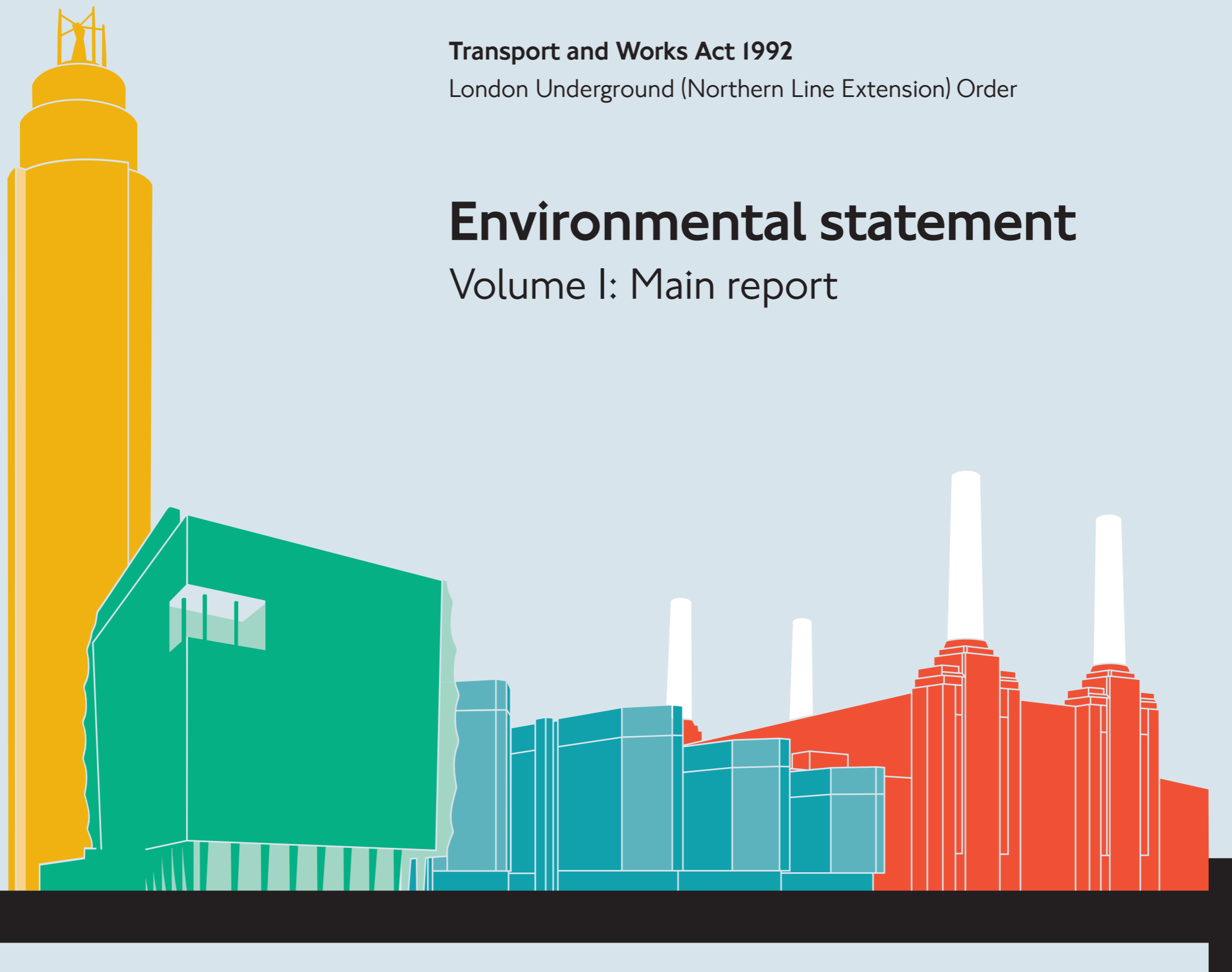


Transport and Works Act 1992

London Underground (Northern Line Extension) Order

Environmental statement

Volume I: Main report



Northern Line Extension
Environmental Statement

Volume I

April 2013

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Glossary and Abbreviations

Abbreviation	Definition
AADT	Annual Average Daily Traffic (flow)
ACCA	Adapting to Climate Change. A URS tool designed to help users understand the likelihood and magnitude of climate change risks and opportunities related to their assets, projects and services
ACM	Asbestos Containing Materials. Any materials containing the natural fibrous minerals amosite, crocidolite, chrysotile, actinolite, tremolite, or anthophyllite, where chrysotile is the most commonly used form. Its excellent heat resistant properties mean that it can be found in everything from roofing to insulation. Exposure to asbestos can cause adverse health effects including cancer. It has been banned from use in the UK since 1999
AD	Anno Domini
AEP	Annual Exceedance Probability
ALARP	As Low As Reasonably Practicable
AMDS-Roads	ADMS-Roads is a modern dispersion model used to quantify pollution levels at selected receptors
ANC	Association of Noise Consultants
AOD	Above Ordnance Datum. The distance above the mean tides at Newlyn, Cornwall
APA	Archaeological Priority Area
APZ	Archaeological Priority Zone
AQAP	Air Quality Action Plan. A Local Authority produced plan to tackle air quality issues within designated Air Quality Management Areas (AQMA)
AQEG	Air Quality Expert Group. The Air Quality Expert Group (AQEG) is an advisory group that provides independent scientific advice on air quality, in particular the air pollutants contained in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland and those covered by the EU Directive on ambient air quality assessment and management (the Air Quality Framework Directive). AQEG reports to the Secretary of State for Environment, Food and Rural Affairs, Scottish Ministers, the National Assembly for Wales and the Department of the Environment in Northern Ireland (the Government and Devolved Administrations)
AQMA	Air Quality Management Area. Designated under the Local Air Quality Management regime for areas currently, or forecast, to exceed National Air Quality Strategy objectives
ASHP	Air Source Heat Pump
ATC	Automatic Traffic Count
ATO	Automatic Train Operation
AURN	Automatic Urban and Rural Network
Alluvium	Soil deposited by river processes
Ambient	Background levels

Abbreviation	Definition
Amenity	An element of a location or neighbourhood that helps to make it attractive or enjoyable for residents and visitors
Applicant	The person or organisation seeking consent for development (for example a Transport and Works Act Order, Town and Country Planning Act application)
Aquifer	A below ground, water-bearing layer of soil or rock
Archaeological watching brief	Attendance on site of a suitable qualified or experienced archaeologist during the course of ground excavations, usually working to a brief agreed with the local planning authority
Asbestos	Toxic material historically used as insulation
A-weighted sound pressure level	A logarithmic measure of sound pressure which takes into account the human auditory system's response to the size of changes in sound pressure and differential sensitivity to sounds of different pitches (or frequencies)
BAP	Biodiversity Action Plan. A plan highlighting a species of concern within a specific geographical area
BC	Before Christ
BCT	Bat Conservation Trust
BDCH	Battersea Dogs and Cats Home
bgl	Below ground level
BGS	British Geological Society
BH#	Borehole [number]. A deep hole bored into the ground as part of an intrusive investigation
BH	Buro Happold
BMS	Building Management System
BoCC	Birds of Conservation Concern
BOD	Biological Oxygen Demand
BPEO	Best Practicable Environmental Option
bph	Buses Per Hour
BPM	Best Practicable Means
BPS	Battersea Power Station
BPSDC	Battersea Power Station Development Company
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method. Used for rating the environmental performance of buildings
BRMC	Biodiversity Recording and Monitoring Centre
BS	British Standard
BSI	British Standard Institute

Glossary and Abbreviations

Abbreviation	Definition
BTO	British Trust for Ornithology
Baseline	Existing environmental conditions present on, or near a site, against which future changes may be measured or predicted
Benchmark	A standard by which something can be measured or judged
Benzene	Colourless liquid hydrocarbon
Biodiversity	The diversity or variety of plants and animals and other living things in a particular area or region. It encompasses landscape diversity, ecosystem diversity, species diversity and genetic diversity
Biofuel	Solid, liquid or gaseous fuel obtained from relatively recently lifeless or living biological material and is different from fossil fuels
Breakers	Pneumatic hammer for breaking through concrete
Brownfield site	Sites that comprise previously developed land
Brown roof	A roof with a covering of a layer of locally sourced material
c.	Circa
CA	Conservation Area. An area designated under Planning (Listed Buildings and Conservation Areas) Act 1990 as being of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance
CABE	Commission for Architecture in the Built Environment
CAC	Conservation Area Consent
CAD	Computer Aided Design
CAFE	Clean Air For Europe
CAT	Cable Avoidance Tool
Cat	Category
CAZ	Central Activities Zone
CBC	Common Bird Census
CCC	Climate Change Committee
CCHP	Combined Cooling and Heating Plant
CCIR/ITU	International Radio Consultative Committee/International Telecommunication Union
CCL	Concept Consultants Ltd
CCRA	Climate Change Risk Assessment
CCS	Considerate Contractors Scheme
CCTV	Closed Circuit Television
CD	Chart Datum
CEMP	Construction Environmental Management Plan
CFA	Continuous Flight Auger – piling method
CGMA	Covent Garden Market Authority

Abbreviation	Definition
CH ₄	Methane
CHP	Combined Heat and Power. The simultaneous generation of both heat and electricity. CHP allows a more total use of energy than conventional generation, potentially reaching an efficiency of 70-90%, compared with approximately 50% for conventional plants. This means that less fuel needs to be consumed to produce the same amount of energy
CIL	Community Infrastructure Levy
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CLEA	Contaminated Land Exposure Assessment
CLOHAM	Central London Highway Assignment Model
CLP	Construction Logistics Plan
CLR	Contaminated Land Research
CMS	Construction Method Statement – A statement of the planned construction activities, including proposed mitigation measures to minimise or remove potential environmental impacts.
CO	Carbon Monoxide. CO is a colourless, odourless gas generated as a result of the incomplete combustion of fossil fuels. Main sources of CO include the automobile, industrial processes and fuel combustion. CO is a toxic gas, which reduced oxygen transport in the blood of animals. The health threat exposure to CO is most serious for those who suffer from cardiovascular disease, although healthy individuals are also affected, but only at higher levels of exposure. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, and difficulty in performing complex tasks
CO ₂	Carbon Dioxide. A naturally occurring gas comprising 0.04 per cent of the atmosphere. The burning of fossil fuels releases carbon dioxide fixed by plants many millions of years ago, and this has increased its concentration in the atmosphere by some 12 per cent over the past century. It contributes about 60 per cent of the potential global warming effect of manmade emissions of greenhouse gases
CoCP	Code of Construction Practice. Document providing mitigation to reduce or eliminate adverse effects and enhance beneficial effects
CoCPS	Code of Practice for Construction Sites
COMAH	Control of Major Accident Hazards
CoP	Code of Practice
COPA	Control of Pollution Act, 1974
CPZ	Controlled Parking Zone
CroW	The Countryside and Rights of Way Act, 2000

Glossary and Abbreviations

Abbreviation	Definition
CRTN	Calculation of Road Traffic Noise
CSE	Confined Space Entry
CSH	Code for Sustainable Homes
CSM	Conceptual Site Model
CSO	Combined Sewer Overflow
Case Law	Principles and rules of law set forth in judicial opinions from courts of law. Case law incorporates courts' decisions from individual cases and encompasses courts' interpretations of statutes, constitutional provisions, administrative regulations and, in some cases, law originating solely from the courts
Cladding	Protective coating or 'shell' of outer most part of a building
Commercial (activity)	Activities involved in buying and selling things, such as office workplaces. Commercial sites are not usually open to the public
Conservation	The preservation or enhancement of a species or building/structure
Contamination	Contamination is the addition, or the result of addition, or presence of a material or materials to, or in, another substance to such a degree as to render it unfit for its intended purpose
Controlled Waters	They comprise of all rivers, canals, lakes, ground waters, estuaries and coastal waters to three nautical miles from the shore
Crushers	Deconstruction plant used to reduce the volume of demolition waste
Cumulative Impacts	Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions
Cut-off ditches	Trench, which acts to collect run-off or groundwater flow
Curtilage	The area immediately surrounding a building
Cycle Route	A signed route for cyclists, varying from purpose-built cycleway to a simple advisory route through lightly trafficked parts of the ordinary road network
DAS	Design and Access Statement. Document explaining the design rationale underpinning the proposed locations, layouts and design for the NLE
dB	Decibel. The ratio of sound pressures, which we can hear, is a ratio of 106 (one million: one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (Lp) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply
dB(A)	The unit of noise measurement (measured on a logarithmic scale), which expresses the loudness in terms of decibel (dB) scale and the frequency factor (A)
dBuV/m	The unit of voltage relative to 1 microvolt per metre, used in television and aerial amplifier specifications
DC	Direct Current

Abbreviation	Definition
DCLG	Department for Communities and Local Government.
DCMS	Demolition and Construction Method Statement
DCSF	Department for Children, Schools and Families
DDA	Disability Discrimination Act
DECC	Department for Energy and Climate Change
DEFRA	Department for Environment, Food and the Rural Affairs
DEN	District Energy Network
DETR	Department for the Environment, Transport and Regions
DfL	Design for London
DHW	Domestic Hot Water
DMPD	Development Management Policies Document
DMRB	Design Manual for Roads and Bridges
DMS	Deconstruction / Demolition Method Statement. A statement of the planned deconstruction / demolition activities, including the proposed mitigation measures to minimise, or remove, potential environmental impacts.
DNO	Distribution Network Operator
DPD	Development Plan Document
DPP	Detailed Planning Permission
DO	Dissolved Oxygen
DoE	Department of the Environment
DoS	Degree of Saturation
DoT	Department of Transport
DSP	Delivery and Servicing Plan
DTT	Digital Terrestrial Television
DTLR	Department of Transport, Local Government and the Regions
DWS	Drinking Water Standard
Demolition	Tearing-down of buildings and other structures
Design Code	A document that sets rules for the design of a new development
Desk (-top) Study	A non-intrusive study and review of all available information pertaining to a site including historical records collated and monitored data and consultation with relevant stakeholders
Dewatering	The removal of water from the soil to enable work to be carried out below the groundwater level

