05 Planning Policy Context

Environmental Statement

Volume I

05 Planning Policy Context

Introduction

5.1 This chapter provides a summary of planning policy considerations for the Northern Line Extension (NLE). *Chapter 1: Introduction* provides a description of how the Environmental Impact Assessment (EIA) process fits into the Transport and Works Act Order (TWAO) procedures and overall legislative framework. This chapter concentrates on the planning policy and designations considered in the Environmental Statement (ES).

5.2 Figure 5-1 provides an overview of the key land use policy designations relative to the NLE. The figure also includes:

- Borough boundaries;
- NLE route and scheme features;
- Central Activities Zone (CAZ);
- Vauxhall, Nine Elms Battersea Opportunity Area (VNEB OA);
- Major Development Opportunity site; and
- Safeguarded Wharves.

5.3 It should be noted that it is not the intention for this chapter to describe the policy context in its entirety, as the policy designations for the specific technical studies are described in the relevant technical chapters of this ES. The planning policy context for the NLE comprises three levels of planning policy - national, regional and local. Within each level there is both planning policy and guidance, which combine to provide the overall framework for the consideration of the NLE.

National Planning Policy

5.4 The Government published the National Planning Policy Framework (NPPF) in March 2012 (Ref. 5-1). The document streamlines national planning policy into a consolidated set of priorities, replacing most Planning Policy Statements and Planning Policy Guidance notes. National policy guidance is also provided in the form Circulars, White Papers and other Central Government publications.

5.5 A core theme of the NPPF is the delivery of sustainable development and economic growth, which is enshrined in para 14 whereby, as both plan making and decision making process is established, there is a "*presumption in favour of sustainable development".* In relation to decision making, this means *"approving development proposals that accord with the development plan without delay"*. Para 19 further supports this advising that *"planning should operate to encourage and not act as an impediment to sustainable growth"*.

5.6 Paragraph 17 identifies twelve core planning principles, the following being of particular relevance:

- Proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs.
- Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environment value;
- Promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions;
- Actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable; and
- Take account of land and support local strategies to improve health, social and cultural wellbeing for all, and deliver sufficient community and cultural facilities and services to meet local needs.

Development Plan

5.7 Section 38(6) of the Planning and Compulsory Purchase Act 2004 requires planning applications to be determined in accordance with the Development Plan, unless material considerations indicate otherwise. The Development Plan comprises the London Plan (2011) (Ref. 5-2), London Borough of Lambeth's (LBL) Local Development Framework (LDF), London Borough of Southwark's (LBS) LDF and London Borough of Wandsworth's (LBW) LDF.

5.8 The LBW's adopted LDF comprises the Core Strategy 2010 (Ref. 5-3), Site Specific Allocations Document 2012 (Ref. 5-4) and the Development Management Policies Document 2012 (Ref. 5-5).

5.9 The LBL's adopted LDF comprises the Core Strategy 2011 (Ref. 5-6) and the policies 'saved' within the Unitary Development Plan (UDP) 2010 (Ref. 5-7) and Vauxhall Supplementary Planning Document (SPD) (January 2013) (Ref. 5-8)

5.10 The LBS's adopted LDF comprises the Core Strategy 2011 (Ref. 5-9) and the policies 'saved' within the UDP 2011 (Ref. 5-10).

Regional Planning Policy

London Plan

5.11 The London Plan provides regional planning policy guidance and forms a component part of the statutory development plan. The London Plan embraces two objectives, namely:

- London retains and extends its global roles as sustainable centre for business, innovation, creativity, health, education, and research; and
- The development of London supports the spatial economic environmental and social development of Europe and the UK (Policy 2.1 London in its Global, European and United Kingdom Context).

5.12 The London Plan sets out the Mayor's vision and objective that, over the period to 2031, London should "*excel among global cities - expanding opportunities for all its people and enterprises, achieving the highest environmental standards and quality of life and leading the world in its approach to tackling the urban challenges of the 21st century, particularly that of climate change*" (paragraph 1.52).

5.13 The Mayor's Transport Strategy 2010 (Ref. 5-11) underpins the London Plan and sets out the transport vision for London over the next 20 years.

05 Planning Policy Context

5.14 The VNEB OA is located in the CAZ and the London Plan recognises the importance of these areas as the core of London's employment, providing almost one third of London's jobs (paragraph 2.44). The London Plan advises that the Mayor is committed to supporting CAZ functions including by ensuring that development in the CAZ meets strategic and more local needs.

5.15 Policy 2.10 sets out the strategic priorities for the CAZ. These include enhancing and promoting "*the unique international, national and London wide roles of the CAZ, supporting the distinct offer of the Zone based on a rich mix of local as well as strategic uses and forming the globally iconic core of one of the world's most attractive and competitive business locations*." Policy 2.10 goes on to state that "*in appropriate quarters, [the Mayor will and boroughs should] bring forward development capacity and supporting infrastructure and services to sustain and enhance the CAZ's varied strategic functions without compromising the attractions of residential neighbourhoods where more local uses predominate*."

5.16 Criterion h) of Policy 2.10 relates to the intensification areas within the CAZ. It states that the Mayor will and boroughs should *"bring forward and implement development frameworks for CAZ opportunity and intensification areas (see Policy 2.13) to benefit local communities as well as providing additional high quality, strategic development capacity."*

5.17 Within the London Plan, development is promoted in Opportunity and Intensification Areas (Policy 2.13). Paragraph 2.53 of the London Plan states:

> "*Opportunity areas are the capital's major reservoir of brownfield land with significant capacity to accommodate new housing, commercial and other development linked to existing or potential improvements to public transport accessibility. Typically they can accommodate at least 5,000 jobs or 2,500 new homes or a combination of the two, along with other supporting facilities and infrastructure*".

5.18 The VNEB area is identified as an 'Opportunity Area'. The Strategic Policy Direction for the Opportunity Area states that:

> "*As an integral part of the CAZ, this Area has scope for significant intensification and increase in housing and commercial capacity. To deliver the area's full development potential will require major transport investment and the opportunity to extend the Northern Line into the area is being investigated. Dependent on the scale of public transport improvements, the minimum homes capacity could be increased to at least 16,000. The Battersea Power Station site has the potential to become a new CAZ Frontage with potential for strategically significant mixed use development including residential, business, leisure, retail and service uses. Parts of the area may be suitable for tall buildings subject to London Plan/LDF design policies and criteria. The extensive area of low density, low value industrial uses at Nine Elms conflicts with wider strategic objectives for CAZ and industrial uses should be rationalised whilst sustaining capacity for those which are of particular importance to CAZ and capable of operating more intensively, such as the wholesale market and waste management provision. This Plan continues the requirement of the 2008 version of the London Plan to de-designate part of the historic Strategic Industrial Location in order to facilitate re-development. Safeguarded wharf capacity on the River Thames should continue to perform a key functional role and the use of waste to generate heat and power for developments should be investigated. Stronger traffic management and easier pedestrian and cycle movement will contribute to significant environmental improvements in this location. Informed by a major transport capacity study, an OAPF is being prepared in partnership with the boroughs and other stakeholders*."

5.19 Part of Nine Elms is within a Strategic Industrial Location (SIL). Policy 2.17 states that "*the Mayor will, and boroughs and other stakeholders should promote, manage and, where appropriate, protect the strategic industrial locations (SILs) designated in Annex 3 and illustrated in Map 2.7, as London's main reservoirs of industrial and related capacity, including general and light industrial uses, logistics, waste management and environmental industries (such as renewable energy generation), utilities, wholesale markets and some transport functions*."

5.20 Policy 6.1 supports sustainable forms of transport and encourages development that reduces the need to travel, especially by car. Furthermore, development is encouraged at locations served by high public transport accessibility. Policy 6.4 supports the collaboration of strategic partners in neighbouring regions to facilitate improvements/ enhancements to the transport system, thus assisting in the delivery of cross-London and orbital rail links.

5.21 Policy 6.2 seeks to increase the capacity of public transport in London over the Plan period by securing funding and implementing a number of transport schemes/ improvements. The NLE has been identified (Table 6.1 of the London Plan) to facilitate the regeneration of the Vauxhall/Nine Elms/Battersea area. Thus, the Plan supports an extension of the Northern line to Battersea, providing greater capacity and more reliable journeys.

VNEB OA Planning Framework (OAPF)

5.22 The OAPF was adopted by the Mayor of London in March 2012 (Ref. 5-12) and is supplementary planning guidance to the London Plan. It was prepared in collaboration with a number of authorities, including the London Development Agency (LDA), TfL, Design for London (DfL), English Heritage (EH) and both the LBW and LBL.

5.23 The document provides guidance on the policy direction regarding the future comprehensive development of the VNEB OA. The document supports the development of the NLE which will provide significant improvements to the public transport system (page 55).

5.24 The OAPF promotes high density development within Nine Elms.

5.25 The proposed NLE is therefore fully aligned with the objectives of the OAPF and the wider objectives for the VNEB area (see Figure 5-1).

5.26 Further information regarding the consideration of future development schemes is presented the cumulative effects strategy summarised in *Chapter 2: EIA Methodology*, and set out in *ES Volume II: Appendix A3*.

Local Planning Policy

5.27 As already stated, local planning policy relevant to the NLE is set out in the LBL's, LBS's and the LBW's LDFs.

5.28 The adopted Core Strategies, the saved policies of the superseded LBL and LBS UDPs and the LBW Development Management Policies document governs

development proposals within the boroughs, to encourage balanced and sustainable communities which make LBW, LBL and LBS attractive places to live in, work in and visit.

5.29 Detailed policies relating to specific disciplines are dealt with within the subsequent topic chapters.

London Borough of Lambeth Local Development Framework

5.30 Policy S3 of the Core Strategy supports for the vitality and viability of Lambeth's hierarchy of major, district and local centres, including the Vauxhall and Waterloo London Plan Opportunity Areas, for retail, service, leisure, recreation and other appropriate uses.

5.31 Policy S2 of the Core Strategy identifies the borough's housing need advising the provision of at least 7,700 net additional dwellings across the borough between 2010/17 (this is in line with London Plan targets) with a further 8,800 more homes required by 2024/25. Policy S2 also defines that at least 50% of housing should be affordable where public subsidy is available, or 40% without public subsidy, of which 70% should be social rented and 30% intermediate.

5.32 Policy PN2 of the Core Strategy supports mixed use development at Vauxhall for employment uses, housing, retail, hotel, student accommodation, leisure, entertainment and other commercial and community uses in line with the CAZ designation and as part of the wider London Plan OA. The Policy also states at least 3,500 new homes and 8,000 jobs will be sought, in the Vauxhall area. This will be supported by appropriate community and public transport infrastructure improvements.

5.33 The LBL's Vauxhall SPD (January 2013) aims to create a sustainable mix of high density development providing at least 8,000 new jobs and 3,500 new homes, a diverse and balanced community. The SPD promotes a new District Centre, the 'Heart of Vauxhall' that will increase the vitality of the area and form a 'growth pole' in the form of new CAZ frontage. Principles 8 and 10 of the SPD make specific reference to the importance of supporting infrastructure, including the NLE, in enabling the level of development proposed within the OAPF to be delivered. The SPD advises that a new underground station is required at Nine Elms as part of the extension of the Northern line to facilitate the delivery of regeneration in the area. The preferred location of the Nine Elms station is in line with that proposal (para 5.60).

Lambeth Draft Local Plan (March 2013)

5.34 The Draft Local Plan retains the overall spatial strategy, vision and strategic objectives of the Lambeth Core Strategy adopted in January 2011. It updates the approach to some strategic policy issues in the light of new evidence and the publication of the NPPF and adoption of the London Plan. Detailed development management policies and site allocations are also included in the Local Plan where these are relevant to the Council's strategic objectives.

5.35 The Draft Local Plan notes that the VNEB OA presents "*the most significant potential for commercial development and jobs growth in the borough, alongside their potential to provide new housing*" (para 2.62). The Draft Plan recognises the importance of improvements and investment to public transport to support this growth and development.

5.36 Although both areas are served by major transport interchange, these are already operating at capacity. Major developers will be expected to contribute to meeting the cost of increasing capacity in order to mitigate the impact of their schemes. (Para 2.63).

5.37 It notes that the OAPF promotes the *"optimum level of development for the area"*, including:

- 16,000 new homes and 20,000 to 25,000 jobs;
- A new mixed use residential neighbourhood and linear park in the heart of Nine Elms; and
- A step change in public transport provision including the Northern Line Extension from Kennington to Battersea Power station with an intermediate station at Nine Elms, supported by a comprehensive package of rail, bus, cycling, pedestrian and highway improvements (para 11.6).

5.38 Policy T4 of the Draft Local Plan makes specific reference to the extension of the Northern Line from Kennington to Battersea, which contributes to improved connectivity, quality and capacity in public transport.

London Borough of Southwark Local Development Framework

5.39 Strategic Policy 2 of the Core Strategy (2011) seeks to support sustainable transport and recognises the need to increase the capacity, quality and integration of public transport as a co-ordinated network, in line with Policy 3C.4 of the London Plan and the Mayor's Land for Transport Supplementary Planning Guidance. The NLE is considered to be in accordance with LBS' policy objectives.

London Borough of Wandsworth Local Development Framework

5.40 Policy PL11 of the Core Strategy (2010), promotes high density mixed use development around Battersea Power Station and nearby sites to help create a 'sense of place' and a dynamic mixed use quarter, along with working with the Greater London Authority (GLA) to bring forward new public transport infrastructure. Policy IS5 of the Core Strategy seeks the maximum provision of affordable housing with a target of at least 3,725 affordable homes to be provided in the borough between 2007/08 and 2016/17.

5.41 The LBW Core Strategy Policy IS3e states that "*views of the Westminster World Heritage Site will be protected in accordance with the London Plan and the London View Management Framework*".

5.42 Within the western section of the NLE and within the LBW there is a safeguarded wharf at Cringle Dock, just east of Battersea Power Station, and north east of the proposed Battersea station. Cringle Dock is owned by the Western Riverside Waste Authority and is being used as a waste transfer station. The LBW Core Strategy Policy PL13 states that *"development next to or opposite safeguarded wharves should be designed to minimise the potential for conflicts of use and disturbance"*.

5.43 The Site Specific Allocations Document identifies the VNEB area as a priority area for growth. The Document sets out eight districts, reflecting the potential of the different areas whilst complementing each other in terms of the provision of homes, jobs, recreation and leisure opportunities. It notes that delivering the objectives of the VNEB OA is dependent on major improvements to the public transport system. The NLE is identified as Proposal Site 1 whereby it is envisaged to transform "*the accessibility of much of the area"* (page 16).

References

Ref. 5-1 Department for Communities and Local Government (2012): National Planning Policy Framework

Ref. 5-2 GLA (2011); The London Plan: Spatial Development Strategy for Greater London

Ref. 5-3 LBW (2010); Wandsworth Local Development Framework, Adopted Core Strategy - October 2010

Ref. 5-4 LBW (2012); Site Specific Allocations Document, Adopted Version

Ref. 5-5 LBW (2012); Development Management Policies Document, Adopted Version

Ref. 5-6 LBL (2011); Lambeth Local Development Framework, Core Strategy

Ref. 5-7 LBL (2011); Lambeth UDP 2007: Policies saved beyond 5 August 2010 and not superseded by the LDF Core Strategy, January 2011

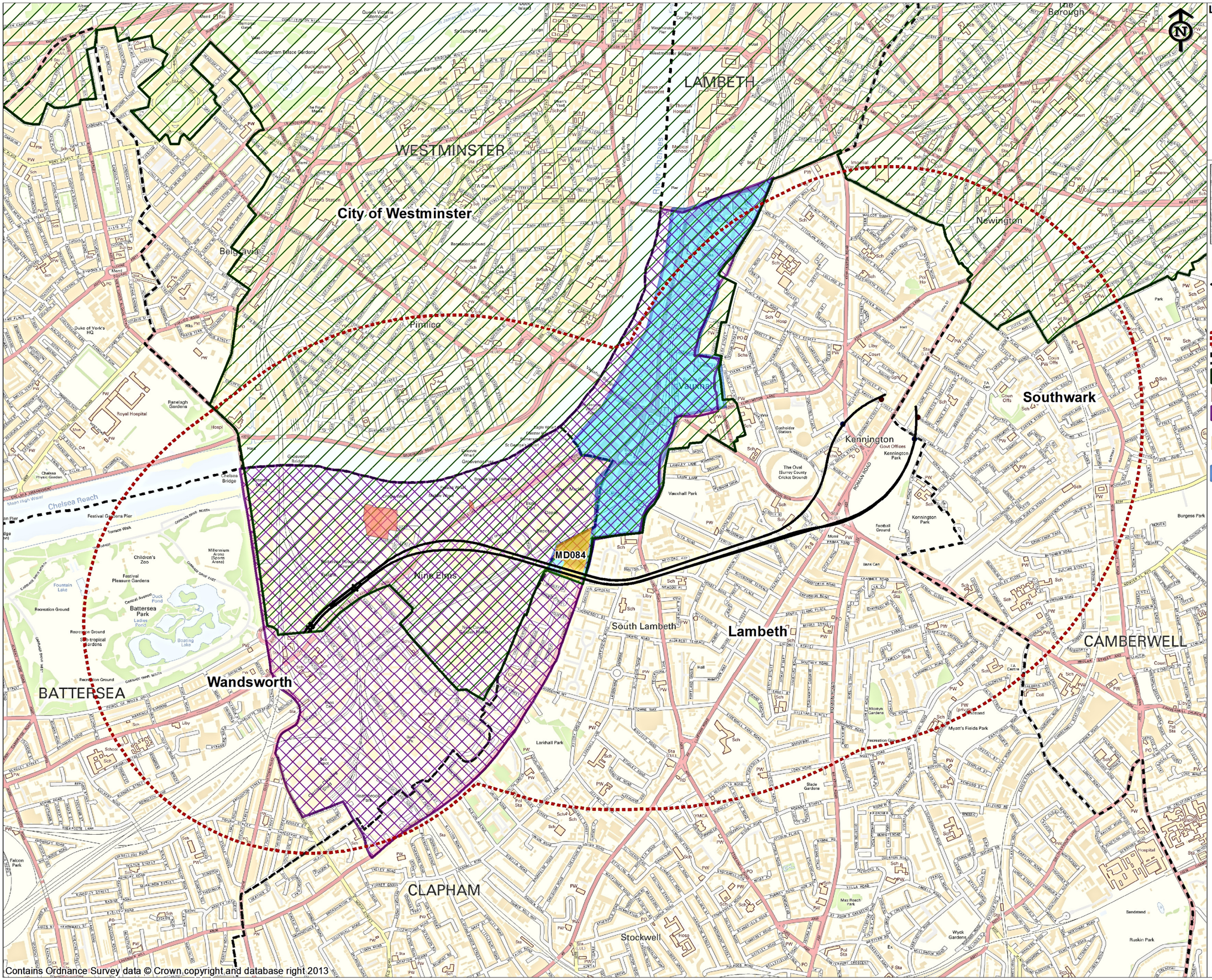
Ref. 5-8 LBL (2013); Vauxhall SPD, January 2013

Ref. 5-9 London Borough of Southwark (LBS) (2011); Southwark Local Development Framework, Core Strategy

Ref. 5-10 LBS (2011); Saved Southwark UDP Policies

Ref. 5-11 GLA (2010); Mayor's Transport Strategy, May 2010

Ref. 5-12 GLA (2012); Vauxhall Nine Elms Battersea. Opportunity Area Planning Framework



Location Plan

Key:

- Track Alignment
- Grauting Shaft
- Vent Shaft
- 1km Buffer
- Borough Boundary
- Central Activities Zone
- Protected Wharves
- Vauxhall Nine Elms Battersea Opportunity Area
- Major Development Opportunity Site
- Vauxhall SPD Area

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Project:

NORTHERN LINE EXTENSION
TO BATTERSEA
TWAO FOR TfL

Drawing:

KEY POLICY DESIGNATIONS
AFFECTING THE NLE

Suitability: S4 FORMAL ISSUE TO CLIENT

Drawn by:	DT	Date:	04/03/2013
Checked by:	TW	Date:	04/03/2013
Approved by:	HW	Date:	04/03/2013

Drawing Scale: 1:15,000 @ A3

Drawing No: Figure 5-1

Revision: 01

06 Traffic and Transport

Environmental Statement

Volume I

06 Traffic and Transport

Introduction

6.1 This chapter of the Environmental Statement (ES) assesses the likely significant environmental effects of the proposed Northern Line Extension (NLE) on the highway, public transport and local pedestrian and cycling networks. It is based on an assessment of the forecasts of future conditions when the planned development in the Vauxhall/ Nine Elms/ Battersea Opportunity Area (VNEB OA) is complete.

6.2 This chapter sets out:

- Relevant planning policy at a regional and local level;
- The assessment methodology and significance criteria that have been applied;
- Current and future baseline conditions;
- The impact assessment; and
- Proposed mitigation measures where required.

6.3 Full details of the scheme are provided in *Chapter 4: Description of the NLE.*

Planning Policy Context

6.4 The NLE has been developed with planning policy in mind and the proposed scheme is consistent with, and supported by, current planning policy at a national, regional and local level. This section provides an overview of relevant regional and local transport policy and describes how the NLE facilitates the achievement of the objectives set out in these documents.

6.5 Further information is provided in the Supporting Statement that accompanies the Transport & Works Act Order (TWAO) application and *Chapter 5: Planning Policy Context* of this ES.

Regional Planning Policy

The London Plan (2011)

6.6 The London Plan (July 2011) (Ref. 6-1) sets the relevant regional planning policy guidance and forms a component part of the statutory development plan.

6.7 The London Plan aims to:

- Meet the needs of a growing population with policy on new homes including affordable housing, housing design and quality, and social infrastructure, which will promote diverse, happy and safe local communities.
- Support an increase in London's development and employment with policy on:
  - Outer London, inner and central London;
  - Finding the best locations for development and regeneration, and protecting town centres; and
  - Encouraging a connected economy and improving job opportunities for everyone, so that London maintains its success and competitiveness.
- Improve the environment and tackle climate change by:
  - Reducing carbon dioxide (CO_2) emissions and heat loss from new developments;
  - increasing renewable energy;
  - Managing flood risk, ensuring water supply and quality;
  - Improving sewerage systems;
  - Improving London's recycling performance and waste management; and
  - Protecting our open spaces making London a green and more pleasant place to live and visit.
- Ensure that London's transport is easy, safe and convenient for everyone and encourage cycling, walking and electric vehicles.

6.8 Policy 6.2c of the London Plan states that:

> *"the Mayor will work with strategic partners to increase the capacity of public transport in London by securing funding for and implementing the schemes and improvements set out in Table 6.1"* [of the Plan].

6.9 Table 6.1 of the Plan includes an extension of the Northern line from Kennington to Battersea to support the regeneration of the VNEB OA.

6.10 Policy 6.12 also outlines that the Mayor will support measures that shift people to more sustainable forms of transport and improve access to and within town centres.

The Mayor's Transport Strategy (2010)

6.11 The Mayor's Transport Strategy (MTS) (May 2010) (Ref. 6-2) sets out the Mayor's vision for transport in London over the next 20 years. The MTS prepares for the Capital's predicted growth of 1.25 million more people and 0.75 million more jobs by 2031 and supports sustainable growth across London to facilitate this. Key proposals include:

- Transforming the Tube;
- Enhancing rail, including Crossrail, Thameslink and the London Overground;
- Improving interchanges;
- Smoothing traffic flow;
- The cycling revolution;
- Making walking count;
- Improving London's buses;
- Better information;
- Better streets and environment, including additional phases to the Low Emission Zone (LEZ);
- Improved access to the transport system;
- Making better use of the Thames;
- Reducing CO_2 emissions, including through the promotion of electric vehicles;

- Supporting the 2012 Olympic and Paralympic Games and its legacy; and
- New river crossings.

