SILVERTOWN TUNNEL

Volume 7

7.4 Design Principles

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April 2016

MAYOR OF LONDON

TRANSPORT FOR LONDON
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Silvertown Tunnel

Design Principles

7.4

Planning Act 2008

Infrastructure Planning

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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List of Abbreviations

BAP	Biodiversity Action Plan
CABE	Commission for the Built Environment
DAS	Design and Access Statement
DBFM	Design, Build, Finance, Maintain
DCO	Development Consent Order
DLR	Docklands Light Railway
EAL	Emirates Air Line
EIA	Environmental Impact Assessment
EPB	Earth Pressure Balance
ES	Environmental Statement
GLA	Greater London Authority
NN NPS	National Networks National Policy Statement
PINS	Planning Inspectorate
SS	Slurry Shield

SUDS	Sustainable Urban Drainage Systems
TBM	Tunnel Boring Machine
TLRN	Transport for London Road Network
UDL	Urban Design London

Glossary of Terms

Contractor	Anyone who directly employs or engages construction workers or manages construction work. Contractors include sub-contractors, any individual self-employed worker or business that carries out, manages or controls construction work.
Design Review Panel	Transport for London has set up an independent design review panel, administered by Urban Design London, to provide design assurance throughout the design process. The panel will focus on the above ground elements of the Silvertown Tunnel. The panel will provide consistency through the life of the design process; ensure that the design principles are applied appropriately and that the eventual built design is of an appropriate quality.
Detailed Design	The design that defines precisely the works that are to be constructed to meet the specified outputs.
Development Consent Order (DCO)	This is a statutory order which provides consent for the project and means that a range of other consents, such as planning permission and listed building consent, will not be required. A DCO can also include provisions authorising the compulsory acquisition of land or of interests in or rights over land which is the subject of an application. http://infrastructure.planninginspectorate.gov.uk/help/glossary-of-terms/
Docklands Light Railway (DLR)	An automated light metro system serving the Docklands and east London area. The DLR is operated under concession awarded by Transport for London to KeolisAmey Docklands, a joint venture between transport operator Keolis and infrastructure specialists Amey plc.
Emirates Air Line (EAL)	A cable car service for pedestrians and cyclists across the River Thames in east London, linking the Greenwich peninsula to the Royal Victoria Dock. The service is managed

	by TfL, and is part of the TfL transport network.
Earth Pressure Balance (EPB) Tunnel Boring Machine	A type of tunnel boring machine used in soft ground. The machine uses the excavated material to balance the pressure at the tunnel face. Pressure is maintained in the cutter head by controlling the rate of extraction of spoil through the removal Archimedes screw and the advance rate of the machine.
Illustrative Design	An example of how the proposals could be developed at the next stage of design as a result of engagement with the DBFM contractor, planning authority and other relevant stakeholders. This is an example of how the Scheme may look, but it is not the final design.
Launch Chamber	A cofferdam or other underground space created to commence bored tunnel construction using a TBM.
Mode share	The percentage of trips or people using a particular mode of transport. Also referred to as mode split.
Project Company	A Project Company is typically a consortium of private sector companies, formed for the specific purpose of providing the services under a private finance contract. This is also technically known as a Special Purpose Vehicle (SPV). The Project Company will obtain funding to design and build the new facilities and then undertake routine maintenance and capital replacement during the remainder of the contract period. The total contract period is typically 30 years. The Project Company will repay funders from payments received from TfL during the post construction period of the contract. Receipt of payments from TfL will depend on the ability of the Project Company to deliver the services in accordance with the output specified in the contract.
Roads Task Force Street	The Roads Task Force (RTF) is an independent body set up by the Mayor of London in 2012 to tackle the challenges facing London's streets and roads. The RTF proposed a