Glossary and Abbreviations

Abbreviation	Definition
Directive	European Commission (EG) Directives impose legal obligations on European Member States. They are binding as to the results to be achieved, but allow individual states the right to decide the form and methods used to achieve the results. An example of this is the EC Air Quality Framework Directive 96/62 that is brought into legal effect in the UK by the Air Quality (England) Regulations (2000)
Displacement	The extent to which the benefits of a project are offset by reductions of output or employment elsewhere
Dust	Fine particles of solid materials ranging in size from 1 to 75 micron diameter (see British Standard 3405) capable of being re-suspended in air and settling only slowly under the influence of gravity where it may cause nuisance
E	East
EA	Environment Agency
EC	European community
ECCP	Environmental Code of Construction Practice
ECIA	Engineering Council Industry Association
EcIA	Ecological Impact Assessment
EDS	Economic Development Strategy
EFT	Emission Factor Toolkit
EH	English Heritage
EIA	Environmental Impact Assessment. A technique for ensuring that the likely effects of new development on the environment are fully understood and taken into account before the development is allowed to go ahead. It provides a focus for public scrutiny of the project and enables the importance of the predicted effects, and the scope for modifying or mitigating them, to be properly evaluated by the decision-making authority
EIRP	Equivalent Isotropically Radiated Power (or Effective). The amount of power an antenna would emit to produce a peak power density in the direction of maximum gain
ELC	European Landscape Convention. Aims to promote landscape protection, management and planning at all scales
EMC	Electromagnetic Compatibility. The ability of equipment to operate adequately in a given electromagnetic environment, while not introducing intolerable electromagnetic disturbances itself
EMF	Electromagnetic Fields. Generally applied under the concept of human health in the presence of high intensity electric and magnetic fields
EMI	Electromagnetic Interference. A degradation of equipment performance due to disturbance from radio frequency, electric or magnetic fields

Abbreviation	Definition
EMP	Environmental Management Plan. A documented management system with environmental procedures to monitor residual impacts of the construction and operational phases of the development
EMS	Environmental Management System
EN	English Nature (now Natural England)
EPA	Environmental Protection Act 1990
EPAQS	Expert Panel on Air Quality Standards
EPH	Extractable Petroleum Hydrocarbons
EPP	Emergency Preparedness Plan
EPS	European Protected Species
EQS	Environmental Quality Standards
ERP	Emergency Response Plans
ES	Environmental Statement. The outcome of the Environmental Assessment presented in a formal document or documents in accordance with EC Directive 85/337. Includes such information that is reasonably required to assess the environmental effects of a development
EU	European Union
Ecology	The study of living organisms in relation to their surroundings
Effluent	A fluid discharged or emitted to the external environment
Emission	A material that is expelled or released to the environment. Usually applied to gaseous or odorous discharges to the atmosphere
Employment Density	Average floor space per person in a given building
Employment uses	Any undertaking or use of land that provides paid employment
Energy centre	Area used for energy generation
Environmental Impact	Positive or negative impact of a project component or activity on the surrounding environment
FEH	Flood Estimation Handbook
FM	Frequency Modulation
FORS	Fleet Operator Recognition Scheme
FRA	Flood Risk Assessment
FTE	Full Time Equivalent
ft ²	Square feet
Fauna	Animal life
Field strength	Unit of measurement of all types of radio signals
Fit-out	Finishing the interior of the building

Glossary and Abbreviations

Abbreviation	Definition
Floodplain	Land adjacent to a watercourse over which water flows, or would flow but for defences in place, in times of flood
Flood Zone	An area at risk from flooding
Flora	The plant life of a particular geographical area
Footprint	Perimeter of building's ground floor plan
Forage	Plant material (mainly plant leaves and stems) eaten by grazing livestock
Free-Field Noise Levels	Levels which are at least 3.5m away from any hard reflecting surface other than the ground
Frequency (Sound)	The rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted kHz, e.g. 2 kHz: 2000 Hz. Human hearing ranges approximately from 20 Hz to 20 kHz. For design purposes, the octave bands between 63 Hz to 8 kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or in some cases, narrow frequency bands
Fugitive emissions dust	Dust emissions escaping from a construction site
GAC	Generic Assessment Criteria
GARDIT	General Aquifer Research Department and Investigation Team
GDP	Gross Domestic Product. A measure of the national economic performance
GEA	Gross External Area. A measure of office space. The aggregate superficial area of a building taking each floor into account. As described in the RICS/ISVA Code of Measuring Practice (UK), this includes: external walls and projections, internal walls and partitions, columns, piers, chimney-breasts, stairwells, lift wells, tank and plant rooms, fuel stores; whether or not above main roof level and open-sided covered areas and enclosed car-parking areas, terraces etc
GHG	Greenhouse Gases
GHz	Gigahertz
GIA	Gross Internal Area. The total area of buildings measured to the internal face of the perimeter walls at each floor level
GiGL	Greenspace Information for Greater London
GIS	Geographical Information Systems
GLA	Greater London Authority
GLHER	Greater London Historic Environment Record
GLSMR	Greater London Sites and Monuments Record
GOL	Government Office for London

Abbreviation	Definition
GOMMMS	Guidance on the Methodology for Multi-Modal Studies
GP	General Practitioners
GPLC	Guiding Principles for Land Contamination
GSV	Gas Screening Value
GWR	Great Western Railways
Geoenvironmental	Study of the engineering and environmental properties of the ground
Geotextile	An engineering membrane installed to affect soil properties
Grade I Listed Building	A listed building of exceptional interest
Grade II* Listed Building	Particularly significant buildings of more than local interest
Grade II Listed Building	Buildings of special architectural or historic interest
Greater London Council	The top-tier local government administrative body for Greater London from 1965 to 1986
Green roofs	A roof of a building that is partially or completely covered with vegetation and soil, or a growing medium, planted over a waterproofing membrane
Grey water	Non-industrial wastewater generated from domestic processes
Gross	The sum total without reduction
Ground Reduction	Reducing the level of the ground
Groundwater	Water associated with soil or rocks below the ground surface but is usually taken to mean water in the saturated zone
Groundwater Source Protection Zone	A defined area within which groundwater is extracted for potable water supply. The area is defined by the Environment Agency on the basis of the length of time taken for groundwater to migrate from the potable source
ha	Hectare
HAP	Habitat Action Plan
HGV	Heavy Goods Vehicle
HLOS	High Level Output Specification
HM	Her Majesty
HMSO	Her Majesty's Stationery Office
HMWB	Heavily Modified Water Body
HSE	Health Safety and Environment
H&SP	Health and Safety Plans

Glossary and Abbreviations

Abbreviation	Definition
HU	Groundwater vulnerability classification. Indicates a high leaching potential as a worst case scenario due to limited amount of data available within any urban area
Hz	Hertz
Habitat	The living place of an organism characterised by its physical or biotic properties
Hazardous	A substance that is potentially damaging to the environment and harmful to humans and other living organisms
Head house	The above ground structure which is associated with and either directly above or off set from a below ground shaft
Heritage Structures	Buildings of historic significance
Hoarding	A temporary board fence set up on the perimeter of a building site
Hydraulic continuity	Hydraulic continuity exists where groundwater can flow unimpeded between different locations (e.g. "the aquifer was in hydraulic continuity with the river", or "the sandstone was in hydraulic continuity with the overlying gravel"). Used in this context to refer to groundwater or surface water
Hydrocarbon	An organic compound consisting entirely of hydrogen and carbon
Hydrogeology	The study of geological factors relating to the Earth's water
I	Influence (as used in <i>Chapter 16: Climate Change Adaptation and Mitigation</i>)
IAQM	Institute of Air Quality Management
ICE	Institute of Civil Engineers
ICE	Inventory of Carbon and Energy (as used in <i>Chapter 16: Climate Change Adaptation and Mitigation</i>)
ICNIRP	International Commission on Non Ionising Radiation Protection
ID	Internal Diameter. This is the measurement of the internal diameter of excavations such as running tunnels or shafts
IEA	Institute of Environmental Management
IEEM	Institute of Ecology and Environmental Management
IEMA	Institute of Environmental Management and Assessment
IFA	Institute of Field Archaeologists
IGBT	Insulated Gate Bipolar Transistor
ILE	Institution of Lighting Engineers
IoA	Institute of Acoustics
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organisation for Standardisation
IT	Information Technology

Abbreviation	Definition
Industrial legacy	Past industrial landuse
Inert waste	Wastes that do not undergo any significant physical, chemical or biological transformation
<i>In-situ</i>	In the natural, original or appropriate position
Inter-tidal	Is the area that is exposed to the air at low tide and underwater at high tide
Intrusive investigation	An in-depth investigation involving further sampling and analysis, such as the gathering of samples from the ground, walls, ceilings for the detection of contamination, asbestos and or archaeological remains
JLE	Jubilee Line Extension
JNCC	Joint Nature Conservation Committee. The UK Government's wildlife adviser, undertaking national and international conservation work on behalf of the three country nature conservation agencies English Nature, Scottish Natural Heritage and the Countryside Council for Wales
kg	Kilogram
km	Kilometres
km ²	Square kilometres
kW	Kilowatt
LA ₁₀	The noise level exceeded for 10% of the measurement time
LA _{90,T} (or LA ₉₀)	The A weighted noise level exceeded for 90% of the specified measurement period. (T) In B84142: 1990 It is used to define background noise level
LA _{eq,T} (or LA _{eq})	Equivalent continuous sound level. Another index for assessment for overall noise exposure is the equivalent continuous sound level, Leq. This is a notional steady level, which would, over a given period of time, deliver the same sound energy as the actual time varying sound over the same period. Hence fluctuating levels can be described in terms of a single figure level
LA _{max}	Maximum value that the A-weighted averaged sound pressure level reached during a measurement period. LA _{maxF} , or Fast, indicates that the sound pressure level is averaged in 0.125 second slices.
LAP	Local Areas of Play
LAARC	London Archaeological Archive and Research Centre
LAQM	Local Air Quality Management. Local authorities have statutory duties for local air quality management (LAQM) under the Environment Act 1995. They are required to carry out regular reviews and assessments of air quality in their area against standards and objectives in the national Air Quality Strategy and which have been prescribed in regulations for the purpose of LAQM. Where it is found these are unlikely to be met, authorities must designate air quality management areas (AQMA) and prepare and implement remedial action plans to tackle the problem

Glossary and Abbreviations

Abbreviation	Definition
LAQM.PG	Local Air Quality Management Policy Guidance
LAQM.TG	Local Air Quality Management Technical Guidance
Larvae	Young (juvenile) form of animal with indirect development, going through or undergoing metamorphosis
LBL	London Borough of Lambeth
LBS	London Borough of Southwark
LBW	London Borough of Wandsworth
L/day	Litres per day
LDF	Local Development Framework
LEAP	Local Equipped Areas of Play
LED	Light Emitting Diode
LEZ	Low Emission Zone
LFEPA	London Fire and Emergency Planning Authority
LHO	Local Health Organisations
LiDAR	Light Detection and Ranging
LNR	Local Nature Reserve
LOAEL	Lowest Observable Adverse Effect Level
LOD	Limits of Deviation. Limits define the maximum extent of the railway and ancillary works authorised by the Order. Both horizontal and vertical limits of deviation allow for refinement of the reference design
LOS	Line of Sight
L _p	Sound Pressure Level
LPA	Local Planning Authority
LPAC	London Planning Advisory Committee
LPWG	London Peregrine Working Group
LRM	London Ring Main
L/sec	Litres per second
LTS	London Transportation Studies
LUL	London Underground Limited
LVMF	London View Management Framework. Provides guidance on the policies in the London Plan for the protection of strategically important views in London
LW	Long Wave
L _w	Sound Power Level
LZC	Low and Zero Carbon

Abbreviation	Definition
Leachate	Potentially polluting liquid resulting from the biological decomposition of organic matter within a landfill site
Light pollution	Different forms of unwanted or wasted light as identified by the Institute of Lighting Engineers, including sky glow, glare and light trespass
Listed building	Buildings of special architectural or historic interest listed by the Secretary of State for Culture, Media and Sport on the advice of English Heritage. Buildings are graded to indicate their relative importance
London Plan 2011	Spatial development plan for Greater London – adopted July 2011
Lux	A unit of measurement of the intensity of light, measured in Ev
m/s	Metres per second
m ³	Cubic metres
MAGIC	Multi-Agency Geographic Information for the Countryside
MDL	Method Detection Limit
M&E	Mechanical and Electrical
MHWS	Mean High Water Springs
MHz	Mega Hertz
MLWS	Mean Low Water Springs
mm	Millimetres
MMS	Material Management Strategy. Document identifying management of materials generated during construction
MOLA	Museum of London Archaeology. Archaeological (Buried Heritage Assets) Consultant
MTS	Mayor's Transport Strategy
MW	Medium Wave. Those between the frequencies of 300 kHz and 3000 kHz. In most of the world, mediumwave serves as the most common band for broadcasting.
Macro fauna	Animals that are one centimetre or more long but smaller than an earthworm
Macro-invertebrates	Animals without backbones that are larger than ½ millimetre
Made Ground	Soils or other material that has been deposited by man rather than natural processes, for example to make up ground levels
Major Aquifer	Strata with high permeability, which has known, or probable significant fracturing. It may be highly productive and able to support large abstractions for public supply and other purposes
Met	Metrological Office
Metropolitan Police	Central London Police Service
Microclimate	The climate in a small-localised area

Glossary and Abbreviations

Abbreviation	Definition
Minor Aquifer	Strata of variable permeability, where groundwater may be used as a local source but seldom produces sufficient water for large abstractions
Mitigation (measure)	The measures put forward to prevent, reduce and where possible, offset any adverse effects on the environment
Multi-pathing	Multiple radio telecommunication signals as a result of obstructions in the signal pathway
Multi-paths	Signals that arrive at the target by different routes
Multiplier	Figure used to calculate the number of induced and indirect jobs created
Multiplier effects	Further economic activity (jobs, expenditure or income) associated with additional local income and local supplier purchasing
N	North
NAQS	National Air Quality Strategy. The Environment Act 1995 required the Government to develop a National Air Quality Strategy. The Strategy, originally published in 1997, set challenging health-based targets for eight main air pollutants. These are benzene; 1,3-butadiene; carbon monoxide; lead; nitrogen dioxide; ozone; fine particles (PM ₁₀); and sulphur dioxide. The predominant source for most of these pollutants is road traffic, but industrial and domestic sources are also major contributors
NATA	New Approach To Appraisal. Provided by DfT
NB	North Bound
NB	Nota Bene
NBN	National Biodiversity Network
NE	Natural England
NE	Northeast
NEAP	Neighbourhood Equipped Areas of Play
NERC	Natural Environment and Rural Communities Act 2006
NGR	National Grid Reference
NIA	Net Internal Area. The usable area within a building measured to the internal face of the perimeter walls at each floor level. It does not include those parts of buildings that enable them to function, i.e. corridors and circulation areas, stairways and stairwells, lavatories and toilet lobbies
NIR	Noise Insulation Regulations 1988
NLE	Northern Line Extension
NMR	National Monuments Record
NNR	National Nature Reserves