6.12 In Proposal 22, the MTS makes specific reference to the NLE stating that the Mayor will seek longer-term enhancements and extensions to the Underground network, including:

> *"A privately funded extension of the Northern line to Battersea to support regeneration of the Vauxhall/Nine Elms/Battersea area"*

6.13 As part of the drive to improve transport opportunities, the MTS states that:

> *"The London Plan identifies areas that have a greater need for investment to accommodate London's growth, expand opportunities for all and address deprivation. Prioritising transport investment in these areas will maximise the benefits of regeneration. Better integration of land use and transport planning will also ensure that new housing and employment is supported by good public transport accessibility and adequate capacity" (E34, MTS, May 2010).*

VNEB OA Planning Framework (VNEB OAPF) (2012)

6.14 The VNEB OAPF (Ref. 6-3) was adopted by the Mayor of London in March 2012 as supplementary planning guidance to the London Plan (2011). It is a planning framework developed by the Greater London Authority (GLA), TfL, the London boroughs of Lambeth and Wandsworth and English Heritage.

6.15 The VNEB OAPF is an articulation of the planning policies set out in both the London Plan and Lambeth and Wandsworth's Local Development Frameworks (LDF) and sets out guidance for the development of the area.

6.16 Section 6.5 of the VNEB OAPF concludes that the only transport package that can facilitate the preferred development scenario in the OA includes an extension to the Northern line from Kennington to Battersea via Nine Elms complemented by new and enhanced bus services.

6.17 Additionally, the VNEB OA Transport Study (2009) (Ref. 6-4), undertaken on behalf of TfL by SKM to inform the OAPF, concluded that the NLE is the only scheme that can provide significant capacity on the network through the OA without adversely affecting Vauxhall Underground station or causing significant congestion on the highway network.

6.18 The NLE is therefore fully aligned with the objectives of the OAPF and the wider objectives for the VNEB OA.

Local Planning Policy

6.19 Three London boroughs – Lambeth, Wandsworth and Southwark – have been involved in the development of plans for the NLE. These three boroughs are all affected by the construction and/or operation of the proposed NLE and, as such, have included its development in their respective planning policies and guidance. The Core Strategies, which form the most important parts of each borough's LDF, set out their objectives through various themes, visions and principles.

Lambeth Core Strategy (2011)

6.20 Lambeth's Core Strategy (Ref. 6-5) was adopted in 2011 and sets out the Council's vision for the spatial development of the Borough. In paragraph 2.4.7 it lists the key themes relating to their spatial strategy as:

- Accommodating population growth;
- Achieving economic prosperity and opportunity for all;
- Tackling and adapting to climate change;
- Providing essential infrastructure;
- Promoting community cohesion and safe, liveable neighbourhoods; and
- Creating and maintaining attractive, distinctive places.

6.21 In Policy S4 Lambeth includes reducing dependence on the private car, better connectivity, quality and capacity in public transport and the promotion of opportunities for extensions to the Underground network as key transport objectives in their strategy.

Draft Lambeth Local Plan (2013)

6.22 Policy T4 of the Draft Local Plan makes specific reference to the extension of the Northern line from Kennington to Battersea, which contributes to improved connectivity, quality and capacity in public transport.

Vauxhall Supplementary Planning Document (2013)

6.23 The Vauxhall SPD (Ref. 6-6) aims to 'translate' the policies set out in the London Plan, Lambeth Core Strategy and VNEB OAPF at the neighbourhood scale.

6.24 Section 3.1 states that:

> *"Lambeth Council has an ambitious vision for Vauxhall based upon unlocking the potential locally to deliver a sustainable community as part of a recognisable and distinct neighbourhood. Vauxhall will be noted for high quality buildings, exemplary streets and spaces and convenient and well managed public transport".*

6.25 Ten principles guide the development strategies and visions for Vauxhall in the SPD. Those of most relevance are:

- Create a sustainable mix;
- Supporting infrastructure; and
- A good transport experience.

Wandsworth Core Strategy (2010)

6.26 Wandsworth's Core Strategy (Ref. 6-7) sets out its vision and key planning principles for the Borough. In describing its vision, Wandsworth seeks to encourage:

- Regeneration activity tackling pockets of deprivation in Battersea, Tooting and Roehampton, with the main areas of change and development being the

Thames riverside, the town centres and the Vauxhall/Nine Elms/Battersea Opportunity Area; and

- Good access to the wider opportunities outside the borough for jobs and services, particularly in central London (3.1).

6.27 The NLE contributes to both of these aims while also enabling the Borough to: "meet needs for housing, business, community services and infrastructure, in a sustainable way, protecting and improving both the built and the natural environments while mitigating climate change", another of its key objectives.

6.28 The Council's overarching Sustainable Community Strategy, of which the Core Strategy is an integral element, reiterates the above goals by listing improvements to the local environment and transport as key strategic priorities alongside the need to meet future housing needs (1.16).

Wandsworth Site Specific Allocations Document (2012)

6.29 The Council's Site Specific Allocations Document (2012) (Ref. 6-8) identifies the VNEB area as a priority area for growth and sets out eight districts, reflecting the potential of the different areas, complementing each other in terms of the provision of homes, jobs, recreation and leisure opportunities. The NLE is recognised as a 'key feature' of the VNEB development in the Site Specific Allocations Development Plan Document, which states:

> *"Achieving the proposed level and mix of development is dependent on major improvement to public transport. The extension to the Northern line, from Kennington to Battersea Power Station, with an intermediate stop on Wandsworth Road (in Lambeth) is seen as key to transforming the accessibility of much of the area" (p.16).*

Southwark Core Strategy (2011)

6.30 Southwark's Core Strategy (Ref. 6-9) lists fourteen policies nested in five themes that aim to deliver its spatial vision for the Borough. Increasing the use of sustainable modes of transport, including public transport, is fundamental to Policy 2 – Sustainable Transport. The NLE also facilitates:

- Policy 1 – Sustainable development;
- Policy 3 – Shopping leisure and entertainment;
- Policy 5 – Providing new homes; and
- Policy 10 – Jobs and businesses.

6.31 In addition, three of the Borough's five themes are aided by the NLE, namely making the Borough a better place for people, delivering quality public services and, particularly, planning for development in growth areas.

Assessment Methodology and Significance Criteria

Assessment Methodology

6.32 The following assessment focuses on the traffic and transport aspects of the NLE, including construction and operation, in order to establish the potential effects of the NLE and assess these against the forecast baseline conditions in 2031 without the NLE in place.

6.33 The Institute of Environmental Management and Assessment (IEMA) Guidelines (2004) (Ref. 6-10) have been taken into account throughout the completion of this assessment. In accordance with these guidelines the affected parties or locations that may be sensitive to changes in transport, traffic and access conditions have been identified.

6.34 The impact of all passenger and vehicle trips generated by the NLE on the local transport network has been assessed by mode and the assessment has been undertaken to determine the likely significant traffic and transport effects of the scheme and to identify steps to mitigate these.

6.35 The future baseline assumes that all consented developments in the VNEB OA, with the exception of those phases of the Battersea Power Station (BPS) development that are conditional upon the NLE, are built out by 2031. This future baseline is then compared against a 'with NLE' scenario that includes the future baseline development, the NLE and further developments enabled by the NLE, including the full build out of the BPS development (phase 2 onwards). Since the NLE is required to enable the full development of the VNEB OA to be realised this impact assessment considers not only the direct traffic and transport impacts associated with the NLE but also the indirect impacts associated with the development across the VNEB OA that will be enabled as a result of the NLE. This is described in further detail in *Chapter 2: EIA Methodology.*

6.36 It should be noted that each of the developments that come forward in the VNEB OA will be the subject of a separate planning application and the environmental effects of each development will be assessed on its own merits. Each application will also be expected to commit to measures to mitigate its own impacts and to pay the Community Infrastructure Levy (CIL) towards wider improvements in the area, consistent with the requirements of the OAPF. This should be taken into account when considering the impacts described in this chapter.

Study Area

6.37 The area of interest, and that which is considered in this traffic and transport assessment, is focused on the VNEB OA, particularly the areas around the two proposed new stations. Consideration is also given to transport conditions within the vicinity of the four proposed worksites in the Kennington area - particularly in relation to NLE construction effects. The VNEB OA, the location of the proposed new stations and the proposed worksites are set out in Figure 6-1.

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Figure 6-1 VNEB OA and Proposed NLE Worksites

Source: TfL

6.38 For some modes such as London Underground, the NLE will have impacts outside of the locations set out in Figure 6-1 and where this is the case locations beyond the areas of interest have been considered.

Data and Information Sources

6.39 The baseline transport conditions in the vicinity of the NLE have been established through a variety of means, including:

- Desktop studies;
- Site investigations;
- Document reviews;
- Transport surveys and data; and
- Junction and link capacity assessments.

6.40 The surveys and data include;

- London Underground Rolling Origin & Destination surveys (RODS);
- Trafficmaster data;
- Observed traffic surveys;
- Observed pedestrian counts; and
- Observed cycling counts.

Assessment Tools and Modelling

6.41 In order to inform the assessment of impacts relating to public transport and accessibility a Public Transport Accessibility Level (PTAL) assessment of the OA has been undertaken. PTAL measures the accessibility of a location to the public transport network, taking into account walk access time to stops and stations and service frequencies. The method is a way of measuring the density of the public transport network at any location in Greater London. Scoring ranges from 0 to 40+, with scores then banded into levels from 1a (very poor accessibility) to 6b (excellent accessibility).

6.42 In order to inform the assessment of impacts relating to road users the information presented in *Chapter 4: Description of the NLE* has been used to quantify the level of road traffic that will be generated during the construction phase using a range of transport modelling software described in the following paragraphs.

6.43 These models have been used in order to quantify the impact of the proposed NLE during its construction and operation.

6.44 Estimates of trip generation and distribution for the future year assessments have been derived from the London Transportation Studies (LTS) model.

6.45 A strategic SATURN model, the Central London Highway Assignment Model (CLoHAM) has been used to assess:

- Baseline conditions (with and without NLE construction traffic);
- Baseline conditions with NLE construction traffic and cumulative scheme construction traffic;
- Future baseline (2031) without the NLE; and
- Future year (2031) with the NLE.

6.46 Several more localised TRANSYT models have also been used in the assessment of highway impacts for the baseline conditions (with and without NLE construction traffic).

6.47 Regional Railplan modelling has been undertaken to assess the public transport impacts, for the following scenarios:

- Baseline conditions;
- Future baseline (2031) without the NLE; and
- Future year (2031) with the NLE.

6.48 The Pedroute Strategic Model (PEDS) has been used to assess delay and congestion at individual London Underground stations most likely to be impacted by the NLE, both with and without the NLE.

6.49 A Legion model of Kennington station has been used to assess the impact of the NLE, including new cross passages to be provided at platform level. Further detail can be found in *ES Volume II: Appendix C4*.

6.50 In order to inform the assessment of impacts relating to pedestrians, a Pedestrian Environment Review System (PERS) assessment of the area surrounding the key sites has been undertaken. PERS is a tool that measures the quality of the pedestrian environment through subjective review, and generates a measure of the quality and condition of pedestrian facilities. Further information on PERS can be found in *ES Volume II: Appendix C2*.

Significance Criteria

6.51 Guidelines set out by the IEMA (Ref. 6-10) and the Department for Transport (DfT) (Ref. 6-11) have been consulted in order to identify significance criteria applicable to this assessment. For a number of effects there are no readily-accepted thresholds of significance and, as such, in accordance with the approach outlined in *Chapter 2: EIA Methodology* there has been a need for interpretation and professional judgement, based on knowledge of the sites and/or quantifiable data where available.

6.52 It is envisaged that the NLE will, in some respects, have similar types of traffic and transport effects (during construction and operation) to those identified for Crossrail and the Victoria Station Upgrade scheme. Therefore, the assessment criteria used for these projects, with the addition of criteria related to crowding levels (as defined by the number of people standing per square metre) and highway effects, has been used as the basis for defining a significant effect. This is consistent with guidance set out by the IEMA.

6.53 The magnitude of each effect and its significance, be it adverse or beneficial, has been predicted by a variety of mechanisms, including transport modelling (where applicable) and professional judgement. Therefore, the assessment criteria have not been used as the sole basis for judging significance.

6.54 It should be noted that the assessment criteria set out in the tables below predominantly consider adverse effects, yet in a number of cases beneficial traffic and transport effects will occur as a consequence of the NLE and these advantageous or positive changes are also documented in this chapter.

6.55 The assessment criteria that define a significant impact are set out in Table 6-1 (construction phase) and Table 6-2 (operational phase).

Table 6-1 Temporary Adverse (Construction) Assessment Criteria – Definition of 'Significant'

Topic	Assessment Criteria
Traffic levels and delays	A 30% net increase in traffic (lorries or all vehicles) over future baseline two-way flows (or one-way flows where either the link or the lorry route is one-way) for links affected for more than four weeks in any 12-month period, and where the total increase in traffic is more than 40 vehicles a day, subject to the increase leading to delay. Individual temporary increases of up to five days do not count towards the four-week period. Or
	A 100% net increase in traffic (lorries or all vehicles) over future baseline two-way flows (or one-way flows where the link or the lorry route is one-way) for links affected for more than five days up to four weeks in any 12-month period, and where the total increase in traffic is more than 40 vehicles a day, subject to the increase leading to delay. Individual temporary increases of up to five days do not count towards the four week period. Or
	A temporary diversion, for more than four weeks in any 12-month period that leads to a maximum increase in length of journey of more than 2.5 km on a route carrying more than 100 vehicles a day, 5 km on a route carrying more than 50 vehicles a day, or 10 km on any other route. Or
	A significant delay problem is forecast, such as at a specific junction or associated with access.
Public transport delay	Changes in a majority of representative journey times by rail, Underground or light rail of more than 20% lasting for more than four weeks in any 12-month period. Or
	Temporary changes in journey distances by bus for more than four weeks in any 12-month period, of more than 400 m in the GLA area and 1 km elsewhere, where diversions apply. Or
	A temporary net increase of more than 30%, for more than four weeks in any 12-month period, in lorries or total traffic on a route running along a bus route, or a net increase of more than 30% in total traffic on a route intersecting a bus route. Or
	A significant delay, disruption, overcrowding or other impact affecting the public transport network over a wide area for a period of more than five days.
Disruption to interchange	A material change in the vicinity of stations and worksites for over four weeks in any 12-month period to public transport interchange such as: • Bus facilities and operation (e.g. material loss of or relocation of bus stops, passenger waiting facilities, bus

Topic	Assessment Criteria
	stands or operator facilities); or • Taxi facilities and operations (e.g. material loss of or relocation of taxi stands, passenger waiting facilities or operator facilities); or • 'Kiss-and-ride' facilities or operation (e.g. material loss or relocation of dropping off areas).
Parking and loading	*On-street facilities* Loss for more than four weeks in any 12-month period of: • One or more on-street loading bays; or • One or more on-street parking bays for a specific user or vehicle, including - Disabled persons, buses, taxis, doctors, ambulances and police vehicles; or • Five or more on-street bays for residents and businesses; or • Five or more on-street pedal or motor cycle spaces; or • 20 or more general parking bays or the equivalent length of unrestricted kerbside space; and • The bays or spaces are reasonably well used. Or
	Public off-street parking Loss for more than four weeks in any 12 month period of: • 30 or more public off-street car parking spaces; or • 20 per cent of the capacity of the car parks if the number of spaces lost is less than 30; or • Loss of any public off-street spaces for disabled persons, buses, taxis, doctors, ambulances or police vehicles ; or • Loss of any public off-street loading bays or facilities; and the spaces are reasonably well used and, for ordinary parking spaces, replacement facilities are more than 5 minutes' walk away.
	Private parking A material traffic or transport impact due to a loss of private off-street parking or loading facilities for more than four weeks in any 12-month period.
Vulnerable road users (pedestrians, cyclists, mobility impaired persons)	A temporary increase of more than 30% in the total traffic flow, or the number of lorries, for more than four weeks in any 12-month period; and • The increase is more than 40 movements a day; and • There will be over 100 two-way movements of cyclists or pedestrians per 12-hour average weekday. and
	A temporary maximum increase, for more than four weeks in any 12-month period, in pedestrian journey length along a road or other public right of way of more than: • 250 m on a route carrying more than 200 pedestrians a day; or • 500 m on a route carrying more than 100 pedestrians a day; or • 1 km on a route carrying more than 50 pedestrians a day; or • 2 km on any other route. Or
	A temporary maximum increase in journey length, for cyclists or equestrians along a road or other public right of way, for more than four weeks in any 12-month period, of more than: • 1.5 km on a route carrying more than 100 cyclists a day; or • 3.0 km on a route carrying more than 50 cyclists a day; or • 6.0 km on any other route. Or
	A significant problem is forecast such as at a specific crossing, associated with footway or footpath overcrowding or with access to or between stations or bus stops, or to premises.
Accidents and safety	Those junctions that have experienced more than ten (or ten per 100 metre length) personal injury accidents in the recent three year period for which data is available; or • Links for which data is available that have experienced on average more than ten personal injury accidences per 100-metre length in a three-year period ending in the recent three year period; and • The junctions or links would be subject to a net increase of 10% or more in total traffic flow during construction for a period exceeding four weeks in any 12-month period.
Waterways	Loss of, or prevention of access to, moorings or waterside or water-borne facilities or closure of a route with a diversion distance of more than 1000 m, for a period of more than five days, considering the level of use and local circumstances.

Table 6-2 Operational Adverse Assessment Criteria – Definition of 'Significant'

Topic	Assessment Criteria
Traffic levels and delays	A 10% increase in morning peak hour two-way traffic levels on non-congested links. Or
	A 5% increase in morning peak hour two-way traffic levels • On congested links (congestion defined as links where the volume to capacity ratio exceeds 85%), or • In another sensitive area (defined as schools, hospitals or other community facilities). Or

06 Traffic and Transport

Topic	Assessment Criteria
	Increase in inter-peak traffic levels that exceed 30% of the inter-peak two-way traffic in congested or non-congested conditions; or
	A 10% decrease in morning peak hour modelled traffic link speeds on non-congested links. Or
	A 5% decrease in morning peak hour modelled traffic link speeds on congested links (congestion defined as links where the volume to capacity ration exceeds 85%). Or
	A 30% decrease in inter-peak modelled traffic link speeds on congested or no-congested links. Or
	A permanent increase in journey length of 1,250m.
Public transport	A 20% change in journey times (an increase or decrease) on bus links. Or
	A permanent change in journey distance of more than 400m. Or
	A comparison of public transport journey times without the NLE (by any or all modes) and with the proposed NLE journey time has been assessed. A significant impact is defined as a change (increase or decrease) in representative journey times of more than 10%. Or
	A 10% increase in crowding as defined by London Underground standing passengers per square metre if base is more than 3 standing per square metre.
Station and interchange impacts	Impacts that may be caused by additional NLE passengers arriving and departing at stations have been assessed using professional judgement, taking account of: • Local transport conditions at each station; or • Forecast additional NLE passengers; or • Forecast changes in levels of service; or • The resulting increases in passengers arriving and departing on foot, by bicycle, by car and by bus and taxi Impacts considered that will not be able to be mitigated by local improvement measures are reported as significant impacts.
Parking and loading	A loss of special-use on-street spaces, including spaces for disabled persons, buses, taxis, doctors, ambulances, police vehicles and car club bays. Or
	Any predicted increase in on-street parking demand in the vicinity of the station. Or
	A loss of private car parking. Or
	Any loss of off-street station car parking.
	In all cases, based on assessment of impact considering level of use and local circumstances such as parking controls and availability of alternative parking

Topic	Assessment Criteria
Pedestrian delay and loss of amenity	A predicted permanent increase of more than 10% in the 12-hour weekday two-way traffic flow; and • The increase will be more than 40 vehicle movements a day; and • There will be over 100 two-way movements of pedestrians per 12-hour average weekday; and • The vulnerability of the pedestrian is 'high'. Or
	A predicted permanent increase of more than 30% in the 12-hour weekday two-way traffic flow; and • The increase is more than 40 vehicle movements a day; and • There will be between 50 and 100 two-way movements of pedestrian per 12-hour average weekday; and • The vulnerability of the pedestrian is 'high'. Or
	A predicted permanent increase of more than 30% in the 12-hour weekday two-way traffic flow; and • The increase is more than 40 vehicle movements a day; and • There will be over 100 two-way movements of pedestrian per 12-hour average weekday; and • The vulnerability of the pedestrian is 'moderate'. Or
	A predicted permanent increase in journey length of more than 250m for pedestrians; and • There will be over 100 two-way movements of pedestrians per 12-hour average weekday. Or
	A predicted permanent increase in journey length of more than 500m for pedestrians; and • There will be between 50 and 100 two-way movements of pedestrians per 12-hour average weekday. Or
	A predicted permanent increase in journey length of more than 1,000m for pedestrians; and • There will be less than 50 two-way movements of pedestrians per 12-hour average weekday.
	Note that high vulnerability is, for example, no adequate footway or crossing facilities for pedestrians
Cyclist delay and loss of amenity	A predicted permanent increase of more than 10% in 12-hour weekday two-way traffic flow; and • The increase will be more than 40 vehicle movements a day; and • There will be over 100 two-way movements of cyclists per 12-hour average weekday; and • The vulnerability of the cyclist is 'high'. Or

Topic	Assessment Criteria
	A predicted permanent increase of more than 30% in 12-hour weekday two-way traffic flow; and • The increase is more than 40 vehicle movements a day; and • There will be between 50 and 100 two-way movements of cyclists per 12-hour average weekday; and • The vulnerability of the cyclist is 'high'. Or
	A predicted permanent increase of more than 30% in 12-hour weekday two-way traffic flow; and • The increase will be more than 40 vehicle movements a day; and • There will be over 100 two-way movements of cyclists per 12-hour average weekday; and • The vulnerability of the cyclist is 'moderate'. Or
	A predicted permanent increase in journey length of more than 750 m; and • There will be over 100 two-way movements of cyclists per 12-hour average weekday. Or
	A predicted permanent increase in journey length of more than 1250 m for cyclists; and • There will be less than 100 two-way movements of cyclists per 12-hour average weekday.
	Note that high vulnerability is, for example, no physically segregated facilities for cyclists.
Accidents and safety	Those junctions that have experienced more than ten personal injury accidents in a three-week period ending in 2012 for which data is available; or • Links for which data is available that have experienced an average of more than ten personal injury accidents per 100-metre length in a three year period ending in 2010 or 2011; and • The junctions or links would be subject to an increase of 10% or more in the total 12-hour weekday traffic flow.

6.56 The assessment criteria set out in Table 6-1 and Table 6-2 define whether an effect is considered to represent a significant impact. The extent to which an adverse significant effect is caused is dependant on a number of factors. These are defined in *Chapter 2: EIA Methodology*.

6.57 The consideration of the classification of effects presented in this chapter follows that defined in *Chapter 2: EIA Methodology* and applies the following terms:

- Beneficial – advantageous or positive change to an environmental resource or receptor;
- Adverse – detrimental or negative change to an environmental resource or receptor; and are considered
- Negligible – no perceivable impact; or
- Minor – slight, very short term or highly localised impact; or
- Moderate – limited impact (by extent, duration or magnitude); or
- Major – considerable impact (by extent, duration or magnitude) of more than local importance or in breach of recognised standards, policy or legislation.

6.58 In this assessment, a significant effect is taken to be an effect which is deemed either 'moderate' or 'major'. The duration of residual effects is also stated, as either short or long term. Wherever a significant adverse effect has been identified, mitigation measures are proposed; in some cases mitigations are also proposed where a minor adverse effect is identified, although this is not a requirement. Where appropriate, the potential to revise the construction methodology, programme or design to mitigate any potential adverse effects and/or make alterations to existing arrangements has been identified.

Baseline and Future Baseline Conditions

6.59 The proposed route of the NLE will run from Kennington to the BPS site, through the VNEB OA. A description of the proposed scheme is set out in *Chapter 4: Description of the NLE*.

6.60 The OA is currently served by the Transport for London Road Network (TLRN) including Nine Elms Lane and the Vauxhall Gyratory, several bus routes and three National Rail (NR) stations. The northern part of the OA also has access to the London Underground at Vauxhall station.

