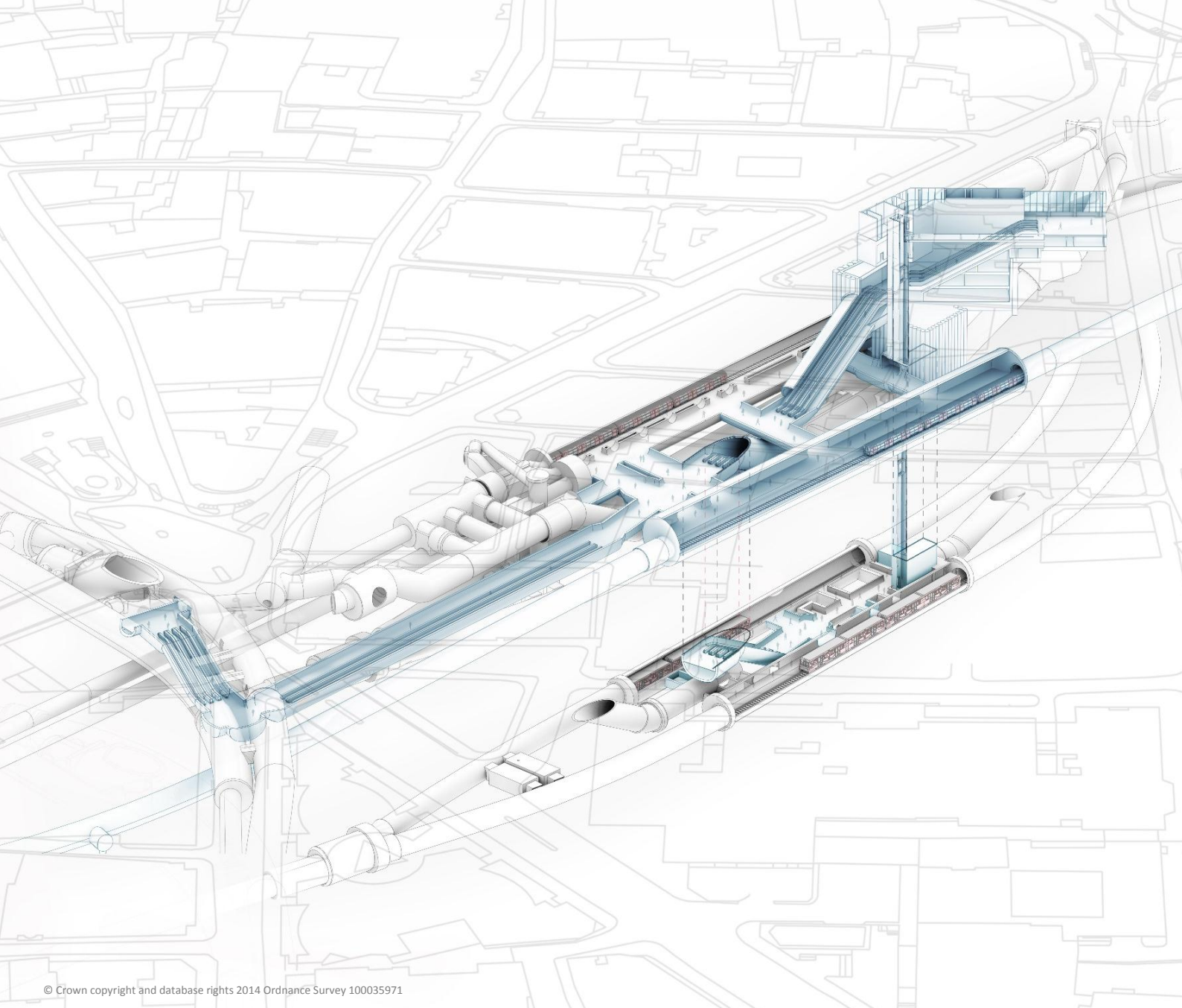


A6 – Method of Assessment

A6.1 – Health Impact Assessment

A6.1 – Health Impact Assessment



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Transport and Works Act 1992
London Underground (Bank Station Capacity Upgrade) Order

Health Impact Assessment

September 2014

MAYOR OF LONDON



**TRANSPORT
FOR LONDON**
EVERY JOURNEY MATTERS



Transport and Works Act 1992

London Underground (Bank Station Capacity Upgrade) Order

Health Impact Assessment

September 2014

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LUL Document Reference:
LUL-8798-RPT-G-002206

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List of Abbreviations

Abbreviation	Definition
ARI	Acute Respiratory Infection
APHO	Association of Public Health Observatories
BAME	Black, Asian and Minority Ethnic
BSCU	Bank Station Capacity Upgrade
CCEP	Crowd Control and Evacuation Plan
CCTV	Closed Circuit Television
CHD	Coronary Heart Disease
CLP	Construction Logistic Plan
CoCP	Code of Construction Practice
CRA	Customer Risk Assessment
CVD	Cardiovascular Disease
DAS	Design and Access Statement
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DLR	Docklands Light Railway
DoH	Department of Health
DPD	Development Plan Documents
EIA	Environmental Impact Assessment
ES	Environmental Statement
GLA	Greater London Authority
HEAT	Health Economic Assessment Tool
HIA	Health Impact Assessment
HGV	Heavy Goods Vehicle
HUDU	Healthy Urban Development Unit
km	Kilometres
LIP	Local Implementation Plans
LSOA	Lower Super Output Area
LUL	London Underground Limited
m	Metres

Abbreviation	Definition
MTS	Mayor's Transport Strategy
NHS	National Health Service
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
NPPF	National Planning and Policy Framework
NPSE	Noise Policy Statement for England
NSWWS	National Severe Weather Warning Service
O ₃	Ozone
ONS	Office of National Statistics
OSD	Over Site Development
PM	Particulate Matter
RODS	Rolling Origin/Destination Survey
SIDOS	Security in Design of Stations
SPG	Supplementary Planning Guidance
SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan
TfL	Transport for London
TWAO	Transport and Works Act Order
VDV	Vibration Dose Value
WEMWBS	Warwick-Edinburgh Mental Well-being Scale
WHO	World Health Organisation
WPRA	Workplace Risk Assessment
µgm ⁻³	Micrograms per cubic meter

Executive Summary

The Bank Station Capacity Upgrade (BSCU) Project involves a major upgrade of the Bank Monument Station Complex to provide greatly improved passenger access, circulation and interchange. It will also improve emergency fire and evacuation protection measures. It includes provision of a new passenger entrance with lifts and escalator connections; a new Northern Line passenger concourse using the existing southbound platform tunnel; a new Northern Line southbound running and platform tunnel; and new internal passenger connections between the Northern Line, the Docklands Light Railway (DLR) and the Central Line.

The new Station Entrance will open on to Cannon Street at the junction with Nicholas Lane. An entrance hall will provide circulation space, as well as accommodating staff facilities, plant rooms and associated retail space. New passenger lifts will link the entrance hall directly with the Northern Line and DLR providing step free access to and from these lines. Escalators will also connect the entrance hall with the Northern Line.

The existing southbound platform for the Northern Line will be converted into a new passenger concourse. A new southbound running and platform tunnel will be located to the west of the existing platform. New cross passages will connect the Northern Line concourses and platforms. New walkways and escalators will better connect the Northern Line, the DLR and the Central Line. In particular, a tunnelled passageway fitted with moving walkways will link to new escalators, greatly improving interchange between the Northern Line and the Central Line.

Works to divert and protect utilities and to protect listed and other buildings from ground settlement, will also be undertaken where monitoring and/or damage analysis indicates this is required. The compulsory purchase and temporary use of land, the temporary stopping up of streets, street works and ancillary works will also be required.

The Mayor of London is under an obligation to promote the health of Londoners, and this is supported through UK and European legislation. Therefore, this Health Impact Assessment (HIA) has been produced as a report on the potential consequences for health and well-being from the construction and operation of the BSCU, to inform decisions and to assign responsibilities for delivering the greatest health benefits and minimising the adverse impacts on health.

'Determinants of health' include influences such as an individual's age/sex/ethnicity/genetics, their lifestyle (e.g. levels of exercise, healthy eating, smoking and drinking), the surrounding environment (e.g. levels of noise, air quality and quality of open space) and socio-economic factors (e.g. social and community interaction, access to work and deprivation).

Due to the nature of the Bank Monument Station Complex i.e. not only a destination but also a point for interchange, the HIA has determined that the health of communities is likely to be most affected in the following geographical areas:

- Lower Super Output Area (LSOA)¹ 001F in which Bank Station is situated;
- City of London; and
- Greater London.

The analysis has shown that the City of London has a high proportion of residents within the 'working age' group (25-64 year olds), compared to the other age groups (particularly the over 65 age group). The City of London population is less ethnically diverse than that of London but is still relatively mixed when compared to the national figures for areas outside of London. A range of health indicators, such as levels of deprivation and proportion of residents classed as in 'bad' and 'very bad' health show that the City of London and the area in which the BSCU is located typically demonstrate better health when compared to London as a whole. Over-represented health issues in the City of London (compared to England) relate to communicable diseases; cardiovascular disease, coronary heart disease and diabetes.

The scope of the HIA has been established through a HIA Scoping Report, which was sent to a number of Public Health professionals, along with a number of meetings and discussions with the Greater London Authority's (GLA) public health representative.

The existing environmental conditions and likely significant environmental effects are described in the Environmental Statement (ES) for the BSCU. The prediction of health impacts are largely based on these findings, alongside an understanding of the health impact evidence base (Appendix B) and the baseline and health status of the communities in the geographical areas set out above.

This assessment uses the NHS London Healthy Urban Development Unit (HUDU) 'Rapid Health Impact Assessment Tool' (2013) checklist as a framework for assessing the potential health impacts.

The BSCU is likely to affect the determinants of health via different direct or indirect 'pathways', as described in the evidence base.

The main direct influences on health and wellbeing are:

- improving accessibility – the BSCU, once operational, should improve journey times (by creating a more effective interchange) and a more pleasant and less crowded experience. The BSCU will result in very clear improvements for passengers using the station, with quicker walking times between lines, and safer accommodation on the platforms. The BSCU will improve access for disabled people, older people and parents/carers travelling with babies and young children in pushchairs/buggies by providing lifts, increased escalator capacity and moving walkways, a new Station Entrance and a pedestrian crossing on Cannon Street (although the type and layout is still to be determined);

¹ An LSOA is defined by the Office for National Statistics as an area contained a minimum population of 1,000 or a maximum population of 3,000 or a minimum number of households of 400 and a maximum of 1,200.

- improved travel experience - measures in the BSCU such as an enhanced layout will result in more space, better circulation, and fewer narrow passageways. All of these measures will enhance the journey experience and reduce the anxiety/stress of commuting;
- designing out crime –measures such as improved lighting, less congestion and additional passenger emergency alarms will enhance safety and reduce the opportunity for crime and the fear of crime; and
- providing opportunities for physical activity – during construction, and whilst the temporary blockade is in place, pedestrians will need, and be encouraged to, take alternative routes, often by walking, which can help to reduce the risk of cardiovascular disease and incidence of obesity.

The main indirect influences on health and well-being are:

- improving access to work – during construction and operation, the BSCU will provide direct employment and also seek to secure contractors and suppliers to the project via ‘responsible procurement’.

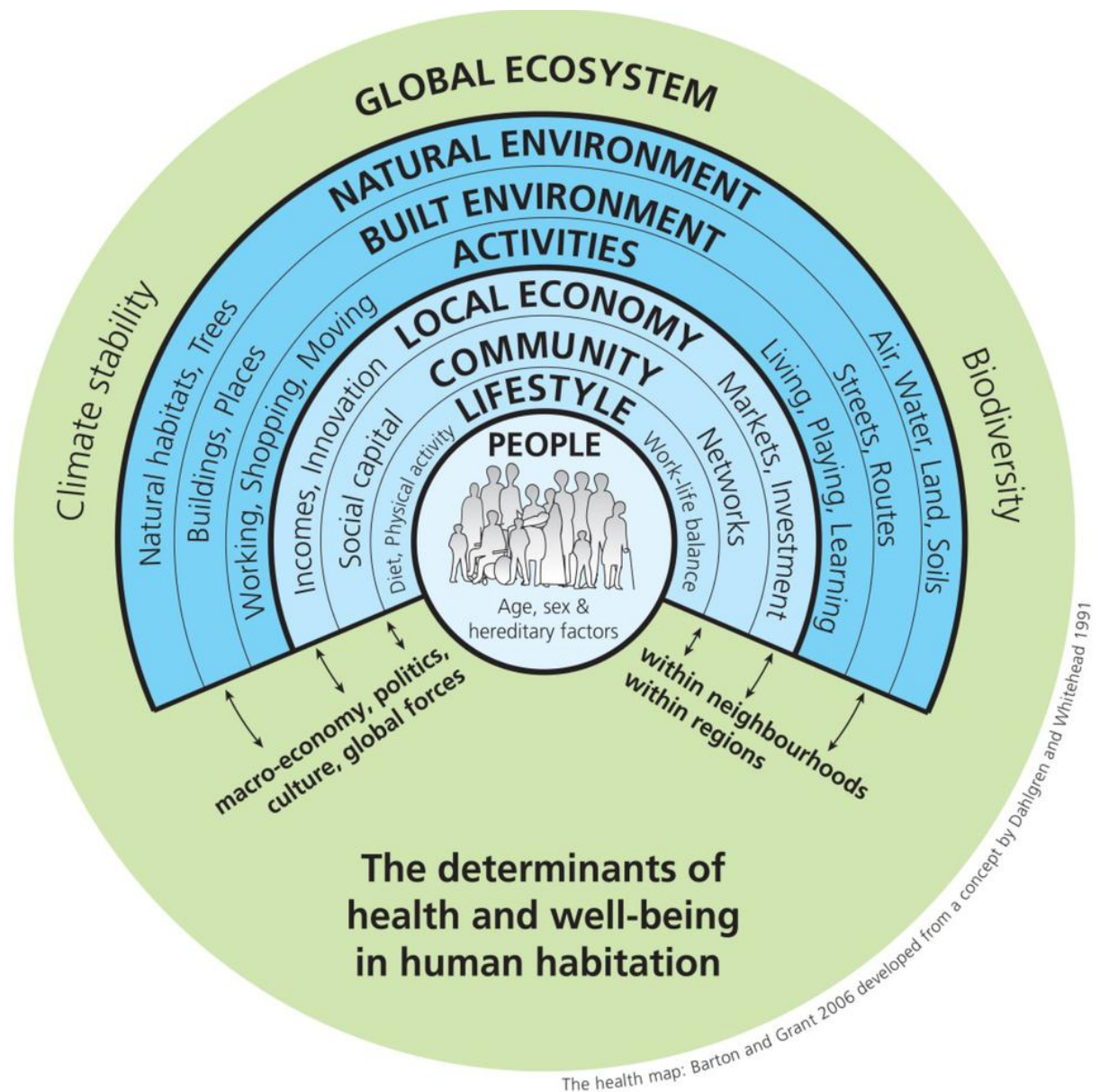
More significantly, the BSCU will lead to better access to the City of London for all commuters, which will support business and the London economy, particularly in terms of employment. Employment not only increases self-esteem and improves wellbeing, but also helps to tackle poverty and deprivation.

The HIA outlines the measures to be employed during construction and operation for mitigating and monitoring the aspects of the project that could lead to adverse health impacts (such as controlling construction noise as set out in the draft Code of Construction Practice (CoCP), and personal injury collisions levels outside the operational station), and for developing aspects of the project that can lead to beneficial health impacts.

Overall, the BSCU may lead to some temporary adverse health impacts during construction, which will be reduced as far as reasonably practicable, and more long term permanent beneficial direct and indirect impacts that will help to support improvements in health and well-being of users of BSCU across Greater London will occur during operation.

1 Introduction

- 1.1.1 This report describes potential consequences, both positive and negative, for health and well-being from the construction and operation of the Bank Station Capacity Upgrade (BSCU) that have been determined through a Health Impact Assessment (HIA). It has been prepared to inform the project decision making process and is included with the Transport and Works Act Order (TWAO) application submitted by London Underground Limited (LUL).
- 1.1.2 The HIA is a desk based assessment that incorporates discussions with specialists from Transport for London (TfL), URS, and the Greater London Authority (GLA), comments from the BSCU public consultation exercises (see Section 3: 'Scope') and information from the other application documents.
- 1.1.3 Under the *GLA Act 1999* the Mayor of London is under an obligation to promote the health of Londoners and to take into account the effect of his policies on the health of London's population. As a Functional Body of the GLA, TfL (of which LUL is a part) is committed to supporting the delivery of these obligations by considering the opportunities to enhance public health and reduce health inequalities during the design and consent processes for this project.
- 1.1.4 The World Health Organisation (WHO) Europe defines health as *a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity* (World Health Organisation, 1948). Consequently public health encompasses general well-being, not just the absence of illness. Some effects are direct and obvious, others are indirect and some may be synergistic, with different types of impact acting in combination.
- 1.1.5 *EU Directive 2011/92/EU* (European Commission, 2011), which relates to the assessment of effects of certain projects on the environment, states: *The effects of a project on the environment should be assessed in order to take account of concerns to protect human health.... It also seeks to guarantee rights of public participation in decision-making in environmental matters in order to contribute to the protection of the right to live in an environment which is adequate for personal health and well-being. Article 3* requires an assessment of the direct and indirect effects of a project on human beings.
- 1.1.6 Factors that have the most significant influence on the health of a population are called 'determinants of health'; these include an individual's genetics and their lifestyle, the surrounding environment, as well as policy, cultural and societal issues. The inter-relationship between these is shown in Figure 1.1.

Figure 1.1: The Determinants of Health

- 1.1.7 The BSCU could cause impacts on the determinants of health via different 'pathways', which can be direct or indirect.
- 1.1.8 Direct impacts or influences include, access to public services, opportunities for physical activity, air quality, noise and neighbourhood amenity, accessibility and transport.
- 1.1.9 Indirect impacts or influences include crime reduction and community safety, food access, access to work, social cohesion and social capital, resource minimisation and climate change (NHS London Healthy Urban Development Unit, 2009).

1.1.10 Within a population there can also be health 'inequalities'. The WHO defines this as *differences in health status or in the distribution of health determinants between different population groups*. For example, *differences in mobility between elderly people and younger populations or differences in mortality rates between people from different social classes* (WHO, 2013). HIA therefore takes into account health inequalities and considers how the project could reduce the gap between Londoners with the best and worst health outcomes.

1.2 Objectives of the HIA

1.2.1 The objectives of the HIA are to:

- understand how the BSCU might directly and indirectly impact on the determinants of health;
- identify those determinants of health likely to be most affected and how any changes to these determinants might affect health inequalities; and
- identify measures to enhance the positive and mitigate the negative impacts on public health and establish responsibilities for delivering and monitoring these.

1.3 Report Structure

1.3.1 The HIA is structured as follows:

- Chapter 1 provides a summary description of the BSCU, and describes the other developments that are expected to occur in the study area;
- Chapter 2 explains the assessment methodology;
- Chapter 3 sets out the scope of the HIA;
- Chapter 4 summarises the relevant health and well-being policies at national, regional and local levels;
- Chapter 5 presents a summary profile of the communities that are most likely to be affected;
- Chapter 6 presents an assessment of the impacts of the BSCU upon health and well-being using the NHS London Healthy Urban Development Unit (HUDU) Rapid Health Impact Assessment Tool (HUDU, 2013) checklist; and
- Chapter 7 provides the conclusions of the assessment of the BSCU. This chapter also sets out the measures that will be employed to enhance the potential positive and reduce the potential negative health impacts and the measures for monitoring these impacts.

1.3.2 The following appendices are included:

- Appendix A provides further policy context;
- Appendix B provides the evidence base that supports the HIA's identification of the links and pathways between aspects of the BSCU, the potential health and well-being impacts on communities likely to be most affected and the existing health status of these communities as described in the community profiles;
- Appendix C describes who was consulted on the scope of the HIA and includes a copy of the Scoping Report; and
- Appendix D provides the full profiles of the communities and study areas considered in the HIA.

1.4 The Proposed Development

Overview

- 1.4.2 The BSCU involves a major upgrade of the Bank Monument Station Complex (hereafter known as Bank Station) to provide greatly improved passenger access, circulation and interchange. It will also improve emergency fire and evacuation protection measures. It includes provision of a new passenger entrance with lifts and escalator connections; a new Northern Line passenger concourse using the existing southbound platform tunnel; a new Northern Line southbound running and platform tunnel (and diversion of the Northern Line through this); and new internal passenger connections between the Northern Line, the Docklands Light Railway (DLR) and the Central Line.
- 1.4.3 The new Station Entrance will open on to Cannon Street at the junction with Nicholas Lane. An entrance hall will provide circulation space, as well as accommodating staff facilities, plant rooms and associated retail space. New passenger lifts will link the entrance hall directly with the Northern Line and DLR providing step free access to and from these lines. Escalators will also connect the entrance hall with the Northern Line.
- 1.4.4 The existing southbound platform for the Northern Line will be converted into a new passenger concourse. A new southbound running and platform tunnel will be located to the west of the existing platform. New cross passages will connect the Northern Line concourses and platforms. New walkways and escalators will better connect the Northern Line, the DLR and the Central Line. In particular, a tunnelled passageway fitted with moving walkways will link with new escalators and will greatly improve interchange between the Northern Line and the Central Line.
- 1.4.5 Works to divert and protect utilities and to protect listed and other buildings from ground settlement, will also be undertaken, where monitoring and/or damage analysis indicates this is required. The compulsory purchase and

temporary use of land, the temporary stopping up of streets, street works and ancillary works will also be required.

- 1.4.6 The BSCU is shown in three dimensions in Figure 4.2 (see ES Figures Volume). Figures 4.3-4.7 (ES Figures Volume) show the proposed changes at each level and the new Station Entrance. The BSCU will be constructed and operated within the limits of deviation applied for as part of the Transport and Works Act Order (TWAO) application. The TWAO application is accompanied by a request for a Planning Direction for deemed planning permission for all works that may be built for the BSCU Order. This is accompanied by proposed planning conditions which allows for some details of the BSCU such as materials and finishes of the Station Entrance to be approved by the City of London Corporation when discharging these conditions. The following sections describe the BSCU in more detail.