Types	'street family' of nine Street Types, in which streets are defined by significance of their 'movement' and the intensity of their 'place'. TfL are working with the London boroughs to classify the network according to this new family of Street Types.
Semi-Natural Habitat	Generally considered to be any naturally occurring vegetative habitat that has been affected by human actions, and includes most, if not all, habitats in the UK
Service Building, Tunnel Service Building, Portal Building	The building housing all control, power supply, and other essential equipment for the operation of the tunnel. Also houses firefighting control and ventilation equipment. Serves as a maintenance base and has the facility to become a standby operations room.
The Scheme	The construction of a new twin-bored tunnel with cut and cover sections at either end under the River Thames (the Silvertown Tunnel) between the Greenwich peninsula and Silvertown, as well as necessary alterations to the connecting road network and the introduction of user charging at both Silvertown and Blackwall tunnels.
Slurry Shield (SS) Tunnel Boring Machine	A form of soft ground closed face tunnel boring machine which is selected in certain types of ground containing sands and gravels, and where high groundwater pressures exists. The chamber containing the TBM cutter head is filled with pressurised slurry which applies pressure to the excavation face. The slurry acts as a ground support and transport medium for the excavated material, which is continuously circulated between the TBM and a slurry treatment plant, where the excavated material is separated out for disposal or reuse.
Streetscape Guidance	TfL Streetscape Guidance provides a standard for London's streets and spaces for those who will be working on or affecting London's streets. All works on the Transport for London Road Network must adhere to the guidance provided. A copy of the guidance can be found at : https://tfl.gov.uk/streets-toolkit

Transport for London (TfL)	A London government body responsible for most aspects of the transport system in Greater London. Its role is to implement transport strategy and to manage transport services across London. These services include: buses, the Underground network, Docklands Light Railway, Overground and Trams. TfL also runs Santander Cycles, London River Services, Victoria Coach Station and the Emirates Air Line. As well as controlling a 580km network of main roads and the city's 6,000 traffic lights, TfL regulates London's private hire vehicles and the Congestion Charge Scheme.
The Tunnel, Silvertown Tunnel	Proposed new twin-bore road tunnels under the River Thames from the A1020 in Silvertown to the A102 on Greenwich Peninsula, East London.
Tunnel Boring Machine (TBM)	A machine used to excavate tunnels with a circular cross section. There are two main types of closed face TBMs: Earth Pressure Balance (EPB) and Slurry Shield (SS). Please see glossary for further explanation.
Tunnel Portal	A structure created which defines the end of a section of tunnel.

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1. INTRODUCTION

1.1 Purpose of this report

1.1.1 This document contains the Design Principles as stated in the Design and Access Statement (DAS) (Document Reference 7.3). It is presented as a separate document to enable it to be a certified document for the purposes of the DCO. As such it should be read alongside the DAS.

1.1.2 The purpose of this document is:

1. To define Design Principles which set the framework within which, through the DCO, the detailed design of the Scheme will be required to respond; taking account of the sites' rapidly changing context and contractor-led innovation.
2. To provide sufficient design information for the purposes of the Environmental Impact Assessment (EIA) of the Scheme and to enable essential measures for the mitigation of the significant effects to be identified.
3. To provide stakeholders with assurance that their reasonable requirements and aspirations for the Scheme infrastructure (including the road, landscape, portal buildings and associated buildings and structures) will be met.
4. To set out TfL design related commitments made in response to public consultation and ensure that these are followed through to detailed design.
5. To demonstrate how TfL will continue to take account of the criteria for good design set out in policy in order to ensure that the Scheme is as sustainable and as aesthetically sensitive, durable, adaptable and resilient as it can reasonably be. This policy includes the National Road and Rail Networks: National Policy Statement (the NN NPS) and other relevant TfL, Greater London Authority (GLA) and local policies as defined in the DAS.

1.2 Design assurance

1.2.1 The Design Principles sit within the Design Assurance Framework described in the DAS. This includes the Design Principles, Illustrative Designs and Silvertown Tunnel Design Review Panel.