6.61 This section considers both the current baseline, for which the most recent data is available (this varies by mode) and the future baseline situation in 2031. To allow an analysis of the effects of the NLE, the future baseline considers a scenario of 2031 that includes the development planned in the OA that can be completed without the NLE in line with consented planning applications in the area as of January 2013 (as set out in the cumulative assessment). The "with NLE" scenario assumes in addition the completion of all of the development sites within the OA, including those which are directly dependent on the NLE. This is described in further detail in *Chapter 2: EIA Methodology.*

London Underground

Current Baseline

6.62 The London Underground network experiences high levels of demand resulting in crowding at peak times on some links. Figure 6-2 sets out the extent of crowding in the AM peak (2007), measured as the number of passengers standing per square metre, and is broadly representative of current conditions.

6.63 Figure 6-2 demonstrates that there are a number of links in and around central London that experience greater than 4 passengers standing per square metre in the peak hour and are considered crowded. These include the following sections:

- Northern line between Kennington and Moorgate;

- Northern line between Clapham Common and Kennington; and
- Victoria line between Victoria and Oxford Circus.

The Northern Line

6.64 The Northern line has two northern branches (to High Barnet and Edgware), two central branches (via Charing Cross and Bank) and a southern terminus at Morden. It is one of the busiest lines on the Underground network and carries approximately 250 million passengers per year.

Kennington Underground Station

6.65 Kennington station is on the Charing Cross and Bank branches of the Northern line. The majority of southbound Charing Cross branch trains terminate at Kennington; they then go around the Kennington Loop to the northbound Charing Cross branch platform. Trains using the Bank branch cannot use the Kennington Loop and almost all the trains on this branch continue to Morden from Kennington.

6.66 Kennington Underground station is a key station for this assessment. In 2011, 4.5 million passengers used this station for entry and exit. Although Kennington is a relatively lightly used station compared to many other inner and central London stations, this level of demand can put pressure on parts of the station at peak times. The average annual daily patronage during the three hour AM peak and all day is identified in Table 6-3.

Table 6-3 Current Baseline – Patronage at Kennington Station

Time period	Entering	Exiting	Interchange between branches
AM peak (07:00–10:00)	2,700	1,100	8,100
All day	7,100	6,600	34,500

Source: London Underground RODS data (2011)

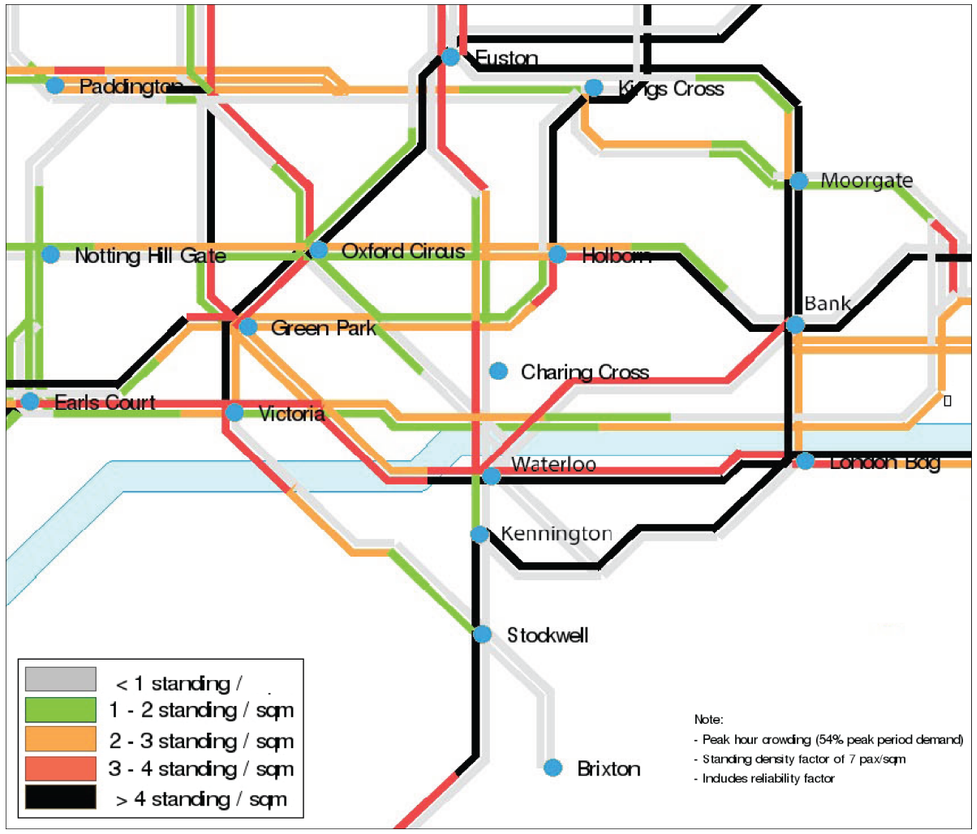
6.67 The service frequencies, given in trains per hour (tph), from Kennington station during the AM peak hour are identified in Table 6-4. Over the course of the day just under half of all southbound trains terminate at Kennington.

Table 6-4 Current Baseline – Service Frequencies at Kennington Station, AM Peak Hour (08:00–09:00)

Time period	Northbound	Southbound
AM peak hour – 08:00-09:00	Via Charing Cross 20 tph	To Morden 24 tph
	Via Bank 22 tph	Around the Kennington Loop 18 tph

Source: TfL

Figure 6-2 Current Baseline – London Underground and DLR Crowding Levels, AM Peak Hour (08:00–09:00)



Source: TfL Regional Railplan model

The Victoria Line

6.68 The Victoria line carries approximately 200 million passengers per year and in normal service, all trains run from Brixton to Seven Sisters, with approximately two thirds continuing to Walthamstow Central.

6.69 The Victoria line has recently been upgraded and a minimum of 30 tph are operated on the line in peak periods.

Vauxhall Underground Station

6.70 Vauxhall Underground station is the only Underground station in the OA and already experiences problems in terms of capacity and congestion, particularly in peak periods. The station suffers regular peak hour congestion in the ticket hall because of a poor configuration of ticket gates, constrained by the available space.

This contributes to lengthy queuing in the subway that provides a link to the NR station.

6.71 Vauxhall is the key interchange in the area, providing connections between NR, London Underground and bus services as well as having Barclays Cycle Hire docking stations and secure cycle parking nearby. Significant interchange between modes takes place at Vauxhall and many journeys also start and end here.

6.72 In 2011 a total of 20.9 million people used Vauxhall Underground station. The average annual daily patronage during the three hour AM peak and across a day is identified in Table 6-5. As Vauxhall is only served by a single line, there is no interchange with other London Underground lines.

Table 6-5 Current Baseline – Patronage at Vauxhall Underground Station

Time Period	Entering	Exiting
AM peak period (07:00 – 10:00)	10,800	8,200
All day	34,600	31,300

Source: London Underground RODS data (2011)

6.73 Current service frequencies, given in trains per hour (tph), from Vauxhall station during the AM peak hour are identified in Table 6-6.

Table 6-6 Current Baseline – Service Frequencies at Vauxhall Underground Station, AM peak hour (08:00 – 09:00)

Time period (Mon – Fri)	Northbound	Southbound
Morning peak hour	To Seven Sisters: 30tph (with 18tph continuing to Walthamstow Central)	To Brixton: 30 tph

Source: TfL

Future Baseline

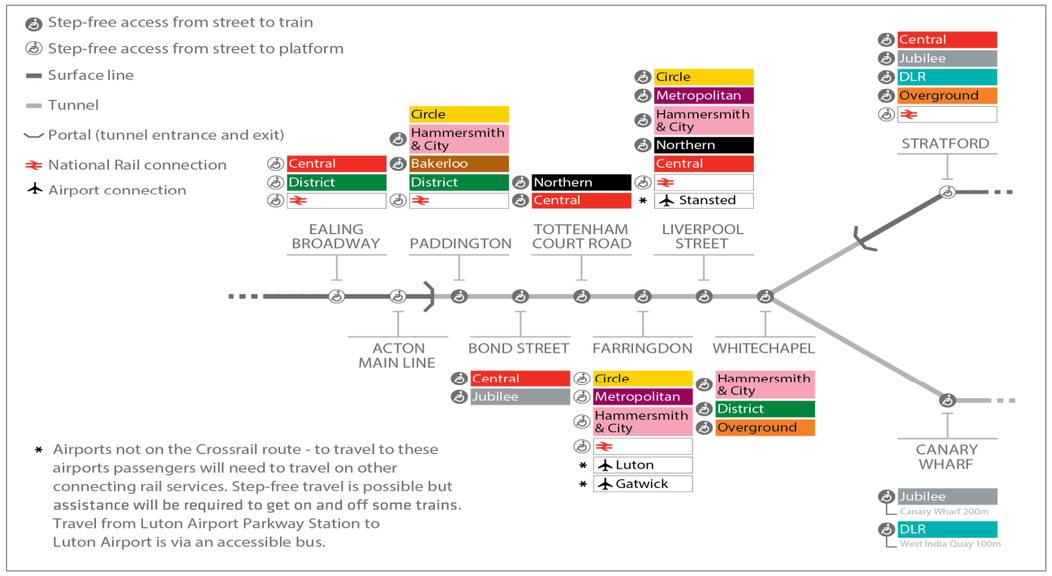
6.74 Passenger numbers on the London Underground network will continue to grow to 2031 and significant investment in the London Underground network is being made to manage this growth.

6.75 Most notably, Crossrail will be operational by 2019, adding 10% to the overall capacity of London's rail network. In central London, Crossrail will provide an interchange with existing Underground lines and in some cases NR including at:

- Paddington (NR and Circle, Hammersmith & City, District and Bakerloo lines);
- Bond Street (Central and Jubilee lines);
- Tottenham Court Road (Northern and Central lines);
- Farringdon (NR and Circle, Metropolitan and Hammersmith & City lines);
- Liverpool Street (NR and Circle, Metropolitan, Hammersmith & City and Central lines); and
- Whitechapel (Hammersmith & City and District lines and Overground).

6.76 All Crossrail stations in central London will be accessible and provide step-free interchange with NR services at key termini stations and many Underground lines. The central London section of Crossrail and its interchanges with existing services is shown in Figure 6-3.

Figure 6-3 Crossrail (Central London Section)



Source: TfL

6.77 By 2031, in addition to Crossrail, a programme of London Underground upgrades will also be complete. The most notable for this assessment is a programme of upgrades for the Northern line which will be undertaken in two phases referred to as Upgrade 1 and Upgrade 2.

6.78 Upgrade 1 will introduce new signalling and a new control centre, enabling additional services to be operated. It is set to be complete in 2014 and will increase capacity by 20%. Upgrade 2, which is partially funded and scheduled for completion in 2022, and includes signal upgrades, would enable even more services to be operated, delivering an additional 31% capacity on the Bank branch and 25% on the Charing Cross branch.

6.79 Table 6-7 outlines the future service frequency on the Northern line following the upgrades.

6.80 While this investment will help to reduce crowding levels on some sections of the Underground network, passenger growth will continue such that on other sections of the network the level of crowding is expected to continue to grow. The location and level of crowding on the network will therefore change over time. Figure 6-4,

identifies the forecast level of crowding across the network in 2031 for the AM peak.

Table 6-7 Current and Future Baseline – Northern line Service Frequencies, AM Peak Hour (08:00–09:00)

Northern line branch	2013	Post Upgrade 1 (2014)	Post Upgrade 2 (2022)
Northbound			
Bank Branch	22 tph	24 tph	33 tph
Charing Cross	20 tph	24 tph	30 tph
Southbound			
Bank Branch	20 tph	24 tph	30 tph
Charing Cross	20 tph	24 tph	30 tph

Source: TfL

6.81 Figure 6-4 demonstrates that for the section of the network closest to the OA the most congested links in the AM peak northbound in 2031 will be:

- Northern line between Clapham South and Kennington;
- Northern line (Bank branch) between London Bridge and Moorgate;
- Jubilee line between Waterloo and London Bridge; and
- Victoria line between Victoria and Green Park.

London Underground Stations

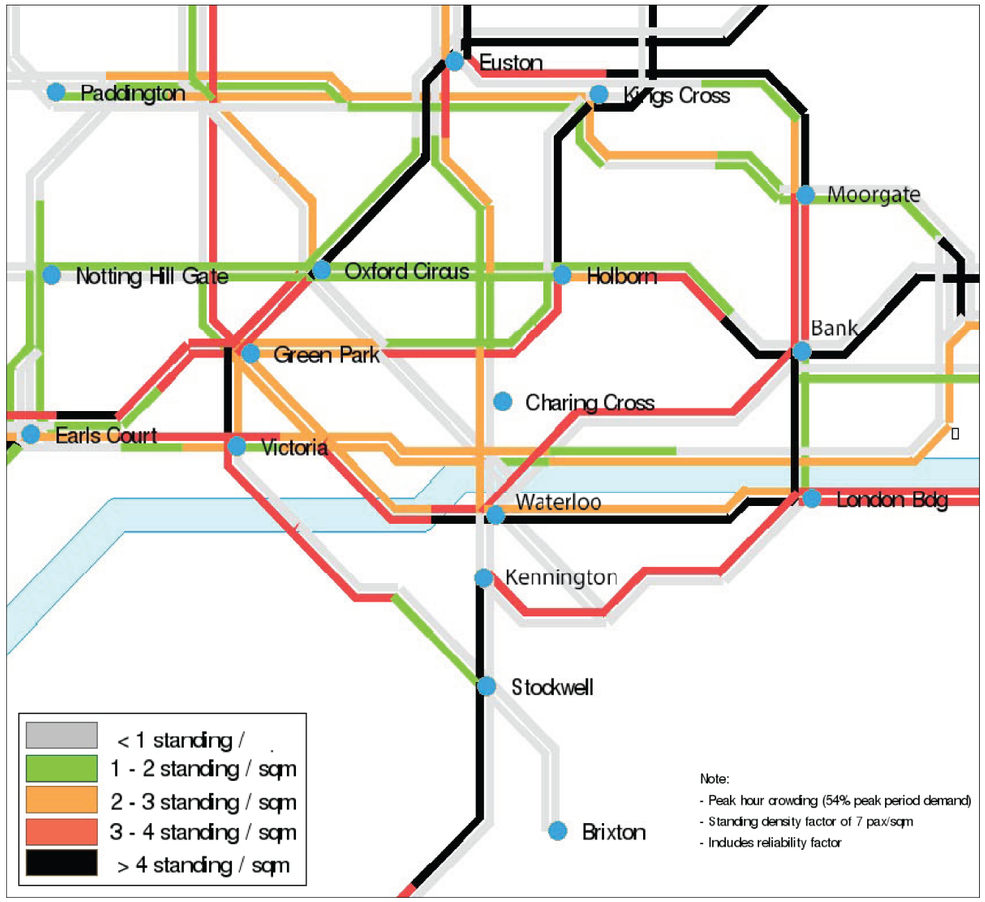
6.82 There are also planned and funded improvements at several stations across the network, including at Vauxhall station on the Victoria line and at Tottenham Court Road, Bank and Elephant & Castle stations on the Northern line.

6.83 In the OA in particular, a funded congestion relief plan for Vauxhall will improve gate line and ticket hall capacity as well as provide step-free access. The upgrade will improve interchange between modes, and a new lift from the ticket hall to the platform will create a fully accessible interchange between NR, bus and Underground. This is expected to be provided by 2015 (Ref. 6-12). Nonetheless, Vauxhall is expected to remain crowded as a result of increased passenger journeys through this station.

6.84 At Kennington station, there is a programme of work funded through the TfL Business Plan (Ref. 6-13) to address priority stations across London and to enable growth; this includes a provision for Kennington station. Plans are still at an early stage, however any plans will be developed taking account of the NLE.

6.85 As with Underground lines however, despite the investment in the network, including at both Vauxhall and Kennington, some stations will suffer crowding in 2031. Regardless of station improvements, forecasts indicate that in 2031, passenger demand at both Kennington and Vauxhall Underground stations will increase significantly from the current baseline. This increase is due to wider population and employment growth across London, the effect of the London Underground line upgrades and, particularly in the case of Vauxhall, the impact of the consented OA development (Vauxhall would be the only Underground station in the OA). This is reflected by the significant increase in passengers entering Vauxhall station in the AM peak, which rises by over 50%. Kennington sees an increase in entries of over 100%, albeit from a relatively low base compared to Vauxhall. Such increases in demand will increase the pressure placed upon each station even accounting for the planned station improvements as outlined above.

Figure 6-4 Future Baseline – London Underground and DLR Crowding Levels, AM Peak Hour (08:00–09:00)



Source: TfL Regional Railplan model

6.86 Table 6-8 identifies the future baseline for both key stations for this assessment in terms of passengers entering and exiting the stations, and interchange between Underground lines (without the NLE).

Table 6-8 Future Baseline – Patronage at Kennington and Vauxhall Underground Stations, AM peak period (07:00–10:00)

Station	Entering	Exiting	Interchange
Kennington	5,600	2,100	12,600
Vauxhall	17,700	11,600	n/a

Source: TfL Regional Railplan model, factored using RODS data according to London Undergrounds combination forecasting methodology

National Rail Services

Current Baseline

6.87 The OA is served by three Network Rail stations:

- Battersea Park;
- Queenstown Road; and
- Vauxhall.

6.88 Battersea Park station is located in the south-west of the OA, with services to and from stations including London Victoria, Clapham Junction, Sutton and East Croydon. Queenstown Road station is located approximately 200m to the south of Battersea Park station with services to and from stations including London Waterloo, Clapham Junction and Richmond. Vauxhall station is located in the north of the OA and is served by the same services as Queenstown Road as well as additional services to and from stations including Wimbledon, Kingston, Surbiton and Chessington South.

6.89 As with the London Underground, there are several NR links in to central London that currently experience crowding in the AM peak, which can be seen in Figure 6-6.

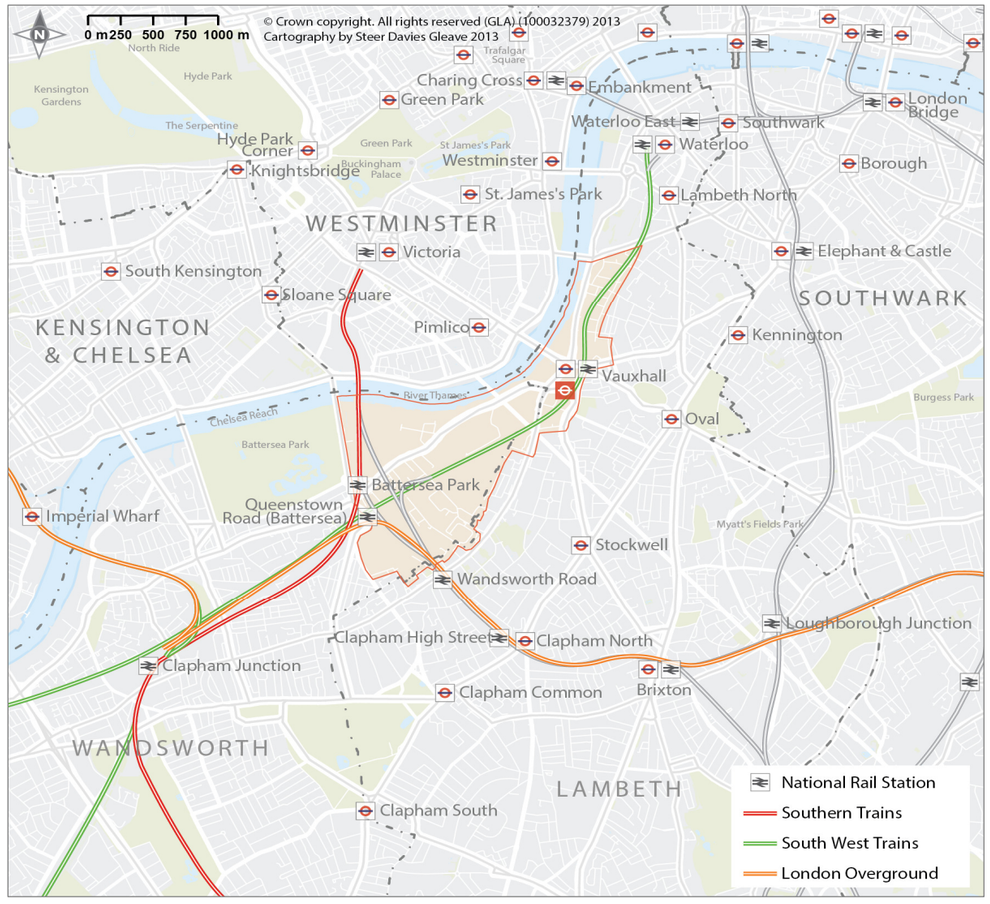
Battersea Park Station

6.90 Battersea Park station (operated by Southern Railways) is situated at the junction of the South London line and the Brighton main line. All services that stop at Battersea Park station also stop at London Victoria and Clapham Junction stations, where numerous other train services can be accessed

6.91 Access to the station is via an entrance on Battersea Park Road. There is no step-free access from the street to the platform and no cycle parking is provided. Bus routes 44, 137, 156, 344 and 452 serve the station.

6.92 AM peak service frequencies from Battersea Park station are identified in Table 6-9.

Figure 6-5 Current Baseline – National Rail and Overground Routes though the VNEB OA



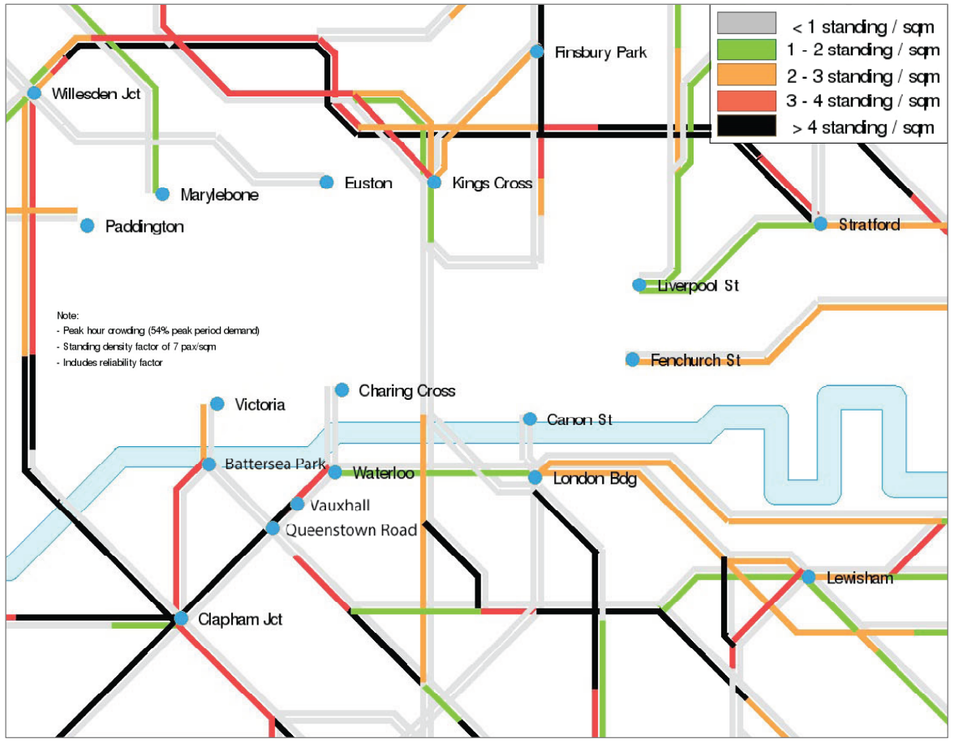
Source: TfL

Table 6-9 Current Baseline – Service Frequency at Battersea Park Station, AM Peak Hour (08:00–09:00)

Direction	Max train length	Weekday peak hour frequency
London Victoria	4 carriages 8 carriages	4 tph 6tph
Clapham Junction	8 carriages	9 tph

Source: TfL

Figure 6-6 Current Baseline – National Rail Crowding Levels, AM Peak Hour (08:00–09:00)



Source: TfL Regional Railplan model

6.93 In 2011/12 approximately 2.5 million passengers used Battersea Park Station (*Source: ORR, 2011*). Although relatively lightly used compared to other inner and central London stations, it does experience some limited congestion, particularly around the gateline.