A new Station Entrance

- 1.4.7 A new Station Entrance Hall will be constructed within the footprint of the site bounded by King William Street, Nicholas Lane, Cannon Street and Abchurch Lane (hereafter referred to as the Whole Block Site). It will open on to Cannon Street at the junction with Nicholas Lane. A canopy extending over the pavement will provide weather protection and add to the street presence of the station in long views. Bollards at the pavement boundary will be provided for security and to protect passengers at the entrance. Nicholas Lane will feature a level surface for pedestrians and vehicles. The new Station Entrance Hall will include staff facilities, plant rooms and associated retail space. The Nicholas Lane façade will include louvres to ventilate the plant rooms.
- 1.4.8 In response to pedestrian and vehicle studies, a new pedestrian crossing on Cannon Street to the west of the new Station Entrance will be provided in the event that no alternative arrangement emerges as a result of area-wide initiatives by the City of London Corporation and/or Transport for London. While a light controlled crossing is included at this stage in the process, the type of crossing will be developed at a later stage in discussion with the City of London Corporation.

Northern Line Improvements

- 1.4.9 To improve circulation for Northern Line passengers, the existing southbound platform will be converted into a new concourse. This will require a new platform and running tunnel to accommodate the southbound Northern Line, which will be constructed west of the existing platform. Four new cross-passages will be constructed which will link the platforms and concourse, with three also connecting with new interchange routes.

Central Line Improvements

- 1.4.10 A new tunnelled passageway (Central Line Link) from the Northern Line concourse with its moving walkways approximately 95m long, will provide access to a set of triple escalators which will take passengers up to the Central Line platforms via an existing cross passage which will be reconstructed and enlarged. A second cross passage at the far (western) end will provide improved access between the eastbound and westbound platforms.

Docklands Light Railway Improvements

- 1.4.11 New set of triple escalators connecting the new Northern Line concourse and the DLR will be provided and to facilitate their installation a number of existing plant rooms will be relocated. Two new cross passages will link the DLR arrival and departure platforms with the existing DLR passenger concourse, and a third will link the DLR arrival platform to the existing passenger concourse.

Construction of the BSCU Project

- 1.4.12 Construction will commence in 2016 with the diversion of utilities within Arthur Street prior to construction of the Arthur Street shaft. The tunnelling and below ground excavation will start towards the end of 2016 and will take approximately four years (completing late 2020) with peak tunnelling activity occurring in 2017. Construction of the new Station Entrance Hall is programmed for 2021. An indicative works programme including the phasing of construction activities is provided in the Outline Construction Logistics Plan (CLP) (Appendix A8.2 of the ES).
- 1.4.13 Permission for an Over Site Development (OSD) located over and around the new station infrastructure was sought via an application to the City of London Corporation under the Town and Country Planning Act 1990. Permission was granted on 27 June 2014.
- 1.4.14 The BSCU will be constructed from two work sites. The first work site will be at the site bounded by King William Street, Nicholas Lane, Cannon Street and Abchurch Lane (the Whole Block Site - note that this is referred to as the Cannon Street Work Site in some consultation material) (see Figure 4.10 ES Figures Volume). The Whole Block Site will be used to construct the escalators, cross passages and new Northern Line passenger concourse. A second smaller work site will be located on Arthur Street (see Figure 4.11 ES Figures Volume). A shaft will be sunk at Arthur Street and used to excavate the new Northern Line southbound running tunnel. Approximately 80 per cent of the concrete required for construction will be prepared at the work sites. The remaining 20 per cent of the concrete will be delivered to the sites. The disused King William Street underground station located beneath the junction

of King William Street and Arthur Street will be used for logistics purposes during construction.

Working hours

- 1.4.15 Standard working hours for the construction of the BSCU will be:
- 08:00 - 18:00 hours on weekdays (excluding public holidays); and
 - 08:00 - 13:00 hours on Saturdays
- 1.4.16 Mobilisation and demobilisation activities may be undertaken respectively for a period of up to one hour before and one hour after the standard working hours.
- 1.4.17 Certain elements of the construction works will need to be undertaken 24 hours a day, seven days a week. These works will include:
- below ground works associated with tunnelling excavation;
 - surface operations undertaken in support of the tunnelling excavation (including transport of excavated material from site); and
 - certain utilities works to divert and protect utilities affected by construction.

Blockade

- 1.4.18 During the final phases of construction in 2020 when the new tunnels and infrastructure are connected to the existing network, a period of closure (referred to as a blockade) of the Northern Line will be required between specified points. The blockade will comprise the following:

Full Closure

- Northern Line both northbound and southbound – no Northern Line services in either direction for six weeks between Kennington and Moorgate.

Partial Closure

- Northern Line northbound – trains running northbound but not-stopping at Bank Station for 11 weeks; and
- Northern Line southbound – no southbound services for 11 weeks between Kennington and Moorgate.

Utilities Works

- 1.4.19 Works to divert and protect utilities affected by construction are also proposed. General utilities works will include the excavation of trenches, duct and pipe laying, chamber construction, pulling and jointing of pipes and cables, and then commissioning of new or reinstated connections.

1.4.20 The main utilities works for the BSCU comprise:

- diversion of utilities at Arthur Street to allow construction of the shaft;
- diversion of utilities and protective works to the Low Level 2 Sewer (a west-east sewer between Cannon Street and King William Street) and to the London Bridge Sewer (a north-south sewer running beneath King William Street);
- minor protective works to utilities to ensure there are no impacts from settlement; and
- road strengthening works at Monument Junction.

2 Assessment Methodology

2.1 HIA Methodology

2.1.1 There is no single guidance for defining the scope and method of HIA for the assessment of development projects. Instead, a range of guidance documents exist for a variety of land use or public health situations. None are specific to a London Underground station.

2.1.2 With regard to methodology, this assessment uses the NHS London HUDU Rapid Health Impact Assessment Tool (HUDU, 2013) as a framework to assess the likely direct and indirect health impacts of the BSCU. This is the standard approach adopted by TfL. The HUDU approach uses a checklist to determine and assess the potential health impacts and is divided into 11 health determinants as set out below:

- housing quality and design;
- access to healthcare services and other social infrastructure;
- access to open space and nature;
- air quality, noise and neighbourhood amenity;
- accessibility and active travel;
- crime reduction and community safety;
- access to healthy food;
- access to work and training;
- social cohesion and lifetime neighbourhoods;
- minimising the use of resources; and
- climate change.

2.1.3 The HUDU checklist has been designed to *inter alia* assess the likely health impacts of outline and full planning applications. It is based on the WHO publication *Healthy Urban Planning* (Barton and Tsourou, 2000). As such, some of the framework assessment topics (such as housing quality and design) are not applicable to the BSCU.

2.1.4 In order to establish the baseline for the assessment, community profiles were created which set out the baseline conditions for the areas likely to be affected by the BSCU. The community profiles contain information on:

- population;
- ethnicity;

- deprivation;
- child development;
- unemployment;
- general health and disability;
- housing; and
- travel to work data.

2.1.5 The community profiles included information from the following sources:

- Public Health England;
- Office for National Statistics (ONS);
- Joint Strategic Needs Assessment; and
- Association of Public Health Observatories.

2.1.6 Information used for this assessment has been taken from relevant chapters and appendices of the BSCU Environmental Statement and the Design and Access Statement in order to describe the:

- current and future baseline environmental conditions;
- current and future use of Bank Station;
- BSCU design and construction and its sustainability benefits;
- impacts on pedestrians, passengers and the local community during construction and operation, and
- the proposed environmental mitigation measures.

2.1.7 In assessing the health impacts of the BSCU, the HUDU checklist includes a number of high level criteria and a range of sub-criteria that provide for a more detailed analysis. In addition, URS' approach has included further criteria based on the temporal nature of the impact (i.e. during the construction or operational phase) and the likely health impacts of the residual effects identified in the ES. These are described in detail below.

- **construction / operation** – this provides an indication of the timings of the impacts, including potential duration;
- **impact identified** – a description of the impacts generated by the BSCU which are likely to have an effect on health;
- **residual effect** – the effect identified in the ES; and
- **potential health impact** – the predicted impact on health given the likely receptors.

- 2.1.8 The HIA is mainly qualitative and based on professional judgment of the likely health impacts. Where appropriate, quantitative data has informed the assessment, though a detailed quantitative analysis of health impacts has not been undertaken because for the majority of health determinants there are no widely accepted methods for quantifying the potential health impacts. The qualitative assessment is supported by an evidence base and is therefore robust for the purposes of assessing the BSCU.
- 2.1.9 Table 2.1 describes the impact rating/ranking categories that have been used.

Table 2.1: HIA Impact Rating/Ranking Categories

Impact Category	Description
Strong positive	A beneficial impact of moderate to major magnitude
Positive	A beneficial impact of minor magnitude
Neutral	No discernible health impact
Negative	An adverse impact of minor magnitude
Strong negative	An adverse impact of moderate to major magnitude
Uncertain	Where uncertainty exists as to the overall impact

- 2.1.10 The determination of whether an impact is considered to be important takes account whether impacts are judged to be positive or negative, permanent or temporary, direct or indirect, as well as the duration and frequency of the impact and whether any secondary impacts are caused.
- 2.1.11 It should be noted that in many cases, mitigation to reduce health impacts or measures to enhance health benefits is embedded within the design of various aspects of the BSCU (see Chapter 4: The Proposed Development of the ES). The HIA has taken these into account when assessing the health impacts.

Future Baseline including Cumulative Schemes

- 2.1.12 There are a number of 'cumulative developments', which are major schemes in their own right and are close enough to the two BSCU Work Sites to have a potential combined impact on health. Construction of the BSCU will occur in parallel with some of these (see Chapter 17: Inter-relationships and Cumulative Effects of the ES for a full list).
- 2.1.13 Cumulative construction impacts have the potential to exacerbate adverse health impacts on local residents and users of Bank Station both due to potential combined noise, dust and vehicle movements of more than one scheme on the same community, and also due to the period of disruption to neighbourhood amenity. Due to the uncertainty about various schemes' construction programmes and methods, it is not possible to provide an accurate assessment, although it is expected that the Contractors on these schemes will adopt appropriate mitigation, such as through a CoCP.

- 2.1.14 Construction of an over site development (OSD) is likely to be 2021/22 – 2023/25 (dependent on potential overlap or break between completion of the BSCU and OSD construction). However, this assessment also considers a potential overlap in works of up to one year. Given the distance between the Arthur Street Work Site for the BSCU, an OSD at the Whole Block Site, and the nature of the works likely to be undertaken at each site during the construction period, the likelihood of cumulative impacts is expected to be limited to construction traffic, although this overlap was considered as part of the noise, air quality and socio-economic assessments presented in the ES.
- 2.1.15 There are a number of schemes that are of particular relevance to this HIA. First, Crossrail will soon be operational, effectively reducing the overcrowding on a number of east-west links on the London Underground Network. More underground stations will have step-free access (including the new Bloomberg entrance to Bank Station). The Bank Area Enhancement Strategy should encourage more active travel and exercise, as will new routes of the Cycle Superhighway.
- 2.1.16 Whilst these schemes may increase capacity on the network and provide alternative means of travel that are more ‘healthy’, population growth would exert continuing pressure on the London Underground Network and as such many of the issues identified in the baseline are assumed to be present under the future baseline. In particular, the issue of traveling conditions in the network is a priority given the potential for climate change to make travelling on the London Underground Network increasingly uncomfortable due to predicted hotter summers.

2.2 Assumptions and Limitations

2.2.1 The HIA has been subject to the following assumptions:

- there will still be further population pressure on the London Underground Network and as such many of the pressures identified in the baseline are assumed to be present under the future baseline;
- this HIA assesses the potential health impacts of the BSCU, using current baseline information as described in the community profiles. It is not possible to accurately know what the demography and health status of local communities will be by the time the BSCU commences service (in 2021). However, the HIA assumes that the change in demography and health status between now and 2021 will not be materially different;
- it has been assumed that the ‘working age’ population is the more resilient (to disease and poor health) section of the population given age and likely activity; and

- given the varied demographic profile and transient nature of the receptors, e.g. people passing through the areas affected rather than being permanently present, there is an uncertainty about affected individuals' health. However, it is assumed that they will be largely representative of the whole population.

2.2.2 The HIA has identified the following limitation:

- It was not possible to run the World Health Organisation (WHO) Health Economic Assessment Tool (HEAT)² for this project due to the following limitations:
 - no suitable walking distances identifiable (> 500 m);
 - it was not possible to determine the percentage of pedestrians and cyclists that may change behaviour as a result of the BSCU i.e. the number of people who carry on walking and cycling, having had to walk or cycle more during the blockade; and
 - it was not possible to determine of the percentage of pedestrians, the split between cyclists and pedestrian modes.

² TfL's Improving the Health of Londoners Transport Action Plan (2014) encourages the use of HEAT where suitable. If possible, pedestrian activity data will be collected before and during the construction period so as to provide data on the impact on pedestrian activity that would be useful for future HIAs.

3 Scope

3.1.1 The scope of the HIA was developed and set out in a HIA Scoping Report (see Appendix C). This report was consulted upon between 23 December 2013 and 17 January 2014. The Scoping Report was sent to the following relevant organisations and public health professionals:

- Director of Public Health, City and Hackney;
- Director of Public Health, London Borough Tower Hamlets;
- Health Improvement Manager, Public Health England;
- Project Director NHS London HUDU;
- City of London; and
- GLA.

3.1.2 This section summarises the scope that was consulted on and subsequently agreed with TfL. One response was received from the NHS London HUDU during the Scoping Report consultation period. The HUDU was supportive of the methodology and the range of determinants to be examined. HUDU's full response is included in Appendix C. The GLA was also involved in developing the scope of the HIA. This has been through attendance at meetings and helping to scope the feasibility of using the HEAT.

3.2 Public Consultation

3.2.1 Four rounds of public consultation have been held to help publicise and inform the development of the proposal for the BSCU. These public consultations took place in Autumn 2011, Spring 2012, Autumn 2013 and Summer 2014 (<http://www.tfl.gov.uk/bank-consultation>). An analysis of the Consultation Report which documents the responses to these consultations has not resulted in any further points that need to be considered as part of this HIA.

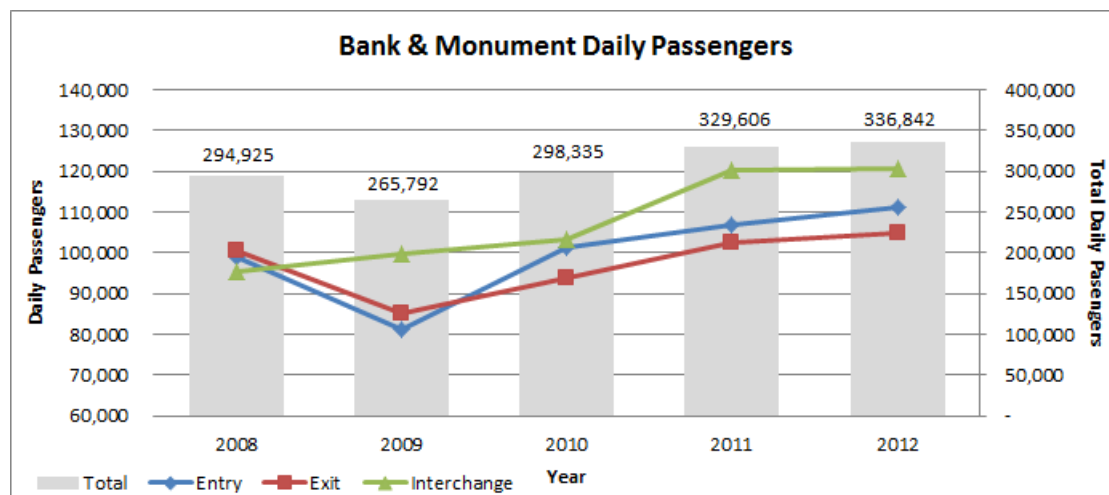
3.3 Geographic Scope

3.3.1 A Lower Super Output Area (LSOA) is defined by the ONS as an area containing between 1,000 and 3,000 residents or between 400 and 1,200 households. While the City of London is recorded as having a population of 7,187, the LSOA 001F in which Bank Station is situated has a population of just over 1,000 (ONS, 2011), few of which are anticipated to live within 500m of Bank Station.

3.3.2 Besides the resident population in the LSOA the other receptors (i.e. those that might be exposed to an impact) include users of the station, which the Transport Assessment (Appendix A8.1 of the ES) indicates is over 335,000

each day – see Figure 3.1, and pedestrians, cyclists and other users of rights of way/other routes near the BSCU Work Sites that are not users of the station.

Figure 3.1: Daily Passengers 2008-2012



3.3.3 Three community profiles were developed in order to understand the health and social issues of the communities most likely to be affected by the BSCU. These were:

- the City of London Lower Super Output Area (LSOA 0001F) (within which the BSCU is located);
- the City of London; and
- Greater London.

3.3.4 A community profile for Greater London is included in this report as this is where the bulk of the peak weekday origin and destination points are (about 76 per cent for the morning peak (07:00 – 10:00) origin and 78 per cent for the evening peak (16:00 - 19:00) destination).

3.4 Scope of Health Determinants

3.4.1 Following the scoping process the number of determinants, from the range identified in the HUDU checklist, considered relevant for this HIA was reduced from eleven to six. With the scoping out of 'housing', 'access to healthcare services and other social infrastructure', 'access to open space and nature', 'access to healthy food' and 'social cohesion and social capital' as either not being applicable to the project or the project not affecting or being to affect this determinant in any way. The full range of determinants considered and the determinants that were scoped into the HIA (shown in **bold text**) are shown in Table 3.1. The scope of each determinant and reasons for the scoping out of some determinants is set out below.

Table 3.1: HUDU Checklist Headings

Determinant
1. Housing
2. Access to healthcare services and other social infrastructure
3. Access to open space and nature
4. Air quality, noise and neighbourhood amenity
5. Accessibility and active travel
6. Crime reduction and community safety
7. Access to healthy food
8. Access to work and training
9. Social cohesion and social capital
10. Minimising the use of resources
11. Climate change

Housing

- 3.4.2 The health implications for housing and design have been scoped out of the assessment as the BSCU does not affect or make provision for housing.

Access to healthcare services and other social infrastructure

- 3.4.3 The BSCU does not include any provision for social infrastructure or healthcare and will not affect any social infrastructure in the City of London. It is anticipated that most of the construction workers on the BSCU will commute in from other areas. As construction workers are likely to be already based in and around London they are likely to already be registered with General Practitioners and to use social infrastructure local to where they live. Hence, there should be no additional burden on healthcare facilities either in the area of the BSCU or in the areas of residence of the construction workforce.

Access to open space and nature

- 3.4.4 Access to the one site of 'open space' in the assessment area, Abchurch Yard, should not be affected by the BSCU in either the construction phase or operation because pedestrian access will be maintained. However, there may be temporary restrictions to vehicular access through Abchurch Lane (the carriageway of which is often used by pedestrians), so this topic has therefore been scoped in.

Air quality, noise and neighbourhood amenity

- 3.4.5 Air quality, noise and neighbourhood amenity are scoped into the assessment as construction activities, facilities and traffic associated with the BSCU have

the potential to lead to impacts in relation to air quality, noise and townscape / visual attributes.

Accessibility and active travel

- 3.4.6 The BSCU has the potential to affect participation in walking and cycling, and distances travelled by these modes, during construction and operation. Diversions, the temporary blockade of a section of the Northern Line (between Kennington and Moorgate), changes to public transport routes and cycle lanes during construction could change walking and/or cycling distances or the attractiveness or ability to walk or cycle, with potential associated health impacts. In addition, the provision of facilities for construction workers or station staff could affect the uptake of walking and cycling. There is the potential for traffic management to affect cyclist and pedestrian movement during construction.
- 3.4.7 The operation of the BSCU may alter walking distances and times and lead to better pedestrian circulation within the station, whilst the new Station Entrance and potential changes in the street layout (such as a new pedestrian crossing on Cannon Street) could affect above-ground walking and cycling behaviour which could also lead to potential health impacts.
- 3.4.8 In addition, the above impacts could affect people with mobility problems or a disability in accessing buildings or public transport during construction, and during operation with the installation of lifts and step free access.
- 3.4.9 Impacts on walking, cycling, connectivity to public transport and inclusive access for those with impaired mobility have all been scoped into the HIA.

Crime reduction and community safety

- 3.4.10 There is the potential for the BSCU to lead to crime and safety concerns for people during construction and operation. Crime and the fear of crime may be of concern at construction sites and along diversions during construction. The design of the new Station Entrance, passageways and platforms could also affect fears over personal safety and crime. The design of the BSCU and its impact on crime, the fear of crime and safety has been scoped into the assessment.
- 3.4.11 'Safety' has been included under this criterion as there is a need to consider the potential safety impacts of construction and operation of the station (e.g. collisions with motor vehicles) on users and other potential receptors.

Access to healthy food

- 3.4.12 No existing healthy food outlets are affected during the construction or operational phases and no other healthy food related uses are being applied

for as part of the TWAO. On this basis access to healthy food has been scoped out of the assessment.

Access to work and training

- 3.4.13 Construction and operational activities will generate employment opportunities, providing access to jobs and training. This could be of benefit to local people, within the immediate environs of the station and the City of London, via local and responsible procurement as well as to the wider community of Greater London. Employment generated in and around London and opportunities for local employment within the City of London during construction have been scoped into the assessment.
- 3.4.14 The BSCU does not include childcare facilities of workspace for local businesses and therefore these criteria have been scoped out of the assessment.

Social cohesion and social capital

- 3.4.15 This has been scoped out of the assessment as the Bank area is largely commercial with a small resident population. The construction work sites have been designed so as to not sever any existing communities, and the nature of the BSCU means that it will not bring a new resident community into the area.

Minimising the use of resources

- 3.4.16 Making the best use of existing land has been scoped into the HIA on the basis that health impacts will be dependent on the location, size and activities of construction work sites. During operation, Bank Station will operate at a higher capacity, and allow for an Over Site Development, encouraging a more efficient use of land.
- 3.4.17 Recycling and sustainable design and use of construction materials and equipment have also been scoped into the HIA and considered in construction. Recycling during operation will be included as part of London Underground Limited's (LUL) standard practices.