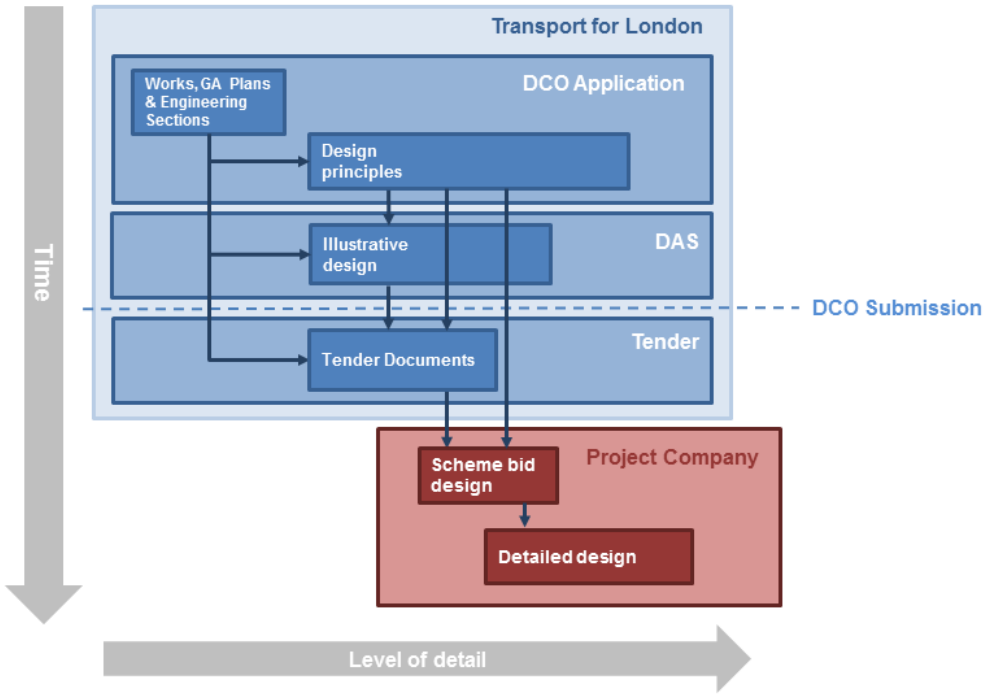
1.2.2 The Design Principles apply within the framework provided by the General Arrangement Plans, Works Plans, Engineering Section Drawings and Plans included within the application for development consent. They provide sufficient details of the design intent while allowing for appropriate flexibility to develop the detailed designs of the Scheme prior to its construction.

1.2.3 The Design Principles should be read in conjunction with the Illustrative Design presented in the Design and Access Statement. The Illustrative Design provides an example of how the Scheme could be developed to comply with the undertaking and requirements within the DCO whilst adhering to the Design Principles.

1.2.4 TfL has set up an independent design review panel, administered by Urban Design London (UDL), to provide advice on the design of the above ground elements throughout the design process. The panel will provide consistency through the life of the design process; ensure that the Design Principles are applied appropriately and that the eventual built design is of an appropriate quality. The Terms of Reference of the Silvertown Tunnel Design Review Panel can be found in Appendix A.

1.2.5 Each of the above elements sits within the design process as shown in Figure 1-1.

Figure 1-1 Design Process



1.3 Design Vision

1.3.1 The design vision for the Scheme sets the high level design aspirations for the above ground elements. The vision sets the context in which the Design Principles have been developed and the strategic goals that they are seeking to achieve. The principles in turn define measureable ways in which the achievement of the vision can be assessed.

1.3.2 The vision is that the Scheme should incorporate:

- ***High quality and appropriate architecture.*** Good architecture and urban design should reconcile the project with its environment by creating structures and associated facilities that respond to their context. The aspiration is to create simple, well-conceived infrastructure and buildings with a clear design rationale that reflect the purpose of the infrastructure but pay careful attention to their context. The design quality of the Scheme should significantly contribute to the overall appearance, reputation and impact of infrastructure projects and how they can benefit society as a whole. The building's appearance should tell us something about what purpose it serves, its importance to the area and what goes on inside. The new tunnel, its portals and ancillary buildings should be integrated, as far as reasonably possible, with

existing infrastructure and land uses, enable future change that is consistent with policy and be flexible in order to integrate with uncertain or undefined future change. The architecture of the Scheme should enable the Scheme to be celebrated and become an object of local, regional and national pride.

- ***Built in reliability, robust materials and detailing.*** High quality materials and careful detailing should limit the need for maintenance and allow the Scheme to weather and age well over the full life of the project. This cannot be achieved without appropriate, carefully chosen and installed materials. To be reliable, the Scheme and its design must be easily maintainable in order to maximise its availability to users. Maintainability must be designed into the Scheme from the outset and cover all modes of movement through the tunnel and in the adjacent areas. This includes continuity of the use of the tunnel by vehicles and the ability of pedestrians and cyclists to move along routes in the local area easily and safely at all times, as far as practical. The requirement to maximise availability extends to ensuring the continued availability of existing infrastructure during the construction of the Scheme.

- ***Integrative landscape design*****.** The landscape design associated with the Scheme including planting and public realm should enhance its use, its setting and mitigate the visual impact of the road, portal and buildings along with any impacts of the associated traffic. The landscape design should create a sense of place and enable the public realm to be accessed and used by all in a safe and meaningful way that supports the local area. It should support the creation of consistent and coherent pedestrian and cycle networks that are fit for today and the future. The planting should protect and enhance biodiversity, including the creation of spaces remote from human activity that can become valuable habitats for a wide range of flora and fauna. The planting should also humanise the infrastructure by softening its appearance and helping to integrate it into its context.

