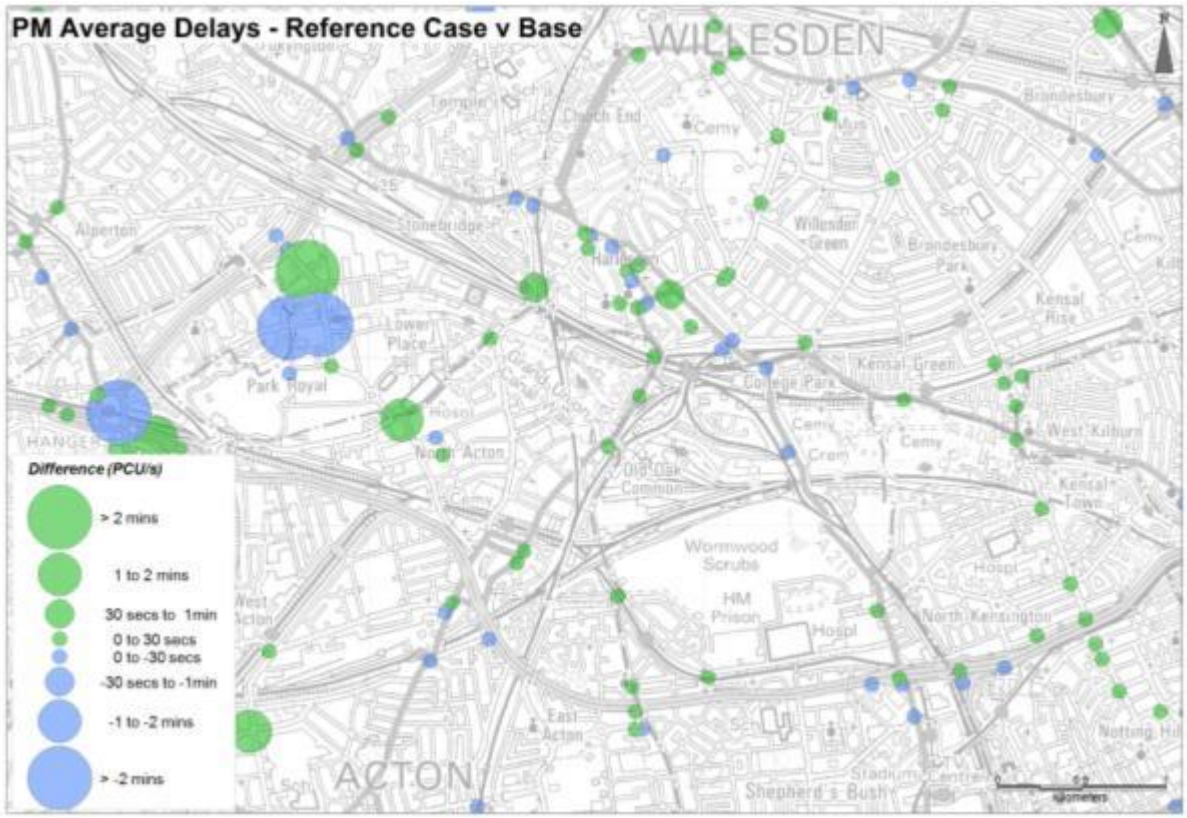


Figure 6-10: Change in junction delay between current year & 2031 Reference Case PM pk

Traffic volume and road capacity (V/C)

Figure 6-11 and Figure 6-12 show forecast V/C for the 2031 Reference Case, for the AM and PM peak respectively. The operation of key links and junctions, in terms of theoretical capacity, are seen to be similar to that recorded in the current year (Figure 4-4 and Figure 4-5).

During the AM peak, the approach to Gypsy Corner gyratory has a V/C ratio over theoretical capacity, as per the current year. However, additional locations whereby critical operation is identified are at Hanger Lane Gyratory and on the A406 North Circular Road. Also, a greater number of locations whereby links and junctions are approaching critical capacity (80-90% V/C) within the study area are identified.

During the PM peak, approaches to the Hanger Lane gyratory and sections of the A406 North Circular Road and A4000 Horn Lane have a V/C ratio over theoretical capacity, as per the current year. However, the 2031 Reference Case shows a greater number of links and junctions approaching critical capacity within the study area, notably on the A40 between Hanger Lane and Gypsy Corner, and in Harlesden.

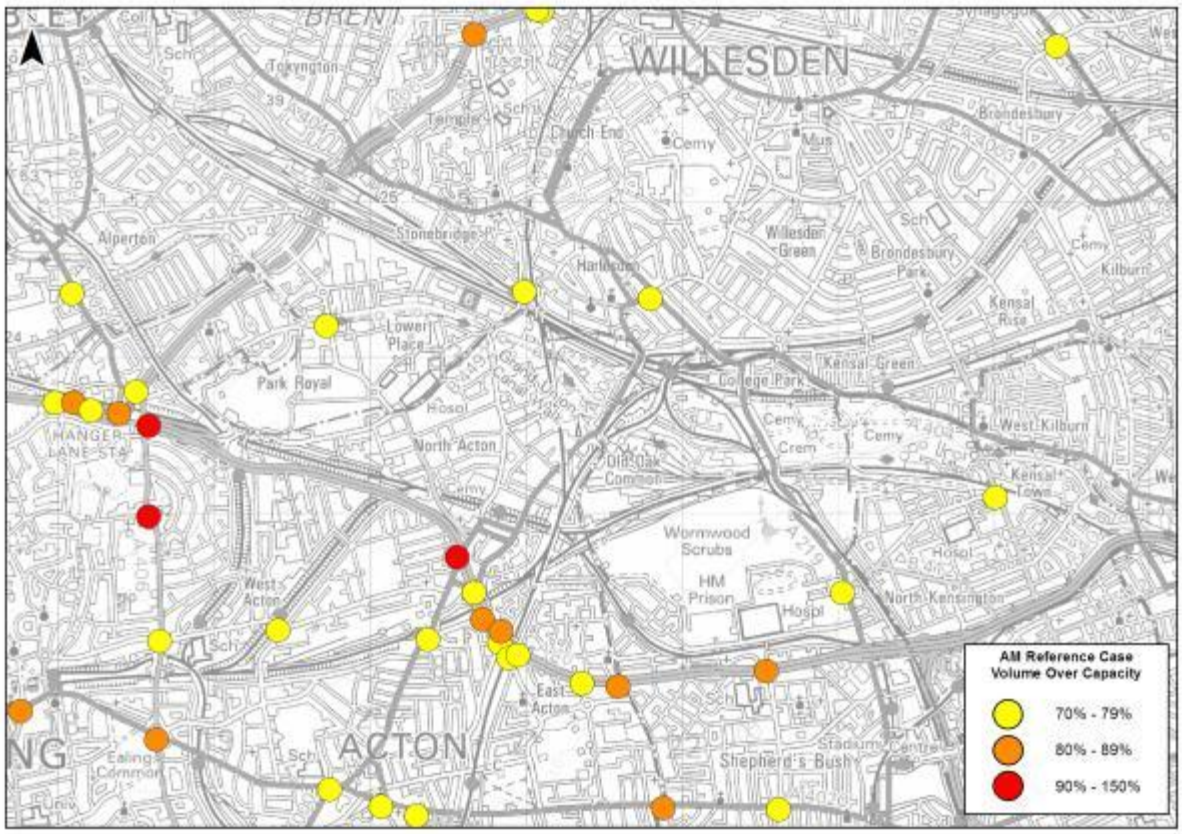


Figure 6-11: Highway network V/C – 2031 Reference Case AM pk

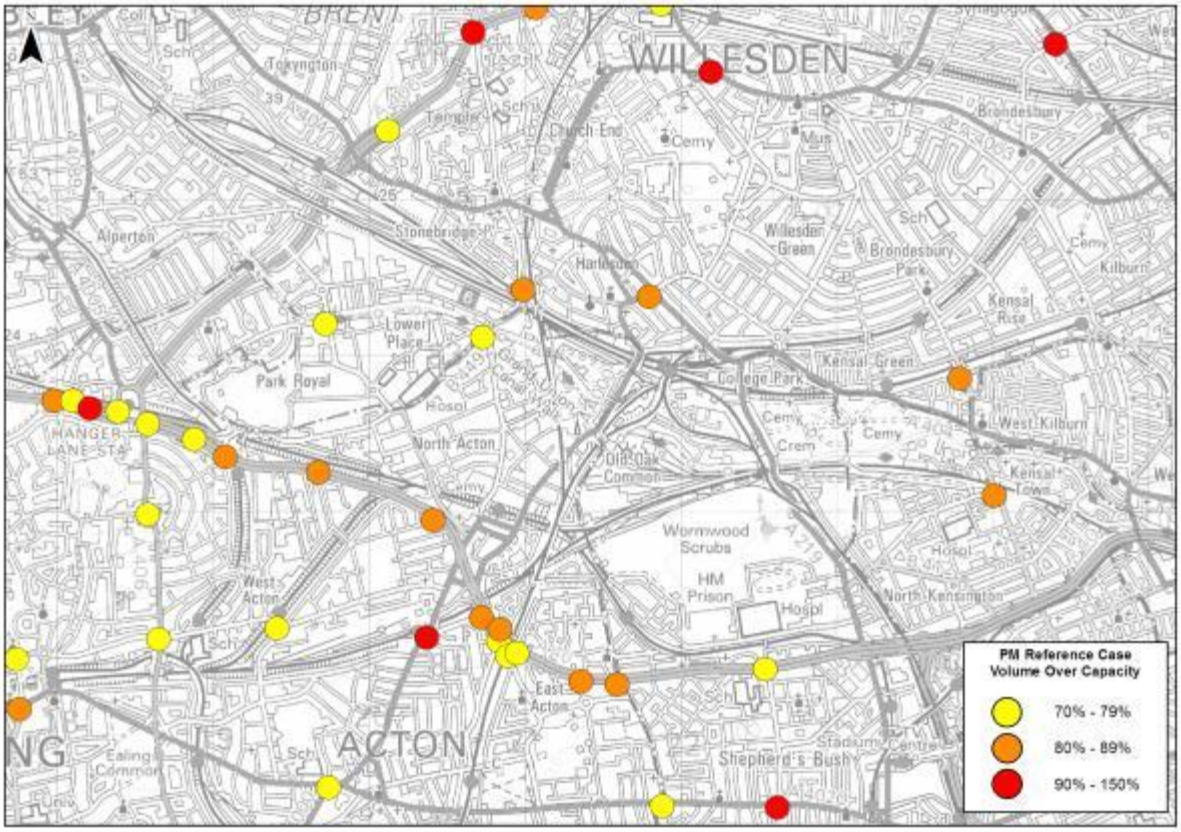


Figure 6-12: Highway network V/C – 2031 Reference Case PM pk

6.5 Public transport network

This section outlines the projected operation of the public transport network in 2031, through analysis of outputs from TfL's strategic public transport model. The analysis compares the current situation (the 2012 base) with the 2031Reference Case.

6.5.1 Public transport supply and demand

The public transport 2031 Reference Case includes HS2, Crossrail and a range of other committed capacity and service enhancements, but again without any OOCOA related development.

The number of peak public transport trips expected in 2031 to and within London is expected to rise by 28% in the AM peak and by 9% in the PM peak, compared to current trips. The impact of this on the public transport network is considered below.

6.5.2 Rail network performance

Crowding

The level of crowding on the LU network, in the 2031 Reference Case, is shown in Figure 6-13. The combination of HS2, Crossrail and a range of committed capacity enhancements on the LUL network assumed in the 2031 Reference Case means that capacity tends to keeps pace with the forecast increased in demand. Therefore, when compared to current year levels (Figure 4-14) there are no significant changes in crowding levels on the LUL network, which remain acceptable. The forecast indicates some reduction in crowding on

the eastern branch of the Central Line, where Crossrail abstracts demand. However, there is some increase in crowding on the Northern Line, due to the impact of HS2 passengers disembarking at Euston.

The level of crowding on the LO and National Rail network, in the 2031 Reference Case, is shown in Figure 6-14. When compared to current year levels (Figure 4-15), there is, in general, an improvement in crowding on the NLL and WLL which run through Willesden Junction. This is due to the introduction of improved capacity and rolling stock on the lines subsequent to the current year assessment. Improvements in crowding levels are also apparent south of the Thames; for example on Southeastern services, with some relief from Crossrail services and also the introduction of Thameslink. There is an increase in crowding forecast on Chiltern Railway services on the Chiltern Main Line, feeding Marylebone, due to forecast increase in demand.

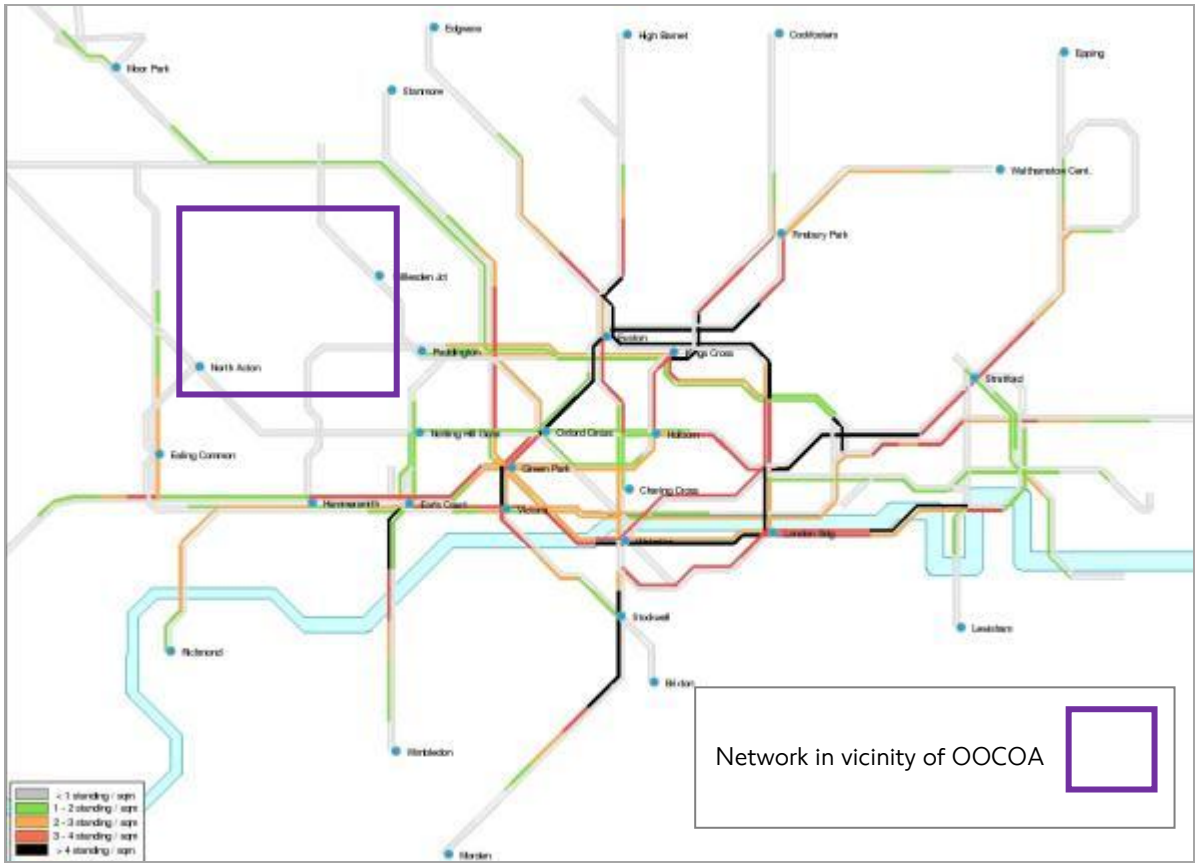


Figure 6-13: Crowding on LUL – 2031 Reference Case

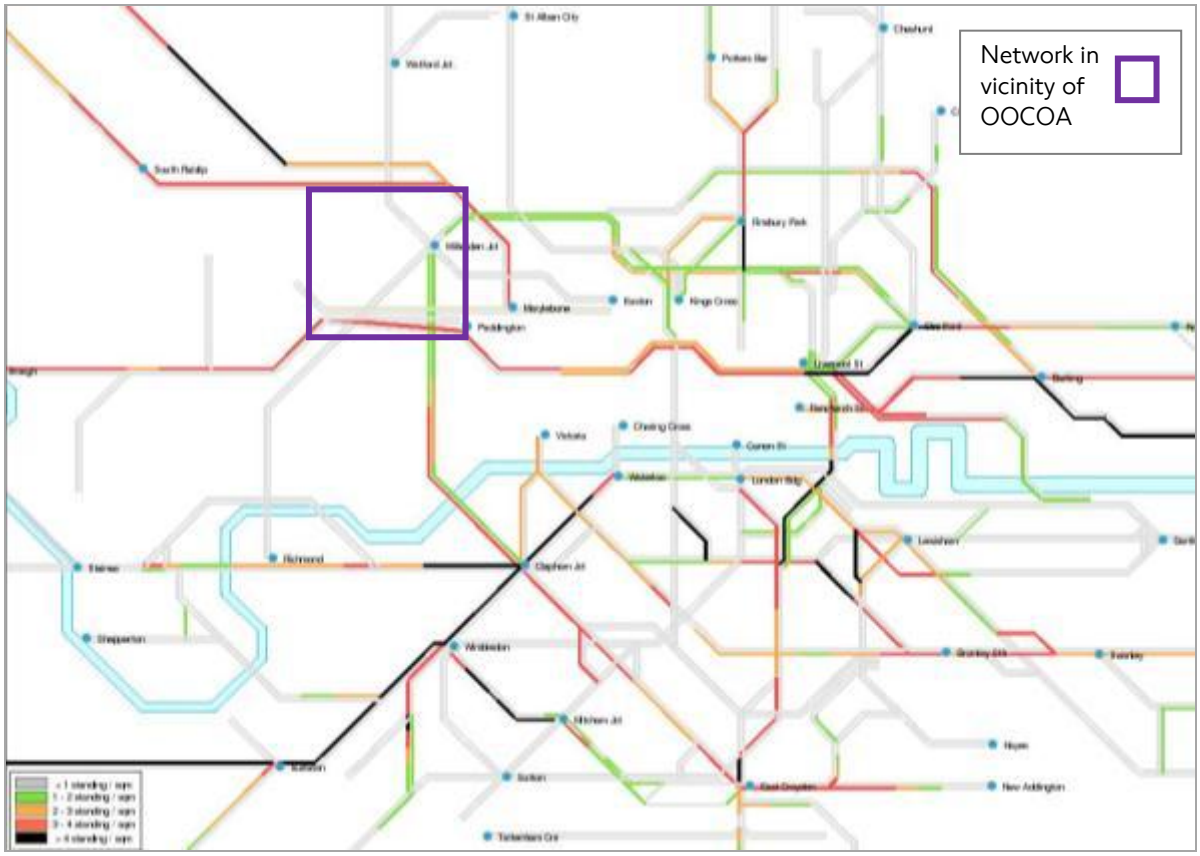


Figure 6-14: Crowding on LO and National Rail – 2031 Reference Case

Station demand

The passenger station demand in the 2031 Reference Case, with regard to AM peak (0700 – 1000) entry and exit, is shown in Table 6-1. The overall station movement, which includes passengers interchanging between services, is shown in Table 6-2. The current (base) year numbers are shown for comparison.

Station	Current (base) year		2031 Reference Case	
	Entry (no. passengers)	Exit (no. passengers)	Entry (no. passengers)	Exit (no. passengers)
Old Oak Common	-	-	2,600	4,100
Willesden Junction	2,600	2,000	2,900	2,300
Kensal Green	1,800	1,700	1,900	1,900
North Acton	1,500	1,100	1,300	1,100

Table 6-1: Station entry and exit – current year and 2031 Reference Case AM pk

Station	Current (base) year	2031 Reference Case	% change
	Total station movement (no. passengers)		
Old Oak Common	-	42,300	-
Willesden Junction	7,700	9,700	+26%
Kensal Green	3,500	3,900	10%
North Acton	2,600	2,400	-8%

Table 6-2: Total station movement – current year and 2031 Reference Case AM pk

There is a negligible change in the numbers of passengers using Kensal Green and North Acton station. However, Willesden Junction is forecast to see a 26% increase in AM peak demand, which is broadly in-line with general growth in public transport demand across the network. Whilst there is no comparable data for the new Old Oak Common station, it is useful to note the likely station movements in the 2031 Reference Case which, based on TfL's forecasts, indicate that the majority of passengers are interchanging, with less than 10% entering or leaving the station (shown in Figure 6-15).

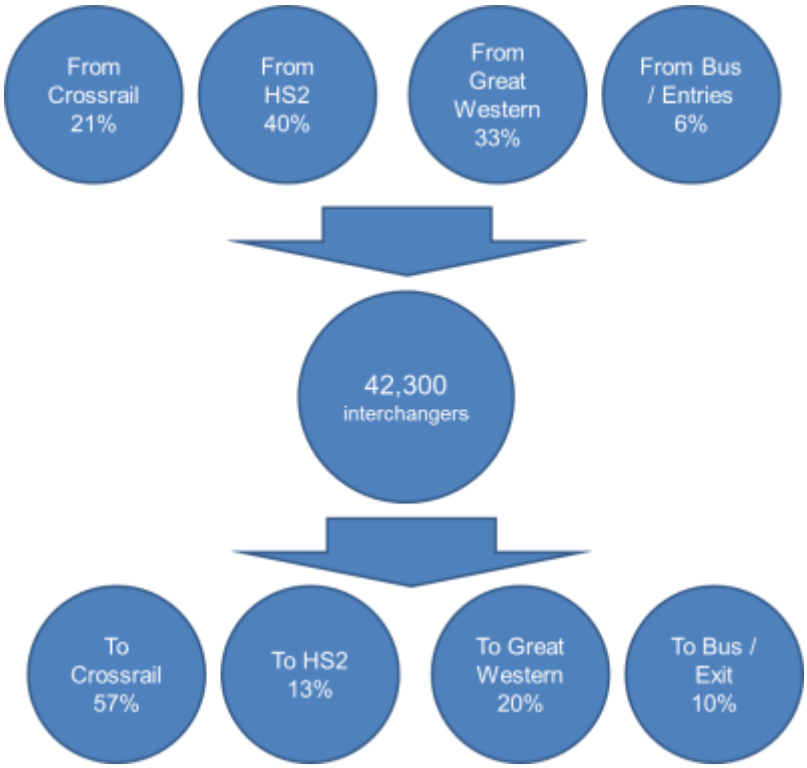


Figure 6-15: Forecast passenger movements at Old Oak Common station AM pk

6.5.3 Bus network performance

Bus demand

Bus demand, as a proportion of bus capacity, for the 2031 Reference Case, is shown in Figure 6-16. The principal change between the current year and 2031 Reference Case is the change in bus flows around White City/ Wood Lane, south of the OOCOA. The increase in flow is considered to be a consequence of Old Oak Common station likely to provide an attractive alternative boarding location for passengers travelling to this area, compared to existing options such as Hammersmith, Shepherd's Bush, Wood Lane and White City LUL stations. This has resulted in an increase in bus crowding, compared to existing levels (Figure 4-22), on Old Oak Common Lane, Du Cane Road and the A40 between Savoy Circus and Old Oak Common. However, there is still a level of available capacity on all roads, apart from A219 Scrubs Lane as was the case in the current year. Bus operations may also be adversely affected by increased highway congestion.

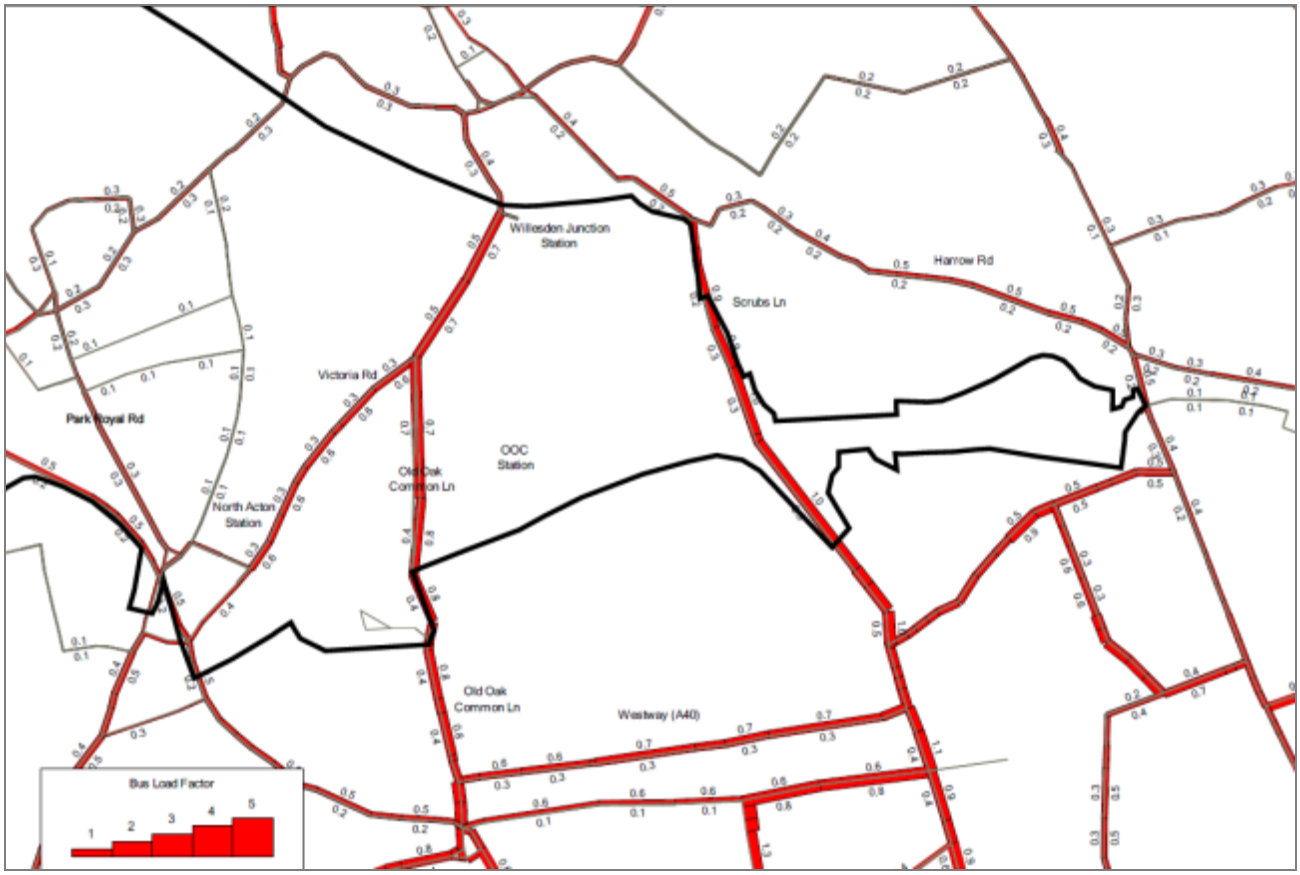


Figure 6-16: Bus volume demand to capacity ratio – 2031 Reference Case AM pk

6.6 Summary of findings for 2031 Reference Case (without development)

This section has reported on the forecast nature and operation of a 2031 Reference Case transport network, which accounts for background growth and committed schemes, but not OOCOA related development. The key findings are summarised below.

Highway network:

Natural growth in traffic volumes has resulted in some level of adverse change from the current conditions on network performance, with regard to junction delay and operation based on theoretical highway capacity. Although the increase in traffic volumes are not exceptionally high, they are forecast to further compound stresses found on the highway network at present (i.e. Gypsy Corner, Hanger Lane gyratory, sections of the A406 North Circular Road and A4000 Horn Lane). They are also forecast to create highway operation pressures at new locations in and around Old Oak Common.

There is minor change recorded within the OOCOA itself in the Reference Case, which reflects the fact that this scenario excludes development growth. It is, however, worth noting that some of the roads which could be considered gateways to the site are already under operational stress in the current year and remain that way i.e. Wood Lane, Savoy Circus, Gypsy Corner, Harlesden gyratory.

Rail network:

There are few changes of significance in crowding levels on the National Rail, LO and LU network between the current situation and 2031 Reference Case. This is primarily due to committed capacity enhancements, including the introduction of Crossrail, offsetting the forecast increase in demand. The increase in crowding that is observed at certain parts of the network, are outside of the area primarily concerning OOCOA. Crowding on the LO network does, however, remain a problem in some locations, as at present, such as the WLL, south of Willesden Junction. It is forecast that the vast majority of HS2 passengers arriving at Old Oak Common are interchanging to Crossrail services.

Bus network:

There is forecast to be an increase in demand on bus services operating to the south of the OOCOA, namely Old Oak Common Lane, Du Cane Road and parts of the A40. This is representative of an anticipated increase in bus patronage between the OOCOA and White City/ Wood Lane. Bus demand to capacity ratios elsewhere in and around the OOCOA are forecast to remain similar to present day. Only sections of Scrubs Lane are forecast to have bus services operating at capacity.

7 Future Year (2031) with development

Following review of the 2031 Reference Case, without taking the impact of any development into account, this section considers the impact of a development scenario without any mitigation measures in place.

7.1 Development scenarios

The Old Oak Common Vision presented a number of different scenarios for growth, with three potential development scenarios agreed by the OAPF group in April 2013. These are shown in Table 7-1.

	Planning scenario 1	Planning scenario 2	Planning scenario 3
	Lower growth	Medium growth	Higher growth
Homes	29,000	24,000	19,000
Jobs	30,000	55,000	88,000

Table 7-1: Proposed development scenarios

Given the level of existing pressure on the transport network in both the current year and 2031 Reference Case, it was agreed to start by assessing the impact of medium growth - Planning Scenario 2. This was to see if that level of growth could be accommodated on the local public transport and highway network, before deciding whether it would be appropriate to test the other scenarios.

Whilst the intention had been to assess at least two development scenarios, following initial analysis of Planning Scenario 2, it was agreed in consultation with the OAPF group not to proceed with any further testing at this stage, as this appeared to present the optimum development scenario for the area, taking into account existing and future transport conditions, and the potential ability to mitigate the impact of further growth. The assessment outlined in this section, therefore, relates to that of Planning Scenario 2 comprising 24,000 homes and 55,000 jobs which is the level of growth proposed in the Further Alterations to the London Plan (FALP) and assumed in the draft OAPF.