Abbreviation	Definition
NO ₂	Nitrogen Dioxide. Road transport and the burning of fossil fuels for power are the main sources of Nitrogen dioxide. In addition to being a greenhouse gas it also contributes to photochemical smog formation. It is an irritant to the respiratory system
NO _x	Nitrogen Oxides. NO _x is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. NO _x is typically comprised largely of nitric oxide (NO) and nitrogen dioxide (NO ₂). Many of the nitrogen oxides are colourless and odourless, although NO ₂ can often be seen as a reddish-brown layer over many urban areas when present alongside particulates. NO _x form when fuel is burned at high temperatures, as in a combustion process. Consequently, these emissions occur almost exclusively from the combustion of fossil fuels for industry and transport, and from the burning of biomass
NOEL	No Observed Effect Level
NPPF	National Planning Policy Framework (published 27 th March 2012)
NPSE	Noise Policy Statement for England
NR	Network Rail
NRMM	Non-Road Mobile Machinery
NSR	Noise Sensitive Receptors
NTS	Non-technical summary. A summary of the Environmental Statement in non-technical language providing a concise, yet comprehensive description of the likely effects of the project on the environment
NVQ	National Vocational Qualification
NW	Northwest
Natural Area	Sub-division of England, each with a characteristic association of wildlife and natural features
Natural Resources	Resources naturally within environments that exist relatively undisturbed by mankind, in a natural form. A natural resource is often characterized by amounts of biodiversity existent in various ecosystems
Nature Conservation Area	An area defined as being of interest/importance for nature conservation
Net	After all deductions have been made
Network Rail	Owns and operates Britain's rail infrastructure
Non-aquifer	A below ground layer of soil or rock that does not yield water
Non-hazardous Material	Material that may contain contaminants but poses no risk to the environment

Glossary and Abbreviations

Abbreviation	Definition
O ₃ .	Ozone is a molecule composed of three atoms of oxygen. Two atoms of oxygen form the basic oxygen molecule – the oxygen we breathe that is essential to life. The third oxygen atom can detach from the ozone molecule, and re-attach to molecules of other substances, thereby altering their chemical composition. The same chemical properties that allow high concentrations of ozone to react with organic material outside the body give it the ability to react with similar organic material that makes up the body, and potentially cause harmful health consequences. When inhaled, ozone can damage the lungs
OA	Opportunity Area. Areas identified with the London Plan where development is to be encouraged
OAPF	Opportunity Area Planning Framework. A document setting out the strategic vision for an area
OCA	Obstacle clearance authority
OD	Ordnance Datum
ODPM	Office of the Deputy Prime Minister
OGV	Other Goods Vehicle
ONS	Office for National Statistics
ORR	Office of Rail Regulation
OS	Ordnance Survey
OSA	Open Space and Child Play Space Audit
OSD	Over Site Development
OSS	Open Space Study
P	Probability (as used in <i>Chapter 16: Climate Change Adaptation and Mitigation</i>)
PAH	Poly Aromatic Hydrocarbon
PAN	Peroxyacetyl Nitrate
PCT	Primary Care Trust
PEA	Preliminary Environmental Assessment
PEDS	Pedroute Strategic Model
PERS	Pedestrian Environment Review System
pH	A measure of the acidity or basicity of a solution
PIR	Passive Infra-Red
PLA	Port of London Authority. A self-financing statutory body, whose responsibilities include ensuring navigational safety along the Tidal Thames, promoting use of the River and safeguarding the environment
PM _{2.5}	Particulate mater with a mean aerodynamic diameter of 2.5 microns or less

Abbreviation	Definition
PM ₁₀	Particulate mater with a mean aerodynamic diameter of 10 microns or less
PMS	Personal Medical Service
PPC	Pollution Prevention and Control
PPE	Personal Protective Equipment
PPG	Planning Policy Guidance
PPGN	Pollution Prevention Guidance Notes (Environment Agency)
PPM	Planned Preventative Maintenance
PPS	Planning Policy Statement
PPV	Peak Particle Velocity in metres per second. The vibration measurement parameter that based on a form of acceleration that is frequency weighted to reflect human sensitivity to various frequencies
PSAR	Project Sustainability Assessment Report. Document comprising series of commitments to achieve sustainable development
PTAL	Public Transport Accessibility Level. Method used in United Kingdom transport planning to assess the access level of geographical areas to public transport
PV	Photovoltaics. The process of converting light into electric energy
Particulate matter	Discrete particles in ambient air, sizes ranging between nanometres (nm, billionths of a metre) to tens of micrometres (µm, millionths of a metre)
Pathways	The routes by which impacts are transmitted through air, water, soils or plants and organisms to their receptors
Percentile levels	The level of A-weighted noise exceeded for N% of the measurement time. LAF90, T is often used as a measure of background noise in many standards and guidelines. The LAF90, T parameter would therefore represent the level exceeded for 90% of the measurement period, T. Likewise the LAF10, T would indicate the level exceeded for 10% of the measurement period, T indicating the higher noise levels measured.
Perennial vegetation	A plant that lives for more than two years
Permeability	The ease at which liquids (or gases) can pass through rocks or a layer of soil
Phase I Ecology Survey	An on-site survey of the general habitat types, sizes, locations and other relevant ecological information. This type of survey is usually done first before the more detailed Phase II survey is carried ou
Photomontage	The use of photographs of a site from a certain viewpoint to show both the current base (pre-development) state of the site and the anticipated view of the site once development is complete
Phototoxic	A phototoxic substance is a chemical compound, which becomes toxic only when exposed to light

Glossary and Abbreviations

Abbreviation	Definition
Pile	A timber, steel or concrete post that is driven jacked or cast (bored) into the ground to carry vertical or horizontal loads
Planktonic Life	Any drifting organisms (animals, plants, archaea, or bacteria) that inhabit the pelagic zone of water bodies
Plant	A building's generator, heating, ventilation, and/or electricity-production system, or the machinery used in demolition and construction
Pollution pathway	A pollution pathway exists when a source of pollution has been identified which can impact upon a receptor in some way
Polycarbonates	A plastic derived contaminate
Preservation by Record	The recovery of archaeological evidence and in its interpretation and publication
Principal Contractors	The Contractors duly appointed by the Applicant as the Principal Contractors pursuant to regulation 6(5) Construction design and management (CDM Regulations 2007). Responsible for overall planning, management, monitoring of construction process, welfare and safety of construction workers and securing the Site during construction.
Public Realm	The space between and within buildings that are publicly accessible, including streets, squares, forecourts, parks and open spaces
R	Risk (as used in <i>Chapter 16: Climate Change Adaptation and Mitigation</i>)
RBD	River Basin District
RBMP	River Basin Management Plan
RC	Reinforced Concrete
R&D	Research and Development
RDB	Red Data Book. A species that is listed as occurring in 15 or fewer 10km squares in the UK
RDP	Research Development Paper
REO	Real Estate Opportunities
RFRA	Regional Flood Risk Assessment
RMC	Ready Mix Concrete
RODS	Rolling Origin & Destination Survey. London Underground procedure
RPG	Regional Planning Guidance
RSL	Registered Social Landlord
RSPG	Railway Safety Principles and Guidance
RSS	Regional Spatial Strategy
RTD	River Terrace Deposits

Abbreviation	Definition
Rw	Single number quantity that categorises the airborne sound insulating properties of a material or building element over a range of frequencies
Receptor	(Sensitive) A component of the natural created or built environment such as human being, water, air, a building, or a plant that is affected by an impact
Redline Plan	Site plan showing extent of development area
Refuse Burning Station	A power generating facility utilising refuse as a fuel
Reinforced concrete	Concrete reinforced with steel bars to increase tensile strength
Rendering	A technical term used to describe the process of creating a two-dimensional output image from the 3D wireframe image within the visual assessment
Reserved Matters	Parts of the site that are detailed or reserved
Residual Impacts	Those impacts of the development that cannot be mitigated following implementation of mitigation proposals
Retail	The activity of selling goods to the public, usually in small quantities
Risk Assessment	An assessment of the likelihood and severity of an occurrence
Riverine	Located on or inhabiting the banks of a river
Running Tunnels	Basic sections of tunnels between stations, shafts and turnouts
Runoff	Rainwater flowing off the ground surface
SAC	Special Areas of Conservation. SACs are strictly protected sites designated the EC Habitats Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). Sites proposed for selection are proposed by the statutory nature conservation agencies, co-ordinated through JNCC
SAM	Scheduled Ancient Monument
SAP	Species Action Plan. A logical way of allowing the ecological knowledge gained about a species to be collated and conservation actions listed in a clear manner
SATURN	Simulation and Assignment of Traffic to Urban Road Networks. A suite of network analysis programmes
SB	South Bound
SBINC	Site of Borough Importance for Nature Conservation
SCL	Sprayed Concrete Lining
SDG	Steer Davies Gleave
SDS	Sustainable Development Strategy

Glossary and Abbreviations

Abbreviation	Definition
SE	Southeast
SFRA	Strategic Flood Risk Assessment
SGI	Spheroid Graphite Iron. A construction method using cast iron linings for support in connecting new tunnels to existing tunnels
SGV	Soil Guideline Values
SHF	Super High Frequency
SI	Statutory Instrument
SIL	Strategic Industrial Location
SINC	Site of Importance for Nature Conservation. Designated as sites of ecological value at local level under local planning policy
SKM	Sinclair Knight Merz. Transport consultants employed by GLA to undertake modelling of various public transport options in the Opportunity Area
SLINC	Site of Local Importance for Nature Conservation
SME	Small and Medium Enterprise
SMINC	Sites of Metropolitan Importance for Nature Conservation
SMR	Sites and Monuments Records
SNCI	Site of Nature Conservation Importance/Interest
SO ₂	Sulphur dioxide. SO ₂ is an acidic gas that belongs to the family of sulphur oxide gases (SOX), produced during the combustion of fuels that contain sulphur compounds, such as coal and oil. SO ₂ is also released naturally from volcanic eruptions and similar natural phenomena. The health effects associated with high levels of SO ₂ are mainly concerned with breathing problems and aggregates heart and lung problems. SO ₂ , along with NOX, is one of the precursors to 'acid rain'
SOAEL	Significant Observed Adverse Effects Level
SPA	Special Protection Area. The EC Directive on the Conservation of Wild Birds (79/409/EEC) requires member states to safeguard the habitats of migratory birds and certain particularly threatened birds. Under the Directive, the UK is committed to taking "the requisite measures to preserve, maintain and re-establish a sufficient diversity and areas of habitat" for "all species of naturally occurring birds in the wild state". This includes the designation of SPAs
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance. Non-statutory guidance that supplements Unitary Development Plan (UDP) policies
SPZ	Source Protection Zone
Sq.m	Square metres
SRDF	Sub-Regional Development Framework
SSL	Sainsbury's Supermarkets Limited

Abbreviation	Definition
SSSI	Site of Special Scientific Interest. The best sites for wildlife and geological features in England as designated under the Wildlife and Countryside Act 1981
SuDS	Sustainable Drainage Systems
SVOC	Semi-volatile Organic Compounds
SW	Short Wave
SWMP	Site Waste Management Plan
Scoping	An initial stage in determining the nature and potential scale of environmental impacts arising as a result of a development, and an assessment of what further studies are required to establish their significance
Sediment Traps	A sediment trap is a containment area where sediment-laden runoff is temporarily detained
Shaft	A vertical excavation used as a passage from the surface to the below ground works, used for ventilation, travelling, hoisting, or all three. Shafts are usually of limited cross section in relation to their depth
Sound Power	The sound power level (L _w) of a source is a measure of the total acoustic power radiated by a source. The sound pressure level varies as a function of distance from a source. However, the sound power level is an intrinsic characteristic of a source (analogous to its volume or mass), which is not affected by the environment within which the source is located
Spoil	Refuse material removed from an excavation
Stakeholder	A person, group, or organisation that affects or can be affected by an organisation's actions
Station Box	A deep cut and cover box below ground level which will contain the station concourse and relevant facilities
Statistical Noise Levels	For levels of noise that vary widely with time, it is necessary to employ an index that allows for this variation. For example, L ₁₀ is the level exceeded for ten per cent of the time period. A weighted statistical noise levels are denoted LA ₁₀ , dBLA ₉₀ etc. The reference time period (T) is normally included, e.g. dBLA ₁₀ , 5min or dBLA ₉₀ , 8hr
Statutory Consultee	Groups or bodies that, by law, must be consulted as part of the planning application process for EIA development
Step Junction Plate	A junction where two tunnels lined with plates of different diameters meet, and vertical plates are used to close the vertical faces, to form a step
Strata	Layer of rock or soil
Stratigraphic sequence	The order in which rock and soil layers are found in the ground
Substructure	Foundations or base of a structure

Glossary and Abbreviations

Abbreviation	Definition
Sub-tidal	Zone just below the low water mark of the tide that is never exposed, even at low tide
Superstructure	Is an upward extension of an existing structure above a baseline
Sustainable Development	Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs
T	Tonnes
TA	Transport Assessment. Prepared and submitted alongside applications for developments likely to have significant transport implications. For major proposals, assessments should illustrate the following: accessibility to the site by all modes, the likely modal split of journeys to and from the site and proposed measures to improve access by public transport, walking and cycling. Statutory plans produced by each borough, which integrate strategic and local planning responsibilities through policies and proposals for the development and use of land in their area
TBM	Tunnel Boring Machine
TD	Threshold Detector
TE1200	Thames Estuary 2100 Plan
TfL	Transport for London
THUK	Treasury Holdings UK Ltd
TI	Technology International (Europe) Ltd
TLRN	Transport for London Road Network
TMP	Travel Management Plan
TPH	Total Petrol Hydrocarbons
tph	Trains Per Hour
TRANSYT	A traffic simulation and signal timing optimising programme
TRAVL	'Trip Rate Assessment Valid for London' – multi-modal trip generation database specifically for London
TSO	The Stationary Office
TSP	Total Suspended Particulates
TT	Tranquillity Transect.
TTWA	Travel To Work Area
TV	Television
TV (DTT)	Television (digital)
TWAO	Transport and Works Act Order. Can authorise railways, tramways, guided transport schemes and certain other types of infrastructure project in England and Wales
TWRM	Thames Water Ring Main
TWUL	Thames Water Utilities Limited

Abbreviation	Definition
Tender	A bid for a contract
Threshold	A level of effect above which an assessment will be taken of whether any changes to procedures need to be made
Topography	The natural or artificial features, level and surface form of the ground surface
Trial Pits	Intrusive investigation positions excavated by a mechanical excavator
Trusses	A structure comprising one or more triangular units constructed with straight slender members whose ends are connected at joints referred to as nodes
UDP	Unitary Development Plan. A land use plan. It provides the statutory planning framework for the local planning authority setting out the objectives, policies and proposals for the use of land and buildings in the area for the next 10 years
UHF	Ultra High Frequency. UHF designates a range (band) of electromagnetic waves whose frequency is between 300 MHz and 3.0 GHz. Waves whose frequency is above the UHF band fall into the microwave or higher bands, while lower frequency signals fall into the VHF or lower bands
UK	United Kingdom
UKCIP	UK Climate Impacts Programme
UKCP09	UK Climate Projections 2009
UKPN	UK Power Network
UKTAG	UK Technical Advisory Group
URS	URS Infrastructure and Environment UK Limited. Authors of the Environmental Statement
US EPA	United States Environmental Protection Agency
UST	Underground storage tanks
UV	Ultraviolet
UXO	Unexploded Ordnance
VDV	Vibration dose values in metres per second. The vibration measurement parameter that based on a form of acceleration that is frequency weighted to reflect human sensitivity to various frequencies
VHF	Very High Frequency. Designated range of radio frequency electromagnetic waves from 30 MHz to 300 MHz
VNEB	Vauxhall Nine Elms and Battersea. This is identified as an 'Opportunity Area' in the London Plan for regeneration and redevelopment, as an integral part of the Central Activities Zone.