- ***Sustainability through design.*** Aspects of the Scheme's buildings are likely to change their use over their lifetime, as will the technologies they contain. The design of these structures should be flexible, able to accommodate changing requirements without major alterations, and be adaptable so that they can be altered or extended conveniently when necessary. Where possible, building materials should be locally sourced, reclaimed, recycled and have low carbon impact. The site development strategy should accommodate biodiversity, landscape

planting and Sustainable Urban Drainage Systems (SUDS). The strategy should seek to remove or reduce where possible the environmental impact of traffic and highway infrastructure on workers and residents, be resilient to climate change, and enable the provision of sustainable public and private road transport.

- ***Safe, secure and smart infrastructure.*** The Scheme should meet the needs of all categories of road users enabling them to use the Scheme and the areas impacted by it safely. It should optimise traffic flows and create a safe environment for road construction, working and maintenance, including incorporation of safe road crossings at all times. The Scheme should result in a safer environment for all users of the local area. The critical nature of the infrastructure means that the design should be secure, resilient and designed to meet the latest counter-terrorism guidance.

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2. DESIGN PRINCIPLES

2.1 Introduction

2.1.1 The Design Principles that follow will be applied to guide the detailed design of the Scheme in accordance with the Design Vision. The Illustrative Design as presented in the DAS shows one example of how these Design Principles can be incorporated into the Scheme.

2.2 Landscape

2.2.1 The landscape design of the Scheme covers public realm, walking, cycling and planting. The landscape design objectives of the Scheme are to:

- enhance pedestrian and cycle provision and connectivity around the portal area including access to the EAL;
- provide access to Tunnel Service Buildings, where required;
- contribute to place-making and enhance the character of the area;
- minimise land take and optimise future development potential of adjacent sites; and
- provide appropriate protection and enhancement of the biodiversity of the area.

2.2.2 This should be achieved by adhering to the following Design Principles:

Table 2-1 Landscape

Reference	Landscape Design Principles
LSCP.01	The detailed design of the Scheme should adhere to TfL Streetscape Guidance and London Cycle Design Standards.
LSCP.02	The detailed design of the Scheme should incorporate the Roads Task Force Street Types. The appropriate type for each street should be identified through discussion with the host boroughs.
LSCP.03	The detailed design of the Scheme should be developed with reference to relevant guidance on

	safety and security, including Secured by Design, Design Council CABE guidance and the Centre for the Protection of National Infrastructure and National Counter-Terrorism Security Office's Protecting Crowded Places design guidance.
LSCP.04	The detailed design of the Scheme should seek to improve access for pedestrians and cyclists, taking account of local community needs, whilst being functional, practical and economical. It should help to create a legible street network that promotes walking and cycling, and defines spaces through public realm not highways.
LSCP.05	Footways should be an adequate width and achieve an appropriate Pedestrian Comfort Level as defined in TfL's Pedestrian Comfort Guidance for London.
LSCP.06	Public realm materials should be robust, durable and meet the technical requirements of the Scheme. Materials should relate to and reflect the anticipated and emerging character of the surrounding townscape and be suitable for a high quality mixed use development.
LSCP.07	The public realm design should promote interaction with existing and proposed developments.
LSCP.08	Any formal cycle or car parking spaces affected by the works should, where practicable, be re-provided to an equivalent standard.
LSCP.09	The placement of trees should help to reinforce public realm design elements such as: • strengthening movement patterns; • connecting spaces and providing visual continuity across them; • aiding reinforcement of space and boundaries; • providing character and sense of space; • enhancing architectural elements; and • screening of visually unattractive vehicles.

LSCP.10	The placement of trees should be located to consider; • street signs and signals; • proximity to buildings and carriageway; • appropriate footway width; • underground and overhead utilities; and • accessibility for future maintenance.
LSCP.11	Where trees are planted in a streetscape setting, the exact volume of soil required should be calculated depending on ultimate size of the tree, water availability and ground water storage. Large tree pits should be provided to maximise tree size and growth potential in order to increase the tree's access to space and light and reduce the potential for vandalism. The tree planting should take account of standards and guidance that are presented in the Silvertown Tunnel Biodiversity Action Plan (BAP) in the Environmental Statement (ES) Appendices (Document Reference 6.3).
LSCP.12	The detailed design of the Scheme should ensure green infrastructure assets are properly planned, maintained and managed by relevant arboriculture and landscape professionals; with a strategic goal to enhance the built environment and tackle climate change. Wherever possible, green infrastructure should: • improve air quality and human health; • manage surface water run-off; • mitigate the urban heat island effect; • increase biodiversity and ecosystem variety; and • add amenity value through creating beautiful streets and spaces for people to enjoy.