Climate change

- 3.4.18 Ensuring that buildings and public spaces are designed to respond to winter and summer temperatures and the impact of increased passenger numbers (e.g. breath and radiated heat) is important for preventing heat stress, mental stress, dehydration and physical stress (such as fainting). During construction the BSCU could potentially lead to, or worsen, such mental and physical impacts in some people through congestion and longer journey times due to diversions, or the temporary total and partial blockade of the Northern Line. During operation the reduced levels of crowding, step free access, walkways

and escalators, plus additional help points and seating could have a positive impact. Positive and negative health impacts could be made more acute through the effects of a changing climate (e.g. hotter summers).

4 Legislative and Policy Context

4.1.1 This section sets out the key national, regional and local policies that relate to the HIA and the impacts on health and wellbeing of those that may be affected by the BSCU.

4.2 National Policy

Fair Society, Healthy Lives: The Marmot Review (Marmot, 2010)

4.2.2 *The Marmot Review* states that serious avoidable health inequalities exist across England and shows these inequalities to be determined by a wide range of socio-economic factors. Relevant policy objectives include the need to:

- *create fair employment and good work for all;*
- *ensure a healthy standard of living for all;*
- *create and develop healthy and sustainable places and communities; and*
- *strengthen the role and impact of ill-health prevention.*

4.2.3 The report argues that economic growth without a reduction in inequality will not result in better health, and that improving health results in economic benefits when the costs of loss of productivity and treatment expenditure are taken into account. Furthermore, the report links health equality to promoting environmental sustainability as the poorest in society bear the brunt of adverse impacts of climate change.

Healthy Lives, Healthy People: Our Strategy for Public Health in England (Department of Health, 2010)

4.2.4 This White Paper outlines a commitment to protecting the population from serious health threats; helping people live longer, healthier and more fulfilling lives; and improving the health of the poorest, fastest. It also adopts the life course framework (outlined in *The Marmot Review*) for tackling the wider social determinants of health.

Healthy Lives, Healthy People: A Call to Action on Obesity in England (Department of Health, 2011)

4.2.5 The White Paper sets out a series of measures to address increasing obesity. One measure relevant to the BSCU is that of maximising the potential of the planning system to support health and economic development through the *National Planning Policy Framework* (Department of Communities and Local Government, 2012). It notes that local government has the opportunity to ensure that buildings and spaces are designed in a way that makes it easy for people to be active.

Public Health Outcomes Framework (Department of Health, 2012)

- 4.2.6 The *Public Health Outcomes Framework* sets the context for a new health system which is being refocused on achieving positive health outcomes for the population and reducing inequalities in health.

National Planning Policy Framework (Department for Communities and Local Government (2012)

- 4.2.7 The social role of the planning system is defined in the *National Planning Policy Framework (NPPF)* as *supporting vibrant and healthy communities, with a core planning principle being to take account of and support local strategies to improve health, social and cultural wellbeing for all*. Planning policies and decisions should ensure that new development is appropriate for its location and the effects of pollution on health, the natural environment or general amenity should be taken into account.

Planning Practice Guidance (Department for Communities and Local Government (2014)

- 4.2.8 Health and planning is also covered in the government's planning guidance, set out in the *PPG* (Department for Communities and Local Government, 2014). In the context of the BSCU, the following paragraph is relevant:
- 001 – *Local planning authorities should ensure that health and wellbeing, and health infrastructure are considered in local and neighbourhood plans and in planning decision making.*

Noise Policy Statement for England (Defra, 2010)

- 4.2.9 Health is placed in the forefront of the *Noise Policy Statement for England (NPSE)*, being included in the Noise Policy Vision: *Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development*. Specifically, the objectives for the *NPSE* state that significant adverse effects in health should be avoided, that adverse effects should be mitigated for and that where possible, health and quality of life should be improved.
- 4.2.10 Importantly, the *NPSE* makes a distinction between 'health', which is referred to as physical and mental well-being and 'quality of life' which is defined as *a subjective measure that refers to people's emotional, social and physical well-being*.

National Road and Rail Networks: draft National Policy Statement (Department for Transport, 2013)

- 4.2.11 This draft *National Policy Statement (NPS)* states that national road and rail networks *have the potential to affect the health, well-being and quality of life of*

the population. Networks can have direct impacts on health including increasing traffic, noise, vibration, air quality and emissions, light pollution, community severance, dust, odour, polluting water, hazardous waste and pests. New or enhanced infrastructure can have indirect health impacts on access to public services, local transport or the use of open space for recreation and physical activity.

- 4.2.12 Where projects have an effect on human beings, the *NPS* states that the accompanying ES should assess the effects listed above for each element of the project, *identifying any adverse health impacts, and identifying measures to avoid, reduce, or compensate for these impacts as appropriate.* The applicant and the Secretary of State should consider the cumulative impact of the scheme on health when applying for and determining schemes for development consent respectively.

4.3 Regional Policy

The London Plan (GLA, 2011)

- 4.3.1 *The London Plan* sets the overarching policy framework in which the London boroughs formulate their Local Plans and supplementary planning guidance.
- 4.3.2 *The London Plan* provides policies that address many of the determinants of health. There are many policies and they have been listed in Appendix A.
- 4.3.3 The *Revised Early Minor Alterations to the London Plan* (Greater London Authority, 2013) further highlights, through additions of supporting *paragraphs 3.9A and 3.10A* and changes to the supporting text of *Policy 3.2 'Improving health and addressing health inequalities'*, the importance of improving health and addressing health inequalities in delivering transport improvements in London. *Paragraph 3.10A* is of particular relevance in that it states that *inter alia new development should be supported by necessary and accessible health and social infrastructure.*

Draft Further Alterations to the London Plan (GLA, 2014)

- 4.3.4 The draft *Further Alterations to the London Plan* further highlights, through changes to supporting paragraphs, the importance of *Policies 6.9 and 6.11* in promoting healthy lifestyles through encouraging walking and cycling. *Policy 7.15* regarding the need to reduce and manage noise has been strengthened to include greater reference to health, soundscapes, and new technologies and improved practices to reduce noise at source.
- 4.3.5 The supporting text for *Policy 3.2 Improving Health and Addressing Health Inequalities* suggest that an HIA should be considered where a development is likely to have significant implications for health and wellbeing in order to *identify opportunities for minimising harm and maximising potential health gains.*

London Plan Implementation Plan 1 (Greater London Authority, 2013)

- 4.3.6 The *London Plan Implementation Plan 1* sets out how the policies of *The London Plan* will be translated into practical action. The *Implementation Plan* seeks to improve the quality of urban planning and give greater consideration to health inequalities in planning decisions; whilst delivering strategic transport and health infrastructure provision to support growth.

Mayor's Transport Strategy (Greater London Authority, 2010)

- 4.3.7 The *Mayor's Transport Strategy (MTS)* sets out the following relevant goals:
- *support economic development and population growth;*
 - *enhance the quality of life for all Londoners;*
 - *improve the safety and security of all Londoners;*
 - *improve transport opportunities for all Londoners; and*
 - *reduce transport's contribution to climate change and improve its resilience.*

- 4.3.8 The *MTS* outlines a series of challenges, outcomes and proposals.

- 4.3.9 It sets a challenge to improve health impacts, through facilitating an increase in walking and cycling, and also records that the Mayor is seeking to increase cycle trips by 400 per cent by 2026, against the 2001 baseline (taking cycling's overall mode share from two to five per cent). *Section 4.3.6* of the strategy provides more detail on the strategy's ability to improve health impacts, particularly in terms of reducing obesity. It is supported by *Policy 17*, which states:

The Mayor, through TfL, and working with the DfT and other government agencies, the London boroughs, health authorities any other stakeholders, will promote healthy travel options such as walking and cycling.

- 4.3.10 Proposals in the *MTS* relevant to health are: *5.8 A more accessible transport system, 5.14 Making walking count, 5.17 Reducing crime, fear of crime and antisocial behaviour, 5.19 Improving noise impacts, 5.21 Improving air quality, 5.22 Reducing carbon dioxide emissions and 5.23 Adapting to climate change.*

Mayor's Air Quality Strategy (GLA, 2010)

- 4.3.11 The *Mayor's Air Quality Strategy* details how the Mayor aims to protect Londoners' health and increase their quality of life through initiatives to reduce air pollutant emissions and improve air quality; such as promoting eco-driving, low-emission vehicles, introducing age limits for taxis, retrofitting older buses and introducing new standards for the Low Emission Zone.

- 4.3.12 The strategy notes that TfL monitors air quality in tunnels and stations to ensure that staff and the travelling public are not exposed to harmful levels of particulates (mainly dust) and other air pollutants. Particulate levels are well below the Workplace Exposure Limit set by the Health and Safety Executive.
- 4.3.13 The objective of reducing non-transport emissions from construction and demolition activities are highlighted within the *Sustainable Design and Construction Supplementary Planning Guidance* (Greater London Authority, 2014) for sites in strategic planning applications.

Sounder City, the Mayor's Noise Strategy (Greater London Authority, 2004)

- 4.3.14 As explained in Appendix B of this report, noise can have an effect on health. *Sounder City, the Mayor's Ambient Noise Strategy*, includes objectives to minimise the adverse impacts of road traffic noise, freight and servicing, to promote effective noise management on rail networks in London.
- 4.3.15 It also seeks to protect and enhance the tranquillity and soundscape quality of London's open spaces, green networks and public realm.

Mayor's Climate Change Mitigation and Energy Strategy (Greater London Authority, 2011)

- 4.3.16 As explained in Appendix B of this report, climate change can have an effect on health. The Mayor's *Climate Change Mitigation and Energy Strategy* notes that a target of a 60 per cent reduction in the 1990 carbon dioxide (CO₂) emissions is to be achieved by 2025. The policies presented within the strategy contribute towards reducing the extent of climate change with its consequential diverse effects upon health.

Mayor's Climate Change Adaptation Strategy (Greater London Authority, 2011)

- 4.3.17 The Mayor's *Climate Change Adaptation Strategy: Managing Risks and Increasing Resilience* examines the outcomes of climate change (flooding, drought and overheating) to which London will need to adapt.
- 4.3.18 The strategy sets out a number of objectives, including to:
- *identify and prioritise the climate risks and opportunities facing London and understand how these will change through the century, along with the key actions required to prepare for these (including identifying those responsible);*
 - *promote and facilitate new development and infrastructure that is located, designed and constructed for the climate it will experience over its design life;*

- *ensure that tried and tested emergency management plans exist for the key risks and that they are regularly reviewed and tested.*
- 4.3.19 It also describes the cooling strategy for the London Underground Network:
- *delivering new air-conditioned carriages on the sub-surface lines;*
 - *investigating further opportunities to use groundwater cooling systems;*
 - *improving ventilation shafts and replacing and upgrading out-of-service ventilation fans across the network;*
 - *placing industrial fans or chiller units on the concourses of key stations as part of future major station upgrades.*

- 4.3.20 The strategy observes that temperatures on the London Underground Network will continue to be uncomfortable in hot summers, hence advice to passengers to prepare for travelling in warmer conditions will continue.

Mayor's London Health Inequalities Strategy (Greater London Authority, 2010)

- 4.3.21 The Mayor's *London Health Inequalities Strategy* sets out a framework for action to:
- *improve the physical health and mental well-being of all Londoners;*
 - *reduce the gap between Londoners with the best and worst health outcomes;*
 - *create the economic, social and environmental conditions that improve quality of life for all; and*
 - *empower individuals and communities to take control of their lives, with a particular focus on the most disadvantaged.*

4.4 Supplementary Planning Guidance

Draft Land for Industry and Transport (Greater London Authority, 2012)

- 4.4.1 The draft Supplementary Planning Guidance (SPG) *Land for Industry and Transport* promotes walking and cycling through incorporating within new development layouts and facilities (such as cycle parking) to encourage cycling and encouraging the development of high quality public realm and safe, convenient, direct and accessible walking routes.

Health Issues in Planning Best Practice Guidance (Greater London Authority, 2007)

- 4.4.2 This guidance shows how health inequalities can be tackled through planning policies and proposals, as well as through better partnership working between

health and development planning sectors. The guidance highlights important policies in *The London Plan* that are relevant to health including health determinants such as housing, employment, social infrastructure and open space, which should be used to address the health impacts of development and tackle health inequalities.

4.5 Local Planning Context

Core Strategy (City of London Corporation, 2011)

4.5.1 The *Core Strategy* sets out a spatial framework for how the City of London Corporation wants to see the City of London develop to 2026 and beyond. There are seven Core Strategy policies (CS) which are particularly relevant to health, they are:

- *CS3 Safety and Security - to ensure that the City of London is secure from crime, disorder and terrorism, has safe systems of transport and is designed and managed to satisfactorily accommodate large numbers of people.*
- *CS6 Cheapside and St Paul's - to develop Cheapside and St Paul's area promoting the City of London's unique cultural and leisure activities and improving the pedestrian environment.*
- *CS10 Design - to promote a high standard of sustainable design of buildings, streets and spaces, having regard to their surroundings and the character of the City of London and creating an inclusive and attractive environment.*
- *CS15 Sustainable Development and Climate Change - To enable City of London businesses and residents to make sustainable choices in their daily activities creating a more sustainable City of London, adapted to the changing climate.*
- *CS16 Public Transport, Streets and Walkways - to build on the City of London's strategic central London position and good transport infrastructure to further improve the sustainability and efficiency of travel in, to, from and through the City of London.*
- *CS18 Flood Risk - to ensure that the City of London remains at low risk from all types of flooding.*
- *CS19 Open Spaces and Recreation - to encourage healthy lifestyles for all the City of London's communities through improved access to open space and facilities, increasing the amount and quality of open spaces.*

Bank Conservation Area Character Summary & Management Strategy Supplementary Planning Document (City of London Corporation, 2012)

- 4.5.2 The *Bank Conservation Area Character Summary & Management Strategy* sets out the wider policies and guidance that future development schemes and enhancement projects need to account for in order to uphold the special architectural and historic interest of the conservation and enhancement of Bank Conservation Area.
- 4.5.3 New developments should protect and enhance the significant characteristics of the Bank Conservation Area including its distinctive street pattern with broader streets being connected by lanes, alleys and courts as a key to encouraging pedestrian movement.
- 4.5.4 Trees, churchyards, gardens and other green spaces make a strong contribution to the character and appearance to parts of the Bank Conservation Area and should be enhanced, where appropriate, when opportunities arise.
- 4.5.5 This strategy also makes reference to *City of London Street Scene Manual* (City of London Corporation, 2012) and the main principles which provide the framework for the streets are: *rationalise street furniture, improve the pedestrian experience, enhance paving and surfaces, introduce more trees and planting, preserve historic character, create an inclusive environment and maximise the sustainability of each project.*
- 4.5.6 The use of Sustainable Drainage Systems (SuDS) such as green roofs and rainwater attenuation measures is supported.

Bank Area Enhancement Strategy (Publica and Atkins, 2012)

- 4.5.7 The *Bank Area Enhancement Strategy* sets out the City of London Corporation's vision for public realm improvements in the Bank area and outlines the following guiding policies:
- *to reduce conflict and improve road safety for all modes of transport;*
 - *to improve the function of Bank junction for all modes of transport;*
 - *to accommodate future growth, ensuring that the area functions well and provides a suitable environment that contributes towards maintaining the City of London's status as the world's leading international financial and business services centre; and*
 - *to improve the pedestrian environment by creating more space for pedestrians, enhancing walking routes throughout the area, and ensuring that streets and spaces are inclusive and accessible to all.*
- 4.5.8 This strategy gives a particular focus to Bank Junction through the following objectives: improve safety, provision for pedestrians and cyclists, reduce traffic

conflicts, manage future demand, create a more efficient junction, consider re-balancing bus routes, and consider radical options that could involve major change such as closing roads, timed closures and shared surfaces.

5 Community Profile Summary

5.1 Introduction

5.1.1 To understand the potential for health impacts, it is important to understand the health status of and key health determinants influencing existing communities likely to be affected by a project. Three community profiles are presented in Appendix D. The community profiles focus on a number of key health determinants in the three study areas most likely to be affected by the BSCU: the City of London LSOA 001F (within which the BSCU is located); the City of London; and Greater London.

5.1.2 The community profiles include consideration of: age, ethnic background, unemployment, education, levels of deprivation, general levels of health and disability and overall life expectancy, and are summarised in turn below.

5.2 Population

5.2.1 The age group most likely to be affected by the BSCU is those of 'working age'. This is because the City of London and London have a larger proportion of residents in the 16-64 year old age groups. Just over a third of residents in LSOA 001F are aged 30-44, and there are low numbers of children and elderly people. This is due to the employment-oriented nature of the City of London and the main use of Bank Station being for commuting to and from workplaces located in the City of London.

5.3 Ethnicity

5.3.1 Each of the affected study areas is ethnically mixed. The City of London (21.4 per cent) Black and Mixed Ethnicity - BAME) is less ethnically diverse than Greater London (40.2 per cent) however this is still significantly more diverse than the England average (14.6 per cent).

5.4 Deprivation

5.4.1 Levels of deprivation vary across London. Relative to the national and regional picture (Greater London), the City of London is amongst the least deprived areas.

5.5 Unemployment

5.5.1 Unemployment is far lower in the City of London (1.4 per cent) than the rest of Greater London (4.0 per cent) and England (3.6 per cent).

5.5.2 The BSCU, through both direct job creation but also greater accessibility to reemployment opportunities may affect areas of higher unemployment.

5.6 General health and disability

- 5.6.1 Those people self-rated their health as 'bad' or 'very bad' is lower in the City of London (3.3 per cent) than for the other study areas. London reports 5.0 per cent, England 5.5 per cent.
- 5.6.2 Rates of limiting long-term illness or disability are more favourable for the City of London (11.5 per cent) and Greater London (14.2 per cent) than for England (17.6 per cent).
- 5.6.3 Life expectancy for men and women is considerably higher in the City of London (males 83.6, females 83.4) than the regional (males 78.6, females 83.1) and national (males 78.3, females 82.3) averages respectively.
- 5.6.4 Health issues that are higher in the City of London and Greater London than England are prevalence of communicable diseases (in particular tuberculosis); cardiovascular disease (including coronary heart disease and stroke) and diabetes. Obesity is generally lower in Greater London and the City of London than England. The Standardised Mortality Ratio for all forms of cancer, circulatory disease and respiratory disease are all higher than the England ratios.

5.7 Travel to Work Data

- 5.7.1 In terms of travel behaviour, the most popular method of travelling to work for residents of the City of London and the LSOA is to walk to work (around 50 per cent), followed by using the London Underground. Around 20 per cent of people in the LSOA, City of London, and Greater London as a whole use the London Underground to get to work.
- 5.7.2 Although the rate of people killed or seriously injured in road traffic collisions is lower in the City of London and Greater London compared to England; vulnerable road users such as pedestrians and cyclists make up a higher proportion of those injured.

5.8 Summary

- 5.8.1 The age profile and employment status of the population is likely to mean that they are more resilient to changes in health determinants.
- 5.8.1 The City of London is generally less deprived than the Greater London average and has lower self-reported bad health and a higher life expectancy. Greater London has a wider range of deprivation from some of the most to the least deprived areas compared to England.
- 5.8.2 Over-represented health issues in the City of London (compared to England) relate to communicable diseases; cardiovascular disease (including coronary heart disease and stroke) and diabetes. Coronary heart disease prevalence is

higher in the City of London than for London. The Standardised Mortality Ratio for all forms of cancer, circulatory disease and respiratory disease are all higher than the England ratios.

- 5.8.3 Obesity is less-prevalent in the City of London and London than the national average however it remains an important health issue.
- 5.8.4 In the City of London, 58 people were killed or seriously injured on the roads in 2012, an increase of 18 per cent on the previous year (Hackney and City Health and Wellbeing Boards, 2014). Of those killed or seriously injured; 33 per cent were pedestrians; 45 per cent cyclists and 16 per cent motorcyclists in the City of London; compared to 44 per cent; 23 per cent and 21 per cent in London respectively (Hackney and City Health and Wellbeing Boards, 2014). There is a lower rate of people killed or seriously injured in road traffic collisions in the City of London than London and England; however vulnerable road users such as pedestrians and cyclists make up a higher proportion of those injured. Pedestrians and cyclists are therefore at greater risk of an injury in the City of London.

6 Assessment

6.1 Introduction

- 6.1.1 This impact assessment uses the HUDU checklist, focussing on those determinants that were scoped in during the HIA scoping process (see Chapter 3 for the rationale for choosing the health determinants that were scoped 'in' or 'out' of the assessment). As stated previously, this framework was devised to assess outline and full urban development planning applications, and as such, some of the topics and questions are not relevant to the BSCU.
- 6.1.2 Some determinants are affected during construction only, some during operation only and some during both phases. In some cases, where it was not possible to disaggregate the determinant e.g. sustainability, construction and operation have been assessed jointly.
- 6.1.3 Where possible, direct and indirect impacts and the impact on health inequalities have been identified and assessed.

6.2 Access to Open Space and Nature

Are the open and natural spaces welcoming and safe and accessible for all?

Construction

- 6.2.2 Abchurch Yard is the only area of 'open space' affected (albeit not directly) by the BSCU construction works. The provision of hoardings and use of demolition/construction equipment around construction sites may temporarily make the immediately surrounding area a less welcoming space. However, given the proximity of other small open spaces, such as at Stephen's Row, it is considered that there is likely to be a **neutral impact** on health from changes in accessibility to open and natural spaces during construction.

Operation

- 6.2.3 The operational BSCU will not have an effect on open spaces, and will have a **neutral impact** on health.

6.3 Air quality, noise and neighbourhood amenity

Does the proposal minimise impacts such as dust, noise, vibration and odours?