Glossary and Abbreviations

Abbreviation	Definition
VOC	Volatile Organic Compounds. Volatile organic compounds (VOCs) are a group of natural organic chemicals that contain carbon in their molecular structure, including methane and non-methane species, such as benzene, toluene, xylene, and 1,3-butadiene, for example
V/v	Measure of gas velocity
Viaduct	A bridge composed of several small spans
Verified Image	An outline image of the Development on a base photograph to provide projections of key views
WAC	Waste Acceptance Criteria
WebTAG	Web Transport Analysis Guidance. Provided by DfT
WEEE	Waste Electrical and Electronic Equipment
WCA	Wildlife and Countryside Act 1981
WFD	Water Framework Directive

Abbreviation	Definition
WG	Weather Generator
WHO	World Health Organisation
WiFi	Wireless network
WRA	Water Resources Act 1991
WRAP	Waste & Resources Action Plan
WRZ	Water Resource Zone
WTE	Whole Time Equivalent
WTS	Waste Transfer Station
WTW	Water Treatment Works
WWII	Second World War
$\mu\text{g}/\text{m}^3$	Microgram per cubic metre. A measure of concentration commonly used to present air quality conditions

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No figures

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01 Introduction

Environmental Statement

Volume I

01 Introduction

Introduction

- 1.1** This Environmental Statement (ES) forms part of the 'Statement of Environmental Information' required to support the Transport and Works Act Order (TWAO) application for the proposed Northern Line Extension (NLE). This chapter comprises three main parts:
1. The Need for NLE - this section introduces Transport for London (TfL), the project sponsor of the proposed NLE, and provides an overview of the relationship between the NLE and the Vauxhall Nine Elms Battersea Opportunity Area Planning Framework (VNEB OAPF) (Ref. 1-1), the Mayor's Transport Strategy (MTS) (Ref. 1-2) and the London Plan (Ref. 1-3).
 2. Scheme Overview - this section presents an overview of the NLE optioneering process and chosen route and outlines the key components of the chosen route, which have been assessed by the Environmental Impact Assessment (EIA).
 3. The TWAO Process - this section introduces the TWAO application process and outlines the broad content of this ES.

The Need for the NLE

- 1.2** TfL is responsible for most aspects of the transport system in Greater London. It is responsible for London Underground Ltd, which runs London's underground rail network, and implements the MTS. This Strategy identifies the NLE as one of the proposed measures to achieve the Mayor's vision for London's transport system.

The Vauxhall, Nine Elms & Battersea (VNEB) Opportunity Area (OA)

- 1.3** In the London Plan, OAs are identified on the basis that they are capable of accommodating substantial new jobs and homes and the London Plan advises that their potential should be maximised.
- 1.4** The MTS sets out the Mayor's vision for transport and describes how TfL and its partners, including the London boroughs will deliver the Mayor's vision. To achieve this overarching vision, the MTS sets out six goals, five of which are applicable to the VNEB OA and supported by the NLE:
- 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.
- 1.5** Policy 2.13 of the London Plan identifies a number of OAs and explains that Planning Frameworks will be used in order to realise their growth potential. In order to achieve this, a Planning Framework must:
- Seek to optimise residential and non residential output and densities;
 - Provide necessary social and other infrastructure to sustain growth, and, where appropriate, contain a mix of uses;

- Contribute towards meeting (or where appropriate, exceeding) the minimum guidelines for housing and/or indicative estimates for employment capacity set;
- Realise scope for intensification associated with existing or proposed improvements in public transport accessibility; and
- Support wider regeneration (including in particular improvements to environmental quality) and integrate development proposals to surrounding areas.

- 1.6** The Greater London Authority (GLA) adopted a planning framework for the VNEB OA in March 2012. This is commonly referred to as the Opportunity Area Planning Framework (OAPF) and is referred to in this ES, and in other TWAO application documents, as the OAPF. The OAPF was prepared in collaboration with a number of authorities, including TfL, Design for London (DfL), English Heritage (EH) and both the London boroughs of Wandsworth and Lambeth (LBW and LBL respectively). The GLA has also worked closely with a number of key developers in the OA Figure 1-1 identifies the location of the VNEB OA in the context of south west London.

- 1.7** The main objective of the OAPF is to guide the regeneration and redevelopment of the VNEB OA. It sets out the infrastructure that is needed to maximise development potential. It is widely recognised that the key to achieving the potential of an OA is the provision of significant improvements to public transport accessibility. As part of the OAPF preparation, Sinclair Knight Merz (SKM) transport consultants were appointed by the GLA to undertake modelling of various public transport options, including the potential for an extension of the London Underground Northern line, and relate this to various development density scenarios (Ref. 1-4). The SKM modelling concluded that only through major transport improvements, including bus improvements and the extension to the London Underground Northern line, would transport capacity increase sufficiently to deliver comprehensive high density regeneration, in line with the London Plan. One of the key developments within the VNEB OA is the proposed redevelopment of Battersea Power Station (BPS). This has an extant planning approval (Ref. 2009/3575) from LBW given in November 2010 (Ref. 1-5) and enabling works on the earlier development phases are expected to commence shortly.

- 1.8** As a result of this analysis of public transport accessibility, the NLE is supported by the planning policy framework of the GLA, the LBW, and consistent with policies of LBL.

- 1.9** The planning policy context for the NLE is described further in *Chapter 5: Planning Policy Context* of this ES.

Scheme Overview

Route Development Options

- 1.10** *Chapter 3: Options and Alternatives* of this ES provides further information on the transport options considered by TfL, NLE route options and the optioneering

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process undertaken in relation to the alignment, tunnels, station and ventilation / intervention shaft locations and design as part of the TWAO process. A summary of the NLE route options is provided below.

- 1.11** A number of different route options and sub-options have been considered. Four main route options have been considered as described below:
- Route 1 – an extension directly from Kennington to BPS with no intermediate stops;
 - Route 2 – an extension from Kennington to BPS with an intermediate station located near Wandsworth Road, south of the Network Rail mainline railway viaduct;
 - Route 3 – an extension from Kennington to BPS including a new interchange at the existing Vauxhall Underground station; and
 - Route 4 – an extension from Kennington to BPS with an intermediate station to the north of the Network Rail mainline viaduct near Wandsworth Road or adjacent to the proposed site of the new American Embassy.
- 1.12** Following consideration of a wide range of matters including engineering feasibility, environment and economic viability factors, public consultation, and land acquisition, the decision was taken to proceed with Route 2. Route 2 connects to the existing Northern line on each side of the Kennington Loop and proceeds via an intermediate station at Nine Elms to a terminus at BPS approximately 3, 200 metres (m) away.
- 1.13** The NLE works comprise the construction of an underground railway to form an extension of the Northern line (Charing Cross branch) from Kennington to Battersea. It will diverge from the existing railway south of Kennington station from a section of track used by terminating trains (known as the Kennington Loop) and will comprise the following:
- Railway approximately 3,150m long northbound and approximately 3,250m long southbound including overrun / stabling tunnels west of the terminus at Battersea, a crossover east of the terminus and junctions serving each of the tunnels to link with the existing railway at the Kennington Loop;
 - A terminus at Battersea between Battersea Park Road and Battersea Power Station (BPS) and an intermediate station at Nine Elms west of Wandsworth Road and north of Pascal Street, both providing step-free access from trains to street level;
 - Intervention and ventilation shafts with head houses at Kennington Green and Kennington Park to provide emergency access, tunnel ventilation and smoke control; and
 - Ancillary and mitigation works within the limits of deviation including (but not limited to) providing power supply, additional cross passages at platform level at Kennington station and works related to highways, footways and utilities.
- 1.14** The NLE works also include:
- Accommodation works for affected landowners / occupiers including (but not limited to):

- Temporary facilities for Battersea Dogs and Cats Home and Covent Garden Market Authority;
 - Temporary and permanent facilities for occupiers of the park lodge at Kennington Park; and
 - The installation of a water tank for the benefit of the Beefeater Gin Distillery.
- Temporary works including worksites at the locations of the proposed stations and shafts / head houses, temporary shafts at Radcot Street and Harmsworth Street and a temporary conveyor and associated alterations to the jetty at BPS to facilitate the transfer of material onto barges.

1.15 Once fully operational, the NLE will operate up to 28 trains per hour.

1.16 In order to facilitate development within the VNEB OA, it is anticipated that site enabling works of the NLE would commence in 2015 with commissioning in 2020.

1.17 Figure 1-2 presents an overview of the main elements of the NLE project. Further details on the NLE chosen route can be found in *Chapter 4: Description of the NLE*.

The Transport & Works Act Order (TWAO) Process

Overview of the TWAO Process

- 1.18** Orders under the Transport and Works Act 1992 (the TWA) (Ref. 1-6) can authorise railways, guided transport schemes and certain other types of infrastructure project in England and Wales. In England, applications for TWA Orders are made to the relevant Secretary of State. Applications are made by (or on behalf of) the promoters of the scheme.
- 1.19** The kinds of scheme that may be authorised by a TWA Order can have a very important role to play in improving the country's infrastructure and economy. They can also give rise to objections from people whose property or business is affected, or who may be concerned about the effect on the local environment. The purpose of the procedure is to allow the Secretary of State to come to an informed view on whether it is in the public interest to make the TWA Order.
- 1.20** The Secretary of State considers each application carefully and without bias. Decisions are only made after considering all the comments made - sometimes through a public inquiry. An EIA has been undertaken as part of the requirements of Rules 7 and 10 of the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (the TWAO Rules) (Ref. 1-7) and an ES prepared to accompany the TWAO application. Schedule 1 to the TWAO Rules identifies the "information to be included in an environmental statement". As such, the ES has been prepared in accordance with these rules.
- 1.21** The typical documents, specified by the TWAO Rules, needed for a proposal involving works are:
- A draft Order and an explanatory memorandum;
 - A concise statement of the aims of the proposals;
 - A report summarising the consultations carried out by the applicant;
 - Plans and cross-sections;

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- An Environmental Statement;
- A book of reference, including names of owners and occupiers of land to be acquired compulsorily;
- The estimated costs of the proposed works; and
- The funding arrangements.

1.22 The following interrelated documents are also submitted with the NLE TWA Order application:

- A Design and Access Statement (DAS), explaining the design rationale underpinning the proposed locations, layouts and design for the NLE,
- A Material Management Strategy (MMS) (found in *ES Volume II: Appendix B1*), identifying the management of materials generated during construction,
- A Project Sustainability Assessment Report (PSAR) (found in *ES Volume II: Appendix O*), which comprises a series of commitments that TfL will deliver during the detailed design, construction and operational phases of the NLE, to achieve a sustainable development, and
- An Outline Energy Strategy (found in *ES Volume II: Appendix O*) that details the methods identified to minimise the NLE's operational energy consumption through the implementation of passive design measures, energy efficiency, and Low and Zero Carbon (LZC) technologies.

The NLE Environmental Statement

1.23 Likely environmental impacts have been studied systematically through the EIA process, the results of which are presented within this ES. The ES describes the environmental and socio-economic impacts and effects of the NLE during site preparation, construction, excavation and subsequent operation. The ES is designed to inform readers of the nature of the NLE, the likely environmental impacts and any significant environmental effects and the measures proposed to protect the environment or render any significant adverse effects non-significant. In addition to the TWAO Rules, as a matter of best practice the ES has also been prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (hereinafter referred to as the 'EIA Regulations') (Ref. 1-8). Further explanation of the EIA methodology can be found in *Chapter 2: EIA Methodology*.

1.24 The ES also describes the consultation process undertaken. Views of statutory and non-statutory consultees serve to focus the environmental studies and to identify specific issues, which require further investigation. Consultation is an ongoing process, which enables mitigation measures to be incorporated as the design of the project evolves, thereby limiting adverse effects and enhancing project benefits. A 'Report on Consultation' has been produced by TfL, and submitted as part of the TWAO application. Consultation specific to the ES is described in *Chapter 2: EIA Methodology*.

Structure of the Environmental Statement

1.25 This Environmental Statement (ES) consists of:

- **Volume I: ES** forms the main body of the ES and comprises:

- Introductory chapters that introduce the NLE, provide background information, and the methodology that has been used in the technical assessment chapters;
 - Scheme description chapters that describe the main options considered in reaching the design that the TWAO seeks powers to construct;
 - Technical assessment chapters that detail the results of environmental investigations, impacts arising and proposed mitigation measures;
 - Concluding chapters that provide a summary of the cumulative and residual effects.
- **Volume II: Technical Appendices** comprise background data, technical reports, tables, figures (including photomontages) and surveys.
 - **Non-Technical Summary (NTS)**: this is presented as a separate document (and bound into the front of ES Volume I), providing a concise description of the NLE, development alternatives, environmental impacts, mitigation measures and residual effects. The NTS is designed to give information on the NLE to a wide and non-technical audience and to assist interested parties with their familiarisation of the project.

Location of Information within the ES

1.26 The EIA Regulations (Schedule 4, Part 1) identify information that is "*reasonably required to assess the environmental effects of the development and which the applicant / promoter can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile*". In addition, as mentioned earlier, Schedule 1 to the TWAO Rules identifies the "*information to be included in environmental statement*."