2.3 Integration of Permanent Structures

2.3.1 There are three common component parts to the Scheme at each end of the tunnel and these comprise:

- Portal Structure including retaining walls;
- Tunnel Services Buildings housing mechanical, electrical and fire suppression accommodation; and
- Tunnel Services Compound sited within operational land and containing the services buildings and providing parking for operational and maintenance vehicles.

2.3.2 These elements may be physically separate or combined in a number of configurations subject to the detailed design of the Scheme portals and the emerging third party masterplan proposals adjacent to them.

2.3.3 A head house is also required at each portal. These should be located directly above the TBM launch chambers.

2.3.4 This should be achieved by adhering to the following Design Principles:

Table 2-2 Integration of Permanent Structures Design Principles

Reference	Integration of Permanent Structures Design Principles
PRBD.01	The detailed design of the Scheme should allow for a range of development scenarios to be realised in the future. The detailed design of the Scheme should avoid creating constrained development sites or under utilised open space.
PRBD.02	The building layouts should facilitate the development of adjacent sites that are of high design quality and should secure long term place-making.
PRBD.03	Where public realm is adjacent to the edge of the operational compound, portal buildings should, where practicable, be used to edge the compound rather than fences. In these cases the exposed façades should create a meaningful relationship with the space.
PRBD.04	Where required, compound boundary fences and walls should be of high quality and suitable for their context and adjacent uses.

PRBD.05	The Tunnel Services Compounds and Tunnel Service Buildings should be minimised as far as possible without compromising operability and safe access to the equipment for maintenance and replacement.
PRBD.06	In order to minimise the footprint of the portal buildings, the water tanks should be located below ground where practicable.
PRBD.07	Where applicable, the new buildings and structures should have a Scheme wide common and recognisable architectural language that is also capable of responding to the site specific contexts in which they are located.
PRBD.08	The new buildings and structures should be of high quality architectural design, making the function of the buildings clear and signifying their importance to the area. Buildings should, where practicable, be located over the portal and have appropriate architectural treatments that are fully integrated into their design. Where practicable and appropriate all buildings and the portal should be combined into a single structure.
PRBD.09	The design of buildings should consider their appearance from multiple viewpoints; particularly from the road by vehicle users, the public realm of cyclists and pedestrians, as well as the occupants of nearby buildings.
PRBD.10	High quality and robust building materials should be used in the Scheme construction to limit the need for maintenance. Materials that reflect the value of the portal structures as civic buildings should be used. Local materials and traditional building methods should inform the detailed design of Scheme buildings where appropriate.
PRBD.11	Where an adjacent site masterplan has been prepared and approved by the statutory planning process, the detailed design of the Scheme proposals should seek to integrate with the masterplan design where practicable and without prejudice to its functionality. Where masterplan proposals on adjacent land have been

	approved, TfL and the Project Company should endeavour to work with stakeholders where reasonably possible and appropriate to ensure the optimal integration of the Scheme with adjacent development.
PRBD.12	The detailed design of the portal and ancillary buildings should be developed with reference to relevant guidance on safety and security, including Secured by Design, and in particular, the section describing 'Resilient Design For Counter-Terrorism'.
PRBD.13	The detailed design of the portal and ancillary buildings should be developed such that all routine maintenance of the buildings can be undertaken from ground level and without the need to close the Silvertown Tunnel.
PRBD.14	Tunnel head houses are to be designed so that they can be incorporated into future structures or standalone in open space, as required.

Silvertown Portal

2.3.5 The detailed design of the new tunnel portal at Silvertown should have regard to the need to coordinate in design terms with emerging adjacent future uses such as the Thames Wharf DLR station, mixed-use redevelopment and associated landscaping.