Construction

- 6.3.2 In general, construction activities have the potential to generate fugitive dust emissions as a result of demolition, construction, earthworks or the transfer of material to surrounding roads. Any impact would be dependent on the

sensitivity of receptors being exposed e.g. asthma sufferers, but would be minimised through extensive measures set out on the BSCU Code of Construction Practice (CoCP) (a draft of which is provided in Appendix A4.1 of the ES). No significant air quality effects have been identified in the ES, including for additional and diverted traffic during construction. Noise will generally be not significant in environmental terms, although there are likely to be temporary significant adverse effects in places (such as St Mary Abchurch, 15 Abchurch Lane, Mansion House, St Stephen's Church and the Magistrates Court) post mitigation. This could lead to disturbance, and potentially increase stress and anxiety. LUL is committed to implementing a CoCP and working with affected parties to ensure that disturbance from such activities is kept to a minimum. Residual noise effects during construction are not uncommon for development projects within the City of London, due to the dense nature of existing development.

- 6.3.3 Therefore, it is considered that there is a **neutral/negative impact** on health from air quality and noise during construction. There are no odour impacts.

Operation

- 6.3.4 There are no new 'conventional' ventilation shafts proposed as part of the BSCU but there are station ventilation plant proposed. Noise impacts from the ventilation plant have been minimised, so as to result in no significant effects. There will be no significant air quality impacts associated with the fans. Furthermore, operational noise limits have been applied to the scheme design, and the trackform will be developed so as to minimise operational impacts from the passage of trains in passenger service along the new tunnel alignment and result in no predicted significant effects in the ES.

- 6.3.5 Therefore, it is considered that there is likely to be a **neutral impact** on health from air quality and noise during operation of the BSCU.

Does the proposal minimise air pollution caused by traffic and energy facilities?

Construction

- 6.3.6 As described in Chapter 12: Air Quality of the ES, air pollution is minimised through a range of controls and processes that will be implemented through documents such as the Construction Logistics Plan, the Traffic Management Plan and the CoCP. This includes measures such as using low emissions vehicles, ultra low sulphur fuels and diesel particulate filters where appropriate. In terms of generating energy facilities, the use of diesel or petrol powered generators will be minimised, and instead mains electricity or battery powered equipment will be used.

6.3.7 In addition to the closure of Arthur Street, there will be total and partial closures of several strategic roads during the general utility works, which will lead to the diversion of some traffic onto alternative routes. The temporary nature of the closures and the associated traffic management measures relating to the works will promote the free flow of traffic and thereby minimise the potential for excessive emissions to air from congested traffic. Effects due to general utilities works are therefore not considered likely to be significant.

6.3.8 The ES found that the air quality from increased construction traffic and plant and changes to traffic flows would be unlikely to be significant, and it is considered that there is likely to be a **neutral** impact on health from these aspects.

Operation

6.3.9 There are no significant traffic effects predicted during operation, as the BSCU is not expected to cause a material change in traffic numbers and there are no energy facilities being proposed. Therefore it is considered there will be no impacts on health, the BSCU should be **neutral** on both counts.

Does the proposal minimise noise pollution caused by traffic and commercial uses?

Construction

6.3.10 No commercial uses are proposed during construction of the BSCU.

6.3.11 Noise pollution from construction traffic will be minimised through various measures set out in the CLP and TMP. This includes designing construction work sites so that heavy goods vehicles (HGVs) can enter and leave the site in forward gear, thus reducing the incidence of the reversing signal. HGVs will also be routed so that they use strategic roads, as opposed to less busy and quieter roads, where their noise would be more noticeable.

6.3.12 The ES has identified that there are unlikely to be significant traffic noise effects during construction, and therefore, it is considered that there is likely to be a **neutral impact** on health.

Operation

6.3.13 Although there will be a retail element provided at the new Station Entrance Hall, and new building services and fixed plant required as part of the BSCU, the ES has not identified any significant residual noise effects from these elements. The groundborne noise from trains using the newly constructed running tunnel will not be significant either. Therefore, it is considered that there is likely to be a **neutral impact** on health.

6.4 Accessibility and Active Travel

Does the proposal prioritise and encourage walking (such as through shared spaces?)

Construction

- 6.4.2 Whilst the proposal does not necessarily prioritise or encourage walking *per se*, the BSCU has the potential to affect rates and distances of walking during construction due to pedestrian diversions, changes to pavements, severance by construction activities and traffic, temporary closures to some London Underground stations during the full and partial blockades of the Northern Line (between Kennington and Moorgate) and changes to public transport routes.
- 6.4.3 Chapter 8: Transport and Movement of the ES has identified that there will be no significant temporary effects to vulnerable road users (pedestrians and cyclists) through increased vehicle movements, changes in travel distance caused by diversions and changes in pedestrian comfort. There will also be a non-significant effect on users of bus route 344, affected by the closure of Arthur Street, as there will be replacement bus stops and alternative bus services nearby.
- 6.4.4 With the exception of Nicholas Lane for a period to allow demolition activities at the Whole Block Site, all other roads will remain open to pedestrians at all times to maintain the current level of amenity.
- 6.4.5 To accommodate the work sites' hoarding, the northern footway along Arthur Street may be reduced in width from 1.6m to no less than 1.2m as will the footways around the Whole Block Site on Abchurch Lane and Nicholas Lane. The outline CLP and draft CoCP provide details of the measures proposed to mitigate for any potential adverse impacts that could be caused by closures and changes to pedestrian routes and reduced pedestrian comfort. However, for certain users such as disabled people, older people and parents/carers travelling with babies and young children in pushchairs/buggies, the narrower pavement might make it more difficult for walking. Therefore, it is considered that there is likely to be a temporary **negative impact** on health, for these sensitive groups, from prioritisation and encouragement of walking due to pedestrian overcrowding during construction.
- 6.4.6 During the blockade, analysis in the Transport Assessment has shown that the greatest potential for increased walking is on the London Bridge – Bank – Moorgate corridor during the total blockade, which could have some health benefits. However, there might be over 27 additional pedestrians per metre width per minute (ppmm) on some of the links (which is associated with a Pedestrian Comfort Level of 'very uncomfortable'), although this is expected to

be less than 10ppmm on most of the links. This may exacerbate feelings of stress from those affected by the blockade.

- 6.4.7 Travel Demand Management (TDM) measures will include a signage strategy that encourages walking and cycling as alternative modes for transport during the blockade. Due to the temporary nature of the blockade works, and mitigation for pedestrians during the wider construction works, the health impact would be **neutral**.

Operation

- 6.4.8 The BSCU is likely to indirectly affect 'walking' through the provision of improved interchange within the station and a new entrance.
- 6.4.9 Changes in journey distance resulting from the BSCU for interchange passengers are presented in the Transport Assessment. It shows that some passengers, for example for those travelling from DLR to the Northern Line southbound, will walk up to 99 metres less than they do currently. Conversely, some passengers, such as those travelling from Northern Line northbound to Central Line eastbound, will walk up to 74 metres more. The introduction of a new Station Entrance is also expected to lead to slightly shorter distances for some passengers to walk to their destinations.
- 6.4.10 The BSCU will result in very clear improvements for passengers using the station, with generally quicker walking times between lines, and safer accommodation on the platforms and improved accessibility for those with disabilities, elderly people and carers with children in pushchairs/buggies (eg lifts, moving walkways, escalators).
- 6.4.11 The increased provision of facilities to ensure access for people with reduced mobility should increase accessibility to those receptors during operation. The health impacts of this are likely to be **neutral**.

Does the proposal prioritise and encourage cycling (for example by providing secure cycle parking, showers and cycle lanes?)

Construction

- 6.4.12 The BSCU has the potential to affect cyclists indirectly during construction through highway and cycle lane diversions, increases in traffic, changes in traffic flow and congestion. The Outline CLP (Appendix A8.2 of the ES) includes details about how traffic will be managed during construction, considerations for cyclists and details of proposed highway closures and diversion routes. Chapter 8: Transport and Movement in the ES has concluded that there would be no significant effects on cycling as there are various alternative routes to use.

- 6.4.13 Therefore, it is considered that there is likely to be a **neutral impact** on health due to encouragement of cycling during construction.

Operation

- 6.4.14 There will be no changes to the surrounding cycle infrastructure and facilities, and no new cycle trips will be generated. Furthermore, there are no additional connections proposed though existing connections will be maintained. Therefore, it is considered that there is likely to be a **neutral impact** on health from prioritising and encouraging cycling during operation.

Does the proposal connect public realm and internal routes to local and strategic cycle and walking networks?

Construction

- 6.4.15 The BSCU is located along pedestrian and cycle routes (as described in Chapter 8: Transport and Movement of the ES) and has the potential to affect these routes during construction through pedestrian diversions, temporary closures to some London Underground stations during the full and partial blockades of the Northern Line (between Kennington and Moorgate) and changes to public transport routes and cycle lanes. There are no permanent changes to local or strategic walking or cycle networks and temporary routes will be maintained for pedestrians and cyclists and signposted to encourage walking and cycling.

- 6.4.16 Therefore, it is considered that there is likely to be a **neutral impact** on health from connecting public realm and internal routes to local and strategic cycle and walking networks during construction.

Operation

- 6.4.17 There will be no changes to the surrounding cycle infrastructure and facilities, and no new cycle trips will be generated. Furthermore, there are no additional connections proposed though existing connections will be maintained. The only change to the local walking network will be a new pedestrian crossing on Cannon Street proposed as part of the BSCU to reflect the desire lines across this road and the extra passengers who will be using this entrance (details of this will be agreed with the City of London Corporation).

- 6.4.18 Therefore, it is considered that there will be a **neutral impact** on health from connecting public realm and internal routes to local and strategic cycle and walking networks during operation.

Does the proposal include traffic management and calming measures to help reduce and minimise road injuries?

Construction

- 6.4.19 As described in the Transport Assessment (Appendix A8.1 of the ES) (Section 6.9) pedestrians and cyclists are at risk of a personal injury collision in the City of London, some 50 per cent of collisions involve pedestrians and cyclists. Particular attention will be given to safety for these modes not only around the construction work sites but also on those pedestrian and cycle routes that are likely to experience overcrowding or increased traffic flows during the construction works. To mitigate the risk, an outline CLP has been produced, which will be updated, agreed with the City of London Corporation, and then implemented. Furthermore, the Traffic Management Plan (TMP) will include details of how traffic will be managed during construction, pedestrian and cyclist considerations and plans to confirm details of proposed highway closures and diversion routes.
- 6.4.20 Chapter 8: Transport and Movement of the ES has identified that there will not be a significant effect on collisions and safety as those junctions that are most prone to collisions (more than 10 in a three year period) will not be subject to a 10 per cent increase in traffic flow for longer than four weeks. In addition, there are measures set out in the outline CLP, such as vehicle safety checks, that will mean that there would be a **neutral impact** to pedestrian safety.

Operation

- 6.4.21 Analysis of the scheme indicates that the new Station Entrance proposed on Cannon Street as part of the BSCU can be expected to result in large numbers of additional pedestrians crossing this street. To reduce the risk of collisions for passengers leaving Bank Station by the new Station Entrance, a new pedestrian crossing on Cannon Street to the west of the new Station Entrance will be provided (in the event that no alternative arrangement emerges as a result of area-wide initiatives by the City of London Corporation and / or Transport for London). The provision of a safe, controlled crossing point would reduce the level of vulnerability of these pedestrians crossing Cannon Street.
- 6.4.22 Therefore, it is considered that this is likely to be a **positive impact** on health from traffic management and calming measures during operation.

Is the proposal well-connected to public transport, local services and facilities?*Construction*

- 6.4.23 The BSCU is inherently well-connected. Bank Station is served by five LUL lines and the DLR, and is within walking distance of a number of other stations and other public transport. Also, being in this part of the City of London, the Bank area itself has numerous local services and facilities.

- 6.4.24 The majority of the construction works will not have a significant effect, however during the temporary blockade Chapter 8: Transport and Movement of the ES states there is predicted to be increased crowding on the network, significantly on sections of the Northern Line (Charing Cross Branch) and Waterloo & City Line. There will also be significant temporary adverse effects from increased journey times to some passengers.
- 6.4.25 Journey disruption and overcrowding can contribute to elevated stress and blood pressure. Raised blood pressure can lead to Cardiovascular Disease (CVD) and CVD is an important health issue in the City of London and Greater London.
- 6.4.26 Therefore, it is considered that there is likely to be a short-term **negative impact** on health from disruptions to connections to public transport, local services and facilities due to the temporary blockade during construction.

Operation

- 6.4.27 The BSCU, once operational, will reduce journey times by creating a more effective interchange, and provide a more pleasant and less crowded experience. Reductions in journey duration, and improvements in predictability and convenience can lead to lower stress levels. In addition there will generally be quicker journey times between lines and safer accommodation on the platforms.
- 6.4.28 Therefore, it is considered that there is likely to be a **positive impact** on health from improving connections to public transport, local services and facilities due to the improved station infrastructure during operation.

Does the proposal allow people with mobility problems or a disability to access buildings and places?

Construction

- 6.4.29 Apart from the station, the BSCU does not affect access to other buildings and places except as already discussed and considered in the '*Does the proposal prioritise walking?*' and '*Is the proposal well-connected to public transport, local services and facilities?*' sections.
- 6.4.30 Measures will be included that ensure adequate access to buildings for disabled people and those with limited mobility.
- 6.4.31 Therefore, it is considered that there is likely to be a **neutral impact** on health from access to buildings and places during construction.

Operation

- 6.4.32 Currently, Bank Station only provides step-free access to and from the DLR (albeit by an indirect route). Therefore, by providing a step-free interchange

between Northern Line and DLR trains, and two new lifts to allow step-free access to Northern Line trains from the street, the BSCU will improve access for disabled people, older people and parents/carers travelling with babies and young children in pushchairs/buggies. Increased escalator capacity and moving walkways and a new Station Entrance and possible pedestrian crossing on Cannon Street will further enhance accessibility for all.

6.4.33 Therefore, it is considered that there is likely to be a **positive impact** on health from access to buildings and places during operation.

6.5 Crime Reduction and Community Safety

Does the proposal incorporate elements to help design out crime?

Construction

6.5.2 During construction, there is the potential for criminal activity on the BSCU Work Sites (such as theft). Standard security measures such as hoarding and lighting and, where necessary, Closed Circuit Television (CCTV), will be implemented.

6.5.3 Therefore, it is considered that there is likely to be a **neutral impact** on health from these elements.

Operation

6.5.4 The BSCU will provide:

- an enhanced layout - improved sight lines, less congestion, feeling of open space, reduction of blind corners and recesses;
- lighting – improved uniformity and colour rendering;
- CCTV – improvements to system and coverage;
- signage – improved consistency and clarity; and
- passenger emergency alarms – help points will be installed in all areas of the station rather than primarily station platforms.

6.5.5 All of these measures will serve to enhance the journey experience and reduce the anxiety/stress of travelling and commuting through increasing safety and reducing the opportunity for crime and the fear of crime (including acts of terrorism).

6.5.6 Therefore, it is considered that there is likely to be a **positive impact** on health from elements to help design out crime during operation.

6.5.7 Terrorism, and the risk of a terror attack have been considered with reference to a range of relevant legislation, policy, guidance and LUL standards, including

the *London Plan* (GLA, 2011) and the *Security in Design of Stations (SIDOS) Guide* (Department for Transport, 2012).

Has engagement and consultation been carried out with the local community?

- 6.5.8 There have been four main phases of consultation on the BSCU since 2011:
- Phase 1: Autumn 2011;
 - Phase 2: Spring 2012;
 - Phase 3: Autumn 2013; and.
 - Phase 4: Summer 2014.
- 6.5.9 The consultation process helped to result in a number of changes to the BSCU. For example, the advantages of acquiring the entire Whole Block Site rather than the original concept of just 10 King William Street were better understood, such as it would allow escalators as well as just lifts to be incorporated, and also highlighted the benefits of ensuring the new Station Entrance would be on Cannon Street rather than King William Street. In addition, the effectiveness and appropriateness of various mitigation measures was discussed with local community members.
- 6.5.10 The undertaking of consultation is not considered to have resulted in specific health impacts *per se* but rather contributed towards the improvement of the project design. However, those people who commented on the project design, and especially those who have had their feedback incorporated into the project design, are likely to have some increase in wellbeing through feeling included and listened to.
- 6.5.11 It is considered that there is likely to be a **neutral/positive impact** on health from local community engagement and consultation on those people who participated in the consultation.

6.6 Access to Work and Training

Does the proposal provide access to local employment and training opportunities, including temporary construction and permanent 'end-use' jobs?

Construction

- 6.6.2 A number of employment opportunities will be generated by the demolition and construction activities of the BSCU. Chapter 16: Socio-Economics of the ES predicts that there will be approximately 200 direct and indirect jobs created within Greater London. This has been assessed in the ES as a significant beneficial effect. People currently employed in the office and retail business at the Whole Block Site will be displaced, although it is considered that the

majority will not experience difficulty in finding alternative premises or employment.

- 6.6.3 From a health perspective, unemployment is associated with losses in well-being and increased morbidity and premature mortality. It is a significant, independent risk factor for both mental and physical illness, including coronary heart disease and depression.
- 6.6.4 Therefore, it is considered that there is likely to be a **positive impact** on health from access to local employment and training opportunities during construction for those who obtain employment.

Operation

- 6.6.5 The BSCU's overall employment generation has been assessed in Chapter 16: 'Socio-Economics' of the ES as not significant (net increase of six jobs). These are likely to be long term permanent jobs. There has also been an assessment of effects of the enhanced transport system on the wider economy. This concluded a significant positive effect through: reduced station closures and disruption; reduced journey times; and better access to the City of London for commuters which will support businesses and the London economy, particularly in terms of employment.
- 6.6.6 This may lead to increased self-esteem for some individuals, which could lead to a **positive impact** on health from access to local employment and training opportunities for those who obtain employment.

Does the proposal include opportunities for work for local people via local procurement arrangements?

Construction / Operation

- 6.6.7 LUL and Dragados will seek to secure contractors and suppliers to the project via 'responsible procurement' as is defined and set out in the GLA's *Delivering Responsible Procurement* programme (Greater London Authority, 2012b), which is designed to respond to relevant European and UK Government legislation and best practice. The Responsible Procurement requirements include requirements relating to local employment, training and apprenticeships. However, given that the proportion of the employment in the City of London and adjoining boroughs in the construction industry is fairly low compared to Greater London and England, it is likely that although impacts will be felt locally, they will be greater at a regional level.
- 6.6.8 Therefore, it is considered that there is likely to be a **positive impact** on health for local people (and those for Greater London) who are directly and indirectly involved in jobs supporting the construction.

6.7 Minimising the Use of Resources

Does the proposal make best use of existing land?

Construction / Operation

6.7.2 The nature of the BSCU is that it is largely below ground and remains within the same footprint of the existing buildings. This means that it inherently makes the best use of existing land. The built up nature of the local area and important design dependencies resulted in the need to construct the BSCU from two main works sites. The buildings on the Whole Block Site are considered to have limited architectural and heritage value, and their replacement with an Over Site Development (OSD) (not part of the BSCU) will result in a better use of existing land.

6.7.3 Therefore, it is considered that there is likely to be **neutral impact** on health from making best use of existing land.

Does the proposal encourage recycling (including building materials)?

Construction

6.7.4 The BSCU will be applying the principles of designing out waste during construction to:

- minimise resource use and construction waste;
- segregate construction and excavation materials; and
- use a suitable waste contractor to maximise diversion from landfill via reuse, recycling and recovery.

6.7.5 A target of 95 per cent recovery for beneficial reuse or recycling has been set for the approximate 200,000 tonnes of construction, excavation and demolition material anticipated to be generated. A large proportion of the waste from the BSCU will be from tunnel excavation comprising clean material. Waste materials will be transported off site for segregation, recycling or reprocessing and use at other sites.

6.7.6 'Green procurement' objectives will be defined and integrated into the procurement and specification process to use reused or recycled products and construction materials.

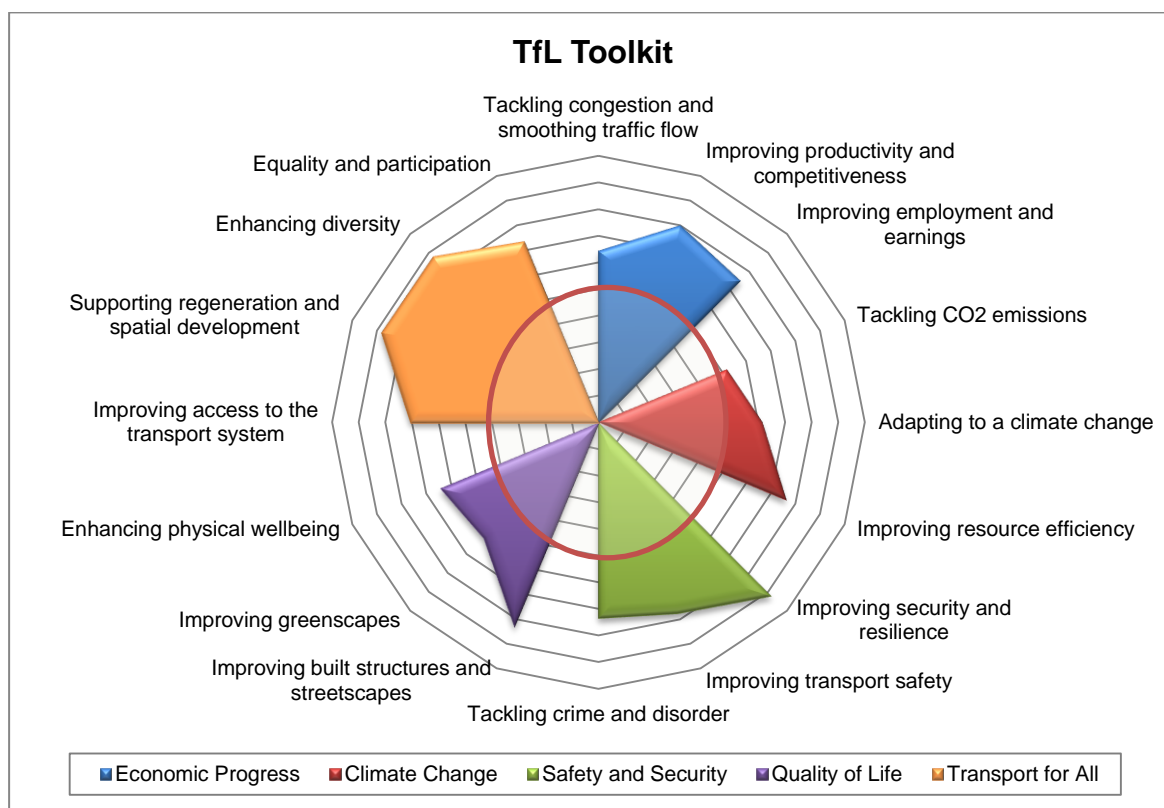
6.7.7 Therefore it is considered that there is likely to be a **positive impact** on health from encouraging recycling during construction, because less material will need to be transported (leading to less dust and vehicle emissions), and less will end up in landfill (which contributes towards loss of green space).