7.2 Demand assumptions

7.2.1 Population and employment

An indicative distribution of homes and jobs across the site was developed by the OAPF group in 2013. The agreed indicative distribution for the Planning Scenario 2 is shown in Figure 7-1 and has been used in the Strategic Transport Study. However, the distribution of homes and jobs is being amended and updated as the OAPF is developed.

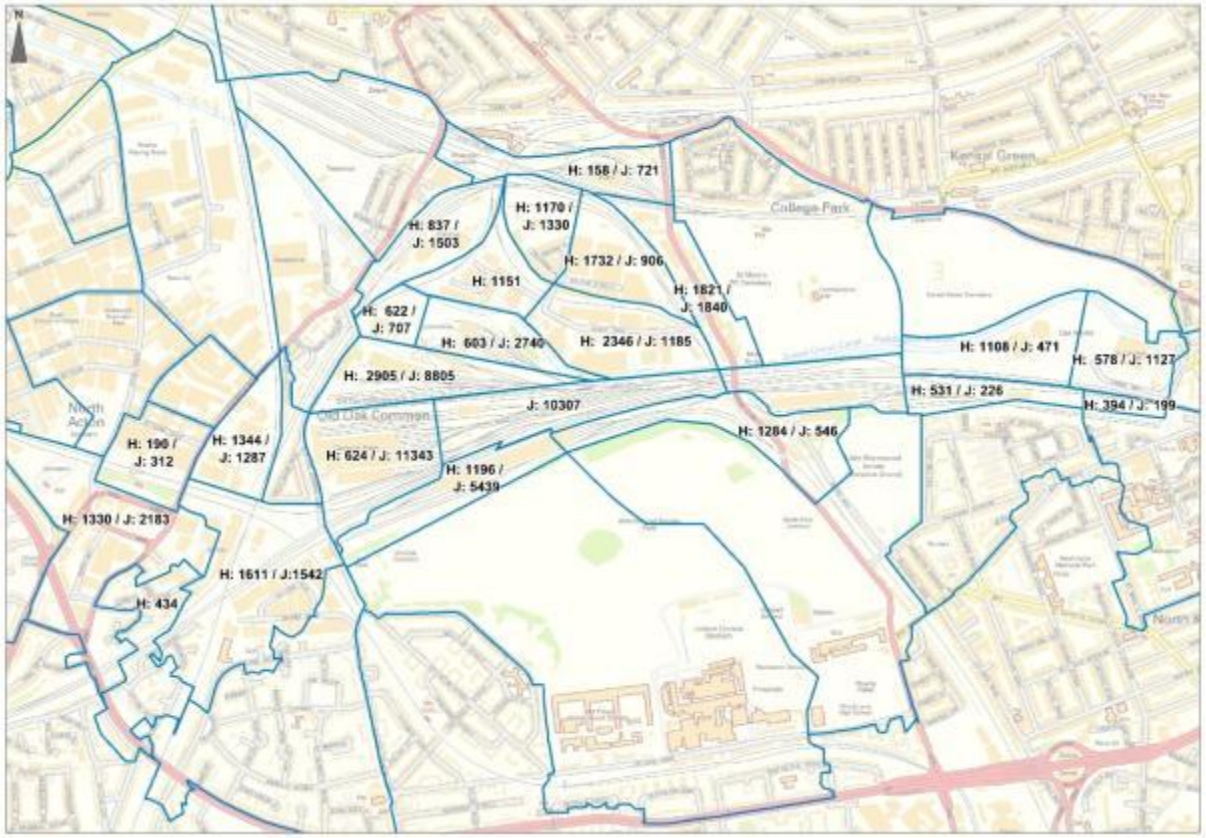


Figure 7-1: Proposed location of homes (H) and jobs (J) across the OOCOA

The majority of jobs are likely to be located in the area to the south of the canal, around what will be the new HS2 station hub and where access to public transport facilities will be at its highest. The majority of housing provision would be located to the north. There is also development to be clustered around North Acton. Figure 7-2 shows the likely distribution of blue and white collar jobs, from which it can be seen that white collar jobs are primarily located in the OOCOA, especially around the HS2 station, whilst the majority of blue collar jobs are based around the periphery of the OOCOA and mainly in North Acton.

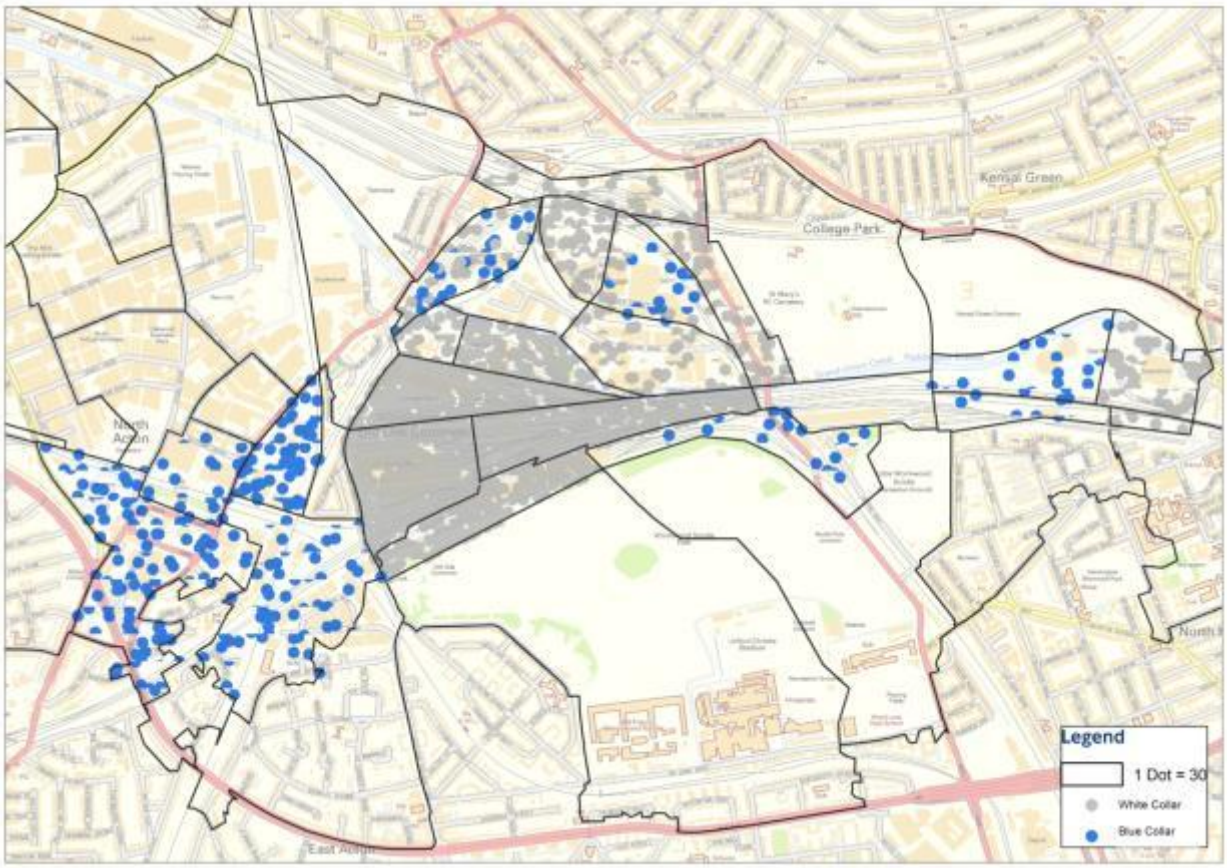


Figure 7-2: Location of employment by white and blue collar jobs

7.2.2 Highway network

The highway network schemes assumed to be part of Planning Scenario 2 include the HS2 access road to the south of the canal, as well as the existing roads in the Hythe Road industrial estate, as shown in Figure 7-3. Some minor additions to the existing road network have also been included, which ensures all zones within the development are connected to the wider highway network.



Figure 7-3: Planning Scenario 2 highway network and assumed connectivity

Demand

The additional trips to and from the OOCOA during the three hour AM peak, associated with the development under Planning Scenario 2, is forecast to be 7,900 car trips (assuming average occupancy of 1.5 per vehicle) and 26,500 public transport trips.

Trip distribution

The development site was split into three sectors; north of the canal, south of the canal and North Acton, as shown in Figure 7-4. Analysis was carried out to forecast the distribution of highway and public transport trips to and from these development sectors.

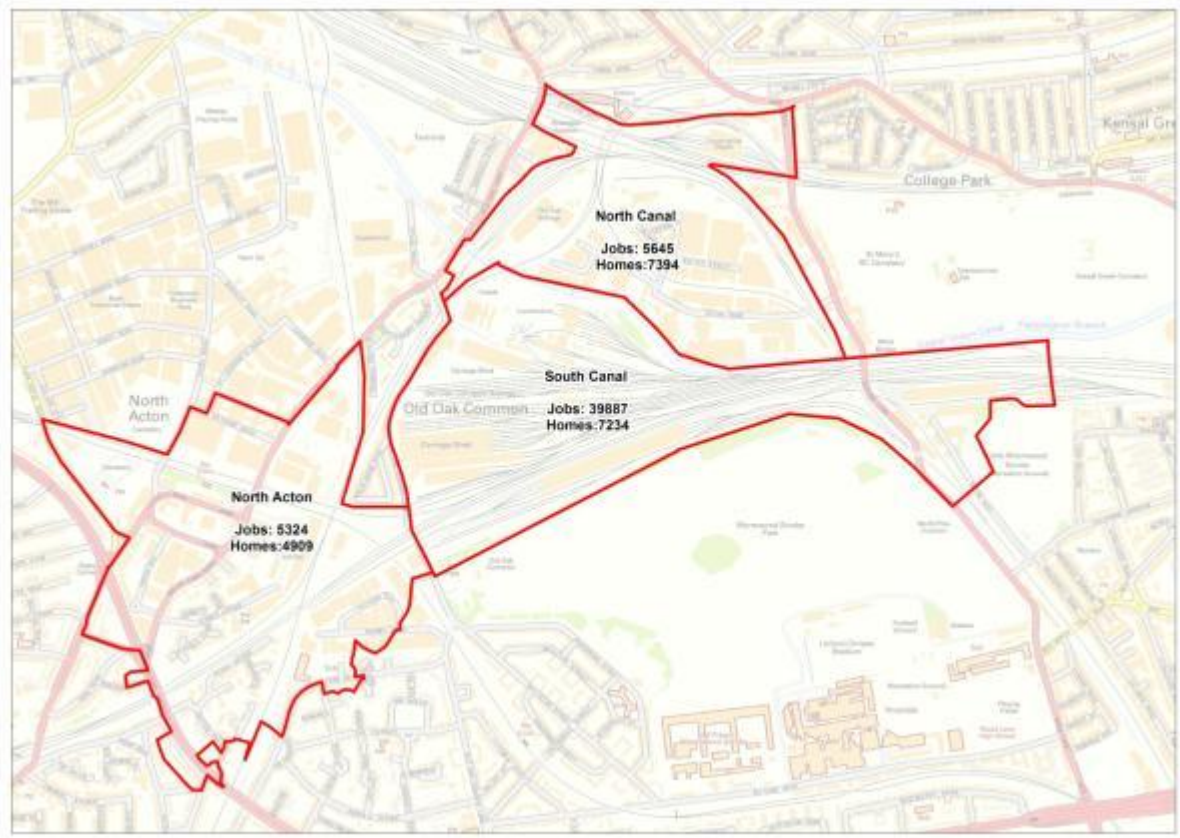


Figure 7-4: OOCOA development sectors used for trip generation

For highway trips, Table 7-2 shows the distribution of trips in the AM peak. The majority of car trips to and from the OOCOA are forecast to be from the boroughs located in closest proximity to the development area, with trips from LLB, LBE, LBHF and LBKC accounting for 59% of the total highway trips to the OOCOA and 61% of total highway trips from the OOCOA. A further 10% of trips to and from the OOCOA are forecast to be from outside of London.

Trips to the OOCOA		Trips from the OOCOA	
Brent	19%	**Hammersmith & Fulham**	20%
Ealing	19%	**Ealing**	16%
Hammersmith & Fulham	13%	**Brent**	15%
Kensington & Chelsea	8%	**Kensington & Chelsea**	10%
Other London	30%	**Other London**	29%
External to London	10%	**External to London**	10%

Table 7-2: Distribution of highway trips to and from the OOCOA AM pk

For public transport trips, Table 7-3 shows the distribution of trips in the AM peak. The distribution is similar to that of highway trips, with the boroughs in closest proximity accounting for the most significant number of trips to and from the OOCOA. LBB, LBE, LBHF and LBKC account for 27% of public transport trips to the OOCOA, whilst 7% of trips are from the borough of Croydon and 17% are from destinations outside London.

Trips to the OOCOA		Trips from the OOCOA	
Hammersmith & Fulham	11%	**Hammersmith & Fulham**	21%
Ealing	9%	**Westminster**	16%
Brent	7%	**Ealing**	9%
Croydon	7%	**Camden**	7%
Other London	49%	**Other London**	40%
External to London	17%	**External to London**	6%

Table 7-3: Distribution of public transport trips to and from the OOCOA AM pk

7.3 Highway network impact

The 'with development' highway model incorporates the addition of 24,000 homes and 55,000 jobs as a consequence of the development. Of the approximate 47,000 jobs that are expected in the immediate vicinity of the new Old Oak Common station, around 41,000 of these are located in areas that feed to the road network west of the development. Of the approximate 16,500 dwellings in the vicinity of the station, around 9,500 of these are located in areas that feed to the road network east of the development. This leads to an imbalance of demand with the road network west of the development being mainly used for traffic relating to employment on the site and the road network east of the development being mainly used for traffic relating to dwellings on the site.

Initial forecasts for this development scenario, without appropriate mitigation measures, indicate severe delays at certain locations on the network such as on Old Oak Common Lane and Victoria Road. An initial model run showed severe delays of up to 30 minutes for people trying to get out of the site, largely due to the poor quality of the existing access arrangements.

7.3.1 Routing analysis

Select link analysis was undertaken to understand how the traffic generated by the development dissipates through the network in the AM peak. The analysis was undertaken to show traffic flow for the eastern access, shown in Figure 7-5, as well as the western access, shown in Figure 7-6.

The analysis shows that traffic associated with the eastern gateway (which mostly relates to housing related demand) is lower than the traffic generated by the western entrance. This traffic uses A219 Scrubs Lane and North Pole Road as key routes to the south. Some traffic

also finds its way to the A5 using All Souls Avenue. Traffic generated by the western side of the site (which mostly relates to employment demand) uses the A4000 and Old Oak Common Lane to access the A40, but also Du Cane Road as an alternative route due to congestion and capacity issues at the other A40 junctions.

As expected, the A40 is the main feeder of traffic to the area of the OOCOA in both cases. Some traffic uses the A406 North Circular and reaches the OOCOA through the A404 and Brentfield Road.

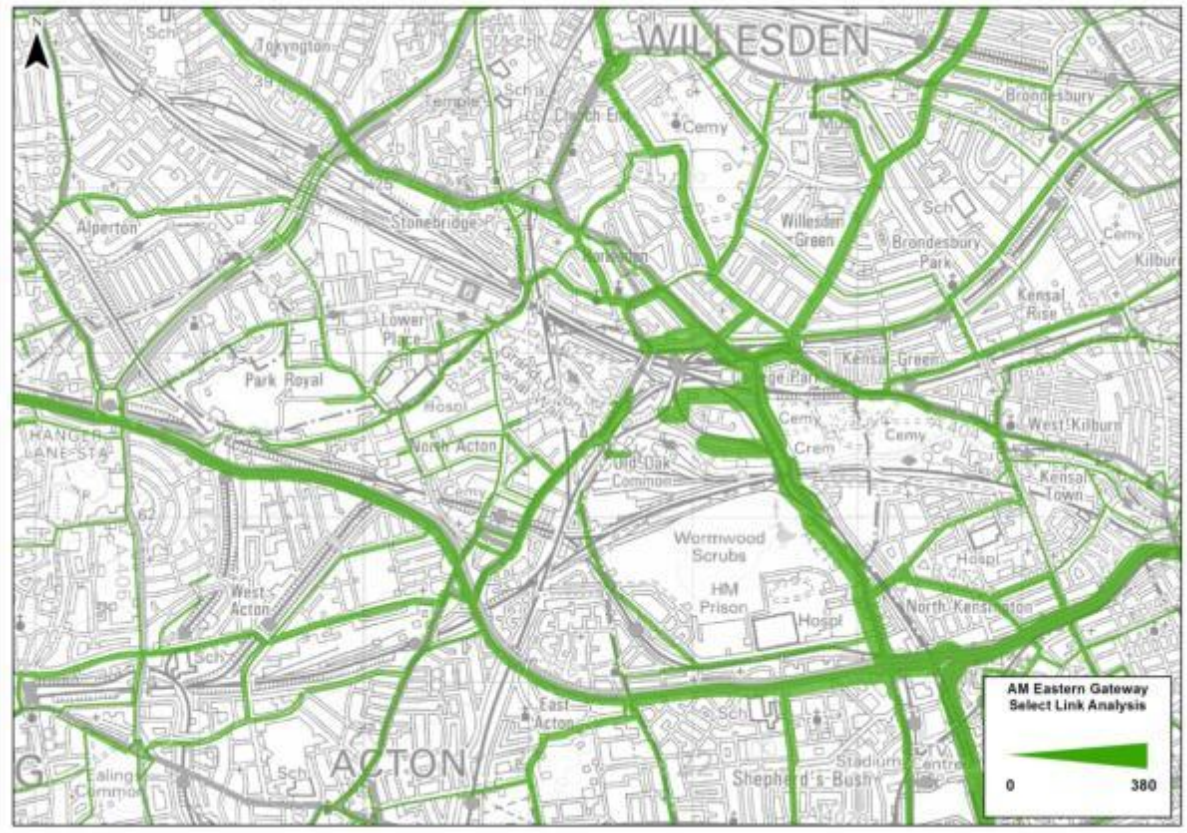


Figure 7-5: Eastern access select link analysis AM pk

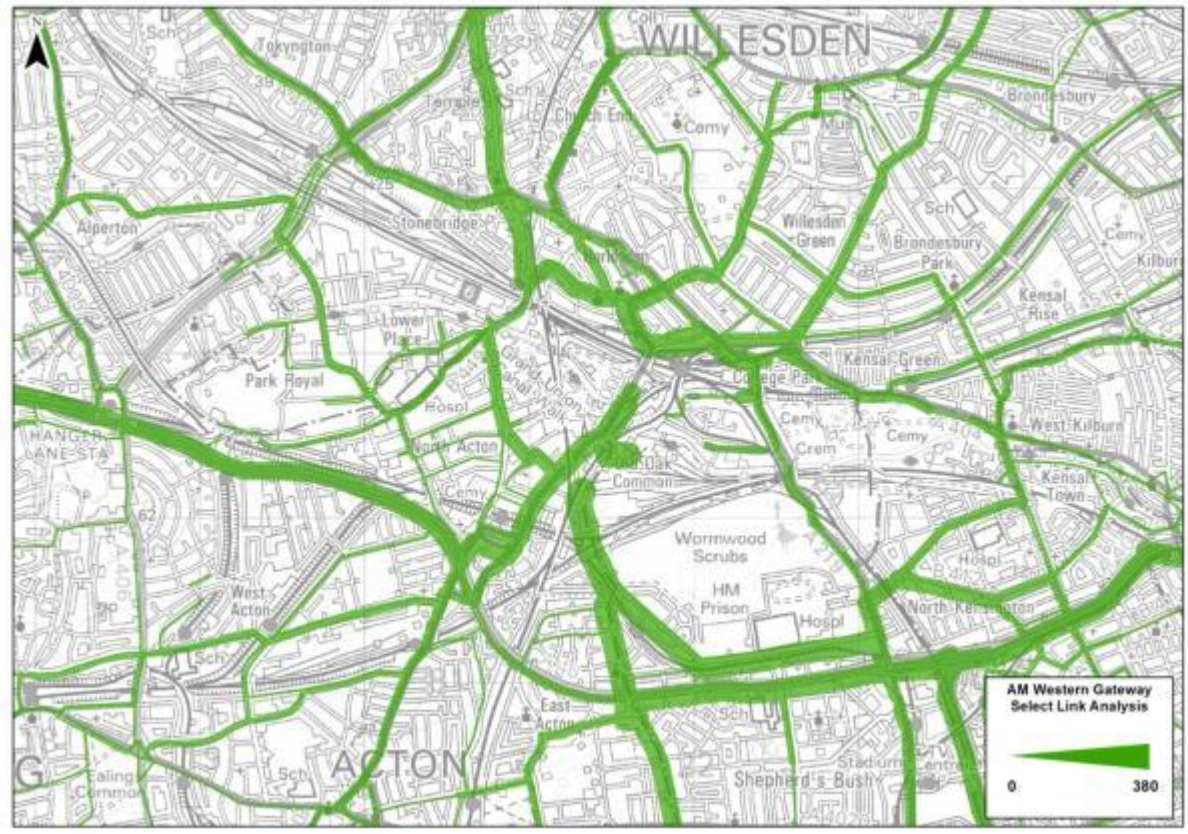


Figure 7-6: Western access select link analysis AM pk

7.3.2 Highway network performance

Traffic flows

Figure 7-7 and Figure 7-8 show the difference in traffic flows between the 2031 Reference Case and Planning Scenario 2, in the AM and PM peaks respectively. It is evident that the introduction of development results in an increase in traffic flow on the majority of key roads in and around the OOCOA. During both AM and PM peak periods, the greatest forecast increase in traffic flow within the OOCOA is seen on Old Oak Common Lane and A4000 Victoria Road.

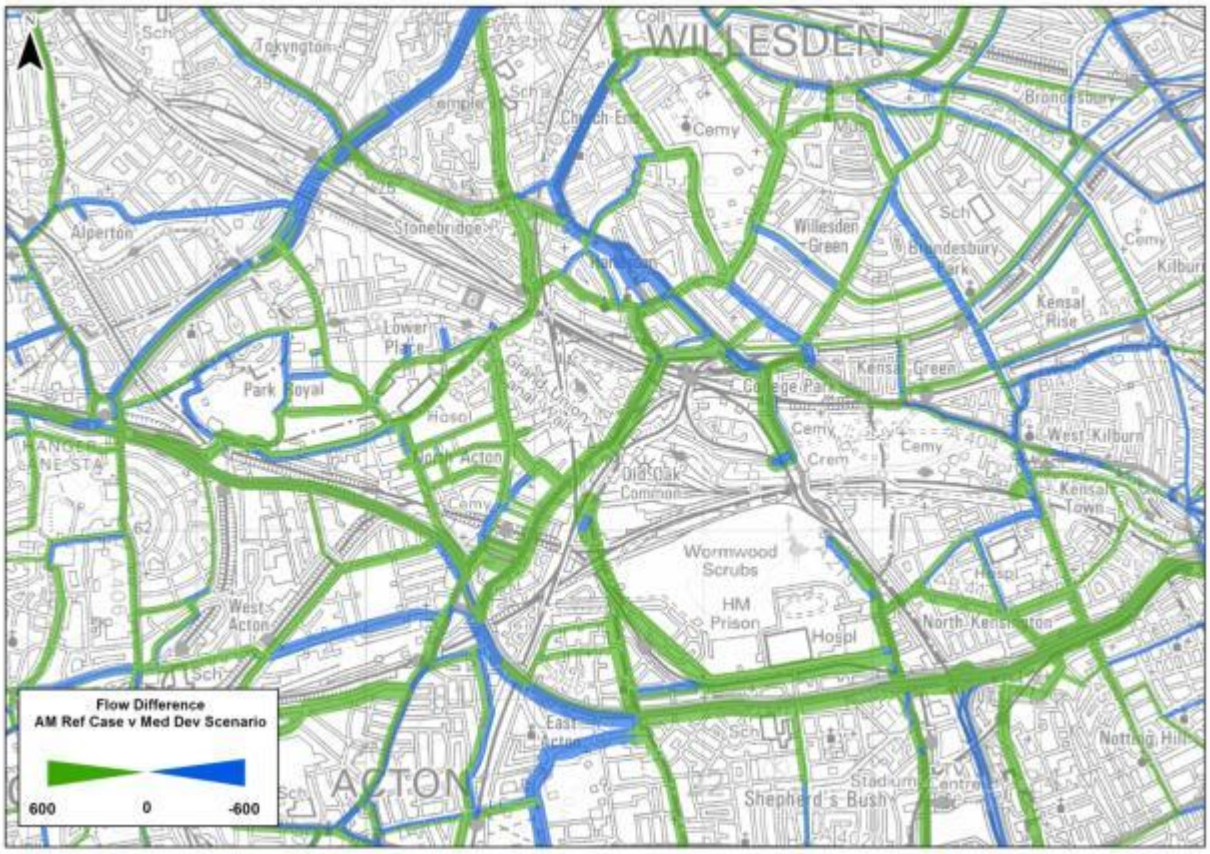


Figure 7-7: Traffic flows – 2031 Reference Case vs. Planning Scenario 2 AM pk

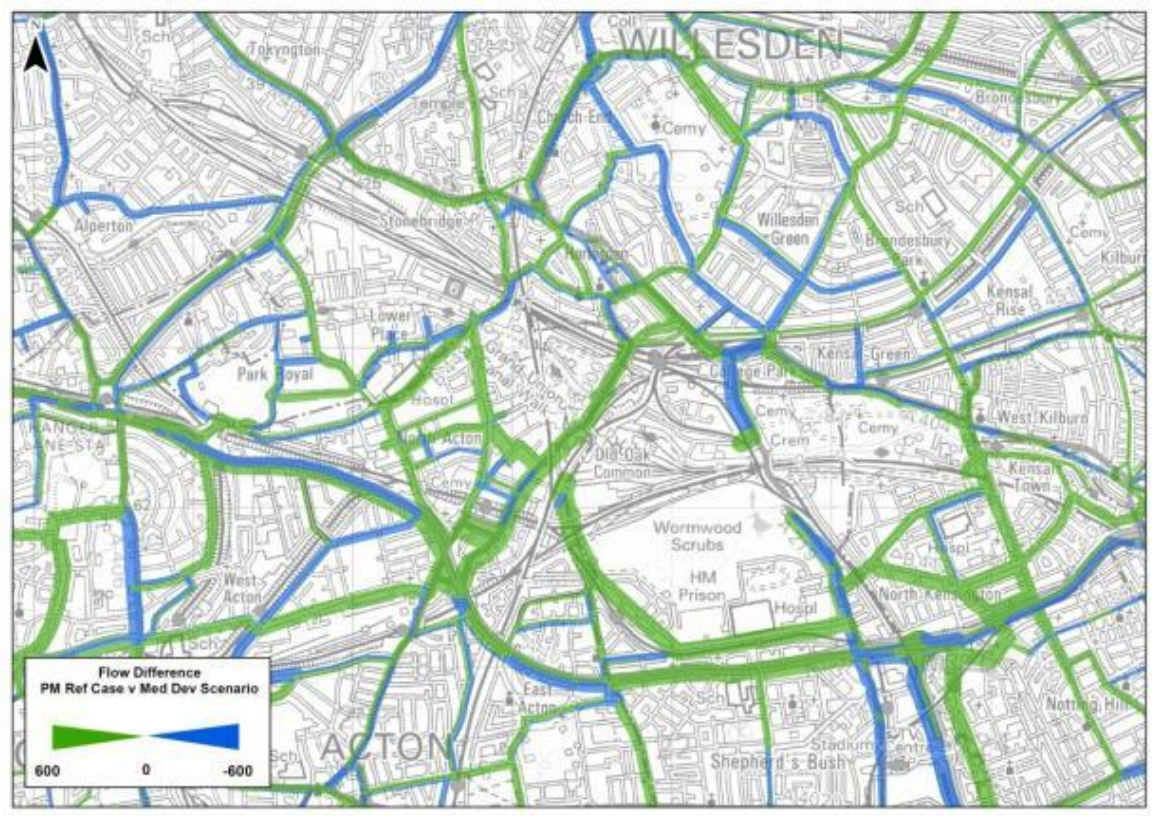


Figure 7-8: Traffic flows – 2031 Reference Case vs. Planning Scenario 2 PM pk

Junction delays

Figure 7-9 and Figure 7-10 show the difference in average delays between the 2031 Reference Case and Planning Scenario 2. It is evident that the introduction of OOCOA related development has an adverse impact upon junction operation, with a number of locations where delays worsen, including:

- Harlesden Gyratory - increase of delays up to 1 minute per vehicle;
- Acton Lane with Mordaunt Road- increase of delays up to 36 seconds per vehicle;
- Station Road just north of Willesden Junction – increase in delays of over 2 minutes per vehicle;
- Savoy Circus, with additional delays to East Acton Lane of 69 seconds and Old Oak Road of 38 seconds per vehicle;
- Gypsy Corner at Noel Road, entering the A4000 (just south of the A40) - increase of delays up to 8 seconds per vehicle;
- Wood Lane, approaching the A40- increase of delays up to 3 seconds per vehicle; and
- The A406, north of Hanger Lane, along the majority of its extent up to the A5.

During the PM peak, the increases in average delay over the 2031 Reference Case are projected to be more significant, in particular on Old Oak Common Lane (increase of delays up to 3 minutes per vehicle) and Du Cane Road (increase of delays up to 2½ minutes westbound and 73 seconds eastbound per vehicle), as well as on the A4000 into Tubbs Road, and Noel Road in North Acton.