2.3.6 This should be achieved by adhering to the following Design Principles:

Table 2-3 Silvertown Portal Design Principles

Reference	Silvertown Portal Design Principles
SILPO.01	If it is found that locating ancillary buildings and uses adjacent to the tunnel portal would impede the optimum development of adjacent development sites, the possibility of locating buildings and other uses under the Silvertown Way slip road should be explored. This would be subject to appropriate access, maintenance, safety and security requirements.
SILPO.02	The detailed design of the tunnel portal and buildings should

	facilitate high quality pedestrian and cycle links between Royal Victoria DLR station and the proposed Thames Wharf DLR station.
SILPO.03	The detailed design of the tunnel portal and buildings should not compromise the existing link under Silvertown Way (at the south of the site) from the Royal Docks to Dock Road and the proposed Thames Wharf DLR station.
SILPO.04	The detailed design of the approach road and portal structure should not prevent the future construction of a foot and cycle bridge by a third party at a later date over the portal approach in between Dock Road, Silvertown Way and Tidal Basin Roundabout.
SILPO.05	The detailed design of the portal structure should not prevent the future provision of an environmental canopy by a third party over the portal at a later date, in order to provide additional visual screening of the road. This would require all appropriate permissions and additional air quality modelling.

Greenwich Portal

2.3.7 The detailed design of the new tunnel portal at the Greenwich Peninsula should have regard for emerging future uses; mixed-use redevelopment and associated landscaping on the Greenwich Peninsula.

2.3.8 This should be achieved by adhering to the following Design Principles:

Table 2-4 Greenwich Portal Design Principles

Reference	Greenwich Portal Design Principles
GREPO.01	The massing of any built development above the new portal on the Greenwich Peninsula should: • actively contribute to the high quality pedestrian environment on Millennium Way through a high quality elevational treatment that lends interest to and animates the local street scene; and • not intrude into the footway on Millennium Way or impede the planting of trees (by others) along the kerb line.

GREPO.02	The location of the portal building should not impede views significantly from Edmund Halley Way westwards to the River Thames.

2.4 Boord Street Pedestrian and Cycle Bridge

2.4.1 The replacement Boord Street pedestrian and cycle bridge should be of a design and alignment that facilitates easy and safe navigation across the A102 and provide an attractive route that helps to overcome the existing severance created by the road. The detailed design of the bridge should consider potential future change in the area and the likely impact of this change on the number of users of the bridge.

2.4.2 This should be achieved by adhering to the following Design Principles:

Table 2-5 Boord Street Pedestrian and Cycle Bridge Design Principles

Reference	Boord Street Pedestrian and Cycle Bridge Design Principles
BRDFB.01	The approaches to the bridge should be designed to take into account all committed regeneration proposals on adjacent sites and pay due consideration to emerging proposals.
BRDFB.02	The approaches and central span should be structurally independent to allow modification of the stairs and ramps at a later date. This could facilitate improved pedestrian and cyclist movement and integration with adjacent development sites subject to all appropriate permissions.
BRDFB.03	The bridge should be aligned with Boord Street visible from Millennium Way.
BRDFB.04	The bridge should be fully accessible for cyclists and pedestrians, and meet TfL standards.
BRDFB.05	The bridge should be designed for the predicted level of usage based on the traffic generation of known committed developments and should consider the impact of emerging regeneration proposals.

BRDFB.06	The bridge should be designed in such a way that a step free access route is maintained during construction and operation.
BRDFB.07	The bridge and approach structures should not compromise fire service access and egress to the existing Studio 338 or Brenntag Site.
BRDFB.08	The central span should have no intermediate supports.
BRDFB.09	The bridge should be designed as a landmark structure, optimising and signalling its importance as the link between the east and west sides of the Greenwich peninsula.
BRDFB.10	In developing the detailed design for the bridge access ramps, thought should be given to shielding the ramp approach, in part, from the A102 Blackwall Tunnel Approach Road and the accompanying high volumes of traffic.
BRDFB.11	The detailed design of the Scheme should enable the bridge to be constructed and maintained without need to close the critical highway link that it crosses. In developing the detailed design of the bridge, careful consideration should be given to the selection of materials, their finishes and the manner in which they are assembled, such that maintenance is minimised.

2.5 Sustainability & Environment

2.5.1 The Scheme should ensure sustainability in the five themes of the TfL sustainability toolkit: economic progress; climate change; safety and security; quality of life; and transport for all. The sites are located in a highly urbanised industrial environment and habitats across the site are generally of poor quality, though are subject to high levels of pressure in terms of biodiversity loss due to development.