1.27 This information together with its location within the ES is presented in Table 1-1.

Planning Policy Context

1.28 Throughout the preparation of the ES, consideration has been given to relevant planning policy. In particular, due consideration has been given to the National Planning Policy Framework (NPPF), relevant Mayoral Strategies (e.g. the Transport Strategy) and the London Plan (the Spatial Development Strategy) and related Supplementary Planning Guidance (SPG), the VNEB OAPF and Local Development Frameworks, including Core Strategies, saved Unitary Development Plan policies and Preferred Options and other related Supplementary Planning Documents (SPD). A summary of the planning policy context for the NLE project is presented in *Chapter 5: Planning Policy Context* of this ES.

01 Introduction

Table 1- 1 Location of Information within the ES

Specified Information (2011 EIA Regulations & 2006 TWAO Application Rules)		Location within the ES
1.	Description of the development, including in particular:	Chapter 4: Description of the NLE
a)	A description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases;	Chapter 4: Description of the NLE
b)	A description of the main characteristics of the production processes, for instance, nature and quantity of the materials used; and	Chapter 4: Description of the NLE
c)	An estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development.	Chapter 4: Description of the NLE and Chapters 6-16
2.	An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice made, taking into account the environmental effects.	Chapter 3: Options and Alternatives
3.	A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the interrelationship between the above factors.	Chapters 6-16
4.	A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from:	Chapters 6-16
a)	The existence of the development;	Chapters 6-16
b)	The use of natural resources;	Chapters 6-16
c)	The emission of pollutants, the creation of nuisances and the elimination of waste and the description by the applicant or appellant of the forecasting methods used to assess the effects on the environment.	Chapters 6-16

Specified Information (2011 EIA Regulations & 2006 TWAO Application Rules)		Location within the ES
5.	A description of the measures envisaged to prevent, reduce and where possible, offset any significant adverse effects on the environment.	Chapters 4 and 6-16
6.	A non-technical summary of the information provided under 1-5 above.	Non-Technical Summary
7.	An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant or appellant in compiling the required information.	Chapter 2: EIA Methodology and Chapters 6-16

Project Team

- 1.29** The project team has been led by TfL, whose extensive role has included managing the submission of the TWAO material.
- 1.30** This ES has been compiled by URS Infrastructure and Environment Ltd. (URS) and presents the results of an EIA carried out by a number of technical specialists. The specialists are presented in Table 1-2, along with their respective disciplines and contribution to the EIA.

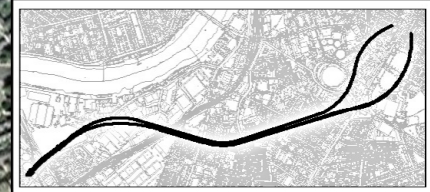
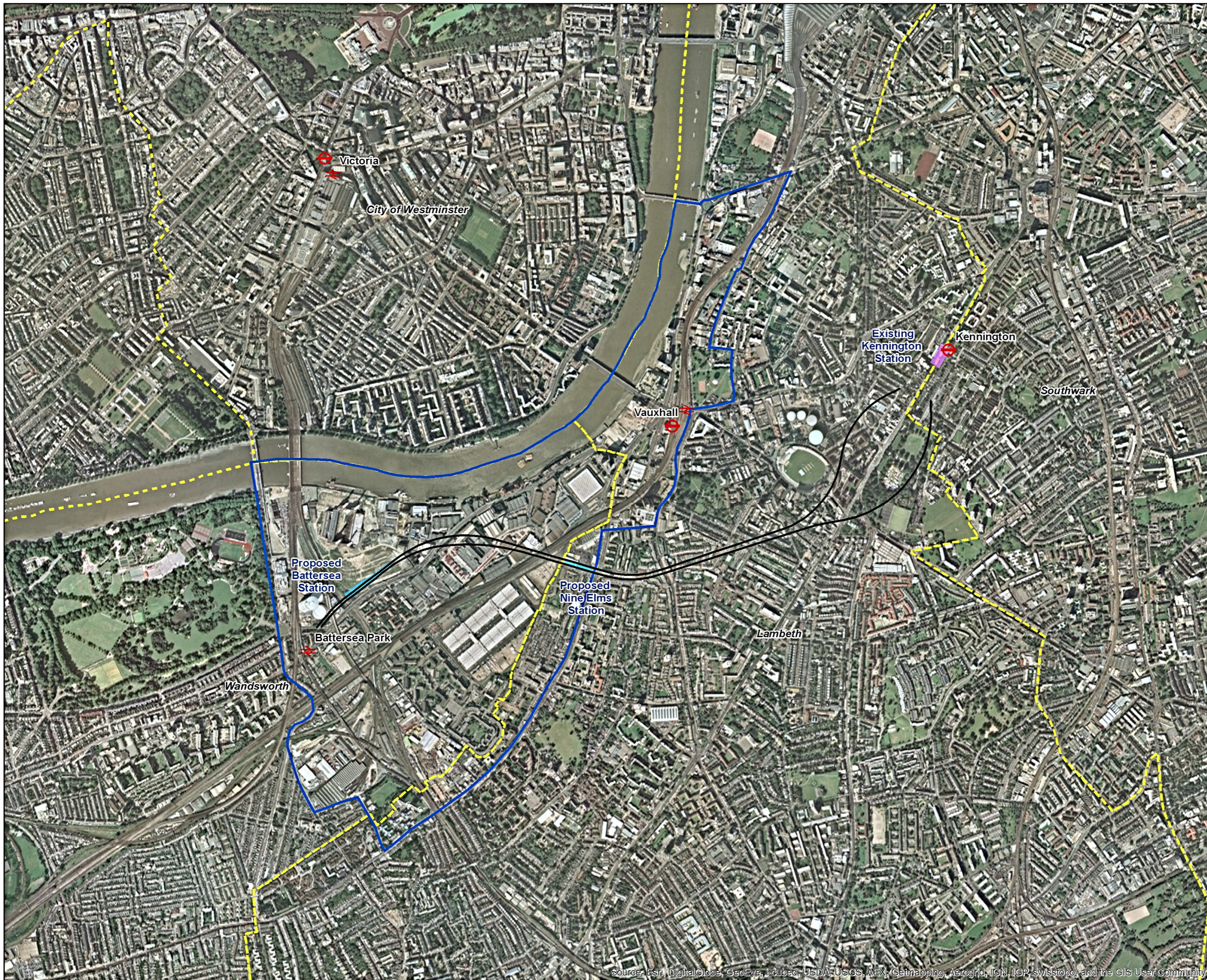
01 Introduction

Table 1-2 The Project Team

Expertise / EIA Input	Organisation
NLE Promoter, author of Chapter 6 Traffic and Transport, Part A of the Code of Construction Practice, and the Arboriculture Report.	TfL
Land Referencing	Ardent Management Limited
Legal Advisors to TfL	Bircham Dyson Bell LLP
Structural Engineers, Drainage & Flood Risk	Buro Happold
Feasibility, Cost & Quantity Surveyors	Corderoy
NLE Design Engineers	Halcrow
Above Ground Station and Shaft Architects	John McAslan and Partners
Technical Advisors to NLE Design Team	London Underground Limited
Archaeological Consultant	Museum of London Archaeology
Planning Consultant	Quod
Transport Consultant	Steer Davies Gleave
Below Ground Station Architects	Studioshare
Electromagnetism Consultant	Technology International (Europe) Ltd.
EIA Project Manager Production of ES Chapters: Socio-Economics, Noise & Vibration, Air Quality, Surface Water Resources and Flood Risk, Land Quality and Groundwater, Ecology, Townscape and Visual Amenity, Climate Change Adaptation and Mitigation. Production of Design and Access Statement, Project Sustainability Appraisal Report, Outline Energy Strategy	URS

References

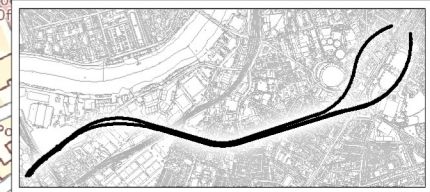
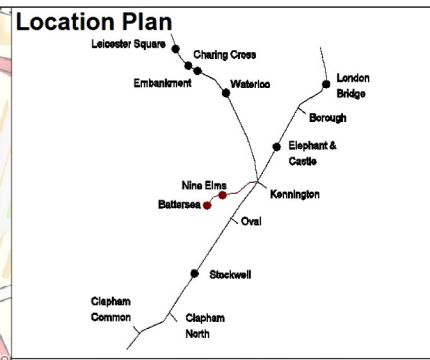
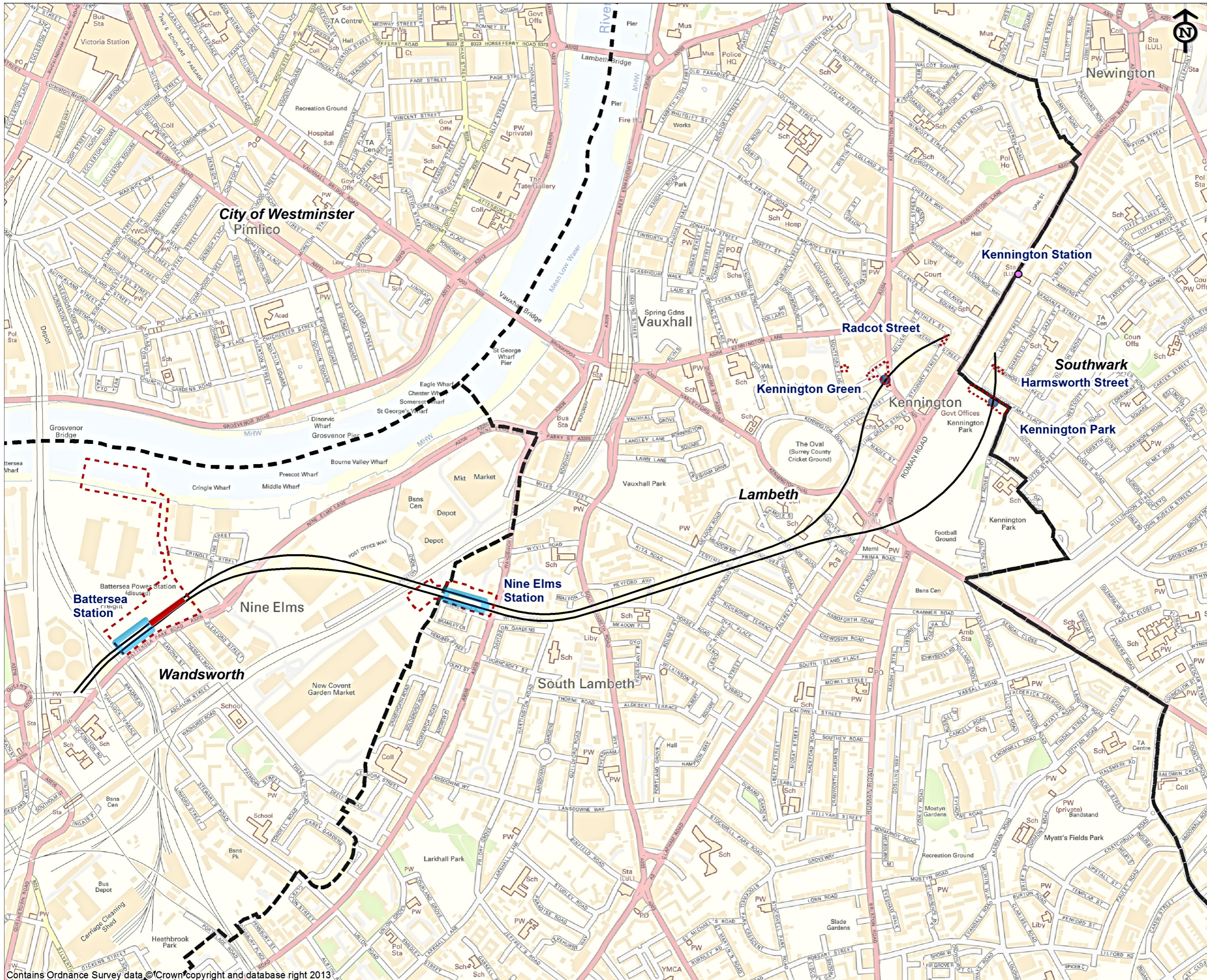
- Ref. 1-1 Mayor of London (2012); Adopted Vauxhall Nine Elms Battersea Opportunity Area Planning Framework
- Ref. 1-2 Greater London Authority (2010); Mayor’s Transport Strategy, May 2010
- Ref. 1-3 Greater London Authority (2011); The London Plan, Spatial Development Strategy for Greater London
- Ref. 1-4 Sinclair Knight Merz (2009); VNEB OA Transport Study Report
- Ref. 1-5 2009/3575, 2009/3576, 2009/3577, 2009/3578 Battersea Power Station Outline Planning Application
- Ref. 1-6 The Stationary Office (1992); Transport and Works Act 1992
- Ref. 1-7 Department for Transport (2006); Transport and Works (Applications and Objections Procedure) (England and Wales) Rules
- Ref. 1-8 Department for Communities and Local Government (DCLG) (2011); Town and Country Planning (Environmental Impact Assessment) Regulations.



- Key:**
- Proposed Station
 - Existing Station
 - Track Alignment
 - Opportunity Area
 - Borough Boundary

Client:		Transport for London
Project:		NORTHERN LINE EXTENSION TO BATTERSEA TWA0 FOR TfL
Drawing:		THE VAUXHALL NINE ELMS BATTERSEA OPPORTUNITY AREA
Suitability:		S4 FORMAL ISSUE TO CLIENT
Drawn by:	DT	Date: 04/03/2013
Checked by:	TW	Date: 04/03/2013
Approved by:	HW	Date: 04/03/2013
Drawing Scale:		1:15,000 @ A3
Drawing No:	Figure 1-1	
		Revision: 01

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



- Key:**
- Track Alignment
 - Borough Boundary
 - Proposed Station Footprint
 - Existing Station
 - Indicative Construction Site
 - Proposed Crossover
 - Permanent Ventilation and Intervention Shaft

Client: **Transport for London**

URS

Project: **NORTHERN LINE EXTENSION TO BATTERSEA TWA0 FOR TfL**

Drawing: **AN OVERVIEW OF THE NORTHERN LINE EXTENSION**

Suitability: **S4 FORMAL ISSUE TO CLIENT**

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

Drawing No: **Figure 1-2** Revision: **01**

02 EIA Methodology

Environmental Statement

Volume I

02 EIA Methodology

Introduction

2.1 This chapter describes the form of the Transport & Works Act Order (TWAO) application, and the methodology followed in the Environmental Impact Assessment (EIA) to predict the likely significant environmental impacts and effects of the works on environmental resources and receptors. The methodology is in accordance with applicable legislation, guidance and case law and has been tailored to each environmental discipline (e.g. noise and vibration, socio-economics and ecology) using industry standard methods and criteria. The overall approach and methodology is described in this chapter; with further detail on the application of the methodology to each environmental topic presented in the respective technical chapter. This chapter has been written by URS Infrastructure and Environment Ltd. (URS).