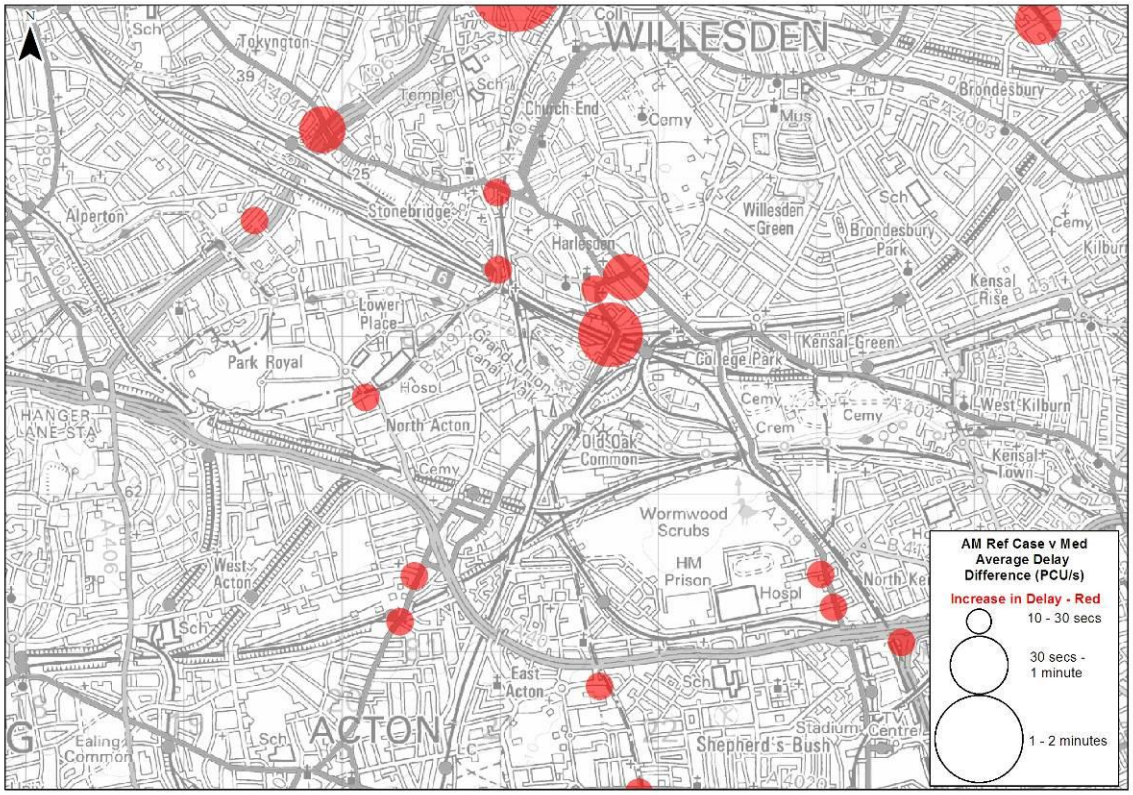


Figure 7-9: Change in junction delay between 2031 Reference Case & Planning Scenario 2 AM pk

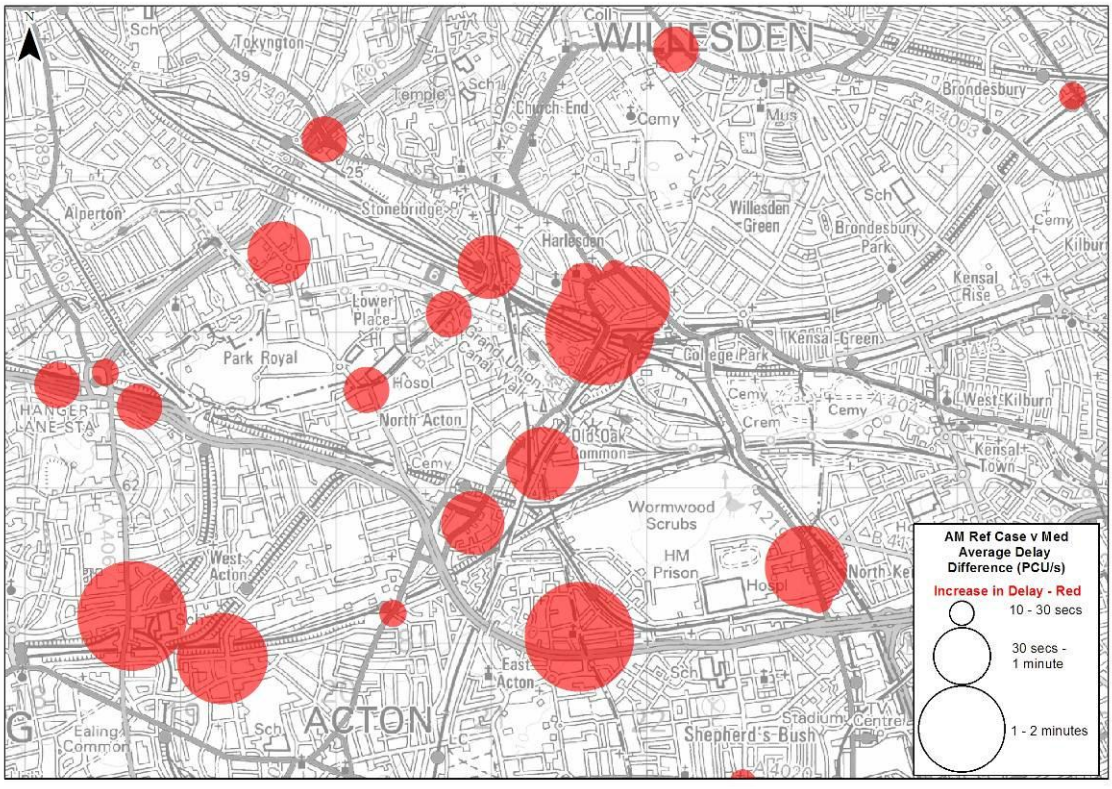


Figure 7-10: Change in junction delay between 2031 Reference Case & Planning Scenario 2 PM pk

Traffic volume and road capacity (V/C)

During the AM peak, shown in Figure 7-11, the highway network V/C for Planning Scenario 2 model is, in general, consistent with the 2031 Reference Case (Figure 6-11). Approaches to Gypsy Corner, Hanger Lane Gyratory and the A406 North Circular Road are still forecast to have a V/C ratio of over 90%. However, there are locations in the vicinity of the OOCOA which are forecast to operate under additional stress and be approaching theoretical capacity, such as along the A404 and B4492 Acton Lane.

During the PM peak, shown in Figure 7-12, the aforementioned locations are also saturated but conditions are generally worse across the network in comparison to the AM peak, and indeed the 2031 Reference Case, with additional roads forecast to be operating over 90% of theoretical capacity, including Hanger Lane northbound into the gyratory and A4000 into Tubbs Road.

It is evident that the introduction of OOCOA related development is likely to have an adverse impact upon highway operation in and around Old Oak Common, with the network potentially unable to cope with the forecast demand without modification and intervention.

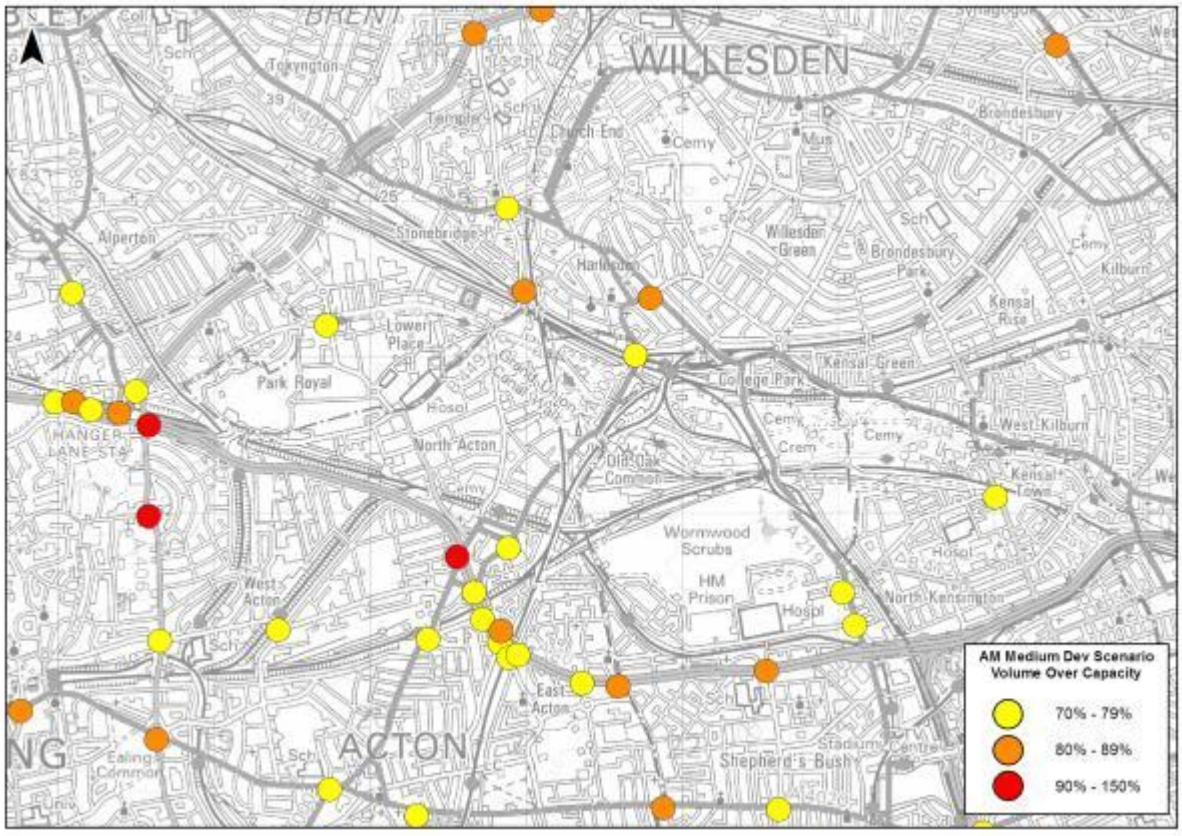


Figure 7-11: Highway network V/C – Planning Scenario 2 AM pk

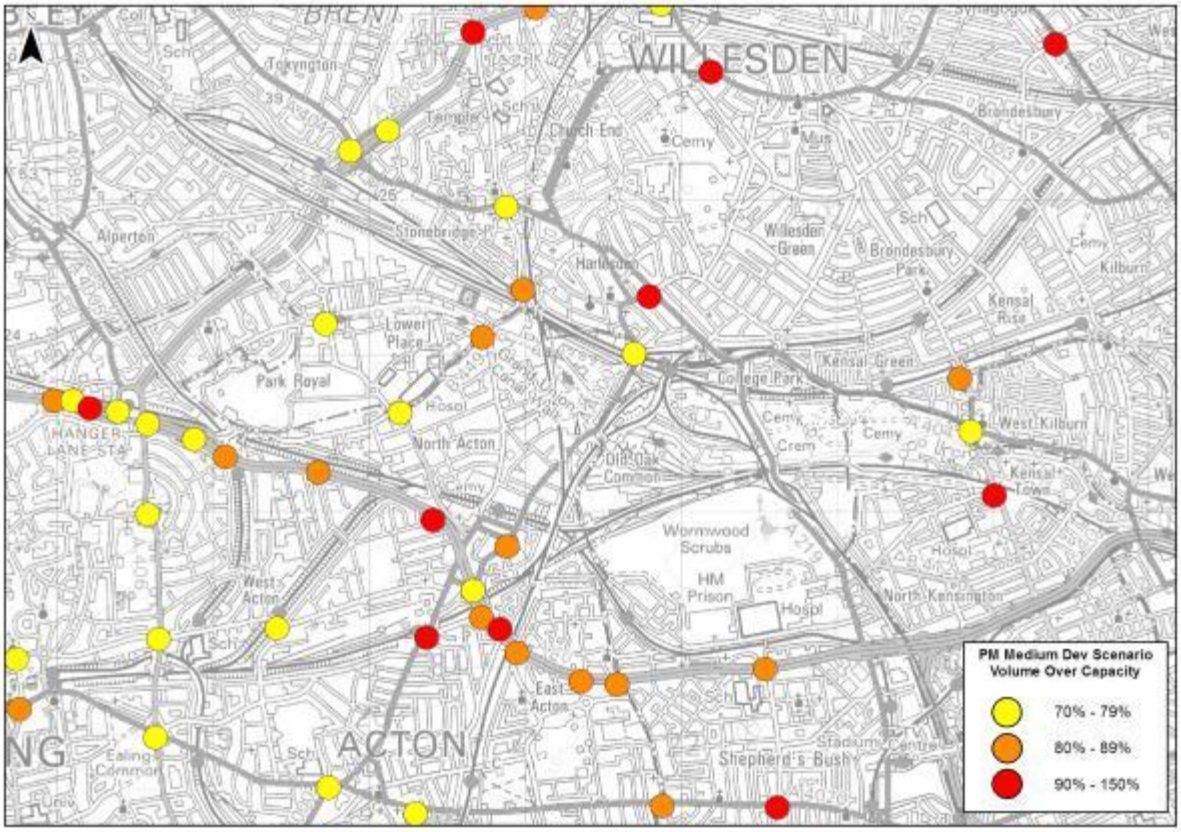


Figure 7-12: Highway network V/C – Planning Scenario 2 PM pk

7.4 Public transport network impact

For the purposes of assessing planning scenario 2, no additional public transport schemes were assumed over and above those included in the 2031 Reference Case.

7.4.1 Rail network performance

Crowding

The level of crowding on the LUL network, in Planning Scenario 2, is shown in Figure 7-13. All analysis is based on the 3 hour peak and there may be instances where crowding will occur within the peak of the peak. When compared to the 2031 Reference Case (Figure 6-13), there is no change to the levels of crowding on the LUL network in the vicinity of the OOCOA. The levels of crowding are forecast to be acceptable, due to capacity enhancements mitigating an increase in demand. For example, the forecast increases in flows eastbound from Old Oak Common are accommodated on the Central line due to planned capacity enhancements which have been accounted for in the assessment.

The level of crowding on the LO and National Rail network, in Planning Scenario 2, is shown in Figure 7-14. When compared to the 2031 Reference Case (Figure 6-14), the levels of crowding increase on Crossrail services eastbound from Paddington to Bond Street, from less than one passenger standing per square metre, to one to two passengers standing per square metre. Passenger crowding on Chiltern Railway services into central London remain consistent with the 2031 Reference Case, still with a projected three to four standees per square metre along large sections of the routes.

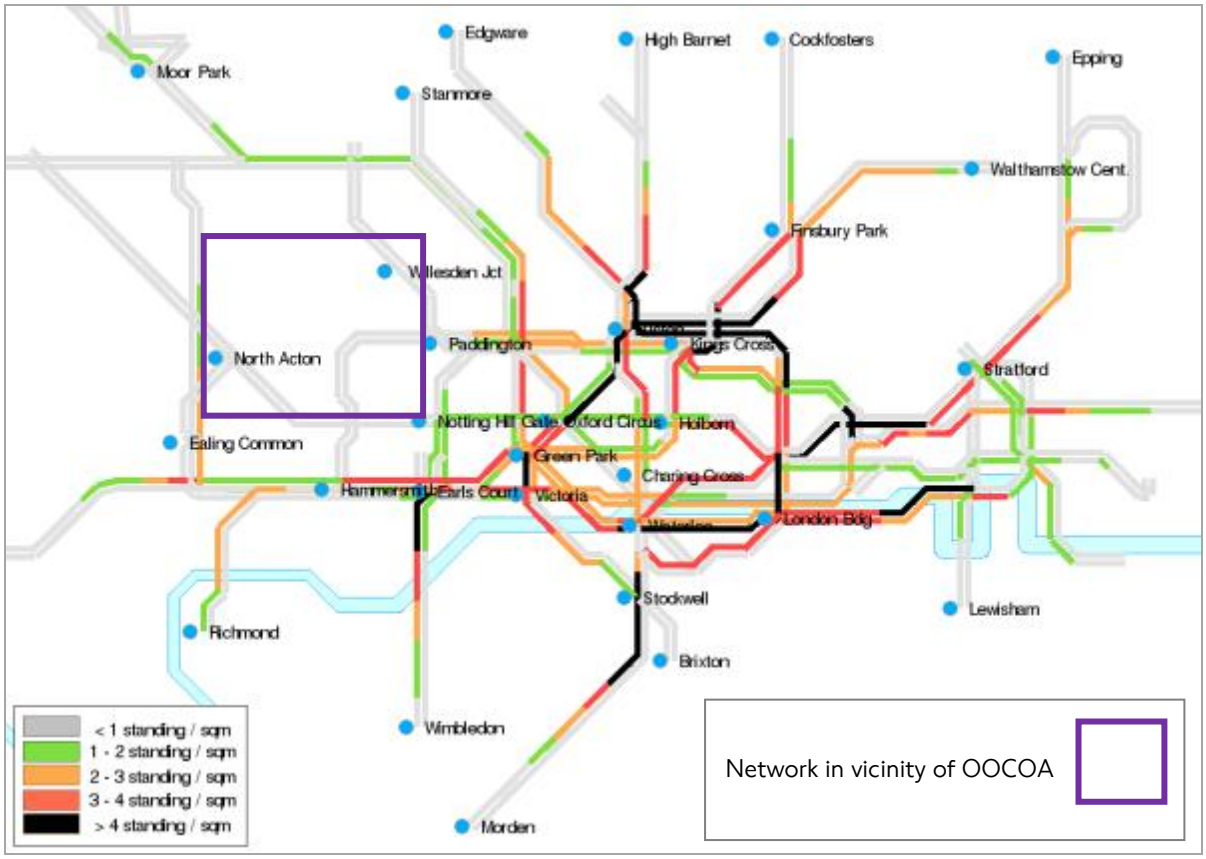


Figure 7-13: Crowding on LUL – Planning Scenario 2

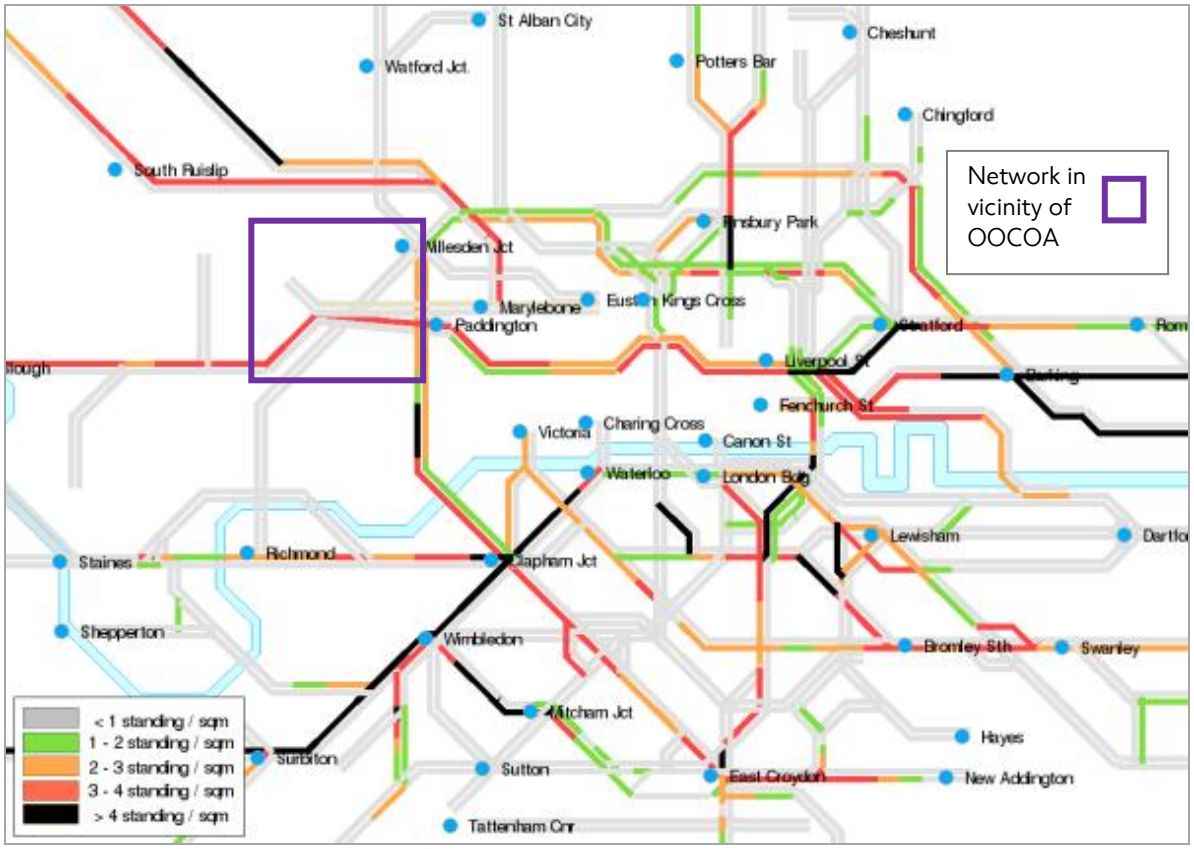


Figure 7-14: Crowding on LO and National Rail – Planning Scenario 2

Station demand

The passenger station demand in Planning Scenario 2, with regard to AM peak (0700 – 1000) entry and exit, is shown in Table 7-4. The overall station movement, which includes passengers interchanging between services, is shown in Table 7-5. The 2031 Reference Case numbers are shown for comparison. There are no changes to network or service provision between the 2031 Reference Case and Planning Scenario 2.

Station	2031 Reference Case		Planning Scenario 2	
	Entry (no. passengers)	Exit (no. passengers)	Entry (no. passengers)	Exit (no. passengers)
Old Oak Common	2,600	4,100	3,500	8,800
Willesden Junction	2,900	2,300	4,600	4,900
Kensal Green	1,900	1,900	2,100	3,500
North Acton	1,300	1,100	2,600	2,600

Table 7-4: Station entry and exit 2031 Reference Case and Planning Scenario 2 AM pk

Station	2031 Reference Case	Planning Scenario 2	% change
	Total station movement (no. passengers)		
Old Oak Common	42,300	47,600	+13%
Willesden Junction	9,700	13,600	+40%
Kensal Green	3,900	5,700	+46%
North Acton	2,400	5,200	+117%

Table 7-5: Total station movement 2031 Reference Case and Planning Scenario 2 AM pk

It is evident that all stations in and around the OOCOA experience an increase in demand, as a result of OOCOA development related trips. This may put pressure upon the operation of existing stations, which are forecast to have an increase in passenger movement of between 40% and over 100%. As with the 2031 Reference Case, the vast majority of passengers using Old Oak Common station are interchanging for HS2 and Crossrail services with 8,800 exiting the station in the morning peak.

7.4.2 Bus network performance

Bus demand, as a proportion of bus capacity, for Planning Scenario 2, is shown in Figure 7-15. The principal change between the 2031 Reference Case and Planning Scenario 2 is the increase in bus usage on routes serving the OOCOA, consistent with the additional trips generated by the development. The change is particularly marked on services connecting the OOCOA with Willesden Junction, North Acton and the HS2 station and significant worsening of bus crowding journey conditions are apparent on the following roads:

- A219 Scrubs Lane, from A40 Westway to Harrow Road, where the passengers to capacity ratio exceeds a value of 1.3 in both directions, indicating demand exceeds available capacity. The southern part of this section was already forecast to be operating at full capacity in the southbound direction in the 2031 Reference Case, however the rest of the section was forecast to be within capacity;
- Old Oak Common Lane, where the load factor reaches or exceeds full theoretical capacity along sections, particularly in the southbound direction. In the 2031 Reference Case, Old Oak Common was forecast to be operating within theoretical capacity;
- A4000 Victoria Road, between North Acton and Old Oak Common Lane, where the services reach full theoretical capacity. Again, this section was forecast to be within capacity in the 2031 Reference Case; and
- A404 Harrow Road, between Ladbroke Grove and Willesden Junction, where although the load factor does not exceed theoretical capacity, an increase is forecast in comparison to the 2031 Reference Case.



Figure 7-15: Bus volume demand to capacity ratio – Planning Scenario 2 AM pk

7.5 Summary of future year with development findings

This section has reported on the forecast nature and operation of a transport network which incorporates medium scale (Planning Scenario 2) OOCOA development. The key findings are summarised below.

Highway network:

Additional traffic generated by Planning Scenario 2 development sees an increase in traffic flow on roads in and around the OOCOA, notably so on Old Oak Common Lane, A4000 Victoria Road and sections of the A40. An adverse impact is also anticipated upon a high number of junctions, with significant increases in delay. Volume over capacity ratio analysis indicates that the highway network is, in general, under a similar level of operational stress to the 2031 Reference Case, with approaches to Gypsy Corner, Hanger Lane Gyratory and the A406 North Circular Road forecast to have a V/C ratio of over 90%. However, under the development scenario, additional locations are also forecast to be approaching or over theoretical capacity during peak periods of the day. Overall, the operation of the highway network is forecast to deteriorate, and by a significant amount at certain key locations, to the point that it is unlikely the network could operate satisfactorily without intervention.

Rail network:

Given the committed capacity upgrades and introduction of HS2 and Crossrail services prior to the development, the impact of OOCOA upon crowding levels is not significant across the majority of the rail network. However, there is an anticipated increase in crowding on eastbound Crossrail services from Paddington to Bond Street. Crowding levels, as with the 2031 Reference Case, are relatively high (three to four standees per square metre) along sections of the WLL, Chiltern Railway services and Crossrail.

All rail stations immediately serving the OOCOA are forecast to see a significant increase in use, of between 40% and over 100% for existing stations. This may have a significantly adverse impact upon station operation without suitable mitigation.

Bus network:

Under Planning Scenario 2, there is forecast to be an increase in bus patronage on key bus routes serving the area to, at some locations, levels whereby they are over theoretical capacity. These include A219 Scrubs Lane, Old Oak Common Lane and A4000 Victoria Road. This indicates there is a likely requirement to improve bus service provision in the area in order to accommodate the forecast demand.

Conclusion:

The projected increase in trips generated by the Planning Scenario 2 (and indeed natural background growth) is forecast to cause significant issues on the local and strategic highway network serving the development. These will need to be addressed through mitigation if this level of development is to be feasible and considered acceptable. It is also recognised that appropriate access and egress arrangements and provision will need to be in place to enable traffic to effectively enter and exit the OOCOA and distribute across the wider network. Traffic generated by construction activities was not considered specifically and will need to be the subject of a separate piece of work.

Whilst crowding levels on the rail services serving the area remain similar to the 2031 Reference Case, there are some sections which are relatively crowded, whilst significant increases in station usage are anticipated. The current lack of local connectivity between the OOCOA and public transport services is a key issue which needs to be addressed. Given there is forecast to be some spare capacity on the public transport network in this area , it is suggested that a package of interventions centred on encouraging the use of more sustainable travel modes, if managed carefully, could be an effective way of helping to mitigate the impact on the highway network.

The issues identified in this section have highlighted where improvements to the transport network may be needed in order to accommodate a development of this scale. At this initial stage it was assumed that there were no demand management measures such as restricted parking or other measures to influence modal choice in place. Consequently, a package of measures to reduce highway traffic associated with the development and improve local connectivity has been developed and tested. This is considered in more detail over the following sections of this report.

8 Proposed transport interventions to support future development

8.1 Option appraisal process

A comprehensive list of transport interventions were identified and developed through a review of evidence with key stakeholders and the application of specialist knowledge and analysis, to mitigate the forecast impact of the Planning Scenario 2, as detailed in Section 7.

The appraisal process for intervention is shown in Figure 8-1 and is aligned with both TfL's Strategic Assessment Framework criteria and the OOCOA objectives.

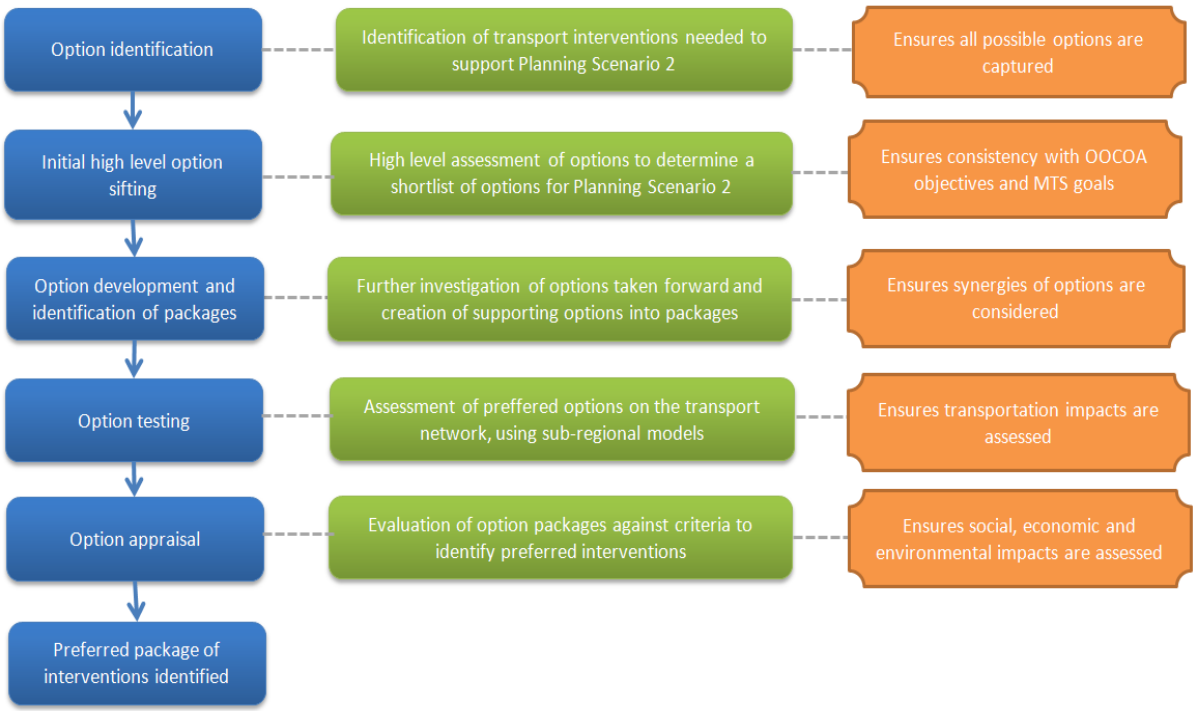


Figure 8-1: Intervention option appraisal process

The transport interventions identified in this section focus on the promotion of sustainable and active modes to accommodate the development related growth and the additional demand generated by HS2. The options include large scale schemes to cater for the onward dispersal of passengers and smaller scale initiatives to improve bus facilities and increase pedestrian and cycling permeability, through the provision of new walking and cycling links to and through the station and OOCOA, improved way-finding, legibility and urban realm. The options are detailed within this section, with potential benefits and dis-benefits identified, whilst also being assessed against the Old Oak Common and MTS objectives.

8.2 High level sifting of interventions

Initially, a substantial list of all potential interventions was produced for consideration. A high level shifting process was carried out, to determine if each of these were:

- Consistent with the MTS goals;
- Consistent with the OOC transport principles;
- Acceptable: Consistent with Stakeholder, community and political aspirations; and
- Deliverable: In terms of cost and implementation (at a conceptual level of investigation).

Based on this assessment, a package of interventions, which met this criteria, were taken forward for further investigation and assessment as part of this Transport Strategy.

8.3 Intervention categories

The interventions which met the initial high level criteria fall under the categories listed below and have been assessed using a combination of quantitative and qualitative methods, as outlined in Section 9.