2.5.2 This should be achieved by adhering to the following Design Principles:

Table 2-6 Sustainability and Environment Design Principles

Reference	Sustainability & Environment Design Principles
SUEN.01	Where feasible the design of buildings permanent structures should consider the inclusion of low zero carbon technology such as solar photovoltaic panels to reduce carbon emissions

	resulting from operation of the Scheme.
SUEN.02	The detailed design of the Scheme should ensure that the species selected for the permanent landscaping should be native and of local provenance and opportunities to introduce brownfield habitat should be maximised. All landscaping should be designed in accordance with the Biodiversity Action Plan (BAP) in the Environment Statement Appendices (Document Reference: 6.3)
SUEN.03	Opportunities to introduce Green Infrastructure design including biodiversity roofs and sustainable living walls should be considered within the building design and Scheme landscaping.
SUEN.04	All habitats that cannot be replaced on site should be offset to ensure there is an overall net gain in biodiversity. The loss has been monetised through Natural Capital Valuation and should be provided offsite in accordance with the Scheme specific BAP in the Environment Statement Appendices (Document Reference: 6.3)

2.6 Public Art

2.6.1 Public art can add value to the urban environment, and the Scheme could provide opportunities to deliver a range of types of public art in a way that integrates the infrastructure into the public realm and engages with the local communities. Such opportunities should be considered during the detailed design of the Scheme.

2.6.2 This should be achieved by adhering to the following Design Principles:

Table 2-7 Public Art Design Principles

Reference	Public Art Design Principles
PBRT.01	Public art should be considered part of the Scheme design process and as a means of engaging with the local community, encouraging a sense of ownership and belonging in the public realm.
PBRT.02	Consideration should be given to both temporary and permanent art.

PBRT.03	The integration of public art should be considered as part of any night-time functional lighting Scheme.
PBRT.04	Where barriers are required for noise or visual mitigation, they should be designed so that they could be used as a canvas for public art or for signage and safety measures

2.7 Advertising and Commercial Activity

2.7.1 Advertising and other commercial activity are increasingly important ways to raise revenue to support the delivery of transport schemes. This should be considered from the outset.

2.7.2 This should be achieved by adhering to the following Design Principles:

Table 2-8 Advertising and Commercial Activity Design Principles

Reference	Advertising and Commercial Activity Design Principles
ADCA.01	Any new advertising hoardings should be fully integrated into the design from the outset. Locations should be chosen considering their impact on the character of adjacent public realm and residential environments.
ADCA.02	Modern LED advertising screens should be dynamic in form.
ADCA.03	Advertising screens could also be used where appropriate as a canvas for public art.
ADCA.04	Structures should be designed to allow for integration with future buildings, such as oversite development.

2.8 Signage & Wayfinding

2.8.1 Wayfinding for pedestrians, cyclists and motorists is integral to transport infrastructure. Poorly sited signage can be a distraction and an obstruction to movement, and harm legibility of the road network.

2.8.2 This should be achieved by adhering to the following Design Principles:

Table 2-9 Signage & Wayfinding Design Principles

Reference	Signage & Wayfinding Design Principles
SGWF.01	Clear lines of sight should be maintained throughout pedestrian environments to maximise ease of accessibility, enhance network legibility and wayfinding, and reduce dependence on signage and auditory information
SGWF.02	The detailed design of the Scheme should avoid unnecessary traffic signage, especially where it would act as a roadside distraction or visibility hazard.
SGWF.03	Wayfinding signs do not always need to be illuminated by internal or external lighting, or use reflective materials.
SGWF.04	The Scheme design should provide wayfinding guidance to aid navigation and encourage people to walk, while aiming to minimise the total number of pedestrian signs to reduce clutter. Wayfinding signs should therefore: • be located where pedestrians start their journey and at key decision points and landmark destinations; • be located to minimise physical intrusion into the streetscape, but be sufficiently visible so as to serve their intended purpose; and • be local authority signs where pedestrian routes cross the Transport for London Road Network (TLRN).

2.9 Lighting

2.9.1 All highway lighting, including within the tunnel, should be in accordance with relevant design standards and guidance and use sustainable, energy efficient illumination throughout. Lighting should also be used to provide for personal safety and security including the illumination of cycleway and footways.