Operation

- 6.7.8 Recycling opportunities will be maximised through the use of dedicated waste management facilities for the collection of the station's operational-related recyclable waste streams, so that such waste can be diverted from landfill. The station design will include sufficient space for bin rooms to separate and store materials. A bin store will be located at street level within the new Station Entrance Hall, to house any waste collected from within the station. This will lead to good levels of hygiene and less litter (which can lead to fires and trip hazards).
- 6.7.9 Therefore it is considered that there is likely to be a **positive impact** on health from encouraging recycling during operation, particularly to those responsible for the BSCU waste management.

Does the proposal incorporate sustainable design and construction techniques?*Construction / Operation*

- 6.7.10 As described in the Sustainability Statement (Appendix A6.2 of the ES), the BSCU includes a range of sustainability measures to enhance and minimise impacts from the built environment. These include:
- selection of sustainable materials;
 - targeting a 95 per cent target of recovery for beneficial reuse or recycling;
 - minimising water consumption through the installation of water efficient sanitary ware; and
 - the use of natural ventilation.
- 6.7.11 The TfL Sustainability Toolkit assessment shows that the BSCU achieves a relatively balanced score across all categories (see Figure 6.1).

Figure 6.1: TfL Sustainability Toolkit assessment of the BSCU

6.7.12 A pre-assessment of an industry accepted method for assessing the sustainability performance of infrastructure projects, known as CEEQUAL has also been undertaken. The BSCU is predicted to achieve an 'Excellent Rating' on completion.

6.7.13 The BSCU includes a number of measures that have been identified as contributing towards 'enhanced physical well-being' which include smoother journeys and reduction in journey times (and consequently lower stress levels).

6.7.14 Therefore, it is considered that there is likely to be a **positive impact** on health from incorporating sustainable design and construction techniques during construction and operation.

6.8 Climate Change

Does the proposal incorporate renewable energy?

Construction / Operation

5.3.1 During construction, various energy saving measures will be adopted, including the relevant items from the Considerate Contractors Scheme (CCS) as the BSCU will be registered with the scheme. The Carbon Trust's recommendations listed within their *Action Plan to Reduce Carbon Emissions* (Carbon Trust, 2010) are also included.

- 6.8.2 The draft CoCP confirms that LUL will implement working methods that reduce energy consumption and aim to continually improve energy efficiency on site during the construction phase.
- 6.8.3 During operation, the BSCU includes a range of energy saving measures that if implemented could achieve a 23 per cent reduction on CO₂ over the baseline. A number of renewable energy technologies have been considered for the BSCU, although none of the assessed technologies were found feasible for installation as part of the BSCU. In addition, the Energy Statement will be revised through each design stage and will fulfil the role of the Carbon and Energy Efficiency Plan required by TfL's Pathway process (TfL's new project and programme methodology) to guide energy consumption and reduction.
- 6.8.4 Therefore, it is considered that there is likely to be a **neutral/positive impact** on health from incorporating energy saving features during construction and operation.

Does the proposal ensure that buildings and public spaces are designed to respond to winter and summer temperatures, i.e. ventilation, shading and landscaping?

Construction

- 6.8.5 It is not considered that there are any relevant elements or measures that are applicable, and this is expected to have a **neutral impact** on health.

Operation

- 6.8.6 The layout of the BSCU platforms and vertical circulation elements take into consideration the flow of passengers and capacity as well as the overall appearance of the station. Internal air quality and temperature is maximised through natural ventilation flow with mechanical assistance where required in order to maintain both comfort levels (as defined in Pedestrian Comfort Guidance for London (Transport for London, 2010) and ensure air flow and the internal environment meets key public and environmental health standards such as those set out in the TfL Vision and S1-352 Station Ambience Standard (Transport for London, 2007).
- 6.8.7 Heat gains will be mitigated by passive measures to prevent overheating, such as the efficient use of thermal mass and improved natural ventilation strategy.
- 6.8.8 It is likely that, given the impacts of climate change (particularly potentially hotter summers), that effective ventilation and the control of overcrowding will be particularly important in order to avoid the associated stress and health impacts (heat exhaustion). Babies, young children and the elderly are particularly vulnerable to both heat and cold related stress.

6.8.9 Therefore, it is considered that there is likely to be a **positive impact** on health from ensuring building and open spaces are designed to respond to winter and summer temperatures during operation.

6.9 Future Baseline and Cumulative Health Impacts

6.9.1 It has been concluded in Chapter 17: Inter-relationships and Cumulative Effects of the ES that the BSCU is unlikely to lead to significant cumulative environmental effects when considered alongside the other developments that are likely to take place in the area, with the exception of a significant benefit on townscape together with the replacement OSD building on the Whole Block Site.

6.9.2 The combination of transport improvements across London are designed to ensure, in part, that journeys are more comfortable for passengers in the future. Schemes such as the Northern Line Upgrade (NLU) and NLU2 will further improve access and journey times, and Crossrail which will decrease overcrowding across the network (particularly east-west links). Also, other stations being upgraded with step free access, cooling the tube programme, and new Cycle Superhighways and the Bank Area Enhancement Strategy which will encourage more active travel. There is also the potential for a greater use of these public transport infrastructure and associated modal shift from some car journeys.

6.9.3 The other developments listed in Chapter 17: Inter-relationships and Cumulative Effects are also likely to generate further local and Greater London wide jobs and be subject to good standards of sustainable design and construction.

6.9.4 Therefore, it is considered that there are likely to be **positive cumulative impacts** in the long-term from the BSCU.

7 Conclusions and next steps

- 7.1.1 The assessment has found that many of the health determinants included in the HUDU checklist were not relevant to the BSCU, and have been scoped out. For those determinants scoped in, the majority are considered to result in **neutral impacts** to health.
- 7.1.2 The analysis of the local population and those likely to use Bank Station has shown that their age profile is more of 'working age' than the London and National average. Due to the Bank area comprising a large working population, the levels of unemployment are also lower than the London and National average. As a result, the population is likely to be more resilient to changes in health determinants, and therefore this HIA has not identified any specific measures to target any particular age, ethnic or socio-economic group.
- 7.1.3 The small number of negative health impacts are predicted to occur during the construction period. These **negative impacts** are associated with air quality, noise, narrowing of footways around construction sites, and general reductions in neighbourhood amenity, and are typical for construction sites in London. These impacts can lead to stress and disturbance, and discourage people (particularly those with limited mobility) from walking. Also, during the period of the blockade (both total and partial) there will be increases in crowding and journey times for many passengers, which can lead to stress, although it will also lead to an increase in the number of people walking to and from their destinations.
- 7.1.4 On completion, the BSCU will largely have **positive impacts** on health (with the remaining impacts **neutral**) due to the enhanced environment delivered by the upgrade that improves accessibility for all, reduces travel stress, increases safety and better responds to the other negative aspects associated with travelling through Bank Station. There will also be health benefits through achieving a high sustainable design and construction rating, which includes efficiently managing and recycling waste, and reducing climate change impacts. The BSCU creates jobs during construction and helps to ensure jobs in the Bank area are more accessible to all, which leads to health benefits through aspects such as improved self-esteem and reduced levels of deprivation.
- 7.1.5 With regard to addressing health inequalities, some of the impacts predicted do have the potential to disproportionately affect sensitive receptors, particularly disabled people, older people and parents/carers travelling with babies and young children in pushchairs/buggies. During construction, the increased vehicular and pedestrian traffic on some local roads, together with the reduction in some footway widths, and disruption during the temporary blockade may negatively affect these groups to a greater degree.

- 7.1.6 However, once operational, the BSCU will introduce a new Station Entrance, step-free access to the Northern Line and DLR trains, new escalators and moving walkways, seating and help-points. This, coupled with the significant reductions in crowding at the station, will create greater positive effects for these groups.
- 7.1.7 With regards to the effect that the BSCU will have on some of the wider causes of health inequalities (e.g. housing and education) it is considered that this is likely to be neutral, although the provision of direct employment, and the improved access to employment as a result of the BSCU will help to alleviate poverty and therefore have a positive impact on health inequalities.

7.2 Further work, monitoring and mitigation proposals

- 7.2.1 Many of the potential causes of negative impacts to human health are also associated with negative impacts to the environment. As such, the implementation of mitigation measures proposed within the ES, and sustainable design and construction measures described in the Sustainability Statement will minimise and avoid the majority of health impacts. Similarly, many of the beneficial effects described in the ES also have positive effects on health, and these have been maximised through the optioneering and design process.
- 7.2.2 The HIA has helped to inform the following further work that is required in order to ensure the negative impacts are minimised and positive impacts are maximised:
- a new pedestrian crossing on Cannon Street to the west of the new Station Entrance will be provided in the event that no alternative arrangement emerges as a result of area-wide initiatives by the City of London Corporation and / or Transport for London. While a signal controlled crossing is assumed at this stage of the process (see Appendix 11B of Transport Assessment), the type of crossing will be developed at a later stage in discussion with the City of London Corporation;
 - a signage strategy will be developed as part of the TDM that encourages walking and cycling as alternative modes for transport during the blockade, and shows where alternative public transport services are available. The CLP and TMP will include measures to identify measures to protect pedestrians and cyclists on the affected roads;
 - within Bank Station during the construction works (and other stations where large passenger increases are expected as a result of the blockade), crowd management techniques will be agreed by the station managers to reduce accidents and anxiety; and

- pedestrian routes will be kept clear so that there is enough space for a large pushchair/buggy to go along easily, where parts of roads are used as pedestrian routes these will be fenced off from motor vehicle traffic, traffic speeds will be controlled where there is pedestrian and cycle traffic that is likely to be crossing or moving close to each other because of footpath or road narrowing.

7.2.3 The HIA has also helped to inform the following proposed monitoring measures:

- monitoring construction noise and vibration and air quality in accordance with the draft CoCP; and
- monitoring near misses (through observation) and collision levels through measures set out in the TMP in above ground areas identified in the Transport Assessment as experiencing overcrowding.

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Appendix A: London Plan Policy List

- Policy 2.13 - Opportunity areas and intensification areas
- Policy 2.18 - Green Infrastructure
- Policy 3.1 - Ensuring equal life chances for all
- Policy 3.2 - Improving health and addressing health inequalities
- Policy 3.6 – Children and young people’s play and informal recreation facilities
- Policy 3.9 - Mixed and balanced communities
- Policy 3.16 - Protection and enhancement of social infrastructure
- Policy 3.19 - Sports facilities
- Policy 4.12 - Improving opportunities for all
- Policy 5.1 - Climate change mitigation
- Policy 5.2 - Minimising carbon dioxide emissions
- Policy 5.3 - Sustainable design and construction
- Policy 5.5 - Decentralised energy networks
- Policy 5.5 - Decentralised energy in development proposals
- Policy 5.7 - Renewable energy
- Policy 5.9 - Overheating and cooling
- Policy 5.10 - Urban greening
- Policy 5.11 - Green roofs and development site environs
- Policy 5.12 - Flood risk management
- Policy 5.13 - Sustainable drainage
- Policy 5.21 - Contaminated land
- Policy 6.1 - Strategic approach
- Policy 6.2 - Providing public transport capacity and safeguarding land for transport
- Policy 6.4 - Enhancing London’s transport connectivity
- Policy 6.9 - Cycling
- Policy 6.10 - Walking
- Policy 6.13 - Parking

- Policy 7.1 - Building London's neighbourhoods and communities
- Policy 7.2 - An inclusive environment
- Policy 7.3 - Designing out crime
- Policy 7.4 - Local character
- Policy 7.5 - Public Realm
- Policy 7.6 - Architecture
- Policy 7.13 - Safety, security and resilience to emergency
- Policy 7.14 - Improving air quality
- Policy 7.15 - Reducing noise and enhancing soundscapes
- Policy 7.18 - Protecting local open space and addressing local deficiency

Appendix B: Evidence Base

B1.1 Introduction

B1.1.1 This appendix describes the way the specific direct and indirect influence categories considered in Section 6 of the HIA report can lead to health problems and benefits. It does not consider those aspects which have been scoped out.

B1.1.2 This information has been obtained from a review of some of the available literature. However, it is important to note that the detailed relationships between the environment, health and wellbeing are subject to an extensive and rapidly evolving literature base and therefore this assessment represents a 'snapshot' in time.

B1.2 Access to open space and nature

B1.2.1 The 2011 *Survey Of Attitudes Towards Walking In London* (Transport for London, 2011) revealed the following conclusions:

- almost half of Londoners (46 per cent) make a walking journey at least five times a week, and 85 per cent do so at least once a week;
- in general Londoners' frequency of walking has changed little over the past few years, despite saying they are walking more, or that they are open to doing so;
- women, young people and those living in inner London continue to be the groups most likely to make frequent walking journeys. Women also tend to be most likely to be open to walking more, for example by alighting from a bus a couple of stops early;
- the main reason Londoners say they make walking journeys is to gain the health and fitness benefits that it provides; however, the proportion saying that this motivates them to walk has been declining for the last two years and is now at 36 per cent, down from 55 per cent in 2009;
- of those making short regular journeys (to work, school or college, to get the groceries, or to take a child to school), at least half do so on foot (rising to 70 per cent for taking a child to school locally). However, fewer than half of those who live nearby, but do not currently walk, say they would be prepared to consider making the journey by foot (decreasing to 32 per cent for those making short trips for the groceries);
- when asked, Londoners agree that a variety of changes could make them walk more, with the single largest change being new or improved pleasure walking routes (74 per cent say this would encourage them to walk more).

Three quarters (73 per cent) also say that they would walk more if they knew that the journey would be quicker on foot than by an alternative mode; and

- women, Black and Minority Ethnic (BAME) Londoners and young people in London are generally more likely than other groups to agree that improvements to walking infrastructure would encourage them to walk more.

- B1.2.2 The physical characteristics of the built environment, and the degree to which they enable and promote positive health behaviours, all make a contribution to health. The Foresight Project highlighted *increasing walkability/cyclability of the built environment* as one of the top five policy responses assessed as having the greatest average impact on levels of obesity (Government Office for Science, 2007).
- B1.2.3 Health transport behaviour requires spaces that are safe, accessible and pleasant, with high quality pedestrian and cycling infrastructure. The 2010 *Marmot Review* highlighted that well designed, car free and pleasant streets encourage feelings of well-being, social interactions, and promote active travel (Marmot, 2010). People are more active when they can easily access key destinations, such as parks, workplaces and shops.
- B1.2.4 Mixed-use urban planning that combines shops, schools, healthcare services, residential streets and workplaces is considered most beneficial in terms of health. The likelihood of a pedestrian walking for non-work purposes increases proportionately to the level of street connectivity where they live (Frank et al, 2006). A 'walkable neighbourhood' is characterised by having a range of facilities which can be accessed comfortably on foot. The regeneration proposals are envisaged to create a walkable neighbourhood that readily will extend to the existing community.
- B1.2.5 Lack of pavement and protected areas for walking and cycling can contribute to increased collisions. Short duration traffic signals and wide streets also compromise the safety of less physically able pedestrians, for example frail older people or disabled people (WHO Regional Office for Europe, 2004). Other factors in the built environment that can discourage active travel include: a lack of quality lighting, lack of access to open spaces, rundown houses and neighbourhoods, poor aesthetics, and a lack of awareness about, as well as an overestimation of, the time needed to walk (or cycle) to destinations (WHO, 2006).
- B1.2.6 Increasing activity levels contribute to the prevention and management of over 20 conditions and diseases including coronary heart disease, diabetes and cancer, positive mental health and weight management (Department of Health,

2005) (Kahn, et al., 2002) (Foresight, 2007). The benefits of physical activity can be illustrated by the following statistics:

- moderate physical activity could reduce coronary heart disease by 10 per cent;
- moderately active individuals have a 20 per cent lower risk of stroke incidence or mortality;
- active individuals have a 20 per cent lower risks of type 2 diabetes;
- most active individuals have a 40-50 per cent lower risk of colon cancer;
- more active women have a 30 per cent lower risk of breast cancer; and
- being physically active reduces the risk of later hip fracture, due to osteoporosis, by up to 50 per cent (Department of Health, 2010).

- B1.2.7 Physical activity offers a substantial reduction in the risk of developing major chronic diseases such as coronary heart disease, stroke, type 2 diabetes and cancer, especially colon and breast cancer (Department of Health, 2004; Baumann, 2004). Regular physical activity may also help with weight control and obesity prevention. Muscle and bone strength may also benefit from regular physical activity; this can be of particular benefit for those at risk of falls and fractures, for example the elderly.
- B1.2.8 Well-planned, designed, managed and maintained streets, open spaces and buildings maximise opportunities for activity. Access for all to well-maintained, safe walking and cycling routes, leisure and sports facilities, playgrounds, parks and the countryside enable people to live more active lives.
- B1.2.9 The *Active People Survey* (Sport England, 2011) show that between April 2010 and April 2011, 58.9 per cent of adults in England do one or more occasion(s) of moderate physical activity (at least 30 minutes) per week and 21.5 per cent of adults do five or more occasions of physical activity per week; while 29.5 per cent reported doing no 30 minute occasions of physical activity per week excluding occupational activity or work in the home.
- B1.2.10 There is significant potential for promoting 'active travel', particularly given that 66 per cent of all trips are under 5 miles, with 20 per cent under one mile (Department for Transport, 2013). Promoting walking and cycling as viable alternatives to car use for such journeys could have substantial benefits – not only for promoting healthy weight, but also for climate change, congestion and the wider environment.
- B1.2.11 The connectivity of streets (Frank, Sallis, Conway, Chapman, Saelens, & Bachman, 2006) (Heath, Brownson, Kruger, Miles, Powell, & Ramsey, 2006) and trails (Suminski, Poston, Petosa, Stevens, & Katzenmoyer, 2005) is important for pedestrians and cyclists. Studies reinforce the idea that if it is

easy to walk or cycle then people are more likely to do so (Saelens, Sallis, Black, & Chen, 2003).

- B1.2.12 Distance to, number of and types of amenities within walking and cycling distance from home are important in influencing the amount of physical activity (Krizek & Johnson, 2006) (Hoehner, Ramirez, Brennan, Michael, Handy, & Brownson, 2005) (Moudon, et al., 2006).
- B1.2.13 With employment opportunities being for increasingly sedentary jobs and reliance on motorised transport, leisure-time physical activity is important in meeting the recommended levels of physical activity (Bedimo-Rung, Mowen, & Cohen, 2005).

B1.3 Air Quality, Noise and Neighbourhood Amenity

Health Effects of Poor Air Quality

- B1.3.1 Health-based guidelines and objectives defined in legislation and guidance establish the basis for assessing and managing air pollution. Such guidelines and objectives are based on epidemiological studies on populations. This is an association between exposure to increased concentrations of particulate matter (PM) and increased mortality, increased hospital admissions, as well as a range of other symptoms such as asthma attacks. These effects appear to have no lower threshold concentration (Greater London Authority, 2010).
- B1.3.2 Road transport is the dominant source of PM₁₀ emissions within central London, contributing approximately 79 per cent in 2008; 80 per cent in 2011; and a predicted 75 per cent in 2015 (Greater London Authority, 2010). UK road transport is responsible for more than 30 per cent of the emissions of primary particles measured as PM_{2.5}, and about 50 per cent of the very small (ultrafine) particles (PM_{0.1} (less than 0.1 microns in diameter)) (Air Quality Expert Group, 2005). These particles are believed to play a significant role in causing adverse health effects.
- B1.3.3 Emissions from road transport dominate Greater London's emissions of nitrogen oxides (NO_x) emissions in 2008 (contributing 46 per cent) and predicted to contribute approximately 30 per cent by 2015, based on existing forecasts of changes to vehicle exhaust emissions and fleet. NO_x is a precursor of ozone (O₃), which irritates the respiratory system and damages the lungs when inhaled. It is particularly dangerous for people suffering from respiratory conditions such as asthma.
- B1.3.4 Although it has long been accepted that air pollution episodes lead to increased mortality and morbidity, 'normal' levels of outdoor air pollution may also rise to result in increases in:
- premature deaths from cardiorespiratory causes;

- respiratory hospital admissions;
- exacerbations of pre-existing asthma;
- respiratory symptoms; and
- reductions in lung function (Dockery & Pope, 1994).

- B1.3.5 In Europe, a rise of $10\mu\text{g}\cdot\text{m}^{-3}$ of PM_{10} is estimated to increase the number of daily deaths by 0.6 per cent, with an estimated 0.3 per cent increase in daily death per $10\mu\text{g}\cdot\text{m}^{-3}$ of O_3 (WHO, 2004). These are small increases in daily deaths and those at greatest risk are individuals whose health is already impaired, in particular those with existing cardiorespiratory disease. However, adverse consequences can currently result from long term exposure to outdoor air pollution, especially to ambient PM, at 'normal' levels (Health Scotland, 2007).
- B1.3.6 It is estimated that overall there is a 6 per cent change in mortality per $10\mu\text{g}\cdot\text{m}^{-3}$ change in annual average $\text{PM}_{2.5}$ (Committee on the Medical Effects of Air Pollutants, 2006) equivalent to a reduction in life expectancy of about 220 days per person, for every $10\mu\text{g}\cdot\text{m}^{-3}$ increase in $\text{PM}_{2.5}$. This compares to an estimated reduction in life expectancy of less than 90 days attributable to passive smoking (Miller & Hurley, 2006).
- B1.3.7 Asthma is a common chronic illness in childhood with asthma morbidity and mortality being closely related to both indoor and outdoor air quality. Outdoor air pollutants that can exacerbate asthma include pollen, mould, and pollutants such as nitrogen dioxide, ozone, and diesel exhaust particles (Pandya, et al., 2002) (American Academy of Pediatrics, 2004). Note that although higher air pollution may worsen the symptoms of pre-existing asthma, it has not been established that air pollution initiates the disease (Committee on the Medical Effects of Air Pollutants, 1995).
- B1.3.8 Exposure to air pollution for children is of particular concern because their immune system and lungs are not fully developed, and different responses are possible to those seen in adults (Schwartz, 2004). This is exacerbated as children spend more time outside, where the concentrations of air pollution are generally higher. Recent studies have suggested that air pollution, particularly traffic-related pollution, is associated with infant mortality and the development of asthma and atopy (Schwartz, 2004). Other studies have associated particulate air pollution with acute bronchitis in children and demonstrated that rates of bronchitis and chronic cough declined in areas where particle concentrations have fallen (Schwartz, 2004).