- Highway interventions;
- Managing travel demand;
- Increasing rail capacity and improving rail connectivity;
- Improving bus and other public transport facilities;
- Future proofing for appropriate freight services;
- Improving pedestrian accessibility, wayfinding and urban realm; and
- Improving cycle accessibility and facilities.

8.4 Proposed interventions

The interventions proposed to mitigate the impact of OOCOA development on the transport network are described below. The options tested do not necessarily represent the Old Oak Common partners' preferences and includes a wide variety of interventions in order to ensure that the Study optioneering process is robust and thorough. The optioneering process has been iterative and interventions have been proposed through developing the OAPF and the DIFS which have not been specifically tested as part of the study. They will need to be subject to testing at a more localised level.

8.4.1 Highway interventions

At present, there are limited opportunities to access the OOCOA and very little in terms of an internal road network. The current highway infrastructure is not considered suitable to accommodate the large scale of development proposed and, therefore, the provision of new accesses and an internal road network is considered necessary. As such, the highway interventions proposed, focus primarily on the effective and efficient distribution of development traffic within the OOCOA. The aim is to mitigate any adverse impact of the development traffic and provide multiple points for entry and exit to the OOCOA.

The following interventions are proposed:

- Eastern access from A219 Scrubs Lane;
- Western access from Old Oak Common Lane;
- Western access from A4000 Old Oak Lane;

- Internal roads and junctions including two new bridges over the canal;
- New bus, pedestrian / cycle only link to HS2 Crossrail hub;
- Victoria Road widening; and
- Highway 'quick wins'.

Eastern access from A219 Scrubs Lane

The development of the OOCOA will lead to a rise in demand for access to the site from the A219 Scrubs Lane. The provision of a new access from the east into the development would reduce pressure on an already congested Old Oak Common Lane to the west. Analysis undertaken has demonstrated that the existing access via Hythe Road cannot accommodate the forecast increase in demand. As such, the provision of a new gateway access into the site is considered necessary. This would require improvements to A219 Scrubs Lane and a new underpass to overcome the severance caused by the presence of existing railway National Rail lines. It is proposed that the existing Hythe Road exit would be upgraded and retained as a bus, pedestrian, cyclist and station traffic only road to serve the OOCOA and the HS2/ Crossrail hub. It would also be available for use by emergency vehicles.

The proposal for two accesses from the east is considered sufficient to service the increase in demand from the OOCOA and to provide necessary network resilience in the event of an incident or a closure.

High level scheme appraisal:

✓ Provides gateway access from Scrubs Lane.

✓ Reduces congestion on the surrounding highway network.

✓ Reduces pressure on Old Oak Common Lane.

✓ Provides resilience to the access on to Scrubs Lane in the event of an incident or closure.

✓ Important in providing through routes suitable for buses

✘ The cost of the railway underpass would add significant infrastructure cost to the project.

Western access from Old Oak Common Lane

Analysis undertaken demonstrated that the existing access on Old Oak Common Lane does not have sufficient capacity to service the forecast increase in demand generated by the Planning Scenario 2. It is therefore considered that the provision of a new access onto Old Oak Common Lane to enhance capacity will help mitigate this issue.

High level scheme appraisal:

✓ Provides gateway access from Old Oak Common Lane.

✓ Reduces congestion on the surrounding highway network.

✓ Reduces pressure on Old Oak Common Lane.

✓ Provides resilience to the western access for the development in event of incident or closure.

✘ Requires agreement with Network Rail for change in layout and access arrangement

Western access from A4000 Old Oak Lane

The development of the OOCOA will lead to a rise in demand for access from the A4000 Old Oak Lane. Currently, there is no direct access to the area from the A4000 Old Oak Lane. The proposal involved provision of a new access to the north-west part of site, by realigning the A4000 Old Oak Lane and removing existing rail sidings under the ownership of Network Rail. This access would act as a gateway to the development and provide resilience in the event of an incident or closure to the other access. However, the loss of rail sidings would require a replacement facility to be found nearby and a formal process for disposal of rail land would need to be followed. There would also be significant visual impact for adjacent properties and therefore this option should not be taken forward and further options for improving access from the west should be considered as an alternative.

High level scheme appraisal:

✓ Reduce congestion on the surrounding highway network.

✓ Provides resilience to the western access for the development in event of an incident or closure.

✓ Potentially enhance the quality of life for local residents.

✘ The realignment of A4000 Old Oak Lane and provision of a railway over bridge will add significant infrastructure cost.

✘ Significant visual impact on adjacent properties due to need for banking and elevation of highway structure.

✘ Loss of rail infrastructure

Internal roads and junctions

The internal circulation of traffic is considered critical to the successful operation of the OOCOA. The current network of internal roads needs to be significantly upgraded and expanded to cover the whole of the OA, to enable the effective and efficient distribution of traffic. This will involve the provision of new road links, junctions and canal and railway

bridges to facilitate the creation of a new internal road network. The western canal bridge will be open to all vehicles and the eastern canal bridge will be available for buses, cyclists, pedestrians and station access.

High level scheme appraisal:

- ✓ Improve connectivity.
- ✓ Reduce congestion on the surrounding highway network.
- ✓ Potentially enhance the quality of life for local residents.
- ✗ The canal and railway bridges will add significant infrastructure costs to the project.

New bus, pedestrian, cycle and station traffic only link to HS2 Crossrail hub

It is recognised that the new HS2/ Crossrail transport hub will attract a significant proportion of the trips to the OOCOA from the east via the A219 Scrubs Lane by all modes of travel. Therefore, an eastern access to HS2/ Crossrail hub is considered essential to service and distribute this demand. The proposal involves the provision of a new bridge over the canal to improve the permeability of the site and to overcome the severance caused by the presence of the canal. In order to limit the potential for rat-running through the site and unnecessary congestion it is proposed that this link would not be made available for private through traffic other than those vehicles wanting to access the station.

High level scheme appraisal:

- ✓ Improve connectivity.
- ✓ Enhances network resilience.
- ✓ Reduces overall congestion on the surrounding highway network.
- ✓ Reduces journey times for HS2 Crossrail hub users.
- ✓ Potentially enhance the quality of life for local residents.
- ✗ The canal bridges will add significant infrastructure cost to the project.

Victoria Road widening

Victoria Road will act as a key route for development traffic accessing the OOCOA from the west. Widening Victoria Road would add more capacity and make it the main access route from the A40 to the Opportunity Area, thereby also reducing pressure on Old Oak Common Lane. HS2 Ltd is proposing widening of Victoria Road although there may need to be further improvements to provide access to development at Old Oak Common and so it has only been modelled as part of a package of interventions rather than being included in the 2031 Reference Case.

High level scheme appraisal:

- ✓ Improve connectivity.
- ✓ Enhances network resilience.
- ✓ Reduces overall congestion on the surrounding highway network.
- ✓ Reduces journey times for HS2 Crossrail hub users.
- ✓ Improves access by public transport.
- ✓ Potentially enhance the quality of life for local residents.
- ✓ Reduces pressure on Old Oak Common Lane.

Highway 'quick wins'

A number of minor highway interventions are proposed. These are considered to be 'quick wins', as they do not require significant land take or major construction. Improvements include optimising local signals and changing lane allocations at locations where certain movements were forecast to be operating at or near capacity.

8.4.2 Managing travel demand

A main focus of proposals to support the OAPF and mitigate the impact of the related traffic impact has been on improvements to sustainable and active travel modes rather than wide-ranging increases in highway capacity.

A 'target based' approach has been applied, whereby a package of measures to achieve a very low car mode share have been identified, as it is recognised that this will be needed to help facilitate the level of development proposed on site.

The following interventions are proposed:

- Promoting sustainable urban mobility;
- Zonal access; and
- Residential and workplace travel plans to support new development.

Promoting sustainable urban mobility

Sustainable residential and workplace travel will be encouraged through targeting a low car mode share for the site, including restrictive parking standards for all land uses (car-free for the commercial and very low provision for the residential element), integrated travel solutions and real time information. This is accompanied by a supporting package of walking, cycling and public transport improvements as detailed later in this Section.

The combination of these measures will help reduce peak hour traffic levels by both restricting people's ability to drive to the site through the lack of suitable parking facilities, but also by encouraging the uptake of walking, cycling and public transport. The use of car clubs can also reduce dependency on private vehicle ownership. The viability of these services is dependent upon achieving high levels of utilisation, and therefore any development at Old Oak Common should consider the potential for and promotion of car

club services as part of the residential aspect of the development, as an alternative to providing private car parking spaces.

High level scheme appraisal:

- ✓ Low cost and effective solution to promote sustainable and active modes.
- ✓ Instil sustainable travel patterns and culture from the outset.
- ✓ Encourages a range of alternatives to private vehicle use, which reduces demand on the highway network

Zonal access

The introduction of zonal access aims to minimise rat running by vehicular traffic across OOCOA, by restricting through movement by unsuitable traffic and limiting access within individual development zones to residents, visitors and servicing vehicles.

High level scheme appraisal:

- ✓ Manages vehicular traffic through the OOCOA, by reducing rat running and therefore relieves pressure on the internal highway network.
- ✓ May encourage alternative and more sustainable means of travel throughout the OOCOA, thus reducing demand on the highway network

Residential and workplace travel plans to support new development

Travel plans should be encouraged, or made a condition of planning approval, to support new development in the OOCOA. A travel plan is a long term management strategy which encourages sustainable travel for new and existing developments. It sets out transport impacts, establishes targets and identifies a package of measures to encourage sustainable travel i.e. secure cycle parking, car sharing and travel information packs. This will help reduce the demands on the surrounding highway network and promote a more active means of travel.

High level scheme appraisal:

- ✓ Promotes sustainable and active modes.
- ✓ Instil sustainable travel patterns and culture from the outset.
- ✓ Encourages a range of initiatives to reduce demand on the highway network

8.4.3 Increasing rail capacity and improving rail connectivity

The arrival of HS2/ Crossrail along with the OOCOA related development will lead to increased demand for existing public transport services at Old Oak Common. Whilst most

lines which pass through the area are not projected to suffer from a significant increase in congestion due to planned capacity enhancements, the analysis which has been undertaken suggests that LO services, especially on the WLL may come under increased pressure, as may North Acton and Willesden Junction stations. The provision of new and improved pedestrian connections may also increase the demand for rail and underground services in some areas.

The following interventions are proposed:

- Willesden Junction station capacity enhancements;
- North Acton station capacity enhancements;
- LO capacity enhancements;
- Provision of a new LO station on the NLL and WLL; and
- Provision of a Crossrail 1 to WCML spur.

Willesden Junction station capacity enhancements

At Willesden Junction, a major rebuilding of the station will be required to cater for development related trips and to act as a focus for development in the north of Old Oak. The details of the design will be impacted by the precise nature of the proposals for redevelopment in the area, and the potential need to cater for passenger traffic associated with events. The rebuilt station will need to offer improved interchange between LUL and LO services, accessibility improvements, better connections with buses and high quality pedestrian links to the surrounding streets. Walk and cycle routes in and around the station will be improved in width and quality to cater for increased passenger numbers. A new bridge over the West Coast Main Line will be needed to connect Old Oak North to Willesden Junction station. The feasibility of the bridge being built to a standard capable of accommodating buses will be the subject of a separate study.

High level scheme appraisal:

✓ Enables better utilisation of capacity on LO and Bakerloo line services.

✓ Increases step free journey opportunities on the LUL network.

North Acton station capacity enhancements

As well as improved access arrangements, works at North Acton to accommodate the predicted increase in passenger numbers is likely to require improved entrances and ticket hall, a new footbridge, new stairs and lift access. LUL has completed a study looking into potential options for improvement. The preferred option and design will be dependent on funding and more detailed station modelling. There is also the possibility of a more substantial redevelopment which could allow for new structures to be built above the station.

High level scheme appraisal:

✓ Increases access to the Central line in the area, to provide more Tube travel for local trips that supplements central London links provided by Crossrail.

✓ Complements existing proposals by LBE, for improving the urban realm around the station.

✓ Increases step free journey opportunities on the LUL network.

LO capacity enhancements

Increases in frequencies are proposed to address the severe crowding on the LO network (especially the WLL). This results in 4 trains per hour (tph) from Richmond to Stratford and 6tph from Clapham Junction to Stratford, or 10tph from Willesden Junction to Stratford. At present, this is considered to be the highest frequency you can achieve due to other constraints on the line, such as the presence of freight trains. This is now a committed scheme in the TfL Business Plan. Train length is assumed to remain at 5 carriages as in the 2031 reference case and planning scenario 2.

High level scheme appraisal:

✓ Provides some additional capacity on the network.

✓ Improves quality of journeys on the LO.

✗ May not fully address all issues of overcrowding on the LO network.

Provision of new LO stations on the NLL and WLL

Following the Government's announcement to proceed with a HS2 station at OOC, TfL has been petitioning for the provision of new LO stations at Old Oak Common in order to enhance local and regional connectivity and to help provide additional public transport options for the onward movement of passengers alighting HS2 at Old Oak Common. It is TfL's view that connecting the LO to the Old Oak Common interchange could provide additional benefits for the area, enabling the OOCOA and west London economy to gain from HS2 and Crossrail connectivity.

At the time of the study, three options for locating new stations were under consideration. For the purposes of this study, Option A was modelled as the preferred option, as that was the case at the time following the conclusions of the GRIP 2 report. However, there is little difference in the transport impact of the different options. Following the conclusion of the GRIP 3 report and the results of public consultation, option A has now been rejected in favour of Option C (see section 6.3.5.). As well as providing enhanced connectivity, new LO stations would also help facilitate the regeneration of the site by providing additional public transport provision. Option C is particularly beneficial in this respect.

High level scheme appraisal:

- ✓ Improves the north/ south accessibility of the site
- ✓ Brings up to 250,000 additional people within an hour of the job opportunities being created at OOC.
- ✓ Improves access from the HS2 station by sustainable modes of travel.
- ✓ Provides journey time savings
- ✓ Removes 10% of HS2 passengers from Euston, reducing crowding in central London
- ✘ Exacerbates issues of overcrowding on the WLL.

Provision of a potential Crossrail 1 to WCML spur

A potential new spur from Crossrail to the WCML has been proposed, as shown in Figure 8-2. This would have the benefit of providing improved connections across north-west and west London and between the WCML and the west, east and central London. It would lead to a reduction in the number of trains arriving/ departing Euston Station, resulting in a corresponding reduction in passenger congestion at Euston. This is an important consideration as Euston already suffers from congestion at peak periods and this is expected to worsen with the arrival of HS2 services. It could also provide access to potential sites for the full or partial relocation of the Crossrail depot. Decisions on whether to take the project forward will depend on a positive business case and consideration of wider strategic issues including the impact on users of the WCML.

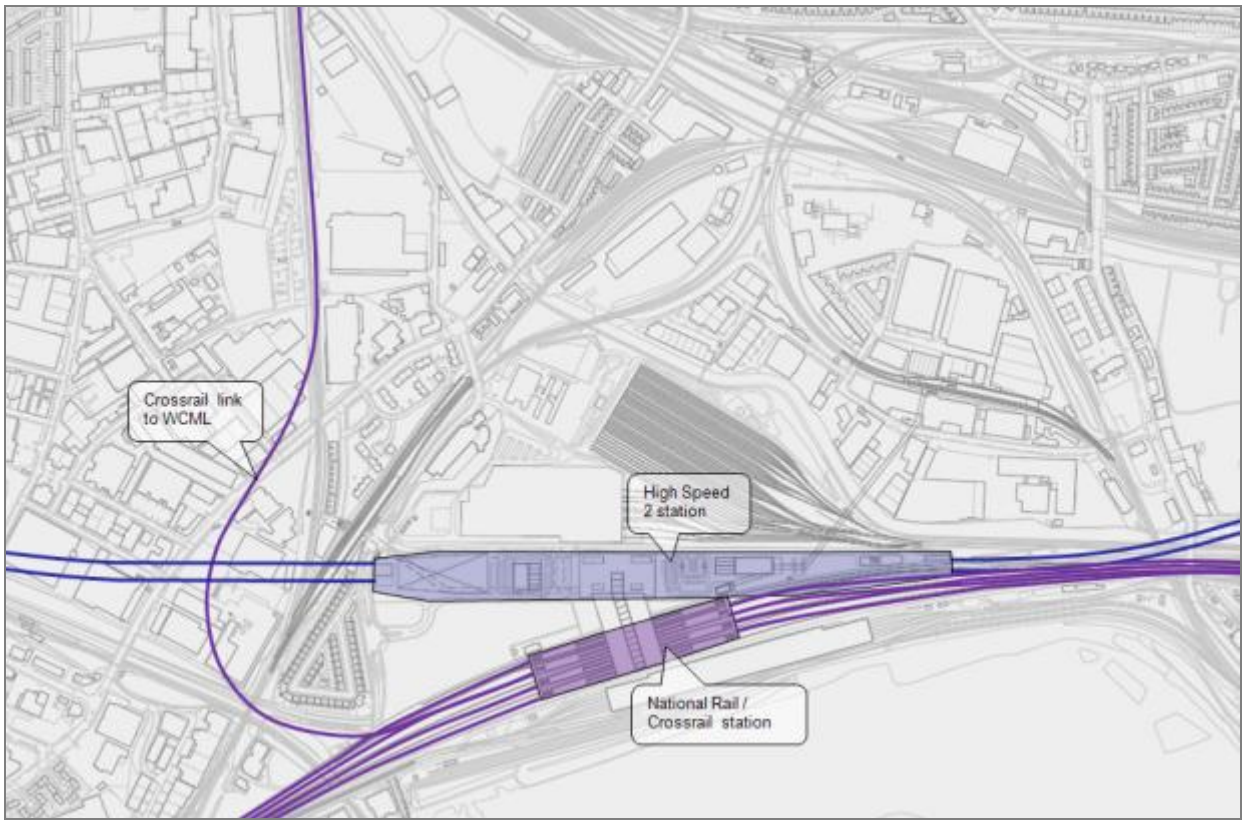


Figure 8-2: Potential Crossrail to WCML spur (preferred option at GRIP 2)

8.4.4 Improving bus and other public transport facilities

Additional bus stops and stands, with good interchange between bus and rail, will be required to meet the demand from HS2 and the OOCOA related development. New and extended bus routes through the OOCOA will also be required to help facilitate regeneration and bring all future residents within an accessible distance of 400 metres of a bus stop. Helping to promote onward travel by bus will also help reduce the potential for overcrowding on other modes, in particular the LO (WLL). Whilst a new bus station is being proposed as part of the HS2 works, the introduction of the OOCOA related development shifts the focus of the site, and means that in the future, demand will be spread out across the whole of the OOCOA rather than being concentrated around the HS2 station.

The regeneration of Old Oak Common provides the opportunity to completely review the bus network in the area to ensure that it is fit for purpose. This is considered important given that the current land uses on site generate limited demand for buses, which will completely change with the number of new homes and jobs being proposed. As development on the site is planned to be phased, it will be important to ensure that the bus network responds to growth over time to ensure that any new routes proposed are serving the local population and going where people want to go. This means that services will be subject to review and may evolve over time.

New infrastructure, in particular new crossings over the canal, will be required to help support the development of the bus network. Appropriate supporting infrastructure such as bus stops, stands and driver facilities will also be needed. Other public transport facilities such as new taxi ranks will also be required to serve the site.

The following interventions are proposed:

- New bus routes and infrastructure serving the development (including bus stops, stands and drivers' facilities); and
- Suitable provision of taxi ranks.

New bus routes and infrastructure serving the development

The introduction of OOCOA related development will significantly alter the demand for bus services in the area, in particular north of the canal where there will be increased demand against both the current situation and the reference case, where a HS2 station is in operation.

To accommodate this increase in demand, it will be necessary to recast the bus network in this part of London, and introduce new and extended bus routes across the site. This increase in bus services will also require the provision of new supporting infrastructure such as bus stops, stands and driver facilities. Whilst these issues will need to be considered in more depth at the detailed design stage and with detailed discussion with London Buses, it is important that that they are built into the masterplan now, as they will require sufficient space to be made available for their provision. The actual bus routes would, however, need to be determined at a later date following review of the bus network operating in the wider area, and what form new development, particularly north of the canal, takes. There may also be a case for a bridge connection north over the West Coast Main Line tracks to Willesden Junction station suitable for buses. Further work will be needed to examine this option

including costs and feasibility. At present, however, it is anticipated that there would be at least six bus routes running to/ through the site, and that these would take the form of both new and extended services. Sufficient standing space for terminating services will also need to be identified. Bus stops will be provided throughout the site and, as aforementioned, be located a maximum distance of approximately 400m apart.

High level scheme appraisal:

✓ Improve accessibility across the site.

✓ Provides some additional capacity on the bus network and relieves pressure on the highway network by private car journeys.

✓ Improves access from the HS2 station by sustainable modes of travel.

✓ Likely to improve quality of journeys on the bus network.

✘ The future bus network is not yet known.

✘ New standing space will have to be found in the public realm.

Suitable provision of taxi ranks

A new taxi rank will be provided as part of the HS2 station proposals. For the wider area, suitable provision for taxis will need to be built into the emerging development proposals. This will involve drop-off/ pick up facilities being available throughout the site, as well as the provision of new taxi ranks where appropriate such as in locations with high concentrations of leisure and office floor space.

Sufficient space should be provided so that passengers can safely board and alight taxis. Trying to combine the drop-off and pick-up areas may result in taxis not being able to reach the kerbside, due to the space already being occupied and passengers then having to board or alight in the carriageway. This is potentially dangerous, and can be particularly problematic for disabled passengers if a wheelchair ramp cannot be safely deployed. Issues such as this will need to be taken into account as part of the detailed design process.

High level scheme appraisal:

✓ Improve accessibility and connectivity to the HS2 station and key developments on the site.

✓ Caters for onward journeys from HS2 to the locality.

✘ May contribute to pressures on the highway network.

✘ Suitable design and standing space will have to be found in the public realm.

8.4.5 Future proofing for appropriate freight services

With the amount of residential and commercial development planned within the OOCOA, there will be a corresponding increase in the amount of construction traffic and the number of servicing trips to and from the area. Setting out a framework to manage both construction

logistics and servicing activity will help minimise the impacts and reduce the number of vehicles in the area and associated pressure on the highway network.

The following interventions are proposed:

- Adoption of a site-wide Construction Logistics Strategy
- Requirement for site-specific Construction Logistics Plans (CLPs)
- Consolidation centre(s);
- Provision of Delivery and Servicing Plans (DSPs);
- Re-timing deliveries to outside of peak periods; and
- Concierge services.

Construction Logistics

Although the high level modelling has not explicitly considered construction transport, the level of congestion justifies the adoption of a Construction Logistics Strategy that aims to minimise the impact on the highway network. This will include encouraging reuse and recycling of materials on site, use of rail and water transport where possible and the adoption of good practice in road based transport. Alongside a site-wide strategy, individual developments will need to be supported by CLPs that are in conformity with the site-wide framework.

High level scheme appraisal:

✓ Reduce traffic levels and associated pressure on the highway network.

✓ Reduce the danger to pedestrians and cyclists from HGVs

✓ Reduce emissions of harmful exhaust gases from construction vehicles.

✓ Exploits the potential for use of rail and water transport.

✘ Requires ongoing project management resources and commitment.

Consolidation centre(s)

The provision of a consolidation centre or centres would involve logistics facilities situated in relatively close proximity to the OOCOA, where goods could be transferred between vehicles to reduce net vehicle kilometres on the final delivery leg. This could serve construction transport needs as well as catering for deliveries. Opportunity to coordinate this proposal with any similar facilities or arrangements planned by HS2 Ltd should be investigated.

High level scheme appraisal:

- ✓ Reduce peak hour traffic levels and associated pressure on the highway network.
- ✓ Reduce emissions of harmful exhaust gases during the busiest periods.
- ✓ Reduce the danger to pedestrians and cyclists from HGVs
- ✓ The area lends itself as a suitable location for a consolidation centre.
- ✘ Short-term loss of land for development.

Provision of Delivery and Servicing Plans (DSPs)

DSPs can help encourage off-peak deliveries and servicing, thus reducing pressure on the highway network during busy periods of the day. Freight journeys can be reduced by changing practices in terms of the way materials and supplies are ordered at the site and the management of the delivery process. A booking system could also be introduced, which would assist in preventing vehicles from queuing to access the site, reducing traffic disruption and delays. Whilst a site wide DSP Framework could be developed, these will ultimately need to be secured for individual developments by condition.

High level scheme appraisal:

- ✓ Reduce peak hour traffic levels and associated pressure on the highway network.
- ✓ Reduce emissions of harmful exhaust gases during the busiest periods.
- ✓ Reduce the danger to pedestrians and cyclists from HGVs
- ✘ On-going costs for enforcement.

Re-timing deliveries to outside of peak periods

Through the use of DSPs and other measures, effort should be made for all deliveries to the site to be made outside of the peak periods and, where feasible, overnight, in order to limit the impact on the surrounding highway network. To help facilitate this, consideration will need to be given to the future design of buildings which are proposed (particularly residential) to ensure that out of hours deliveries can take place without causing any amenity issues.

High level scheme appraisal:

- ✓ Reduce peak hour traffic levels and associated pressure on the highway network.
- ✓ Reduce emissions of harmful exhaust gases during the busiest periods.
- ✓ Improved perception of the public realm/ amenity space during the day.
- ✘ On-going costs for enforcement.

Concierge services

It is proposed that new residential buildings have a concierge service, or a communal drop-off point, so that deliveries can be made when people are not home. This will reduce the number of unnecessary journeys that have to be made to one delivery per item, which will reduce the impact on the highway network, as well as providing environmental benefits.

High level scheme appraisal:

✓ Reduce peak hour traffic levels and associated pressure on the highway network.

✓ Reduce unnecessary journeys on the highway network.

✓ Reduce emissions of harmful exhaust gases.

✖ Responsibility for the introduction of a scheme of this kind will need to be clarified.

8.4.6 Improving pedestrian connectivity, wayfinding and urban realm

The OAPF aims to change the nature of Old Oak Common from an old industrial area which is not well frequented by visitors, to a vibrant new part of London that is a destination in its own right as well as being an important new transport hub. The aim is to make it a place people want to go and spend time, with lots of movement and activity at street level. The current industrial nature of the site does however cause problems, as the OOCOA is currently dominated by railway lines, tunnels and bridges, along with the canal, all of which act to sever the site. Reducing this severance and increasing pedestrian permeability throughout the OOCOA, through the provision of improved links and connections, is a key objective of the Transport Strategy, and should help to facilitate the anticipated increase in walking arising from the OOCOA related development and arrival of HS2.

The following interventions are proposed:

- Create a new network of streets and improve pedestrian permeability and connectivity; and
- Improve pedestrian wayfinding.

Create a new network of streets and improve pedestrian permeability and connectivity

There is currently a lack of pedestrian facilities available on site, and few footways of a desired standard. This issue needs to be addressed if the site is to become a major new destination in London. The proposals include the introduction of an extensive new pedestrian network through the site with appropriate facilities. These include formal and informal crossing points, infrastructure improvements such as new connections over the Grand Union canal and existing railway lines, and measures to promote walking such as designated routes and facilities, the introduction of Legible London wayfinding signage, public realm improvements and measures to address safety (both real and perceived).

Primary new pedestrian connections are proposed to North Acton, Wormwood Scrubs, Kensal, and along the north side of the canal. Major new north/ south and east/ west routes

are also proposed. These new links will ensure the site is permeable, brings people into the area, and encourages the use of more active modes, alongside integrating the OOCOA into existing communities. It is considered that a finer grain network will also be developed as individual development plots are built out.

When considering the future pedestrian network at the detailed design stage, especially for individual development plots, the following design principles should be taken into account:

- Clear sight lines along all pedestrian routes;
- Selected use of tall buildings to help assist with pedestrian orientation and navigation;
- Preference for segregated pedestrian and cyclist facilities, especially around highway environments and in areas of high flows. High volumes of pedestrians and cyclists make the successful use of shared routes (e.g. canal towpaths) more problematic;
- The more legible the development pattern is, the easier it will be to navigate around the site and there will be less need for formal wayfinding facilities;
- Lots of crossing opportunities (both formal and informal) should be provided throughout the development;
- There is a need to have active frontages on buildings wherever possible, to help support natural surveillance;
- There would be a desire to provide opportunities for pedestrians to make their own routes through the site through the provision of some unstructured pedestrian networks. A pattern of development made up of lots of little blocks may help encourage this;
- People will generally walk a maximum of 1-2 km and, beyond this, the level of walking declines significantly. Below 1km, however, walking is almost always the dominant mode, so providing pedestrians with walkable environments and good access to a high frequency public transport network will help support the site-wide policy of low car use; and
- Shared surfaces could be considered, if the built environment supports this e.g. very low car use and low speeds.

High level scheme appraisal:

✓ The proposed connections would strongly encourage walking for journeys through the area and to the station through the provision of new links and bridges.

✓ Proposed pedestrian routes would naturally improve the public realm and encourage improvements in streetscape i.e. lighting and street furniture

✓ Improved Pedestrian Comfort Levels.

✓ Improved crossing facilities.

✓ Improved north/south, east/west permeability across the OOCOA.

Improved pedestrian wayfinding

At present, there is a lack of desirable pedestrian facilities on the site, whilst wayfinding is non-existent. Given the development aspirations for the OOCOA and the introduction of a new transport hub, high footfall is forecast, with many pedestrians unfamiliar with the local area. The arrival of HS2/ Crossrail services, in particular, will increase the number of visitors and so schemes which improve people's ability to navigate the area by foot or bicycle will be critical, both to reduce pressure on the public transport network and to promote active sustainable travel.

In this regard, the implementation of a consistent wayfinding strategy, such as Legible London totems and fingerposts, is proposed. A wayfinding strategy is a fundamental element of the approach to encourage walking across the site, and should also complement any proposals for new links and urban realm enhancements. The wayfinding provided should include signage to local public transport services, sites where the heaviest footfall is anticipated and other key attractions of the area.

High level scheme appraisal:

- ✓ Promotes walking, especially amongst new and occasional visitors who may be less familiar with the area.
- ✓ Supports onward journeys from transport hubs by foot.
- ✓ Creates a high quality streetscape and a positive impression of the OOCOA.
- ✓ Can create a harmonious approach to wayfinding currently employed across the TfL estate including the LUL, buses, DLR and the LO.