Transport & Works Act Order (TWAO) Applications

- 2.2** An order made under the Transport and Works Act (TWA) 1992 (Ref. 2-1) is the usual way of authorising a new railway or tramway scheme in England and Wales. Applications for a TWAO are made, in England, to the relevant Secretary of State. Applications are made by (or on behalf of) the promoters of the scheme, in this case Transport for London (TfL). Promoters of schemes of this kind often need a range of powers to put their scheme into practice. Under the TWA, a promoter can apply to the Secretary of State for an order giving these powers. The powers that can be given in a TWAO can be very wide ranging, for example the promoter of a new railway may need compulsory acquisition powers to buy land or powers to close roads.
- 2.3** The promoter may also make a request for a direction deeming planning permission to have been given for any development authorised by the TWAO. The Secretary of State will only direct that planning permission is deemed to be granted if the Secretary of State decides to make the TWAO. The Secretary of State will do so at the same time the order is made, and may attach conditions to the direction. Alternatively, the promoter applying for a TWAO may also apply for planning permission separately to the local planning authority/authorities before or after the TWAO has been made by the Secretary of State.
- 2.4** In the case of the Northern Line Extension (NLE), the promoter will make an application to the Secretary of State for a direction for deemed planning permission, under Section 90(2A) of the Town and Country Planning Act 1990, at the same time as making the TWAO application.
- 2.5** Sometimes a scheme requires listed building consent or Conservation Area consent, or another type of consent in addition to the TWAO. Applications for a listed building consent or Conservation Area consent can be made simultaneously with, or just after, the TWAO application. In this case, it is planned that the NLE TWAO application will be supported by two Conservation Area Consent applications and one Listed Building Consent application.
- 2.6** Applications for TWAOs, and objections to them, must follow the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (Ref. 2-2). The Rules specify the documents which must be submitted with an application. These vary according to the type of order being applied for, but the

typical documents needed for a proposal involving works are detailed in *Chapter 1: Introduction* of this Environmental Statement (ES).

Requirement for EIA

- 2.7** Rule 7 of the TWAO Rules requires an ES to be provided with an application for a TWAO if the order would authorise a project of a type mentioned in Annex I or Annex II to the EIA Directive (Ref. 2-3). Where a project falls within Annex I, the applicant must provide an ES. Where a project falls within Annex II, an ES must be provided unless the Secretary of State has made a screening decision that an EIA (and hence ES) is not required. Such a screening decision would be made on the basis that the project, although listed within Annex II, would not have a significant impact on the environment.
- 2.8** It was considered by TfL that the NLE falls within Annex II Paragraph 10(h) "*Tramways, elevated and underground railways, suspended lines or similar lines of a particular type, used exclusively or mainly for passenger transport*" and could have a significant environmental effect (both beneficial and adverse (without suitable mitigation)) and, therefore, accepted that the TWAO application should be accompanied by an ES.

Legislation and Guidance

- 2.9** The ES has been prepared in accordance with applicable national and European Union (EU) legislation, the TWAO Rules and good practice guidance, including:
- Transport and Works Act 1992;
 - Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006;
 - EIA Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment (as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC) and codified by Directive 2011/92/EU (Ref.2-3);
 - A TWA Guide to Procedures (Department for Transport) June 2006 (Ref. 2-4);
 - Department of Environment, Transport and the Regions (DETR) Circular 02/99 Environmental Impact Assessment (Ref. 2-5);
 - Preparation of Environmental Statements for Planning Projects that require Environmental Assessment: Good Practice Guide, Department of the Environment (DoE) 1995 (Ref. 2-6);
 - Department for Communities and Local Government, June 2006; Environmental Impact Assessment: A Guide to Good Practice and Procedures - A Consultation Paper (Ref. 2-7);
 - Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Impact Assessment, 2004 (Ref. 2-8);
 - Office of the Deputy Prime Minister (ODPM) Environmental Impact Assessment: A Guide to Procedures, 2001 (Ref. 2-9); and
 - European Commission (EC), October 2012; Proposal for a Directive of the European Parliament and of the Council amending Directive 2011/92/EU on

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the Assessment of Effects of Certain Public and Private Projects on the Environment (Ref. 2-10).

EIA Methodology

- 2.10** The EIA has been prepared taking into account or having had regard to:
- Consultation with statutory and non-statutory consultees;
 - Local, regional and national planning policies, guidelines and legislation relevant to the design, TWAO and EIA process;
 - Environmental significance criteria;
 - The optioneering review and assessment of alternatives;
 - A review of secondary information, previous environmental studies and planning applications for the area, and publicly-available information and databases;
 - Solicitation of and response to expert opinion;
 - Physical surveys and monitoring;
 - Preparation of desk-top studies;
 - Monitoring and modelling (for example of the noise and air quality environments and transport effects); and
 - Current guidance and future, likely requirements in relation to London Underground Limited's (LUL) operations.
- 2.11** The EIA has considered the likely effect of the works on its neighbours, local environment, local transport, local and regional economy and the wider area. Beneficial and adverse, short and long-term (temporary and permanent), direct and indirect and cumulative effects have been considered.
- 2.12** The assessment methodology has taken into account relevant best practice methodology and known changes to the EIA Directive that are being considered (see Ref. 2-11). For example, the proposed changes include clearer requirements for the assessment of impacts on biodiversity, climate change, landscape and natural and man-made disaster risks (which would include, for example, flooding). These topics are covered in this ES in Chapters 14, 16, 15 and 12 respectively. The proposed changes will also make the consideration of alternatives to the development a mandatory requirement, where currently it is optional. This ES includes a detailed account of the alternatives considered by TfL, and the environmental considerations in the decision-making process. Whilst the changes to the EU Directive are unlikely to take effect until after 2016, the EIA methodology has given appropriate regard to these changes to ensure all relevant considerations have been taken into account.

Assessment of Effects and Defining Significance

- 2.13** This ES identifies and assesses the likely significant environmental effects of the NLE in relation to both demolition/construction and operational phases. Environmental effects have been evaluated with reference to definitive standards and legislation where available. Where it has not been possible to quantify effects, qualitative assessments have been carried out, based on available knowledge and

professional judgement. Where uncertainty exists, this has been noted in the relevant technical chapter.

- 2.14** EIA assesses environmental effects on resources and receptors, which are generally defined as follows:
- Resources are defined as features or items of 'environmental capital'; examples include heritage assets, aquifers, access routes and community facilities; and
 - Receptors comprise of the biophysical features of the environment including human beings, either individually or collectively, and other organisms, including habitats.
- 2.15** In a few cases these terms can be used interchangeably, an example being where potential effects of pollution would impact on a resource such as a water body, which would also be a receptor of the pollution (as well as being a pathway to organisms which would be considered receptors).
- 2.16** For consistency and to allow comparison between topics, the methodology described in this section will be applied where appropriate. It considers the sensitivity of receptors or the value of resources and the magnitude of the impact or change that is anticipated to be caused. The resulting effect is categorised from these elements as shown in Table 2-1.
- 2.17** For each topic area of assessment which utilises the methodology, the categories of receptor sensitivity (low to high) and magnitude of impact (low to high) will be appropriately described and defined.

Table 2-1 Classification of Effects

Sensitivity of Receptor	Magnitude of Impact		
	High	Medium	Low
High	Major	Major/Moderate	Moderate
Medium	Major/Moderate	Moderate	Moderate/Minor
Low	Moderate	Moderate/Minor	Minor

- 2.18** For some topics, the relevant professional bodies prefer approaches which only identify 'significant' or non-significant' effects (rather than a graded scale of significance). In these cases, major and moderate effects are usually regarded as significant, and minor effects as non-significant.
- 2.19** Where appropriate, the definition of resultant effect categories as shown in Table 2-1 – from minor to major will also be defined on a topic by topic basis. Where this is not practical or logical for a particular topic, the generic definitions as shown in Table 2-2 will be used to guide assessment.

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Table 2-2 Effect Definitions

Effect	Criteria
Major	Potentially associated with sites and features of national importance or likely to be important considerations at a greater than local scale. Major effects may relate to resources or features which are unique and which, if lost, cannot be replaced or relocated.
Moderate	These effects, if adverse, are likely to be important at a local scale and the cumulative effects of such issues may lead to an increase in the overall effects on a particular area or on a particular resource or receptor.
Minor	These effects may be raised as local issues and may be of relevance in the detailed design of the project.

2.20 Effects are also described as:

- Adverse – detrimental or negative effects to an environmental resource or receptor; or
- Beneficial – advantageous or positive effect to an environmental resource or receptor.

2.21 Where an effect is considered to be not significant or have no influence, irrespective of other effects, this is classified as negligible.

2.22 Following the classification of effects using this methodology, further consideration of whether an effect is significant and requires mitigation is carried out using professional judgement, but taking account of:

- The positive or negative nature of the effect;
- Whether the effect is permanent or temporary;
- The duration/frequency/likelihood of the effect;
- Whether the effect is direct or indirect; and
- Any secondary effects.

2.23 If mitigation is proposed, an assessment of the likely residual effect following mitigation is made using the same system to assess the effectiveness of the mitigation.

2.24 This approach is in accordance with the relevant guidance and good practice.

Scoping and Consultation

Scoping

2.25 Scoping forms one of the first stages of the EIA process and it is through scoping that the Local Planning Authorities (LPAs) and other Statutory Consultees are consulted on those environmental aspects that may be significantly affected by a development and, therefore, should be included in the scope of the EIA. Through scoping, the potential significance of effects associated with each environmental

aspect becomes more clearly defined, resulting in the identification of a number of priority issues to be addressed in the EIA.

2.26 A Scoping Report setting out the proposed scope of the EIA was submitted directly to the LBW, the LBL and the LBS in August 2010. A further route specific Scoping Report was submitted in May 2011. The 2011 Scoping Report, along with any information comprising a Scoping Response, is provided in *ES Volume II: Appendix A*.

Consultation

2.27 Views of statutory and non-statutory consultees serve to focus the environmental studies and to identify specific issues, which require further investigation. Consultation is also an ongoing process, which enables mitigation measures to be incorporated into the design, thereby limiting adverse effects and enhancing benefits.

2.28 Consultees involved in the evolution of the NLE design and assessment of environmental impacts are listed in the Consultation Statement (produced by TfL), which accompanies the TWAO application. This details the extensive consultation process undertaken through development of the NLE design and preparation of the TWAO application with both statutory and non-statutory consultees and the general public.

2.29 Of particular reference to the ES, the following consultation has occurred:

- Agreement with LBW, LBS, LBL and the City of Westminster Council over the cumulative impact strategy (provided in *Appendix A3 of ES Volume II*);
- Agreement with LBW, LBS and LBL over the locations for the representative views for the townscape and visual amenity assessment (see ES Chapter 15);
- Liaison and discussions with the Environment Agency (EA), Natural England (NE), English Heritage (EH) and the Port of London Authority (PLA), to get their views on the relevant aspects of the NLE.

Resources and Receptors

2.30 The EIA process has included the identification of resources and receptors/receptor groups likely to be impacted during the site preparation, excavation and construction phases and once the NLE is complete and operational. These resources and receptors/receptor groups, along with examples, are presented in Table 2-3.

Table 2-3 Receptors/Receptor Groups Potentially Impacted by the NLE

Resource/Receptor/Receptor Group	Examples
Local highway network	The local highway / road network and traffic along / adjacent to the route of the NLE.
Public transport network	Bus network and wider London Underground network etc.
Pedestrian and cycle network, safety and	Pedestrians, cyclists, the business

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Resource/Receptor/Receptor Group	Examples
amenity	community and tourists etc.
Neighbouring commercial properties and local businesses	Churches, community centres, hospitals and clinics, libraries, schools and colleges etc.
Existing local residents	Residents from local / adjacent residential properties, care homes, hospitals and clinics etc.
Demolition and construction workers	Demolition and construction workers of the NLE.
Archaeological assets	Subsurface archaeological deposits in the footprints of any proposed shaft and station locations.
Listed Buildings	Listed buildings such as Grade II* listed Battersea Power Station, Grade II listed Battersea Water Pumping Station, Grade II listed 3 Montford Place, Grade II listed Old Town Hall (former Church of England Children's Society), Grade II* listed Prince Consort Lodge at the entrance to Kennington Park etc.
Underlying Geology and Hydrogeology	Ground conditions including the shallow and deep groundwater aquifers.
Water resources	Shallow groundwater, deep groundwater, surface water (e.g. River Thames), extractions etc.
Existing utilities and infrastructure	Subsurface Thames Water Ring Main, subsurface existing Northern and Victoria LU tunnels, Network Rail assets, UKPN cable tunnel, the Thames Water Heathwall Sewer (new line) and the South-west Storm Sewer etc.
Local views, townscape character and Conservation Areas	Kennington Park (a registered Historic Park and Garden and Local

Resource/Receptor/Receptor Group	Examples
	Nature Reserve), Kennington Park Conservation Area, Kennington Green (covered by the London Squares Preservation Act), Hanover Gardens, Kennington Green Conservation Area, St. Mark's Conservation Area, The Oval Cricket Ground. No London View Management Framework (LVMF) views affected.
Local amenity areas and community facilities	Kennington Park, the lodge in the north eastern corner of the park (hereafter referred to as Kennington Park Lodge), Kennington Green.
Local businesses etc.	Banham Security Ltd, Sainsbury's, Covent House (head office of the Covent Garden Market Authority), C&C Fruit Co Ltd, Battersea Dogs and Cats Home, Beefeater Gin Distillery etc.
Ecology	Trees, bats, birds, invertebrates, the River Thames, its foreshore ecology and its status as a Site of Metropolitan Importance for Nature Conservation (SMINC).