Queenstown Road Station

6.94 Queenstown Road station (operated by South West Trains) is situated between Vauxhall and Clapham Junction. It has seven tracks running through it but only three platforms, two of which are in use, serving trains on the Waterloo to Richmond line and the Hounslow Loop. Access to the station platforms is via the entrance on Queenstown Road. Cycle parking is provided outside the station. Bus routes 137, 156, 452 serve the station.

6.95 AM service frequencies from Queenstown Road station are identified in Table 6-10.

Table 6-10 Current Baseline – Service Frequency at Queenstown Road Station, AM Peak Hour (08:00–09:00)

Direction	Max train length	Weekday peak hour frequency
London Waterloo	8 carriages	8 tph
Clapham Junction	8 carriages	8 tph

Source: TfL

6.96 In 2011/12 approximately 1.4 million passengers used Queenstown Road Station *(Source: ORR, 2011).* Queenstown road is a relatively lightly used station compared to other inner and central London rail stations and does not have any significant congestion issues.

Vauxhall National Rail Station

6.97 Vauxhall National Rail station (operated by South West Trains) is on the south side of Vauxhall Bridge. It has eight platforms, although platform 1 is not in regular use. Frequent services run to London Waterloo and to the suburbs of south-west London. Bus routes 2, 36, 87, 88, 149, 152, 155, 185, 196, 360 and 436 serve the station. The station was upgraded in 2012 to provide an enlarged passenger concourse and step-free access from street to platform.

6.98 Service frequencies and train lengths from Vauxhall National Rail station are identified in Table 6-11.

Table 6-11 Current Baseline – Service Frequency at Vauxhall Rail Station, AM Peak Hour (08:00–09:00)

Direction (to/from Waterloo)	Max train length	Weekday peak hour frequency
From Richmond	10 carriages	13 tph
To Richmond fast	8 carriages	6 tph
To Richmond slow	8 carriages	5 tph
From Wimbledon	8 carriages	17 tph
To Wimbledon	8 carriages	16 tph

Source: TfL

6.99 In 2011/12 approximately 18.1 million passengers used Vauxhall NR station. *(Source: ORR, 2011)*

Future Baseline

6.100 By 2031 upgrades to the NR network will have been delivered as part of the DfT's High Level Output Specification (HLOS) (2012) (Ref. 6-14). The HLOS defines the railway that the Government wishes to see by 2019 and includes major rail investment schemes such as Thameslink and Crossrail, which will provide high capacity north-south and east-west passenger routes across London. It also sets

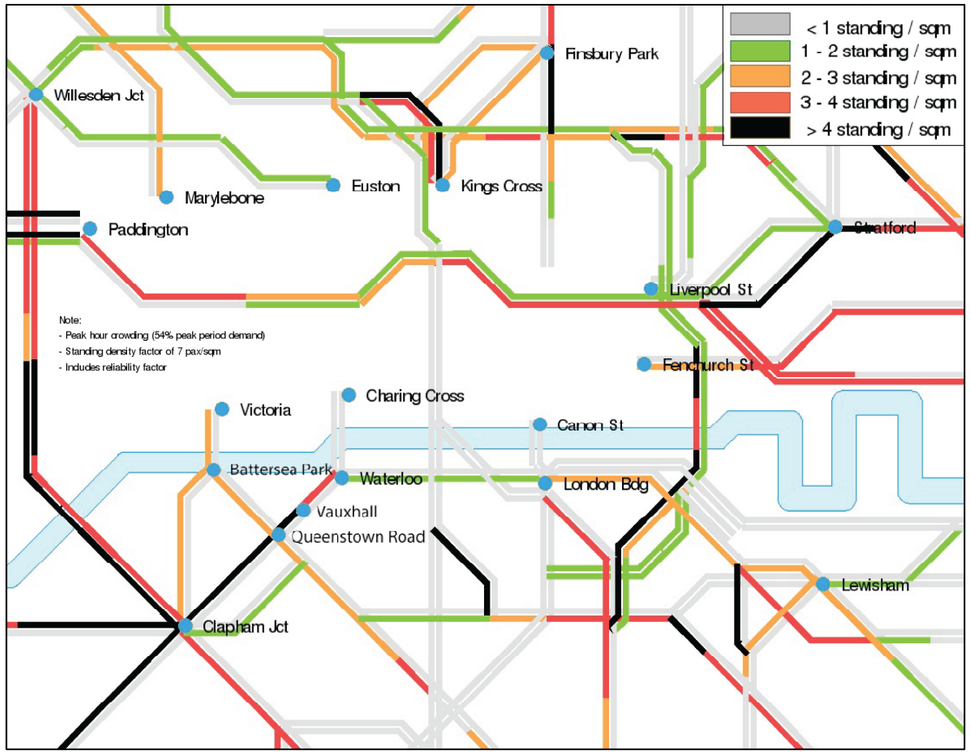
out measures regarding the rollout of further electrification, signalling and accessibility schemes to provide for additional peak demand.

6.101 With regards to the OA specifically, the HLOS upgrades will provide additional capacity to each of the stations in the Area through the provision of longer trains on certain services.

6.102 By 2031 improvements will have increased suburban train capacity and overall crowding levels on NR links will have been reduced.

6.103 Despite this investment however, and given the development in the VNEB OA, crowding will exist on NR links in the VNEB OA, and Clapham Junction to London Waterloo is expected to remain crowded, including between Queenstown Road and Vauxhall. Forecast crowding on NR services in the AM peak at 2031 is identified in Figure 6-7.

Figure 6-7 Future Baseline – National Rail Crowding Levels, AM Peak Hour (08:00–09:00)



Source: TfL Regional Railplan model

6.104 In terms of the NR stations in the OA, Battersea Park and Queenstown Road, both will remain relatively lightly used (compared to other inner and central London stations) in the future baseline and will not suffer a worsening of service as a result of OA development as the consented developments are principally in the central and northern parts of the Area and, the population and employment growth brought about by theses sites result in very little change in entries and exits. Demand at Vauxhall will also increase, in line with wider population and employment growth across London.

Bus Services

Current Baseline

6.105 The areas of interest (i.e. the OA and areas around the Kennington worksites) are served by several bus services, using key roads in the OA including Battersea Park Road, Nine Elms Lane, Queenstown Road, Wandsworth Road and South Lambeth Road. All bus routes serving the OA are shown in Figure 6-8.

6.106 The frequency of buses serving the area defined as buses per hour (bph) is set out in Table 6-12.

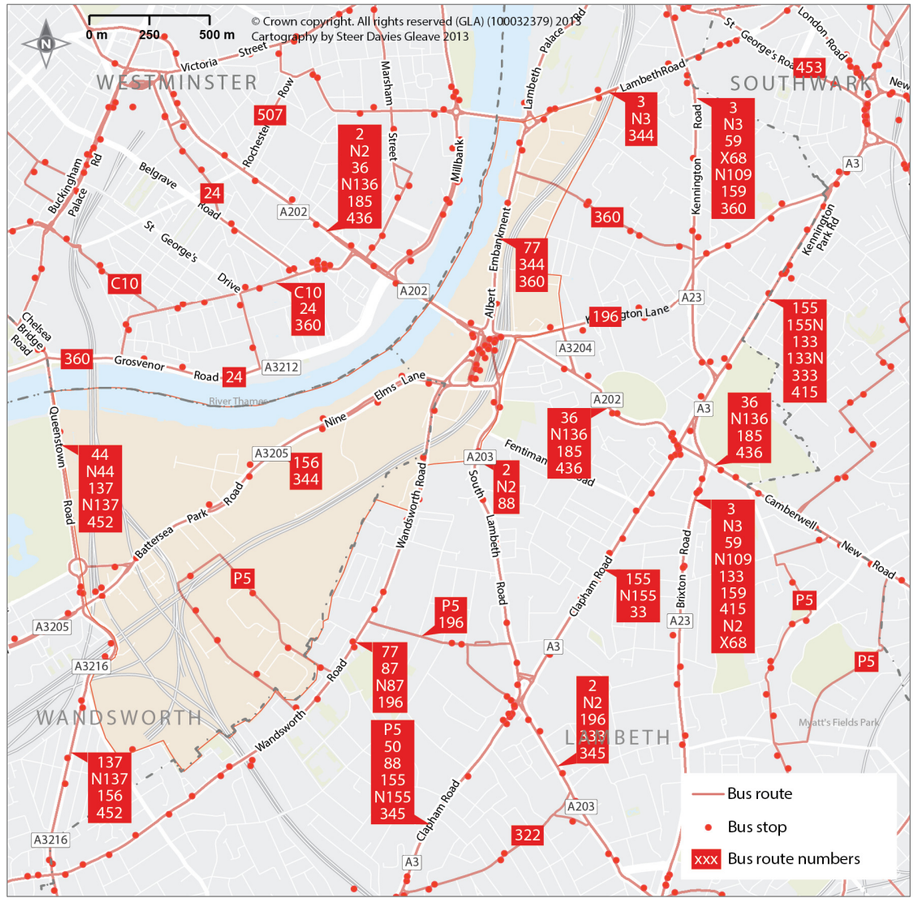
Future Baseline

6.107 A package of enhancements to bus services is planned to support the VNEB OA and to be in place prior to 2031. Specific details of these enhancements are yet to be confirmed as they will be developed to reflect the profile and location of population and employment growth in the OA as it evolves. The enhancements will be tailored to reflect increased demand for bus services and implemented on an incremental basis as they are required, in agreement with the relevant boroughs.

6.108 However, for the purposes of this assessment, a high level package of bus service enhancements, consistent with the improvements set out in the VNEB OAPF have been assumed. This includes increased service levels of up to 20% on existing bus routes serving the OA and three new or extended bus routes to serve the OA, including one that will provide a link from the OA to Stockwell to the south-east and a new link between Nine Elms Lane and Wandsworth Road.

6.109 Despite this investment, the additional passengers brought about by the consented developments will place additional pressure on some local services.

Figure 6-8 Current Baseline – Bus Routes in the VNEB OA



Source: TfL

Table 6-12 Current Baseline – Bus Service Frequency

Service number	Route	Main road used through the area	AM Peak frequency (bph)	Inter-peak frequency (bph)	Evening frequency (bph)
2	Norwood – Marylebone	South Lambeth Road	9	8	5
3	Crystal Palace – Oxford Circus	Kennington Park Road / Brixton Road	8	8	4
36	New Cross – Queen's Park	Camberwell New Road (A202)	10	10	5
44	Tooting – Victoria	Queenstown Road	6	6	4
59	Streatham Hill – King's Cross	Kennington Park Road / Brixton Road	9	9	5
77	Tooting – Waterloo	Wandsworth Road	6	6	5
87	Wandsworth – Aldwych	Wandsworth Road	10	10	5
88	Clapham Common – Camden Town	South Lambeth Road	8	8	5
133	Streatham – Liverpool Street	Kennington Park Road / Brixton Road	10/11	9	5
137	Streatham Hill – Oxford Circus	Queenstown Road	10	10	6
155	Tooting – Elephant & Castle	Kennington Park Road	7/8	7/8	5
156	Wimbledon – Vauxhall	Nine Elms Lane/Queenstown Road	7/8	7/8	5
159	Streatham – Paddington Basin	Kennington Park Road / Brixton Road	11/12	10	5

Service number	Route	Main road used through the area	AM Peak frequency (bph)	Inter-peak frequency (bph)	Evening frequency (bph)
185	Lewisham – Victoria	Camberwell Road	6	6	5
196	Norwood Junction – Elephant & Castle	Wandsworth Road	5	5	3
333	Tooting Broadway – Elephant & Castle	Kennington Park Road	6	6	5
344	Clapham Junction – Liverpool Street	Nine Elms Lane	10	8/9	5
415	Tulse Hill – Elephant & Castle	Kennington Park Road / Brixton Road	5	5	3
436	Lewisham – Paddington	Camberwell New Road	10	8	5
452	Wandsworth Road – Kensal Rise	Queenstown Road	7/8	7/8	5

Source: TfL

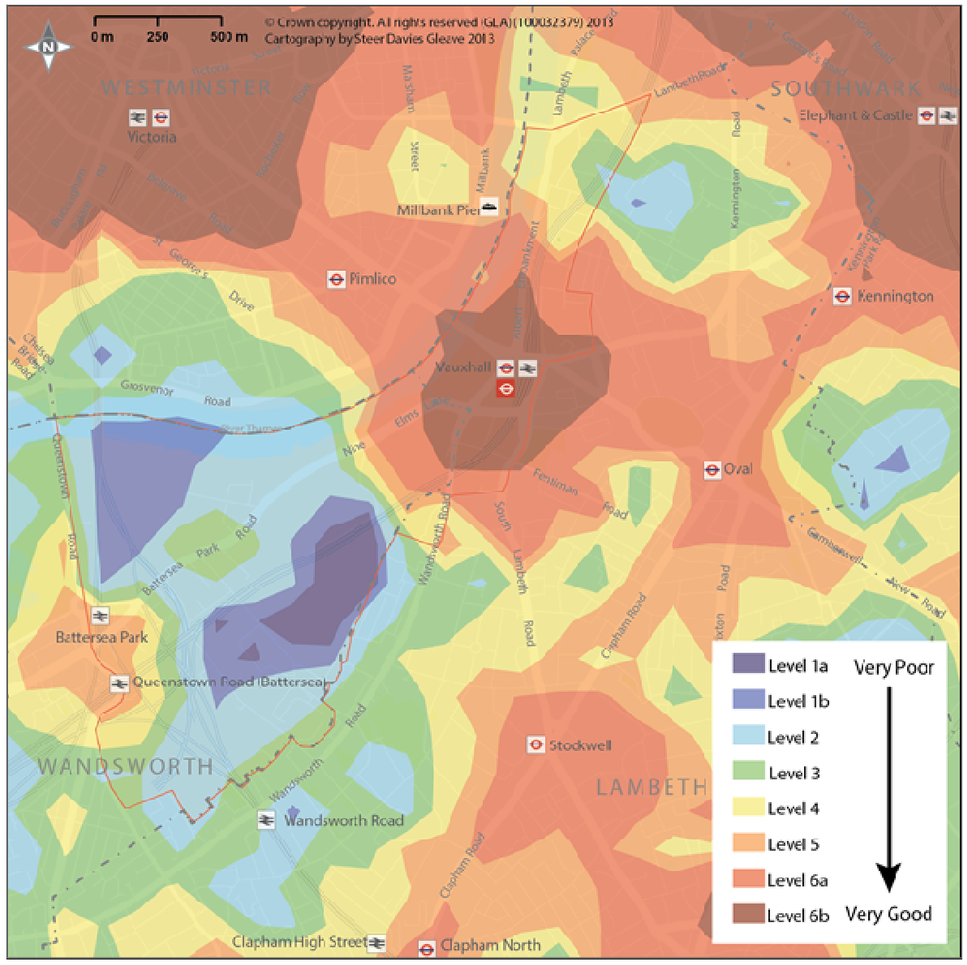
Public Transport Accessibility

Current Baseline

6.110 A large proportion of the OA suffers from poor public transport accessibility, especially relative to other areas of central and inner London. With the exception of Vauxhall and its immediate surroundings, the rest of the OA including the area around BPS has a low level of public transport accessibility and relies predominantly on access by bus and NR services.

6.111 One way of measuring the relative public transport accessibility of particular sites or areas is through PTAL. PTAL is a detailed and accurate measure of the accessibility of a point to the public transport network, taking into account walk access time and service availability. A plan showing the current PTAL across the OA is shown in Figure 6-9 and shows poor levels of accessibility (e.g. Levels 1a and 1b) in many parts of the OA and is in stark contrast to much of the rest of central London that has excellent levels of accessibility.

Figure 6-9 Current Baseline – Public Transport Accessibility Levels

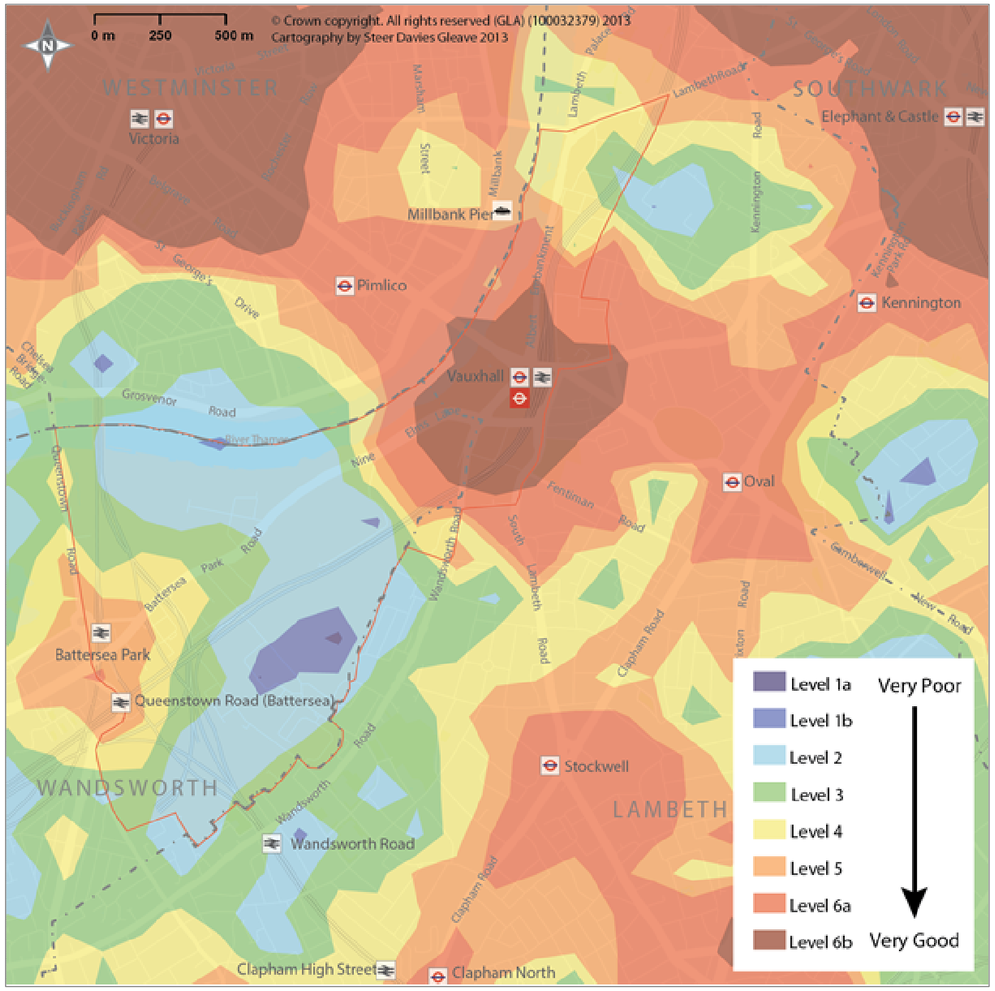


Source: TfL

Future Baseline

6.112 While the bus enhancements deliver some limited improvement in accessibility, the increase in PTALs will be relatively modest. This is due to the constraints of the network, with the proposed bus service enhancements predominantly only being able to serve existing corridors which, with some limited exceptions, such as at BPS are unable to penetrate the new development sites as well as the high journey times and lower capacity provided by buses as opposed to Rail and Underground services.

Figure 6-10 Future Baseline – Public Transport Accessibility Levels



Source: TfL

6.113 Overall, despite the significant development that will occur in the OA, the future public transport accessibility will remain similar to how it is today, and the OA will continue to be a poorly connected part of central London, with very few new points of access to the public transport network to encourage more sustainable travel patterns. This is shown in Figure 6-10.

Local Highway Network

Current Baseline

6.114 Figure 6-11 sets out the major road network in the OA and around the Kennington worksites. The TLRN represents strategic roads which carry a high volume of traffic and for which TfL is the highway authority. The London boroughs of Lambeth and Wandsworth are the highway authorities for the other major roads and all of the local roads in the OA. The London boroughs of Lambeth and Southwark are responsible for the major and local roads around the proposed constructions sites at Radcot Street, Harmsworth Street, Kennington Park and, Kennington Green, with the exception of Kennington Road and Kennington Park road, both of which are part of the TLRN.

6.115 The principal TLRN roads are:

- Harleyford Road / Camberwell New Road (A202);
- Kennington Road / Brixton Road (A23);
- South Lambeth Road (A203);
- Nine Elms Lane / Battersea Park Road (A3205);
- Vauxhall Bridge (A202);
- Albert Embankment (A3036);
- Kennington Lane (A3204);
- Kennington Road (A23); and
- Kennington Park Road (A3)

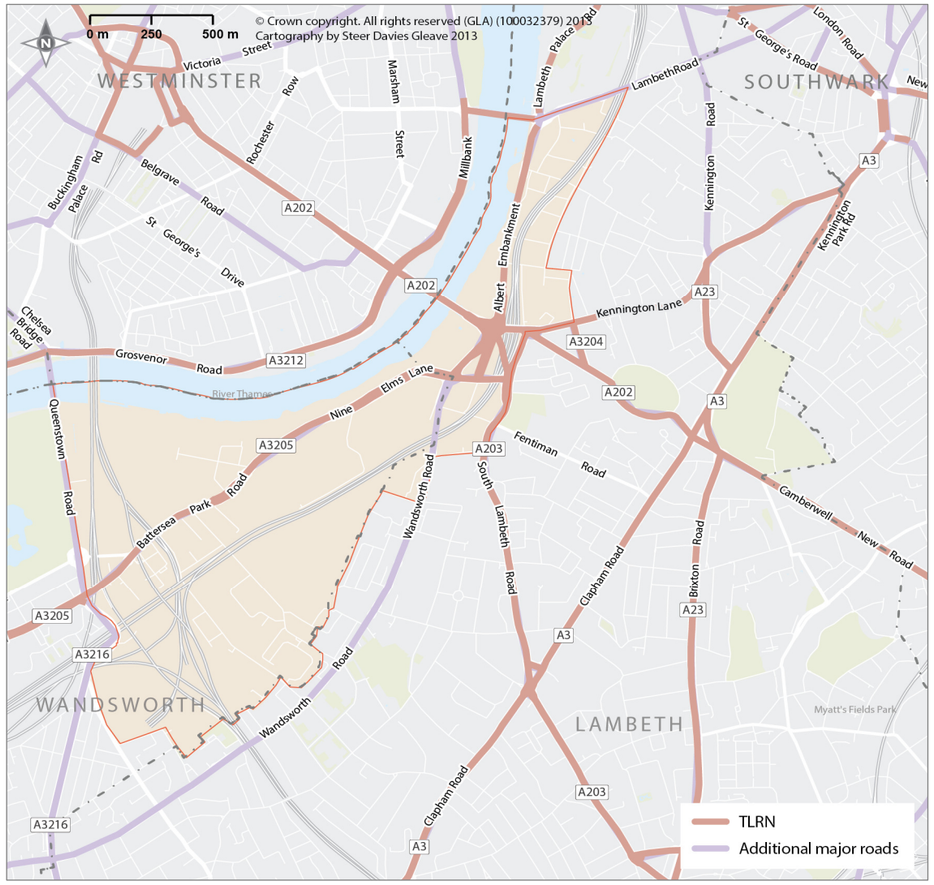
6.116 The main borough roads include:

- Wandsworth Road (A3036); and
- Queenstown Road (A3216)

6.117 The proportions of different vehicles using selected links in the area are identified in Table 6-13.

06 Traffic and Transport

Figure 6-11 Current Baseline – Major Road Network



Source: TfL

6.118 Junction capacity modelling of the highway network has been undertaken using TRANSYT. Further detail is contained in *ES Volume II: Appendix C1*. As detailed in this report, a local junction assessment near the proposed worksites shows that the following junctions have a traffic throughput relative to capacity (degree of saturation) that currently exceeds the theoretical maximum level recommended for optimum operation (90%) of the junction during the peak hours:

- Kennington Park Road / Kennington Park Place; and
- Pascal Street / Wandsworth Road.