8.4.7 Improving cycle accessibility and facilities

At present, there is limited opportunity to cycle through the OOCOA. This is primarily due to a lack of dedicated facilities and severance caused by the presence of railways and other infrastructure. However, in future there will be opportunities to improve facilities along the Grand Union Canal corridor and to provide links to the proposed Cycle Superhighway along the A40 corridor.

The *Mayor's Cycling Vision* sets out plans for substantial and transformative change in provision for cycling in London. Given the current level of cycling through the site and the predicted growth in future volumes of cyclists, it is vital that appropriate facilities are in place, and that all movements are made as safe and comfortable as possible. In particular, the potential for conflicts between cyclists and other road users should be minimised.

The following interventions are proposed:

- High quality infrastructure and facilities for cyclists across the site to the standard, or surpassing that, adopted in mini-Holland schemes;
- Links to planned facilities and the wider network; and
- Provision of publicly accessible, high quality, cycle parking.

High quality infrastructure and facilities for cyclists

To help facilitate an increase in cycling at Old Oak Common and to achieve an above MTS mode share target for cycling by the time the development is fully built out, a number of options for improving conditions for cyclists were identified. The aspiration is to adopt a standard similar to, or surpassing, the mini-Holland schemes being implemented elsewhere in London. These include the provision of new cycle routes, safety measures, junction improvements both on and off-site, improved connections to the proposed east-west Cycle Superhighway along the A40, improved connections along the Grand Union Canal, and the provision of publicly accessible cycle parking throughout the site. It is recommended that consideration is given to how cycle connections from the site to surrounding areas such as White City, Harlesden, Park Royal and Ladbroke Grove could be improved.

Whilst these cycle links would act as the core cycle network through the site, the site should be designed so that cycling is encouraged throughout, so people have choice over which routes they would like to take. To help facilitate this and to try to achieve a higher than MTS target mode share for the OOCOA, the following design principles should be considered when developing the future cycle network at the detailed design stage:

- Ensuring cycle, rather than car, access through the site is the predominant network so that this becomes a more attractive mode for people to use;
- Ensuring the north/ south and east/ west connections through the site by bike are implemented. The 'green spine' proposed to run through the site from Willesden Junction to Wormwood Scrubs will help provide part of this, but it will require links to feed off it;
- Consideration of what routes may require specific infrastructure to be provided e.g. where are dedicated cycle lanes required, and where will it be appropriate to cycle on-street. This will largely be a function of the road and how much traffic is using it;
- A clear, uncluttered road network is the most conducive to cycling i.e. one with minimal amounts of on-street parking and other obstructions; and
- When designing new cycle infrastructure the London Cycling Design Standards (2014) should be used to determine what features may be required. The chapter on 'cycle friendly street design' will be a particularly useful guide.

High level scheme appraisal:

✓ Improvements to the real and perceived safety of cycling.

✓ Encourages the use of cycle journeys through the area and to the station.

✓ Improved permeability and choice for cyclists across the site.

Links to planned facilities and the wider network

To ensure cycle infrastructure and facilities within the OOCOA is well linked to the wider cycle network, and indeed any future planned infrastructure, links should be provided beyond the OOCOA where necessary. For example, links to the proposed east-west Cycle Superhighway may need to extend beyond the OOCOA site as far as the A40 i.e. along the length of A219 Scrubs Lane and A4000 Victoria Road.

High level scheme appraisal:

- ✓ Provides connections to surrounding areas
- ✓ Provides links to the strategic cycle network, thus further encouraging sustainable travel to and from the OOCOA.

Provision of publicly accessible, high quality, cycle parking

The provision of high quality, well located, cycle parking should be provided throughout the OOCOA to help support the Mayor's target of a 5 per cent London-wide cycle mode share by 2031, and the aspirations of the OOCOA site to achieve higher than that. Cycle parking at Old Oak Common station should be located to allow cyclists to access it safely on desire lines from the surrounding network and should be close and convenient for station entrances, well lit and subject to natural and more formal surveillance. The quality of the cycle parking provision is also critical and should be provided in a secure and covered location wherever possible, whilst being integrated carefully into the urban realm.

Cycle parking in new residential and commercial developments should have generous levels of secure and convenient cycle parking provision in accordance or in excess of the minimum standards set out in the proposed Further Alterations to the London Plan, or any subsequent revisions. This includes the provision of visitor cycle parking, located in the publicly accessible parts of new developments.

High level scheme appraisal:

- ✓ The nature of the site provides an opportunity to provide a step change in provision with high capacity, high quality cycle parking which could be used as a model of best practice.
- ✓ Encourages the use of cycle journeys through the area and to the station.

8.5 For further investigation

It is recommended that additional and more detailed investigation be carried out for the following, in order to help further develop the interventions outlined to date:

- A review of what major junction/ capacity improvements may be needed on the strategic road network, including the A40 Westway, Hanger Lane Gyratory and the A406 North Circular to mitigate the traffic impact. It is proposed that these be looked at in more detail as part of a separate piece of work;

- A review of the feasibility and impact of emerging proposals to improve access to the OOCOA and additional links to the wider highway network including work currently being developed by TfL in response to the Roads Task Force recommendations;
- A review of proposals developed by other stakeholders including the new highway link to the A40 proposed by Fosters and a new link road from A219 Scrubs Lane to Ladbroke Grove. It should be noted that these proposed schemes have not been included as part of the recommended Transport Strategy outlined in this report;
- Localised modelling of junctions and links within the Park Royal area and preparation of a transport strategy for Park Royal;
- Complete the detailed design for new LO stations and associated infrastructure, following public consultation and a recommendation to proceed with option C. In particular, the transport impact of a new station in the Old Oak North site should be explored;
- A more detailed examination of what improvements may be needed at both North Acton and Willesden Junction stations;
- A study into the feasibility of building the proposed bridge over the WCML tracks from Old Oak to Willesden Junction to a standard that could accommodate buses;
- A more detailed review of bus services and liaison with operators, to ensure the provision of an efficient bus network to serve OOCOA and provide connections to the wider area;
- A review of the modelling outputs on rail crowding taking into account the impact of the potential Crossrail 1 to WCML link;
- Further consideration as to what cycle facilities may be needed to achieve levels of cycling above MTS targets including the adoption of mini-Holland type schemes, connecting the site to the wider area e.g. White City, Harlesden, Ladbroke Grove and Park Royal and to future infrastructure such as the proposed Cycle Superhighway;
- Development of a Construction Logistics Strategy that aims to maximise the use of rail and water transport and minimises the impacts of road based transport;
- A review and update of the Transport Strategy to inform the Local Plan process;
- A monitoring strategy; and
- A phasing strategy.

8.6 Assessment of interventions against Old Oak Common Strategic Transport Study and MTS goals

The transport interventions proposed to address the challenges arising from the anticipated growth in the Old Oak Common area have been assessed against the Old Oak Common Strategic Transport Study objectives and MTS goals below:

- Minimise congestion on the surrounding highway network (OOCOA);
- Improve connectivity throughout the Opportunity Area and the surrounding area (OOCOA);
- Improve access to/from the proposed HS2 station by sustainable modes of transport (OOCOA);
- Measures which meet the future freight/ servicing demands within the OA (OOCOA);
- Support economic development and population growth (MTS);

- Enhance the quality of life for all Londoners (MTS);
- Improve the safety and security or all Londoners(MTS);
  Improve transport opportunities for all Londoners (MTS); and
- Reduce transport's contribution to climate change, and improves its resilience (MTS).

Taking into account the known constraints, risks and opportunities, each intervention (note that in some cases the interventions described in the previous section have been presented in more detail, to assess each individual component of that intervention) has been evaluated against OOC and MTS goals with a positive or negative rating. It should be noted that the ratings applied have been based primarily upon professional judgement and qualitative appraisal at this stage.

Table 8-1: Summary of recommended interventions and MTS/ Old Oak Common Strategic Transport Study objectives delivered

Rating Key

- Strong adverse	-Moderate adverse	- Slight adverse	Neutral	+ Slight benefit	+ Moderate benefit	+ Strong benefit

Intervention	MTS and Old Oak Common Transport Objectives Criteria								
	Minimise congestion on the surrounding highway network	Improve connectivity throughout the Opportunity Area and the surrounding area	Improve access to/ from the proposed HS2 station by sustainable modes of transport	Measures which meet future freight/ servicing demands within the OA	Support economic development and population growth	Enhance the quality of life for all Londoners (enhanced streetscape, reduced emissions and noise)	Improve the safety and security for all Londoners	Improve transport opportunities for all Londoners (equality)	Reduce transport's contribution to climate change, and improve its resilience
Highway interventions									
Eastern access from A219 Scrubs Lane									
Junction 1- A219 Scrubs Lane/ Hythe Road (Access 1)	Moderate +	Strong +	Moderate +	Moderate +	Slight +	Slight +	Neutral	Slight +	Neutral
Scrubs Lane realignment	Strong +	Strong +	Moderate +	Moderate +	Strong +	Slight +	Neutral	Moderate +	Slight +
Junction 2- A219 Scrubs Lane/ Access 2 (TBC)	Strong +	Strong +	Moderate +	Strong +	Strong +	Slight +	Slight +	Moderate +	Slight +
Western access from Old Oak Common Lane									
Junction 7 - Old Oak Common Lane / Access Road - 4 (L12) (TBC)	Strong +	Strong +	Moderate +	Strong +	Strong +	Slight +	Moderate +	Moderate +	Moderate +
Junction 6 - A4000 Victoria Road/ Old Oak Common Lane Junction (Signalised)	Moderate +	Neutral	Slight +	Slight +	Slight +	Slight +	Slight +	Neutral	Neutral
Western access from A4000 Old Oak Lane									
Junction 10 - Old Oak Common Lane/Link Road Junction	Strong +	Strong +	Moderate +	Strong +	Strong +	Moderate +	Moderate +	Moderate +	Strong +
Junction5- A4000 Old Oak Lane/ Access 3	Strong +	Strong +	Moderate +	Strong +	Strong +	Slight +	Slight +	Moderate +	Slight +
Internal roads and junctions									
Bridge 2- Railway underbridge for new access road onto Scrubs Lane	Strong +	Strong +	Moderate +	Strong +	Strong +	Slight +	Slight +	Moderate +	Slight +
New Junction (new 4-arm 'mini Holland' roundabout)	Slight +	Strong +	Slight +	Slight +	Moderate +	Neutral	Moderate +	Slight +	Slight +
New internal bridge across WLL	Slight +	Moderate +	Moderate +	Slight +	Moderate +	Slight +	Slight +	Moderate +	Moderate +
New junction (new 4-arm 'mini Holland' roundabout north)	Slight +	Strong +	Slight +	Slight +	Moderate +	Neutral	Moderate +	Slight +	Slight +

Intervention	MTS and Old Oak Common Transport Objectives Criteria								
	Minimise congestion on the surrounding highway network	Improve connectivity throughout the Opportunity Area and the surrounding area	Improve access to/ from the proposed HS2 station by sustainable modes of transport	Measures which meet future freight/ servicing demands within the OA	Support economic development and population growth	Enhance the quality of life for all Londoners (enhanced streetscape, reduced emissions and noise)	Improve the safety and security for all Londoners	Improve transport opportunities for all Londoners (equality)	Reduce transport's contribution to climate change, and improve its resilience
New junction (new 4-arm 'mini Holland' roundabout south)	Slight +	Strong +	Slight +	Slight +	Moderate +	Neutral	Moderate +	Slight +	Slight +
B7- new railway over bridge for junction 5/ access 3	Strong +	Strong +	Moderate +	Strong +	Strong +	Moderate +	Slight +	Moderate +	Slight +
New bus, pedestrian/ cycle only link to HS2 Crossrail hub									
New bus, cycle, pedestrian and station traffic link from Hythe Road to HS2/Cross rail Hub (Option A)	Slight +	Moderate +	Strong +	Slight +	Moderate +	Slight +	Slight +	Moderate +	Neutral
Victoria Road widening									
Widening of Victoria Road	Moderate +	Moderate +	Slight +	Slight +	Moderate +	Moderate +	Slight +	Moderate +	Slight +
Highway 'quick' wins									
Old Oak Lane improvements	Strong +	Strong +	Moderate +	Strong +	Strong +	Moderate +	Slight +	Moderate +	Moderate +
Other (for sensitivity testing)									
New through Link Road running east west through the site	Moderate +	Strong +	Moderate +	Strong +	Strong +	Moderate +	Moderate +	Moderate +	Moderate +
Managing travel demand									
Promoting sustainable urban mobility									
Restrictive parking standards	Moderate +	Neutral	Neutral	Neutral	Slight +	Moderate +	Moderate +	Neutral	Moderate +
Zonal access									
Zonal access - east / west and north / south access	Moderate +	Strong +	Slight +	Moderate +	Strong +	Moderate +	Moderate +	Moderate +	Moderate +
Residential and workplace travel plans									
Ensuring travel plans are developed and adhered to for new developments	Moderate +	Neutral	Neutral	Neutral	Slight +	Moderate +	Moderate +	Neutral	Moderate +
Increasing rail capacity and improving rail connectivity									

Intervention	MTS and Old Oak Common Transport Objectives Criteria								
	Minimise congestion on the surrounding highway network	Improve connectivity throughout the Opportunity Area and the surrounding area	Improve access to/ from the proposed HS2 station by sustainable modes of transport	Measures which meet future freight/ servicing demands within the OA	Support economic development and population growth	Enhance the quality of life for all Londoners (enhanced streetscape, reduced emissions and noise)	Improve the safety and security for all Londoners	Improve transport opportunities for all Londoners (equality)	Reduce transport's contribution to climate change, and improve its resilience
Willesden Junction station capacity enhancements									
Willesden Junction DDA compliancy	Neutral	Neutral	Slight +	Neutral	Neutral	Moderate +	Slight +	Moderate +	Slight +
Willesden Junction station capacity enhancement	Slight +	Slight +	Strong +	Neutral	Moderate +	Moderate +	Slight +	Slight +	Slight +
North Acton station capacity enhancements									
North Acton station capacity enhancement	Slight +	Slight +	Moderate +	Neutral	Moderate +	Moderate +	Slight +	Slight +	Slight +
LO capacity enhancements									
Overground capacity enhancement	Moderate +	Moderate +	Strong +	Neutral	Moderate +	Moderate +	Slight +	Slight +	Slight +
Provision of a new LO station on the North London and West London lines									
New Overground station at Old Oak Common - option a - new station on the NLL before Willesden Junction	Moderate +	Moderate +	Strong +	Neutral	Strong +	Moderate +	Moderate +	Moderate +	Moderate +
New Overground station at Old Oak Common - option b - new station on the NLL before Willesden Junction directly over the box of HS2 station (further south than proposed in option a)	Moderate +	Moderate +	Strong +	Neutral	Strong +	Moderate +	Moderate +	Moderate +	Moderate +
New Overground station at Old Oak Common - option c - 2 new stations, one on the NLL and one on the WLL	Moderate +	Strong +	Strong +	Neutral	Strong +	Moderate +	Moderate +	Moderate +	Moderate +
Crossrail to WCML spur									
Provision of a Crossrail to WCML spur	Slight +	Slight +	Moderate +	Neutral	Moderate +	Moderate +	Moderate +	Moderate +	Moderate +
Improving bus and other public transport facilities									
New bus routes and infrastructure serving the development (including terminating services)									
New bus routes and infrastructure serving the development (including terminating services)	Strong +	Strong +	Strong +	Neutral	Strong +	Strong +	Moderate +	Strong +	Moderate +

Intervention	MTS and Old Oak Common Transport Objectives Criteria								
	Minimise congestion on the surrounding highway network	Improve connectivity throughout the Opportunity Area and the surrounding area	Improve access to/ from the proposed HS2 station by sustainable modes of transport	Measures which meet future freight/ servicing demands within the OA	Support economic development and population growth	Enhance the quality of life for all Londoners (enhanced streetscape, reduced emissions and noise)	Improve the safety and security for all Londoners	Improve transport opportunities for all Londoners (equality)	Reduce transport's contribution to climate change, and improve its resilience
Personal Rapid Transport -Ease of access through site and interconnectivity with PT	Slight +	Moderate +	Slight +	Neutral	Slight +	Slight +	Slight +	Moderate +	Moderate +
Suitable provision of taxi ranks									
Suitable provision of taxi ranks	Slight +	Moderate +	- Slight	Neutral	Slight +	Neutral	Slight +	Moderate +	Neutral
Future proofing for appropriate freight services									
Consolidation centre(s)									
Provision of a consolidation centre(s) in close proximity to the OOCOA	Moderate +	Neutral	Neutral	Strong +	Slight +	Moderate +	Slight +	Neutral	Slight +
Provision of Delivery and Servicing Plans (DSPs)									
New developments to be supported by DSPs	Moderate +	Neutral	Neutral	Strong +	Slight +	Moderate +	Slight +	Neutral	Slight +
Re-timing deliveries to outside peak periods									
Freight Screening/Night Time delivery/Drop Box	Moderate +	Neutral	Neutral	Strong +	Slight +	Moderate +	Slight +	Neutral	Slight +
Concierge services									
Developments to have a concierge service or communal drop off point to ensure deliveries are made first time	Moderate +	Neutral	Neutral	Strong +	Slight +	Moderate +	Slight +	Neutral	Slight +
Improving pedestrian accessibility, connectivity and the urban realm									
Create a new network of streets and improve pedestrian permeability and connectivity									
Provide pedestrian facilities within the development especially around public transport interchanges	Neutral	Strong +	Strong +	Neutral	Strong +	Strong +	Strong +	Strong +	Moderate +
Improve pedestrian way finding									
Introduction of Legible London and signage across the site	Neutral	Strong +	Strong +	Neutral	Neutral	Moderate +	Slight +	Neutral	Slight +
Improving cycle accessibility and facilities									

Intervention	MTS and Old Oak Common Transport Objectives Criteria								
	Minimise congestion on the surrounding highway network	Improve connectivity throughout the Opportunity Area and the surrounding area	Improve access to/ from the proposed HS2 station by sustainable modes of transport	Measures which meet future freight/ servicing demands within the OA	Support economic development and population growth	Enhance the quality of life for all Londoners (enhanced streetscape, reduced emissions and noise)	Improve the safety and security for all Londoners	Improve transport opportunities for all Londoners (equality)	Reduce transport's contribution to climate change, and improve its resilience
High quality cycle infrastructure and facilities across the site									
Provide cycling facilities within the development especially around public transport interchanges	Neutral	Strong +	Strong +	Neutral	Strong +	Strong +	Strong +	Strong +	Moderate +
Links to planned facilities and the wider network									
Provision of local cycle links to wider cycle schemes proposed i.e. A40 East-West Cycle Superhighway/	Neutral	Strong +	Strong +	Neutral	Strong +	Strong +	Strong +	Strong +	Moderate +
Provision of publicly accessible, high quality, cycle parking									
Provision of high quality and well located cycle parking across the OOCOA and also integrated into new developments	Neutral	Neutral	Neutral	Neutral	Neutral	Strong +	Strong +	Neutral	Moderate +

9 Transport strategy performance

9.1 Background

Under Planning Scenario 2 which models the impacts of 24,000 homes and 55,000 jobs, there is forecast to be an increase in demand on the highway and public transport network, as a result of the quantum of development proposed. The interventions which form a proposed transport strategy, as detailed in Section 8, have been developed to facilitate the scale and nature of the development and improve the local connections for existing communities, whilst reducing the negative impacts of transport on those communities and the environment.

The public transport interventions and opportunities proposed need to reflect the aspirations for the area and help achieve high levels of public transport mode share for residents and employees.

The strategy seeks to build on the wider area's good network of strategic connections, and also to develop a comprehensive walking and cycling network within the OOCOA itself, which helps promote sustainable means of travel. It is centred on the creation of a new and high quality public transport interchange and station, which meets the operational requirements for projected growth. This includes a legible, safe and accessible transport interchange between different modes of travel and particularly between public transport, pedestrian and cyclists- with extensive and improved permeability across the OOCOA and connectivity with the surrounding areas.

The strategy is predicated on a two pronged approach, which seeks to combine demand management measures such as very low residential and car-free employment car parking standards, with a comprehensive package of sustainable transport measures including high quality public transport facilities along with new and improved walking and cycling opportunities, to help minimise reliance on the private car, and thus minimise the traffic impact. In addition, new connections are proposed which seek to mitigate the impact of the numerous railway lines and other pieces of infrastructure which currently act to sever the site.

Maximising the use of public transport and active modes, such as walking and cycling, is a key tenet of the strategy. Sustainable transport is encouraged by the provision of a safe, attractive, legible, high capacity and permeable network of routes, alongside the provision of enhanced public transport services.

These mode share assumptions, together with a number of small scale highway capacity improvements, form the basis of the recommended Transport Strategy as summarised below:

- New LO station(s) at Old Oak Common serving the NLL and WLL;
- A potential extension of Crossrail 1 to the WCML ;
- Improved frequencies on the LO;

- Increased bus frequencies and new/ extended routes operating throughout the OOCOA;
- New internal walk network through the OOCOA;
- New cycle connections throughout the OOCOA;
- Demand management policies to reduce car mode share;
- Improved site access to the OOCOA alongside new and improved road connections; and
- Highway 'quick wins' involving local small scale junction improvements.

9.2 Impact Assessment

This proposed package of transport interventions has been tested to forecast its effectiveness at mitigating the impact of Planning Scenario 2 related development on the strategic highway and public transport networks.

In the first instance, to enable the disentangling of the network changes and the demand changes for the highway modelling, the original '*Planning Scenario 2 plus HS2'* demand matrices were tested on the 2031 highway network as a sensitivity test. For ease of wording the sensitivity test run will be referred to as the '*unadjusted scenario'*, while the primary run will be referred to as the '*Reduced Highway/ High PT (public transport) Share scenario'*. The reduced highway and high public transport share scenario has been based upon a 5% commercial and 15% residential car mode share being employed (with a level of flexibility for robustness), which is deemed desirable and also achievable for the OOCOA.

To better understand the impact of the interventions proposed, the following model runs were undertaken:

- **Highway, unadjusted scenario** – 2031 Reference Case network, plus capacity enhancements to local junctions to improve site access (highway 'quick wins'), plus the Planning Scenario 2 development demand;
- **Highway, Reduced Highway / High PT Share scenario** - Network as above, plus reduced highway demand (5% commercial and 15% residential highway mode share);
- **Public Transport, unadjusted scenario –** Planning Scenario 2 development demand, plus Strategic Intervention Package – Old Oak Common LO station, WCML Crossrail link and enhanced bus frequency and routes; and
- **Public Transport, Reduced Highway / High PT Share scenario –** Network as above, plus reduced highway demand/ higher public transport demand (5% commercial and 15% residential highway mode share).

The results from these runs are considered in more detail below, along with the results of a series of highways sensitivity tests which were subsequently undertaken.

9.2.1 Highway network performance

Traffic flows

Figure 9-1 and Figure 9-2 show the AM and PM peak hour traffic flows (in PCUs), respectively, for the Old Oak Common area in the Reduced Highway/ High PT Share scenario.

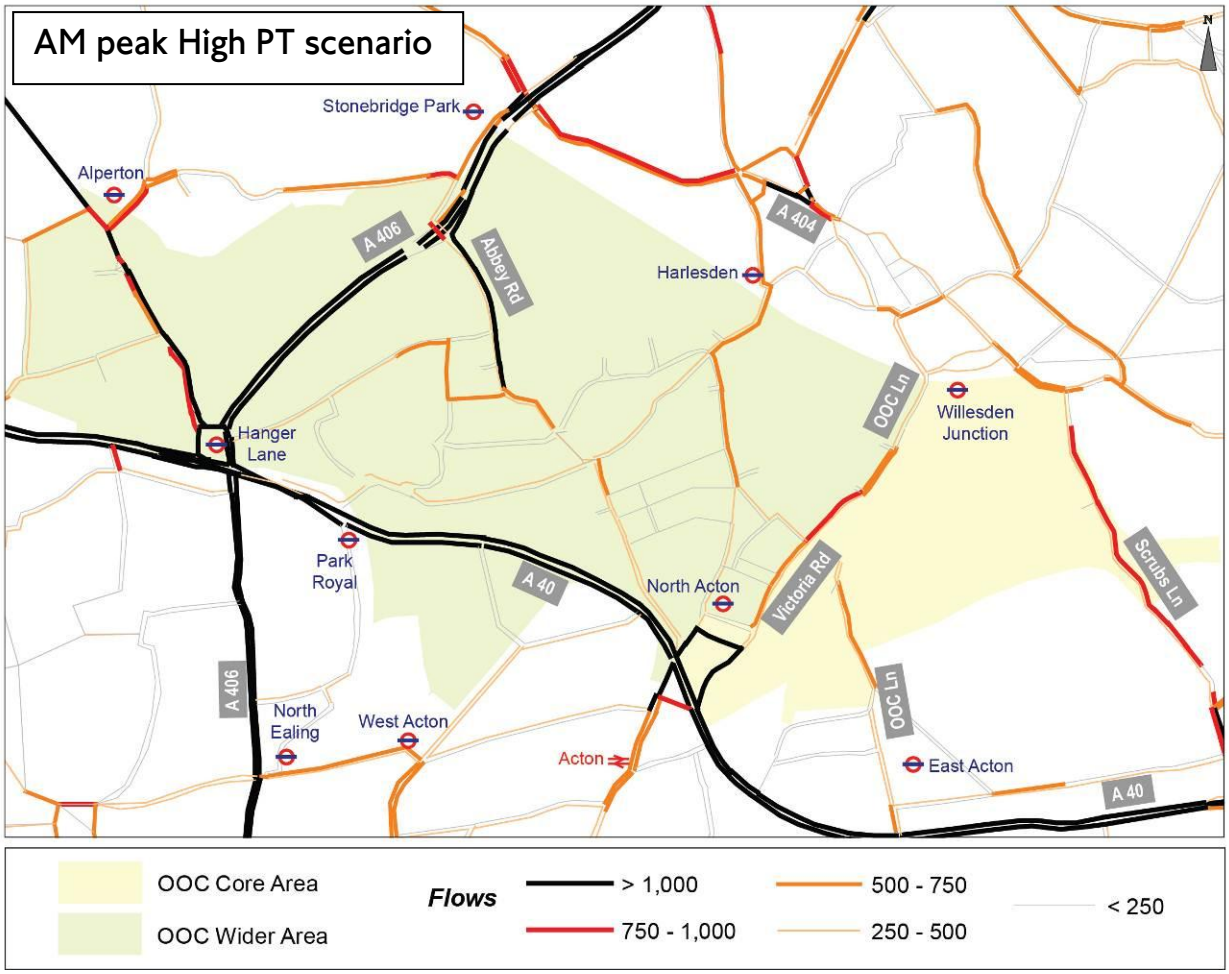


Figure 9-1: Traffic flows – Reduced Highway/ High PT Share scenario AM pk

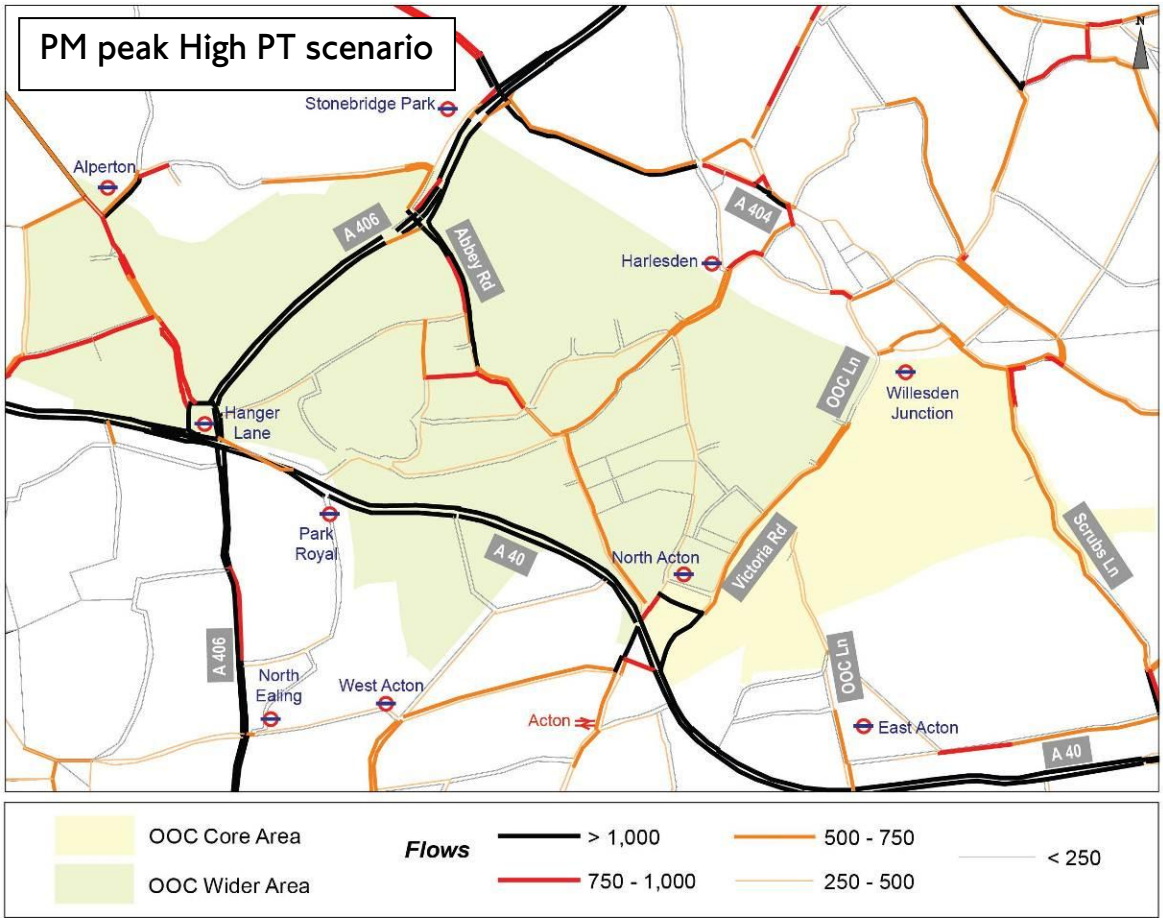


Figure 9-2: Traffic flows – Reduced Highway/ High PT Share scenario PM pk

The highest flows in the area, during both peak hours, occur on the A40 Westway and A406 North Circular. The traffic flow analysis indicates:

- **A40 Westway**: The AM peak hour flows along the A40 eastbound are approximately 2,700 to 2,900 PCUs per peak hour. Further out, the eastbound flows into the Hanger Lane Gyratory are of the order of 4,800 PCUs per hour, reducing to some 2,800 PCUs per hour east of Hanger Lane, as traffic disperses north and south on the A406 North Circular. This has changed little from the 2031 Reference Case.