Temporal Scope

- 2.31** The approach to assessment is to evaluate the environmental effects of the NLE at key stages in its construction and operation. The environmental effects can then be compared to the situation prevailing before demolition and construction is commenced (this is referred to as the current baseline) and to the situation that would prevail in the future without the NLE (i.e. the future projected baseline, which is referred to as the 'Without NLE' scenario).
- 2.32** The current baseline year is generally taken as 2012 since this is the period in which the majority of the baseline work for the EIA was undertaken. A wide range of information about the existing environment has been obtained from observations made on-site, field surveys, information provided by stakeholders and desk based information. This allows the existing environmental resources present to be identified and evaluated.
- 2.33** In order to establish the future baseline, a number of assumptions regarding the level of development which is likely to come forward within the Vauxhall Nine Elms

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Battersea Opportunity Area (VNEB OA) (Ref. 2-11) have been made. These assumptions are dependent on whether the NLE is implemented or not and can be considered as 'With or Without the NLE' development scenarios.

2.34 The 'Without NLE' scenario assumes that all of the consented schemes (as set out in the cumulative assessment and listed in Table 2-5 within VNEB OA) are built out according to their planning consents as of January 2013, with the exception of specific phases of Battersea Power Station. Battersea Power Station includes a Grampian Condition which means that only Phase 1 (Development Zone RS-1) becoming open to the public, or it being demonstrated that the NLE would be open to the public before Phase 1 is occupied. The remaining phases of the development therefore cannot come forward under the current consent without the NLE. The number of homes and estimated population and jobs expected under this scenario is set out in Table 2-3.

2.35 The environmental effects of the NLE, once operational, are assessed at two points in the future as follows:

- At the point of NLE opening, which is assumed to be Q1 of 2020); and
- At 2031, when the NLE would be operating at standard capacity, and the TfL programme of Transport Network Upgrades has been realised.

2.36 There are two potential scenarios considered under the 2031 'With NLE' scenario; 'Scenario A' and 'Scenario B'. 'Scenario A' assumes the development of all the consented schemes as per their planning consents in January 2013, including all phases of Battersea Power Station, i.e. the provision of the NLE 'releases' the remainder of the power station development. 'Scenario B' assumes the same level of development as considered in 'Scenario A' but also includes provision for development on other sites within VNEB which have yet to come forward with a planning application or are part of the Over Site Development (OSD) at the stations that would only come forward with the NLE. A number of these sites are currently in pre-application stage but many are at the western end of the Opportunity Area, where public transport accessibility levels without the NLE are at their lowest. Development assumptions have been made for these sites by applying similar development densities to those that have been consented on other VNEB sites of similar size and location to estimate the number of homes and commercial floorspace which could come forward. It is considered unlikely that these sites would come forward at these assumed densities without the NLE due to the limited transport accessibility. If they were to come forward before or without the NLE it may reduce the level of housing and employment capacity of these sites, or lead to unsustainable travel patterns. To assess the likely significant effects of the NLE it is necessary for reasonable assumptions to be made in respect of the predicted levels of development at 2031. Therefore for the purposes of this assessment 'Scenario B', as defined above, is used for the assessments in the subsequent chapters and is referred to as the 'With NLE' scenario hereinafter.

2.37 The numbers of homes and estimated population and jobs assumed under these 'Without NLE' and 2031 'With NLE' scenarios are set out in Table 2-4.

2.38 It should be noted that the 'With NLE' scenario is defined in a narrow way, in that all those schemes could be lawfully developed without the NLE, whether or not developers have applied for permission in the expectation that the NLE will be delivered.

Table 2-4 Development Scenarios

Scenario	Residential Units	Population	Gross Employment	Net Additional Employment
Without NLE	12,778	22,647	15,215	9,822
2031 With NLE Scenario A	15,197	28,442	28,301	22,908
All consented Development as of January 2013				
2031 With NLE Scenario B	18,365	34,366	29,238	23,845
All consented development plus remaining sites yet to come forward				

Limitations

2.39 The EIA has been subject to the following limitations:

- Baseline conditions are accurate at the time of the physical surveys but, and due to the dynamic nature of the environment, conditions may change during the site preparation, excavation, construction and operational phases;
- The extent of ground investigation carried out is appropriate to the stage of design development. Further ground investigation will be undertaken as appropriate prior to construction commencing; and
- The assessment of cumulative effects relies on the availability of information on proposed and consented developments.

Structure of Technical Chapters

2.40 The technical chapters generally follow a common structure and format and the contents of each section are outlined below.

Introduction

2.41 This section of each technical chapter outlines the format and scope of the assessment presented within the chapter and identifies the author.

Planning Policy

2.42 Within each topic chapter, the relevant national, regional (London-wide) and local planning policy context is presented.

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Methodology and Basis of Assessment

2.43 This section of each technical chapter describes the approach taken to the assessment, including the surveys/studies undertaken to determine the baseline conditions and the procedure followed to assess impacts and effects. Topic specific significance criteria and the standards/guidance from which they are derived are explained and definitions of minor, moderate and major (adverse or beneficial) and negligible effects given. In addition, this section of each technical chapter defines the 'Basis of Assessment' and highlights any assumptions made and any limitations of the assessment.

Baseline Conditions

2.44 In order to assess the potential impact of the works, it is necessary to determine the environmental conditions that exist across the study area (which itself is specific to each technical aspect of the EIA). These are known as 'baseline conditions'. As explained in the section on Temporal Scope, the baseline conditions are described for the existing situation (in most cases taken as 2012 since this is the time at which much of the baseline studies were undertaken) and, where relevant, the situation that would prevail in the future without the NLE in the place for both 2020 (the assumed year of opening) and 2031 (when the NLE will be operating at standard capacity, and the TfL programme of Transport Network Upgrades has been realised).

2.45 Within the topic chapters a description will be provided of the main resources and receptors within the study area together with an evaluation of their status, value and/or sensitivity.

Impact Assessment and Mitigation

2.46 This section of each technical chapter identifies the likely environmental effects arising as a result of the works during site preparation, excavation and construction and once the NLE is complete and operational. For the purposes of the EIA, it has been assumed that on commissioning of the NLE, the new underground line will run at a limited service frequency, but will become fully operational with full service frequency by 2031.

2.47 This section also describes the mitigation measures that the TWAO will implement to reduce or eliminate adverse effects and enhance beneficial effects. Where appropriate for construction effects, reference is made to the Code of Construction Practice (CoCP) which is provided in *ES Volume II: Appendix N*. Part A of the CoCP provides a more general range of mitigation; with Part B to be completed once a Contractor is appointed (which will provide more detail on mitigation, such as site-specific Construction Environmental Management Plans).

2.48 A table showing the mitigation measures proposed is presented in *Chapter 18: Mitigation, Residual Effects and Conclusions*.

Residual Effects and Conclusions

2.49 This section sets out those effects remaining once mitigation measures are in place for both the site preparation and construction phase and for the completed operational NLE. The section ends with a conclusion as to the overall nature of effects on identified resources and receptors.

Cumulative Effects Assessment

2.50 In accordance with the TWAO Rules, the ES has given consideration to 'Cumulative Impacts'. Two types of cumulative impact have been considered:

- 1) The combined impacts of several development schemes which may, on an individual basis not be significant but, cumulatively, may have a significant effect. These are impacts that result from incremental changes caused by other reasonably foreseeable works or developments, together with the NLE; and
- 2) The combined effect of individual impacts, for example noise, airborne dust or traffic on a single receptor (in combination effects).

2.51 The Strategy for Cumulative Impact Assessment, as described in 1) above, is presented in *ES Volume II: Appendix A: Scoping* and has been discussed and agreed with the LBL, LBW and LBS (as well as the City of Westminster Council). It describes what topics are subject to cumulative impacts, and sets out what will be considered. For construction effects, there are a number of other major schemes (i.e. those referable to the Mayor of London) which are understood to be known to be coming forward for planning, planning applications have been submitted, have full planning consent or a resolution to grant consent or schemes under construction located within 1km of the site centreline. The location of these schemes in relation to the site centreline is shown on Figure 2-1, and a description provided in Table 2-5. For the purposes of this assessment, those schemes under construction now, are anticipated to be complete by the time construction commences for the NLE.

2.52 For operational impacts, the cumulative scenario will be the year of opening, which assumes those developments listed in Table 2-5 will be complete by 2020. It also assumes any other transport schemes and improvements (including works on the London Underground network) programmed for completion by 2020 will be so.

2.53 For the future year (2031), two development scenarios have been considered: Scenario A, where all consented development as of January 2013 is completed; and Scenario B, which includes all consented as of January 2013 plus remaining sites yet to come forward within the VNEB OA.

2.54 The results of the assessment of cumulative effects with other developments are presented within each of the technical chapters 6-16.

2.55 As outlined in 2) above, the assessment will also consider potential in combination effects at particular sites due to any incremental potential effect arising which may be associated with more than one different topic effect. In combination effects arise (at a site) as a result of several other (different types of) effects acting together. Individually, these may not be significant, but the accumulation of different effects may give rise to an overall significant effect.

2.56 The in combination effects assessment is presented in *Chapter 17: In Combination Effects Assessment* of this ES.

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Table 2-5 Description of Cumulative Schemes and Current Planning Status

Map Ref	Cumulative Scheme	Description of Scheme	Status ^{Note1}	Anticipated Construction Phasing
1	Battersea Power Station, Wandsworth 2009/3575, 2009/3576, 2009/3577 and 2009/3578 also accompany	The redevelopment of the site will create 3,400 new homes (private and affordable), 160,000 sq m of new office space, 56,000 sq m of retail and cover 9 hectares of public realm. Subsequent applications (and approvals) for demolition and repair to ancillary areas (including towers, jetty and pumping station).	Application Approved	Q4 2012 – Q2 2019 Peak year 2017.
2	Wah Kwong House, 10 Albert Embankment, Lambeth 11/00909/FUL	102 bed aparthotel together with restaurant and penthouse residential units.	Application Approved	Q3 2012 - Q4 2014 Peak year 2013.
3	1 Glyn Street, Lambeth 07/01681/FUL	The development involves the demolition of the existing warehouse and office building and redevelopment of the site for affordable residential accommodation comprising 69 units with a mix of 1, 2 and 3 bedroom self contained units, in a ground plus six storey building. The proposal also included a retail/café unit at ground floor.	Application Approved	Under construction. Assumed complete by Q4 2013
4	Riverlight, Tideway Industrial Estate 2011/3748	Redevelopment to provide a residential led mixed use development of six buildings between 12 and 20 storeys (plus 2 basement levels) comprising 806 residential units. Also to provide flexible commercial uses, retail, restaurant, healthcare and leisure facilities.	Application Approved	Under construction. Assumed complete by Q1 2015.
5	Hampton House, 20 Albert Embankment 07/04264/FUL	Construction of a 27 storey building with one 24 and one 13 storey building to provide a 167 room hotel, 242 residential units, 77 of which will be affordable, and ground floor retail.	Application Approved	Q1 2013 - Q4 2014
6	St George Wharf and Vauxhall Tower 11/00855/FUL 03/01501/FUL	A 93,000 sq m mixed use scheme overlooking the River Thames at Vauxhall Bridge. The development comprises luxury apartments, retail units, offices and restaurant units, as well as a proposed health/fitness facility. A residential tower rising to 50 floors above ground, 180metres (590 feet) with 200 apartments and incorporating a wind turbine on the roof to power the internal lighting of the building.	Application Approved	Under construction. Completed by Q1 2014.
7	Kennington Oval 07/0459/FUL	Replacement of the existing Surrey Tavern and Lock, Laker and Peter May Stands and other minor associated buildings/structures to create a new plaza and the erection of a six-storey stand incorporating 1,632 additional spectator seats, hospitality and ancillary facilities, together with the erection of a new five-storey building with set back roof plant containing a 168 bedrooms hotel with top floor restaurant fronting Kennington Oval, and incorporating basement car park for 57 spaces, together with the erection of a new two-storey ticket/security office and turnstile system with associated landscaping and infrastructure.	Application approved	Q1 2018 – Q4 2019

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Map Ref	Cumulative Scheme	Description of Scheme	Status ^{Note1}	Anticipated Construction Phasing
8	Parliament House, 81 Black Prince Road 08/04454/FUL	The 11,150 sq m scheme contains a total of 101 flats, including private for sale, social rented and affordable housing, as well as 1,770 sq m of commercial development within its street scale podium base.	Application Approved	Q1 2014 – Q4 2015
9	Land on south side of Nine Elms Lane incorporating Ponton Road (US Embassy) 2009/1506 2012/2759 (reserved matters)	Redevelopment of an area of 2.15 hectares to provide a new US Embassy to a maximum height of 97m. Associated buildings and new access road.	Application Approved	Q2 2013 - Q4 2017
10	Embassy Gardens, land to south of Nine Elms Lane comprising DHL Depot and 1-12 Ponton Road and 51 Nine Elms Lane 2011/1815	Outline application for demolition of all existing buildings and construction of a mixed use development comprising 9 building plots, with buildings up to 23 storeys and maximum overall floorspace of 263,030sqm GEA. Provides residential units, financial/professional services, café/restaurant/bar, car showroom, office, hotel, community and leisure space.	Application Approved	Under construction (demolition only) Phase 1 between 2013 – 2017, other Phases to follow (assume up to Q1 2020).
11	Vauxhall Sky Gardens (143-161 Wandsworth Road) 09/04322/FUL	Redevelopment for residential-led mixed use purposes comprising a part-3, part-6 and part-36 storey building (120 metres high) to provide 239 residential units, 4,722 sq. m. of commercial (B1 office) floorspace, 257 sq. m. of retail or community floorspace, amenity space and new vehicular access.	Application Approved	Q2 2013 – Q2 2015
12	Thames Tunnel, Kirtling Street Worksite. No planning ref.	Construction work and permanent structures required to operate the main Thames Tunnel. The site would be used to drive the of the main tunnel in two directions to Chambers Wharf and to Carnwath Road Riverside and would be used to temporarily store and then off-load excavated material.	Application pending	Q1 2016 – Q1 2023 Peak construction year 2016
13	Post Office Depot, South London Mail Centre, Nine Elms Lane (Parkside) 2011/2462	Outline planning application for demolition of existing buildings and construction of a mixed use redevelopment comprising 7 buildings up to 23 storeys and maximum overall floorspace of 222,120 sq m.	Application approved	Q1 2016 – Q4 2023 Peak construction year 2017
14	New Covent Garden Market 2011/4664 12/00289/OBS (Lambeth Observation record)	In total the application seeks outline consent for 426,874 sq m of development which will deliver modern new market facilities and a new food centre for London, paid for by developing homes, shops, commercial space, a hotel and public open space on parts of the site not needed for the new market.	Application approved	Q1 2014 –Q2 2023 Peak construction year 2016.
15	Sainsburys 62 Wandsworth Road London 11/02326/OUT	Part detailed, part outline application for demolition of existing retail store and petrol station allowing for replacement retail store and additional services, retail and residential units with ancillary units arranged in seven blocks including towers of 19, 28, and 37 storeys, with associated retail, residential parking spaces, cycle spaces, open space, children's play space, landscaping and public realm improvements. Outline planning for flexible floorspace and dwellings.	Application approved	Q1 2012 – Q1 2019 Peak Construction year 2015
16	Eastbury House 30 - 34 Albert Embankment	Demolition of the existing building and the erection of a part 14, part 21, part 28 storey building to provide a mixed use scheme incorporating: ground floor	Application approved	Q2 2013 – Q2 2015