Air Quality on the Underground Rail Network

- B1.3.9 Mass concentrations of PM (e.g. PM₁₀ or PM_{2.5}) in underground railways are typically much higher than ambient background levels in cities. The dust in underground railways is principally due to abrasion between wheels and rails, whereas general ambient PM is primarily from combustion, especially traffic. Underground dust is consequently much coarser than ambient particulate pollution, and has a different composition. Seaton et al concluded that there were some risks to health from pollution both above and below ground, but that the differences were not big enough that they should influence individuals' choice of mode of transport (Seaton et al, 2005).
- B1.3.10 As users of the London Underground Network experience crowded confined spaces, concern has been expressed as to whether exposure to particulate matter on underground rail systems represents a risk to health (British Lung Federation, 2003). However, LUL undertake regular monitoring of the air quality throughout the London Underground Network in order to comply with stringent occupational health levels. It is considered that if air quality is within safe levels for employees who may spend their whole shifts in this environment, it will cause little or no health effects to passengers who would spend far less time there.
- B1.3.11 Research conducted between 2005 and 2008, suggests that while there are elevated levels of particulate matter on underground rail systems, these are within acceptable levels for health (Grass, Ross et al, 2005) (Ripanucci, et al., 2006) (Bigert, et al., 2008).

Noise and Vibration

- B1.3.12 Research has shown how annoyance is related to noise exposure from road, rail or air traffic, each with its own annoyance curve (Highways Agency, 2011).
- B1.3.13 The health outcomes of elevated sound levels are reported as:
- hearing loss or degradation: Guidelines developed by the WHO state that a lifetime of regular exposure to 70dBA could produce negligible hearing loss (Berglund, et al., 1999);
 - cardiovascular disease: Studies indicate potential links between ischemic heart disease, a commonly occurring type of heart disease, and long-term exposure to high levels of road traffic noise (Babisch, 2006). While these relative risks are low, the ubiquity of noise and prevalence of ischemic heart disease make it a potentially important public health issue;
 - communication interference: Older adults, those with hearing impairments, and those not familiar with the spoken language or in the process of

learning are particularly vulnerable to speech interference effects (Watkiss, et al., 2000); and

- sleep disturbance: It is difficult to correlate increasing aggregate noise exposures to sleep disturbance as individuals can become accustomed to noise levels. The long-term health effects from sleep disturbance, however, may result in lowered performance and physiological effects.

B1.3.14 While the focus of noise assessments is upon the general population, particularly vulnerable groups including those with decreased personal abilities (old, ill, or depressed people), people with particular diseases or medical problems, people dealing with complex cognitive tasks, such as reading acquisition, people who are blind or who have hearing impairment, and foetuses, babies and young children. These people may be less able to cope with the impacts of noise exposure and be at greater risk for harmful effects.

B1.3.15 Laboratory experiments have shown that habituation to night-time noise events occurs, and that noise-induced awakening decreases with increasing number of sound exposures per night (WHO, 1999). The WHO report observed that special attention should also be given to the following considerations:

- noise sources in an environment with a low background noise level. For example, night-traffic in rural or suburban residential areas;
- environments where a combination of noise and vibrations are produced. For example, railway noise and heavy duty vehicles; and
- sources with low-frequency components. Disturbances may occur even though the sound is below 30dBA.

B1.3.16 The WHO (WHO, 2007) reported the following conclusions:

- disturbed sleep is associated with several adverse impacts on health;
- biological effects of noise during sleep cause an increase in heart rate, sleep stage changes, hormone level changes and awakening;
- night noise exposure causes self-reported sleep disturbance, increase in medicine use, increase in body movements and (environmental) insomnia;
- while noise-induced sleep disturbance is viewed as a health problem in itself (insomnia), it also leads to further consequences for health and well-being;
- disturbed sleep causes fatigue, accidents and reduced performance; and

- noise at night may cause clinical conditions such as cardiovascular illness, depression and other mental illness.

B1.3.17 In addition to noise impacts, vibration can also have an effect on those subjected to it. For example, underground trains may cause groundborne vibration as well as low frequency noise. Although it has been identified that such vibration is unlikely to risk buildings' structural integrity, it may cause anxiety and annoyance when it can be felt.

Accessibility and Active Travel

B1.3.18 Reducing travel time may increase the number of destinations reachable for an affected population, for example the number of retail areas, health facilities, recreational facilities, or other destinations within the target travel time represents another measure of access.

B1.3.19 Transport users are exposed to sources of stress such as overcrowding and delays on trains and in traffic jams. Commuting by car and train has been linked to elevated stress and blood pressure (Health Scotland, 2007).

B1.3.20 Regular exposure to road traffic congestion impairs health, psychological adjustment, work performance and overall satisfaction with life. Congestion also constrains movement, which increases blood pressure and frustration tolerance. This phenomenon not only reduces the well-being of those experiencing it, but can also lead to aggressive behaviour and an increased likelihood of involvement in a crash (Wener R. E., 2003).

B1.3.21 It is difficult to compare different commuters and different stress levels due to the multiple influences on stress, in particular with job-related stress linked to commuting (Health Scotland, 2007). Journey duration, predictability and convenience appear to be linked with lower stress levels (Wener, et al., 2005) (Transport Research Planning Group, 2003).

B1.3.22 Guidance from the National Institute for Health Care Excellence on physical activity (National Institute for Clinical Excellence, 2008) recommends the following measures:

- new developments prioritise the need for people to be physically active as a routine part of their daily life;
- pedestrians, cyclists and users of other modes of transport that involve physical activity are given the highest priority when developing or maintaining roads;
- public open spaces and public paths can be reached on foot or by bicycle, and are maintained to a high standard; and

- during building design or refurbishment, staircases are designed and positioned to encourage use, and are clearly signposted.

B1.3.23 Access to public transport encourages walking and cycling, and is associated with increased levels physical activity. Conventional theory is that individuals will walk 0.5 miles to rail and 0.25 miles to bus. However, recent evidence demonstrated that pedestrians are prepared to travel more than 0.5 mile if an accommodating atmosphere prevails (Canepa, 2007).

B1.4 Crime Reduction and Community Safety

B1.4.1 Personal safety fears and fear of crime may deter people from walking, cycling or using public transport. Perceptions of safety can affect people's decisions on transport mode selection. Streets dominated by vehicles with few people on the streets, may create a social environment that is conducive to increased crime, which then discourages more people from walking. This is particularly true for women and children (Loukaitou-Sideris, 2006). It has been argued that the greatest contribution to safe, comfortable walking is to encourage more people to walk (Health Development Agency, 2005).

B1.4.2 Lack of pavement and protected areas for walking and cycling can contribute to increased collisions. Short duration traffic signals and wide streets also compromise the safety of less physically able pedestrians, for example frail older people or disabled people (WHO Regional Office for Europe, 2004). Other factors in the built environment that can discourage active travel include: a lack of quality lighting, lack of access to open spaces, rundown houses and neighbourhoods, poor aesthetics, and a lack of awareness about, as well as an overestimation of, the time needed to walk (or cycle) to destinations (WHO, 2006).

B1.4.3 Neighbourhood disorder and fragmentation are associated with higher rates of violence, whilst cohesive social organisation protects against risk, stress and physical illness (McCulloch, 2003) (Fitzpatrick & LaGory, 2000). The burden of injuries and violence in the UK is not equally distributed across the population, and those from lower socio-economic groups are disproportionately affected (Bambra, et al., 2009).

B1.4.4 In terms of safety, older people are more at risk of falling due to:

- buses starting before they are seated or parking away from the kerb;
- uneven pavements; or
- being knocked down in a road collision or by a bicycle on the pavement, due to difficulties with sight, hearing or mobility.

- B1.4.5 Older people are often more seriously injured than a younger person would be in the same circumstances, due to the complicating health factors relating to their age.
- B1.4.6 Efforts within regeneration or new developments can be considered as contributing to discouraging crime. For example, well lit streets and no hidden doorways will make it more difficult for crimes to be committed.
- B1.4.7 Fear of crime emerges repeatedly in passenger surveys as being an important factor that influences travel choices. On the whole, women's fear is greater than men's, and women are more likely to avoid using public transport as a result (Department for Transport, 2001).
- B1.4.8 Research has shown that many modes of transport are considered problematic for women after dark (including buses, trains and walking) and many interchanges (bus/railway stations, bus stops and car parks) are considered unsafe. Aspects such as poor lighting, lack of visibility, lack of cleanliness, vandalism and poor maintenance can all have an impact on women's perceptions of safety. These issues are also relevant to other groups vulnerable to hate crime.

B1.5 Access to Work and Training

- B1.5.1 Being in work is important to public health, not just for material reasons. Research shows that the 'psychosocial' pathways of relative deprivation such as control, mastery, insecurity, anxiety, and social isolation remain largely unacknowledged and untouched by economic and social policy interventions. Policy interventions aimed at addressing economic issues can therefore have a positive (or negative) impact on health, for reasons beyond actual pay (Core Cities Group, 2012).
- B1.5.2 Providing work opportunities for unemployed and workless people primarily requires more jobs, although this alone is not enough. Individuals who have been out of the labour market for a significant amount of time may have complex barriers to work (poor health, low confidence and skills levels) and, as such, they need to be equipped with the support and skills to access job opportunities.
- B1.5.3 There is a strong link between being in paid work and subjective well-being (Bryson, 2011). Those who become unemployed have been shown to experience considerable losses in well-being, and in parallel fashion employment insecurity also threatens well-being. Those who feel that their job is insecure, especially insecure workers who feel that they would not find it easy to obtain another good job, express losses in wellbeing that are sometimes comparable in magnitude to those who have become unemployed (Green, 2011).

- B1.5.4 In times of economic recession, with rising unemployment especially among young people and those who are most affected by the risk of job loss, their well-being may also be at greater risk. Unemployment is also associated with increased morbidity and premature mortality. It is a significant, independent risk factor for both mental and physical illness, including coronary heart disease and depression. It is also associated with increased prevalence of smoking (Husband & Chan, 2008).
- B1.5.5 The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) was developed to judge the mental well-being (Tennant, et al., 2007) of communities. Research for the Health Survey for England showed that the WEMWBS scores of those in low security jobs were close to those for unemployed workers. This finding helps to set in context why recessions can resonate beyond just those who lose their jobs. A climate of fear brought on by an adverse economic situation can have far-reaching effects on subjective well-being.
- B1.5.6 Research into the current and future public health and primary healthcare needs of workers in the City found that 18.5 per cent of all workers report suffering from stress for several months of the year (Public Health Action Support Team, 2012). The greatest demand for additional services was for support with stress, anxiety and depression. Business stakeholder interviews reported stress due to the nature of their work and the number of hours worked each week as a major reason for absence from work. The research stated that *interventions that address stress and anxiety, substance misuse and smoking may help to tackle health issues before they escalate and cause longer-term harm.*
- B1.5.7 The bus is a key transport mode for people living on lower household incomes. Compared to 61 per cent of all Londoners using the bus at least once a week, 69 per cent of people with household incomes <£20,000 do so (and this rises to 73 per cent amongst the lowest household income bracket of <£5,000).
- B1.5.8 Londoners with lower household incomes are less likely to use the car (both as a driver and passenger), train, bicycle, and London Underground than all Londoners.
- B1.5.9 People with low household incomes are less likely to use Oyster pay as you go to travel and instead higher proportions use Freedom Passes to get around London (this is a result of disabled and older Londoners being more likely to have low household incomes). A lower proportion (43 per cent) of those with a household income of <£20,000 have an Oyster card (compared to 54 per cent of all Londoners), though this is counterbalanced by a higher proportion (35 per cent) possessing a pass or card which entitles them to free travel or reduced fares (compared to 26 per cent of all Londoners).

- B1.5.10 Londoners in lower household income brackets tend to be less engaged with cycling as a mode of transport. 13 per cent of Londoners sometimes use a bike to get around London in the summer – this declines to 9 per cent amongst Londoners in the lowest social grades (D (Semi and unskilled manual workers) and E (State pensioners, casual or lowest grade workers, unemployed with state benefits only) households).
- B1.5.11 Awareness of the Barclays Cycle Hire scheme is lower amongst DE households compared to all Londoners, and the user profile of both these schemes is skewed towards those with higher household incomes (Transport for London, 2012).

B1.6 Minimising the Use of Resources

- B1.6.1 Some waste can be hazardous to health, particularly where it is produced and stored in large quantities, or where it is toxic and has pathways between the source and human receptor.
- B1.6.2 Municipal solid waste comprises of discarded solids and liquids that serves as a breeding ground for bacteria and fungi. Individuals involved in the collection, transport, transfer and management of this waste may be exposed to elevated concentrations of biological aerosols and microbial pathogens. Based on the nature of the work environment and the knowledge of bioaerosol related health effects in other occupations, the handling of municipal solid waste can be expected to result in adverse health outcomes. The existing body of research suggests that there is an association between handling of municipal solid waste and various respiratory, dermatologic and gastrointestinal health effects (Perez, et al, 2006).
- B1.6.3 Ten pollutants considered to have the greatest potential impact on human health based on environmental persistence, bioaccumulation and amount emitted and/or on inherent toxicity were cadmium, mercury, arsenic, chromium, nickel, dioxins, PCBs, PAHs, PM10 and SO₂. Dust and the production of particulate matter are produced in landfill, incineration and composting processes and by road traffic involved in all waste management options (Rushton, 2003).
- B1.6.4 Furthermore, the production of materials can result in the pollution of natural systems and lead to ecological impacts. Efficient reuse of previously developed land as well as reusing and recycling materials can lead to an overall improvement to the environment at all scales, which is good for health in direct and indirect ways (Healthy Urban Development Unit, 2005).

B1.7 Climate Change

- B1.7.1 Climate change has the potential to affect health, particularly as a result of heat, extreme weather events and flooding. The symptoms of heat exhaustion include headaches, dizziness, nausea and vomiting, muscle weakness or cramps, pale skin, and a high temperature. Heat-related illnesses such as heatstroke and dehydration can cause damage to the brain and other vital organs. Extreme heat can also exacerbate the impact of air pollution on respiratory and cardiovascular health.
- B1.7.2 The people expected to be most vulnerable to climate change (Chalmers, 2009) those who are:
- poorly housed or not mobile;
 - living in places at risk (e.g. flood zones, coast); or
 - socially isolated or otherwise unable to adapt to change.
- B1.7.3 Heat can affect anyone; however, some people run a greater risk of serious harm. Babies, young children and the elderly are particularly vulnerable to both heat and cold related stress. People taking diuretic drugs or suffering from dementia; heart disease or respiratory ailments; some neurological conditions and different types of diabetes are also particularly sensitive to temperature extremes (Defra, 2012).
- B1.7.4 People in lower socio-economic groups are at risk from extreme heat partly because they tend to have higher levels of long-term ill-health. Environmental factors such as poor quality housing and lack of access to green space can also increase the problem. Similarly, the potential adverse consequences of flooding are greater for those on lower incomes, many of whom do not have insurance.
- B1.7.5 The *UK Climate Change Risk Assessment* (Defra, 2012) identifies lower winter mortality rates as a benefit and four potential threats to public health as follows:
- heat-related death and illness in summer;
 - marine and freshwater pathogens;
 - health problems due to air pollution; and
 - the many health impacts of flooding.
- B1.7.6 Research shows that by the time a heatwave starts, the window of opportunity for effective action is very short indeed, and therefore advanced planning and preparedness is essential.
- B1.7.7 The number of deaths and injuries directly caused by extreme weather event flooding and storms in the UK is relatively small, but there is emerging evidence

of a substantial impact on mental health. The most significant health risks posed by extreme weather events are expected to be due to flooding (Defra, 2012). Spring floods due to snow melt are expected to become less frequent, while autumn and winter flooding due to intense precipitation becomes more frequent. Floods are associated with increased incidence of skin and ear infections, gastrointestinal infections and traumatic injuries.

- B1.7.8 In hotter temperatures, dehydration and heatstroke increases morbidity and mortality in people with diabetes. People with diabetes are predisposed to cardiovascular events during heat waves and higher mortality from heart attack on days of high air pollution (International Diabetes Federation, 2012).
- B1.7.9 The Heat-Health Watch system comprises four main levels (Levels 1-4). Levels 1-3 are, based on threshold day and night-time temperatures as defined by the Met Office. These vary from region to region, but the average threshold temperature is 30°C during the day and 15°C overnight (Department of Health, 2012).
- B1.7.10 The levels are:
- Level 1: Heatwave and Summer preparedness and long-term planning;
 - Level 2: Alert and readiness, triggered as soon as the Met Office forecasts that there is a 60 per cent chance of temperatures being high enough on at least two consecutive days to have significant effects on health. This will normally occur 2–3 days before the event is expected;
 - Level 3: Heatwave action, triggered as soon as the Met Office confirms that threshold temperatures have been reached in any one National Severe Weather Warning Service (NSWWS) region or more. This stage requires specific actions targeted at high-risk groups; and
 - Level 4: National Emergency, this is reached when a heatwave is so severe and/or prolonged that its effects extend outside health and social care, such as power or water shortages, and/or where the integrity of health and social care systems is threatened. At this level, illness and death may occur among the fit and healthy, and not just in high-risk groups, and will require a multi-sector response at national and regional levels.
- B1.7.11 The threshold temperature for the London National Severe Weather Warning Service region is 32°C during the day and 18°C at night.

B1.8 Disease

- B1.8.1 Research suggests that those who used public transport occasionally were at a greater risk for developing an acute respiratory infection (ARI) than those who do not. The relationship between public transport use and acquisition of ARI is

not well understood but potentially important during epidemics and pandemics (Troko, 2011).

- B1.8.2 However, regular passengers could potentially have enhanced immunity, as they are more frequently exposed to viruses and other microbes, and build up antibodies. They may also be more aware of risks and, therefore, take more precautions to protect themselves.
- B1.8.3 Given a novel virus, against which there is lower background population immunity, the attenuating effect of regular public transport use would be diminished and the individual risk might be driven more by recent use of public transport and less by habitual patterns of usage. Thus the same protective effect of regular bus and tram use may not be present.
- B1.8.4 The findings support current public advice to exercise good respiratory hygiene and existing pandemic guidance which suggests that individuals refrain from making unnecessary journeys by public transport when exhibiting symptoms of ARI. The findings do not support the effectiveness of suspending mass urban transport systems as a pandemic countermeasure aimed at reducing or slowing population spread as, whatever the relevance of public transport is to individual-level risk, household exposure most likely poses a greater threat.

Appendix C: HIA consultation organisations and Scoping Report

The following bodies were consulted on the HIA Scoping Report.

Name	Title	Borough	Address
Dr Penny Bevan	Director of Public Health City and Hackney	City of London	Hackney Service Centre 1 Hillman Street London E8 1DY
Beverley Bush	Principal Planner	City of London	City of London Corporation Built Environment Department PO BOX 270 Guildhall LONDON EC2P 2EJ
Dr Somen Banerjee	Director of Public Health, London Borough Tower Hamlets	Tower Hamlets	Tower Hamlets Council Town Hall Mulberry Place 5 Clove Crescent E14 2BG
Michael Brannan	Health Improvement Manager	PHE	Public Health England London Regional Office, 151 Buckingham Palace Road, London SW1W 9SZ
Malcolm Souch	Project Director NHS London Healthy Urban Development Unit	HUDU	Aneurin Bevan House, 81 Commercial Road, London, E1 1RD
Lucy Saunders	Consultant in Public Health	GLA	City Hall The Queen's Walk London SE1 2AA

One response was received, from the HUDU, which confirmed support for the method of assessment to be adopted.

Appendix D: Community Profiles

D1.1 Introduction

- D1.1.1 To understand the potential for health impacts, it is important to understand the health status of and key social determinants influencing existing communities likely to be affected by a project. This section focuses on a number of health determinants in the areas most likely to be affected by the BSCU: the City of London LSOA 001F, within which the BSCU is located and the City of London, the borough with the most residents using Bank Station; compared to London and England as a whole. These include consideration of: age, ethnic background, unemployment, education, levels of deprivation, general levels of health and disability and overall life expectancy.
- D1.1.2 Public Health England produce annual Health Profiles that draw together information for 32 indicators to present a picture of health in Local Authorities, in order to help understand the needs of the community and to improve people's health and reduce health inequalities. Normally this would be the basis for understanding the baseline health of the community profiles identified within the assessment; however due to the small resident population of the City of London, Public Health England has not produced a Health Profile for the City of London. Instead, alternative local health indicators to those in the Health Profiles are used, using data from Public Health England (see Table D1 below). This data is sourced (where possible) across the LSOA, City of London and Greater London scales to allow a like-for-like comparison.

D1.2 Physical Environment

- D1.2.1 The existing physical environment in the area (such as noise and air quality conditions) is described in the relevant chapters of the ES.
- D1.2.2 At all monitoring locations and during all monitoring periods, existing road traffic noise was noted as the dominant contributor to overall measured levels of noise.
- D1.2.3 In terms of air quality, measured annual mean Nitrogen Dioxide (NO₂) concentrations are above the national air quality objective at all locations monitored and for all of the considered years, except for at Speed House (Barbican Centre) between 2010-12. The 1 hour NO₂ objective is also regularly exceeded at locations near to the City of London's busy roads.
- D1.2.4 Measured annual mean concentrations of particulate matter (PM₁₀) are below the national air quality objective value at all monitoring stations; however, they are at risk of exceeding the objective value at the location on Upper Thames Street, which is in close proximity to the Arthur Street Work Site.