  The PM peak flows are slightly higher westbound, with flows approaching the Hanger Lane Gyratory of up to 3,700 PCUs per hour. Again, there is not much change observed between the Reduced Highway / High PT Share scenario and the 2031 Reference Case.

- **A406 North Circular:** The AM peak hour flows on the A406 North Circular are forecast to be highest to the north of the Hanger Lane gyratory, and are greatest in the northbound direction, at around 3,200 PCUs per hour, compared to 1,600 PCUs per hour southbound. This represents a slight increase in 2-way flow over the 2031 Reference Case. The PM peak hour flows show the same patterns north of the gyratory with northbound flows of 3,250 vehicles per hour and southbound flows of 1,800 PCUs per hour. These are slightly lower than the flows seen in the 2031 Reference Case.

- **OOCOA local highway network**: In and around the OOCOA, the roads with significant peak traffic flows are the A404 through-route to the north of the site, linking the A406 North Circular to the A40; the A4000 Victoria Road; A219 Scrubs Lane / Wood Lane; and the B450 Ladbroke Grove. The last three of these represent north-south links between the A404 and A40. In general, directional flows on these roads are below 1,000 PCUs per hour.

Comparison between the Reduced Highway/ High PT Share scenario, the Unadjusted scenario and the 2031 Reference Case

Figure 9-3 (AM peak) and Figure 9-4 (PM peak) shows the difference in traffic flows between the Reduced Highway/ High PT Share scenario and the 2031 Reference Case. This shows that overall flows are broadly similar. There is a slight increase in demand on the A40 and access routes in both peaks, as well as an apparent increase in rat running between the A40 and A406 North Circular, north-east of Hanger Lane in the AM peak. The flow reductions apparent are both caused by proposed network changes: the existing Old Oak Common Lane to the north-west of the site has been tested as a shared space resulting in traffic diverting to a new road to the east; and Hyde Road access/egress road to the east of the site has in this test been made bus-only with all general traffic entering/exiting the site to the east doing so via a new link.

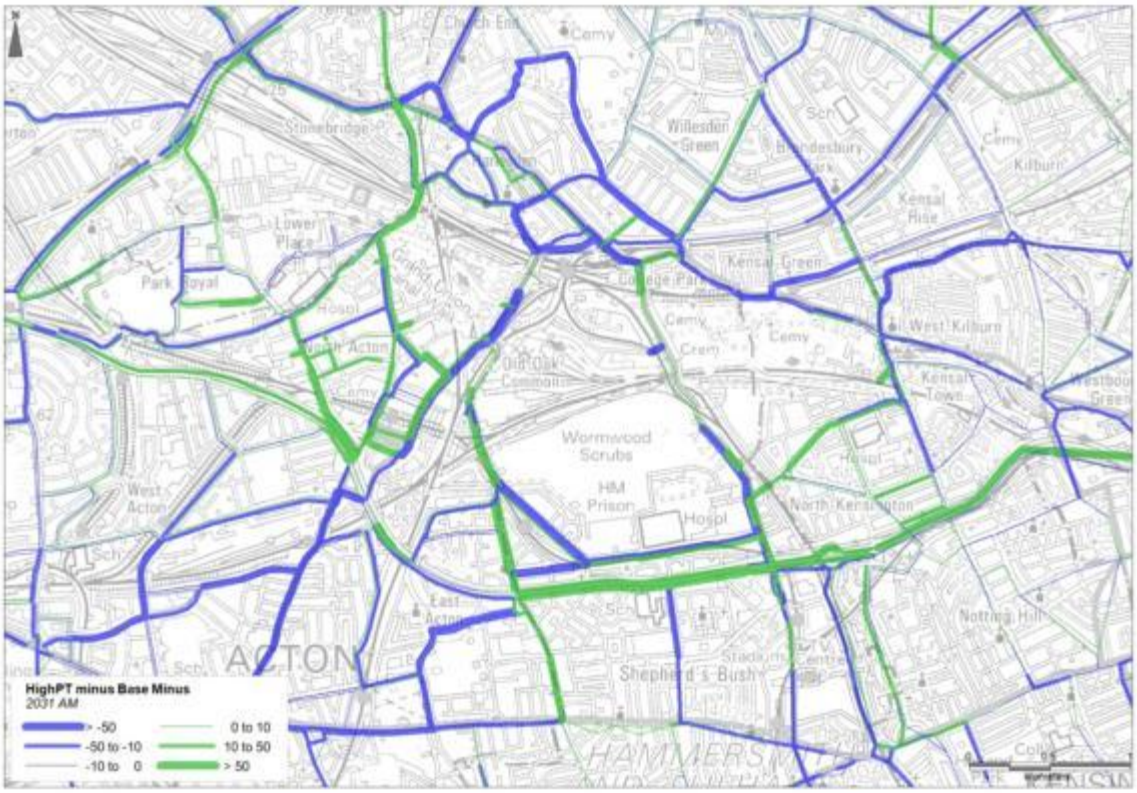


Figure 9-3: Traffic flows – Reduced Highway/ High PT Share scenario vs. 2031 Reference Case AM pk

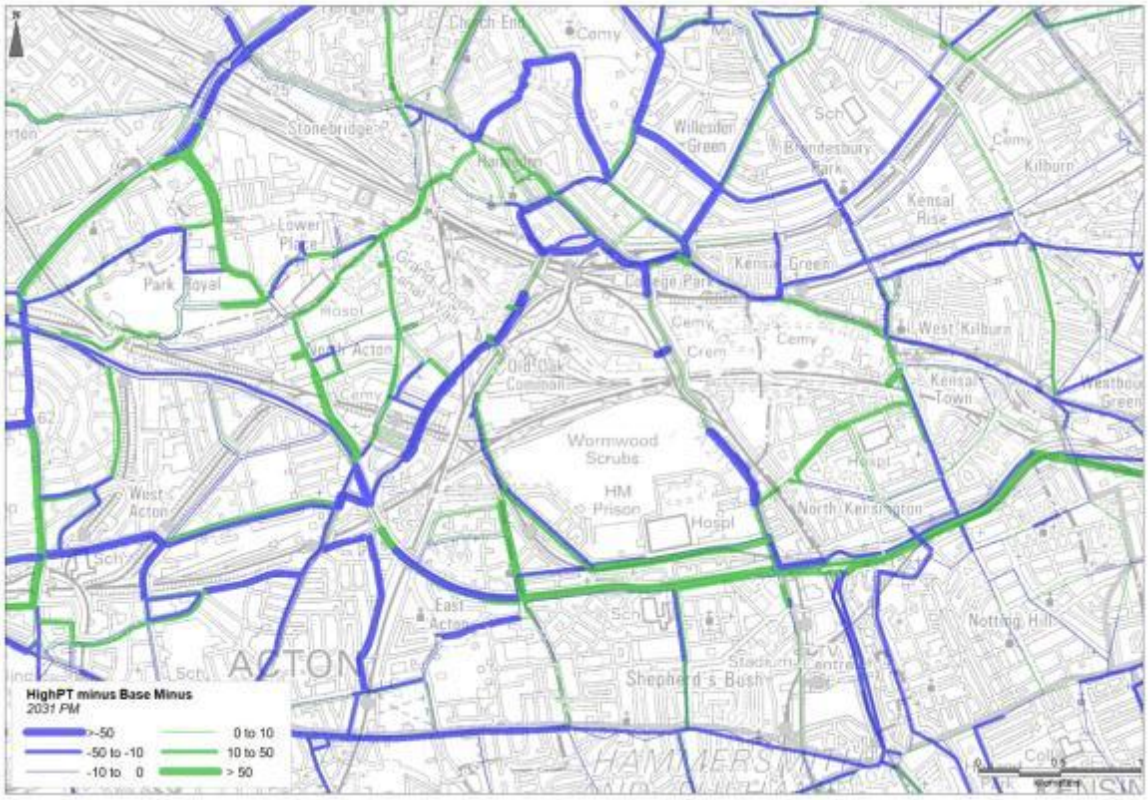


Figure 9-4: Traffic flows – Reduced Highway/ High PT Share scenario vs. 2031 Reference Case PM pk

Figure 9-5 (AM peak) and Figure 9-6 (PM peak) shows the difference in traffic flows between the Reduced Highway/ High PT Share scenario and the Unadjusted scenario (Planning Scenario 2 demand). These show significant flow reductions to and from the site, from which the underlying behaviour of site demand can be more easily deduced. There are some increases in flow on the A40, A406 North Circular and feeder roads, probably due to the removal of OOCOA development demand permitting more traffic wishing to use these links to pass through the preceding junctions. The OOCOA clearly operates differently on the east and west gateways. The pattern can be summarised as:

- The western gateways, onto Old Oak Common Lane show a much greater usage than the eastern gateway onto A219 Scrubs Lane; and
- At the western gateways, in the AM peak, most extra traffic is towards the development, whereas in the PM peak most extra traffic seeks to depart the development. This tendency is reversed at the eastern gateway.

Both of these are to be expected considering that the western access to the site is predominantly for the employment uses, whilst the eastern access is for the more residential aspect of the development.

The AM peak flow difference plots suggest:

- That traffic accessing the development mainly uses the A40 westbound. It then splits between Du Cane Road westbound and Old Oak Common Lane, this is likely to be a

result of the fact that right turns are not allowed at the A40/Old Oak Common Lane junction. This also leads to the extensive use of Savoy Circus as a way of accessing Old Oak Common Lane from the A40 westbound. This in turn leads to a significant reduction in traffic on East Acton Lane eastbound, as traffic cannot find gaps at the give way to Old Oak Common Lane;

- To the north of the OOCOA, traffic finds its way through the A4000 and A404;
- To the west, traffic approaches the site from the A4000. Access to the A4000 is either through the A40 itself or through various local roads once leaving the A40 at Western Avenue;
- There seems to be limited interaction between the Old Oak Common Opportunity Area and the A406 North Circular itself; and
- The traffic leaving the development to the east does so via A219 Scrubs Lane. It then dissipates though the network in an attempt to travel west and on the B412 towards the east. Traffic aiming north follows the same routes as traffic coming to the site.

The PM peak flow difference plots suggest:

- Traffic is leaving the OOCOA mainly from the western gateway. Reverse patterns to those observed in the morning peak can be seen, but the connection with the A40 tends to be through Wales Farm Road, in North Acton, rather than through Old Oak Common Lane; and
- Traffic reaches the development via A219 Scrubs Lane. As most origins are in the southeast, the preferred route appears to be through St Anns Road and North Pole Road, whilst a more logical route would be through Wood Lane or the A3220. This can be explained by the worsening traffic conditions at the Du Cane Road and Wood Lane junction making this route unattractive.

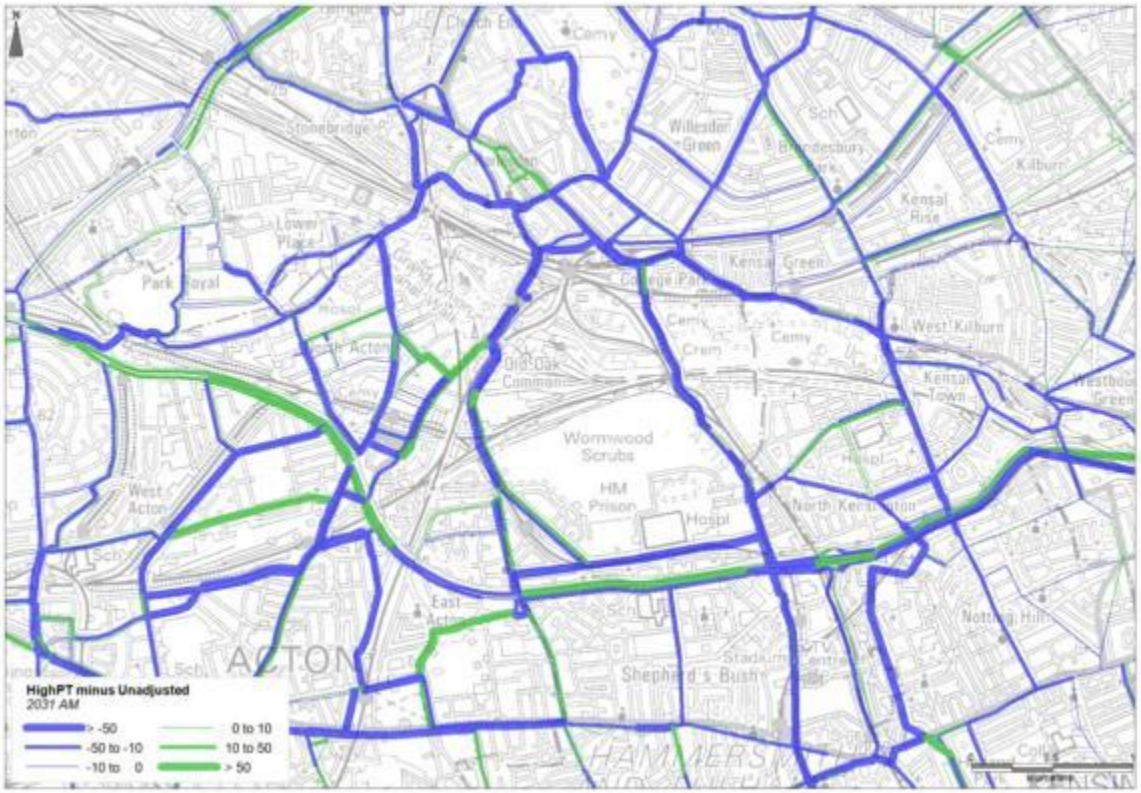


Figure 9-5: Traffic flows – Reduced Highway/ High PT Share scenario vs. Unadjusted scenario AM pk

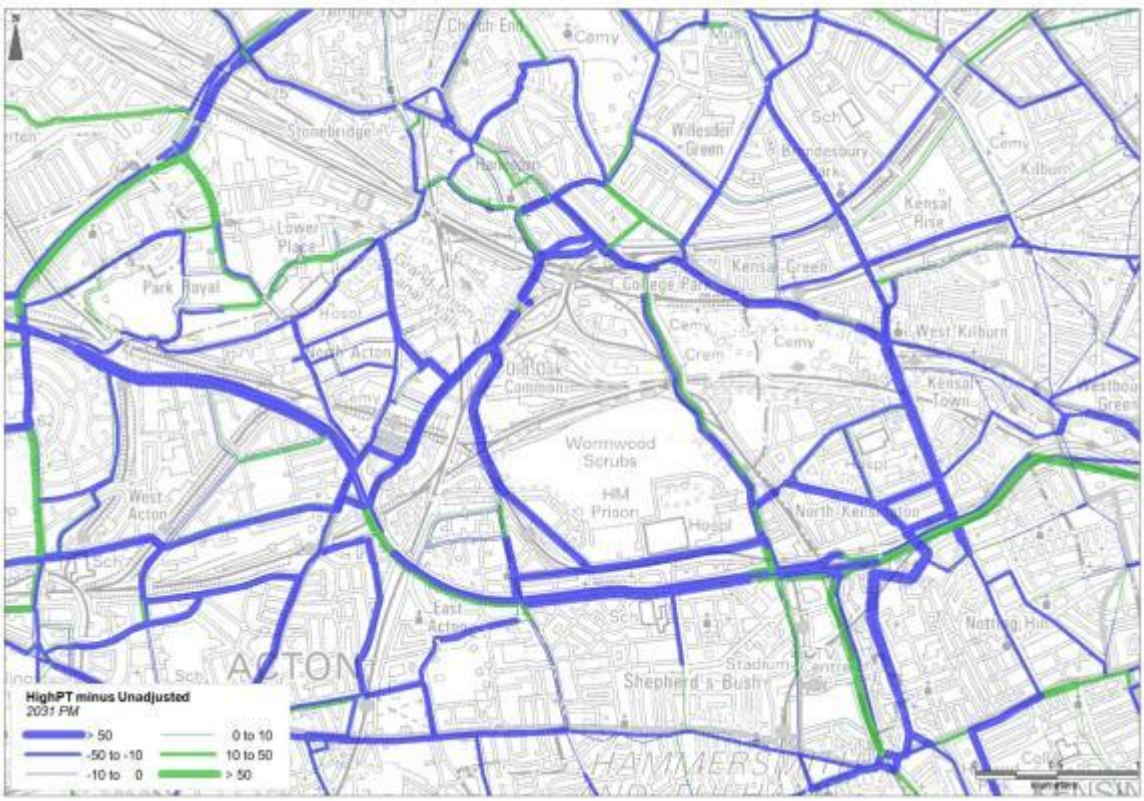


Figure 9-6: Traffic flows – Reduced Highway/ High PT Share scenario vs. Unadjusted scenario PM pk

Junction delays

Figure 9-7 and Figure 9-8 show the average delays per vehicle (PCU) in seconds for the AM and PM peaks respectively.



Figure 9-7: Junction delay – Reduced Highway/ High PT Share scenario AM pk



Figure 9-8: Junction delay – Reduced Highway/ High PT Share scenario PM pk

During the AM peak, there are around four junctions in the vicinity of the OOCOA which are forecast to have delays above four minutes. Most of these appear to be generated by signalised junctions. The highest delay is in the order of 8 minutes (502 seconds) on the A406 southbound entry to the Hanger Lane gyratory, which is a similar delay to that forecast in the 2031 Reference Case.

During the PM peak, delays are forecast to be more significant and more widespread than those in the morning. This was a trend apparent in the 2031 Reference Case, too. There are significant delays of the order of 8 minutes (500 seconds) or more on various westbound roads accessing the A406 North Circular, including:

- A40 and Twyford Abbey Road into Hanger Lane gyratory;
- A404 Brentfield;
- Brentfield Road; and
- B4492 Abbey Road.

There are also forecast delays in excess of over 4 minutes on Hanger Lane northbound and southbound into the gyratory, and on the A40 westbound approaching the junction with Old Oak Common Lane. Within the OOCOA, the biggest delays are forecast to be on the A4000 Old Oak Lane, towards Tubbs Road.

Comparison between the Reduced Highway/ High PT Share scenario, the Unadjusted scenario and the 2031 Reference Case

Figure 9-9 (AM peak) and Figure 9-10 (PM peak) shows the difference in average delays between the Reduced Highway / High PT Share scenario and the 2031 Reference Case. These show that the majority of links/junctions are forecast to have a decrease in delays, though it is apparent that some of the roads around the OOCOA show increases of up to 16 seconds with the new shared space road showing delay increases of up to 60 seconds.

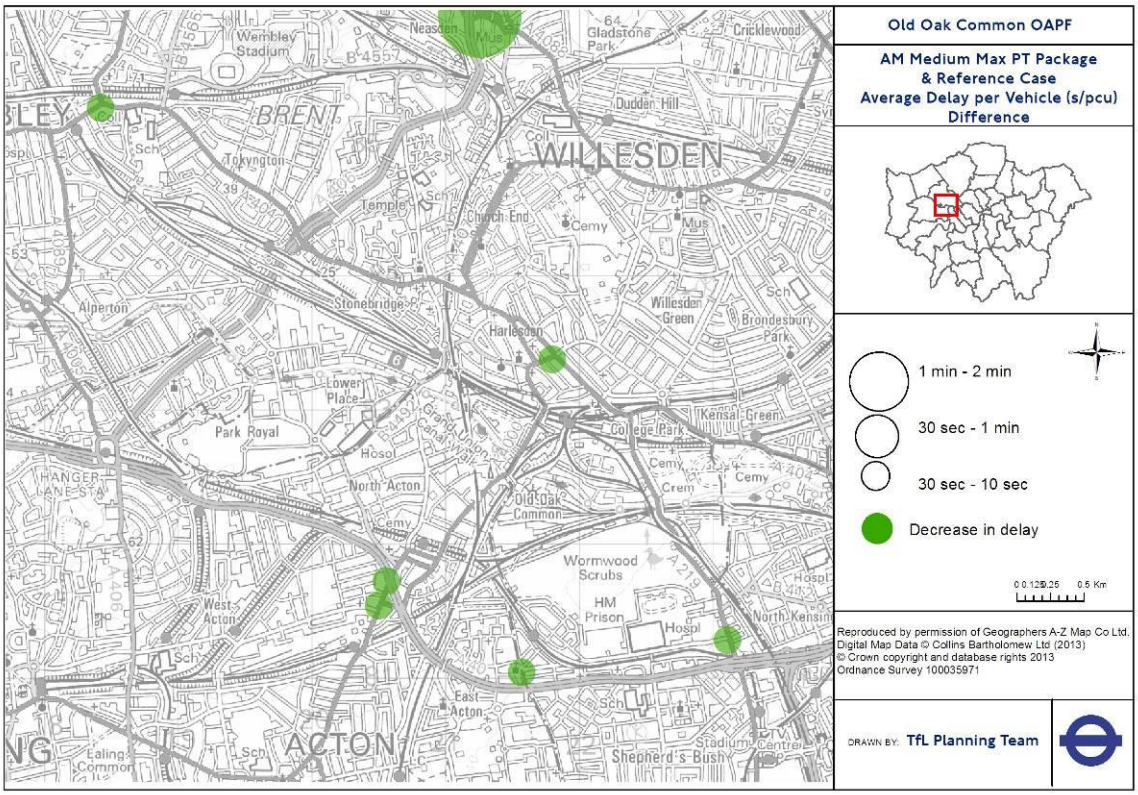


Figure 9-9: Junction delay –Reduced Highway/ High PT Share scenario vs. 2031 Reference Case AM pk

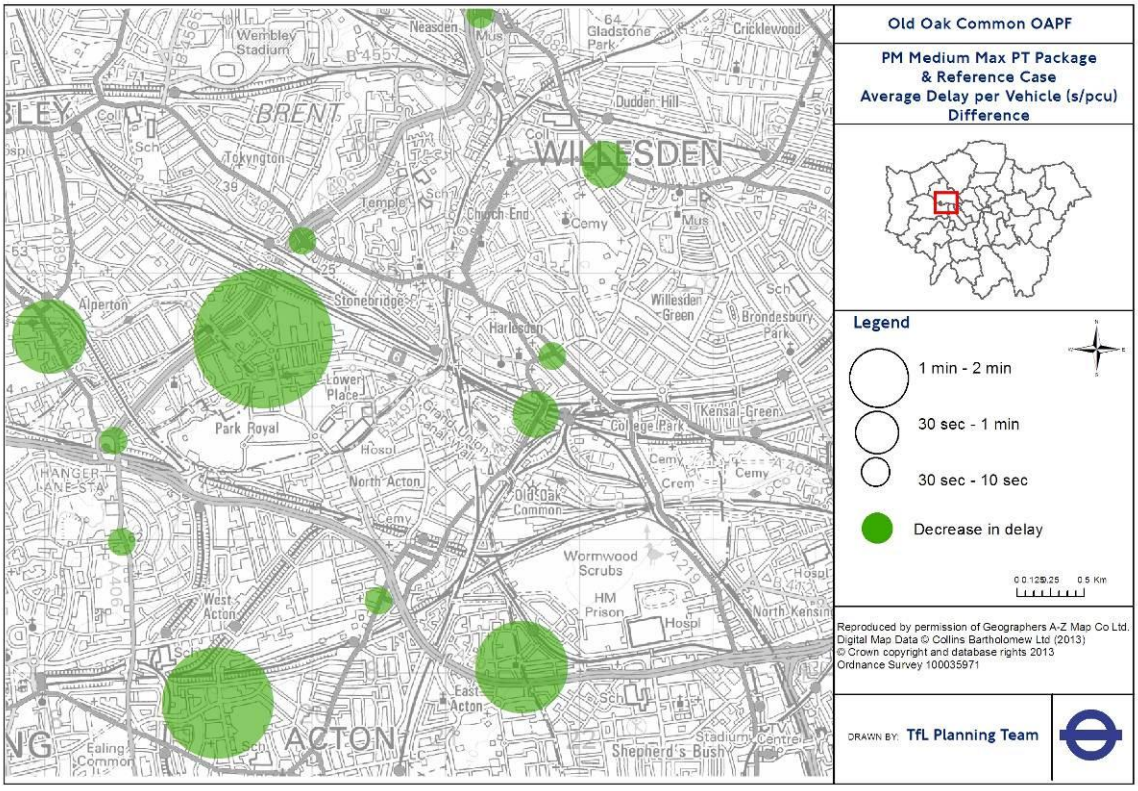


Figure 9-10: Junction delay –Reduced Highway/ High PT Share scenario vs. 2031 Reference Case PM pk

Figure 9-11 (AM peak) and Figure 9-12 (PM peak) show the difference in average delays between the Reduced Highway/ High PT Share scenario and the Unadjusted scenario (Planning Scenario 2 demand). These show that in comparison with the Unadjusted scenario, there is forecast to be widespread reductions in delays during both peaks. This is especially so on the middle access/egress road on the west of the OOCOA where, in the Unadjusted scenario, queuing at the signalised junction on Old Oak Common Lane causes delays of over 30 minutes (2000 seconds) at the junction with the bus-only road during both peaks.



Figure 9-11: Junction delay –Reduced Highway/ High PT Share scenario vs. Unadjusted scenario AM pk

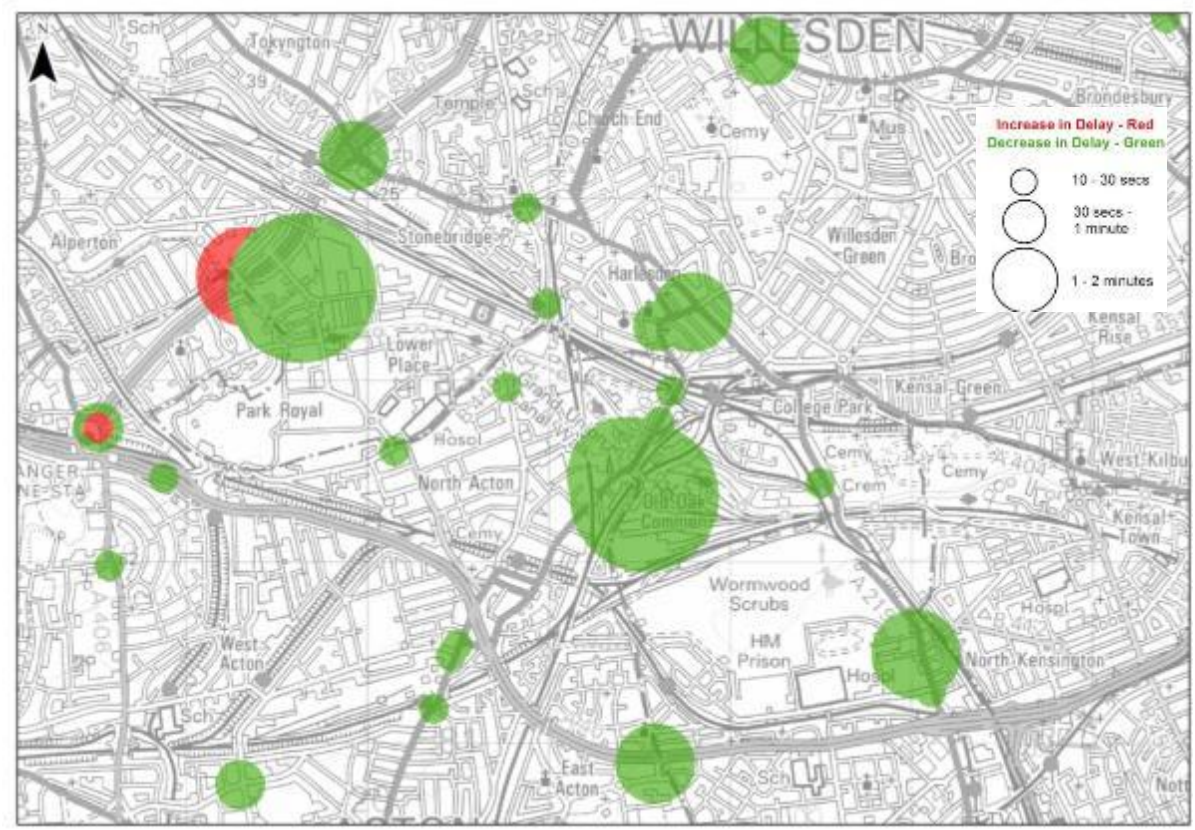


Figure 9-12: Junction delay –Reduced Highway/ High PT Share scenario vs. Unadjusted scenario PM pk

Traffic volume and road capacity (V/C)

Figure 9-13 and Figure 9-14 show the AM peak and PM peak V/C ratios, respectively, for the junctions for the Reduced Highway/ High PT Share scenario. In the AM peak, one junction is forecast to be at critical, or over, capacity within the OOCOA, with two further afield, as listed below. There are also several 'amber' junctions along the A40 and A406, indicating locations which are approaching critical theoretical capacity. These include Old Oak Common Lane/ A40, and A406/ Brentfield Road. In comparison to the 2031 Reference Case and Planning Scenario 2, the number of junctions approaching or at theoretical capacity in and around the OOCOA is broadly similar.

- A40 junction with A4000;
- Old Oak Common Lane (caused primarily by the need to reduce road capacity on this route to prevent too many vehicles using it as a rat run in the model); and
- The A40 westbound approach to Hanger Lane Gyratory.

In the PM peak, the number of junctions approaching or at theoretical capacity in and around the OOCOA is broadly similar to that shown in the 2031 Reference Case. However, the junctions that are critical in the Reduced Highway/ High PT Share scenario, that were not so in the 2031 Reference Case, are:

- A406 junction with Great Central Way; and
- Part of Old Oak Common Lane.

However, it is evident that the Reduced Highway/ High PT Share scenario results in fewer junctions approaching or at critical capacity than was forecast for Planning Scenario 2 (without intervention).