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Map Ref	Cumulative Scheme	Description of Scheme	Status ^{Note1}	Anticipated Construction Phasing
	12/01768/FUL	cafe/retail unit (A1/A3) and public piazza, office accommodation (B1) and 48 residential units, together with basement car and cycle parking and plant equipment.		Peak construction year 2014
17	8 Albert Embankment, London Fire Brigade Headquarters 10/04473/FUL	Demolition of the brigade workshop/office buildings to the rear of the fire station. Construction of 7 new buildings ranging in height from 5 to 15 storeys for mixed use purposes... The development would provide a total of 276 residential units, a 2,721 sq m fire station, 8,554 sq m of commercial floorspace (use Class B1), 696 sq m of retail/A Class floorspace and 161 car parking spaces.	Under appeal, new application pending	Q2 2013 – Q2 2015 Peak construction year 2014
18	Island Site Vauxhall Cross 10/02060/FUL	Erection of two towers, Tower A rising to 41 storeys (approx 140m) and Tower B rising to 32 storeys (approx 115m), plus 4 basement levels below ground; to provide a mixed use development comprising 291 residential units (made up of 225 market units, 42 socially rented, 42 intermediate, which makes 23% of the units affordable, 663 sq m of floorspace for food and drink commercial uses, 2,162 sq m of floorspace for employment commercial uses, a 179 room hotel and 1,371 sq m of floorspace for community facilities/ assembly and leisure (consisting of a dentist surgery, a soft play facility and a digital cinema/ performance space).	Application approved	Q2 2013 – Q4 2016 Peak construction year 2015
19	CLS Vauxhall Square 11/04428/FUL	Demolition of existing buildings (except for the listed buildings on site) to provide a mixed use scheme comprising eight blocks ranging between 6, 9, 11, 16, 21, 26, 48 and 50 storeys, which include 604 dwellings, 14,722sqm Gross Internal Area (GIA) of new office floor space (B1), 3047sqm GIA of A1-A5 retail, 438 bedroom hotel (C1), 40 bedroom replacement homeless hostel (sui generis), 416 student rooms (C1), new multi-screen cinema (D2), 1167sqm GIA Gym (D2), associated basement car parking and servicing; new public square and children's play area and associated public realm improvements.	Application submitted	Q1 2015 – Q4 2019 Peak construction year 2017
20	30-60 South Lambeth Road 11/04181/FUL	Redevelopment of the existing site to provide a 32 storey mixed-use building comprising new leisure uses (swimming pool & gymnasium) and 572 units for student residential accommodation. Provision of refuse and cycle storage, disabled parking and associated landscaping.	Under construction	Q3 2012 – Q4 2014 Peak construction year 2013
21	Spring Mews, Vauxhall Walk 11/04510/FUL	Redevelopment of 2-16 (evens) Tinworth Street and 100-110 Vauxhall Walk to provide a mixed use scheme comprising a range of buildings up to 8 storeys in height; providing a 120 bedroom hotel (4,706sqm GIA), student accommodation and associated support facilities including 399 student bedrooms (13,141sqm GIA), a convenience retail store (346sqm GIA), a series of small business units (use class B1 - totalling 467sqm GIA) a replacement community centre (561sqm GIA), associated basement servicing area, new public realm, public realm improvements and disabled parking.	Application approved	Q4 2012 – Q1 2015 Peak construction year 2013
22	Battersea Plant, Nine Elms Lane Goods Yard, Cringle Street 2012/0764	Redevelopment and consolidation of the site will involve the demolition of the existing concrete plant, conveyor gantry, aggregate storage bins and related structures, construction of replacement concrete plant, aggregates storage facility and ancillary office units, hardstanding and landscaping and redesign of the	Application approved	Q2 2013 – Q4 2014. Peak construction year 2014

02 EIA Methodology

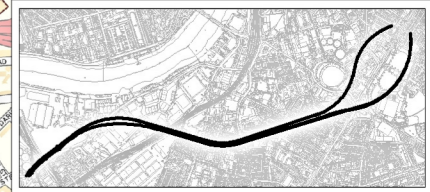
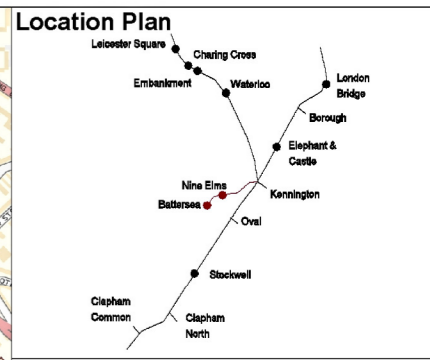
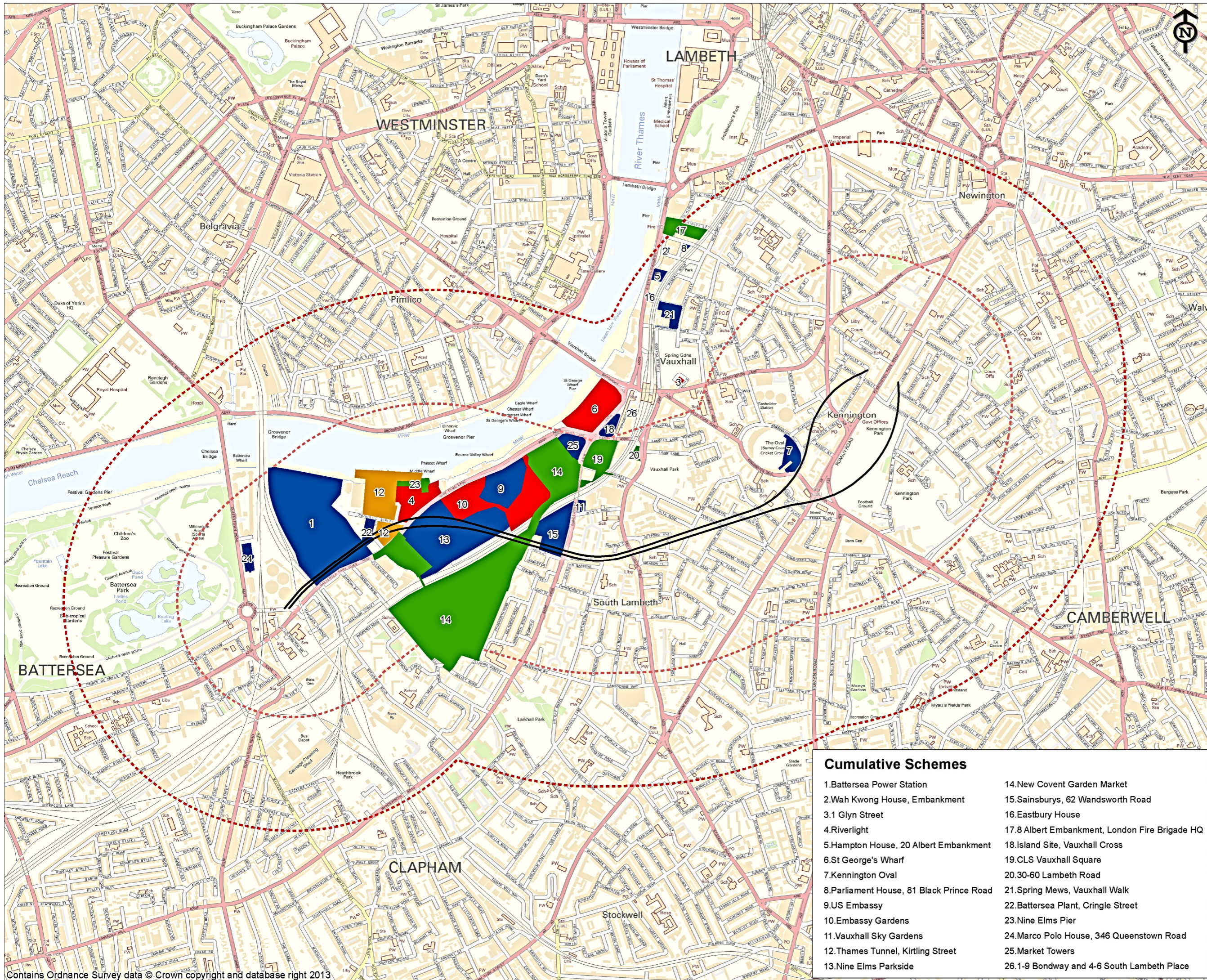
Map Ref	Cumulative Scheme	Description of Scheme	Status ^{Note1}	Anticipated Construction Phasing
		access.		
23	Nine Elms Pier 2011/1928	Demolition of the existing pier and erection of a new marina to provide permanent moorings for up to 33 houseboats and moorings for up to 2 visitor boats; including construction of a single storey ancillary structure on the marina to provide studio, office, storage and utilities space with a landscaped roof terrace above. [REVISED SCHEME - Amendments include: revised arrangement of the boats, a reduction in the number of permanent moorings from 37 to 33, relocation of impact protection barriers].	Application submitted	Q3 2013 - Q1 2023 Peak construction year 2015
24	Marco Polo House, 346 Queenstown Road 2011/2089	Demolition of existing building. Erection of two new buildings of up to 17 storeys and 15 storeys high to provide 456 residential units and 1,257 sq.m. of commercial floor area comprising of office (B1 & A2), retail (A1) and cafe/restaurant (A3) uses, together with new pedestrian link and vehicular access, basement car and cycle parking, landscaping, excavation works and servicing.	Application approved	Q4 2014 – Q4 2021 Peak construction year 2016
25	Market Towers 2012/0380	Demolition of existing buildings and structures. Erection of two new buildings of 58 storeys (up to 200m above ground) and 43 storeys (up to 161m above ground) high to up to: 77,548 sq.m. of residential floorspace (up to 491 units); 721 sq.m. of retail uses; 10,986 sq.m. of office space; 11,617 sq.m. hotel; provision of private and public open spaces; vehicular access and reconfigured vehicular access routes; provision of cycle, motorcycle and car parking, servicing and energy centre within two level basement; landscaping; excavation works; and other associated works.	Application approved	Q4 2014 – Q4 2020 Peak construction year 2016
26	1-9 Bondway and 4-6 South Lambeth Place 10/03151/FUL	Redevelopment of the site involving the demolition of the existing buildings and the erection of a 6 storey building (plus lower ground floor level) to provide a hotel comprising of 148 bedrooms (Use Class C1) with ancillary bar/ restaurant facilities along with commercial floorspace at ground floor level in either Use Classes A1 (retail), A2 (financial and professional services), A3 (restaurants and cafes), A4 (drinking establishments) and formation of roof level plant [Amended Plans]	Application approved	Q1 2014 - Q1 2016. Peak construction year 2015

Note 1: The planning status of the cumulative schemes was understood to be correct as of January 2013

02 EIA Methodology

References

- Ref. 2-1 The Stationary Office (1992); Transport and Works Act 1992
- Ref. 2-2 DfT (2006); Transport and Works (Applications and Objections Procedure) (England and Wales) Rules
- Ref. 2-3 EIA Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment (as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC and codified by Directive 2011/92/EU)
- Ref. 2-4 A TWA Guide to Procedures (Department for Transport) June 2006
- Ref. 2-5 ODPM; Note on EIA Directive for Local Planning Authorities (1999 EIA Regulations)
- Ref. 2-6 Department of Environment, Transport and the Regions (DETR) (1999); Circular 02/99 - Environmental Impact Assessment
- Ref. 2-7 DoE (1995); Preparation of Environmental Statements for Planning Projects that require Environmental Assessment: Good Practice Guide
- Ref. 2-8 Department for Communities and Local Government (DCLG) (June 2006); Environmental Impact Assessment: A Guide to Good Practice and Procedures - A Consultation Paper
- Ref. 2-9 Institute of Environmental Management and Assessment (IEMA) (2004); Guidelines for Environmental Impact Assessment
- Ref. 2-10 Office of the Deputy Prime Minister (ODPM) (2001); Environmental Impact Assessment – A Guide to Procedures
- Ref. 2-11 European Commission (EC) (October 2012); Proposal for a Directive of the European Parliament and of the Council amending Directive 2011/92/EU on the Assessment of Effects of Certain Public and Private Projects on the Environment
- Ref. 2-12 Mayor of London (2012); Adopted Vauxhall Nine Elms Battersea Opportunity Area Planning Framework



- Key:**
- Track Alignment
 - 1km Buffer
 - 500m Buffer
 - Borough Boundary
- Planning Status as of December 2012**
- Under Construction
 - Granted
 - Submitted
 - Other Cumulative Scheme

Cumulative Schemes

1. Battersea Power Station	14. New Covent Garden Market
2. Wah Kwong House, Embankment	15. Sainsburys, 62 Wandsworth Road
3. 1 Glyn Street	16. Eastbury House
4. Riverlight	17. 8 Albert Embankment, London Fire Brigade HQ
5. Hampton House, 20 Albert Embankment	18. Island Site, Vauxhall Cross
6. St George's Wharf	19. CLS Vauxhall Square
7. Kennington Oval	20. 30-60 Lambeth Road
8. Parliament House, 81 Black Prince Road	21. Spring Mews, Vauxhall Walk
9. US Embassy	22. Battersea Plant, Cringle Street
10. Embassy Gardens	23. Nine Elms Pier
11. Vauxhall Sky Gardens	24. Marco Polo House, 346 Queenstown Road
12. Thames Tunnel, Kirtling Street	25. Market Towers
13. Nine Elms Parkside	26. 1-9 Bondway and 4-6 South Lambeth Place

Client: **Transport for London**

URS

Project: **NORTHERN LINE EXTENSION TO BATTERSEA TWAO FOR TfL**

Drawing: **LOCATION OF CUMULATIVE SCHEMES AND CURRENT PLANNING STATUS**

Subtitle: **S4 FORMAL ISSUE TO CLIENT**

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

Drawing Scale: 1:15,000 @ A3

Drawing No: **Figure 2-1** Revision: **01**