Table 6-13 Current Baseline – Two-Way Traffic Flows, AM Peak Period (07:00-10:00)

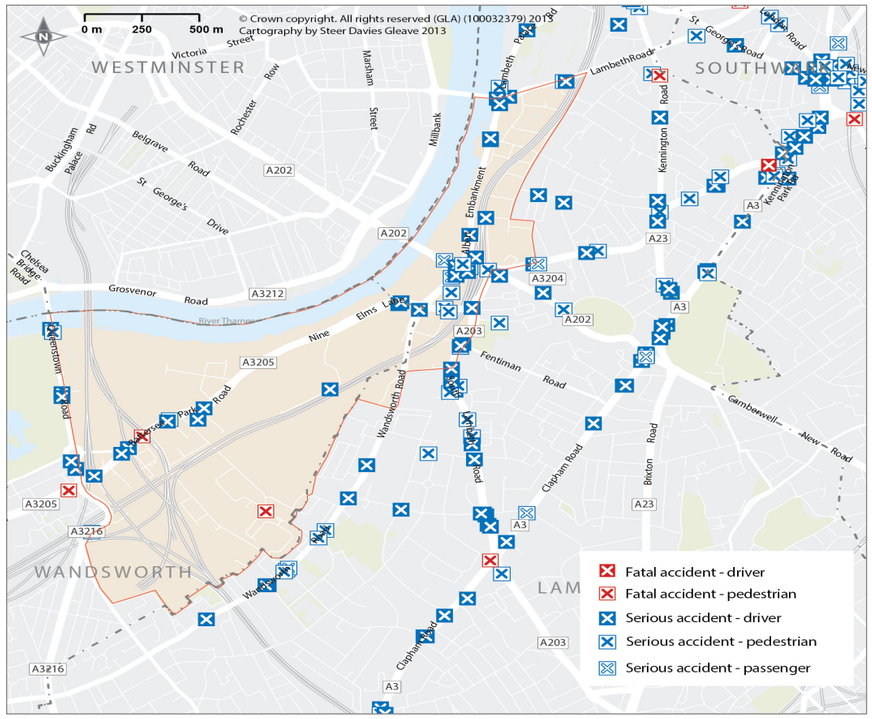
	Direction	Car/Light Goods Vehicles	Lorry /Heavy Goods Vehicle	Bus	Motor-cycle	Total
Kennington Park Road, north of Claylands Road	Northbound	1,550	80	60	510	**2,200**
	Southbound	1,460	80	50	110	**1,700**
Kennington Road, north of Stannary Street	Northbound	1,620	50	110	440	**2,220**
	Southbound	770	30	100	30	**930**
Wandsworth Road, South of Pascal Street	Northbound	1,980	90	90	240	**2,400**
	Southbound	780	40	70	40	**930**
Battersea Park Road, North of Prince of Wales Drive	Eastbound	2,200	150	70	490	**2,910**
	Westbound	2,240	170	70	120	**2,600**

Source: TfL survey data (2012)

Road Safety

6.119 There were a total of 1,419 accidents recorded for the 36 month period to the end of June 2012. The majority of these were slight accidents where injuries were not sufficient to warrant medical treatment (1,197). The remaining 222 were serious and fatal accidents. Of these, nine of were fatalities, with eight of them involving pedestrians. Figure 6-12 shows the location of severe and fatal accidents and the mode of transport being used. The majority of accidents on these routes were recorded as being a result of driver / rider error through disobeying a give way, stop sign or road marking.

Figure 6-12 Current Baseline – Accidents (June 2009 – June 2012)



Source: TfL

Future Baseline

6.120 The future baseline shows an increase in traffic on main roads in the areas of interest both as a result of general population and employment growth across London and specifically OA growth. The future baseline also includes a representation of highway improvements associated with the committed OA developments at the Royal Mail Site, US Embassy site, Sainsbury's (on Wandsworth Road) and Vauxhall Square. Each of these improvements is assumed to occur both 'without' and 'with' the NLE.

6.121 The development that occurs in the OA in the future baseline, without the significant increase in public transport accessibility brought about by the NLE, will increase the number of vehicular trips in the area, putting increased pressure on the Vauxhall gyratory and other strategic and local roads in the OA. The overall growth in traffic volumes along the key links in the current and future baseline is presented in Table 6-14. The overall traffic is measured in passenger car units (PCUs), which reflects the amount of road capacity that each vehicle takes up (a car is 1 equivalent to PCU, a lorry is equivalent to 2-3 PCUs etc.).

6.122 The table shows that two-way traffic grows on all key links by between 3% (Kennington Park Road) and 59% (Kennington Road), with most links increasing by between 10% and 30%, between 2009 and 2031.

6.123 The table also shows the volume to capacity ratio, which is a measure of how congested the road network is. The ratio shows the percentage of total theoretical road capacity that is accounted for by traffic, and a ratio of 85% or above, based on the two-way flow, denotes where a link is congested (this is the measure of congestion defined by the assessment criteria in Table 6-2).

Table 6-14 Increase in 2-Way Traffic (PCUs) – Current to Future Baseline, AM Peak Hour (08:00-09:00)

Road	Current Baseline (2009)	Future Baseline (2031)	Percentage Change (current to future baseline)	Future baseline Volume to Capacity Ratio
Vauxhall Bridge	3,150	3,670	17%	63
Albert Embankment (A3036)	780	1,020	31%	12
Nine Elms Lane (A3205)	870	1,060	22%	22
Battersea Park Road (A3205)	1,730	2,250	30%	48
Kennington Park Road (A3)	1,350	1,390	3%	35
Harleyford Road (A202)	1,590	1,790	13%	65
Kennington Lane (A3204)	1,310	1,460	11%	69
Kennington Road (A23)	940	1,500	59%	55
South Lambeth Road (A203)	990	1,100	11%	42
Queenstown Road (A3216)	1,240	1,420	14%	87
Wandsworth Road (Principal route)	910	1,240	36%	30

Source: TfL Central London Highway Assignment Model (CLoHAM)

Parking

Current Baseline

6.124 Parking and loading restrictions on the TLRN are managed under the Red Route regime for which TfL is responsible. Parking and loading controls on non-TLRN roads fall under the jurisdictions of the London boroughs of Southwark, Lambeth and Wandsworth.

6.125 The OA and areas around the worksites are covered predominantly, but not entirely, by on-street controlled parking zones (CPZs). The area around the proposed Battersea station site is currently the only uncontrolled area in areas of interest.

6.126 Parking surveys in the vicinity of the NLE worksites were undertaken in September 2012. The findings of this study concluded that in all areas, when considered at a neighbourhood level, there is spare parking capacity at all times. The full parking study is included in *ES Volume II: Appendix C1.*

Future Baseline

6.127 It is assumed that by 2031 all areas of the VNEB OA will be controlled by on-street CPZs. In addition parking provision for all new developments in the VNEB OA will be provided in line with London Plan standards.

Pedestrians

Current Baseline

6.128 The quality and condition of the pedestrian environment around the proposed stations and worksites has been considered by way of a Pedestrian Environmental Review System (PERS) audit. The full audit report is included in *ES Volume II: Appendix C2*.

6.129 The footways in the residential areas around Kennington are of good quality with a few minor problems such as wheelie bins stored on the footway, and narrow and uneven sections where tree roots have grown large. The footways on Kennington Park Road and Wandsworth Road are generally wide and of very high quality with good tactile surfaces and dropped kerbs. Meanwhile, the pedestrian environment in the OA, particularly near BPS is low quality with major roads and other transport infrastructure creating barriers and preventing ease of movement.

6.130 Surveys of pedestrian movements on a typical workday in the vicinity of the worksites have been undertaken and a summary is presented in Table 6-15. Further detail on the locations and results of these surveys is included in *ES Volume II: Appendix C1.*

Future Baseline

6.131 The pedestrian environment in parts of the VNEB OA is set to be improved as a consequence of future consented development in the area, as set out in the VNEB OAPF. Proposals include:

- An improved river walk from Lambeth Palace Gardens to Battersea Park;
- Re-surfaced footways;
- Unified street lighting;
- Regular, wide pedestrian (and cycle crossings) along Albert Embankment and Nine Elms Lane;
- A new linear park in Nine Elms;
- Strategic river links to provide access from the existing residential hinterland to the river; and
- A new pedestrian/cycle bridge connecting Nine Elms with the north side of the River Thames.

Table 6-15 Current Baseline – Two-Way Pedestrian Movements

Worksite	7:00-10:00	10:00–16:00	16:00–19:00	Total
Radcot Street	100	160	80	3,400
Harmsworth Street	140	300	290	730
Kennington Green[1]	700	1,920	990	3,610
Kennington Park[2]	400	630	470	1,500
Nine Elms (Wandsworth Road/Pascal Street)	360	1,050	640	2,050
Battersea (Battersea Park Road)	200	20	200	420

Source: TfL survey data (2012)

Cyclists

Current Baseline

6.132 The current cycle networks around the proposed stations and worksites are shown in Figure 6-13. There are two Barclays Cycle Superhighways in operation, CS7 which runs down Kennington Park Road and CS8 which runs across Chelsea Bridge. A number of local cycle routes also pass through the OA and near proposed worksites.

6.133 In addition to the cycling networks, there are approximately 200 Barclays Cycle Hire docking points north of Harleyford Road/Kennington Oval along with numerous secure cycle parking facilities throughout the areas of interest.

6.134 Flows on the main routes are set out in Table 6-16. The peaks reflect commuter movements into and out of central London.

6.135 The highest cycle flow during the morning peak takes place along Kennington Park Road north of Claylands Road in a northbound direction. A total of 942 cyclists

[1] Includes movements on Montford Place

[2] Does not include movements in the park itself

used Kennington Park Road in a northbound direction from 08:00-09:00 which was over 53 percent of total vehicles.

6.136 Of the surveyed routes, Kennington Road has the second highest cycle flow during the morning peak. The cycle flow was measured near Kennington Green, north of the junction with Stannary Street. A total of 710 cyclists passed along Kennington Road during the busiest hour of the morning peak (08:00-09:00) in a northbound direction (45%of total vehicles).

Figure 6-13 Current Baseline – Cycle Network

Source: TfL

6.137 Lower cycle traffic was recorded on Wandsworth Road at the junction with Pascal Street. A total of 280 cyclists passed along Wandsworth Road in a northbound direction during the busiest hour of the morning peak (08:00-09:00).

Future Baseline

6.138 The conditions for cyclists in 2031 are expected to be improved in parts of the OA both as a result of wider investment such as the addition of Barclays Cycle Superhighway CS5 which will run through Vauxhall and across Vauxhall Bridge, as well as improvements that will be made as part of the consented development in the OA. The latter includes a minimum of ten new Barclays Cycle Hire docking stations, some cycle paths and increased levels of secure cycle parking provided at new developments in the VNEB OA (in accordance with the London Plan minimum standards and the OAPF). Improved cycle facilities are also planned for Nine Elms Lane and at Vauxhall Gyratory. Due to the planning conditions attached to the BPS development, the majority of cycle improvements planned as part of this scheme would not be able to come forward without the NLE.

Table 6-16 Current Baseline – Cycle Flows

Road	Direction	07:00-10:00		16:00-19:00	
		Total Flow	% of total vehicles	Total Flow	% of total vehicles
Kennington Park Road, north of Claylands Road	Northbound	1,890	45%	170	9%
	Southbound	190	10%	1,450	38%
Kennington Road, north of Stannary Street	Northbound	1,450	39%	130	8%
	Southbound	60	6%	950	32%
Wandsworth Road, South of Pascal Street	Northbound	560	20%	70	4%
	Southbound	3	0%	10	0%
Battersea Park Road, East of Prince of Wales Drive	Eastbound	360	11%	180	7%
	Westbound	230	8%	250	7%

Source: TfL survey data

River Services and Piers

Current Baseline

6.139 There is one pier in active use within the areas of interest – St George Wharf, close to Vauxhall station. The pier is operated by Thames Clippers, and services operate with a boat arriving every 30-40 minutes throughout the day, seven days a week on the Tate to Tate route (St George Wharf – Blackfriars or Bankside).

Future Baseline

6.140 Improvements to services and new river piers at BPS and at the Riverlight development are planned as part of the wider development of the OA. Measures to increase use of the river are consistent with the Mayor's River Action Plan (2013) which includes the aim to double passenger journeys by 2020.

Potential Impacts and Mitigation Measures (with NLE)

6.141 This section considers the traffic and transport impacts of the proposed NLE during construction and operation. The methodology described in paragraphs 6.32-6.58 of this chapter has been applied and the significance of the various effects identified are assessed using the criteria set out in Tables 6-1 and 6-2 as well as professional judgement. This section first considers the impact of the construction phase, followed by the operational 'end state' (2031) effects.

Construction Phase

6.142 The majority of adverse traffic and transport effects will arise for a temporary period only during the scheme's construction, when extensive and multi-phased construction works are required, meaning the impacts are predominantly short-term. Inevitably this will cause disruption to some groups and the impact of the construction phase is therefore considered in relation to the significance criteria identified in Table 6-1.

6.143 The NLE will take approximately four years to construct and a number of transport modes are expected to be affected in different ways. The effect on each relevant transport mode has been considered individually, as appropriate.

6.144 There are currently two potential construction methodologies. Construction Option A requires six worksites – two temporary shafts at Radcot and Harmsworth Streets (in the London boroughs of Lambeth and Southwark respectively), two permanent shafts at Kennington Green and Kennington Park (in the London Borough of Lambeth) and two station sites at Nine Elms and Battersea (in the London boroughs of Lambeth and Wandsworth respectively). In Construction Option B, the temporary shafts would not be required but there is a consequential increase in the level of activity at the permanent shaft sites (approximately a 5% increase in construction traffic).

6.145 For the purposes of this assessment, as the impacts of the two methodologies do not differ significantly (as the length, level and patterns of the peaks are similar), the effects of Construction Option A are considered as more sites are impacted by construction.

6.146 *ES Volume II: Appendix C1* sets out the differences in trip generation between the Options in more detail and full details of the NLE construction (for both methodologies) can be found in *Chapter 4: Description of Works*.

London Underground Effects

6.147 During construction of the NLE, closures of the Kennington Loop will be required to enable construction of the step plate junctions. Wherever reasonably practicable, the closures of the Kennington Loop will be coordinated with other relevant Underground works in order to minimise disruption. The effect on London Underground services is the same under both construction options.

6.148 It is assumed that the closure programme required for the step-plate junction works will be over six weekends and would be timed to take place at less busy times wherever possible. During these closures, Kennington station will remain open and services will continue to operate on both branches of the Northern line, however service frequencies will need to be reduced.

6.149 This effect of this is not considered significant in terms of public transport delay, when based on the Assessment Criteria set out at Table 6-1, since the impact on journey times would be minimal (less than 20%), the duration is limited (fewer than four weeks) and the effect is localised. Therefore, the required closure of the Kennington Loop is considered to have a minor adverse effect.

6.150 In addition, the construction of the cross-passages at Kennington station, to be delivered as part of the NLE, will cause some disruption to the station. Works will take approximately four weeks at the northbound platform and four weeks at the southbound platform, to be undertaken separately in order to minimise disruption.

6.151 During these works (that will total approximately eight weeks) the station will remain open but one platform will need to be closed. This means that there will be some disruption to interchange for passengers wanting to transfer between branches as well as some restrictions on travel to/from Kennington station (i.e., passengers will not be able to board/disembark at one branch of the Northern line in one direction).

6.152 This effect of this is not considered significant in terms of public transport delay, when based on the Assessment Criteria set out at Table 6-1, since the impact on journey times would be minimal (less than 20%), the duration is limited (four weeks at the northbound and 4 weeks at the southbound platforms) and the effect is localised. Therefore, the construction of the cross passages at Kennington station is considered to have a minor adverse effect.

London Underground Mitigation and Significant Residual Effects

6.153 In order to minimise the impact of the closure of the Kennington Loop, alterations to the existing Northern line weekend schedule would be implemented, further minimising the overall impact on passengers.

6.154 In addition, a concerted travel planning and demand management campaign would be established by TfL to mitigate the impact of the required closure of the Kennington Loop as well as the cross passages works in line with the London Underground protocol.

6.155 TfL will also seek to undertake the cross passages work at a relatively quiet period of the year (such as Christmas) in order to minimise the disruption.

Highway Effects

6.156 This section considers traffic levels and delays, including accidents and safety, in respect of NLE construction traffic at both a strategic and local junction level. Overall, both construction options generate very similar levels of traffic but since Construction Option A affects a greater number of locations, the assessments consider the effects of this methodology. *ES Volume II: Appendix C1* sets out the difference between the two construction options.

6.157 Routes to worksites will be on the major road network as these roads are capable of accommodating high volumes of traffic, with vehicles only using local roads to directly access the worksites. It is assumed that construction vehicles will generally use the following roads to access the worksites:

- Kennington Park Road / Clapham Road (TLRN);
- Kennington Road (TLRN);

- Wandsworth Road (in the vicinity of the Nine Elms construction site only) (Borough Road); and
- Nine Elms Lane/Battersea Park Road (TLRN).

Changes to the Road Network During Construction

6.158 While there are no closures to strategic roads planned as part of the works, the temporary removal of approximately 80m of bus lane on Kennington Road (related to construction of the Kennington Green shaft) will reduce capacity on this section of road. Highway modelling has indicated that this will not be significant in terms of traffic levels and delays, since the effect on capacity is minimal and localised. The effect is therefore considered to be minor adverse.

6.159 Radcot Street and Harmsworth Street will need to be closed to make space for the temporary shaft worksites (in Construction Option A). This will require the temporary diversion of local traffic but this is not considered significant when based on the Assessment Criteria (Table 6-1) since the diversion is less than 2.5km. The effect is therefore considered to be minor adverse.

6.160 For a period of around three months, there will be a temporary stopping up of part of Kennington Road around the Green to enable construction of the head house. Access to properties around the Green will not be affected by this short-term closure and the effect is therefore considered to be minor adverse.

6.161 It is proposed that a new junction on Battersea Park Road will be created at the Battersea station worksite to enable the safe movement of construction vehicles to and from the site. The details of this temporary access, which incorporates the existing dual pelican crossing, are set out in *ES Volume II: Appendix C1*. The effects of this junction on traffic flows are summarised in *ES Volume II: Appendix C1* which concludes that there will be negligible impact at this junction.

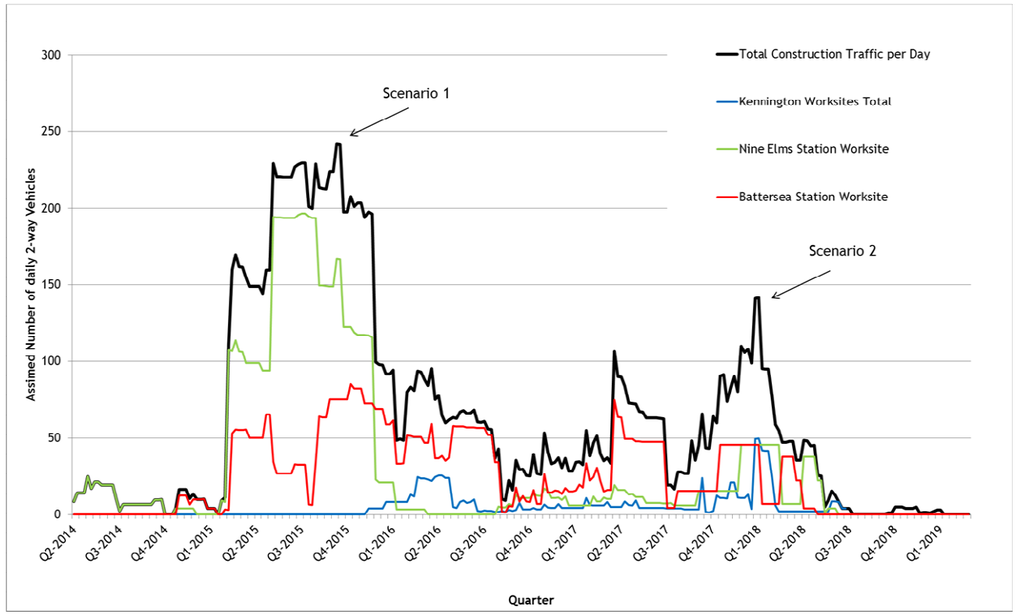
Strategic Level Assessment of Effect of NLE Construction Traffic

6.162 Wherever reasonably practical, excavated material will be taken from site by river to minimise disruption to the road network. Depending on the construction option adopted up to approximately 67% of excavated material will be transported by river and the remaining 33% will be transported by road. It may be possible that there will be further opportunities to increase the use of the river, as well as consolidate some activities with other developments in the area, and these will continue to be investigated by TfL.

6.163 Discussions with local highway authorities on lorry routes will form part of the development of traffic management plans prior to the start of construction. For the purposes of this assessment, the routes chosen are those that provide the most direct feasible access to/from the strategic road network.

6.164 At a strategic level, a 'worst case' scenario, where construction vehicle movements generated by the NLE are at their highest, has been tested using the CLoHAM model (full details of which are provided in *ES Volume II: Appendix C1*). The peak construction period occurs between Q1 2015 and Q1 2016 and is shown in Figure 6-14. This area wide traffic assessment compares Baseline 2009 traffic flows with the assumed Construction Option A flows, which has the highest number of movements overall (see Table 6-17 for the number of vehicles).

Figure 6-14 Construction Option A, Daily Vehicle Movements



Source: TfL

6.165 The road network in the vicinity of the worksites consists, in general, of high capacity roads that would not be unduly affected by the increase in construction traffic generated by the NLE. This modelling shows marginal changes in the reassignment of traffic flows across as a result of the additional traffic generated by the NLE construction.

6.166 The assessment concludes that there would be a minor adverse impact on the network based on the Assessment Criteria set out in Table 6-1 since increases in flow are low and delay is localised and short-term.

Local Level Assessment of Effect of NLE Construction Traffic

6.167 While the impact on the major road network in terms of traffic levels and delay is not deemed significant, the assessment has also considered the junctions to be used by construction vehicles since they access and egress sites directly to and from the major road network.

6.168 Traffic generated by construction varies significantly throughout the programme therefore two scenarios have been developed to help understand the impact of NLE traffic on the highway network at different time periods. The analysis presented here considers the worst case scenarios under Construction Option A, when traffic generated by NLE construction is at its highest.

6.169 Scenario 1 occurs in Q4 2015 where the majority of trips are generated at the Nine Elms and Battersea worksites and Scenario 2 occurs in Q1 2018 where vehicle

trips are spread throughout the Kennington, Nine Elms and Battersea areas. For each of these scenarios, the daily vehicle numbers during these peaks are set out in Table 6-17.

Table 6-17 Daily NLE Two-Way Construction Vehicle Trips by Location, Peak Scenarios

Worksite	Scenario 1 - Q4 2015	Scenario 2 - Q1 2018
Radcot Street	0	0
Harmsworth Street	0	9
Kennington Green	0	1
Kennington Park	0	41
Nine Elms	167	46
Battersea	75	46
Total	**242**	**143**

Source: TfL

6.170 This assessment is based on there being one inward and one outward route to and from each worksite. The routes considered in this assessment are those that provide the most direct feasible access to the major road network. The junctions assessed were:

- Kennington Road / Stannary Street – providing access to the Radcot Street worksite;
- Kennington Park Road / Kennington Park Place – providing access to the Harmsworth Street and Kennington Park worksites;
- Kennington Road / Kennington Green (north) and Kennington Road / Kennington Green (south) – providing access to the Kennington Green worksite;
- Pascal Street / Wandsworth Road – providing access to the Nine Elms worksite; and
- Battersea Park Road / Battersea station construction worksite access.

6.171 The local junction modelling undertaken using TRANSYT models for the relevant junctions indicates that there will be two junctions at which there will be a significant effect for part of the construction period. These are:

- Kennington Park Road / Kennington Park Place junction during Scenario 2 (PM peak); and
- Pascal Street / Wandsworth Road junction during Scenario 1 (AM peak).

Table 6-18 TRANSYT Results

Junction	Degree of Saturation (%)			Mean Delay (Secs)			Mean Max Queue (PCU)		
	Base	Scenario		Base	Scenario		Base	Scenario	
		1	2		1	2		1	2
Kennington Park Road – Northbound (pm peak)	90	90	92	48.4	48.3	52.9	17	17	19
Wandsworth Road – Northbound (am peak)	91	94	89	46.0	55.4	43.5	20	23	19

Source: TfL

6.172 Both of these junctions already operate at close to theoretical capacity (90% and 91% degree of saturation) and the NLE construction traffic will result in these junctions operating closer to capacity, which is considered to be moderate adverse.