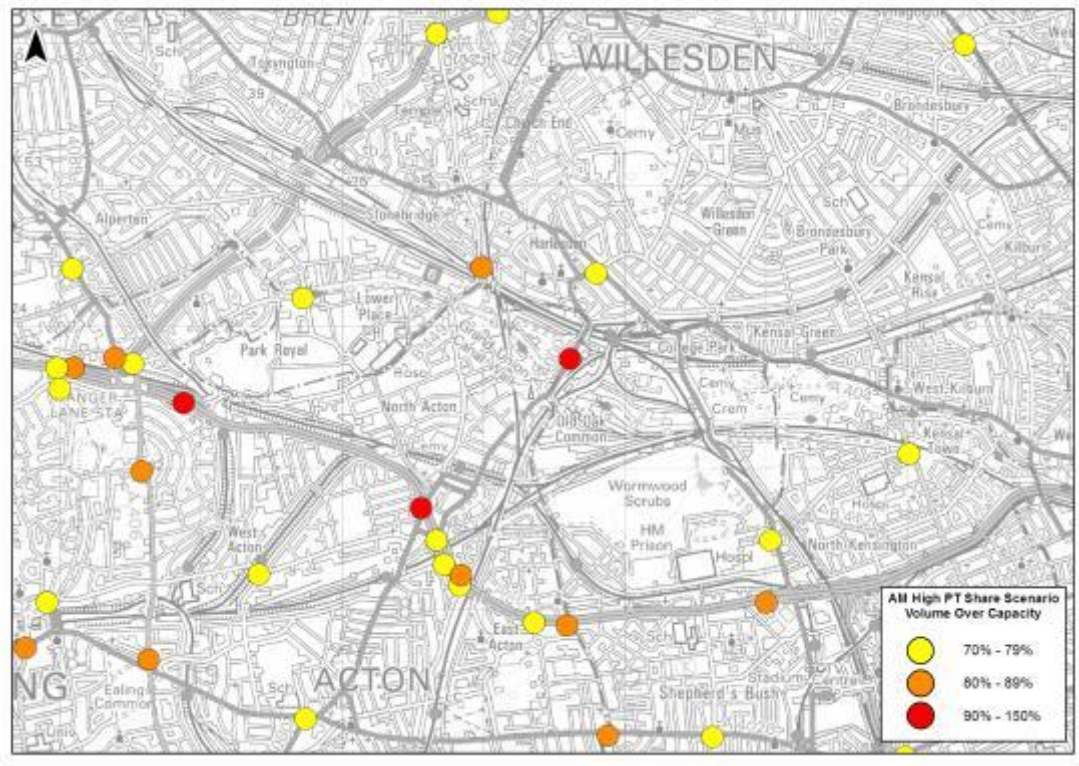


Figure 9-13: Highway network V/C –Reduced Highway/ High PT Share scenario AM pk

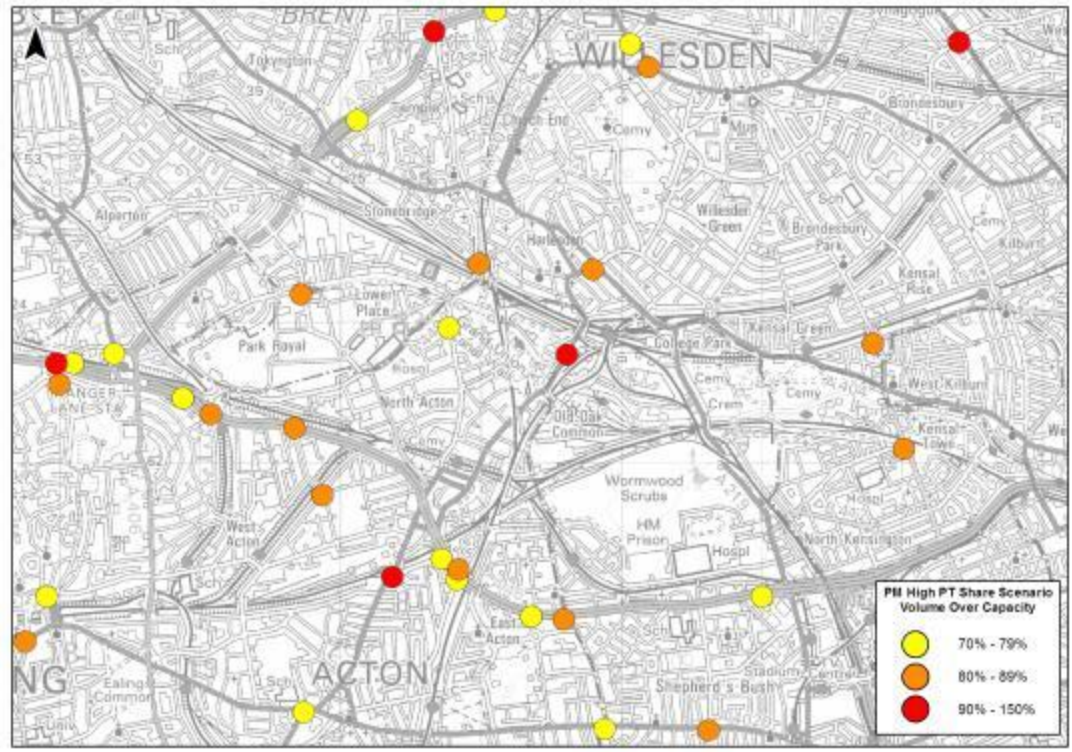


Figure 9-14: Highway network V/C –Reduced Highway/ High PT Share scenario PM pk

OOCOA specific traffic routing

In order to better understand how the traffic generated by the OOCOA development dissipates through the highway network, routing analysis has been undertaken at both gateways to the site for the AM and PM peaks. These are shown in Figure 9-15 and Figure 9-16 for the western access and Figure 9-17 and Figure 9-18 for the eastern access.

Traffic generated by the western side of the site (mostly employment related traffic) uses the A4000 and (primarily) Old Oak Common Lane to access the A40, but also Du Cane Road as an alternative route because of congestion and capacity issues forecast at the other A40 junctions. As expected, the A40 is the main feeder of traffic to the area of the OOCOA. To a lesser extent, some traffic uses the A406 North Circular and reaches the OOCOA via the A404 and Brentfield Road.

Traffic linked with the eastern gateway to site, and mostly representing housing related demand is predicted to be less than the traffic generated by the western entrance. It is less dependent on the A40 to access OOCOA and uses A219 Scrubs Lane and North Pole Road as key routes to the south. A proportion of traffic also finds its way to the A5 via All Souls Avenue.

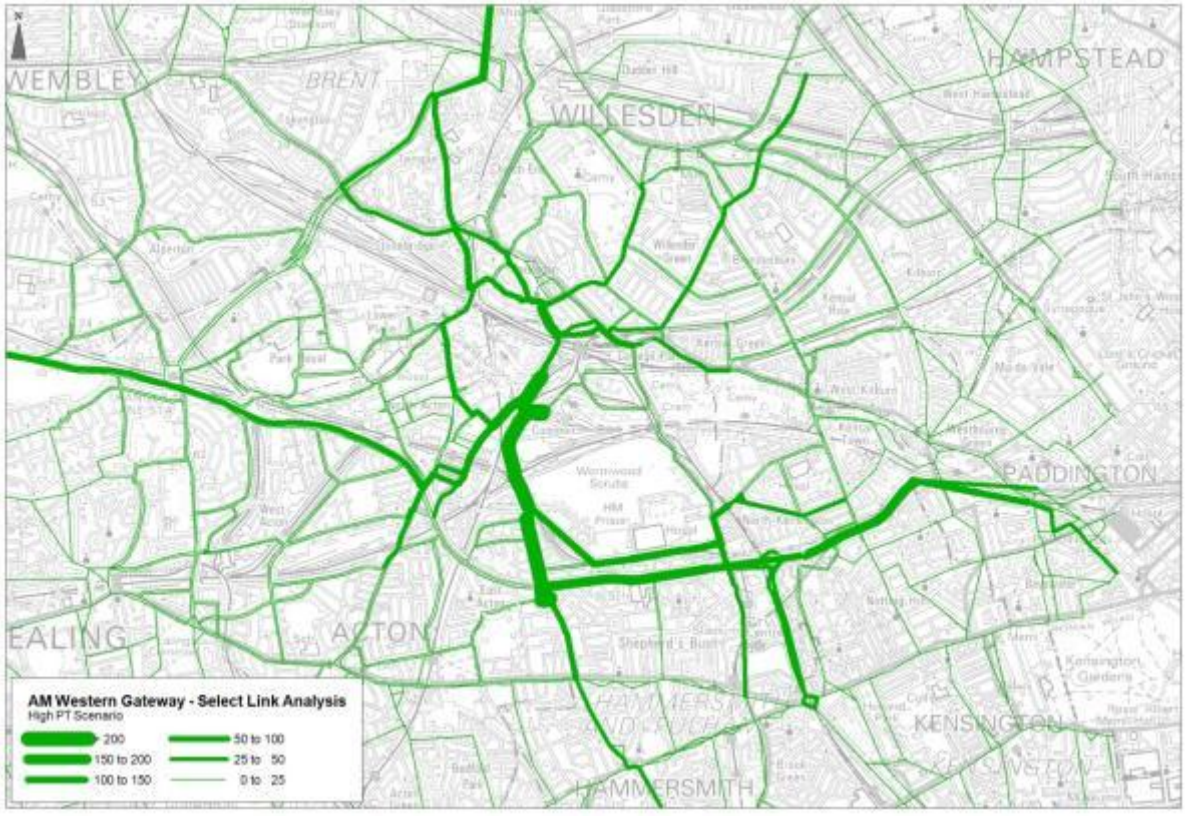


Figure 9-15: OOCOA specific traffic flow - Reduced Highway/ High PT Share scenario, western access AM pk

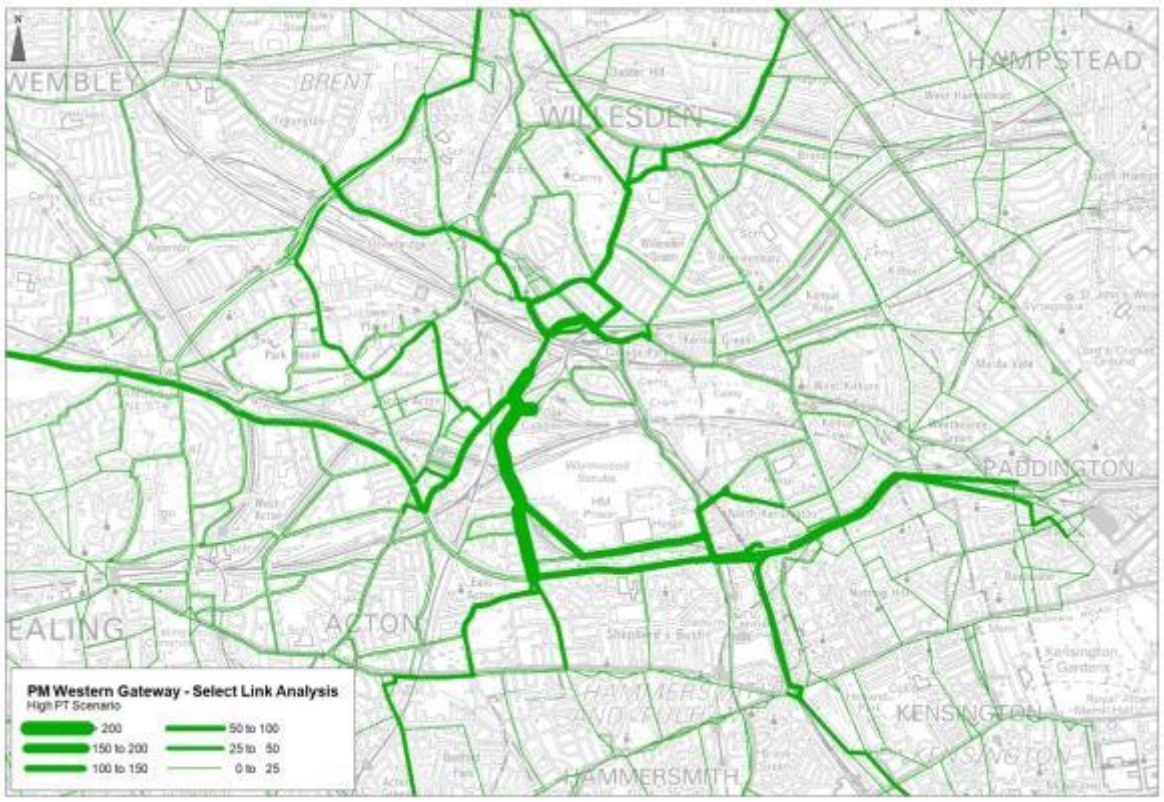


Figure 9-16: OOCOA specific traffic flow - Reduced Highway/ High PT Share scenario, western access PM pk

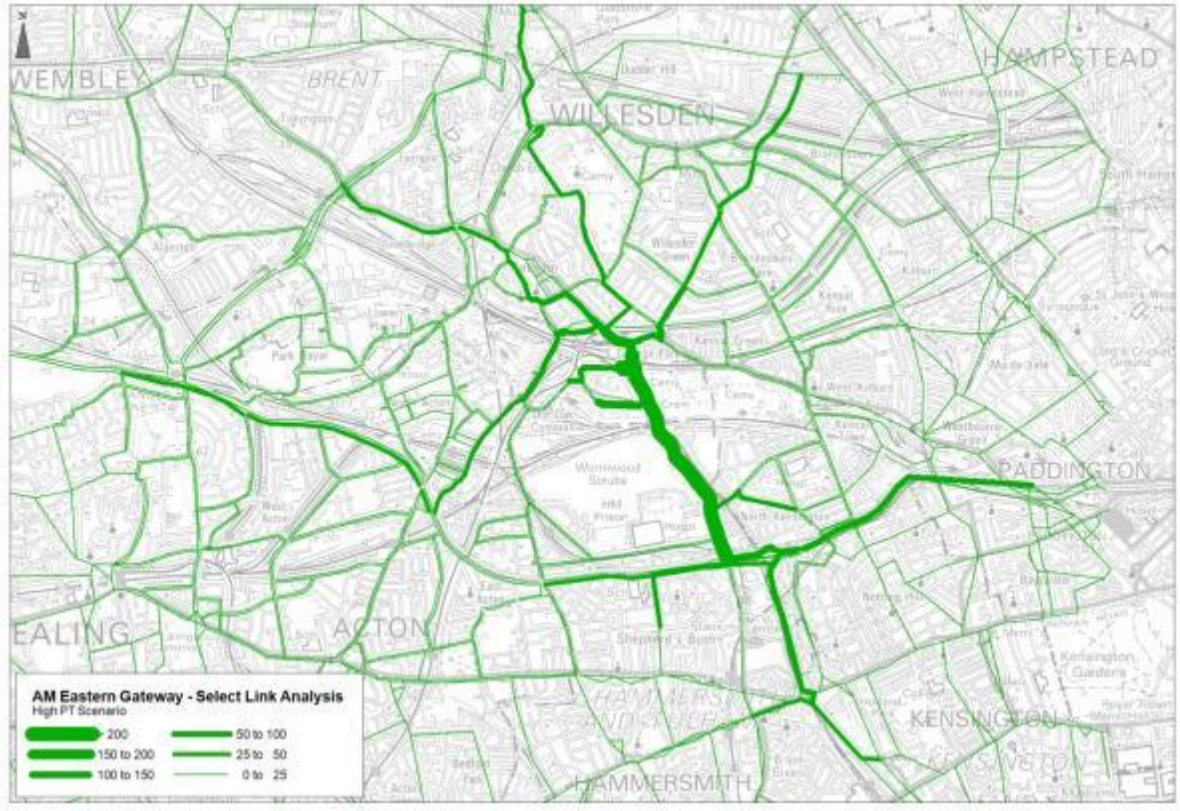


Figure 9-17: OOCOA specific traffic flow - Reduced Highway/ High PT Share scenario, eastern access AM pk

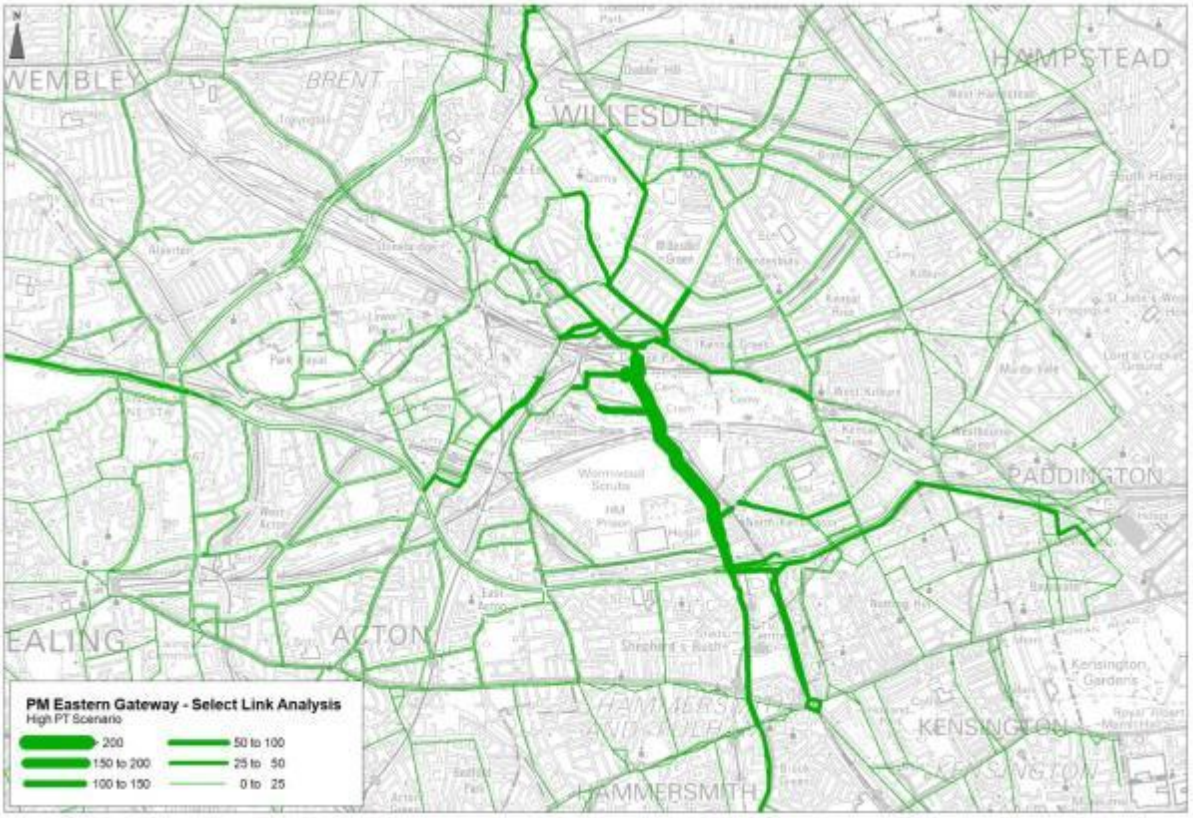


Figure 9-18: OOCOA specific traffic flow - Reduced Highway/ High PT Share scenario, eastern access PM pk

9.2.2 Highway network sensitivity testing

Subsequent to the above assessments, three additional scenarios were designed and tested in comparison to the Reduced Highway/ High PT Share scenario demand. The first of these was a proposal to reduce flows between the OOCOA and the A40 via Old Oak Common Lane by instituting turn bans. Specifically, car traffic heading northbound along Old Oak Common Lane would be banned from turning right into the site at the junction with the middle western access/egress road, with car traffic exiting the site on this road banned from turning left onto Old Oak Common Lane. This was referred to as the *Turn Ban scenario*.

The second of these network alterations was the introduction of a through route accessible to cars through the site between the middle western access/egress road and the eastern site access/egress road. This was referred to as the *Through Route scenario*.

A third test involved increasing the site demand by a fixed proportion over and above that used in the Reduced Highway Demand/ High PT Share scenario. The purpose of this test was to see how much 'capacity' there was, should the targets on car trip proportions incorporated into the Reduced Highway Demand/ High PT Share scenario runs not be achieved. As a preliminary exercise, the flows for key movements at key junctions were analysed in both the Reduced Highway Demand/ High PT Share scenario and the Unadjusted scenario, for both peaks. By comparing flow volumes and V/C ratios it was possible to estimate the total flow for each movement that would equate to flow at capacity. It was decided to test the networks with OOCOA development related car traffic at 50%, 60% and 70% over and above the Reduced Highway Demand/ High PT Share scenario values. Analysis

of the results shows that the networks started to break down when the OOCOA development related car demand was 60% over and above that of the Reduced Highway Demand/ High PT Share scenario. This scenario was referred to as the *High PT plus 60% scenario*.

A summary of the highway sensitivity testing results is outlined below.

Turn Ban scenario

In this test, the flow changes on Old Oak Common Lane are broadly beneficial, while the re-routing resulting has little significant negative impact on the network. The flow increases through Harlesden resulting from the rerouting may be mitigated by the introduction of the OOCOA through route alongside the banned turns tested in this run.

Through Route scenario

In this sensitivity test, the flow changes on roads through the OAPF site have minimal negative impact on the network, with the resultant rerouting creating beneficial reductions in flow on Old Oak Common Lane, Du Cane Road and in Harlesden.

The slight flow increases northbound on Old Oak Common Lane between the A40 and Du Cane Road may be mitigated by the introduction of turn bans at the middle western junction preventing access to the OOCOA through route from the south.

High PT plus 60% scenario

In this sensitivity test the AM peak network proves to be more resilient, although there is noticeable extra strain around the OOCOA. In the PM peak, the development related car demand increase of 60% over and above that seen in the High PT Share run causes the middle western egress from the OOCOA site to seize up, and further increases in demand over and above this level will generate even more significant delays on this egress road.

Since the signal settings at the key junctions were optimised for the 2031 Reduced Highway / High PT Share scenario flows, it is possible that further signal optimisation will permit more traffic to flow in the PM peak, thus raising the implied traffic demand threshold. However, if the Through Route Scenario tested were to be used, the significant extra traffic demand at two of the gateway junctions resulting from this will significantly reduce the amount of extra OOCOA-related highway demand that can be accommodated.

This would suggest that the 60% increase in traffic over and above the 2031 Reduced Highway / High PT Share Scenario is a reasonable upper bound for the amount of highway demand that the network can accommodate, unless the Through Route Scenario is taken forward whereupon the upper bound is likely to be lower than this.

9.2.3 Public transport network performance

Rail network performance

Passenger volumes/ flows

Figure 9-19 shows the change in passenger volumes/flows between the Unadjusted scenario and 2031 Reference Case. The principal increases in flows, indicated by red lines, occur along the WLL, NLL and Crossrail, i.e. routes which provide future year additional capacity. The

extra flow on these routes is principally abstracted from the WCML into Euston and HS2 from Old Oak Common to Euston. There is a significant decrease on the Victoria Line between Euston and Clapham Junction (via interchange at Vauxhall). This is caused because demand from the WCML to the Clapham area (and destinations beyond) may now interchange at Old Oak Common and use the direct WLL.

Figure 9-20 shows the change in flows between the Reduced Highway / High PT Share scenario and 2031 Reference Case. In comparison with the Unadjusted scenario, there is a forecast increase in passenger flow on all lines serving the OOCOA due to the high public transport modal share assumed in this scenario.

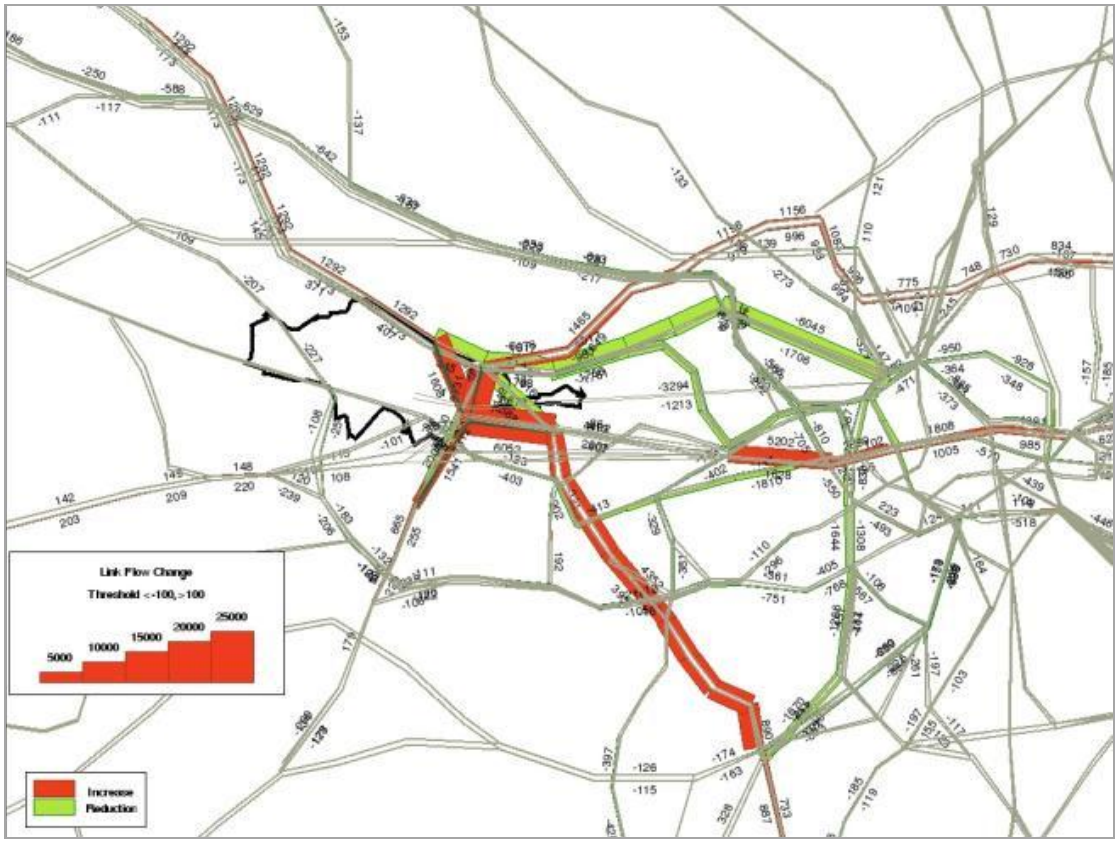


Figure 9-19: Rail passenger flows Unadjusted scenario vs. 2031 Reference Case AM pk

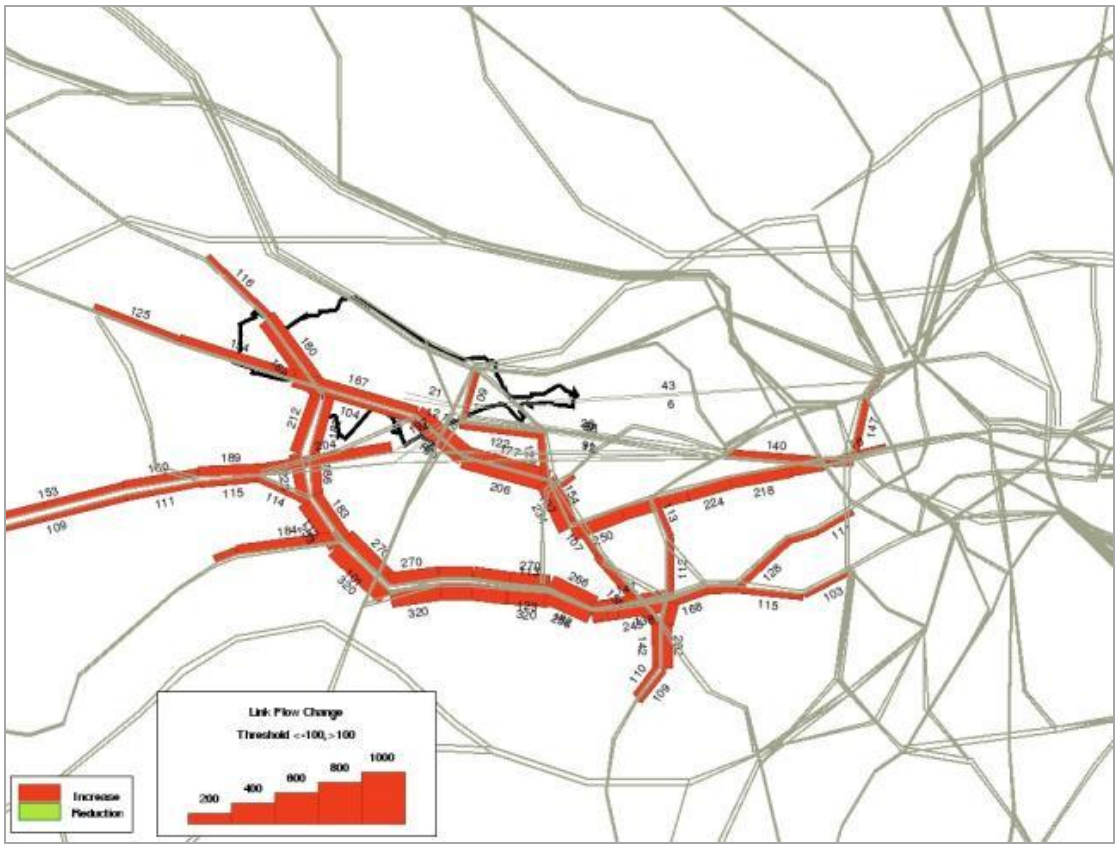


Figure 9-20: Rail passenger flows Reduced Highway / High PT Share scenario vs 2031 Reference Case AM pk

Crowding

For the Unadjusted scenario, the forecast change in flow (Figure 9-19) indicates relief at Euston station and in particular, the LUL lines passing through it. This is reflected to a degree by LUL crowding factors (Figure 9-21) which indicate a crowding reduction on some sections of the network i.e. Northern Line from Euston to King Cross and from Goodge Street to Tottenham Court Road, and the Victoria line from Oxford Circus to Green Park. Overall, crowding levels remain consistent with the 2031 Reference Case and Planning Scenario 2, with services in the vicinity of and serving OOCOA at acceptable levels. However, further improvements may be required to mitigate crowding on the wider LUL network.

On the LO and National Rail network (Figure 9-22) it is evident that there is an exacerbation of crowding on certain routes, in particular the NLL between Gunnersbury and Stratford, the WLL between Clapham Junction and Shepherd's Bush, and Crossrail between Paddington and Tottenham Court Road, in comparison to the 2031 Reference Case and Planning Scenario 2. This is potentially due to the introduction of a LO station in OOCOA and the Crossrail-WCML link which increases patronage on these lines. This may suggest that whilst the interventions improve access to the OOCOA, further improvements may be required to mitigate crowding on the wider rail network.