- D1.2.5 In terms of dust, receptors currently experience dust deposition at a rate that is determined by the contributions of local and distant sources. This baseline rate of soiling is considered normal and varies dependent on prevailing climatic conditions. In the case of the BSCU, the potential for contamination from dust is low for adjacent site users and residential receptors.
- D1.2.6 Due to the nature of the BSCU and the historically urban/commercial environment, the likelihood of soil contamination is low, and any potentially contaminated soil would be expected to be restricted to shallow depths and removed during excavation and tunnelling works. It is likely that basement construction at the Whole Block Site would have removed much of the contamination associated with the importation of Made Ground.
- D1.2.7 Potentially contaminated soil encountered during construction works will be segregated, treated and reused off-site or alternatively disposed of to landfill and no mitigation beyond this is expected to be required.
- D1.2.8 Low level groundwater contamination has been found on-site; however given the urban nature of central London combined with the vulnerability of the aquifer to pollution is such that the shallow aquifer is generally unsuitable for potable water supply abstractions.
- D1.2.9 The BSCU takes place in an area of open space deficiency. There is little public open space in the vicinity; the most notable of which is Abchurch Yard, a small area of hardstanding off of Abchurch Lane outside St Mary Abchurch.

D1.3 Overview of Health Indicators and Demographics

- D1.3.1 An overview of Health Indicators and Demographics is shown below in Table D1. Looking at the data, it can be seen that there are clear differences between the City of London, London and England in terms of deprivation, ethnicity, employment and age structure with the City of London performing better against almost all of the indicators. This demonstrates the notable inequalities experienced between the City of London, London and England.
- D1.3.2 In terms of ethnic diversity, the City of London is less diverse than the London average but more diverse than England:
- in the City of London, 12.7 per cent of the population is classified as Asian and 2.6 per cent as Black;
 - in London, 18.4 per cent of the population is classified as Asian and 13.3 per cent as Black.
 - in England, 7.7 per cent of the population is classified as Asian and 3.4 per cent as Black.

Table D1: Health Indicators for the City of London, London and England
(Source: Public Health England)

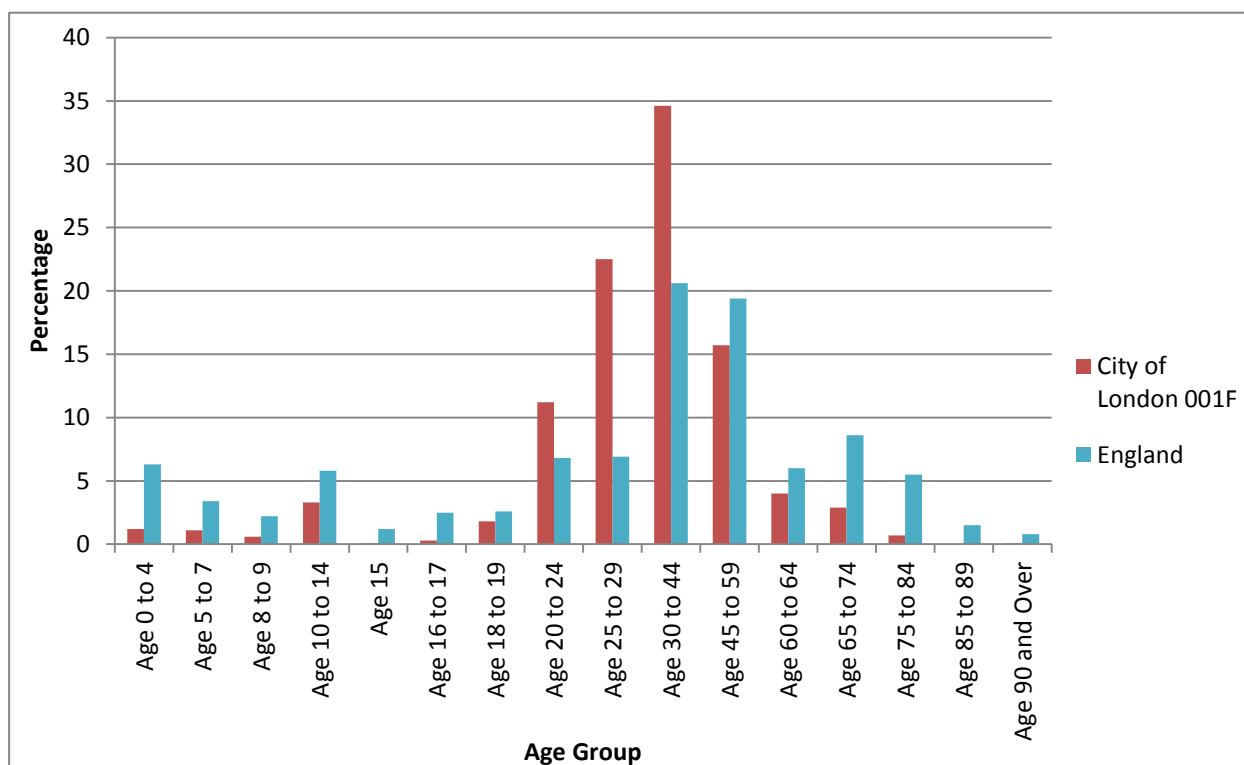
Indicator (all ages unless otherwise stated)	City of London	London	England
Population aged 0-15 years (%)	8.3	19.9	18.9
Population aged 16-24 years (%)	9.5	12.2	11.8
Population aged 25-64 years (%)	68.0	56.8	52.9
Population aged 65-84 years (%)	12.6	11.1	14.2
Population aged 85+ years (%)	1.6	1.5	2.2
Black Asian and Minority Ethnic (BAME) Population (%)	21.4	40.2	14.6
Non White UK Population (%)	42.5	55.1	20.2
Proficiency in English of people whose main language is not English (%)	1.4	4.1	1.7
Income Deprivation (%)	5.2	18.9	14.7
Child Poverty (%)	13.3	32.2	21.8
Older People in Deprivation (%)	9.9	23.8	18.1
Low Birth Weight Births (%)	4.2	7.9	7.4
Child Development at age 5 (%)	57.7	59.5	58.8
GCSE Achievement (5A*-C including English and Maths) (%)	54.5	62.1	58.2
Unemployment (%)	1.4	4.0	3.6
Long Term Unemployment (Rate/1,000 working age population)	3.3	6.7	6.0
General Health - bad or very bad (%)	3.3	5.0	5.5
Limiting long term illness or disability (%)	11.5	14.2	17.6
Provision of 1 hour or more unpaid care per week (%)	7.8	8.4	10.2
Provision of 50 hours or more unpaid care per week (%)	0.9	1.8	2.4
Households with central heating (%)	95.7	97.2	97.3
Overcrowding (%)	50.8	21.7	8.7
Life expectancy at birth for males	83.6	78.6	78.3
Life expectancy at birth for females	83.4	83.1	82.3

D1.3.3 Population forecasts taken from the *Office for National Statistics (ONS) Interim 2011-based subnational population projections for England* (ONS, 2012) shows that the population of the City of London is due to increase by 62 per cent in the period 2011 to 2021; and London by 14 per cent. This is in contrast to the England projection of 9 per cent.

D1.4 City of London LSOA 001F

D1.4.1 The population age profile of LSOA 001F is shown in Figure D4. This shows that the LSOA has a significantly greater 'working age' population; particularly between ages 20 and 44; than the national average; with far fewer children and older people.

Figure D1: City of London LSOA 001F Age Profile (Source: 2011 Census, (ONS, 2012))

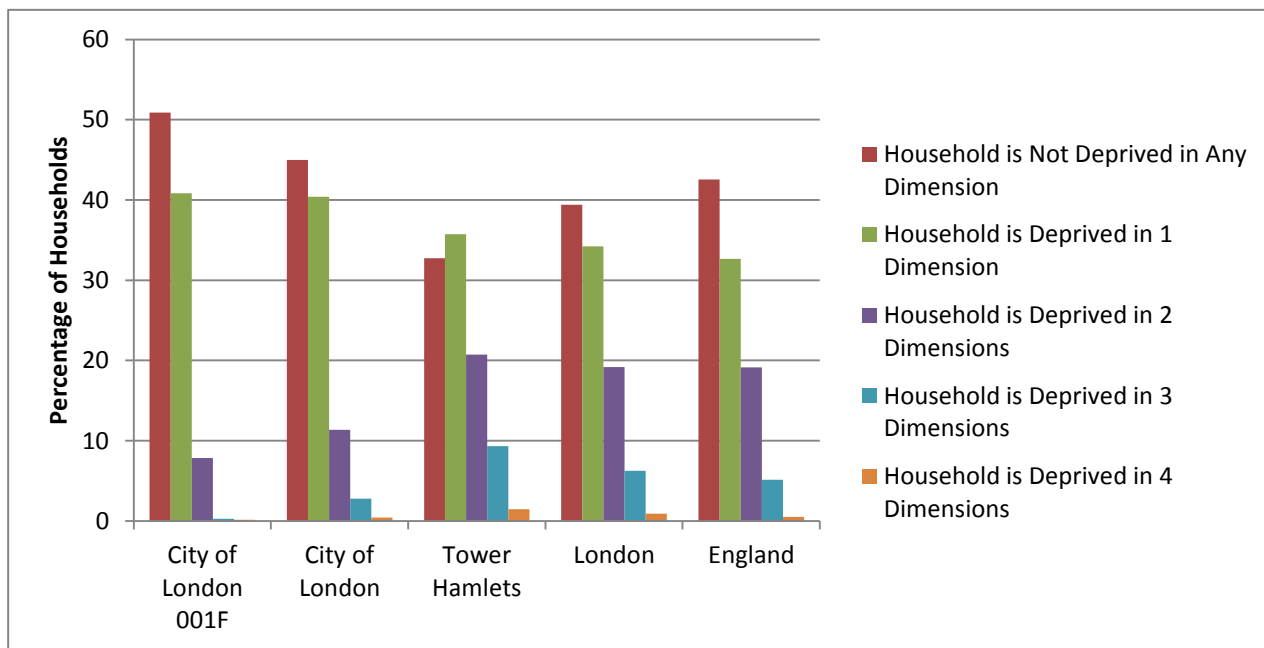


D1.4.2 The BAME population in City of London LSOA 001F is 22.2 per cent; greater than the England average (14.6 per cent) but around half that of London (40.2 per cent). The Non-White UK population is 53.5 per cent; more than double the England rate (20.2 per cent) and around the same level as the London rate (55.1 per cent). Of those in the LSOA whose first language is not English; 0.5 per cent cannot speak English well or at all (compared to 4.1 per cent in London and 1.7 per cent in England).

D1.4.3 Data is not available at LSOA level for the number of people living in deprivation. Information is however available for the number of households that suffer from deprivation under a different number of dimensions of deprivation (households in England and Wales are classified by four dimensions of deprivation: Employment, Education, Health and disability, and Household overcrowding). There are seven indices of deprivation which are income deprivation; employment deprivation; health, deprivation and disability deprivation; education, skills and training deprivation; barriers to housing and services deprivation; crime deprivation and living environment deprivation.

D1.4.4 This shows that the LSOA is less deprived than all of the other comparators with over half of households not deprived under any dimension. The LSOA is in the least 10 per cent deprived nationally for income and the least 20 per cent deprived nationally for health and disability.

Figure D2: Percentage of Households in Different Dimensions of Deprivation (Source: 2011 Census)



D1.4.5 No data is available at LSOA level for low birth weight; child development at age 5; GCSE achievement or unemployment.

D1.4.6 Figure D3 shows the level of general health of residents and clearly shows that the level of good or very good health is higher than the other comparator areas, and conversely the level of bad or very bad health is lower. Figure D4 shows that fewer people in the LSOA provide unpaid care at both more than one hour and more than 50 hours per week.

Figure D3: General Health of Residents (Source: 2011 Census)

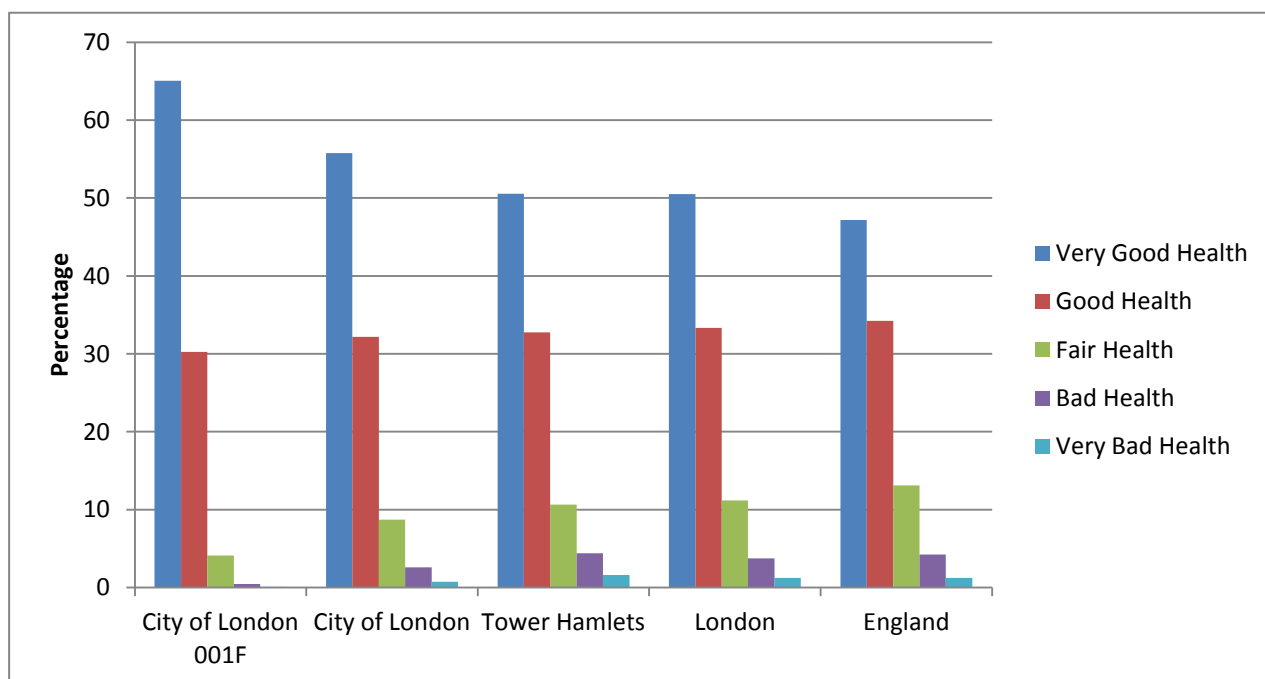
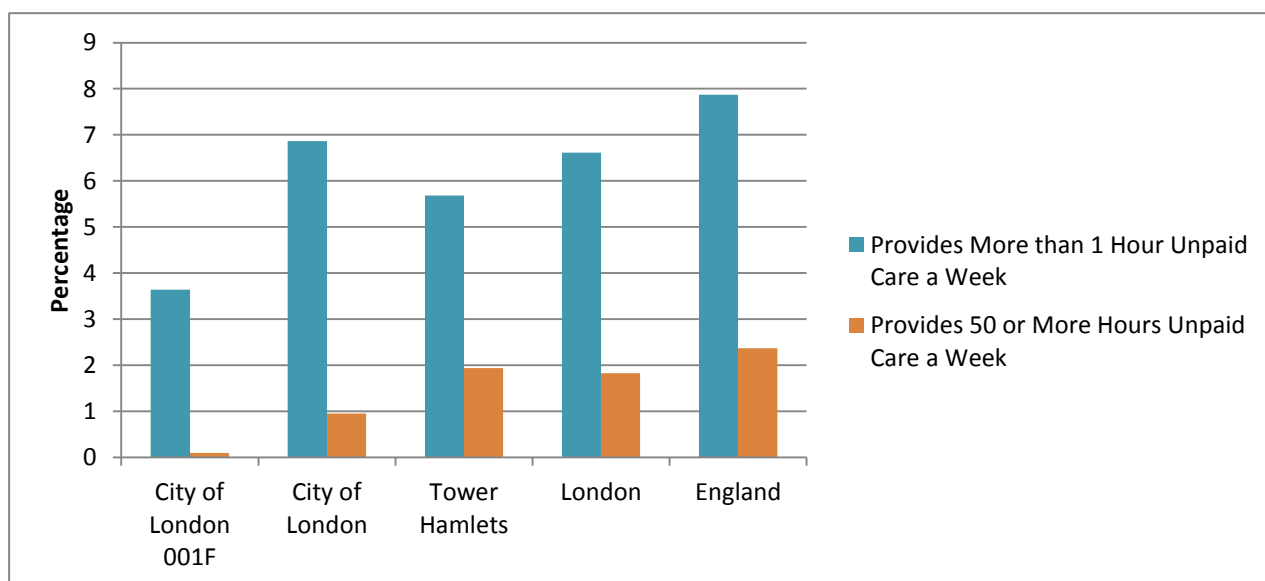


Figure D4: Provision of Care (Source: 2011 Census)



D1.4.7 The main household tenure in the LSOA is private rented at 57.3 per cent compared to London (25 per cent) and England (16.8 per cent). Only 1.6 per cent of households are social rented; much lower than London (24.1 per cent) and national (17.7 per cent) figures.

D1.4.8 The percentage of households in the LSOA with central heating is significantly lower (92 per cent) than the percentages for London (97.2 per cent) and England (97.3 per cent). 32.2 per cent of households are overcrowded in the

LSOA compared to 21.7 per cent in London and 8.7 per cent in England; a significantly higher figure.

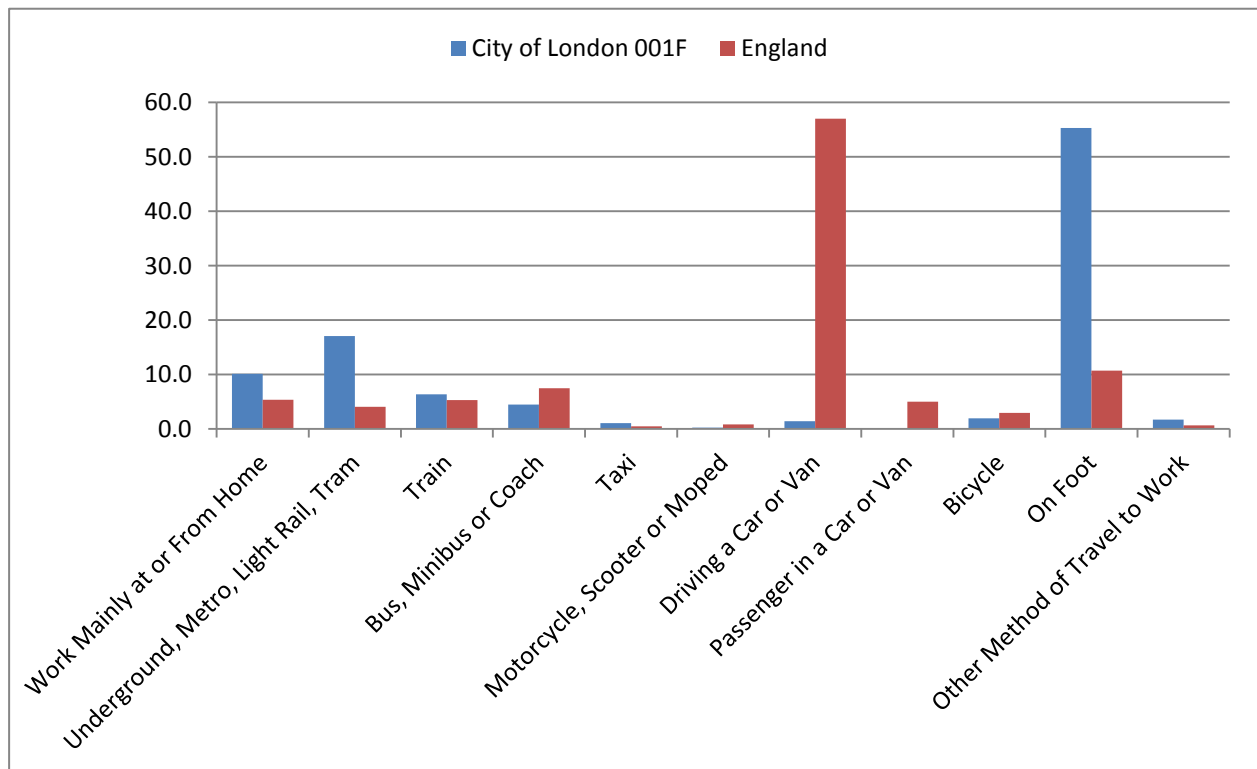
- D1.4.9 Table D2 shows that over three quarters of households have no access to a car or van; and that car or van ownership in the City of London is less than half the London rate and the England rates.

Table D2: Access to a Car or Van (Source: 2011 Census)

	City of London LSOA 001F	London	England
No cars or vans in household	76.3	41.6	25.8
1 car or van in household	18.5	40.5	42.2
2 cars or vans in household	3.6	14	24.7
3 cars or vans in household	1	2.9	5.5
4 or more cars or vans in household	0.6	0.9	1.9
Average cars or vans per household	0.32	0.82	1.16

- D1.4.10 Figure D5 shows that the 55.3 per cent of LSOA 001F workers walk to work; over six times the national rate (8.8 per cent). The next most popular mode is by light rail or London Underground (17.1 per cent). Notably 1.5 per cent of workers drive a car or van to work in the LSOA compared to 57 per cent nationally.