6.173 The analysis indicates that for all other junctions the impact of the NLE construction traffic is not significant when based on the Assessment Criteria set out at Table 6-1. Further detail on these junctions is presented in *ES Volume II: Appendix C1*.

Road Safety

6.174 Personal Injury Accident data for the routes expected to be used by NLE construction traffic was analysed for the three year period ending June 2012 and was presented in Figure 6-12.

6.175 The type and severity of recorded accidents is considered typical of urban environments where conflicting movements can occur. The analysis, presented in full in *ES Volume II: Appendix C1*, concludes that there are no particular patterns or safety problems in the areas of interest (no clusters exceeding more than 10 personal injury accidents in any 100m) and that NLE construction will have a negligible effect on road safety when based on the Assessment Criteria set out in Table 6-1.

Impact of Construction Workers

6.176 For normal daytime working all construction staff will be encouraged to travel to the worksites by public transport. No staff parking will be provided at any of the worksites. The majority of worksites are within walking distance of

Underground/NR stations and access to the sites by public transport is feasible and a detailed Construction Logistics Plan including a Travel Plan for construction workers will be produced prior to the commencement of works. Therefore, the impact of conduction workers is considered negligible.

6.177 More detail on the numbers of construction workers is included in *Chapter 7: Socio-Economics*.

Highway Mitigation and Significant Residual Effects

6.178 As set out above, the TRANSYT modelling has shown that there are two junctions where there will be a moderate adverse impact on traffic flows when based on the Assessment Criteria set out in Table 6-1 (Kennington Park Road/Kennington Park Place and Pascal Street/Wandsworth Road). These junctions currently operate at a degree of saturation above 90% and NLE construction vehicles will increase the degree of saturation as shown in Table 6-18.

6.179 Both these impacts will only be sustained for a short period – approximately three months – and thus are short-term. For this reason, physical interventions are not considered appropriate to mitigate the impact. Instead, the CoCP and Traffic Management Plan for the site will provide a basis for reducing the peaks in traffic flow by adjusting the construction programme or restricting construction vehicle movements to the site during the relevant peak period (during PM peak at Kennington Park Road/Kennington Park Place and AM peak at Pascal Street/Wandsworth Road). This would enable the impact of construction traffic at these two junctions to be minimised, resulting in minor adverse effects.

6.180 To further improve safety on local and major roads, TfL will mandate that all contractors and their suppliers working on the NLE have bronze accreditation of the Fleet Operator Recognition Scheme (FORS) (or similar) (Ref. 6-15).

Parking Effects

6.181 Some parking spaces will need to be temporarily suspended to make room for the worksites and in order to ensure construction vehicles can safely access these worksites. The number of spaces to be suspended in order to provide safe access to the worksites for larger vehicles was based on swept path analysis for three different types of vehicles. As 10m rigid and large tipper type vehicles will need access throughout the construction period, spaces will be suspended to enable the safe manoeuvring of these vehicles for the duration of construction. Low loader vehicles will be used by exception for specific tasks at the beginning and end of the construction period and as such, the additional spaces needed to accommodate low loaders will only be suspended on an ad hoc basis for short periods of time.

6.182 The number of parking spaces to be temporarily suspended by location is identified in Table 6-19.

6.183 The analysis based on the parking surveys shows that at a wider neighbourhood level there is sufficient spare parking capacity to accommodate the expected reduction in parking due to NLE construction. However, the loss of parking spaces at the Radcot Street, Harmsworth Street, Kennington Park, Kennington Green and Nine Elms worksites will be an inconvenience to residents at a local level and is considered to have a significant effect based on the criteria set out in Table 6-1 since more than five on-street bays would be suspended for a period of more than four weeks. This impact is considered moderate adverse since it has a limited impact.

6.184 Under Construction Option B, the effects of construction remain the same at the station and permanent shaft sites, and at Radcot Street and Harmsworth Street, in the absence of worksites, there will be no impact on parking.

Table 6-19 Number of Parking Spaces to be Temporarily Suspended, by Location

	Parking spaces suspended during construction period				**Ad-hoc additional removal for short periods**
Location	**Duration (approx)**	**Construction site**	**10m rigid & Large tipper**	**Total**	**Low loader**
Radcot Street (Construction Option A only)	2 years	12	3	**15**	8
Harmsworth Street (Construction Option A only)	2 years	10	3	**13**	8
Kennington Green	2.5-3 years	10	0	**10**	0
	3 months	2	0	**2**	0
Kennington Park	2.5-3 years	13	0	**13**	3
Nine Elms	4 years	4 (car) 5 (motor cycle)	9	**13 (car) 5 (motor cycle)**	0
Battersea	4 years	0	0	**0**	0

Source: TfL

Parking Mitigation and Significant Residual Effects

6.185 The analysis based on parking surveys (included in *ES Volume II: Appendix C1*) shows that all displaced parking demand at all sites could be absorbed by alternative provision nearby, leading to a minor adverse effect.

Bus Effects

6.186 The effect of NLE construction on buses is the same when considering either construction option. The strategic modelling (included in *ES Volume II: Appendix C1*) indicates that the effect of the NLE construction on bus journey times (public transport delay) within the vicinity of the worksites will not be significant when judged against the Assessment Criteria set out in Table 6-1.

6.187 As described earlier, the Kennington Green worksite will occupy an approximate 80m section of bus lane adjacent to the worksite. Two-way traffic will be maintained on Kennington Road throughout the works with a single lane in each direction for traffic and a bus lane for southbound buses. The increased journey time for passengers resulting from the removal of the bus lane will have a minor adverse effect and does not require mitigation since the impact is localised and short-term.

Pedestrian Effects

6.188 The following section provides a summary of the effects on pedestrians by location. Generally, the pedestrians are local residents passing near the worksites. Each worksite will have a banksman and warning signs for pedestrians alerting them to construction traffic.

6.189 Construction Option A will require the following changes to pedestrian facilities:

- Narrowing of the north-western footway on Radcot Street. This will have a minor adverse effect.
- Closure of the western footway on the southern side of Harmsworth Street, with the eastern footway remaining open to provide 24 hour emergency access to Bishop's House Day Nursery. This will have a minor adverse effect.
- Closure of the footways around Kennington Green and the pedestrian crossing on Kennington Road, requiring pedestrians to divert to alternative footways and crossings. For the majority of the time the worksite is in situ and this will have a minor adverse effect, however for a 12 week period when the worksite boundary is extended westwards resulting in the closure of Montford Place there will be a moderate adverse effect.
- Closure of the footway that abuts Kennington Park on Kennington Park Place. This will have a minor adverse effect.
- Closure of the footway on the western side of Wandsworth Road, including two crossings at Pascal Street and closure of the eastern side of Pascal Street. This will have a moderate adverse effect.
- Introduction of a temporary signal controlled junction at the Battersea station site that will incorporate the existing dual pelican crossing on Battersea Park Road (near Thessaly Street) into the temporary junction with demand-actuated traffic signals. This will be approximately 70m from the existing crossing and the effect will be negligible.

6.190 Under Construction Option B, the effects of construction remain the same at all sites except Radcot and Harmsworth Street, where in the absence of worksites there will be no effect on pedestrians.

Pedestrian Mitigation and Significant Residual Effects

6.191 To mitigate the effects of the Kennington Green worksite on pedestrians, it is proposed that the existing island on Kennington Road near the bus stop will be widened, with clear signage directing pedestrians to use this facility. As a consequence, the impact on pedestrians using the north footway at this location will be reduced from a moderate to a minor adverse effect.

6.192 To mitigate the effects of the closure of the footway on Wandsworth Road, pedestrians will be directed by clear signage to cross the road at existing crossing points either side of the worksite and use the eastern footway. On Pascal Street the footway on the western side of the road will remain open thereby ensuring that this route can continue to be used by pedestrians. As a consequence, the effect on pedestrians in the vicinity of this worksite will be negligible.

6.193 Although the closure of the footway on Kennington Park Place is not deemed significant, a traffic marshal system for access to the worksite on Kennington Park will be deployed if necessary to prevent any safety conflicts between school children and the construction site/vehicles.

6.194 In terms of pedestrian safety, notwithstanding the conclusion that the impact on pedestrians will not be significant and that no particular safety issues have been identified in the highway network analysis, the safety measures that all contractors will be required to employ to undertake work on the NLE will help to improve conditions for pedestrians around worksites.

Cycling Effects

6.195 Road safety analysis indicates that there are no particular safety issues as a consequence of the NLE construction traffic at a local level in the vicinity of the worksites. However there could be a more general moderate adverse effect on cyclists as a consequence of the increased lorry movements generated in the wider area.

6.196 Cyclists who currently use Radcot Street and Harmsworth Street will be required to use alternative routes or dismount while passing the worksites and use the footways. This is considered to have a minor adverse effect.

6.197 Under Construction Option B, the effects of construction remain the same at all sites except Radcot and Harmsworth Street, where in the absence of worksites there will be no effect on cyclists at these locations.

Cycling Mitigation and Significant Residual Effects

6.198 To ensure the safety of cyclists on local cycling routes in the vicinity of the Radcot Street, Harmsworth Street and Kennington Park worksites, diversions to alternative cycling routes will be implemented. TfL will work closely with boroughs and local cycling groups to determine the most appropriate routes and ensure these are

communicated effectively. Alternatively, if cyclists do not wish to divert, they will be able to dismount while passing the worksites and use the footways.

6.199 In addition to having bronze accreditation of the FORS (Ref 6-15), all contractors and suppliers must produce regular collision and emission reports and the vehicles and drivers working on the NLE contracts must meet specific safety standards, including the requirement that all HGVs are fitted with Fresnel lenses or front mounted rear facing CCTV, close proximity warning systems which results in an audible beep in the driver's cab when a cyclist is on the left inside space, and side under-run guards to help prevent cyclists coming into contact with lorry wheels. All fleet vehicles must also carry signs to warn cyclists and pedestrians. All fleet drivers will be required to have regular licence checks with DVLA and to undertake FORS Approved Safe Urban Driving accredited training every three years and FORS approved annual safety e-learning.

6.200 TfL will also raise awareness of the issues associated with cycling near lorries by promoting events such as 'Exchanging Places' (Ref. 6-16). These events provide people with the opportunity to sit in the driver's seat of a lorry to get a better understanding of what a lorry driver can and can't see and where vehicle blind spots can exist.

6.201 Taken together, these mitigation measures during the construction phase will minimise the impact on cyclists, resulting in minor adverse effects.

Pier/River Effects

6.202 Under Option A and Option B an estimated 70% and 68% by volume respectively of material will be removed by barge, with the remainder by road. For waterborne transport, movements would be controlled and managed so as to minimise impacts on the waterways and other waterway users. The effects on river traffic are broadly the same under each construction option.

6.203 The impact of the construction activities on the river is deemed to be negligible when judged against the Assessment Criteria. Discussions with the Port of London Authority (PLA) indicate that there is sufficient river capacity to carry the anticipated additional traffic generated by NLE, providing movements are managed and coordinated with other activities such as Thames Tideway Tunnel and the BPS site. TfL is working with Thames Water and the developer of BPS to develop a joined-up approach to use of the river.

Operational Phase ("end state")

6.204 By 2031 it is assumed that the full development of the VNEB OA will be complete including all development sites and that a full service frequency of 28 tph is operating on the NLE during the AM and PM peaks.

6.205 This section considers the traffic and transport effects of the NLE including from the additional development that is enabled by the scheme. This equates to approximately 14,000 additional jobs and 5,600 new homes over what was considered in the future baseline sections earlier in this chapter and enables the OA to be developed to the level supported by the VNEB OAPF.

6.206 As set out earlier in this chapter, the transport impacts of the NLE have been assessed using TfL's suite of strategic public transport and highway models (Regional Railplan and CLoHAM) as well as more detailed modelling to assess impacts at stations (e.g.PEDS and Legion, the results of which are presented in *ES Volume II: Appendix C3* and *Appendix C4* respectively).

London Underground Effects

6.207 The NLE will provide two new stations – at Nine Elms and at Battersea. These stations will provide step-free access from street level to the trains via lifts, improving physical accessibility and facilitating many more Underground journeys for people who require step-free access. This includes direct links from the OA to the Central line and Crossrail at Tottenham Court Road, linking with all other step-free stations on Crossrail in central London and many more across the network.

6.208 The new stations at Nine Elms and Battersea will greatly improve interchange in the OA. The stations will be effectively integrated with other transport modes, particularly bus and cycle and optimise passenger interchange, delivering benefits to all public transport users.

6.209 By 2031, both upgrades to the Northern line (described earlier) will be complete and the line will be capable of delivering 30 tph on the Charing Cross branch and 33 tph on the Bank branch. On the Charing Cross branch in the peak periods, up to 28 tph would depart from/terminate at Battersea station, with two additional trains per hour terminating at Kennington and using the loop.

6.210 To assess the effect of the NLE on the Underground network, both the change in flow and the impact that this has on crowding levels must be considered. The following section firstly sets out the change in flows then considers the impact this has on crowding levels.

Northern Line Passenger Flows

6.211 It is forecast that in the AM peak, the number of passengers using the NLE between Battersea, Nine Elms and Kennington stations will be as set out in Table 6-20.

Table 6-20 Forecast Patronage on the NLE, 2031

From/To	AM peak (07:00–10:00)
Northbound	
Battersea – Nine Elms	4,100
Nine Elms – Kennington	8,200
Southbound	
Kennington – Nine Elms	6,400
Nine Elms – Battersea	4,300

Source: TfL Regional Railplan model

6.212 These forecast flows are well within the capacity provided by the NLE and the two new stations have been designed to meet levels of demand significantly greater than that generated in 2031. As such the NLE is able to easily accommodate the forecast demand and enable sustainable travel to and from the OA.

6.213 Table 6-21 shows the forecast changes in flows on the Charing Cross branch of the Northern line north of Kennington in the AM peak as a result of the NLE. This is the section of the network that will experience the greatest change in passenger flows as a consequence of the NLE.

6.214 The increase in flows set out in Table 6-21, which in some cases represent a large percentage increase (such as between Kennington and Waterloo in both directions), must be considered in the context of available capacity and forecast loadings on these links without the NLE. While the increases themselves are large, the flows even with the NLE are well within the capacity of the line as demonstrated by the fact that they are still below patronage levels experienced elsewhere on the Northern line. As such, these links will be able to accommodate the increase in flows without having a detrimental impact on the line or the wider network. Moreover the increases in patronage southbound indicates a greater use of currently underused capacity, indicating more efficient use of the network. An assessment of the impact of the NLE on crowding levels is presented later in this section.

Table 6-21 Forecast Change in Patronage – Northern Line Charing Cross Branch, North of Kennington Station, AM Peak Period (07:00–10:00), 2031

From/To	Without NLE	With NLE	Change	% Change
Northbound				
Kennington – Waterloo	14,400	18,700	4,300	+30%
Waterloo – Embankment	26,700	29,600	2,900	+11%
Embankment – Charing Cross	26,000	27,700	1,700	+7%
Southbound				
Charing Cross – Embankment	19,400	21,600	2,200	+11%
Embankment – Waterloo	12,000	15,100	3,100	+36%
Waterloo – Kennington	3,100	7,100	4,000	+129%

Source: TfL Regional Railplan model

6.215 On the Bank branch, the changes brought about by the NLE are noticeably smaller than on the Charing Cross branch. Table 6-22 shows the forecast changes in flows on the Bank branch north of Kennington in the AM peak.

6.216 As can be seen, although the increased demand does lead to higher flows on these links, the increases themselves are small and the overall flows still fall within the capacity of the line. As such, it is considered that these additional flows can be accommodated without having a detrimental impact on the line or the wider network.

6.217 Despite the additional homes and jobs to be delivered as part of the VNEB OA, the NLE results in some decreases in patronage on some sections of the Underground network, particularly south of Kennington – which is forecast to continue to be one of the most heavily used sections of the line. Table 6-23 shows the forecast change in flows on the Northern line south of Kennington in the AM peak. The relative proximity of the proposed new stations at Nine Elms and Battersea to the existing Northern line stations at Stockwell, Oval and Clapham North means that the NLE provides a benefit to this section of the line as passengers using these stations would choose to use the NLE instead.

Table 6-22 Forecast Change in Patronage – Northern Line Bank Branch, North of Kennington Station, AM Peak Period (07:00–10:00), 2031

From/To	Without NLE	With NLE	Change	% Change
Northbound				
Kennington – Elephant & Castle	37,200	38,400	1,200	+3%
Elephant & Castle – Borough	38,300	39,400	1,100	+3%
Borough – London Bridge	38,000	39,100	1,100	+3%
Southbound				
London Bridge – Borough	19,600	20,500	900	+5%
Borough – Elephant & Castle	16,700	17,600	900	+5%
Elephant & Castle – Kennington	13,700	14,800	1,100	+8%

Source: TfL Regional Railplan model

Table 6-23 Forecast Change in Patronage – Northern Line, South of Kennington Station, AM Peak Period (07:00-10:00), 2031

From/To	Without NLE	With NLE	Change	% Change
Northbound				
Clapham North – Stockwell	51,500	50,900	-600	-1%
Stockwell – Oval	44,100	42,600	-1,500	-3%
Oval – Kennington	46,200	44,600	-1,600	-3%
Southbound				
Kennington – Oval	15,000	14,600	-400	-3%
Oval – Stockwell	14,200	13,800	-400	-3%
Stockwell – Clapham North	16,400	16,300	-100	-1%

Source: TfL Regional Railplan model

Victoria Line Passenger Flows

6.218 Table 6-24 shows the modelled changes in flows on the Victoria line either side of Vauxhall, the only Underground station currently located in the OA, in the AM peak.

Table 6-24 Forecast Change in Patronage – Victoria Line, Around Vauxhall Station, AM Peak Period (07:00-10:00), 2031

From/To	Without NLE	With NLE	Change	% Change
Northbound				
Stockwell – Vauxhall	31,900	32,100	200	+1%
Vauxhall – Pimlico	46,100	45,200	-900	-2%
Pimlico – Victoria	45,600	44,700	-900	-2%
Southbound				
Victoria – Pimlico	24,700	23,500	-1,200	-5%
Pimlico – Vauxhall	16,200	15,000	-1,200	-7%
Vauxhall – Stockwell	8,800	8,600	-200	-2%

Source: TfL Regional Railplan model

6.219 Similar to links south of Kennington on the Northern line, the NLE will reduce passenger numbers between Vauxhall and Victoria. There would be a marginal increase in passengers northbound between Stockwell and Victoria.

Summary of Passenger Flow Effects

6.220 When considered as a whole, Tables 6-21 to 6-24 show that, notwithstanding the significant increase in jobs and homes in the VNEB OA, the NLE has a limited effect on loadings on the Northern and Victoria lines. Where additional passengers are generated on the Northern line these will dissipate into the network and are also offset by reductions in flows on both the Northern line south of Kennington, which is the most heavily used section of the line, and on the Victoria line.

6.221 Where flows do increase as a consequence of the NLE these flows do not exceed the maximum loadings on other links on the same line with the same capacity. The next section sets out how these changes in flow impact upon crowding levels, and assesses the impact of the NLE in line with the criteria set out in Table 6-2.

London Underground Crowding Levels

6.222 Crowding levels are recorded as the number of people standing per square metre. Based on the Assessment Criteria (Table 6-2), the future year forecasts show that the NLE will not lead to any significant crowding level impacts as crowding does not increase by more than 10% on any link with a forecast future baseline crowding ratio (without the NLE) of greater than 3 passengers standing per square metre in the AM peak which is TfL's standard.

6.223 The key links serving the OA are shown in Tables 6-25 to 6-28. For completeness, these tables denote whether the link meets the Assessment Criteria in Table 6-2. It can be seen that, while none of these links show a crowding impact that meets the significance criteria, there are some links where crowding levels do change and these effects are considered either minor adverse or minor beneficial.

Table 6-25 Forecast Crowding Levels – Northern Line Charing Cross Branch, North of Kennington Station, AM Peak Period (07:00-10:00). Absolute Standing Pax/Sqm Ratio, 2031

From/To	Without NLE	With NLE	Base > 3 pax/sqm	% Change	Meets the Criteria
Northbound					
Kennington – Waterloo	0.1	0.7	No	600%	No
Waterloo – Embankment	2.3	2.8	No	22%	No
Embankment – Charing Cross	2.1	2.4	No	14%	No
Southbound					
Charing Cross – Embankment	0.5	0.8	No	60%	No
Embankment – Waterloo	-0.6	-0.2	No	-67%	No
Waterloo – Kennington	-1.7	-1.0	No	-41%	No

Source: TFL Regional Railplan model

Table 6-26 Forecast Crowding Levels – Northern Line Bank Branch, North of Kennington Station, AM Peak Period (07:00-10:00). Absolute Standing Pax/Sqm Ratio, 2031

From/To	Without NLE	With NLE	Base > 3 pax/sqm	% Change	Meets the Criteria
Northbound					
Kennington – Elephant & Castle	3.5	3.7	Yes	6%	No
Elephant & Castle – Borough	3.7	3.9	Yes	5%	No
Borough – London Bridge	3.8	3.9	Yes	3%	No
Southbound					
London Bridge – Borough	0.8	0.9	No	13%	No
Borough – Elephant & Castle	0.7	0.8	No	14%	No
Elephant & Castle – Kennington	0.1	0.2	No	100%	No

Source: TfL Regional Railplan model

Table 6-27 Forecast Crowding Levels – Northern Line, South of Kennington Station, AM Peak Period (07:00-10:00). Absolute Standing Pax/Sqm Ratio 2031

From/To	Without NLE	With NLE	Base > 3 pax/sqm	% Change	Meets the Criteria
Northbound					
Clapham North – Stockwell	5.4	5.3	Yes	-2%	No
Stockwell – Oval	4.5	4.3	Yes	-4%	No
Oval – Kennington	5.0	4.8	Yes	-4%	No
Southbound					
Kennington – Oval	0.0	-0.1	No	132%	No
Oval – Stockwell	0.0	-0.1	No	322%	No
Stockwell – Clapham North	-0.1	-0.1	No	0%	No

Source: TfL Regional Railplan model

Table 6-28 Forecast Crowding Levels – Victoria Line Around Vauxhall Station, AM Peak Period (07:00-10:00). Absolute Standing Pax/Sqm Ratio, 2031

From/To	Without NLE	With NLE	Base > 3 pax/sqm	% Change	Meets the Criteria
Northbound					
Stockwell – Vauxhall	1.9	1.9	No	0%	No
Vauxhall – Pimlico	3.3	3.2	Yes	-3%	No
Pimlico – Victoria	3.4	3.3	Yes	-3%	No
Southbound					
Victoria – Pimlico	0	-0.1	No		No
Pimlico – Vauxhall	-0.5	-0.6	No	20%	No
Vauxhall – Stockwell	-1.2	-1.2	No	0%	No

Source: TfL Regional Railplan model

6.224 Based on the flows and crowding levels presented above, the overall effect of the NLE on London Underground flows using the Assessment Criteria is not considered significant. Taking into account both the effect of the NLE on flows and on crowding, the conclusions are that in the AM peak:

- On northbound Northern line links south of Kennington there is a minor beneficial effect due to the reduction in passenger flows and crowding levels;
- On northbound Northern line links north of Kennington (both branches) there is a minor adverse effect due to the increase in passenger flows but minimal impact on crowding levels;
- On northbound Victoria line links there is a minor beneficial effect due to the reduction in passengers flows and crowding levels; and
- On southbound Northern and Victoria line links there is a minor beneficial effect due to the utilisation of the available capacity meaning the Underground network is being used more efficiently.

6.225 In the case of minor adverse effects identified no mitigation is required as the additional demand generated by the NLE and the wider VNEB OA can be accommodated on the network without causing a significant increase in crowding levels.

Stations

6.226 Increased patronage on the Underground as a result of the NLE will also have an impact on stations in/near the OA. The future baseline demonstrates that even without the NLE and as a consequence of the consented development in the VNEB OA, there are expected to be large increases in passengers at both Kennington and Vauxhall. With the NLE in place the greatest impact will be seen at Kennington and Vauxhall stations, considered individually in the following paragraphs. Tables 6-29 and 6-30 set out the change in flows at these stations as a result of the NLE. Further information on the effects of the NLE on other Northern line stations can be found in *ES Volume II: Appendix C3.*

Kennington Station

6.227 At Kennington station there will be a large increase in passenger throughput as a consequence of the NLE. Table 6-29 shows that this effect is predominantly due to a large increase in interchanging passengers between the two branches of the Northern line. There is only a negligible increase in total passengers entering or exiting the station.