2.9.2 This should be achieved by adhering to the following Design Principles:

Table 2-10 Lighting Design Principles

Reference	Lighting Design Principles

LTNG.01	Wherever possible, lighting designs should adhere to TfL's Streetscape Guidance and should enhance night-time use, economy and enjoyment and provide safe passage for all users.
LTNG.02	The need for lighting to reduce the risk of accidents, help prevent crime and the fear of crime, should be balanced where practicable with the need to promote terrestrial and aquatic biodiversity.
LTNG.03	In pedestrian areas, dark patches and high light/dark contrasts should be avoided where they impair visibility.
LTNG.04	In order to reduce visual clutter, lighting should be integrated into seating, steps, walls, furniture and other similar design features where feasible to do so.
LTNG.05	Lighting units should be high quality and robust. The ease of their future maintenance should be a relevant consideration to the choice of detailed light fittings.
LTNG.06	Lighting units should be selected to be aesthetically appropriate and to limit light pollution, improve energy efficiency and to ensure equipment longevity.
LTNG.07	Notwithstanding the above requirements to reduce light pollution, lighting designs, wherever possible, should take into account the contribution made by lighting to create a sense of place, while complying with Streetscape Guidance or making an exception to the guidance where shown to be necessary.
LTNG.08	Lighting proposals should contribute to the legibility of the proposed streetscape with clear distinctions made between vehicle, cycle and pedestrian environments.
LTNG.09	Buildings should be made attractive and legible at night, their form highlighted and strengthened, by an intelligent lighting design. This should be the case particularly when viewed by drivers and passengers from the tunnel approach roads.

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Appendix A. SILVERTOWN TUNNEL DESIGN REVIEW PANEL TERMS OF REFERENCE

A.1.1 The Silvertown Tunnel Design Review Panel has been set up to provide design assurance throughout the Silvertown Tunnel design process. The design review panel is set up and administered by Urban Design London (UDL) and agrees to operate under the following terms of reference:

1. The panel will be administered by UDL and will remain independent at all times.

2. All panel members are responsible for declaring any conflicts of interest[1] or perceived conflict of interest; this may result in members leaving the panel.

3. The initial list of panel members is listed in A.1.2 below. The panel may be augmented by other design specialists as required upon agreement between TfL and UDL.

4. The panel will provide design review and assurance in respect of the above ground elements of the Scheme:
    a. the service buildings;
    b. portals structures, retaining walls and other structural highway infrastructure;
    c. landscape design, planting and terrestrial ecology; and
    d. urban realm including pedestrian and cycling provision.

5. TfL and the Project Company will take design proposals for the Scheme elements listed above to the Design Review Panel at the following stages:

    - prior to DCO examination;
    - prior to discharge of requirements; and
    - generally to advise on the implementation of the Design Principles.

[1] This could include any work undertaken by panel members for land owners or developers with an interest in the Silvertown Tunnel or work undertaken on behalf of consortia bidding for the tunnel contract

6. Panel sessions will be arranged at least four weeks in advance of the session.

7. A session pack will be circulated electronically at least one week before the session outlining the stage the project has reached, any additional constraints and the focus of the session. This will be summarised by TfL and the Project Company at the start of the session.

8. At certain points the panel may be asked to review material remotely. This process will be administered by UDL and panel members will be asked to provide comments within three days of receiving the material. Advance warning of the remote review will be given, where possible at least a week in advance.

9. The host boroughs are invited to send up to two representatives to observe any review sessions. If they choose to attend then one representative will be invited to make comments before the session starts but then act as observer during the session.

10. The panel's comments are not binding and should be treated as advisory only. TfL, the Project Company and the boroughs will at all times retain the responsibility to deliver and ensure good design regardless of the comments of the panel. As such, the borough will remain responsible for discharging any design related requirements of the DCO.

11. During the session the chair (as defined in appendix A.1.1 and appointed by UDL) will manage the debate. He/she will ensure that the Scheme is fully understood by the panel members and that the discussion is appropriate for the stage of the project and within the acknowledged constraints. The chair will also focus debate on the issues raised by the TfL, the Project Company and borough representatives, including the resolution of conflicting views. The chair will provide a short verbal summary at the end of the session.

12. UDL will prepare a brief note of the meetings which will record the discussion and suggestions made by the Panel. The note will be signed off by the chair and issued to TfL and the Project Company for distribution within four weeks of the meeting.

A.1.2 Initial list of Design Review Panel Members:

1.	Fred Manson	Chair
2.	Kathryn Firth	Publica
3.	Deborah Saunt	DSDHA
4.	Sam Richards	Crossrail Urban Integration
5.	Hiro Aso	Gensler
6.	Esther Kurland	Urban Design London
7.	Paul Dodd	Urban Design London