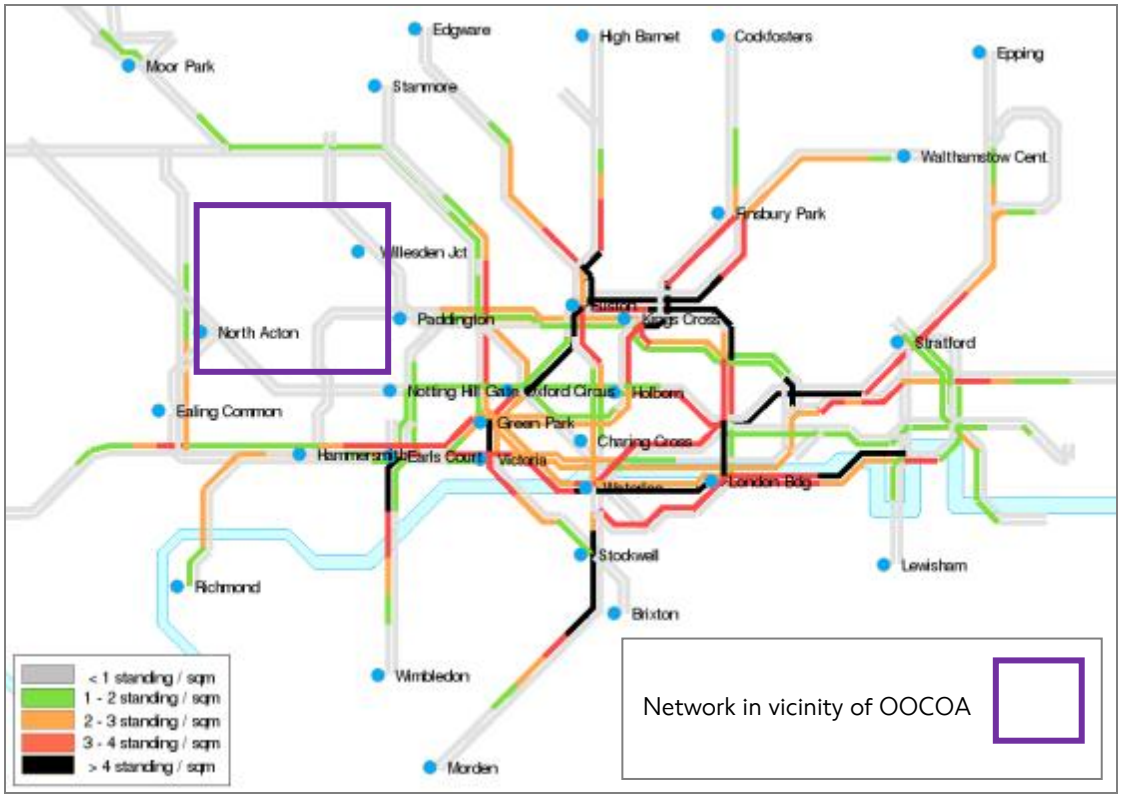


Figure 9-21: Crowding on LUL – Unadjusted scenario

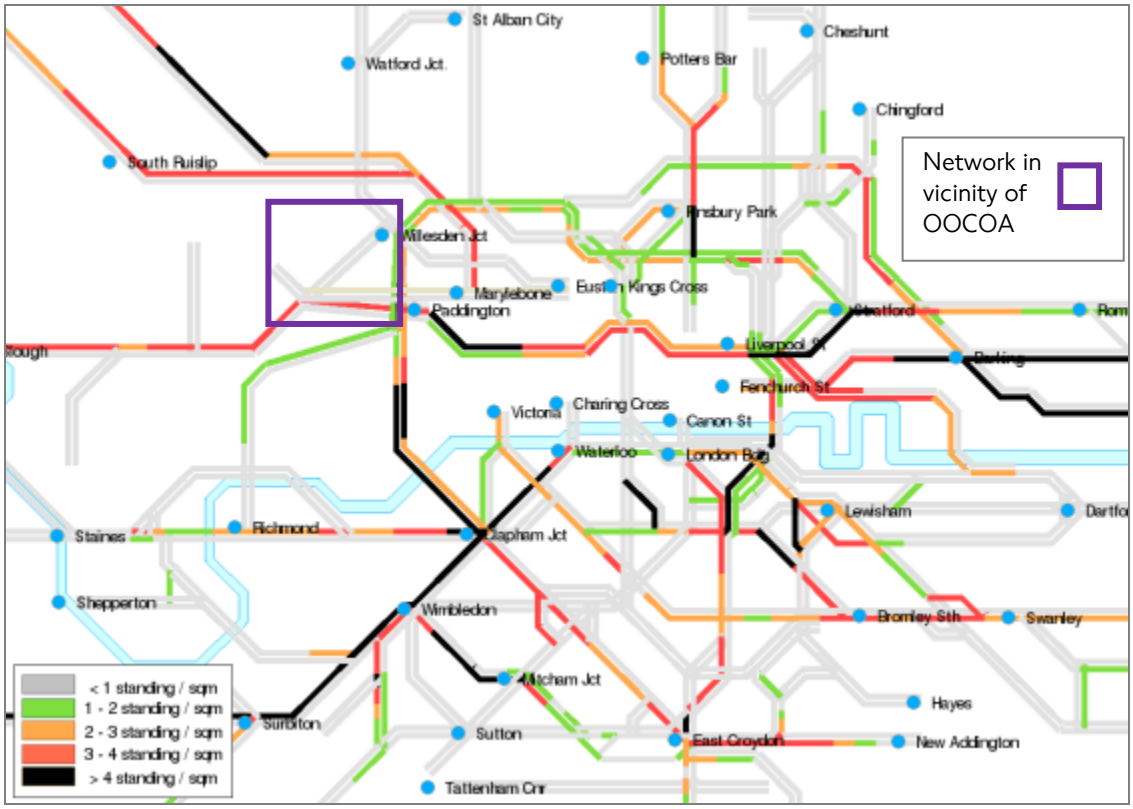


Figure 9-22: Crowding on LO and National Rail – Unadjusted scenario

For the Reduced Highway / High PT Share scenario, crowding factors for the LUL network is shown in Figure 9-23, and for the LO and National Rail network in Figure 9-24. In comparison to the Unadjusted scenario, there is little apparent change in crowding, except on one link on the Piccadilly line between Hammersmith and Barons Court on the LUL and on one link on the Kingston Loop on National Rail. This indicates that the introduction of the higher public transport share does not have a significant impact upon crowding levels on the rail network, which are still at an acceptable level in the immediate vicinity of the OOCOA. However, further mitigations may be required to improve travel conditions on the wider network i.e. WLL.

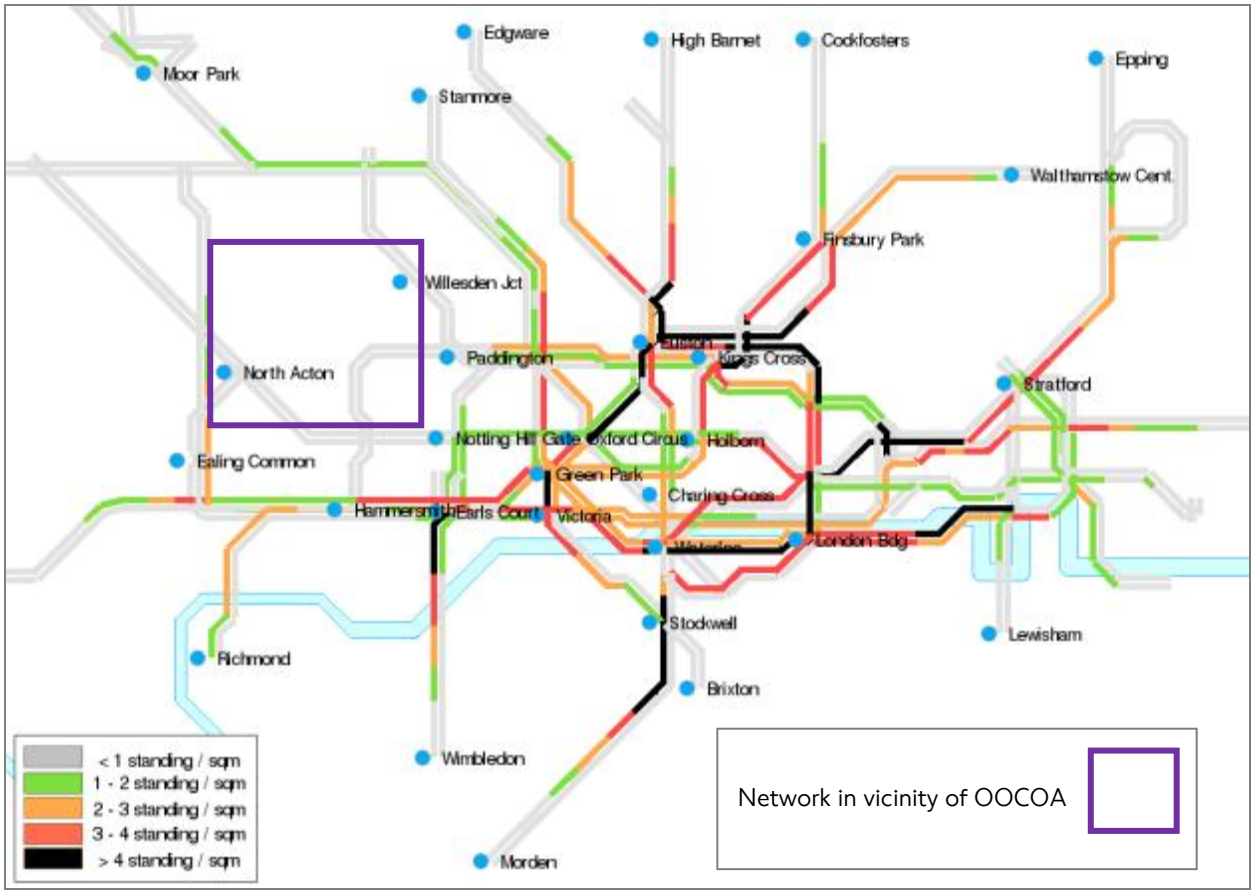


Figure 9-23: Crowding on LUL – Reduced Highway / High PT Share scenario

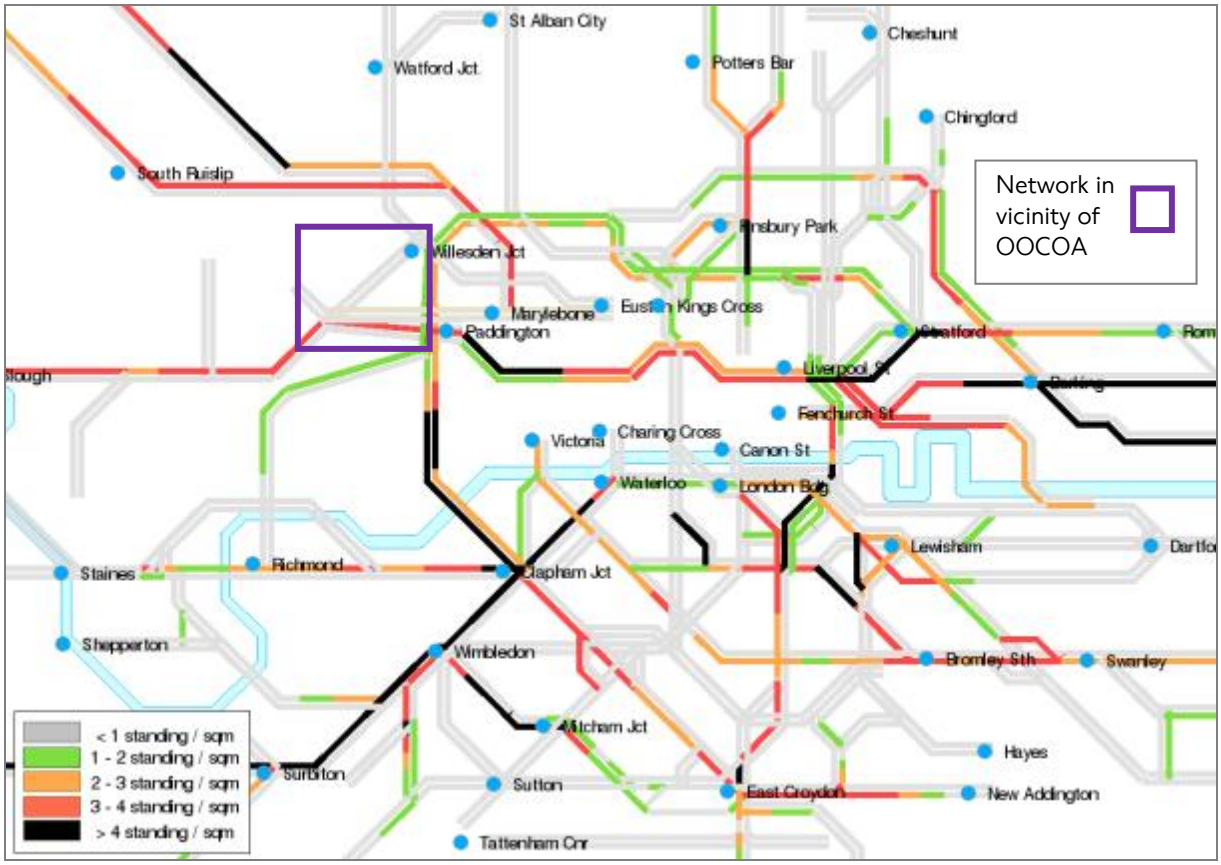


Figure 9-24: Crowding on LO and National Rail – Reduced Highway / High PT Share scenario

Station Demand

The passenger station demand in the Unadjusted and Reduced Highway/ High PT Share scenarios, with regard to AM peak (0700 – 1000) entry and exit, is shown in Table 9-1. The overall station movement, which includes passengers interchanging between services, is shown in Table 9-2. The 2031 Reference Case and Planning Scenario 2 numbers are shown for comparison.

Station	2031 Reference Case		Planning Scenario 2		Unadjusted scenario		Reduced Highway/ High PT Share scenario	
	Entry (no. pass)	Exit (no. pass)	Entry (no. pass)	Exit (no. pass)	Entry (no. pass)	Exit (no. pass)	Entry (no. pass)	Exit (no. pass)
Old Oak Common	2,600	4,100	3,500	8,800	6,100	15,300	6,200	15,600
Willesden Junction	2,900	2,300	4,600	4,900	4,300	4,000	4,300	4,000
Kensal Green	1,900	1,900	2,100	3,500	1,700	1,500	1,700	1,500
North Acton	1,300	1,100	2,600	2,600	2,500	2,600	2,600	2,700

Table 9-1: Station entry and exit – Unadjusted scenario and Reduced Highway/ High PT Share scenario AM pk

Station	2031 Reference Case	Planning Scenario 2	Unadjusted scenario	Reduced Highway/ High PT Share scenario
	Total station movement (nos. passengers)			
Old Oak Common	42,300	47,600	63,900 (34%)	64,300 (35%)
Willesden Junction	9,700	13,600	13,200 (-3%)	13,400 (-1%)
Kensal Green	3,900	5,700	3,200 (-78%)	3,200 (-78%)
North Acton	2,400	5,200	6,000 (5%)	6,200 (9%)

Table 9-2: Total station movement – Unadjusted scenario and Reduced Highway/ High PT Share scenario AM pk

It is evident that Old Oak Common and Willesden Junction rail stations remain important services for site access and egress. With the intervention scenarios, there are significant increases in use of Old Oak Common rail station, primarily due to the introduction of LO services, which allows for approximately an additional 4,000 alighters into the OOCOA in the AM peak. HS2 passengers also take advantage of increased interchange options, with less alighters (previously connecting with buses) in the Reduced Highway/ High PT Share scenario (down from 2,400 to 1,700). The reduced usage of Kensal Green station relates to the interventions providing improved options for alternative public transport services (improved bus and walking provision, along with LO services) and therefore a reduction in station demand.

Bus network performance

Bus demand, as a proportion of bus capacity, for the Unadjusted scenario is shown in Figure 9-25. It can be seen that the addition of the Unadjusted scenario intervention package provides a general improvement in the area, particularly on Old Oak Common Lane and Victoria Road and A219 Scrubs Lane corridors, where demand in general does not exceed capacity. There are few sections of the network where demand is close to or reaching capacity; for example along Hythe Road outbound from the OOCOA and then right onto A219 Scrubs Lane or around OOCOA. There is, however, an overall improvement to bus crowding conditions, when compared to the Planning Scenario 2 impact without interventions (Figure 7-15).



Figure 9-25: Bus volume demand to capacity ratio – Unadjusted scenario AM pk

Bus demand, as a proportion of bus capacity, for the Reduced Highway/ High PT Share scenario is shown in Figure 9-26. In this scenario, as described earlier, the increases in public transport supply are accompanied by an increased public transport demand that has been shifted from the highway. Trips from the highway network have come predominantly from the local area, as shown in Table 9-3. The forecast shows a relatively small increase in bus demand on the network, in comparison to the Unadjusted scenario, mainly along A219 Scrubs Lane (where the volume to capacity ratio exceeds one i.e. demand exceeds capacity), Hythe Road and around Old Oak Common. This is consistent with the pattern of the trips shifted from the highway to public transport network, which shows that the new trips are concentrated mostly in LBE, LBHF and LBB; therefore within direct vicinity of the OOCOA. In comparison with Planning Scenario 2 without intervention, however, bus crowding levels are still much reduced under the Reduced Highway/ High PT Share scenario.



Figure 9-26: Bus volume demand to capacity ratio – Reduced Highway/ High PT Share scenario AM pk

High PT Shift	Airports	RB Kingston-upon-Thames	LB Croydon	LB Bromley	LB Hounslow	LB Ealing	LB Havering	LB Hillingdon	LB Harrow	LB Brent	LB Barnet	LB Lambeth	LB Southwark	LB Lewisham	LB Greenwich	LB Bexley	LB Enfield	LB Waltham Forest	LB Sutton	LB Richmond upon Thames	LB Merton	LB Wandsworth	LB Hammersmith and Fulham	RB Kensington and Chelsea	City of Westminister	LB Camden	LB Tower Hamlets	LB Islington	LB Hackney	LB Haringey	LB Newham	LB Barking and Dagenham	City of London	LB Redbridge	External	Total
Airports	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	10
RB Kingston-upon-Thames	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	12
LB Croydon	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	6
LB Bromley	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	5
LB Hounslow	-	-	-	-	-	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	120
LB Ealing	5	1	1	1	29	608	0	18	15	110	21	3	2	1	0	0	6	1	1	8	1	4	548	59	48	11	2	3	1	3	1	1	1	1	65	1,584
LB Havering	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2
LB Hillingdon	-	-	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	-	-	-	-	-	-	-	-	-	-	-	68
LB Harrow	-	-	-	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46	-	-	-	-	-	-	-	-	-	-	-	70
LB Brent	-	-	-	-	-	161	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	499	-	-	-	-	-	-	-	-	-	-	-	660
LB Barnet	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66	-	-	-	-	-	-	-	-	-	-	-	83
LB Lambeth	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21	-	-	-	-	-	-	-	-	-	-	-	25
LB Southwark	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-	20
LB Lewisham	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	8
LB Greenwich	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2
LB Bexley	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1
LB Enfield	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	17
LB Waltham Forest	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	6
LB Sutton	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	7
LB Richmond upon Thames	-	-	-	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	-	-	-	-	-	-	-	-	-	-	-	49
LB Merton	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	8
LB Wandsworth	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	-	-	-	-	-	-	-	-	-	-	-	34
LB Hammersmith and Fulham	13	4	2	1	40	412	0	43	28	323	40	9	7	2	1	1	10	3	2	16	3	16	958	166	112	62	8	12	7	11	4	1	3	1	166	2,488
RB Kensington and Chelsea	-	-	-	-	-	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	183	-	-	-	-	-	-	-	-	-	-	-	230
City of Westminister	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	173	-	-	-	-	-	-	-	-	-	-	-	218
LB Camden	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	-	90
LB Tower Hamlets	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	11
LB Islington	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	-	-	-	-	-	-	-	-	-	-	-	24
LB Hackney	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	16
LB Haringey	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	17
LB Newham	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	7
LB Barking and Dagenham	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2
City of London	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2
LB Redbridge	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	4
External	-	-	-	-	-	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	196	-	-	-	-	-	-	-	-	-	-	-	264
Total	19	5	3	2	69	1,546	1	61	44	433	61	12	9	3	1	1	16	4	3	24	5	21	3,078	225	160	73	10	15	8	15	5	2	4	2	231	6,170

Table 9-3: Distribution of highway trips that transfer to the public transport network

9.3 Summary of findings for future year with development including interventions

This section has reported on the forecasts and future operation of a transport network which incorporates the interventions proposed, which aim to further reduce highway demand and achieve a higher public transport mode share. The Reduced Highway/ High PT Share option applied a target mode share to the Planning Scenario 2 demand generated by the development. The target mode share was based on that achieved by exemplars of sustainable and public transport orientated development within London. The key findings are summarised below.

Highway network:

The Planning Scenario 2 was adjusted in line with aspirations for a reduced highway demand and a high PT share, to be achieved for trips from and to the OOCOA. Under the Reduced Highway/ High PT Share option, a number of roads and junctions are forecast to remain under stress, including:

- A406 immediately north and south of Hanger Lane gyratory, including side roads accessing it at signalised junctions (Brentfield Road/Drury Road, Brentfield Road/Harrow Road, Hillcrest);
- Hanger Lane gyratory itself, particularly from Twyford Abbey Road westbound and the A406 southbound;
- The A40/A4000 gyratory;
- The A40 westbound approach to the Old Oak Common Lane junction and Savoy Circus;
- B408 Old Oak Road/A4020 The Vale south of the A40; and
- The A4020 / A4000 junction.

The reduction in development related highway trips in the highway model results in the highway network not being under significantly extra strain compared to the 2031 Reference Case. Although no major congestion occurs within the immediate OOCOA area, access to the major surrounding roads of the A406, A40 and, to a lesser extent the A404 is subject to similar congestion to the Reference Case. Therefore, even under Reduced Highway/ High PT Share conditions, this may adversely affect the ability of the network to deliver new traffic to and from the proposed OOCOA developments. Further work is needed to examine possible options for the A40 and A406, taking into account the cumulative impact of a number of large-scale developments.

Public transport network:

A package of public transport interventions was proposed for Planning Scenario 2, to improve connectivity within the OOCOA and the wider area, and encourage the use of sustainable travel.

The improvements were applied to the Planning Scenario 2 network and tested in the assignment models with the original demand matrix, to assess their impact on this scenario. The analysis of the results showed general improvements in public transport travel conditions such as crowding on bus services in the local area. The increase in the number of passengers accessing the OOCOA on Crossrail and LO implies that the interventions improve conditions enough to make those services an attractive way of accessing this area.

Further improvements may, however, need to be considered, to mitigate the effects on the wider network, for example on the WLL between Clapham Junction and Shepherd's Bush, and Crossrail between Paddington and Tottenham Court Road, where crowding levels are forecast to be at, or approaching, an undesirable level.

The target mode share approach assumed that around 6,000 highway trips would shift from highway to public transport in response to the interventions. The revised demand assumptions were tested in the public transport model by assigning this matrix on the Planning Scenario 2 network, with interventions incorporated. The results showed an increase in trips localised in LBE, LBHF and LBB, and in the immediate vicinity of the OOCOA. This, in turn, resulted in very minimal changes on LUL, LO and National Rail network, although some worsening of crowding on bus services in and around the OOCOA, in comparison with the Unadjusted scenario.

The results of the tests with interventions, and also with and without demand shifting from highway to public transport, show that, in general, the interventions improve access to the OOCOA. Further interventions may, however, need to be considered, to mitigate the impact on the wider network (LO/Crossrail) and mitigate levels of crowding on bus services in and around the OOCOA.

10 Implementation

Each intervention measure will be subject to further planning and assessment, following which an indicative programme for delivery will be identified, based on short term (up to 2020), medium term (2020 to 2026) and long term (post 2026) timeframes. It is anticipated that the programme will be guided by the OAPF delivery and implementation plan.

Interventions	Short term	Medium Term	Long Term	Likely responsible authority
Highway interventions				
Eastern access from A219 Scrubs Lane				TfL, Local Authorities, developers
Western access from Old Oak Common Lane				TfL, Local Authorities, developers
Western access from A4000 Old Oak Lane				TfL, Local Authorities, developers
Internal roads and junctions, including two new bridges over the canal				TfL, Local Authorities, developers
New bus, pedestrian / cycle only link to HS2 Crossrail hub				HS2 Ltd, TfL, Local Authorities, developers
Victoria Road widening				HS2 Ltd, TfL, Local Authorities, developers
Highway 'quick wins'				TfL, Local Authorities, developers
Managing travel demand				
Promoting sustainable urban mobility				TfL, Local Authorities, developers
Zonal access				Local Authorities, developers
Residential and workplace travel plans to support new development				Local Authorities, developers
Increasing rail capacity and improving rail connectivity				
Willesden Junction station capacity enhancements				TfL, NR, Local Authorities, developers
North Acton station capacity enhancements				TfL, Local Authorities, developers
LO capacity enhancements				TfL, NR, Local Authorities
Provision of a new LO station on the NLL and WLL				HS2 Ltd, TfL, NR, Local Authorities
Provision of a Crossrail 1 to WCML spur				HS2 Ltd, TfL, NR, Local Authorities
Improving bus and other public transport facilities				
New bus routes and infrastructure				TfL, Local Authorities, developers
Suitable provision of taxi ranks				TfL, Local Authorities, developers
Future proofing for appropriate freight services				
Consolidation centre(s)				TfL, NR, Local Authorities, developers
Provision of Delivery and Servicing Plans (DSPs)				TfL, NR, Local Authorities, developers
Re-timing deliveries to outside of peak periods				TfL, NR, Local Authorities, developers

Interventions	Short term	Medium Term	Long Term	Likely responsible authority
Concierge services	■	■	■	TfL, NR, Local Authorities, developers
Improving pedestrian connectivity, wayfinding and urban realm				
New network of streets and improve pedestrian permeability and connectivity	■	■	■	TfL, Local Authorities, developers
Improved pedestrian wayfinding	■	■	■	TfL, Legible London
Improving cycle accessibility and facilities				
High quality facilities for cyclists		■	■	TfL, Local Authorities, developers
Links to planned facilities and the wider network		■	■	TfL, Local Authorities, developers
Provision of publicly accessible, high quality, cycle parking	■	■	■	TfL, Local Authorities, developers

Table 10-1: Indicative programme for proposed interventions

11 Conclusions and next steps

This Strategic Transport Study has identified a number of existing issues associated with the transport network surrounding the OOCOA and challenges faced in the context of future development and trip generation related to the site. The challenges faced were, in general, apparent in the 2031 Reference Case, without development, which highlights and further compounds the transportation problems faced and the level of intervention required to support development.

The Study proposed a package of transport interventions to help mitigate these and support the planned employment and population growth in the OOCOA. These have been developed through qualitative assessment, discussion with key stakeholders and through strategic transport modelling. The package of interventions proposed to mitigate the impact of the preferred development scenario includes:

- New LO station(s) at Old Oak Common serving the NLL and WLL;
- Willesden Junction station improvements and bridge over WCML
- Potential Crossrail 1 to WCML link;
- Improved frequencies on the LO (4 tph from Richmond to Stratford and to 6 tph from Clapham Junction to Stratford, resulting in 10 tph from Willesden Junction to Stratford);
- Increased bus frequencies and new routes operating throughout the OOCOA;
- New internal walk network throughout the OOCOA;
- New highway connections throughout the OOCOA and the wider area;
- A package of highway 'quick wins' (including new site accesses);
- A package of measures to improve conditions for walking and cycling; and
- A package of demand management measures to ensure a reduced car mode share, including 'car-free' parking for the commercial elements of the development and low levels for the residential uses.

The conclusions of this Study are based on a low car mode share being achieved through the implementation of the preferred Transport Strategy. If this cannot be achieved, then other measures will need to be considered to ensure the number of highway trips can be managed and accommodated on the network. This may potentially involve having to reduce the amount of development on site. A monitoring strategy for any future development which takes place is therefore likely to be crucial.

In addition to the preferred package of interventions, the Study has also identified a number of areas where additional work should be undertaken, in collaboration with stakeholders in order to further facilitate the planned development of the area. These are as follows:

- A review of what major junction/ capacity improvements may be needed on the strategic road network, including the A40 Westway, Hanger Lane Gyratory and the A406 North Circular to mitigate the traffic impact. It is proposed that these be looked at in more detail as part of a separate piece of work;
- A review of the feasibility and impact of emerging proposals to improve access to the OOCOA and additional links to the wider highway network including work currently being developed by TfL in response to the Roads Task Force recommendations;

- A review of proposals developed by other stakeholders including the new highway link to the A40 proposed by Fosters and a new link road from A219 Scrubs Lane to Ladbroke Grove. It should be noted that these proposed schemes have not been included as part of the recommended Transport Strategy outlined in this report;
- Localised modelling of junctions and links within the Park Royal area and preparation of a transport strategy for Park Royal;
- Complete the detailed design for new LO stations and associated infrastructure, following public consultation and a recommendation to proceed with option C. In particular, the transport impact of a new station in the Old Oak North site should be explored;
- A more detailed examination of what improvements may be needed at both North Acton and Willesden Junction stations;
- A study into the feasibility of building the proposed bridge over the WCML tracks from Old Oak to Willesden Junction to a standard that could accommodate buses;
- A more detailed review of bus services and liaison with operators, to ensure the provision of an efficient bus network to serve OOCOA and provide connections to the wider area.
- A review of the modelling outputs on rail crowding taking into account the impact of the potential Crossrail 1 to WCML link;
- Further consideration as to what cycle facilities may be needed to achieve levels of cycling above MTS targets including the adoption of mini-Holland type schemes, connecting the site to the wider area e.g. White City, Harlesden, Ladbroke Grove and Park Royal and to future infrastructure such as the proposed Cycle Superhighway;
- Development of a Construction Logistics Strategy that aims to maximise the use of rail and water transport and minimises the impacts of road based transport;
- A review and update of the Transport Strategy to inform the Local Plan process;
- A monitoring strategy; and
- A phasing strategy.

The Study is based on the current HS2 station designs (including the accommodating highway improvements) and the level of development assumed in the medium growth scenario (i.e. 24,000 homes and 55,000 jobs). Any changes to these assumptions in whole or part may result in the requirement to alter or change any of the recommended interventions of this Study.

Furthermore, this Study assumes an 'end-state' scenario in 2031 although development will be spread over a longer timescale, and that all of the current barriers to developing the site in its entirety e.g. the presence of the Crossrail and IEP depots, have been overcome. Further work to look at an appropriate phasing strategy for delivering the interventions which have been identified should therefore be undertaken. This may form part of the Development Infrastructure Funding Study which is currently underway, or be carried out as a separate piece of work.