Table 6-29 Forecast Passenger Flows at Kennington Station, AM Peak Period (07:00-10:00), 2031

	Without NLE	With NLE	Change	% Change
Entries/Exits	7,700	7,900	200	3%
Interchange between branches	12,600	15,500	2,900	23%
Total	20,300	23,400	3,100	15%

Source: TfL Regional Railplan model, factored using RODS data according to London Underground's combination forecasting methodology

6.228 Up to four new cross passages will be constructed at Kennington as part of the NLE, two each between the two northbound platforms and the two southbound platforms. More detail on the additional cross passages can be found in *Chapter 4: Description of Works*.

6.229 Dynamic station modelling using Legion has been undertaken for Kennington station for both the 'future baseline' (that does not include additional cross passages) and the 'with NLE' scenario (that does include additional cross passages). This demonstrates that even with the additional demand generated by the NLE, Kennington station operates with less crowding than in the future year baseline due to the additional cross passages set to be delivered as part of the scheme. The effect on the station is therefore considered moderate beneficial as it will enable it to operate more efficiently than would have been possible without the NLE. More detail on the Legion modelling can be found in *ES Volume II: Appendix C4*.

Vauxhall Station

6.230 The overall impact of the NLE on Vauxhall Underground station is shown in Table 6-30.

Table 6-30 Forecast Passenger Flows at Vauxhall Underground Station, AM Peak Period (07:00-10:00), 2031

	Without NLE	With NLE	Change	% Change
Entries/Exits	29,300	26,300	-3,000	-10%

Source: TfL Regional Railplan model, factored using RODS data according to London Underground's combination forecasting methodology

6.231 This indicates that the NLE will have a moderate beneficial effect by providing congestion relief to this important interchange by transferring passenger demand to the two new NLE stations at Battersea and Nine Elms. In particular, this indicates that people living and working in the OA will choose to use the NLE instead of the Victoria line from Vauxhall and thus reduce the impact of OA development on the station.

National Rail Effects

National Rail Services

6.232 The NLE will reduce flows on NR services in the AM peak, albeit by a small amount. Tables 6-31 to 6-33 show the forecast change in flows on the local NR services that stop at the stations in the OA as a consequence of the NLE.

6.233 There is a marginal decrease in passenger flows from Battersea Park to Victoria, and this is minimal in comparison to the high flows between these two stations and, as such, is considered negligible.

6.234 There is a marginal decrease in passenger flows from Queenstown Road to Vauxhall, this is minimal in comparison to the high flows between these two stations and, as such, is negligible.

6.235 There is a marginal decrease in passenger flows from Vauxhall to London Waterloo. These flows are minimal in comparison to the high flows between these two stations and, as such, this effect is negligible.

Table 6-31 Forecast Change in Patronage on National Rail Services To/From Battersea Park Station, AM Peak Period (07:00-10:00), 2031

From/To	Without NLE	With NLE	Change	% Change
Northbound				
Clapham Junction – Battersea Park	13,600	13,900	300	2%
Battersea Park – London Victoria	12,500	12,200	-300	-2%
Southbound				
London Victoria – Battersea Park	1,500	1,400	-100	-7%
Battersea Park – Clapham Junction	1,600	1,600	0	0%

Source: TfL Regional Railplan model

Table 6-32 Forecast Change in Patronage on National Rail Services To/From Queenstown Road Station, AM Peak Period (07:00-10:00), 2031

From/To	Without NLE	With NLE	Change	% Change
Northbound				
Clapham Junction – Queenstown Road	17,500	17,600	100	1%
Queenstown Road – Vauxhall	17,500	17,100	-400	-2%
Southbound				
Vauxhall – Queenstown Road	6,800	6,500	-300	-4%
Queenstown Road – Clapham Junction	6,800	6,800	0	0%

Source: TfL Regional Railplan model

Table 6-33 Forecast Change in Patronage on National Rail Services To/From Vauxhall Station, AM Peak Period (07:00-10:00), 2031

From/To	Without NLE	With NLE	Change	% Change
Northbound				
Clapham Junction – Vauxhall	71,800	71,100	-700	-1%
Vauxhall – London Waterloo	50,100	49,200	-900	-2%
Southbound				
London Waterloo – Vauxhall	13,900	13,400	-500	-4%
Vauxhall – Clapham Junction	17,400	17,100	-300	-2%

Source: TfL Regional Railplan model

6.236 The NR effects are further informed by the levels of crowding, presented in Tables 6-34 and 6-35 which show that the change in crowding levels as a consequence of the NLE is negligible despite the additional development that is enabled by the scheme (based on the criteria set out in Table 6-2).

Table 6-34 Forecast Crowding Levels on National Rail Services To/From Battersea Park Station, AM Peak Period (07:00-10:00). Absolute Standing Pax/Sqm Ratio, 2031

From/To	Without NLE	With NLE	Base > 3 pax/sqm	% Change	Meets the Criteria
Northbound					
Clapham Junction – Battersea Park	2.2	2.2	No	0%	No
Battersea Park – London Victoria	2.2	2.2	No	0%	No
Southbound					
London Victoria – Battersea Park	-3.0	-3.0	No	0%	No
Battersea Park – Clapham Junction	-2.6	-2.5	No	-4%	No

Source: TfL Regional Railplan model

Table 6-35 Forecast Crowding Levels on National Rail Services To/From Queenstown Road and Vauxhall NR Stations, AM Peak Period (07:00-10:00). Absolute Standing Pax/Sqm Ratio, 2031

From/To	Without NLE	With NLE	Base is > 3 pax/sq m	% Change	Meets the Criteria
Northbound					
Clapham Junction – Queenstown Road	5.1	5.0	Yes	-2%	No
Queenstown Road – Vauxhall	5.1	5.0	Yes	-2%	No
Vauxhall – London Waterloo	3.5	3.4	Yes	-3%	No
Southbound					
London Waterloo – Vauxhall	-1.8	-1.8	No	0%	No
Vauxhall – Queenstown Road	-1.4	-1.5	No	7%	No
Queenstown Road – Clapham Junction	-1.4	-1.4	No	0%	No

Source: TfL Regional Railplan model

National Rail Stations

6.237 In addition to NR flows, the NLE and associated development enabled by the NLE will also have an impact upon the three NR stations located in the OA. Table 6-36 presents the change in flow at each of the stations as a result of the NLE.

Table 6-36 Forecast Passenger Flows at National Rail Stations in the OA, AM Peak Period (07:00-10:00), 2031

Station	Without NLE	With NLE	Change	% Change
Battersea Park	1,900	2,500	600	33%
Queenstown Road	2,100	1,800	-300	-16%
Vauxhall	18,300	18,400	100	0%

Source: TfL Regional Railplan model, factored using survey data according to London Underground's combination forecasting methodology

6.238 Table 6-37 shows a minor beneficial effect at Queenstown Road NR station and a negligible effect at Vauxhall NR station as a result of the NLE as some passenger demand is transferred to the new London Underground stations at Battersea and Nine Elms.

6.239 Conversely, Battersea Park experiences a large percentage increase in passenger flows as a result of the NLE. This is not as a direct consequence of NLE demand but instead as a result of the additional development facilitated by the NLE, particularly as part of the BPS development.

6.240 An assessment has been undertaken for Battersea Park station to establish the impact of the increased patronage. This demonstrates that although the station does not comply with all station standards in the current and future baseline years, the additional passenger flows generated as a result of the NLE do not cause the station to exceed any standard with the exception of requiring an additional ticket gate over what would be required without the NLE. As such, the impact on Battersea Park station is considered to be minor adverse**.** More detail on the assessment of Battersea Park station can be found in *ES Volume II: Appendix C5*.

6.241 TfL is currently working with key stakeholders including Network Rail and the London Borough of Wandsworth to identify how best to manage the additional demand at this station in the future and various options are being considered. The additional funding for these improvements would be expected to be generated in part by the developments that cause the impacts that have not yet received planning permission. Funding for improvements at this station is also identified in the VNEB Development Infrastructure Funding Study (Ref. 6-17).

Bus Effects

6.242 The NLE will also have an effect on bus services in the OA. For the purposes of this assessment the future year bus service provision in the OA is assumed to be the same in both the 'without NLE' and 'with NLE' scenarios.

6.243 Overall, there will be a reduction in bus demand for trips into and out of the OA with the NLE when compared to a situation without the NLE. Table 6-37 indicates that the combination of the NLE and the additional development enabled by the NLE is expected to reduce bus demand by around 12% on services in the area, with the vast majority of these being inbound trips. There is only forecast to be a very minor change in total outbound trips.

Table 6-37 Forecast Bus Passenger Flows on Total OA Bus Services, AM Peak Period (07:00-10:00), 2031

Direction of flow	Without NLE	With NLE	Change	% Change
Inbound	24,200	19,700	-4,500	-19%
Outbound	14,200	14,000	-200	-1%
Total	38,400	33,700	-4,700	-12%

Source: TfL Regional Railplan model

6.244 The largest difference in bus flows as a result of the NLE are forecast to be along the routes closest to the proposed stations at Battersea and Nine Elms along Battersea Park Road / Nine Elms Lane and Wandsworth Road respectively. In both cases eastbound flows from the west are forecast to have a significant increase in passenger numbers prior to reaching each of the new stations followed by a significant decrease once services have passed the stations and before reaching Vauxhall. These changes in flow suggest that a sizable number of NLE passengers will be attracted to bus services that allow interchange to the NLE therefore, the NLE will result in fewer people travelling to Vauxhall via bus and interchanging there.

Table 6-38 Forecast Bus Passenger Flows on Nine Elms Lane /Battersea Park Road Bus Services near Battersea station, AM Peak Period (07:00-10:00), 2031

Direction of flow	Without NLE	With NLE	Change	% Change
Nine Elms Lane east of Battersea station				
Eastbound	3,300	3,000	-300	-9%
Westbound	2,100	2,000	100	-4%
Battersea Park Road west of Battersea station				
Eastbound	3,000	3,800	800	27%
Westbound	1,900	2,300	400	21%

Source: TfL Regional Railplan model

6.245 Overall the impact on individual bus services and corridors is varied with a mixture of increases and decreases, although as shown in Tables 6-38 and 6-39 there is a pattern of passengers interchanging from bus services to use the NLE leading to large changes once the bus reaches the stations. Such varied flows will be accounted for by TfL when it plans the future bus network. Due to the overall

reduction in bus patronage as a result of the NLE, the impact on the bus network is considered to be a minor beneficial effect.

Table 6-39 Forecast Bus Passenger Flows on Wandsworth Road Bus Services near Nine Elms station, AM Peak Period (07:00-10:00), 2031

Direction of flow	Without NLE	With NLE	Change	% Change
Wandsworth Road east of Nine Elms station				
Eastbound	3,500	1,700	-1,800	-51%
Westbound	1,400	900	-500	-36%
Wandsworth Road west of Nine Elms station				
Eastbound	3,500	3,600	100	3%
Westbound	1,400	1,300	-100	-7%

Source: TfL Regional Railplan model

Public Transport Accessibility

6.246 The NLE will result in a large increase in public transport accessibility as defined by PTAL, both in the OA, particularly at the western end and central part and also in the existing communities in the areas surrounding the two new stations. With the NLE in operation, the future PTAL for the OA and areas around it is set out in Figure 6-15.

6.247 As set out in Figure 6-15, the NLE will increase public transport accessibility levels in the western part of the OA in the area around Battersea station and to a lesser extent in the central part of the OA and the existing communities near to Nine Elms station. This shows that the NLE is able to make the OA much more characteristic of central London by increasing the ease of public transport access and providing a new sustainable means of getting to and from the OA. The overall impact of the NLE on public transport accessibility is considered to be a major beneficial effect.

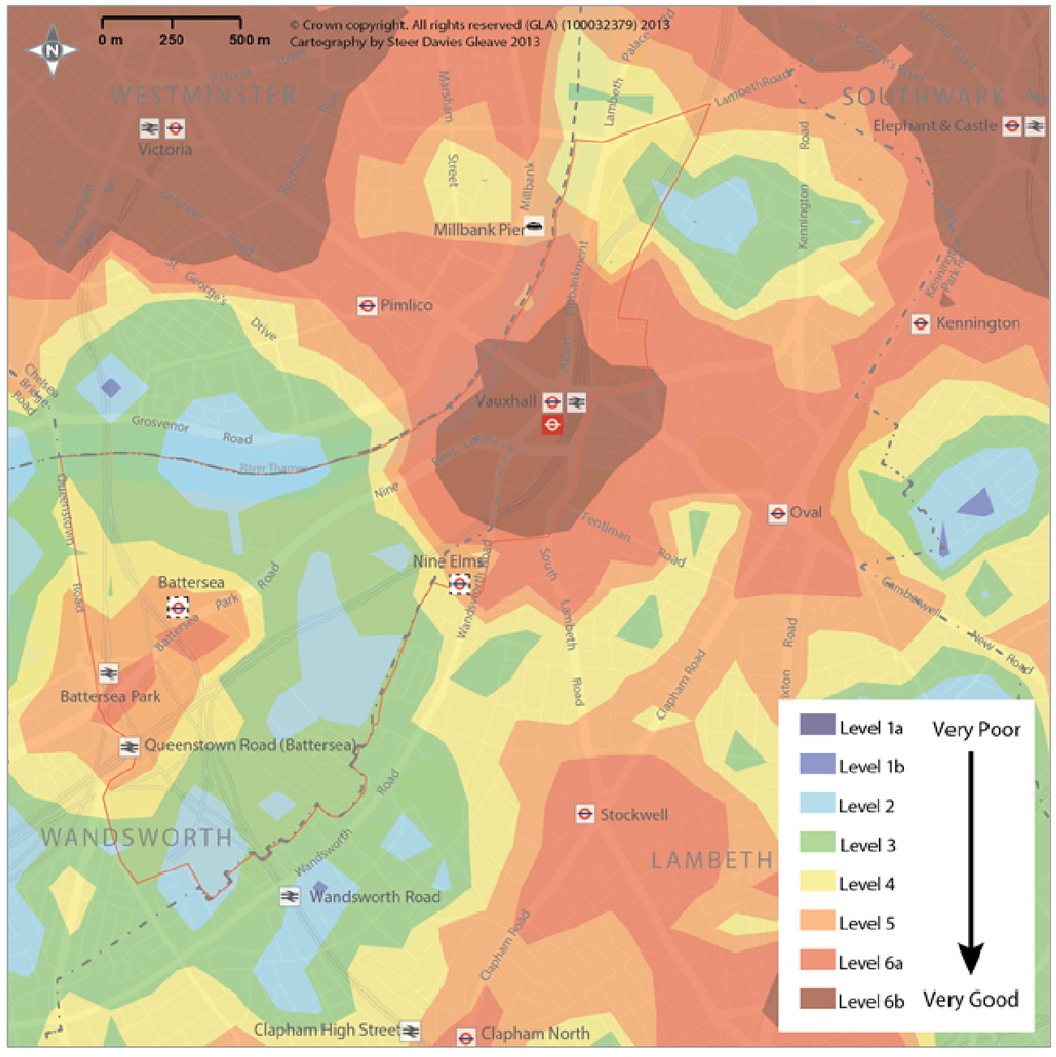
Journey Times

6.248 The NLE will result in substantial reductions in overall journey time for public transport users travelling to and from the OA. Figures 6-16 to 6-19 show the decrease in generalised journey time (taking into account both travel time and crowding levels) to and from the new stations at Nine Elms and Battersea.

6.249 The key areas that benefit from reductions in journey time are central, north and east London as well as the area around Kennington. This is due to the route of the Northern line that provides easy access to these areas as well as the new interchange with Crossrail that will be provided at Tottenham Court Road reducing journey times to east London. There are no increases in generalised journey times as a consequence of the NLE.

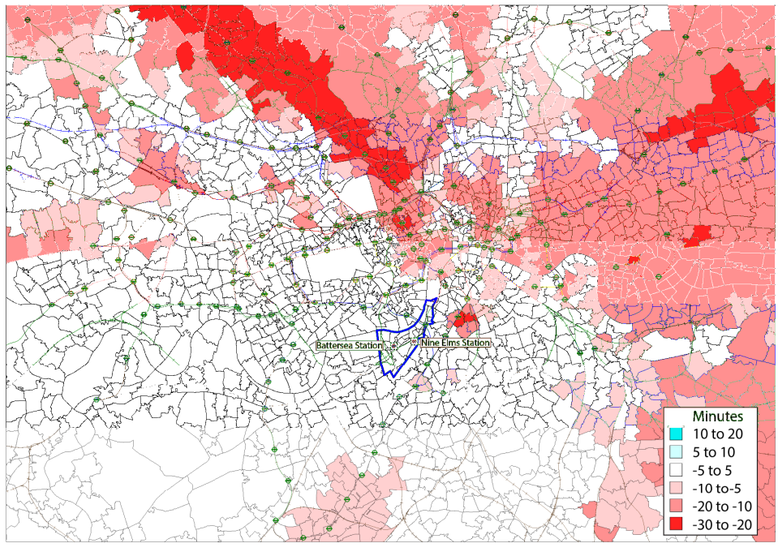
6.250 It is evident that the NLE significantly reduces journey times to large parts of London, including most importantly the rest of central London as well as east London including Canary Wharf (via interchange with Crossrail). As with the increase in PTAL, this demonstrates how the NLE links the VNEB OA more closely to the rest of central London and encourages sustainable travel to the OA via the NLE. The benefits are greater travelling to and from Battersea than they are to and from Nine Elms owing to Battersea's lower PTAL without the NLE. However, with reductions in journey times of more than 10% overall the impact is considered to be a major beneficial effect.

Figure 6-15 Forecast Public Transport Accessibility Levels With the NLE, 2031



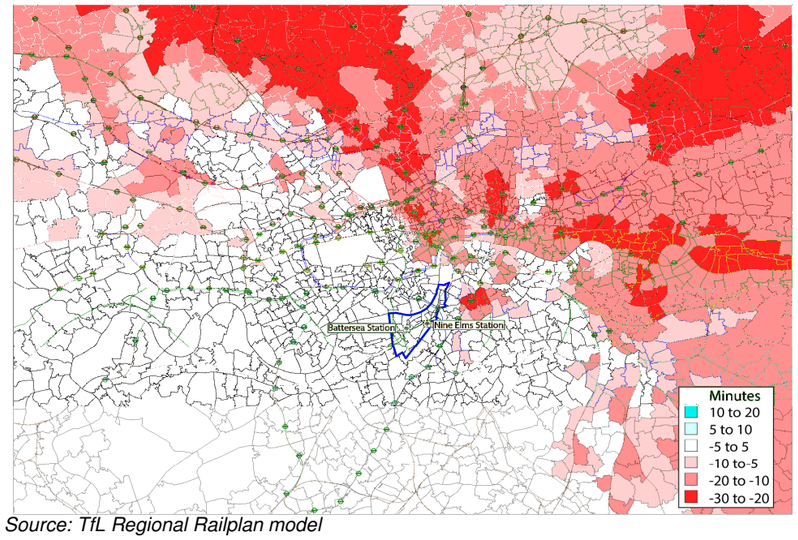
Source: TfL

Figure 6-16 Forecast Change in Generalised Journey Time From Battersea Resulting From the NLE, 2031



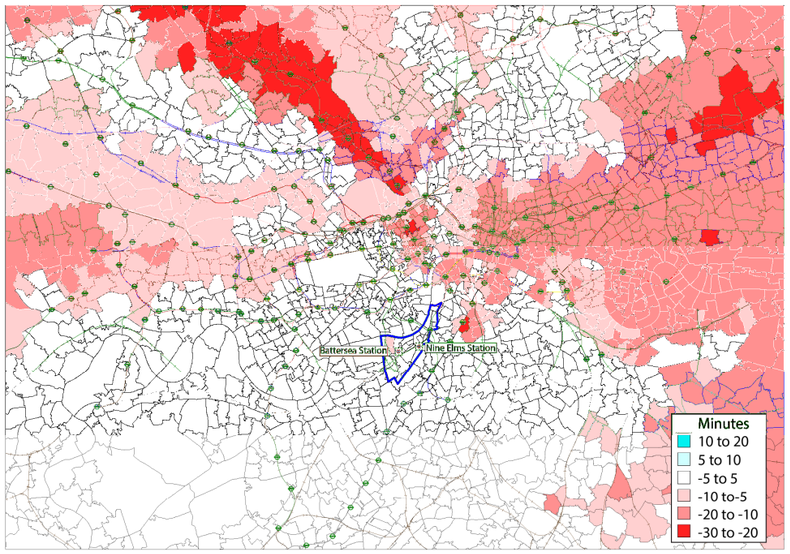
Source: TfL Regional Railplan model

Figure 6-17 Forecast Change in Generalised Journey Time to Battersea Resulting From the NLE, 2031



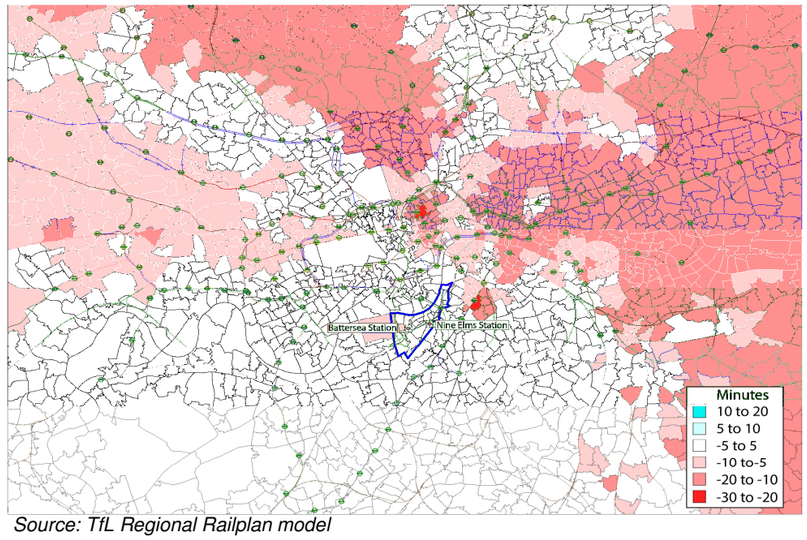
Source: TfL Regional Railplan model

Figure 6-18 Forecast Change in Generalised Journey Time From Nine Elms Resulting From the NLE, 2031



Source: TfL Regional Railplan model

Figure 6-19 Forecast Change in Generalised Journey Time to Nine Elms Resulting From the NLE, 2031



Source: TfL Regional Railplan model

Highway Effects

6.251 The forecast impacts on the highway network with the NLE include the committed changes to the network associated with the future baseline as well as changes that will be implemented as a consequence of the additional development that will be enabled by the NLE.

6.252 This only includes those changes to the road network with a confirmed design, such as the new access junctions to serve the BPS development (Phase 2 onwards), and not those that may be a condition of a consented scheme but for which no design has been agreed, such as the improvements to Queens Circus and Queenstown Road (required as part of the BPS development). It is expected that the additional development will bring with it site specific improvements, as well as CIL to pay for wider infrastructure improvements, consistent with the OAPF. The difference between the future baseline and the 'with NLE' scenario is explained in paragraph 6.34 as well as in *Chapter 2: EIA Methodology.*

6.253 The assessment has been undertaken using CLoHAM to consider whether there will be a significant change in flow, congestion or speeds between the future baseline and the 'with NLE' scenario, based on the criteria set out in Table 6-2. The relevant criteria relate to traffic levels, traffic speeds and journey lengths, each of which is discussed below.

6.254 It should be noted that all of the increased highway demand generated by the NLE is as a result of the additional development enabled by the scheme rather than the NLE itself. As such, all of the impacts presented in the section must be attributed to the OA developments rather than the NLE. Moreover, as part of the planning process, each of these developments has already or will have to provide an Environmental Impact Assessment and Transport Assessment demonstrating that their forecast highway impacts can be accommodated and, where appropriate, identifying suitable mitigation measures. This would then need to be agreed with the relevant planning authority.