Figure D5: Method of Travel to Work (Source: 2011 Census)

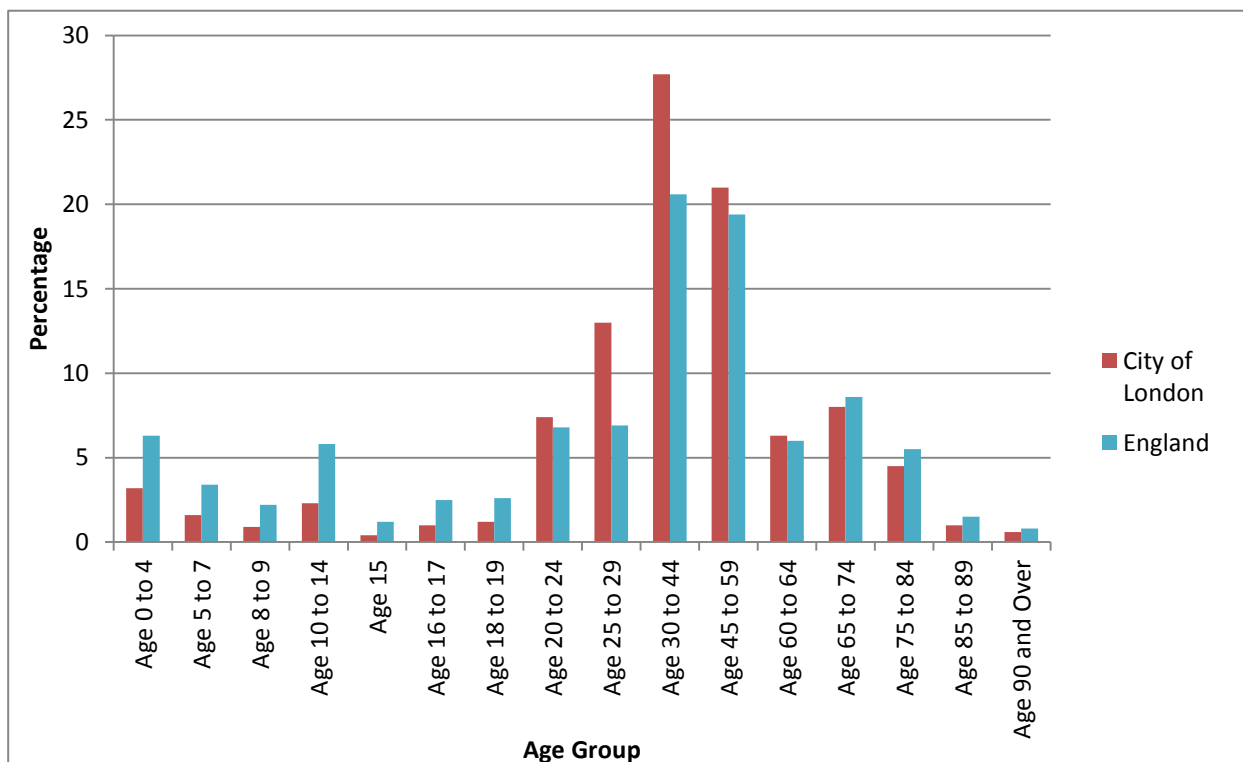


D1.4.11 No data exists for child and adult obesity or mortality, cause of death or life expectancy at the LSOA level.

D1.5 City of London

D1.5.1 The population age profile of the City of London is shown in Figure D6 This shows that the City of London has a significantly greater 'working age' population than the national average, particularly between the ages of 25 and 44, with far fewer children.

Figure D6: City of London Age Profile (Source: 2011 Census)



D1.5.2 The BAME population in the City of London is 21.4 per cent; greater than the England average (14.6 per cent) but significantly lower than that of London (40.2 per cent). The Non-White UK population (42.5 per cent) is more than double that of England (20.2 per cent); but lower than the London average (55.1 per cent). Of those in the City of London whose first language is not English; 1.4 per cent cannot speak English well or at all (compared to 4.1 per cent in London and 1.7 per cent in England).

D1.5.3 In the City of London, 5.2 per cent of people suffer from income deprivation in compared to 18.9 per cent in London and 14.7 per cent in England. The City of London is in the 5 per cent least deprived nationally in the ‘income’ sub-domain and the 10 per cent least deprived in terms of ‘health and disability’ sub-domain.

D1.5.4 In the City of London, 13.3 per cent of children are living in income-deprived households; significantly fewer children than the regional (32.2 per cent) and national (21.8 per cent) rates. The percentage of older people living in deprived households is 9.9 per cent compared to 23.8 per cent in London and 18.1 per cent in England.

D1.5.5 In terms of children’s development 4.2 per cent of children are born with a low birth weight, fewer than the regional and national averages. 57.7 per cent of children had a good level of development at age five, slightly fewer than the regional and national figures. The percentage of children achieving five A*-C

GCSEs (including English and Maths) is fewer (54.5 per cent) than the percentage for London (62.1 per cent) and England (58.2 per cent).

- D1.5.6 1.4 per cent of working age people in the City of London are unemployed which is lower than the London and England averages. Long-term unemployment is also favourable at 3.3 people per 1,000 working age population, roughly half the rate for London and England.
- D1.5.7 The number of residents reporting bad or very bad health at 3.3 per cent is less than that of 5 per cent in London and 5.5 per cent in England. Significantly fewer people in the City of London provide unpaid care than the regional and national averages. 7.8 per cent of people provide one hour or more unpaid care per week in the City of London compared to 8.4 per cent in London and 10.2 per cent in England, whilst 0.9 per cent of people provide 50 hours or more compared to 1.8 per cent in London and 2.4 per cent in England.
- D1.5.8 The majority of City of London residents are registered with the Neaman practice in the City of London (81 per cent). In 2011/12 (Hackney and City Health and Wellbeing Boards, 2014):
- The crude prevalence of cancer recorded by the Neaman practice was 1.5 per cent (134 individuals). This rate is relatively high due to the older population (rates are not age-standardised).
 - The crude prevalence of hypertension recorded by the Neaman practice was 8.4 per cent (746 individuals); lower than the corresponding London figure of 11.1 per cent.
 - The crude prevalence of Coronary Heart Disease recorded by the Neaman practice was 1.9 per cent (173 individuals). This crude rate is comparable with the average for London. Prevalence has fallen slightly in the past eight years. Since 2007, there has been a decrease in premature deaths from CHD for both men and women in Hackney and the City of London. More men are victims of premature death from CHD than women. Rates of premature death from CHD are higher than the corresponding London figures.
- D1.5.9 In terms of communicable diseases; rates of tuberculosis has halved since 2004 in the City of London at around 25 per cent compared to 40 per cent in London (Hackney and City Health and Wellbeing Boards, 2014). There was an outbreak of measles in the City in December 2012 and marked increases in cases of pertussis (whooping cough); whilst flu vaccination uptake is high compared to London (Hackney and City Health and Wellbeing Boards, 2014).
- D1.5.10 Estimates of coronary heart disease in 2011 (APHO, 2011) are that for residents aged 16 and above; 4.91 per cent in the City of London and Hackney

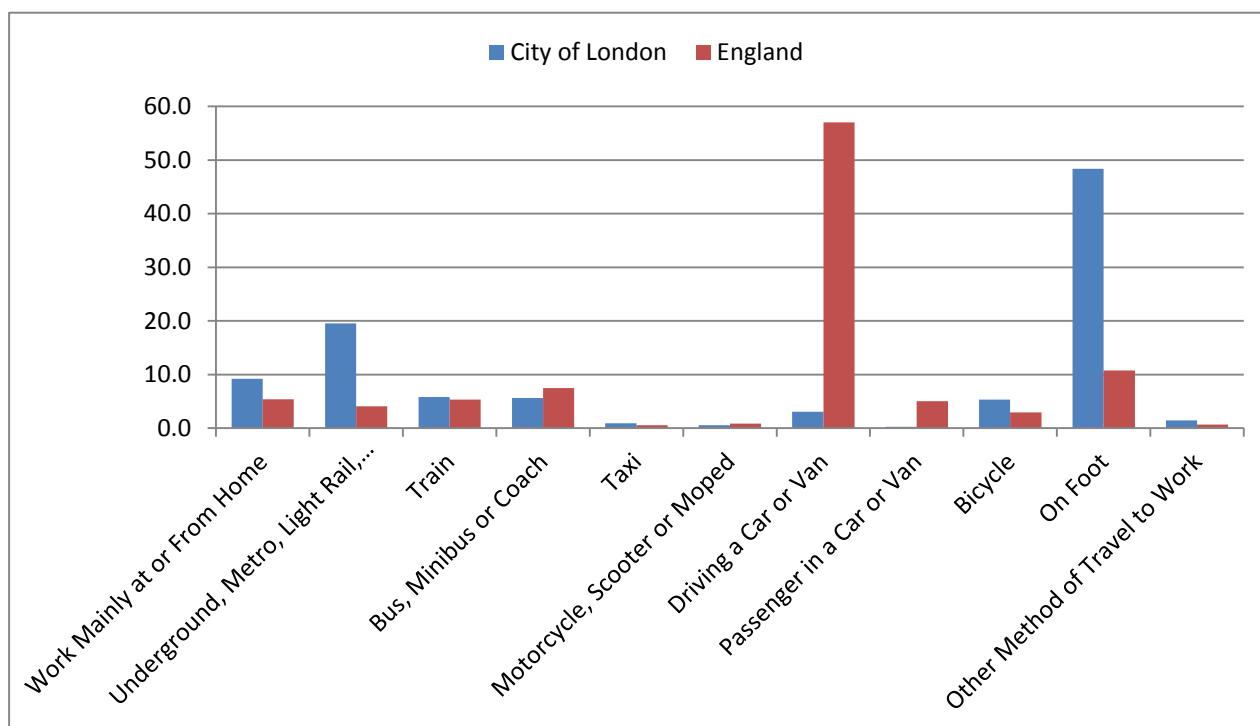
Primary Care Trust area suffer from the condition; which is lower than the average for England (5.80 per cent) but higher than London (4.60 per cent).

- D1.5.11 The main household tenure in the City of London is Private Rented which at 35.9 per cent is significantly higher than London (25 per cent) and England (16.8 per cent). The percentage of social rented (16.5 per cent) is lower than that of London (24.1 per cent) and roughly in-line with national (17.7 per cent) figures. Home ownership is significantly lower in the City of London than London and England.
- D1.5.12 In the City of London, 95.7 per cent of households have central heating which is lower than London (97.2 per cent) and England (97.3 per cent). 34.6 per cent of households are classed as overcrowded, significantly higher than the figure for London (21.7 per cent) and England (8.7 per cent).
- D1.5.13 Table D3 shows that nearly 70 per cent of households have no access to a car or van and that car or van ownership in the City of London is approximately 60 per cent of the London rate and the England averages.

Table D3: Access to a Car or Van (Source: 2011 Census)

	City of London	London	England
No cars or vans in household	69.4	41.6	25.8
1 car or van in household	25.1	40.5	42.2
2 cars or vans in household	3.9	14.0	24.7
3 cars or vans in household	1.2	2.9	5.5
4 or more cars or vans in household	0.4	0.9	1.9
Average cars or vans per household	0.39	0.82	1.16

- D1.5.14 Figure D7 shows that the majority of workers walk to work; almost five times the national rate. The next most popular mode is by light rail or underground (19.5 per cent). Significantly, 3.1 per cent drive a car or van to work in the City of London compared to 57 per cent nationally. 5.3 per cent of workers cycle which is above the London and national averages (4.0 per cent and 3.0 per cent respectively).

Figure D7: Mode of Travel to Work (Source: 2011 Census)

D1.5.15 In the City of London, 58 people were killed or seriously injured on the roads in 2012, an increase of 18 per cent on the previous year (Hackney and City Health and Wellbeing Boards, 2014). Of those killed or seriously injured; 33 per cent were pedestrians; 45 per cent cyclists and 16 per cent motorcyclists in the City of London; compared to 44 per cent; 23 per cent and 21 per cent in London respectively. This shows that pedestrians and cyclists are disproportionately killed or injured in the City of London compared to London (Hackney and City Health and Wellbeing Boards, 2014).

D1.5.16 No data is available for child obesity in the City of London or London area; however 13.7 per cent of adults are obese compared to 24.1 per cent in England, almost half the rate. Between 2011/12 at the Neaman practice in the north-west of the City around 3 per cent of adults are obese, which is lower than the rates for surrounding areas and London as a whole (Hackney and City Health and Wellbeing Boards, 2014).

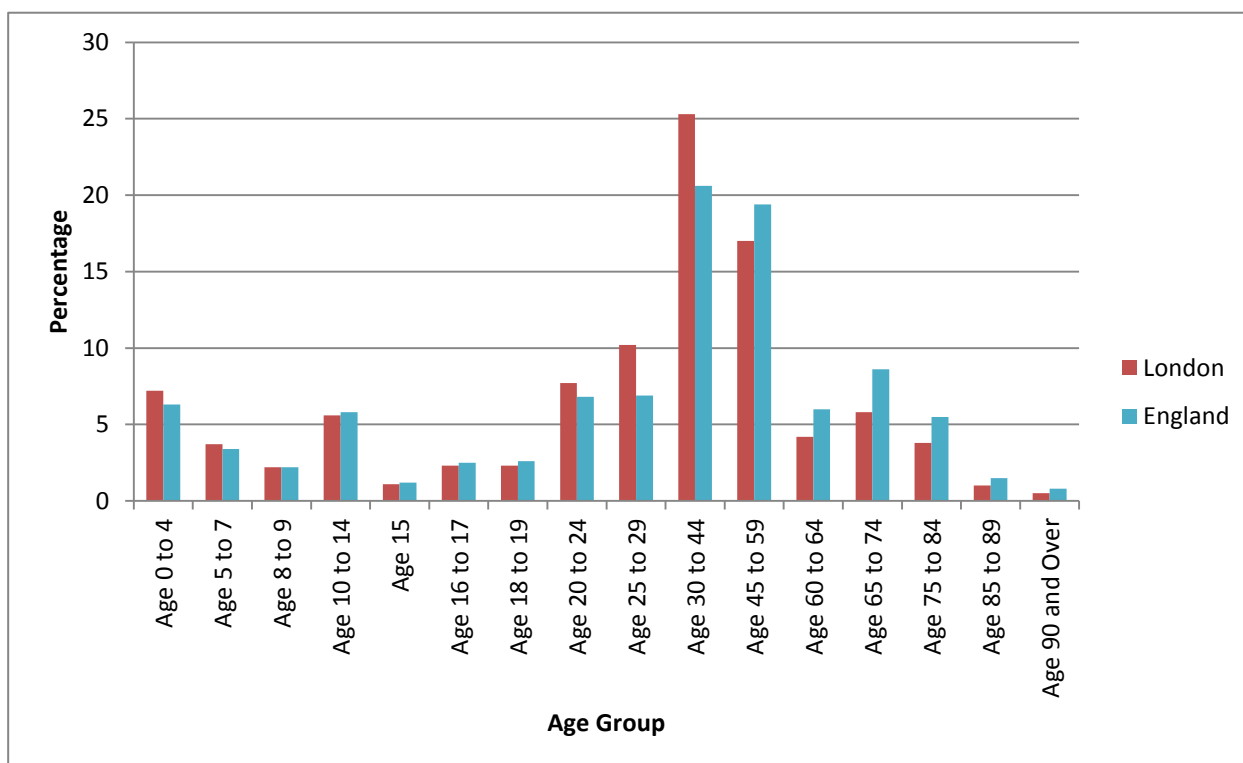
D1.5.17 The Standardised Mortality Ratio for all forms of cancer is 76.4; 72.6 for all circulatory disease; 49.2 for stroke; and 48.5 for respiratory disease. All are lower values than the England index (100).

D1.5.18 Life expectancy for males in the City of London is far higher (83.6) than for London (78.6) and England (78.3); and is also higher for females (83.4 compared to 83.1 and 82.3 respectively).

D1.6 Greater London

D1.6.1 Figure D8 shows the age profile for London. The capital has a significantly higher proportion of 20 to 44 year olds and a marginally higher proportion of 0 to 7 year olds than the national average. The percentage of people aged 45 and older is much lower than for England.

Figure D8: Greater London Age Profile (Source: 2011 Census)

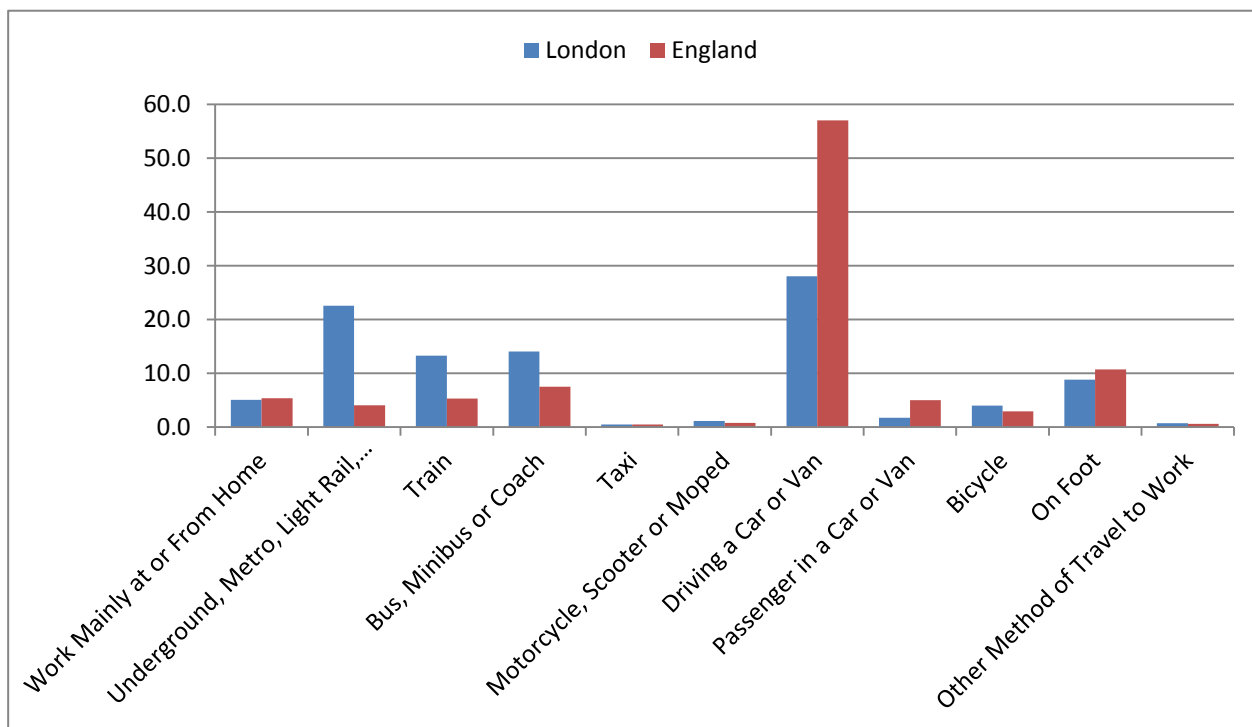


D1.6.2 London has a large BAME population which stands at 40.2 per cent of residents. This is much higher than the national figure which is 14.6 per cent. The Non-White UK population figure is also high at 55.2 per cent compared to 20.2 per cent for England. Proficiency in English is low as 4.1 per cent of people cannot speak English well or at all which is higher than the England average (1.7 per cent).

D1.6.3 Unemployment in the capital is above the national average at 4 per cent compared to 3.6 per cent in England. Long-term unemployment is also higher at 6.7 people per 1,000 working age population compared to 6 in England.

D1.6.4 General health is better in London than nationally, with fewer people (5 per cent) reporting their health as bad or very bad compared to England (5.5 per cent). 8.4 per cent of people provide one hour or more unpaid care per week in London compared to 10.2 per cent in England, whilst 1.8 per cent of people provide 50 hours or more compared to 2.4 per cent in England.

- D1.6.5 According to the 2010 London Health Profile (APHO and DoH, 2010) London has:
- a significantly higher rate of early deaths from heart disease & stroke per 100,000 people (79.4) than the England average (74.8).
 - a significantly higher rate of new cases of Tuberculosis per 100,000 people (44) than England (15).
 - a significantly higher percentage of people diagnosed with diabetes (4.43 per cent) than England (4.3 per cent).
 - a significantly lower percentage of obese adults (20.7 per cent) than England (24.2 per cent).
- D1.6.6 Cardiovascular disease is one of the most common causes of death in London killing over 16,000 people every year (APHO, 2010). The main risk factors for premature death from cardiovascular disease include smoking, raised blood pressure, diabetes, obesity and lack of physical activity.
- D1.6.7 The main tenure in London is 'owned with a mortgage' which represents 27.1 per cent of households. 21.1 per cent of households are owned outright whilst 23.7 per cent are private rented. Just under a quarter (24.1 per cent) of households are social rented accommodation which is higher than the 17.7 per cent figure for England.
- D1.6.8 In London, 97.2 per cent of households have central heating which is similar to England (97.3 per cent). 21.7 per cent of households are classed as overcrowded, significantly higher than the figure for England (8.7 per cent).
- D1.6.9 Figure 0.9 shows that half as many people drive to work in London compared to England. A much higher proportion of people in London use the London Underground and light rail, the bus or train to get to work than nationally.

Figure D9: Mode of Travel to Work (Source: 2011 Census)

D1.7 Summary and Conclusions

- D1.7.1 Each of the affected communities has an ethnically mixed, particularly Asian, population. The population most likely to be affected by the BSCU is of working age as the City of London and London have a larger proportion of residents in these age groups.
- D1.7.2 Levels of deprivation vary across London. Relative to the national and regional picture, the City of London is amongst the least deprived areas.
- D1.7.3 The health status indicators follow a similar pattern, showing great inequalities between the City of London and Greater London.
- D1.7.4 Health issues that are more prevalent in the City of London and Greater London than England are incidence of communicable diseases (in particular tuberculosis); cardiovascular disease (including CHD and stroke) and diabetes. Obesity is less of an issue in London and the City of London than England; however that is not to say that it is not an important health issue.
- D1.7.5 The London population is more closely-aligned to the national averages, except with higher levels of deprivation and ethnicity.
- D1.7.6 In terms of travel behaviour, the most popular method of travelling to work for residents of the City of London and the LSOA is to walk to work, followed by using the London Underground. Approximately 20 per cent of people in the

City of London, the LSOA and London use the London Underground to get to work.

- D1.7.7 Although the rate of people killed or seriously injured in traffic collisions is lower in London and the City of London compared to England; pedestrians and cyclists are disproportionately involved in such collisions.
- D1.7.8 In conclusion, the City of London has a significantly healthier population than London as a whole, which is therefore less resilient to adverse health impacts.