6.255 The assessment is based upon assessing the impacts on eleven key highway links, which have been identified as those links where the development that will be enabled by the NLE would have the greatest impact on traffic levels.

Changes in Traffic Levels

6.256 Table 6-40 shows the change in two-way flows on each of these eleven key highway links, in the AM peak and inter-peak periods. These represent percentage changes between the future baseline and the "with NLE" scenario.

6.257 There will be an increase in traffic flows on both Battersea Park Road and Nine Elms Lane reflecting the higher level of development that would take place in this part of the OA, and principally at the BPS site, with the NLE compared with the future baseline.

6.258 Table 6-40 shows the largest increase in flows on Battersea Park Road (10% and 12% in the AM and inter-peak periods respectively) adjacent to the BPS development. Modest increases in flow would occur on Nine Elms Lane (2% peak and 4% inter-peak) and at Queenstown Road in the inter-peak (5% increase). Based on the criteria set out in Table 6-2 the AM peak increase at Battersea Park Road is considered to represent a moderate adverse effect on this link of the highway network as the increases exceed 10% in the AM peak. It must also be noted that this accounts for the gross impacts of those developments that are assumed to come forward with the NLE in place but does not take account of the mitigation that they would bring. Additionally, the relative impact of this change in flows should be considered in the context of the volume-capacity ratio on these links as set out in Table 6-42, which would still be below 50%.

Table 6-40 Forecast Percentage Change in Two-Way Hourly Traffic Flow Due to the NLE on Key Links, 2031

Link	AM peak (08:00–09:00)	Inter-peak (average hour 10:00-16:00)
Vauxhall Bridge	-1%	-4%
Albert Embankment (A3036)	-1%	-1%
Nine Elms Lane (A3205)	2%	4%
Battersea Park Road (A3205)	10%	12%
Kennington Park Road (A3)	1%	2%
Harleyford Road (A202)	-1%	0%
Kennington Lane (A3204)	0%	0%
Kennington Road (A23)	0%	-1%
S Lambeth Road (A203)	-1%	2%
Queenstown Road (A3216)	-2%	5%
Wandsworth Road (Principal route)	3%	1%

Source: TfL Central London Highway Assignment Model (CLoHAM)

Impact on Capacity and Congestion

6.259 The impact of additional traffic volumes on the network will depend on how close to capacity the network is operating – the closer to theoretical capacity, the greater impact that additional traffic will have in terms of congestion. Congested links have been defined, in accordance with the criteria set out in Table 6-2, as links where the volume to capacity ratio is greater than 85%.

6.260 The volume to capacity ratios for each of the key links is presented (as a percentage of the maximum theoretical capacity) in Table 6-41 for the AM peak period and Table 6-42 for the inter-peak.

6.261 Tables 6-41 and 6-42 show that the links experiencing the largest increase in flow (Battersea Park Road and Nine Elms Lane) both have comparatively low levels of delay indicated by volume to capacity ratios of between 43% and 48% in the peak and inter-peak periods respectively. The low volume to capacity ratio, even with NLE, show that these links will operate within capacity and will therefore be capable of accommodating the increase in traffic flow. The overall impact on these links is therefore expected to be negligible.

6.262 This accords with detailed junction modelling work that informed the development of highway and junction improvements which will be implemented as part of the BPS development and other developments in the area, included in the transport assessments undertaken as part of the respective planning submissions (Ref. 6-18).

Table 6-41 Forecast Volume to Capacity on Key Links, With and Without NLE (Two-Way Average), AM Peak Hour (08:00–09:00), 2031

Link	Current Baseline	Future Baseline Without NLE	With NLE
Vauxhall Bridge	54%	63%	62%
Albert Embankment (A3036)	9%	12%	11%
Nine Elms Lane (A3205)	36%	44%	44%
Battersea Park Road (A3205)	37%	44%	47%
Kennington Park Road (A3)	34%	35%	35%
Harleyford Road (A202)	57%	65%	65%
Kennington Lane (A3204)	64%	69%	69%
Kennington Road (A23)	36%	55%	55%
S Lambeth Road (A203)	13%	16%	16%
Queenstown Road (A3216)	74%	87%	86%
Wandsworth Road (Principal route)	22%	30%	31%

Source: TfL Central London Highway Assignment Model (CLoHAM)

Table 6-42 Forecast Volume to Capacity on Key Links, With and Without NLE (Two-Way Average, Inter-Peak), 2031

Link	Current Baseline	Future Baseline without NLE	With NLE
Vauxhall Bridge	48%	67%	64%
Albert Embankment (A3036)	10%	11%	11%
Nine Elms Lane (A3205)	37%	46%	48%
Battersea Park Road (A3205)	36%	39%	43%
Kennington Park Road (A3)	30%	34%	34%
Harleyford Road (A202)	33%	45%	44%
Kennington Lane (A3204)	64%	62%	62%
Kennington Road (A23)	27%	42%	41%
S Lambeth Road (A203)	15%	19%	20%
Queenstown Road (A3216)	83%	90%	95%
Wandsworth Road (Principal route)	19%	29%	29%

Source: TfL Central London Highway Assignment Model (CLoHAM)

6.263 The volume to capacity ratio for Queenstown Road indicates that there is congestion on this link (above 85%) both with and without the NLE, albeit the level of congestion will be higher with the NLE in the inter-peak, and slightly lower in the AM peak. As inter-peak traffic flows are expected to rise by only 5% in the off-peak, compared to the threshold criterion of 30%, this is therefore considered to have a moderate adverse effect when considered against the criteria in Table 6-2.

6.264 Junction improvements at Queen's Circus on Queenstown Road were agreed as part of the consented scheme for BPS and are now being refined by the BPS developers working closely with the London Borough of Wandsworth and TfL. The agreed scheme will be implemented by the BPS developer and aims to reduce traffic congestion on Queenstown Road and give due consideration to the needs of other road users, such as cyclists and pedestrians. TfL will continue to work with the developers and local authorities to determine the final design and suitability of these improvements.

Change in Traffic Speeds

6.265 The impact of the proposed NLE on traffic speeds on the key links is presented in Table 6.43.

Table 6-43 Forecast Percentage Change in Traffic Speeds on Key Links Due to the NLE, 2031

Link Name	AM peak (08:00–09:00)	Inter-peak (average hour 10:00-16:00)
Vauxhall Bridge	7%	5%
Albert Embankment (A3036)	0%	0%
Nine Elms Lane (A3205)	0%	0%
Battersea Park Road (A3205)	-19%	-26%
Kennington Park Road (A3)	0%	0%
Harleyford Road (A202)	0%	0%
Kennington Lane (A3204)	0%	0%
Kennington Road (A23)	0%	0%
S Lambeth Road (A203)	0%	0%
Queenstown Road (A3216)	-12%	-25%
Wandsworth Road (Principal route)	0%	0%

Source: TfL Central London Highway Assignment Model (CLoHAM)

6.266 The table shows that the impact of traffic speeds is greatest along Battersea Park Road and Queenstown Road, which are both the closest to the BPS development. During the AM peak traffic speeds decrease in excess of 10% on Battersea Park Road (a non-congested link) and in excess of 5% on Queenstown Road (a congested link). During the inter-peak there are decreases of 28% on Battersea Park Road and 25% on Queenstown Road but no decreases in excess of 30%. When based on the assessment criteria in Table 6-2 there is therefore expected to be a moderate adverse effect on traffic speeds on Battersea Park Road and Queenstown Road in the AM peak.

6.267 There are no other links that experience a decrease in speeds of over 5%, and therefore the impact on speeds on other sections of the network is negligible.

Changes in Journey Lengths

6.268 As a consequence of the NLE there will not be any increase in traffic journey lengths, and this criterion of the assessment criteria is therefore not applicable.

6.269 Overall, on the highway links identified, when based on the assessment criteria in Table 6-2 the greatest highway impact will be on Queenstown Road where the effects will be moderate adverse. This link will be congested in 2031 even without the NLE, and will see an increase in traffic flows and a decrease in journey speeds during the AM peak with the NLE and the additional development.

6.270 Moderate adverse effects will also occur on Battersea Park Road (increase in traffic flows and decrease in traffic speeds).

6.271 These impacts will occur not as a direct result of the NLE, but rather due to the demand that will be generated by the additional development that will be enabled in this part of the OA and in particular at the BPS site by the NLE.

6.272 No other highway links will be significantly adversely impacted by the NLE.

Highway Mitigation and Significant Residual Effects

6.273 As part of the planning process for developments yet to go through planning, or where there are reserved matters relating to transport, the developers of these schemes will need to ensure that forecast highway impacts can be accommodated and, where appropriate, mitigation measures will need to be agreed.

6.274 TfL will continue to work with the London boroughs of Wandsworth and Lambeth to assess the impacts of new developments on the highway impact where appropriate, including advising on amendments to proposals and mitigation measures. In the case of the later phases of the BPS development (phase 2 onwards), specific junction and highway improvement measures have been identified including at Queen's Circus junction and Queenstown Road (Ref. 6-18). These measures will lessen the adverse effects on traffic flow and speeds on Queenstown Road, Nine Elms Lane and Battersea Park Road.

6.275 Taken together, these mitigation measures will be targeted to address the adverse effects that would otherwise be created at specific highway links, and once implemented it is expected that the adverse effects would be reduced to a minor adverse or negligible effect. However as the final details of these measures are yet to be approved or implemented (and are also the responsibility of other developers to implement), for the purpose of this assessment the residual effect remains moderate adverse, but with the expectation that the future improvements, implemented as part of the additional developments will reduce these impacts to either minor adverse or negligible.

6.276 In summary it is the highway demand associated with the additional development enabled by the NLE at the BPS site and in the surrounding area, rather than the impact of the NLE scheme itself, that results in the highway impacts presented in this section.

Parking Effects

6.277 It is assumed that the entirety of the OA and surrounding areas will be designated as a CPZ and that the only additional parking provided once the NLE is delivered will be included as part of the developments enabled by the scheme. Therefore, in accordance with the criteria set out in Table 6-2 the impact on parking is negligible.

Pedestrian Effects

6.278 The NLE will deliver direct benefits to pedestrians, with improved footways and wayfinding around both new stations as well as around the permanent shafts at Kennington Green and Kennington Park. There is a commitment at the new stations to improve pedestrian facilities through the provision of improved footways close to NLE station entrances and clear signage from the stations to key destinations in the OA.

6.279 At Nine Elms, a new high quality pedestrian route will be opened through the existing railway viaduct immediately to the north west of the station and this will increase pedestrian permeability to both the station and in the local area. In particular, it will break the current severance created by the Southwest Mainline railway viaduct and enable direct access from the existing communities around Wandsworth Road to the new United States Embassy and other sites in the VNEB OA.

6.280 At both Nine Elms and Battersea stations, the urban realm improvements associated with the NLE and the other developments will link open space with key pedestrian routes through the use of improved crossings, lighting, and materials/surfacing. More detail can be found in the Design and Access Statement.

6.281 Conditions for pedestrians will also be improved through the development in the OA that the NLE enables. There will be further high quality walk links, proposed new public squares, well surfaced pavements, street lighting and pedestrian crossings in the area.

6.282 There will be an increase in pedestrian activity around the stations, with around 9,000 people expected to use Battersea station and 6,000 expected to use Nine Elms station in the AM peak. It is forecast that, with the urban real improvements delivered as part of both the NLE and the enabled development. Particularly around the proposed stations, the local pedestrian network will be able to accommodate the increase in pedestrians in the vicinity of the stations and there would be no adverse effects associated with this activity.

6.283 As a consequence of the increases in traffic generated by the developments that the NLE enables, it is considered that the effect on pedestrians will be negligible as the provision of adequate footways and crossing facilities means that the vulnerability of pedestrians is low.

6.284 Overall therefore the NLE is considered to have a moderate beneficial effect on pedestrians.

Cycling Effects

6.285 The new stations at Nine Elms and Battersea will provide a range of high quality cycle parking facilities. 90 secure spaces will be provided at Nine Elms station. These will be provided as part of the NLE and will be located near the entrances to the station and will be integrated into the wider urban realm. Battersea station will have 100 secure cycle spaces; these will be delivered as part the BPS development that will be enabled by the provision of the NLE. There will also be Barclays Cycle Hire facilities within the vicinity of the stations.

6.286 In addition, clear signage will be provided around each of the stations, directing users to cycle routes and parking facilities, improving wayfinding. The wider urban realm improvements to be delivered as part of the development in the OA, as facilitated by the NLE, will provide a number of cycle paths, delivering benefits for cyclists. More detail on the signage and cycle parking to be provided can be found in the Design and Access Statement.

6.287 The increases in traffic generated by the developments that the NLE enables (set out in the highway section), are considered to have a negligible effect on cyclists as the provision of segregated paths through the OA (Ref. 6-3 and 6-17), including through the BPS site, along the proposed linear park and through the link beneath the South West Mainline delivered as part of the NLE means that the vulnerability of cyclists is not high (as per the Assessment Criteria set out in Table 6-2).

6.288 Overall therefore the NLE is considered to have a moderate beneficial effect on cycling given that the range of improvements proposed that will facilitate reductions in journey time and length, as well as deliver improvements to cycling infrastructure.

Pier/River Effects

6.289 River/pier activity will increase commensurate with the development of the OA enabled by the NLE. Improvements to existing piers including the pier at BPS as part of the OA development will ensure that this activity can be safely accommodated and has a positive impact on use of the river. Based on the Assessment Criteria set out at Table 6-2, the impact on river/pier activity will be negligible.

Residual Effects Assessment and Conclusion

Residual Effects Assessment

6.290 Table 6-44 provides a summary of the significant effects of the NLE (i.e. both moderate and major effects) and all proposed mitigation. It is not expected that there will be any significant adverse residual traffic and transport effects following mitigation.

Table 6-44 Significant and Residual Effects of NLE

Transport Receptor	Potential Impact	Significance of Effect (Pre-Mitigation)	Mitigation Measures	Significance of Residual Effect (Post-Mitigation)
Demolition and construction				
Highway users	NLE construction traffic will result in the Kennington Park Road/Kennington Park Place and Wandsworth Road/Pascal Street junctions operating closer to capacity for short periods of time	Moderate adverse	Managed through the code of construction practice and Construction Traffic Management Plan. This could include changes to the construction programme or restricting construction traffic movements to outside of effected peak periods.	**Minor adverse**
Parking	Temporary loss of parking spaces at Radcot Street, Harmsworth Street, Kennington Park and Kennington Green worksites causing inconvenience to local residents	Moderate adverse	Use of alternative parking provision nearby will be possible, which is able to accommodate demand	**Minor adverse**
Pedestrians	Closure of footways and the pedestrian crossing around Kennington Green worksite	Moderate adverse	Existing pedestrian island on Kennington Road will be enhanced and pedestrians will be directed to use this facility	**Minor adverse**
	Closure of footways on Wandsworth Road and Pascal Street (around Nine Elms worksite)	Moderate adverse	Pedestrians directed to use alternative crossing points on Wandsworth Road Western footway on Pascal Street will remain open providing an alternative route	**Minor adverse**
Cyclists	Increased lorry movements due to construction of NLE and other developments will have an adverse impact on cyclists generally	Moderate adverse	Alternative cyclist diversion routes will be implemented around worksites All contractors working on NLE will be signed up to FORS and have received bronze level accreditation (or similar) TfL will raise awareness of issues with cycling near lorries through the provision of dedicated events	**Minor adverse**
Operation				
London Underground users	Creation of new cross passages at Kennington station will enable station to operate more efficiently	Moderate beneficial	N/A	**Moderate beneficial**
	Congestion relief at Vauxhall station by transferring demand to NLE stations	Moderate beneficial	N/A	**Moderate beneficial**
Public transport accessibility levels	Significant increase in public transport accessibility levels across the OA, particularly in the western and central parts	Major beneficial	N/A	**Major beneficial**
Public transport journey times	Improvements in generalised journey times to and from the OA	Major beneficial	N/A	**Major beneficial**

Transport Receptor	Potential Impact	Significance of Effect (Pre-Mitigation)	Mitigation Measures	Significance of Residual Effect (Post-Mitigation)
Highway users	Highway users – As a consequence of the additional level of development that will be enabled by the NLE, principally at the Battersea Power Station site, traffic flows will increase on Queenstown Road, Nine Elms Lane and Battersea Park Road. Traffic speeds will also decrease on Queenstown Road and Battersea Park Road for the same reason, though speeds on Nine Elms Lane will improve due to junction improvements as part of the Battersea Power Station development. These highway links are concentrated in the south-west of the OA, close to the Battersea Power Station site.	Moderate adverse	These impacts are caused by the additional, private development that will be enabled by the NLE rather than by the NLE itself. As part of the planning process, each of these developments has already or will have to provide an Environmental Impact Assessment and Transport Assessment demonstrating that their forecast highway impacts can be accommodated and, where appropriate, identifying suitable mitigation measures. In particular, the planning consent for the Battersea Power Station development (phase 2 onwards), which is the origin or destination for the vast majority of additional highway trips enabled by the NLE requires the implementation of a set of agreed in principle improvement measures at the specific links and junctions identified in this ES to accommodate the increased traffic flows and reduce the impact of the development to an acceptable level. TfL will continue to work with developers and local authorities to determine the final design and suitability of the highway link and junction improvements identified in the Battersea Power Station Planning Consent and any other improvements, and to assess the impacts of new developments on the highway where appropriate, including advising on the suitability and design of any further mitigation measures.	**As the details of these mitigation measures (improved junctions and links are the responsibility of the Battersea Power Station and other developers to implement, and have yet to be approved finally by TfL and the London Borough of Wandsworth, the residual effect remains moderate adverse, with the expectation that the future improvements, implemented as part of the additional developments will reduce these impacts to either minor adverse or negligible.**
Pedestrians	Enhancements to pedestrian environment particularly around the new stations, including improved footway conditions, signage, lighting, pedestrian crossings and improved permeability at Nine Elms by creation of new route through railway viaduct	Moderate beneficial	N/A	**Moderate beneficial**
Cyclists	Enhancements to cyclist facilities particularly around the new stations, including new cycle parking and signage, and cycle paths as part of developments facilitated by NLE	Moderate beneficial	N/A	**Moderate beneficial**

Conclusion

6.291 Overall, the NLE delivers significant benefits to the VNEB OA, enabling the creation of approximately 14,000 new jobs and 5,500 new homes, which in turn enables the full development of the OA to be realised in line with policy aspirations. In particular it enables the area to become much more integrated with the rest of central London by providing greater public transport accessibility and reduced journey times through the provision of a sustainable new transport link.

6.292 In terms of traffic and transport specifically, the NLE has been assessed against relevant criteria for all modes of transport both during the construction phase and once it is in operation and the main findings of the assessment are as follows:

- The NLE delivers significant accessibility improvements in a currently low PTAL area of central London
- The NLE provides for a high capacity public transport link in the VNEB OA;
- The NLE delivers substantial reductions in journey times to and from the VNEB OA;
- The pedestrian and cycle environments in the vicinity of the stations and permanent shafts are enhanced by the NLE;
- The NLE will not have a significant impact on either London Underground or Network Rail crowding although there will be some minor beneficial and some minor adverse effects in some areas;
- The provision of additional cross passages at Kennington Underground station as part of the NLE will improve passenger flows at this station despite an increase in interchange passengers;
- Construction traffic and activities will need to be carefully managed to mitigate impacts on the local road network and river barges will be used to transport a majority of the excavated material;
- All construction vehicles will be required to conform to the latest cycle safety measures including membership of FORS;
- The Code of Construction Practice, Construction Logistics Plan (including a travel plan to promote the use of public transport to construction workers) and a Traffic Management Plan will be used to minimise the effects of construction;
- Some adverse effects on the highway network will be created by the additional development enabled by the NLE, particularly around BPS, and developers of these sites will need to ensure that the effects of the traffic generated are appropriately mitigated through implementation of the highway proposals which are part of the consented schemes.

6.293 In accordance with the assessment criteria set out in Table 6-2, the only significant adverse residual effect from the completed scheme would be in relation to the impacts on highway users of schemes enabled by the NLE. These adverse effects are not a direct consequence of the NLE and would be substantially outweighed by the significant benefits to public transport users, pedestrians and cyclists.

Cumulative Effect Assessment

6.294 This section considers the cumulative effects of the NLE, which in respect to traffic and transport occur during the construction of the NLE. There are no specific cumulative operational effects of the NLE as these are assessed in the future baseline scenario presented earlier.

Cumulative Construction Effects

6.295 This section considers the traffic effects of the NLE construction on the highway network together with those effects generated by other proposed and committed developments in the OA. Given the scale of development planned across the OA in the coming years a significant level of construction activity is expected to take place across numerous sites simultaneously, and the traffic generated by this construction traffic has the potential to impact on the highway network.

6.296 The NLE will benefit, and in some cases enable, a number of development proposals in the VNEB OA. This is explained in further detail in *Chapter 2: EIA Methodology***.** The developments that have been considered in terms of their cumulative construction traffic effects are principally those consented schemes that are included in the cumulative scenario (set out in Table 2-2 of *Chapter 2: EIA Methodology*) and are expected to be under construction between 2014-2019. The proposed Thames Tideway Tunnel worksites at Heathwall Pumping Station and Albert Embankment are also included as these are expected to generate construction traffic in this period. In order to test a 'worst case' several other non-consented development proposals for which the construction programme has not been confirmed but which may be constructed in the same timeframe as the NLE have also been included.

6.297 The consented and proposed developments considered in the assessment are as follows:

- Battersea Power Station, Phase 1;
- Riverlight;
- Royal Mail site (Nine Elms Parkside);
- Covent Garden Market Authority;
- US Embassy;
- Embassy Gardens;
- Market Towers;
- Marco Polo House;
- Sainsbury's;
- Vauxhall Square;
- Vauxhall Cross Island Site;
- Sky Gardens;
- South Lambeth Place (Bondway North);
- Battersea Plant;

- LFB Headquarters;
- Eastbury;
- Kennington Oval (hotel element of scheme only); and
- Thames Tideway Tunnel – Kirtling Street, Heathwall Pumping Station and Albert Embankment sites.

6.298 Construction of the NLE will overlap with the construction programmes for a number of these schemes. Whilst the NLE will therefore add to cumulative construction traffic in the VNEB OA, the relative contribution from the NLE scheme to the overall level of construction traffic will be moderate and will represent a relatively small proportion overall.

6.299 CLoHAM modelling has been undertaken to assess the impact of cumulative construction traffic on the strategic highway network, and this indicates that network will be able to cope sufficiently well and operate effectively. The cumulative impact of construction traffic from the NLE and those schemes listed at paragraph 6.298 is therefore not expected to have a significant effect on the strategic highway network.

6.300 Should cumulative construction traffic impacts be found to arise at a local level, these impacts will be mitigated using a number of mechanisms including the Code of Construction Practice and through active coordination with other developments to minimise the effects on the highway network in the VNEB OA. TfL is currently working with the London boroughs of Wandsworth and Lambeth, Thames Water and the developers of BPS to actively coordinate construction activities across the OA and this engagement will continue throughout the NLE's construction period.

References

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Ref. 6-2 Greater London Authority (2010); Mayor's Transport Strategy

Ref. 6-3 Greater London Authority (2012); Vauxhall Nine Elms Battersea. Opportunity Area Planning Framework

Ref. 6-4 Sinclair Knight Merz (2009); VNEB OA Transport Study

Ref. 6-5 London Borough of Lambeth (2011); Lambeth Local Development Framework, Core Strategy

Ref. 6-6 London Borough of Lambeth (2013); Vauxhall SPD

Ref. 6-7 London Borough of Wandsworth (2010); Wandsworth Local Development Framework, Adopted Core Strategy – October 2010

Ref. 6-8 London Borough of Wandsworth (2012); Site Specific Allocations Document, Adopted Version

Ref. 6-9 London Borough of Southwark (2011); Southwark Local Development Framework, Core Strategy

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Ref. 6-18 Steer Davies Gleave (2010); Battersea Power Station Transport Assessment (London Borough of Wandsworth Planning Application ref 2009/3575)